

# Geological information for Europe: Towards a pan-European Geological Data Infrastructure

Integrating geoscientific information  
for EU competitiveness



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# European societal challenges and geological information

Europe is facing major challenges towards the further development of European society. The most important challenges have been prioritized by the European Commission, providing the framework for the Horizon 2020 Research Programme. These include stimulation of economic recovery in a global economy, securing energy, water, food and natural resources, protection against natural hazards and consequences of climate change, and securing a healthy environment. In many of these domains the use of geological knowledge and information is crucial to enable stakeholders from policy,

research and industry to contribute to sustainable solutions.

At European level this concerns for example the Raw Materials Initiative, the Strategic Energy Technology Plan (SET Plan), the Soil thematic strategy, the Water Framework Directive and INSPIRE. In the marine domain it concerns coastal and off-shore topics covered by the Horizon 2020 focus area 'Blue Growth', including for example marine environment, deep sea resources and coastal development.

## Towards a European Geological Service

At national and regional levels, the geological survey organizations of Europe play an important role for the long-term (public) management of substantial geological data and knowledge repositories. At European level, the surveys collaborate in many cross-border and EU-projects to develop interoperable, harmonized geoscientific information in multiple domains, based on their national knowledge and databases. Working towards the European societal challenges, international and European stakeholders are calling for increased

coordination and more sustainable accessibility of geological information at EU-level.

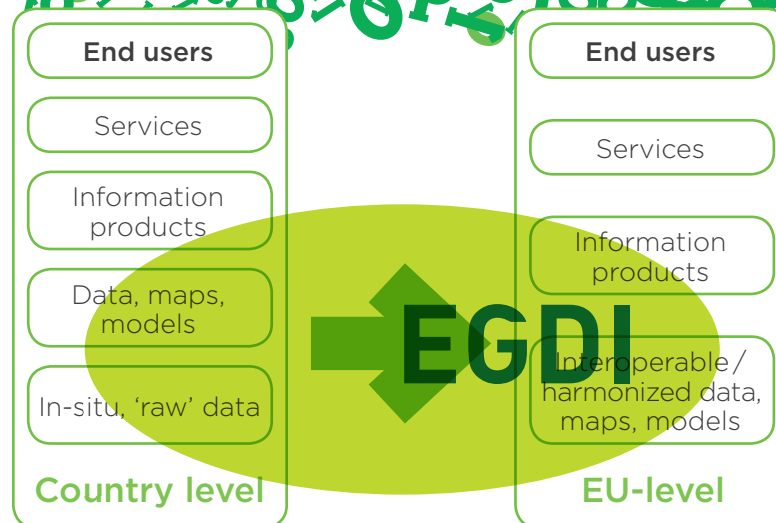
To support this, the geological surveys of Europe have joined forces to prepare for a European Geological Data Infrastructure (EGDI), under the framework of the EU-funded EGDI-Scope study. This is an important pillar under their joint strategy towards the development of a European Geological Service.

# Europe-wide access to valuable geological information

The EGDI will cover pan-European, interoperable, thematic geological data and information related to e.g. geohazards, mineral resources and groundwater and soil quality. To describe its scope, it is also important to distinguish different characteristics and 'levels' of geological data and information. The basic level covers 'raw data', e.g. from boreholes, earth observation and monitoring programs. It can also contain a variety of technical reports, exploration permit documentation, et cetera. A next level could be described as 'interpreted geological information', such as (digital) geological maps and models.

The following level could be described as 'information products' that can be derived from the other levels, for example by applying specific queries and calculations, and combining with information from other domains. A Minerals Year Book is an example of this. On the basis of these information products, 'services' can be delivered to end users from different domains. The quality of these services depends on the long-term availability, updating and development of the 'underlying' information levels.

This 'information chain' is very different for every country, and for every thematic domain, due to different methodologies and standards, legal, economic and institutional frameworks, historical settings and so on. The EGDI will be the 'junction', where relevant data and information from national repositories will be transformed, assembled and made accessible at a central (European) level. This 'transforming and assembling' is covered by continuous EU-projects in different domains, and the EGDI will provide the e-infrastructure to secure sustainable access and management of the most relevant results.



