**Intergovernmental Oceanographic Commission**
*Training Course Reports*

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# Training Course on Management of Marine Data and Information for the Mediterranean Region

Organized in cooperation with:
Malta Council for Science and Technology
Euro-Mediterranean Centre on Insular Coastal Dynamics
CEC-MAST

Valletta, Malta
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**UNESCO**

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## 1. INTRODUCTION & OBJECTIVES

The Training Course on Management of Marine Data and Information for the Mediterranean Region was held at the Mediterranean Conference Centre in Valletta, Malta from 10 to 21 April 1995. The Course was organized in cooperation with and kindly hosted by the Malta Council for Science and Technology and the Euro-Mediterranean Centre on Insular Coastal Dynamics.

The course frames within the continuing training programme of the IODE to familiarize marine data and information managers with current procedures and methods related to marine data and information management. Through such training courses the IOC aims to ensure increasing and sustained collaboration of Member States in the IODE programme, and to maintain a high level of competence in the National Oceanographic Data Centres.

The current course covered countries in the Mediterranean region.

## 2. PARTICIPANTS

The course was attended by participants from Croatia, Egypt, Greece, Malta, Morocco, Portugal and Turkey. Lectures were provided by lecturers from Malta, Russian Federation, United Kingdom, United States, and IOC. The list of participants and lecturers is provided as Annex II.

## 3 COURSE PROGRAMME

### 3.1 OPENING CEREMONY

The Training Course was officially opened on Monday 10 April by Dr. Salvino Busuttil, Director General of the Foundation for International Studies. Prof. Busuttil welcomed the participants and reconfirmed the support which Malta is always willing to provide in order to aid the IOC in its mission especially with regard to the Mediterranean. He remarked that this course is undoubtedly a unique opportunity for all the participants not only in streghthening oceanographic data exchange in the region, but also in enhancing each participant's current activities in their home countries. Mr. Aldo Drago, the Maltese Delegete for IOC, also addressed the participants. His speech is attached as Annex III.

On behalf of the Secretary IOC, Mr. Peter Pissierssens thanked the Malta Council for Science and Technology, and the Euro-Mediterranean Centre on Insular Coastal Dynamics - Foundation for International Studies for co-organizing and hosting this training course. He expressed the wish that this training course would contribute to the further development of the IODE system and its implementation in the Mediterranean region. He reiterated the importance attached by the IOC to the IODE programme and highlighted the important role of the National Oceanographic Data Centres in the IODE system. He referred to the continuous efforts of the various Groups of Experts in identifying new methods, techniques and technologies and their application in data and information management.

## 3.2 LECTURES & PRACTICALS

### 3.2.1 **Introduction to the IODE System** (P. Pissierssens)

Mr. Pissierssens provided an overview of the IOC Committee on International Data and Information Exchange system and its Committee (IODE). The course covered the following topics:

- History of IODE
- IODE's Terms of Reference

- IODE Centres Network
- IODE and information
- Composition of the IODE Committee
- Data Management
    - IODE's Data Management Policy
    - Data types
    - The Data Flow
        = NODC/DNA
        = RNODCs
        = WDCs Oceanography

Special attention was given to Marine Information Management. This included the following topics:

- What is information
- IODE's MIM Programme
    = MEDI
    = ASFIS/ASFA
        . ASFA objectives
        . ASFA products
        . ASFA availability
        . ASFA partners
        . ASFA partner responsibilities
        . ASFA: Board and Secretariat
        . ASFA subject coverage
        . MSCT/FACT
        . IMS Newsletter
    = GE-MIM
        . Terms of Reference
        . Actions and Products
        . Publications
        . MIM and developing countries

### 3.2.2 **Information Networks** (P. Pissierssens)

During this lecture Mr. Pissierssens gave an extensive overview of the procedures involved in the development of national or regional information exchange networks. The lecture covered the following topics:

= Definition of national/regional information requirements
= Identification of network components and their responsibilities
= A case study :RECOSCIX-WIO

For more information he referred to the IOC publications IOC Manuals and Guides No. 30 Vols. 1, 2 and 3.

As all participants are data managers in their national institutions, their knowledge about information and information management was limited: although they have libraries in their institutions, contacts between the information managers and data managers prove to be limited. Few participants were aware of the database engine software Micro CDS/ISIS and only one participant has used it. However, he regretted that the software is very user-unfriendly and therefore he did not frequently use it.

