Global Ocean Observing System

Intergovernmental Oceanographic Commission

Training Course Report

70

Sixth IOC/WESTPAC Training Course on NEAR-GOOS Data Management

Japan Oceanographic Data Centre
Hydrographic Department
Japan Coast Guard

Tokyo, Japan
21 October - 1 November 2002

GOOS Report No. 131

UNESCO

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Abstract

This report presents a summary of the Sixth IOC/WESTPAC Training Course on NEAR-GOOS Data Management, which was organized by the Japan Oceanographic Data Center (JODC) under the auspices of the IOC, from 21 October to 1 November 2002 at the JODC, Hydrographic and Oceanographic Department, Japan Coast Guard, Tokyo, Japan. Seven persons were participated in the training from China, Fiji, Indonesia, Malaysia, the Republic of Korea, the Russian Federation and Thailand. The objective of the training course was to provide personnel currently involved in oceanographic data management in the WESTPAC Member States with basic concepts of the IODE system and its function, NEAR-GOOS Real Time and Delayed Mode Database, and acquisition, procession and compilation of oceanographic data. In addition, the participants were asked to present country reports regarding data management and the state-of-the-art in the field of marine observation in their respective countries.

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1. INTRODUCTION

An annual "Training Course on the Oceanographic Data Management for WESTPAC" has been organized since 1982 by the Japan Oceanographic Data Center (JODC) in support of the activities of the IOC Sub-Commission for the Western Pacific (WESTPAC). With the commencement of NEAR-GOOS in 1996, the training course on Oceanographic Data Management broadened its scope and was henceforth named "IOC/WESTPAC Training Course on the NEAR-GOOS Data Management".

The Sixth IOC/WESTPAC Training Course on the NEAR-GOOS Data Management was organized by JODC under the auspices of the IOC and with financial support from the UNESCO/Japan FIT (506RAS2001) Project, from 21 October to 1 November 2002 at JODC, Hydrographic and Oceanographic Department (JHOD), Japan Coast Guard, Tokyo, Japan.

The objectives of the training course were to disseminate concepts of NEAR-GOOS and its functions in the WESTPAC region and to allow participants to become acquainted with the acquisition, processing and exchange of oceanographic data in accordance with principles used within the framework of the International Oceanographic Data and Information Exchange (IODE) programme.

2. PARTICIPANTS

The IOC announced the training course through its Circular Letter No. 2024 dated 3 June 2002 to all Member States. The application requirements were that applicants should possess adequate background knowledge in the field of oceanographic data management, preferably with a responsibility in the collection, archiving and exchange of oceanographic data and management at the national organizations relevant to NEAR-GOOS, and that they should have a good command of the English language.

Twenty-eight applications were received from twelve Member States of the WESTPAC in response to the IOC Circular Letter. Out of these, seven participants from China, Fiji, Indonesia, Malaysia, the Republic of Korea, the Russian Federation and Thailand were selected by the IOC and the JODC (see Annex II).

3. TRAINING COURSE

3.1 OPENING

The training course was officially opened on 21 October 2002 by Mr. Nobuyuki SHIBAYAMA, Director of Japan Oceanographic Data Center, Hydrographic and Oceanographic Department, Japan Coast Guard, Tokyo, Japan. In his opening remarks, Mr. SHIBAYAMA reminded the participants and the lecturers that the aim of this training course is to improve the levels of oceanographic data management, both in real time and non-real time and to facilitate mutual data exchange in Western Pacific Regional countries, and thus contribute to the Global Ocean Observing System. To achieve these aims, JODC invited seven lecturers in addition to the staff members of JHOD and JODC: Dr. Keisuke TAIRA, Inspector General, Japan Society for the Promotion of Science, Prof. Dr. Makoto TERAZAKI and Associate Prof. Dr. Yutaka MICHIDA, Ocean Research Institute, University of Tokyo, Mr. Takashi YOSHIDA, Japan Meteorological Agency, Dr. Yutaka NAGATA and Ms. Sachiko OGUMA, Marine Information Research Center, Japan Hydrographic Association and Mr. Robert D. GELFELD, National Oceanographic Data Center in USA.

Furthermore, he stressed that since oceanographic data exchange was one of the most efficient and important aspects of the international cooperation, the participants' role, not only in their own country but also in the international oceanographic community, would become more important.

Finally he expressed that mutual friendship and understanding between participants and related organizations was one of the important factors for efficient data and information exchange.

3.2 OUTLINE OF THE COURSE PROGRAMME

The program covered various subjects such as the functioning of the NEAR-GOOS, Regional Real Time Data Base and Regional Delayed Mode Data Base, the method of processing and managing oceanographic data and information, an outline of the activities of JODC, the concept of the IODE program and practical training on the usage of personal computers and workstations in data management and quality control. Study visits to relevant organizations such as the Japan Meteorological Agency (JMA) were also included. In addition, the course contained new training component, this being marine chemical data processing and management.

Course materials distributed to the participants are as follows:

(i) Activities of JHOD, JODC and Guide of J-DOSS (brochure)
(ii) IODE Resource Kit (CD-ROM)
(iii) Oceanographic Data and Information Management Text Book prepared by JODC
(iv) Oceanographic Data Processing and Management Text Books prepared by each lectures (CD-ROM)
(v) Activities of JMA (brochure)
(vi) Activities of National Research Institute of Fisheries Science (brochure)
(vii) Activities of Japan Marine Science and Technology Center (brochure)

3.2.1 IOC/WESTPAC and NEAR-GOOS

Lectures were given on the organizations, methods of operation, and activities using homepages of the IOC and the NEAR-GOOS on the Internet. Also, examples of international cooperation studies were given, thus placing emphasis on the importance of international cooperation for oceanographic studies.

3.2.2 International Oceanographic Data and Information Exchange (IODE) System

A lecture was given on the history, structure and function of the IODE system of the IOC, proceeded by the outlines of the IOC's activities. It included the basic idea, organizational structure and history of the IODE followed by explanations of data flow from observing stations to World Data Centers (WDCs) through National Oceanographic Data Centers (NODCs) and Responsible National Oceanographic Data Centers (RNODCs).

The lecture further briefed the participants on the activities of National Oceanographic Data Center (US-NODC) and World Data Center - A for Oceanography, and elaborated on the GODAR (Global Oceanographic Data Archaeology and Rescue) Project promoting by IODE and "World Ocean Database 2001" published by US-NODC.

3.2.3 IODE Resource Kit

An introduction to the IODE Resource Kit was given. This Kit was developed by the IODE/IOC in order to support Oceanographic Data Centers and improve the technological skills of the staff. Mainly the lecture introduced the software for quality control of observation data as contained on the IODE Resource Kit CD-ROM.

3.2.4 Activities of JODC

An outline of the JODC was presented to the participants focusing on its activities as the NODC and lectures were given on data exchange in the WESTPAC region, explaining the activities of JODC as the RNODC for the WESTPAC. It was noted that JODC was also acting as the RNODC for Acoustic Doppler Current Profiler (ADCP) measurements, etc. The lecture outlined the tasks of the RNODC for the WESTPAC including the procedures for forwarding and disseminating oceanographic information, procedures for forwarding data and data announcements and the retrieval of data and information through the WESTPAC program.

The lecture stressed the purpose, necessity, and importance of the management of observation information through National Oceanographic Programmes (NOP) and Cruise Summary Reports (CSRs).
These information are released through the JODC Web page widely and research organizations are able to input these information by online directly. These systems were shown on workstation. The participants were informed that JODC annually publishes and distributes the RNODC Activity Report to IOC Member States, at the same time, participants were reminded that the submission of CSR to JODC is required because JODC is the RNODC for the WESTPAC.

In addition, the following lectures were given on the collection of oceanographic data, the subsequent data processing flow and handling of data files adopted by the JODC:

(i) Methods and procedures of obtaining data from organizations that conduct observation.
(ii) Methods of converting data provided in various forms or by different devices (digital or analog data and written reports), to standard formats.
(iii) Explanation of Standard JODC Format for individual data items.

Finally a short presentation was given on the GODAR-WESTPAC Project (GODAR Project in the WESTPAC region) , which was adopted at the 16th Session of the IOC Committee on IODE.

3.2.5 NEAR-GOOS Data Management

3.2.5.1 Real Time Data Base (RTDB)

Lectures were given on the current real-time data exchange framework of NEAR-GOOS and the roles of the Regional Real Time Data Base (RRTDB) and the respective Real Time Data Base in each country. Also, the effectiveness and importance of real-time oceanographic data were pointed out based on examples of monitoring and forecasting of an El Nino event. Further information was given on the current status of data assimilation and its potential application in various fields once data assimilation using real-time data is advanced in the future.

3.2.5.2 Delayed Mode Data Base (DMDB)

This section covered an explanation on the system configuration of the Regional Delayed Mode Data Base (RDTDB), on how oceanic data is managed and archived, the relationship between RRTDB and RTDB, and how to download the data from RDTDB by online.

3.2.6 Procedure of Observation Data and Data Management

3.2.6.1 CTD and BT Data

CTD and temperature measurements (through XBT and AXBT etc.) were outlined, and the importance of quality control for observation data was pointed out. Lectures were made on CTD data processing procedures, methods of correcting

various data including water temperature, salinity, water pressure, and a number of specific procedures to be followed by data producers.

3.2.6.2 Ocean Current Data

The various instruments for oceanic current measurement, such as GEK, Moored current meter, ADCP and surface drifters, were introduced. Particular emphasis was put given on the principle of measuring ocean currents by Shipboard ADCP, procedures for subsequent data processing, reasons why error data occur and methods of correcting such error data, and on the application of quality control procedures.

3.2.6.3 Marine Chemical Data

In the beginning, the availability and importance of chemical oceanographic data such as the carbon dioxide were explained in relation to the global warming. Then, overview of methods on collecting chemical oceanography data, observation instrument normally used, and also the methods of analysis were provided. Also, lecture was given on the methods for calibration and quality control of the collected data, and the importance of meta data in order to achieve the reliability.

3.2.6.4 Marine Biological Data

Information was given on the recent rising of importance for marine organisms data in the conduct of resolving the global environmental change. And, lectures were presented on the kind of marine organisms such as Plankton and Benthos, distribution aspects and food-chain. Subsequently, the method of marine organism observation, the equipment and instrument to collect and analyze of them were introduced using video.

In addition, lectures were given on the JODC marine organism data management. The marine biological data management system is composed of two databases in the JODC. One of them is the "JODC Taxonomic Code of Marine Organisms (Plankton)" which is a digital code for marine organisms developed to realize efficient management of information through the use of computers and all marine organisms are registered concerning the taxonomic ranks of Phylum to Order basically. The another database contains marine organism observation data, mainly plankton. The marine organisms in the database are defined by the Name Code and Taxonomic Code based on "JODC Taxonomic Code of Marine Organisms (Plankton)". The structure, maintenance control and the usage method of these database were explained.

3.2.6.5 Tidal Data

The lectures started by explaining the importance of collecting and managing tidal data (sea level) for the hydrographic survey, tidal prediction, ground level change, and monitoring of the sea-level rise caused by the global climate change. After a brief explanation on the tidal theory, lectures were given on the tide gauge, tidal station, method of tidal observation and data processing.

3.2.7 Practical Training

In 1995 the JODC developed an Internet system called "J-DOSS: JODC Data On-line Service System" that provides oceanographic information and data to users online. JODC is presently operating the system. Lectures on the hardware and software in support of J-DOSS were given by explaining the WWW JODC homepages released on J-DOSS. After the lecture, trainees accessed the J-DOSS using personal computers leased to all trainees, and performed queries for downloading particular sets of information and data. They also accessed the RDMDB of NEAR-GOOS to similarly learn the methods of operation.

Additionally, the following lectures were given based on the data quality control and management procedure being executed by the JODC:

(i) Objectives of quality control and its necessity.

(ii) Assignment of organization codes and vessel codes, and methods of code conversion.

(iii) Methods of checking observation positions and date and time of observation based on ship's velocity calculated. Also check if observation has been performed at sea or land.

(iv) Methods of checking data range and water depths.

(v) Definitions and setting of flags corresponding to the results of various checks.

(vi) Merging of observation data into a master file after quality inspection, and the need to duplicate check at that time.

3.3 STUDY VISIT

3.3.1 Hydrographic and Oceanographic Dept., Japan Coast Guard (JHOD)

A study visit to JHOD was conducted in the morning of 22 October. Firstly, the brochure Striving for revealing oceans scientifically and safe navigation at sea was distributed to the participants for their reference and an outline of the activities of JHOD was introduced during the tour.

A demonstration on the Electronic Chart Display and Information System (ECDIS) was provided by using the Electronic Navigational Chart (ENC) of Tokyo Bay. The usefulness of the navigational information combined with the nautical chart information from ENC was explained at the Chart and Navigational Information Division. Special attention was also given to the situation of oceanographic observation and monitoring of marine pollution, a system of trajectory prediction and information on oceanic conditions as conducted by the Environmental and Oceanographic Research Division.

3.3.2 Japan Meteorological Agency (JMA)

On 25 October, the participants visited the JMA, and received a lecture on the NEAR-GOOS Real Time Data Exchange System in the morning. In the afternoon, a study tour was carried out during which the participants were briefed on;

(i) JMA's data collection/processing activities for physical oceanographic services. The hardware for the NEAR-GOOS Real Time Data Base was also shown, and some of the data base capabilities were demonstrated.

(ii) The JMA's wave analysis and forecast activities. The numerical ocean wave prediction models calculate evolution of wave conditions based upon the equations of wave dynamics using the surface wind data given by numerical weather prediction models of JMA.

(iii) The JMA's activities related to the sea ice monitoring and the pollution chemical analysis.

(iv) The operational global and limited area numerical weather prediction models. Some output from the numerical models and data assimilation systems were demonstrated.

(v) The weather forecast services at JMA. The major services are to issue the weather forecasts in short-range, one-week, and long-range; the warning/advisories for typhoon and heavy rainfall/snowfall; the warning/forecast for tsunami; storm surge, ocean waves and flood; and information on earthquake and volcanic activities.

3.3.3 National Research Institute of Fisheries Science (NRIFS)

In the morning of October 29, the participants visited the NRIFS which is conducting research on fisheries resources, the ocean environment and fish culture.

First, the participants were introduced to the NRIFS operations by watching a video tape, and heard a lecture on such topics as the changes in the oceanic conditions in the area south of Honshu. After this, they inspected a fish culture experimental facility for fish and shellfish, a satellite data reception and analysis system and were given a lecture on the method to analyze oceanic conditions in areas around Japan using this system.

3.3.4 Japan Marine Science & Technology Center (JAMSTEC)

A study visit to the JAMSTEC was organized to give a chance for the participants to see underwater observation technology in the afternoon of October 29. JAMSTEC was founded in 1971 through the cooperative efforts of government, academia and the private sector. The center was expected to promote marine sciences and technology in Japan in response to the social needs of the people, and today plays a highly important role in those activities.

At the beginning of the visit, the outline of the JAMSTEC was introduced by video to the participants. Then several studies on ocean research regarding global change, especially surface moored buoy network named TRITON (TRIangle Trans-Ocean Buoy Network) Project for observing oceanic and atmospheric variability in the Pacific Ocean and its adjacent seas were introduced. Lastly, the participants visited the submergible Research Vessel " SHINKAI 6500".

