Spatial Data Infrastructure Convergence
Building SDI Bridges to address Global Challenges

Workshop 4.1

Marine SDI and the International Coastal Atlas Network (ICAN)

GSDI
Global Spatial Data Infrastructure
GSDI 11 World Conference

INSPIRE
3rd INSPIRE Conference

GEONOVUM
RGI
Public sector meets Science & Industry

Marine SDI and the International Coastal Atlas Network (ICAN)

Roger Longhorn, Information Policy Advisor, EUCC - The Coastal Union; lead presenter, also presents African, Caribbean and Irish marine atlases and ICAN technical guidelines.

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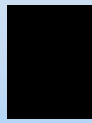
Marine Spatial Data Infrastructure

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Intergovernmental Oceanographic Commission of UNESCO
International Oceanographic Data and Information Exchange

Workshop Overview

- What is a Marine/Coastal SDI?
- How does a Marine/Coastal SDI compare to a national SDI or other generic SDIs?
- Main marine/coastal data themes in SDIs
- Examples of some (very few!) CSDIs/MGDIs that exist today.
- Harmonising land-sea datasets at the coast
- The International Coastal Atlas Network (ICAN) – a global Marine/Coastal SDI component?

CSDI/MGDI v. SDI

- Terminology – Coastal SDI (CSDI) vs. Marine Geospatial Data Infrastructure (MGDI)
- What differentiates CSDI/MGDI from generic National SDI (NSDI)?
- Can CSDI/MGDI exist in isolation from NSDI?
- Issues pertinent to the coast/oceans:
  - boundaries – 27 definitions for 'coastline'
  - temporal nature – features move!
  - 3D features – that move!
  - irregular coordinate systems (meshes versus 2D topo)

What comprises a Marine or Coastal SDI?

- Many SDI components will be the same as for other generic or national SDIs, e.g. policies, standards, etc.
- Biggest difference is in the types of data (themes) that are important to the coastal and marine communities.
- A very good example of a 'thematic SDI' – very few of which have so far been defined or attempted.
- We take a look at the many different data themes specified in a large regional SDI, such as that in Europe's INSPIRE initiative.

....but first

Why create SDIs at all?

- So we can process, publish, access and share data – as easily and cost effectively as possible – for all.
- Sharing across organisational and national boundaries …
- … but more importantly – and often with more difficulty - across disciplinary boundaries.

Coastal SDI should support <u>all</u> disciplines

- How do you capture and express the data sharing needs of multiple disciplines - who happen to work in a place called "the coast"?

- "Coasts" <u>are</u> the interface between ocean and land – regardless of <u>how</u> you define "coast" for specific purposes, functions or applications.

- Coastal SDI is seldom – never? – implemented in isolation from national (generic) SDI.

- SDI itself is implemented under the umbrella of a wider "information infrastructure" – e-Govt.

Multi-disciplinary SDI issues (1)

- The language of research/academia versus business versus government versus "citizens".
- The language/semantics of different disciplines - whether in science, engineering, business, governance, citizenry, e.g. what does "coastal" mean to these different groups and to disciplines within groups.

Multi-disciplinary SDI issues (2)

- The different ways that information is used – e.g. for science, law, leisure …
  - affects gross attributes, e.g. quality, accuracy, currency, certifiability
  - affects who can access …
  - and how …
  - and for what uses/re-use (exploitation)
  - and at what cost – to the end-user, to the owner/custodian, to the government, to society.

Informing the SDI creation process (1)

"Stakeholder" consultation:

- *Managing* the consultation process – art or science?
- *Participating* in the consultation process – commitment.
- *Monitoring* the effectiveness of the consultation process – by an independent body.
- *Reporting* the result of the consultation process - widely.
- *Applying the results* of the consultation process – was it all worth it?

