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The Association of the Geological Surveys of Europe

www.eurogeosurveys.org

The role of EuroGeoSurveys in the development of a geoscientific data infrastructure in Europe based on INSPIRE

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Chair EGS INSPIRE Expert Group

Technischer Workshop am 18.11.2010 - in Freiburg i. Br.

Context : SHARING GEOSCIENTIFIC INFORMATION through an European Geological Infrastructure

- A need for Interoperability

  Interoperability = “Ability to co-operate” (Nato)

  Need to share information with other geologists … and with non-geologists

  Not only a technical question, an economic and cultural issue !

- Inspire : a strong “incentive” in Europe

- but also SEIS, GMES, GEO/GEOSS

- European /Global initiatives of our community :
  - OneGeology, GeoSciML, Promine, Pangeo, Eurogeosources
  - eEarth, eWater, Geomind,…
  - … GeORG

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INSPIRE,
a European Directive

- To establish the Infrastructure of Spatial Information in Europe, for the purposes of Community environmental policies

- 5 chapters in INSPIRE regulation :

  - Metadata
  - Data specification
  - Network services
  - Data sharing
  - Monitoring and reporting

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INSPIRE, 34 data themes

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 Government services
7. Environmental monitoring facilities
8. Production and industrial facilities
9. Agricultural and aquaculture facilities
10. Population distribution – demography
11. Area management
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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EuroGeoSurveys participation to INSPIRE

- Coordination through an **“EGS GI & INSPIRE” Expert Group**
- **EGS member of INSPIRE Expert(s) Group(s) (since 2002)**
- **EGS registered as a “Spatial Data Interest Community” (SDIC)**
  - **Some EGS members registered as LMOs (Legally Mandated Organisations) : UK, Germany, Netherlands, Norway, Italy, Switzerland, Latvia, France,…**
- **EGS experts participate to “Implementing Rules Drafting Teams”:**
  - NGU - Per Ryghaug (Metadata support team)
  - BGR – Christine Asch (Data Harmonisation support team)
  - BRGM – Francis Bertrand (Data Harmonisation support team)
  - BRGM - Jean-Jacques Serrano (chair Network Services team)
  - BGS - Ian Jackson (Data Sharing and re-use support team)
- **15 EGS experts in the “Thematic Working Groups” (Geology, Mineral Resources, Risk Zones)**
- **Coodination of actions contributions through the “INSPIRE and Geographic Information” Expert Group**

→ *Clearly the most active and visible community (apart from mapping agencies)*

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Challenges of the Geology Thematic Working Group

- Derive operational specifications covering the Geology data theme, in line with the legal definition in the text of the Directive :

  "Geology characterized according to composition and structure. Includes bedrock, aquifers and geomorphology."

- Scale ? Maps ? 3D ? Boreholes ? Geophysics ?...

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Geology Thematic Working Group
JUST started to work – 21/05/2010

INSPIRE Context

Examples of use ?

Generic Conceptual Model

Definitions

Use cases ?

Methodology

Reference Material

Data Specification

Experts

Standard Data models: GeoSciML, EarthResourceML, GroundWaterML, …
Projects: OneGeology-Europe, ProMine, PanGeo,…

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Which level of harmonisation is « just right »?

Simple  Complex

Too simple

- Identified requirements cannot be supported
- Insuficient harmonisation
- Few benefits

Too complex

- Difficult to implement
- Substantial benefits available only to a few users
- High cost

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GeoSciML
a language for geoscience data interoperability

- An international initiative : *the GeoSciML Interoperability Working Group*
  - Formed in 2003 under the Commission for the Management and Application of Geoscience Information (CGI) of the International Union of Geological Sciences (IUGS)
  - It is currently comprised of geology and information technology specialists from 9 countries across Europe, North America, Australia and Asia (Australia, Canada, France, Germany, Italy, Japan, Sweden , UK, USA)
  - On a voluntary basis

The OneGeology Project and ~~compliance~~ *contribution* to the INSPIRE Directive

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OneGeology-Europe
… an INSPIRE pilot

- The European contribution to the global OneGeology initiative

That includes:

- making geological information of Europe available for everyone,
- at a 1:1 Million scale,
- web accessible,
- interoperable,
- with „**progress towards harmonisation**“

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Basic principles

- Based on “**interoperability”** principles
- Maps produced on **distributed servers** and sent directly to web client (user side)
- Every participant delivers its map through a standard web service (WMS / WFS)
- The list of metadata of maps / services is collected into a catalogue of services managed “centrally”
- The portal can display / aggregate all the maps

WMS – WFS ?

Two ISO/OGC standards of web services to give access to geographical information through **web portals and/or GIS tools**

- WMS - **Web Map Service** : produces an image (raster)

- WFS - **Web Feature Service** : provides data
  - Geometry (points, polygons, lines,…)
  - Attributes

  → In a standardised text format (GML / GeoSciML)

