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ODINAFRICA II Combined Madagascar Marine Atlas Workshop and Remedial Training Course in Marine Data Management for Comores

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Abstract

A special workshop has been held in Tulear, Madagascar from June 30 to July 11, 2003 as part of the ODINAFRICA-II program for ocean data management. This report describes the content and accomplishments of that special workshop. 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. The workshop addressed the specific marine data identification, reformatting, and analysis methods needed by Madagascar's National Oceanographic Data Centre to develop a new national marine atlas. The remedial course (held simultaneously) addressed the training needs of the ODINAFRICA-II student from Comores who has experienced severe communications and travel difficulties in the past, and who requested "one-on-one" training to reach parity with the other students.

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1. INTRODUCTION AND GOALS

ODINAFRICA is a data and information project working towards establishing a lasting network of marine and aquatic data and information centres in Africa. Two international Workshops in Marine Data Management have been organised by the ODINAFRICA II project (Casablanca, April, 2001; and Tunis, May 2002), attended by students from twenty African nations. 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.

As an extension of the general course of training exercises and assignments developed and managed under the main educational program, ODINAFRICA-II also supports special methods training in individual countries which desire to develop higher-level products, such as national marine data atlases. Under the leadership of the IOC, and with funding generously provided by the government of Flanders, this workshop was designed to provide such special training for the Centre National de Données Oceanographiques (CNDO) of Madagascar. Subsequent to initial planning for this effort, it was determined that the ODINAFRICA-II student from the Comores, who has had severe communications and travel difficulties during the first two years of the program, could benefit by attending also. Toward this end, it was arranged for a combined session to be held, covering national marine atlas development for Madagascar, and a remedial training course for Comores. The simultaneous sessions were accomplished in Tulear, Madagascar, from June 30 – July 11, 2003, at the Institut Halieutique et des Sciences Marines (IHSM), host agency for the CNDO.. This report describes the content and accomplishments of that special workshop.

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. The national atlas workshop for Madagascar used primarily the Roadmap Tutorials section of the Resource Kit, found on the Internet at <http://ioc.unesco.org/oceanteacher/resourcekit/M3/tutorials.htm>. The remedial training course was based on the Data Short Course already developed for such circumstances, found at <http://ioc.unesco.org/oceanteacher/data/DataShortCourse/index.htm>. The detailed course program and timetable is provided in Annex I.

2. PARTICIPANTS

Three students from Madagascar and one student from Comores attended the workshop. The list of participants and information about the lecturer are provided as Annex II.

3. PROGRAMME

3.1 OBJECTIVES

The Madagascar National Marine Atlas Workshop was organized to address the following objectives:

- Identification of relevant global and regional datasets
- Identification of the national Area of Interest polygon
- Selection of themes and datasets for inclusion
- Extraction of necessary data from global archives
- Reformatting data for use in selected analysis programs
- Standard analyses and products, using selected analysis programs
- Creation of the atlas structure and interface
- Assembly of necessary dataset documentation

The Data Short Course for Comores as organized to address the following objectives:

- Creation of a national data collection of standard oceanographic data
- Creation of standard data products and graphics from the national collection
- Reformatting data for use in selected analysis programs
- Standard analyses and products, using selected analysis programs

3.2 ATLAS WORKSHOP TECHNICAL OUTLINE

The outline of the workshop was designed to address specific technical capabilities that the invited student has indicated to be problematic. In addition, the new Marine Environmental Data Inventory (MEDI) software (which has not been addressed directly in previous workshops) was presented.

Workshop Section	Goal(s)	Technical Topics
Introductory	Establish agreement on the scope, purposes, general content and form of the Atlas	<ol style="list-style-type: none"> 1. Select final Area of Interest rectangle 2. Review and discuss available global and regional data files 3. Select major Atlas themes
Atlas Content	Determination of Atlas content	<ol style="list-style-type: none"> 1. Selection of Atlas software platform 2. Selection of datasets 3. Selection of intended analyses and products 4. Selection of final formats 5. Selection of standard image size (for GeoTIF images)
Database Management	Development of file conversion and manipulation skills	<ol style="list-style-type: none"> 1. Creating GIS-compatible files from other formats and/or from graphical interfaces 2. Creation of instrument-specific ocean station data (OSD) collections 3. Standard product exports from OSD collections

