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International Conference on the International Oceanographic Data & Information Exchange in the Western Pacific (IODE-WESTPAC) 1999 - ICIWP '99

Pelangi Beach Resort, Langkawi, MALAYSIA
1-4 November 1999

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Fig.1 The Photo Session of ICIWP'99 on 3rd November 1999
at the entrance of Pelangi Beach Resort, Langkawi, Malaysia

1. INTRODUCTION

The International Conference on International Oceanographic Data & Information Exchange in the Western Pacific 1999 (ICIWP'99) was held in Langkawi, Malaysia from 1st to 4th November 1999. The Conference was aimed at bringing together scientists & data managers to discuss the many new challenges facing the International Oceanographic Data & Information Exchange (IODE) programme of the Intergovernmental Oceanographic Commission (IOC) in the region and to identify measures for increasing the effectiveness of the system.

The IOC of UNESCO organised the Conference in collaboration with the Japan Oceanographic Data Center (JODC) and the Oceanographic Research Coordination Committee of Malaysia. It was financially supported by the Nippon Foundation through the Marine Information Research Center (MIRC) of Japan, the Japanese Science and Technology Agency (STA) through the Japan International Science and Technology Exchange Center (JISTEC) and the Japan International Cooperation Agency (JICA). The Conference organizing structure is presented in Annex I.

The first two days of the Conference were dedicated to the presentations on oceanography and marine science activities in the region with a specific focus on data requirements, needs and products. The last two days were dedicated to a forum for an exchange of views and ideas on how the IODE centres can better respond to the needs of research programmes and other users of marine data. The Conference programme is attached in Annex II.

The Conference was attended by almost 130 participants from 14 countries. The List of Participants is given in Annex III. The photo of the conference participants is shown in Fig. 1 (page ii). There was considerable local interest in the Conference, with radio and newspapers reporting on the Conference. Copies of newspaper articles are included in Annex IV.

2. OPENING

ICIWP'99 was officially opened at 9am on the 1st November, 1999 by the Honourable Chief Minister of Kedah, Yang Amat Berhormat Tan Sri Dato' Seri Sanusi Junid at the Pelangi Beach Resort, Langkawi, Kedah, Malaysia..

Fadm. Mohd Rasip bin Hassan, Chairman of the National Commission for IOC of Malaysia, welcomed participants to the Conference on behalf of the organisers. He addressed the issue of oceanographic research in Malaysia and the importance of matching user requirements with data availability and collection as well as the need to review the data exchange system as we move into the next millennium. He suggested that the seminar and workshop would be of great value to all participants in helping them to understand the IODE system that aims to meet the needs of national and international marine communities.

As the IODE Regional Coordinator for WESTPAC, Mr Toshio Nagai was pleased that IOC adopted his proposal for ICIWP ‘99 at the fourth session of the IOC Sub-commission for the Western Pacific held in the Republic of Korea. He felt that it was necessary to hold a meeting to review and discuss the activities of IODE in the WESTPAC region with a view to determining future directions. He expressed his appreciation to the agencies supporting the Conference and to the International Organising Committee, the Scientific Advisory Board, the Local Organising Committee, and both the

International and Local Secretariats. He praised those involved for the successful coordination and preparation of the Conference.

Dr Iouri Oliounine, the Deputy Executive Secretary of IOC/UNESCO, expressed his appreciation to the local organisers and Government of Malaysia for hosting this critical meeting. He mentioned that IOC has focussed on promoting marine scientific investigations and ocean related services with the view to helping member states to learn more about the marine environment. The purpose of IOC is to coordinate and facilitate worldwide cooperation in research, monitoring and sustainable development in order to ensure that countries benefit from the science of oceanography and its application. Regionalisation is an important mechanism in achieving this goal. He looked forward to seeing the Conference proposing new mechanisms for making the IODE system more effective in the region and more able to cope with the increasing demands for oceanographic data and information.

Full texts of welcome addresses are given in Annex V.

With grace and good humour the honourable Chief Minister of Kedah talked about the need for managing the oceans. He raised concerns on the conflicting needs of resource exploitation and development with sustainability of marine ecosystems. He welcomed the efforts to improve the collection of data and exchange of information as this would contribute to governments making better decisions for the management of the seas at national, regional and global levels.

3. SEMINAR ON OCEANOGRAPHY AND MARINE SCIENCE

The Seminar provided an opportunity for scientists from the region to describe their specific needs for data and data products, and for data managers to describe the development of capabilities to improve access to marine data for all users. The Seminar was organised from 1st to 2nd November in parallel sessions covering 5 themes areas;

- SESSION 1: Coastal Environment – Data requirements, Needs and Products
- SESSION 2: Data Management Activities and Technical Developments
- SESSION 3: Living Marine Resources – Data requirements, Needs and Products
- SESSION 4: Global Climate Change and Regional Oceanography – Data requirements, Needs and Products
- SESSION 5: Marine Pollution – Data requirements, Needs and Products

A total of 56 papers and 8 posters were presented during the two-day seminar and 5 groups also exhibited their activities during the conference. The list of presentations is shown in Annex VI.

The presentations provided excellent overviews of marine science activities in various fields within the WESTPAC region and information on interesting technological innovations in data collection and management.

3.1 SESSION 1: COASTAL ENVIRONMENT – DATA REQUIREMENTS, NEEDS AND PRODUCTS

Prof. Dr Tetsuo Yanagi from Japan gave the keynote address on "Ocean Circulation in Coastal Waters". Prof. Yanagi addressed the significance of the transport of materials such as oil spills, nutrients and fish larvae. He talked about the problems of the long-term maintenance of mooring systems with current meters. The data accumulated from these moorings, particularly on sea surface wind and sea surface topography were very useful to estimate current fields in coastal areas. In his presentation he described the tidal phenomena in the South China Sea, the understanding of which resulted from analysing the available tide gauge and satellite altimetry data. The seasonal variation of the three-dimensional circulation in the region was determined using a diagnostic numerical model.

After the keynote address, 14 papers were presented in three different sub-sessions under this theme. Session 1A was chaired by Assoc. Prof. Hadibah Ismail from Malaysia. Prof. Yanagi chaired the session 1B and Dr Iouri Oliounine of IOC chaired Session 1C.

3.2 SESSION 2: DATA MANAGEMENT ACTIVITIES AND TECHNICAL DEVELOPMENTS

Mr Ben Searle, the Chairman of the IOC Committee on IODE presented the keynote paper entitled "Technical Developments in Marine Data Management". He spoke about the need for greater quantities of marine data to support a range of maritime activities including resource management, sustainable use, defence activities and policy development. Many of the requirements for data were driven by the requirements and obligations under the United Nations Convention on the Law of the Sea (UNCLOS) and by human impact and resource conflict issues in the coastal zones. Greater pressures were being imposed on data managers as a result of increases in the quantities of data collected by new instruments. Given this increased complexity the task of marine data management is now considered to be a scientific activity in its own right. He focussed on Internet-related technological developments and capabilities that would support future marine data management activities. These included databases capable of supporting spatial data and object data structures, data markup languages such as the eXtensible Markup Language (XML) and the extension of existing marine data management systems such as the Electronic Navigational Chart (ENC).

After the keynote address, 4 papers were presented in this session that was chaired by Dr Henry R. Frey.

3.3 SESSION 3: LIVING MARINE RESOURCES – DATA REQUIREMENTS, NEEDS AND PRODUCTS

Prof. Dr Makoto Terazaki from Japan gave the keynote paper for this session entitled "Utilisation of biological data for IODE system in the WESTPAC area". He highlighted the ongoing international projects in the WESTPAC area related to living marine resources such as NEAR-GOOS, HAB, GLOBEC, Global Coral Reef Monitoring Work, Bio-diversity and Large Marine Ecosystems.

He addressed the problems of biological data collection efficiency and accuracy (quality). The areas of concern included sampling, analysis, variability and complexity of marine biological data. In addition there is a shortage of specialists in managing biological data. The development and

application of new and advanced technologies, such as acoustic and optical instruments is anticipated to clear some of these problems in the future.

After the keynote address, a total of 6 papers were presented in two sub-sessions. These were chaired by Dr Kushairi Mohd Rajuddin and Prof. Dr Makoto Terazaki.

3.4 SESSION 4: GLOBAL CLIMATE CHANGE AND REGIONAL OCEANOGRAPHY – DATA REQUIREMENTS, NEEDS AND PRODUCTS

The keynote presentation was given by Dr Warren White from the Scripps Institute of Oceanography (USA). The title of his paper was "Global and regional ocean climate change and interannual to interdecadal timescales: Outstanding problems, global networks and products". Looking at interannual timescales, Dr White discussed El Niño, the Southern Oscillation, the Pacific North American pattern, the Antarctic Circumpolar Wave and the global ENSO wave within a global context. He also discussed the problem of understanding the interconnections of the atmosphere and the oceans. The interdecadal modulation in relation to the intensity and evolution of El Niño and Southern Oscillation was also examined. He highlighted some examples on how network design theory can be used to establish optimal data networks necessary to observe regional and global climate variability in the upper ocean.

After the keynote address, 10 papers were presented in three sub-sessions chaired by Dr Yutaka Nagata, Dr White and Assoc. Prof. Dr Nasir Saadon.

3.5 SESSION 5: MARINE POLLUTION – DATA REQUIREMENTS, NEEDS AND PRODUCTS

Prof. Dr Gil Jacinto from Philippines gave the keynote paper for this session, entitled "Exchanging data and information on marine pollution – Challenges and Issues". In his paper, Prof Jacinto addressed the problems of obtaining marine pollution data, their poor and inconsistent quality due to the non-standard procedures of data collection, equipment and reference materials. This was further complicated due to small volumes of internationally available data. Monitoring of contaminants is generally limited to near shore areas because this area is more accessible to laboratories, thereby limiting the spatial perspective of contaminant levels. He stressed that some of these difficulties can be resolved but others would require development of new approaches and cooperation of scientists who acquire data and share information.

Nine papers were presented in three sub-sessions chaired by Assoc. Prof. Dr Zubir bin Din, Prof. Dr Jacinto and Dr Mohd Kamil Abdul Rashid.

