

**m** INTELL  
**4** EU



# Mineral Intelligence for Europe

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731166



## Overall objectives of Mintell4EU:



- ① To update the electronic European Minerals Yearbook with production and trade data, resource and reserve data as well as exploration information.
- ② To improve the quality and spatial coverage of the minerals inventory, addressing harmonization issues and facilitating interoperability with other ongoing European mineral intelligence projects.
- ③ To test the application of the UNFC classification system as a tool to obtain more accurate information on pan-European mineral inventories.
- ④ To establish recommendation on interactions between already existing databases and data portals and the Raw Materials Information System (RMIS).
- ⑤ To integration of the electronic European Minerals Yearbook and minerals inventory (Minerals4EU database) in the European Geological Data Infrastructure (EGDI).



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# Mintell4EU in numbers

- 27 partners from 25 countries – all national or regional geosurveys
- Five WPs:
  1. Management, Communication, and Sustainability (GEUS)
  2. Update to Electronic European Minerals Yearbook (BGS)
  3. Minerals Inventory (GeoZS)
  4. UNFC pilot (NGU)
  5. Improvement of the KDPs' application and interaction with the RMIS and EGDI (BRGM & GEUS)



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## Why Mintell4EU?



- Builds on previous projects
- Extends the data coverage and harmonisation
- Develops Quality Control tools and automated harvesting systems
- Integrate new and existing data into EGDI

All to provide *easy web access* to *useful* and *reliable* mineral intelligence for *all of Europe*



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# Update to electronic Minerals Yearbook



## Objective

- To update the data contained within the European Minerals Yearbook, produced by the Minerals4EU project (2013-2015). The yearbook contained:
  - Production data 2004 to 2013
  - Import and Export data 2004 to 2013
  - Resource, reserve, exploration data with a reference year of 2013
- Updates in Mintell4EU:
  - Production data updates 2014 to 2017; trade data updates 2014 to 2016 (finalized and data transferred to eMY)
  - Production data updates 2018 and 2019; trade data updates 2017 and 2018 (ongoing)
  - Resources, reserves and exploration data updates with a reference year of 2019 (ongoing)



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## Updated Yearbook – front page



HOME DATA SEARCH MAP VIEWER YEARBOOK METADATA CATALOG

### EUROPEAN MINERALS YEARBOOK

Welcome to the 'European Minerals Yearbook'.

This Yearbook contains data for primary minerals production, trade, resources and reserves; and for secondary materials it contains data for mineral-based waste generation, treatment and trade. It also contains case studies relating to the recovery of 10 commodities from key waste streams. For these data, please select one of the 4 options shown below in the grey section.

Also available from the Yearbook are three brand new options for viewing data related to the social and environmental dimensions of mineral extraction. These are a small selection of the datasets that could potentially be available for these aspects, but these are presented here as a demonstration. For these data, please select one of the 3 options shown below in the green section.

If you have any comments regarding this Yearbook, please send them to [Yearbook@minerals4EU.eu](mailto:Yearbook@minerals4EU.eu)



**BY COUNTRY**

Albania

**VIEW**



**BY COMMODITY**  
FOR PRIMARY MINERALS

Aggregates and relat

**VIEW**



**BY CATEGORY**

FOR MINERAL-BASED WASTE FLOWS FOR CASE STUDIES ON COMMODITIES FROM WASTE AND OTHER YEARBOOK-RELATED DOCUMENTS

Batteries and accum

**VIEW**



**VIEW**

Demonstration datasets related to selected social and environmental dimensions of mineral extraction.

