



TCS Geological Information and Modelling

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(BRGM, French Geological Survey)**

Thematic Core Services Geological Information and Modelling



Group formed during the EPOS Implementation Phase – Consortium formalised in 2018

10 members: BRGM (FR), GFZ (DE), GSI (IE), UKRI/BGS (UK), Uppsala University (SE), GEUS (DK), ISPRA (IT), EuroGeoSurveys (EU), GeoZS (SI) and CGS (CZ)

Governance:

- Chair: EuroGeoSurveys + Co-Chair: CGS
- Coordinator: BRGM
- Data Provider Committee: includes an EGS representative, an academic representative and representatives of entities providing data sets
- Service Provider to ICS-C EPOS portal: EuroGeoSurveys
- Stakeholder Panel: includes main representatives of the user community – Lead: BGS
- IT Contact points: BRGM (Lead), GEUS and GeoZS
- MoU EPOS-ERIC-EGS (The Geological Surveys of Europe)

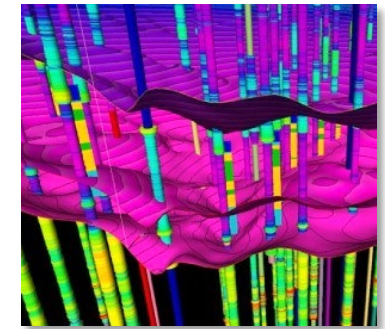
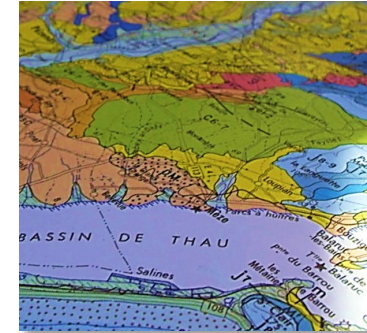
Why Geological surveys in EPOS ?

- **Complement** the majority of geophysics-related services with geology and georesources
- **Develop** the synergy with EGS-EGDI and the data produced by the European Surveys
- **Build** on common standards, data infrastructures, while promoting and implementing standards for geological information

Thematic Core Services

4 thematic domains: 4 x view & discovery services

- **Geological Map (service provider: EGS/GeoZS, SI)**
 - National geological maps at 1:1,000,000
 - 34 countries
- **Boreholes (service provider: EGS/BRGM, FR)**
 - Simple feature index: location, depth, drilling method, drilling purpose
 - 2.5+ millions boreholes
- **3D Model (service provider: EGS/GEUS, DK)**
 - Metadata catalogue
 - 25
- **Mineral Resources (service provider: EGS/GEUS, DK)**
 - 143,500 Mineral occurrences and 59,000 Mines
 - 31 countries



Domain-controlled geoscience vocabularies through the European Geoscience registry (INSPIRE Register Federation)
<https://data.geoscience.earth/ncl/>

Data Services on the EPOS Portal

Geological Map of Europe at 1:1,000,000

The screenshot displays the EPOS portal interface. The top left features the EPOS logo and the text "Testing Version 1.0.1". Below this is a search bar with the placeholder "Free text search" and a "Filters" dropdown. A sidebar on the left contains a "Geological Information and Modelling" section with a grid of icons. The main content area shows the "Geological Feature View Service (EGDI Geological Map)" at a scale of 1:1,000,000. It includes a breadcrumb "Geology > Geological Maps", a "Visible on: Map" link, and "Advanced search filters (9 of 9)". The filters include "Coordinates" (90, -90, -180, 180), "Height of the output map" (660), "Output format" (image/png), "Layers" (GeologicUnitView_Lithol...), and "Request type" (GetMap). The bottom of the sidebar shows "Results per page: 10" and "Page 1 of 1". The main map area shows a geological map of Europe with various colored regions. The top right of the map has a "Login" button and a "Menu" icon. The bottom right of the map has a "Leaflet | Powered by Esri | Earthstar Geographics" footer.

