Global
Ocean
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Intergovernmental Oceanographic Commission

Training Course Report **59**

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

Japan Oceanographic Data Centre

Hydrographic Department

Japan Coast Guard

Tokyo, Japan

27 November - 8 December 2000

GOOS Report No. 104 **UNESCO**

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Abstract
This report presents a summary of the Fourth IOC/WESTPAC Training Course on NEAR-GOOS Data Management, which was organized by the Japan Oceanographic Data Center (JODC) under the auspices of IOC from 27 November to 8 December 2000 at the JODC, Tokyo, Japan. Five participants from China, Indonesia, the Republic of Korea, the Russian Federation and Malaysia were selected by IOC and JODC, and many lectures were given on the following: The concept of NEAR-GOOS and its function in the WESTPAC region; The framework of the International Oceanographic Data and Information Exchange (IODE) programme; Processing and management of various types of marine data and information; Practical training on quality control for oceanographic data by using PC, etc., and also Country reports were presented by the five participants regarding data management and the state-of-the-art in the field of marine observation in their countries.

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SUMMARY REPORT

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1. INTRODUCTION

"The Training Course on the Oceanographic Data Management for WESTPAC" has been organized every year since 1982 at the Japan Oceanographic Data Center (JODC), in support of the activities of the IOC Sub-Commission for the Western Pacific (WESTPAC). The activities of NEAR-GOOS started in 1996. From 1997 the training course on Oceanographic Data Management added these activities into the course. That is why the name of the course changed from " The Training Course on Oceanographic Data Management for WESTPAC" to "IOC/WESTPAC Training Course on NEAR-GOOS Data Management".

The Fourth IOC/WESTPAC Training Course on NEAR-GOOS Data Management was organized by the JODC under the auspices of the IOC and with financial support from the Japanese Government, from 27 November to 8 December 2000 at the JODC, Hydrographic Department, 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. 1654 dated 1 June 2000 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 collection, archiving and exchange of oceanographic data and management at the national organizations, which are interested in NEAR-GOOS, and they should have a good command of the English language.

Fifteen applications were received from seven Member States of the WESTPAC in response to the IOC Circular Letter. In consultation with the authorities concerned, five participants from China, Republic of Korea, Russian Federation, Indonesia and Malaysia were selected by the JODC and the IOC (see Annex II).

3. TRAINING COURSE

3.1 OPENING

The training course was officially opened on 27 November 2000 by Mr. Toshio NAGAI, Director of Japan Oceanographic Data Center, Hydrographic Department, Japan Coast Guard, Tokyo, Japan. In his opening remarks, Mr. NAGAI 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 North East Asian Regional countries, and thus contribute to Global Ocean Observing System. To achieve these aims, JODC invited five lecturers in addition to the staff members of Hydrographic Department and JODC: Prof. Dr. K. TAIRA, Ocean Research Institute of Tokyo University, Mr. N. HASEGAWA, Japan Meteorological Agency, Dr. Y. NAGATA, Director of Marine Information Research Center, Dr. T. SUZUKI, Marine Information Research Center, Japan Hydrographic Association and Mr. Patrick C. CALDWELL, National Oceanographic Data Center, Dept. of Oceanography, Univ. of Hawaii.

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 programme covered various subjects such as NEAR-GOOS Regional Real Time Data Base and Regional Delayed Mode Data Base, the method of oceanographic data processing, outline of the activities of JODC and the Hydrographic Department (JHD), the IOC/IODE system, oceanographic data management at the JODC, study visits (see Annex I), and practical training on the usage of personal computers (PCs) and workstations in data management. During the course, PCs were provided for on-line database training including Internet.

Course materials distributed to the participants are as follows:

(i) Activities of JHD and JODC (brochure)
(ii) Manual on International Oceanographic Data Exchange (IOC Manual and Guide 9, Revised Edition, 1991)
(iii) NEAR-GOOS (manual V2.0, Revised Edition 1998) (brochure)
(iv) Oceanographic Data and Information Management Text Books prepared by JODC
(v) Oceanographic Data Processing Text Books prepared by each lecturer
(vi) WOCE Operations Manual (Last Revision Nov. 1994)
(vii) Activities of MIRC (brochure)
(viii) Activities of JMA (brochure)
(x) Activities of JAMSTEC (brochure)

3.2.1 Activities of JHD and JODC

The participants visited the various divisions in JHD.

The brochures *Striving for revealing oceans scientifically and safe navigation at sea* were distributed to the participants for their reference. An outline of the activities of the Hydrographic Department was introduced during the tour in the exhibition room.

A demonstration on the Electronic Chart Display and Information System (ECDIS) was given 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 Cartography Office. 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 Ocean Surveys Division.

An outline of the JODC activities included an elaboration on the retrieval of oceanographic data and information from the originators, the subsequent data processing flow, and data file handlings. It also highlighted the roles of the JODC as the National Oceanographic Data Centre (NODC) and as Responsible National Oceanographic Data Centres (RNODCs).

3.2.2 International Oceanographic Data and Information Exchange (IODE) System and Data Exchange in the WESTPAC Region

A lecture was given on the history, structure and function of the IODE system of the IOC, as well as an outline of IOC's activities in general. It included the basic idea, organizational structure and history of the IODE followed by an explanation of data flow from observing stations to World Data Centres (WDCs) through National Oceanographic Data Centres (NODCs) and Responsible National Oceanographic Data Centres (RNODCs). The GODAR project (Global Oceanographic Data Archaeology and Rescue Project) was also explained.

Lectures were given on data exchange in the WESTPAC region, explaining the activities of the JODC as the RNODC for the WESTPAC. It was noted that the JODC was also acting as the RNODC for the Integrated Global Ocean Services System programme (IGOSS), the RNODC for the IOC Marine Pollution Monitoring programme (MARPOLMON) for the WESTPAC region, and the RNODC for Acoustic Doppler Current Profiler (ADCP) data. The lectures outlined the tasks of the RNODC for the WESTPAC including procedures for forwarding and disseminating oceanographic information, procedures for forwarding data, and data announcement and retrieval of data and information under the WESTPAC programme.

3.2.3 IOC/WESTPAC and NEAR-GOOS

Lectures were given on the organizations, methods of operation, and activities of WESTPAC and NEAR-GOOS, 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.

3.2.4 NEAR-GOOS Data Management

3.2.4.1 Real Time Data Base (RTDB)

The detailed methods of real-time data exchange under IGOSS were discussed, explaining the type of data and the historical background of the data exchange system, and how NEAR-GOOS worked to increase the number of participating institutions.

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 the El Nino event. In addition, explanations were made on the current status of data assimilation and on how its application to various fields may be realized if data assimilation using real-time data is advanced in the future.

3.2.4.2 Delayed Mode Data Base (DMDB)

Explanations were made on the system configuration of the Regional Delayed Mode Data Base (RDTDB), on how oceanic data is managed, the relationship between RRTDB and RTDB, and how to obtain an authorization for downloading data online.

3.2.5 Procedure for Observation of Data

3.2.5.1 Serial Observation Data, CTD and BT

Serial observation procedures (exemplified by the methods using the so-called Nansen reversing water bottle and the CTD) and temperature measurements (through XBT and AXBT etc.) were outlined, and the importance of quality control for data observation was pointed out. Lectures were made on CTD data processing procedures, methods of correcting various data including water temperature, salinity, and water pressure, and procedures to be taken by data producers in particular.

3.2.5.2 ADCP Data

Lectures were 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 Information Management

This lecture stressed the purpose, necessity, and importance of the management of observed data and observation information through National Oceanographic Programmes (NOP) and Cruise Summary Reports (CSR).

Data base management practices for NOPs and CSRs at JODC were shown on a workstation. The participants were informed that JODC annually publishes and distributes the information to IOC Member States through the RNODC Activity Report. At the same time, participants were reminded that the submission of CSR to JODC is required because JODC is the RNODC in WESTPAC.

3.2.7 Data Management

3.2.7.1 Oceanography

The following lectures were given based on the data management procedures performed by the JODC:

(i) Methods and procedures of obtaining data from organizations that conduct observations
(ii) Methods of converting data provided in various forms or by different devices (digital or analog data and written reports), to standard formats, and the assignment of cruise numbers by the JODC as necessary and the necessity of such numbers.
(iii) Explanation of Standard JODC Format for individual data items.
(iv) Basic quality control procedures for observing positions, and the date and time of observation and a spike check of values obtained from observation, as well as the setting of error flags on doubtful data and why they are needed.
(v) Merging of observation data into the master file after quality inspection, and the need to duplicate a check at that time.
(vi) Importance of maintaining branch files to backup the master file and methods of maintaining records prepared for emergency situations.
(vii) How to respond to users requesting data.

3.2.7.2 Marine Geophysics

Since most of the participants had no experience with oceanographic surveys or geophysical research, a preliminary explanation of soundings shown on charts, basic maps of the sea, and the GEBCO (General Bathymetric Chart of the Oceans) was given.

After that, the data management system, J-BIRD (JODC Bathymetry Integrated Random Data Set) and the MGD77 (Marine Geophysical Data Format) for geophysical/geological data were outlined. Formats and data contents of the JODC's geological/geophysical master files were also shown. In addition, GEBCO was introduced as an example of international cooperation in the field of geology/geophysics.

3.2.7.3 Quality Control of Oceanographic Data

Lectures were given on the quality control of oceanographic data based on methods and procedures actually used for developing the MIRC Ocean Datasets 2001. The outline of the lectures is shown below:

(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 a calculation of the ship's velocity. A check if observation has been performed at sea or land.
(iv) Methods of checking data range, gradients, observing water depths and density.
(v) Definitions and setting of flags corresponding to the results of various checks.

In addition to the above, methods of processing errors in data detected during the quality control of data at the Wakayama Prefectural Fisheries Experiment Station.

3.2.8 Practical Training

3.2.8.1 External Data Base (J-DOSS and RDMDB)

In 1995 the JODC developed an Internet system called "J-DOSS: JODC – Data Online Service System" that provides oceanographic information and data to users online. JODC is presently operating the system. Lectures on the hardware and software components of the 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 allocated to all trainees, and searched information and data; downloading required searched data as necessary. They also attempted to access the RDMDB of NEAR-GOOS to learn how it operates.

3.2.8.2 Quality Control of Oceanographic Data

On-the-job training was given on QC by using quality control software for field oceanographic data developed by MIRC. Copies of the software were given to all the trainees.

3.3 STUDY VISIT

3.3.1 Marine Information Research Center (MIRC)

A study visit to the Marine Information Research Center (MIRC) was carried out in the afternoon of 27 November with a view to familiarize the participants with this part of the Japan Hydrographic Association.

