eENVplus pilots and scenarios

Geological map harmonisation Italy – Slovenia

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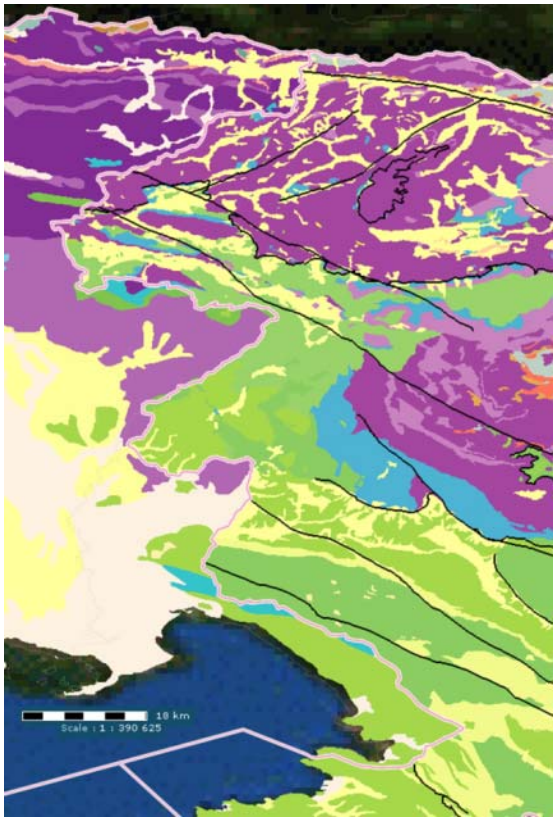
eENVplus/INSPIRE National Workshop
15 September, 2015, Ljubljana

Scenarios >> Pilots: INSPIRE Data Themes

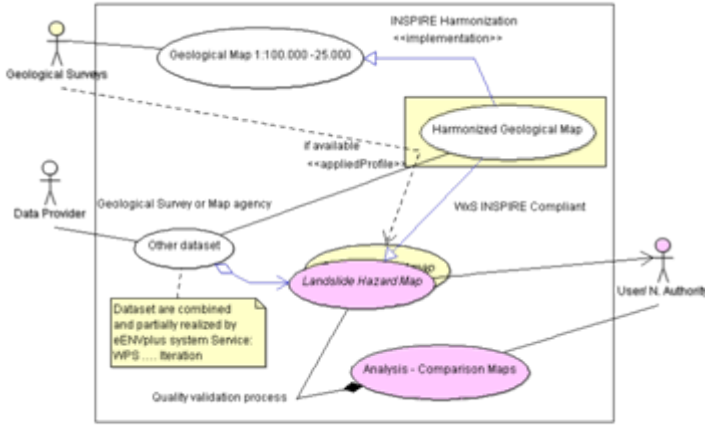
- In 10 pilots, 9 Scenarios, 3 cross-border

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

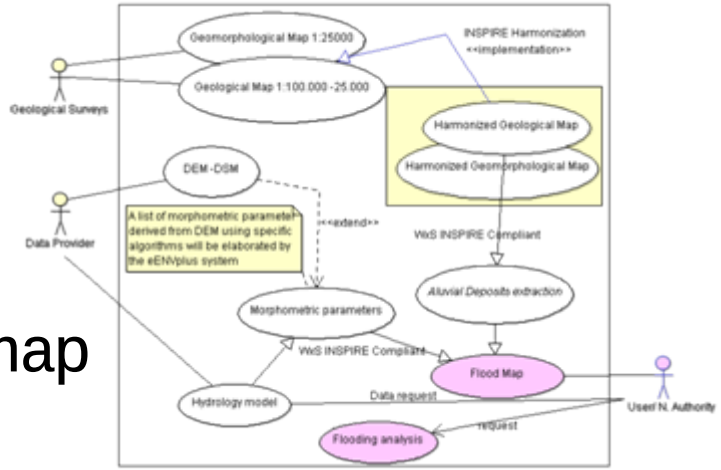
Geological Map Harmonisation Pilot



Use-case 1
Environmental risk (geohazard): Landslide susceptibility map



Use-case 2
Environmental risk (geohazard): Flood probability map



Pilots and use-cases

- A deep analysis conducted on the 26 different use cases of the 10 pilots lead to the identification of **21 INSPIRE data-themes target schemas to be used** in the harmonisation process.

About
Home
About INSPIRE
Legislation
History
Who's who in INSPIRE
INSPIRE library
INSPIRE Conferences

Implementation
Roadmap
Monitoring and Reporting
IOC
INSPIRE GeoPortal
Maintenance and Implementation

Adoption

INSPIRE DIRECTIVE

In Europe a major recent development has been the entering in force of the INSPIRE Directive in May 2007, establishing an infrastructure for spatial information in Europe to support Community environmental policies, and policies or activities which may have an impact on the environment.

INSPIRE is based on the infrastructures for spatial information established and operated by the 27 Member States of the European Union. The Directive addresses 34 spatial data themes needed for environmental applications, with key components specified through technical implementing rules. This makes INSPIRE a unique example of a legislative "regional" approach.

Data Specifications

Legislation | Who | Consultations | Testing | Roadmap | Library | News | Themes | Data Models

ANNEX I

1 Coordinate reference systems
2 Geographical grid systems
3 Geographical names
4 Administrative units
5 Addresses
6 Cadastral parcels
7 Transport networks
8 Hydrography
9 Protected sites

ANNEX II

1 Elevation
2 Land cover
3 Orthoimagery
4 Geology

ANNEX III

1 Statistical units
2 Buildings
3 Soil
4 Land use
5 Human health and safety
6 Utility and governmental services
7 Environmental monitoring Facilities
8 Production and industrial facilities
9 Agricultural and aquaculture facilities
10 Population distribution and demography
11 Area management / restriction / regulation zones & reporting units
12 Natural risk zones
13 Atmospheric conditions
14 Meteorological geographical features
15 Oceanographic geographical features
16 Sea regions
17 Bio-geographical regions
18 Habitats and biotopes
19 Species distribution
20 Energy Resources
21 Mineral Resources

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font size

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Website and documents
Website only
OK

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Welcome to the new Inspire Site. If you are a new user you can register here
Registered users can login here.

