MINERAL INTELLIGENCE
FOR EUROPE

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MINERALS INVENTORY REPORT – status after 1st year

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GENERAL INTRODUCTION

About Mintell4EU:

The European Union has identified security of supply, improvement in environmental management and resource efficiency as key challenges for the raw materials sector. Data regarding the location and spatial distribution of primary and secondary raw materials with respect to exploration, exploitation, production and trade activities, underpin decision making in government and industry. Given the dynamic character of such data regular updates of comprehensive, reliable and harmonized information across borders are required. The overall aim of this project is to improve the European Knowledge Base on raw materials by updating the electronic Minerals Yearbook produced in the Minerals4EU project and to extend the spatial coverage and quality of data currently in the Minerals Inventory. The project will, furthermore, aim to increase the degree of harmonization, communication and interaction between existing data platforms, with the ambition of reaching a fully operational and reliable data knowledge management system, fulfilling the European needs and taking into account the Raw Materials Information System (RMIS) of the European Union. Importantly, the project will also integrate the electronic Minerals Yearbook into the Minerals4EU database, ensuring future sustainability as part of the EuroGeoSurveys-governed European Geological Data Infrastructure (EGDI). All results will be integrated in the GeoERA Information Platform that will, by end of the project, disseminate European raw materials intelligence in a uniform way to end users through a common web portal interface. Finally, the applicability of the UNFC classification system for obtaining more accurate Pan-European mineral inventories will be tested.

EXECUTIVE REPORT SUMMARY

This report describes how Mintell4EU started with the process of refining the Minerals Inventory (current Minerals4EU (M4EU) database) through:

- identification of data gaps in spatial coverage;
- setting up the quality control application to identify gaps and errors in data;
- harvesting quality assurance to identify technical errors in the process of harvesting data;
- connections established with other relevant projects.

The report describes the status after one year and sets the time scale for further activities, specifically in regard to data providers (workshops, individual correspondence, use cases…).

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1 MINERALS INVENTORY DATA CONTROL

The main objectives of the work package 3 is to extend the spatial coverage and quality of data currently stored in the Minerals4EU database to have access to up-to-date and harmonized information across borders on primary raw materials by using the existing systems developed within the project Minerals4EU. Currently, the Minerals4EU database is not covering all Europe and it is not fully harmonized, and a different degree of data coverage is available from country to country.

The first year the project mainly focused on extension of the existing Minerals Inventory spatial coverage and addressing problems of data quality. Our activities to refine the Minerals Inventory (current Minerals4EU database) included:

1. Setting up a Mintell4EU Quality Control Application for quality check of data stored in the Minerals Inventory.
2. Extension of spatial coverage with a strong interlinkage to the RESEERVE project (see Chapter 2 of this document), through which the Minerals Inventory was modified with data from Western Balkan countries, even though in limited manner.
3. New connections with data providers from Romania, Albania (same organization, but new responsible person) and Germany (States new data provider from Regierungspräsidium Freiburg) were established
   .
4. In strong connection to WP5 we were also working on a harvesting reporting system including quality assurance procedures to ensure that data harvesting happens correctly.

At the end of June 2019, the ORAMA project published technical guidance for the data harmonization of raw materials, which will be examined in detail to implement them in Mintell4EU. Furthermore, ORAMA prepares training materials for data providers that will also be taken into account.

1.1 Mintell4EU Quality Control Application

For the purpose of data quality check and production of relevant maps on commodities for the Mintell4EU (Minerals4EU) database we have created an application (Figure 1), where data from the current M4EU harvesting database are displayed through different spatial (point and polygon) layers that show different information on commodities.

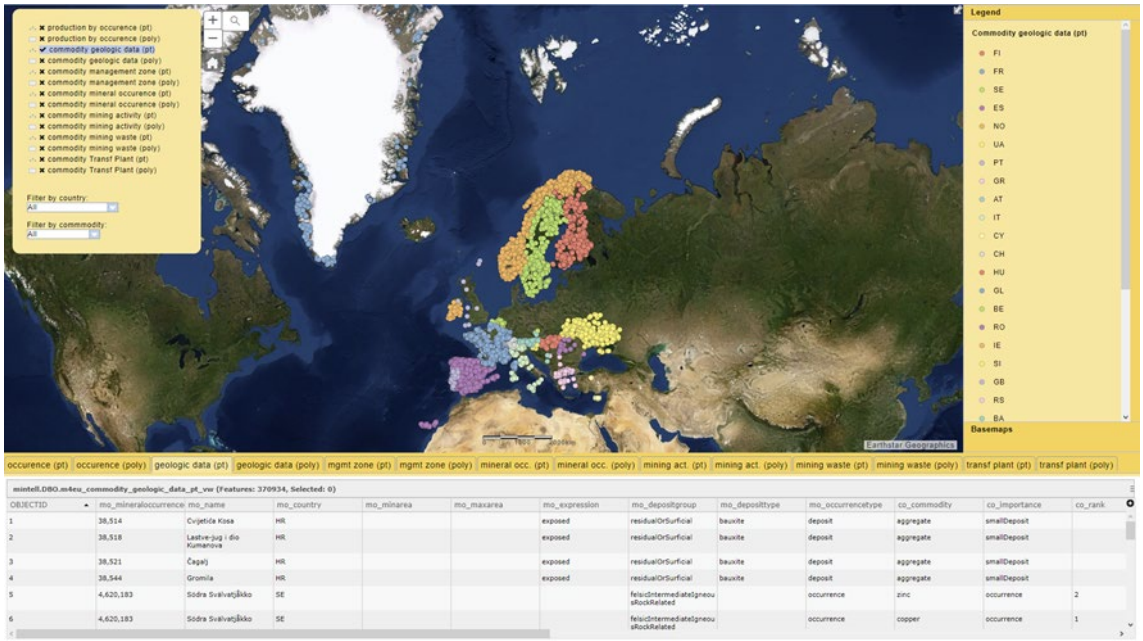


Figure 1: Front page of the Mintell4EU Quality Control Application.

All commodities in the database are related to mineral occurrences that must have location data (coordinates) and occurrence type. It was decided to show information on commodities such as:
- production;
- geological data (including end use potential);
- management zones;
- mineral occurrences (including UNFC);
- mining activity;
- mining waste (data, collected in the ProSum project);
- transformation plants.

Not all attributes, connected to commodity within selected layers, are displayed on the application, only the most relevant (marked green in the Appendix I of this report). This decision was made to ease control of data for data providers, to achieve higher transparency of the data themselves and to speed the process of displaying data on the Quality Control application. Nevertheless, all attributes, connected to commodities within related content will be available as “export to csv” per each country.

At the moment there are two search filters added to the application. One enables selection of desired country and the other selection of one of the prioritized commodities. Our starting point for commodity prioritization is battery elements, in specific lithium, cobalt, graphite and nickel (Deliverable D1.2 Project Management Plan), so the filter enables a user to select amongst the four above mentioned commodities or to select all, which covers other commodities as well.

When a country is selected (for instance we are looking at geological data of Portugal and commodity cobalt), the table geologic data (pt) is updated accordingly, and records are displayed with their existing attributes – see Figure 2 below).