New logos added

Updated text

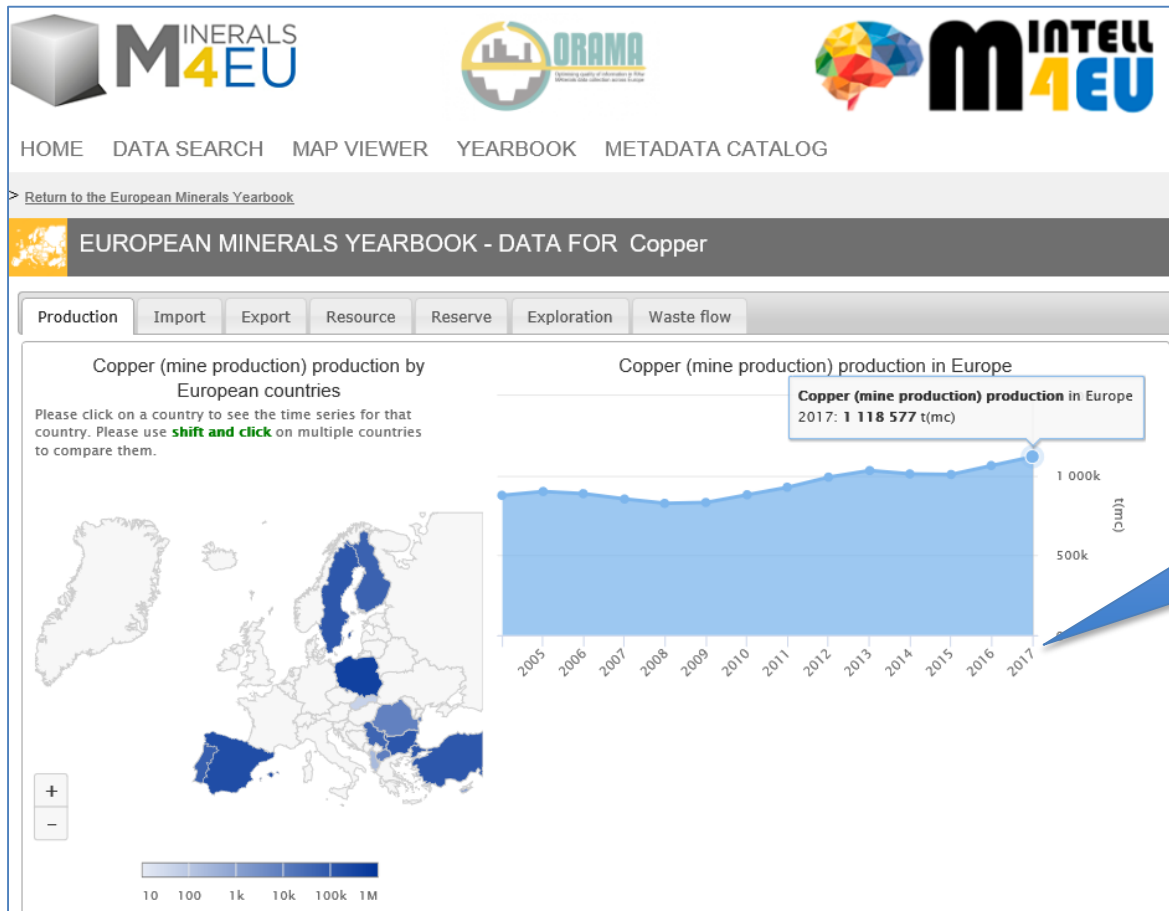
Updated data in these two sections



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## Updated Yearbook - data



Production data updated for all years; new data added for 2014 to 2017

Trade data added for 2014 to 2016



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## More info:

To view the electronic European Minerals Yearbook, please visit:  
[http://minerals4eu.brgm-rec.fr/m4eu-yearbook/theme\\_selection.html](http://minerals4eu.brgm-rec.fr/m4eu-yearbook/theme_selection.html)

Any questions, please contact: Teresa Brown [tbrown@bgs.ac.uk](mailto:tbrown@bgs.ac.uk)



**British  
Geological Survey**

Expert | Impartial | Innovative



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# Mineral Inventory

*See also presentation D702*



## Objective

- To improve the Minerals Inventory (current Minerals4EU database) by
  - Identifying and filling data gaps,
  - Identifying low-quality or completely missing data
  - Harmonizing data
  - Extending the spatial coverage
  - Develop Quality Control tool
- To document historical mine sites with touristic features and provide information and a map (layer in EGDI)