Geological Map Harmonisation Pilot

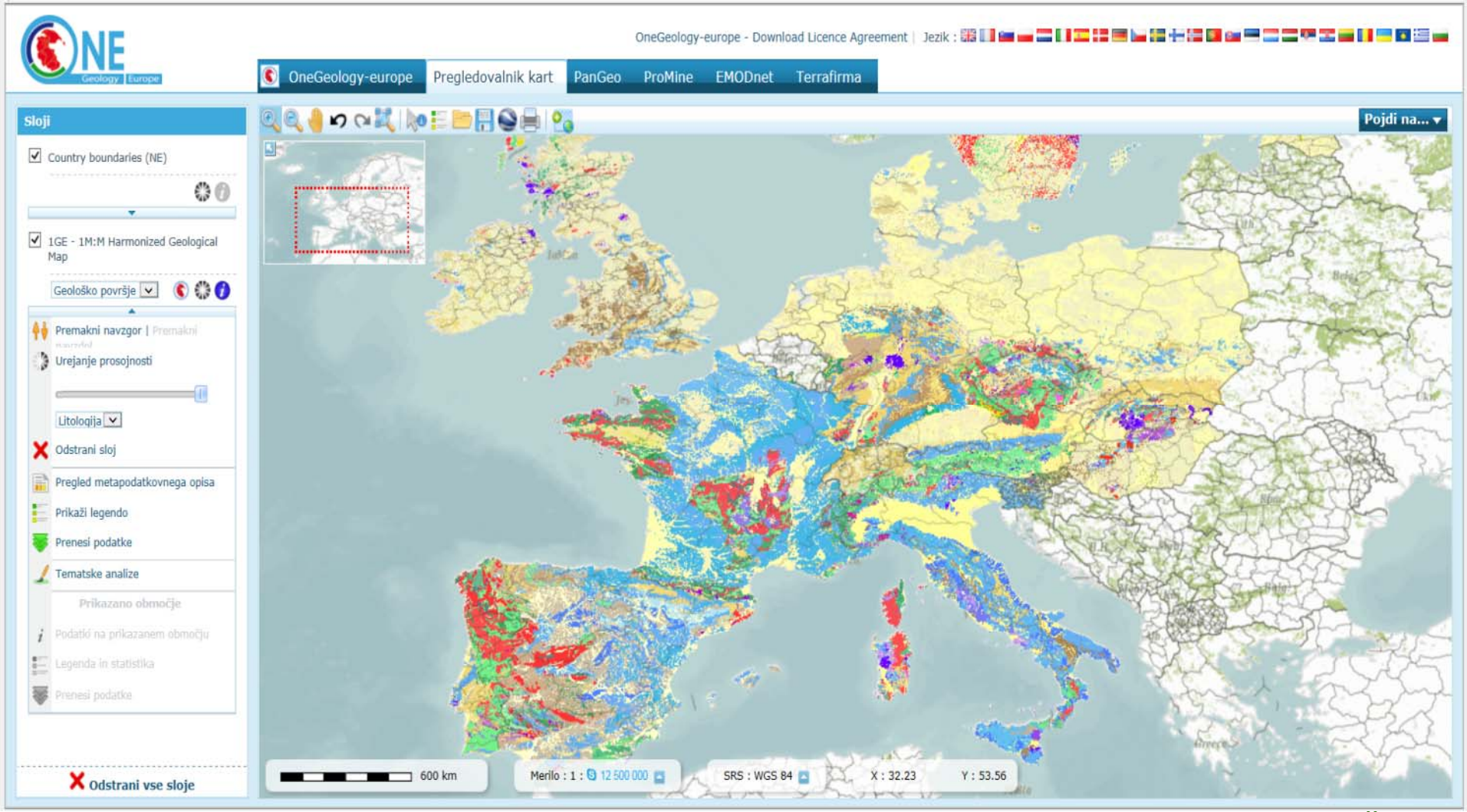
- Objectives
  - A uniform harmonized geological layer across the Italian-Slovenian border based on the INSPIRE Geology model;
  - Standard access to geological data, regardless of how each provider manages these data, to improve accessibility to information to most users;
  - A common semantic language to exchange geological data.

Pilot analysis

- eENVplus components used in the pilot
  - Harmonisation toolkit and service
  - Validation services
  - Standard WCS services as output
  - Processing services
  - TF services (keywords, metadata and data)