The lecturer pointed out that, within IODE, important steps have been made to develop joined data-information products. He pointed out that ultimately all data become information and there should therefore not exist a discontinuity between data and information management. Accordingly, data managers and information managers need to become more involved in each other's activities.

Following the theoretical lectures and discussions the participants were informed about the ASFISIS software package, developed jointly by the GE-MIM and the ASFA Board. It was developed for the use by ASFA input centres for the standardized preparation of ASFA input records. However, thanks to the inclusion of both input and output modules it can also be applied for the development of institutional bibliographic databases. The participants were given a short demonstration of the software and some requested a copy of the software.

### 3.2.3 **Microcomputer Introduction** (M. Galea)

During this lecture Mr. Galea gave an on-screen overview of microcomputers and their comparison to other systems. He also compared different operating systems such as DOS and UNIX.

### 3.2.4 **Ocean Data Formatting Systems - formats for data storage** (N. Mikhailov)

During the first part of this lecture Mr. Mikhailov focused on the GETADE format (GETADE subset). He also provided a list of theoretical materials and software for future use.

The problems of oceanographic data formatting were considered in detail during this lecture. The theoretical part included consideration of possible structures for oceanographic data streams and the main elements of the data formatting : logical and physical data structure on the technical carrier, data description means (languages) and the software of the formatting support.

The major principles, technical specifications and the peculiarities of the use were given for the following formats and formatting systems : GF-3, GTSPP, JGOFS, HDDL (Russia), BUFR, ICES, Punch Card, ICES-BLue Print, SD2 (U.S.A. NODC), WOA94 CD-ROMs (U.S.A. NODC), GETADE IOC.

The development of data formatting methods was considered, using the format, developed at the IOC GETADE, as an example. Theoretical materials, prepared by the experts of the IOC's GETADE, and materials from other sources were widely used during the lecture.

During practical exercises the participants prepared the format for oceanographic data exchange, using GETADE formatting means.

During the lectures and practical exercises the participants discussed the positive and

negative (in their opinion) qualities of the considered formats and formatting systems. Most of the participants favored the unification of the formatting means, developed at the IOC, for international data exchange.

### 3.2.5 Oceanographic data quality control (N. Mikhailov)

The participants were acquainted with the methods of oceanographic data control, which are given in the *IOC Manuals and Guides No. 26* , entitled 'Manual of Quality control procedures for validation of oceanographic data' prepared by IOC and CEC in 1993.

The following stages of oceanographic data management to check the meta-data and data were considered :

- Stage 0 : oceanographic station/profile duplication checking;
- Stage 1 : station information ( platform, latitude, longitude, date, time and etc. ) checking;
- Stage 2 : checking profiles from oceanographic station ;
- Stage 3 : checking stations on base of climatology and statistical tests.

The algorithms of QC procedures which are used on the above-mentioned stages of QC were given the participants.

Practical exercises for QC oceanographic data included the consideration of different error types using real examples and the work to check oceanographic data using OCEAN-PC. The participants were provided the subroutines ( FORTRAN Microsoft source text ) which were developed by Russian NODC.

### 3.2.6 Software for Ocean Data and Information Manageme nt (Ocean PC) (N. Mikhailov)

The purpose of this lecture was to provide the basic aspects of oceanographic data and information management using OCEAN-PC software. Topics covered included :

- history of the IOC Project for the development of OCEAN-PC;
- system structure, contents and organization of data files and internal system format;
- manual for OCEAN-PC and installation of the system on PC;
- OCEAN-PC functions: Manual key-entry of data and cruise descriptions; Import/export of oceanographic data on base of the format data conversions; Quality check and utilities for summarizing and displaying data; Oceanographic mapping .

The lectures were accompanied by an OCEAN-PC software demonstration. During the practical exercises the participants performed key-entry of some oceanographic stations and quality check of the data and test data files, they imported the data files for the Mediterranean sea from the World Atlas 94 CD-ROM under OCEAN-PC and carried out the summarizing and displaying of the data using OCEAN-PC and ATLAST.

The aspects of practical usage of OCEAN-PC and future development of this system has aroused considerable interest among the participants of the course.