Data Services on the EPOS Portal

Boreholes (1/3)

The screenshot displays the EPOS Testing Version 1.0.1 portal. The main interface features a map of Europe with numerous blue circular markers representing borehole locations. On the left, a sidebar contains a search bar labeled 'Free text search' and a 'Filters' dropdown. Below this, a panel titled 'Geological Information and Modelling' is open, showing the 'Borehole View Service' details. This panel includes a breadcrumb trail 'Geology > Boreholes', a 'Visible on: Map' indicator, and an 'Advanced search filters (9 of 9)' section. The filters are organized into two columns: 'Coordinates' (90, -90, -180, 180) and 'Height of the output map' (660). The 'Layers' section shows 'BoreholeView' selected, and the 'Request type' is set to 'GetMap'. The 'Output format' is 'image/png'. At the bottom of the panel, it shows 'Results per page: 10' and 'Page 1 of 1'. The top right of the map area includes a 'Login' button, a 'Menu' icon, and a coordinate display '46.42822 : 12.08496'. The bottom of the map area features a footer with 'Leaflet | Powered by Esri | Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community'.

Data Services on the EPOS Portal

Boreholes (2/3)

EPOS Testing Version 1.0.1
EUROPEAN PLATE OBSERVING SYSTEM

Free text search

Filters

Geological Information and Modelling

Borehole View Service
Geology > Boreholes
Visible on: [Map](#)

Advanced search filters (9 of 9)

Coordinates: 90 -90 -180 180

* Height of the output map: 660
* Layers: BoreholeView
* Output format: image/png
* Request type: GetMap

Results per page: 10 Page 1 of 1

Borehole View Service

Borehole 02746X0002.C (Completed) by /Unknown

Purpose:	Inclination:	Elevation:	Length:
unknown	Unknown	50m	m

Borehole 02746X0033.F (Completed) by ZAGOREOS/Unknown

Purpose:	Inclination:	Elevation:	Length:
unknown			

Drill: POVOFOR 2000 (...2009-03-26)