Informing the SDI creation process (2)

"Expert" Groups / Working Groups:

- Composition of groups
- Who leads?
- Transparency - in processes
- Openness - in publishing results, both interim and final
- Accountability – to whom?
- Auditability?
- Inclusion – what if you are left out?

Participating in the SDI process (1)

- Marine/Coastal community does <u>not</u> have a strong SDI record, especially in Europe. *[USA and Canada are exceptions]*

- Few European nations have coastal/marine SDI initiatives underway. *[UK , others?]*

- Pan-European marine/coastal SDI initiative(s) are in very early stages.

  – mentioned in new EC Communication on an **"Integrated Maritime Policy for the European Union"**

  – Marine Services in the **Global Monitoring for Environment and Security** programme – the EU contribution to GEOS

- Little or no current marine/coastal <u>information infrastructure </u>focus in the global initiatives. *[exception is IOC/IODE – WMO – JCOMM, some regional programmes]*

Participating in the SDI process (2)

- Many marine/coastal "experts" do not feel that they <u>need</u> to be involved.

- Others do not <u>want</u> to be involved ("it's an IT issues")

- So don't complain (later) if the special data/information needs of the many disciplines that meet at or within the "coastal zone" are <u>not</u> satisfied by the generic information infrastructures or generic SDIs that will eventually be created in all countries.

  – temporal, 3-D, inherently multi-disciplinary

What data comprises CSDI/MGDI?

- 'Core' marine/coastal data themes
- Other themes of regular interest to different stakeholders working in the coastal/marine environments
- Tertiary themes – these data exist in the coastal zone, but do not necessarily have 'marine' aspects, e.g. geographic names.

Let's look at some practical examples from the US NSDI and the legally mandated, pan-European SDI – INSPIRE.

US NSDI coastal/marine themes

- **Baseline (Maritime)** - the line from which maritime zones and limits are measured.
- **Cadastral (Offshore)** - the land management system used on the outer continental shelf, extending from the baseline to the extent of United States jurisdiction.
- **Climate** - data describing the spatial and temporal characteristics of the earth's atmosphere/hydrosphere/land surface system, both model-generated and observed (either in situ or remotely sensed) environmental information.
- **Elevation Bathymetric** - bathymetric data for inland and inter-coastal waterways collected to ensure that federal navigation channels are maintained to their authorized depths. Support the Nation's critical nautical charting program. Used to create Electronic Navigational Charts. Supports the elevation layer of the geospatial data framework.

US NSDI coastal/marine themes

- **Federal Land Ownership Status** - land ownership status includes the establishment and maintenance of a system for the storage and dissemination of information describing all title, estate or interest of the federal government in a parcel of real and mineral property.
- **Flood Hazards** – the National Flood Insurance Program has prepared flood hazard data for approximately 18,000 communities.
- **Hydrography** - includes surface water features such as lakes, ponds, streams and rivers, canals, oceans, and coastlines. Each hydrography feature is assigned a permanent feature identification code (Environmental Protection Agency Reach Code) and may also be identified by a feature name. Spatial positions of features are encoded as centrelines and polygons. Also encoded is network connectivity and direction of flow.
- **Marine Boundaries** - depict offshore waters and sea beds over which the United States has sovereignty and jurisdiction.

US NSDI coastal/marine themes

- **Offshore Minerals** - minerals occurring in submerged lands, such as oil, gas, sulphur, gold, sand and gravel, and manganese.
- **Outer Continental Shelf Submerged Lands** - lands covered by water at any stage of the tide, as distinguished from tidelands, which are attached to the mainland or an island and cover and uncover with the tide. Tidelands presuppose a high-water line as the upper boundary; whereas submerged lands do not.
- **Shoreline** - the intersection of the land with the water surface. The shoreline shown on NOAA (National Oceanic and Atmospheric Administration) Charts represents the line of contact between the land and a selected water elevation. In areas affected by tidal fluctuations, this line of contact is the mean high water line.