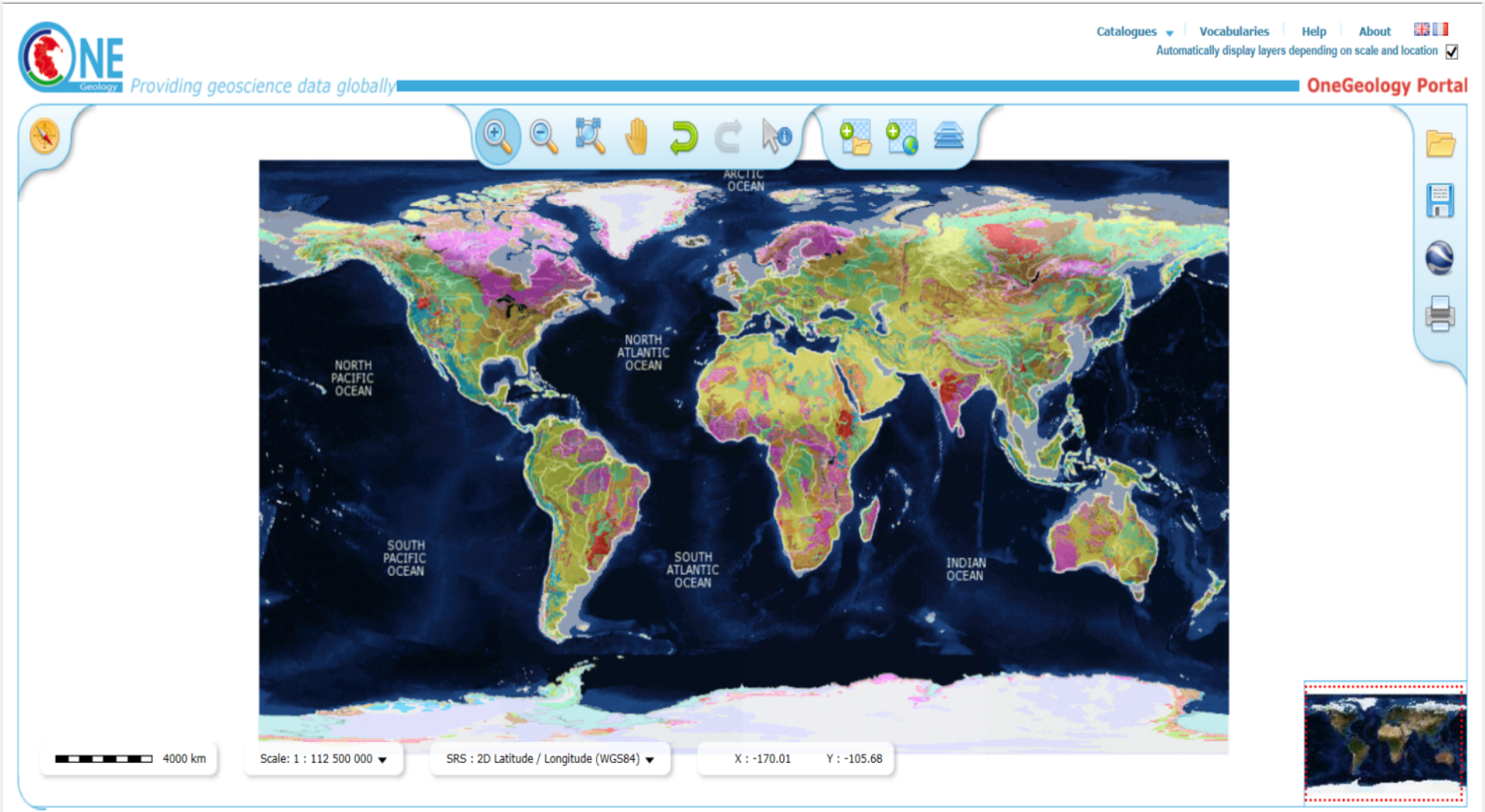
Pilot background

- http://geoportal.onegeology-europe.org/geoportal/viewer.jsp

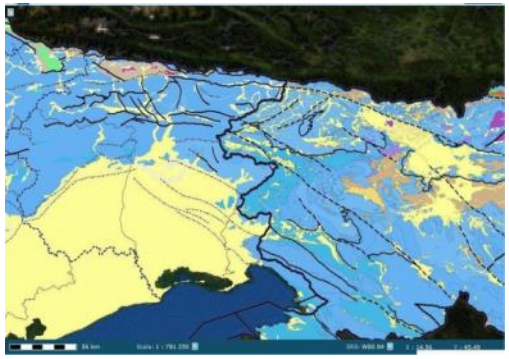


Pilot background

- http://portal.onegeology.org/

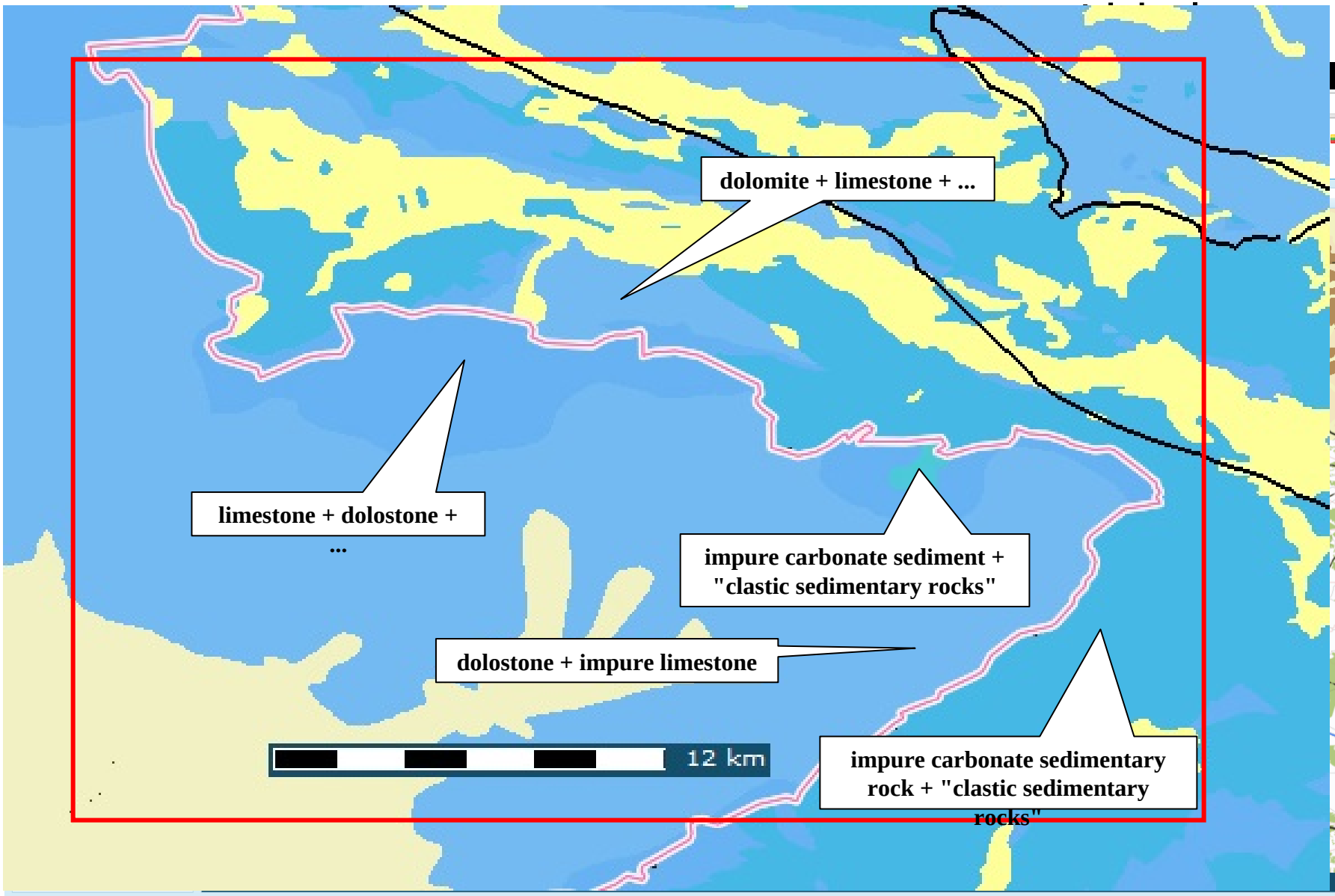


Starting from OneGeology- Europe activity



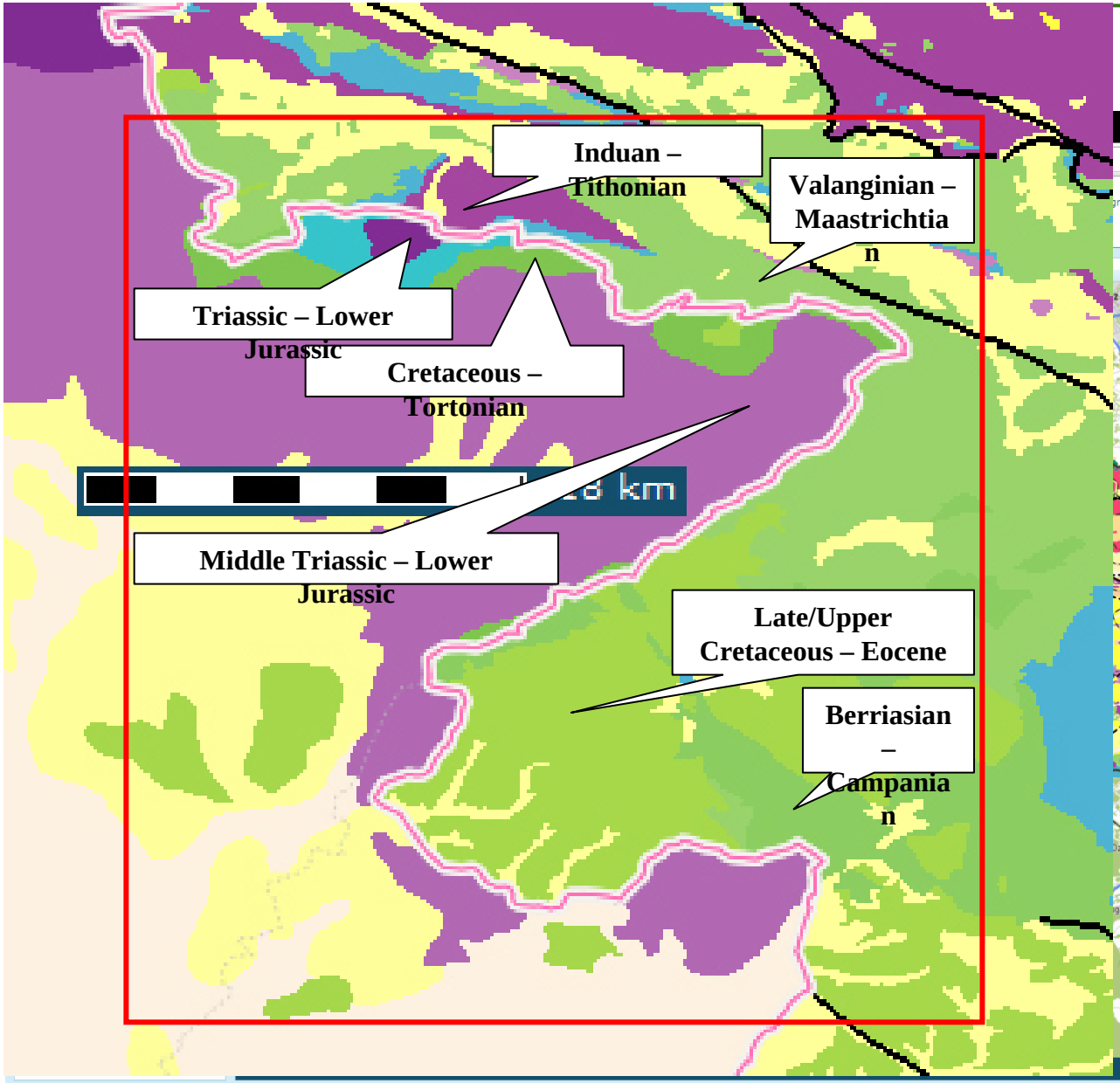
- OneGeology-Europe dataset
- Evaluate litho-stratigraphic anomalies
- Solve semantically and geometrically problems
- Using 1GE vocabularies
- Mapping in GE INSPIRE data model