1 of 1

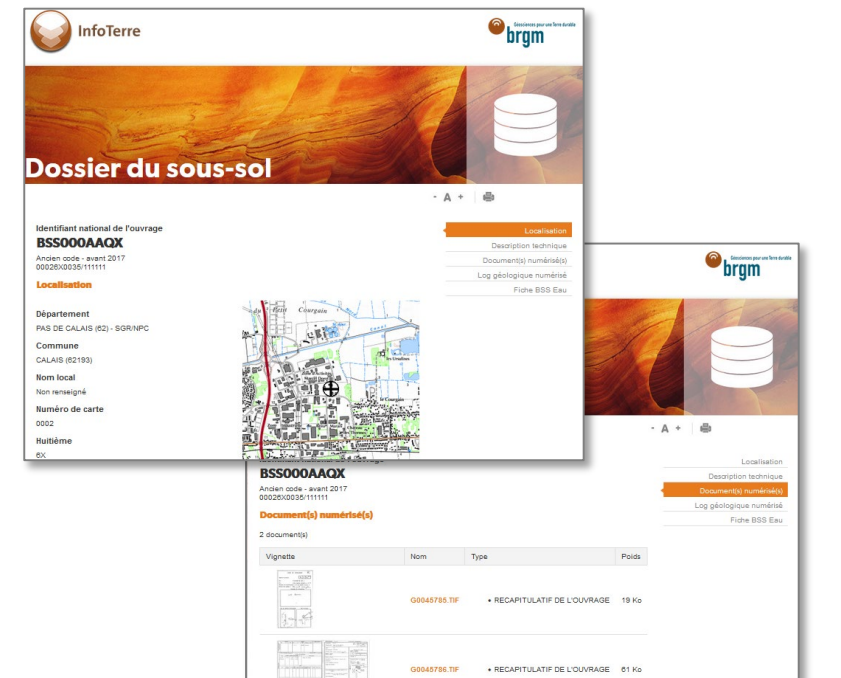
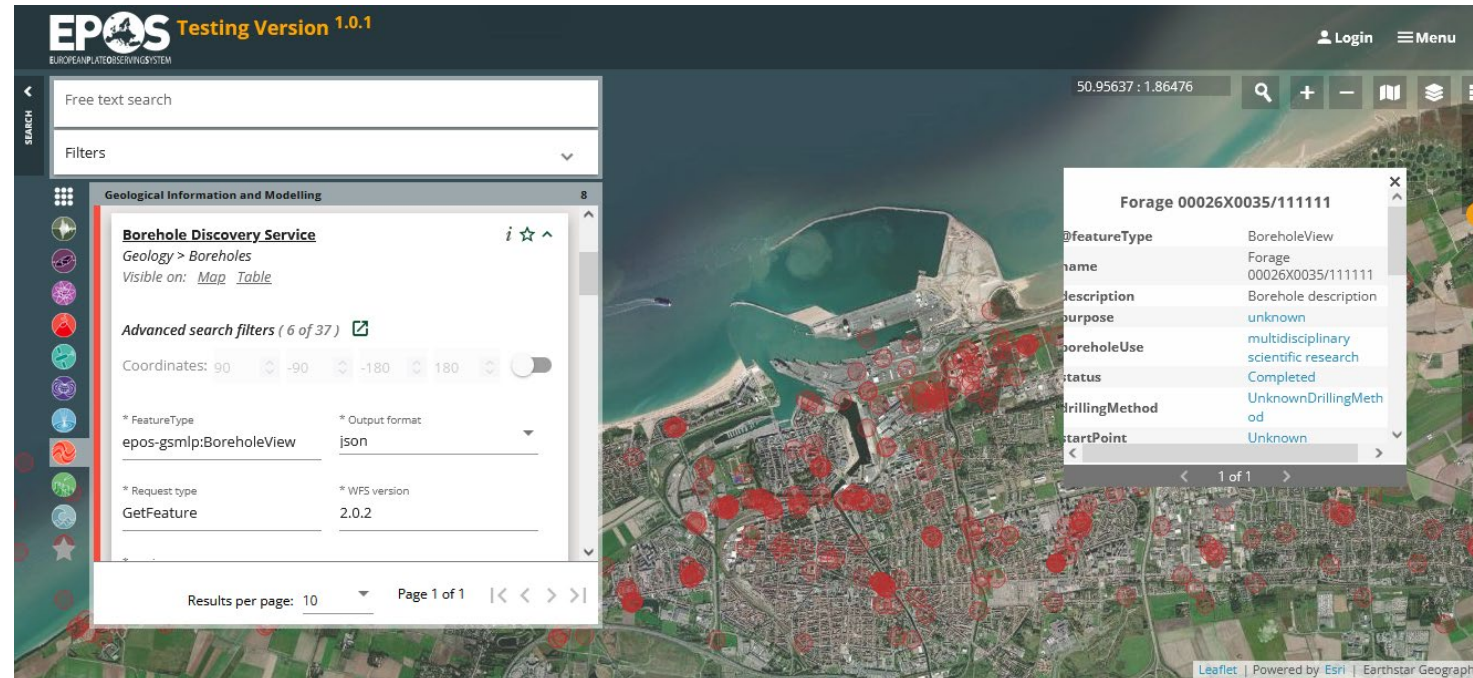
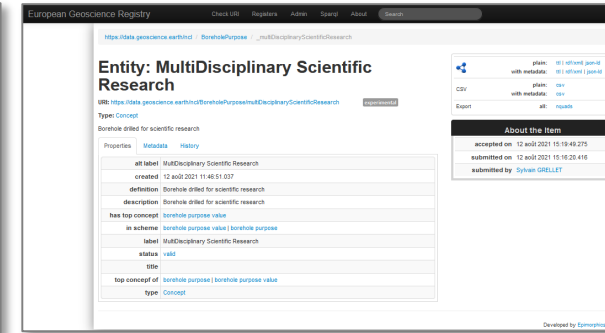
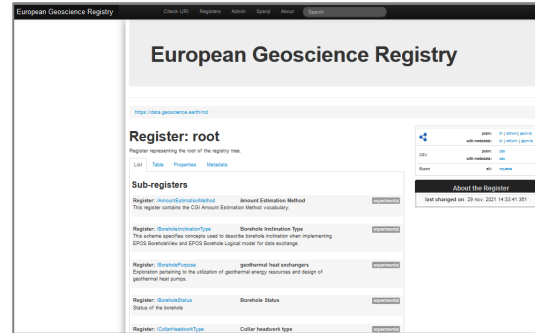
Borehole View Service (default)

