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## IOC-JODC Training Course on Oceanographic Data Management

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Japan Oceanographic Data Centre  
Hydrographic Department  
Maritime Safety Agency  
Tokyo, Japan, 28 September - 9 October 1992

# IOC Training Course Reports

No. Title	Language versions
1. IOC Indian Ocean Region Training Course in Petroleum Monitoring Perth, 18 February-1 March 1980	English
2. IOC Regional Training Course for Marine Science, Technicians Cape Ferguson, Queensland, 1-28 June 1980	English
3. ROPME-IOC-UNEP Training Workshop on Oceanographic Sampling Analysis, Data handling and Care of Equipment, Doha, Qatar, 3-15 December 1983	English
4. Stage COI d'initiation à la gestion et au traitement de l'information scientifique et technique pour l'océanologie, Brest, France, 28 novembre - 9 décembre 1983	French
5. Curso mixto COI-OMM de formación sobre el Sistema Global Integrado de Servicios Oceánicos (SGISO), Buenos Aires, Argentina, 15-26 de octubre de 1984	Spanish
6. UNESCO-IOC-NBO Training Course on Tidal Observations and Data Processing Tianjin, China, 27 August - 22 September 1984	English
7. Stâge COI sur la connaissance et la gestion de la zone côtière et du proche plateau continental Talence, France, 18 septembre - 4 octobre 1984	French
8. IOC Regional Training Course on Marine Living Resources in the Western Indian Ocean Mombasa, Kenya, 27 August - 22 September 1984	English
9. IOC-UNESCO Summer School on Oceanographic Data, Collection and Management Erdemli, Icel, Turkey, 21 September - 3 October 1987	English
10. IOC-UNESCO Regional Training Workshop on Ocean Engineering and its Interface with Ocean Sciences in the Indian Ocean Region, Madras, India, 17 March - 5 April 1986	English
11. IOC-UNESCO Training Course on the Use of Microcomputers for Oceanographic Data Management Bangkok, Thailand, 165 January - 3 February 1989	English
12. IOC Advanced Training Course on Continental Shelf Structures Sediments and Mineral Resources Quezon City, Philippines, 2-13 October 1989	English
13. IOC/IODE Training Course on GF3 Data Formatting System Obninsk, USSR, 14-24 May 1990	English
14. IOC Training Course on Microcomputers and Management of Marine Data in Oceanographic Data Centres of Spanish-speaking Countries, Bogotá, Colombia, 21-30 October 1991	English Spanish
15. IOC Advanced Training Course on Nearshore Sedimentation and the Evolution of Coastal Environments, Kuala Lumpur, Malaysia, 17-29 February 1992	English
16. First IOC Training Course on the Applications of Satellite Remote Sensing to Marine Studies Caracas, Venezuela, 24-28 September 1990	English
17. IOC-KMFRI-RECOSCIX (WIO) Regional Training Course on Microcomputer-based Marine Library Information Management, Mombasa, Kenya, 10-21 August 1992	English
18. ROPME-IOC Regional Training Course on Management of Marine Data and Information on Microcomputers for the ROPME Region, Kuwait, 18-28 October 1992	English
19. IOC-SOA Training Workshop on Environmental Effects on Benthic Communities Xiamen, China, 19-23 October 1992	English
20. IOC Training Course for the Global Sea Level Observing System (GLOSS) directed to the African and South American Portuguese and Spanish-Speaking Countries São Paulo, Brazil, 1-19 February 1993	English
21. IOC-SSTC-SOA Training Course on Marine Information Management and ASFA Tianjin, China, 19-30 October 1992	English
22. First IOC/OCARIBE-UNEP Training Course on Monitoring and Control of Shoreline Changes in the Caribbean Region Port-of-Spain, Trinidad and Tobago, 21-30 July 1993	English Spanish
23. IOC/WESTPAC Training Course on Numerical Modelling of the Coastal Ocean Circulation Matsuyama, Japan, 27 September - 1 October 1993	English
24. IOC-JODC Training Course on Oceanographic Data Management Tokyo, Japan, 28 September - 9 October 1992	English

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## 1. INTRODUCTION

The training Course on Oceanographic Data Management is organized every year since 1982 at the Japan Oceanographic Data Centre (JODC), in support of activities of the IOC Sub-Commission (previously Regional Sub-Committee) for the Western Pacific (WESTPAC). Since the beginning, the course has accommodated 39 trainees from eight countries, including Democratic People's Republic of Korea, Indonesia, Malaysia, People's Republic of China, Philippines, Republic of Korea, Thailand and Vietnam (see Annex III).

