Geohazard monitoring by means of INSPIRE-compliant services: the PanGEO project for Roma

CARLO CIPOLLONI, VALERIO COMERCI, PIO DI MANNA, LUCA GUERRIERI, EUTIZIO VITTORI
GEOLOGICAL SURVEY OF ITALY – ISPRA

ERIKA BERTOLETTI, MARIA CIUFFREDÁ, CLAUDIO SUCCHIARELLI
DEPARTMENT OF URBAN PLANNING - ROMA CAPITALE, ITALY
What is PanGeo?

It’s an EU project that provides information about the stability of the ground on which we live, work and play.

- Ground Stability Layer
- GMES for land monitoring
- Geological in situ data
- PS InSAR
Results

The Ground Stability Layer for a town where there are several **Geohazard**: Observed

All the geohazard are classified in according with INSPIRE NRZ Data Model Code-lists
# Geohazard

<table>
<thead>
<tr>
<th>Deep Ground Motion</th>
<th>Man Made (Anthropogenic) Ground Instability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthquake (seismic hazard)</td>
<td>Groundwater Management - Shallow compaction</td>
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<tr>
<td>Tectonic Movement</td>
<td>Groundwater Management - Peat oxidation</td>
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<tr>
<td>Salt Tectonics</td>
<td>Groundwater abstraction</td>
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<tr>
<td>Volcanic inflation/deflation</td>
<td>Mining</td>
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<tr>
<td></td>
<td>Underground construction</td>
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<tr>
<td></td>
<td>Made ground</td>
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<td>Oil and Gas production</td>
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</table>

<table>
<thead>
<tr>
<th>Natural Ground Instability</th>
<th>Other</th>
</tr>
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<tbody>
<tr>
<td>Landslide</td>
<td></td>
</tr>
<tr>
<td>Soil Creep</td>
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<tr>
<td>Ground Dissolution</td>
<td></td>
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<tr>
<td>Collapsible Ground</td>
<td></td>
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<tr>
<td>Running Sand/Liquefaction</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Natural Ground Movement</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressible Ground</td>
<td></td>
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<tr>
<td>Shrink-swell clays</td>
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</tbody>
</table>
The case of Roma Municipality

- Roma municipality has an area of 1285 km$^2$
- Roma maximum elevation delta is about 40 m.
Which are the layers? Which are the geohazard?

<table>
<thead>
<tr>
<th>Geohazard (INSPIRE)</th>
<th>Dataset</th>
<th>Observed/potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landslide</td>
<td>IFFI - Italian Landslides Inventory</td>
<td>Observed</td>
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<tr>
<td></td>
<td>Roma landslide DB</td>
<td>Observed</td>
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<tr>
<td></td>
<td>Susceptibility landslide map</td>
<td>Potential</td>
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<tr>
<td>Collapsible round</td>
<td>Sinkhole DB</td>
<td>Observed</td>
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<td></td>
<td>Cavities and collapse</td>
<td>Potential</td>
</tr>
<tr>
<td></td>
<td>Cavities</td>
<td>Potential</td>
</tr>
<tr>
<td></td>
<td>Cavities' probability map</td>
<td>Potential</td>
</tr>
<tr>
<td>Compressible ground</td>
<td>Geology 10k Roma</td>
<td>Potential</td>
</tr>
<tr>
<td></td>
<td>Geology CARG 25k</td>
<td>Potential</td>
</tr>
<tr>
<td></td>
<td>Lithology 100k</td>
<td>Potential</td>
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<tr>
<td>Underground construction</td>
<td>Underground train network distribution</td>
<td>Potential</td>
</tr>
<tr>
<td></td>
<td>Tunnelling</td>
<td>Potential</td>
</tr>
<tr>
<td>Tectonics movements</td>
<td>CARG Faults</td>
<td>Potential</td>
</tr>
<tr>
<td>Mining</td>
<td>Quarries and Mines distribution</td>
<td>Potential</td>
</tr>
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<td></td>
<td>Geology CARG 25k</td>
<td>Potential</td>
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<td>Ground water abstraction</td>
<td>Fresh water borehole</td>
<td>Potential</td>
</tr>
<tr>
<td></td>
<td>Aquifers level comparison Map</td>
<td>Potential</td>
</tr>
<tr>
<td>Made ground</td>
<td>Thickness anthropic deposits map</td>
<td>Potential</td>
</tr>
</tbody>
</table>
Analysis example

Alluvium deposits = Potential geohazard layer to HazType

Compresible Ground

Observed PSI

Compresible Ground
Observed geohazard

The observed geohazards cover more than 580 km²
Potential geohazard

The potential geohazards cover more than 880 km$^2$
Observed and Potential geohazard
How we serve in INSPIRE format?

WMS INSPIRE Compliant Service
WFS INSPIRE Compliant Service
How we serve in INSPIRE format?

Wrapper connector to map local data to INSPIRE NRZ data model

eXows:
- INSPIRE compliance
- Multilingualism
- INSPIRE GetCapabilities
- PanGeo common data model

INSPIRE WMS, PanGEO data model

INSPIRE WFS, PanGEO data model
Potential combination use of more “INSPIREd” Services

PanGeo + Urban Atlas
Thank you for the attention!

Web-references:

PanGeo project  http://www.pangeoproject.eu

Portale SGI  http://sgi.isprambiente.it/geoportal

Contact us:  carlo.cipolloni@isprambiente.it
              valerio.comerici@isprambiente.it