		<ol style="list-style-type: none"> 4. Conversion of gridded products from global archives to general-purpose format 5. Combined extraction/conversion of gridded products, as in 3. 6. Image manipulations/transformations for GIS usage 7. Special methods for colour-palette to data-value conversions
Data Products	Development of standard data products and the software skills needed to create them	<ol style="list-style-type: none"> 1. Standard base mapping components (bathy/topo/coastline; political infrastructure, etc.) 2. OSD collection graphics in Ocean Data View 3. Gridding and contouring OSD data with Surfer 4. Gridding and contouring other gridded data from global data climatologies 5. Creating GIS-compatible products from gridded/contoured datasets 6. Data synthesis in GIS
Atlas Structure and Documentation	Identify the principal components of the Atlas interface and its structure	<ol style="list-style-type: none"> 1. Provide appropriate overview information 2. Select technical themes 3. Select documentation for datasets 4. Introduce and provide necessary software 5. Provide contact information 6. Legal disclaimers (bathymetry/topo/coastline data)

3.3 DATA SHORT COURSE TECHNICAL OUTLINE

The outline of the workshop was designed to address specific technical capabilities that the invited students have indicated – both individually in communications with the instructors and by their submission of intersessional assignments – to be problematic. In addition, the new Marine Environmental Data Inventory (MEDI) software introduced, installed and tested successfully.

Workshop Section	Goal(s)	Subdivisions	Goal(s)	Technical Topics
Basics Review	Review some basic concepts that (based on performance) have not been adequately	Business Concepts	Review some ordinary PC practices for better computer use and improved communications	<ul style="list-style-type: none"> • WINDOWS Review • EMAIL Review

	adequately learned in previous workshops	Scientific Concepts	To review some of the most important formats, databases and programs in the Resource Kit	<ul style="list-style-type: none"> Resource Kit Contents Format ABCs Important Formats Important Databases Important Software Integration
MEDI	To provide an overview of metadata; and to demonstrate the installation and use of the metadata authoring tool for MEDI (Marine Environmental Data Inventory)			<ul style="list-style-type: none"> Metadata - What are Metadata? - Why use Metadata? - The Role of a Data Directory • MEDI Authoring Tool - Background to MEDI - Install the MEDI Software - Enter your own metadata records • MEDI User Manual
National Data Collection	To show students, "step by step," how to create a national data collection from the World Ocean Database 2001 (WOD01)	Determine the AOI "Box"	To demonstrate some methods for determining the Area of Interest (AOI)	Area of Interest Tutorials (C-1 to C-8) in the IODE Resource Kit
		Create the Original Data Collection	To demonstrate how to use the AOI to select data from WOD01 to make an preliminary data collection called the Original Data Collection	Creation of Data Collections (D-1 to D-3) in the IODE Resource Kit
		Create the National Collection	To demonstrate how to made the desired National Data Collection from the temporary Original Data Collection	Creation of Data Collections (D-4) in the IODE Resource Kit
		Make an Inventory	To demonstrate some basic methods for managing your ODV collection	Collection Housekeeping (G-2) in the IODE Resource Kit
Add Your Own Data	To demonstrate the basic methods to digitize "hard copy" data into a spreadsheet	Data ABCs	To provide a review of some important concepts about ocean data measurements	<ul style="list-style-type: none"> Oceanographic Parameters Parameter Units Conventions
		Spreadsheet Work	To demonstrate how to make a spreadsheet for data entry, and to digitize a "hard copy" dataset into that spreadsheet	Adding Other Data (H1-H4) in the IODE Resource Kit
Analysis,	To demonstrate			<ul style="list-style-type: none"> Integrated Formats

Quality Control & Exporting	some basic Quality Control (QC) methods for marine data, using analysis procedures in Ocean Data view (ODV), and to demonstrate how to make data products (files and figures) with ODV			Documentation <ul style="list-style-type: none"> • Analysis and Quality Control (I1-I4) in the IODE Resource Kit • Exporting ODV Products (J1-J2) in the IODE Resource Kit
Gridding and Contouring	To demonstrate the basic concepts in gridding and contouring a set of scattered data points			Gridding and Contouring Data in SURFER (K1-K6) in the IODE Resource Kit
Data from Images	To demonstrate some basic methods for extracting usable data from images (especially satellite images)	Data from HDF	To demonstrate how to extract an ASCII data grid from an HDF file, and to convert it to XYZ data for gridding	Managing HDF Files (M1-M8) in the IODE Resource Kit

4. RECOMMENDATIONS

Madagascar Data Atlas Workshop resulted in firm plans and objectives for the assembly of the large amount of available data (see Annex III) into a comprehensive, quality product. Due to the volume of resources (over 1000 candidate files) and the considerable work that must go into each separate product, it is estimated that approximately a year will be required for an initial draft. It has been recommended to the CNDO that a complete set of analyses for the month of January for each dataset be attempted, in order to crystallize the methods and intended product formats, as a first effort, rather than all months for all datasets. CNDO was encouraged to present early results at the upcoming ODINAFRICA II workshop session in Belgium (September 2003).

