Intergovernmental Oceanographic Commission
Training Course Reports

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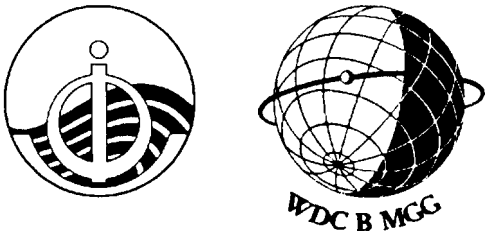

IOC/IODE Training Course on Marine Geological and Geophysical Data Management

National Marine Geological
and Geophysical Data Center
World Data Center B,
Marine Geology and Geophysics

Gelendzhik, Russian Federation
13-29 September 1995

UNESCO

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.	Stage 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/IOCARIBE-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
25.	IOC-JODC Training Course on Oceanographic Data Management Tokyo, Japan, 27 September - 8 October 1993	English
26.	IOC Training Course on Ocean Flux Monitoring in the Indian Ocean. Organized with the support of the Government of Germany, Mombasa, Kenya, 15-27 November 1993	English
27.	IOC-UNEP-SPREP Training Course on Coral Reef Monitoring and Assessment Rarotonga, Cook Islands, 23 February - 13 March 1994	English
28.	IOC-JODC Training Course on Oceanographic Data Management Tokyo, Japan, 26 September - 7 October 1994	English
29.	IOC-UNEP-WHO-FAO Training Course on Qualitative and Quantitative Determination of Algal Toxins Jena, Germany, 18-28 October 1994	English
30.	IOC Training Course on Oceanographic Data Management for the Black Sea Countries Obninsk, Russian Federation, 1-12 August 1994	English
31.	COI-CEADO Curso Regional de Capacitación en Gestión de Datos e Información Oceanográficos Buenos Aires, Argentina, 17-28 de octubre de 1994	Spanish
32.	IOC-UNEP-FAO Training Course on Nutrient Analysis and Water Quality Monitoring Zanzibar, Tanzania, 21-26 November 1994	English
33.	IOC-IOMAC Advanced Training Course on Marine Geology and Geophysics off Pakistan. Pakistan, 12-26 November 1994	English
34.	Training Course on Management of Marine Data and Information for the Mediterranean Region Valletta, Malta, 10-21 April 1995	English
35.	IOC-UNEP-WHO-FAO Training Course on Toxin Chemistry and Toxicology related to Harmful Algal Blooms Trieste, Italy, 3-12 September 1995	English
36.	MAST-IOC Advanced Phytoplankton Course on Taxonomy and Systematics Naples, Italy, 24 September - 14 October 1995	English
37.	IOC-JODC Training Course on Oceanographic Data Management Tokyo, Japan, 16-27 October 1995	English
38.	IOC/IODE Training Course on Marine Geological and Geophysical Data Management Gelendzhik, Russian Federation, 13-29 September 1995	English

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IOC/IODE Training Course on Marine Geological and Geophysical Data Management

National Marine Geological
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UNESCO

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SUMMARY REPORT

ANNEXES

1. INTRODUCTION

The IOC Committee on International Oceanographic Data and Information Exchange (IODE) at its Fourteenth Session (Paris, December 1992) adopted Recommendation IODE-XIV.8 by which, *inter alia*, it was recommended to have a Training Course on Marine Geological and Geophysical Data Management during the intercessional period 1993-1995. Recommendation IODE-XIV.8 was approved by the IOC Assembly at its Seventeenth Session in March 1993. The Russian Federation expressed its desire to host the Training Course and provide facilities at the WDC-B for Marine Geology and Geophysics located in Gelendzhik.

In response of this decision, the IOC/IODE Training Course on Marine Geological and Geophysical Data Management for the countries bordering the Black and Caspian Seas was held in Gelendzhik, Krasnodar region, Russian Federation, 13-29 September 1995. The Training Course was organized under the auspices of the World Data Center B, for Marine Geology and Geophysics (WDC-B, MGG) and the National Marine Geological Data Center and was co-sponsored by the Russian Federation State Committee on Geology and Mineral Utilization (Roskomnedra), the Intergovernmental Oceanographic Commission (IOC) and the Office of the Black Sea Ecological Programme (BSEP) of the UN Global Ecological Fund (GEF).

The International Marine Geological and Geophysical (MGG) data exchange is supported by IOC/IODE and ICSU/WDC systems. MGG data and information are very important for climate studies, oil, gas and mineral resources prospecting of the World Ocean and the Black and Caspian Sea regions, in particular.

