Intergovernmental Oceanographic Commission
Training Course Reports
13

IOC/IODE Training Course on GF3 Data Formatting System

All-Union Research Institute
of Hydrometeorological Information
World Data Centre B, Oceanography
Obninsk, USSR, 14-24 May 1990

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, 16 January-3 February 1989	English
12.	IOC Advanced Training Course on Continental Shelf Structures, Sediments and Mineral Resources	English
13.	IOC/IODE Training Course on GF3 Data Formatting System	English

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SC-89/WS-48

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1. INTRODUCTION

The IOC Committee on International Oceanographic Data and Information Exchange, at its Thirteenth Session (New York, USA, 17-24 January 1990), welcomed the offer of the Soviet Union to host the Training course on GF3, and in Annex II to Recommendation IODE-XIII.7 "IODE Strategy for 1990-1995: Work Plan and Programme for 1990-1991", decided to give a high priority to training on GF3.

In response to this decisions, the Training Course on GF3 Data Formatting system was held in Obninsk, Kaluga District, USSR, 14-24 May 1990. The course was organized under the auspices of the National Oceanographic Data centre and was co-sponsored by the USSR State Committee for Hydrometeorology and the Intergovernmental Oceanographic commission (IOC).

The General Format 3 (GF3) was developed by the IOC/IODE Group of Experts for handling geo-references data. The structure of the various GF3 records gives uses the freedom to include virtually any type of geo-data. The GF3 system includes a well documented data format and a large library of software utility routines.

The purpose of the training course was to train participants in modern oceanographic data management methods, to get them acquainted with GF3 data management system and to help data managers understand the possibilities for the application of the formatting system in order to facilitate their participation in international oceanographic data exchange.

The training course was directed by Dr. Y. Sychov, Director of the National Oceanographic data Centre. The staff of the All-Union Research Institute of Hydrometeorological Information - World Data Centre (VNIIGMI-WDC) assisted effectively in delivering lectures and in providing practical training, as well as with all types of routine arrangements for the conduct of the Course.

Special thanks are due to Dr. N. Mikhailov and Dr. V. Melnikov, Chiefs of Laboratories of VNIIGMI-WDC, whose efforts in arranging the course and making local arrangements convenient for the participants contributed a lot to the success of the course.

2. PARTICIPANTS

About 20 applications from IOC Member States were received in response to the announcement of the Course, which were evaluated carefully by local organizers and the IOC Secretariat. The criteria for a final selection included the need to work in the field of oceanographic data management, to be familiar with rules and procedures of the IODE System, with the general concepts of data management in the operational system of the VM/SP or VM/CMS types and have experience in programming in FORTRAN-4 (77) and PL-1, and to have a good command of English.

Seven participants were selected from five IOC Member States of Europe and Asia: Bulgaria, China, Greece, India and Thailand. All selected experts were well qualified and involved in oceanographic data and information management at the NODC or its equivalent in their home country. All participants had from very good to reasonably good command of English.

In addition to lecturers from VNIIGMI-WDC, an Assistant Secretary of IOC, Mr. T. Sankey, contributed to planning the course programme and provided lecturers on IOC and IODE System and on different formatting systems for oceanographic data collection, accumulation and dissemination, which have been developed by different international organizations and agencies. (The list of participants and lecturers is given in Annex II).

3. COURSE PROGRAMME

3.1 OPENING

The Training Course on the GF3 Data Formatting System was opened at VNIIGMI-WDC on 14 May 1991 by the Deputy Director of the Institute, Dr. L. Timohin. In his opening address the Deputy Director welcomed the participants, emphasized the purpose and the significance of the course and stressed the importance of the course for establishing working contacts between scientists from different European and Asian countries. He finally expressed the hope that this training course will help participants to increase their participation in regional oceanographic research and in the IODE System, and facilitate their current work at home.

Dr. Y. Sychov welcomed the participants on behalf of the staff of the National Oceanographic Data Centre (NODC) and pointed out that NODC has actively participated in the work of the IODE System and in GF3 development in the past and intends to continue and even broaden its participation in the future. He referred to the growing interest and concern of the world community in oceanographic data collection and handling and expressed his desire to see this course as one of the mechanisms to meet the concerns of the scientific community.