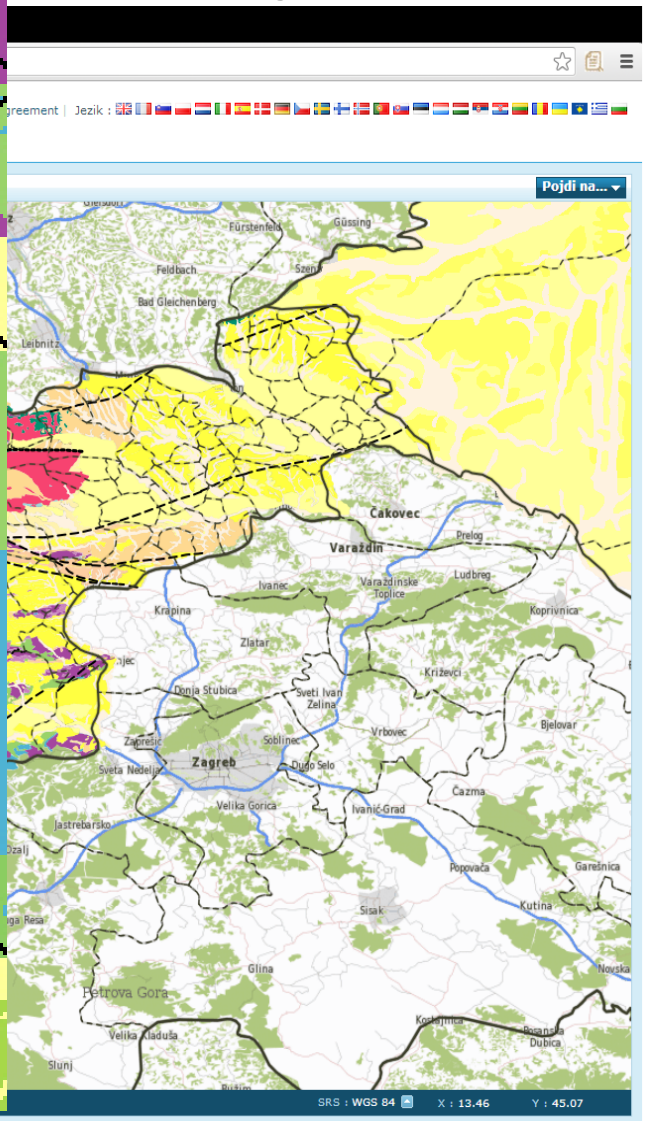
Harmonisation procedure



Harmonisation procedure

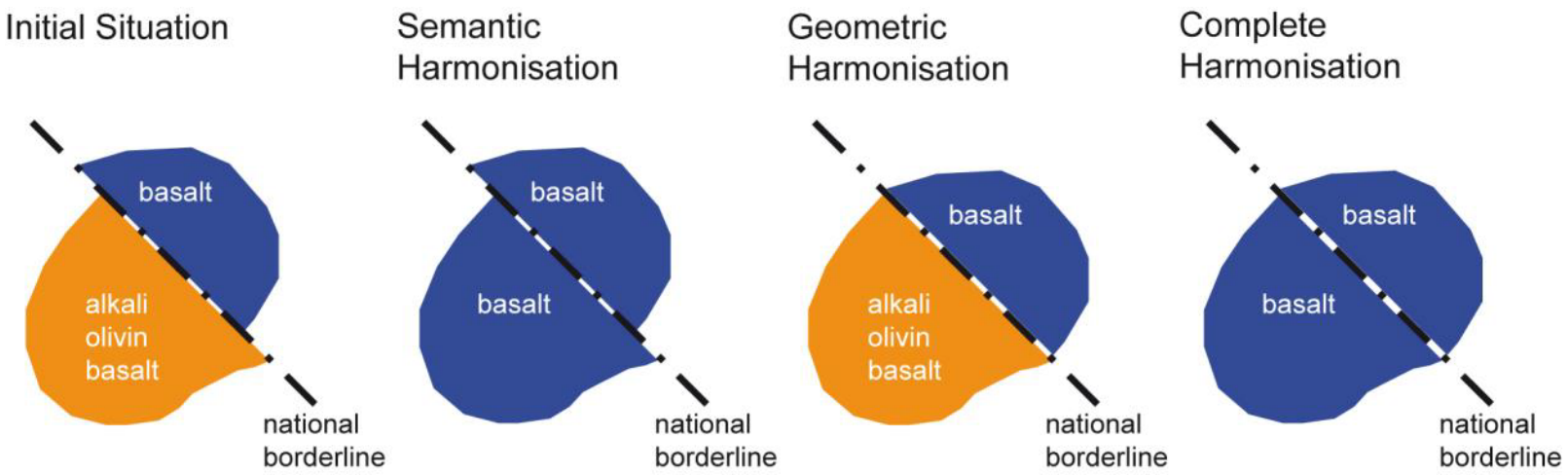
- Age





Harmonisation procedure

- Semantic harmonisation
- Geometric harmonisation
- OneGeology Europe aimed to achieve complete semantic harmonisation, but it was only carried out in limited areas



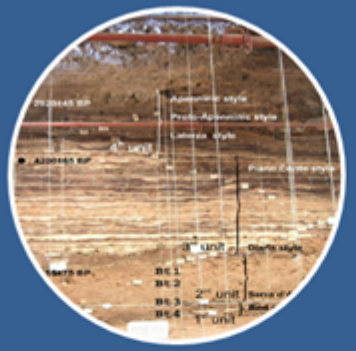
Geologic Unit: Composition Part

Composition part 1

Lithology

Role of composition part

Proportion of composition part



Composition part 2

Lithology

Role of composition part

Proportion of composition part

Composition part 3

Lithology

Role of composition part

Proportion of composition part

Composition part 4

Lithology

Role of composition part

Proportion of composition part

Harmonisation procedure

	OPIS _ID	GEOLOGIC UNIT NAME	DESCRIPTION	AGE	NOV _ID	GEOLOGIC UNIT NAME
3	1	Holocene Fluvial Deposits	Fluvial sediments (gravel, sand, silt and clay)	Quaternary - Holocene	0	Holocene Fluvial Deposits
4	3	Quaternary Terrestrial Deposits	Clay	Quaternary	1	Quaternary Terrestrial Deposits
5	4		Rubble	Quaternary		
6	5		Alluvial fan (rubble, gravel and silt)	Quaternary		
7	6		Deluvium (mostly clay with various rock fragments)	Quaternary		
8	7		Mine waste deposits	Quaternary - Holocene		
9	8		Clay, peat (marsh deposits)	Quaternary		
10	9		Clay, silt and weathered peat (marsh and lacustrine deposits)	Quaternary		
11	10		Gravel and sand	Quaternary		
12	11		Clayey silt (loess)	Quaternary		
13	12		Loose fluvial deposits; terraces (gravel, sand, silt and clay)	Quaternary		
14	13		Coherent fluvial deposits; terraces (conglomerate with gravel intercalations)	Quaternary		
15	14		Till; moraine	Quaternary - Pleistocene		
16	2	Recent Marine Deposits	Recent marine deposit			Recent Marine Deposits