The Regional Committee, at its Fourth Session, Bangkok, Thailand, 22 to 26 June 1987, *"expressed appreciation of JODC's activities in oceanographic data management training" and "reiterated the importance of these courses in training personnel from developing countries of the region; it recommended that this Training, Education and Mutual Assistance (TEMA) activity continue"* (Document WESTPAC-IV/3 para. 152).

JODC prepared a course programme for 1992 (see Annex I), and the organization of the course and recruitment of trainees was announced to all IOC Member States of WESTPAC through IOC Circular Letter No. 1327 dated 16 April 1992. The Eleventh IOC-JODC Training Course on Oceanographic Data Management was thus organized by JODC under the auspices of IOC from 28 September to 9 October 1992 at JODC, Hydrographic Department, Maritime Safety Agency, Tokyo, Japan.

The objective of the training course was to allow personnel currently involved in oceanographic data and information management from Member States of the WESTPAC region to become acquainted with basic concepts of the International Oceanographic Data and Information Exchange (IODE) system and its function, especially in the WESTPAC region, and acquisition, processing and compilation of oceanographic data, as well as general data formats used within the framework of the IODE system.

## 2. PARTICIPANTS

The application requirements set by the IOC announcement stipulated that candidates should have adequate background knowledge in the field of oceanographic data management, preferably with responsibilities for oceanographic data management at their national oceanographic data centres (NODC), or equivalent organizations in their home country and a good command of the English language.

Eighteen applications were received from five Member States of WESTPAC in response to the aforementioned IOC Circular Letter. In consultation with the authorities concerned in Japan, three participants from Indonesia, Philippines and Thailand were selected by JODC and IOC (see Annex II).

## 3. TRAINING COURSE

### 3.1 OPENING

The training course was officially opened on 28 September 1992 by Mr. Osamu Yamada, Director of Japan Oceanographic Data Centre, Hydrographic Department (JHD), Maritime Safety Agency, at JODC in the JHD Headquarters Building, Tokyo, Japan. In his opening remarks, Mr. Yamada reminded the trainees and the lecturers that oceanographic observation requires an enormous amount of time, money and effort, and even at a huge expense not one country can successfully meet demands from the scientific, environmental, navigational and fishery communities. He stressed that only international co-operation can realize sufficient data to satisfy the data needs in an efficient manner.

Mr. Yamada called the attention of the participants to the concern for global and climate changes and stressed that research programmes in this field need more and more oceanographic data in improved timeliness for a global scale. To this end, appropriate operation of international exchange systems for data and information is crucial for the success of the various programmes related to global and

climate changes, and international co-operation in this regard is increasingly important. He noted that international oceanographic data exchange was increasingly recognized as one of the most efficient and important ways for international co-operation.

Mr. Yamada emphasized that under these circumstances, the participants' role, not only in their own country, but also in the international community, will be far more important. He expressed his wish that the participants and lecturers would not only work closely together towards the objectives of the course, but also deepen understanding and friendship throughout the course period, noting that partnership is one of the important factors for efficient operation of data and information exchange.