The purpose of the Training Course was to train participants in modem methods and technologies of marine geological and geophysical data collection, processing and usage, in creation of databases, in principles of international exchange of data and information.

The Training Course was directed by Dr. V. Shcherbakov, Director of the World Data Center B, MGG. The staff of the National Marine Geological Data Center assisted effectively in delivering lectures, practical work sessions and on-board training, as well as with all types of routine arrangements for the smooth conduct of the Course.

Eighteen lecturers from Gelendzhik, Moscow, Obninsk, Sochi (Russian Federation), Paris (France), Boulder, Colorado (USA) took part in the Training Course. A trainee from India, Mr. P. Kunte, gave a presentation on the catalogue of the world MGG databases, developed by the Indian Oceanographic Institute in Goa, India. Special thanks are due to Dr. G. Sharman, Dr. A. Murakhin, Dr. V. Artemenko, Mrs. A. Shcherbakova, Ms. Svirilina and Mr. Y. Serikov, whose efforts in arranging the Course and making local arrangements convenient for the participants contributed a lot to the success of the course.

Dr. I. Oliounine, the Representative of IOC/UNESCO, gave lectures and contributed to the formulation of the Course programme and its successful implementation.

2. PARTICIPANTS

Seventeen participants were selected from 11 IOC Member States of Europe and Asia, from the Black and Caspian Seas region namely, from Azerbaijan, Bulgaria, Georgia, Iran, Kazakhstan, Romania, Russian Federation, Turkey, Turkmenistan, Ukraine. One participant was invited from China (WDC-D, Oceanography) and two participants from India (National Institute of Oceanography, Goa). All experts were well qualified and involved in MGG data and information processing and management in their respective home countries. Unfortunately, at the last moment, two participants from Ukraine and one participant from Azerbaijan were not able to come to Gelendzhik due to different reasons. They represented organizations, ministries and departments with experience in different fields of marine geological and geophysical data collection and management. Two days were devoted to train people on the methods, technology and procedures of geological, geophysical, geochemical and ecological data collection.

Lecturers from the Russian Federation, the USA and IOC gave talks during 12 working days.

The List of Participants is given in Annex II.

3. COURSE PROGRAMME

The Training Course on Marine Geological and Geophysical Data Management was opened at the State Enterprise National Marine Geological Data Center on 13 September 1995 by the Director of the Center Dr. V. Shcherbakov. In his opening address he welcomed the participants, emphasized the importance of the Course for scientific and practical purposes and for establishing working contacts between marine geologists of different countries. He finally expressed a strong hope that the Training Course will help participants to increase their input to MGG data collection and exchange in the Black and Caspian Sea regions.

Speaking on behalf of the IOC Executive Secretary, Dr. G. Kullenberg, Dr. I. Oliounine emphasized the importance of the Course for the regional scientific research and co-operation. It was the first Training Course arranged by the IOC/IODE Committee on the management of a special type of data - marine geological and geophysical. Many physical processes in the Black and Caspian Sea regions cannot be explained without understanding the geological and geophysical processes. The Training Course was an attempt to get data managers in the region become “aware of modem technologies and methods for data collection and handling. It comprised an important contribution to the mechanisms established within IOC and other international bodies for meeting objectives of such regional programmes as COMSBlack, the Investigation of the Caspian Sea and Floating University. Dr. Oliounine stressed that it was not by chance that the Training Course was arranged in Gelendzhik, the place where WDC-B for Marine Geology and Geophysics is located which is well known for its successes in marine geological and geophysical activities. Finally, he commended the local organizers for facilities provided and the Russian organizations and BSEP GEF facilities in Istanbul, Turkey for support which made the Course possible. Dr. Oliounine wished all participants every success and a nice stay in Gelendzhik.

The Vice-Chairman of the IOC/IODE Committee, Dr. V. Smirnov invited participants to use the knowledge they gain during the Course for the development of new effective tools and methods for international marine geological and geophysical data exchange.

The Representative of the Ministry of Foreign Affairs, Mr. B. Panov, expressed belief that training of specialists from neighboring countries will permit to establish direct contacts and to find answers to different questions of the Black and Caspian Seas environmental problems.

Dr. R. Karpov from the Geological Survey of the Russian Federation welcomed experts and lecturers of the Course and expressed hope that the collaboration of Russian and foreign specialists will permit Member States to come closer to resolving complex geological and ecological problems in the Black and Caspian Sea region.

