

Introduction

The 6th IOC/WESTPAC Training Course on NEAR-GOOS Data Management was organized by the Japan Oceanographic Data Center (JODC) under the auspices of the IOC and with financial support from the Japanese Government during 21 October-1 November 2002 at the JODC, Hydrographic and Oceanographic Department, Japan Coast Guard, Tokyo, Japan. The objectives of this training course were to allow participants to become acquainted with the concept of NEAR-GOOS and its function in the WESTPAC region, and the acquisition, processing, compilation and exchange of oceanographic data in accordance with principles used within the framework of the International Oceanographic Data and Information Exchange (IODE) programme.

Seven participants were participated in this training course from China, Indonesia, Malaysia, the Republic of Korea, the Russian Federation, Fiji and Thailand (ANNEX II). They shared together their experience in field of data management.

This report presents the summary of the training course; outline of the course program lecture, practice and study visits.

The Course Program

The training program focused on the activities of JODC, NODCs, facilitate data exchange in the region, IODC system and the operation of NEAR-GOOS. The course program was composed of lectures, practices and study visits. The details were explained as below:

A. Lecture

1. Outline about IOC, WESTPAC and NEAR-GOOS

Lectured by Dr. Keisuke TAIRA

A lecture was given the history of IOC and the example of WESTPAC programs and projects. He introduced the NEAR-GOOS (The North East Asian Regional- Global Ocean Observing System) which started its operation in 1996, explained the structure and function of NEAR-GOOS, data gathering, data processing, dissemination and distribution, and data product and models.

2. Oceanographic Data and Information Management in JODC

Lectured by Mr. Y. SUGIYAMA

The organization of JODC, JODC data and information management were explained in this subject via internet. He gave the information of data processing and the data file description including file format designed by JODC. Also JODC publications were introduced in this lecture.

3. Introduction to WDC-A and NODC activities

Lectured by Mr. Robert D. Gelfeld

A lecture was given the principles and responsibilities of ICSU World data Centers, international marine data base of WDC for oceanography, NOAA National Data Centers, World Ocean Database, World Ocean Database data types are namely: Ocean Station Data (OSD), High Resolution CTD data (CTD), Mechanical Bathythermograph Data (MBT), Expendable Bathythermograph Data (XBT), Surface Only Data (SUR), Moored Buoy Data (MRB), Profiling

Float Data (PFD), Drifting Buoy Data (DRB), and Undulating Oceanographic Recorder (UOR).

4. Introduction to the IODE system and GODAR project

Lectured by Mr. Robert D. Gelfeld

A lecture was given the introduction of IOC and the history and the objectives of IODE which established to enhance marine research, exploration, and development by facilitating the exchange of oceanographic data and information between participating member states. Also IODE structure and the activities of IODE for global and regional.

In addition, lecturer gave the introduction and history of Global Oceanographic Data Archaeology and Rescue (GODAR) project, the report of GODAR regional meeting, international aspects of ocean data archaeology and rescue and the future.

5. Introduction to the IODE Resource Kit

Lectured by Mr. I. TEDOKON

Lecturer introduced the International Oceanographic Data Exchange (IODE) Resource Kit, a comprehensive self training and resource tool for newly established oceanographic data centres. It composed of data Centre system, Data Management System, and Data analysis and products. It contains a range of marine data management and information management materials, including software, quality control and analysis strategies, training manuals and relevant IOC documents. The kit provide a broad spectrum of background information on global data and information archiving activities, specification for data storage in standard formats, and the software tools to perform quality control, subsetting and analysis procedures. The kit is accompanied by manual and regional dataset used in training workshop.

During the explanation, the CD-ROM of IODE resource kit were used.

6. Ocean Research and Utilization/ Management Data Management

Lectured by Dr. Y. NAGATA

Lecturer introduced the history of JODC, archiving data and explained ADCP (Acoustic Doppler Current Profiler). He suggested that all data need to check.

7. CTD and BT Data Processing

Lectured by Mr. H. KINOSHITA

A lecture was given the introduction of Towed CTD (Batfish), BT, CTD, and shipboard current profiler and the hydrographic data processing and also was shown field observing picture are taken onboard icebreaker Shirase. He explained CTD data processing and bottle data quality control, making data report. Then, he presented XBT, XCTD and AXBT.

