

Data Infrastructures: GS Soil



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GS Soil: “Assessment and strategic development of INSPIRE compliant **G**eodata-**S**ervices for European **S**oil Data”

<http://gssoil-portal.eu/>

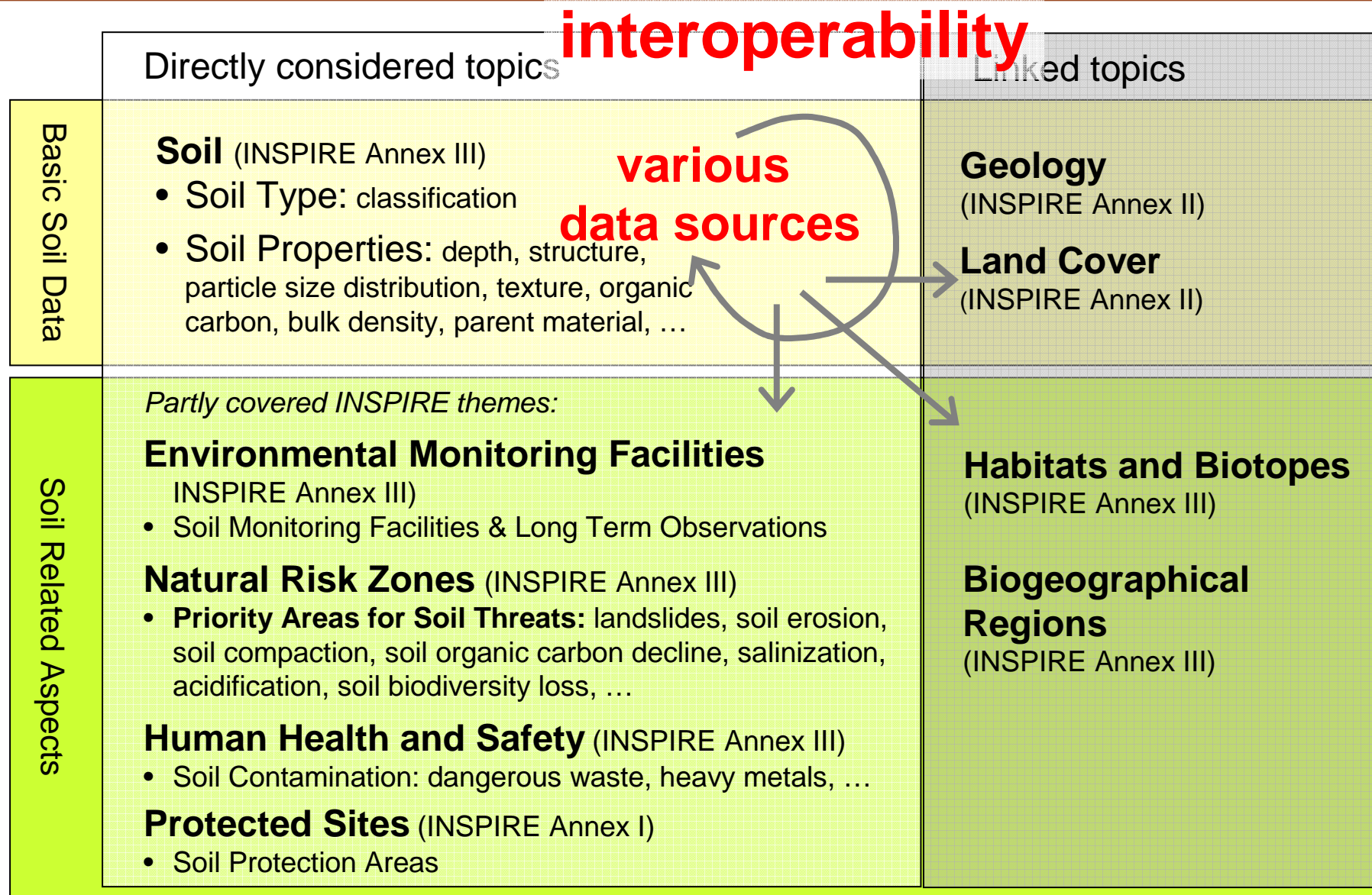
- EU-Programme: *eContentplus*
- Funding: 4,1 Mio € (overall budget 5.1 Mio €)
- Duration: 06/2009 – 05/2012 (3 years)
- Coordinator: Coordination Center PortalU (German Environmental Portal)
- Consortium: 34 Partner
18 EU member states
24 soil data providers



- **Aim GS Soil:**
 - **Establishment** of an European network **to improve the access to INSPIRE related spatial soil data,**

INSPIRE:

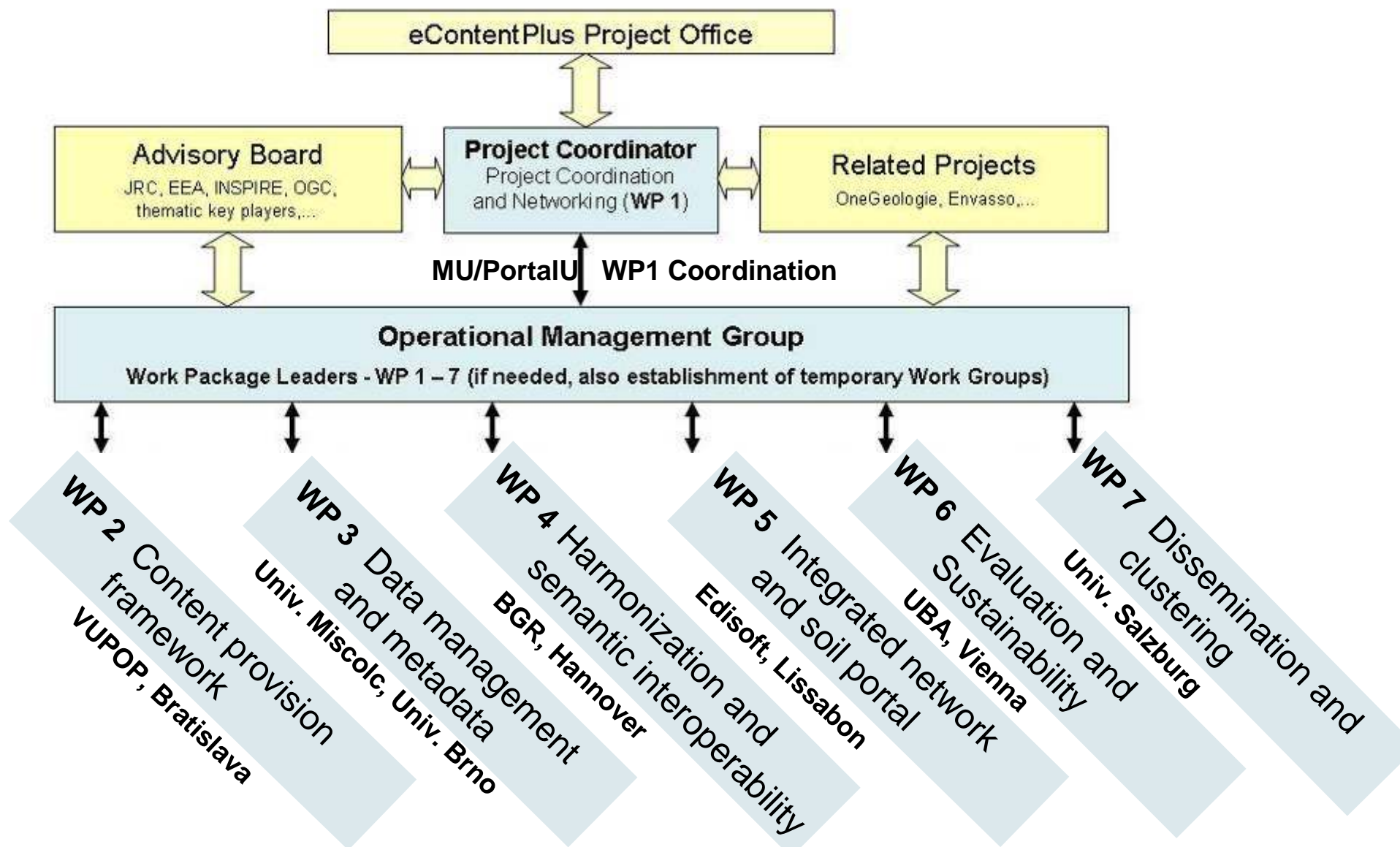
- **discovery services** (meta data)
- **view services** (web map services, WMS)
- **download services** (web feature services, WFS)
- **transformation services** (e.g. schema transformation: map non-interoperable data sets to interoperable ones; from local data bases into standardized exchange formats(XML); build WMS and WFS on such data sets)



- The **INSPIRE directive** has been established in 2007
- **Metadata** have to be provided for INSPIRE Annex I and II themes until Dec. 3, 2010 (metadata services 2011),
[Annex III: 03 Dec. 2013](#)
- **Spatial data services** for discovery and view services have to be set up in [2011 \(May/Nov\)](#)
- Provision of **INSPIRE-conform interoperable data sets** (existing data) by [May 15, 2019](#)
- **Thematic working groups** (TWGs) for data specifications development Annex II and II are now installed
[Version 2.0](#) (for commenting and testing by registered participants (SDIC and LMO) [May – Oct. 2011](#); [Version 3.0](#) currently being developed as basis for implementing rules (supplement INPSIRE regulation)

Best Practice Network to ...

