Intergovernmental Oceanographic Commission

Training Course Report   **79**

First ODINAFRICA-III Training Course in Marine Data Management

Supported by the IOC and the Government of Flanders

Ostend, Belgium
April 11 – 29, 2005

UNESCO

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1. INTRODUCTION AND OBJECTIVES

The First ODINAFRICA III Training Workshop in Marine Data Management was held in Ostend, Belgium, April 11-29, 2005 and was attended by students from eleven African nations, representing the IOCINCWIO (Western Indian Ocean) and IOCEA (Central Eastern Atlantic) regions of the IOC. ODINAFRICA is a data and information project working towards establishing a lasting network of marine and aquatic institutes in Africa. Its headquarters is located at the central United National Environmental Program offices in Nairobi, Kenya. Through its information services to the scientific community, the project aims at promoting the scientific capabilities of this continent. The objectives of the ODINAFRICA project are as follows:

a) Provide marine scientists in Africa with the necessary bibliographic and scientific literature

b) Make full use of the scientific literature available in Africa

c) Promote and facilitate communication between marine scientists in Africa

d) Promote and facilitate communication in Africa and other regions

e) Promote the scientific activities of the marine and coastal scientists within and outside Africa

f) Provide scientific information, and equipment, software and training to make full use of this information

Under the leadership of the IOC, and with funding generously provided by the government of Flanders, the workshop was designed to address the final objective listed above. The workshop was organized locally by Dr. Vladimir Vladymyrov of the IOC Project Office for IODE in Ostend.

The marine data management-training curriculum developed by the IOC's International Oceanographic Data and Information Exchange Program (IODE) is based on an extensive collation of international public documents on marine data, formats, software, program and data management procedures, manuals, protocols, and associated tutorials. The main resource, entitled OceanTeacher, is a 1.5 gigabyte Digital Library of primary documents -- accompanied by various thematic Course Manuals -- that has been under development by the IOC training staff since 1997 (see outline in Annex III). OceanTeacher is the principal training resource used during data management courses, currently available on the World Wide Web and soon to be published on DVD (digital versatile disk).

2. PARTICIPANTS

Participants included five countries which have already been involved in previous ODINAFRICA training workshops (Cameroon, Cote d'Ivoire, Guinea, Morocco and Seychelles) and six countries new to the program (Algeria, Angola, Congo, Egypt, Gabon and Namibia). The first group of

countries included those where previous students have moved on to other positions, or where remedial training had been recommended. Invited data managers from Australia, Belgium, France, the United States of America, and the IOC provided lectures. The list of participants and lecturers is provided as Annex II.

3.   COURSE PROGRAMME

3.1   LECTURES AND PRACTICALS

3.1.1   Workshop Objectives

The ODINAFRICA III Marine Data Management training curriculum has been designed to provide participants with knowledge and skills in the following areas:

- Basic computer skills
- The importance of marine data in general, and particularly within participants' national and regional environments
- How to set up an oceanographic data center within the IODE System
- The infrastructure requirements, including hardware and software tools
- How to manipulate and analyze the principal types and formats of marine data
- How to produce ocean data products and to disseminate thee products, both over the Internet and by traditional methods

This first workshop in the new cycle of ODINAFRICA training had been designed to cover materials formerly covered in two sequential years of work in previous cycles. It included all of the more complex topics – especially in the area of data and data-product synthesis. Particular emphasis is now placed on obtaining data directly from Internet website sources, rather than the previous heavy reliance on specially prepared CD-ROMs.

3.1.2   Workshop Technical Outline

The following is the outline of the relevant Course Manuals prepared and selected for use in this workshop. [ID = Interdisciplinary; DM = Data Management] All of the following topics were covered in lectures and practical exercises , using basic reference materials contained in the IODE OceanTeacher Digital Library (outlined in Annex III).

ID 100: Introduction to OceanTeacher

GOALS	To provide orientation to new students, on the structure and contents of OceanTeacher
	To provide instructions on the use of the Course Manuals to access topical information in the Digital Library
CONTENTS	Digital Library
	Software
	Data & Information Exercise
	Course Manuals

ID 101: Computer Basics

GOAL	To introduce the data manager to computer systems, tools and practices necessary to operate a modern ocean data center
CONTENTS	Skills Assessment
	Computer Hardware
	Operating Systems
	Software: Introduction
	Software: Editors
	Software: Browsers
	Software: Spreadsheets
	Software: Databases
	Software: Compression
	Computer Networks
	Computer Maintenance
	Computer Media