# Roadmap towards the EGDI

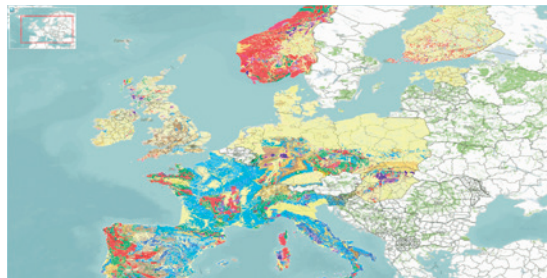
The EGDI is a growth model. Starting point is the current EGDI-Scope study (finish 2014) assessing the relevant use cases, datasets, functional and technical requirements, legal topics and governance framework. The next phase will cover the implementation of a first operational technical and organizational structure, securing the maintenance and further development of datasets, tools and functionalities from prioritized European projects:

- OneGeologyEurope: harmonised 1:1 million geological map data, serving these data for 21 countries through web services in a multilingual portal in 18 languages.  
@ [www.eurogeosurveys.org/projects/onegeology-europe](http://www.eurogeosurveys.org/projects/onegeology-europe)
- Minerals4EU/ EuroGeoSource: aggregated geographical information on geo-energy (oil, gas, coal etc.) and mineral resources (metallic and non-metallic minerals, industrial minerals and construction materials).  
@ [www.eurogeosource.eu](http://www.eurogeosource.eu) - [www.minerals4eu.eu](http://www.minerals4eu.eu)
- EMODnet-Geology: Data on seabed substrate, sea-floor geology, coastal behaviour, geological events and probabilities, and minerals. @ [www.emodnet.eu](http://www.emodnet.eu)

- PANGEO: The PanGeo service provides entirely free access to geohazard information for many of the largest cities in Europe.  
@ [www.pangeoproject.eu](http://www.pangeoproject.eu)
- GEMAS: Geochemical mapping of agricultural and grazing land soil of Europe.  
@ [www.eurogeosurveys.org](http://www.eurogeosurveys.org)

After the implementation phase the EGDI will continuously extend towards being the central junction for all relevant pan-European interoperable, harmonised geological information for stakeholders from policy, industry and general public.

Subsequent extensions of the EGDI will be based on results from past, current and future EU-projects.



Geological Map at European scale from EU-project OneGeologyEurope

## EGDI: Governance

The EGDI will be run – and owned – by Europe’s national geological survey organizations. To manage the EGDI, and to secure the necessary legal and financial requirements, a central operational structure will be established in close connection with EuroGeoSurveys (Association of the European Geological Surveys). A main task of this structure will be to provide periodic (annual) work plans that will guide the development of the EGDI.

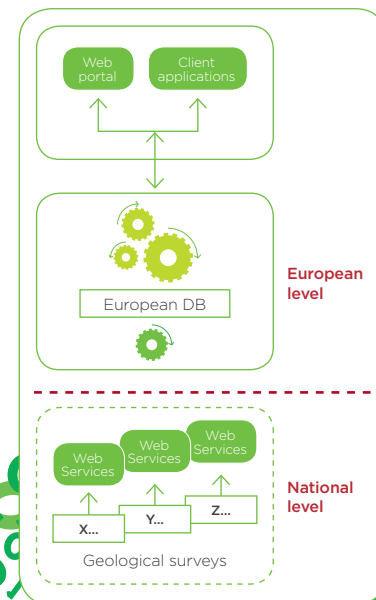
These work plans will be approved by representatives from the European geological surveys. The EGDI will maintain close relations to other EU level organizations, such as DG JRC (Joint Research Centre), EEA (European Environment Agency) and other DG’s, as well as with other infrastructures, networks and programs, such as GEO, EPOS and OneGeology.

# Technical infrastructure

The EGDI will provide a distributed system relying on national data providers (in most cases survey organizations). The data are delivered to the European level through web services. The INSPIRE Directive already provides data models for some data sets to be delivered by Member States. For parts of the data, the EGDI system will also include a European database where (processed) data can be stored.

This (periodically updated) data storage also enables the split between data collection and diffusion databases as well as the application of tools and web services at central level. In addition, combination with data from external sources will then be possible, which increases the functionality of the generated information products.

The user interface towards the data and information will be a central data access portal (The EGDI portal) and a number of thematic portals. The thematic portals will typically be developed by dedicated EU projects, but the EGDI governance body will provide implementation guidelines and cross-domain coordination to ensure proper connection with the underlying long-term sustainable data infrastructure and compliance with the identified generic user requirements.



# Legal topics

In its first stage, the EGDI will focus on access to open data, that is publicly available and free of charge. In subsequent stages it might be required to include also charged or even restricted data. In any case the EGDI (and included data and functionalities) will have to comply to legal frameworks that do not conflict with the legal regulations of any of the involved countries, which are very different. EGDI-Scope has investigated the most important licensing frameworks, and the conditions for their application.

To ensure the trust in the EGDI service, three main domains will be covered: trust in the data (e.g. quality), trust in the services (e.g. availability) and trust in the people (e.g. regarding access and use conditions).

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