ODINAFRICA II Training Course in Marine Data Management for Mozambique

Supported by the IOC and the Government of Flanders

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11-22 August 2003

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Abstract
The ODINAFRICA-II Training Course in Marine Data Management was held in Maputo, Mozambique between 11 and 22 August 2003, and was organised by the Instituto Nacional de Hidrografia e Navegação (INAHINA). The workshop was attended by 10 students from marine institutions in Mozambique. Lectures were provided by invited resource persons from the USA and the IOC. The workshop programme was based on the IOC OceanTeacher capacity building tool - an extensive collation of documents on marine data, formats, software, program and data management procedures, manuals, protocols, and associated tutorials.
TABLE OF CONTENTS

1. INTRODUCTION AND OBJECTIVES 1
2. PARTICIPANTS 1
3. COURSE PROGRAMME 1
  3.1 Workshop Objectives 1
  3.2 Workshop Abstract 2
  3.3 Workshop Technical Outline 3
4. RECOMMENDATIONS 4

ANNEXES

I. Course Program and Timetable
II. List of Participants
III. Group Photograph
1. **INTRODUCTION AND OBJECTIVES**

The ODINAFRICA-II Training Workshop in Marine Data Management for Mozambique was held in Maputo, Mozambique from 11-22 August 2003 and hosted by the Instituto Nacional de Hidrografia e Navegaçao (INAHINA). The workshop was attended by ten students from marine institutions in Mozambique. ODINAFRICA is a data and information project working towards establishing a lasting network of marine and aquatic data and information centres in Africa. 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:

1. Provide assistance in the development and operation of National Oceanographic Data (and Information) Centres and establish their networking in Africa;
2. Provide training opportunities in marine data and information management applying standard formats and methodologies as defined by the IODE;
3. Assist in the development and maintenance of national, regional and Pan-Africa marine metadata, information and data holding databases;
4. Assist in the development and dissemination of marine and coastal data and information products responding to the needs of a wide variety of user groups using national and regional networks.

Under the leadership of the IOC, and with funding provided by the government of Flanders, the workshop was designed to address the final objective listed above. A complete record of the previous workshops, including detailed descriptions of the training materials, is given in IOC Training Course Reports 60 (Casablanca) and 64 (Tunis).

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 that forms part of the IODE Ocean Teacher product. The main collection, entitled the IODE Resource Kit, is a 650 megabyte CD-ROM that has been under development by the IODE training staff since 1997. The Ocean Data Management Training Manual, a smaller companion documents designed for instructors, accompanies the Resource Kit for Data Management.

2. **PARTICIPANTS**

Ten students from marine institutions in Mozambique attended the training workshop. Invited data managers from United States of America and the IOC provided lectures. The list of participants is provided as Annex II.

3. **COURSE PROGRAMME**

3.1 **WORKSHOP OBJECTIVES**

The ODINAFRICA II 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 centre within the IODE System
- 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
3.2 WORKSHOP ABSTRACT

The topics for the workshop have been selected for coverage in the first year of an ongoing programme. These include:

- **Introductory Materials**
  - What is this particular course going to cover?
  - Who are the participants, and what do they do?
  - What are the instructional materials and how do they work?
  - The schedule and housekeeping information specific to an individual workshop.

- **The IOC/IODE System**
  - What is it and what does it do?
  - What is included in "marine data & information?"
  - What is important about "marine data & information?"

- **Introduction to the Use of the PC for Ocean Data & Information Management**
  - What are the basic knowledge and skills needed by a marine data manager?
  - What are the computer tools we need to manage a marine data centre?

- **Basic Data Concepts**
  - What are the formats we use for marine data?
  - How do we construct data files?
  - What are the special "tricks" a marine data manager must know?

- **Data, Metadata & Information**
  - Where do we get data?
  - What are the major data types we must work with?
  - What is metadata, and how do we use it?
  - What is the "best" metadata system for marine data?
  - How is "information management" related to "data management?"