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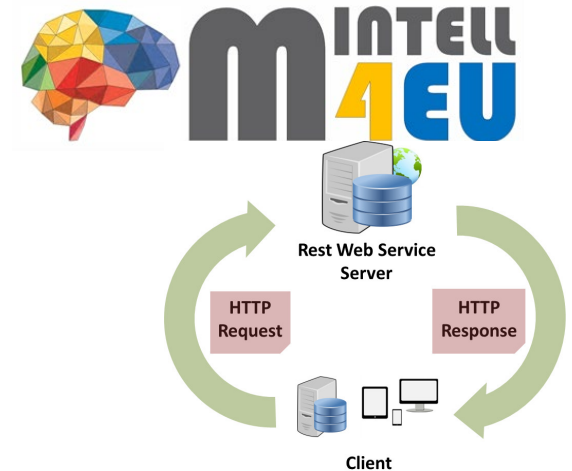
## Extending the existing harvesting system

- Collecting and validating data
- Automatic extraction from web services
- INSPIRE solution as a common standard

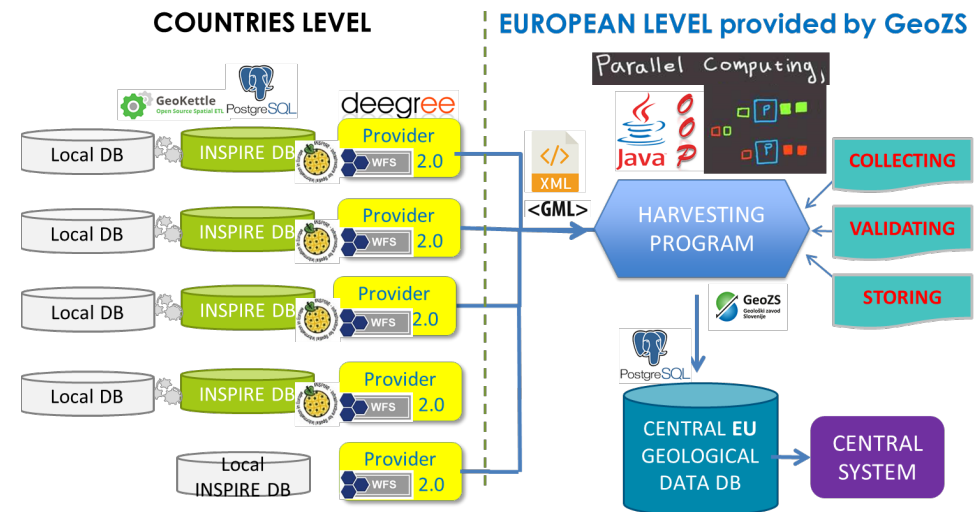
- For occurrence description
- For information exchange
- Basic data models are extensible

## ➤ Technical routines

- Count report
- Geometry check
- Log files
- Warning/error files
- SQL command files



## Harvesting System Architecture



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# Mintell4EU Quality Control Application