Speaking on behalf of the Secretary IOC, Mr. T. Sankey welcomed the participants of the course and expressed appreciation to the Government of the Soviet Union for hosting the course. Mr. T. Sankey then reminded the participants on the history of GF3 development and on the importance of the course for establishing a necessary co-operation between the Member States. In conclusion, he expressed his hope that the knowledge gained by the participants in the venue of the course will be effectively used at home, so as to help their respective countries to enrich their scientific and operational potentials. He wished the participants every possible success.

3.2 OUTLINE OF COURSE PROGRAMME

The programme of the course was developed jointly by experts from VNIIGMI-WDC and IOC. Participants had an opportunity to get acquainted with the course programme prior to the opening **and a few modifications were made during the first days of the training.** The reference manual prepared by local organizers which included the time-schedule, programme and information on local arrangements was very useful.

The programme was designed for eight working days and included lectures (14-18 May) and practical training (21-23 May). A final time-schedule and a programme of the course are presented in Annex I to this Report.

The following topics were discussed during the training course:

(i) IOC International Data Exchange System - goals and status;

(ii) description of data formats for oceanographic data exchange;

(iii) use of GF3 for data management;

(iv) technical specifications of GF3 and GF3 parameter codes;

(v) design and use of GF3 standard subsets for specific oceanographic data types;

(vi) software for processing data stored in GF3;

(vii) use of GF3 PROC software package.

Although the spectrum of scientific and technical lecturers presented for trainees was relatively wide they may be divided into four main groups:

(i) lectures on international oceanographic data exchange;
(ii) general information on GF3 data formatting system;
(iii) GF3 PROC software package; and
(iv) practical studies.

To enable the participants to make a wider use of the knowledge acquired during the training course, the participants received a set of documents describing the GF3 formatting system, a magnetic tape with GF3 PROC software package and with a GF3 user software library which would help to read and write the data and test GF3 tapes (see Annex III attached to this Report).

3.3 PRACTICAL TRAINING

Practical studies were oriented on acquisition of skills in using the GF3 system for the development of the specialized format subsets and on acquisition of experience in using GF3-PROC software package.

For better understanding the theoretical material on GF3, each trainee was requested to prepare a specialized GF3 subset for different types of oceanographic data; coastal hydrometeorological; deep-water hydrological -hydrochemical observations; current observations, etc. All the trainees implemented this exercise successfully. Some definition records prepared by them are presented in Annex III to this Report.

For better acquaintance with a GF3 PROC software package, all trainees were divided into two groups. Each group has a task to develop a programme and debug it on a computer (VM/SP) using FORTRAN-77 language. This programme was designed to provide a data input from the user's set and process and record an output file in the form of GF3 records*. CMDGF3 programme from GF3 PROC software package was used as a basic one. Both groups carried out the task successfully - the programmes were written and results were obtained in the form of GF3 files on magnetic tapes.

3.4 CLOSURE

The training course on GF3 Data Formatting System was closed on 24 May. At the closing ceremony, Dr. Y. Sychov congratulated the participants for successfully completing the course and thanked the lecturers, instructors and IOC for their co-operation. He hoped that the knowledge acquired by the participants during the days of training will be utilized at home and that their friendship will continue. The participants thanked the local organizers and IOC for the opportunity provided and expressed their satisfaction for the course.

Before closing the course, Dr. Y. Sychov awarded all participants with the Certificates signed by the Secretary IOC and the Director of VNIIGMI-WDC, indicating successful completion of the course (see Annex V attached to this Report).

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* in accordance with definition records developed in advance.

4. COURSE EVALUATION

At the beginning of the course all trainees received questionnaires (see Annex VI to this Report), which were designed to obtain their opinions regarding the organization and conduct of the course. Below, you will find an assessment based on this survey.

Participants considered the whole course or part of it to be of direct relevance to their field of interest. The course was carried out in a business like friendly atmosphere. Some of them stressed that the knowledge gained at the course will help them to strengthen the capability of their national oceanographic data centres to manage marine data and to promote international exchange within IODE. All the participants, but one, thought that theoretical information was adequate and practical training sufficient. One considered the course as too advanced. Many of the participants had plans to apply practical exercises and demonstrations immediately on their return home in order to improve the activities of NODCs. It was pointed out that all Centres had adequate equipment and facilities to make this application a success. One participant pointed out that there is no adequate computer system in his institute and he had to use the computer of another institute. While describing the essential requirements which are necessary to meet current and future demands in oceanographic data management and preparation of products, the need for additional equipment e.g., big chart plotters and digitisers, was emphasized.