3.6 PANEL DISCUSSION

To complete the Seminar Session a panel discussion was held in order to clarify the needs for data and information to support the scientific research programmes and other user groups within the WESTPAC region. The Panel was chaired by Fadm Mohd Rasip Hassan, Chairman of National Committee for IOC of Malaysia, and consisted of:

- Mr Ben Searle, Director, Australian Oceanographic Data Centre (Chairman, IODE), Australia
- Dr Gil S. Jacinto, Marine Science Institute, University of the Philippines, Philippine

- Assoc. Prof. Hadibah Ismail, Director of Coastal & Offshore Engineering Institute, Universiti Teknologi Malaysia, Malaysia
- Prof. Dr Makoto Terazaki, Ocean Research Institute, University of Tokyo, Japan
- Prof. Dr Manuwadi Hungspreugs, Dept. of Marine Science, Chulalongkorn University, Thailand
- Dr Yutaka Nagata, Director of Marine Information Research Center, Japan
- Dr Iouri Oliounine, Deputy Executive Secretary IOC/UNESCO, France

The Chairman briefly summarised the seminar and then called upon Prof. Manuwadi Hungspreugs to initiate the discussions. She suggested that the seminar was a useful mechanism to help strengthening marine science research and infrastructure in WESTPAC countries. She suggested that IODE activities needed to be better known and IODE procedures be put into practice. While several countries had established National Oceanographic Data Centres (NODC), many developing countries of the region such as Thailand had been discussing establishing an NODC for more than 20 years. Prof. Hungspreugs said that while Thailand had undertaken some IOC/IODE activities in the last few years, many of these were affected by economic problems. Prof. Hungspreugs expressed hope that the Panel Discussion would help making strong recommendations, developing an action plan to improve national marine data management infrastructure, establishing focal points and ensuring that they are effectively linked with the IODE programme.

The Chairman then invited Dr. Oliounine to share his experience with countries in the WESTPAC region regarding the establishment of NODCs. Dr. Oliounine explained that the IOC/WESTPAC Committee was one of the most advanced regional bodies of the IOC and was performing well. Developed countries were often helping the less developed countries in this region. Dr. Oliounine described unsuccessful attempts by Malaysia, Indonesia and Thailand to establish NODCs. This was partially due to the fact that the IOC mission to the region, organized in the eighties, had not succeeded in convincing governments of these countries of the value of establishing NODCs. However, recently Malaysia has established a Designated National Agency (DNA), located within the Hydrographic Department of the Royal Malaysian Navy. Dr. Oliounine reminded the participants that IODE provides a considerable level of support to the countries that are member states of IODE. This support is provided free of charge and includes the provision of publications, training programmes, software and CD-ROMs containing ocean data. He also reminded the participants that NODCs need to be active at both national and international levels, providing access to data for users inside as well as outside their own country and supporting the goodwill and cooperation between member states.

The Chairman then invited the chairpersons of the seminar sessions to summarize the challenges and needs that were expressed at each session. The following conclusions were made:

COASTAL ENVIRONMENT

- There is an increasing need for data from the coastal zone;
- High quality, reliable data is needed to support decision making and to provide an input into numerical models for Coastal Zone Management;
- There is recognition that information on the data held by various agencies is needed;
- There is a need for strong interaction between oceanographers and engineers in relation to the collection, management and application of data, and for the transformation of data into

information that leads to creation of decision support tools. There is a need to establish communication between scientists and engineers with the decision makers;
- Effective data exchange is essential for scientific community and decision makers;
- Data is important for modellers to support calibration and provide initial and bounding conditions;
- The Gulf of Thailand Project is not only a scientific venture, but also an opportunity to create a network of observation sites, which may be an input to GOOS. The project also strengthens cooperation between countries in the region;
- There is an urgent need to improve national and regional infrastructures for marine research, monitoring, data collection and management. The highest priority and support should be given by the Governments of the region in meeting this need;
- Data relevant to the region but collected by countries outside the region should be made available.

LIVING MARINE RESOURCES
- Many factors need to be considered in relation to biological data management, such as the technical aspects of data sampling, analysis, variability of marine biological data, as well as a shortage of experts in biological data management. These factors influence the accuracy and availability of data. The session identified the need for standardisation of plankton sampling as a priority.

GLOBAL CLIMATE CHANGE and REGIONAL OCEANOGRAPHY
- There is a recognition that improved climate prediction would benefit the region;
- There is a need for long time series data in order to observe the global warming effect within the region;
- For regions dominated by monsoons a good knowledge of the wind fields is necessary;
- More data is needed and there is a need to better organize existing available data, including satellite data;
- New technologies are needed for combining physical, biological and chemical data sets;
- Metadata and other directory systems are important since although there is a view that a ‘lot of data’ exists, there is little knowledge of the location of the data;
- There is a need for greater cooperation and expansion of NEAR-GOOS focus from physical oceanographic data to including other data parameters.

MARINE POLLUTION
- Problems of insufficient and poor quality data for marine pollution research were noted;
- There is very little standardisation in pollution data acquisition methods, instruments, data validation and exchange;
- It is suggested that IODE promotes the development of data and information exchange methods on this field;
- A mechanism to establish this ‘link’ is to form a ‘virtual data centre’ between a few data holders in each country;
- The importance of regional programmes for promoting quality control standards is stressed. These programmes should complement each other.

Following the comments of the sessions Chairs some other significant points were raised:

- Prof. Dr Ali Hassan offered the assistance of the Office of Naval Research in facilitating collaboration between scientists in the region and their United States counterparts.
- Dr. Iouri Oliounine commented that the accuracy and reliability of marine data and also the 'price' of data are very important issues for users. The IODE policy of "free and open exchange of data" is strongly recommended. He informed the participants of the World Intellectual Property Organization (WIPO) position regarding the issue of data commercialisation. The position of WMO, IOC and ICSU is to protect the existing free and open data exchange principle of IODE.
- The attachment of metadata to data sets provides a mechanism for assessing the quality of that data. IODE needs to ensure that detailed metadata is available with each data set.
- Mr Ben Searle elaborated on some aspects of his presentation, specifically on the concept of a Virtual Data Centre (VDC). He suggested the establishment of a group to oversee the development of a marine version of the eXtensible Markup Language (XML). This proposal was strongly supported.

The Panel discussions resulted in the identification of a number of issues that need to be addressed by the IODE community. Some of these issues include:

- Better tools to assist with data integration;
- Tools to assist in increasing the awareness and access to marine data – such as metadata directories and inventories;
- The need to increase the flow of data from a scientist to data centres to better support national interests;
- The need to increase the profile of IODE with both scientists and governments;
- The need to establish data standards and protocols to improve data quality, improve the standardisation of data collection, processing, data management and exchange activities;
- The importance of rescuing data through the IODE Global Oceanographic Data Archaeology and Rescue Project (GODAR);
- The need to increase communication between scientists and data managers on issues of common interest;
- The need to provide data and products in a timely manner to policy makers especially those responsible for environmental management;
- The need for a marine data management infrastructure based on Internet technologies, specifically XML.

The Panel discussion concluded at 5 pm after the Chairman Fadm Mohd Rasip suggested to the participants of the Seminar that they should work towards improving the IODE system in the region with a focus on the issues outlined above. He also invited the participants to continue their discussions in the workshop to be held over the next two days. Details of the seminar recommendations are given in Annex VII.

4. WORKSHOP ON IODE ACTIVITIES IN THE WESTPAC REGION

4.1 OPENING AND ADMINISTRATIVE ARRANGEMENTS

The Workshop was held on the 3rd and 4th of November and focussed on the activities of the IODE programme within the Western Pacific region. Mr. Ben Searle, as the IODE Chairman chaired the workshop with assistance from Dr. Iouri Oliounine. Mr. Searle outlined the objectives of the workshop and requested that the participants develop some specific recommendations for submission to IODE XVI to be held in mid 2000. To provide basis for discussion, invited speakers gave presentations on a range of topics. These are in Annex VIII.

4.2 STATUS OF OCEANOGRAPHIC DATA AND INFORMATION EXCHANGE - NATIONAL AND INTERNATIONAL PROJECTS OPERATING IN THE WESTPAC REGION

Dr Oliounine gave an overview of the International Oceanographic Data and Information Exchange (IODE) programme. He informed the participants that a fundamental principle of IODE was the data exchange policy that provided for free and open access to data without charge. IODE 's objective is to create a technologically advanced data management system including data and information processing and distribution systems aimed at providing a wide range of products and services.

Today the IODE System is comprised of 10 Responsible National Oceanographic Data Centres (RNODC) as well as 58 National Oceanographic Data Centres (NODCs) and Designated National Agencies (DNAs). Dr. Oliounine then described the major changes in the international political arena that were impacting on IODE, including the end of the cold war, the Earth Summit and the Conventions on Biodiversity, Climate Change and UNCLOS. He described how these events have lead to the creation of a number of global scientific research and observing programmes including IGBP, GOOS and WOCE. These activities created new challenges for IODE. A number of the IODE success stories including GODAR, GTSPP, ODINAFRICA and the IODE Resource Kit were mentioned, which had been implemented to support the new needs. He said that data quality was important, as was the requirement to submit data within a year of collection. A number of remaining shortcomings existed including the time delays in submitting data, incompleteness of databases, the lack of metadata, poor information services and a low awareness of IODE activities. Dr. Oliounine then indicated other challenges facing IODE, including how to cope with the increases in the volumes of data, increases in data complexity and the needs for multi-disciplinary data sets. Finally, Dr. Oliounine proposed that to address these challenges there were expectations on member states to:

- Establish IODE Focal Points;
- Participate in the activities and contribute resources to IODE planning and implementation;
- Increase support for existing ocean observing & data management systems;
- Increase support for new data management technologies; and
- Increase support for capacity building or TEMA-type of activities.

Mr Searle then presented his view of the future of IODE. The profile of the marine environment has been significantly raised by the progress with the ratification of UNCLOS and other related initiatives including the many oceans related conventions. These are raising the importance of

marine data management. To address this, IODE must strengthen its capabilities at national levels and must provide a supporting framework among the NODCs at the international level. IODE also needs to be more proactive, taking responsibility for international marine data management issues, and address the issue of marine data standards. In order to address these challenges, IODE should work in the following areas:

- Improve cooperation among data centres to reduce duplication of effort, and to ensure that a broad range of data such as coastal and pollution data, are managed;
- Improve linkages with activities of scientific research groups such as WOCE, intergovernmental programmes and with relevant commercial communities;
- Develop marine data standards and data management and exchange applications based on Internet technologies such as XML;
- Develop data management tools and products; and
- Develop a strategy for the future direction of IODE in the new millennium.

Dr. Henry Frey provided an overview of the status of US NODC/WDC-A activities. He informed the Workshop that US-NODC operates the World Data Centre-A for Oceanography that is a core component of the IODE system. US-NODC also participates in, and supports many international projects including the World Ocean Circulation Experiment (WOCE) and the Joint Global Ocean Flux Study (JGOFS). US-NODC has also provided training for personnel from foreign oceanographic data centres. Recently, access by users to online data has increased substantially, especially from the commercial sector.