### 3.2.7 Management of Historical Data (GODAR Project) (R. Gelfeld)

3.2.7.a History of Global Oceanographic Data Archaeology and Rescue Project (GODAR)

September 1990: Ad Hoc meeting held at the U.S. National Oceanographic Data Center in Washington DC to discuss the state of historical oceanographic data. Participants included scientists and data managers from Australia, Chile, Japan, Korea, Russia, and the United States. As a result of the discussions the following conclusions were reported:

a) substantial amounts of oceanographic data exist in manuscript form and are thus unavailable to national and international research communities. Data are at risk of being lost due to media degradation or neglect.
b) substantial amounts of oceanographic data exist in digital form and are not available to national and international research communities. Data are at risk of being lost due to media degradation or neglect.

September 1992: Workshop on Ocean Climate Data held in Greenbelt, Maryland. Scientists and data managers gathered to demonstrate the progress of national and international "data archaeology and rescue projects". The meeting recommended to institute an international data and archaeology rescue project.

December 1992: IOC/IODE meeting in New York, NY. A proposal was submitted by the U.S.NODC and collocated World Data Center A, Oceanography to launch an international data archaeology and rescue project. The IODE passed a recommendation to the IOC Governing Bodies to establish a :Global Oceanographic Data Archaeology and Rescue Project (GODAR).

March 1993: The IOC Assembly accepted the proposal and established GODAR.

3.2.7.b Archaeology Goals

a) prepare catalogues (inventories) of:
   data now available in manuscript form
   data now available in analog form
   digital data not presently available
b) digitize data known to exist only in manuscript or analog form
c) ensure all oceanographic data archived at two or more international centers
d) make all data accessible on various media

3.2.7.c Current Archaeology Activities

a) summarize existing archived data in data centers and data gathering institutions and establish the total volume of historical data
b) summarize known manuscript and analog data that should be digitized
c) increase communication among scientists and data managers and convince institutions to make available the newly discovered historical data and necessary documentation
d) digitize (optical or manual) manuscript and analog data and perform scientific quality control activities
e) make the data accessible to scientists and data managers

Special attention was given to the following topics:

- Geographic Station Location Plot Technique
- Data Sets Received through the GODAR Project:
  There have been more than 1.4 million profiles containing 1500 megabytes of data rescued to date through GODAR.
- Geographic Station Location Plot Examples
  Russian Oceanographic Station Data - 12,268 profiles
  Russian Mechanical Bathythermograph Data - 220,000 profiles
- GODAR Regional Workshops
  GODAR I - Obninsk, Russia, May 1993. Participants from region including Eastern and Northern Europe. Results available in IOC Workshop Report No. 88
  GODAR II - Tianjin, China, March 1994. Participants from region including the Western Pacific. Results available in IOC Workshop Report No. 100
  GODAR III - Goa, India, December 1994. Participants from region including the Indian Ocean. Results available as IOC Workshop report No. 107
  GODAR IV - La Valletta, Malta, April 1995. Participants from region including the Mediterranean Sea.
  GODAR V - Site and date to be determined -Possibly Fall 1995 or first quarter of 1996. Participants to be invited from South American region. International GODAR Review - Site and date to be determined. Participants will be worldwide
- NODC Ocean Data Holdings (WDC-A Oceanography Data Holdings)
- International Cooperation and Data Exchange Network:
  Worldwide map of the World Data Centres for Oceanography, National Oceanographic data centers, IOC headquarters, and the ICES headquarters
- International projects involved in Ocean Science and Global Change:
  Tropical Ocean-Global Atmosphere (TOGA) Project
  World Ocean Circulation Experiment (WOCE)
  Joint Global Ocean Flux Study (JGOFS)

3.2.7.d GODAR Software demonstration - World Ocean Atlas 1994

The World Ocean Atlas 1994 consists of:
a) four atlas volumes - vol. 1: nutrients, vol. 2: oxygen, vol. 3: salinity, vol. 4: temperature
b) two technical reports on data processing and quality control
c) atlas data sets on CD-ROM or exabyte tape

The World Ocean Atlas 1994 CD-ROMs contain:
a) objectively analyzed fields
   disc 1 - temperature
   disc 2 - salinity (and 5-degree square statistics)
   disc 3 - oxygen, apparent oxygen utilization, oxygen saturation, phosphate, silicate, nitrate
b) observed level profile data
   disc 4 - North American (0-40N), North Indian, and South Indian Oceans
   disc 5 - North Atlantic (40-90N) and South Atlantic Oceans
   disc 6 - North Pacific (0-30N) and South Pacific Oceans
   disc 7 - North Pacific (30-90N) Ocean
c) Standard Level Profile Data
   disc 8 - Atlantic and Indian Oceans
   disc 9 - Pacific Ocean

### 3.2.8. Integrated Data and Information Systems - Global Temperature-Salinity Pilo t Project (GTSPP) (R. Gelfeld)

Mr. Gelfeld described the GTSPP project, the GTSPP Real-Time Data Sets and detailed the Integrated Global Ocean Services System of GTSPP data flow and data management.