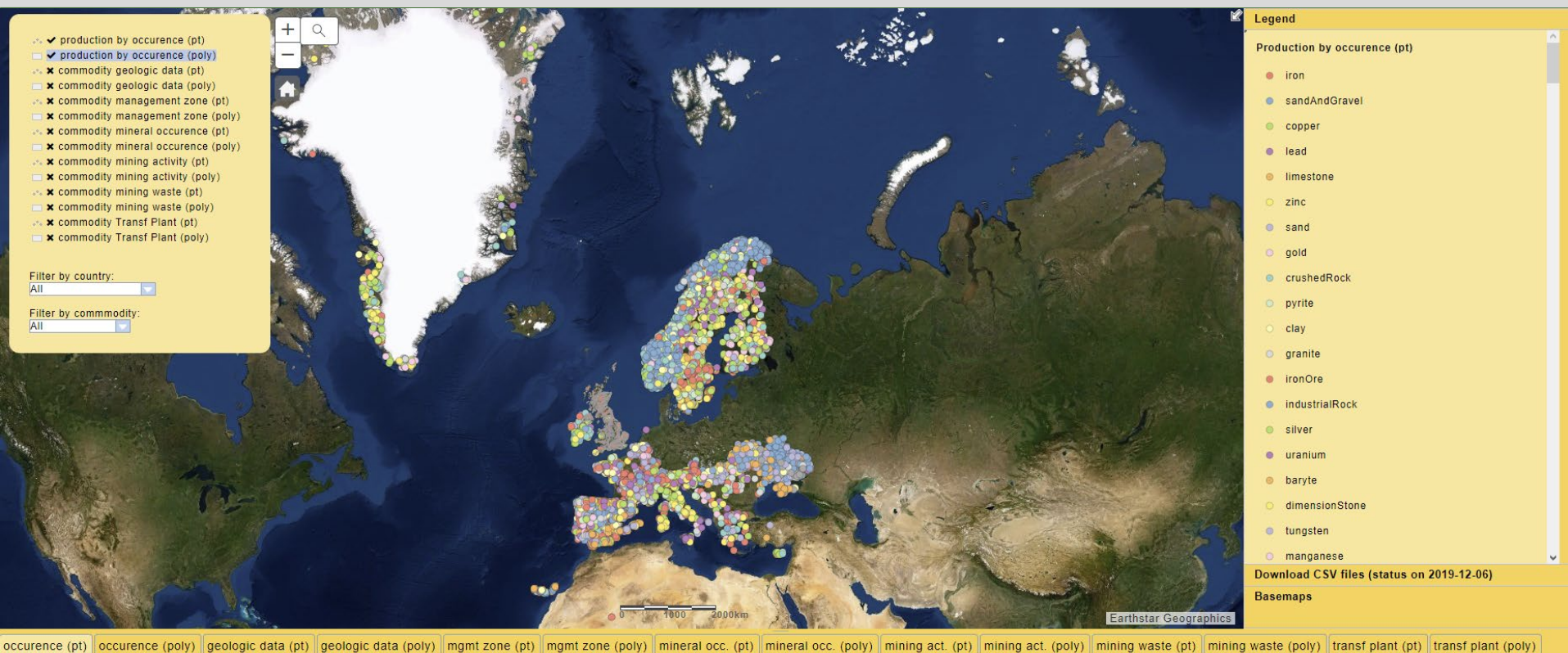
Application for quality check of data stored in the M4EU DB

- The Mintell4EU QCA is temporary **running on a GeoZS server** to enable higher stability, security and optimal connection to harvesting system.
- Status of the data corresponds to the **latest reported data** from data providers.
- **Constant modification** due to new data updates and improvements in the harvesting system.



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occurrence (pt) occurrence (poly) geologic data (pt) geologic data (poly) mgmt zone (pt) mgmt zone (poly) mineral occ. (pt) mineral occ. (poly) mining act. (pt) mining act. (poly) mining waste (pt) mining waste (poly) trans plant (pt) trans plant (poly)

mintell.DBO.m4eu\_productionbyoccurrence\_pt\_vw (Features: 130346, Selected: 0)

mineraloccurrenceidbk	Id	country	commodity	minquantity	maxquantity	uomquantity	name	ty
3014	3014	GR	zinc	84,480	84,480	t	GRC-00720	ST_Point
3014	3014	GR	iron	84,480	84,480	t	GRC-00720	ST_Point
3014	3014	GR	copper	84,480	84,480	t	GRC-00720	ST_Point
3014	3014	GR	zinc	0	0	t	GRC-00720	ST_Point
3014	3014	GR	iron	0	0	t	GRC-00720	ST_Point
3014	3014	GR	copper	0	0	t	GRC-00720	ST_Point
3029	3029	GR	silver	0	0	t	GRC-00739	ST_Point
3029	3029	GR	nickel	0	0	t	GRC-00739	ST_Point