8. Tidal Data Processing

Lectured by Dr. M. ODAMAKI

He explained the important of observation tide and sea level, tidal data processing, brief review of tidal theory, also he discussed what causes the change of tidal phenomena, combination of tides by Moon and Sun. He introduced the interesting website which give further information on tidal observation and data processing.

9. Ocean Current Data Processing

Lectured by Assoc. Prof. Dr. Y. MICHIDA

A lecture was given the introduction of the instruments for oceanic current measurement: the theory of Acoustic Doppler Current Profiler (ADCP), error and correction, ADCP data centers, scientific application. Also surface drifters were introduced, global observed in 1978-2000.

10. Practice on Data Management using PC and NEAR-GOOS Delayed Mode Database and JODC Data On-line Service System

Lectured by Mr. T. MIYAKE & Mr. KYUMA

A lecture was given the holding data base: NEAR-GOOS Delayed Mode Database and JODC Data Online Service System, the structure of JDOSS/NEAR-GOOS, and function of firewall. JDOSS is a system that allows those people to search and retrieve the data and information via internet, since 1994. It have provide oceanographic, geophysics, biology data and information. Then, he explained NEAR-GOOS Delayed Mode Database and how to access. He introduced several software which used for quality control. Also he introduced international projects such as ARGOS system, NOAA polar orbiting environmental satellite, the Array3 for Real Time Geostrophic Oceanography (ARGO), etc. Then, I had a chance to visit computer system at JHD. The present computing system which is connected to the other JHD data processing systems, such as the Electronic Chart Production System, Satellite Data Reduction system, and the JHD internet server. Lastly, I visited JODC office to see internal system of JODC.

11. Marine Chemical Data Processing and Management

Lectured by Ms. S. OGUMA

Lecturer explained the objective of chemical oceanographic data, the method of observation, the importance and process of data quality check. She lectured data quality assessment and explained the objective of calibration, then introduced chemical data management. Finally, she introduced the textbook which are more useful for participants.

12. Marine Biological Data Processing

Lectured by Prof. Dr. M. TERAZAKI

A lecture was given the introduction of marine biological study, the important of marine organism study and the method of collecting sample and marine biological data processing.

13. Marine Biological Data Management

Lectured by Mr. T. CHIBA

A lecture was given the introduction and importance of marine biological data management. The lecturer gave the information of marine organism data mainly plankton in JODC format. He also explained that the JODC designed the classification code (14 digits) and name code (5 digits). Four types of marine organism data file format. He taught how to access marine organism data via internet.

B. Study visit

1. Hydrographic and Oceanographic Department (JHD), Japan Coast Guard

On 22 October 2002, I had a chance to visit the divisions in JHD. The brochure “Striving for revealing oceans scientifically and for safe navigation at sea” was distributed for the reference. The activities of the JHD were introduced during the tour.

JHD which had previously developed technology and data Electronic Navigational Charts (ENCs), began to construct the coastal Information Management program System for Environmental Protection by using techniques to provide the necessary information as a part of national emergency including oil spill disasters. The electronic Navigational Charts (ENC), the chart information stored on CD-ROMs were introduced. Because ENCs are managed as a database, they are considered to be a form of the Geographic Information System (GIS), and the data will be utilised in various applications in all activities on the sea. Necessary information to help recover spilled oil in the case of oil spill accidents is prepared in this system and the information can be displayed superimposed with the dispersion of spilled oil and the result of drift reduction.

2. Japan Meteorological Agency

On 25 October 2002, I visited the Japan Meteorological Agency (JMA), received a lecture on the NEAR-GOOS Real Time Data Exchange System in the morning. NEAR-GOOS (RRTDB) is operated by JMA for exchange of oceanographical data among the participating institutions in NEAR-GOOS. The data in the NEAR-GOOS (RRTDB) are kept 30 days and then transfer to NEAR-GOOS Regional Delayed Mode Data Base (RDMDDB). I practiced how to access the data, however it opened for registered only. Then, study tour to the sections was carried out as follow:

- a) Oceanographical Division
- b) El Nino Monitoring and Prediction Centre
- c) Wave Forecasting Service/Marine Meteorological Division
- d) Sea Ice Monitoring Service/Maritime Meteorological Division
- e) Pollutants Chemical Analysis Oceanographic/Oceanographic Division
- f) Numerical Prediction Division
- h) Forecast Division

3. National Research Institute of Fisheries Science and Japan Marine Science and Technology Center

On 29 October 2002, In the morning a study visit to National Research Institute of Fisheries Science (NRIFS) was organized to give a chance for the participants to see the activities of NRIFS.