3.4 COUNTRY REPORTS

Country Reports were presented by the seven participants. This session provided useful information to the JODC staff and participants with regard to the oceanographic data management and state-of-the-art in the field of marine research in the region. The Country Reports are shown in Annex III.

3.5 CLOSURE

The training course was completed on 1 November. Mr. Nobuyuki SHIBAYAMA, Director of the JODC, congratulated the participants for their fruitful completion of the course, which had been run with the assistance of IOC and the Ministry of Education, Culture, Sports, Science and Technology of Japan, and other related organizations.

He mentioned that he believes this course could provide the participants with knowledge of basic oceanographic data management, both in real time and non real time as well as information on the JODC activities. He pointed out that this course would enable good human relations among the participants and between the participants and the JODC staff, and that the participants were very welcome to contact the JODC for further information and technical assistance.

Each of seven participants was awarded a certificate signed by the Executive Secretary of the IOC and the Director of the JODC, indicating that they had successfully completed the training course.

On behalf of the participants, Lt. Cdr. Norhizam B. HASSAN thanked the JODC for organizing the course and the IOC for providing them with an opportunity to take part in this training course.

4. COURSE EVALUATION

On 1 November, all the participants submitted evaluation reports on the training course. A summary of the evaluation is given below.

4.1 LOCAL ARRANGEMENTS

Accommodation
All participants stayed at the hotel introduced by JODC, of which, a few participants commented that the hotel was convenient from its location in the urban area, although the rooms were small and a bit expensive.

Classroom, facilities and materials
All f participants commented as either good or excellent.

Interpreter
Evaluated as good in general but 2 participants questioned about the interpretation on some of the lectured subjects as not being adequate enough.

Supporting condition by JODC staff
All participants made comments that the JODC staffs were very helpful and friendly and offered sufficient support.

4.2 PERIOD OF THE TRAINING COURSE

There were divisions on the comments made by the participants; four participants claimed that they needed 3 or 4 weeks while the other two said the period was adequate and one participant commented that it was too long.

4.3 LECTURES

Most of the lectures were considered informative and evaluated as almost satisfactory because of the provision of information and technology on data processing and management. Particularly, NEAR-GOOS Data Exchange System, JODC Data Online Service System, CTD and BT Data Processing, Tidal Data Processing and WDC-A/NODC Activities were taken as beneficial lectures.

4.4 STUDY VISIT

The participants felt all the places they visited were valuable to expand their knowledge. Particularly, Japan Meteorological Agency (JMA) offered an information on the latest forecast technologies. And at Japan Marine Science and Technology Center (JAMSTEC), comments were made such that they were strongly impressed by the state-of-the-art marine research starting with the SHINKAI 6500.

4.5 SUGGESTIONS FOR IMPROVING THE COURSE

Although the evaluations of the overall training by the trainees were satisfactory in general, some suggestions were also made as follows:

(i) Lacking an adequate training period based on the contents of the training program.
(ii) To provide lecture materials prior to the start of the training in order to better understand the contents of the training.

(iii) Practice hours of Quality Control using computers were not enough.

(iv) To include study visit of the marine researching vessels equipped with the latest observation equipment.

4.6 CONCLUSIONS

In order to enrich the contents of the training and make them more effective, according to the recommendation by the Fifth Session of NEAR-GOOS Co-ordinating Committee, lecture using the IODE Resource Kit as well as on the subject of marine biological data and tidal data were included from the previous training course. Furthermore, lecture on marine chemical data was included on this training. Offering these lectures should be continued based on the increasing importance of these data concerning the global environment change.

As requested by the participants, lecture materials will be sent when possible prior to the start of the training. Additionally, there are requests made to extend the computer practice hours and to visit the research vessel, which may be difficult to realize all of them considering the limited training period. However, these subjects will be considered for fulfillment in the future by revising the current curriculum.

ANNEX I

COURSE PROGRAMME

Sixth IOC/WESTPAC Training Course on NEAR-GOOS Data Management

Monday, 21 October 2002	
10:00 - 12:00	Opening Ceremony and Course Orientation
13:30 - 16:00	Lecture on Outline about IOC, WESTPAC and NEAR-GOOS *Dr. Keisuke TAIRA Inspector General, Japan Society for the Promotion of Science*
Tuesday, 22 October 2002	
10:00 - 12:00	Study Visit to Hydrographic and Oceanographic Department, Japan Coast Guard
13:30 - 17:00	Country Report Presentation *Introduction of Oceanographic Data Management in the Participant Country*
Wednesday, 23 October 2002	
10:00 - 12:00	Lecture on Oceanographic Data and Information Management in JODC *Mr. Y. SUGIYAMA, JODC*
13:30 - 16:00	Introduction to WDC-A and NODC activities *Mr. Robert D. Gelfeld, NODC/WDC-A*
Thursday, 24 October 2002	
10:00 - 12:00	Introduction to the IODE system and GODAR project *Mr. Robert D. Gelfeld, NODC/WDC-A*
13:30 - 17:00	Introduction to the IODE Resource Kit *Mr. I. TEDOKON, JODC*
Friday, 25 October 2002	
10:00 - 12:00	Lecture on NEAR-GOOS Real Time Data Exchange System *Mr. T. YOSHIDA, Japan Meteorological Agency*
13:30 - 16:00	Study Visit to Japan Meteorological Agency
Monday, 28 October 2002	
10:00 - 12:00	Lecture on Ocean Research and Utilization / Management *Dr. Y. NAGATA Director, Marine Information Research Center, JHA*
13:30 - 15:15	Lecture on CTD and BT Data Processing *Mr. H. KINOSHITA Senior Researcher, Ocean Research Laboratory, JHOD*
15:30 - 17:00	Lecture on Tidal Data Processing *Dr. M. ODAMAKI Head of Ocean Research Laboratory, JHOD*
Tuesday, 29 October 2002	
All Day	Study Visit to; National Research Institute of Fisheries Science Japan Marine Science and Technology Center
Wednesday, 30 October 2002	
10:00 - 12:00	Lecture on Ocean Current Data Processing *Assoc. Prof. Dr. Y. MICHIDA Ocean Research Institute, University of Tokyo*
13:30 - 17:00	Practice on Data Management using PC Lecture on NEAR-GOOS Delayed Mode Database and JODC Data On-line Service System *Mr. T. MIYAKE & Mr. KYUMA, JODC*

Thursday, 31 October 2002	
10:00 - 12:00	Lecture on Marine Chemical Data Processing and Management *Ms. S. OGUMA Senior Researcher, Marine Information Research Center, JHA*
13:30 - 15:30	Lecture on Marine Biological Data Processing *Prof. Dr: M. TERAZAKI Ocean Research Institute, University of Tokyo*
15:45 - 17:00	Lecture on Marine Biological Data Management *Mr: T. CHIBA, JODC*
Friday, 1 November 2002	
10:00 - 12:00	Course Evaluation and Closing Ceremony
Afternoon	Customized Special Study

ANNEX II

LIST OF PARTICIPANTS

1. INVITED TRAINEES

Dr. Qinzheng Liu
Senior Research Professor,
National Center for Marine Environment Forecast
8 Dahuisi Rd., Haidian District, Beijing, 100081,
P.R.of China
Tel : 86-10-62173322 ext150
Fax : 86-10-62173620
E-mail : qzliu@axp800.nmefc.gov.cn

Ms Famiza Yunus
Project assistant,
South Pacific Applied Geoscience Commission (SOPAC)
PMB Suva
Fiji
Tel : 679-3381377
Fax : 679-3370040
E-mail : famiza@sopac.org

Mr. Nur Riyadi
Head of Oceanography Section,
Marine Environment Division,
Hydro-Oceanographic Service,
Indonesian Navy
JL. Pantai Kuta V No.1 Ancol Timur Jakarta
Indonesia
Tel : 62-021-684810
Fax : 62-021-684819
E-mail : infohid@indo.net.id

Lt. Cdr. Norhizam B. Hassan @ Abd Ghani Rmn
Oceanographic Database Manager,
Hydrographic & Oceanographic centre,
Naval Hdqrs., Ministry of Defense
Naval Headquarters Ministry of Defence
50634 Kuala Lumpur,
Malaysia
Tel : 603-20713156
Fax : 603-26987972
E-mail: rmnodc@tm.net.my

Dr. Hyunju OH
Researcher,
KODC, National Fisheries Research and Development Institute
408-1 Shirangri, Kijang, Busan, 619-902
Rep. of Korea
Tel : 82-51-720-2221
Fax : 82-51-720-2225
E-mail : hjoh@nfrdi.re.kr

Dr. Elena Ustinova
Senior scientist,
Laboratory of Fisheries Oceanography,
Pacific Scientific Research Fisheries Centre (TINRO-Centre)
TINRO-Centre, 4 Shevchenko Alley,
Vladivostok, 690600
Russian Federation
Tel : 4232-257-934
Fax : 4232-300-752
E-mail: eustinova@mail.ru

Ms Kaewnuratchadasorn Pattaratjit
Researcher,
Southeast Asian Fisheries Development Center (SEAFDEC)
Phrasamutchedi, Samutprakarn, 10290,
Thailand
Tel : 662-425-6142
Fax : 662-425-6110
E-mail: pattarajit@seafdec.org

2. INSTRUCTORS

Mr. Robert D. Gelfeld
Oceanographer
National Oceanographic Data Center
World Data Center -A for Oceanography
U.S.A.

Dr. Keisuke Taira
Inspector General,
Japan Society for the Promotion of Science

Prof. Dr. Makoto Terazaki
Ocean Research Institute,
University of Tokyo

Assosi. Prof.. Dr. Yutaka Michida
Ocean Research Institute,
University of Tokyo

Mr. Tkashi Yoshida
Senior Scientific Officer,
Japan Meteorological Agency (JMA)

Dr. Yutaka Nagata
Director,
Marine Information Research Center (MIRC)

Ms. Sachiko Oguma
Senior Researcher,
Marine Information Research Center (MIRC)

Dr. Minoru Odamaki
Head of Ocean Research Laboratory,
Japan Hydrographic and Oceanographic Department (JHOD)

Mr. Hideki Kinoshita
Senior Researcher,
Ocean Research Laboratory, JHOD

Mr. Nobuyuki Shibayama
Director,
Japan Oceanographic Data Center (JODC),
JHOD

Mr. Satoshi Sato
Deputy Director,
JODC, JHOD

Mr. Shigeru Toyoshima
Senior Research Officer,
JODC, JHOD

Mr. Masahide Ameku
Oceanographic information Officer,
JODC, JHOD

Mr. Takeharu Miyake
Research Officer,
JODC, JHOD

Mr. Yoshihiko Sugiyama
Research Officer,
JODC, JHOD

Mr. Tsuyoshi Chiba
Research Officer,
JODC, JHOD

Mr. Isao Tedokon
Assistant Research Officer,
JODC, JHOD

Mr. Yuichi Kyuma
Assistant Research Officer,
JODC, JHOD

3. SECRETARIAT

Mr. Shigeru Toyoshima
Senior Research Officer,
JODC, JHOD

Mr. Norio Baba
Research Officer,
JODC, JHOD

Mr. Isao Tedokon
Assistant Research Officer,
JODC, JHOD

Mr. Yuichi Kyuma
Assistant Research Officer,
JODC, JHOD

Mr. Hiroki Yunomae
Assistant Research Officer,
JODC, JHOD

ANNEX III

COUNTRY REPORTS

Dr. Qinzheng Liu
National Center for Marine Environment Forecast
CHINA

Ms Famiza Yunus
South Pacific Applied Geoscience Commission (SOPAC)
FIJI

Mr. Nur Riyadi
Hydro-Oceanographic Service, Indonesian Navy
INDONESIA

Lt. Cdr. Norhizam B. Hassan @ Abd Ghani Rmn
Hydrographic & Oceanographic centre, Naval Hdqrs., Ministry of Defense
MALAYSIA

Dr. Hyunju OH
KODC, National Fisheries Research and Development Institute
Rep. of KOREA

Dr. Elena Ustinova
Pacific Scientific Research Fisheries Centre (TINRO-Centre)
RUSSIAN FEDERATION

Ms Kaewnuratchadasorn Pattaratjit
Southeast Asian Fisheries Development Center (SEAFDEC)
THAILAND

Dr. Qinzheng Liu

National Center for Marine Environment Forecast

P. R. of CHINA

Introduction

The Chinese government pays great attention to the development of marine environment observing and monitoring network. An ocean observing and monitoring network has been developed for public service and scientific research in China. This network, together with data management and information service system and forecast system, compose of the Chinese public oceanic services. These three components are introduced in this presentation. At present, the real time data and delayed mode data have become a component of NEAR-GOOS and are available via Internet.

1. Ocean Observing and Monitoring Network

The ocean observing and monitoring network consists of coastal stations, land-based radar, research vessels, voluntary observing ships, data buoys, airplanes and ground stations for receiving satellite remote sensing data. Many types of data from this network are gathered by National Marine Environment Forecast Center and National Marine Data and Information Services. The data include sea surface temperature, wave, and relevant meteorological data et al.

The coastal stations are administrated by State Oceanic Administration (SOA) and well-designed along the coastline. Tide is also observed in some coastal stations. Fourteen coastal stations: Xiaochangshang, Laohutan, Zhifudao, Xiaomaidao, Lianyungang, Lvshi, Shengshan, Zhenhai, Dachen, Nanlu, Beishuang, Xiamen, Dongshan and Zhelang, are established and perform the routine observation. Wave and sea surface temperature are measured at 00:00, 06:00 and 12:00 every day. The related meteorological data such as air temperature, cloud, humidity, and wind are also collected. In winter, sea ice concentration, thickness and ice drift are observed.

The buoys collect wave data and sea temperature at regular time every day. In the future, data from more buoys are expected to be included into the bases.

The ships over the area (15N-42N, 105E-130E) are requested to report wave data and sea surface temperature at prescribed time every day. Some irregular observation maybe reported from the voluntary ships and Research vessels.

A land-based radar, which is located at Bayuquan in the Gulf of Liaodong, is established to monitoring the sea ice. It report the sea ice condition to National Marine Environment forecast Center regularly. Some times, irregular sea ice observation maybe carried out for special use.

Remote sensing satellite data is received by several ground stations and national centers and is used to supply the large scale oceanic information such as SST, water color, sea ice and harmful algal bloom. The remote sensing data are from several satellites such as NOAA, HY-1 and so on.

Airplanes are routinely used to observe the sea ice in Bohai Sea and the North Yellow Sea in winter. Some times, it is used to monitoring the harmful algal bloom, spilt oil, et al.

2. Data management

The data management are divided into two types: the real time database (RTDB) and the delayed mode database (DMDB). The databases are maintained by two national operational centers under State Ocean Administration (SOA): National Marine Environment Forecast Center (NMEFC, in Beijing) and National Marine Data and Information Service (NMDIS, in Tianjin), respectively. Both of the databases are in well operation and provide relevant oceanographic and meteorological data and information for various users.

National Real-Time Data Base (RTDB) is established in NMEFC. NMEFC is responsible for managing, maintaining, and inter-exchanging with regional and international Real Time Data Centers. NMEFC gathers data from coastal stations, land-based radar, research vessels, voluntary observing ships, data buoys and airplanes via VSAT and internet. The remote sensing data are received at the ground station from a series of satellites. It performs the real time data collecting, validation, quality control, analyses and real time product making. The analyses (such as wave and sea temperature analyses) and forecast products (such as storm surge forecasting and warning) are achieved and distributed through many ways such as VSAT and Internet etc.