The MIRC was established in May 1997 with the objective of conducting high-grade quality control on the oceanic data compiled by JODC, and producing useful data products for users of various fields. MIRC further ensures the speedy distribution of necessary data sets and data products, backed by a number of experts, technical staff and computer and communication facilities to conduct these activities. Another task of MIRC is to promote awareness building of the general public through its data products. MIRC further cooperates with international data exchange systems in order to produce the necessary high quality global data sets needed in studies on the global environment and climate prediction research.

3.3.2 Japan Meteorological Agency (JMA)

At the Japan Meteorological Agency (JMA), the participants received a lecture on the NEAR-GOOS Real Time Database in the morning followed by a study tour to different sections of the agency, covering:

(i) Oceanographic Division – where JMA's data collection/processing activities for physical oceanographic services were explained. The hardware for the NEAR-GOOS Real Time Data Base was also shown, and some of the data base capabilities were demonstrated.
(ii) El Nino Monitoring and Prediction Center – where the Ocean Data Assimilation System for El Nino monitoring was explained. It was shown that the system gave useful information for the early detection of the El Nino event of 1997-98.

(iii) Wave Forecasting Service/Marine Meteorological Division - where JMA's wave analysis and forecast activities were demonstrated. The numerical ocean wave prediction models calculate the evolution of wave conditions based on the equations of wave dynamics using surface wind data derived from numerical weather prediction models of JMA.

(iv) Sea Ice Monitoring Service/Maritime Meteorological Division – where the JMA's activities related to sea ice monitoring were shown

(v) Pollutants Chemical Analysis Centre/Oceanographic Division – where the Centre's activities were described with emphasis on systematic measurements of the carbon dioxide flux through the sea surface.

(vi) Numerical Prediction Division – where the operational global and limited area numerical weather prediction models were explained. Some output from the numerical models and data assimilation systems was demonstrated.

(vii) Forecast Division – where the weather forecast services at JMA were briefly introduced. The major services are to issue the weather forecasts in short-range, one-week, and long-range; the warning/advisories against typhoon and heavy rainfall/snowfall; the warning/forecast of tsunamis; storm surges, ocean waves and floods; and to provide the information on earthquake and volcanic activities.

3.3.3 Japan Marine Science & Technology Centre (JAMSTEC)

At the Japan Marine Science and Technology Center (JAMSTEC) the participants had an opportunity to see underwater observation technology.

At the beginning of the visit, an outline of the JAMSTEC was shown on video. Then several studies on ocean research regarding global change, especially the 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 submersible Research Vessel " SHINKAI 6500".

3.4 COUNTRY REPORTS

Country Reports were presented by the five 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 service in the region. The Country Reports are shown in Annex III.

3.5 CLOSURE

The training course was completed on 8 December. Mr. Satoshi SATO, Deputy Director of the JODC, congratulated the participants on their completion of the course, which had been run with the assistance of IOC, the Ministry of Education, Science, Sports and Culture of Japan, and other related organizations. He expressed his hope that the course had provided the participants with knowledge of basic oceanographic data management, both in real time and non real time as well as information on 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.

On behalf of the participants, Dr. Alexander SAVELIEV thanked the JODC for organizing the course and the IOC for providing them with an opportunity to take part in it. Each of five 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.

4. COURSE EVALUATION

On 8 December, all the participants submitted evaluation reports on the training course. A summary of the evaluation is given below.

4.1 Local Arrangements

Accommodation, lecture conditions including facilities and classroom, and assistance of JODC staff members were evaluated as excellent.

4.2 Length of Course and Materials

Trainees evaluated the length of the course and training materials as suitable on the whole. However, trainees from Russian Federation and Malaysia pointed out that hours for the courses on quality control and database management were not sufficient.

4.3 Lectures

Most lectures were considered to be useful and beneficial to actual operations in the future. Lectures on the quality control of oceanographic data, browsing and extracting data from the database using PCs, data processing of observation data of various layers, and NEAR-GOOS Database were considered especially significant.

4.4 Study Visit

The study visits to Japan Meteorological Agency (JMA), Marine Information Research Center (MIRC), and Japan Marine Science and Technology Center (JAMSTEC) were considered to be very informative and interesting.

4.5 Expectations and Satisfaction

All of the participants were satisfied with the course arrangements. The following specific comments were made

(i) It was pointed out by a Korean trainee that the training could have been more effective if more details on the schedule and content of this training course were provided to all trainees in advance.
(ii) It was pointed out by trainees from Indonesia and Malaysia that the lectures were significant. The lectures adequately provided the trainees with the knowledge and skills on methods of oceanographic data management and methods of setting up and operating databases.
(iii) A trainee from Malaysia said that he now fully understands the importance of data management and quality control.
(iv) It was pointed out by a Russian trainee that the course had met his expectations of learning about the status of activities of Japan in the context of NEAR-GOOS and methods of data management and the latest information technology.

4.6 Suggestions for Improvement of the Course

(i) Trainees from Russian Federation and China pointed out that they think that the training course for quality control of data using personal computers should be strengthened.
(ii) The Malaysian trainee requested that a lecture on tides and tidal currents be provided.
(iii) The Korean trainee requested that a fishery research institute be added to the list of study visits.

4.7 Conclusions

The training course has been conducted in line with the purpose of NEAR-GOOS Data Management. Trainees received lectures on the concept of NEAR-GOOS and its framework, the IODE system, methods of processing oceanographic data and management of data. It can be considered that the intended objectives have been fully achieved.

For the purpose of this training course, Mr. Patrick Caldwell was invited from the NODC Department of Oceanography, University of Hawaii, as a guest specialist on ADCP, placing emphasis on data processing and quality control of ADCP data. The training on practical data processing and quality control using personal computers and information and data exchange technology using the Internet will be strengthened in response to comments made by some trainees. It will be necessary to study curriculums more in the future, taking into consideration such requests and the advancement of information technology.

It is considered that the participation of personnel from institutions, engaged in oceanographic data management in various WESTPAC countries, to this type of training course not only serves the improvement at a technical level but also deepens the understanding on oceanographic research and data management systems in different countries, and that it further contributes to the promotion of information exchange and for continued training in the future.

ANNEX I

COURSE PROGRAMME

Date	10:00 - 12:00	lunch time	13:30 - 16:00
27/11/2000 Monday	Opening Ceremony and Course Orientation		Study Visit to: - Hydrographic Department, Japan Coast Guard - Marine Information Research Center (MIRC) Mr. Toyoshima, JODC
28/11/2000 Tuesday	Lecture on IODE (incl. CSR, GODAR and JODC activities) Mr. Aiura, JODC		Country Report - Introduction of Oceanographic Data Management in the Participant Country
29/11/2000 Wednesday	Lecture on Geographic Data Management in JODC (J-BIRD, MGD-77 and Software of GEODAS) Mr. Ito, JODC		Lecture on Oceanographic Data and Information Management in JODC Mr. Shimizu, JODC
30/11/2000 Thursday	Training and Explanation on JODC Data Online Service System (J-DOSS) Mr. Nakazato, JODC		Lecture on Practice Data Management by using PC Mr. Miyake, JODC
1/12/2000 Friday	Lecture on Real Time Data Base Mr. Hasegawa, JMA		Study Visit to: Japan Meteorological Agency (JMA)
2/12/2000, Saturday 3/12/2000, Sunday			
4/12/2000 Monday	Lecture on IOC/WESTPAC and its activities (incl. NEAR-GOOS) Dr. Taira, ORI, Tokyo Univ.		Lecture on Ocean Current Data Processing Dr. P. Caldwell, Hawaii Univ.
5/12/2000 Tuesday	Lecture on Research for Ocean and Utilization and Management Dr. Nagata, MIRC		Lecture on Quality Control of Oceanographic Data Mr. Suzuki, MIRC
6/12/2000 Wednesday	Lecture on Practice of Data Management by using PC Mr. Miyake, JODC		Lecture on Serial Station Data Processing Mr. Imoto, JHD
7/12/2000 Thursday	Study Visit to: Japan Marine Science and Technology Centre (JAMSTEC) Mr. Toyoshima, JODC		
8/12/2000 Friday	Course Evaluation and Closing Ceremony		Customized Special Study

ANNEX II

LIST OF THE PARTICIPANTS

1. INVITED TRAINEES

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Mr. Keiji AIURA
Principal Research Officer, JODC

Mr. Kiyohisa ITO
Senior Research Officer, JODC

Mr. Yoshio SHIMIZU
Research Officer, JODC

Mr. Takeharu MIYAKE
Research Officer, JODC

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Mr. Taiji IMOTO
Principal Officer, Ocean Research Laboratory, Planning Division

Prof.. Dr. Keisuke TAIRA
Director, Ocean Research Institute, University of Tokyo (ORI, UT)

Mr. Patrick C. Caldwell
Oceanographic Liaison, National Oceanographic Data Center (NODC)
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Mr. Naoyuki HASEGAWA
Senior Scientific Officer, Japan Meteorological Agency (JMA)

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

Dr. Toru SUZUKI
Marine Information Research Center (MIRC)

3. SECRETARIAT

Mr. Shigeru TOYOSHIMA
Senior Research Officer, JODC

Mr. Hiromi KINOSHITA
Officer in charge of International Affairs, JODC

Ms. Masako SAITO
Assistant of International Affairs, JODC

ANNEX III

COUNTRY REPORTS

A - CHINA

Oceanographic Activities and Data Centre Activities

Xiting Wang
National Marine Data and Information Service

1. Introduction

The National Marine Data and Information Service (NMDIS) under the State Oceanic Administration, which was set up in 1958, is a national comprehensive sector for research on marine information technologies and service for public benefits. The NMDIS is composed of three operational systems, i.e. China National Oceanographic Data Centre, the Institute of Marine Scientific and Technological Information (IMSTI), and the National Marine Archives.

NMDIS acts also as the national partner participating in the Aquatic Science and Fisheries Information System (ASFIS) of the United Nations and the National Input Centre in China, Documents Depository Centre of UNESCO/IOC. The World Data Centre D, Oceanography is also managed by the NMDIS.

The main functions of NMDIS are the followings:

- Organize and coordinate the national work on marine data, scientific and technological information and marine archives;
- Take charge of the collection, processing, storage and service of marine data and information;
- Establish various kinds of oceanographic databases, managing the National Marine Information System;
- Provide service with different kinds of data and information products through China Oceanic Information Network (http://www.coi.gov.cn) or other means;
- Conducting tide and tidal current analysis and prediction, publishing Tide Tables;
- Operating and management of World Data Center-D, Oceanography, maintaining close relations with WDC-A and WDC-B for Oceanography.