Mr. Toshio Nagai presented the results of a survey he undertook on the IODE activities in the member states of the WESTPAC region. A questionnaire was distributed to 23 WESTPAC countries through the national IODE contacts, and responses were obtained from 12.

The results of the survey indicated that a number of countries within WESTPAC are interested to cooperate with IODE activities and to support the IODE programme. Some members pointed out difficulties within NODC operations related to budgets, personnel and data formatting issues. The survey indicated that it was important for National Oceanographic Committees to plan the establishment of NODCs at an early stage and to seek assistance through official development programmes to support the establishment of NODCs and to overcome some of the problems mentioned above.

Mr. Toshio Nagai then reported on the North-East Asian Regional GOOS (NEAR-GOOS) project, operated by China, Republic of Korea, Japan and Russia. When NEAR-GOOS started, Japan managed the databases. Now China, Korea and the Russian Federation have started to develop their own NEAR-GOOS databases. The 4th Coordinating Committee Meeting, consisting of representatives from all participating countries and some IOC staff, was held in Japan on September1999. The Committee reviewed the inter-sessional activities and discussed the future plans. The main themes for the future included promotion of NEAR-GOOS, cooperation with other related projects, increasing a number of users, inclusion of chemical and biological data into the databases and development of forecasting technology for describing ocean condition. To support NEAR-GOOS data management activities JODC is organizing the IOC/WESTPAC training course on NEAR-GOOS Data Management every year since 1998.

Dr. Anond Snidvongs from the Southeast Asia START Global Change Regional Center (SEASTART RC), Thailand, provided a summary of activities of SEASTART RC and related programmes. He indicated that SEASTART had benefited from funding support for cruises, workshops and training programmes. The IOC had assisted in the establishment of the data centre. The scientific issues being addressed included developing an understanding of the three-dimensional circulation of the Gulf of Thailand and the associated sediment transport (pollution, fisheries); the response of coastal oceanography to global climate change and coastal & land-based pollution, coastal eutrophication and harmful algae blooms. The centre has access to comprehensive temperature and salinity data, maintains a good archive of chemical and biological data and has good boundary conditions from the monitoring programme. He concluded that there was a need for more collaboration with regional initiatives of UNEP, remote sensing programmes and hydrology. More understanding was needed of the clients needs, regional data exchange protocols, access to data and links to other disciplines. Dr. Snidvongs suggested a regional project on data management with IODE.

Fadm Mohd Rasip then talked about the IODE activities in Malaysia. The Royal Malaysian Navy Oceanographic Data Centre (RMNODC) was established in 1994 in order to enhance the flow of oceanographic information within the RMN and to the civilian maritime community. The RMNODC was then appointed as a DNA of IODE. The RMNODC had the investment in oceanographic data management activity primarily from annual national cruises to study natural changes during the monsoon and inter-monsoonal periods. Malaysia has participated in regional cruises such as the ASEAN-Australia Straits of Malacca Cruises (1994) and the Gulf of Thailand Cruises (1999). Cruise Summary Reports (CSR) have been submitted to the RNODC for WESTPAC. Fadm Rasip indicated that there would be an increased need in WESTPAC for bathymetry in relation to electronic charting and for improving skills (TEMA). Problems included data formats and inventories of national sources. Quality control of data was another area, which required improvement. He also stressed that coordination was needed at the national level to foster cooperation and increase awareness of data management activities. Coordination of cruises was needed to avoid duplication and training was required in the collection of data.

In the discussions that followed it was revealed that the benefit of training in data management was an incentive for scientists to contribute to IODE projects. These benefits needed to be brought to the attention of scientists so that the rate of data submission increased.

4.3 REVIEW OF IODE PRODUCTS AND SERVICES

Mr. Searle introduced the Global Temperature and Salinity Profile Programme (GTSPP). GTSPP was established in 1989 as a pilot project with the aim of providing a timely and complete data and information base of ocean temperature and salinity data. The Marine Environmental Data Service (MEDS) in Canada manages the near real-time data stream available on the Global Telecommunication System (GTS). MEDS undertakes semi-automated quality control of this data. The US-NODC manages the delayed mode data and integrates the near real-time data with delayed mode data in the 'Continuously Managed Database'. GTSPP has provided many benefits including the standardisation of data quality control procedures and the availability of the most 'complete' temperature and salinity database through the integration of high quality delayed mode data and near real-time observations. GTSPP data is used to support a number of activities.

Dr Henry Frey provided an update on the Global Oceanographic Data Archaeology and Rescue Project (GODAR). As a result of GODAR a large number of profiles have been added to the NODC/WDC-A archive. This includes 310,000 station data casts, 120,000 chlorophyll profiles, 600,000 plankton *taxa*, etc. These results are available on the CD-ROM 'World Ocean Database 1998'. The last meeting of GODAR was held in the United States in 1999. The meeting recognized the success of GODAR and encouraged its expansion into the rescue of biological and chemical datasets.

Metadata development in IODE was presented by Mr. Greg Reed from AODC. In 1971, the 15th session of IOC recommended establishment of a Joint Task Team and preparation of the "Marine Environmental Data Information (MEDI) Pilot Catalogue". The first edition of the MEDI catalogue was published in 1979, and the third edition was published in 1993 containing 247 data descriptions. At IODE-XV, it was considered that a more modern version of MEDI was required and the IODE Committee approved a pilot project to create a new MEDI based on modern technologies. Version 1 of the pilot project software was released in 1998, using a commercial database and a spatial query tool written in Visual C^{++}. Future issues to be resolved included the use of non-commercial software ensuring machine and database independence, and review of the keyword list.

Dr. Nguyen Hong Phuong from VODC introduced the use of the MEDI Pilot Project software in Viet Nam. The Marine Data Management Department, Hanoi Institute of Oceanography has developed a PC-based metadata entry system based on the IODE MEDI Pilot Project software. This is called MEDI Vietnam. The system is one of the outcomes of the ASEAN–Australian cooperation programme: Coastal Zone Environmental and Resource Management Project (CZERMP). Although the system is still in development, it is compatible with a number of the developing international metadata systems such as the GCMD, etc.

Mr. Ben Searle briefly described the IODE's Cruise Summary Report (CSR) and National Oceanographic Programmes (NOP) activities. CSR and NOP are important activities in the IODE programme. NOP describes proposed research cruises and identifies training opportunities and availability of data. An online database for NOPs is available from the University of Delaware in USA (http://oceanic.cms.udel.edu/ships/). Mr Searle suggested that WESTPAC countries would benefit from using NOP, helping scientists in the region to become aware of proposed research cruises. However, there are presently few countries in the region that are submitting NOPs. The Cruise Summary Report (CSR) is a report of oceanographic cruises and includes information such as type of data collected, the instruments used, locations of the station etc. Today, more than 18,000 cruises are recorded on CSR in digital form. Mr Searle encouraged WESTPAC countries to submit and use CSR. Electronic data entry and retrieval tools for CSR were available from ICES at http://www.ices.dk/ocean/roscop/. The software is called ROSWIN and ROSEARCH,

Dr. Henry Frey introduced the World Ocean Database 98 (WOD98). The World Ocean Database 1998 includes observed and standard level temperature, salinity, oxygen, nutrient, chlorophyll, pH, alkalinity and plankton biomass and taxa data, which are products of GODAR, the WDC-A/World Ocean Database project and GTSPP. The new WOD98 database has a higher resolution (1/4 degree grid) than the previous World Ocean Atlas released in 1994.

Mr. Greg Reed introduced the IODE Resource Kit that includes Ocean PC. The IODE Resource Kit is designed for countries wanting to set up a data centre. The Resource Kit consists of

data management documentation, data & information management tools, and training tools within 3 modules. A final version will be released on CD-ROM in 2000.

The group discussed a number of the issues raised in the presentations. The issue of generating products was often dependent on the number of requests for that product. In addition to this, the issue of commercial interests, the selling of data and data products was discussed. The meeting suggested that data should be easily and 'freely' available. The meeting considered that development of a data rescue project in the WESTPAC region would be useful and proposed that a group be formed to carry out drafting of the project proposal. It was hoped that funding could be made available from UNESCO (IOC) and extra budgetary funding from other organisations and private institutions.

The participants identified a number of obstacles to improving data management in the region. These included a shortage of funds, the shortage of personnel, low salary of staff, lack of access to the technology necessary for training as well as weak local and regional infrastructures.

4.4 CAPACITY BUILDING FOR OCEANOGRAPHIC DATA AND INFORMATION MANAGEMENT

Dr. Iouri Oliounine provided an overview of the IODE training programme. He emphasized that at the end of 1995, there were 70 marine scientific institutes in the WESTPAC region and now the number of institutes has risen to 100. Society now requires the capacity for making marine observations and forecasts as well as the ability to analyse the observations, develop products and communicate the results in support of many activities including policy making.

Dr Oliounine mentioned that the goals of the IODE capacity building programme, as part of the IOC's Training, Education and Mutual Assistance in Marine Science (TEMA) includes continuing education and training, increasing availability of data management knowledge and providing software technology for data processing and exchange. There are a number of ways to achieve the IODE capacity building goals, which include:

- Organisation of training courses and workshops;
- Development of subject oriented training packages and resource kits;
- Providing study grants and fellowships;
- Implementation of visiting experts programme;
- Implementation of joint projects with other organisations;
- Publishing manuals and Guides, and
- Organisation of awareness campaigns.

IODE is providing many types of training including short-term training, shipboard training, training of trainers, on-the-job training at established data centres, training through research, and special project-focussed training courses such as for GODAR, data formats or a specific type of data. Ocean PC is the one of the training packages that is used in IODE training courses. Within the WESTPAC region there have been a relatively large number of training courses due, in part, to considerable efforts of the JODC.

IODE nominated 9 regional coordinators in 1996. One of their duties is to provide improved TEMA support to their region. Dr. Nagai of the JODC is the IODE Regional Coordinator for WESTPAC. Regional Coordinators have a responsibility to coordinate with training activities and for bringing results of global activities closer to regional needs. In an effort to support training and dissemination of information about IODE, an IOC/IODE web site was established (http://iode.org). This web site describes the IODE activities in detail, including the materials that can be used for training.

Mr. Aiura from JODC described the efforts of Japan in training personnel from foreign countries. The Hydrographic Department of Japan Maritime Safety Agency is conducting 3 training courses; hydrographic survey for production of nautical charts, oceanography and data processing course and the IOC/WESTPAC Training Course on NEAR-GOOS data management. The first two courses are conducted under the policy of the Japanese Government Official Development Assistance, and IOC organizes the last one.