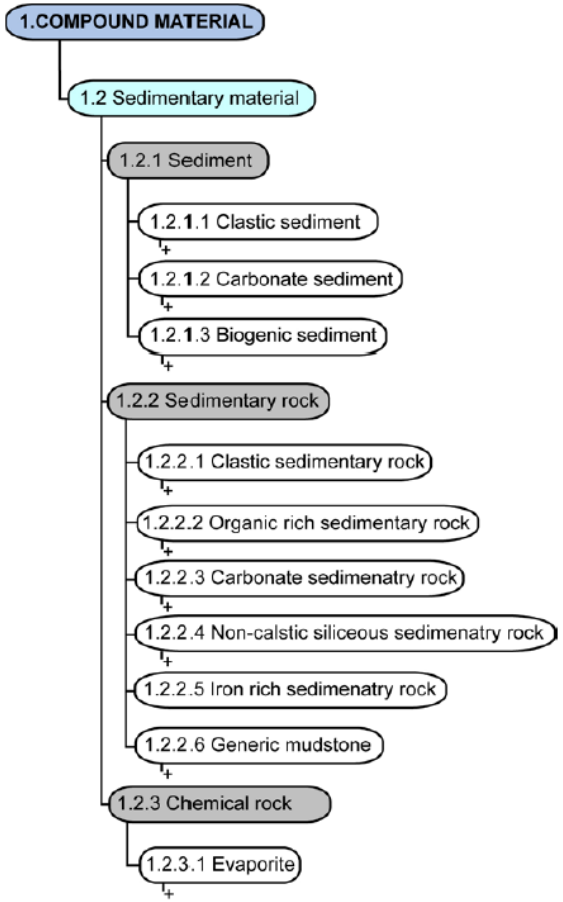


Table 4-6: The 1G-E vocabulary for Sedimentary material.

1G-E ID	1G-E Term	1G-E Broader Concept	Definition
1.2	Sedimentary material	compound _material	Material formed by accumulation of solid fragmental material deposited by air, water or ice, or material that accumulated by other natural agents such as chemical precipitation from solution or secretion by organisms. Includes both sediment and sedimentary rock. Includes epiclastic deposits. All stated composition criteria are based on the mineral/compound material (GeoSciML term)/particulate fraction of the material, irrespective of porosity or the pore-fluid. No distinctions are made based on porosity or pore fluid composition (except organic rich sediment in which liquid hydrocarbon content may be considered).
1.2.1	Sediment	sedimentary _material	Unconsolidated material consisting of an aggregation of particles transported or deposited by air, water or ice, or that accumulated by other natural agents, such as chemical precipitation, and that forms in layers on the Earth's surface. Includes epiclastic deposits.
1.2.1.1	Clastic sediment	sediment	Sediment in which at least 50 % of the constituent particles were derived from erosion, weathering, or mass-wasting of pre-existing earth materials, and transported to the place of deposition by mechanical agents such as water, wind, ice and gravity.
1.2.1.1.1	Diamicton	clastic _sediment	Unsorted or poorly sorted, clastic sediment with a wide range of particle sizes, including a muddy matrix. Biogenic materials that have such texture are excluded. Distinguished from conglomerate, sandstone, mudstone based on polymodality and lack of structures related to transport and deposition of sediment by moving air or water. Assignment to an other size class can be used in conjunction to indicate the dominant grain size.

	A	B
2	D	litho_1
3	0	1.2.1.1
4	1	1.2.1.1
5	2	1.2.1.1.4
6	3	1.2.1.1.4
7	400	1.2.1.1
8	401	1.2.2.3.1.2
9	402	1.2.2.1.2
10	403	1.2.1.1.4
11	5	1.1.1.1.2
12	600	1.1.1.1.2
13	601	1.1.2.1.03.
14	7	1.2.2.3.2
15	8	1.2.2.3.1.2
16	9	1.2.2.3.2
17	10	1.2.2.3.1.2
18	11	1.2.2.3.1.2
19	12	1.3.1.1.04
20	13	1.2.2.3.1.2
21	14	1.2.2.3.1.1
22	15	1.2.2.3.1.2
23	16	1.1.2.2.3.1
24	17	1.2.2.3.1.2
25	18	1.2.2.1.3
26	19	1.1.2.1.03.
27	20	1.2.2.1.4.3
28	21	1.2.2.1.4.3
29	22	1.3.1.1.01
30	23	1.3.1.1.01