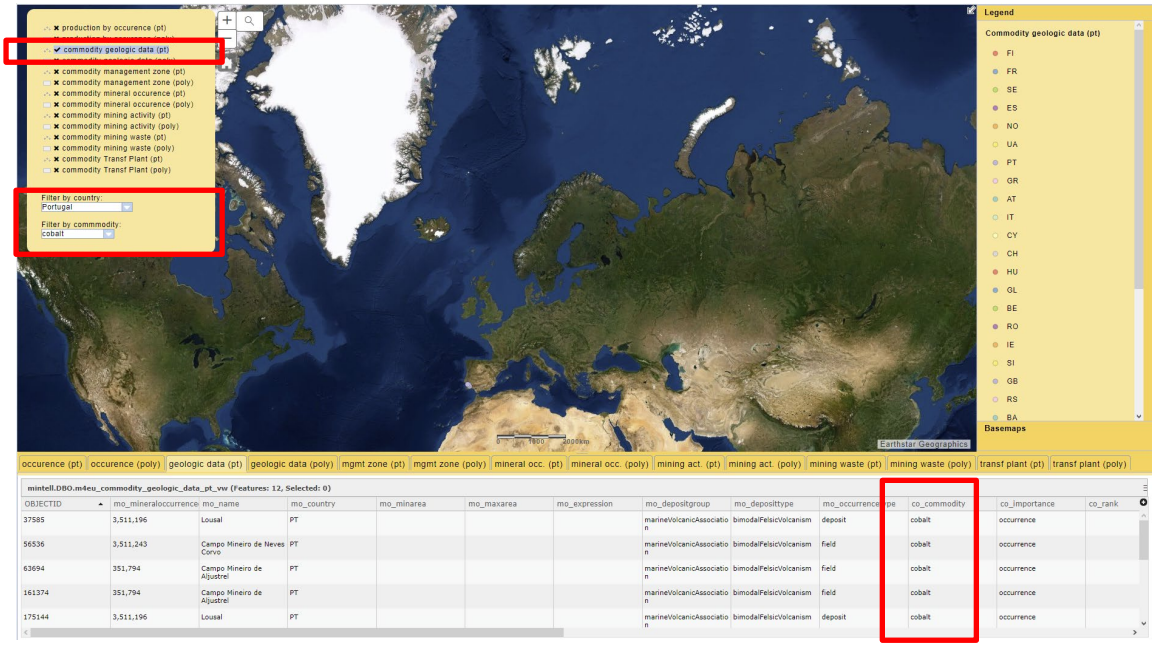


Figure 2: Example of geological data for commodity cobalt in Portugal.

By selecting a row in the table, a colored selection of points is displayed on a map.

By selecting a commodity and / or a country, the same filter is also set for other layers, whether or not the layer is already visible.

No tables are generated in advance but begin to generate only when the layer is switched on: the corresponding layer <-> corresponding table.

If data are not displayed in the table, you have an additional refresh / reload table option in the table menu to avoid possible technical problems, occurring within ArcGIS JavaScript.

The Mintell4EU Quality Control Application is temporary running on a GeoZS server to enable higher stability, security and optimal connection to harvesting system: https://mintell4eu-qca.geo-zs-si/ (status 19th August 2019) and it will be subject to constant modification due to improvements in the harvesting system.

There will be a Mintell4EU consortium meeting in October 2019, where the application will be presented, and guidelines distributed among data providers. Till then it should be considered as a working version with the possibility of errors.

We propose to optimize the communication process so that information of new updates will not be lost.

The proposed workflow for data providers related to the Mintell4EU Quality Control Application includes 4 phases:

1. A data provider identifies errors or missing information;
2. A data provider updates a local (national) database and sends information on updated service to the e-mail address harvesting@geo-zs.si;

3. The harvesting is updated accordingly in the shortest possible time (the process of updating might be delayed due to human or technical factor);
4. The data provider gets feedback on updated data via e-mail and checks the application again to verify that the new information has been transferred to the harvesting database successfully.

1.1.1 Geometry issues

When manipulating data and preparing services upon the harvesting database, we came across a technical issue of geometry as we identified errors in geometrical objects within records in the database (Table 1 and Table 2, status of data June 2019). It was assumed, that errors originate from the harvesting process itself.

Table 1: Number of records in the Minerals4EU database (point and polygon) according to correctness of geometry.

	PT	PL	PT_ VALID	PT_ NOTVALID	PL_ VALID	PL_ NOTVALID
COMMODITY_MINERALOCCURRENCE	129228	28391	129228	0	24368	4023
COMMODITY_GEOLOGIC_DATA	370934	97517	370934	0	83011	14506
COMMODITY_MANAGEMENTZONE	3511	0	3511	0	0	0
COMMODITY_MINING_ACTIVITY	133546	27113	133546	0	23090	4023
COMMODITY_MINING_EWASTE	120568	27113	120568	0	23090	4023
COMMODITY_TRANSF_PLANT	120568	27113	120568	0	23090	4023
PRODUCTIONBYOCCURRENCE	130876	31432	130876	0	27206	4226

*PT – point data; PL – polygon data

Table 2: Number of records in the Mintell4EU Quality Control Application (point and polygon) according to correctness of geometry.

	PT	PL
COMMODITY_MINERALOCCURRENCE	123477	24368
COMMODITY_GEOLOGIC_DATA	370934	83011
COMMODITY_MANAGEMENTZONE	3511	0
COMMODITY_MINING_ACTIVITY	133546	23090
COMMODITY_MINING_WASTE	120568	23090
COMMODITY_TRANSF_PLANT	120568	23090
PRODUCTIONBYOCCURRENCE	130876	27206

*PT – point data; PL – polygon data

The difference in the number of records occured also within polygon data for commodity_mineraloccurrence layer due to multipolygon geometry:

- When someone reports simple polygons (not multipolygons) with holes, they were not harvested;
- When there are multiple polygons, only the first was recorded;
- Combination of different parts of geometries.

We have applied a solution to use validation of geometry and error display, using:
"ST_IsValid(ST_GeomFromGML (' string '))"
"ST_IsValidReason(ST_GeomFromGML (' string '))"
"ST_IsValidDetail(ST_GeomFromGML (' string '))"

In that regard, we assured the correctness of geometry data, performed by harvesting. Any geometry irregularities can still occur within the data providers services, which is solved individually with each data provider.

The latest harvesting was performed on September 12, 2019. The documentation on harvesting performed consists of:
- records count report by countries;
- geometry validity test (errors occurred for PL, CZ and GB – we have identified errors within services and data providers were informed);
- harvesting error log.

All files are available to data providers from GeoZS ftp server.

1.2 Extension of spatial coverage and data harmonization

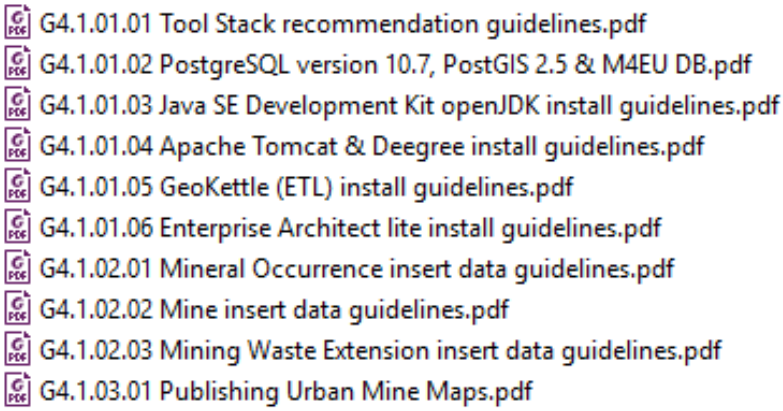
One of the project objectives is to extend spatial coverage of data, currently stored in the Minerals4EU system.

So far, we have managed to extend spatial coverage to data providers from West Balkan (see Chapter 2 of this report). Partners from the RESEERVE project will deliver limited data on primary and secondary mineral resources data following the INSPIRE Specifications.

We are also in contact with new responsible persons from the German States and BGR, new responsible people from Romania and Albania, so we will be able to assure new or modified data in the Minerals Inventory for these countries as well.

Due to different sources of data, we do not know precisely to what extent the harmonization can be carried out. Data providers within Mintell4EU are expected to modify and update their data according to ORAMA technical guidelines.

Documentation is ready for download from ORAMA project web site as D4.1 Technical guidance for the data harmonization of raw materials (https://orama-h2020.eu/downloads/#tab-id-4), with the following guidelines:



The first group of guidelines (G4.1.01.0X) are instructions how to install different open source software to use Mintell4EU data models, the second group (G4.1.02.0X) are guidelines for data providers, how to insert their mineral occurrence, mine and mining waste national data. The last document (G4.1.03.01) is to demonstrate how Urban Mine maps can be published in an INSPIRE conformant way.