Data Centre Activities:

a) Establishing the National Marine Information System
This system, is a comprehensive marine information network and can be accessed through Internet and it is part of the international marine information exchange system.

b) The China Oceanic Information Network (COInet) has been formally established in NMDIS. Taking the provision of marine information query, service and exchange and support for the state and local governments' marine institutions engaged in integrated marine management and marine scientific researches as its aims, the COInet is a field in which to give publicity to marine academic exchanges, an information link between the marine institutions and users both at home and abroad and a physical support for realizing marine data and information sharing in the marine community of China.

c) Data Rescue project between China and USA

d) Participating the China-Japan Cooperative Study of Subtropical Circulation System, conducting data processing and management.

e) Holding International meetings:

- The Fourth session of the Coastal GOOS Committee was held at NMDIS, Tianjin from Nov.2 - 4, 1999.
- The Third Session of the IOC Editorial Board for the International Bathymetric Chart for the Western Pacific at NMDIS, Tianjin, from Sep.25 to 30, 2000.

2. Work on China NEAR-GOOS Delayed Mode DataBase (CDMDB)

2-1. Operation of China NEAR-GOOS Delayed Mode Data Base (CDMDB)

The CDMDB is operated on a regular basis. A special working group on the CDMDB has been set up in the NMDIS to take charge of the maintenance and management of the database and to update the data. Up to now, the access to the website of the CDMDB has amounted to over 8000 person-time. The users groups are mostly from universities, institutes, societies and the marine management departments of the governments at various levels in China and foreign relevant organizations and scientists. Their purposes on using the data are various: study and research, data exchange, co-operation, to monitor the data status and so on.

2-2. Management on CDMDB

The CDMDB can be accessed by all users who are interested in obtaining or providing data. Users from all the countries in the world are welcomed to use the CDMDB and to conduct data exchange and sharing through Internet. According to the requirement of the Third Session of IOC/WESTPAC Co-ordinating Committee for the NEAR-GOOS, we have already created the on-line registration system in our homepage, it takes a minute to fill in the register form, and to become a registered user. The form's contents are user name, password, user's real name, user's organization, E-mail address, telephone or fax and user's purpose. Only the registered users can access the CDMDB. They can transfer the data to their own computers by using the file transfer function of the WWW browser.

The National Marine Data and Information Service (NMDIS) takes responsibilities for the maintenance and management of the CDMDB, including data collection and quality control, data loading, data transferring from RTDB to DMDB, development of data products, monitoring the uses of the data bases and further development of data base management techniques, etc.

At present, the data loaded into the CDMDB will be updated once every month. The NEAR-GOOS working group at the NMDIS takes charge of the data updating. In the future, we will periodically submit reports on the uses of the data bases and the suggestions on the further development of the data bases to the SOA, IOC, and the NEAR-GOOS Coordinating Committee.

3. Types and Products of Data In The CDMDB

The following five types of data are available in the CDMDB at present:

- Buoy Data
  Buoy data are provided by NMEFC (National Research Centre for Marine Environmental Forecasts) of China, MOMAF (Ministry of Maritime Affairs and Fisheries) of Korea and KMA (Korea Meteorological Administration).
- Ships of Opportunity Data
  Ships of opportunity data are provided by NMEFC.
- Station Data
  Station data are provided by NMEFC and NMDIS.
  There are three types as follows:
  1. Coastal station temperature and salinity data.
  2. Coastal station wave and wind data.
  3. Station data.
- SST Data
  SST Data are satellite remote-sensing SST data.
- GTS Data
  GTS data are provided by NMEFC.
  There are three types as follows:
  1. Radiosounding Data.
  2. Surface Meteorological Data.
  3. Ship Meteorological Data.

Fig. 1 CDMDB HOMEPAGE (http://Near-goos.coi.gov.cn)

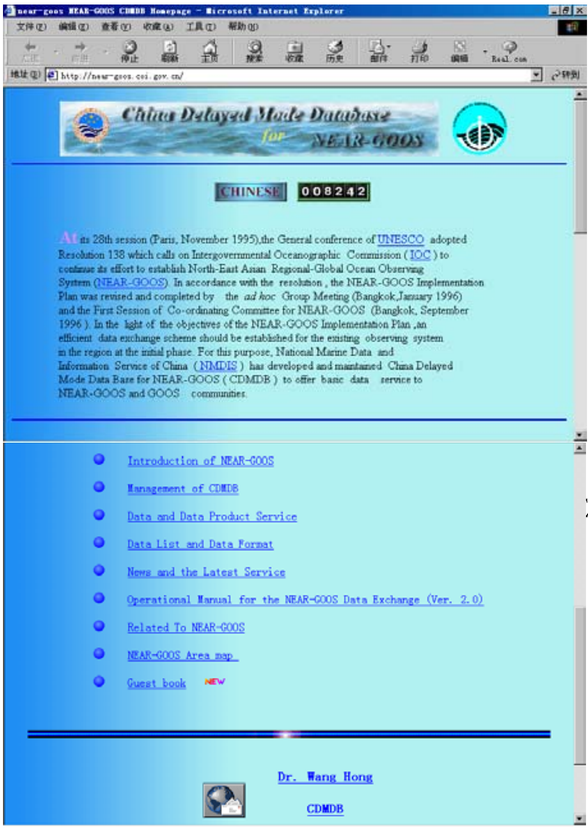
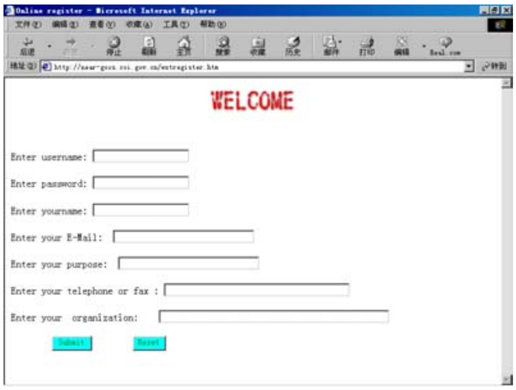