- support the development of a **European geodata infrastructure for soil data** by improving the **accessibility** of digital soil data for better (re)usage and exploitation
- **lower the barriers** to use data from different sources
- develop methods to **produce interoperable spatial soil data**, analyse requirements to harmonise soil information; consider the **cross-border usability** of data
- develop a “harmonized” **metadata** and content framework for soil information
- establish and operate a network of services for spatial datasets and metadata



- A consolidated **soil-related theme catalogue and standards for describing the content of spatial soil data sets** (WP 2)
- A INSPIRE compatible **soil metadata profile** and **Best Practice Meta Data Development** (WP 3)
- Development and testing of data exchange formats and **Data Harmonization Best Practice Guidelines** (WP 4)
- A web portal (**GS Soil Portal**) which provides access to all project-relevant data (“open” network/”distributed” services):
 - Multilingual thesaurus for soil data
 - a view services for spatial data sets
 - data editor and catalogue service for INSPIRE conform metadata sets
 - WMS and prototype WFS for exemplary interoperable spatial soil datasets
 - case studies on cross-boarder delivery of harmonised soil data
- **Operational management plan** beyond the project lifetime

WP 2

Content provision framework

 	
Product ID:	313
Country:	Slovakia
Product name:	Land Evaluation Unit database
Owner:	Soil Science and Conservation Research Institute, Gagarinova 10, 827 13 Bratislava, Slovakia
Author:	Soil Science and Conservation Research Institute, Gagarinova 10, 827 13 Bratislava, Slovakia
Version:	final Date: 1993
Updates:	yes ; annually
Availability for GS SOIL:	no no additional info
Description and purpose:	Land-evaluation unit (LEU) map being delineated according to: soils (Soil Typological Unit, depth, stoniness and texture), climate and topography, agricultural land; implemented in national legislation evaluation of agricultural soils
Free keywords:	land-evaluation unit, soils, agricultural land
Use constraints:	free to view, certificate is charged
Citation:	no information
Contact information:	
Organization:	Soil Science and Conservation Research Institute, Gagarinova 10, 827 13 Bratislava, Slovakia
Person:	Pavol Bielek no information
E-mail:	p.bielek@vupop.sk no information
Telephone:	+421-2-434 20 888
Fax:	+421-2-432 95 487
Web:	www.vupop.sk

Technical information report

Metadata report

Web Services report

Data information report

General information report (example)

Result:

- 335 products
- 19 countries

Content intellectual property rights assessment

- **Recent evaluation of IPR for preliminary GS Soil catalogue**

103 records have been evaluated:

Data access without restriction: 24 records

Data with restriction: 13 records

Access as raster: 10 records

Access with costs: 1 record

Access with the other restrictions: 2 records

Data with not definitely determined access: 12 records

Data with not defined access: 15 records

Data not available for GS Soil portal: 39 records

This result is preliminary. More data will enter into catalogue and some IPR statuses can be negotiated.

Definition of content framework best practice guidelines

e.g. analyse and extend the existing reference material, analyse and process test cases - dependent on product type and scale

- Recommendations for **legend definitions** legend elements
- Recommendations for **legend stratification**
- Recommendations for mandatory **attribute data** (definitions) (for mapping units)
- Recommendations for **soil profile properties** (minimum set needed for important applications - PTF)
- Recommendations for **parameter definitions** (texture class acc. to FAO)

⇒ In a way this may repeat what is already there, but it is **combined to a common terminology for soil data exchange in Europe**

WP 3

Data management and metadata

- **Guidelines to correctly create and maintain metadata** in the XML format; examples of the XML encoding
- **Added soil theme-specific metadata elements**
- Well-described structure according to the ISO 19100 series standards; within ISO 19115 framework
- Registered as the INSPIRE Reference Material
- **Analysis of multilingual needs for meta-data content: development of a multi-lingual soil thesaurus**

GS SOIL PROFILE

INSPIRE

ISO CORE

Mandatory

ISO 19115

ISO 19119

ISO 19139



2. Mandatory/conditional

1. INSPIRE meta data (1205/2008/EC)

Coordinate reference system

Character Encoding

Source date of mapping

Spatial representation type

Encoding

Source title

Topology level

Online digital transfer options

Source mapping scale

Thematic Accuracy –
 – Classification Correctness
 – Misclassification Rate

Completeness – Omission

Positional Accuracy – Absolute or External Accuracy

Furthermore for services:

- Contains operations
- Service version

3. Optional meta data

WP 4

Harmonization and semantic interoperability



Objectives

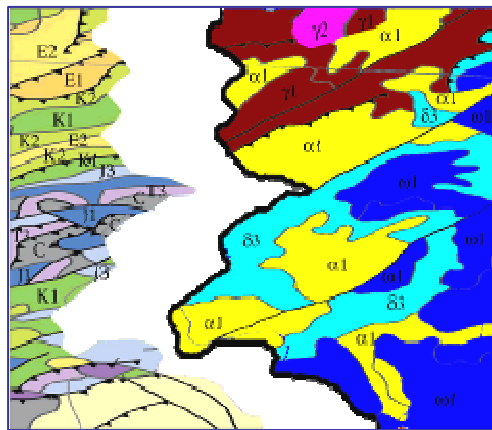
Develop a methodical framework to share data using OGC and other (theme-specific) services

- **develop/test and/or modify data specifications**
- **define harmonization components for soil**
- **develop/test transformations**

⇒ Data Harmonization Best Practise Guidelines

- to allow the querying and exchange digital, interoperable soil information between data providers and users

- different formats
- different content



Figures:
Asch and Troppenhagen (2004)

standardized domain-specific exchange formats: e.g. GeoSciML, SoilML

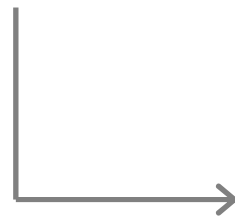
- comparable content and format

Application Schema

Agreements on content descriptions and semantic harmonization



- Review INSPIRE **methodology for data-specification-development**
- Review of **interoperability components**
- Review of **Soil Data Exchange Formats** (ISO SoilML, GeoSciML, SoterML)
- Analysis and description of the **semantic content and structure of testing data**
- Examples and rules for **improving the ISO draft exchange standard** for soil data, and example to implement it (applying data specifications and export data into standard XML structure (export file))



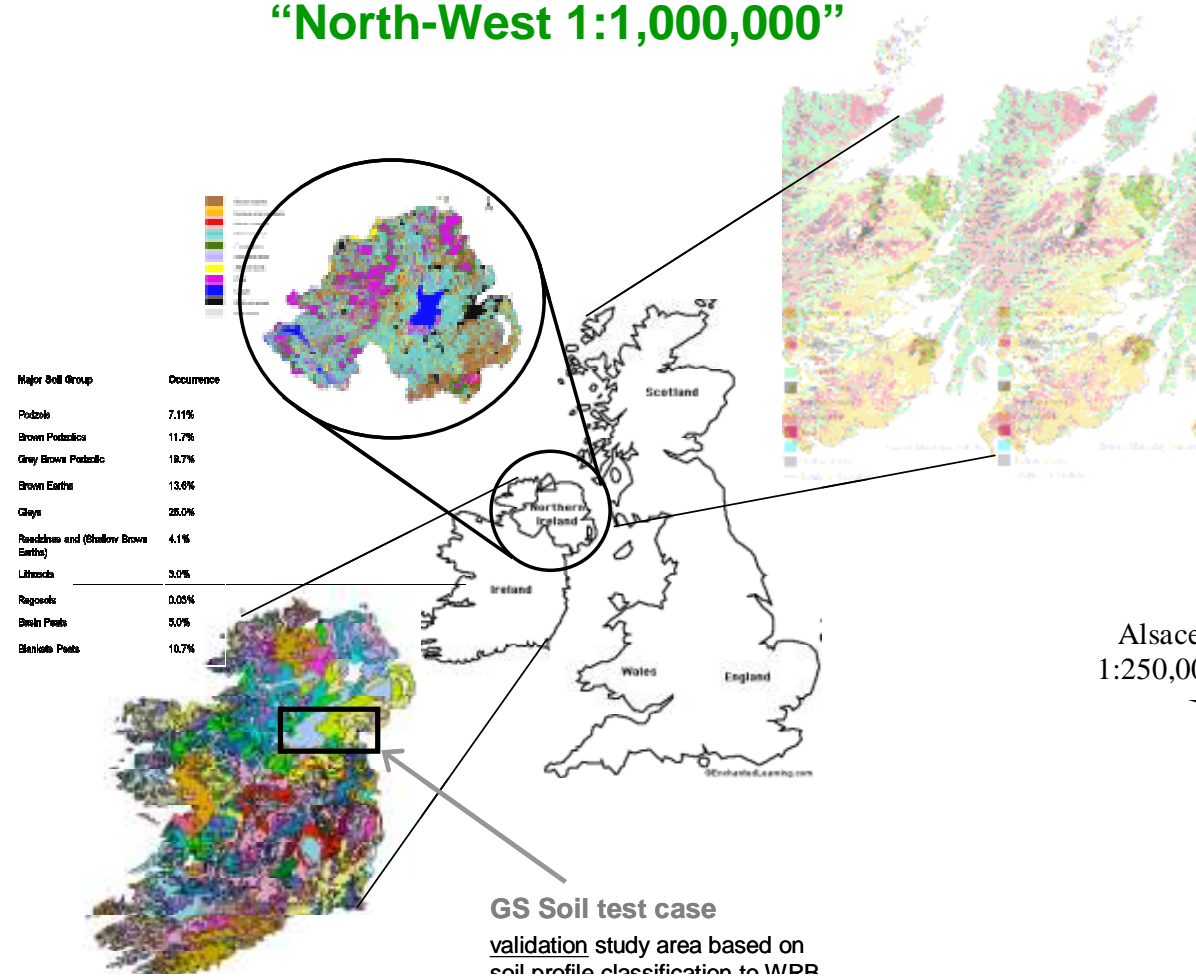
Managed by France!