Practical exercises were carried out using the NODC Global Temperature-Salinity CD-ROM No. 02-03 and associated software.

### 3.2.9 New Technologies (R. Gelfeld)

Mr. Gelfeld provided a PC Slideshow describing new NODC Technologies, Products and Services. During a practical exercise the NODC CD-ROM was used on Oceanographic Station Time Series Profiles using ATLAST software. Finally a practical demonstration was presented of the NODC CD-ROM on Taxonomic Code System

The lecturer also provided some information on the NODC Home Page, the NODC Ocean Bulletin Board Service, NODC Products and Services and NODC Online Data Access.

### 3.2.10 Remote Sensing (S. Boxall)

Mr. Boxall gave an extensive overview of many aspects of remote sensing and drew the attention of the participants to the limitations of the technique caused by various factors ranging from atmospheric conditions to instrumentation errors. Quality control of the acquired data was highlighted as an important phase in the management of remotely-sensed data.

### 3.2.11 Establishment of NODC: a case study (I. Oliounine)

The backbone of the IODE system is a network of National Oceanographic Data Centres. There are currently 40 NODCs spread around the world - 15 in Europe; 8 in Asia; 2 in North America; 2 in Central America; 8 in South America; 4 in Africa and Australia. There are still big gaps in the NODC networks in Central America, Southern Asia, Africa and the Middle East.

NODCs constitute a central national facility for providing on a continuing basis ocean data/information in a usable form to a wide user community. NODCs acquire, process, quality control, inventory, archive and disseminate data in accordance with national responsibilities. In addition to disseminating data and data products nationally, NODCs are charged with the responsibility for conducting international exchange.

A data centre should ideally have an adequate base of historical data/information for its area of interest. Such a base is of a considerable importance for scientists as it helps identify trends, extremes and averages of marine environmental parameters. A historical database provides assistance in verifying the quality of newly collected data. If national exchange has not provided large databases, the role of an NODC will be to create these bases through expanding international and national exchange acting as the national point of contact with other NODCs, RNODCs and WDCs for Oceanography.

A data centre may contribute significantly to the resource development of a country by providing information for applied research in fisheries, aquaculture, exploitation of mineral resources, ocean engineering, etc.

A data centre can also assist by providing input to education processes, academic studies and theses. It can provide a source of oceanographic information as a means of developing a national awareness of the marine sciences and their potential for improving the environment and living conditions through lectures, publications and training.

The lecturer gave a description of different types of NODCs and presented different options of NODC functions and terms of reference. A case study was presented on the development of a project proposal for the establishment of an NODC.

In closing, the lecturer appealed to the trainees to bring information on the benefits of NODCs activities to national decision makers in order to make the necessary actions for the establishment of an appropriate and effective data management infrastructure in their respective countries.

## 4. COURSE EVALUATION

On the last day of the course an evaluation of the course was carried out with the participants and the lecturers by submission of a questionnaire and discussions. A summary of the evaluation is given below.

### EXPECTATIONS OF THE COURSE

The participants expected to be informed about the following issues during the course:

- activities of other NODCs, new technology in data processing & archiving, applying of these to own centre
- expected, practicals in data formatting systems
- to get a varied information to assist in data management and data exchange
- how to store marine data; what are formatting systems; quality of data; software for storage, processing and management of data; new technologies in data management
- increase knowledge of ocean data and information management

Evaluation: the majority of the participants found that the course covered all important issues.
In general the participants asked to be given copies of the lecture material and to make available a list of references which could be used after the course.

### LECTURE EVALUATIONS

**3.2.1 Introduction to the IODE System** (P. Pissierssens)

Although IODE is considered as very relevant, the knowledge about the programme among the scientists is not uniform. This introduction was therefore well received. The participants requested copies of the hand-out used for the lectures so these can be used to publicize the IODE programme in their own country.

**3.2.2 Information Networks** (P. Pissierssens)

Well received.

