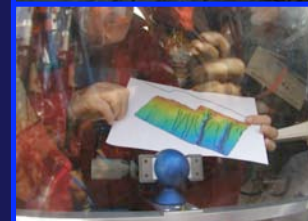
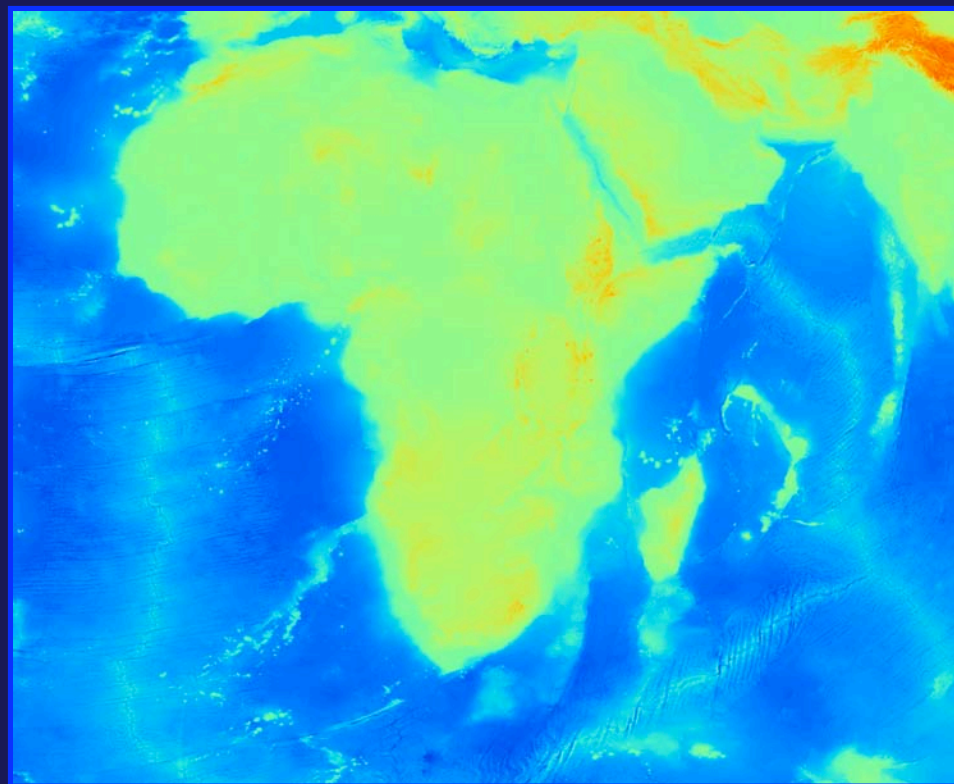
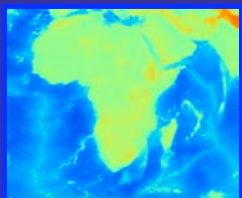
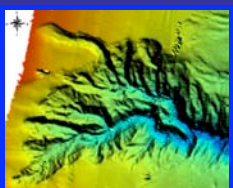
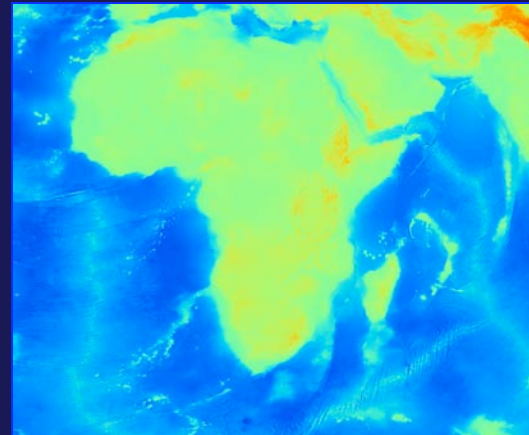
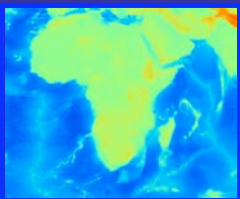
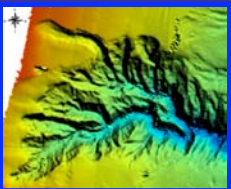


The African Marine Atlas

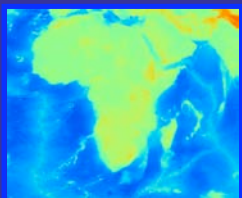
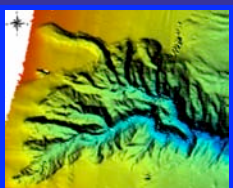


