The evolution of geospatial data handling in environmental information systems

with some focus on renewable energy and marine

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Enviroinfo 2013, September 4th Hamburg
Outline

The European policy framework
The dynamics of geospatial information
Trends in technology and standardisation
Global issues call for global governance
Mapping renewable energy and marine challenges
Priority objective 5: To improve the evidence base for environment policy
Quality of data and information

lack of comparability in the information provided by the Member States
scale of the data and the level of detail in the assessments

Data flows and information systems

Where the public at large is concerned
Not suited to the needs
Not enough flexibility, not enough feedback possibilities

Where the Member States and local authorities are concerned
better address cross-border environmental issues
improved ways to find data and information needed
Data redundancy – not following SEIS principles

Where the Commission is concerned
More timely access in support of policy proposals
Better monitoring of implementation of legislation
Better dissemination through more open source powered solutions
SEIS implementation outlook - priorities

Assessing (and support the improvement of) the current capacities within the Member States (e.g. Copernicus GISC, EMODNET, GEO projects)

Streamlining EU reporting requirements towards fully on-line reporting (e.g. WISE, BISE, SENSE, eReporting systems)

Improving public access to environment information (EU open data strategy, strengthen EU environmental data centres)

Improving public participation in the collection and dissemination of environment data and information (e.g. review of PSI directive)

Promoting and assessing the implementation of the Infrastructure for Spatial Information in Europe Directive (Review INSPIRE – a core architecture for SEIS)
The next 5 years - EEA strategic areas 2014-2018

Informing policy implementation

Assessing systemic challenges

Dynamic interactions

Knowledge co-creation, sharing and use

European Environment Agency
Building the evidence base for environment policy

(M) Monitoring
(D) Data
(I) Indicators
(A) Assessments
(K) Knowledge

Observe
Structure
Interpret
Integrate
Share

European Environment Agency
Outline

Trends in technology and standardisation
Web mapping is the process of designing, implementing, generating and delivering maps on the World Wide Web.
Trend: centrally managed and used anywhere
Principles: *using software as services*

Spatial Data Infrastructure for Web dissemination

EEA infrastructure

ArcGIS online
http://eea.maps.arcgis.com

ArcGIS Server Farm
http://discomap.eea.europa.eu

Cloud

Consumer

Web maps
Feature services
Tiled services
Templates

On premises

GIS Officers  Operators  Integrators

advanced web-services
Map layouts
simple web-services

Print services
Print layouts
Centralised EEA-SDI / node for others to connect

Loosely coupled SDI

- Other European SDI’s
- Regional SDI’s
- International SDI’s
- National SDI’s
- SDI’s

EEA
Standardisation - data and service quality

Open standards

For web (mapping) services
For data specifications

courtesy OGC
Outline

The dynamics of geospatial information
Evolution steps (general and for EEA)

2009/10
- watches (air, water)
- crowd sourcing
- mapping applications

2011/12
- enhanced watches (air, water, noise)
- citizen science social media (nature, marine)
- web mapping services

2013 ...
- loosely coupled SDIs
Development characteristics - key drivers

Public private partnerships (ESRI, Microsoft)

Open standards

SEIS principles

Citizen science and crowd sourcing

Social media enabled – communities sharing

International cooperation
Drivers: the growth of web mapping services e.g. EEA
Yearly demand on interactive maps

- Total maps requested
- Total maps generated

Cost per map was low enough to handle five thematic areas.

Work can be performed by GIS operators rather than Special GIS Team and IT-developers.

All EEA staff internal and external can publish and produce web maps.

Demands from WISE
Total investment per interactive map

Existing technologies demand lots of in-house development.

EEA developed own application templates reducing overall cost.

New industry standards (OGC, REST, ...) improved overall development cost.

Software as a Service (AGO) makes cost drop totally.

Maintenance cost in altering standardised map templates.
Data set dissemination through EEA data service (2012)


- **Corine land cover** (2000, 2006, raster, vector, changes), 52.1%
- **Population density / distribution**, 2.0%
- **GMES Urban Atlas**, 10.3%
- **Water** (Waterbase: rivers and UWWTD, river basin districts), 4.2%
- **Emission reporting** (E-PRTR; EU ETS, CO2 passengers cars, UNFCCC and GHG, LRTAP), 11.9%
- **Biological diversity** (Natura 2000 data - the European network of protected sites; National CDDA), 8.0%
- **Air quality** (Air base), 6.5%
- **Geospatial reference data** (grids, elevation), 5.0%
- **Spatial / GIS data**

Source: Web statistics (David Simoens, EEA)
Results: Fully geospatial enabled - web mapping service based

http://discomap.eea.europa.eu/

Discomap
Discovering EEA's Map services

Discomap is a website for developers and GIS experts to allow reuse of our map services. Any map services here is exposed for public users by EEA or any other website who might be interested to do.