<https://mintell4eu-qca.geo-zs.si/>



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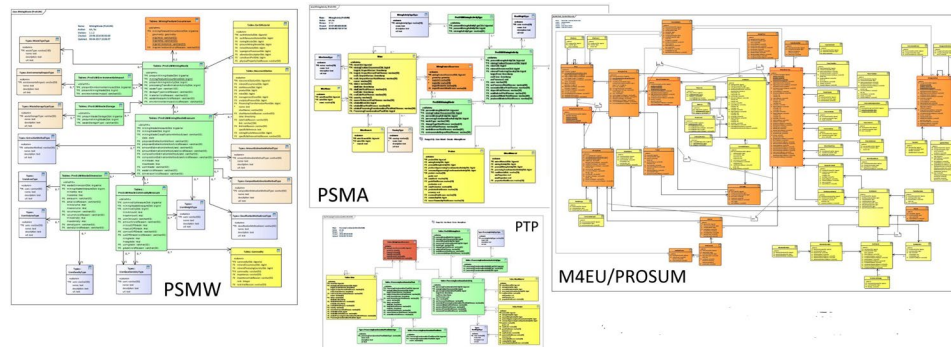


# Currently 30 data providers for M4EU DB

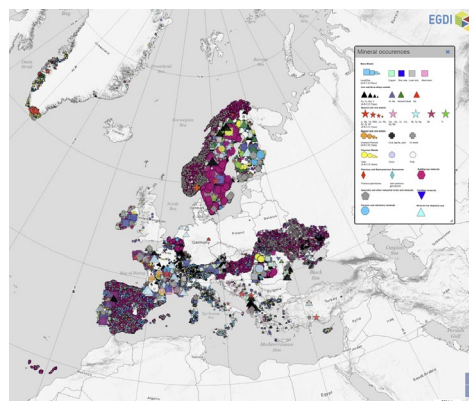


1. Albania
2. Austria
3. Belgium
4. Federation of Bosnia and Hercegovina
5. Bosnia and Hercegovina – Republic of Srpska
6. Croatia
7. Cyprus
8. Czech Republic
9. Denmark
10. Finland
11. France
12. Greece
13. Hungary
14. Ireland
15. Italy
16. Montenegro
17. Netherlands
18. Norway
19. Poland
20. Portugal
21. Romania
22. Serbia
23. Slovakia
24. Slovenia
25. Spain
26. Sweden
27. Switzerland
28. Turkey
29. Ukraine
30. United Kingdom

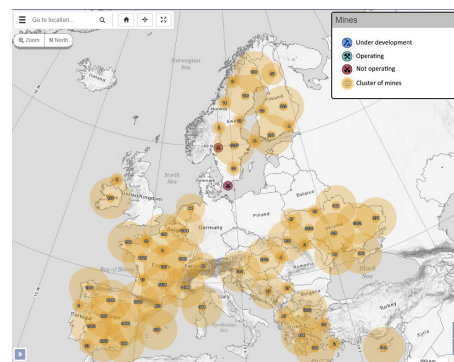
New data providers marked in red, some via cooperation with the RESEERVE project, and a German State (Regierungs-präsidium Freiburg) in Mintell4EU



Consolidated view on the EGDl platform



<https://geoera.eu/projects/mintell4eu7/>



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## Historical mine sites



Documentation of those mining areas which have developed (active) **tourist attractions or amenities following the closure of the mines.**

- Recording of relevant features and attributes of each site (a brief overview of the mine, its current condition, attractions and management of the site).
- The intention is to create a story map available from the EGDI platform.




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Mintell4EU Historical mine sites - Shortlist builder-Copy6

DE DK ES GB IE

### Arigna



The main activity at Arigna was Underground Mining. The site was active from 1600 to 1990. The main commodity extracted on location was Coal. This was extracted from rock formed during the Carboniferous era. Further information can be found below.