The Delayed Mode Data Base (DMDB) is established in NMDIS. NMDIS is responsible for the managing, maintaining and inter-exchanging with regional and international delayed-mode data. It performs the collecting, quality control and analysis of the historical data including the irregular data from various sources. These data can be provided to users for various purposes.

3. Public Services and Users

The NEAR-GOOS database RTDB and DMDB are widely used in Chinese public services. The public services include supplying real time data for marine environment forecasting and delayed mode data for scientific research, marine engineering, fishery etc.

The marine environment forecasting in china is carried out in a national center (NMEFC), three regional centers (which are located in Qingdao, Shanghai and Guangzhou, respectively) and several local stations. NMEFC is designed to collect and analyze the real time data for operational marine environment forecasting of the china seas and world oceans. NMEFC also does some researches on the marine environment forecast and provides technical guidance for regional forecasting centers. The operational forecasts include ENSO, ocean wave, storm surge, sea ice, SST and High algae bloom et al. The analyzed and forecast products are supplied to government, regional centers, local stations and special users through VSAT, television, internet, fax and so on. The regional centers are designed to provide services for the local governments and clients in the Bohai Sea/the Yellow Sea, the East China Sea and the South China Sea, respectively. They get the data needed via delicate line-VSAT. The Local stations serve the local clients where they are situated.

Since 1998, the receiving and transmitting data equipment renewal has made the communicating rate and quality much improved in the three regional centers and local stations.

The users of China National RTDB are mainly those who are engaged in marine forecast(s), marine/coastal management, offshore oil exploration and exploitation, and other production activities at sea (for instance, ocean transportation companies, etc.).

The data and information management are to serve users. Recent years, much endeavor is engaged in increasing public awareness of marine environment, reduction and mitigation of marine hazards, and improving the service for scientific and technical research.

Clients for the databases are divided mainly into three types according to their purposes: (1) scientific researchers and engineering; (2) operational agencies issuing forecasts and Warnings, etc; and (3) managers of data collection and information determination programmes and decision-makers. Most users are research scientists from research organizations and Universities. Some users outside China, especially within the NEAR-GOOS region, have visited the website and downloaded the files they wanted.

One who is to be a user of the National DMDB is just requested to provide information such as the name of the organization, e-mail address, telephone number and purpose for using the database. After registered he/she can obtain data just through the e-mail address.

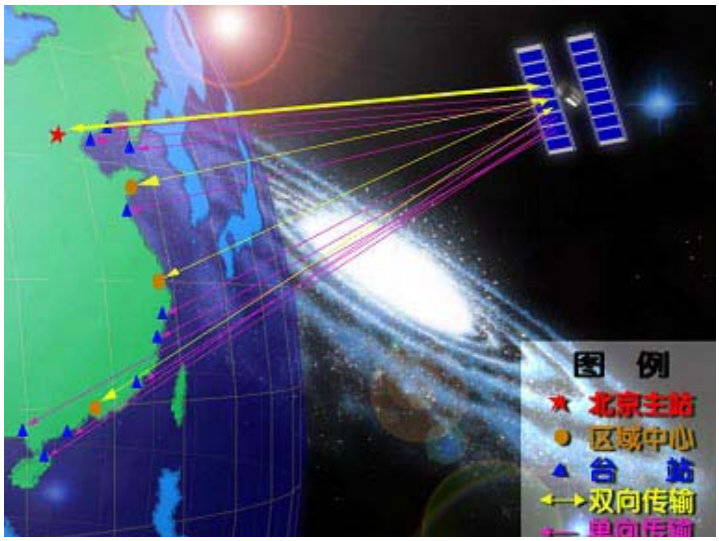
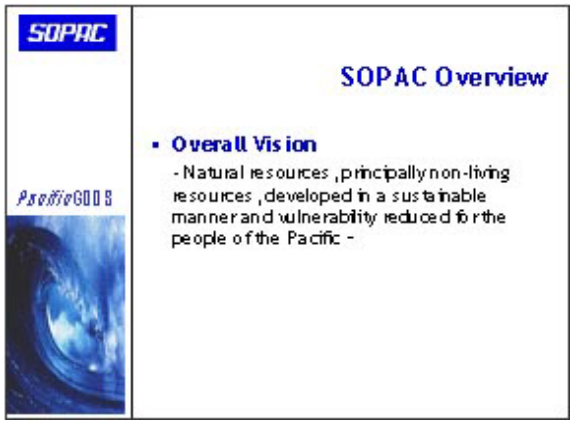


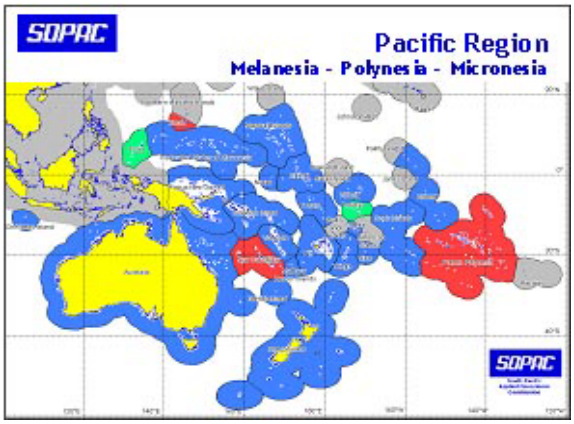
Figure. The VSAT system for real time information of marine environment

Ms Famiza Yunus

South Pacific Applied Geoscience Commission (SOPAC)

FIJI





SOPAC

programmes

- **Operational Programmes of SOPAC**
  - Community Lifelines
  - Community Risk
  - **Ocean & Islands** (PacificGOOS falls in this programme area)

PacificGOOS

SOPAC

programmes

- **Community Lifelines**
  - To improve communities access to energy; water and sanitation; and information and communication technologies for sustainable livelihoods
- **Community Risk**
  - To improve hazard assessment and risk management practices to build safer communities

and..

PacificGOOS

SOPAC

programmes

- **Ocean & Islands**
  - To improve scientific knowledge of ocean and island ecosystems for the sustainable management of natural resources
  - 3 main components
    - Resource use solutions
    - Ocean Governance
    - Monitoring Ecosystem Change -
      - to provide timely and accessible information from monitoring physical and chemical parameters of ocean and islands ecosystems to enable SOPAC Island member countries to improve their management strategies and practices (PacificGOOS component)

PacificGOOS

SOPAC

PacificGOOS

- Pacific Ocean
  - Comprises 180 million sq km or over half of the world's oceans space and close to one third of the surface of the earth
- Pacific Island Countries
  - Large Ocean Island States
  - Ocean plays vital role in the subsistence and livelihood of the people in the Pacific
  - Ocean has significant influence through impacts resulting from such things as tropical cyclones, storm surges, tsunamis, and earthquakes
  - El Nino phenomenon -
    - triggers droughts and rain
    - Accuracies in forecasting these and the extent of their impacts needs to be improved

PacificGOOS

SOPAC

PacificGOOS initiatives

- 3 regional ocean observation workshops in the Pacific
  - 1998 Pacific Regional GOOS workshop held in Suva, Fiji
    - workshop concluded that, in both regional and global context, a regional PacificGOOS would be relevant and positively beneficial.
  - 2000 PacificGOOS coastal workshop held in Apia, Samoa
    - Identified 3 possible pilot projects in the areas of coral reef health, coastal water quality and coral reef development

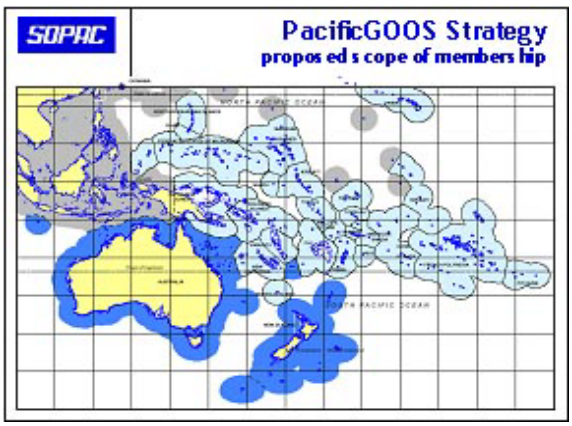
PacificGOOS

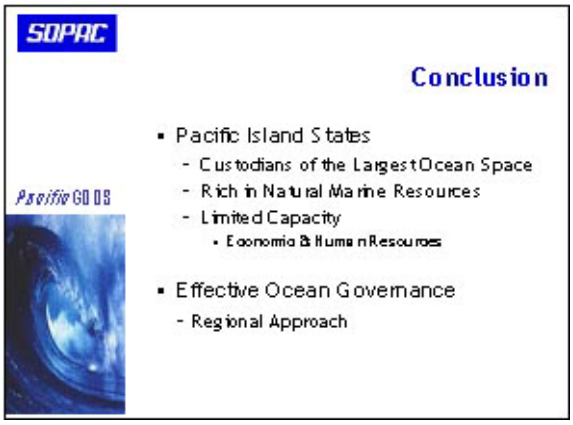
SOPAC

PacificGOOS initiatives

- 2002 workshop on Potential Applications of Ocean Observations for the Pacific held in Nadi, Fiji
  - 5 scientists and country representatives worked on the following themes:
    - Climate Services and Change
    - Community Risks and Community Lifelines
    - Resource Management: Coastal and Marine, Agriculture
    - Basic Research, Secondary Education and Capacity Building

PacificGOOS





Mr. Nur Riyadi

Marine Environment Division, Hydro-Oceanographic Service
Indonesian Navy

INDONESIA

OCEANOGRAPHIC DATA MANAGEMENT IN DISHIDROS

1. INTRODUCTION

Based on PP (Government Regulation) Nr. 23 in 1951 and Keppres (President Decree) Nr. 164 in 1960, Dinas Hidro-Oseanografi (abbreviated as Dishidros) or the Hydro-Oceanographic Service has function and authority to conduct the surveys, mapping and oceanographic researches, either in the defence or the national importances, especially for the navigation safety of the vessels shipping in Indonesian waters. Beside that, Dishidros is a national hydrographic service which makes the nautical charts for the sea navigation importance in Indonesia. Dishidros is also a permanent member of IHO (International Hydrographic Organization) which produces the international regulations, either in the survey methods or techniques.

Beside of the main functions, Dishidros also carries out the task of the sea information service, either for the national or international importances. The service is in the form of supplying the nautical chart for the safety of the navigation and the information to be used in the fields of the coastal zone management as well as the sea exploration, and to support the other developments, particularly in the maritime and the defence development.

In supporting the main functions, Dishidros brings about the data collecting, processing, analyzing and memorizing. The data collecting is carried out by conducting the survey itself, cooperating either with the government or the private institutions both in the domestic and the foreign countries, or obtaining the data from the other institutions, like P2O-LIPI (Research an Center for Oceanology), BPPT (Agency for the Assessment and Aplication of Technology), Directorate General of Sea Communication), BMG (Meteorolodical and Geophysical Agency).

2. FUNCTIONS AND AUTHORITIES

As mentioned above, according to the Government Regulation Nr. 23 in 1951 dated 31st March 1951 and the President Decree Nr. 164 in 1960 dated 14th July 1960 about Hydrographic Services, stated that Naval Hydrography has a function to carry out the compilation and the correction of the nautical charts, notice to mariners and the hydrographic books.

As a national hydrograhic service, Dishidros has 4 (four) actual functions related to the task and the authority which have been carried out, i.e. brings about the hydro-oceanographic mapping and surveys in the framework of:

a. Publishing, distributing and renovating all of the existing hydro-oceanographic informations of the navigation safety.
b. Developing the ports, controlling and keeping the coastal erosion, reclamating the beach, facilitating the marine resources, developing the coastal construction, developing the infrastructure for the management importance of the coastal area.
c. Developing the charts of the sea bottom for the importances of the marine resources exploration, the area lay-out, the environmental conservation in the sea and the coastal area, the sciences, and the other developments.
d. Developing the military special charts for the surface water war, the submarine war, the anti-submarine war, and the amphibian war for the state importance in the maritime defence.

3. CAPABILITIES

To carry out the function, the authority and the responsibility, Dishidros is manned by the professional personnels and supported by the high technology ships and the survey equipments.

a. Personnels

Now, Dishidros has 208 experts which consist of the scholars having the qualifications S1 and S2 in the fields of the hydrography, the oceanography, the coastal technique, the maritime geodesy, the maritime geography, the survey equipments and electronics, the hydrographic surveyors A and B grades, the cartography, the lithography, the oceanographic laboratory assistant, and engineering technician. In carrying out the jobs, the experts are supported by 362 persons as the operators and the skilled workers, and 635 proponent workers related to the specialization jobs. The personnels and the expert workers of the hydro-oceanographic field above are prepared and trained in the primary course of Naval Hydro-Oceanograhic School (Sekolah Hidro-Oseanografi TNI AL / SEHIDROS). Beside of the SEHIDROS training, it is also conducted the continuous training and exercising either in the hydro-oceanographic courses or universities, both in the domestic and the foreign countries related to their basic specialization.

b. Ships

The ships are the prominent supporting medias to carry out the mapping and the survey operations. Now, Dishidros has 1 (one) offshore survey ship (KRI Dewa Kembar), 3 (three) coastal survey ships (KRI P. Route, KRI P. Rempang and KRI P. Romang). All four survey ships are completed by the mapping and the survey equipments in accordance with the function itself, respectively. To maintain the quality of the field personnels, Dishidros has 1 (one) trained ship used to bring about the restricted survey operation (KAL Aries). Beside of four ships, till now Dishidros operates 2 (two) research ships owned by BPPT, i.e. KAL Baruna Jaya II and IV. Meanwhile, to anticipate the survey operation in the beach and the coastal areas which can not be done by using the ship, Dishidros has 4 (four) coastal survey units having the same capability as the ships.

c. Survey Equipments

The mapping and the survey equipments owned by Dishidros consist of the modern and coventional equipments, either for the data collecting and processing or the printing and the cartographic processing. The data collecting and processing are also supported by the computerized systems of the integrated Authomatic Data Logging (ADL) and Authomatic Data Processing (ADP), so the products can be memorized in the digital data format. The cartographic processing uses the Geographic Information System (GIS) which able to produce the Electronic Navigational Chart (ENC).

d. Collected Data

From the mapping and the survey operation of Dishidros, the collected data consist of: Bathimetric Data, Oceanographic Data, Maritime Geographic Data, Maritime Meteorologic Data, Geodetic Data, Geophysics Data.

Beside of Dishidros data, the Indonesian oceanographic data have been collected by some of the oceanographic institutions. The hydrographic surveys and oceanographic researches for collecting data are carried out by the institution itself, by joining the surveys with another institutions or countries. Most of the oceanographic data are collected and stored at DISHIDROS. The hydrographic surveys and the oceanographic researches which are conducted by the oceanographic institutions in Indonesia based on their functions and their competence of each institution, i.e. for the science purposes, the navigation safety, the fisheries, the marine monitoring, the defense, etc.