- exploration/exploitation
- geotechnicalSurvey
- geothermalEnergy
- groundwaterLevelMonitoring
- hydrocarbonProduction
- industrialWaterSupply
- irrigation
- mineralExploration/Exploitation
- mitigation

Leaflet | Powered by Esri | Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Data Services on the EPOS Portal

Boreholes (3/3)



Data Services on the EPOS Portal

3D Models metadata catalogue (1/2)

EPOS Testing Version 1.0.1
EUROPEAN PLATE OBSERVING SYSTEM

Free text search

Filters

Geological Information and Modelling

3D/4D Model Discovery Service
Geology > 3D/4D Models
Visible on: [Map](#) [Table](#)

Advanced search filters (6 of 40)

Coordinates: 90 -90 -180 180

* FeatureType: ModelView
* Output format: json
* Request type: GetFeature
* WFS version: 2.0.2

Results per page: 10 Page 1 of 1

@featureType	name	description	individualName	organisationName	status	creationDate	releaseDate
ModelView	Project Ge...	Geopower...	Reinhard ...	GEUS, LLU...	Finalised	2011-08-3...	2015-05-3...
ModelView	Tectonic e...	Mapping ...	Kristian Sv...	Geological...	Finalised	2012-09-3...	2015-07-1...
ModelView	Geological...	Geological...	Chiara D'A...	ISPRA	Ended	2015-04-1...	2015-06-2...
ModelView	Geological...	Chiara D'A...	ISPRA, Uni...	Ended	2004-07-2...	2004-07-2...	
ModelView	Modèle gé...	3D Model	C. Allanic	BRGM Uni		2013-05-2...	2015-08-2...

Leaflet | Powered by Esri | Earthstar Geographics

Data Services on the EPOS Portal

3D Models (2/2)

The screenshot displays the EPOS portal interface with a map background. On the left, a sidebar contains a search bar and a 'Filters' dropdown. The main content area shows the '3D/4D Model Discovery Service' with a breadcrumb 'Geology > 3D/4D Models' and links for 'Map' and 'Table' views. Below this, 'Advanced search filters (6 of 40)' are visible, including 'Coordinates', 'FeatureType' (set to 'ModelView'), 'Output format' (set to 'json'), 'Request type' (set to 'GetFeature'), and 'WFS version' (set to '2.0.2'). At the bottom of the sidebar, it shows 'Results per page: 10' and 'Page 1 of 1'.

A metadata popup window is open, displaying the following information:

organisationName	BRGM
creationDate	2013-05-26Z
releaseDate	2015-08-27Z
verticalSRS	http://www.opengis.net/def/crs/EPSSG/0/5720
outputGeometryReference	https://data.brgm.fr/files/2015/1/dbf1f7c-13f2-49e9-abed-71e6da509513/output.zip

Below the popup, a 3D model visualization is shown, depicting a geological structure with various colored layers (pink, yellow, orange, green, blue) and a central brown mass.

On the right, a document cover is displayed with the title 'Élaboration d'un chantier RGF : retour d'expérience du chantier pilote Vosges - Fossé rhénan' and 'Rapport final'. It includes the BRGM logo and the text 'BRGM/RP-83003-FR Décembre 2013'.