Chimney, Crusher, Engine House, Pit, Ruins, Spoil Heaps, Mining Tracks, Mining Village, Underground workings, Winch

Baby changing facilities, Carpark, Childrens Play Area, Coffee Shop, Free WiFi, Fully wheelchair accessible, Gift Shop, Guided Tours, Info Boards, Library, Museum, Public Phone, Walking Trails

Audio exhibition, Guided tour, Historical documents, Library, Mining equipment, Mining history exhibit, Museum, Photographs, Underground access

Yes

[More info](#)



## Historical mine sites – possible outlook of a story map

Esri, HERE, Garmin, FAO, NOAA, USGS

EN 12:18 PM 3/10/2020



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## More info:

Any questions, please contact:  
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Geological Survey of Slovenia



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## UNFC pilot in Mintell4EU



### Objective

- To demonstrate that geological surveys will be able to apply UNFC to the complete range of mineral resources (construction materials, industrial minerals and metals) and across all knowledge levels.
- To show if the application of UNFC will provide better harmonization of mineral resource data nationally, and across Europe, and to demonstrate the strength of UNFC as a tool for more accurate mineral inventories.
- The work is case study based, but aimed to be Pan-European in nature; it covers the range of solid mineral resource types



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## UNFC PILOT



### ➤ Why?

- Geological surveys need a tool that can be used to manage a country's resources and potential resources.
- The society (at national and European level) needs a tool for resource awareness, foresight and policy formulation, for safeguarding and manageability
- The system must be manageable for the geological surveys

### ➤ How?

- We apply UNFC on different commodities and in different countries.
- We test the application of the UNFC classification system as a tool to obtain more accurate information on pan-European mineral inventories.
- We use experiences from previous and collaborate with ongoing activities (ORAMA, Nordic UNFC project, UNECE etc.) and build our work on this.



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## Case studies



### Ongoing case studies across Europe

Country	Gold	Copper	Cobalt	REE	Phosphate	Limestone	Graphite	Aggregates	Natural stone	Peat	Secondaries	Lithium
Austria								GBA				
Slovenia						GeoZS						
Norway		NGU	NGU		NGU		NGU	NGU	NGU			
Denmark						GEUS		GEUS (marine)				
Ukraine							GeoInform					
Finland	GTK	GTK	GTK				GTK			GTK		
Kroatia						HGI-CGS	?	HGI-CGS	HGI-CGS			
Hungary	MBFSZ (Ores)				MBFSZ (non-metallic)			MBFSZ			MBFSZ	
Belgium					GSB-RBINS	GSB-RBINS						
Sweden				SGU								
#	1	2	2	1	2	4	3	5	2	1	1	0



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## UNFC pilot – next steps and outcome



- Test cases are under elaboration by partners, supplemented with examples from other RM projects as FRAME and EuroLithos
  - Existing material and guidelines, e.g. from the ORAMA project are used in the test cases
  - A code list to be able to report UNFC into EGDI is being defined
  - Workshop in Orléans, France in October based on the finalised test cases  
Demonstrate cross border aggregation (Cu, Aggregates and Industrial minerals)
- ❖ **Finally, a recommendation on IF and HOW to implement the UNFC classification, based on manageability and coherence in national to Pan-European datasets and aggregated inventories, will be formulated.**



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## More info:

Any questions, please contact:  
Kari Aasly [Kari.Aasly@ngu.no](mailto:Kari.Aasly@ngu.no)



GEOLOGICAL  
SURVEY OF  
NORWAY

- NGU -



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# Improving the of Knowledge Data Platform applications and interaction with RMIS and EGDI



## Objective

- To integrate the electronic European Minerals Yearbook and the Minerals Inventory (Minerals4EU database) in the European Geological Data Infrastructure (EGDI).
- To establish recommendation on interactions between already existing databases and data portals and the Raw Materials Information System (RMIS).
- To set up web services and Application Programming Interfaces (APIs) for facilitating data exchange with external systems.