The Institutions collecting the Oceanographic Data in Indonesia

	DATA / INSTITUTIONS	TIDE	CURRENT	NAUTICAL INFO	NAUTICAL CHART	CHEMICAL OF SEA WATER	MARINE BIOLOGY	CTD	GEOLOGY MARINE	METEOROLOGY MARINE	REMARKS
1	DISHIDROS	X	X	X	X	X		X		X	
2	BPPT						X	X		X	
3	BAKOSURTANAL	X									
4	LIPI	X	X			X	X	X			
5	PPGL								X		
6	DKP						X	X			
7	BMG									X	

Notes:

DISHIDROS	= HYDRO-OCEANOGRAPHIC SERVICE
BPPT	= Agency for the Assessment and Application of Technology
BAKOSURTANAL	= NATIONAL COORDINATOR FOR SURVEY AND MAPPING AGENCY
LIPI	= INDONESIAN INSTITUTE OF SCIENCES
PPGL	= MARINE GEOLOGY RESEARCH CENTER
DKP	= DEPARTMENT OF MARINE AND FISHERIES
BMG	= METEOROLOGICAL AND GEOPHYSICAL AGENCY

There are 2 programs in order to collect data and for monitoring marine environment in Indonesian waters, MEMS (Marine Environment Monitoring System) that is carried out by DISHIDROS and Indonesian Sea-watch program which is

conducted by BBPT jointly with DISHIDROS and another oceanographic institution. The MEMS project started in 1997 for five years planning. 2 of 37 stations have been established on sites of Aru and Lombok. Because there are some problems, especially the budget for maintenance, at present for temporary the instruments are not working. The rest of the other 35 stations have not been installed, because of the national economic crisis. BPPT also has already deployed 12 Seawatch buoys for monitoring marine environment, but recently only 2 buoys are operating in Batam waters.

4. PRODUCTS

From the mapping and the survey operations, Dishidros has produced the nautical charts and books. The chart products are as follows: Nautical Chart (Navigation Chart, Maritime Tourism Chart and Primary Port Chart) and Thematic Chart (Base Point Chart, ALKI Chart, Magnetic Chart, ZEE Chart, Bathymetric Chart, GEBCO Chart and Military Special Chart). Meanwhile, the products of the nautical books are like these: Nautical Almanac, Tides Current, Navigation Tables, Tides Tables, Pilot Book, Ship Framework Tables, Indonesian Buoy Tables, Notice to Mariners, Sea Mine Tables, Indonesian Port Information, Light-Buoy Book, Tides Constant Book, Surface Current Chart, Weather Chart in Indonesian Waters, Information Book of Indonesian Port, etc.

5. OCEANOGRAPHIC DATA MANAGEMENT

a. Data Processing and Analyzing

The collected data are firstly entered in the processing section to control the data quality, so the valid data can be continued to be processed and analyzed furthermore, while first of all the doubtful accuracy data are memorized to be checked in the next survey. The data processing and analyzing are done by the personnels having the hydrographic qualification and comformed to the requested output. The produced data and informations are memorized in two forms, firstly in the form of the digital data-base, and secondly in the computer / CD / disc.

b. Information/Data Classification

Data/information is classified into 3 groups, including the secret, restricted and usual (open) data. The secret information/data is the data/information used to the defence/military importance. The restricted data means that the data/information can be used in the limited field. While the usual classification is concerned to the open data/information. The determination of the oceanographic data classification is so complex if it is faced to the maritime people requiring the oceanographic data, because the oceanographic data depend on the technology, the methods, the purposes, and the personnel capabilities in processing and analyzing.

c. Information/Data Distribution

In supporting the main functions of Dishidros, one of them is for the public service, so the products are distributed by the section of the production and distribution, while the data/information services are carried out by the section of the hydro-oceanographic data information memorizing all the oceanographic data of Dishidros.

In the services of the oceanographic data requests to Dishidros, the process is not too difficult, moreover for the government institutions or the students conducting the research. Dishidros always gives the data (if there are the requested data), only by proposing the formal letter from the relevant institution. The cases of the data requests by personal will be checked and investigated first of all.

6. NODCI (NATIONAL OCEANOGRAPHIC DATA CENTRE INDONESIA)

Considering there are still many oceanographic institutions in Indonesia and each institution conducts the oceanographic researches and surveys itself in accordance with the functions and the tasks, so the surveys and researches sometimes overlap and closed each other causing the fund wasting. It must be recognized honestly that the case occurs nowadays in our environment. As we have known that the oceanographic researches and surveys use the expensive fund, therefore the oceanographic researches and surveys programmes in each institution are synchronized with the other institution either in the domestic country or in United Nations, like IOC.

The oceanographic data/informations in Indonesia still spread out in many existing maritime institution, so it is important to be collected in one institution or committee, and then NODCI (National Oceanographic Data Centre Indonesia) can be formed. Relating with many cases which must be given attention in the oceanographic data centre, especially in funding, so NODCI should be formed by networking to each institution with each password and the data use is in the responsibility of each institution. By the establishment of NODCI, it is hoped that the oceanographic field will develop fastly. The next problem is, who is the NODCI focal point? LIPI, DKP or the others? The case is necessary to be presented in the upper regulations, for example in President Decree? Or even Legislation? Or the others?

7. CONCLUSION

a. The Indonesian oceanographic data still spread in many existing oceanographic instituitions.
b. It is urgent to establish NODCI in order to make easier the uses, either to support the oceanographic development or the science importance.
c. To establish NODCI, it is important to choose the focal point by Government Regulation, President Decree or the others.

Lt. Cdr. Norhizam B. Hassan @ Abd Ghani Rmn

Hydrographic and Oceanographic Center
Naval Headquarters Ministry of Defence

MALAYSIA

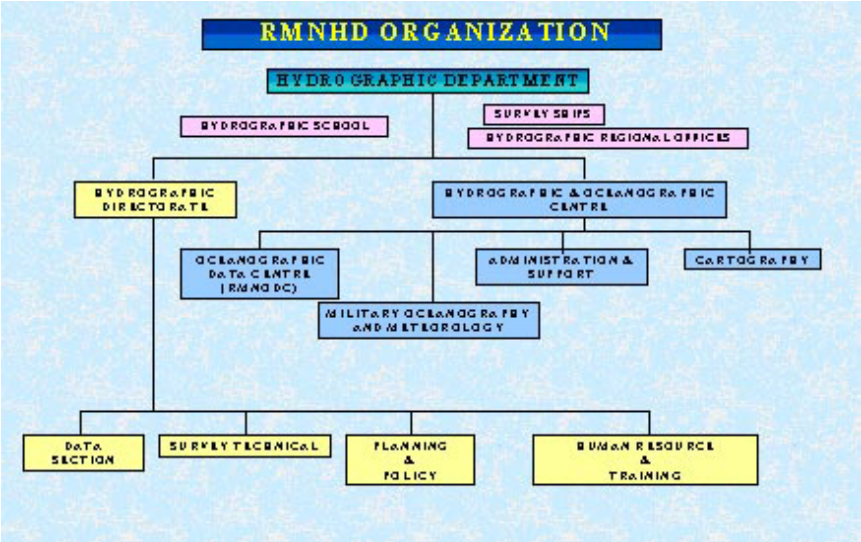
ORGANISATION

1. The Royal Malaysian Navy (RMN) Hydrographic Service is the National Government Agency responsible for the hydrographic surveying and the publication of up-to-date nautical charts and other oceanographic information required to ensure safety of ships navigating in Malaysian waters.

2. The RMN Hydrographic Service has its origins in some ways from British Admiralty Hydrographic Office, and the Admiralty carried out surveys and published charts of the Malaysian coast throughout the nineteenth century in support of the British Defense and commercial development of its Far East colonies. Technically Malaysia assumed responsibility for its own hydrographic surveys in 1957 (at independence), but the training of local Malaysian personnel was only started in 1965. In 1972 the Government made the RMN Hydrographic Service solely responsible for the hydrography of Malaysian waters. With two hydrographic ships collecting bathymetric data, the RMN achieved its aim to publish its own charts since 1984.

3. The roles and task of the RMN Hydrographic Department (RMNHD) have been increasing as time progress. The rapid expansion of the modern technology and increased functions of the department has led to the restructuring of the organization. The new RMNHD organization structure was approved with the creation of two main divisions, **Hydrographic Directorate and Centre of Hydrography and Oceanography**. The main missions are:

A) Ensure safety of navigation
B) Support national defense and development requirements
C) Satisfy international obligations and contribute to the preservation of the marine environment



4. **The Directorate**. The Directorate now solely responsible for policies, staff duties and the operation of the surveying vessels. While the Centre, caters for line function involving Cartography, Oceanography, Meteorology and Administration. The restructuring was aimed at improving the organisation roles and function more efficient and productive. With a staff of 83 personnel, the directorate located in Ministry of Defence, Kuala Lumpur is organized for:

a. Planning of field operations
b. Issue of Hydrographic Instructions
c. Training and personnel management
d. Examination, review and archiving of hydrographic and oceanographic data
e. Printing Navigational Warning and Tides Tables
f. Chart Production and Maintenance
g. Sale of products and services

5. **Hydrographic Section**. The main functions are:

a. Collecting data.
b. Planning and updating of hydrographic surveys
c. Professional standards in hydrographic survey
d. Research and development
e. Delimitation of Maritime Zones
f. Planing field operations
g. Data management
h. Training
j. Budget
k. Administration and management of survey personnel.

6. **Cartographic Section**. This section is for:

a. Compilation of nautical charts and nautical publications
b. Updating of nautical charts and nautical publications
c. Cartographic training
d. Reproduction
e. Notices to Mariners

f. Navigational warnings
g. Research and development including ENC

7. **Oceanographic Section**. The aim of this section is to collect and archive data in support naval maritime defence and research, namely to:

a. Collect, analyze and archive oceanographic data
b. Produce of oceanographic charts and publication
c. Manage oceanographic data
d. Predict tides and tidal stream
e. Provide meteorology for naval operations

PERSONNEL

8. Towards the end of the year, there were 56 hydrographic officers and 221 technicians in the Royal Malaysian Navy Hydrographic Service (RMNHS). This showed slight increase from last year's total, with 10 new trained personnel joining the organization.

A MODERN STATE OF THE ART SURVEY/RESEARCH VESSEL

KD PERANTAU

9. The Hydrographic Service of the Royal Malaysian Navy is based on manpower of 277 and two survey vessels. In order to enhance this capacity, upon decommissioning of the old KD PERANTAU in early 1990, a concept for a new ocean - going survey/research vessel was developed by the RMN. By end of 1995 after a Malaysian - wide competition the vessel was ordered from Hong Leong Lurssen shipyard Sdn Bhd in Penang with the design and scientific coordination developed in Germany. The vessel was launched in May 1997 and christened KD PERANTAU. On 12th October 1998 KD PERANTAU was commissioned into the RMN and became fully operation in March 1999.

10. KD PERANTAU's main dimensions are 67.8m (length overall), 13.3m (breadth) and 4m (draught) respectively with a total displacement of 2000 tons. Two Deutz MWM motors of 1760 KW each on two shafts give a maximum speed of 16.3 knots to the vessel .She has a compliment of 96 officers and crew and is equipped with 2 cranes, a side A - frame, a combined bottom profiler/CTD winch and transportable winches for CTD, sub - bottom profiler and sound velocity profiler. Two survey launches with fully survey facilities. A part from the vessel wheel house and a number of stores four rooms are exclusively dedicated to the survey/research: wet laboratory, dry laboratory, survey chart room and survey equipment room.

11. The vessel was built not only to naval standards but also to commercial classification, in this case that of Lloyd's register. As such, it increases the possibilities and options for RMN to lease the vessel to the private sectors if the need arises.

12. The primary design goal of KD PERANTAU is to gather and process hydrographic and oceanographic data digital that could be used to produce navigational charts and oceanographic publications at much faster rate. In order to achieve such performance, she is equipped with the latest state - of - the - art survey systems consisting, a DGPS based navigation system with ECDIS, a suite of echo sounders and multibeams echo sounders on both survey and mapping system. A side scan sonar, chirp bottom profiler and tide gauges enhance the surveying capacities. For oceanographic research the vessel will operate corers and dredges, XBT and CTD with water sampler rosette, an under water camera, an ADCP and are mooring system with currents meters. The laboratory facilities include a salinometer, a spectrophotometer and basic marine chemical equipment.

13. With the recent ratification of UNCLOS II, KD PERANTAU is set to deliver vast amount of data and thus contribute to the rapid growth of Malaysia's information on its coastal waters and EEZ.

ACTIVITIES OF KD PERANTAU AND KD MUTIARA

14. **Oceanographic Cruises**. A total of 3 cruises were conducted in the Straits of Malacca and South China Sea to observe conductivity, temperature and depth profiles at planned stations to study the seasonal variations and update the existing data bank. These cruises also to provide training to personnel on techniques and instrumentation of some new equipment acquired.

15. **Tidal and Current Observations**. A series of tidal and current observations was observed at various locations such as Tg Gerak, Langkawi, Sg Santi Johor in conjunction of hydrographic survey.

16. **Hydrographic Surveys**. KD PERANTAU and KD MUTIARA have successfully completed 16 Hydrographic Instructions (HI) in Malaysian water since last year until now.

OCEANOGRAPHIC SECTION

17. **General**. The Oceanographic Section conducted a program for data collection through its own oceanographic cruises to meet the national maritime defence and development requirements. Consultation services were also provided to other government department and agencies.

18. **Publications**. These were published during the year:

a. **Malaysia Tide Tables**.

(1) Volume 1 - Peninsular Malaysia Port including Singapore
(2) Volume 2 - Sabah, Sarawak Port including Brunei.
(3) Restricted - For RMN use only.

b. **List of Tidal Bench Marks.**

(1) Volume 1 - Peninsular Malaysia
(First Edition July 1987)
(2) Volume 2 - East Malaysia
(First Edition April 1996)

c. **Oceanographic Data Inventory**. This publication lists all the oceanographic data held by the RMN Oceanographic Data Centre (RMNODC) and other agencies in Malaysia.

d. **Environmental Brief**. These were published as and when they are required to support naval exercise/operations.

19. New additional features has been added to Tide Tables to include Full Moon and New Moon symbols on specific dates according to the predictions.

20. **Tidal Stations**. This section continued her tidal observation by erecting new tide gauges in Peninjau and Siput Reef. Observations were carried out for one to three months. Another tide gauge was erected in Tg Pelepas Port to establish a Standard Port.

21. **Current Metering Project**. The on-going project at Johor Straits was conducted in May till now to study underwater currents and update the existing data bank.

22. **Oceanographic Cruise**. In year 2001 and 2002 a total of 5 Oceanographic cruise was conducted at South China Sea, East Coast of Malaysia and Malacca Straits. To date a total of 22 oceanographic cruise were conducted since November 1994.

23. **Intergovernmental Oceanographic Commission (IOC)**. The Ministry of Science, Technology & Environment in 1997 has appointed the Hydrographic Department as the focal point for IOC activities in Malaysia. The Department has also

appointed as the Designated National Agency (DNA) for International Oceanographic Data Exchange (IODE). The 5th IOC/WESTPAC International Scientific Symposium was held in Seoul, Korea last year was participated by Director General of Hydrographic Department.

24. **Global Oceanographic Data and Archaeology and Data Rescue (GODAR)**. In line with the function as Designated National Agencies (DNA), RMNHD continued its effort in archeology and rescue of oceanographic data in the country. Meeting with other agencies involved in oceanographic data collection has been organised to identify the implementation and Data Inventory.

25. **Oceanographic Research in Malacca Straits using US NAVY PC3 Orion**. Joint Oceanographic and environmental research between RMN and USN was conducted in Malacca Straits last year. The objective of this research was to bulit up a graphic model on current circulation, acoustic and biological productivity within shallow water area. Data on temperature, salinity, noise profile, internal wave and current have been collected by using Airborne Expandable Bathythermograph (AXBT) and noise probe at the height of 300 meter above sea level.