**3.2.3 Microcomputer Introduction** (M. Galea)

The topic was appreciated but the participants felt the level could have been higher as all participants use the PC on a daily basis. On the other hand it was felt that GIS which was touched briefly should be given more attention.

**3.2.4 Ocean Data Formatting Systems - formats for data storage** (N. Mikhailov)

This lecture was well received but the participants requested more practical exercises. It was also felt that more focus should be put on fewer formatting systems. It was also suggested for the participants to bring their own data.

**3.2.5 Oceanographic data quality control** (N. Mikhailov)

The topic was well received. However the participants found the software, although very necessary, not very user friendly and recommended that efforts should be put into developing a user friendly interface. It was also found that knowledge about Ocean PC was not widespread so this topic was very relevant.

**3.2.6 Software for Ocean Data and Information Manageme nt (Ocean PC)** (N. Mikhailov)

This topic was very relevant. It was noted that NODCs don't have standard quality control procedures. It was found that this should be changed.

**3.2.7 Management of Historical Data (GODAR Project)** (R. Gelfeld)

This topic was well appreciated as an introduction to the GODAR workshop.

**3.2.8. Integrated Data and Information Systems - Global Temperature-Salinity Pilo t Project (GTSPP)** (R. Gelfeld)

This lecture was found to be very useful by the participants. However it was felt that more practical exercises need to be included.

**3.2.9 New Technologies** (R. Gelfeld)

Although this was a very interesting subject it was regretted that no Internet connection was available.

**3.2.10 Remote Sensing** (S. Boxall)

Although the lecture was well received it was felt that too much attention was given to generalities. It was suggested to give more attention to the use and management f remotely-sensed data.

**3.2.11 Establishment of NODC: a case study** (I. Oliounine)
Well received.

## 5. CONCLUSIONS & RECOMMENDATIONS

The network lecture attracted special attention from the participants as one of them pointed out that the networking strategies being presented could equally be used for data exchange. The lecturer confirmed this citing the ODINEA (Ocean Data and Information Network in East Africa) network being developed now in the Western Indian Ocean region building on the RECOSCIX-WIO foundation.

During the discussions on IODE several participants pointed out that they had difficulties in obtaining data from the scientists in their national institutions. The fear for data being used by others is real and hampers the development of national datasets in the NODCs. In this respect several options to fight this problem were suggested: national policy on data exchange, payment for data, exchange of data by scientists for data management services by the NODC, etc. Lack of resources in the NODCs was also cited as an important factor in the sometimes limited activity of NODCs. Some participants suggested that a Trust Fund should be established for the support of small NODCs. Alternatively the possibility for paid NODC services (pay for data services) was mentioned. However, it was agreed that this would not be beneficial for the smaller NODCs.

The participants of the course believed that the understanding of principles and methods of data formatting on technical media is very important both for the international data exchange and the realization of data management schemes at a specific centre or organization.

In conclusion, the training course was considered to have been a successful undertaking which had met, to a large extent, its objectives. The course has enabled the participants to extend their understanding of the importance of the IODE programme in general and of data and information management in particular. The linking of data and information management in one course was well received as a new and most useful approach. The participants who were all involved in marine data management in their national institutions expressed their intention to actively publicize IODE in their own countries.

In order to maximize the impact of future training courses it was recommended that:

(i) attention is given to identify candidates of a similar level in terms of knowledge and experience with regard to data and information management;
(ii) include more practical exercises involving the participants' own data;
(iii) ensure that handouts and list of references are available

## ANNEX I

## COURSE PROGRAMME & TIMETABLE

| Date | Time | Activity | Lecturer(s) |
|---|---|---|---|
| 10 April Monday | 09:00 | Registration of participants | |
| | 11.00 | Official opening | |
| | 14:00 | Introduction Lecture on the IODE System | P.Pisssierssens |
| | 16:00 | Marine Information Management Networks | P. Pissierssens |
| 11 April Tuesday | 09:00 | MIM RECOSCIX | P. Pissierssens |
| | 11:00 | MIM practical | P. Pissierssens |
| | 14:00 | Microcomputer introduction | M. Galea |
| 12 April Wednesday | 09:00 | Ocean Data Formatting Systems formats for data storage, dissemination and exchange | N. Mikhailov |
| | 14:00 | GF/3 and other formats | N. Mikhailov |
| 13 April Thursday | 09:00 | Formatting guidelines | N. Mikhailov |
| | 10:00 | Record structure (practicals) | N. Mikhailov |
| | 14:00 | Record structures (discussions) | N. Mikhailov |
| | 14:30 | Ocean PC (theory and practicals) | N. Mikhailov |
| 14 April Friday | PUBLIC HOLIDAY | | |
| 15 April Saturday | PUBLIC HOLIDAY | | |
| 16 April Sunday | PUBLIC HOLIDAY | | |
| 17 April Monday | 09:00 | Quality Control (theory and practicals) | N. Mikhailov |
| 18 April Tuesday | 09:00 | Management of Historical Data - GODAR Project | R. Gelfeld |
| | 11:00 | GODAR Software demonstration - World Atlas 1994 | R. Gelfeld |
| | 14:00 | Integrated Data and Information Systems (GTSPP) | R. Gelfeld |
| 19 April Wednesday | 09:00 | New technologies | R. Gelfeld |