Mr. Ben Searle introduced the new Elsevier Journal on Ocean and Atmospheric Data Management. The Journal aims to promote the management of marine and atmospheric data as a 'science'. The Journal will be available on-line and on paper. The web site is located at http://www.elsevier.nl/locate/oadmol.

The participants then discussed a number of points related to the issues raised by the previous speakers. Some participants were concerned with use of OceanPC as a training tool since it is based on old technologies. New developments, especially the IODE Resource Kit that will include some components of OceanPC, but also much more, will help to overcome these concerns. The Resource Kit will become available on the IODE web site. In relation to this, JODC indicated that they use sophisticated software for data processing and would use the software, as appropriate in the JODC training.

Dr. Nagata informed the participants of MIRC's activities and how MIRC was created to support the activities of JODC and facilitate international cooperation. Dr Nagata indicated MIRC's interest in assisting with capacity building in WESTPAC and suggested that funds were available to send experts to developing countries in the region. MIRC has also developed some software for quality control and management of oceanographic data. The software was introduced at the Seminar and will be made available to scientists and data managers free of charge.

The participants discussed the IODE web site suggesting that while the site was useful in publicising IODE, some of the material was out of date and called on IOC to update the information more regularly. UTM of Malaysia welcomed support for training experts in the field of coastal & ocean engineering.

4.5 MEASUREMENTS TO SATISFY USER NEEDS FOR DATA FROM THE IODE SYSTEM, QUALITY CONTROL OF OCEANOGRAPHIC DATA, PROCESSED DATA AND INFORMATION TYPES

Dr. Yutaka Nagata from MIRC spoke on the distribution of temperature and salinity data in seas around Japan and discussed the statistical parameters used in the MIRC visual quality control software. The distribution characteristics of temperature and salinity were analysed in order to determine several variables for use in developing the high-level quality-control software. Dr. Nagata

suggested that the ranges used in the World Ocean Database 1998 (WOD98) were too large for local purposes and the MIRC studies were confined to a limited area around Japan. The study hoped to be able to 'rescue' data collected by many of the Japanese fisheries institutes and make this data available to JODC.

Dr. Henry Frey presented information on the management of plankton data in the US NODC. US-NODC has as a priority the development of a coral reef data base system, harmful algal blooms data management system and a primary productivity data management system to support their biological data management activities. The Coral Reef Database system is part of the National Coral Reef programme for monitoring and protection coral reefs in subtropical and tropical regions of the United States and around the world. US-NODC is a member of the data-working group of this programme. The system is in its infancy, but will be able to manage not only biological data but also physical and chemical data. The Harmful Algal Blooms Data Management system is being developed under the pilot project, ECOHAB for the Gulf of Mexico. This system will manage data from the research project and NODC historical data, which is essentially coastal profile and time series data, buoy and shore site data. An advantage of this system is that it brings together both physical and biological data.

To support the biological data initiatives the NOAA Biological Data Working Group has been established to assure the long-term stewardship and archiving of NOAA's biological, chemical, and associated data. An additional part of these activities is the Integrated Taxonomic Information System (ITIS), which is based on the NODC Taxonomic Database, and aims to serve as U.S standard for biological nomenclature.

Dr Oliounine discussed the declassification of naval oceanographic data. Much of what is presently known about the sea and many of the most significant ocean engineering advances have come about as a consequence of naval research & development. Navies have traditionally classified these technical developments, together with large volumes of data. The end of the cold war has brought a willingness to release information and to make military technology available for civilian purposes. Implementation of the GODAR project has helped rescue hundreds of thousand of oceanographic data sets collected by naval ships.

The success of the declassification process needs to be publicised and the meeting recommended the introduction of a GODAR project within the WESTPAC region. To implement the pilot scheme successfully it is essential that national institutions and navies participate. National Oceanographic Committees can assist by formulating national oceanographic data exchange policies. The IODE national coordinators should be proposing the declassification of naval data to support broad national objectives. The Conference considered that the presentation by Dr. Oliounine was extremely valuable. The participants felt that the information on the benefits of declassifying naval data and other relevant information should be available to the IODE National Coordinators in the form of a small paper.

4.6 PROPOSED ACTIONS

Mr Greg Reed gave a presentation on the IOC/IODE web site and relevant newsletters. He described the newsletter "WESTPAC Information" that has been published by the IOC Sub-commission for WESTPAC. This newsletter provides information on projects in the region, news on

training programmes and updates on IODE activities. However, it is not published frequently. Also, while the IOC has a web site on IODE, the site on WESTPAC within the IOC Regional Programmes is still "under construction". The IOCINCWIO web was considered a good example of a regional web 'presence', containing a lot of information provided by member states. Mr. Reed indicated that there were many options for improving awareness of IODE in the region including a web page from IOC or NODCs within the region, a newsletter and a mailing list (email) for a discussion group. A mailing list discussion group is a good way to share information on specific subjects. A good example of a mailing list in this region is the Gulf of Thailand discussion group, which is set up by the Gulf of Thailand project, and has about 160 subscribers. To be successful, all these options require input from the regional community.

Mr. Aiura (JODC) reported on the cooperation between oceanographic research programmes and the Japanese data centre in relation to submission of data to JODC. He informed the participants that JODC participates in global, regional and bilateral projects as part of the process of acquiring data and understanding the role of data management in these projects. As a result, JODC assists a large number of oceanographic surveys and research projects through standardization of data, creation of databases and other forms of data management. JODC also integrates and makes available data sets arising from these projects.

Mr. Yamamura from JICA Malaysia Office discussed the cooperation with oceanographic programmes by the Japanese Governmental Aid Programme. The Japan International Cooperation Agency (JICA) is responsible for the technical cooperation aspects of Japan's ODA programmes. JICA carries out a variety of responsibilities including technical cooperation dispatch of Japan Overseas Cooperation Volunteers, training and recruitment of qualified personnel for technical cooperation, survey and administration of Grant Aid Programmes, and disaster relief. JICA provides 5 schemes for technical cooperation. These are: Training in Japan, Dispatch of Experts, Provision of Equipment, Project-type Technical Cooperation, and Development Study.

To request assistance from JICA, developing countries need to provide a request to the Japanese Government through their own government. The Ministry of Foreign Affaires evaluates the request together with JICA Headquarters and the Ministries concerned. It takes from 6 months to 1 year to inform developing countries if the request has been approved. The budget for JICA programmes in FY1990 was about 185.1 billion-yen and approximately 20,000 people participated in training programmes. There are courses held in many fields including oceanography such as:

- Hydrographic Survey (International Accredited Category B Course)
- Oceanography and Data Processing
- Marine Pollution Surveillance and Control
- Bio-production and Environmental Management in Semi-enclosed Sea
- Conservation and Sustainable Management of Coral Reefs
- Sustainable Use of Marine Micro organisms and Marine Natural Chemicals
- Seminar on Integrated Inshore Resource Management in Tropical Sea
- Technical Cooperation Projects
- Aquatic Resources and Environmental Study in Malacca Strait
- Establishment of Port and Hydraulic Research Centre in Turkey

Development studies include:

- Assessment and Monitoring of Fisheries Resources in Argentine
- Study on Coastal Marine Habitat and Biological Inventory in the northern part of the Red Sea Coast
- Study on Environmental Monitoring in the Arabian Gulf
- Re-Survey of One Fathom Bank Area and Investigation of Dangerous/Unconfirmed Shoals and Wrecks in Malacca and Singapore Straits

Further information on JICA activities is available at the JICA WebPages at http://www.jica.go.jp/.

Ms. Lin Shao Hua indicated that China would make every effort to encourage WESTPAC countries to use MEDI. China will also investigate ways of making the meta-database accessible to the Member States, possibly by using a web site as a dissemination vehicle for the distribution of the Meta-database system to all countries in the region.

Mr. Nagai commented that JODC has started developing a cruise based meta-database system together with MIRC. This meta data has more detailed information than CSR and will hold an estimated 2000 cruises every year. JODC will provide this data and the know-how from this development within few years.

Mr Ben Searle commented that if countries set up their own meta-database systems that are different from each other, it is very difficult to make a global system. He also said that IODE should encourage the collection of even more detailed metadata. The Conference recommended that the IODE Committee should investigate and work on the creation of a distributed meta-database system to support global needs.

Fadm. H.M. Makmur Sulaeman pointed out that Indonesia recognised the importance of the IODE system and supported the operation of National Oceanographic Data Centres. To support this, Indonesia has begun a process of developing a comprehensive inventory of tidal data collected in the Indonesian region. As a result of ICIWP'99, Indonesia will now investigate the possibility of creating an NODC.

Dr. Anond Snidvongs from Thailand indicated that due to the importance of IODE, Thailand would soon nominate an IODE contact point. As a concrete step towards setting up a DNA, the IGBP/SEASTART RC at Chulalongkorn University will begin an oceanographic data rescue project for the Gulf of Thailand and adjacent South China Sea in co-operation with the Thai Data Buoy Operating Centre of the National Research Council, and the data centres for Malaysia and Vietnam.

The Conference appreciated the information provided by Thailand on their decision to establish DNA and to nominate an IODE national coordinator.

The Conference adopted recommendations and action plans as presented in Annex IX. They may be summed up in the following way:

- Development of GODAR type project for the WESTPAC region
- Need for IODE national coordinators and NODCs or DNAs
- Promotion of NOPs and CSRs in WESTPAC countries

- Development of a distributed metadata system using the MEDI Pilot Project software
- Development of data exchange mechanisms and tools including data formats
- Improvement of information exchange using Internet technology in the WESTAC region
- Improvement of capacity-building activities
- Promotion of the declassification of naval data

These recommendations will be taken to the XVI session of the IODE Committee in 2000.

5. CLOSURE

The participants were informed that the proceedings of the Conference have been compiled by the Secretariat and the Japanese organizer has already published the document. It was suggested that the proceedings and recommendations be made available on web sites of JODC and IOC.

Mr Ben Searle closed the workshop at a quarter to one in the afternoon, 4 November 1999 with an expression of appreciation and thanks to all participants for their contributions. He also thanked the presenters for providing the very comprehensive views of IODE activities within the WESTPAC region. He finally thanked the local organisers for the successfully management of the Conference.