At the beginning, the outline of the NRIFS was introduced by VDO presentation to participants. The study of relationship Marine Productivity Division was focused

In the afternoon, a study visit to Japan Marine Science and Technology Center (JAMSTEC) was organized to give a chance for me to see underwater observation technology. At first of visit, the outline of the JAMSTEC was introduced by VDO to the participants. 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”

C. Country report

This training course I prepared the country report on the introduction on oceanographic data management of SEAFDEC and present on 22 October 2002 in the afternoon. The country report was shown in Annex III.

Conclusion

It has been a wonderful opportunity for me to participate in the 6th IOC/WESTPAC Training Course on NEAR-GOOS Data Management, organized by the Japan Oceanographic Data Center (JODC). From this training course, I have gained more information and knowledge about NEAR-GOOS data management. I have got a lot of experience at the JODC. Also, it has been a good chance to visit some places that are interesting. Beside that I had a chance to discuss and exchange knowledge with the reseachers from other countries. In addition, the knowledge from this training course is very useful to my work and beneficial for improving my skill.



Fig.1 Opening ceremony on 21 October 2002



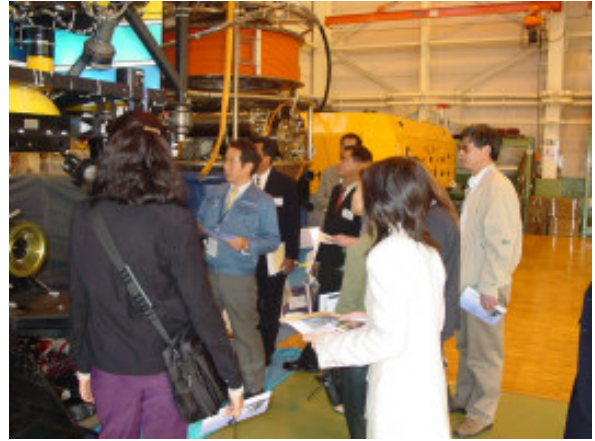
Fig.2 Lecture and practice at JODC.



a. Japan Meteorological Agency



b. National Research Institute of Fisheries Science



c. Japan Marine Science and Technology Center

Fig.3 Study Visits



Fig.4 Closing Ceremony

List of Participants

1. Dr. Elena Ustinova
Senior Scientist, Laboratory of Fisheries
Oceanography Pacific Scientific Research Fisheries Centre (TINRO-Centre)
4 Shevchenko Alley, Vladivostok, 6906000,
RUSSIA
Tel: (4232) 257-934
Fax: (4232) 300-752
E-mail: eustinova@mail.ru

2. Dr. Qinzheng Liu
Senior Researcher Professor
National Center for Marine Environment Forecast
8 Dahuisi Rd., Haidian District, Beijing, 100081,
P.R. of CHINA
Tel: 86-10-62173322 ext. 150
Fax: 86-10-62173620
E-mail: qzliu@axp800.nmefd.gov.cn

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

4. Ms. Pattaratjit Kaewnuratchadasorn
Researcher, Southeast Asian Fisheries Development Center
Phrasamutchedi, Samutprakarn, 10290,
THAILAND
Tel: 66-2-425-6142
Fax: 66-2-425-6110
E-mail: pattarajit@seafdec.org

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

6. Mr. Nur Riyadi
Head of Oceanography Section, Marine Environment Division,
Hydro-Oceanographic Service, Indonesian Navy
JL. Pantai Kuta V No.1 Ancol Timor Jakarta Utara
INDONESIA
Tel: 62-0210684810
Fax: 62-0210684819
E-mail: infohid@indo.net.id

7. 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

**Country report
On the
Introduction of Oceanographic Data Management in SEAFDEC**

Pattarajit Kaewnuratchadasorn

SEAFDEC/ Training Department, P.O.Box 97, Phrasamutchedi, Samutprakan 10290 Thailand

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).