- **IODE Data Centre Operations**
  - What does a data centre do, and what formalities guide this work?
  - How does a typical data centre operate?
  - How do you start a new data centre?
  - What are the scientific aspects of data centre operations?
  - What are the business aspects of data centre operations? Data Manipulation & Analysis
  - What are the software tools available for use with marine data?
  - What relationships exist between marine data formats and available software?
  - How can you integrate the various marine software programs with multiple data formats?
  - What are the "standard" analyses performed on marine data?
  - How is marine data quality controlled?
  - How are various marine and non-marine datasets (and their individual analytical products) synthesized?

- **The Internet**
  - What is it?
  - What system and software tools are necessary to make it work?
  - How are "web documents" created and managed?
  - How can I build my own website?

The final program and timetable for the workshop are presented in Annex I.
### 3.3 WORKSHOP TECHNICAL OUTLINE

The following is the outline for Course 1 of the OceanTeacher Data Management Training Manual which is used for the first workshop in the ODINAFRICA II cycle of training. All of the following topics were covered in lectures and practicals, using basic reference materials contained in the IODE OceanTeacher.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Goal(s)</th>
<th>Content</th>
</tr>
</thead>
</table>
| **The IOC-IODE System** | • To provide an overview of international programs in marine data and information management  
• To provide an introduction to the types of data they maintain. | • Overview  
  o NODCs - National Oceanographic Data Centres  
  o DNAs - Designated National Agencies  
  o RNODCs - Responsible National Oceanographic Data Centres  
  o Intergovernmental Oceanographic Commission's (IOC) Committee on IODE  
  o Role of an NODC  
• WDCs - World Data Centres  
• Marine Data  
  o What we measure and how we do it  
  o Regional Survey: What data do you have? |
| **Introduction to the use of PCs** | • To introduce the data manager to computer systems, tools and practices necessary to operate a modern ocean data centre | • Skills Assessment  
• Computer Hardware  
• Operating Systems  
• Software: Editors  
• Software: Browsers  
• Software: Spreadsheets  
• Software: Compression  
• Computer Networks  
• Computer Maintenance |
| **Basic Data Concepts** | • To familiarize students with the various types of data commonly found in marine science, and about some of the peculiarities of earth science data. | • Data Formats  
• Special Topics  
  o Parameters  
  o Units  
  o Code Tables  
  o Geographic Coordinates  
  o Map Projections  
  o Global Sectors |
| **Data, Metadata and Information** | • To familiarize the students with the three major divisions in ocean resource materials: Data, Metadata, Information  
• To show how a small number of important formats are used most commonly to store and manipulate these resources | • Global Sources of Data  
  o Major Publishers  
  o Major Publications  
  o Major Formats  
  o Data Media  
• Metadata  
  o Overview and Importance  
  o Cruise Summary Reports  
  o Review of Standards and Systems  
  o Introduction to Marine Environmental Data Inventory (MEDI)  
  o MEDI Tutorial  
• Marine Information Management |
4. RECOMMENDATIONS

The workshop included participants from four different institutions in Mozambique. This mix of professionals from different backgrounds (meteorology, fisheries and oceanography) provided a successful forum where the national data management issues were discussed and the participants were able to recognize the value of developing a strong national data centre.

It was agreed that some participants would benefit from supplementary training in basic keyboard skills, Windows commands and Excel spreadsheets. This would assist in providing the skills required to develop a national data collection.

All participants agreed that a follow-up to this course would be beneficial. This follow-up could take the form of an additional course in data management as provided in the Ocean Teacher Training Manual for Data Management (Course 2).

Students were reminded that the IODE Ocean Teacher was a dynamic product and the latest version should always be consulted at http://OceanTeacher.org.
## COURSE PROGRAM AND TIMETABLE