Test cases

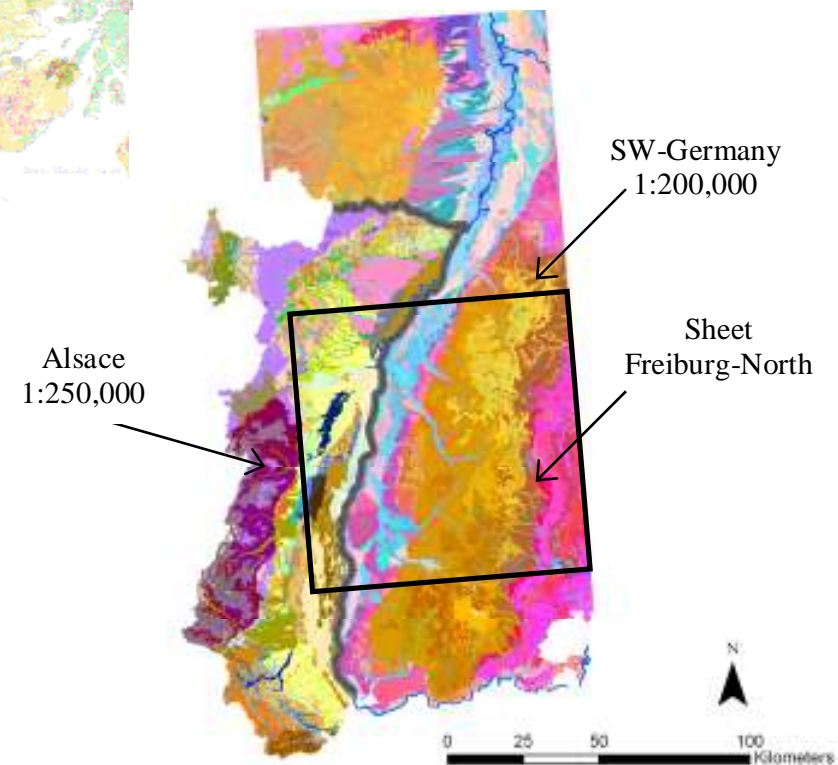
soil mapping 1:250k and related scales	soil mapping at higher resolutions	thematic mapping	soil profiles	soil monitoring	Nomenclature/ classification (WRB)
– Nordic (FI)	– Belgium (BE)	– Belgium (BE)	– Austria (AT)	– Austria (AT)	– various partners
– Balkan (RO, BU, GR)	– Slovenia (SL)	– Germany (DE)	– Slovakia (SK)	– Hungary (HU)	
– UK/IRL/N.-IRL	– Slovakia (SK)	– Slovakia (SK)	– Germany (DE)		
– Germany (DE)/ France (F)	– Hungary (HU)	– Denmark (DK)			
– Austria (AT)/ Slovakia (SK)					

Examples: small-scale mapping

“North-West 1:1,000,000”

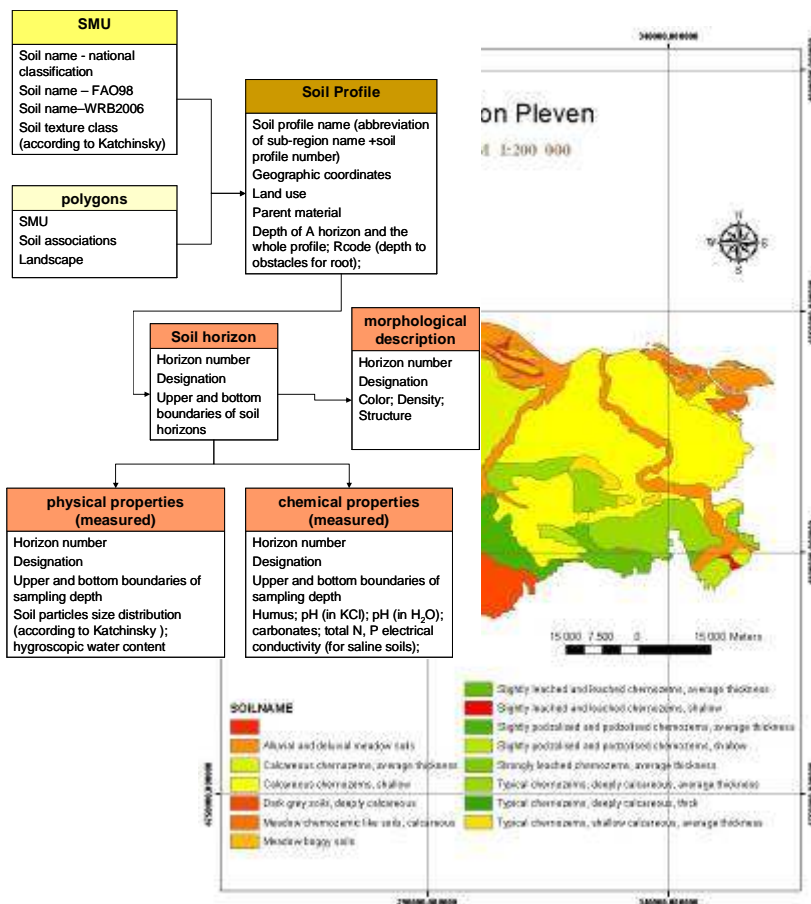


“SW-Germany-Alsace”
1:250,000/1:200,000

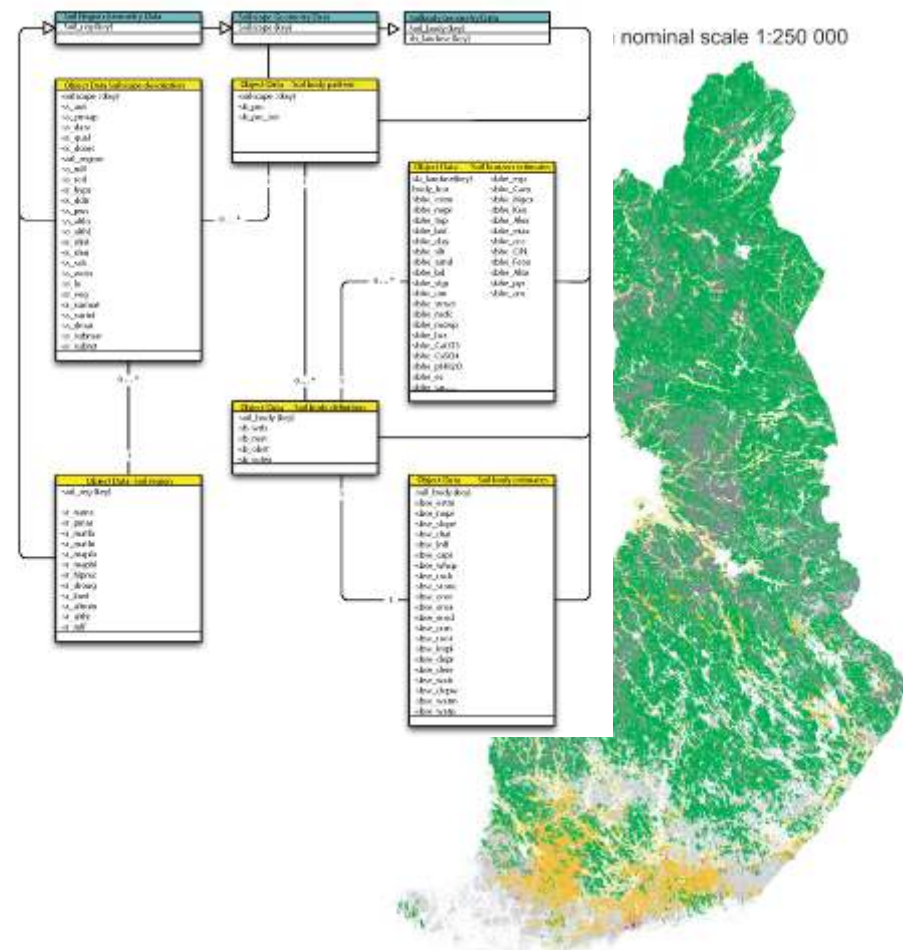


Examples: small-scale mapping

“Balkan – BU, RO, GR”



“Nordic - FI”