To get more information about discomap go here

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Open Source API's
Google Maps API
Microsoft BING API
ESRI API's

Quantum GIS
uDig
ArcGis.com
ArcGis-Desktop
Google Earth
New ways of working - based on social media principles

Web site

Create Users
- Link to web-services
- Link to web app’s (url)
- Upload data/tools/app (zip)
- Upload web-service (zip)
- Create map’s (mashup)

Create Groups
- Invite users
- Add resources
- Secure content
...based on **individual mash-ups**
Example for a new mash-up: maritime shipping 2010 and Natura 2000 protected sites
Integrating citizen science using also mobile devices
NatureWatch as first attempt
“Learning” to do Citizen Science:
Marine litter - a “watch” with specific aims

- Help filling data gaps for MSFD implementation and EEA Assessments

- Explore benefits of involving citizens in collecting and monitoring of marine litter

- Involve and engage with government bodies, industry & citizens in a collective approach to managing marine litter

- Collaborate with existing communities, as well as provide a setup for new communities and initiatives to emerge
Marine LitterWatch

National Databases

Marine LitterWatch Database

MSFD Dataset

Photo: Ferdi Rizkiyanto - 20
On the operational path: 2014 & beyond

Learning by doing project!

- Collect data in (near-)real time & build up knowledge base
- Adjust & provide support to existing communities and help enabling new ones to emerge
- Demonstrate that citizen science can deliver policy relevant (MSFD) data
- Explore collection & use of data for EEA assessments
- Help foster collective approach to managing marine litter
Social media integration - throughout geospatial platforms - easily enabled for content managers.
Summary: Building on distributed network services to support a wide range of users
Outline

Global issues call for global governance
Do we know what we need to know?

Source: EEA, 2012
Environmental megatrends
-Increasingly severe consequences of climate change

Source: SOER 2010 Assessment of Global Megatrends
INSPIRE to help securing the European contribution to Global networks

- Global Earth Observation System of Systems – GEO/GEOSS
- UN Global Geospatial Information Management – UN GGIM and the Global Map for Sustainable Development – GM4SD
- Global Environmental Outlook - UNEP-Live
- The Eye on Earth Global Network of Networks - GNON
UNEP, GEO/GEOSS and the Copernicus program
SECOND HIGH LEVEL FORUM ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT

Doha, Qatar from 4-6 February 2013
Outline

Mapping renewable energy and marine challenges
Maritime industries and Blue Growth Trends

- Short sea shipping up 100% by 2050
- Offshore wind annual growth rate 21.7%
- Maritime monitoring and surveillance in growth
- Cruise tourism experience 12% growth rate
- Fisheries -25% since 1993 – potential to reverse trend and rebuild fish stocks?
Natural capital - renewable energy: offshore wind

Offshore wind capacity, historic and predicted (EWEA 2011)
From Offshore Grid Integration towards Smart Grids

- Significant benefits of (offshore) grid development and interconnection
  - Energy security
  - Electricity market integration

- Smart Grids as key vectors for:
  - Management of energy networks
  - Integration of renewable energy
  - Sustainable growth
Early protocols & knowledge to solve trade-offs

**Trade-Offs & Benefits**

- Noise ?
- Electromagnetic Fields ?
- Aggregate Footprint ?
- Risks of Collision ?
- Impacts of Drilling & Infrastructure
- Synergies with Marine Protected Areas ?
Copernicus / GMES - providing data
European economy can benefit from a more structured approach to marine knowledge.
Merging information to illustrate complex interactions

Cumulative human impacts

Source: HARMONY project
Offshore wind farms - example „Deutsche Bucht“
Offshore windfarms - details
http://www.4coffshore.com/windfarms/borkum-riffgrund-west-germany-de03.html
The end

Thanks to the audience for the attention

Thanks to Constanca Belchior, Jan Bliki and Johnny Reker for discussions and slides provided