Harmonisation of geological data to support geohazard mapping: the case of eENVplus project

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Keys objective and founding

- to support INSPIRE and SEIS implementation
- through deployment and integration of value-added eEnvironment services
- available at national level and through past/on-going key EC-funded project.

Total budget of project: 4,9 M €
co-financed by EC CIP-ICT-PSP programme: 2,45 M €
**Scenarios >> Pilots: INSPIRE Data Themes**

- In 10 pilots, 9 Scenarios, 3 cross-border

<table>
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<tr>
<th>Scenario Title</th>
<th>ENV Aspect</th>
<th>Pilots</th>
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<td>Implementation of a SEIS for air quality data</td>
<td>Air Quality</td>
<td>BELGIUM</td>
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<td>Providing INSPIRE-compliant access to utility services: the case of sewage networks in Flanders</td>
<td>Water</td>
<td>BELGIUM</td>
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<td>CSspire</td>
<td>Everyday life issues connected to Environmental aspects</td>
<td>CZECH REPUBLIC / SLOVAKIA</td>
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<td>Natural Areas INSPIRE Compliance Toolbox</td>
<td>Nature Conservation</td>
<td>FRANCE</td>
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<td>Forest Fire Management Scenario</td>
<td>Environmental Risk (Fire)</td>
<td>GREECE</td>
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<td>Window on the Protected Areas - Mobile Conservation Map (WMA MCM)</td>
<td>Nature Conservation</td>
<td>HUNGARY / SLOVAKIA</td>
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<td>INSPIRE Geoportal</td>
<td>Nature conservation</td>
<td>ICELAND</td>
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<td>Geological Map Harmonization</td>
<td>Environmental Risk (Geohazard)</td>
<td>ITALY / SLOVENIA</td>
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<td>Urban Ecological Landuse Planning</td>
<td>Ecological Landuse Planning</td>
<td>PORTUGAL</td>
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</tbody>
</table>

21 INSPIRE Data themes
Geological Map Harmonisation Pilot

**UC-EP09-01**
Environmental risk (geo-hazard): landslide susceptibility map

**UC-EP09-02**
Environmental risk (geohazard): Flood probability map

**INSPIRE DATA THEME**
I.7 TN
I.8 HY
II.1 EL
II.4 GE
III.12 NZ
Harmonising procedure

Starting from OneGeology-Europe activity

OneGeology-Europe dataset

Evaluate litho-stratigraphic anomalies

Solve semantically and geometrically problems

Using 1GE vocabularies

Mapping in GE INSPIRE data model
Harmonising procedure

Using OneGeology- Europe approach

Geological Map 1:100k dataset

Evaluate lithology + cronostratigraphic anomaly contact

Solve semantically problems and feasible geometrically

Using CGI-IUGS vocabularies

Mapping in GeoSciML 3.2 data model
Harmonising procedure

CGI Vocabularies used

International Chronostratigraphic Chart (2013)
http://resource.geosciml.org/vocabulary/cgi/201211/ + timescale/isc-2013.rdf

CGI Simple Lithology Categories
+ SimpleLithology201211.rdf

CGI compound Material Constituent Part Role vocabulary
+ CompoundMaterialConstituentPartRole201211.rdf

CGI Proportion Term Vocabulary
+ ProportionTerm201211.rdf

CGI Event Environment Categories
+ EventEnvironment201211.rdf

CGI Event Process Categories
+ EventProcess201211.rdf

CGI Geologic unit type vocabulary
+ GeologicUnitType201211.rdf

CGI Consolidation Degree Term Vocabulary
+ ConsolidationDegree201211.rdf

CGI Foliation Type categories
+ FoliationType201211.rdf
Harmonising procedure

WFS INSPIRE compliant
Use case procedure chain
Flood procedure

Geology 1:1M OneGeology-Europe served in GE INSPIRE Data Model

<ge:eventEnvironment xlink:href="http://resource.geosciml.org/classifier/cgi/eventenvironment/basin_plane_setting" xlink:title="basin_plane_setting"/>

Geology 1:100k GeoSciML 3.2 Data Model

<harm:harmonised geology>

Dem

Harmonised geology
Flood procedure

Geohazard served in NRZ INSPIRE Data Model

<nz-core:typeOfHazard><nz-core:NaturalHazardClassification>
</nz-core:NaturalHazardClassification></nz-core:typeOfHazard>........
<nz-core:LikelihoodOfOccurrence>
<nz-core:qualitativeLikelihood>High Probability</nz-core:qualitativeLikelihood>

Flood probability Map
Landslide procedure

Geology 1:1M OneGeology-Europe served in GE INSPIRE Data Model

<ge:CompositionPart><ge:material xlink:title="clastic_sandstone" xlink:href="http://resource.geosciml.org/classifier/cgi/lithology/clastic_sediment"/>

...

Geology 1:100k GeoSciML 3.2 Data Model

<gsmlgu:composition><gsmlgu:CompositionPart>...
<gsmlgu:material><gsmlem:RockMaterial gml:id="id_n">...
<gsmlem:consolidationDegree xlink:href="http://resource.geosciml.org/classifier/cgi/consolidationdegree/unconsolidated" xlink:title="unconsolidated"/>
</gsmlgu:composition>

Harmonised geology
Landslide procedure

Geohazard served in NRZ INSPIRE Data Model

<nz-core:typeOfHazard><nz-core:NaturalHazardClassification>
</nz-core:NaturalHazardClassification>

<nz-core:LikelihoodOfOccurrence>
<nz-core:qualitativeLikelihood>High Susceptibility</nz-core:qualitativeLikelihood>
</nz-core:LikelihoodOfOccurrence>

Landslide susceptibility Map
Some general considerations:

<table>
<thead>
<tr>
<th>Data Harmonisation</th>
<th>Semantic harmonisation is possible only if we using the terminology vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Different application schema have different namespace and different encoding</td>
</tr>
<tr>
<td></td>
<td>If we want provide more information usable for analysis we need to use Extension Mod.</td>
</tr>
<tr>
<td>eENVplus infrastructure</td>
<td>The infrastructure is composed by modular components re-usable or remodulable</td>
</tr>
<tr>
<td>Geohazard widget</td>
<td>The widget and more components are extensible and cross-platform</td>
</tr>
</tbody>
</table>
Thank you for the attention!

? Questions ?

Project reference

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Web: http://www.eenvplus.eu