Drought Data, Metadata and Interoperability – Theory and Experience in the Context of EDO

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Outline

**Context:** European Drought Observatory (EDO) and the EuroGEOSS project

**Theory:** GEOSS and INSPIRE specifications for metadata and interoperability

**Experience:** Application of GEOSS and INSPIRE specifications in EDO and EuroGEOSS
Multi-scale approach that integrates drought information from various scales:

– continental
– (inter-) national
– regional and local

→ Interoperability of drought information systems required
Initiatives for Information Sharing

GEOSS - Global Earth Observation System of Systems

INSPIRE Directive – Infrastructure for Spatial Information in Europe
GEOSS

• Interconnecting Earth observation systems by making them interoperable
  – Common standards for architecture and data sharing
  – Provision of data and services directly to users

• GEOSS is to be implemented between 2005 – 2015
GEOSS Specifications

• Architecture:
  – Based on non-proprietary, formal international standards by standardizing interfaces for connecting GEOSS components.

• Data sharing principles:
  – Full and open exchange of data, metadata and products (under consideration of national policies)
  – Delivery with a minimum time delay and at minimum cost
  – Free of charge delivery to research and educational institutions
INSPIRE Directive

Infrastructure for Spatial Information in Europe
- adopted in March 2007
- full implementation required in 2019

Objectives
- to improve accessibility and interoperability
- to support collaboration across the EU

Main issues:
- Metadata
- Data specifications
- Network services
- Data and service sharing
- Monitoring and reporting
“Metadata’ means information describing spatial data sets and spatial data services and making it possible to discover, inventory and use them.” (Directive 2007/2/EC, article 3 paragraph 6)

Source: H06 JRC
The Implementing Rules

- Focus on Discovery and **elements** needed to implement the requirements of the Directive and allow interoperability through standards.

- Requires **Unique IDs** for datasets and introduces link between data and services.

- States clearly what kind of information should be encoded for each element, which elements are **mandatory**, and provides **code lists** when relevant.

Source: H06 JRC
The Online Metadata Editor

- Online application to demonstrate the creation of INSPIRE-compliant metadata records
- Input: new file or existing XML file
- Output: XML file, ready to be inserted in your metadata catalogue
- URL: http://www.inspire-geoportal.eu/index.cfm/pageid/342

Source: H06 JRC
Key messages

• INSPIRE metadata is technically not difficult to create

• INSPIRE metadata is useful to discover each other’s GIS resources

• Tools already exist (and/or are being developed)

• Good practices are required to improve metadata quality, integrate metadata creation in existing workflows and reduce creation and maintenance efforts

Source: H06 JRC
… the European approach to GEOSS is a 3 year FP7 project, started May 2009

Objective:
– To establish the exchange of data and models across disciplines

Three thematic areas:
– Drought
– Forestry
– Biodiversity
Objectives

• Explore and define interoperability arrangements for drought information systems in Europe (“EDO recipes”)

• Establish interoperability between EDO and national and regional drought information from various sources (“EDO pilots”)

• Contribute to multi-discipline research and exchange with other thematic areas of EuroGEOSS

• Facilitate global access to European drought information through GEOSS
Requirements

→ Tool for search & discovery of drought-relevant information

→ Means to access relevant drought data services
Tools and Approaches

Search and Discovery: Metadata
- Following INSPIRE specifications
- Metadata editors provided
- Metadata Catalogue developed

Data access: Open Web Services
- Web Map Services for viewing maps of drought indicators
- Web Coverage Services for the exchange of drought data
- Web Feature Services for retrieving time series data (e.g. precipitation)
EDO map server

http://edo.jrc.ec.europa.eu
Drought Metadata Catalogue

http://eurogeoss.unizar.es/Search/Search.html
Assessment of the drought situation in Europe:

Who: an administrative user

What: get an overview of the drought situation in Europe and detailed information on affected regions

How: start from the EDO map server…

EUROGEOSS: DROUGHT CATALOG

Results list
Results 1 to 4 from 4

Spatial Data Infrastructure of Spanish Observatory for Sustainability (IDE-OSE) Annual sustainability indicators 2007
Spatial Data Infrastructure of Spanish Observatory for Sustainability (IDE-OSE) Annual sustainability indicators 2008
JRC EDO (European Drought Observatory) Draft Drought Products Delivery TYPES

DFICI15 WH15

IDECOSE includes the cartography of different Sustainability indicators about economic, social, environmental, global, cultural and institutional dimensions. Through the IDE-OSE, we represent the cartography of these indicators for the Autonomous Community for national scale analysis, or by European countries, when the analysis is made for the scale (border country).

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The service is a draft version of a WMS service to deliver drought products, i.e., maps of drought indicators as they are displayed into the EDO MapServer Prototype (see http://edio.esd.jrc.ec.europa.eu/services/telegraph.html?application=version=2.11, and described on the EPO website (http://www.esd.jrc.ec.europa.eu)). For making maps, monthly precipitation data from GPCP were used. The data are tabulated in latitude/longitude form in resolution 1 degree x 1 degree. For calculating monthly anomalies (1, 10, 30 and 12 - with 12) used data from GPCC, while precipitation (0.1 degree x 0.1 degree) for all period (1981-2000) were used. For calculating D19 modified version of program from Colorado Climate C...
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Spatial Data Infrastructure of Spanish Observatory for Sustainability (IDE-OSI). Annual sustainability indicators 2007

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JRC EDO (European Drought Observatory) - Drought Drought Products Catalogue 2011

IDE-OSI includes the cartography of different sustainability indicators about economic, social, environmental, global, cultural and institutional dimensions. Through the IDE-OSI, we represent the cartography of these indicators for the Autonomous Community, for national scale analysis or by European countries when the analysis is made for the scale (broader comparison). . .

For making maps monthly precipitation data from DWD were used. The data were used in latitude/longitude format in resolution 1 degree x 1 degree. For calculating monthly averages (5, 10, 15, 30 and 120 - with 120 used data from PGRAS/PCC/HRD/OMD resolution 0.5 degree x 0.5 degree for all period 1961-2000) were used. For recalculating SPI modified version of program from Colorado Climate Co.
Demonstration – Scenario 2

Exploration of drought data services through a drought expert:

**Who:** a drought expert user

**What:** identification and accessing of drought-related data sets for drought research

**How:** start from the Metadata catalogue...

http://eurogeoss.unizar.es/Search/Search.html
Demonstration – Scenario 3

Sending drought alerts to drought managers
Link established between metadata catalogue and EDO map server

- Direct discovery and display of drought resources

Drought data on different scales are connected

- Europe, Spain and South-East Europe
Outlook – Technical and Thematic

• Develop a download functionality for drought data

• Updating and archiving

• Add more partner resources

• Addressing drought research questions, e.g.
  – Multi-source drought detection and assessment
  – Scaling of drought indices
  – Regional drought studies (Spain, SE Europe)

• Contributing to interdisciplinary collaboration R&D with thematic areas of EuroGEOSS
Summary

- GEOSS and INSPIRE specifications for interoperability and data exchange

- Application of these specifications in EDO through EuroGEOSS