2 CONTRIBUTION FROM EIT RM PROJECT „RESEERVE "- MINERAL POTENTIAL OF ESEE REGION

The KIC EIT Raw Material programme is financing the project RESEERVE on mineral potential of the ESEE region because primary and secondary mineral resources are of strategic importance for the EU. Most EU countries are already part of the Minerals4EU Network, which provides consistent and organized data information on primary and secondary mineral resources on the European level. The West Balkan region represents a gap in this network.

The main objectives of the RESEERVE project can be summarized into a) creation of a common SEE Mineral Register for primary and secondary mineral resources, b) mapping mineral resources data of: Croatia, Bosnia and Herzegovina - Federation of Bosnia and Herzegovina, Bosnia and Herzegovina – Republic of Srpska, Serbia, Montenegro and Albania and c) connection of SEE countries to the Minerals4EU database.

The results will be implemented in Mintell4EU because the data collected in the RESEERVE will be transmitted into the Minerals Inventory. These will ensure the extension of coverage to the missing area of West Balkan and entries of new data which will also take into account the harmonization of the data.

Activities done so far:

- GeoZS, as a lead partner, have created two elementary tables with minimum requirements for collecting primary and secondary mineral resources data. INSPIRE compliance was considered as well, that is why guidelines included connections to data models and code lists to Minerals4EU database.
- In autumn 2018 GeoZS has performed several workshops on how to map primary mineral resources data in: Bosnia and Herzegovina - Federation of Bosnia and Herzegovina (Geological Survey of Federation of Bosnia and Hercegovina in Sarajevo), Bosnia and Herzegovina – Republic of Srpska (Geological Survey of the Republic of Srpska in Zvornik), Serbia (Faculty of Mining and Geology in Belgrade), Albania (Albania Geological Survey in Tirana) and Montenegro (Geological Survey in Podgorica) – Figure 3.

a) Belgrade workshop

b) Zvornik workshop

c) Tirana workshop

Figure 3: Workshops, performed within RESEERVE project in 2018, on how to map primary mineral resources data.

- A RESEERVE Task Partner (TP) INSPIRE Workshop was held in Ljubljana at GeoZS in February 2019 where current directives in the field of Mineral Resources in Europe, other on-going projects with related content (Mintell4EU, ORAMA, etc.), UNFC and also the technical overviews of data harvesting systems, their architectures, demands and software needed were presented.

Main problems encountered by the data providers when mapping data can be divided into two groups:

I. Mistakes performed by data providers:
   a) Fulfilment of obligatory fields:
      - EarthResourceMaterial_Proportion were left null. Both columns proportion and proportionvoidreason in earthresourcematerial cannot be null. / Solution: to fill the field void reason with code unknown.
      - Sometimes null value in column "occurrencetype" of table mineraloccurrence violates not-null constraint/the field occurrencetype was empty but it is obligatory.
   b) Using of code lists
      - null value in column "occurrencetype" of table mineraloccurrence violates not null constraint/the word occurrence was misspelled.
      - null value in column "category" of table reserve violates not-null constraint/the code list was not followed (misspelled), null value in column "status".
      - Table mine violates not-null constraint/ misspelled UnderDevelopment has to be underdevelopment.

II. General errors

- Some tables like measurement, analytical process and specimen, were harvested for the first time in the process, so the harvesting system was optimized in that way.

GeoZS created a referenced database to which data partners from RESEERVE project mapped their data (Figure 4):

- Serbia – 20 occurrences,
- Bosnia and Herzegovina – Federation of Bosnia and Herzegovina – 31 occurrences,
- Bosnia and Herzegovina – Republic of Srpska – 17 occurrences,
- Albania – 23 occurrences,
- Montenegro – 8 occurrences,
- Croatia – no data for PRM.

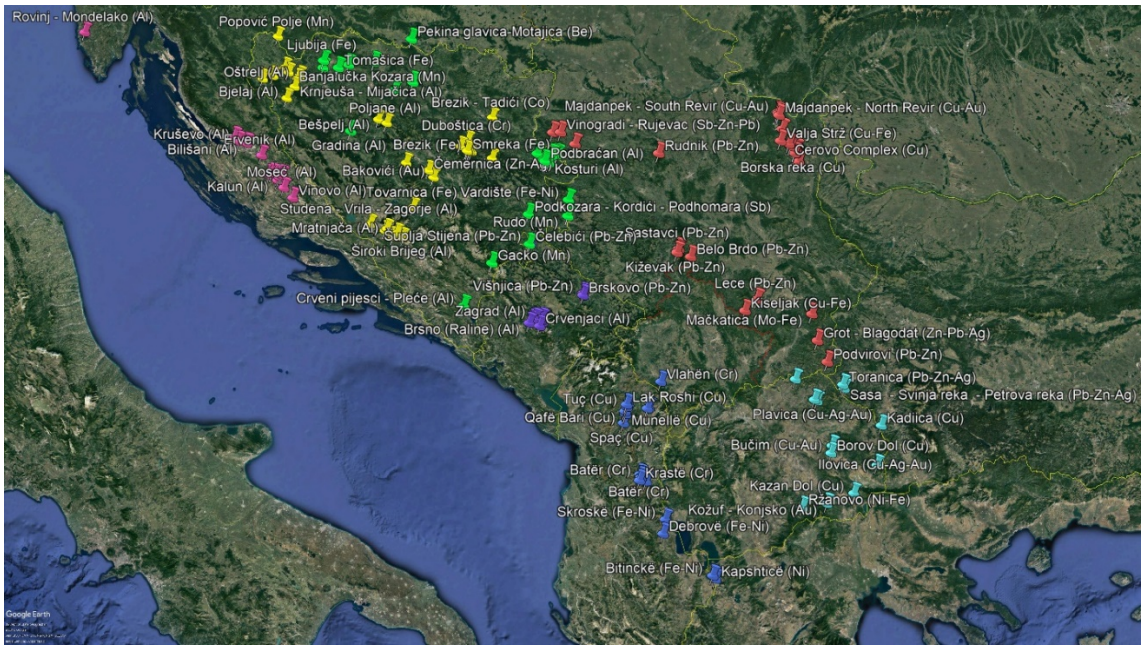


Figure 4: Locations of primary raw material data in countries, that are partners in RESEERVE project (status July 2019).

All these data were successfully harvested to INSPIRE data model and are at the moment stored in GeoZS referenced database and will be part of Mineral Inventory by the end of September 2019.

In the later stage of the RESEERVE project also data on secondary raw material will be collected and included into Minerals Inventory. At least 50 mineral deposits should be provided per partner in 2019 with metal and non-metal deposits as a priority.

3 HARVESTING QUALITY ASSURENCE (IN CONNECTION TO MINTELL4EU, RESEERVE AND ORAMA PROJECTS)

Data harvesting is a process to automatically extract large amount of data from web services implemented by the national data providers. GeoZS developed and implemented a harvesting system to collect and validate INSPIRE compliant spatial European geological data and provide access to Pan-European and national databases across Europe.