Fig. 2 REGISTER FORM



D USER ENTRY

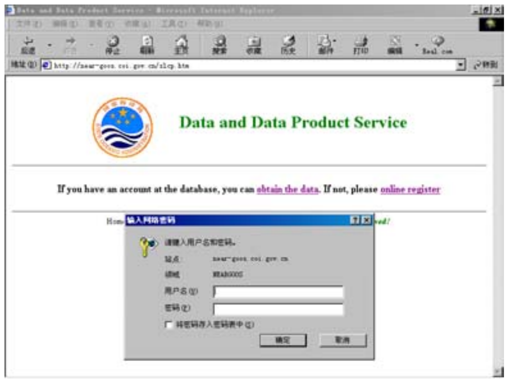


Fig. 4 TYPES AND PRODUCTS OF DATA

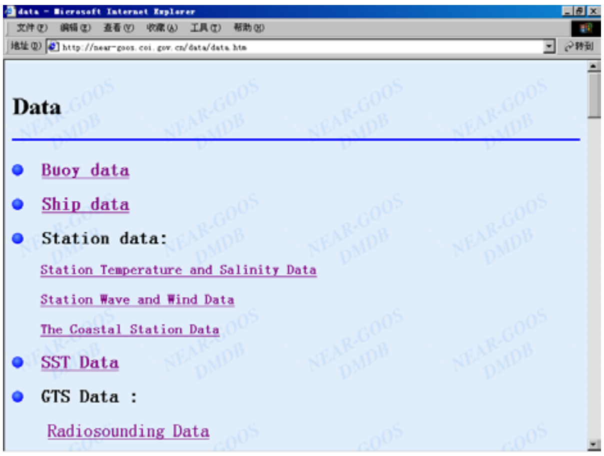


Fig. 5 TYPES AND PRODUCTS OF DATA

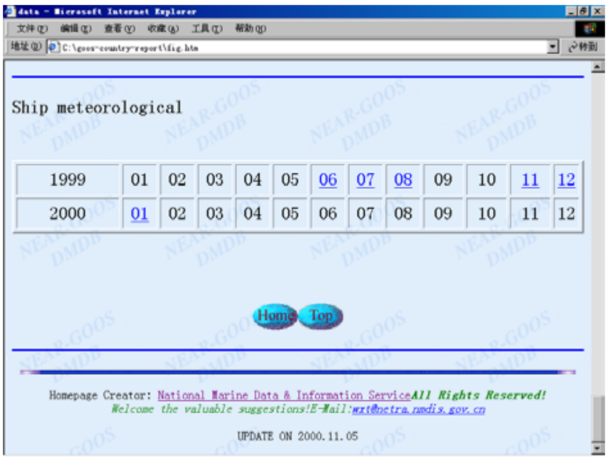


Fig. 6 TYPES AND PRODUCTS OF DATA

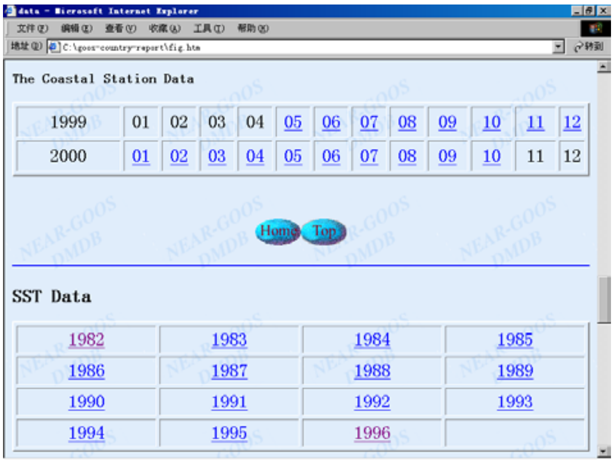
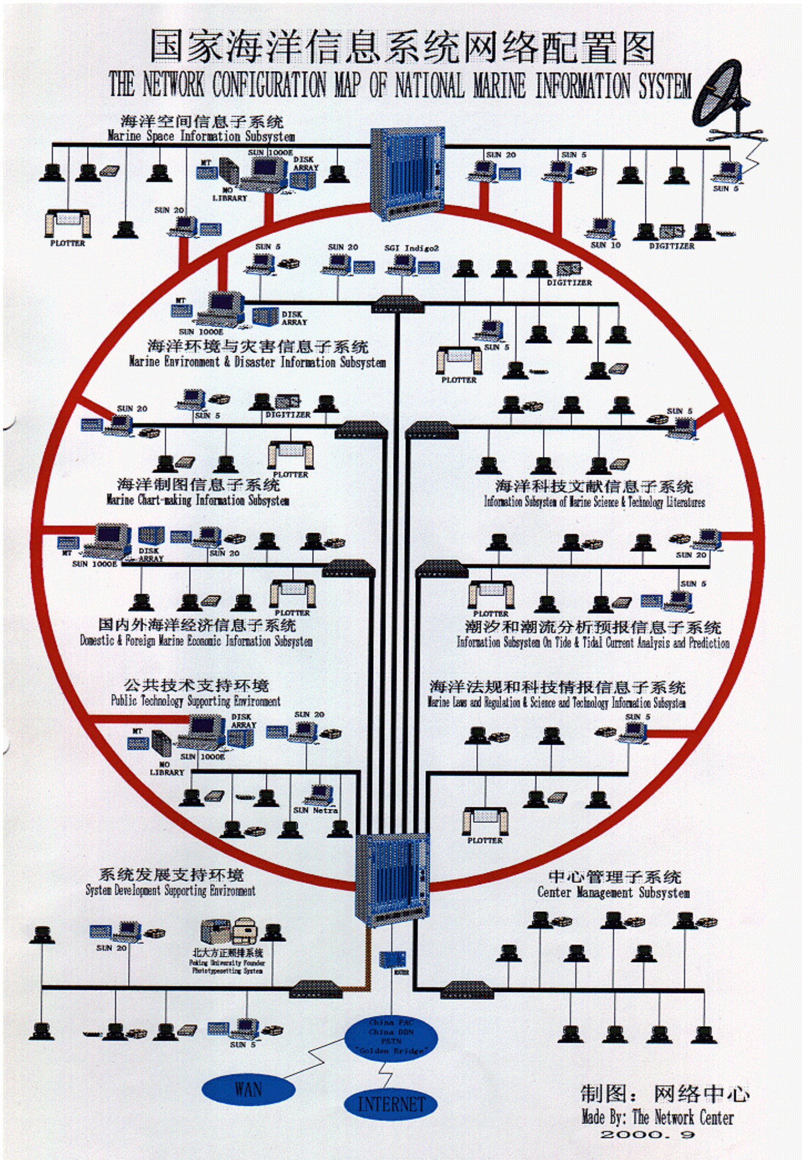


Fig. 7 TYPES AND PRODUCTS OF DATA



B – INDONESIA
Marine Meteorological Data Monitoring in INDONESIA

Moch Rifangi
Marine Sub Division, Meteorological and Geophysical Agency

1. **Introduction**

As it is well known, Indonesia is an archipelago. It spreads out from 94 degrees east to 141 degrees east longitude and from 6 degrees north to 11 degrees south latitude. It consists of more than 17,000 islands, which has approximately 81,000 km of shore lines and surrounded by 5.8 million square kilometers marine area. It is located between two continents Asia and Australia, and it separates two big oceans, the Pacific Ocean and the Indian Ocean. Its territorial waters contain the major shipping lanes between Asia and Europe, Africa and the Middle East. And also the number of marine living resources will be depending on the quality of the Indonesian marine environment when migrating between these oceans.

These facts have to be considered on the management of the meteorological data. The Indonesian Meteorological and Geophysical Agency (MGA) is responsible for the supply of marine meteorological information for the all activities at sea, especially to meet international obligation in accordance with the International Convention for the Safety of Life at Sea (SOLAS), and also for the international marine meteorological data exchange.

The accurate marine meteorological information provided by the MGA will improve safety and efficiency of all activities at sea. It can be implemented if the MGA has the good data management.

2. **Present Status**

2-1. Marine Meteorological Observation Network in Indonesia.

Marine Meteorological Observation consist of regular observation managed by Meteorological and Geophysical Agency, and Voluntary special observation carried out by cooperative stations of other agencies.

a. Marine Meteorological Station.

There are 13 Marine Meteorological Stations managed by Meteorological and Geophysical Agency located in the following Sea Ports: Belawan, Padang, Lampung, Jakarta, Semarang, Surabaya, Pontianak, Kendari, Ujung Pandang, Bitung, Ambon, Maumere, and Kupang. The parameters observed by those stations are cloud, wind speed and direction, visibility, weather, air pressure, air temperature, rainfall. The observations are carried out hourly from 00 UTC during 24 hours, they have also to observe and report at any time on an weather significant event and its change, such as gusty, very poor visibility and the time of its change to calm, better visibility, etc.

All the observed data are sent to the Data Collecting Centre in Jakarta by teleprinter or facsimile.

b. Voluntary Observing Ships.

The Marine Meteorological Station have two function either as The Marine Meteorological Observation Station or The Port Meteorological Officers. The Port Meteorological Officers have recruited 30 Ships as the Supplementary Ships.

The parameters observed by those ships are cloud, wind speed and direction, visibility, weather, air pressure, air temperature, sea temperature, wind wave and swell wave (visual). The observations are carried out at the WMO standard time. They have also to observe and report at the time on the event of bad weather.

The marine meteorological data are sent to the Data Collecting Centre in Jakarta trough the Coastal Radio Station. The Marine Meteorological Data real time collected average 15 data a day.

To enhance both the quality and the quantity of marine meteorological data, the Port Meteorological Officers have the following duties:

1) To promote and maintain liaison with harbor authorities and shipping companies for recruiting Voluntary Observing Ships (VOS).
2) Visit to ships :

   The purpose of visits to ships is :

   a) To maintain personal periodic contact with Master, Deck and Radio Officers.
   b) To check and to calibrate meteorological instruments.
   c) To provide instructions regarding observations, logbook, etc.
   d) To obtain information regarding problems experienced in the transmission of meteorological observations and the reception of the weather and sea bulletins.

3) To carry out supervision and maintenance of observing stations on board the ships.
4) To provide weather information for :
   a) International and national shipping
   b) Ship's entering and leaving the port.
   c) To support the port activities and the coastal community.

c. Buoy System

In 1998 Indonesia deployed 10 buoys. This programme is implemented through Joint co-operation between the Government of Indonesia and the Government of Norway. The buoys are located in Malaka Strait around Batam waters (4 buoys), Java Sea northern part of Jakarta Bay (3 buoys), and Eastern part of Java Sea around Masalembo Waters (3 buoys).

The buoys are equipped to monitor the following parameters: wind speed, wind direction, air temperature, air pressure, wave height, wave period, current speed, current direction, oxygen saturation, turbidity, nutrient content and salinity.

These buoys are operated by The Indonesian Agency for Assessment and Application of Technology (BPPT).

The buoy data are sent automatically through INMARSAT hourly to the down reading station at BPPT to be distributed to the MGA.

Since April 2000, all of these buoys have been withdrawn to the land until there is financial support for operation and maintenance.

2-2. Data Collecting Centre / Data base.

All of the marine meteorological data are collected in the data base.

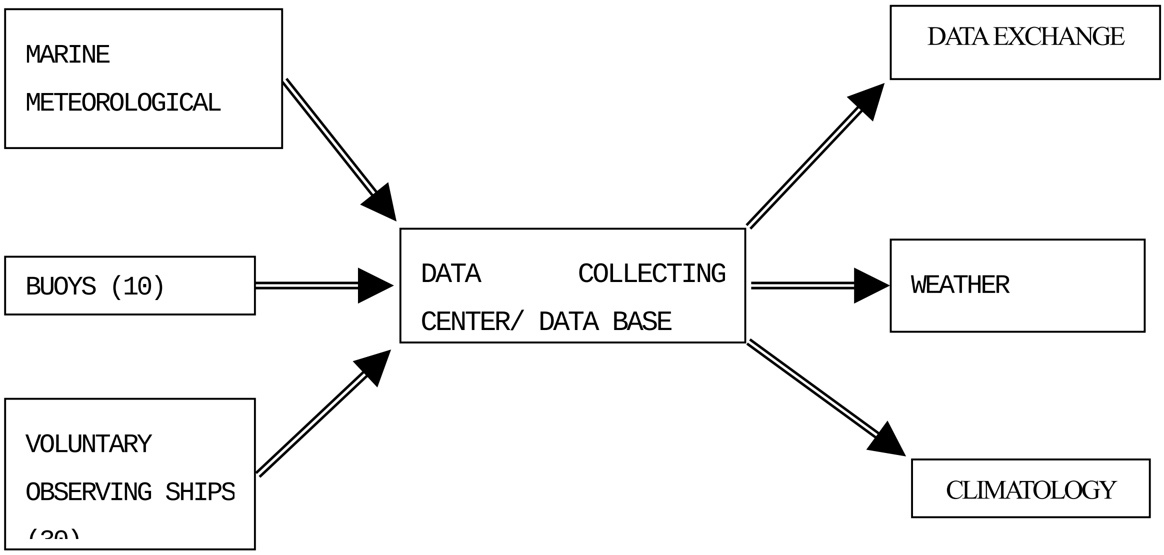
The marine meteorological data are very important not only for the marine meteorological services to support the activities at sea but also for the International Data Exchange trough The Global Telecommunication System (GTS).