<table>
<thead>
<tr>
<th>Day</th>
<th>Topic</th>
<th>Content</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Opening ceremony</td>
<td>Welcome address</td>
<td>IODE Resource Kit and Training Manual</td>
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<tr>
<td></td>
<td>Preliminaries</td>
<td>Overview and Course Objectives</td>
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<td>Participant Introduction</td>
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<td>Introduction to OceanTeacher</td>
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<td></td>
<td>The IOC / IODE System</td>
<td>ODINAFRICA Project</td>
<td>Overview of the ODINAFRICA Project</td>
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<td>Overview of IODE</td>
<td>The IODE System</td>
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<td>Description of NODCs, DNAs, RNODCs</td>
<td>Description of NODCs, DNAs, RNODCs</td>
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<td>The IOC Committee on IODE</td>
<td>The IOC Committee on IODE</td>
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<td>The Role of an NODC</td>
<td>The Role of an NODC</td>
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<td></td>
<td>Introduction to the use of PCs for Ocean</td>
<td>World Data Centres</td>
<td>Description of the World Data Centre System</td>
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<td>Data Management</td>
<td>Marine Data</td>
<td>Introduction to Datasets</td>
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<td>Skills Assessment</td>
<td>Oceanography Primer</td>
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<td>Computer hardware</td>
<td>National Survey</td>
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<td>Operating systems</td>
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<td>2</td>
<td></td>
<td>Data Concepts</td>
<td>ASCII editors tutorial and exercise</td>
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<td></td>
<td></td>
<td>Software – editors</td>
<td>Introduction to web browsers</td>
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<td></td>
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<td>Software – browsers</td>
<td>Creating ODV files in Excel</td>
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<tr>
<td></td>
<td></td>
<td>Software – spreadsheets</td>
<td>Types of networks, Network components</td>
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<td></td>
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<td>Computer Networks</td>
<td>Backups, compressing files, viruses</td>
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<td></td>
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<td>Computer Maintenance</td>
<td>Major format types</td>
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<td>Data Formats</td>
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<tr>
<td>3</td>
<td></td>
<td>Data, Metadata and Information</td>
<td>Special Topics (parameters, units, code tables, etc)</td>
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<td>Global sources of data</td>
<td>Overview of major publishers of data</td>
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<td>Media types for data distribution</td>
<td>Media types for data distribution</td>
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<td>On-line data servers</td>
<td>On-line data servers</td>
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<td>Metadata</td>
<td>Major format types</td>
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<td></td>
<td>Overview and importance of metadata</td>
<td>Review of metadata standards and systems</td>
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<td>4</td>
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<td>Data Centre Operations</td>
<td>MEDI – introduction and software installation</td>
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<td>Marine Information Management</td>
<td>MEDI – data entry exercise</td>
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<td>Data Management Policies and Procedures</td>
<td>Introduction to MIM</td>
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<tr>
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<td>NODC Examples</td>
<td>Science Plans, Implementation Plans, DM Policies</td>
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<td>Business Plans</td>
<td>A long established NODC, a newly established NODC</td>
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<td>Examples of Business Plans</td>
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<tr>
<td>5</td>
<td>Data Manipulation and Analysis</td>
<td>Software: Analysis Tools</td>
<td>Software description and installation (including ODV)</td>
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<td>Data Formats</td>
<td>Format conversion, compatibility matrix</td>
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<td></td>
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<td>The Roadmap Tutorials</td>
<td>Tutorial C. Area of Interest</td>
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<td>6</td>
<td></td>
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<td>Tutorial D. Create Data Collections</td>
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<td>Tutorial H. Add Other Data</td>
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<td>7</td>
<td>Tutorial I. Analysis and Quality Control</td>
<td>Tutorial J. Data Products</td>
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<td>8</td>
<td>Tutorial K. Grid and Contour with Surfer</td>
<td>Tutorial R. Using NetCDF Data</td>
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<tr>
<td>9</td>
<td>The Internet</td>
<td>Technical Overview</td>
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<td>Internet Service Providers</td>
<td>Dial-up connections, connect to the internet</td>
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<td>Email</td>
<td>Email etiquette</td>
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<td>Outlook Express</td>
<td>Set up an account</td>
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<td>Markup Languages</td>
<td>Introduction to HTML</td>
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<td>10</td>
<td>Course wrap-up</td>
<td>National Data Catalogues</td>
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<td>IODE Resource Kit</td>
<td>Review of MEDI</td>
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<td></td>
<td>Review of Intersessional Goals</td>
<td>Review of Resource Kit Content</td>
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</tbody>
</table>
ANNEX II

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ANNEX III

GROUP PHOTOGRAPH