Harvesting database: 2018-09-06		30	31	32	33	34	36	40	41	43	44	45	46	47	48	351	353	357	358	380	385	386	420	421
M4EU & ProSUM tables	record#	GR	NL	BE	FR	ES	HU	RO	CH	AT	GB	DK	SE	NO	PL	PT	IE	CY	FI	UA	HR	SI	CZ	SK
alteration description	323				92											183		2			46			
alterationdistribution	83															83								
commodity	140.379	934	6	684	6.444	38.541	1.594	579	2.000	4.068	25.107	1.125	24.423	18.875	385	3.130	381	199	4.300	5.799	46	220	977	562
commoditymeasure	20.542	1.868			12.888						6	234	1.066	7			208	398	495					3.372
earthmaterial	64.642	504	5		11.466						21.928	81	29.765	9		614		224			46			
earthresourcematerial	82.047	504	5		16.375			1			21.928	81	30.044	9		734		322	5.228	6.770	46			
endowment	1.278											154												1.124
endusepotential	52.700		5			18.797	804	364	1.290		30.082	230			316						46	204		562
environmentaldomain	2.031		16				1.268															185		562
environmentalimpact	114															17					46		51	
explorationactivity	12.895							53			34	16					281		12.465		46			
explorationresult	382										32	23					281				46			
geologicevent	33.904							292			21.886	641	8.754			203			1.316		46	204		562
legislationcitation	16		16																					
lineariorientation	807							1								35			163		46			562
managementzone	4.699		16				1.268													2.668		185		562
mine	33.656	236	205	314	4.214	18.809	1.268		154			1	676			455	166	172	346	5.119	46	206	707	562
minedmaterial	5.550												676							4.828	46				
minename	41.616	472	384	314	8.834	18.809	2.536		154			1	676			488	166	275	346	5.119	92	412	1.414	1.124
mineral	19.305		5		7.642							56	11.173	9		211		209						
mineraloccurrence	116.013	236	5	573	4.214	31.129	1.268	386	1.290	3.474	22.576	893	18.279	18.862	302	2.277	281	172	1.908	6.309	46	206	707	620
mineralproducingcountry	5.691		1	1			1										1			5.122	1	1	1	562
mineremark	72															72								
miningactivity	17.260	236	223	314	4.214	2.971	1.268		154			2	676			39	166	172	168	5.119	46	223	707	562
miningfeatureoccurrence	41.423	472	428	314	8.428	18.809	2.536		308			6	676	137		1.452	332	344	514	5.119	46	223	717	562
miningwaste	747											1	676			14					46		10	
occurrenceform	17.600				4.214	10.291		298			29	542	66			182	281	172	963					562
occurrencemanagementzone	3.190		6				1.268													1.731		185		
occurrencename	13.868	236	5		4.620		1.268									89	281	103		6.309	46	204	707	
occurrenceremark	11.226	471			8.744						1.560	18				31	109	293						
occurrenceshape	27.261				4.214			297			21.895	15				158		172	464		46			
oremeasure	16.090	472			8.428						6	316	438	7		2.277	176	344	244			10		3.372
planarorientation	31.776	236			4.214	25.936										57		172	599					562
processingtransformationactivity	5.165																			5.119	46			
processingtransformationplant	5.165																			5.119	46			
processingtransformationplantname	5.165																			5.119	46			
product	15.319	934	223		6.444								1.674					199		5.799	46			
prosumminingactivity	764											1	676							12	46	19	10	
prosumminingwaste	225											1		137						12	46	19	10	
prosumminingwastemeasure	148											1		137									10	
prosumwastecommoditymeasure	14																						14	
prosumwastedimension	145													137									8	
reserve	5.918	236			4.214							1	31			106	4	172	20			10		1.124
resource	8.893	236			4.214						6	160	407	7		2.171	172	172	224					1.124
rockmaterial	45.231	406			3.824						21.928	25	18.592			403		7			46			
rockmaterialilithology	71.200	406			3.732						48.257	17	18.517			220		5			46			
thematicid	16		16																					
unfclassification												1												
wastestorage	70															14					46		10	
record# sum::	982.625	9.095	1.570	2.514	141.673	184.092	16.347	2.271	5.350	7.542	237.260	4.643	167.961	38.333	1.003	15.715	3.286	4.300	29.763	81.192	1.335	2.716	6.060	18.604
record# sum without rock*:	866.194	**8.283**	**1.570**	**2.514**	**134.117**	**184.092**	**16.347**	**2.271**	**5.350**	**7.542**	**167.075**	**4.601**	**130.852**	**38.333**	**1.003**	**15.092**	**3.286**	**4.288**	**29.763**	**81.192**	**1.243**	**2.716**	**6.060**	**18.604**
2018-08-14 record# sum without rock*:	812.828	7.114	1.055	2.514	134.117	184.092	4.934	2.271	5.350	7.542	167.075	4.601	126.477	38.333	1.003	15.092	3.286	3.918	29.763	45.668	1.243	2.716	6.060	18.604

Notes:
> The line above prosumminingactivity denotes countries that do not have implied service for prosum.
> For rock* (rockmaterial, rockmaterialilithology) tables the number of records in harvested database is not neccesary to be equal to the number of records in local county database because it depends on country harvesting order and already harvested records.
The number of records in the rockmaterial and rockmaterialilithology tables will be the same to the number of records in local country database if only that country is harvested.

Figure 5: Example of harvested data report – September 2019 (APPENDIX B):

To ensure higher quality of harvested data we have establish a semi-automated report which checks transferred data with the previous version of the report. The harvested data report provides information on the number of records harvested in every table of the M4EU DB for each country. For example, if the number of harvested records is significantly lower than the number of previously provided records by data provider, it is already an indicator of an error in the harvesting process.

3.1 QA of harvesting procedure

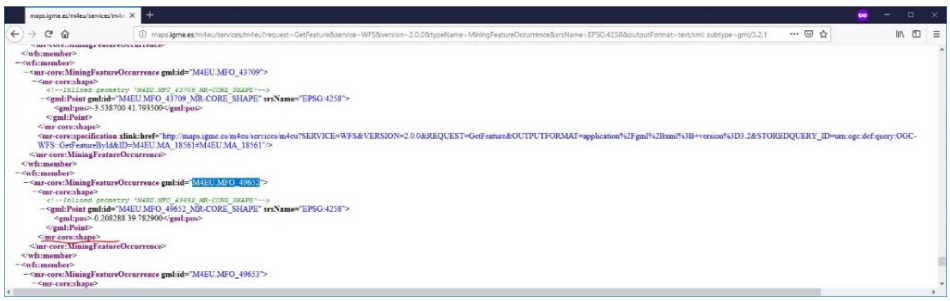
In order to verify and ensure the quality of the data, we carried out the following activities:

- more frequent run of harvesting procedure (because of testing and harvesting analysis);
- a procedure for building referential databases for each country/provider was set up (the reference databases are not yet established for all countries)
  The purpose of the referential database is to protect the related data from being accidentally modified and/or deleted, but at the same time to prevent that the harvesting of the entire database would be empty for a certain country/provider due to service failure or any other technical reasons.
- individually communication with providers;
- doing an analysis of harvested data;
- preparing new reports and harvesting procedure log for each country.

3.2 Findings and Recommendations for QA

After one year of running QA of harvesting procedure our findings and recommendations are:

1. Data providers must fill the data correctly.
   a. Data providers need simple and short manuals on how to do that. In great extent that is covered by ORAMA technical guidelines (see Chapter 1.2 of this report).
   b. Services are based on the views. For m4eu_v1.1.2 all necessary views are defined in '02 views v.1.1.2.sql file (https://geusgitlab.geus.dk/m4eu/09-db-m4eu/blob/master/v1.1.x/v1.1.2/DBPostgreSQL/02%20views%20v1.1.2.sql). Views reads data from the database and transform it to the structure, required for the services. If data are not entered correctly, views do not create a proper transformation and services do not provide the data for harvesting. As example see the picture below where incorrect data input doesn't give a result of "<mr-core:specification xlink:href="http ..."(marked with red line on the picture).