26. **8th National Oceanographic Research Coordination Committee Meeting**. The meeting was convened at University of Malaysia Sabah and chaired by the Director General and will be held yearly basis. The purpose of the meeting was to coordinate oceanographic researchs conducted by various agencies in the nation.

27. **Training/Courses**. Hydrocomp II training course were conducted from 24 to 26 July to enhance the knowledge of newly joined officer. The Manager of Information Technology from the Australian Oceanographic Data Centre conducted it. The Course for Tactical Environment Support system (TESS) was also conducted at this section from 19-26 October by Commander Craig Roy RAN, Director of RAN- METOC. In the month of August and September, one officer was sent as an observer and trainee onboard RV MIRAI which conducted oceanographic Research (Tropical Ocean Climate Study) in West Pacific Sea, South China Sea, Andaman Sea and Indian Sea. The research was conducted under supervision and administration of Japan Marine Sciences and Technology Center (JAMSTEC).

ROYAL MALAYSIAN NAVY OCEANOGRAPHIC DATA CENTRE MALAYSIA

28. **Data Centre Description**. The Royal Malaysian Navy Oceanographic Data Centre (RMNODC) has been appointed as the Designated Oceanographic National Agency (DNA) of Malaysia by IOC in 1994 and has act as the national focal point for the accessing and dissemination of oceanographic data and information for the country as well as the national point of contact with other NODCs.

29. **Brief History**. The RMNODC has been actively engaged in the field of oceanographic for the country. It has assumed the role as the Chairman and Coordinator for the National Oceanographic Research Coordinating Committee (NORCC) in Malaysia. In addition, it has carried out numerous oceanographic cruises in the gathering of oceanographic data such as providing the platform for the Gulf of Thailand Oceanographic expedition in 1999. In Nov 99, the organization and appointments for the Oceanographic and Hydrographic Center has been officially approved and established in the RMN.

30. **Roles and Responsibilities of the Data Center**. The RMNODC is responsible for the acquisition, production, management of oceanographic data and dissemination of marine environmental products and services for the nation. Besides the national responsibilities, the RMNODC form a part of a global network of oceanographic data centers coordinated by IOC. The Data Center function as an DNA to provide on a long term and continuous basis, data and information in a usable form meeting the need of individual or organization in the country.

31. **Data Center Projects and Activities during the Intercessional Period**. As the DNA, the RMNODC has assumed the scientific role in providing data and information to local universities and scientists for the research and forecasting purposes. On the educational role, officer from the RMNODC has been engaged in higher learning institutions, provide consultative advise and

develop awareness on the field of marine science. It has also contribute to the economic role for the country in providing data and information, bathymetry and base charts for the exploitation of natural resources and fisheries activities. The RMNODC has strive to live up to the information role in serving a multiplicity of users through the publication of product such as tide and tidal stream prediction tables, environmental briefs etc.

32. The RMNODC will be participating in Group of Expert Meeting for Hydrographic (GEM HDI - 3) under the Workshop for Managing Potential Conflicts in the South China Sea, from 6 to 7 Nov in Bali, Indonesia. Two cooperation projects for the coastal states within the South China Sea, namely the Data and Information Exchange and Tides Monitoring and Sea Level Rise will be put foward for discussion and agreement. A joint hydrographic survey project for the South China Sea will be discussed. The meeting is funded by the Canadian International Development Agency (CIDA) with technical assistance from the Informal Working Group for the South China Sea, University of British Colombia, Canada.

33. **Data Center Products and Service Developed and/or Made Available during the Intercessional Period**. An oceanographic Data Inventory which include an extensive list of data and information products and services developed and/or made available to user groups have been published annually to facilitate the acquisition and dissemination within the Ministry of Defense as well as other national and international marine science community. The document contained information as to the data held at the RMNODC at the time of the publication and in determining which data is available at national level and how data and information can be requested.

34. **Comments**. Following the official approval of the Hydrographic and Oceanographic Center in the Royal Malaysian Navy, the RMNODC will now be able to provide on a long term continuous basis data and information to various users and agency. Continuous planning and development are underway to further strengthen the capacity of the RMNODC as the National Oceanographic Data Center (NODC) of Malaysia. The RMNODC has acquired the Environmental Monitoring System, Upgrading of Tidal Facilities and Upgrading of Oceanographic Database and expected to be fully operational by end 2002. The National Hydrographic and Oceanographic Center (NHOC) located in Pulau Indah, Pelabuhan Klang has been approved and has begun construction. The new center fully equipped with modern oceanographic facilities is scheduled to be operational by 2005.

Dr. Hyunju OH

Korea Oceanographic Data Center
Oceanography Division, National Fisheries Research and Development Institute

Rep. of KOREA

Oceanographic Observation and Data Management in Korea

In Korea, oceanographic observation including the environmental monitoring has been carried out by the several organizations, National Fisheries Research and Development Institute (NFRDI), National Oceanographic Research Institute (NORI), National Maritime Police Administration (NMPA), Korea Ocean Research and Development Institute (KORDI), Korea Institute of Geology, Mining and Materials (KIGAM), Korea Meteorological Administration (KMA). KORDI is in charge of Real Time Data Base (RTDB).

But NFRDI is responsible for the time series oceanographic observation and operation of the national network on marine environment monitoring. Korea Oceanographic Data Center (KODC) operated by NFRDI is in charge of Delayed Mode Data Base (DMDB).

Serial oceanographic observations

Since the foundation of Fisheries Experiment Station (the predecessor of NFRDI) in 1921, the serial oceanographic observations have been carried out in Korea (Table 1). The present-day 186 stations from 25 observation lines, except for one line, were established in 1961. The Korea-Japan Cooperative Line (K-line) in the southern sea of Korea, was added in the Korean oceanographic observation system in 1968. The serial oceanographic observations have been carried out bimonthly and sea water samples were collected at the depth layers of 0 m, 10 m, 20 m, 30 m, 50 m, 75 m, 100 m, 125 m, 150 m, 200 m, 250 m, 300 m, 400 m and 500 m. Beside the network of serial oceanographic observations, the 315 and 316 observation lines surveyed in the period of CSK (1965~1970) were specially observed again from 1995. The 317 of line observations were adding since 2000. These lines for the oceanographic information of the northern part of the East China Sea have been observed four times a year. The monitoring variables in these oceanographic observations are water temperature, salinity, dissolved oxygen, nutrients, chlorophyll, zooplankton biomass and meteorological factors. We are offering distributions of chlorophyll and raw data of zooplankton is published in annual report of Oceanographic observations (Tab. 2). The Ullungdo-Yamato Bank Line (line-500) for the monitoring of a squid fisheries environment has also acquired CTD data from 1993. This monitoring is carried out once a year in August.

Environmental monitoring

The Korean network for marine pollution monitoring was reorganized in 1997 and NFRDI is responsible for operating the network. The marine pollution monitoring is carried out four times a year in the 256 coastal stations and once a year in the 40 offshore stations (Tab. 3). The general variables, like as pH, DO, COD, suspended solids, oil, nutrient (PO4-P, NO2-N, NO3-N, NH3-N) and cloakrooms, are analyzed for the all 296 monitoring stations since 2000 (Table 4). The particular variables, like as heavy metals and CN, are analyzed for the 66 stations of them. The persistent organic pollutants (e.g., PCB, TBT, PAHs, heavy metals, dioxins, chlorinated pesticides and radioactivity) endocrine disruptors are analyzed in the 20 stations of coastal stations.

Table 1. Time series oceanographic observations in Korea

Area	Around Korea	East China Sea	From Ulhungdo to Yamato Bank
Frequency	Bimonthly	Four times a year (Feb., May, Aug., Nov.)	Once a year (August)
Line Station	22 Lines 176 Sts.	3 Lines 32 Sts.	1 Line 17 Sts.
Data	Water temperature Salinity Dissolved oxygen Nutrients (NO_2-N, NO_3-N, PO_4-P, SiO_3-Si) Chlorophyll-*a* Zooplankton Meteorological factor		CTD Meteorological factors
Beginning	1961 – (1921 –)	1995 – (1965 – 1970)	1993 –

Table 2. The form of raw data of zooplankton

(4) 동중국해 동물플랑크톤 자료 (4) Zooplankton Data : East China Sea

Zooplankton Data **Line 315**

Month	February						May					
Station	13	15	17	19	21	22	13	15	17	19	21	22
Date	14	14	14	14	13	13	26	26	27	27	27	27
Time	10:40	07:35	04:10	01:10	21:15	19:00	20:00	23:55	04:00	09:15	12:10	14:15
Col.* Depth(m)	75	75	50	50	30	20	100	100	75	50	30	30
Pre.** Volume(cc)	5	4	3	3	2	1	40	10	12	2	0.5	2.5
Biomass(mg/m³)	92.2	105.7	60.4	62.9	88.1	195	615.1	284.3	242.3	61.6	23.1	205.5
Copepoda(Individuals***)	719	245	552	690	153	119	2783	2154	3096	1131	317	5112
Amphipoda	4	1	-	-		-	31	7	44	2	1	-
Chaetognatha	97	171	100	37	5	3	478	90	108	3	-	108
Euphausiacea	3	9	15	18	17	5	21	24	80	35	7	8

Month	August						November					
Station	13	15	17	19	21	22	13	15	17	19	21	22
Date	17	17	17	17	17	17	15	16	16	16	16	16
Time	02:00	05:10	08:15	11:05	14:35	16:45	11:50	02:40	05:15	08:05	10:40	12:05
Col.* Depth(m)	100	100	75	50	40	30	110	100	75	60	40	30
Pre.** Volume(cc)	8	11	4.5	0.9	9	11	5.3	5.4	5.4	2.5	0.3	1
Biomass(mg/m³)	111.3	182.4	92.2	12.6	358.5	509.4	77.2	87.4	100.6	51.4	50.3	46.1
Copepoda(Individuals***)	1222	1479	1011	98	1244	1759	1419	1506	2461	964	37	243
Amphipoda	76	7	-	-	-	2	13	8	7	22	-	6
Chaetognatha	273	851	316	68	458	756	430	407	345	76	7	21
Euphausiacea	50	7	7	-	38	22	6	1	16	1	-	2

Table 3. The organization of marine environment monitoring in Korea

Area	Sampling Station Line (Stations)		
	Total	Coastal	Offshore
The whole of Korea waters	66 (296)	60 (256)	6 (40)
East Sea	17 (77)	15 (65)	2 (12)
South Sea	32 (127)	30 (117)	2 (10)
West Sea	17 (92)	15 (74)	2 (18)

Table 4. Variables of marine environment monitoring in Korea

Classification		Monitoring variable	Sampling the times of year	Sampling station
Seawater	General	Temp., Sal, pH, DO, COD, T-N (NO_2-N, NO_3-N, NH_3-N), T-P (PO_4-P), Oil, SS, Transparency, E-coli	Feb. May Aug. Nov.	29
	Trace metals	Cu, Pb, Zn, Cd, Cr^{6+}, Total Hg, As, CN	Feb., Aug.	〃
	Persistent organic pollutants	PCBs, TBT	Feb.	20
Marine organisms	General	Chlorophyll-a	Feb., May Aug., Nov.	60
	Trace metals	Cu, Pb, Zn, Cd, Cr^{6+}, Total Hg, As	Feb.-May	20
	Persistent organic pollutants	PCBs, TBT, Chlorinated pesticides, PAHs	-	20
Sediments	General	Grain size, COD, IL(Ignition loss), AVS(Acid volatile sulfide)	Feb.	60
	Trace metals	Cu, Pb, Zn, Cd, Cr^{6+}, Total Hg, As	-	60
	Persistent organic pollutants	PCBs, TBT, Chlorinated pesticides, PAHs	-	20

Coastal oceanographic Data

Since 1915, the sea surface temperature and meteorological factors in the coastal stations around Korea have been daily observed. The present-day 34 fixed coastal stations, except for some stations, were established in 1967 (Fig 6). The SST data which are from the satellite and daily observation of these stations are analyzed for providing the water temperature information, and used in the prediction and warning of near shore upselling cold water.eal time sea surface temperature (SST) Data

The real time sea surface temperature (SST) data are obtained directly from the advanced very highly resolution radiometer (AVHRR) on the U. S. National Oceanic and Atmospheric Administration (NOAA) polar orbiting satellites (Fig. 7-a). And Ocean color and atmospheric Administration (NOAA) polar orbiting satellites. And Ocean color and atmospheric data are obtained from MODIS satellite since August 1999 (Fig. 7-b). In the summer, monitoring for low-saline water and harmful algal blooms (HABs) is extensively implemented in the coastal area through the ship and buoy observations.

Oceanographic data management

Oceanographic data and information, obtained from NOAA satellite MCSST estimates, ship, drifting buoys, CTD and seawater samples, make it possible to forecast the oceanographic condition and fisheries environment in the seas around Korea. Korea Oceanographic Data Center (KODC), operated by NFRDI, nowcasts and forecasts the oceanographic conditions in the seas around Korea for the fisheries industries, via facsimile and webpage of KODC. The forecasting programmes of the oceanographic condition are as follows: Oceanographic Data and News (daily), Weekly Oceanographic Information, Monthly Oceanographic Information and HAB News (for the information of harmful algal bloom, daily in summer).

Korea Oceanographic Data Center devotes itself to collect the oceanographic data produced by several organizations in Korea, and efforts in improving the system for the oceanographic data management and flow. The oceanographic data file, prepared by KODC, has been expanded and a large amount of hydrographic data has been accumulated. The serial and coastal oceanographic data are published on the KODC internet server. KODC will establish the national NEAR-GOOS Delayed Mode Data Base.

The project of Korea Oceanographic Data and Information Service

KODC has been carried out this project from 1999 until 2002.
The setting on example URL is http//kodis.nfrdi.re.kr
The object of this project
1.Construction of unified management system Korea Oceanographic data and information service.
2. Increment on mutual exchange of Ocean Science Information among the Korea ocean research organization.
The main contents of his project are construction of Metabase (Table 5).