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ANNEX I

CONFERENCE ORGANIZING STRUCTURE

1. INTERNATIONAL ORGANIZING COMMITTEE

- Dr Iouri Oliounine (Deputy Executive Secretary, IOC)
- Mr Ben Searle (Chairman of IODE Committee, IOC)
- Dr Keisuke Taira (Chairman for WESTPAC/IOC Regional Sub-Committee)
- First Admiral Mohd Rasip bin Hassan (Chairman of National Commission for IOC-Malaysia)
- Mr Toshio Nagai (Director of JODC)

2. SCIENTIFIC ADVISORY GROUP

- Dr Yutaka Nagata, Director of MIRC, Japan
- Assoc. Prof. Hadibah Ismail, Director of COEI, Universiti Teknologi Malaysia, Malaysia
- Prof. Dr Makoto Terazaki, ORI, Univ. of Tokyo, Japan
- Prof. Dr Tetsuo Yanagi, Univ. of Kyushu, Japan

3. LOCAL ORGANIZING COMMITTEE

- Coastal & Offshore Engineering Institute, Universiti Teknologi Malaysia (UTM)
- Hydrographic Dept., Royal Malaysian Navy (RMN)
- Maritime Institute of Malaysia (MIMA)
- National Hydraulic Research Institute of Malaysia (NAHRIM)
- Ministry of Science Technology & the Environment
- Ministry of Education Malaysia
- JICA Malaysia Office
- Oceanographic Research Coordination Committee of Malaysia

4. SECRETARIAT

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ANNEX II

CONFERENCE PROGRAMME

SUN, 31 OCTOBER, 1999

PRE CONFERENCE

1800-2000 Registration at Foyer I
2000-2200 Icebreaking

MONDAY, 1 NOVEMBER 1999

OFFICIAL OPENING CEREMONY AT DEWAN PELANGI

0800-0900 Registration at Foyer I
0900-0905 Arrival of the Honorable Chief Minister of Kedah
0905-0915 Welcome Remarks by Fadm. Mohd Rasip bin Hassan, Chairman of National Commission for IOC-Malaysia
0915-0925 Speech by Mr Toshio Nagai, IODE Regional Co-ordinator for WESTPAC
0925-0940 Address by Dr I. Oliounine, Deputy Executive Secretary, IOC/UNESCO
0940-1000 Official opening by the Honorable Chief Minister of Kedah
1000-1030 Exhibition Tour / Refreshments
1030-1100 Press Conference at the Marine Club Lounge

SEMINAR ON "OCEANOGRAPHY AND MARINE SCIENCE"

	SLOT 1 (at Dewan Pelangi)		**SLOT 2 (at Dewan Cenang)**
1030-1300	Session 1A	1030-1300	Session 2
1300-1415	*Lunch / Poster Session at Dewan Pelangi*		
1415-1600	Session 1B	1415-1600	Session 3A
1600-1630	*Refreshments / Poster Session at Dewan Pelangi*		
1630-1800	Session 1C	1630-1800	Session 3B
2000-2200	*Dinner reception*		

TUESDAY, 2 NOVEMBER 1999

SEMINAR (CONTINUED)

0900-1045	Session 4A	0900-1045	Session 5A
1045-1115	*Refreshments*		
1115-1245	Session 4B	1115-1245	Session 5B
1245-1400	*Lunch*		
1400-1515	Session 4C	1400-1515	Session 5C
1515-1545	*Refreshments*		
1545-1700	Panel Discussion at Dewan Pelangi		
2000-2200	*Dinner reception*		

WEDNESDAY, 3 NOVEMBER 1999

WORKSHOP ON "IODE ACTIVITIES IN THE WESTPAC REGION" AT DEWAN PELANGI

0900-0910 1. Opening
0910-0920 2. Administrative Arrangement
0920-1035 3. Status of oceanographic data & information exchange, the national and international projects operating in the WESTPAC region
1035-1105 Refreshments
1105-1230 3. Status of oceanographic data & information exchange, the national and international projects operating in the WESTPAC region (continuation)
1230-1400 Lunch
1400-1610 4. Review of IODE products and services
1610-1630 Refreshments
1630-1800 5. Capacity building for oceanographic data & information management
2000-2200 Dinner reception

THURSDAY 4 NOVEMBER 1999

WORKSHOP (CONTINUED)

0830-1010 6. Measurements to satisfy the user needs for data from the IODE system, quality control of oceanographic data and processed data & information types etc.
1010-1030 Refreshments
1030-1200 7. Proposed actions
1200-1230 8. Wrap up
1230-1245 9. Closing
1245-1400 Lunch

1400-1800 Post - Conference Study Tour / Excursion (optional) Island Hopping, Island Tour etc.

ANNEX III

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ANNEX IV

ARTICLES IN NEWSPAPERS

REPORT FROM BERITA HARIAN, SATURDAY, 30 OCT. 1999

UTM anjur persidangan di Kedah

INSTITUT Kejuruteraan Pantai dan Lepas Pantai, Universiti Teknologi Malaysia (UTM), akan menganjurkan persidangan antarabangsa bertajuk 'International Oceanographic Data & Information Exchange In The Western Pacific (IODE-Westpac) 1999 (ICIWP '99) di Langkawi, Kedah, mulai Isnin sehingga Khamis ini.

Persidangan antarabangsa itu yang akan dirasmikan oleh Menteri Besar Kedah, Tan Sri Sanusi Junid, dianjurkan dengan kerjasama pelbagai pihak lain, termasuk Kementerian Sains, Teknologi dan Alam Sekitar.

Objektif persidangan itu ialah untuk menemukan saintis dan pengurus data bagi membincangkan cabaran terkini yang dihadapi oleh sistem IODE di rantau Asia Pasifik di samping mengenal pasti ukuran bagi menambah keberkesanan sistem sedia ada.

Persidangan itu menyediakan platform kepada pakar untuk bertukar maklumat kepakaran dan kerjasama bagi program penyelidikan yang meliputi pelbagai bidang oseanografi

LITERAL TRANSLATION

University Technology Malaysia Organize International Conference in Kedah

The Coastal & Offshore Engineering Institute (UTM), will organize an international conference entitled "International Oceanographic Data & Information Exchange in the Western Pacific (IODE-WESTPAC) 1999, (ICIWP'99) in Langkawi island, Kedah, starting from Monday to Thursday this week.

Kedah State Minister, Tan Sri Sanusi Junid will officiate the opening ceremony of this international conference; where the Ministry of Science, Technology and Environment is also the co-organizer. The objective of this conference is to give opportunity to the scientist and data managers to discuss the challenges of the IODE system in the Asia Pacific region. The meeting is hoped to confirm and facilitate the effectiveness of this system. This conference also provides a platform to professionals and scientists to exchange information and collaborate on the research programmes related to oceanography in the region.

REPORT FROM THE STAR, TUESDAY 2 NOV. 1999

More aid sought for maritime research

LANGKAWI: The Government has been urged to allocate a bigger budget for oceanography research to aid in tapping the country's vast maritime resources.

Inter-Governmental Oceanographic Commission Malaysia national chairman Laksamana Pertama Mohd Rasip Hassan said being a maritime nation, the country should not take oceanography for granted.

He said not much funds had been provided for maritime studies and research.

"We think oceanography needs more funds immediately as there are plenty of resources in our waters," he told newsmen yesterday after the opening of the International Conference on the International Oceanographic Data and Information Exchange in the Western Pacific at the Pelangi Beach Resort here.

Mentri Besar Tan Sri Sanusi Junid opened the four-day conference attended by 150 ocean scientists from 17 countries.

REPORT FROM BERITA HARIAN, TUESDAY 2 NOV. 1999 (Right)

Kajian oseanografi perlu peruntukan besar

LANGKAWI, Isnin – Peruntukan lebih besar perlu bagi membiayai kajian oseanografi untuk menerokai khazanah maritim negara, kata Pengerusi Pertubuhan Oseanografi Antara Kerajaan (IOC) bagi Malaysia, Laksamana Pertama Mohd Rasip Hassan.

Beliau berkata, peruntukan untuk kegunaan di bidang yang merangkumi pelbagai displin termasuk hidrografi, meteorologi, geofizik dan ekologi itu lebih mendesak berbanding bidang lain, termasuk kajian membabitkan angkasa lepas.

"Malaysia masih belum menerokai sumber lautan sepenuhnya kerana kurang penggunaan teknologi dan penyelarasan data yang konsisten.

"Sehubungan itu, komitmen yang lebih mendalam dan sokongan kewangan perlu bagi membolehkan negara mempelopori potensi dan sumber laut," katanya selepas perasmian persidangan antarabangsa mengenai Pertukaran Maklumat dan Data Oseanografi (IODE) di sini, hari ini.

Persidangan dua hari itu dirasmikan Menteri Besar Kedah, Tan Sri Sanusi Junid. Persidangan pertama kali di negara ini mengenai IODE itu bertujuan mengenal pasti keperluan data dan maklumat marin melalui program penyelidikan saintifik di rantau ini.

Ia juga membolehkan saintis dan pengurus data berkongsi kefahaman mengenai teknologi maklumat serta teknik dalam penyelidikan oseanografi di samping menggubal fungsi sistem IODE di rantau ini.

Sistem IODE membantu masyarakat dunia mendapatkan data oseanografi dan sebarang data berkaitan lautan menerusi persefahaman antara negara dengan kemudahan sistem teknologi maklumat terkini.

IODE mempunyai rangkaian menyeluruh mengenai pusat dan pengurusan data marin yang sempurna dan luas. Ketika ini, pertukaran data dan kemahiran wujud menerusi sumber yang didapati daripada lebih 65 negara dengan sembilan pusat pengumpulan data.

LITERAL TRANSLATION

Oceanographic Research Need Much Funding

The President of the Intergovernmental Oceanographic Commission (IOC) Malaysia, First Admiral Mohd Rasip Hassan said: more funding is needed to provide the oceanographic research work to be carried out. He said funding is needed for disciplines such as hydrographic, meteorology, geophysics and ecology. Malaysia does not have yet fully discovered his maritime due to shortages of technology and no consistent data. Besides, we need to co-operate and obtain the commitment from many departments who are involved in this region. He gave a speech on the opening ceremony of International Oceanographic Data & Information Exchange in the Western Pacific(IODE) 1999(ICIWP'99). The two-day conference was opened by Kedah State Chief Minister, Tan Sri Sanusi Junid. The purpose of organizing this IODE is to realize the importance of data and marine information through the scientific research programmes in this region. This also provides good opportunity for scientists and data managers to share their opinion and discovery on the oceanographic research by using IODE system. IODE system provides oceanographic information and any kind of data regarding to ocean through the latest information technology. IODE have a complete system on maritime data management. Presently, there are 65 countries and 9 Data collection centres around the world.