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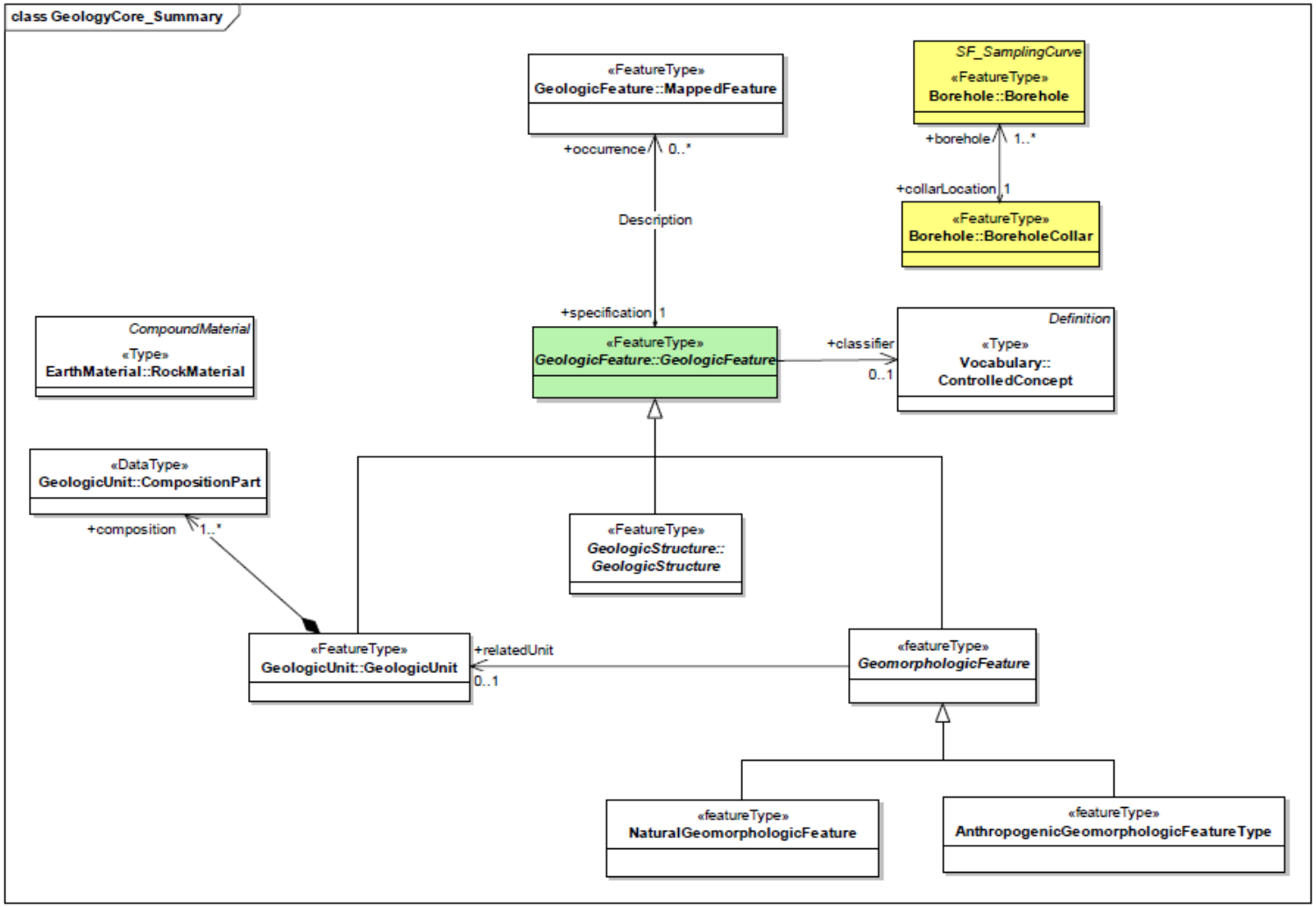
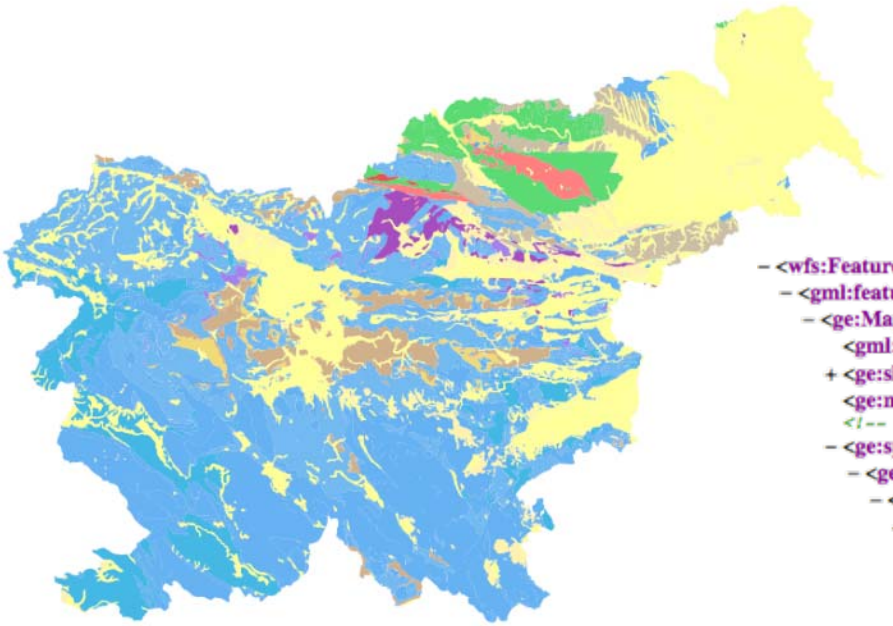
29	2
30	2

5.2.1 Description of the GeologyCore application schema

A summary of the Geology Core application schema is given in Figure 1.



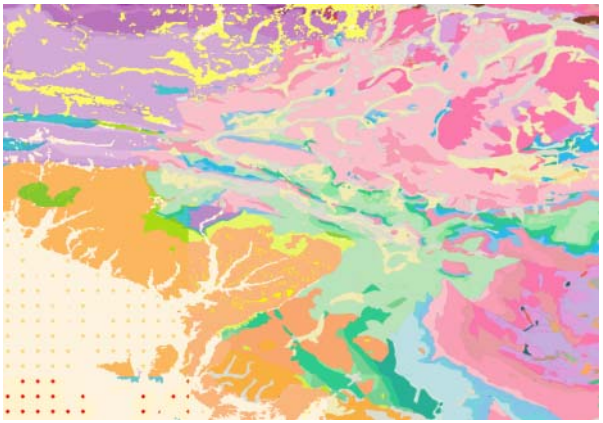
Harmonisation procedure



- WFS INSPIRE compliant

```
– <wfs:FeatureCollection xsi:schemaLocation="http://inspire.ec.europa.eu/schemas/ge-core/3.0rc3 http://inspire.jrc.ec.e
  – <gml:featureMember>
    – <ge:MappedFeature gml:id="FeatureID1">
        <gml:identifier codeSpace="http://sgi.isprambiente.it/geodata/">Geo1MDB</gml:identifier>
      + <ge:shape></ge:shape>
        <ge:mappingFrame xlink:href="http://sweet.jpl.nasa.gov/ontology/earthrealm.owl#LandSurface"/>
        <!-- Geological part -->
      – <ge:specification>
        – <ge:GeologicUnit id="GU_1">
          – <ge:inspireId>
            – <base:Identifier>
                <base:localId>InspireID_1</base:localId>
                <base:namespace>ISPRASGI_Geo</base:namespace>
              </base:Identifier>
            </ge:inspireId>
            <ge:name>Geo1MDB_G_1</ge:name>
          – <ge:geologicHistory>
            – <ge:GeologicEvent id="EventID_1">
              – <ge:name>
                  Def: Deltaic, alluvial and coastal plain deposits; aeolian deposits
                </ge:name>
                <ge:eventEnvironment xlink:href="http://resource.geosciml.org/classifier/cgi/eventenvironment/delta
                <ge:eventProcess nilReason="missing" xsi:nil="true"/>
                <ge:olderNamedAge xlink:href="urn:cgi:classifier:ICS:StratChart:200908:Holocene" xlink:title="urn
                <ge:youngerNamedAge xlink:href="urn:cgi:classifier:ICS:StratChart:200908:Holocene" xlink:title="
              </ge:GeologicEvent>
            </ge:geologicHistory>
            <ge:geologicUnitType xlink:href="http://resource.geosciml.org/classifier/cgi/geologicunittype/lithostratigra
          – <ge:composition>
            – <ge:CompositionPart>
                <ge:material xlink:title="urn:cgi:classifier:CGI:SimpleLithology:201001:clastic_sediment"
                xlink:href="urn:cgi:classifier:CGI:SimpleLithology:201001:clastic_sediment"/>
                <ge:proportion xlink:title="predominant" xlink:href="predominant"/>
                <ge:role xlink:title="unspecified_part_role" xlink:href="unspecified_part_role"/>
              </ge:CompositionPart>
```