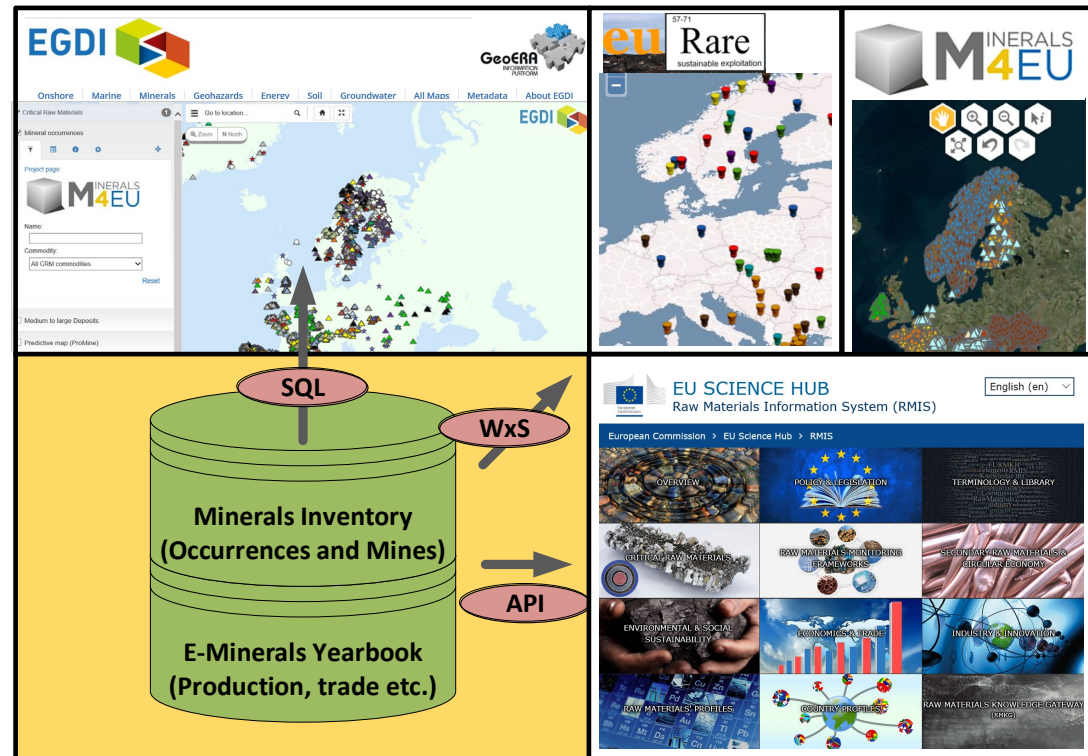
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# Integration of updated European data sets in the EGDI



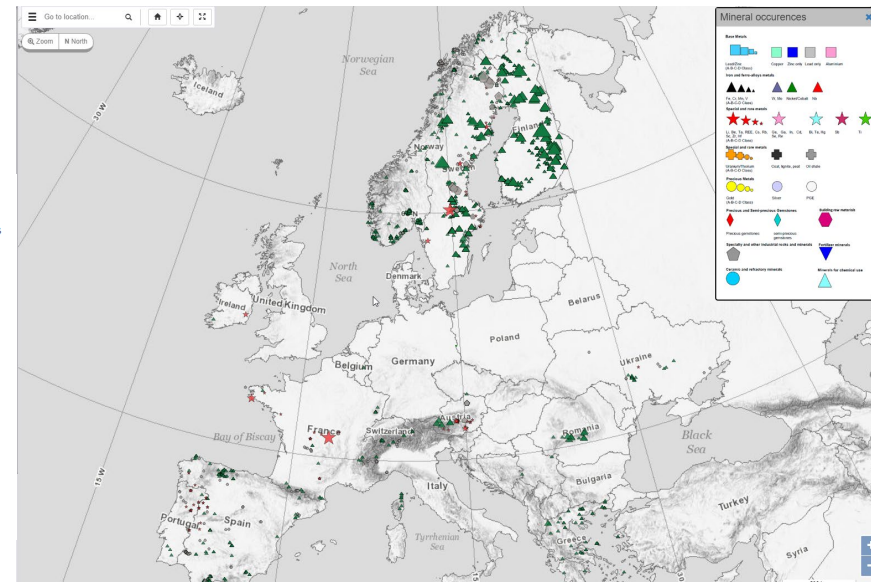
- Minerals occurrences
- Mineral yearbook
  - Production
  - Trade (Import and Export)
  - Resources, reserves and exploration
- Transfer to a panel of public data platforms:
  - EGDI: multi-thematic geoscience
  - EURare, Minerals4EU: mineral resources
  - RMIS: European Commission Joint Research Centre