ID 102: Internet Basics

GOALS	To describe the functional components of the Internet/World Wide Web and the protocols and software that make it work
	To acquaint students methods to obtain ocean data and information on the Internet
CONTENTS	Internet Overview
	General & Introductory
	World Wide Web
	Internet Service Providers
	Email

	Outlook Express
	FTP
	Markup Languages
	Websites
	Information Seeking
	Client-Server Concepts
	Selected Information Product Websites
	Selected Data Product & Analysis Websites
	Downloading Data

ID 103: Information, Data and Metadata

GOAL	To introduce students to fundamental "bridging" concepts and current activities between oceanographic information management and data management
CONTENTS	Information Availability & Access
	Data Availability & Access
	Metadata
	Information Centers
	Data Centers
	World Data Center System
	IODE Data Center System
	DNAs, NODCs and RNODCs
	Other Ocean Data Centers
	Information Catalogs
	Data Catalogs
	OPTION: MEDI Cataloging
	Prerequisite: DM 101 or equivalent experience
	Information & Communication Programs & Organizations

ID 104: Introduction to Oceanography

GOAL	To provide students with an overview of the ocean sciences today
CONTENTS	Background
	Major Oceanographic Disciples
	Research Oceanography
	Survey Oceanography
	Operational Oceanography

	Geopolitics of Oceanography
	Programs & Organizations

DM 102: Ocean Data Collection Management

GOALS	To show students how to create a National Data Collection, using the World Ocean Database 2001, other published or unpublished data sources, and near real-time operational data
	To demonstrate some basic data analysis functions in popular ocean software programs
CONTENTS	Area of Interest
	Creation of Data Collections
	Basic Data Analysis
	Collection Housekeeping
	Exporting ODV Products
	Adding Other Data
	Special Purpose Collections
	Methods for Operational Data

DM 103 Ocean Data Products & Synthesis

GOALS	To demonstrate a broad suite of basic analysis methods for ocean data (including remote sensing data) using popular software systems
	To demonstrate basic methods for combining data products in Geographic Information Systems (GIS)
CONTENTS	Gridding & Contouring with Surfer
	Surfer Vector Charts
	Managing HDF Files
	Bathymetry and Topography Products
	Managing Image Files
	Synthesis in GIS

3.1.3   Invited Presentations

Several special invited presentations were interspersed throughout the regular schedule of lessons, provided by these resource persons (listed in Annex II).

- Ms. Linda Pikula: Introduction to Marine Information Management

- Mr. Loic Petit de Villeon: CORIOLIS Data Center Quality Control Procedures and ARGO Data

- Mr. Vladimir Vladymyrov: The IOC and the IODE

- Dr. Edward Vanden Berghe: Introduction to Biological Diversity Data Concepts

- Dr. Hassan El Ouizgani: Practical Aspects of NODC Website Publication

- Dr. Malika Bel Hassen-Abid: Overview of the IODE MEDI Software

3.1.4   Special Materials

The workshop attendees were provided with the following special training materials, provided by the indicated sources:

- General Bathymetric Chart of the Oceans (GEBCO) Digital Atlas, 2003. A joint product of the IOC and the International Hydrographic Office; CD-ROM copies provided by the British Oceanographic Data Centre.

3.2   RESULTS AND RECOMMENDATIONS

The workshop schedule was successfully accomplished, including a number of special invited lectures on topics of interest. The students exhibited a wide range of individual skills, a situation that has been noted previously in all ODINAFRICA workshops. The most serious deficiencies include inexperience with the Windows operating system for personal computers, a matter of serious concern to the IODE OceanTeacher program, and relatively poor knowledge of marine science shown by some students from allied disciples. The time lost to assistance with operating system problems is considerable, when these problems are known. Unfortunately it is not possible always to identify these problems within the workshop setting, and situations that should have been addressed immediately (thereby also losing time) might have gone unnoticed. The OceanTeacher training curriculum practitioners (i.e. the IODE trainers) remain strongly concerned with the under-preparation shown by some participating students, a situation which we do not feel is still explainable by cultural or national economic milieu.

As with previous workshop cycles, students will be presented with sequential projects to complete over the next year, and these will be publicized by a special website. IODE and ODINAFRICA national coordinators will be kept informed of individual progress.