### 3.2 OUTLINE OF THE COURSE

The programme covered various subjects related to the establishment and operation of a national oceanographic data centre (NODC), as well as oceanographic data management and exchange of information: the concept, function and organizational structure of the IODE system, and the structure and function of JODC; and the introduction of general formats for data exchange used by IODE. Practical exercises in the use of micro-computers for data management and information exchange, and on-the-job training of the routine work of the data centre were also included. During the course, one personal computer per trainee was provided for training for the operation of data management software. The design of the course programme was based on JODC's ten-year experience, recent topics on oceanography and data management and the latest technological development in computer and communication. The following course material was distributed to the participants:

- Guide for Establishing a National Oceanographic Data Centre
- IOC Manual - part 1
- IODE Handbook
- Guide for Responsible National Oceanographic Data Centres
- GTSPP real-time QC Manual
- IOC Manuals and Guides no. 9, Annex 1: GF3 (in part: photocopy)
- Activities of Hydrographic Department (brochure)
- Activities of JODC (brochure)
- WESTPAC Data Management Guide
- Oceanographic Data Management (textbook proposed by JODC)
- Appendix to Oceanographic Data Management
- Tasks of JODC
- Documents related to WOCE and GTSPP

#### 3.2.1 Activities of the Hydrographic Department and JODC

Organizational structure and major activities of JODC and the Hydrographic Department were briefly introduced. The briefing included how the centre receives data and information from various sources, and how they are processed and archived, and how JODC provides the marine community with data in various forms: print out, magnetic tape, floppy disk and microfiche. It also outlined JODC's tasks and activities together with its organization. Research activities by the Hydrographic Department were also described to allow better understanding of data flow within the Department and the organizational function and background of its activity related to JODC.

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

A lecture was given on the history, structure and function of IOC's IODE system. This was preceded by an outline of IOC's activities. It explained the basic idea of the international oceanographic data and information exchange, organizational structure and history of the IODE followed by explanations of data flow from observing stations to World Data Centres through National Oceanographic Data Centres and Responsible National Oceanographic Data Centres (RNODC).

Lectures were given on data exchange in the WESTPAC region, explaining the activities of JODC which functions as the RNODC for WESTPAC. It was noted that the JODC also acts as the RNODC for the Integrated Global Ocean Services System (IGOSS), and the RNODC for IOC Marine Pollution Monitoring Programme (MARPOLMON) for the WESTPAC region. Lectures outlined the tasks of the RNODC for WESTPAC, including procedures for forwarding and disseminating oceanographic information, data announcements and retrieval of data and information on the WESTPAC programme.

### **3.2.3 Global Climate Change**

Global climate change is not one of the main targets for IODE activities. It was stressed that data management was essential for global scale research programmes. GTSP was illustrated using GTSP Real-time QC Manual. Trainees expressed their interest in contributing to programmes related to global climate change such as GTSP, GLOSS and WOCE.

### **3.2.4 Data Management**

#### **3.2.4.1 Oceanography**

Recent oceanographic programmes in Japan were introduced. In order to give trainees a concept of the field survey, the earliest to the latest technology of observation was explained. Also, a film on oceanographic activities by JHD was shown. The film included on-board survey/observation conducted on the **S.V. SHOYO**, one of the largest multi-purpose survey platforms of JHD and gave the trainees an *in situ* feeling of oceanographic work.

Data items, file names and their quantities stored at JODC were described. The system in which the oceanographic data collected by JODC was explained in detail with a textbook prepared by JODC: Oceanographic Data Management. In addition, ADCPs, CTDs and ARGOS data management were also explained.

Trainees were then acquainted with the quality control of the oceanographic data, *in situ* and at JODC, and were familiarized with JODC's oceanographic products, using archived data and statistics. The products included atlases, catalogues, data reports in the form of printed matter and on floppy disks.

#### **3.2.4.2 Marine Geophysics**

Since the trainees were not familiar with geophysical/geological data, an introductory lecture was provided to give them a general idea of the geophysical and geological data sets and products, using visual examples. Also, the scientific interpretation of data was briefly explained during this lecture. The data management system for geophysical/geological data was outlined. The computer systems, master tapes, and microfilms used for the geophysical/geological data management were shown.

Trainees operated a graphic computer (Titan 3000) and the use of a microfilm reader was demonstrated. Formats and data contents of JODC's geological/geophysical master files were then introduced. Formats used during the course were the MGD77 and J-BIRD format. The latter integrated digital bathymetric data system for bathymetric data management was developed by JODC.