Data Services on the EPOS Portal

Mineral resources (1/2)

The screenshot displays the EPOS portal interface. On the left, a sidebar contains a search bar and a list of filters. The main content area shows a map of Europe with numerous colored triangles representing mineral resources. A detailed view of a specific mine is shown on the right, with the following information:

- Mine View Service based on Minerals4EU dataset**
- Mine 0333002 (E5)**
- * CONTESTINS ***
- operating continuously** : A mine is operating continuously. [...]
- Mining activities and associated products**: surface mining; Sorting process - treatment is unknown.
- Document citations**: Remark: [...]

The interface also includes a sidebar with a search bar and a list of filters, and a bottom section with pagination and results per page information.

Data Services on the EPOS Portal

Mineral resources (2/2)

EPOS Testing Version 1.0.1
EUROPEAN PLATE OBSERVING SYSTEM

Free text search

Filters

Geological Information and Modelling

Mine Discovery Service based on Minerals4EU dataset
Geology > Mineral resources
Visible on: [Map](#) [Table](#)

Advanced search filters (6 of 9)

Coordinates: 90 -90 -180 180

* FeatureType: erl:MineView
* Output format: json
* Request type: GetFeature
* WFS version: 2.0.2

Results per page: 10 Page 1 of 1

43.87018 : -7.555

PIEDRAS ALVARELLES

@featureType	MineView
name	PIEDRAS ALVARELLES
identifier	0043002
status	operatingContinuously
observationMethod	unknown
owner	unknown
positionalAccuracy	unknown

1 of 2

CGI Home | GeoSciML | GeoSciML Wiki | EarthResourceML

System Home | About the system | SPARQL Endpoint | Vocabularies | Search

Concept

Preferred Label
operating continuously

Alternate Profiles
Different views and formats:
[Alternate Profiles ?](#)

URI
<http://resource.geosciml.org/classifier/cgi/mine-status/operating-continuously/2/>

Within Vocab
[Mine Status](#)

Preferred Label operating continuously
Definition A mine is operating continuously
Broader [operating](#)
Exact Match <http://inspire.ec.europa.eu/codelist/MineStatusValue/operatingContinuously>
Notation 01.1..
Is Defined By [Mine Status](#)

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Open Geospatial Consortium

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System Home / Vocabularies / OGC Definitions not managed via delegated registers / unknown

Concept

VALID - Concept is valid

Preferred Label
unknown

URI
<http://www.opengis.net/def/nli/OGC/0/unknown/>

Within Vocab
[OGC Definitions not managed via delegated registers](#)

Definition
The correct value is not known to, or not computable by, the sender of this data. However, the correct value probably exists