On behalf of the International Informatization Academy, Dr. A. Murakhin, greeted participants and emphasized that the goals of the Training Course correspond fully to a long desire of mankind to become more familiar with the last unknown - the world ocean bottom and its resources. The exchange of marine geological and geophysical data and information will help to make another step in this direction.

The Programme of the Course was developed jointly by experts from WDC-B MGG and IOC. The participants had an opportunity to get acquainted with the Course programme well in advance of the Course opening.

The local organizers prepared a special brochure which included the time-schedule, programme and information on local arrangements.

The programme was designed to cover 12 working days of lectures and 2 days of on-board training. It started at 10:00 on 13 September and finished at 17:00 on 29 September 1995. A final time-table and programme of the Course are presented in Annex I to this Report.

The following topics were covered by the Training Course programme:

(i) IOC/IODE and ICSU/WDC systems, Black and Caspian Seas countries scientific collaboration and the place of the Russian Federation in regional co-operation and marine data management systems;

(ii) Formats for cruise data and information recording;

(iii) Collection of geological samples and non-digital data;

(iv) Quality control of data; information and documentation on sample's collections;

(v) Development and management of databases;

(vi) MGG data and information dissemination. Metadata;

(vii) Scientific products based on collected data and information. GIS technology and networks.

During the Course, participants acquired knowledge on different MGG data collecting and processing methods and on the usage of data on the basis of the experience of two World Data Centers 'A' and 'B' for Marine Geology and Geophysics and of the recommendations given by leading experts of Russian geological information survey.

In addition to the lectures, there were 22 practical training sessions. These sessions included recording of different types of cruise data into formats, preparing documentation for sample collections, applying of various data and information control procedures manually and with the usage of computer facilities.

Practical exercises were arranged on the development of databases with the help of PCs and SUN Spare workstation. The following software packages were presented for managing marine geological and geophysical databases: GEOLOGY (National RF MGG database), GEODAS, DSDP, ODP (developed by NGDC, NOAA, USA), Geological stations (prepared by WDC-B, MGG), supporting databases (Shore Line, BATHYMETRY, Economical Zone Boundaries).

Geological, hydro-geological and gee-ecological maps of the Black Sea region were presented as GIS computer products and databases.

Methods were demonstrated for data searching and extracting out different databases for files' development, for data visualization and processing and for drawing final geological survey documents.

Visit to the Geophysical Computer Center (Gelendzhik) was useful for understanding seismic data processing and technology of seismic data recording on magnetic tapes.

Participants of the Course received packages containing training materials which included forms and formats, technological schemes and documents examples, diskettes of data and software.

Each trainee had an opportunity to request and get the necessary types of data from WDC-B MGG databases.

All lectures, training work sessions, formats, documents and schemes were delivered to the participants in English and Russian.

4. ON-BOARD TRAINING

According to the Training Course programme during two working days (25-26 September 1995) training was arranged on board the Research Vessel *"Yantar"* (shipowner: state enterprise "Central Geological and Geophysical Expedition"; port of registry: Novorossiysk).

The main parameters and dimensions of the R.V. *"Yantar"* are below:

Year, country of build	1975, USSR
Gross tonnage, t	266
Overall length, m	33.9
Extreme breadth, m	7.0
Summer draught, m	2.6
Autonomy, days	7.0
Crew and scientific staff, persons	15

Scientific equipment/laboratory:

Seismo-acoustic system (24 charnels)	1
Side scan sonar system ("Katran")	1
Geochemistry and ecology laboratory	1
TV robot and system	2
Sampling device (grab, photo, gravity corer, KADR corer, STD system)	5
Echo sounders (shallow/deep water)	2
Geological laboratory	1
Geophysical laboratory	1
Navigation systems (Cicada, Syledis, GPS)	3

During the first on-board training day, there was an introductory lecture given about the research vessel *"Yantar"*, her equipment and laboratories.

The marine geological survey began' with grabbing and gravity core samplings.

Training included presenting the seismo-acoustic system: switching on the on-board receiver, demonstration of the 24-channel floating streamer construction, composition of the acoustic source "Impuls-1".

The sidescan sonar "fish" was put into the water from the *"Yantar"*, and an on-board receiver was switched on. TWO sidescan sonar and echo sounder profiles were carried out between the Sky-blue Bay and the Djankhot village and back. On the sonograms, images of the sea bottom structures were recorded.

Training also included manipulations with the manoeuvrable TV underwater robot. Trainees could see the sea bottom features (rocks, sediments, pipeline, seaweeds, wave ripples) on the TV robot screen. The TV survey results were recorded on a video cassette.