The progress of the student from Comores was remarkable. He is one of the most careful users of the Roadmap Tutorials contained in the Resource Kit the instructor has had the pleasure of teaching. His successes with all the classroom exercises reinforce the value of these materials when conscientiously applied. He was encouraged now to catch up with the set of class assignments, published on a special Internet website (<http://oceanteacher/DataTeacher/>). In addition, he was informed of the need to work toward the presentation of results in the upcoming session in Belgium (see above)

ANNEX I

COURSE PROGRAM AND TIMETABLE

DAY	MADAGASCAR MARINE ATLAS WORKSHOP	COMORES DATA SHORT COURSE
MONDAY	Introductory Atlas Content	Introduction Workshop Information Basics Review
TUESDAY	Database Management	National Data Collection
WEDNESDAY	Database Management	National Data Collection Add Your Own Data
THURSDAY	Database Management	Analysis & Quality Control
FRIDAY	Data Products	Gridding & Contouring
MONDAY	Data Products	Gridding & Contouring
TUESDAY	Data Products Vector Data	Vector Data
WEDNESDAY	Data Products Data from NetCDF Files	Data from HDF files Data from NetCDF files
THURSDAY	MEDI	MEDI
FRIDAY	Atlas Structure and Documentation	Review and discussion

ANNEX II

LIST OF PARTICIPANTS

I. TRAINEES

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ANNEX III

INVENTORY OF DATA FILES FOR THE MADAGASCAR NATIONAL ATLAS

- CMS-MCMC Marine Turtle Program
 - CMS Marine Turtle Nesting Database
- Coastal Zone Color Scanner & Advanced Very High Resolution Radiometer (CZCS & AVHRR)
 - Monthly CZCS Surface Chlorophyll
 - Monthly AVHRR Sea Surface Temperature
- Digital Chart of the World (coastlines, boundaries, roads, cities, waterways, lakes, etc.)
 - Madagascar
 - Mauritius
 - Mozambique
 - Comoros
 - Tanzania
 - Seychelles
- Environmental Science Research Institute (ESRI)
 - World Cities
 - Time Zones
 - UTM Zones
 - World Basemap Data for Madagascar
- Food and Agriculture Organization of the United National (FAO)
 - Area 51 – Fisheries Catch by Country
 - Area 51 – Fisheries Catch by Species
 - Current Global Map
 - Current Indian Ocean Map
- General Bathymetric Chart of the Oceans (GEBCO 2003)
 - Images
 - Coastline
 - Selected Contours
 - Bathymetric Grid
- Global Forest Watch
 - Current Forest Cover
 - Frontier Forests
- Kew Botanic Gardens
 - Simplified Geology
 - Remaining Primary Vegetation
- U.S. National Geophysical Data Center (NGDC) Interactive Maps
 - Bailey Ecoregions
 - Bazilevich Primary Production
 - Deck 41 Surficial Sediments
 - Fedorova World Vegetation
 - Paleoclimatology – Vegetation
- U.S. National Imagery and Mapping Agency (NIMA)
 - DTED Level 0 Topography
- U.S. NOAA-CIRES-Climate Diagnostic Center (CDC)
 - Monthly Optimal Interpolation Sea Surface Temperature
- U.S. NOAA-Navy Shipdrift
 - Monthly (components)
- U.S. National Virtual Ocean Data Distribution System (NVODDS)
 - COADS Monthly Climatology
 - Air Temperature
 - Sea Level Pressure
 - Specific Humidity
 - Sea Surface Temperature
 - Wind (components)

Wind Speed

U.S. Climate Prediction Center (CPC) Merged Precipitation/Standard (monthly)

DBDBV 5-minute Topography

MSU Precipitation (monthly)

Richardson Shipdrift (monthly components)

World Ocean Atlas 2001 (selected depth grids)(seven parameters)

Annual

Seasonal

U.S. Pacific Fisheries Environmental Laboratory (PFEL) Live Access Server

Mixed Layer Depth - Depth Criterion (monthly)

Mixed Layer Depth - Temperature Criterion (monthly)

U.S. NASA PO.DAAC

Pathfinder 1985-2003 (monthly)

U. S. NASA PO.DAAC ESIP

Significant Wave Height 1992-2002 (10-day periods)

Sea Surface Height Residuals 1992-2001 (monthly)

Wetlands International

RAMSAR Wetlands Database

U.S. Geological Survey (USGS) GeoData Explorer

Africa

Country Boundaries

Geological Provinces

Geology

World Ocean Database 2001 (all WOD01 zipped)

All Data (ocean stations, CTD, mechanical bathythermograph, expendable bathythermograph, surface)

All "Accepted" Data (OSD, CTD, MBT, XBT, SUR)

World Ocean Optics Database

Secchi Disk Depths

World Wildlife Federation (WWF)

WWF Ecoregions