The European Commission’s science and knowledge service
Joint Research Centre

Pilot project on EU Disaster damages and losses database

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Workshop on INSPIRE extension
Outline

• Context
• INSPIRE core schemas extension
• Data harmonisation workflow
• Next steps
Aim of the Pilot

- To harmonize relevant natural hazard/risk data/service requirements contained in INSPIRE legislative and technical framework (e.g. Data specification on Natural Risk Zones) with the Guidance for Recording and Sharing Disaster Damage and Loss Data.

- To show the feasibility of a workflow in which the EU Member States provide one set of spatial data services conformant to the requirements contained in both the legal frameworks.
EU legislative framework

- **EU– INSPIRE Directive** (since 2007)
  - Set of Implementing Rules & Technical Guidelines

- **Decision on a Union Civil Protection Mechanism** (since 2014)
  - Guidance for Recording and Sharing Disaster Damage and Loss Data 2015

International activities/frameworks

- **GEO/GEOSS SBA** – Disaster Resilience
- **IUGS** – CGI
- **Sendai, SDGs, COP21, UNISDR, OECD..**
Pilot phases

• Phase 1 (December 2015 – April 2016) – scoping of the data harmonization and identification of the main issues

• Phase 2 (April – December 2016) – creation of the common data model (extended INSPIRE model)

• Phase 3 (January–March 2017) – demonstration phase transforming a few MS data sets to the common data model, and deploying and configuring the remaining INSPIRE components (Metadata, Network services on selected 1-2 MS datasets).
Technological scope of the pilot

- Test data discovery through standardised discovery services & metadata
- Test data (re)use and interoperability by adopting common cross-domain models to exchange data
- Test online data access by means of standardised view and download services
Damage and Loss data model
INSPIRE NZ data model

Simplified representation of the main classes of the INSPIRE DS V3.0 UML data model (Tomas R, Barredo J, Harrison M, et al. 2015)
Common data model initial requirements

Two major use cases analysed:

1. Recording of damage & loss data after an event
   • Focus on the damage/economic/human losses recording

2. Provision/maintenance of past event information
   • Focus on the natural hazard event register (landslides, floods, earthquakes..)
Common data model

INSPIRE NZ core data model
Common data model
Common data model

Affected Elements, Assessment Method
Common data model

JRC Assessment Method for D&L recording
Flexibility of the model

- Geolocation and granularity of the damage & loss data
  - Asset level (object referencing or direct geometry recording)
  - Aggregated / statistical information
- Assessment method used
  - JRC Guidance on D&L Recording
  - Sendai (not yet provided)
  - ...
- Versioning of assessments
- Reliability of data and/or assessment of source
  - PedigreeScore
  - ...
- Use of MD and/or object level information
- Scale of the D&L recording
Common data model – alternative option
Common data model – alternative option
Data harmonization/publication workflow

1. Analysis of source datasets
2. Pre-processing of source datasets
3. Generation of the mapping table
4. Data transformation with HALE
5. Export and use gml files in QGIS
6. Metadata creation with INSPIRE MD editor
7. Deployment of WMS/WFS with deegree/GeoServer
Regione Lombardia Civil Protection use case

- Gml encoding choice
  - Transformation of “Damages” dataset according to L&D target data model, addressing the related phenomenon through “by-internal-reference” encoding of the “isAffectedBy” association
  - Transformation of “Phenomena” dataset mapping to the ObservedEvent FT available in L&D data model
  - Production of 1 gml (containing Damages and Phenomena as 2 different Feature Types at the same level of hierarchy)
Regione Lombardia Civil Protection use case
Regione Lombardia Civil Protection use case

Deegree transforms the internal #reference in a WFS query
Regione Lombardia Civil Protection use case
Regione Lombardia Civil Protection use case
Next steps

• Identification of use cases showing a multi-actor cooperation scenario, e.g.
  • harmonization of past events and damages datasets coming from two different organisations
  • better risk assessment
  • harmonization of source datasets from other regions/MS
  • fast assessment of damages and losses of an event comparing damages and losses of past events in the same area and with similar characteristics.
More information

INSPIRE
• http://inspire.jrc.ec.europa.eu/
INSPIRE Thematic Clusters
• https://themes.jrc.ec.europa.eu/
INSPIRE GeoPortal
• http://inspire-geoportal.ec.europa.eu/
INSPIRE Registry
• http://inspire.ec.europa.eu/registry/
INSPIRE data specifications
• http://inspire-regadmin.jrc.ec.europa.eu/dataspecification/

Towards a cross-domain interoperable framework for natural hazards and disaster risk reduction information