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

Harmonisation procedure

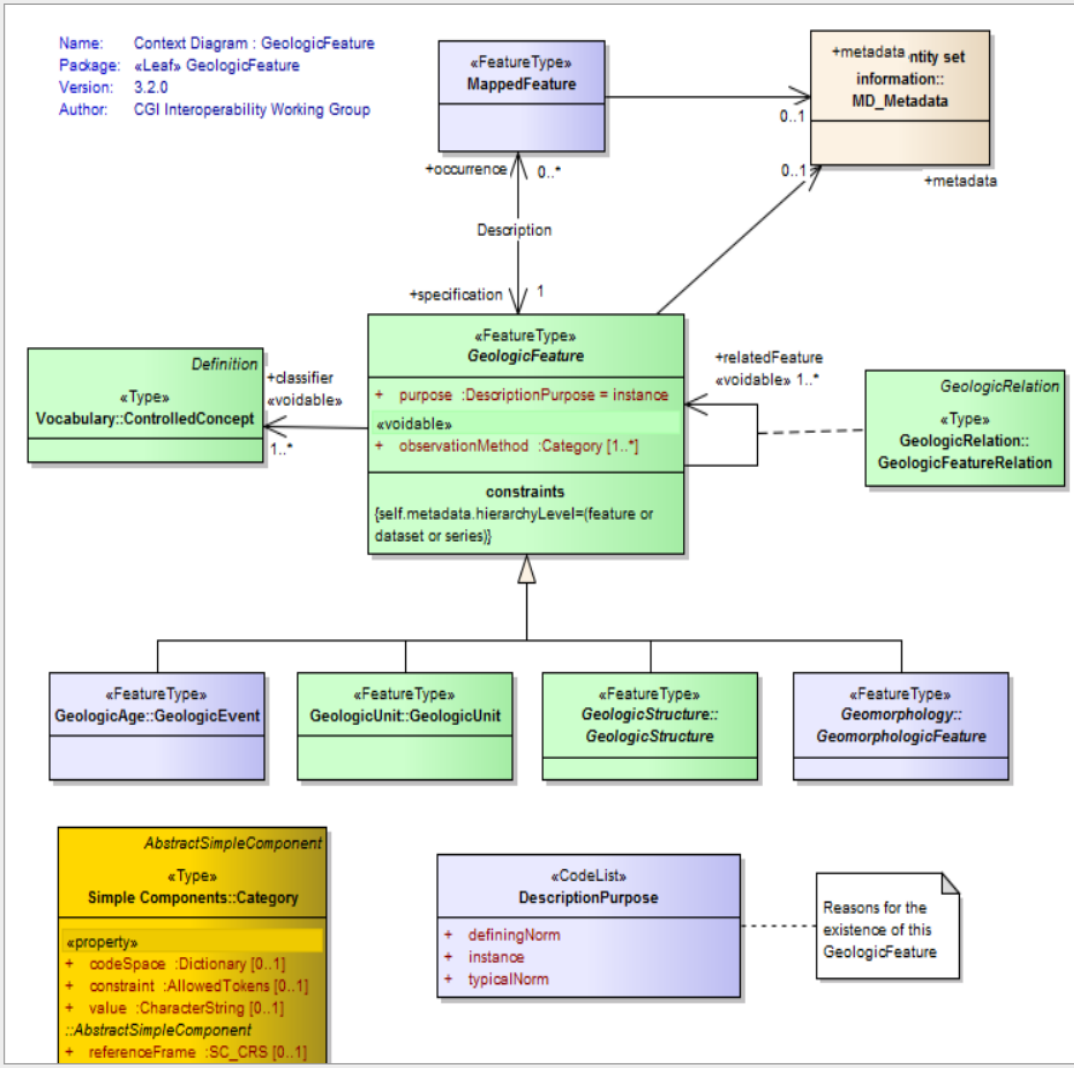
- GeoSciML is based on Geography Markup Language (GML) for representation of features and geometry and provides a framework for application-neutral encoding of geosciences information.

Harmonisation procedure

GeoSciML v3.2

GeoSciML

- GeoSciML v3.2
  - GeoSciML
    - GeoSciML package dependencies (including external)
    - Color code
    - GeoSciML package dependencies (internal)
    - «Application Schema» GeoSciML-Core
      - GeoSciML-Core package dependencies
      - «Leaf» GeologicFeature
        - Context Diagram : DescriptionPurpose
        - Context Diagram : GeologicFeature
        - Context Diagram : MappedFeature
        - Context Diagram : SamplingFrame
        - Summary Diagram : Geologic Feature
        - «FeatureType» GeologicFeature
        - «FeatureType» MappedFeature
        - «CodeList» DescriptionPurpose
      - «Leaf» GeologicRelation
    - «Application Schema» Borehole
    - «Application Schema» CGI_Utilities
    - «Application Schema» Collection
    - «Application Schema» EarthMaterial
    - «Application Schema» Fossil
    - «Application Schema» GeologicAge
    - «Application Schema» GeologicStructure
    - «Application Schema» GeologicTimescale
    - «Application Schema» GeologicUnit
    - «Application Schema» Geomorphology
    - «Application Schema» LaboratoryAnalysis-Specimen
    - «Application Schema» TemporalReferenceSystem
    - «Application Schema» PhysicalProperties
    - «Application Schema» Vocabulary
  - External packages