GEODAS, Geophysical Data Management System created by U.S. NGDC, was explained. GEODAS is an advanced management system handling data formatted in MGD77. GEBCO (IOC-IHO General Bathymetric Chart of the Oceans) was also introduced as an example of international co-operation in the field of geology/geophysics. Concepts and products of GEBCO were outlined and the fifth version of GEBCO maps was displayed. The digital form of GEBCO was also briefly outlined.



### **3.2.4.3 Biology**

Background and objectives of biological data management were introduced, followed by the outline of marine biological data management system at JODC. A detailed explanation was given by the officer-in-charge of the JODC Marine Biological Data Management System, especially enhancing the encoding of biology data developed by JODC.

### **3.2.5 Information Management**

The importance of information management, especially Cruise Summary Reports (CSR) managed by ROSCOP-III was stressed. First, the purpose and characteristics of CSR were introduced, then its contents and formats were explained. After his demonstration of the data base management system for ROSCOP, the lecturer informed the trainees that JODC published and distributed ROSCOP annually.

### **3.2.6 Practical Training**

#### **3.2.6.1 On-the-Job Training**

To familiarize trainees with data management, on-the-job training (OJT) has been included in the course programme since 1989. They spent a whole day with JODC officers and followed the data flow. The OJT was composed of a brief lecture on the general outline of data flow in JODC, data collection, data processing, data service and publications.

Lecturers demonstrated with what kind of tools data were collected and sorted. The course showed how non-digital data and information were sorted and managed, which would greatly assist in the operation of smaller data centres. The trainees were also informed how data were backed up in JODC, including the third master file in a security deposit far away from Tokyo.

The activities of the Marine Information Service Station (MISS), located in the JODC, assisted domestic users in locating and/or obtaining marine data/information. These were deposited not only by the JODC but also by other organizations and trainees were shown how the interface should be set up between data centres and marine data users. It was stressed that MISS has, on a regular basis, sought whether or not users were provided with sufficient information related to ocean and sea.

#### **3.2.6.2 Personal Computer**

The lecturer had prepared an introductory guide on the MSD-DOS and the BASIC. He introduced the PC applications for oceanographic data management which were currently used on IBM-PC's during the course and copies of the following software were given to the trainees:

<b>File</b>	<b>Function</b>
IGOSS (BATHY/TESAC)	Data
IGOSS.BAS	Key-in, check, draw the graph, store the data
MAPPROG.BAS	Draw the station chart with the map on the screen
KER (Kuroshio Exploitation and Utilization Research)	Data
KSDSTD.BAS	Display the SD, STD or CTD data on the screen
KBTGEK.BAS	Display the BT or current data on the screen
JODC's Data (Serial and Current)	
SDRET.BAS	Extracting of the serial data
CURRENT.BAS	Extracting of the current data
SDCMAP.BAS	Draw the station chart

### 3.2.6.3 General Format 3 (GF 3)

After stressing the importance of a standard format, an outline of GF 3 recommended by IOC, was explained. Layered image tape structure and the different kinds of records were explained. The lecturer informed the trainees of the helpful software and information of formats provided by the RNODC.

### 3.2.6.4 Data Base

The merit and advantage of using a data base system was introduced, comparing examples with and without using a data base. The lecturer explained the function of a data base management system, taking as an example a library. Then, types and characteristics of different data base systems applied to Data Catalogue Management in main frame computer and data Management in IBM-PC in JODC were explained.

### 3.2.6.5 New Technologies

The lecturer introduced the recent progress in data handling technology and telecommunication system. He emphasized the continuous interest to apply new technology in the operation of the IODE system and informed the participants of the movement towards a combination of high performance PCs, such as i386 based machines with compact yet large volume storage media, such as CD-ROMs, produced by US NODC, US NGDS and JODC. He then showed an operating example of LAN at JODC and demonstrated its effectiveness in transparent data transfer between different platforms. The trainees then composed a model document on one of the Macintosh computers, sent it to PC9801, and MS-DOS machine, via LAN, then sent the message to IOC by telemail, through VENUS-P packet network to cross the Pacific Ocean for OMNET. The lecturer closed the course by introducing the Hyper-Card, a Macintosh card based data management system.