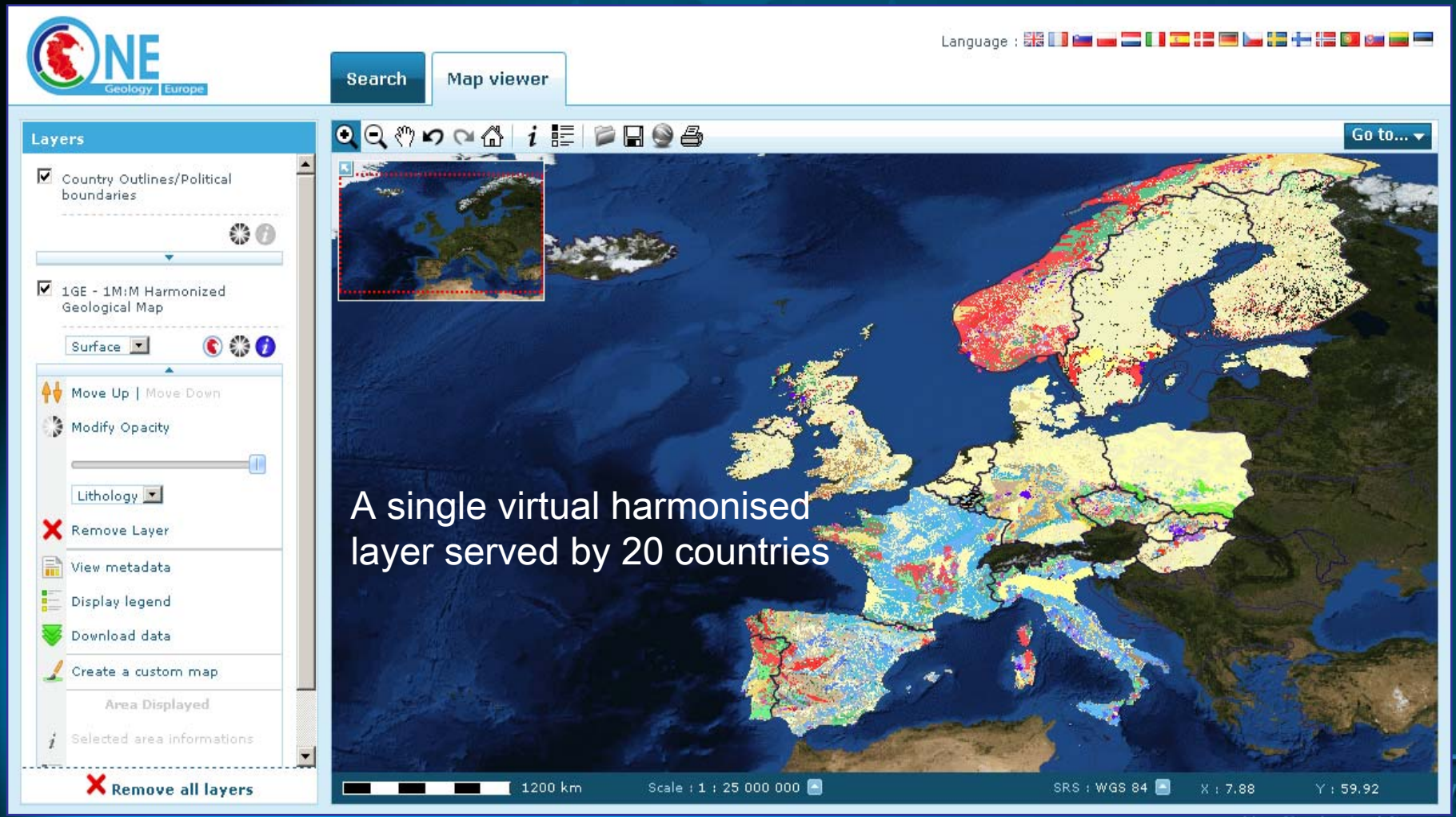
Some of the achievements of the project (direct contributions to INSPIRE)

- User needs and gap analysis reports
- Data model & schema developed
- Geological specification and **vocabulary** developed (*allows progress towards **harmonisation***)
- Implementation and use of multilingual vocabulary services
- Metadata profile produced, accessible through a catalogatalog
- Portrayal rules (common legends) developed
- Implementation of “OneG-E compliant” WMS and WFS for every country
- Multilingual Portal developed
- High resolution and cross-border delivery services tested

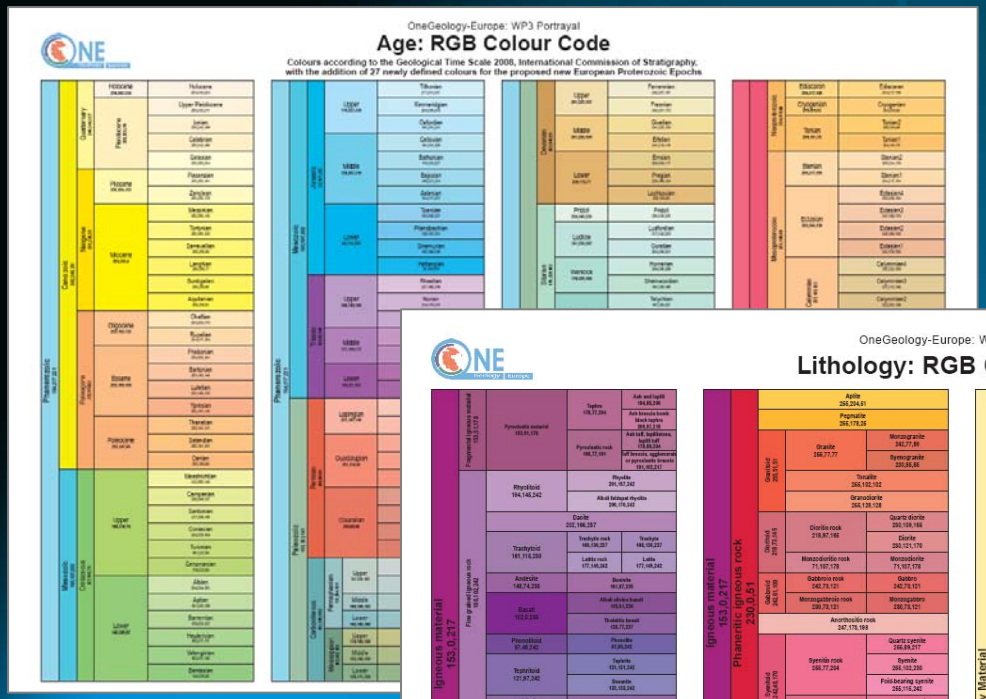
… and

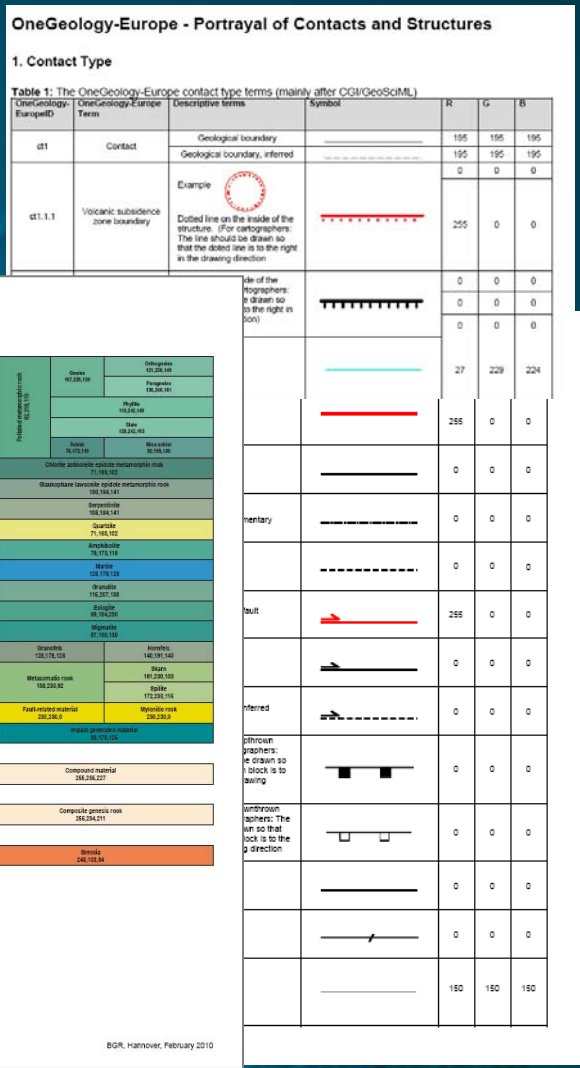
… common licensing agreement for accessing 1:1M map data !