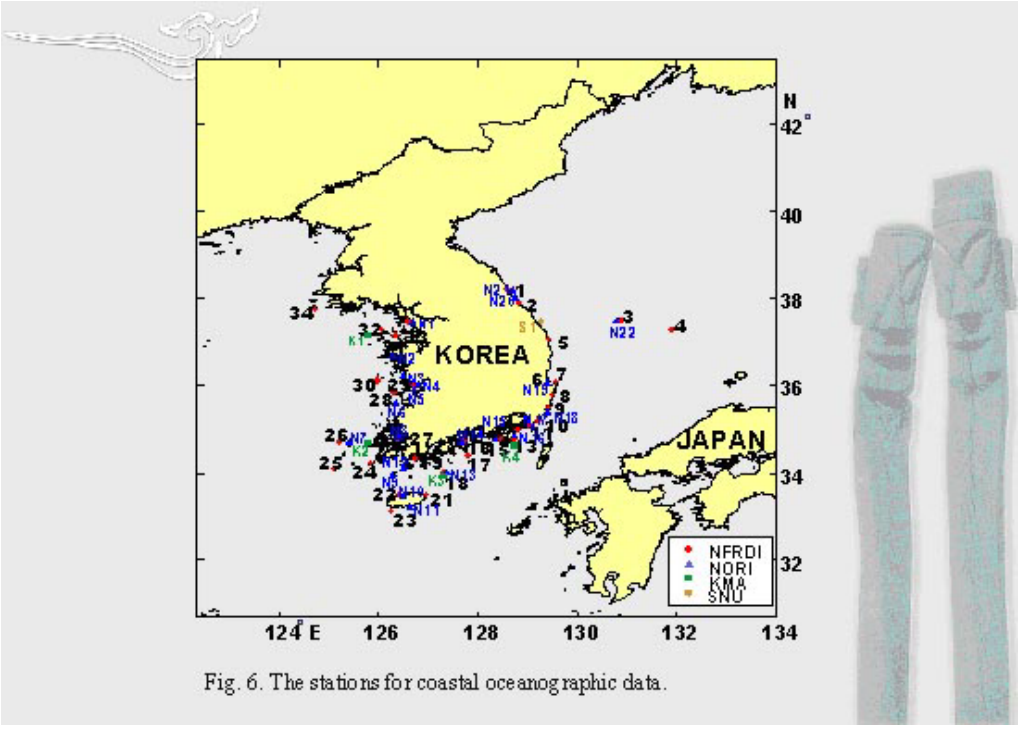


Fig. 6. The stations for coastal oceanographic data.

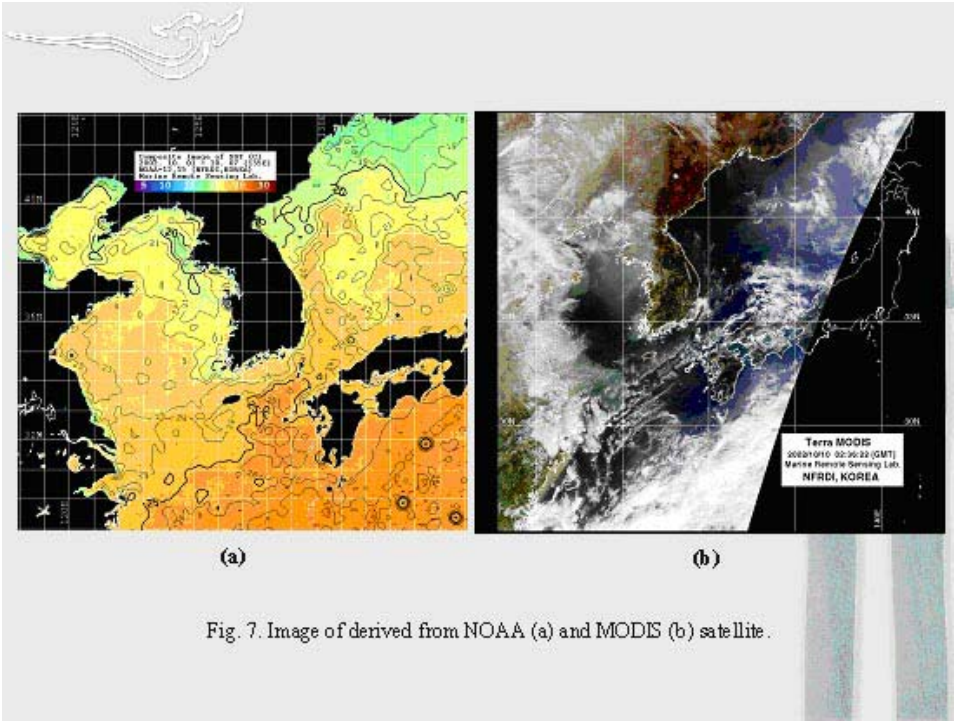


Fig. 7. Image of derived from NOAA (a) and MODIS (b) satellite.

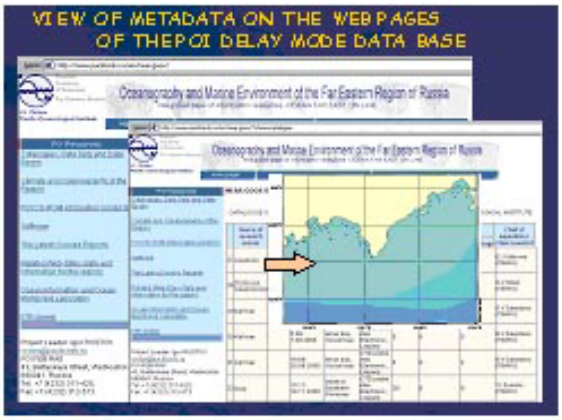
Table 5. Main contents of "The Project of Korea Oceanographic Data and Information Service"

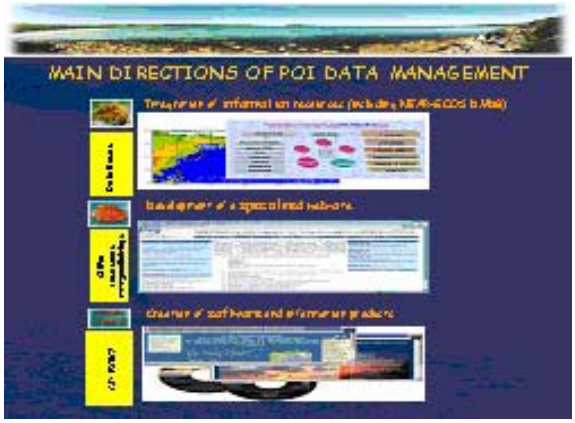
Division	Construction Metadata base
The data for ocean science policy	1. The summarize research and cruise on ocean 2. The domestic and foreign organization related in ocean research, 3. The domestic oceanographer, 4. Present condition and use of ocean research vessel, 5. International organization and programs related in ocean, 6. The trend of foreign marine policy, 7. The equipments of ocean research, 8. NOPs, C&R.
The data of marine observation	1. Physical oceanography : temperature, salinity, current, tide, change of sea level, marine acoustics
	2. Chemical oceanography : pH, DO, BOD, COD, nutrients, SPM, heavy metals, radioactivity substances, organic compound, PAHs, petroleum and related chemicals, etc toxic materials
	3. Biological oceanography : primary productivity, chlorophyll, marine microbe, plankton, benthos attached organism, Egg and larvae, nekton, algae, marine reptilia, marine mammalia
	4. Geological oceanography & Geophysics : depth and shape of sea bottom, terrestrial magnetism, gravity, earthquake, elastic wave probing, image of sea bottom, sedimentology, suspended sediment, core and surface sample of sea bottom, information of coastal line
	5. Ocean meteorology : air temperature, atmospheric pressure, wind speed, wind direction, precipitation, humidity, amount of sunlight and cloud, composition of air

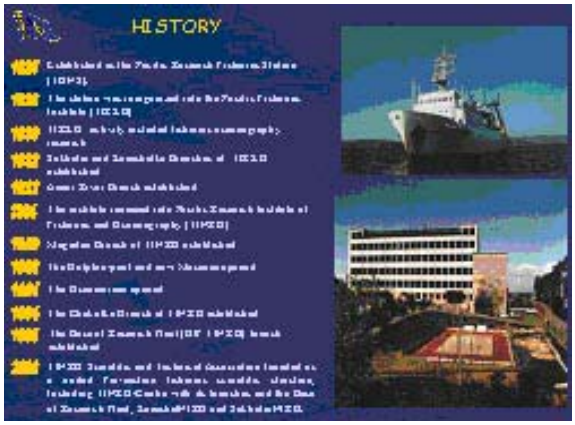
Dr. Elena Ustinova

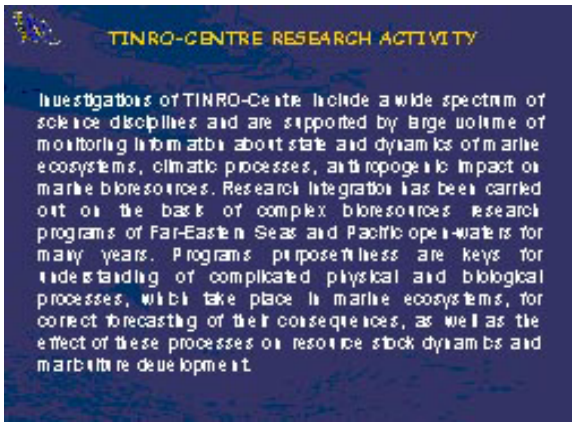
Laboratory of Fisheries Oceanography
Pacific Science Research Fisheries Center (TINRO-Center)

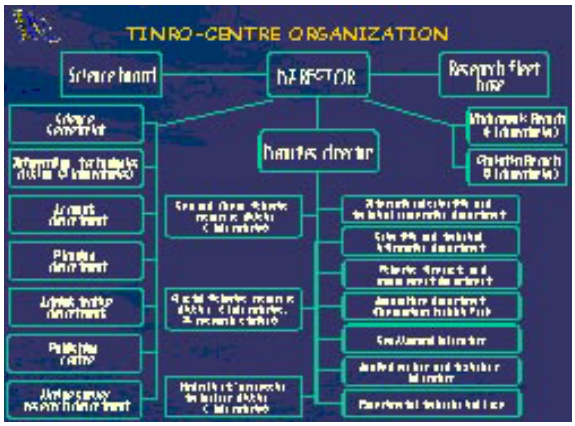
RUSSIAN FEDERATION

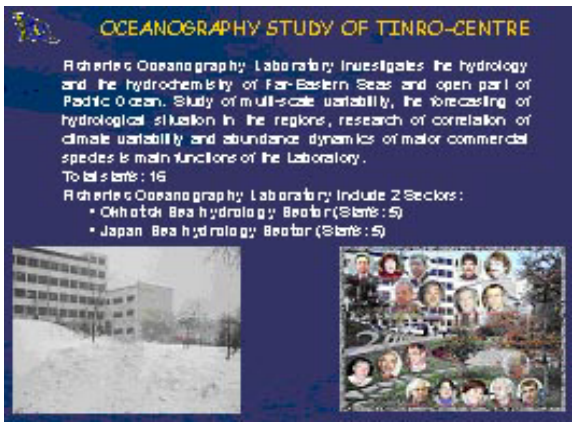


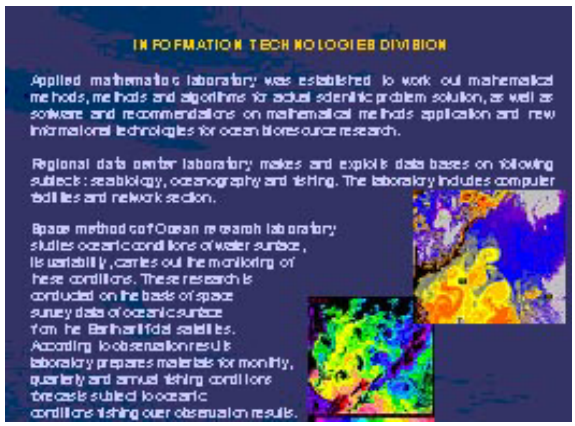

MAIN DIRECTIONS OF POI DATA MANAGEMENT


HISTORY

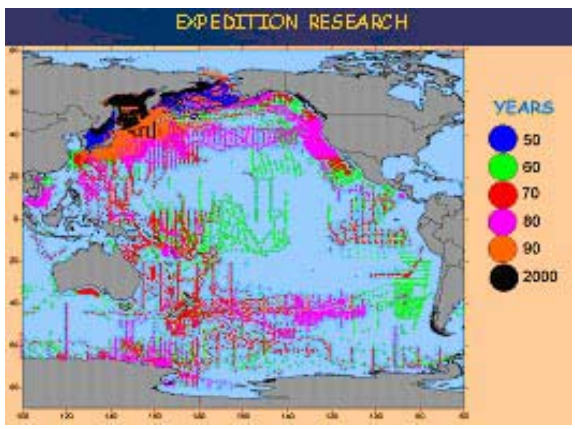

TINRO-CENTRE RESEARCH ACTIVITY
Investigations of TINRO-Centre include a wide spectrum of science disciplines and are supported by large volume of monitoring information about state and dynamics of marine ecosystems, climatic processes, anthropogenic impact on marine bioresources. Research integration has been carried out on the basis of complex bioresources research programs of Far-Eastern Seas and Pacific open-waters for many years. Programs purposefulness are keys for understanding of complicated physical and biological processes, which take place in marine ecosystems, for correct forecasting of their consequences, as well as the effect of these processes on resource stock dynamics and marine fisheries development.

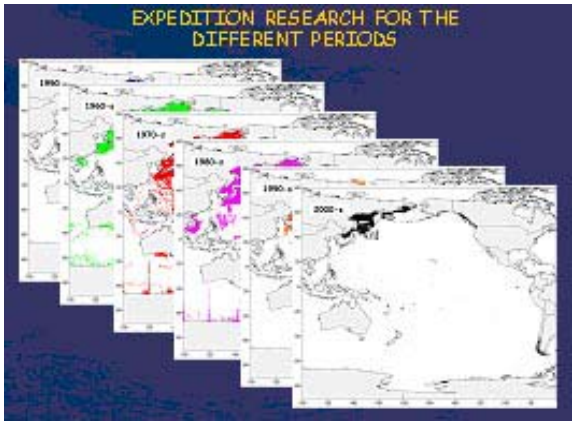

TINRO-CENTRE ORGANIZATION
Science board
DIRECTOR
Research fleet base
Deputies director

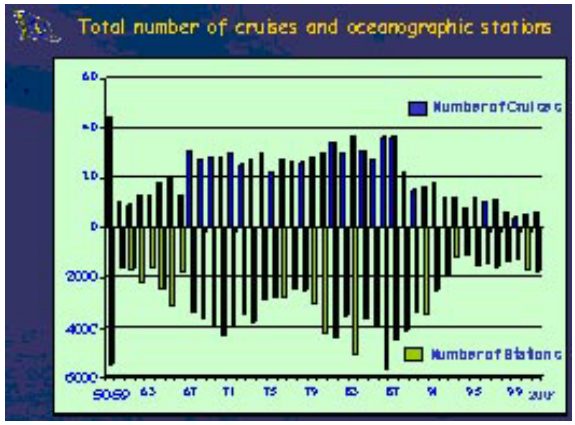

OCEANOGRAPHY STUDY OF TINRO-CENTRE
Fisheries Oceanography Laboratory investigates the hydrology and the hydrochemistry of Far-Eastern Seas and open part of Pacific Ocean. Study of multi-scale variability, the forecasting of hydrological situation in the regions, research of correlation of climate variability and abundance dynamics of major commercial species is main functions of the Laboratory.
Total staff: 16
Fisheries Oceanography Laboratory include 2 Sectors:
• Okhotsk Sea hydrology Sector (Staff: 5)
• Japan Sea hydrology Sector (Staff: 5)

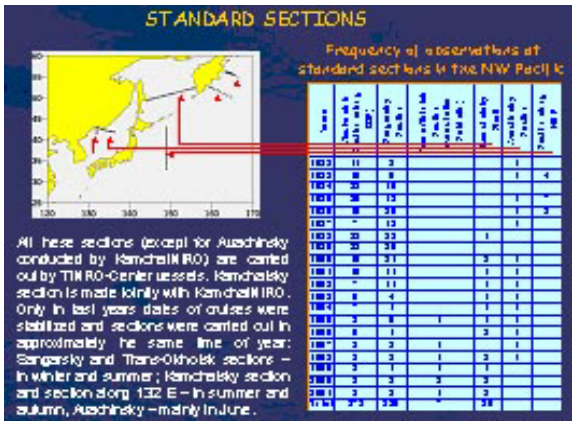

INFORMATION TECHNOLOGIES DIVISION
Applied mathematics laboratory was established to work out mathematical methods, methods and algorithms for actual scientific problem solution, as well as software and recommendations on mathematical methods application and new informational technologies for ocean bioresource research.
Regional data center laboratory makes and exploits data bases on following subject: seabiology, oceanography and fishing. The laboratory includes computer facilities and network section.
Space method of Ocean research laboratory studies oceanic conditions of water surface, its variability, carries out the monitoring of these conditions. These research is conducted on the basis of space survey data of oceanic surface from the Earth artificial satellites. According to observation results laboratory prepares materials for monthly, quarterly and annual fishing conditions forecasts subject to oceanic conditions fishing over observation results.