## 3.3 STUDY VISIT

On 5 October 1992, the first day of the second week of the training course, a study visit was organized to the Japan Marine Science and Technology Centre (JAMSTEC) in Yokosuka.

The outline of JAMSTEC was introduced by video to the trainees. JAMSTEC was founded in 1971 through the co-operative efforts of the government, academia and the private sector. The Centre was founded to promote marine sciences and technology in Japan in response to the social needs of the people, and today plays a highly important role in these activities. The trainees were advised about marine developing equipment such as manned deep sea research submersible systems **Shinkai 2000** (capable of going to 2000 metres deep) and **Shinkai 6500** (to 6.500 metres deep); unmanned survey system, **Dolphin 3K** and manipulator of deep sea research submersibles. They visited the underwater simulation and training facilities which consists of three chambers for underwater technology experiments, diving training, physiological research experiment, etc., at a pressure equivalent to 500m depth maximum. At a remote sensing section the trainees were explained about remote sensing. Remote sensing enables simultaneous, global oceanic observation by aircraft and satellite borne sensors. The trainees were also introduced to the towing test basin with a wave generator. The facility is to test the characteristics of marine structure models such as wave breaking systems, ships, underwater moving bodies, oil fences, etc., under different wave conditions.

## 3.4 CLOSING

The training course was completed on 9 October 1992. Mr. Osamu Yamada, Director of JODC, congratulated the participants for successfully completing the course. He urged the trainees to recognize the important role of the oceanographic data centres, especially for the global environment programmes. He expressed his hope that the participants of this training course would fully utilize the knowledge and experience obtained through the course and continue to contribute to the advancement of the management and international exchange of oceanographic data and information, through the IODE system, on a world-wide basis. Mr. Yamada pointed out that the results of this training course would be

most constructive in establishing good human relations among participants from WESTPAC Member States, as well as trainees and JODC staff and could be an effective step to create a good network of NODCs in the region. He stressed that the trainees were most welcome to feel free to request further information and technical assistance through JODC. Each of the three participants was awarded a certificate signed by the Secretary IOC and the Director of JODC, indicating that they had successfully completed the training course.

The participants thanked JODC for organizing the course and IOC for providing the opportunity.

#### **4. COURSE EVALUATION**

On 9 October 1992, a round-table meeting was held with trainees and lecturers for the evaluation of the training course. Constructive recommendations and comments were given by the course participants.

##### **4.1 LOCAL ARRANGEMENTS**

For the eleventh training course, JODC booked the participants in to the same hotel as for the tenth training course. However, one participant found the service not very good. Noting that every year the hotel reservation for trainees gives difficulty to the JODC staff, it is strongly recommended that future trainees make their request to JODC for hotel reservations as early as possible.

##### **4.2 COURSE PROGRAMME**

###### **4.2.1 Objectives of the Course**

The participants perceived the concepts of international exchange of oceanographic data, organizations and structures. They were informed of and became familiarized with the technical terms and abbreviations used in the international oceanographic data exchange and the global and climate programmes. The trainees received lectures on the formats used for the purpose, as well as acquisition, processing and compilation of oceanographic data during the training course. They also obtained a good idea of the operation of the data centre's day-by-day work.

###### **4.2.2 Level of the Course**

One of the trainees made a comment that although part of the course programme was too advanced, it had given him ideas and knowledge for his future work. Most of the trainees thought that the course programme was adequate.

###### **4.2.3 Usefulness of the Course**

The participants felt that international oceanographic data exchange systems, the information on new technologies and telecommunication system and the on-the-job exercises on data management were especially useful.