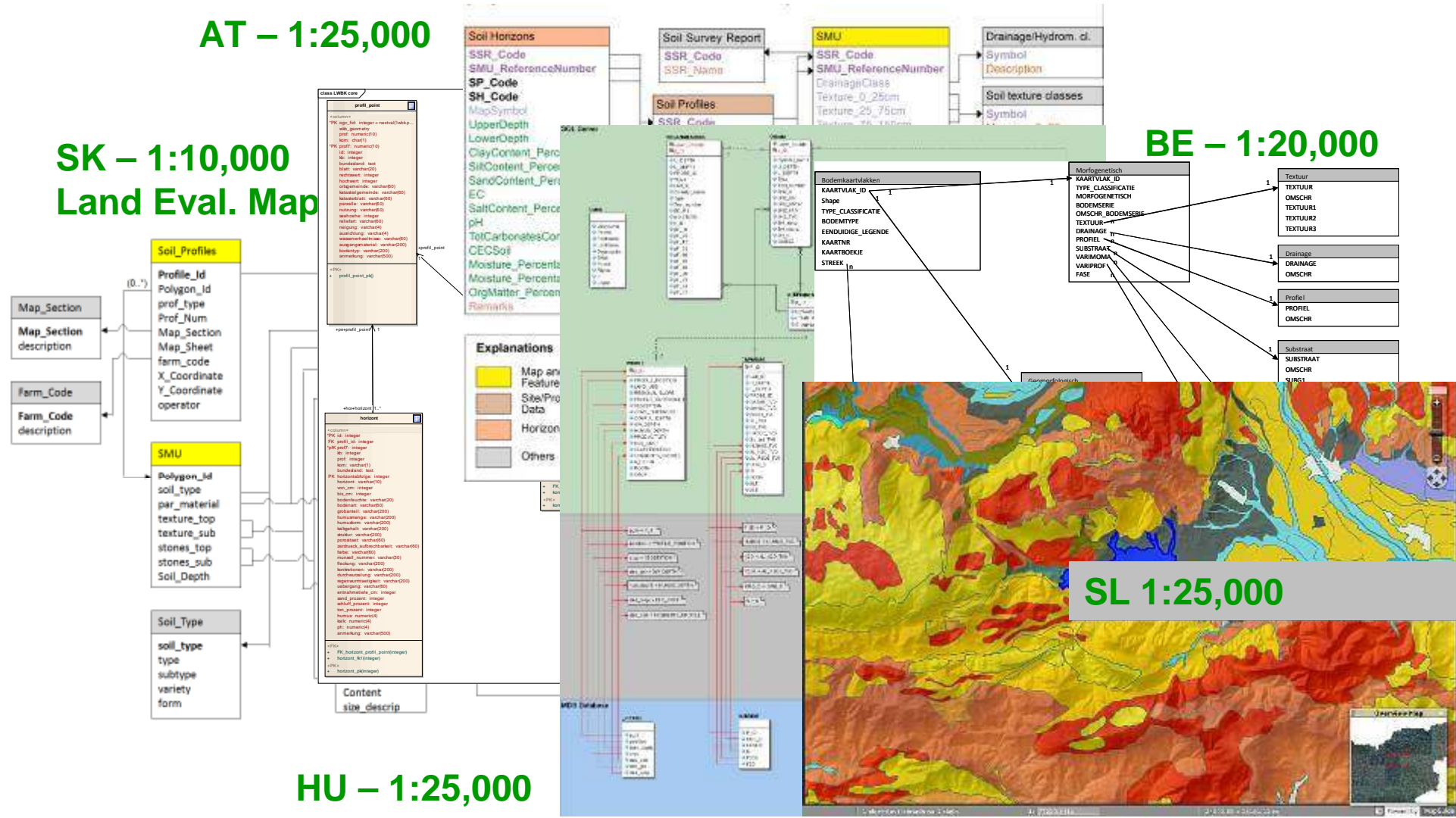


Examples: large-scale mapping GR – 1:20,000/1:50,000

AT – 1:25,000

SK – 1:10,000
Land Eval. Map

BE – 1:20,000

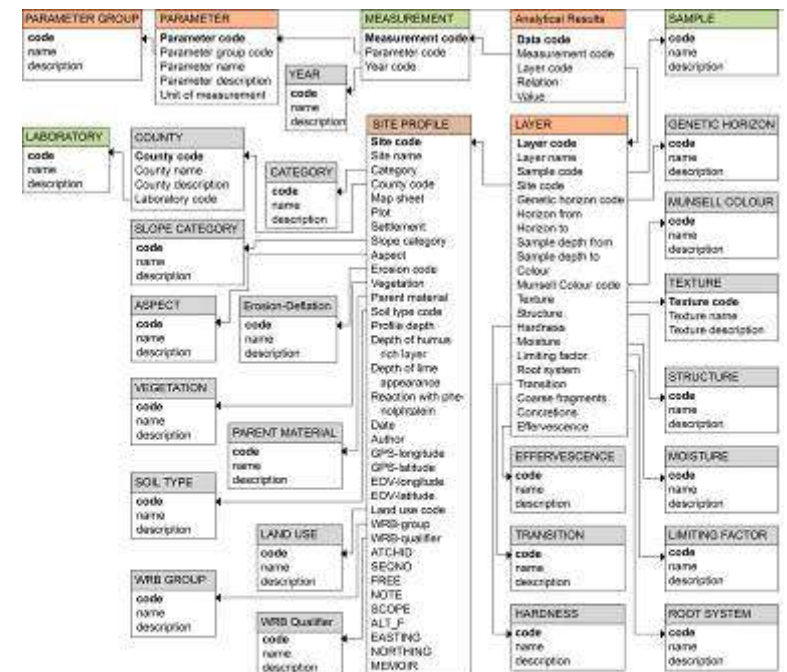


HU – 1:25,000

Examples: monitoring

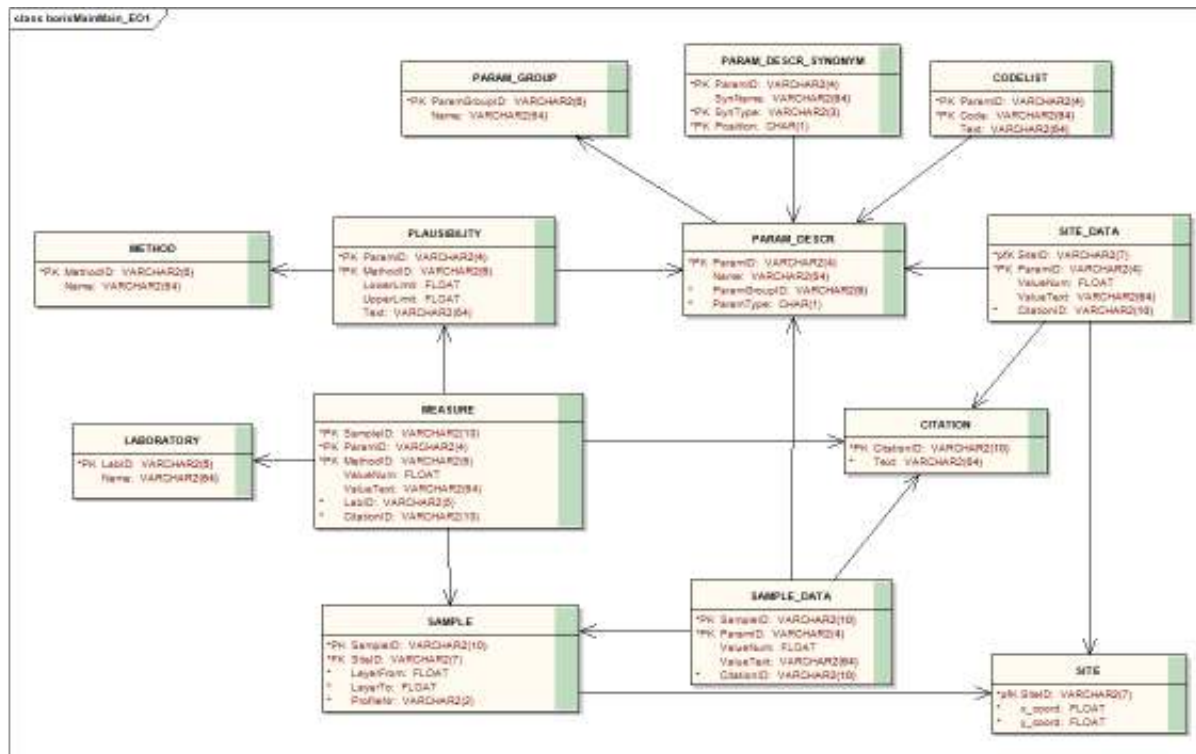
“AGES - Long term tillage experiment”

CAO - Soil Profile and monitoring database



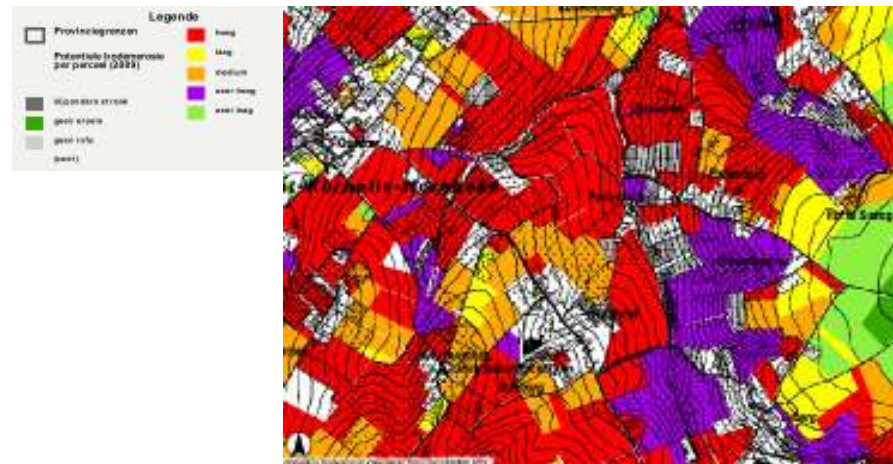
Examples: profile databases

“AT - BORIS”



- Profile databases of soil maps (see above)
- Agricultural soil profile database SK
- Soil profile database SL

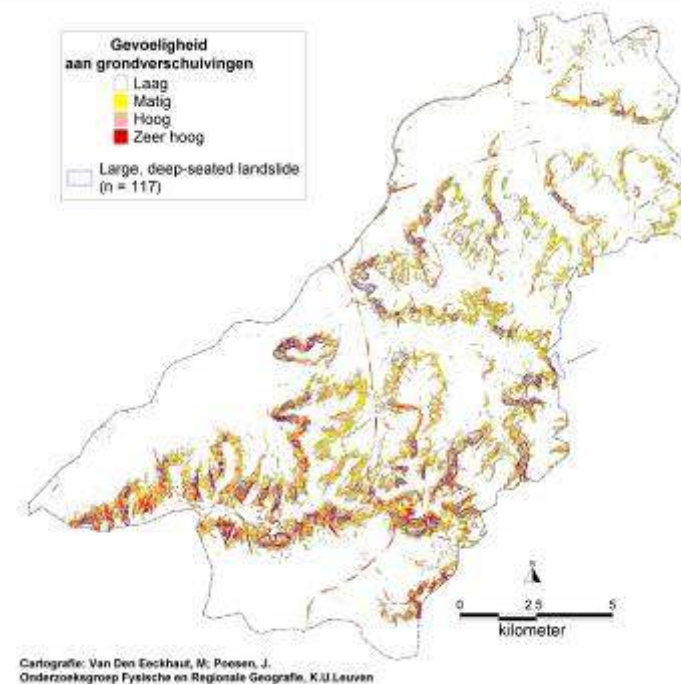
Examples: thematic maps



BE – Flanders:

(a) Potential soil erosion on parcel level (2010)