ANNEX V

OPENING ADDRESSES

A

by YAB Tan Sri Dato' Seri Sanusi bin Junid, the Honorable Chief Minister of Kedah

Please allow me first to welcome participants of this conference and workshop to Langkawi, island of legends. It is appropriate I feel, that a meeting addressing issues related to the ocean is held on an island.

The need for managing our oceans for human and altruistic reasons are widely acknowledged. Resource exploitation and development need to be carried out with due consideration for the environment. As a policy maker and a member of the government, I face these issues on a regular basis. Striking the equilibrium between environment and development is not easy. As the saying goes "one man's joy is another man's pain". What may be considered much needed development could alternatively be seen as being detrimental for the environment. A case in mind being the proposal to develop thirteen artificial island off the coast of this State (Kedah). In any case, the decision made for conservation or development depends a lot on the information provided to the government on many issues - economic benefits and viability of a project, social benefits, and impact and last but not least environmental impact. Whether a not a project is allowed to go ahead depends on a careful and judicious weighing of these factors.

It is therefore heartening to see that there is a well organising and active effort to improve the collection and exchange of information concerning our oceans and coastal area. No doubt this activity will contribute to better decision making about the managing of our oceans, its resources and the coastal area. Such exchanges will contribute greatly to the management of our seas as a global common. I hope you will also bear in mind the advances made in the field on information technology during your deliberation. IT has the potential to make information exchanges speedier and more timely.

Finally let me wish you a fruitful and meaningful deliberation. At the same time please also enjoy Langkawi's many attractions and hospitality.

Thank you.

B

by First Admiral Mohd Rasip bin Hassan, Chairman of National Commission for IOC-Malaysia

Oceanographic research is a subject which is receiving much attention of late in Malaysia. While many research efforts in the field have been undertaken over the year - it appears that they were not done in a coordinated and cohesive manner. The lack of coordination has contributed to a state where it seems that there is no coherent research direction as far as oceanography in Malaysia is concerned; data collection, storage and dissemination are still largely scattered over many institutions; duplication of research work; and especially intense competition for limited resources. The problems have not gone unnoticed and initiatives are being undertaken to address them. Approval has been given by the government for the establishment of an oceanographic directorate to coordinate oceanographic research in the country.

Organizing the oceanographic research also requires improving its data and information component. Matching user requirements with data availability and collection is a crucial component of this initiative. As such this conference and the subsequent workshop will be of great value to all those involved. As we move into the next millenium, it is important that we review our data exchange system. This is important to confirm to the IODE system which would best meet the needs of its users nationally and at the international level. The two day workshop I believe would benefit all scientists and data managers in their quest to full understand the behavior of one of the most important parts of the global ecosystem - the ocean.

C

by Mr Toshio Nagai, IODE Regional Co-ordinator for WESTPAC / IOC

Here, I am delighted to see the International Conference on the IODE-WESTPAC 1999 (ICIWP'99) which is held in Langkawi, Malaysia organized by Intergovernmental Oceanographic Commission (IOC) and with support from many organizations.

At the International Oceanographic Data and Information Exchange (IODE) Officers Meeting held in Goa, India in 1998, the progress of many projects in IODE as well as other international project was reported. Among them, the problems of several IODE regional activities were discussed including that of the WESTPAC region. I, as IODE regional co-ordinator for WESTPAC felt that it was necessary to hold a meeting to review and discuss the activity of IODE-WESTPAC directing to the future. At the fourth session of the IOC Sub-commission for the Western Pacific in Korea, I proposed the ICIWP'99, and this proposal was later adopted officially by IOC. The great place of ICIWP'99, Langkawi, was carefully selected by cooperation of JICA expert who has been dispatched from JODC to Malaysia and his counterpart in Universiti Teknologi Malaysia.

The fund was kindly supported by IOC, Japan Science and Technology Agency (STA), Japan Marine Information Research Center (MIRC) and Japan International Cooperation Agency (JICA). And International Organizing Committee, Scientific Advisory Board, Local Organizing Committee, International Secretariat and Local Secretariat was organized to coordinate preparation of the Conference.

The first 2 days of the conference are held as seminar to share common understanding of the needs from users of oceanographic data, and the last 2 days are held as workshop to discuss the status of oceanographic data management in the WESTPAC region to the 21st century with many participants from many countries.

I hope that this conference finish in great success and make many fruits for activating the IODE system not only in WESTPAC region but also in another regions. And also, I would like to express my heartfull gratitude to all persons who made cooperation with this conference.

D

by Dr Iouri Oloiunine, Deputy Executive Secretary
of the Intergovernmental Oceanographic Commission (IOC)/UNESCO

It is an honour for me to address the Conference & express my deep appreciation to the local organizers & through them to the Government of Malaysia for hosting this critical meeting.

Since its establishment in 1960, the Intergovernmental Oceanographic Commission has focussed on promoting marine scientific investigations & related ocean services with the view to leaning more about the marine environment. The International Oceanographic Data & Information Exchange (IODE) system helps IOC in meeting these objectives. The purpose of IOC is to co-ordinate & facilitate worldwide co-operation in research, monitoring & sustainable development in order to ensure that countries receive the necessary support from the science of oceanography & its application. One of the most important instruments to achieve this goal is through regionalization.

Your conference is aimed at proposing mechanisms for making the IODE system in the region more effective & more able to cope with the increasing demands for oceanographic data & information. I am pleased to note that the specific mission of the meeting is to make oceanographic data available to the international community, to build regional & global oceanographic databases for different fields of application & help in improving the capabilities of data centres, especially at the national & regional levels on the basis of the IODE policy of free access & open exchange of data. I expect that this event will help establish a real regional partnership in which the southern countries of WESTPAC will be assisted by resources & ensured access to efficient data management technologies to become real partners in the major scientific & services efforts. The meeting will also allow the exchange of information & ideas, & help set the tone for future actions. I also hope that it will formulate recommendations for the Committee on IODE on how effectively to proceed in regional data exchange, what difficulties can be expected & what compromises can be found. You will have a hard task to choose the best way forward from among the many alternatives that are possible, but it is important that the Conference succeeds. Many scientists & other oceanographic data users are looking for data to help them in their work. Exchange of data is an integral part of all projects of the world, regional or national level. An efficient regional system of oceanographic data & information is essential to the success of any marine science programme. One of the major tasks of the Conference will be to keep scientists & data managers abreast of the constantly expanding observational & research efforts & to provide appropriate guidelines for facilitating regional data exchange on the basis of the RNODC-WESTPAC of the IODE system. I strongly believe that the results of the Conference will find immediate application on national & regional levels.

Because of IOC long experience & dedication to IODE & because this activity is so important for the WESTPAC region, IOC made special efforts in supporting the Conference by providing funds, expertise & staff time. The level of organization of the Conference & the number of participants showed great devotion of the local organizers to the objectives of the Conference & great interest of the participants in the subject of the meeting & the place of its venue.

I wish you to return home with new knowledge & apply them for the development of data management practices in your country.

I wish you every success in your deliberations.

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ANNEX VI

LIST OF PRESENTATIONS

SESSION 1: COASTAL ENVIRONMENT - DATA REQUIREMENTS, NEEDS & PRODUCTS

SESSION 1A Chairman: Assoc. Prof. Hadibah Ismail

KEYNOTE: Ocean Circulation in the Asian Waters, *Prof. Dr Tetsuo Yanagi, Research Institute for Applied Mechanics, Kyushu University, Japan*

Potential use of Satellite Altimeter Data for the Determination of the Leading Tidal Constituents for the Marine Region of Peninsular Malaysia, *Muhammad Nur JP Vella, Centre for Geodetic and GPS Studies (CGGS), Faculty of Geoinformation Science & Engineering, UTM, Malaysia*

Contribution of National Tidal Data Centre in Research and Development Activities in Indonesia, *First Admiral Mohamad Makmur Sulaeman, Indonesian Navy Dishidors TNI-AL, Indonesia*

Characteristic Scales in Coastal and Limnological Processes: Implications in Data Sparse Environment, *Dr Koh Hock Lye, School of Mathematical Science, Universiti Sains Malaysia, Malaysia*

The National Environment and Resource Information Center (NERIC) and Coastal Zone Management in Vietnam, *Prof. Dr Bui Cong Que, Vietnam National Oceanographic Data Center, Vietnam*

Straits of Malacca Management Compliance and Information System (SOMMACIS), *Prof. Mohd Ibrahim Mohammed, Dept. of Environmental Science, Faculty of Science & Environmental Studies, Universiti Putra Malaysia, Malaysia*

SESSION 1B Chairman: Prof. Dr Tetsuo Yanagi

Research and Data Needs in Managing Coastal Erosion, *Assoc. Prof. Hadibah Ismail, Coastal & Offshore Engineering Institute, Universiti Teknologi Malaysia, Malaysia*

Seasonal Shoreline Characteristics of the Open Muddy Beach of the Pantai Punggur, Malaysia, *Assoc. Prof. Dr Ahmad Khairi Abd. Wahab, Hydraulic & Hydrology Department, Faculty of Civil Engineering, Universiti Teknologi Malaysia, Malaysia*

Some Behaviours of Strongest Short-term Coastal Change Induced by Cross-shore Wave Energy Flow and Corresponding Theoretical Consideration, *Dr Le Phuoc Trinh, Institute of Oceanography of Vietnam, Vietnam*

Rapid Reef Mapping- An Attempt with Hydroacoustic Method, *Lee Yew Jin, Elcee Instrumentation Sdn Bhd, Malaysia*

The Role of International Organizations in the Study of Rivers & Sea Coastal Area Interaction, *Dr I.Oliounine, IOC/UNESCO, France*

SESSION 1C Chairman: Dr I.Oliounine

Real-Time Information System for Sustainable Management of Shared Coastal Waters: Gulf of Thailand as a Demonstration Site, *Dr Anond Snidvongs, Marine Science Dept., Chulalongkorn University, Thailand*

Role and Contribution of Oceanographic Research in Maritime Policy Making in Malaysia, *Mr Mohd. Nizam Basiron, Center for Marine and Coastal Environment, Maritime Institute of Malaysia, Malaysia*

Data Necessary for an Effective Hydraulic Study: The Malaysian Scenario, *Iwan Tan bin Sofian Tan, Hydec Engineering Sdn Bhd, Malaysia*

Effective Coastal Management Strategies in the Era of Hydroinformatics - A UTM Focus, *Faridah Jaffar Sidek, Coastal & Offshore Engineering Institute, Universiti Teknologi Malaysia, Malaysia*