| Date | Time | Activity | Lecturer(s) |
|---|---|---|---|
| 20 April Thursday | 10:00 | Remote Sensing | S.Boxall |
| 21 April Friday | 09:00 | Establishment of NODC: a case study | I. Oliounine |
| | 11:00 | Revision of the Course and Discussion | I. Oliounine P.Pissierssens |
| | 13:00 | Closing | |

# ANNEX II

## LIST OF PARTICIPANTS

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# ANNEX III

## OPENING SPEECH
### Dr. S. Busuttil, Director-General, Foundation for International Studies

May I first of all welcome the lecturers present and the foreign and local participants to this Training course on the Management of Marine Data and Information for the Mediterranean Region . When I first put forward the proposal at the 14th Session of the IOC Committee on International Oceanographic Data and Information Exchange (IODE) in December 1992 to hold this training course in Malta, I was confident that the Maltese authorities, from the limited funds available for oceanographic-related activities, would approve the initiative. Malta has in fact, especially in these last few years, brought forward and fostered its image, on a political as well as a scientific and technological level, as a bridge linking the more developed Northern Mediterranean countries to the rest of the Third Mediterranean countries bordering the Southern and Eastern shores of this Sea. For this reason the Marine Resource Network of the Malta Council for Science and Technology and the Euro-Med. Centre on ICOD have endeavored to promote this Training course.

There is no doubt that the advent of new technologies as well as the enhancement of already established applications have revolutionized the methods in ocean observations; the demands of oceanography have become increasingly directed towards a multi disciplinary approach in which the sea is studied as a whole and by considering the full spectrum of mutually interacting components, both in time and space. Moreover modern oceanography is increasingly relying on the capability of multi-parameter in situ measurements at sea with onboard simultaneous analysis, and on the acquisition of synoptic data from remote sensors. All these aspects have enabled the research at sea to become more precise and better adapted for applications.

It is also however true that these achievements have unfortunately led to a widening of the technological gap between the more technologically advanced countries and the developing countries. This situation is very eloquent in the Mediterranean, a region that is already harassed by diverse political issues and which encapsulates along its perimeter a mosaic of different cultures. Many Mediterranean countries lack the human resources, the financial support and very often the necessary structures that are required to keep the pace with the Northern EU member states. This Training Course can be considered as an endeavor to fill in this gap.

We strongly believe that knowledge, oceanographic information in particular is the patrimony of all mankind; technological progress needs to be shared for the benefit of all. We are also firmly convinced that science has no geographical boundaries, science is a common factor, science has no language. There is no room for excessive advantages to be gained and ambitions by any one country to be pursued too far. The vulnerability of this small planet in which we live has never before been so much of concern. It is now evident, especially in a semi-enclosed sea such as the Mediterranean, that improper practices by a single bordering country can adversely affect the whole region and lead to imbalances in the very delicate equilibria that control marine ecosystems. Moreover no comprehensive and large scale monitoring of the marine environment can be effective unless all the countries possess the necessary element which enable them to actively participate in the related research and monitoring programmes. Countries cannot exercise their efforts in isolation or pretend to stand in a privileged position to impose their work on behalf of others.

These considerations were at the basis of my proposal for this training course in 1992 and have become of greater concern in the last two years. For this reason I would like to thank the IOC, the MCST and the Euro-Med Centre on Insular Coastal Dynamics for supporting this initiative. I hope that such a training course will be repeated in the future, at least once every intersessional period of the IODE Committee. I will endeavor to promote another such meeting to be held in Malta in the future.