US NSDI coastal/marine themes

- **Transportation (Marine)** - the Navigation Channel Framework consists of highly accurate dimensions for every federal navigation channel maintained by US Army Corps of Engineers. The Navigation Framework provides the basis for the marine transportation theme of the geospatial data framework.
- **Watershed Boundaries** - encodes hydrologic, watershed boundaries into topographically defined sets of drainage areas, organized in a nested hierarchy by size, and based on a standard hydrologic unit coding system.
- **Wetlands** - provides the classification, location, and extent of wetlands and deepwater habitats, with no attempt to define the proprietary limits or jurisdictional wetland boundaries of any federal, state, or local agencies.

INSPIRE Data Themes of <u>direct</u> interest to Stakeholders (1)
Annex I

- **Hydrography** - Hydrographic elements, including **marine areas**.

- **Protected sites** - Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives.
  - *Many protected sites exist in the near-shore marine environment + new drive for Marine Protected Areas offshore.*

Annex II
- **Elevation** - Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, **bathymetry** and **shoreline**.

Data Themes of <u>direct</u> interest to Stakeholders
(2)
Annex III

- **<u>Area management/restriction/regulation zones and reporting units</u>** – "Areas managed, regulated or used for reporting at international, European, national, regional and local levels. ... regulated fairways at sea ... areas for the dumping of waste, river basin districts ... and **coastal zone management areas.**"
  - *Many waste dumping areas are located offshore, river basin districts extend into near-shore coastal waters, etc.*
- Agricultural and **aquaculture** facilities
  - *Near-shore and off-shore aquaculture facilities will almost certainly have far different data needs (features, location grids, etc.) than on-shore farming.*
- **<u>Environmental monitoring facilities</u>** –
  - *Coastal environmental monitoring is the focus of numerous actions at the EU level.*
- **<u>Natural risk zones</u>**
  - *Coastal flood plains are an obvious 'risk zone' for which various combinations of data are needed for planning, monitoring and mitigation, e.g. DTMs, bathymetry, meteorological models, etc.*

Data Themes of <u>direct</u> interest to Stakeholders
(3)
Annex III (continued)

- **Oceanographic geographical features** – "Physical conditions of oceans (currents, salinity, wave heights, etc.)".
  - *These are especially important in the coastal zone, which is the main geographical location at which they have a direct impact on human populations!*
- **Sea regions** - Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.
  - *All seas have shorelines!*
- **Energy resources** – "... including depth/height information on the extent of the resource".
  - *What about the current plan to build thousands of off-shore wind farms?*
- **Mineral resources**
  - *Mineral abstraction is another coastal and off-shore process that has can have serious negative impact on coastal regions.*

Data Themes of <u>indirect</u> interest to Stakeholders (1)

Annex I

Coordinate reference systems - Systems for uniquely referencing spatial information in space as a set of coordinates (x, y, z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum. [*What about off-shore and near-shore vertical datums pertinent to coastal information?*]

Geographical grid systems - Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells. [*What about grid systems needed for off-shore and near-shore information purposes, i.e. meshes, etc.?*]

Annex II

Land cover - Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-) natural areas, <u>wetlands</u>, <u>water bodies</u>. [*Terrestrial land cover often has a direct impact on health and use of coastal zones, as is especially true for coastal wetlands and water bodies located near to the coast. Also important is the definition of a 'water body'.*]

Geology - Geology characterised according to composition and structure. Includes bedrock, aquifers and <u>geomorphology</u>. [*What about coastal geomorphology?*]

Data Themes of <u>indirect</u> interest to Stakeholders (2)

Annex III

- **Land use** - Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational). [*Many of these types of 'land use' directly or indirectly impact on, or occur in, the coastal zone.*]

- **Human health and safety** - Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the <u>quality of the environment</u>. [*Pathogens occurring off-shore, for example in shell fish, have a direct impact on 'health and safety', as does general coastal water pollution.*]