International Coastal Atlas Network Workshop, Copenhagen, Denmark, 7 July 2008

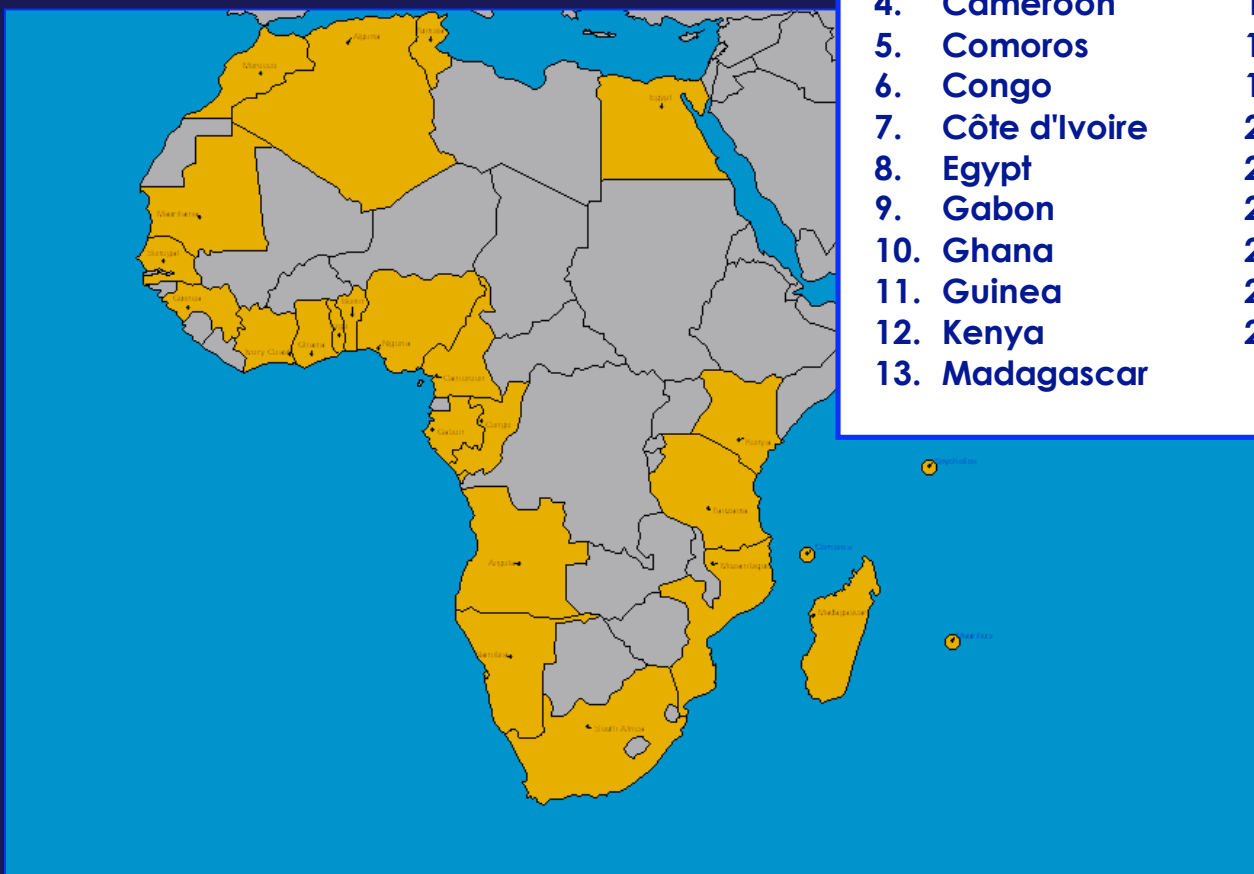
The African Marine Atlas



A project of the:
Ocean Data and Information Network For
Africa (ODINAFRICA),
a network of National Institutions in Africa
funded by the:
Government of Flanders and the:
Intergovernmental Oceanographic
Commission (IOC of UNESCO)'s IODE

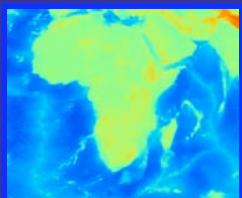
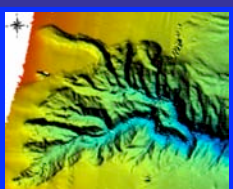


Ocean Data and Information Network for Africa (ODINAFRICA)



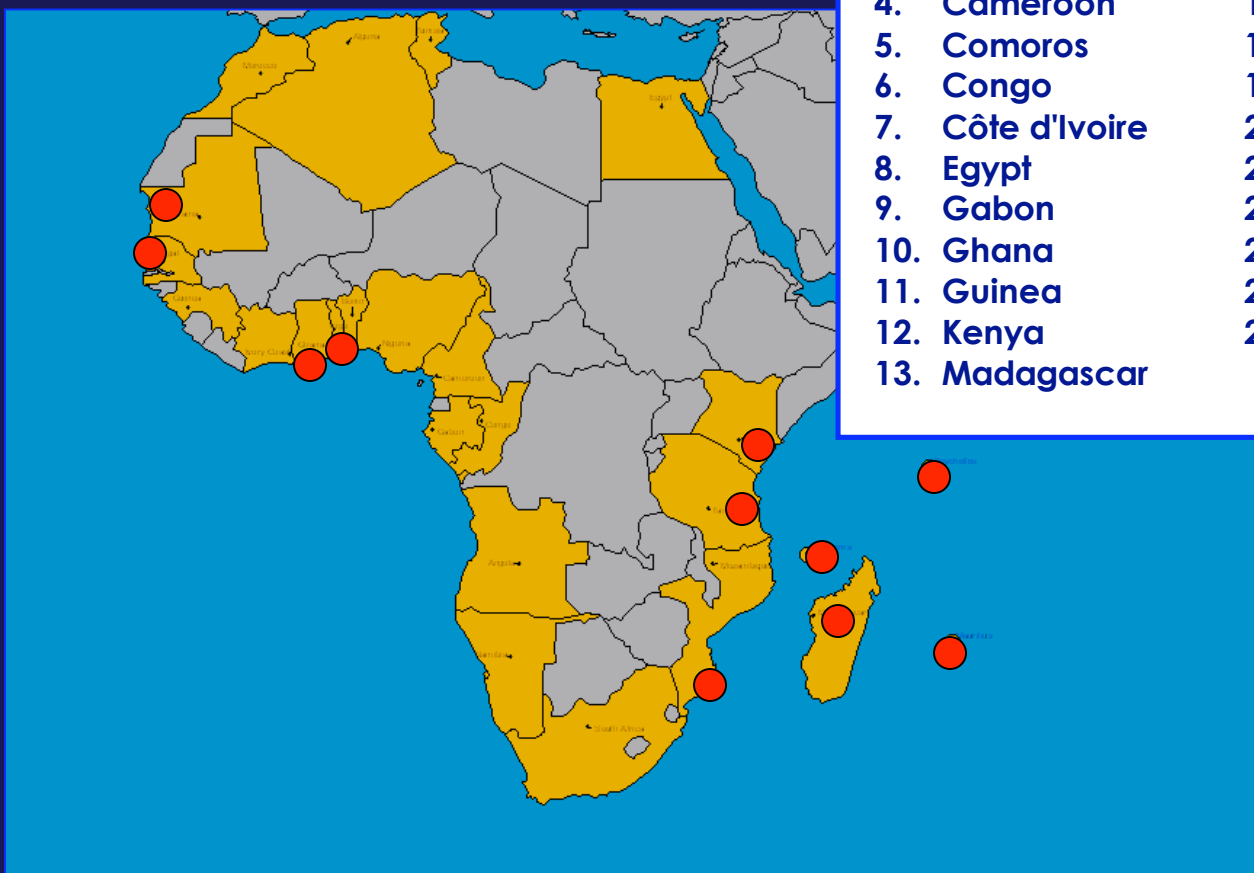
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|------------------|------------------|
| 1. Algeria | 14. Mauritania |
| 2. Angola | 15. Mauritius |
| 3. Benin | 16. Morocco |
| 4. Cameroon | 17. Mozambique |
| 5. Comoros | 18. Namibia |
| 6. Congo | 19. Nigeria |
| 7. Côte d'Ivoire | 20. Senegal |
| 8. Egypt | 21. Seychelles |
| 9. Gabon | 22. South Africa |
| 10. Ghana | 23. Tanzania |
| 11. Guinea | 24. Togo |
| 12. Kenya | 25. Tunisia |
| 13. Madagascar | |

Over 40 institutions in 25 countries
National Oceanographic Data Centres (NODCs)

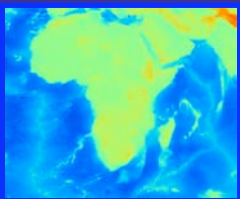
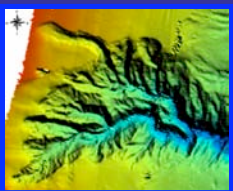


Ocean Data and Information Network for Africa (ODINAFRICA)