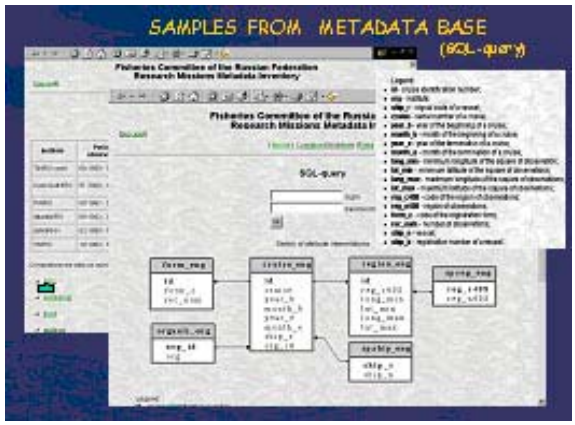

RESEARCH FLEET

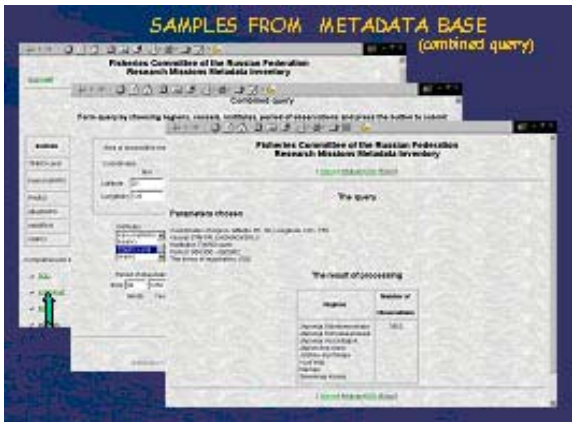

EXPEDITION RESEARCH
YEARS
50
60
70
80
90
2000

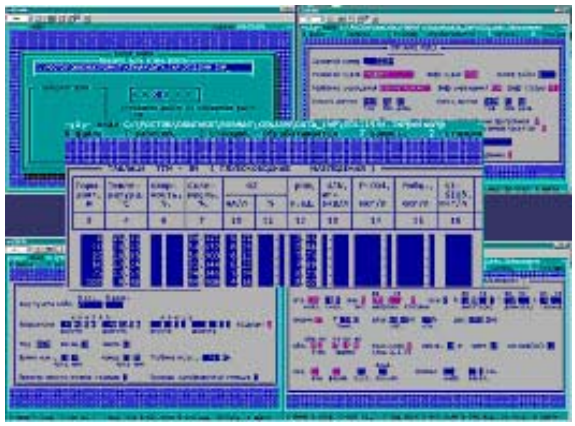

EXPEDITION RESEARCH FOR THE DIFFERENT PERIODS

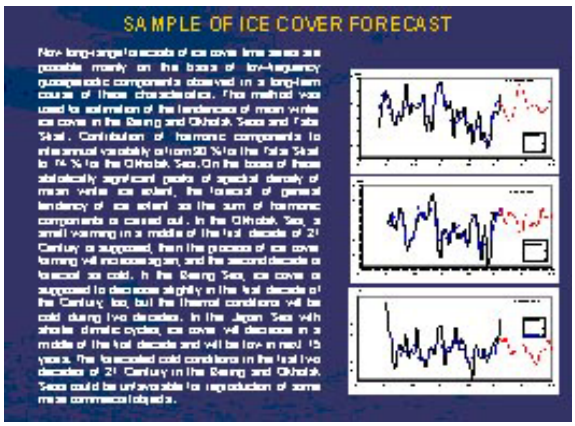

Total number of cruises and oceanographic stations
Number of Cruises
Number of Stations


STANDARD SECTIONS
Frequency of observations at standard sections in the NW Pacific
All these sections (except for Auschinsky conducted by KamchatNIRO) are carried out by TINRO-Center vessels. Kamchatsky section is made jointly with KamchatNIRO. Only in last years dates of cruises were stabilized and sections were carried out in approximately the same time of year: Sangarsky and Trans-Okhotsk sections – in winter and summer; Kamchatsky section and section along 132 E – in summer and autumn, Auschinsky – mainly in June.

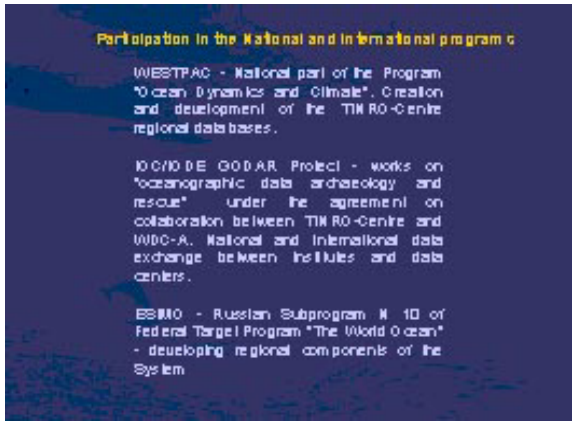

SAMPLES FROM METADATA BASE
(SQL-query)

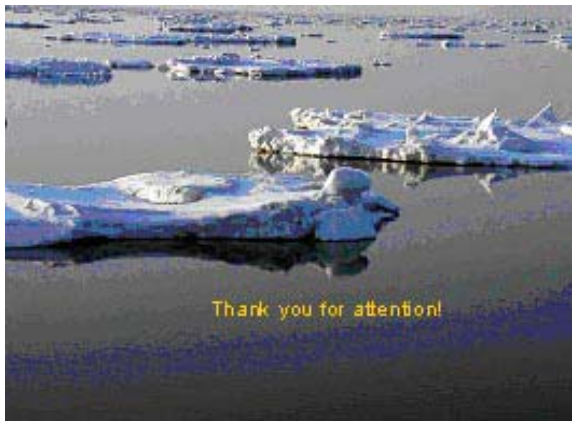

SAMPLES FROM METADATA BASE
(combined query)




SAMPLE OF ICE COVER FORECAST


OCEANOGRAPHIC DATA EXCHANGE
BETWEEN TINRO-CENTRE AND ORGANIZATIONS:
• RIHMI-WDC (All Russian Research Institute of Hydrometeorological Information – WDC (B), Obninsk)
• Far-Eastern Regional Hydrometeorological Research Institute, Roshydromet (FERHRI, Vladivostok)
• V.I. Ilichev Pacific Oceanological Institute, FEB RAS (POI, Vladivostok)
• Primorye Regional Department of Hydrometeorology and Monitoring of the Natural Environment (PRDHMM, Roshydromet),
• Sakhalin Research Institute of Fisheries and Oceanography (SakhNIRO, Yuzno-Sakhalinsk)
• Kamchatka Research Institute of Fisheries and Oceanography (KamchatNIRO, Petropavlovsk-Kamchatsky)
• Chukotka Branch of TINRO-Center.
• Khabarovsk Branch of TINRO-Center.





Ms. Pattarajit Kaewnuratchadasorn

Southeast Asian Fisheries Development Center (SEAFDEC)

THAILAND

Introduction of Ocenographic Data Management in SEAFDEC

Introduction

The Southeast Asian Fisheries Development Center (SEAFDEC) is an autonomous intergovernmental body established as a regional treaty organization in 1976 to promote fisheries development in Southeast Asia. The member countries of SEAFDEC at present are Brunei Darussalam, Cambodia, Japan, Indonesia, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam. SEAFDEC aims specifically to develop the fishery potential in the region through training, research and information services to improve the food supply by rational utilization of the fisheries resources in the region. SEAFDEC has five departments, namely: The Secretariat, MFRDMD (The Marine Fisheries Research Development and Management Department), MFRD (The Marine Fisheries Research Department), AQD (The Aquaculture Department), and TD (The Training Department).

The Training Department is located in Samut prakan, Thailand. The research activities of TD began in 1978 with studies on fishing gear technology, fishing grounds and socio-economics. In recent years, collaborative research programs with other research institutes have been initiated in the areas of physical oceanography, marine pollution, hydroacoustic surveying, fishery biology, food productivity, red tide, fish larvae, plankton and benthos. Research into fishing ground areas is carried out through

numerous surveys on the studies of oceanographic parameters and hydrographic conditions of fishing grounds. The research data aims to support the research and training programs of the Department on fishing technology.

At the present, data and information management plays an important role in providing information for member country researchers and others. SEAFDEC have seen the value of data, therefore, SEAFDEC must expeditiously develop a data and information system.

Marine research activities of SEAFDEC

In the past, the research activities of SEAFDEC focused mainly on fishing operations, until in 1994 SEAFDEC initiated the collection of oceanography data through many research projects, among which are physical, chemical and biological data.

➢ **The Collaborative Research Program in the South China Sea**

SEAFDEC conducted the "Collaborative Research Program on Fishery Resources in the South China Sea" between 1995-2000 using the training and research vessel, MV SEAFDEC with additional information coming from local fishing vessels. Researchers from member countries jointly worked on collecting the information and developing a database on fishery oceanographic and marine environmental conditions and their effects on the abundance and distribution of fishes, that is needed to plan fisheries management in the long term. The survey areas covered the Exclusive Economic Zones (EEZ) of SEAFDEC member countries with coasts on the South China Sea. These are divided into four areas as follows:

Area I: Gulf of Thailand and East Coast of Peninsular Malaysia
Area II: Waters of Sabah, Sarawak and Brunei Darussalam
Area III: Western Philippines
Area IV: Vietnamese Waters

➢ **Tuna fishing ground conditions in the Eastern Indian Ocean**

Since 1993, the SEAFDEC Training Department using M.V. SEAFDEC has conducted tuna resource surveys in the Eastern Indian Ocean and started a fishing ground conditions survey in this area in 1997. This research project aims to provide information on the fishing ground conditions, distribution and biological aspects of tuna in the Eastern Indian Ocean.

Fishing ground conditions, particularly sea water temperature which varies with depth was measured using the ICTD (Integrated Conductivity Temperature and Depth) and XBT(Expandable Bathythermograph) instruments. This temperature profile by depth was analyzed relative to the catch.

➢ **A Coastal Resource Management project in Chumporn province**

Under the Locally based Coastal Resource Management project in Pathew district, Chumporn province (LBCRM-PD), SEAFDEC/TD collaborates with the Department of Fisheries, Thailand to implement this program. Oceanographic and environment surveys are some of the activities conducted every two months since January 2002.

SEAFDEC Data Management

As information technology has developed rapidly and continuously, it is important to manage the data for the benefit and usefulness of the data and information. TD set up the Fisheries Information System (FIS) to develop the data management and information for each project, which appears on the SEAFDEC web site. It consists of Fishery oceanography, Fishery capture and biology and Coastal Fishery Socio-economics (Fig.1).

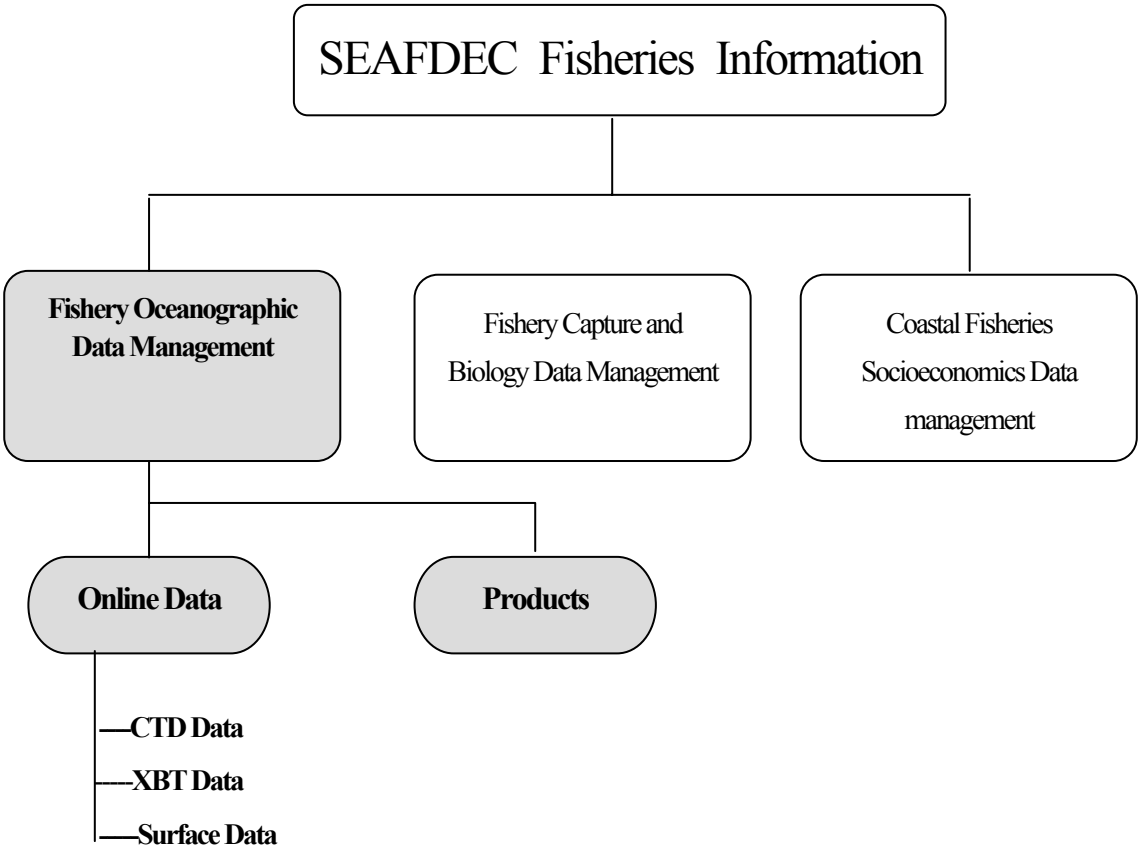


Fig.1 The diagram of the SEAFDEC data management system

Fishery Oceanographic Data Management

The series of oceanographic data collection were derived from the research surveys, undertaken by SEAFDEC. The oceanographic instruments including FSI CTD, SBE CTD, XBT were used for collecting the physical and chemical oceanographic data. After each cruise, the researchers who collected the data must send the digital data to the GIS and Database Unit in the Research Division. Also, the water surface observations were collected and used in term of sea surface data.