- **Utility and governmental services** - Includes utility facilities such as <u>sewage</u>, <u>waste management</u>, <u>energy supply</u> and water supply, administrative and social governmental services such as public administrations, <u>civil protection sites</u>, schools and hospitals. [*All of the underlined facilities have coastal implications when the facilities occur in coastal zones.*]

Data Themes of <u>indirect</u> interest to Stakeholders (3)

Annex III (continued)

• **Production and industrial facilities** - Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning <u>integrated pollution prevention and control</u> and water abstraction facilities, mining, storage sites. *[Pollution prevention and control is a serious issue for many coastal regions and managers, especially where heavy industry or dense population centres are situated near to coastlines.]*

• **Bio-geographical regions** - Areas of relatively homogeneous ecological conditions with common characteristics.

• **Habitats and biotopes** - Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.

• **Species distribution** - Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit. *[Species distribution in the marine and coastal environment is not only an important topic, but one that is the focus of various national, regional and international biodiversity laws and conventions.]*

Data Themes <u>appearing</u> in the coastal zone (1)

Annex I

• **Geographical names** - Names of areas, regions, localities, cities, suburbs, towns or settlements, or <u>any geographical or topographical feature of public or historical interest</u>. *[Of concern here should be ensuring that geographical names can be attached to relevant boundaries, even where the named region occurs offshore, i.e. where land-based boundary descriptive means may not apply.]*

• **Administrative units** - Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries.

• **Addresses** - Location of properties based on address identifiers, usually by road name, house number, postal code.

• **Cadastral parcels** - Areas defined by cadastral registers or equivalent.

• **Transport networks** - Road, rail, air and water transport networks and related infrastructure. Includes links between different networks.

Data Themes <u>appearing</u> in the coastal zone (2)

Annex II

•**Orthoimagery** - Geo-referenced image data of the Earth's surface, from either satellite or airborne sensors.

Annex III

•**Statistical units** - Units for dissemination or use of statistical information.

•**Buildings** - Geographical location of buildings.

•**Soil** - Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.

•**Population distribution - demography** - Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.

Data Themes <u>appearing</u> in the coastal zone (3)

Annex III (continued)

•**Atmospheric conditions** - Physical conditions in the atmosphere. Includes spatial data based on measurements, on models or on a combination thereof and includes measurement locations.

•**Meteorological geographical features** - Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction.

CSDI/MGDI Examples

- **USA – Coastal SDI from NOAA CSC**
- **Canada – MGDI well-defined & integrated into GeoConnections**
- **UK – Digital National Framework Offshore & MEDIN**
- **Ireland – ISDE (mainly marine members today)**
- **Australia – emphasis on marine boundaries and cadastre**

CSDI/MGDI Examples - USA

- CSDI initiative is led by the Coastal Services Centre of NOAA (National Oceanic and Atmospheric Administration)
- Coastal NSDI theme (2003) – 4 main goals:
  - The coastal management community understands and embraces the vision, concepts, and benefits of the NSDI.
  - Geospatial coastal and marine framework data are readily available for use by the coastal management community.
  - Innovative practices and technologies that facilitate the discovery, collection, description, access, and preservation of geospatial data are widely available to the coastal zone management community.
  - Foster, develop, and implement geospatial data applications in response to the needs of the coastal and marine communities.

CSDI/MGDI Examples - USA

- Vision in 2007 for the Marine and Coastal NSDI

    – **"current and accurate geospatial coastal and ocean data will be readily available to contribute locally, nationally, and globally to economic growth, environmental quality and stability, and social progress."**

CSDI/MGDI Examples - USA

- **FGDC Marine and Coastal Spatial Data Subcommittee** came into existence in 1996:
    – mission was to develop and promote the marine and coastal components of the NSDI so that "current and accurate geospatial coastal and ocean data will be readily available to contribute locally, nationally, and globally to economic growth, environmental quality and stability, and social progress".
    – works to develop strategic partnerships, relevant standards, and to provide outreach that will enhance access to and utility of coastal and ocean framework data.