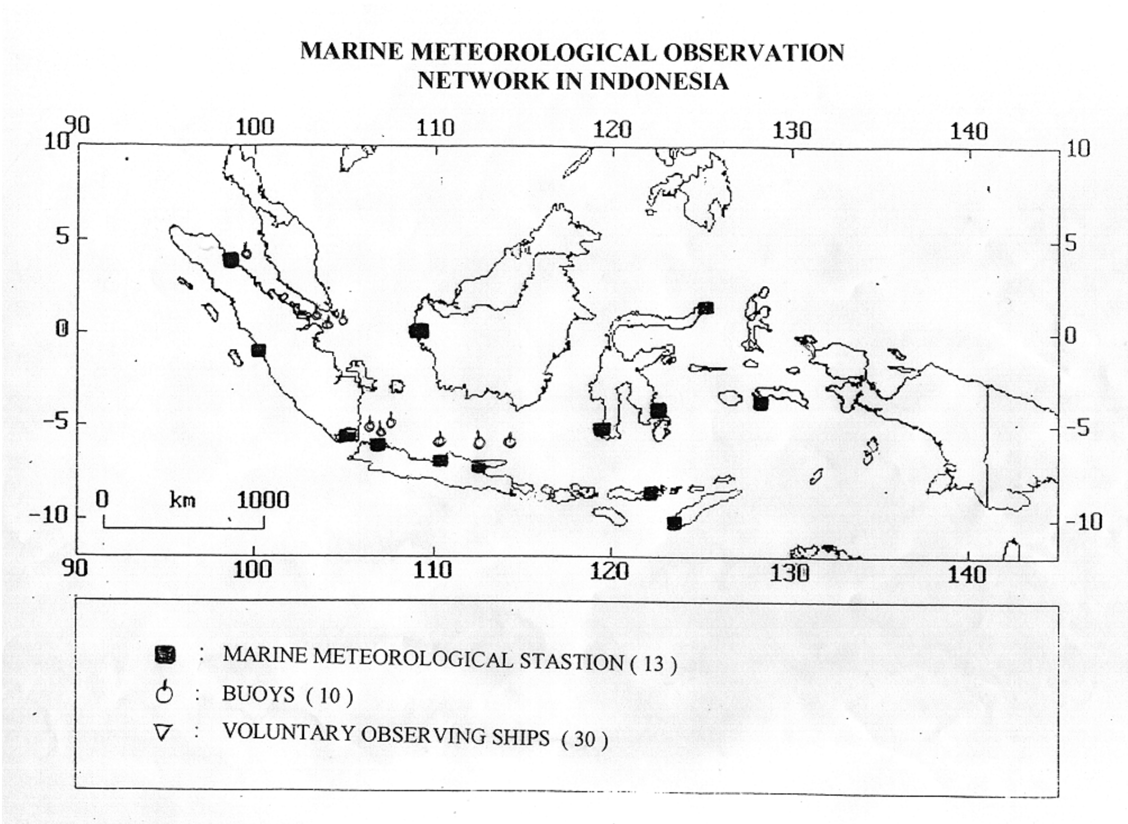
3. Problem

3-1. The limited budget for operating and maintenance, due to the economical situation in Indonesia, has created a situation in which most of the equipment cannot be operated continuously.

3-2. The lack of trained personnel.

Fig. Marine Meteorological Data Monitoring in INDONESIA





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

Contents

- Introduction

A. Serial oceanographic observations

B. Environmental monitoring
C. Coastal oceanographic data
D. Real time sea surface temperature (SST) data
E. Additional survey data
F. Oceanographic data management
G. The project of "Korea Ocean Science
H. Information Network"

- Introduction

In Korea the oceanographic observations (including the environmental monitoring) are carried out by the several organizations (Fig. 1);

1. National Fisheries Research and Development Institute (NFRDI)
2. National Oceanographic Research Institute (NORI)
3. National Maritime Police Administration (NMPA)
4. Korea Ocean Research and Development Institute (KORDI)
5. Korea Institute of Geology, Mining and Materials (KIGAM)
6. Korea Meteorological Administration (KMA)

Here,
KORDI is
in charge of Real Time Data Base (RTDB)
NFRDI is responsible for:

- the operation of Korea Oceanographic Data Center (KODC),
- the time series oceanographic observations,
- the operation of the national network on marine environment monitoring,
- the Delayed Mode Data Base (DMDB)

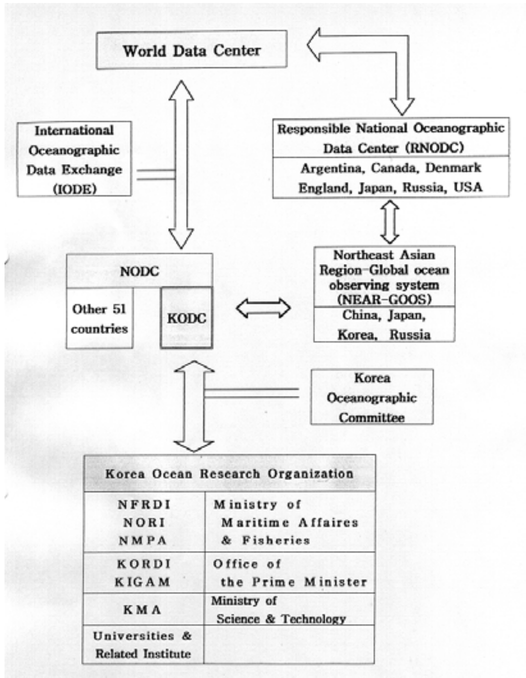


Fig.1 The System of Data Exchange (IODE/IOC/UNESCO)

A. Serial oceanographic observations

- have been carried out in Korea from 1921 (Fig. 2, Table. 1).
- First time, by the Fisheries Experiment Station (the predecessor of NFRDI) and present, by NFRDI
- The present-day 186 stations from 25 observation lines

1. General 21 East, West and South Sea line
   - have been carried out bimonthly and seawater 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.
   - variables are water temperature, salinity, dissolved oxygen, nutrients, zooplankton biomass and meteorological factors.
2. The one Korea-Japan cooperative line (K-line)
   - in the southern sea of Korea, was added in the Korean oceanographic observation system in 1968
   - surveyed in the period of Cooperative Study of the Kuroshio (CSK; 1965-1970) were specially observed again from 1995.
3. The three East China Sea line
   - These lines for the oceanographic information of the northern part of the East China Sea have been observed four times a year.
4. 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.

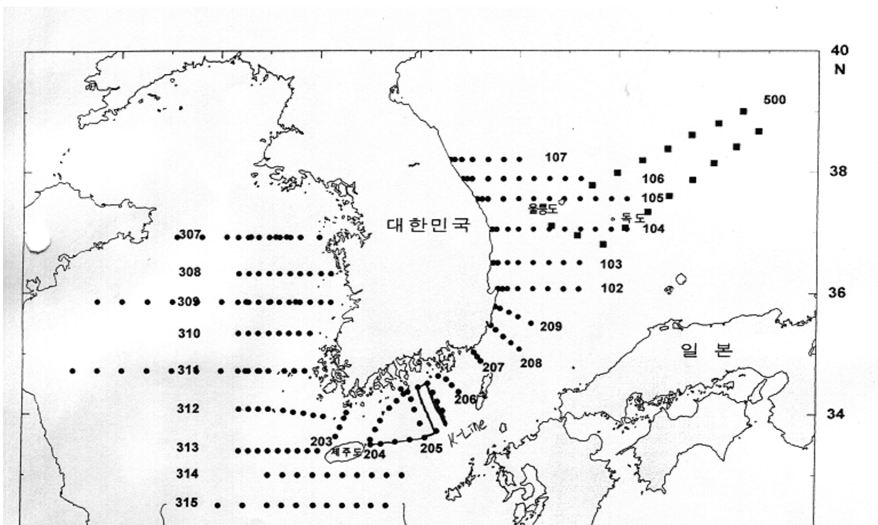


Fig.2 ——K-Line

Table 1. Time series oceanographic observations in Korea

Area	around Korea	East China Sea	from Ullungdo to Yamato Bank
Frequency	Bimonthly	Four times a year	Once a year (August)
Line Station	22 Lines 154 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_2-Si) Zooplankton Chlorophyll-a Meteorological factors		CTD Meteorological factors
Beginning	1961- (1921-)	1995 (1965-1970)	1993-

B. Environmental monitoring

- was reorganized in 1997
- NFRDI is responsible for operating the network
- is carried out four times a year in the 240 coastal stations
- and once a year in the 40 offshore stations (Fig. 3, Table. 2).
- certain variables, such as pH, DO, COD, suspended solids, oil, nutrient (PO4-P, NO2-N, NO3-N, NH3-N) and coliforms, are analyzed for the all 280 monitoring stations.
- The other variables, such as heavy metals and CN, are analyzed for the 66 stations
- As of 2000 endocrine disruptors (e.g., PCB, TBT, PAHs, heavy metals, dioxins, chlorinated pesticides and radioactivity) have been analyzed, too.

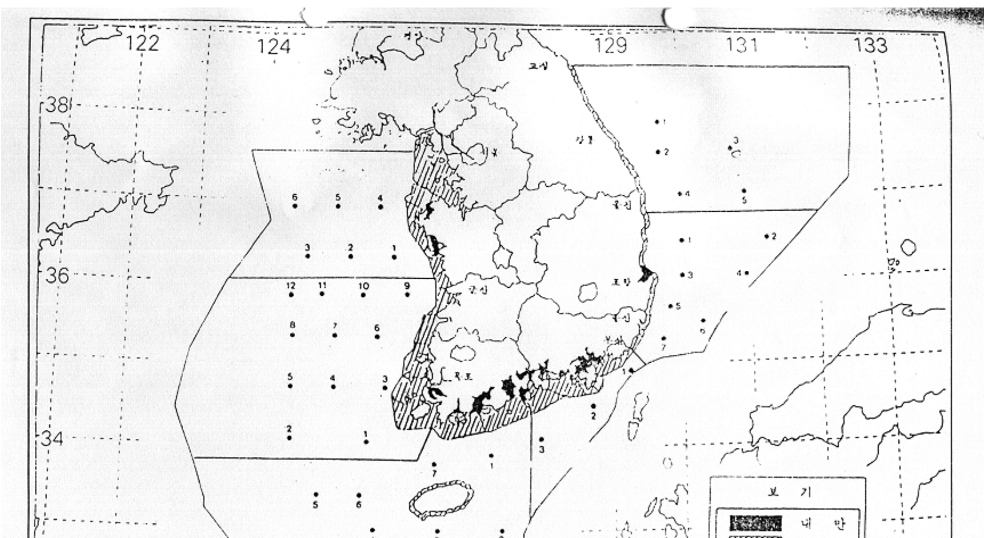


Fig.3 Location Map of Offshore Stations for Environmental Monitoring in Korea

Table 2. Variables for marine pollution monitoring in Korea

Classification		Monitoring variables	Sample
Coastal and offshore areas (280 sts.)	General var. (280 Sts.)	PH, DO, COD, SS, Oil, Nutrients (PO4-P, NO2-N, NO3-N), *E. coli*	seawater
	Particular var. (66 Sts.)	Cr+6, As, Cd, Pb, Cu, Zn, Total Hg, CN	seawater
	Particular var. (20 Sts.)	Endocrine disruptors (PCB, TBT, PAHs, Heavy metals, Dioxins, Chlorinated pesticides, Radioactivity)	seawater sediments organism

C. 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 40 fixed coastal stations.
- except for some stations, were established in 1967.

D. Real time sea surface temperature (SST) data

- Are obtained directly from the advanced very high resolution radiometer (AVHRR) on the U. S. National Oceanic and Atmospheric Administration (NOAA) polar orbiting satellites.
- For providing the water temperature information.
- And used in the prediction and warning of near shore upwelling cold water.

E. Additional survey data

- In the summer,
- monitoring for low-saline water and harmful algal blooms (HABs)
- are extensively implemented in the coastal area through the ship and buoy observations.