SESSION 2: DATA MANAGEMENT ACTIVITIES AND TECHNICAL DEVELOPMENTS

SESSION 2 Chairman: Dr Henry R. Frey

KEYNOTE: Technical Developments in Marine Data Management, *Mr Ben Searle, Chairman, IODE Committee of IOC, Head of Australian Oceanographic Data Center, Australia*

The Use of Autonomous Solar Electric Research Vessel to obtain Oceanographic Data, *Peter Thomas, Dept. of Software & Electronic Eng, Central Institute of Technology, New Zealand*

An Internet Server for the Visualisation of Gridded Oceanographic Data, *Dr Greg Reed, Australian Oceanographic Data Center, Australia*

VODC for PC 2.0 (the Software for Integrated Oceanographic Data Management), *Tac Van Vu, Institute of Oceanography, Nha Trang, Vietnam, Vietnam*

Quality Control Software which is easily applicable to Oceanographic Data Processing in Data Originators, *Dr Toru Suzuki, Marine Information Research Center, Japan*

SESSION 3: LIVING MARINE RESOURCES - DATA REQUIREMENTS, NEEDS & PRODUCTS

SESSION 3A Chairman: Dr Kushairi Mohd Rajuddin

KEYNOTE: Utilization of Biological Data for IODE system in the WESTPAC area, *Prof. Dr Makoto Terazaki, Ocean Research Institute, University of Tokyo, Japan*

Distribution of Intertidal Meiobenthos in Langkawi Island Malaysia, *Dr Idris Abdul Ghani, Dept. of Biology, Faculty of Science & Environmental Studies, Universiti Putra Malaysia, Malaysia*

Leaf Growth, Production and Ecosystem Dynamics of Toothed Seagrass Cymodocea serrulata (R. Br.) Aschers. et Magnus in Port Dickson, Malaysia, *Abu Hena M. Kamal, Dept. of Biology, FSAS, Universiti Putra Malaysia, Malaysia*

SESSION 3B Chairman: Prof. Dr Makoto Terazaki

Some Observations on the Impacts of the Indo-Pacific Region 1998 SST Anomalies on Local Coral Communities, *Dr Kushairi Mohd Rajuddin, Department of Fisheries, Southeast Asia Fisheries Development Center, Malaysia*

Ecological Aspects of Oceanic Squid, Stenoteuthis oualaniensis (Lesson) in the South China Sea, West Coast of Philippines, *Dr Somboon Siriraksophon, Geomatics Research Division, Southeast Asian Fisheries Development Center, Thailand*

Coccolithophorids (Nanoplankton) of the South China Sea - its Mass Water Transport, *Prof. Dr Lokman Shamsudin, Faculty of Applied Sciences and Technology, Universiti Putra Malaysia Terengganu, Malaysia*

Bio-prospecting, Research and Conservation of Deep-sea Resources within and beyond National Jurisdiction, *N. Syed-Ibrahim, Center for Marine and Coastal Studies, Universiti Sains Malaysia, Malaysia*

SESSION 4: GLOBAL CLIMATE CHANGE AND REGIONAL OCEANOGRAPHY - DATA REQUIREMENTS, NEEDS & PRODUCTS

SESSION 4A Chairman: Dr Yutaka Nagata

KEYNOTE: Global and Regional Ocean Climate Change on Interannual to Interdecadal Timescales: Outstanding Problems, Global Networks, and Products, *Dr Warren B. White, Scripps Institution of Oceanography, University of California - San Diego, United States*

Long-term Variations of Surface and Intermediate Water Masses in the North Pacific and their Implications to Climate Change, *Assoc. Prof. Dr Toshio Suga, Dept. of Geophysics, Graduate School of Science, Tohoku University, Japan*

Low Frequency and Quasi-Biennial Oscillations in the Regional Precipitation Anomaly in Malaysia and their Relations to the Winds, SLP and SST in the Tropical Pacific and Indian Oceans, *Dr Fredolin T. Tangang, Dept. of Marine Science, FSSA, Universiti Kebangsaan Malaysia, Malaysia*

SESSION 4B Chairman: Dr Warren B. White

Physical Characteristics of Watermass in the South China Sea, *Assoc. Prof. Dr Mohd. Nasir Saadon, Faculty of Applied Science & Technology, Univ. Putra Malaysia Terengganu, Malaysia*

Properties of the water near the Strait of Malacca using the World Ocean Database 1998 from NOAA, *Mr Takaya Namba, Faculty of Science and Environmental Studies, Universiti Putra Malaysia, Malaysia*

Long term Metocean Measurements in the South China Sea, *En. Rozlan bin Mohd Ramli, Petronas Carigali Sdn. Bhd., Malaysia*

Oceanographic Data Management - Malaysian Experience, *CDr Zainal bin Aziz, Hydrographic Department, Royal Malaysian Navy, Malaysia*

SESSION 4C Chairman: Assoc. Prof. Dr Mohd. Nasir Saadon

SEAWATCH Programme in Indonesia, *Mr Agus Setiaman, Agency for the Assessment & Application of Technology (BPP TEKLOGOI) SEA WATCH Indonesia Programme, Indonesia*

Oceanographic Observations and Coastal Environment Monitoring Programmes of Korea, *Dr Kyu Kui Jung, Korea Oceanographic Data Center, South Korea*

Global Warming and Inter-Annual Variability, *Prof. Dr Alejandro Livio Camerlengo, Faculty of Applied Science & Technology, Universiti Putra Malaysia Terengganu, Malaysia*

An Overviews of the Activities on the U.S. Office of Naval Research International Field Office (ONR IFO), *Hassan B. Ali, Office of Naval Research International Field Office Asia, Japan*

SESSION 5: MARINE POLLUTION - DATA REQUIREMENTS, NEEDS & PRODUCTS

SESSION 5A Chairman: Dr Zubir bin Din

KEYNOTE: Exchanging Data and Information on Marine Pollution - Challenges and Issues, *Prof. Dr Gil S. Jacinto, Marine Science Institute, University of the Philippines, Philippines*

The Straits of Malacca Environmental Information System (SMEIS), *Prof. Kum Sang Low, Institute of Postgraduate Studies & Research, University of Malaya, Malaysia*

Marine Toxicology - Its Nature and Significance in Malaysia, *Assoc. Prof. Iekhsan Othman, Dept. of Bio-chemistry, University of Malaya, Malaysia*

SESSION 5B Chairman: Prof. Dr Gil S. Jacinto

Bioconcentration and Availability of Organo-Chlorine Pesticides (OCP) in different, Compartments of the Food chain in the West Coast of Peninsular Malaysia, *Dr Zubir bin Din, Centre for Marine & Coastal Studies Malaysia, Universiti Sains Malaysia, Malaysia*

Polycyclic Aromatic Hydrocarbons in Mussels from Malaysian Coastal Waters, *Ali Mashinchian Moradi, Faculty of Science and Environmental Studies, Universiti Putra Malaysia, Malaysia*

Distribution of Polynuclear Aomatic Hydrocarbons (PAH)s and Total Aliphatic Hydrocarbons (TAHs) in the bottom sediments of the Gulf of Thailand and the South China Sea, *Dr Mohd Kamil Abdul Rashid, Fakulti Sains Gunaan & Teknologi, Universiti Putra Malaysia, Malaysia*

Trend in Environmental Water Quality of Inner Jakarta Bay, Indonesia, *Melati Ferianita Fachrul, Dept. of Environmental Engineering, Faculty of Civil Engineering, Universiti Teknologi Malaysia, Malaysia*

Dissolved Fraction of Metals in Malaysian Waters, Using an In-site Sampling and Extraction Techniques, *Shahunthala Devi Ramachandran, Institute Penyelidikan Perikana, Malaysia*

SESSION 5C Chairman: Dr Mohd Kamil Abdul Rashid

Concentration of Heavy Metal Contamination in Marine Sediments off East Coast Peninsular Malaysia, *Dr V.R. Vijayan, Mineral and Geoscience Department, Malaysia*

Organic Contaminants in Sediment of Melaka Strait, *Dr Ab. Khalik b. Hj. Wood, Malaysia Institute for Nuclear Technology Research, Malaysia*

POSTER SESSION

Oceanographic Chemical Data Set in the Northwestern Pacific, *Mr Toru Hazama, Japan Oceanographic Data Center, Japan*

Marine Data Collection by a Network of Moored Oceanographic Buoys in the Gulf of Thailand and Andaman Sea, and the applications of such data in various fields, *Pitan Singhasaneh, SEAWATCH Thailand, NationalRresearch Council of Thailand, Thailand*

Cooperative Projects in the Sea of Japan and the Sea of Okhotsk: New Oceanographic Data for International Community, *Dr Alexander N. Man'ko, Far Eastern Regional Hydrometeorological Research Institute, Russia*

International Cooperative Effort on Oceanography and Sustainable Development of the Gulf of Thailand, *Dr Anond Snidvongs, Marine Science Dept., Chulalongkorn University, Thailand*

JICA/UPM Malacca Straits Expedition No2, Nitrogen and Phosphorous Distribution, *Prof. Dr Law Ah Theem, Faculty of Applied Science & Technology, Univ. Putra Malaysia Terengganu, Malaysia*

Distribution of Ortho-phospate in the Straits of Malacca, *Tengku Rozaina binti Tengku Mohamad, Southeast Asian Fisheries Development Center, Malaysia*

Development of Sine-slab® for Coastal Erosion Control, *Assoc. Prof. Dr Noraieni Hj Mokhtar, COEI, Universiti Teknologi Malaysia, Malaysia*

Screening for the Presence of Endoparasites in the Gastrointestinal Tract of Sea Cucumbers From Trengganu, *Hawa Ismail, Biomedical Science Dept., Faculty of Allied Health Sciences, Universiti Kebangsaan Malaysia*

EXHIBITS

Research & Development Activities on Coastal Engineering, *COEI, Universiti Teknologi Malaysia, Malaysia*

Ocean Monitoring System, *Metocean Data Malaysia Sdn Bhd, Malaysia*

Malaysia Chart and Ocean Research Activities, *Hydrographic Department, Royal Malaysian Navy, Malaysia*

Rapid Coral Mapping - Hydroacoustic Method, *Elcee Instrumentation Sdn Bhd, Malaysia*

Hydrographic & Oceanographic Survey Services, *Jurukur Teguh Sdn. Bhd., Malaysia*

ANNEX VII

SEMINAR RECOMMENDATIONS

The panel discussions at the end of the Seminar resulted in a number of recommendations;

- The ability to develop systems to manage marine data and the ability to easily exchange marine data was restricted as a result of the lack of a suitable marine data framework. The Seminar supported the proposal to work towards creating a Virtual Marine Data Centre based on Internet technologies. The Seminar participants strongly supported the call for IODE to develop a marine version of the eXtensible Markup Language (XML) as a means of creating a suitable marine data framework.