(b) Landslide susceptibility map



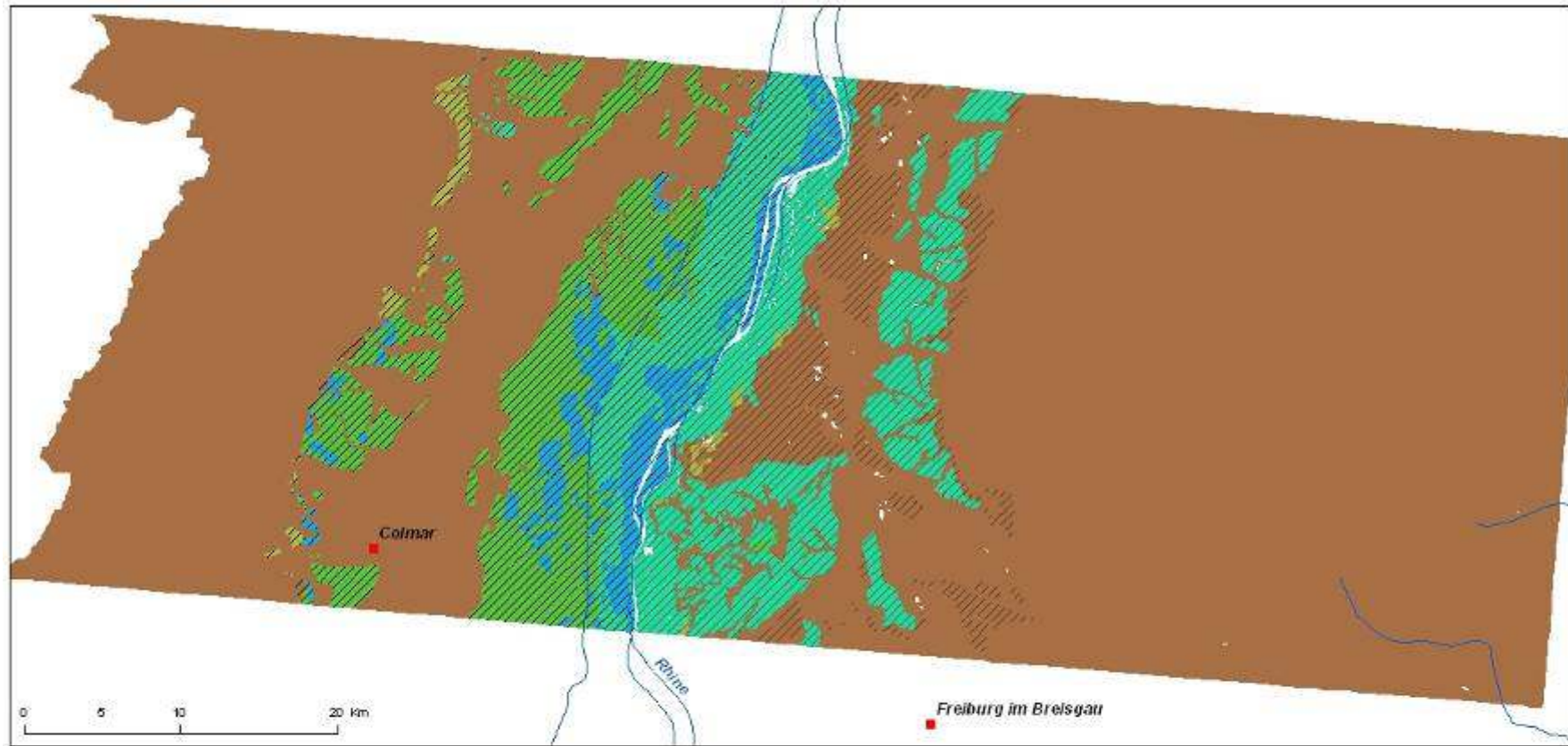
1. Reference terminology

English	Rationale	German	Belgian	Slovakian	Portugies
Soil characterisation	Determination of relevant physical, chemical and biological properties of the soil [Draft ISO 11074:2006]	Bodenmerkmal	Bodemkaraterisatie	charakteristika pôdy	Caracterização do solo
Parent material	unweathered solid or unconsolidated rock from which soil is forming or originates. [Draft ISO 11074:2006]	Ausgangsgestein	Moedermateriaal	pôdotvorný substrát	Material originário do solo
Soil texture	Numerical proportion (% by wt) of mineral particles of different sizes found in a sample of soil (sand, silt, clay). [EC JRC IES soil glossary]	Bodenart	Bodemtextuur	zrornosť pôdy	Textura do solo
Soil structure	Arrangement of particles into aggregates which occur in a variety of recognised shapes and sizes [Draft ISO 11074:2006]	Bodengefüge	Bodemstructuur	štruktúra pôdy	Estrutura do solo
simple mapping unit	<div style="text-align: center;"> <p>■ ■ ■</p> <p>➤ Definitions, concepts and translations</p> <p>■■■</p> </div>				
soil association					
soil complex					
Group					
Type					
Subtype					
Variety					

2. FAO profile properties: D-F test case, CaCO_3

KA4	Identification	%CaCO ₃	FAO	Identification	DONESOL % CaCO ₃	DONESOL 'EFFERV' class	Identification
c0	No reaction	0	N	No detectable visible or audible effervescence	0	0	No reaction (no bubbles)
c1	Very weak reaction, not visible but audible	< 0,5	SL	Audible effervescence but not visible	0 -0,5	1	Slight reaction (some bubbles visible)
c2	Weak reaction, slightly visible	0,5 - 2			0,5-2		
c3	Not persistent effervescence	2 - 10	MO	Visible effervescence	2-10	2	Moderate reaction (continues generation of bubbles, single layer)
c3.2	not persistent but weak visible effervescence	2 - 4					
c3.3	not persistent but clearly visible effervescence	4 - 7					
c3.4	not persistent but strong visible effervescence	7 - 10					
c4	Strong, persistent effervescence depending on added amount of HCL	10 - 25	ST	Strong visible effervescence. Bubbles form a low foam	10-25	3	Strong reaction (thick layer of foam)
c5	Strong, persistent effervescence depending on added amount of HCL	25 - 50	EX	Extremely strong reaction. Thick foam forms quickly	25-50	4	Extremely strong reaction
c6	Strong, persistent effervescence depending on added amount of HCL	> 50					

2. FAO profile properties: D-F test case, CaCO_3



Carbonate Content
French carbonate Content [g/kg] and German Classes assigned to FAO

Carbonate Content in Subsoil

Calcareous Subsoil

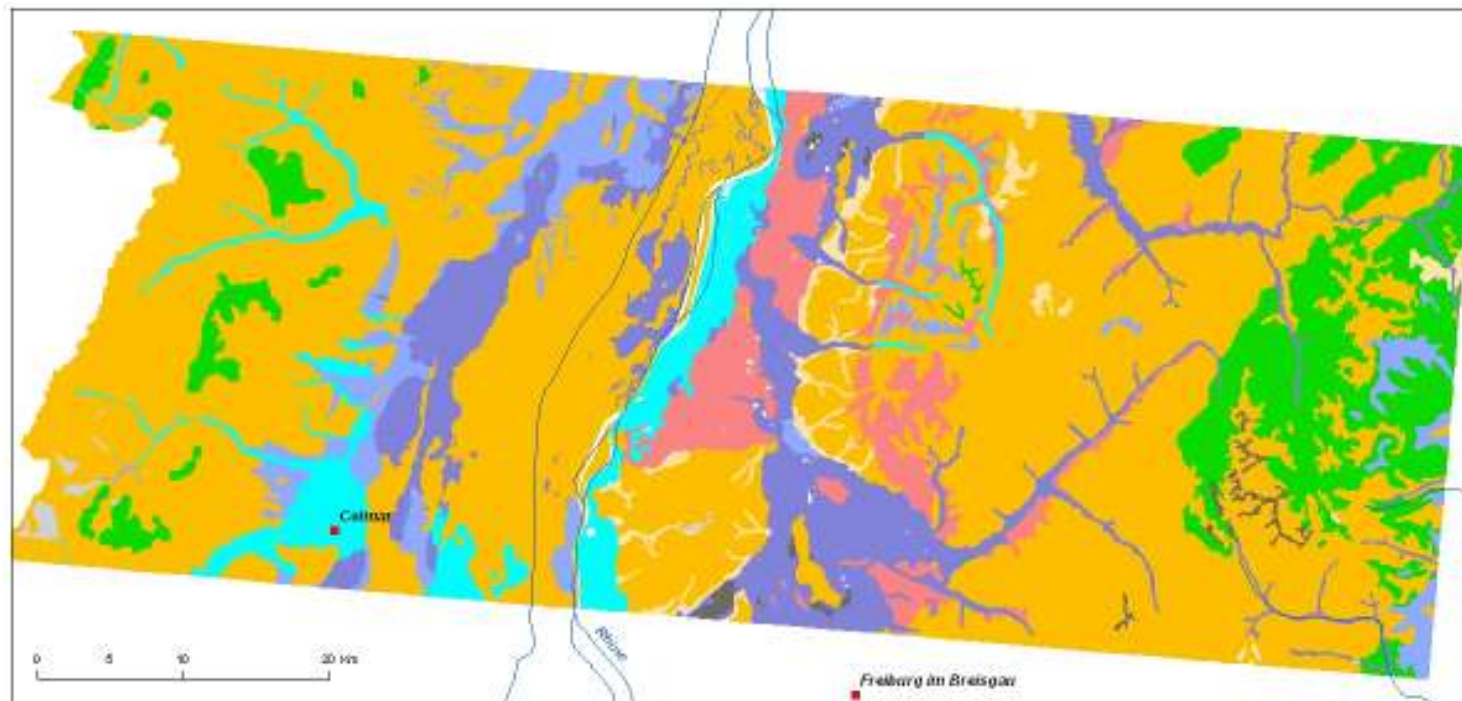
Carbonate Content in Topsoil [%]

N	0	(non-calcareous)
SL	0 - 2	(slightly calcareous)
MO	2 - 10	(moderately calcareous)
ST	10 - 25	(strongly calcareous)
EX	>25	(extremely calcareous)

2. FAO profile properties: conclusions

- Difficulties to select the typical properties per mapping unit; often, 2 profiles dominate a soil mapping unit
- Codes do not match between country and FAO (e.g. texture); causes error
- Needs to be done by the data provider