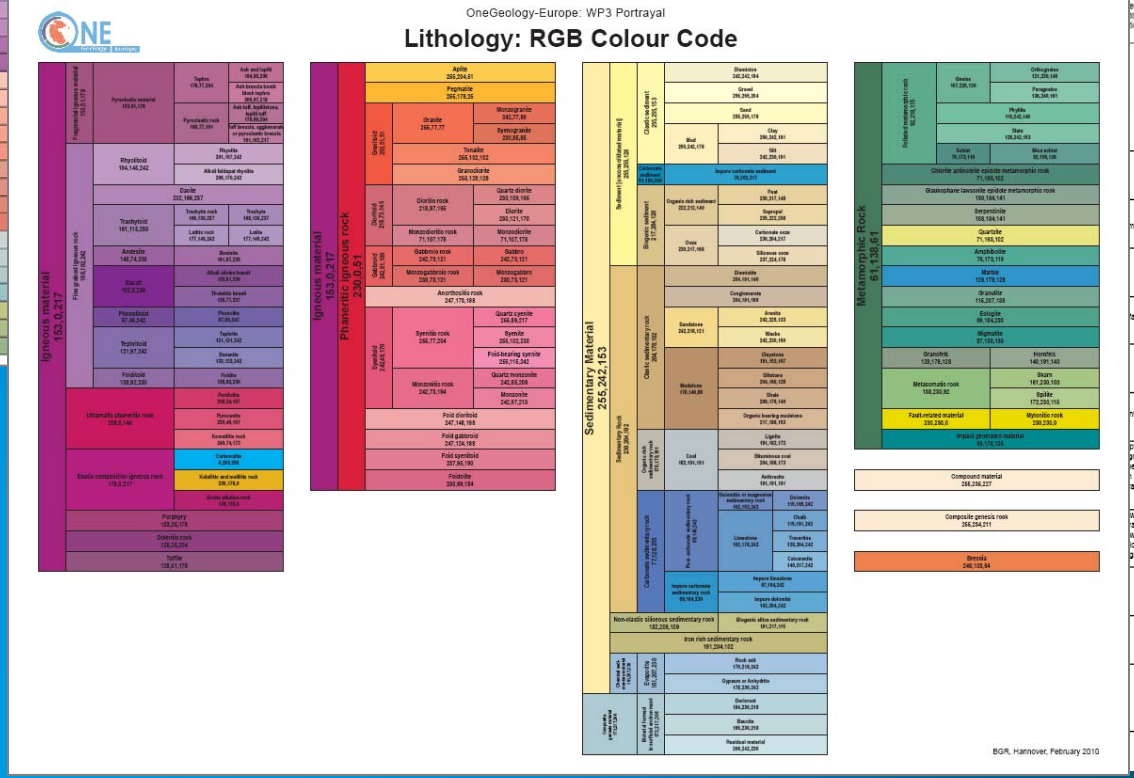
The OneGeology-Europe portal



Common legends („Portrayal Rules“)







Metadata

Search | Map viewer | Metadata folder

Metadata of the discovered datasets and services

1GE GEUS 1M surface Geologic Unit

Denmark
Metadata from GetCapabilities

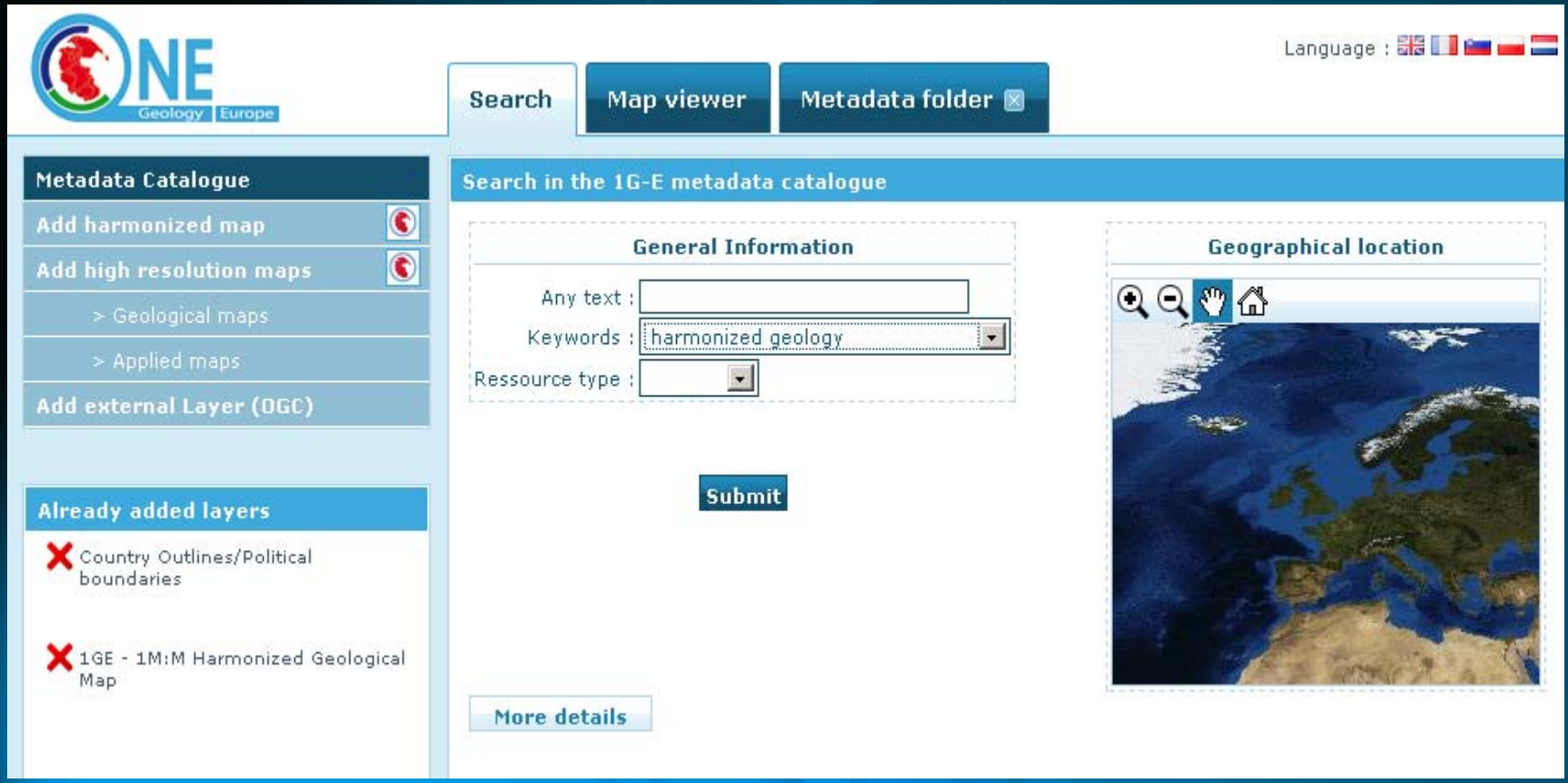
- **Server :**	GEUS - Danmark og Gronland
- **Online resource :**	http://geusjuptest.geus.dk/oneGEconnector/
- **Layer name :**	1GE - 1M:M Harmonized Geological Map
- **Abstract :**	DNK GEUS 1:200.000 M Geology
- **Access constraints :**	Data paa denne service ejes af De Nationale Geologiske Undersoegelser for Danmark og Groenland - GEUS. Dette indebaerer at alle rettigheder, inklussiv men ikke begraenset til copyrights, patenter og andre intellectuelle rettigheder tilhoerer GEUS. Ingen rettigheder maa overfoeres til en bruger. GEUS frasiger sig ethvert ansvar omkring datakvalitet og data brugbarhed for brugeren. GEUS fralaegger sig derfor ethvert ansvar i forhold til eventuelle konsekvenser der foelger brugen af data, uafhaengig af om eventuelle problemer er en foelge af fejlagtige eller manglende data, eller brugerens brug af data.
- **Descriptive keywords :**	