F. Oceanographic data management

In charge of KODC (operated by NFRDI)

1. Nowcasts and forecasts the oceanographic conditions in the seas around Korea for the fisheries industries, via facsimile and webpage of KODC.
2. The forecasting programs of the oceanographic conditions are as follows:
   - Oceanographic Data and News (daily),
   - Weekly Oceanographic Information,
   - Monthly Oceanographic Information
   - HAB News (for the information of HAB, daily in summer).
3. KODC devotes itself
   - To collect the oceanographic data produced by several organizations in Korea,
   - 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.

G. The Project of Korea Ocean Science Information Network
- KODC has been carried out this project from 1999 until 2002.
- The setting on example URL is http://kosi.nfrdi.re.kr.
- The objectives of this project
  1. construction of unified management system on Korea ocean science information
  2. increase on mutual exchange of Ocean Science Information among the Korea ocean research organizations.
- The main contents of this project are construction of a Metadata base (Table. 3).

• Metadata

Information about data, description of the content, quality, condition and other characteristics of data (example; when, where, who, what, how, why of observation data).

Table 3. Main contents of "The Project of Korea Ocean Science Information Network"

Division	Construction of Metadata base
The data for ocean science policy	1. The summarize research and cruise on ocean. 2. The domestic and foreign organizations in ocean related research, 3. The domestic oceanographer, 4. Present condition and use of ocean research vessel, 5. International organizations and ocean related programmes, 6. The trend of foreign marine policy, 7. The equipments of ocean research, 8. NOPs, CSR.
The data of marine observation	1. Physical oceanography temperature, salinity, currents, tides, 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

D - MALAYSIA

Hanafiah bin HASSAN
Hydrographic Directorate, Royal Malaysian Navy, Ministry of Defense

GENERAL

ORGANIZATION

1. The 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 defence 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 RMN Hydrographic Department (RMNHD) main missions are:

a. Ensure safety of navigation
b. Support national defence and development requirements
c. Satisfy international obligations and contribute to the preservation of the marine environment

4. The Directorate. With a staff of 83 personnel, the directorate located in 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

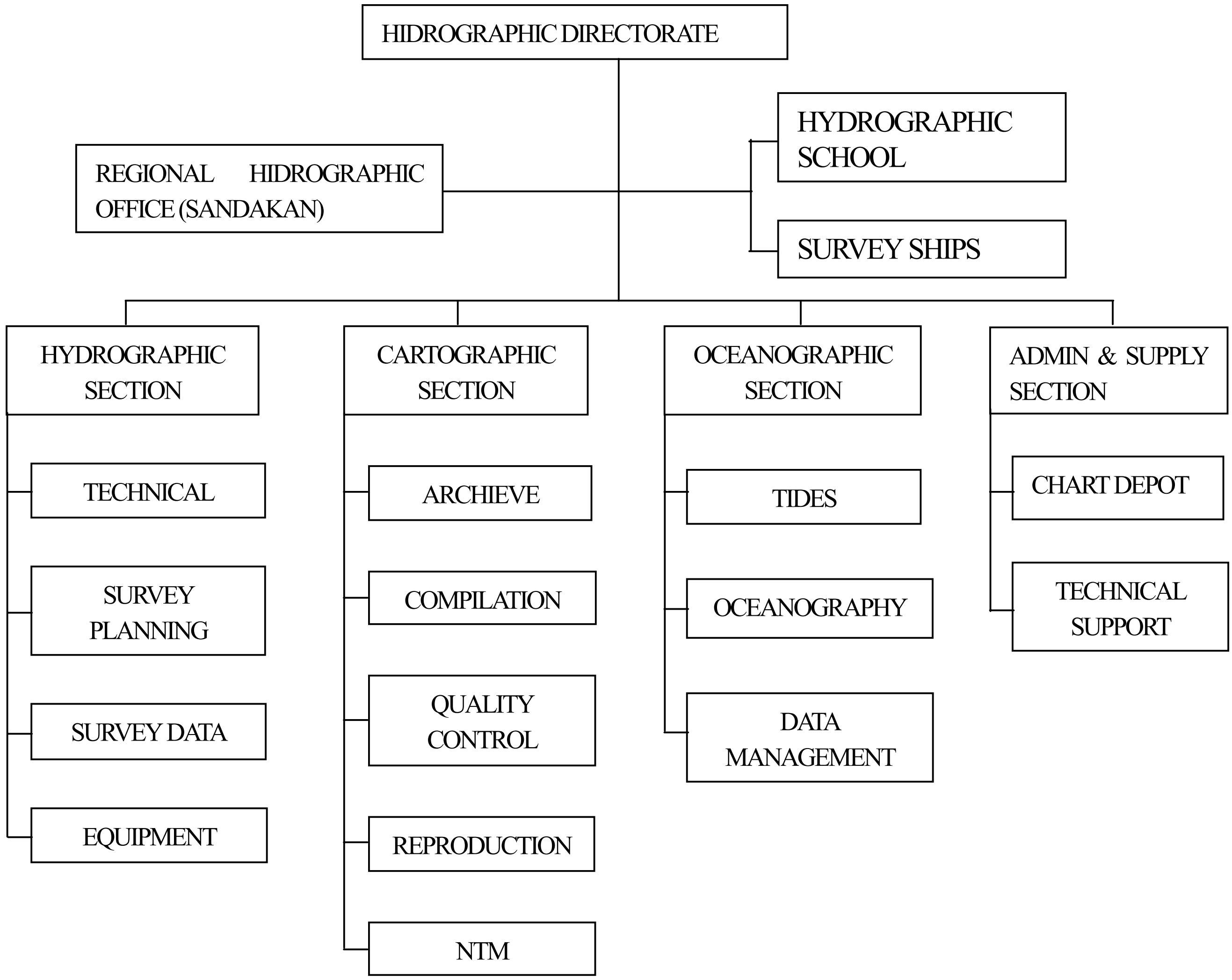
5. Hydrographic Section. The main functions are:

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
i. Budget
j. 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

ORGANIZATIONAL STRUCTURE



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

a. Collect, analyse 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 42 hydrographic officers and 221 technicians in the Royal Malaysian Navy Hydrographic Service (RMNHS). This showed slight increase from last year's total, with 3 new trained personnel joining the organization.

9. The officers and technicians served in the following ships and establishments:

Units	Officers	Technicians
Hydrographic Department	19	74
KD MUTIARA	8	35
KD PERANTAU	8	20
KTD PENYU	1	22
Hydrographic School	1	10
Lumut Regional Office	1	8
Sandakan Regional Office	1	8
Other RMN Bases/Under Training	3	44
Total	42	221

A MODERN STATE OF THE ART SURVEY/RESEARCH VESSEL

KD PERANTAU

10. The Hydrographic Service of the Royal Malaysian Navy is based on a manpower of 285 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.

11. KD PERANTAU's main dimensions are 67.8m (lenght 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. The vessel has a complement 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 wheelhouse 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.

12. 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.

13. The primary design goal of KD PERANTAU is to gather and process hydrographic and oceanographic digital data that could be used to produce navigational charts and oceanographic publications at much faster rate. In order to achieve such performance, the vessel 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.

14. 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

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

16. In 1999 KD PERANTAU coordinated an oceanographic cruise in the Gulf of Thailand with the sponsorship of IOC-WESTPAC Regional Office in Thailand. To date, 13 oceanographic cruises have been conducted to meet both the maritime defence and ocean science research needs.

OCEANOGRAPHIC SECTION

17. General. The Oceanographic Section conducted a programme for data collection through its own oceanographic cruises to

meet the national maritime defence and development requirements. Consultation services were also provided to other governments department and agencies.

18. Publications. The followings 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 have been added to Tide Tables to include Full Moon and New Moon symbols on specific dates according to the predictions.

20. Tidal Stations. The Regional Hydrographic Office (Sandakan) is responsible for maintaining 3 tidal stations at:

a. Labuan Port
b. Pulau Layang-layang
c. Sandakan Port

21. Two tidal stations have also been established in October at:

a. Tanjung Belungkor, Johor.
b. Tanjung Pengelih, Johor.

22. Current Measurement Project. The on-going project of RMNHD and PETRONAS was conducted in October at Duyung Oil Rig to study the offshore underwater currents and update the existing data bank.

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 was also appointed as the Designated National Agency (DNA) for International Oceanographic Data Exchange (IODE).

24. Global Oceanographic Data and Archaeology and Data Rescue (GODAR). The request for up-to-date oceanographic data has been made to various agencies involved in oceanographic data collection to identify the available data in the country. These were then listed in the RMNODC Oceanographic Data Inventory as for all researchers and data-users.

25. Training/ Courses. For newly-joined officers and staff, the HydroComp Training Course was conducted from 1 July to 5 July by the Manager of Information Technology from the Australian Oceanographic Data Centre. One officer attended a local oceanographic workshop on "Priority Setting for Oceanographic Research and Development in Malaysia".

ROYAL MALAYSIAN NAVY OCEANOGRAPHIC DATA CENTRE

26. 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 acted as the national focal point for the access to and dessemination of oceanographic data and information within the country as well as the national point of contact with other NODCs.

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

28. Roles and Responsibilities of the Data Centre. The RMNODC is responsible for the acquisition, production, management of oceanographic data and dessemination of marine enviromental products and services for the nation. Besides the national responsibilities, the RMNODC form a part of a global network of oceanographic data centres coordinated by IOC. The Data Centre function as a DNA is to provide on a long term and continuous basis, data and information in a usable form meeting the needs of individuals or organizations within the country.

29. The RMNODC has also been actively involved in the promotion of oceanographic activities such as collaborating with IOC on the organization of the recent International Conference on the International Oceanographic Data and Information Exchange in the Western Pacific (IODE - WESTPAC 99), in Pulau Langkawi, Malaysia.

30. Data Centre Projects and Activities during the Intersessional 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 purposees. On the educational role, an officer from the RMNODC has been engaged in higher learning institutions, provide consultative advise and develop awareness on the field of marine science. As regards the economic role it has also contributed by providing data and information, bathymetry and base charts for the exploitation of natural resources and fisheries activities. The RMNODC has striven to live up to the information role in serving a multiplicity of users through the publication of products such as tides and tidal stream prediction tables, environmental briefs etc.

31. The RMNODC has organized the Eighth National Oceanographic Research Coordinating Committee meeting from 1 to 2 June 2000 at the University Malaysia Sabah (UMS), Kota Kinabalu, Malaysia. The previous meetings were held in University Teknology Malaysia (UTM), Skudai, Johor Bahru from 19 to 20 July 99 and from15 to 16 December 98 on board the RMN survey ship, KD PERANTAU alongside Swettenham Pier,Penang.