###### **4.2.4 Duration of the Course**

All the trainees insisted that the duration of this training course was too short to practice on a computer. They felt that longer time should have been spent on handling actual computerized data. One participant pointed out that he needed more practice in handling data files, coding, data entering using software.

###### **4.2.5 Suggested Modification of the Course Programme**

One of the participants suggested that weather forecasting should have been included in the course programme.

## 5. CONCLUSION

In conclusion, the training course was considered as a successful undertaking which had achieved, to a great extent, its objectives. The course provided the participants with opportunities to deepen their understanding of the importance of international oceanographic data exchange and the mechanism and function of the IODE system in particular, in the WESTPAC region. The participants who were responsible for oceanographic data management in their own countries, received training on management of NODCs and became familiar with the general formats for data exchange and algorithms for manipulation of various kinds of data, including data quality control. Furthermore, they were able to obtain operational know-how on the day-by-day work of the data centre through on-the-job exercises. Information on a new technical trend was also provided, to orient participants how to establish a modern data and information management system in their home country.

In order to optimize the benefit that participants and marine communities could accrue from such useful training activities in the future, the following observations may be made:

- (i) JODC has been making continuous efforts to up-date the course programme since the course started in 1982 and it seems to meet with the needs of trainees from the region and with the requirements of the oceanographic communities. This exercise should be maintained in the future and further improvement should be considered, including improving practical exercises of data management using personal computers. This is now limited by time resources rather than other obstacles.
- (ii) The homogeneity of the participants in terms of knowledge, experience and interests is essential for the success of training programmes. The participants for the eleventh Training Course were reasonably homogeneous. Utmost efforts should continue to be made in selecting the candidates to best utilize the limited resources for the training course and to have most successful results. The level of trainees is vital for the success of the course.
- (iii) Continuous support of JODC as the RNODC for WESTPAC, and IOC for trainees to operate each NODC is very important. JODC offered the graduated trainees continuous support, particularly technical assistance, after the course.

In conclusion, it is expected that this JODC training course would continue to play an important role in promoting activities of NODC or equivalent organizations in each country and facilitate data exchange in the region, as well as strengthening the IODE system on a global scale.

## ANNEX I

### TIMETABLE

28 September 1992		Lecturer
10.00-16.30	<b>Opening Ceremony and Course Orientation</b> Welcoming remarks by Director of JODC Introduction of trainees Introduction of lecturers Courtesy visit to Director-General of JHD Course guidance General introduction of JHD and JODC Tour of JHD and JODC General guidance of daily life in Tokyo	Tani
29 September 1992		
09.30-12.00	<b>Organizational Structure</b> IOC, IODE (including NODCs, RNODCs, TTs, GEs) WESTPAC	Tani
13.30-16.30	<b>Global and Climate Change</b> IPCC, WOCE, TOGA, IGBP, JGOFS and the role of IODE	Michida
17.30-19.30	Welcome Party	
30 September 1992		
09.30-12.00	<b>GF 3</b> Outline of GF3 Structure of GF3 Several examples of usage GF3 products	Tani
13.30-16.30	<b>New Technologies</b> Database	Tani
1 October 1992		
09.30-12.00	<b>Information Management</b> ROSCOP NOP	Takahashi
13.30-16.30	<b>Oceanographic Data Management (Part 1)</b> Recent oceanographic activities in Japan Data items, files and archives Data management Outline of quality control Products	Iwanami and Shimizu

2 October 1992

09.30-16.30	<b>Oceanographic Data Management (Part 2)</b> Recent oceanographic activities in Japan Data items, files and archives Data management Outline of quality control Products	Shimizu and Kubo
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5 October 1992

All Day	<b>Study Visit</b> Japan Marine Science and Technology Centre	Tsuchiya
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6 October 1992

09.30-12.00	<b>Geophysical Data Management</b> Outline of data Data management including MGD77 and J-BIRD Data Services Products	Shimakawa and Nagao
13.30-16.30	<b>Country Report</b>	JODC Staff