During the second on-board training day, there was implemented a complex of the gee-ecological surveys. Different methods of off-shore, oceanic and on-board investigations were presented in an introduction lecture. Geo-ecological on-board laboratory and technology of off-shore surveys were used. The trainees participated in the interpretation of the results of geo-ecological investigations of the Black Sea and Pacific Ocean Clarion-Clipperton Zone.

Methods of water sampling were demonstrated, as well as STD profiling at a 1,500 m depth. Results of the survey were documented and recorded.

During the on-board training, participants had an opportunity to receive information on integrated geological, geophysical and gee-ecological survey, interpret results, and got acquainted with methods of MGG data and information collection and processing.

5. COURSE EVALUATION

Training course evaluation was arranged in the form of 'roundtable' discussions. Results of these discussions and different opinions and recommendations are presented below.

Participants considered the programme of the Training Course as very well prepared which was fully and successfully carried out. Many professional lecturers gave an opportunity to the participants to gain necessary knowledge in the field of MGG data management. The Course was carried out in a business-like and friendly atmosphere.

The theoretical part of the Course was estimated as unique and was recommended for special publication in Russian and English. The practical part was adequate to the quality of lectures and sufficient. Trainees expressed a desire to have more practical work sessions, especially more training on SUN Spare stations and in managing databases. They thought that the new GIS technology has to be included in more detail in the Course programme.

The participants considered the on-board training as the most successful. They wished to have more on-board training days to become better acquainted with data collection methods and technology.

It was proposed to develop and disseminate among all participants a special software package which would include software of MGD 77 data processing, visualization and map/chart drawing.

The most interesting lectures in the information part of the course were on metadata, manganese nodules data and information, data quality control and correction, presentation of GEOLOGY, GEODAS, DSDP and ODP databases. The participants agreed that the theme of data quality control should be more detailed.

Participants addressed UNESCO/IOC and WDC-B, MGG to organize and implement a new course for MGG data managers. This new course must focus on the practical usage of new technologies (GIS, networks, CD-ROMs, workstations, exabites) and cover a full spectrum of geological data types, information and data collection technology.

Regarding the local arrangements, all the participants agreed that WDC-B MGG provided good conditions for fruitful training. The participants appreciated the excellent social events, which included sight-seeing excursions and friendly parties.

6. CONCLUSIONS AND RECOMMENDATIONS

The Training Course was successfully completed in accordance with the programme and time-table. The success was attributed to the enthusiasm, high professional level and interest of trainees and lecturers. The Course went smoothly in the spirit of friendship and working collaboration. The programme of the first Training Course on Marine Geological and Geophysics Data Management was very useful for participants and considered as a strong support to the “Floating University” training programme in data collecting, processing and usage.

It was recommended that more courses on MGG data and information management should be organized for IOC Member States in support of oceanographic programmes and regional activities. The merging of theoretical lectures, practical exercises and on-board training was considered as very useful. It was pointed out that more time in the next course programme should be devoted to practical training with the usage of new technologies.

There was a general opinion that the Course will facilitate the MGG data collection and exchange among data centers of the IOC Member States of the region and will establish more close and direct contacts between data centers.

7. CLOSURE

The Training Course on Marine Geological and Geophysical Data Management was closed on 29 September 1995. At the closing ceremony, Dr. Shcherbakov congratulated the participants for successfully completing the Course and thanked the lecturers, instructors, the Committee of the Russian Federation on Geology and Minerals Utilization, IOC and BSEP GEF for their co-operation in supporting the Training Course. He expressed hope that the knowledge and experience acquired by the participants during the days of the Course will be utilized at home and that their collaboration and friendship will continue.

The participants thanked the local organizers for the provided facilities and expressed their satisfaction with the support and hospitality.

Before closing the Course, Dr. V. Shcherbakov awarded all participants with a certificate signed by the IOC Executive Secretary and the Director of NMGDC-WDC-B, MGG, indicating the successful completion of the Course (Annex III).