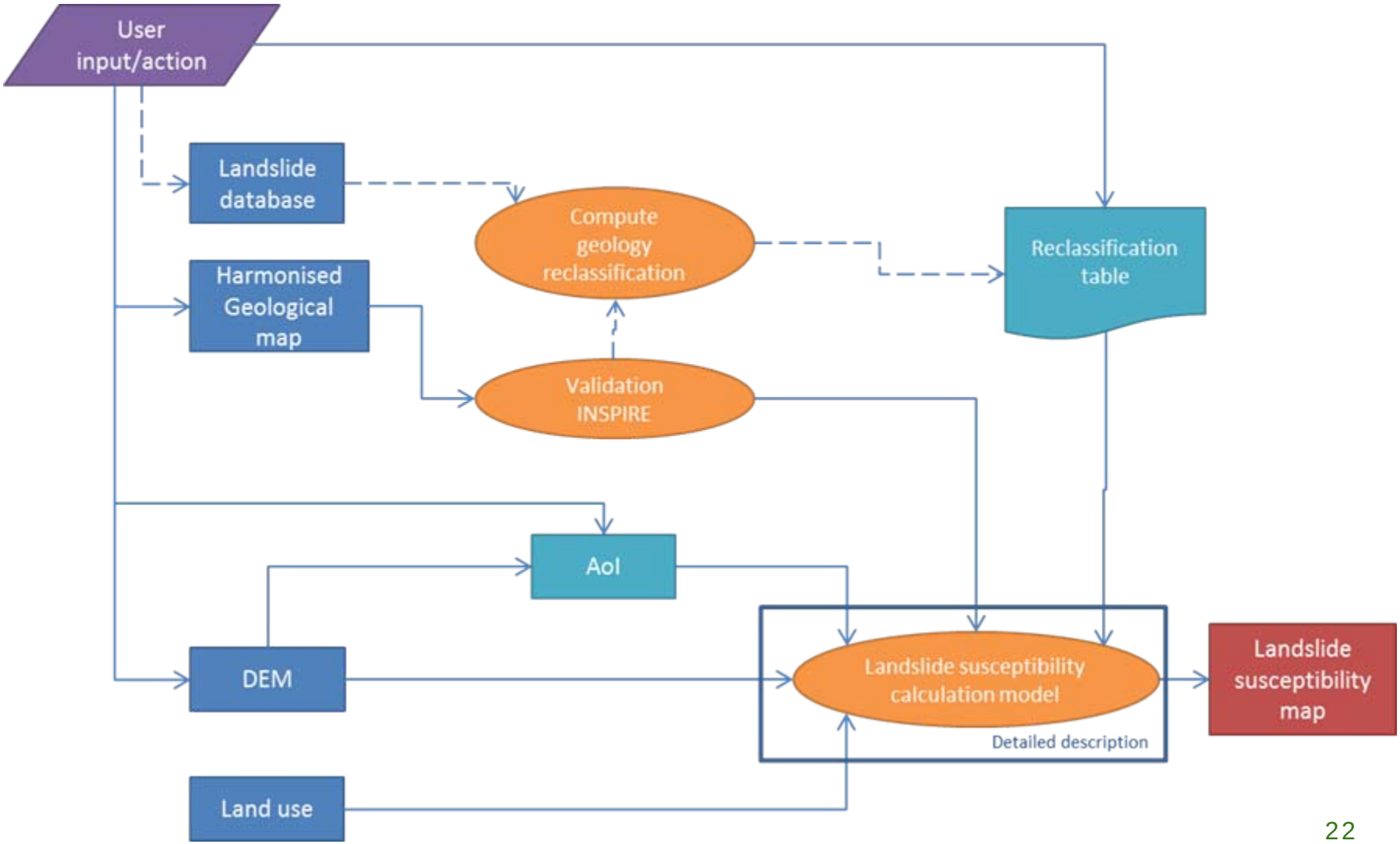
Harmonisation + validation

Performed harmonisation process

- Harmonised and validated dataset
  - List of datasets
    - *Geology 100k Italy + Slovenia*
    - *Geology 1M Italy + Slovenia*
    - *Example of landslide Geohazard maps*
  - Harmonisation and validation
    - *Harmonised using Exows >> Geology*
    - *Harmonised using Hale >> Geohazard example*
    - *All are validated using Altova XMLSpy*

Landslide susceptibility map

- Landslide susceptibility map generation workflow



Landslide susceptibility map

- Engineering geology reclasification table

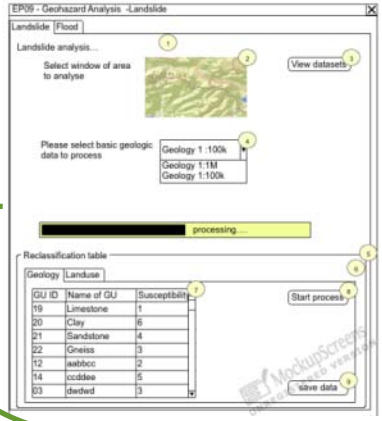
CODE # SLO	ENGINEERING-GEOLOGICAL GROUPS	SUSCEPTIBILITY TO		
		LANDSLIDES	ROCKFALLS	DEBRIS FLOWS
1	predominantly unconsolidated clayey soils	6	1	5
2	predominantly consolidated clayey soils	5	2	4
3	marsh, lacustrine soils (clay, silt, peat)	6	1	5
4	alternation of different unconsolidated soils (gravel, sand, silt, clay)	6	2	6
5	alternation of different consolidated soils (gravel, sand, silt, clay)	5	3	5
6	unconsolitated gravel and sandy gravel	4	5	4
7	consolidated gravel and sandy gravel	3	4	3
8	predominantly unconsolidated coarse-grained soils (till, moraine deposits, rubble)	4	5	5
9	predominantly consolidated coarse-grained soils (till, moraine deposits, rubble)	3	4	4
10	clayey and marly soils and rocks	6	3	4
11	alternation of different soils and rocks (clay, marl, sand, sandstone, gravel, conglomerate)	5	4	4
12	conglomerate or sandstone with soil inclusions	3	6	4
13	shale with intercalations of other rocks	6	3	5
14	marlstone and sandstone (flysch) with intercalations of other rocks	6	4	5
15	clastic sedimentary rocks (sandstone, conglomerate) with intercalations of other rocks	6	4	5
16	predominantly marlstone with intercalations of other rocks	5	5	6
17	massive and thick-bedded limestones	2	6	1
18	thin-bedded limestone	3	6	4
19	massive and thick-bedded limestone and dolomite	2	6	2
20	thin-bedded limestone and dolomite	3	6	3
21	massive and thick-bedded dolomite	2	6	2
22	thin-bedded dolomite	3	6	3
23	limestone with intercalations of other rocks	5	6	6
24	carbonate breccia or conglomerate	3	6	3
25	limestone with intercalations of marlstone, marl, silt and clay	4	6	5
26	schistose metamorphic rocks (slates, schists, phyllites)	5	4	4
27	non-schistose metamorphic rocks (gneiss, amphibolite, eclogite, marble, ...)	3	5	3
28	alternation of schistose and non-schistose metamorphic rocks	4	4	4
29	plutonic igneous rocks (tonalite, diorite, granodiorite, ...)	2	6	2
30	pyroclastic rocks with intercalations of other rocks	5	5	6
31	volcanic igneous rocks (trachyte, dacite, andesite, diabase, basalt, spilite, dolerite, variolite, ...)	3	5	3

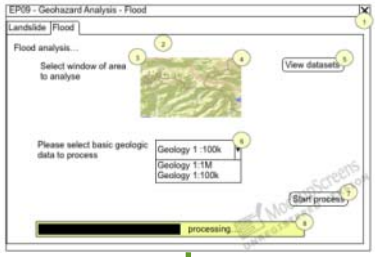
Landslide susceptibility map

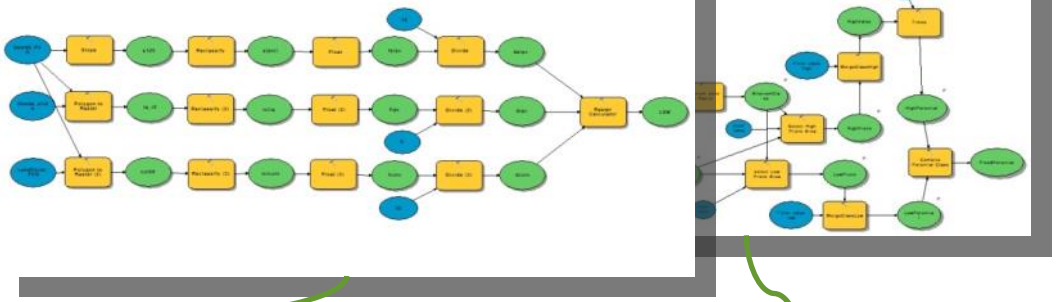
- Inputs

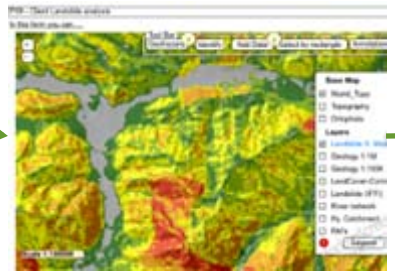
Variable Name	Input Type	Default Value	Mandatory
Topography	WMS	n.a	conditional
Ortophoto	WMS	n.a.	conditional
Geology 1:1M	WMS/WFS	INSPIRE Compliant	yes
Geology 1:100K	WMS/WFS	INSPIRE/GSML Compliant	yes
DEM	Raster GDB	n.a.	yes
LandUse CORINE	WMS/WFS		yes

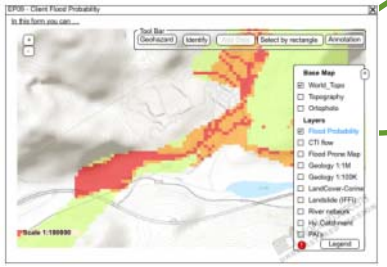
Use case procedure chain











Feel INSPIRED ? …

Questions ?