- **Extent (lat lon bounding box) :**

North 58.15
West 3.1
East 16.5

Legend

Simple search



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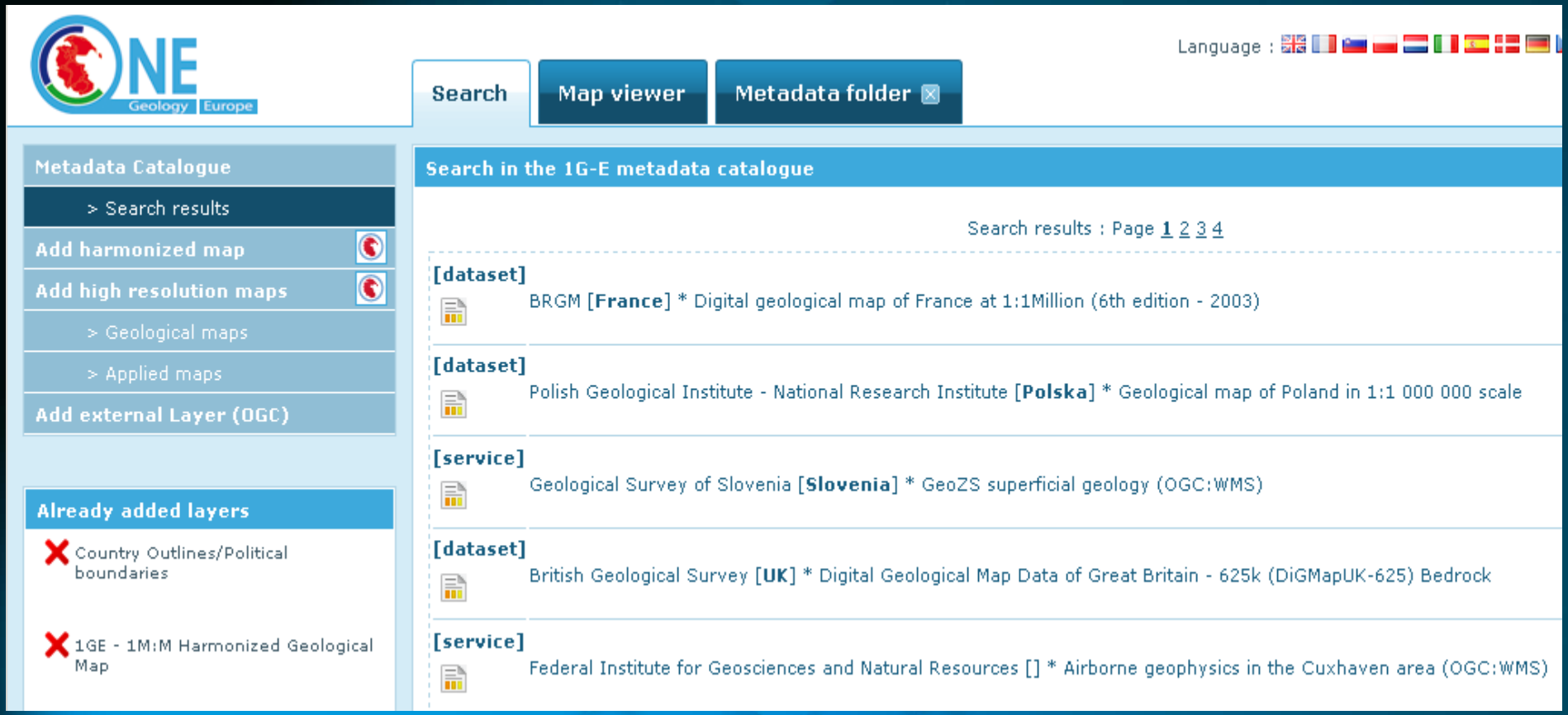
Search results



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Use URL to access the service

Geological map of Poland in 1:1 000 000 scale

More details

Metadata from the metadata catalog

- **Abstract :**	Geological map of Poland in 1:1 000 000 was done in the process of verification of geological map of Poland in 1:500 000 scale. Geological information was generalized to 1:1 000 000 scale in accordance with a knowledge about geology of Poland and assumptions of international initiative OneGeology. It?s required revision of stratigraphy, lithology, preparing a new method of marking small polygons and standards implementation e.g. GeoSciML. Geological map of Poland is available on map portals, e.g. Geoportal IKAR, OneGeology Portal or Google Earth as a part of Geological map of World at 1:1 000 000 scale
- **Ressource type :**	dataset - **Language :** pol, eng
- **Online resource :**	http://ikar2.pgi.gov.pl/services/MGP1MLN/MapServer/WMSServer
- **Reference System :**	EPSG 4326
- **Descriptive keywords :**	Geology, ONEGEOLOGY, GEOLOGY/Stratigraphy, GEOLOGY/Petrology/Lithology, ONEGEOLOGY/OneGeology-Europe, ONEGEOLOGY/OneGeology-Europe/harmonized geology

Access constraints :