2. Special care from providers must be done to (XOR) table connections. The (XOR) indicates mandatory connection to or from only one table and they are currently not checked with DB constrains but only by harvesting process itself. That is why data non-compliance with the (XOR) requirement lead to data harvesting error. Those table connections are marked in 'M4EU and EURare Data Model – Overview (https://geusgitlab.geus.dk/m4eu/08-enterprise-architect-

model/blob/master/EA%20M4EU%20v1.1.2/M4EU%20and%20EURare%20Data%20Model%20-%20Overview%20Whole%20model%20v0.7.0.2.pdf) but are missing in many other documents.
    a. During harvesting procedure, errors were discovered because (XOR) requirements were not fulfilled from the providers. These requirements are not built as database constraints.
    b. We recommend finding a possibility to check that data is entered correctly in the provider database.
    c. The documentation is misleading. All tables Mine, MiningActivity, MiningWaste, ProSUMMiningActivity, ProSUMMiningWaste, ProcessingTransformationActivity and ProcessingTransformationPlant must have (XOR) connection to the MiningFeatureOccurence table. In the current documentation only Mine, MiningActivity and MiningWaste are (XOR) connected with MiningFeatureOccurence.
    d. Improvement of the documentation is recommended. The M4EU database has more (XOR) related tables than described in the current documentation thus documentation improvement is recommended. (
3. Data providers must ensure that identifiers (INPIRE ID's) for the same data stays the same all the time (even if they delete all data and replace it with an ETL process (for example GeoKettle)). An identifier should always correspond to the same occurrence and should not be changed.
4. Data providers must ensure to change the versionID and the begin/end lifespan when a modification is made in a national database.
5. Data providers must always use the actual (the latest from svn repository) version of the database (the ability to identify the version of the database would be welcome). All available versions are accessible on https://geusgitlab.geus.dk/m4eu/09-db-m4eu, but the version with the highest number must be applied (since it is the latest version (at the time of this document the latest version is v1.1.2)).
    a. We recommend that in SQL code for generating tables, views and code lists to add the hardcoded function which will return the version of those SQL files like (db_version(), vw_version(), cl_version()).
6. Data providers must ensure that hardware & software services work permanently. Especially, if they change hardware or upgrade software they must check if their services are still working.

Proposed changes in the harvesting procedure:

- Data provider should send an e-mail to harvesting@geo-zs.si with subject "TEST HARVESTING REQUEST" to perform test harvesting;
- GeoZS will do a test harvesting and create a reference database for provider and inform provider with results;
- will be written in the Recommendations (by ORAMA project).

When data providers input new data, the procedure is to first delete their previous content in the database and then fill it again with new data. Harvesting of only new or modified data requires tracking changes in the database itself, so data input procedure must be change.

3.3 Challenges for the future work

Future improvements to the harvesting system:

- Build in stable INSPIRE id checking;
- Adding all (XOR) correlation & data input requirements in database model and manuals;
- Establishing all (XOR) requirements checking at data input. Till now (XOR) requirements checking codes were tested only on a very limited number of data-tables with (XOR) to confirm feasibility of technical process. It proved to be successful and it will be implemented in some future version of M4EU DB PostgreSQL tables definition;
- We need to inform all data providers on new versions automatically;
- We should add the hardcoded function which will return the version of SQL files like (db_version(), vw_version() and cl_version().

Change of data in semantical point of view:

- New representation of mining feature occurrence is needed (now including also mining activity) so we also have to transform the existing data and add geometry to mining activity;
- Mine and mineral occurrence should be semantically separated (until now we had identical tables for both of them, the same number and locations, which is not correct);
- Other corrections (filling all the void reason columns, life span, version ids, different definition of Inspire IDS, InspireNS).

4 CONCLUSIONS

In the first year, we were able to determine the status of the existing M4EU database and identify the weakest points. Thus, we found errors both on the data providers side, as well as the technical problems of the harvesting system itself.

To solve the problems with data we have created Mintell4EU quality Control Application, to ease data providers to control reported data. The application will be published and introduced to Mintell4EU Consortium at the mid-term meeting in October 2019, where we will also show practices of some data providers, their solutions and ways to solve technical as well as content related issues, the latest in close relation to the ORAMA project technical guidelines. As already planned in the project proposal, some specific oriented workshops on how to insert data into M4EU DB are envisaged in spring 2020 and will be designed according to previously collected data provider's needs.

We are constantly solving the technical problems of the harvesting system, which we will continue to do in the future as well. The communication process between data providers and harvesting operators must be optimized and speed up so that any updates will be performed in time.

The proposed workflow is:

1. A data provider identifies errors or missing information;
2. A data provider updates a local (national) database and sends information on updated service to the e-mail address harvesting@geo-zs.si;
3. The harvesting is updated accordingly in the shortest possible time (the process of updating might be delayed due to human or technical factor);
4. The data provider gets feedback on updated data via e-mail and checks the application again to verify that the new information has been transferred to the harvesting database successfully.

We set strong links with other RM GeoERA theme projects and we plan to continue with cooperation till the end of the project.

APPENDIX A:

List of selected attributes, displayed on the Mintell4EU Quality Control Application

Basic info:

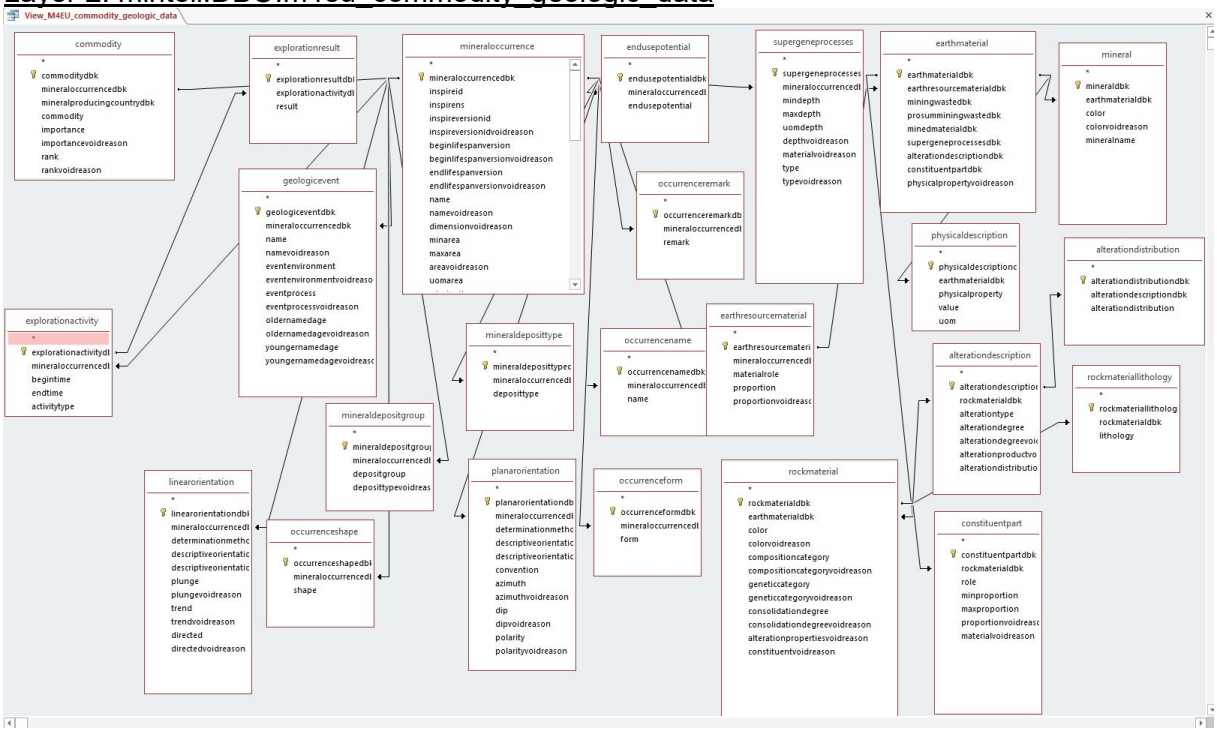
- Each fields list is showing a commodity and its related data, stored in different tables. From the first two letters of the name of the field you can assume from which table are related data coming from (from example: mo_name: the table mineral occurence, name – name of attribute)
- Some examples of table abreviations:
  - mo – mineral occurence
  - co - commodity
  - ge – geological event
  - lo – linear orientation
  - po – planar orientation
  - mdg – mineral deposit group
  - mdt - mineral deposit type
  - erm – earth resource material
  - em – earth material
  - rm – rock material
  - ad – alteration distribution
  - …
- Selected attributes to be displayed directly on a Mintell4EU Quality Control application are marked with green color.