7 October 1992

09.30-12.00	<b>New Technologies</b> CD-ROMs, Telemails	<b>Tani</b>
13.30-16.30	<b>Data Management Exercise</b> Outline of MS-DOS and BASIC Operation of applications including BATHY/TESAC, KER Serial Station Data	Yamamoto, Nagao, Baba and Tsuchiya

8 October 1992

09.30-16.30	<b>Data Management Exercise</b> Outline of JOIDES Operation of JOIDES	Yamamoto, Nagao, Baba and Tsuchiya
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9 October 1992

09.30-12.00	<b>Individual Consultations</b>	JODC Staff
13.30-16.30	<b>Course Evaluation and Closing Ceremony</b>	

**ANNEX II**

**LIST OF PARTICIPANTS**

**TRAINEES**

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Ms. Yasue Shimakawa  
Mr. Kazuaki Kubo  
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**ANNEX III**

**LIST OF COUNTRIES HAVING PARTICIPATED IN PAST  
JODC-IOC TRAINING COURSES ON OCEANOGRAPHIC DATA  
MANAGEMENT - 1982-1992**

1.	29 March-9 April 1982	Republic of Korea, Philippines, Thailand
2.	16-28 May 1983	China, Indonesia, Malaysia
3.	4-16 June 1984	China, Republic of Korea, Vietnam
4.	2-14 September 1985	Philippines, China Vietnam
5.	8-20 September 1985	China, Republic of Korea, DPR of Korea, Malaysia (2), Thailand
6.	7-19 September 1987	China, Philippines, Thailand
7.	26 Sept.-8 Oct. 1988	Republic of Korea, Thailand, Vietnam
8.	25 Sept-7 Oct. 1989	China, Indonesia, Malaysia, Thailand, Republic of Korea
9.	15-26 October 1990	Indonesia, Republic of Korea, Vietnam
10.	24 Sept-9 Oct 1991	Indonesia, Malaysia, Philippines, Thailand (2)
11.	28 Sept-9 Oct 1992	Indonesia, Philippines, Thailand



**ANNEX IV**

ADCP	Acoustic Doppler Current Profiler
BATHY	Bathymetry Report (of IGOSS)
CD-ROM	Compact Disk used as Read Only Memory
GEBCO	IOC/IHO General Bathymetric Chart of the Oceans
GEODAS	Geophysical Data Management System
GF3	General Format 3 (promoted by IODE)
GTSP	Global Temperature Salinity Pilot Project of IODE and IGOSS
IGBP	International Geosphere-Biosphere Programme
IGOSS	Integrated Global Ocean Services System (of IOC and WMO)
IHO	International Hydrographic Organization
IOC	Intergovernmental Oceanographic Commission
IODE	International Oceanographic Data and Information Exchange (of IOC)
IPCC	Intergovernmental Panel on Climate Change
JAMSTEC	Japan Marine Science and Technology Centre
J-BIRD	JODC's Bathymetry Integrated Random Data sets
JGOFS	Joint Global Ocean Flux Study
JHD	Japan Hydrographic Department
JODC	Japan Oceanographic Data Centre
KDD	Kokusai Denshin Denwa Co. Ltd. (International Telecommunication and Telephone of Japan)
KER	Kuroshio Exploitation and Utilization Research
LAN	Local Area Network
MARPOLMON	Marine Pollution Monitoring Programme of IOC
MGD77	Marine Geophysical Data Format
MS-DOS	Disk Operating System of Microsoft
NGDC	National Geophysical Data Centre (of USA)
NODC	National Oceanographic Data Centre of IODE
PC	Personal Computer
RESTEC	Remote Sensing Technology Centre of Japan
RNODC	Responsible National Oceanographic Data Centre of IODE

ROSCOP	Report of Observations/Samples Collected by Oceanographic Progrmmes
TEMA	Training, Education and Mutual Assistance in Marine Sciences
TESAC	Temperature, Salinity, Currents (of IGOSS)
VENUS-P	KDD's International Packet Network
WAN	Wide Area Networks
WESTPAC	IOC Sub-Commission for the Western Pacific
WOCE	World Ocean Circulation Experiment