- **Use Limitation :**	
- **Access**	intellectualPropertyRights

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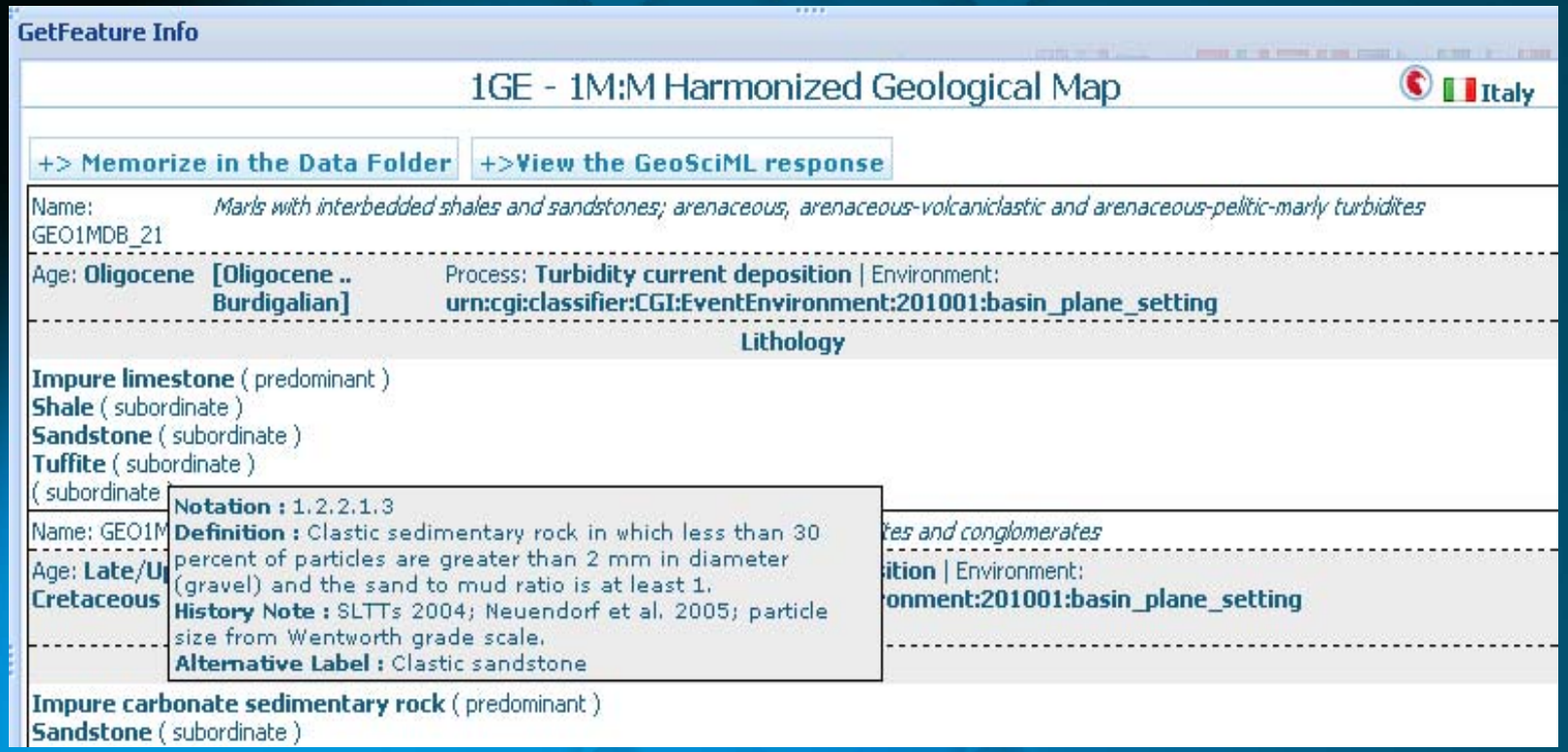
Get Information on a layer