Layer 1: mintell.DBO.m4eu_productionbyoccurrence

Fields:

- OBJECTID
- mineraloccurrencedbk
- id
- cc
- country
- commodity
- minquantity
- maxquantity
- uomquantity
- name
- ty

Layer 2: mintell.DBO.m4eu_commodity_geologic_data



Fields:

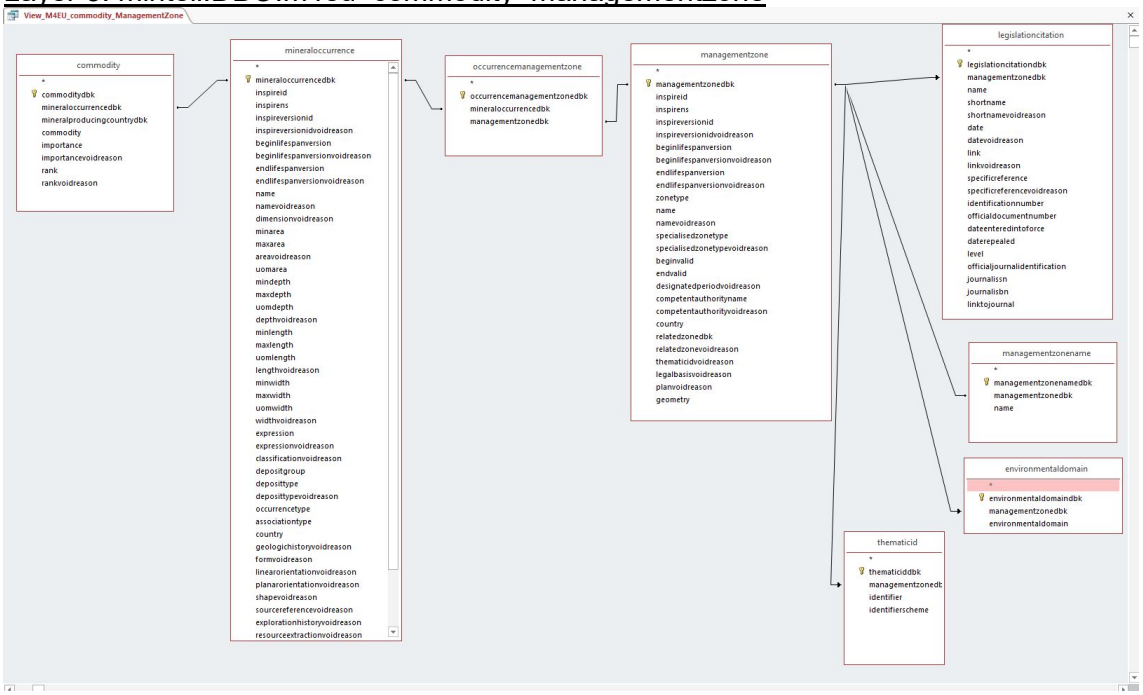
- OBJECTID
- mo_mineraloccurrencedbk
- mo_inspireid
- mo_inspirens
- mo_inspireversionid
- mo_inspireversionidvoidreason
- mo_name
- mo_namevoidreason
- ty
- mo_country
- mo_dimensionvoidreason
- mo_minarea
- mo_maxarea
- mo_areavoidreason
- mo_uomarea
- mo_mindepth
- mo_maxdepth
- mo_uomdepth
- mo_depthvoidreason
- mo_minlength
- mo_maxlength
- mo_uomlength
- mo_lengthvoidreason
- mo_minwidth

- mo_maxwidth
- mo_uomwidth
- mo_widthvoidreason
- mo_expression
- mo_expressionvoidreason
- mo_classificationvoidreason
- mo_depositgroup
- mo_deposittype
- mo_deposittypevoidreason
- mo_occurrencetype
- mo_associationtype
- mo_geologichistoryvoidreason
- mo_formvoidreason
- mo_linearorientationvoidreason
- mo_planarorientationvoidreason
- mo_shapevoidreason
- mo_sourcereferencevoidreason
- mo_explorationhistoryvoidreason
- mo_resourceextractionvoidreason
- mo_oreamountvoidreason
- mo_endusepotentialvoidreason
- mo_geneticdescriptionvoidreason
- mo_compositionvoidreason
- co_commodity
- co_mineralproducingcountrydbk
- co_importance
- co_importancevoidreason
- co_rank
- co_rankvoidreason
- ge_name
- ge_namevoidreason
- ge_eventenvironment
- ge_eventenvironmentvoidreason
- ge_eventprocess
- ge_eventprocessvoidreason
- ge_oldernamedage
- ge_oldernamedagevoidreason
- ge_youngernamedage
- ge_youngernamedagevoidreason
- lo_determinationmethod
- lo_descriptiveorientation
- lo_descriptiveorientationvoidre
- lo_plunge
- lo_plungevoidreason
- lo_trend
- lo_trendvoidreason
- lo_directed

- lo_directedvoidreason
- occurrencename_name
- occurrenceremark_remark
- occurrenceshape_shape
- occurrenceform_form
- endusepotential_endusepotential
- po_determinationmethod
- po_descriptiveorientation
- po_descriptiveorientationvoidre
- po_convention
- po_azimuth
- po_azimuthvoidreason
- po_dip
- po_dipvoidreason
- po_polarity
- po_polarityvoidreason
- mdg_depositgroup
- mdg_deposittypevoidreason
- mdt_deposittype
- supergeneprocesses_mindepth
- supergeneprocesses_maxdepth
- supergeneprocesses_uomdepth
- supergeneprocesses_depthvoidrea
- supergeneprocesses_materialvoir
- supergeneprocesses_type
- supergeneprocesses_typevoidrea
- erm_materialrole erm_proportion
- erm_proportionvoidreason
- em_miningwastedbk
- em_prosumminingwastedbk
- em_minedmaterialdbk
- em_supergeneprocessesdbk
- em_alterationdescriptiondbk
- em_constituentpartdbk
- em_physicalpropertyvoidreason
- physicaldescription_physicalpro
- physicaldescription_value
- physicaldescription_uom
- mineral_color
- mineral_colorvoidreason
- mineral_mineralname
- rm_color
- rm_colorvoidreason
- rm_compositioncategory
- rm_compositioncategoryvoidreaso
- rm_geneticcategory
- rm_geneticcategoryvoidreason

- rm_consolidationdegree
- rm_consolidationdegreevoidreaso
- rm_alterationpropertiesvoidreas
- rm_constituentvoidreason
- constituentpart_role
- constituentpart_minproportion
- constituentpart_maxproportion
- constituentpart_proportionvoidr
- constituentpart_materialvoidrea
- rockmateriallithology_lithology
- ad_alterationtype
- ad_alterationdegree
- ad_alterationdegreevoidreason
- ad_alterationproductvoidreason
- ad_alterationdistributionvoidre
- alterationdistr_alterationdistr