- In relation to the previous recommendation, the Seminar participants felt that IODE should play a stronger role and take the lead in the development of marine data related standards and protocols. This view covered standards in the data quality, collection (instrument inter-calibration) and exchange issues.

- The Seminar participants identified a low level of communication between scientists and data managers as an area that needed improvement. The use of the Internet was recommended as a mechanism to assist in this area.

- The Seminar suggested that it was important to increase the knowledge of the existence of data and suggested both data rescue and data inventories as mechanisms to improve this situation.

- It was widely agreed that the scientific community needed to improve in their submission of data to appropriate national centres. It was acknowledged that data management activities began at the level of the scientist, and the preservation of data could only occur effectively within an appropriate national oceanographic data centre.

- In line with the previous recommendation, the Seminar agreed that every effort should be made to improve marine data management infrastructures at the national level. Part of the process of achieving an increase in resources to do this was through the promotion of the benefits and successes of the IODE system. Another mechanism was encouraged the creation of national IODE coordinators and national coordination committees if they did not exist yet.

- The Seminar acknowledged it was also the responsibility of the scientist to make the IODE system work. This could be achieved through the submission of data to the data centre.

- The Seminar acknowledged the Gulf of Thailand Project as an opportunity to create a network of observational sites, which constitute an input to GOOS and a way to strengthen cooperation between countries in the region. The WESTPAC Member States were called to pool resources in implementing the project.

- The Seminar recommended that National Oceanographic Committees (NODC) should be given high priority and support by the governments as a valuable coordinating mechanism of marine-related activities.

- The Seminar recommended the establishment of a WESTPAC-GODAR project to make available all data collected in the WESTPAC region.

- The Seminar called for the continuation of the IODE policy based on the principle of open access to, and free exchange of data.

- The Seminar recommended that resources should be allocated for acquiring up-to-date computer systems and modern software, that links of communication be improved between national and regional marine institutions to avoid duplication of effort and to achieve the required level of complimentarity.

ANNEX VIII

PRESENTATIONS DURING THE WORKSHOP

3 NOVEMBER, 1999

1. OPENING

2. ADMINISTRATIVE ARRANGEMENTS

3. STATUS OF OCEANOGRAPHIC DATA AND INFORMATION EXCHANGE, THE NATIONAL AND INTERNATIONAL PROJECTS OPERATING IN THE WESTPAC REGION
   3.1 Summary of IODE *by Dr Oliounine, IOC*
   3.2 The future of IODE *by Mr Searle, AODC*
   3.3 Status of U.S.-NODC/WDC Activities *by Dr Frey, US-NODC*
   3.4 Status of IODE activities in the member states by questionnaire *by Mr Nagai, JODC*
   3.5 International projects in the region
      3.5.1 NEAR-GOOS *by Mr Nagai, JODC*
      3.5.2 The Southeast Asia Data *by Dr Anond Snidvongs, SEASTART RC*
      3.5.3 Malaysian Activities *by Fadm. Rasip, RMNAVY*

4. REVIEW OF IODE PRODUCTS AND SERVICES
   4.1 Global Temperature and Salinity Profile Programme (GTSPP) *by MrSearle, AODC*
   4.2 Global Ocean Data Archeology and Rescue Project (GODAR) update *by Dr Frey, US-NODC*
   4.3 Marine Information Management (MIM)
      4.3.1 General talk of Meta data development in IODE *by Mr Reed AODC*
      4.3.2 Development of the MEDI Vietnam - A metadata management software *by Dr Nguyen Hong Phuong, VODC*
      4.3.3 Cruise Summary Report (CSR) and National Oceanographic Programme (NOP) *by Mr Seale, AODC*
   4.4 IODE products
      4.4.1 World Ocean Database 98 *by Dr Frey US-NODC*
      4.4.2 IODE Resource Kit including OceanPC *by Mr Reed, AODC*

5. CAPACITY BUILDING FOR OCEANOGRAPHIC DATA AND INFORMATION MANAGEMENT
   5.1 General picture of the IODE Training programme *by Dr Oliounine, IOC*
   5.2 Training course for foreign countries in Japan *by Mr Aiura, JODC*
   5.3 The Journal for the Developing Science of Ocean & Atmospheric Data Management *by Mr Searle, AODC*

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6. MEASUREMENTS TO SATISFY THE USER'S NEEDS FOR DATA FROM THE IODE SYSTEM, QUALITY CONTROL OF OCEANOGRAPHIC DATA AND PROCESSED DATA & INFORMATION TYPES ETC.
   6.1 Temperature and salinity distribution characteristics in seas around Japan, and statistical parameters used in a visual quality-control software *by DrNagata, MIRC*
   6.2 Plankton data management and metadata in U.S.-NODC *by Dr Frey, US-NODC*
   6.3 Declasification of Naval data *by Dr Oliounine, IOC*

7. PROPOSED ACTIONS
   7.1 Increase awareness of the IODE system in the WESTPAC region
      7.1.1 Application of IOC/IODE web page and Newsletters *by Mr Reed, AODC*
      7.1.2 Cooperation between Oceanographic Research Programme and Data Centre, Introducing of JODC recent dataset *by Mr Aiura, JODC*
   7.2 Roles for developed countries in supporting developing countries in ocean data and information management
      7.2.1 **Application of Existing Cooperation Programme, Japanese Governmental Aid Programme**
      by Mr Yamamura, JICA

8. WRAP UP

9. CLOSING

ANNEX IX

RECOMMENDATIONS OF THE CONFERENCE

The following are the recommendations from the Conference:

- In order to start a GODAR type project in WESTPAC, the Conference recommended establishment of a working group chaired by a representative from Malaysia. This group will start development of an action plan that includes the need for human resources and approaches to gain external resources to implement the project in the region. The group would invite the IODE Regional Coordinator, the Vice-Chairman for WESTPAC, the GODAR project leader or US-NODC experts who were involved the implementation of the GODAR to assist in the development of the action plan. The group should take into account the recommendations of GODAR III regional workshop which took place in Tianjin China in 1994 and the recommendations of the world GODAR Conference which was held at Washington D.C. USA, in 1999.

- The countries where there is no IODE Coordinator, should nominate a person for this position. They should also establish a coordination group at the national level to look at creating a Designate National Agency or a National Oceanographic Data Centre.

- Despite numerous efforts to encourage countries to submit NOPs and CSRs the input is still very low. The Conference urged member states to encourage the provision of NOPs and CSRs to JODC.

- The Conference recommended to set up a marine meta-database for the WESTPAC region. The IODE Committee was invited to investigate and work on the creation of a regional distributed metadata system to provide a global view. It is preferable that provision of the metadata system be done through a network and the MEDI Pilot Project Software be adopted and used.

- The Conference recommended that IODE plays a stronger role and takes a lead in the development of marine data related standards and protocols. This view covered development of a marine data framework and application of Internet technologies such as a marine version of the eXtensible Markup Language (XML).

- The Conference recognized the need to improve communications and discussion on cooperation and collaboration of data management and exchange activities in the WESTPAC region. The Conference requested JODC to investigate hosting of a bulletin board system (BBS) and establishing a mailing list (using Internet technologies) for a discussion group on data management related activities. The discussion group will include data managers and scientists from the region and should become a mechanism to improve IODE services and products.

- The Conference recognized the importance of existing training courses, and expressed appreciation to JODC for its considerable efforts in providing human resource training in the WESTPAC region. The Conference recommended the development of training courses to

support other activities, such as usage of the IODE Resource Kit, GODAR related activities and issues, and use of metadata and the MEDI system.

- The Conference appreciated the progress already made by IODE in declassification of naval data. The Conference recommended that a pilot project be developed and put into operation in the WESTPAC Region in support of a worldwide oceanographic data declassification process. IODE National Coordinators should spare no effort in bringing the idea of the importance of naval data declassification to the attention of respective national authorities, in increasing public awareness of what declassification is and what will be the benefits of participating in a pilot project and contributing to its success. The Conference also recommended that IODE makes promotional materials available for this activity.

ANNEX X

LIST OF ACRONYMS

ASEAN	Association of South East Asian Nations
CD ROM	Compact Disk Read Only Memory
CSR	Cruise Summary Report
CZERMP	Coastal Zone Environmental and Resource Management Project
DNA	Designated National Agency
ENC	electronic navigational chart
ENSO	El Nino and the Southern Oscillation
GCMD	Global Change Master Directory
GLOBEC	Global Ocean Ecosystems Dynamics
GODAR	Global Ocean Data Archaeology and Rescue Programme
GOOS	Global Ocean Observing System
GTS	Global Telecommunication System (WMO)
GTSPP	Global Temperature and Salinity Profile Programme
HAB	Harmful Algal Blooms
ICSU	International Council of Scientific Unions
IGBP	International Geosphere-Biosphere Programme
IOC	Intergovernmental Oceanographic Commission
IOCINCWIO	IOC Regional Committee for the Co-operative Investigations in the North and Central Western Indian Ocean
IODE	International Oceanographic Data and Information Exchange
ITIS	Integrated Taxonomic Information System
JGOFS	Joint Global Ocean Flux Study
JICA	Japan International Cooperation Agency
JISTEC	Japan International Science and Technology Exchange Center
JODC	Japan Oceanographic Data Center
MEDI	Marine Environmental Data Information
MEDS	Marine Environmental Data Service (Canada)
MIRC	Marine Information Research Center (Japan)
NEAR GOOS	North-East Asian Regional GOOS
NESDIS	National Environmental Satellite Data and Information Service
NMFS	National Marine Fisheries Service
NODC	National Oceanographic Data Center
NOP	National Oceanographic Programmes
NOS	National Ocean Service
ODA	Official Development Assistance
ODINAFRICA	Ocean Data and Information Network for Eastern Africa
ONR	Office of Naval Research (USA)
RMNODC	Royal Malaysian Navy Oceanographic Data Centre
RNODC	Responsible National Oceanographic Data Center
SEASTART RC	Southeast Asia START Global Change Regional Center
STA	Science and Technology Agency (Japan)
TEMA	Training, Education and Mutual Assistance in Marine Science

UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UTM	Universiti Teknologi Malaysia
VDC	Virtual Data Center
WDC	World Data Center
WESTPAC	Western Pacific
WIPO	World Intellectual Property Organization
WMO	World Meteorological Organization
WOCE	World Ocean Circulation Experiment
WOD98	World Ocean Database 1998
XML	eXtensible Markup Language