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|------------------|------------------|
| 1. Algeria | 14. Mauritania |
| 2. Angola | 15. Mauritius |
| 3. Benin | 16. Morocco |
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| 11. Guinea | 24. Togo |
| 12. Kenya | 25. Tunisia |
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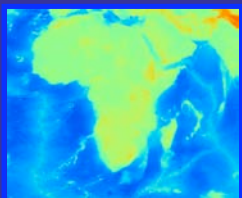
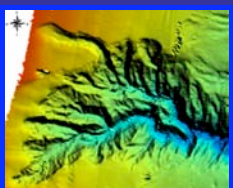
African Marine Atlas - participating NODCs ●
Primary international partners: UNEP, ACEP



The African Marine Atlas

A project designed to address the challenges:

- The coastal region & marine waters of Africa are biologically diverse, physically complex, and not well studied.
- Spatial data from past/published studies are not easily available.
- Coastal and marine management and decision-making is complex and requires easy access to reliable information.
- There is insufficient human capacity and data to meet management needs.
- There is a broad understanding of the usefulness of GIS and RS, but actual use is limited.
- There is limited access to public funded data.
- Global data resources are not easily accessible.
- Useful data products are urgently needed for natural resource management, coastal planning, and management of marine protected areas at a national and regional level.



The African Marine Atlas

The Project

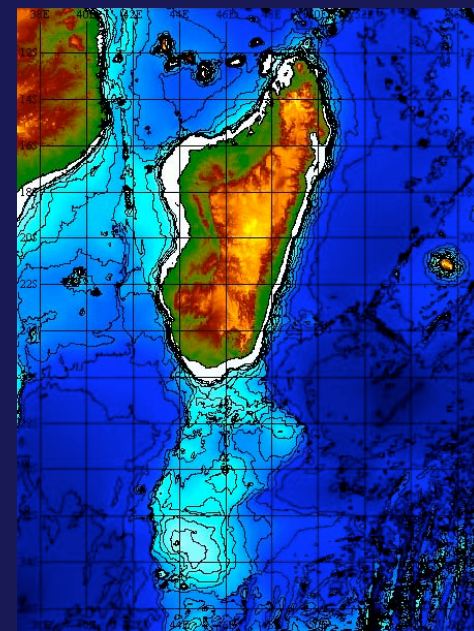
A project that aims to source, collect and format marine geospatial datasets and make them available to marine scientists and managers while building capacity for marine data management.

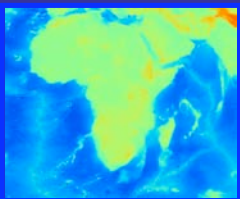
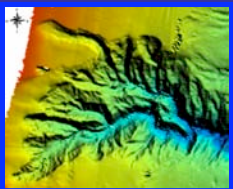
The Products

A digital GIS atlas, and atlas products, containing a broad spectrum of informative marine geo-information about the African coasts and oceans.

1. Improve access to data
(online Atlas product)

2. Increase capacity to use data
(training courses, work programmes)



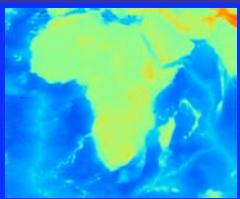
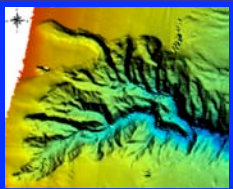


The African Marine Atlas

Designing the project:

1. National level consultation and workshops (Jan – June 2005)
2. Regional workshops, at which regional needs and products were identified and prioritised based on national consultative reports
3. Input from regional programmes
4. Annual ODINAFRICA Seminar





The African Marine Atlas

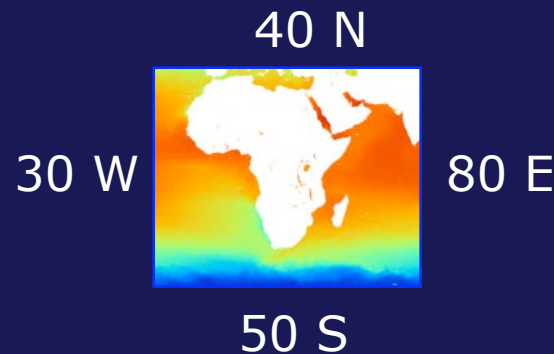
Technical Scope:

Five Themes: Geosphere, Hydrosphere, Atmosphere, Biosphere, Human environment

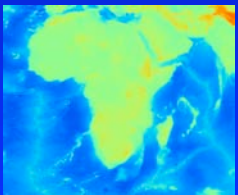
The atlas incorporates data sets that are relevant in any way to coastal / marine sciences or management (initial list of over 200 data categories)

Existing geo-referenced datasets available in the public domain (but tailored to meet specific user requirements).

Continental Africa and island states:



Transboundary data sets



African Marine Atlas – links, partners and contributors

GLOBAL

CoML

GEO/GOOS/GEOS

International Coastal Atlas Network

NOAA

USGS

UNEP

IOC/UNESCO

GBIF

OBIS

AFRICAN

AfrOBIS

NEPAD

ODINAFRICA Sea level data facility

ODINAFRICA

GOOS-Africa

AMIS

GeoNetCast-Africa

ChloroGIN

African Marine Atlas

REGIONAL

ReCoMap

COI

ASCLME

SWIOFP

SST

AMESD

Clearing House Mechanism – East Africa

Regional Atlases

WIO-LaB

WIOMSA

ACEP

Regional Project databases and products

NATIONAL

Universities

Institutions

NGOs

National IOC coastal modelling projects

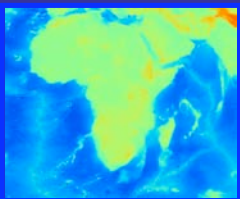
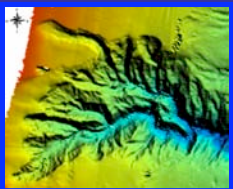
State of the Environment reports

Government departments

National Oceanographic Data Centres

Earth observation networks (SAEON)

National Databases and products



The African Marine Atlas

The Team:

ODINAFRICA National Data Centre Managers from 12 countries and two regional partners, the African Coelacanth Ecosystem Programme (ACEP) and the United Nations Environment Programme (UNEP)



GEOSPHERE & ATMOSPHERE

- Chief Editor Dr. Desiderius C.P. MASALU, University of Dar Es Salaam; Institute of Marine Sciences. *Tanzania*
- Editors Mr. Selorm Dzako ABABIO, Dept. of Oceanography & Fisheries; University of Ghana. *Ghana*
Mr. Mohamudally BEEBEEJAUN, Mauritius Meteorological Services. *Mauritius*
Mr. Anis DIALLO, Centre de Recherches 'Ocanographiques de Dakar- Thiaroye (CRODT). *Senegal*