Layer 3: mintell.DBO.m4eu_commodity_managementzone



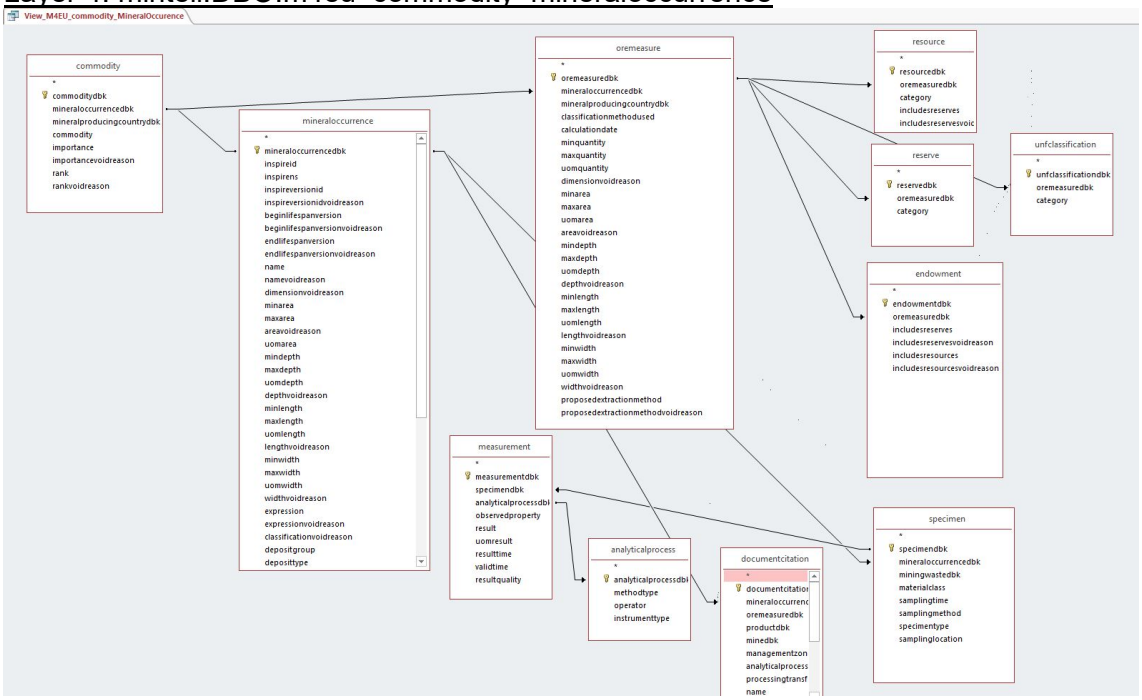
Fields:

- OBJECTID
- mo_mineraloccurrencedbk
- mo_inspirens
- mo_inspireversionid
- mo_inspireversionidvoidreason
- mo_name
- mo_namevoidreason
- ty

- mo_country
- mo_dimensionvoidreason
- mo_minarea
- mo_maxarea
- mo_areavoidreason
- mo_uomarea
- mo_mindepth
- mo_maxdepth
- mo_uomdepth
- mo_depthvoidreason
- mo_minlength
- mo_maxlength
- mo_uomlength
- mo_lengthvoidreason
- mo_minwidth
- mo_maxwidth
- mo_uomwidth
- mo_widthvoidreason
- mo_expression
- mo_expressionvoidreason
- mo_classificationvoidreason
- mo_depositgroup
- mo_deposittype
- mo_deposittypevoidreason
- mo_occurrencetype
- mo_associationtype
- mo_geologichistoryvoidreason
- mo_formvoidreason
- mo_linearorientationvoidreason
- mo_planarorientationvoidreason
- mo_shapevoidreason
- mo_sourcereferencevoidreason
- mo_explorationhistoryvoidreason
- mo_resourceextractionvoidreason
- mo_oreamountvoidreason
- mo_endusepotentialvoidreason
- mo_geneticdescriptionvoidreason
- mo_compositionvoidreason
- co_commodity
- co_mineralproducingcountrydbk
- co_importance
- co_importancevoidreason
- co_rank
- co_rankvoidreason
- omz_mineraloccurrencedbk
- omz_managementzonedbk
- mz_inspireid

- mz_inspirens
- mz_inspireversionid
- mz_inspireversionidvoidreason
- mz_beginlifespanversion
- mz_beginlifespanversionvoidreas
- mz_endlifespanversion
- mz_endlifespanversionvoidreason
- mz_zonetype
- mz_name
- mz_namevoidreason
- mz_specialisedzonetype
- mz_specialisedzonetypevoidreaso
- mz_beginvalid
- mz_endvalid
- mz_designatedperiodvoidreason
- mz_competentauthorityname
- mz_competentauthorityvoidreason
- mz_country
- mz_relatedzonedbk
- mz_relatedzonevoidreason
- mz_thematicidvoidreason
- mz_legalbasisvoidreason
- mz_planvoidreason
- mzn_name
- ed_environmentaldomain
- tid_identifier
- tid_identifierscheme
- lc_name
- lc_shortname
- lc_shortnamevoidreason
- lc_date
- lc_datevoidreason
- lc_link
- lc_linkvoidreason
- lc_specificreference
- lc_specificreferencevoidreason
- lc_identificationnumber
- lc_officialdocumentnumber
- lc_dateenteredintoforce
- lc_daterepealed
- lc_level
- lc_officialjournalidentificatio
- lc_journalissn
- lc_journalisbn
- lc_linktojournal

Layer 4: mintell.DBO.m4eu_commodity_mineraloccurrence



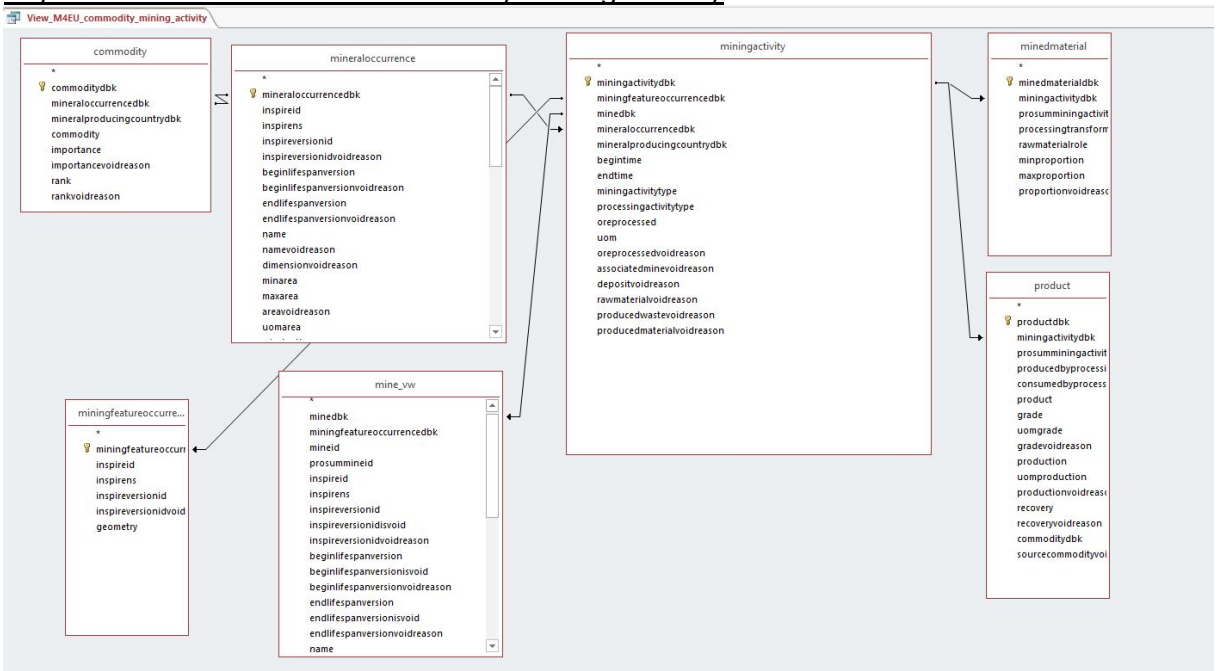
Fields:

- OBJECTID
- mo_mineraloccurrencedbk
- mo_inspireid
- mo_inspirens
- mo_inspireversionid
- mo_inspireversionidvoidreason
- mo_name
- mo_namevoidreason
- ty
- mo_country
- mo_dimensionvoidreason
- mo_minarea
- mo_maxarea
- mo_areavoidreason
- mo_uomarea
- mo_mindepth
- mo_maxdepth
- mo_uomdepth
- mo_depthvoidreason
- mo_minlength
- mo_maxlength
- mo_uomlength
- mo_lengthvoidreason
- mo_minwidth
- mo_maxwidth
- mo_uomwidth
- mo_widthvoidreason