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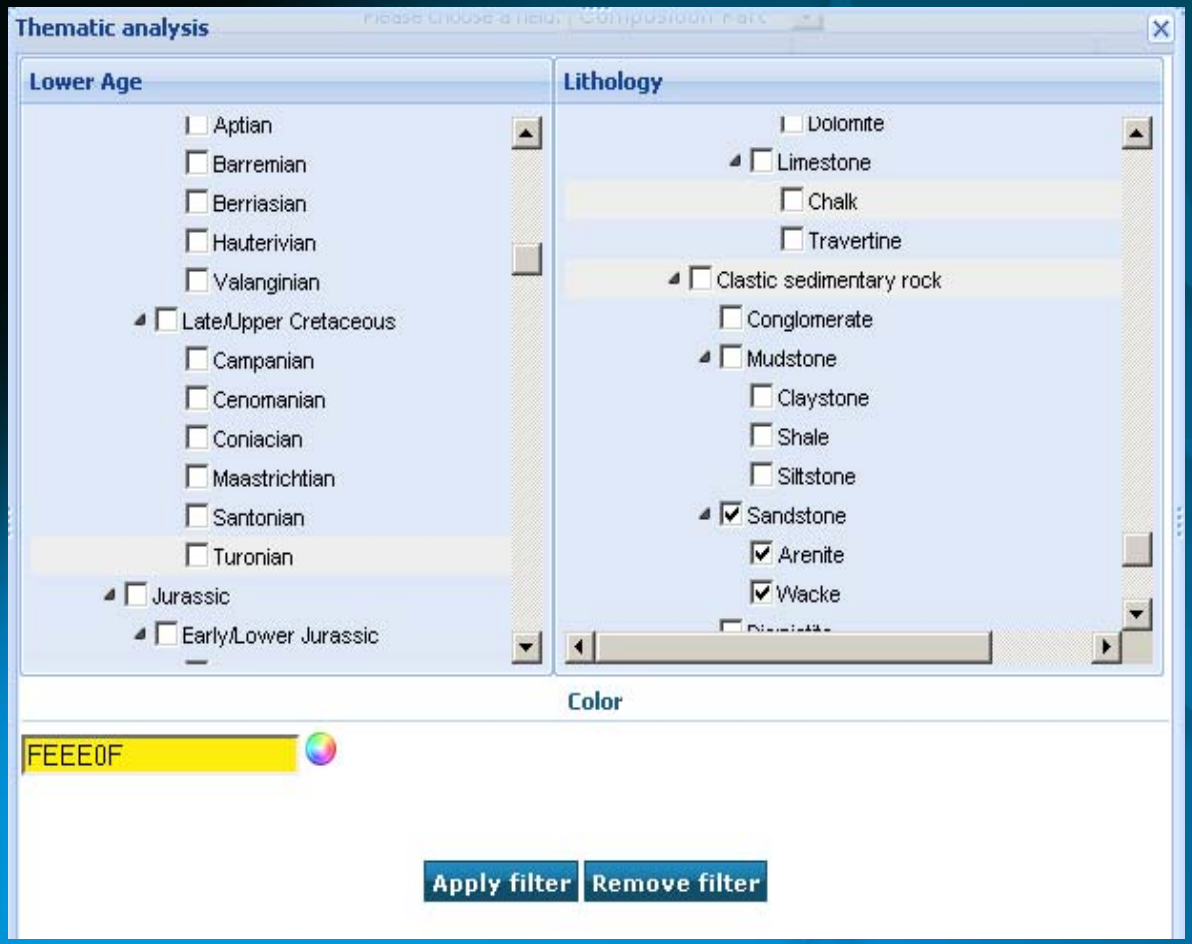
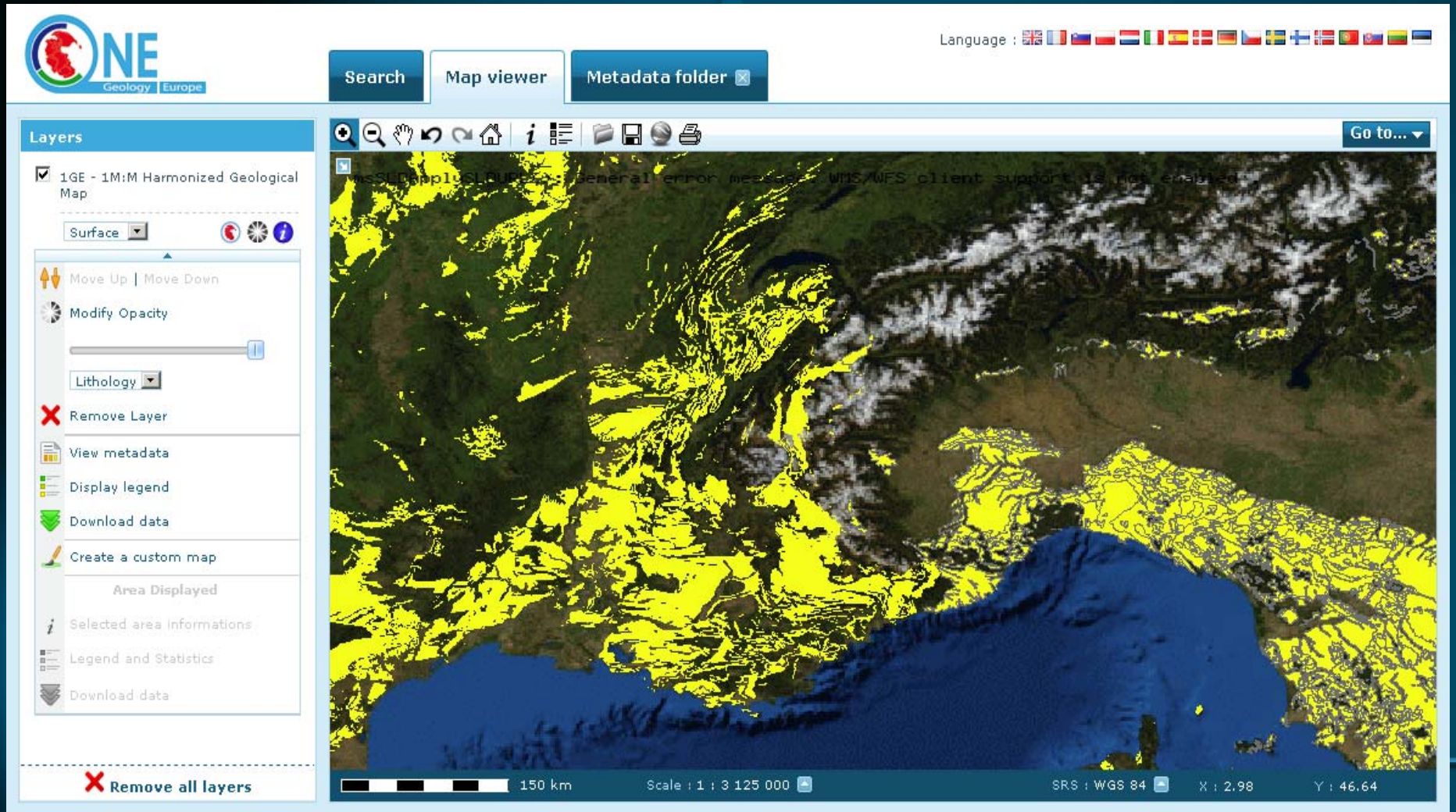
Custom map on lithology and/or age



Create new maps in real time from 20 different maps sharing common data model and vocabularies

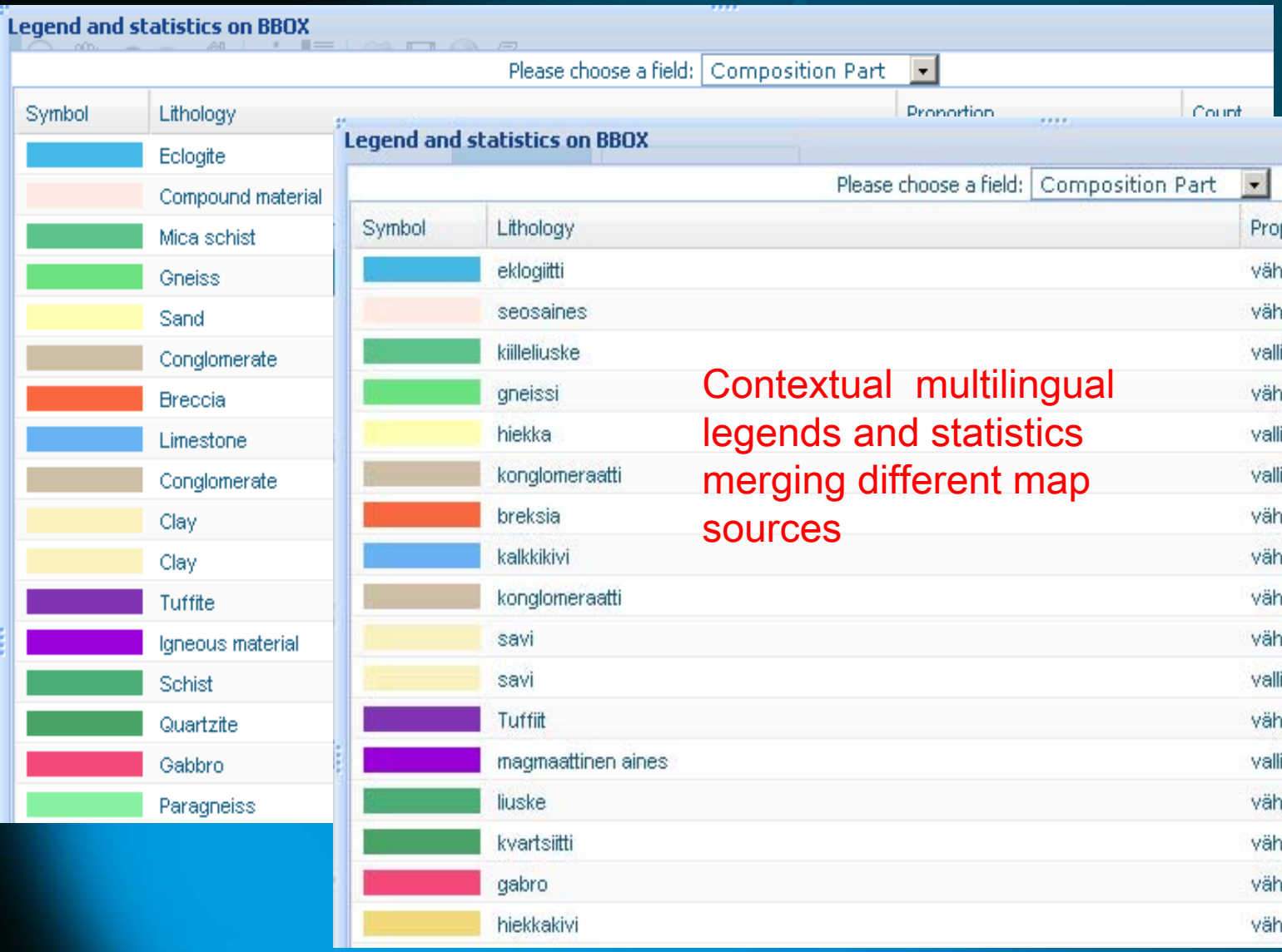
To create a common style (geologic units with sandstone) sent to all services.