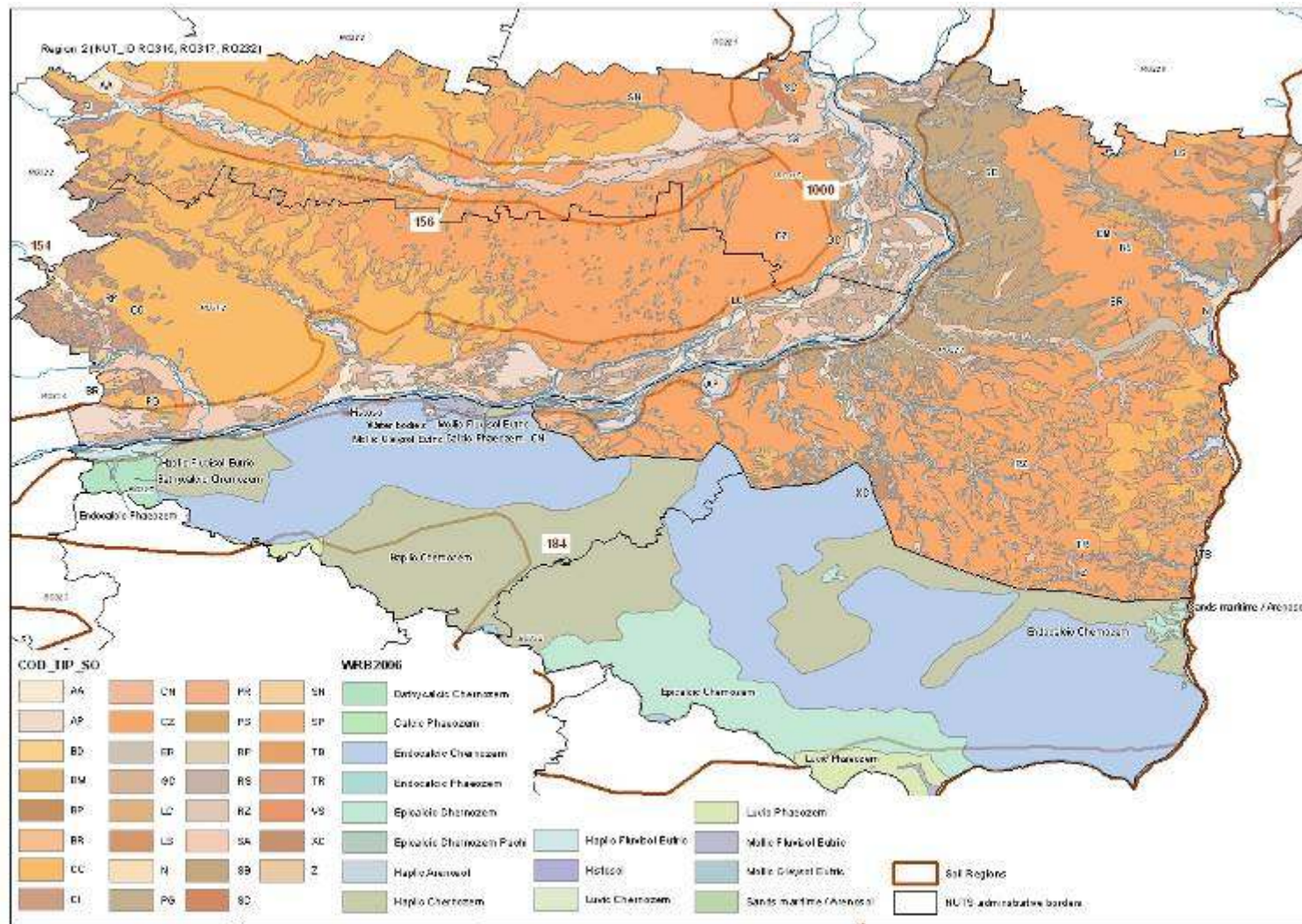
3. Soil classification: D-F test case, WRB-Reference soil Group



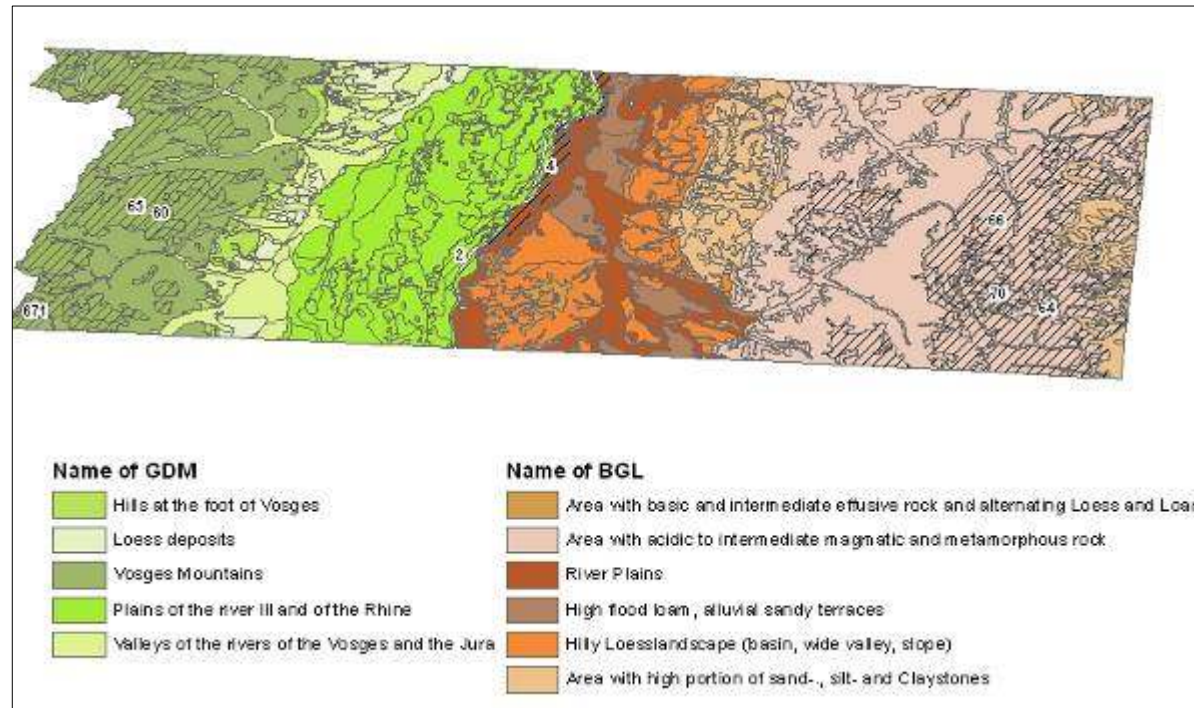
Soil Overview Map
French and German Soiltypes assigned to WRB Reference Soil Groups



4. Soil (typological) maps: RO-BU country border



4. Soil (typological) maps: D-F test area: stratification



France	Germany
<ol style="list-style-type: none"> 1. Grandes Paysages (GP) 2. Grandes Domaines Morphologiques GDM N=5 3. Petits Domaines Morphologiques PDM 	<ol style="list-style-type: none"> 1. Bodenregionen (BR) 2. Bodengroßlandschaft (BGL) N=6 (acc. to the German mapping guide, there is a third potential stratification level, similar to France, but it is not mapped: Bodenlandschaften (BL))

4. Soil (typological) maps: **D-F test area: resolution/structure**

French Units	Germany Units
<ul style="list-style-type: none"> • 1:250.000 • Area: approx 1451 km² • No of polygons: 377 • Minimum size: 0.012 km² • Maximum size: 190 km² • Mean size: 3.9 km² • 43 mapping units (UCS or U_CARTO) • 1 to 12 derived soil profiles per unit (UTS or U_SOL) • 227 derived soil profiles (UTS);134 profiles are observed, analysed and registered in Database for this area • Percentage value estimated by expert judgment • “presence”*-percentage of each profile within unit given in percent 	<ul style="list-style-type: none"> • 1:200.000 • Area: approx 1956 km² • No of polygons: 392 • Minimum size: 0.017 km² • Maximum size: 150 km² • Mean size: 5 km² • 42 mapping units (LE) • 1 to 6 derived soil profiles per mapping unit • 104 Profiles • Percentage value estimated by expert; 3 meaning a percentage range from 30 to 70 percent (see Table 2 for full list of classes) • “presence”-percentage of each profile within unit given as classified unit; each unit represents a percentage range

WP 5

Integrated network and soil portal

- Concept of the Portal- and GS Soil network architecture



- Establishment of semantic services (Thesaurus, Gazetteer)
- Provision of open tools and INSPIRE services for data providers
- Continuous integration of services and information
- Deployment and operational manual including guidelines

Discovery (CSW)
View (WMS)
Download (WFS)
GS Soil services
...



Αρχική Σελίδα | Το δικό μου GS Soil - Χάρτης Ιστοχώρου - Βοήθεια Ιστοχώρου - Επαφές

GS Soil Geodata-Services for European Soil Data

Αναζήτηση Υπηρεσία Χάρτες Σχετικά με το GS Soil

Ελεύθερη Αναζήτηση | Κατάλογοι δεδομένων

ΑΝΑΖΗΤΗΣΗ

Περιβαλλοντικές Πληροφορίες

Εισάγετε ένα ερώτημα

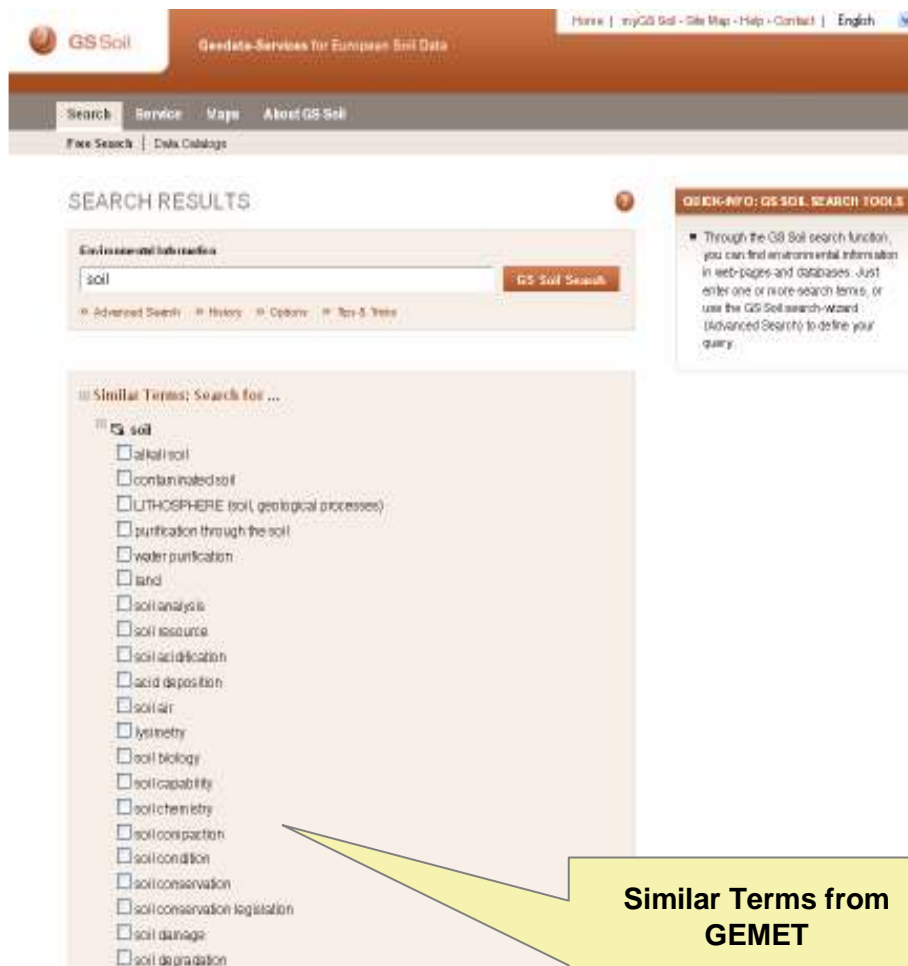
Αναζήτηση στο GS Soil

>> Προχωρημένο >> Καταχωρητής-Ερωτημάτων >> Προμήθειες >> Συμβουλές & Ευχαριστήρια