The length and programme of the course were considered adequate by most of the participants, while two of them thought that the length could be slightly enlarged to give more practical training. It was also proposed to include in future courses dealing with GF3, a lecture on world experience in adapting GF3 to different operational systems for different types of computers.

Regarding local arrangements, all the participants agreed that everybody who was, in any way, involved with the organization of the course, tried their best so as to make the stay in Obninsk useful, productive and enjoyable. All trainees paid special tribute to the level of interpretation where interpreters showed not only an excellent knowledge of English, but also an amazing understanding of technical terminology. Excellent numerous social arrangements helped a lot for the success of the course.

5. GENERAL CONCLUSIONS AND RECOMMENDATIONS

The training course was successfully completed according to the schedule. The success may be attributed to the enthusiasm and interest of trainees and lecturers, and the course went smoothly in the spirit of friendship. It was recommended that more courses should be organized on the relevant subject in other countries, since GF3 was considered as a necessary tool for promoting IODE activities within the international marine science community. The contribution of theoretical lectures and practical exercises was considered very useful. The need to devote more time in the course programme for practical training was pointed out.

There was a general opinion that the course will facilitate the data exchange among NODCs whose experts participated in the training and that it was a most useful interest to establish direct contacts and to know more about each other.

ANNEX I

COURSE PROGRAMME AND TIME SCHEDULE

The programme for the GF3 Training Course is designed for eight working days starting at 9 a.m finishing at 4 p.m..

Date	Name of the lecture
14 May	1. Opening of the GF3 Training Course 2. Introductory lecture of the Course (1) 3. IODE current status and tasks, TC/IODE role in carrying out oceanographic data exchange 4. USSR Oceanographic Data Centre - tasks, functions, data base and processing system characteristics
15 May	1. Oceanographic observation data formatting for data collection, accumulation and dissemination (including international exchange) 2. Characteristics of national oceanographic data recording formats used in the data management practice 3. Basics of GF3 4. Magnetic tape structure, the GF3 records and files
16 May	1. The concept of the GF3 definition record and record sequencing within individual files 2. The composition and format of GF3 records 3. The structure of definition records and peculiarities of their usage 4. GF3 codes and the rules of their usage
17 May	1. The concept of standard GF3 subsets and peculiarities of different hierarchy data arrangement in GF3 2. Examples of using GF3 for different types of oceanographic observations 3. Final talk on the means of formatting data in GF3
18 May	1. GF3 - Proc. Programme Package: concepts, possibilities and technical specifications 2. Application of GF3-Proc in the user programmes (Part I) 3. Application of GF3-Proc in the user programmes (Part 2)

19 May	Day off
20 May	Day off
21 May	1. Using GF3-Proc for testing magnetic tapes 2. Using GF3-Proc. for data recording 3. Practical studies in developing user programmes for read/write of GF3-formatted data
22 May	1. Practical studies in developing a user programme for read/write of GF3-formatted data (continued) 2. The future development of the GF3 system
23 May	1. Final talk on the GF3-Proc. package. 2. Demonstration of a data management and processing system for deep ocean monitoring developed at the National Oceanographic Data Centre, USSR. 3. Closing of the course.

ANNEX II

LIST OF PARTICIPANTS

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ANNEX III

DISTRIBUTIVE MAGNETIC TAPE CONTENT
(DEN=1600; NL; ASCII or EBCDIC, 23 FILES)

File number	File name	File type	Brief description
1	LPRT1	EXEC	EXEC - file text for initializing the data cycle printing programme
2	PRTGF	FORTRAN	Text of the main programme for data cycle printing
3	OBRPRT	FORTRAN	Subroutine for data cycle processing and printing
4	EXGF	EXEC	EXEC - file text for initializing TAPDSK programme
5	LRSPG	EXEC	EXEC - file text for initializing SPGF3 programme
6	TAPDSK	EXEC	PROGRAMME TO COPY GF3-PROC RELEASE TAPE TAPE FROM TAPE TO DISK UNDER CMS
7	SPGF3	FORTRAN	Main programme for reading reference information from GF3 magnetic tape
8	OBR8	FORTRAN	Subroutine for processing the record of type 8
9	OBR1	FORTRAN	Subroutine for processing the record of type 1
10	OBR	FORTRAN	Subroutine for processing the record of type 0
11	OBR5	FORTRAN	Subroutine for processing the record of type 5
12	OBR234	FORTRAN	Subroutine for processing the record of type 3,4
13	TABL21	FORTRAN	Subroutine for output of the table for the 1st card's standard fields (CALL from OBR234)
14	TABL22	FORTRAN	Subroutine for output of the table for the 2st card's standard fields (CALL from OBR234)
15	TABL51	FORTRAN	Subroutine for output of the table for the 1st card's standard fields (CALL from OBR5)
16	TABL52	FORTRAN	Subroutine for output of the table for the 2st card's standard fields (CALL from OBR5)
17	TABL53	FORTRAN	Subroutine for output of the table for the 3st card's standard fields (CALL from OBR5)
18	TABL54	FORTRAN	Subroutine for output of the table for the 4st card's standard fields (CALL from OBR5)