Custom map



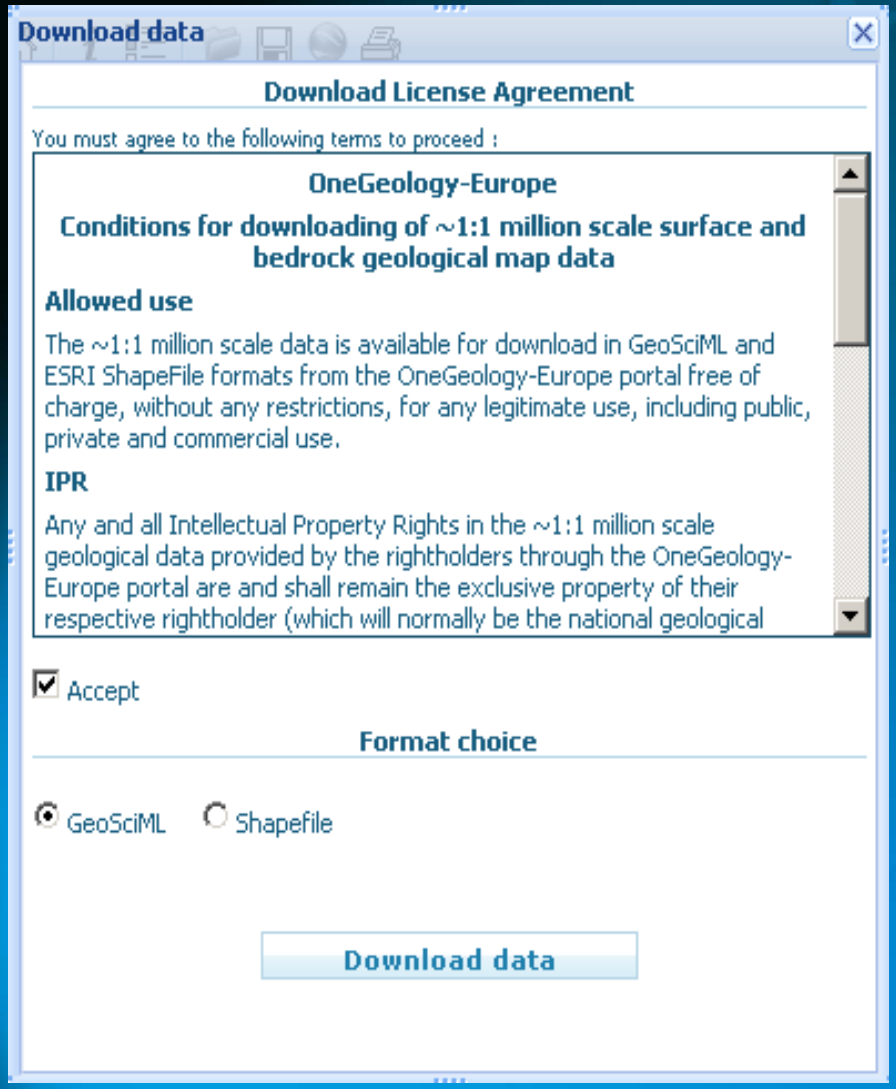
Geologic units with sandstone (colour: yellow)

Legend and statistics on bounding box



Contextual multilingual legends and statistics merging different map sources

Download data



Common License agreement

Download in GeoSciML or in shapefile

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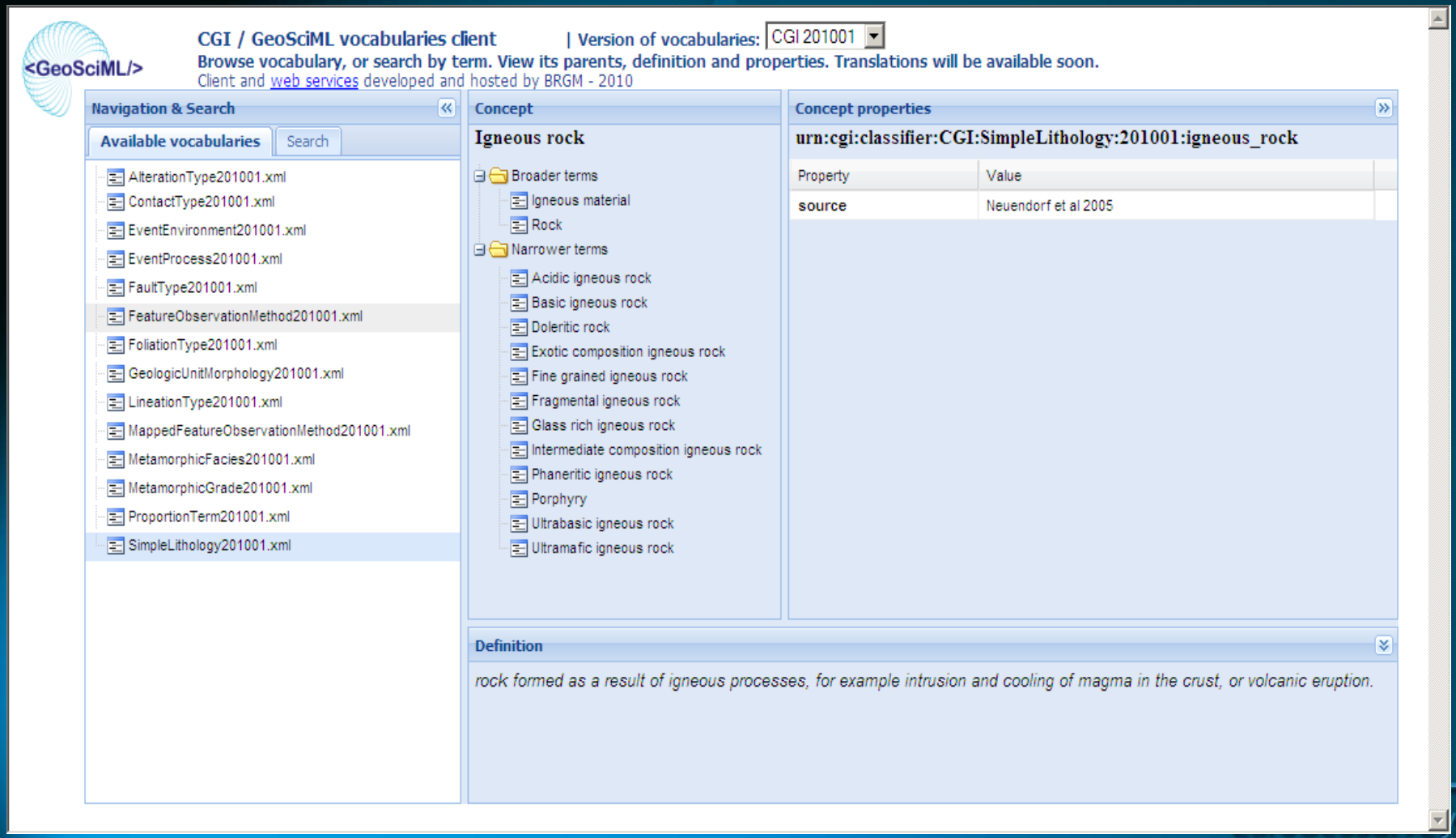
Vocabularies client application