ΓΡΑΦΕΙΟ ΠΛΗΡΟΦΟΡΗΣΗΣ ΕΡΓΑΣΤΗΡΙΟΥ
ΜΑΤΙΩΤΗΣ ΓΣ-SOIL

- Portal surface supports currently 11 Languages:
 - English,
 - German
 - Portuguese
 - Dutch (fm. Belgium)
 - Czech
 - Hungarian
 - Slovak
 - Bulgarian
 - Greek
 - Slovene
 - Romanian

Μέσω της λειτουργίας αναζήτησης του GS Soil μπορείτε να βρείτε περιβαλλοντικές πληροφορίες σε ιστοσελίδες και βάσεις δεδομένων. Απλώς εισάγετε έναν ή περισσότερους όρους αναζήτησης, ή χρησιμοποιήστε τον οδηγό αναζήτησης του GS Soil (Προχωρημένη Αναζήτηση) για να διατυπώσετε το ερώτημα σας.



SEARCH RESULTS

Environmental Information

soil

GS Soil Search

Advanced Search | History | Options | Top 5 Items

QUICK-INFO: GS SOIL SEARCH TOOLS

- Through the GS Soil search function, you can find environmental information in web-pages and databases. Just enter one or more search terms, or use the GS Soil search-wizard (Advanced Search) to define your query.

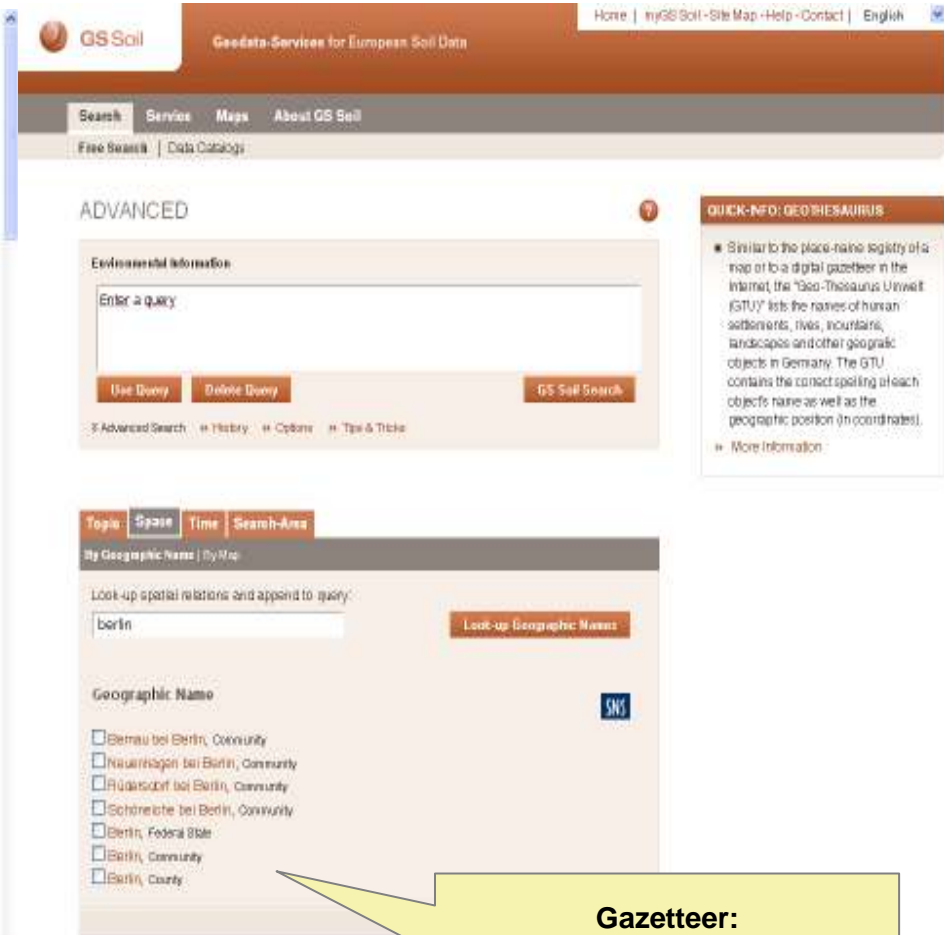
Similar Terms: Search for ...

soil

- all soil
- contaminated soil
- LITHOSPHERE (soil, geological processes)
- purification through the soil
- water purification
- land
- soil analysis
- soil resource
- soil acidification
- acid deposition
- soil air
- lysimetry
- soil biology
- soil capability
- soil chemistry
- soil compaction
- soil condition
- soil conservation
- soil conservation legislation
- soil damage
- soil degradation

Similar Terms from GEMET

...currently further improved for soil specific thesaurus



ADVANCED

Environmental Information

Enter a query

Use Query | Delete Query | GS Soil Search

Advanced Search | History | Options | Tips & Tricks

QUICK-INFO: GEONAMES

- Similar to the place-name registry of a map or to a digital gazetteer in the Internet, the "Geo-thesaurus Umwelt (GTU)" lists the names of human settlements, rivers, mountains, landscapes and other geographic objects in Germany. The GTU contains the correct spelling of each object's name as well as the geographic position (in coordinates).

More Information

Topic: Space | Time | Search-Area

By Geographic Name | By Map

Look-up spatial relations and append to query:

berlin

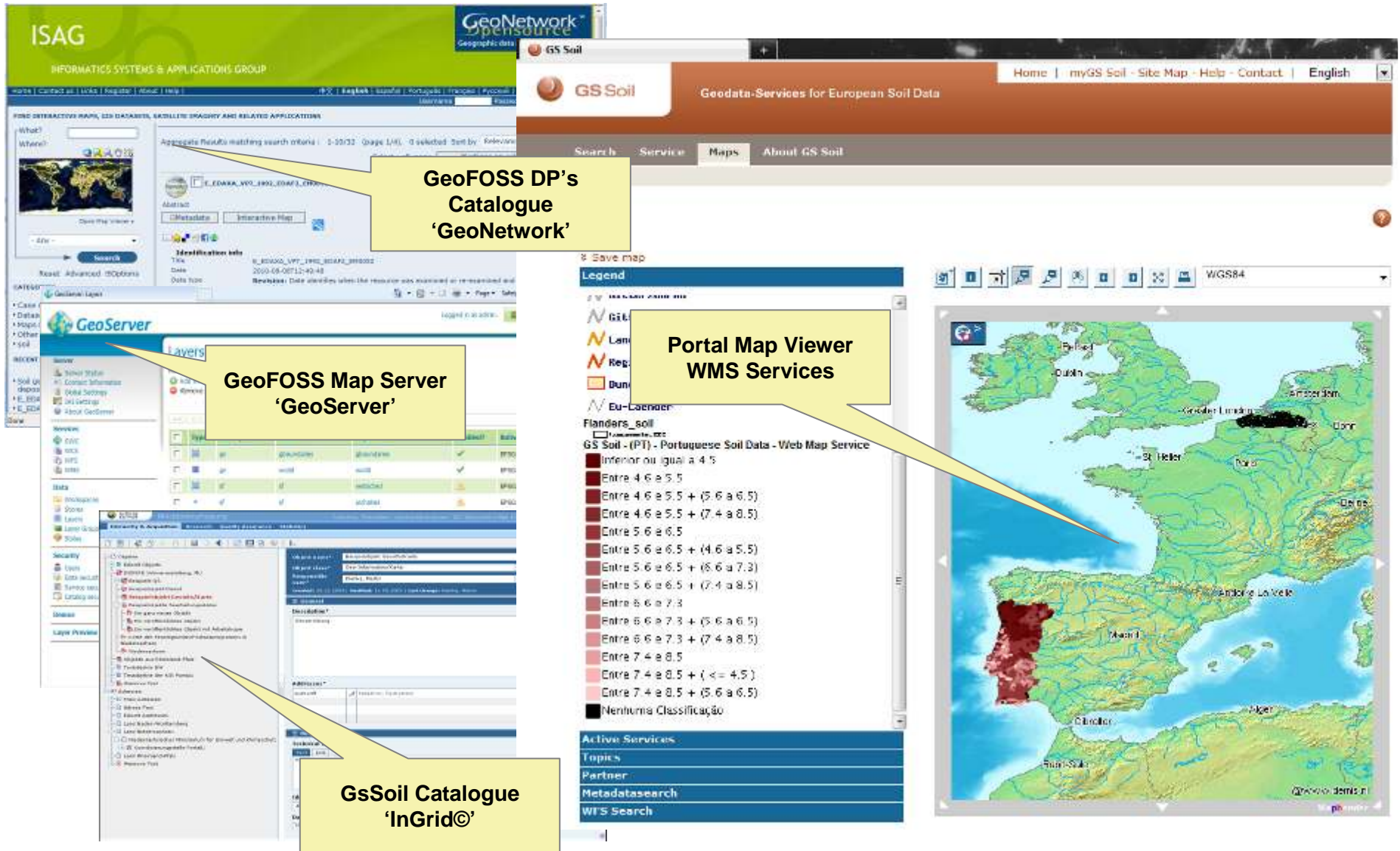
Look-up Geographic Names

Geographic Name

- Bismarck bei Berlin, Community
- Nauenhagen bei Berlin, Community
- Rudersdorf bei Berlin, Community
- Schöneiche bei Berlin, Community
- Berlin, Federal State
- Berlin, Community
- Berlin, County