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- 
- The chart displays the annual nickel mine production in tonnes (million content) from 2004 to 2013. The total production, represented by the blue area, shows a general upward trend with significant fluctuations, peaking in 2011 and 2013. Greece (red area) and Spain (green area) contribute smaller, more stable portions of the total production, while Norway (orange area) shows a very slight increase over the period.
- | Year | All countries | Greece | Norway | Spain |
|------|---------------|--------|--------|-------|
| 2004 | 34,000        | 19,000 | 1,000  | 1,000 |
| 2005 | 45,000        | 19,000 | 1,000  | 2,000 |
| 2006 | 56,000        | 21,000 | 1,000  | 2,000 |
| 2007 | 61,000        | 20,000 | 1,000  | 2,000 |
| 2008 | 61,000        | 19,000 | 1,000  | 3,000 |
| 2009 | 44,000        | 10,000 | 1,000  | 3,000 |
| 2010 | 63,000        | 17,000 | 1,000  | 2,000 |
| 2011 | 77,000        | 22,000 | 1,000  | 1,000 |
| 2012 | 61,000        | 18,000 | 1,000  | 2,000 |
| 2013 | 77,000        | 17,000 | 1,000  | 4,000 |



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## Next steps



- Dialog between the project and the JRC is ongoing on what data should be made available to the RMIS and how it should be delivered.
- Transfer the electronic minerals yearbook data into the Minerals4EU database.
- Trade and production data by country and commodity from the mineral yearbook will be a new layer on the EGDl platform.
- Development of a dedicated “search” capability to the RMIS interface.



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## More info:

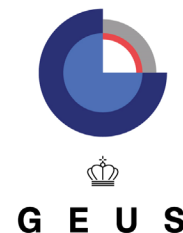
Any questions, please contact:

Marc Urvois [m.urvois@brgm.fr](mailto:m.urvois@brgm.fr)

Bureau de Recherches Géologiques et Minières  
or

Mikael Pedersen [mp@geus.dk](mailto:mp@geus.dk)

Geological Survey of Denmark and Greenland



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# Mintell4EU expected impacts - 1



- The greatest impact is presenting the most comprehensive set of mineral resource data targeted at specific end users:
  - EDGI: geoscientific audience
  - Minerals4EU: thematic audience
  - RMIS: policy makers and regulatory audience

A big impact of the project will be to update the existing information and show data from new providers for the first time.

- The integration of the e-Mineral Yearbook with the Minerals Inventory result in an improved pan-European one-stop-information gateway on primary and secondary mineral resources.



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## Mintell4EU expected impacts 2



- Resource and reserve information in the form of UNFC will start to become available and provide a new insight on European mineral resources. This will highlight the most important deposits that could be developed.
- The project develops previous ones from over a decade, bringing content enrichment, quality control and technical improvements to a panel of stakeholders already using the existing EU Knowledge Data Platforms e.g. Minerals4EU and euRare.
- The project will combine results from other GeoERA RM projects that complement each other to increase the overall impact of the results.

A more useful systems should lead to greater use by decision makers.



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# Thank you for listening

General questions:

[dw@geus.dk](mailto:dw@geus.dk) and [lfj@geus.dk](mailto:lfj@geus.dk)



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