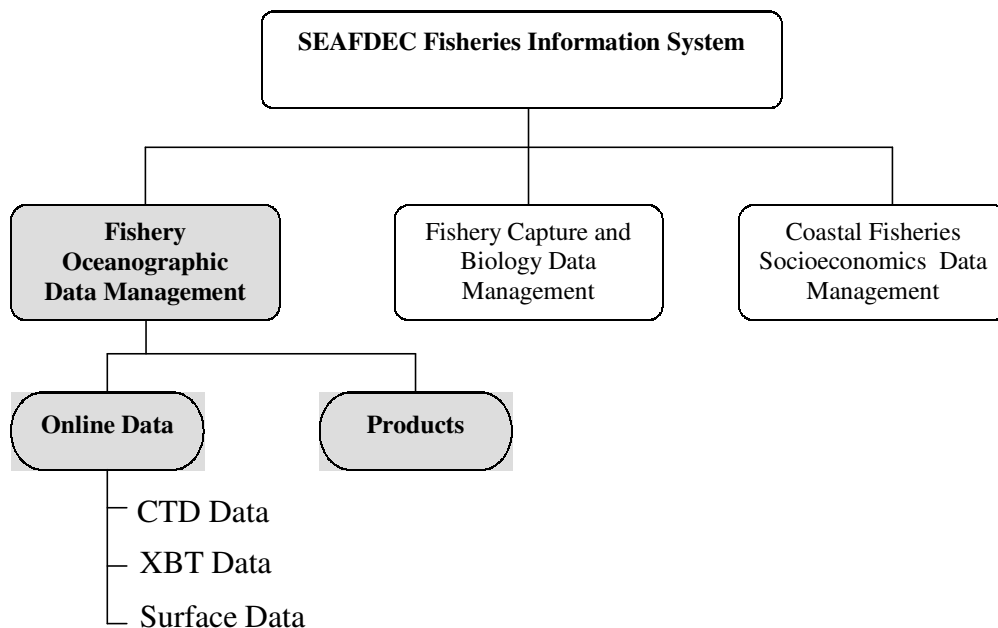


Fig.1 The diagram of the SEAFDEC data management system

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

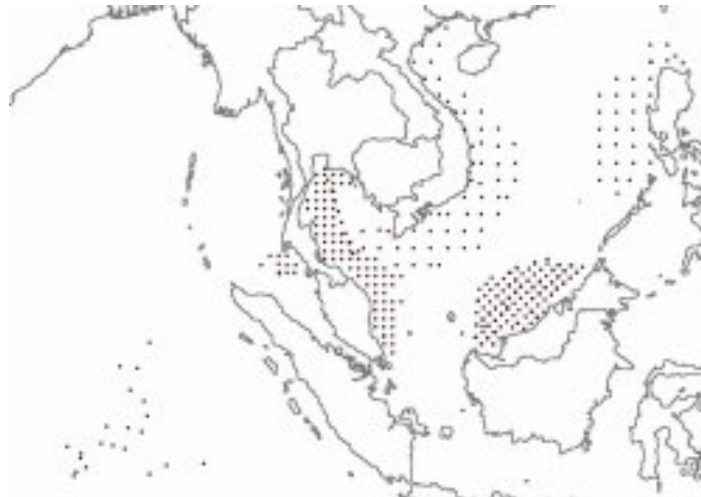


Fig.2 Map of CTD station

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

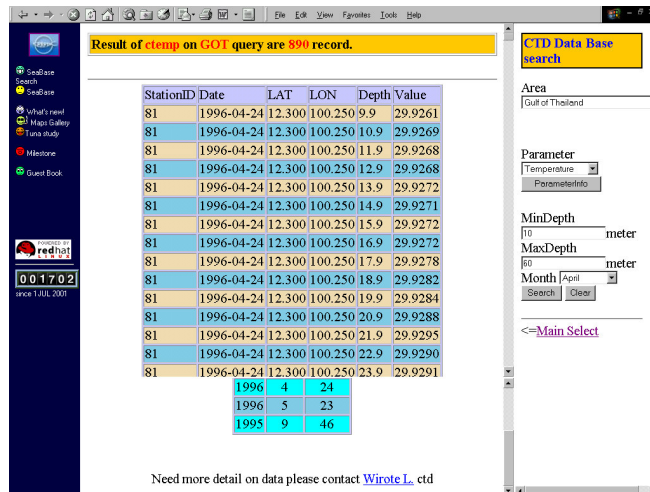


Fig.3 A sample of CTD database search

➤ 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

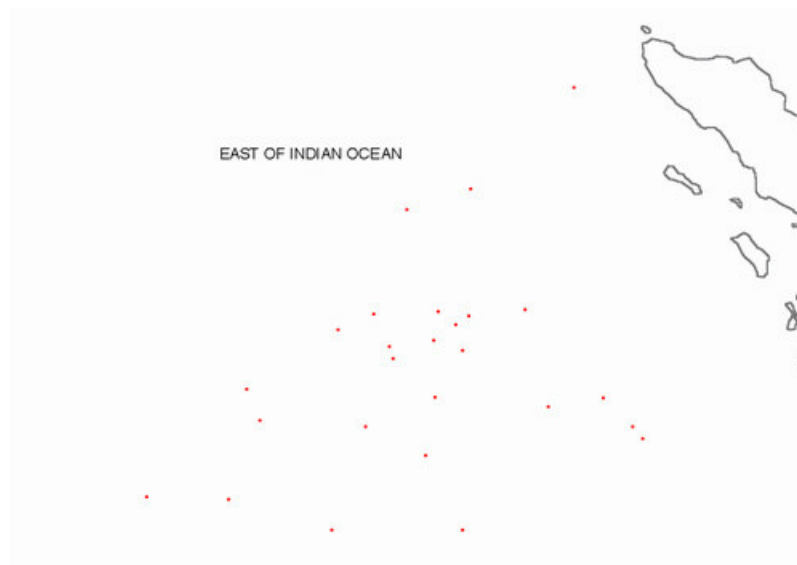


Fig.4 The XBT stations in the Eastern Indian Ocean

Result of Temperature on EBO query are 1498 record.

StationID	Date	LAT	LON	Depth	TEMP
462	2001-10-16 4.611	93.768	29.7	28.73	
462	2001-10-16 4.611	93.768	30.3	28.74	
462	2001-10-16 4.611	93.768	31.0	28.74	
462	2001-10-16 4.611	93.768	31.6	28.73	
462	2001-10-16 4.611	93.768	32.3	28.71	
462	2001-10-16 4.611	93.768	32.9	28.70	
462	2001-10-16 4.611	93.768	33.5	28.67	