32. Two Oceanographic Cruises were conducted with vessels from the RMN as of 2000 in the Malaysian waters, ie. at the east Coast of Malaysia Peninsular and South China Sea. Another oceanographic cruise was conducted in the Malacca Straits under the US Hydrographic Cooperation Program (HYCOOP) in July 2000. In 1999, two oceanographic cruises have been conducted at the east and west coast of peninsular Malaysia. In 1998, an oceanographic cruise was conducted in the Malacca Straits and two tidal streams observations were conducted at the East of Peninsular Malaysia.

33. The RMNODC also participated in the Marine Scientific Research Project "Tropic Ocean Climate Study" with funding from the Japan Marine Science and Technology Centre (JAMSTEC) from 15 Oct. 22 Nov. 2000 at the Exclusive Economic Zone (ZEE) of Malaysia.

E – RUSSIAN FEDERATION
The Russian marine observations and the Japan Sea Oceanographical Data Base

A.V.Saveliev
Far Eastern Hydrometeorological Research Institute

The information on sea observations in the Japan Sea can be divided into (i) observations at coastal stations and (ii) research vessel's observations in the open sea.

1. Russian coastal observations in the Japan Sea

The list of hydrometeorological stations and the all period of observations at Russian coast of the Japan Sea are presented in Table 1. As you can see from the table, total number of stations exceeds 50, but unfortunately the majority of them are closed. Now at the Russian coast there are 17 working stations which are marked in the table with grey colour. The station's location is shown in Fig. 1. The observations are carried out by Local Divisions of the Russian Hydrometeorological Department, therefore all observed data are under their supervision.

The types of observations and their periods at working stations are presented in Table. 2. As you can see from the table, the observation periods at different stations vary from 55 years in Holmsk (Sakhalin Island) to 120-140 years in Alexandrovsk and Vladivostok. As a rule, at all stations the standard meteorological observations are made including air temperature, atmospheric pressure, wind, and cloudiness. Moreover, the oceanographical observations of water temperature and salinity, sea waves (visually) are carried out at stations. In cold period of year the ice cover observations are carried out as well. At some stations the observations of sea level oscillations are fulfilled (there are 5 stations marked with grey colour in the Table 2 and by black circles in Figure. 1). The sea level observations are made by the automatic gauge - sea level meter. It is important to note, that only at the marked stations the complete set of observations is made.
Time interval between measurements of the meteorological characteristics and also water temperature and wave is 6 hours. At present the measurements are carried out at 0, 6, 12 and 18 hours of Greenwich time. The salinity and ice observations are made 1 time per day at 0 of Greenwich time. As a rule, ice observations include definition of ice type and its thickness.

The sea level is obtained as an uninterrupted curve. Then it is processed and represented as a hourly values.

Table 1: The list of Russian stations during all period of observations at the coast of the Japan Sea

No.	Name of station	Year of station's opening	Year of station's closing
1	Nazimovsky	1911	1949
2	Posiet	1953	PRESENT TIME
3	Novgorodskaya Bay	1953	1994
4	Vityaz	1934	1953
5	Gamov	1908	PRESENT TIME
6	Bolshoy Pelis	1950	1962
7	Peschany	1946	1963
8	Rechnoy	1926	1954
9	Post 1	1933	1945
10	Post 2	1933	1958
11	Sad-Gorod	1928	1985
12	Pervaya Rechka	1958	1966
13	Vladivostok	1860	PRESENT TIME
14	Tokarevsky	1916	PRESENT TIME
15	Skripliova	1911	1942
16	Lazurny	1976	1987
17	Maitun	1931	1956
18	Bolshoi Kamen	1940	1964
19	Askold	1909	1964
20	Razboinik	1934	1946
21	Abrek	1935	1947
22	Rudnevo	1934	1956
23	Chaikovskogo Cape	1935	1953
24	Nakhodka	1931	PRESENT TIME
25	Povorotniy	1986	1972
26	Preobragenye	1933	PRESENT TIME
27	Valentin	1935	1972

28	Moriak-Ribolov	1936	1958
29	Nizmenniy	1906	1958
30	Olga	1922	1956
31	Shkota Cape	1951	1958
32	Chihgachev	1922	1951
33	Baluzek	1951	1986
34	Rudnaya Pristan	1913	PRESENT TIME
35	Plastun	1935	1960
36	Jigit	1978	1987
37	Terney	1940	1976
38	Velikaya Kema	1950	1958
39	Belkin	1919	PRESENT TIME
40	Sosunovo	1936	PRESENT TIME
41	Adimi	1940	1964
42	Zolotoi	1932	PRESENT TIME
43	Grossevichi	1935	1990
44	Innokentievka	1940	1987
45	Milutin Ogon	1919	1938
46	Sovetskaya Gavan	1912	PRESENT TIME
47	Vanino	1936	PRESENT TIME
48	Surkum	1933	1974
49	Alexandrovsk	1941	PRESENT TIME
50	Uglegorsk	1947	PRESENT TIME
51	Ilyinskiy	1946	PRESENT TIME
52	Kholmsk	1945	PRESENT TIME
53	Moneron	1950	PRESENT TIME

Fig.1. Position of Russian coastal stations in the Japan Sea working at present

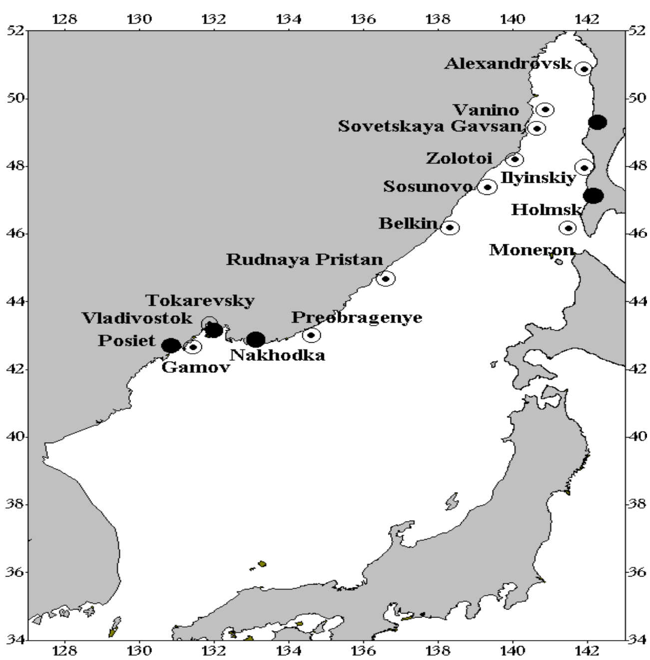


Table 2 Russian coastal stations in the Japan Sea working at present

No.	Name of station	Year of opening	Observed parameters
1	Posiet	1932	T^{O}, S‰, wave, ice, level, meteo
2	Gamov	1908	wave, ,meteo
3	Tokarevsky	1916	T^{O}, S‰, wave, ice, meteo
4	Vladivostok	1860	T^{O}, S‰, wave, ice, level, meteo
5	Nakhodka	1931	T^{O}, S‰, wave, ice, level, meteo
6	Preobragenye	1933	ice, meteo
7	Rudnaya Pristan	1913	T^{O}, S‰, wave, ice, meteo
8	Belkin	1982	T^{O}, wave, meteo
9	Sosunovo	1936	T^{O}, wave, meteo
10	Zolotoi	1932	T^{O}, S‰, ice, meteo
11	Sovetskaya Gavan	1926	T^{O}, wave, ice, meteo
12	Vanino	1936	T^{O}, wave, ice, meteo
13	Alexandrovsk	1881	T^{O}, S‰, wave, ice, meteo
14	Uglegorsk	1947	T^{O}, S‰, wave, ice, level, meteo
15	Ilyinskiy	1946	wave, meteo
16	Holmsk	1945	T^{O}, S‰, wave, ice, level, meteo
17	Moneron	1950	ice, meteo

2. Oceanographical data for open part of the Japan Sea.

Information on the Regional Oceanographical Data Centre.

Before discussing the oceanographical information for open part of the sea, it is necessary to say some words about the Regional Oceanographical Data Centre. In the beginning of 90-th years the problems of environmental monitoring and automation of oceanographic data management have got special attention. In 1994 in the Far Eastern Regional Hydrometeorological Research Institute the Regional Oceanographical Data Center was organized. The main tasks of the Center are presented in a Fig. 2

Regional Center has close communication with Russian National Oceanographic Data Centre in Moscow and main marine organizations in the Far East. One important activity of the Regional Centre is to maintain contacts with the foreign Data Centres. First of all it concerns to the Japan organizations such as the Japan Oceanographic Data Centre and Japan Meteorological Agency, which are leading organizations in collection, utilization and processing of marine data in the Asian Region. Using Internet our Regional Centre has also access to reference and observed information of USA and Korea National Oceanographical Data Centres.

The employees of Regional Center take active part in work of the international organizations such as PICES, WESTPAC and also in the international projects connected with investigation of the Japan and Okhotsk Seas (CREAMS, NICOP) together with the Japanese and American scientists from Hokkaido University and Washington University.

Fig.2. The main tasks of the Regional Centre of Oceanographic Data (RCOD)

Far Eastern Regional Research Institute (FERHRI)
(Director of Institute)

Regional Centre of Oceanographic Data (RCOD)
(Head of RCOD - Dr. N. Rikov; e-mail: hydromet@online.ru)

The main tasks of RCOD

1. Collection and utilization of marine data (hydrological, hydrochemical, meteorological, current observations, marine environmental pollution) and addition of Far Seas data to the State Hydrometeorological Data Base and Russian State Environmental Data Base.
2. Carrying out works on estimation of marine data quality and capacity.
3. Estimation of region studying, preparation and dissemination of oceanographic data and results of their processing in Far Eastern Region.

4. Data exchange among oceanographic organizations and Oceanographic Data Centres.
5. Carrying out an examination of different works on oceanography and marine environmental pollution.

Japan Sea Oceanographical Data Base

One of the main direction of Regional Centre's activity from the moment of its foundation is creation of Regime Oceanographical Data Bases for regions under supervision of Far Eastern Hydrometeorological Research Institute such as: Russian Far East Seas, Northern part of Pacific Ocean and Indian Ocean.

Within the framework of these works the Japan Sea Oceanographical Data Base was created. Data was collected from different sources. The main information was received from Russian National Oceanographic Data Center, Far Eastern Hydrometeorological Research Institute, others marine rganizations in Vladivostok and from foreign sources as well. There is a catalogue created for this Base, which includes information about number of cruise, name of the vessel, country and organization, which provides the number and time of observations.