Exact Match
unknown
Unknown

label
unknown

Date Modified
2012-02-14
<http://www.opengis.net/doc/nli/ogc/0/unknown/2.0.2.1>

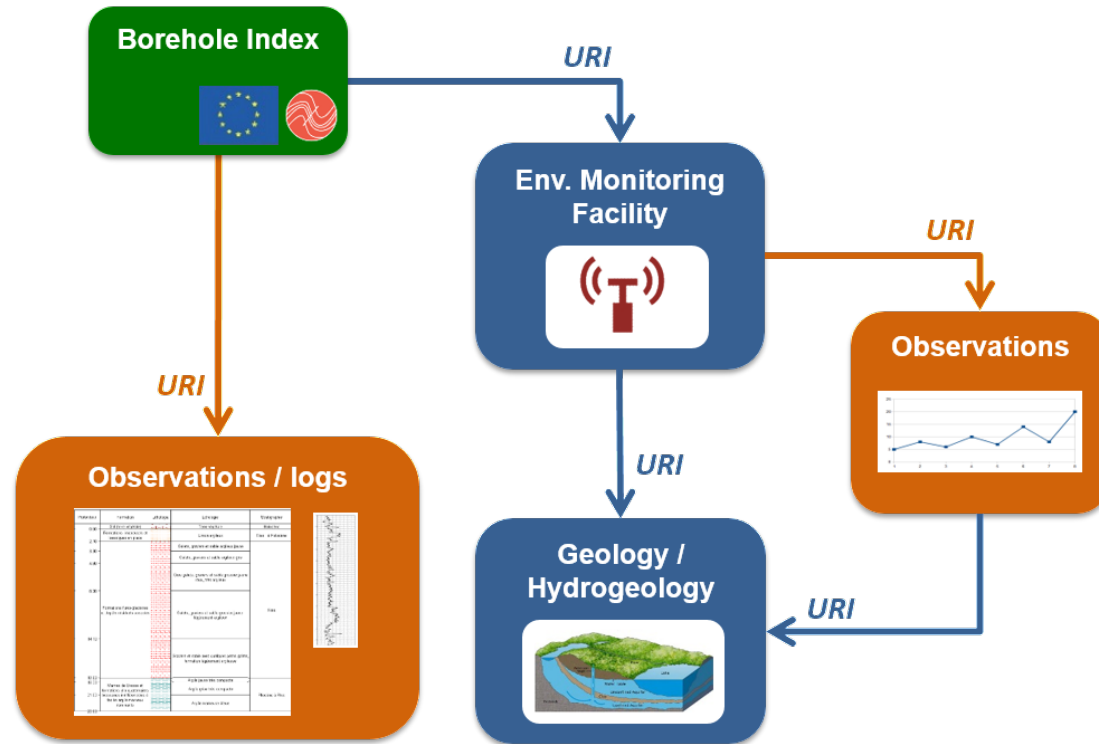
Work program – Future plans (1/2)



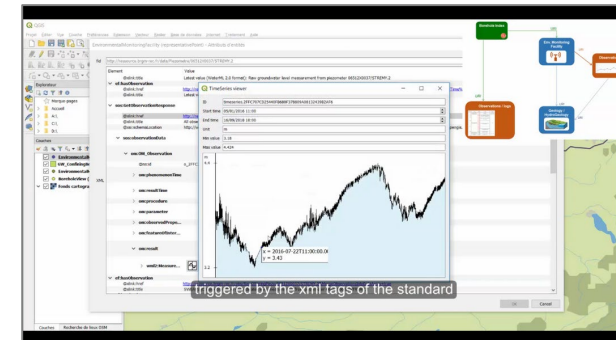
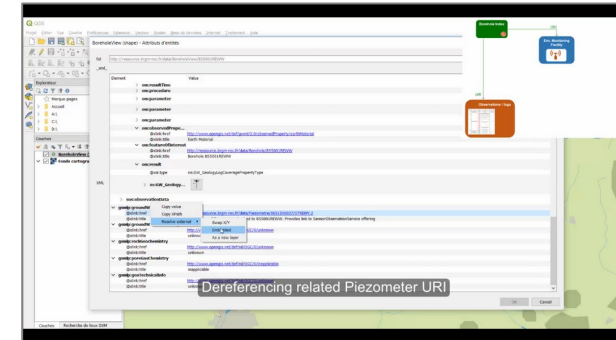
- **Update and display the content of existing data services**
 - Borehole index: harvesting frequency for up-to-date data (comply to legal obligations)
 - Display and interactivity of millions of features (boreholes, maps)
- **Extend the data coverage**
 - Boreholes: Slovenia, Czech Republic, Netherlands, Spain
 - Geological map: Switzerland, Iceland
- **Synergise with other TCS**
 - TCS GIM and TCS Anthropogenic Hazards (upcoming research project Geo-INQUIRE)
 - Boreholes description and Episodes in France, Italy and Spain
- **Provide access to more detailed information**
 - Borehole logs: core description, monitoring sensors, hydrogeological unit, water table time series...
 - From SimpleFeature to ComplexFeature
 - From BoreholeView to GroundWaterML2.0 GW_GeologyLogCoverage
 - Linked Data Approach

Work program – Future plans (2/2)

- Provide access to more detailed information: use case in groundwater monitoring



Borehole-related data sets linked with URIs through a dynamic graph



Implementation with QGIS GML Application Schema Toolbox



Taxi-brousse – M. Urvois

Merci de votre attention
Thank you for your attention
Obrigado pela sua atenção