462	2001-10-16 4.611	93.768	34.2	28.64	
462	2001-10-16 4.611	93.768	34.8	28.61	
462	2001-10-16 4.611	93.768	35.5	28.59	
462	2001-10-16 4.611	93.768	36.1	28.57	
462	2001-10-16 4.611	93.768	36.8	28.55	
462	2001-10-16 4.611	93.768	37.4	28.53	
462	2001-10-16 4.611	93.768	38.1	28.51	
462	2001-10-16 4.611	93.768	38.7	28.48	

Year	Month	Stations
2001	10	2
1995	2	5
1995	5	7
1995	11	6

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 direction at 100 m depth.

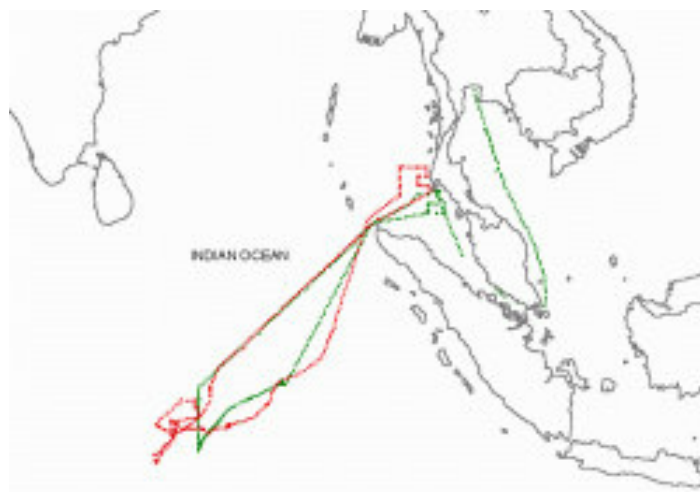


Fig.6 The survey route of MV SEAFDEC in 2002

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

ID	Lat	Lon	Date	Time	AirTemp	Humid	AirPres	WindSpeed	WindDirect	Cloud
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
11	11.153	101.217	2001-10-10	03:00:00	28.2	89.40	1009.8	16.1	240	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>