CSDI/MGDI Examples - USA

- Marine/coastal SDI information standards are developed as part of the US NSDI via the Federal Geographic Data Committee (FGDC)
- CSC participates in:
  - 9 of the 13 FGDC Subcommittees,
  - 7 of the 11 FGDC Working Groups,
  - and chairs the **FGDC Marine and Coastal Spatial Data Subcommittee**, the **Geodetic Control Subcommittee**, and co-chairs the **Marine Boundary Working Group**.

CSDI/MGDI Examples - Canada

- Canadian **Marine Geospatial Data Infrastructure (MGDI)** – initiative began in 1999 – as par of **Canadian Geospatial Data Initiative (CGDI) –** now **GeoConnections**.
- Driver was *1997 Oceans Act* – "set the framework for an ecosystem approach to the management of Canada's oceans and ocean resources."
- **MGDI mission** was "to provide the infrastructure to achieve success in resolving scientific and operational issues through the sharing of geospatial information on the marine environment."

CSDI/MGDI Examples - Canada

- **MGDI** original architecture included:
  - a common spatial data model,
  - an integrated process and data modelling environment,
  - a common spatial language and data exchange format,
  - methods for managing, querying and delivering data with integrity, and
  - open source productivity tools ensuring access for all.
  - Main marine developments now being undertaken under the umbrella of the national SDI – **GeoConnections** - regionally via:
  - **Cooperative Ocean Information Network for the Pacific Region (COIN*Pacific)* and**
  - **Cooperative Ocean Information Network for the Atlantic Region (COINAtlantic) ... for example....**

COIN Atlantic – what it is

- A structure to access and share data and information and to provide open access to regional data and information within the Canadian Geospatial Data Infrastructure (CGDI)
- Information resource focussed on the information needs of integrated coastal and ocean managers
- Collaboration between data providers and formal agreements to ensure sustainability
- Community of users that keeps COINAtlantic relevant and useful to their needs.

COIN Atlantic – what it does

- Increased confidence of coastal stakeholders in coastal management decisions through comprehensive accessible information.
- Increased competitiveness of Atlantic Canadian coastal-related enterprises through efficient and certain management regimes supported by comprehensive accessible information.
- Increased national and international competitiveness of Atlantic Canadian marine geomatics enterprises.

CSDI/MGDI Examples - UK

- began 2003 – **Marine Data and Information Partnership (MDIP)**
- a project of **IACMST** – the UK government **Inter-Agency Committee for Marine Science and Technology**
- pre-dated the current UK SDI strategy by several years
  - numerous committees/working groups created – governance, metadata, technical specifications, etc.
  - agencies joined MDIP on voluntary basis by signing up to a "Statement of Intent"
- IACMST replaced in 2008 by the **MSCC – Marine Science Coordination Committee**

CSDI/MGDI Examples - UK

- now re-constituted as **MEDIN – the Marine Environmental Data and Information Network** – www.oceannet.org
- *"Guidance notes for the production of discovery metadata for the Marine Environmental Data and Information Network (MEDIN)"*
  - UK SDI (the "Location Strategy"), INSPIRE and ISO standards compliant
- what constitutes the UK MGDI now also an integral part of the **Digital National Framework (DNF)**
- heavy involvement from the **UK Hydrographic Office**
- UKHO wholly-owned subsidiary, **SeaZone Solutions**, has developed a fully land-sea information core dataset for major parts of the UK coastline – using a methodology and technology now the focus of a pan-European regional development project proposal for the North Sea states.

CSDI/MGDI Examples - UK

- MGDI architecture encompasses:
  - coastal management data,
  - historical data,
  - estates data,
  - hydrographic data,
  - marine protected areas and habitats,
  - fisheries data,
  - oceanographic data,
  - geological and seismic data
  - topographic data.