The information about observations in the Japan Sea and their seasonal distribution is presented in Tables 3 - 4. There are about 146 thousand stations in the Japan Sea Oceanographical Data Base. As you can see from Table. 3, the most intensive observations in the Japan Sea were carried out from 1951 till 1990. A sharp reduction of the number of observations has taken place in the last 10 years.

Table. 3 Distribution of oceanographic stations in the Japan Sea per decade

Period (years)	Number of stations	Period (years)	Number of stations
1900-1930	4352	1961-1970	32104
1931-1940	13654	1971-1980	20505
1941-1950	13219	1981-1990	31504
1951-1960	27448	1991-1999	3117

Table 4 Distribution of oceanographic stations in the Japan Sea per month

Month	Number of stations	Month	Number of stations
January	4556	July	17467
February	5790	August	18538
Mart	10436	September	14479
April	12582	October	12907
May	17300	November	10407
June	14770	December	6811

Observations are distributed non-uniformly within year (see Table. 4). In winter because of strong ice and weather conditions the observations are not numerous and don't exceed 6 - 7 thousand. The minimum of observations is in January (Fig. 3). The number of observations sharply increases in June and reaches a maximum in August (Fig. 4).

The oceanographical observations include measurement of water temperature and salinity, dissolved oxygen, hydrogen-ion concentration (pH), alkalinity, phosphate, silicate and nitrate. The structure of observations in the different periods of time is essentially unequal (Table. 5). The measurements of water temperature were carried out at each station, but salinity was determined at much smaller number of stations. Such observations were carried out mainly by vessels of Pacific Fishing Institute and Local Divisions of the Russian Hydrometeorological Department. Before the 50-th the hydrochemical observations were not numerous. Quantity and quality of observations has sharply increased in the 50-70 -th owing to the existence in the Far Eastern region of modern research vessels of Russian Academy of Science and Russian Hydrometeorological Department (See Table 5).

Fig. 3 Spatial distribution of oceanographic stations in the Japan Sea in January

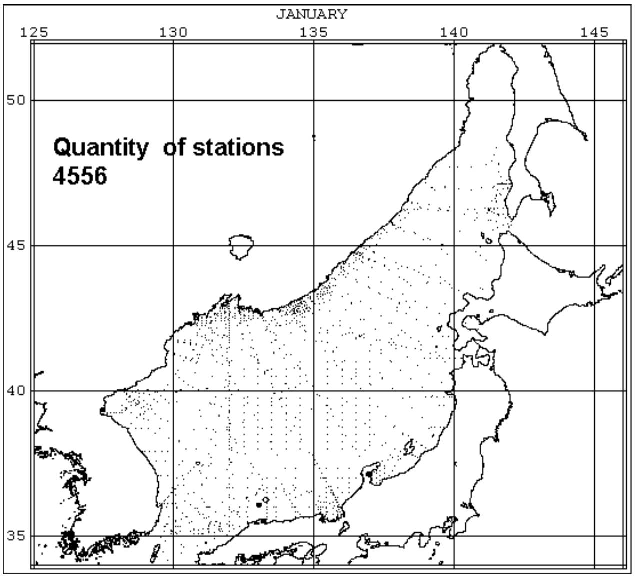


Fig. 4 Spatial distribution of ocean

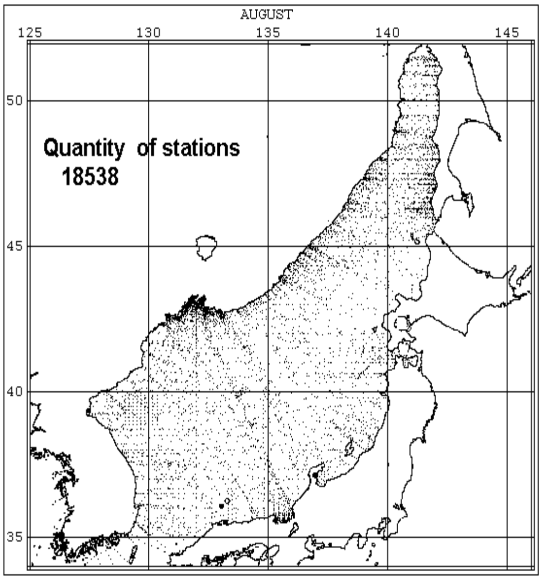


Table.5 Quantity of observations over the different parameters for decades

Parameters	Period (years)						
	1931-1940	1941-1950	1951-1960	1961-1970	1971-1980	1981-1990	1991-1998
Temperature	13654	13219	27448	32104	20505	31504	3117
Salinity	12256	9840	16841	16103	18314	26076	3053
Oxygen	1327	1750	2142	5933	10524	17388	1444
PH	688	654	758	3584	7123	15832	1420
Alkalinity	343	24	167	2522	3974	3813	20
Phosphate	71	412	500	973	2557	5832	829
Silicate	287	451	707	812	2349	7065	998
Nitrate	370	249	199	564	3613	5899	609

Quality of data

Some words about data quality. The information of Japan Sea Oceanographical Base has various quality in various time periods because of the use of different measurement methods, measuring equipment, manner of data processing and qualification of the observers. At present it is difficult to determine the methodical base of measurements for the 30-th -40-th, especially for foreign observations. According to the available information about Russian data in the 50-th - 60-th, the values of temperature, salinity, dissolved oxygen and pH were determined with accuracy 0.01. However their real accuracy owing to imperfection of the measuring equipment didn't exceed 0.1 of appropriate unit of measurements, and the real accuracy of salinity definition was even 0.3-0.5 ‰. The errors of nutrients definition and, first of all, of silicate, could reach 10 % of the measured value. Till 70-th years the error of definition of vessel's position could reach some miles.

The using of new electronic methods in 70-th -80-th years has allowed to reduce the error of definition of nutrients and salinity. During 80-th - 90-th the majority of hydrological observations were obtained by sondes, providing considerably higher accuracy of measurement of water temperature and salinity. The accuracy of definition of station's position has increased up to the tenth and 100-th shares of geographical minutes.

During the data analysis the numerous mistakes of observations was found out. In the initial information there were numerous duplicates of stations. Their number reached 40-50 % from total quantity of observations

At present the Japan Sea Oceanographical Data Base is edited, the quality control of the data is executed, exception of duplicates is made. The edited data allow to construct monthly and annual fields of the measured elements, to estimate their seasonal variability, long-term trends, to carry out other scientific and applied researches and accounts.

3. Data exchange within the framework of the international program NEAR-GOOS.

In 1998 in Far Eastern Hydrometeorological Research Institute the Real Time Data Base was created (Internet address is: http: // www.hydromet.com). Since this year the regular marine meteorological data from ships (including wave observations) are contributing to the NEAR-GOOS Regional Real Time Data Base. Moreover, at present the Russian authorities permitted to transfer to the NEAR-GOOS Regional Real Time Data Base the meteorological data of 3 coastal stations of Japan Sea - Posiet, Vladivostok and Nakhodka (Fig.1). In the future it is planned to expand the volume and type of observations put in NEAR-GOOS Base.

The National Delayed Mode Data Base for NEAR-GOOS has been created in 1999 by the Pacific Oceanological Institute (Far East Branch of the Russia). The Base consists of historical domestic and foreign observations on water temperature and salinity in the Northwest Pacific, including NEAR-GOOS seas and base of the Pacific Oceanological Institute expeditions data sets (hydrology, hydrochemistry and hydrobiology). The information about all oceanographic data is located on the WEB site of Pacific Oceanological Institute (http:// www.pacific.marine.su).

Today Far Eastern Hydrometeorological Research Institute, the Pacific Oceanological Institute, Far East Branch of Russian Academy of Sciences and some other organizations also participate in several international programs such as CREAMS, GODAR, NICOP. As a result, the oceanographic data received during the realization of these programmes have become available for the international data exchange and can be contributed to the NEAR-GOOS Delayed Mode Data Base.

Further development of the NEAR-GOOS programme in Russia is closely related to the modern Russian Federal Programme " Integrated System of Information about the World Ocean " (action period of Programme is 1999 – 2007). The main purpose of this Programme is to develop the Russian nation-wide Marine Information System using modern technologies. In addition to this, it is necessary to improve the telecommunication systems. Some improvements in this field are now under development in Far Eastern Hydrometeorological Research Institute and Pacific Oceanological Institute: it is possible to have an access to Internet and to NEAR-GOOS data bases for scientific and practical goals.

ANNEX IV

LIST OF PARTICIPATING COUNTRIES IN TRAINING COUSE FROM 1982 TO 2000

(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	Republic of Korea (5), Russia, Vietnam
2nd (17th)	:	12 Oct.	-	23 Oct.	1998	China (2), Republic of Korea (2), Malaysia, Russia
3rd (18th)	:	24 Jan.	-	4 Feb.	2000	China • Indonesia • Republic of Korea • Russia • Vietnam
4th (19th)	:	27 Nov.	-	8 Dec.	2000	China • Indonesia • Republic of Korea, Malaysia • Russia

ANNEX V

LIST OF ACRONYMS

ADCP	Acoustic Doppler Current Profiler
AXBT	Air launched Expendable Bathythermograph
CSR	Cruise Summary Report
CTD	Conductance Temperature Depth recorder
DMDB	Delayed Mode Data Base
ECDIS	Electronic Chart Display and Information System
ENC	Electronic Navigation Chart
GEBCO	General Bathymetric Chart of the Oceans
GODAR	Global Oceanographic Data Archaeology and Rescue Project
IGOSS	Integrated Global Ocean Services System programs
IOC	Intergovernmental Oceanographic Commission
IODE	International Oceanographic Data and Information Exchange Programme
JAMSTEC	Japan Marine Science and Technology Centre
J-BIRD	JODC Bathymetry Integrated Random Data Set
J-DOSS	JODC-Data Online Service System
JHD	Hydrographic Department
JMA	Japan Meteorological Agency
JODC	Japan Oceanographic Data Centre
MARPOLMON	Marine Pollution Monitoring programme
MGD	Marine Geophysical Data Format
MIRC	Marine Information Research Centre
NEAR-GOOS	North-East Asian Regional GOOS
NODC	National Oceanographic Data Centre
NOP	National Oceanographic Programme
RNODC	Responsible National Oceanographic Data Centre
RRTDB	Regional Real Time Data Base
RTDB	Real Time Data Base
TRITON	TRIangle Trans-Ocean Buoy Network
WESTPAC	IOC Sub-Commission for the Western Pacific
WDC	World Data Centre
WOCE	World Ocean Circulation Experiment
XBT	Expendable Bathythermograph