HYDROSPHERE

- Chief Editor Mr. Emmanuel Kwame DOVLO, Directorate Of Fisheries; Marine Fisheries Research Division. *Ghana*
- Editors Ms. Clousa MAUEUA, Instituto Nacional de Hidrografia e Navegaao (INAHINA). *Mozambique*
Mr. Josef WEDEINGE, National Marine Information and Research Centre (NatMIRC). *Namibia*
Mr. Bambaye Ould HAMADY, Dpartement Ressources Vivantes et Environnement; Institut Mauritanien de Recherches Ocanographiques. *Mauritania*

BIOSPHERE

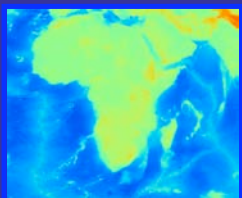
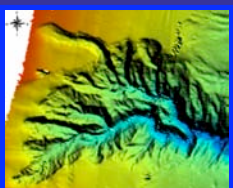
- Chief Editor Ms. Lucy SCOTT, African Coelacanth Ecosystem Programme (ACEP), South African Institute for Aquatic Biodiversity (SAIAB). *South Africa*
- Editors Mr. Zacharie SOHOU, Centre Beninois de la Recherche Scientifique et Technique (CBRST), Centre de Recherches Halieutiques et Oceanologiques du Benin (CRHOB/CNDO). *Benin*
Mr. A.K. ARMAH; Department of Fisheries and Oceanography; University of Ghana/Legon. *Ghana*
- Intern Ms Meaghen McCord, African Coelacanth Ecosystem Programme (ACEP), South African Institute for Aquatic Biodiversity (SAIAB). *South Africa*

HUMAN ENVIRONMENT

- Chief Editor Mr. Mwangi THEURI, UNEP/Nairobi Convention Clearinghouse Mechanism and Information Sharing System. Synergy with ODINAFRICA (of IOC/UNESCO), *Division of Early Warning and Assessment, United Nations Environment Programme (UNEP)*
- Editors Mr. Richard JASMIN, Seychelles Fishing Authority (SFA). *Seychelles*
Mr. Harrison ON'GANDA, Kenya Marine and Fisheries Research Institute (KMFRI). *Kenya*

BASE MAP

- Chief Editor Dr. Murray BROWN; IOC/IODE Consultant. *USA*



Product 1: Static website (spatial data clearinghouse)

Atlas Themes

GEOSPHERE

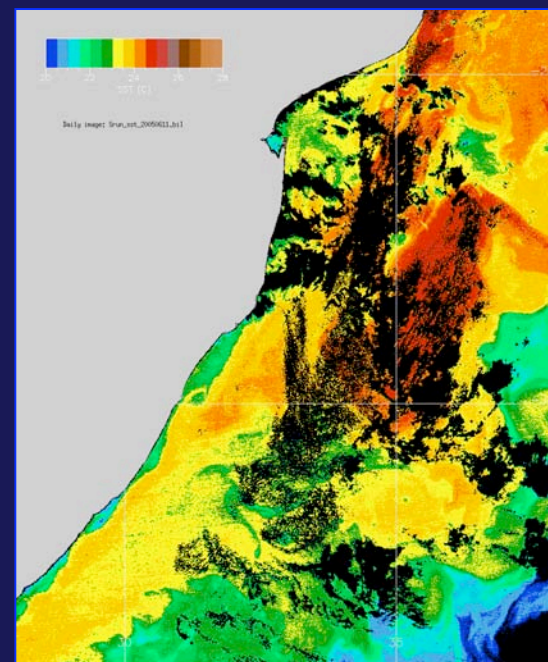
HYDROSPHERE

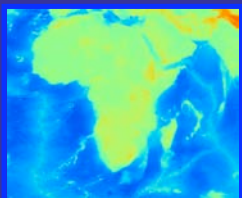
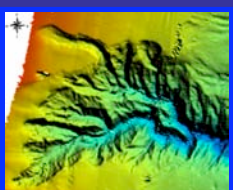
ATMOSPHERE

BIOSPHERE

HUMAN ENVIRONMENT

BASE MAP



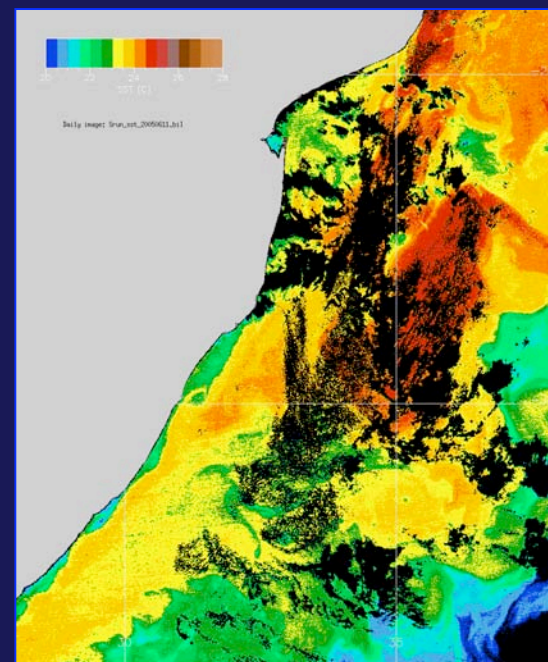


Product 1: Static website (spatial data clearinghouse)

>800 unique data sets, each one:

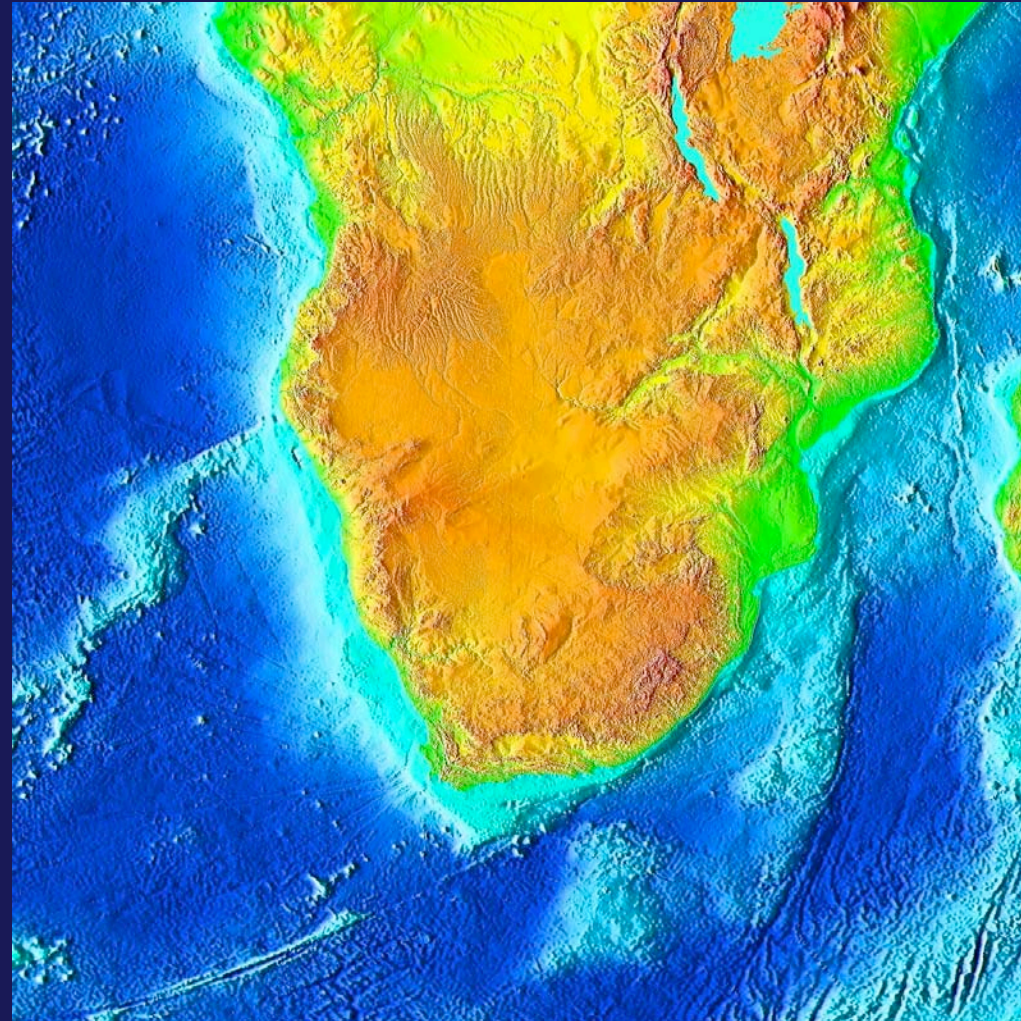
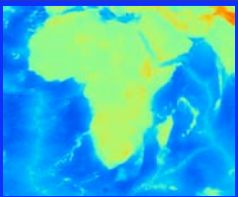
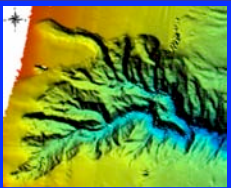
- described briefly
- JPG image provided of the data
- Link to source, citation
- Downloadable zip file:
(actual data, data image and metadata in original form)

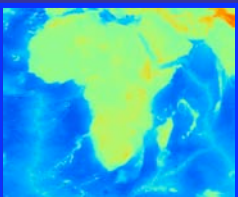
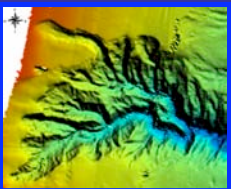
Atlas Themes	Individual Data Products
GEOSPHERE	19
HYDROSPHERE	445
ATMOSPHERE	96
BIOSPHERE	231
HUMAN ENVIRONMENT	27
BASE MAP	61



<http://iodeweb2.vliz.be/omap/OMAP/index.htm>

Themes & data sets





1. Geosphere Theme

Soils

- Basic types

Sediments

- Thickness
- Texture
- Chemical composition (including pollutants)

Minerals

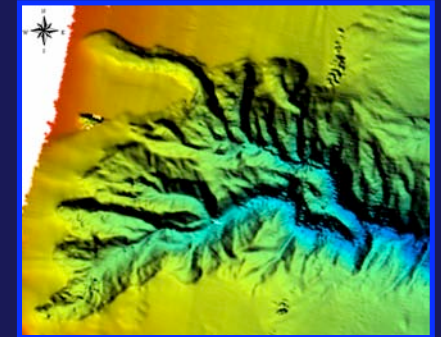
- Resource potential
- Active sites

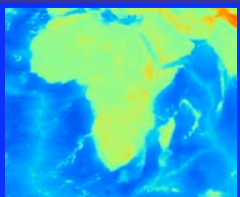
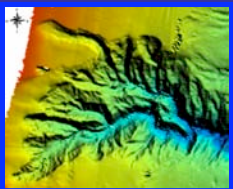
Geohazards

- Faults & plate boundaries
- Historic events
- Historic impacts
- Geotechnical problem areas (slumping etc.)

Beaches & Dunes

- **Distribution**
- **Erosion**





2. Hydrosphere Theme

Historical surveys

- Cruises & stations
- Moorings
- Existing atlases and products

Physical oceanography

Salinity, temperature, density distributions

- In-situ observations & analyses (V)
- Satellite observations & analyses

Currents

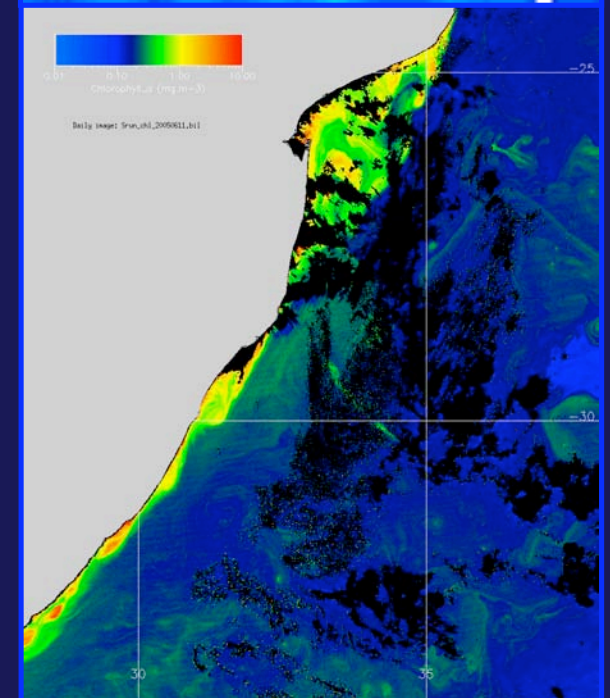
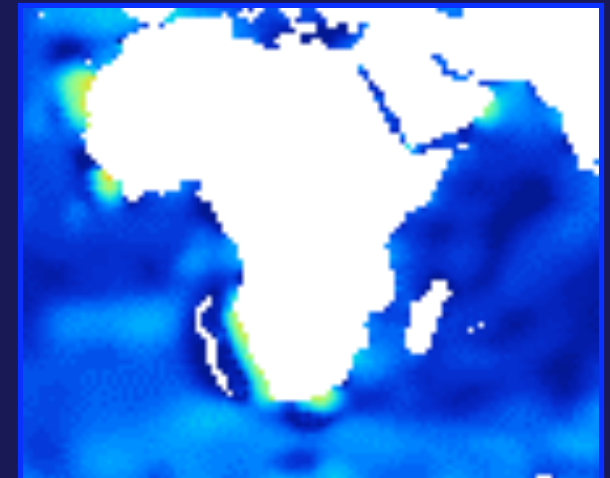
- Traditional
 - » Ship based
 - » Moorings
- Operational
 - » Drifters & floats
 - » Satellites