File number	File name	File type	Brief description
19	GF3PROC	FORTRAN	GF3-PROC SOFTWARE PACKAGE
20	CMDGF3	FORTRAN	Text for GF3-PROC test programme
21	HDRS	DATA	CMDGF3 programme input data
22	CMD	DATA	CMDGF3 programme input data
23	DEFREC	DATA	CMDGF3 programme input data

ANNEX IV

GF3 DEFINITION RECORDS

(i) coastal hydrometeorological observations

Name of the institution : Gidromet

Name of the station : Example Number of the station : 234567

Latitude : 5926 N Longitude : 02251 E

Year : 1976 Month : 2

Day	Time	Sea level	Air pressure	Air temp.	Wind Dir.	Wind Speed
	hh	cm.	mlb.	deg.C	deg.	m/sec
xx	xx	xxx	xxxx.x	xx.x	xxx	xx.x
1	03	-	-	1.2	240	0.2
	09	495	1005.3	1.4	210	0.4
	15	-	-	1.8	190	0.5
	21	493	1003.6	-1.1	180	0.3
2	03	-	-	2.1	160	0.7
	09	491	1003.8	2.4	110	0.9
	15	-	-	-	150	0.4
	21	497	1002.6	-0.1	160	0.3

The content of the series header definition record

```
3   0  7P        (19(2(2X,I2,2X,I2,2X,I3,2X,I5,2X,                    001
3                 3(I3,2X),3X)))                                      002
3                                                                     003
3 DAYS7ZTN   DAY (DD) OF OBSERVATION     I   2                        004
3 TIME7ZTN   TIME(HH) GMT                I   2                        005
3 SLEV7XXD   SEA LEVEL(METER)            I   3-92     1.0  0.0        006
3 ATMS7XXA   ATMOS. PRESSURE(MILLIBARS)  I   5-94     0.1  0.0        007
3 DRYT7XXA   DRY BULB AIR TEMP(DEG C)    I   4-93     0.1  0.0        008
3 WDIR7XXA   WIND DIRECTION ( DEG TRUE )I   3-92     1.0  0.0        009
3 WSPD7XXA   WIND   SPEED (M/SEC)       I   3-92     0.1  0.0        010
```

(ii) deep-water hydrological-hydrochemical observations

General information:

Name of the country: USSR
Name of the institution: AARI
Name of the ship: R.Samoilovich

Area: Baltic Sea

Number of the cruise: 32
Start of the cruise:1986 06 21
End of the cruise: 1986 09 05

Number of the station: 9901

Latitude: 5926 N
Longitude : 02251 E

Hydrometeorological parameters:

Wave type:WW
WW direction:240 WW height:1.5 (m.) WW length:5 (m.)
Horizontal visibility:8 (km.) Air temp.:18.0 (deg.C)
Abs.humidity:13.59 (mlb.) Air pressure:1000.5 (mb.)
Total cloud amount:7 Low cloud amount:6
Water color:12

Hydrological and hydrochemical parameters:

Time (hhmm)	Depth (m.)	Temp. (deg.C)	Sal. (psu)	Diss.oxygen (ml/l)	NO2-N ((mcg-at/l)	NO3-N ((mcg-at)/l)
xxxx	xxxx	xx.xx	xx.xxx	xx.xx	xx.x	xx.xx
1205	0000	15.51	06.735	06.88	01.8	12.03
1204	0010	15.47	-	-	-	-
1203	0020	08.71	06.841	07.36	-	-
1200	0050	01.87	07.517	08.37	02.9	14.02