ANNEX I

COURSE PROGRAM AND TIMETABLE

Course	Lesson Title	Lecturer(s)	Duration (hrs)	Date
Opening Activities	N/A	N/A	2	11
ID 100	Introduction to OceanTeacher	Brown	1/2	11
ID 101: Computer Basics	1. Skills Assessment	Brown	1	11
	2. Computer Hardware	Sims	1/2	11
	3. Operating System	Sims	1	11
	4. Software: Introduction	Brown	1/2	11
	5. Software: Editors	Brown	1/2	11
	6. Software: Browsers	Sims	1/2	12
	7. Software: Spreadsheets	Brown	1/2	12
	8. Software: Databases	Brown	1/2	12
	9. Software: Compression	Brown	1/2	12
	10. Computer Networks	Sims	1/2	12
	11. Computer Mintenance	Sims	1/2	12
	12. Computer Media	Brown	1/2	12
ID 102: Internet Basics	1.A. Internet General & Introductory	Sims	1/2	13
	1.B. World Wide Web	Brown	1/2	13
	1.C. Internet Service Providers	Sims	1/2	13
	1.D. Email	Brown/Sims	1/2	13
	1.D.1. Outlook Express	Brown/Sims	1/2	13
	1.E. FTP	Sims	1	13
	2. Markup Languages	Ouizgani	1	13
	3. Websites	Ouizgani	2	13
	4. Information Seeking	Brown	1/2	14
	5. Client-Server Concepts	Sims	1/2	14
	7. Selected Data Product & Analysis	Brown	1/2	14
	8. Downloading Data	Brown	1	14
ID 103: Information, Data and Metadata	2. Data Availability & Access	Brown	1/2	14
	3. Metadata	Brown	1/2	14
	5.A. World Data Center System	Brown	1/2	14
	5.B. IODE Data Center System	Brown	1/2	14
	5.C. DNAs, NODCs and RNODCs	Brown	1	14
	5.D. Other Ocean Data Centers	Brown	1	14
	7. Data Catalogs		1	14
	8. MEDI Cataloging	Reed/Bel Hassan	2	18
	9. Information Programs & Organizations	Brown	1	15
ID 104: Introduction to Oceanography	1. Background	Brown	1/2	15
	2. Major Oceanographic Disciplines	Brown	1/2	15
	3. Research Oceanography	Brown	1/2	15
	4. Survey Oceanography	Brown	1/2	15
	5. Operational Oceanography	Reed	1	15
	6. Geopolitics of Oceanography	Brown	1/2	15
	7. Programs & Organizations	Odido	1	15
DM 101: Introduction to Ocean Data	1. Oceanographic Parameters	Brown/Brown	2	18
	2. Oceanographic Measurement Units	Brown	1	18

	3. Temperature & Salinity Scales	Brown	1/2	18
	4. Standard Depths	Reed	1/2	18
	5. Collecting Data	Reed	1	18
	6. Data Format Types	Brown	1	18
	7. Oceanographic Data Formats	Brown	1	18
	7.A. Code Tables	Reed	1/2	19
	7.B. Geography: Location	Brown	1	19
	7.C. Geography: Charts	Reed	1/2	19
	7.D. Date & Time	Brown	1	19
	7.E. Quality Flags	Brown	1/2	19
DM 102: Data Collection Management	1. Area of Interest	Brown/Reed	6	20
	2. Creation of Data Collections	Brown/Reed	4	21
	3. Basic Data Analyses	Brown/Reed	4	21
	4. Collection Housekeeping	Brown/Reed	1	22
	5. Exporting ODV Products	Brown/Reed	6	22
	6. Adding Other Data	Brown/Reed	5	22
	7. Special Purpose Collections	Brown/Reed	1	25
	10. Methods for Argo Data	Brown/Reed	3	25
DM 103: Data Products & Synthesis	1. Gridding & Contouring with Surfer	Brown/Reed	6	25
	2. Surfer Vector Charts	Brown	3	26
	4. Bathy/Topo Products	Brown	2	26
	5. Managing Images	Brown	3	27
	7. GIS Synthesis	Brown	6	27
	OPTIONS and make-up work	Brown	?	28
Final Activities and Workshop Close	N/A	Brown	1	29

ANNEX II

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ANNEX III

IODE OceanTeacher Digital Library
Table of Contents

[NOTE: Underlines indicate materials currently present, at least in draft form. Otherwise, no material is yet provided for the specific category]