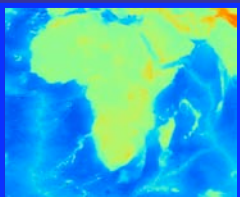
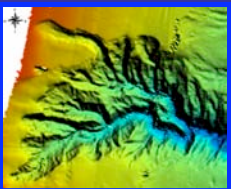
Sea level

- Tide gauges – tides and mesoscale
- Satellites - mesoscale

Waves

- Satellite
- Buoys





Chemical oceanography

- Major nutrients & oxygen
 - Station maps
 - Climatological analyses
- **Micronutrients**
- "Water quality"
 - Low O₂
 - H₂S events
 - Major oil spills

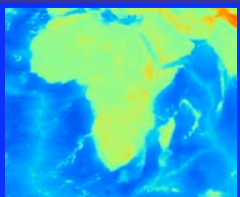
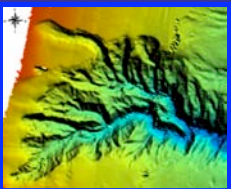
Optical oceanography

- **Compilation of statistics for standard measurements**
- **Particulates, detritus, scattering**

Limnology

- **Drainage basins**
- Major rivers & estuaries
 - Locations
 - Hydrographs (/w extreme)
 - Impacted ocean shelf areas
- Coastal wetlands & lagoons
 - Locations
 - Seasonal levels & extremes





3. Biosphere Theme

Biological oceanography

- Phytoplankton
- Chlorophyll
- Zooplankton

Marine/coastal plants

- Algae and kelp
- Mangroves and seagrasses

Terrestrial and coastal vegetation

Fisheries data (FAO – to country level)

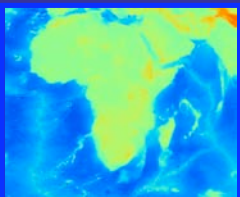
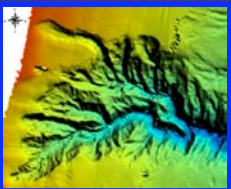
- Species distributions
- Critical habitats
- Fishing areas and landing sites
- Catch statistics

Species distributions

- Corals
- Fishes
- Invertebrates
- Mammals
- Birds

Protected areas





4. Atmosphere Theme

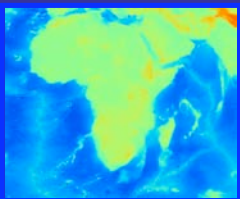
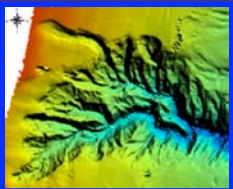
Weather

- **Synoptic weather patterns**
- **Extreme event paths, frequencies and impacts**
- **Maximum storm conditions**

Climate

- **Temperature**
- **Precipitation**
- **Winds**





5. Human Environment Theme

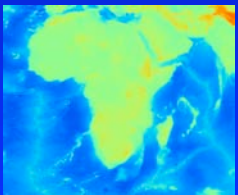
Land

- Countries
- States/internal divisions



Marine

- EEZ boundaries
- Treaty lines
- Military activity zones
- Offshore dumping areas
- Major shipping routes
- IMO regular activity zones (distance limits)
- IMO special activity zones
- Navigational fairways & anchorages
- Pipelines
- Cables
- Minerals leases & platforms



Population

- Municipal population & densities
- Rural population & densities

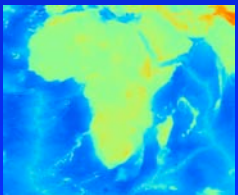
Infrastructure

- Roads
- Ports & coastal engineering structures
- Railroads
- Bridges
- Airports
- Energy transmission
- Information transmission

Industry & commerce

- Factories and production facilities
- Discharges
 - Industrial
 - Sewerage
 - General non-point sources
- Coastal agriculture
- Coastal forestry
- Mariculture
- Coastal mining



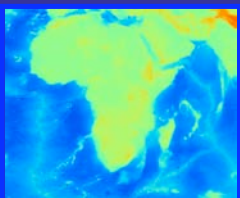
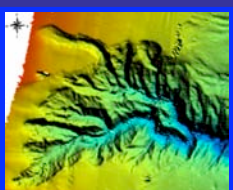


Tourism

- Tourist targets
 - Local/national cultural & historical
 - UNESCO cultural & historical
 - Ecological resources of note (see also Protected Areas)
- Hotels & resorts
- Diving, sportfishing & surfing locations/areas

Socio-economic data

- Employment/unemployment levels
- Income levels
- Employment sectors



Product 2. African Marine Atlas WebMapServer

- Demonstration site developed
- Selection of themes
- Training and working meetings (2)
- Current display: www.africanmarineatlas.net

African Marine Atlas

Home

UNESCO IODE ODINAFRICA UNEP

Main Menu

- Home
- Go to the Atlas
- About AMA...
- What's in AMA...
- The layers...
- How to use AMA...
- Who's who in AMA

About AMA

Written by Piasierens Peter
Thursday, 18 October 2007

The African Marine Atlas developed by the Ocean Data and Information Network for Africa (ODINAFRICA) was officially launched on 23 February 2007 at the IOC Project Office for International Oceanographic Data and Information Exchange (IODE) in Ostend, Belgium.

The African Marine Atlas provides substantial maps, images, data and information to coastal resource managers, planners and decision-makers from various administrative institutions and specialized agencies in Africa. The Atlas will be of immense benefit to national institutions and a variety of users such as environmentalists, local administrators, park managers, scientific community, fishing cooperatives, tourists, hotel keepers, teachers, NGOs, the general public, and any other interested persons. It has over 800 downloadable data products derived from the fields of marine geosphere, hydrosphere, atmosphere, biosphere, geopolitical and the human socio-economic dimensions.