CSDI/MGDI Examples - Ireland

- **Irish Spatial Data Exchange (ISDE**) – a prototype national SDI for Ireland - 3 key marine partners
- Non-marine partners will demonstrate how linkages between marine/coastal and non-marine communities can be effected.
- ISDE exists today as a pilot in 5 institutions and agencies – to be expanded across additional organisations and government agencies in 2009-2010.

CSDI/MGDI Examples - Australia

- **Australian Ocean Data Centre Joint Facility (AODCJF) -** inaugurated on 1 October 2005 - Collaborative Head agreement by Australian Antarctic Division, Australian Institute of Marine Science, Bureau of Meteorology, CSIRO Marine & Atmospheric Research, Royal Australian Navy Directorate and Oceanography and Meteorology, and Geoscience Australia.
- Mission*: "To be Australia's ocean data centre renowned for comprehensive and integrated data management meeting national and international requirements for ocean data and products; underpinned by a whole of nation approach to the collegiate sharing of data and data management resources in Australia."*

The International Coastal Atlas Network: An Emerging Spatial Data Infrastructure Initiative

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Emergence of "Coastal Web Atlases"

"A collection of digital maps and datasets with supplementary tables, illustrations, and information that *systematically illustrate* the coast, oftentimes with cartographic and decision support tools, all of which are accessible via the Internet."

➜   (O'Dea et al., 2007)

➜ Coastal Zone Management, Governance
     Governments, NGOs, Citizen Groups

MIDA, Ireland

Oregon Coastal Atlas, USA

De Kustatlas, Belgium
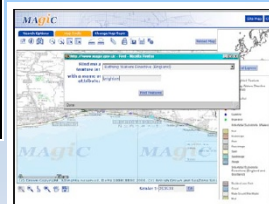
Magic, UK

And many more ...

NOAA Digital Coast, USA

Why ICAN …. Intellectual Merit

- Significant capacity, varying approaches
- Regional governance, coordination
- Best practices?
- Widespread solutions needed
  - Access to and documentation of data
  - Integration of tools
  - Decision support for coastal mgmt via atlases
  - "Semantic interoperability"

ICAN Workshops

- **Workshop 1, 2006, Cork, Ireland**
  - To create & strengthen **relationships** between experts in marine & coastal mapping in North America and Europe
  - To identify **state of the art** approaches to coastal mapping and informatics
- **Workshop 2, 2007, Corvallis, USA**
  - Improve searches *between* atlases
    - metadata to ontologies
    - Marine Metadata Interoperability (MMI)
  - Semantic interoperability
  - Linkages to use cases, communities
  - Proof-of-concept ontologies & **interoperability prototype**
  - Large, collaborative funding proposals

ICAN Workshops

- **Workshop 3, 2008, Copenhagen, Denmark**
  - European Environment Agency sponsorship
  - Advance actions in:
    - Technical developments
      - Review of interoperability prototype
    - Strategic directions
    - Governance structure
  - Link to relevant initiatives in Europe
- **Workshop 4, 2009, Trieste – this autumn**
  - promote technical specifications
  - strengthen linkages to European and global SDIs (especially INSPIRE in Europe)

ICAN Strategic Aims

- Share experiences and find common solutions to coastal web atlas development
  - **Knowledge portal**: Guides, cookbooks, "engines", discussion boards, code, use cases…
- Globally integrate and interoperate among locally-maintained atlases
- Inform regional decision- and policy-making across several themes:
  - **Climate change - coastal vulnerability**
  - **Coastal governance (boundaries, protected areas, etc.)**
  - **Coastal hazards**
  - **Population pressures**
  - **Marine spatial planning**
  - **Resource availability and exploitation**