Gazetteer:

...on the basis of GeoNames, OpenStreetMaps, GeoHash



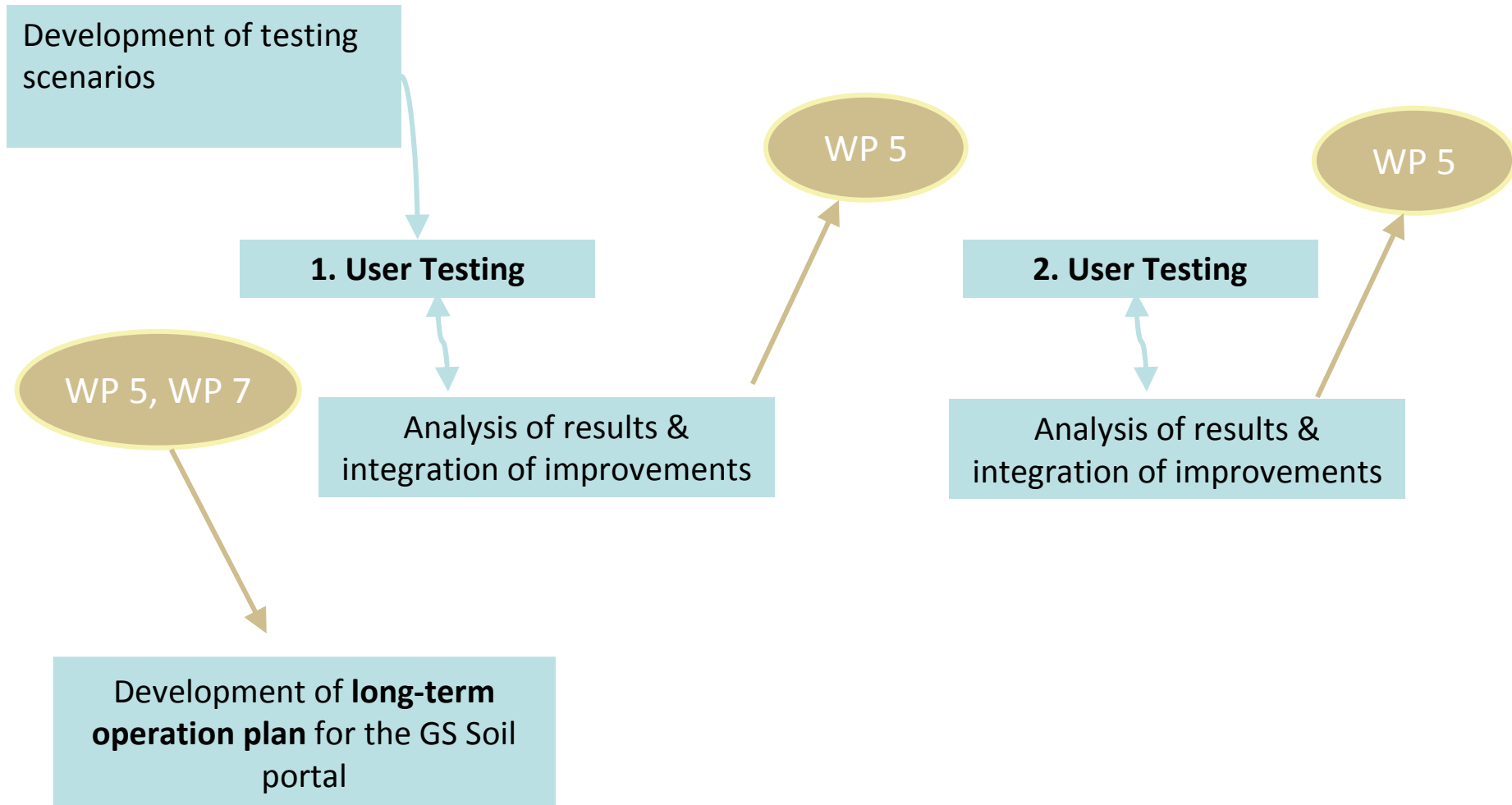
The screenshot shows the GS Soil portal interface with several callout boxes highlighting key components:

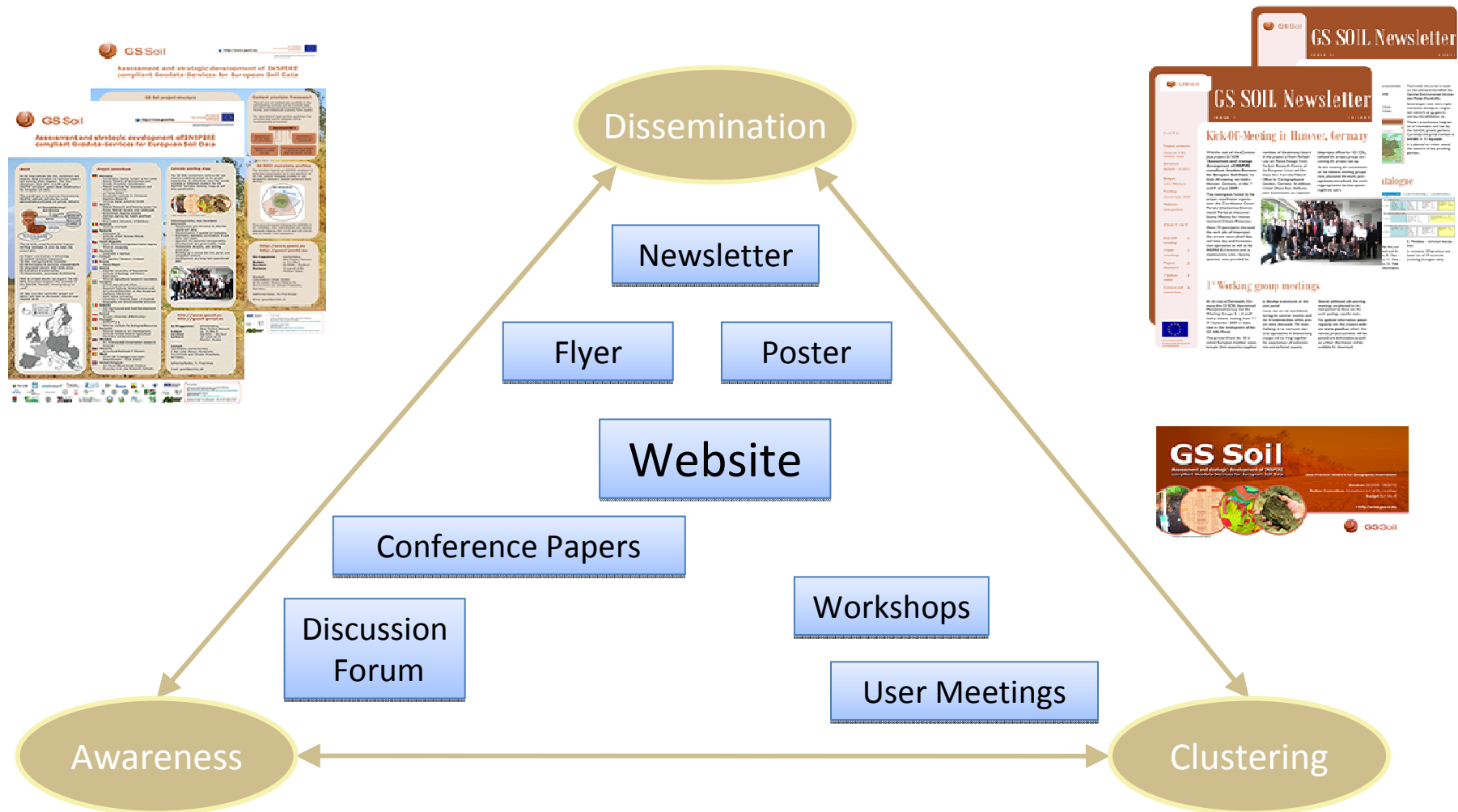
- GeoFOSS DP's Catalogue 'GeoNetwork'**: Points to the search and metadata section of the GeoNetwork interface.
- GeoFOSS Map Server 'GeoServer'**: Points to the layers management section of the GeoServer interface.
- GS Soil Catalogue 'InGrid'**: Points to the metadata and information section of the InGrid interface.
- Portal Map Viewer WMS Services**: Points to the legend and map viewer section of the portal.

The legend for the 'Flanders_soil' WMS service is as follows:

Color	Soil Classification
Dark Red	Inferior ou igual a 4.5
Red	Entre 4.6 e 5.5
Light Red	Entre 4.6 e 5.5 + (5.6 e 6.5)
Lighter Red	Entre 4.6 e 5.5 + (7.4 e 8.5)
Lightest Red	Entre 5.6 e 6.5
Very Light Red	Entre 5.6 e 6.5 + (4.6 e 5.5)
Very Lightest Red	Entre 5.6 e 6.5 + (6.6 e 7.3)
White	Entre 5.6 e 6.5 + (7.4 e 8.5)
Lightest Yellow	Entre 6.6 e 7.3
Light Yellow	Entre 6.6 e 7.3 + (5.6 e 6.5)
Yellow	Entre 6.6 e 7.3 + (7.4 e 8.5)
Light Green	Entre 7.4 e 8.5
Green	Entre 7.4 e 8.5 + (<= 4.5)
Dark Green	Entre 7.4 e 8.5 + (5.6 e 6.5)
Black	Nenhuma Classificação

WP 6 and WP 7

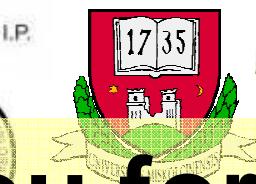




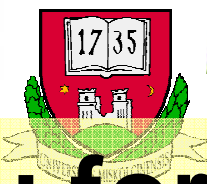


Ministério da Agricultura, do Desenvolvimento Rural e das Pescas

INRB, I.P. Instituto Nacional dos Recursos Biológicos, I.P.



Bundesanstalt für Geowissenschaften und Rohstoffe



Thank you for your attention!



CSIC



umweltbundesamt



NAG REF

wemove



AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY