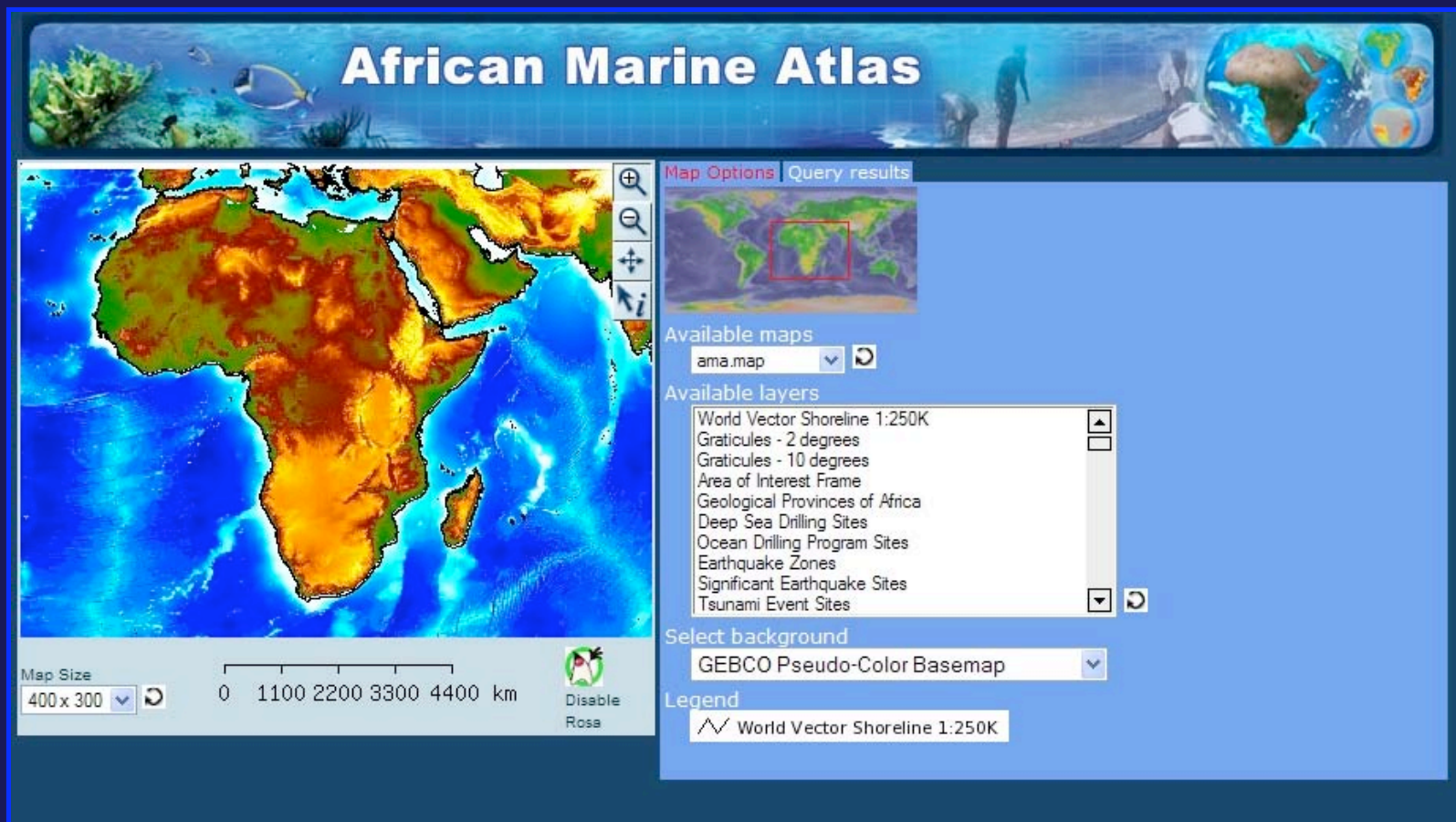
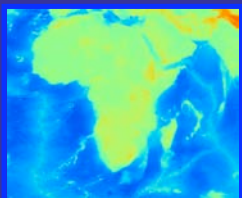
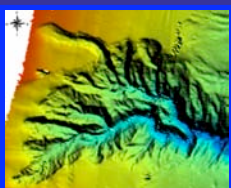
The Atlas indicates areas of intense use along the coastline requiring careful management and provides potential foresight on likely consequences of specific decisions.

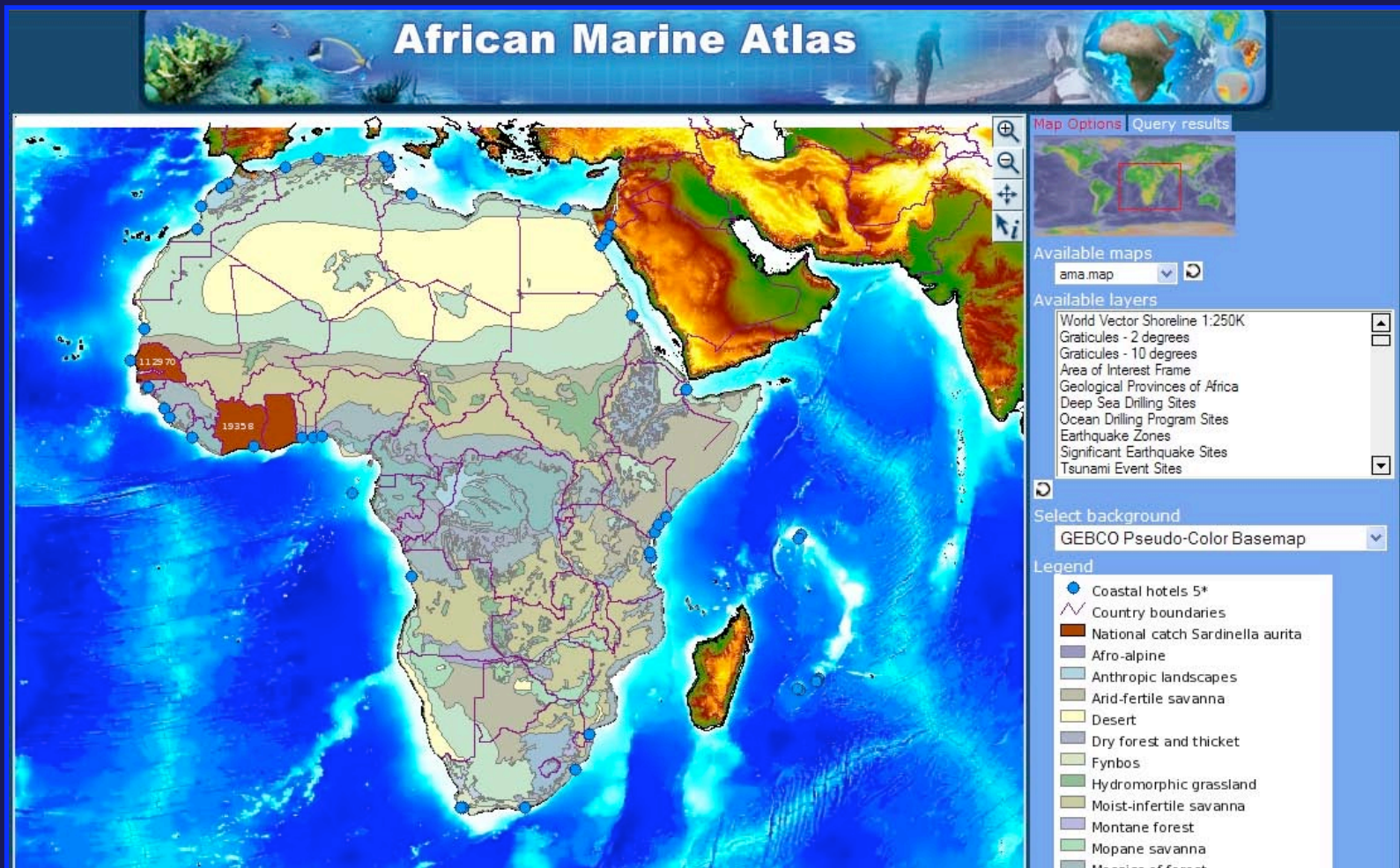
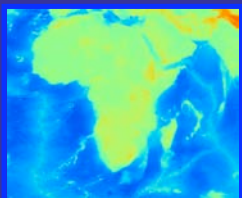
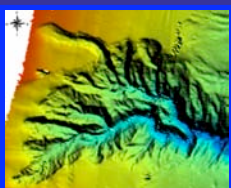
Further, the Atlas indicates gaps in knowledge and information base, where additional efforts may be directed. The Atlas will also act in other ways as a guide to recreational opportunities and tourist attractions.