Online data

✱ CTD Data

There are 468 CTD data collection stations, presently on the web. The operational areas were the Eastern Gulf of Thailand, the Coast of peninsular Malaysia, Western Borneo Island, the Western Philippines, the East Coast of Vietnam, the Andaman Sea and the Eastern Indian Ocean (Fig.2 and Table1). The variables monitored are pressure, temperature, salinity, dissolved oxygen, potential density, dynamic heights, specific volume anomalies, fluorescence, and depth. The example of CTD database search was shown in Fig.3

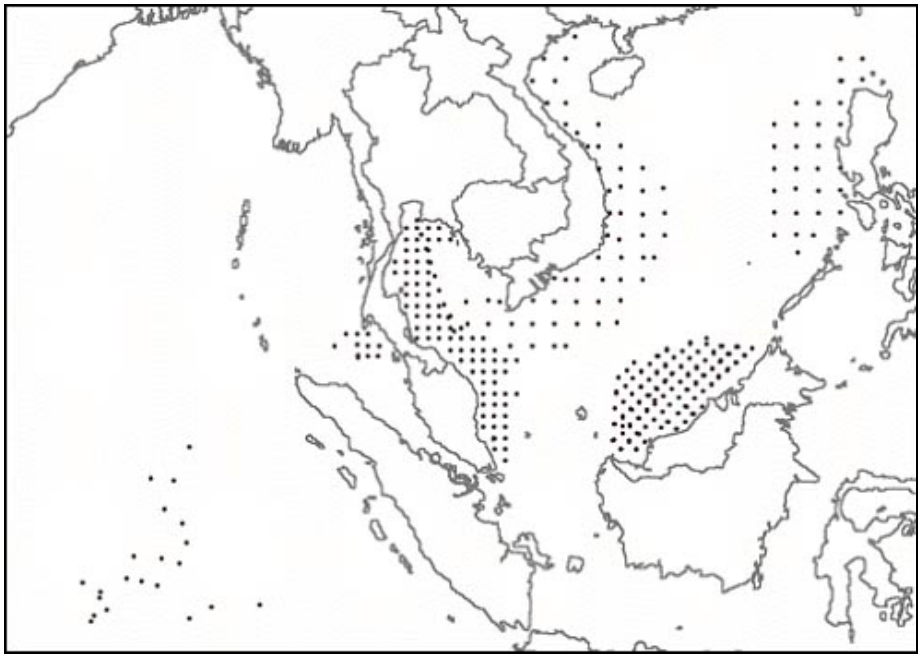


Fig.2 Map of CTD station

Table1. The summary of CTD data station during 1994-2001

Area	1994	1995	1996	1997	1998	1999	2000	2001
Gulf of Thailand		46	47					9
East coast of Peninsular of Malaysia		34	34					
Western Borneo Island			79	79				
Western Philippines					31			
East coast of Vietnam						58		
Andaman Sea	1							19
Eastern Indian Ocean	11	5						15

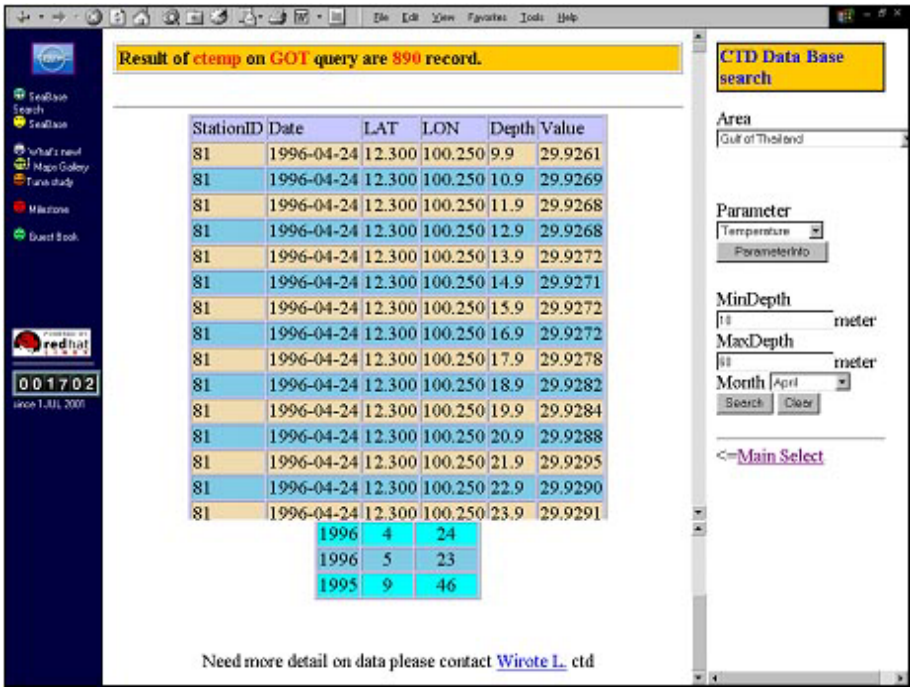


Fig.3 A sample of CTD database search.

✱ XBT data

28 XBT stations were launched in the Eastern Indian Ocean in 1994, 1995 and 2001 and surveyed during October till February (the Northeast monsoon) every year. (Fig.4). The example of XBT database search was shown in Fig.5

Fig.4 The XBT stations in the Eastern Indian Ocean

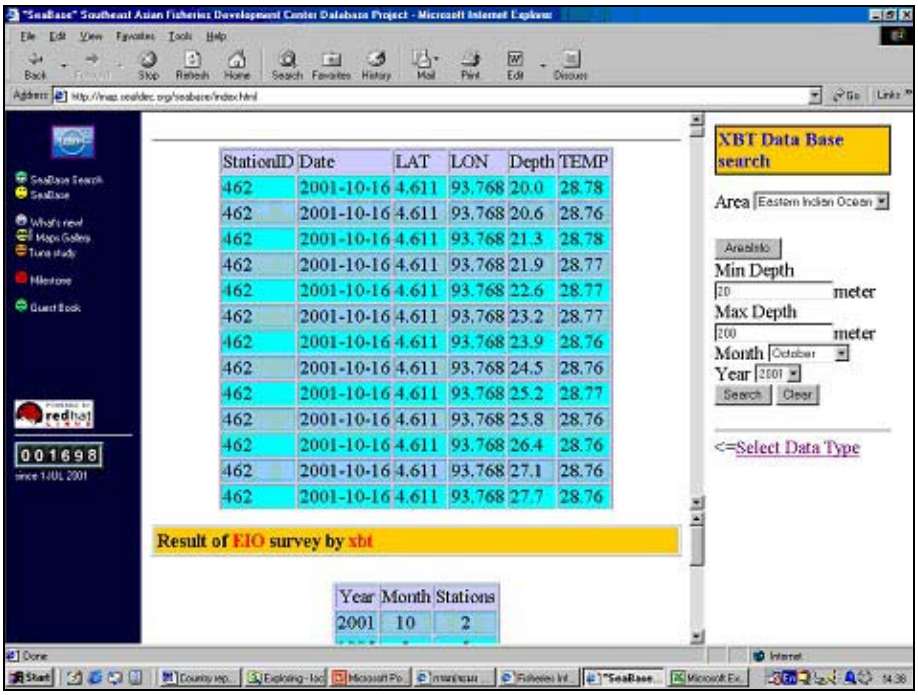


Fig.5 Some XBT data from the database

✱ Surface data

The surface data are the surface water observations by MV SEAFDEC. While the vessel was at sea in the area; the route survey and related information were recorded hourly including the position of the vessel, water current and direction and weather conditions. At the present, the surface data are available only for the year 2001. The survey areas are the Gulf of Thailand (35 stations), Andaman Sea (206 stations) and Eastern Indian Ocean (794 stations) (Fig.6). The parameters are separated into 2 parts as follows:

Weather data contains Latitude, Longitude, Date, Time, Air Temperature, Humidity, Air Pressure, Wind Speed, Wind Direction, Cloud and Weather.

Surface water data comprises Latitude, Longitude, Date, Time, Surface Temperature, Current speed and direction at the sea surface, current speed and direction at 50 m depth and current speed and diretion at 100 m depth.

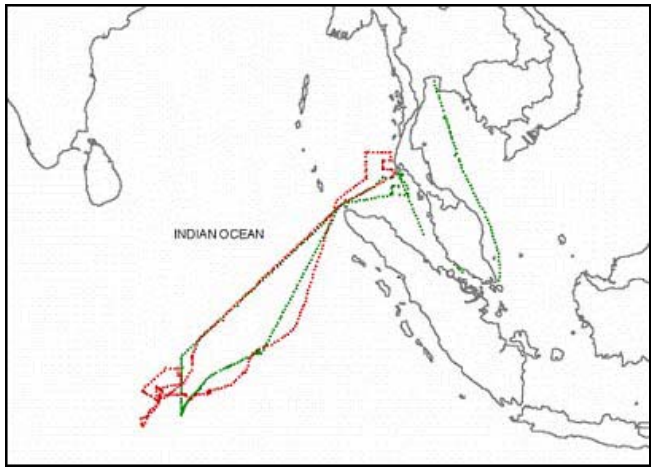
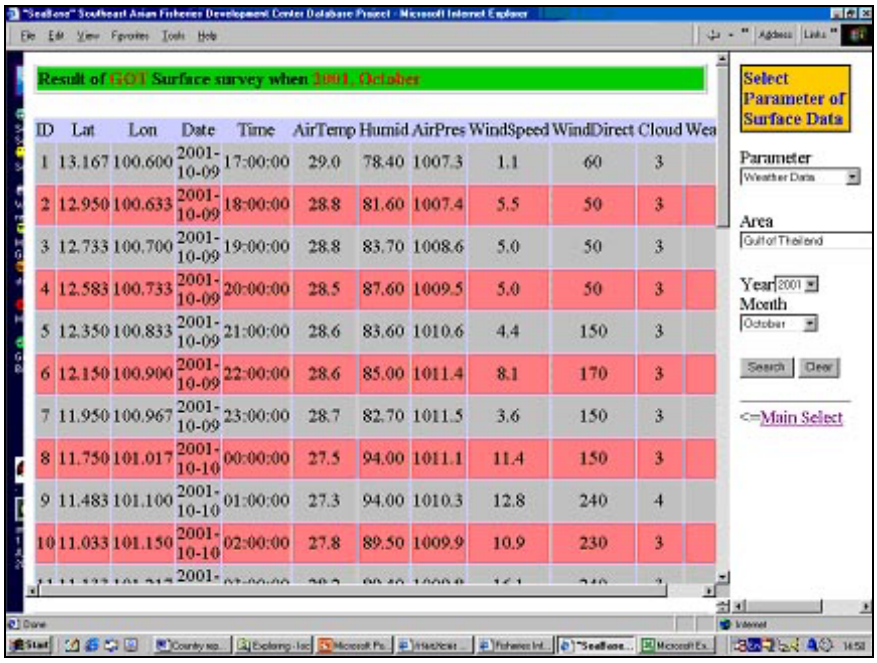


Fig.6
The survey route of MV SEAFDEC in 2002

The example of surface water observation was shown in Fig. 7



ID	Lat	Lon	Date	Time	AirTemp	Humid	AirPres	WindSpeed	WindDirect	Cloud	Wea
1	13.167	100.600	2001-10-09	17:00:00	29.0	78.40	1007.3	1.1	60	3	
2	12.950	100.633	2001-10-09	18:00:00	28.8	81.60	1007.4	5.5	50	3	
3	12.733	100.700	2001-10-09	19:00:00	28.8	83.70	1008.6	5.0	50	3	
4	12.583	100.733	2001-10-09	20:00:00	28.5	87.60	1009.5	5.0	50	3	
5	12.350	100.833	2001-10-09	21:00:00	28.6	83.60	1010.6	4.4	150	3	
6	12.150	100.900	2001-10-09	22:00:00	28.6	85.00	1011.4	8.1	170	3	
7	11.950	100.967	2001-10-09	23:00:00	28.7	82.70	1011.5	3.6	150	3	
8	11.750	101.017	2001-10-10	00:00:00	27.5	94.00	1011.1	11.4	150	3	
9	11.483	101.100	2001-10-10	01:00:00	27.3	94.00	1010.3	12.8	240	4	
10	11.033	101.150	2001-10-10	02:00:00	27.8	89.50	1009.9	10.9	230	3	

Fig.7 A sample of surface database information in the Gulf of Thailand

Coastal data

A water quality project was conducted bi-monthly. The variables monitored and analyzed from 12 stations were water temperature, transparency, salinity, pH, DO, nutrients and Chlorophyll-a.

Products

SEAFDEC produced two types of product:

1. CD-ROM

The data products of the fishery resources in the South China Sea are contained in a CD-ROM package. Recently, these products were completed for Areas I and II. Also included are the highlights of the fishery resources and results from survey cruise and some data from this project. The data dictionary will be produced soon.

2. Map gallery

The oceanographic data from the fishery resource project, were interpreted and displayed as image collections on the website.

Conclusion

SEAFDEC consider that the effective utilization of data and information and good data management will be useful for member country researchers. To achieve the SEAFDEC objectives, the development of data and information management systems giving fisheries information to the region, though the SEAFDEC Fisheries Information system was recently initiated.

Reference

http://map.seafdec.org

ANNEX IV

LIST OF PARTICIPATING COUNTRIES IN TRAINING COUSE FROM 1982 TO 2002

(WESTPAC Data Management)					
1st	:	9 Mar.	- 9 Apr.	1982	Republic of Korea, Philippines, Thailand
2nd	:	16 May.	- 28 May.	1983	China, Republic of Korea, Vietnam
3rd	:	4 Jun.	- 16 Jun.	1984	China, Republic of Korea, Vietnam
4th	:	2 Sept.	- 14 Sept.	1985	China, Philippines, Vietnam
5th	:	8 Sept.	- 20 Sept.	1986	China, Republic of Korea, DPR of Korea, Malaysia (2), Thailand
6th	:	7 Sept.	- 19 Sept.	1987	China, Philippines, Thailand
7th	:	26 Sept.	- 8 Oct.	1988	Republic of Korea, Thailand, Vietnam
8th	:	25 Sept.	- 7 Oct.	1989	China, Indonesia, Malaysia, Thailand, Republic of Korea
9th	:	15 Oct.	- 26 Oct.	1990	Indonesia, Republic of Korea, Vietnam
10th	:	24 Sept.	- 9 Oct.	1991	Republic of Korea, Vietnam, Philippines, Thailand (2)
11th	:	28 Sept.	- 9 Oct.	1992	Indonesia, Philippines, Thailand
12th	:	27 Sept.	- 8 Oct.	1993	Indonesia, Thailand, Vietnam
13th	:	26 Sept.	- 7 Oct.	1994	Malaysia, Philippines, Vietnam
14th	:	6 Oct.	- 27 Oct.	1995	China, Indonesia, Republic of Korea (5)
15th	:	14 Oct.	- 25 Oct.	1996	Philippines, Thailand
(WESTPAC/NEAR-GOOS Data Management)					
1st (16th)	:	13 Oct.	- 24 Oct.	1997	Rep. of Korea (5), Russia, Vietnam
2nd (17th)	:	12 Oct.	- 23 Oct.	1998	China (2), Rep. of Korea (2), Malaysia, Russia
3rd (18th)	:	24 Jan.	- 4 Feb.	2000	China, Indonesia, Rep. of Korea, Russia, Vietnam
4th (19th)	:	27 Nov.	- 8 Dec.	2000	China, Indonesia, Rep. of Korea, Malaysia, Russia
5th (20th)	:	5 Nov.	- 16 Dec.	2001	China, Rep. of Korea, Philippines, Thailand, Russia, Vietnam
6th (21st)	:	21 Oct.	- 1 Nov.	2002	China, Fiji, Indonesia, Malaysia, Rep. of Korea, Russia, Thailand