The content of the series header definition record

```
3  15  8P        (A1,I2,2I3,I2,I4,I5,A2,19X,51(I4,3I5,I4,2I3))          001
3                                                                        002
3                                                                        003
3 SEAS7XXD   SEA STATE  (WMO CODE 3700) A   1                           004
3 VDIR7XXD   VIS.WAVEDIRECTION(DEG TRUE)I   2-91    10.0  0.0           005
3 VEST7XXD   VIS.EST.MEAN.WAVEHEIGHT (M)I   3-92     0.1  0.0           006
3 VLEN2XXD   VIS.EST.MEAN.WAVELENTHT (M)I   3-92     0.1  0.0           007
3 VISB7XXA   HORIZ. VISIBILITY(KM)      I   2 92     1.0  0.0           008
3 DRYT7XXA   DRY BULB AIR TEMP(DEG C)   I   4-93     0.1  0.0           009
3 ATMS7XXA   ATMOS. PRESSURE(MILLIBARS) I   5-94     0.1  0.0           010
3 WCLR7XXD   WATER  COLOR  FOREL-ULE    A   2                           011
4 HHMM7ZTN   TIME(GMT) IN FORMAT HHMM   I   4        1.0  0.0           012
4 DEPH7XXN   DEPTH (METRES)             I   5-94     1.0  0.0           013
4 TEMP7XXD   SEA TEMPERATURE (DEG.C)    I   5-94   0.001  0.0           014
4 USAL7XXD   SALINITY (PSU OR PTS/1000) I   5-94   0.001  0.0           015
4 DOXY7XXD   DISSOLVD OXYGEN (MMOL/M**3)I   4-93     0.1  0.0           016
4 NTRI7XXD   NITRITE (NO2-N) MMOL/M**3  I   3-92    0.01  0.0           017
4 NTRA7XXD   NITRATE (NO3-N) MMOL/M**3  I   3-92     0.1  0.0           018
```

ANNEX V

COURSE CERTIFICATE

INTERGOVERNMENTAL
OCEANOGRAPHIC
COMMISSION

This is to certify that:

Государственный комитет СССР
по гидрометеорологии
ВСЕСОЮЗНЫЙ НАУЧНО-
ИССЛЕДОВАТЕЛЬСКИЙ ИНСТИТУТ
ГИДРОМЕТЕОРОЛОГИЧЕСКОЙ ИНФОРМАЦИИ—
МИРОВОЙ ЦЕНТР ДАННЫХ

Successfully Completed the IOC Training Course on the GF3 data formatting system hosted by the All-Union Research Institute of Hydrometeorological Information - World Data Center B, Obninsk, USSR
14 - 24 May 1990

For IOC:

Dr. Gunnar Kullenberg
Secretary, IOC

for VNIIGMI:

Dr. V. I. Smirnov
Director, WDC B &
Vice Chairman IOC Committee on International Oceanographic Data and Information Exchange

ANNEX VI

QUESTIONNAIRE FOR ASSESSMENT OF THE COURSE BY TRAINEES

Note: The purpose of this questionnaire is to collect information for verall assessment of the training course and to help plan future support for the strengthening of oceanographic data management at the national level.

PART I - PARTICIPANT DETAILS

1. Name of participant

2. Academic Qualifications

3. Field of specialization

4. Name of Employer/Institution

5. Type of work being undertaken in home institution

6. Any other past experience relevant to oceanographic data management

PART II - TRAINING COURSE

1. State which part of the course is of direct relevance to your main field of interest.

2. State which part of the course was particularly interesting to you and in what way it will be useful to you in your future work.

3. Do you think the theoretical information given was:

   Too advanced .....

   Adequate .....

   Not advanced enough .....

   To help you plan future work in your main field of interest ?

   Please check relevant response and give your comments.

   Comments :

4. Do you think the demonstrations and practical exercises were :

   Sufficient .....

   Not sufficient .....

   for you to apply them to future work in your main field of interest ?

   Please check relevant response. If sufficient, how do you plan to start applying them in your own institution ?

5. Do you have adequate equipment and facilities for your data work ? If so please give a brief description of them.

6. In the case that you do not have adequate facilities, what do you think are the essential requirements for you to meet current and future demands in your field of interest ?

7. Aside from the field of your main interest, what other aspects of the course do you think are extremely important and complementary for your future work in your field of main interest ?

8. Please provide your general impression of the course.

9. Please state your future professional plans as well as how you propose to use this training course in your professional work.

10. Please give your comments on the arrangements made in respect of accommodation, transport, food and social events, if any, during the course.

11. What recommendations do you propose that would improve the conduct of the training course and its facilities ?