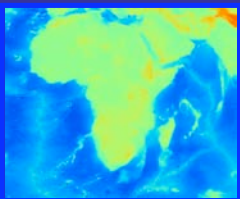
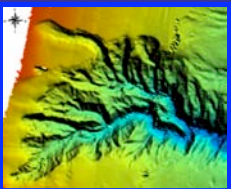
In developing the Atlas, the main objective was to collate available geospatial datasets and information on the marine environment and to summarize it into an African Marine Atlas suite.

The website is one of a set of Marine Atlas products that will include web data services, web mapping and an Atlas publication when completed.

The Atlas was realized through intensive work between May 2006 and February 2007 by a team of 16 marine scientists and GIS experts from NODC's in Benin, Ghana, Kenya, Mauritania, Mauritius, Mozambique, Namibia, Senegal, Seychelles, South Africa, and Tanzania. International ocean data experts provided key inputs in data analysis. It is based on an extensive survey of coastal and marine data needs undertaken in early 2006 in all the countries participating in ODINAFRICA.

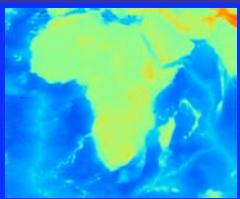
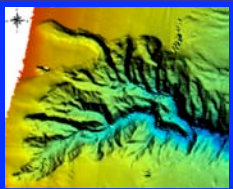






Challenges

- **Expectations of an online data atlas**
- **Metadata management**
- **Standards: choosing data formats and standard legends**
- **Selecting appropriate data of interest and meaning at continental scale**
- **Logistics of working together from several countries**
- **Remote access to servers**
- **Access to the Internet from countries**
- **Biological data: specific permission had to be requested and recorded, data citations were complex**
- **Sustainability of the project**



Short-term recommendations

Linking of the static (clearinghouse) and dynamic (WMS) sites

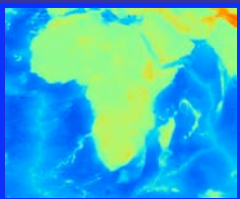
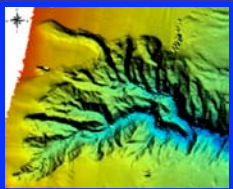
Editing of the WMS site

- Ordering layers by theme, in hierarchical drop-down lists

Investigate the level of use of the Atlas by countries and NODCs and monitor this over time

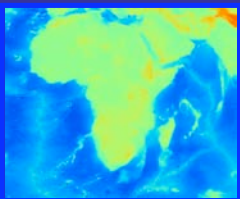
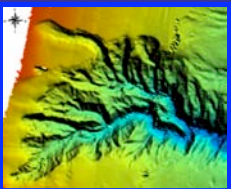
Produce technical and peer-reviewed publications



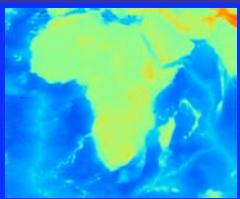
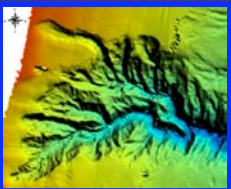


Considerations for the next phase (2009)

- The African Marine Atlas is the largest online resource of multidisciplinary, downloadable spatial information for the African continent, and it has proved to be a valuable information resource in its current shape.
- There is considerable opportunity for the African Marine Atlas to develop further.....
- We have implemented a WMS, need a CSW and WFS.
- Alignment with other regional information systems (Nairobi Convention Clearinghouse Mechanism and LME systems) and international networks (**International Coastal Atlas Network**) is essential.
- We aim to adopt recommendations and best practices of ICAN.



- The AMA must develop functionality at more scales (different management & research questions need data at appropriate scale) including National and case-study scale.
- Regional projects should be encouraged to use and contribute to the AMA process (design, training, data provision).
- LME Projects, for example, have a requirement to collect new data, to provide data management training and to develop data products.
- NODCs (as National data repositories) and the African Marine Atlas (as the continental portal to query the NODC resources) can provide an established framework for some of these activities.
- In the development of National and Continental systems *within* Africa, we have the opportunity to maximise harmonisation (now, through the adoption of consistent structures and ontologies) to minimise the need for mediation later.

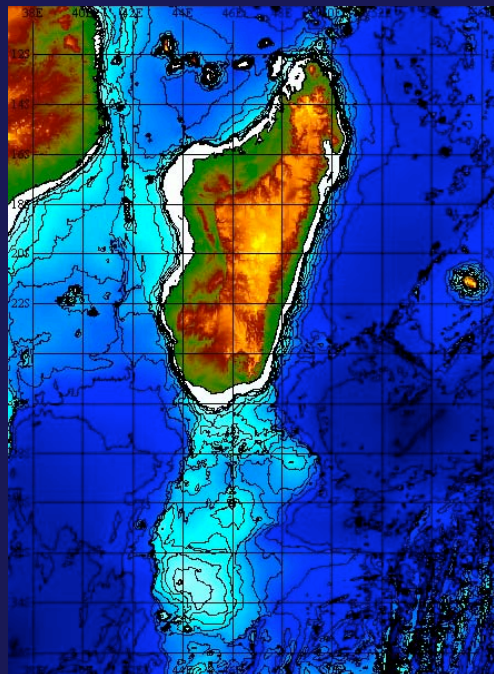
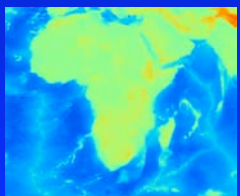


The African Marine Atlas can grow to become an integrated coastal & marine information resource for Africa.

It is itself a product, but it can be more than that, by providing a platform for the dissemination of other products and tools at all scales (regional, national, case study).

Together with OceanTeacher, the AMA can provide material for training courses and derive new products which can go back into the atlas.

Lessons learned and best-practice will be exchanged with other developing country Atlases (such as the Caribbean Marine Atlas – CMA)



www.africanmarineatlas.net

Acknowledgements

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