ANNEX I

PROGRAMME AND TIMETABLE

13 September 1995	
10:00 - 11:00	Official opening and administrative arrangements.
11:00 - 12:40	IODE system - tasks, status and general principles of data management. GOOS and its data management module.
14:20 - 17:00	World Data Centres system and international MGG data exchange. Russian State policy for supporting international collaboration between Black Sea region countries. Licensing system for prospecting and mining of mineral resources on land and off-shore regions of the Russian Federation.
14 September 1995	
09:00 - 12:40	IOC Regional programmes in the Black and Caspian Seas, data collection and management problems. The state bank of digital geological information of the Russian Federation. Oceanographic observation data formatting system and formats for data collection, accumulation and dissemination. The Federal Programme of regional prospecting of the continental shelf of the Russian Federation and some problems of the shelf mineral resources licensing.
14:00 - 18:00 -	NMGDC-WDC BMGG: aims, tasks, functions, data and information, technology. Composition and structure of marine data: geology, geophysics, geochemistry and gee-ecology.
15 5eptember 1995	
09:00 - 12:40	Software and hardware used in the state bank of digital geological information for processing geological/geophysical data. Practical work session on SUN workstation. Mineral resources of Russia and the former USSR republics.
14:20 - 18:00	OceanPC - basic concepts and system architecture. Demonstration of OceanPC software and database of physical oceanography. Practical work session on PC computer on the development of a database of physical oceanography.
16 September 1995 -	Day-off.
17 September 1995 -	Day-off,
18 September 1995	
09:00 - 12:40	Main results of the Russian Federation programme - World Ocean, Russian Economical Zone and Antarctic Investigations. General scheme and methods of MGG data collection during sea expeditions. Collection and recording of general prospecting information. Concept of expedition-profile-station and navigation data.
14:20 - 18:00	Practical work session on data recording. GIS technology in geological surveys. Practical work session on SUN workstation and PC.

	Collection and recording of marine geophysical (bathymetric, magnetic and gravity) data using MGD-77 format. Practical work session on recording geophysical data.
19 September 1995	
09:00 - 12:40	Collection and recording data and information on geological stations, drilling holes and points of visual observations. Age of sediments and rocks. Practical work session on station data recording. Collection and recording geological section data (core information and data). Practical work session on recording core information.
14:20 - 18:00	GEODAS system and storage and retrieval of bathymetric, magnetic, gravity and navigation data. Practical work session on the usage of GEODAS system and software. Collection and recording data of rocks and sediments chemical composition (main components).
20 **September 1995**	
09:00 - 12:40	Collection and recording lithological descriptions of rocks and sediments. Practical work session on preparing Iithological codes. Collection and recording gee-technical and petro-physical data.
14:20 - 18:00	Registration, storage and usage of multi-beam echo sounder data. Registration of chemical and isotopic analysis data. Recording and usage of fluid (water) and gas analysis data. Registration of grain size data and analysis results.
21 September 1995	
09:00 - 12:40	Registration of organic composition data and content of bitumoides. Practical work session on organic data registration. Collection and recording the results of manganese nodules and crusts studies. Video film demonstration.
14:20 - 17:00	Remote-sensed data and information for marine geological investigations. General information. Practical exercise on the usage of general data. Recording of special oil and hydrocarbon data
22 September 1995	
09:00 - 12:40	Recording of profiles results and data seismic researches: ODP, seismo-acoustics. Recording of deep seismic sounding. Measurement and registration of heat flow, kappametry and radiometry data. Practical work session of heat flow data recording.
14:20 - 18:00	Sampling and preparation of geological samples and primary data collections. Registration of photo and TV survey results. Collecting and recording geological data. Black Sea regional maps of hydro-geological, gee-ecological and seismological results. Demonstration of the GIS Black Sea maps. Practical work session with GIS technology.
23 September 1995	
10:00 - 16:00	Geological bus excursion along the shore of the Black Sea,

24 September 1995 -	Day-off.
25 September 1995	
09:30 - 16:30	On-board training.
26 September 1995	
09:30 - 16:30	On-board training.
27 September 1995	
09:00 - 12:40	System of marine geological and geophysical databases: DSP/ODP databases. Practical work session on DSP database. Data input, preprocessing, quality control.
14:20 - 18:00	Interpretation and processing of remote-sensed data and information. Composition of digital GIS maps. Practical work session on PC. Demonstration of GIS maps
28 September 1995	
09:00 - 12:40	Database composition and management. Demonstration of software PARADOX. Practical work session. Procession and analysis of heat flow, radiometry and kappametry data.
14:20 - 18:00 -	Analysis and generalization of gravity and magnetic data. 'Core curator file' as a system for dissemination of geological samples for geological and paleo-climatological tasks. Preparing, systematization, storage and usage of geological and primary collection data. Data control and correction.
29 September 1995	
09:00 - 12:40	MGG data METABASE. Practical work session on METABASE. Digital geological, geophysical, geochemical and special maps of the World Ocean developed ***on*** the basis of databases. Dissemination of data and information. MGG data Bulletin
14:20 - 17:00	Future development of the MGG data and information system. Round-table final discussions, course evaluation and closing ceremony.

ANNEX II

LIST OF PARTICIPANTS

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