3. <u>Geopolitics of Oceanography</u>
4. <u>Research Oceanography</u>
  1. <u>General & Introductory</u>
  2. <u>Biological Oceanography</u>
  3. <u>Chemical Oceanography</u>
  4. <u>Geological Oceanography</u>
  5. <u>Physical Oceanography</u>
  6. <u>Remote Sensing</u>
5. <u>Survey Oceanography</u>
  1. <u>Resource Surveys</u>
  2. <u>Long Time-Series</u>
6. <u>Operational Oceanography</u>
  1. <u>Overview</u>
  2. <u>Economics of Ocean Observations</u>
  3. <u>Data & Information Infrastructure</u>
  4. <u>Global Ocean Observing System</u>
    1. <u>Local Systems</u>
      1. <u>Rutgers</u>
      2. <u>Oregon</u>
      3. <u>ICON</u>
      4. <u>NYHOPS</u>
      5. <u>PORTS</u>
      6. <u>REINAS</u>
      7. <u>SDCOOS</u>
      8. <u>SCMI</u>
    2. <u>Medium-Scale Systems</u>
      1. <u>Black Sea GOOS</u>
      2. <u>BOOS</u>
      3. <u>EuroGOOS</u>
      4. <u>GCOOS</u>
      5. <u>GoMOOS</u>
      6. <u>GOOS-Africa</u>
      7. <u>IOCARIBE-GOOS</u>
      8. <u>IOGOOS</u>
      9. <u>IOOS</u>
      10. <u>MedGOOS</u>
      11. <u>NEAR-GOOS</u>
      12. <u>NOOS</u>
      13. <u>PI-GOOS</u>
      14. <u>SEACAMP</u>
      15. <u>SEACOOS</u>
      16. <u>WAGOOS</u>
    3. <u>Observatories</u>
      1. <u>ESONET</u>
      2. <u>HAWAII-2</u>
      3. <u>LEO-15</u>
      4. <u>MARS</u>
      5. <u>MVCO</u>
      6. <u>NEMO</u>
      7. <u>NEPTUNE</u>
      8. <u>OOI</u>
      9. <u>ORION/GEOSTAR</u>
    4. <u>Global Systems</u>
      1. <u>ARGO</u>
      2. <u>GDP</u>
      3. <u>GLOSS</u>

2. Metadata
   1. Formal Descriptions of Resources
   2. Classifications, Taxonomies, Ontologies
   3. Thesaurus Systems
   4. Discovery & Descriptive Metadata
   5. Metadata Standards & Formats
   6. Crosswalks
3. Information Seeking in Electronic Environments
   1. Searching Information
   2. Text Retrieval
   3. Saving Information
4. Document Production
   1. Internal Reports
   2. Production
   3. Distribution & Sales
   4. Document Imaging
   5. Full Text
   6. Graphics & Images
   7. Animation & Video
   8. Charts & Graphs
   9. Scientist Support
   10. Copyright
   11. Bibliographic Citation Standards
   12. Publishers' Requirements
5. Information & Technology Programs & Organizations
   1. BIOCASE
   2. CENDI
   3. CODATA
   4. DGIR
   5. DMAC
   6. ESIP
   7. GSDI
   8. ICSTI
   9. IEEE
   10. IETF
   11. ISO
   12. MarineXML
   13. MMI
   14. OAI
   15. OCLC
   16. OIT
   17. OPeNDAP
   18. OpenGIS
   19. OpenIOOS
   20. THREDDS
   21. UNICODE
   22. W3C
   23. Societies & Associations
3. Information Management Principles - Under construction
4. Ocean Information Management - Under construction
5. Data Management Principles
   1. Data Formats
      1. ASCII
      2. Binary
      3. Format Types
         1. Document

       7.   Operational GIS
7. <u>Examples</u>
8. <u>Exercises</u>
      1. <u>Information Technology Exercises</u>
      2. Information Exercises
      3. <u>Data Management Exercises</u>
            1. Instructor Whiteboards
                 1. <u>Africa Whiteboard</u>
                 2. <u>South America Whiteboard</u>
            2. <u>Hand Contouring</u>
            3. <u>Data Roadmaps</u>
            4. <u>Data Processing with Excel</u>
            5. <u>Processing Seabird CTD Data with Seabird Software</u>

ANNEX IV

Acronym list

- ODINAFRICA Ocean Data and Information Network for Africa
- IOC Intergovernmental Oceanographic Commission (of UNESCO)
- IOCINCWIO IOC Committee for the Cooperative Investigation In the North and Central Western Indian Ocean
- IOCEA IOC regional Committee for the Central Eastern Atlantic
- DNA Designated National Agency
- NODC National Oceanographic Data Center
- RNODC Responsible National Oceanographic Data Centre
- MEDI Marine Environmental Data Index
- DM Data managers
- IODE International Oceanographic Data and Information Exchange Program
- ODV Ocean Data View
- HDF Hierarchical Data Format
- GEBCO General Bathymetric Chart of the Oceans