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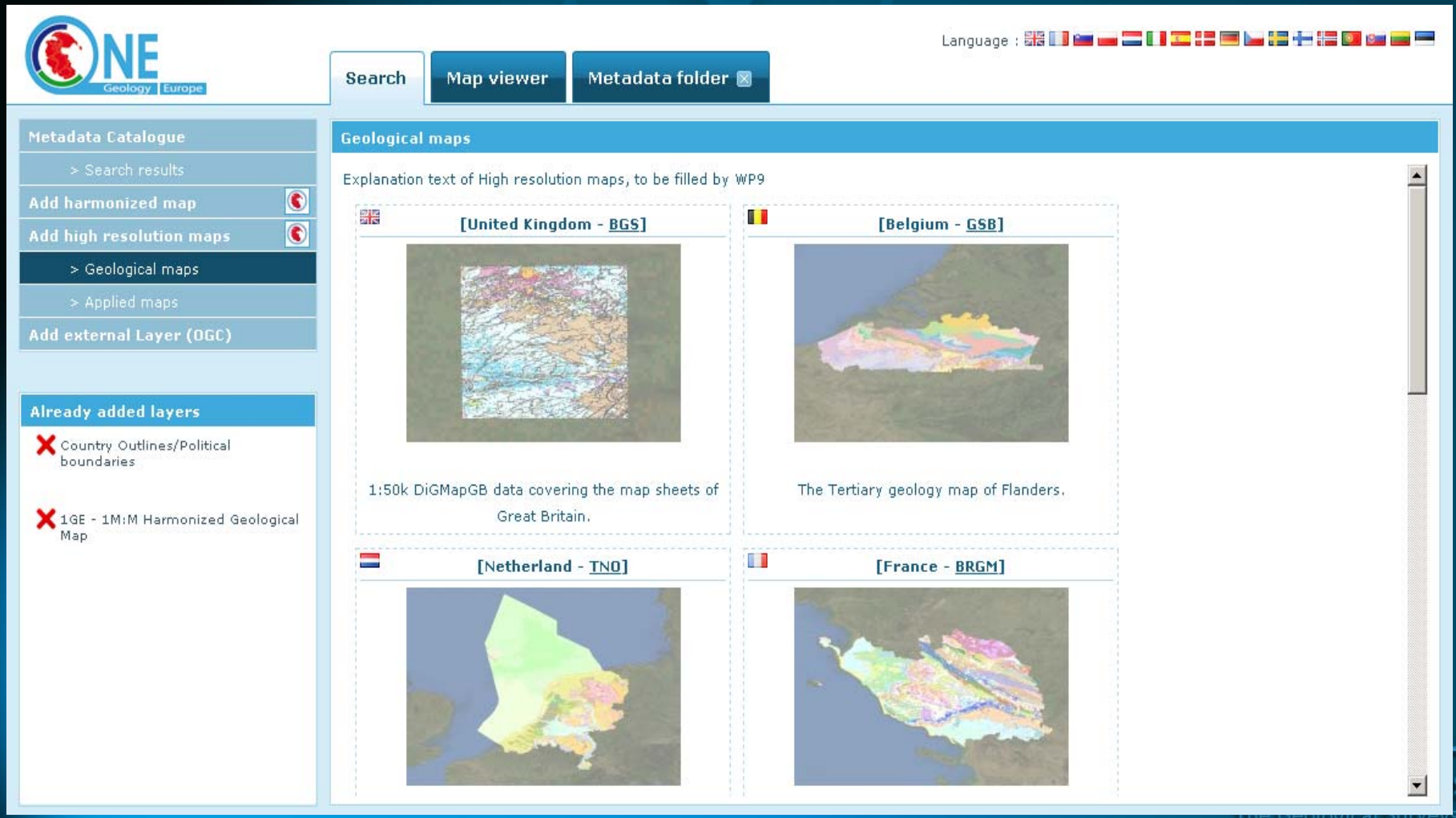
High resolution maps



What did we achieve ?

- Capacity building :
  - Sharing high degree of technical expertise
  - Common understanding on interoperability / harmonisation issues

  →*new way of thinking*

- Expected scientific and technical results
  - Methodology for harmonisation and production of our “fundamental” geological information (geological maps)
  - Done at 1:1M scale, tested for other scales

  → *a prerequisite for further applied geology services*

OneGeology-Europe sustainability ?

- Keep the momentum…
  - WMS and WFS maintained by national geological surveys
  - Maintenance of portal (and monitoring of services) and catalogue funded by EuroGeoSurveys
  - Maintenance of the vocabularies (and associated services)
  - Provide components to OneGeology global (for implementation, adaptation…)
  - Signature of an agreement with the European Environment Agency

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What next ?

- We have an infrastructure
  - populate it (off shore geological maps, urban geohazards,…)
  - develop “services / uses” of on line data

  - Extension to other « INSPIRE » related data (applied maps, derived products, 3D,…) ?
  - Production of operational / reliable services
  - Funding model…

INSPIRE is not the end of the story… we must continue to be proactive in the development of standards for data and information products

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Thank you for your attention

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