ICAN Current Membership: 30+ organizations from 14 nations and growing…
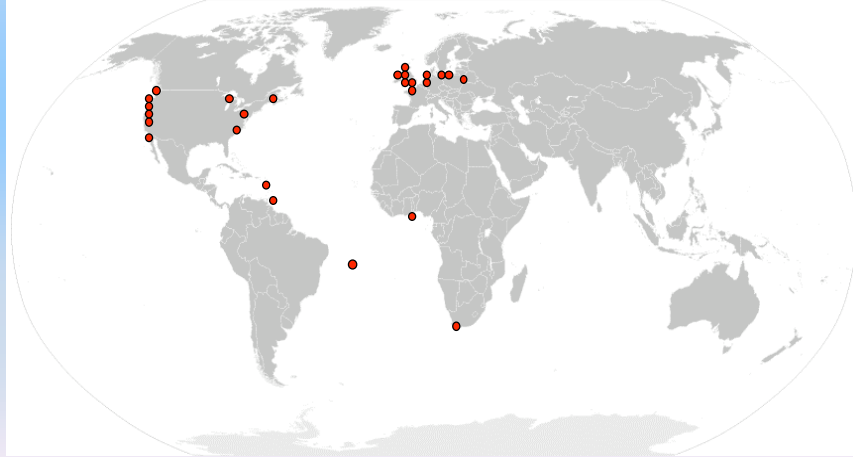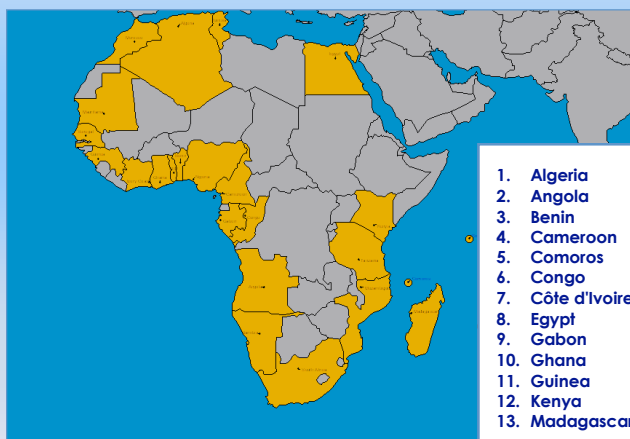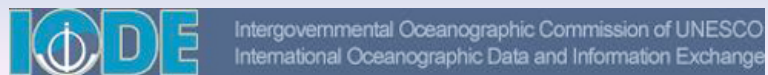

Strategic Directions for ICAN

- **Governance activities**
- **Committee structures**
- **Pathways towards a *sustainable* funding model**
- **Technical project development**
- **Awareness raising and publicity**
- **Outreach and training activities**
- **Documentation of resources, <u>tools</u>, expertise**
- **Further development of ICAN portal**

The African and Caribbean Marine Atlas Projects join ICAN

UNESCO

presentation thanks to **Greg Reed** (Australian Ocean Data Centre Joint Facility) and **Lucy Scott** (The Agulhas and Somali Current Large Marine Ecosystem Project - ASCLME)

IODE Intergovernmental Oceanographic Commission of UNESCO
International Oceanographic Data and Information Exchange

African Marine Atlas

A project in ODINAFRICA

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		

Funded by the Govt. of Flanders and IOC of UNESCO

African Marine Atlas

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

AMA will…

- Improve access to data (via online Atlas products)
- Increase capacity to use data (for training courses, work programmes, monitoring, etc.)

African Marine Atlas

- National level consultation and workshops
- Regional workshops, at which regional needs and products were identified and prioritized based on national consultative reports
- 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)
- Regional leaders selected based on experience & area knowledge
- Input from regional programmes
- Annual ODINAFRICA Seminars

AMA Data Themes

- 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 are available in the public domain (but tailored to meet specific user requirements).
- Continental Africa and island state
- Transboundary data sets
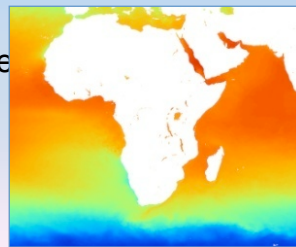
AMA Spatial Data Clearinghouse

- **>800 unique data sets**, for 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 (# of individual products)**
  - GEOSPHERE (19)
  - HYDROSPHERE (445)
  - ATMOSPHERE (96)
  - BIOSPHERE (231)
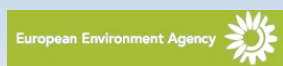 - HUMAN ENVIRONMENT (27)
  - BASE MAP (61)
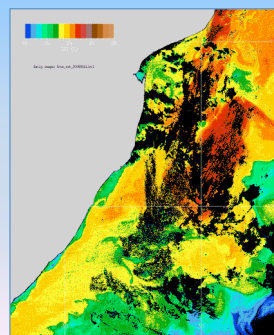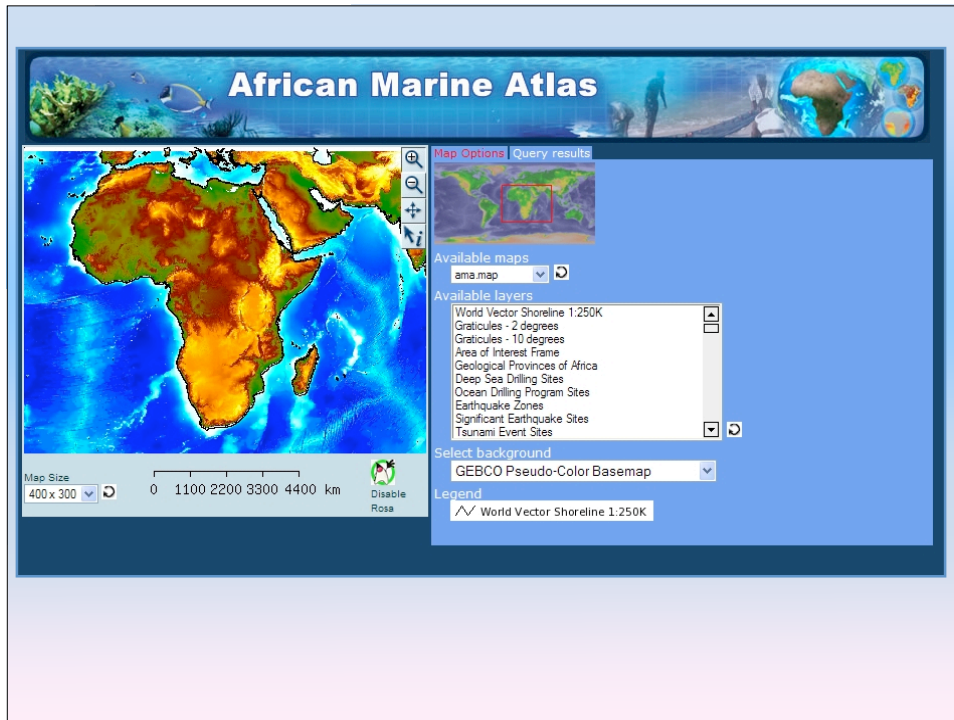
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- **European Environment Agency**

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For More Information on ICAN …

icoastalatlas.net
ican.science.oregonstate.edu
ICAN Interoperability Prototype - ican.ucc.ie

Marine Metadata Interoperability - marinemetadata.org

AMA – www.africanmarineatlas.net

CMA – www.caribbeanmarineatlas.org

That's All!
Thank you for your attention!

Don't forget to fill in the _Session Evaluation_ forms.

For more on ICAN – a full paper will be presented on Friday in Parallel Session 6.3 – Marine SDIs (11.30 – 13.00, Diamond Room 2)

To see what the IOC IODE Project is up to – visit www.iode.org
EUCC Information and Data Management Working Group – www.eucc.net