- mo_expression
- mo_expressionvoidreason
- mo_classificationvoidreason
- mo_depositgroup
- mo_deposittype
- mo_deposittypevoidreason
- mo_occurrencetype
- mo_associationtype
- mo_geologichistoryvoidreason
- mo_formvoidreason
- mo_linearorientationvoidreason
- mo_planarorientationvoidreason
- mo_shapevoidreason
- mo_sourcereferencevoidreason
- mo_explorationhistoryvoidreason
- mo_resourceextractionvoidreason
- mo_oreamountvoidreason
- mo_endusepotentialvoidreason
- mo_geneticdescriptionvoidreason
- mo_compositionvoidreason
- co_commodity
- co_mineralproducingcountrydbk
- co_importance
- co_importancevoidreason
- co_rank
- co_rankvoidreason
- om_mineralproducingcountrydbk
- om_classificationmethodused
- om_calculationdate
- om_minquantity
- om_maxquantity
- om_uomquantity
- om_dimensionvoidreason
- om_minarea
- om_maxarea
- om_uomarea
- om_areavoidreason
- om_mindepth
- om_maxdepth
- om_uomdepth
- om_depthvoidreason om_minlength
- om_maxlength
- om_uomlength
- om_lengthvoidreason
- om_minwidth
- om_maxwidth
- om_uomwidth
- om_widthvoidreason
- om_proposedextractionmethod
- om_proposedextractionmethodvoir

- resource_category
- resource_includesreserves
- resource_includesreservesvoidre
- reserve_category
- endowment_includesreserves
- endowment_includesreservesvoidr
- endowment_includesresources
- endowment_includesresourcesvoir
- unfclassification.oremeasuredbk,
- unfclassification.category
- specimen_miningwastedbk
- specimen_materialclass
- specimen_samplingtime
- specimen_samplingmethod
- specimen_specimentype
- measurement_analyticalprocesdbk
- measurement_observedproperty
- measurement_result measurement_uomresult
- measurement_resulttime
- measurement_validtime
- measurement_resultquality
- analyticalprocess_methodtype
- analyticalprocess_instrumenttyp
- dc_oremeasuredbk
- dc_productdbk
- dc_minedbk
- dc_managementzonedbk
- dc_analyticalprocessdbk
- dc_processtransformatioplantdbk
- dc_name
- dc_shortname
- dc_shortnamevoidreason
- dc_date
- dc_datevoidreason
- dc_link
- dc_linkvoidreason
- dc_specificreference
- dc_miningwastemeasuredbk
- dc_specificreferencevoidreason
- mo_geometry

Layer 5: mintell.DBO.m4eu_commodity_mining_activity



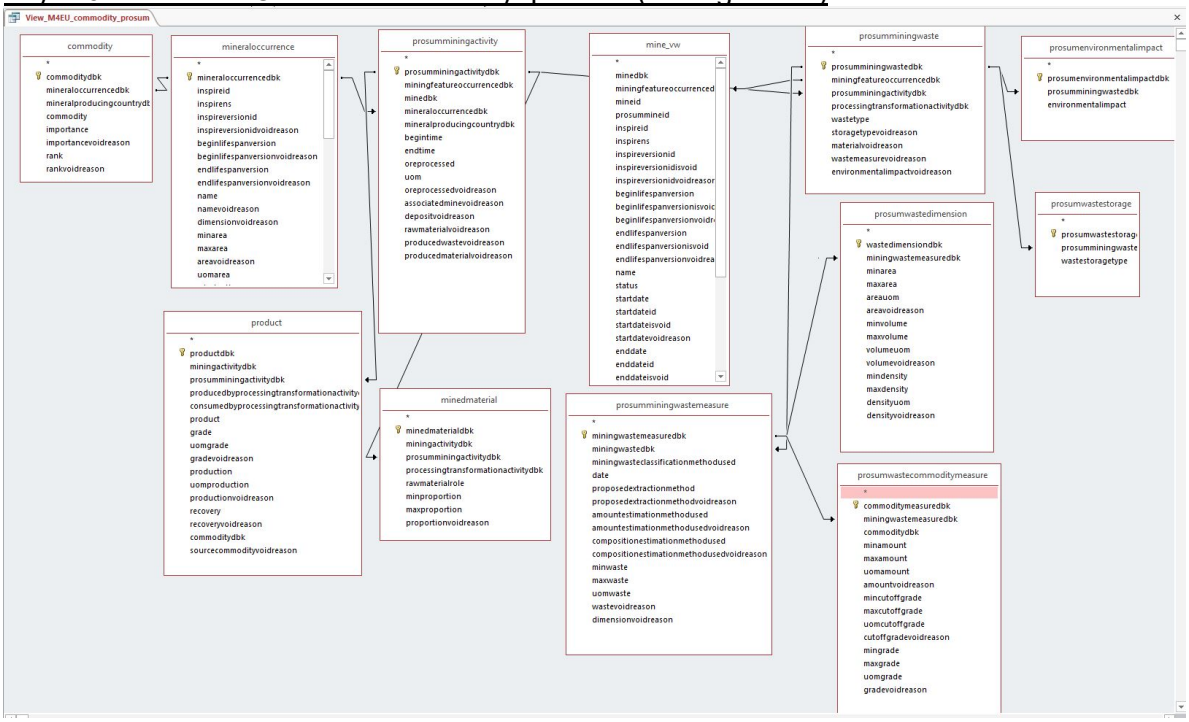
Fields:

- OBJECTID
- mo_mineraloccurrencedbk
- mo_inspireid
- mo_inspirens
- mo_inspireversionid
- mo_inspireversionidvoidreason
- mo_name
- mo_namevoidreason
- ty
- mo_country
- mo_dimensionvoidreason
- mo_minarea
- mo_maxarea
- mo_areavoidreason
- mo_uomarea
- mo_mindepth
- mo_maxdepth
- mo_uomdepth
- mo_depthvoidreason
- mo_minlength
- mo_maxlength
- mo_uomlength
- mo_lengthvoidreason
- mo_minwidth
- mo_maxwidth
- mo_uomwidth

- mo_widthvoidreason
- mo_expression
- mo_expressionvoidreason
- mo_classificationvoidreason
- mo_depositgroup
- mo_deposittype
- mo_deposittypevoidreason
- mo_occurrencetype
- mo_associationtype
- mo_geologichistoryvoidreason
- mo_formvoidreason
- mo_linearorientationvoidreason
- mo_planarorientationvoidreason
- mo_shapevoidreason
- mo_sourcereferencevoidreason
- mo_explorationhistoryvoidreason
- mo_resourceextractionvoidreason
- mo_oreamountvoidreason
- mo_endusepotentialvoidreason
- mo_geneticdescriptionvoidreason
- mo_compositionvoidreason
- co_commodity
- co_mineralproducingcountrydbk
- co_importance
- co_importancevoidreason
- co_rankvoidreason
- mfo_inspirens
- mfo_inspireversionid
- mfo_inspireversionidvoidreason
- ma_mineralproducingcountrydbk
- ma_begintime
- ma_endtime
- ma_miningactivitytype
- ma_processingactivitytype
- ma_oreprocessed
- ma_uom
- ma_oreprocessedvoidreason
- ma_associatedminevoidreason
- ma_depositvoidreason
- ma_rawmaterialvoidreason
- ma_producedwastevoidreason
- ma_producedmaterialvoidreason
- mm_prosumminingactivitydbk
- mm_procestransformactivitydbk
- mm_rawmaterialrole
- mm_minproportion
- mm_maxproportion

- mm_proportionvoidreason
- prod_prosumminingactivitydbk
- prod_produbyprocestransactivdbk
- prod_consubyprocestransactivdbk
- prod_product
- prod_grade
- prod_uomgrade
- prod_gradevoidreason
- prod_production
- prod_uomproduction
- prod_productionvoidreason
- prod_recovery
- prod_recoveryvoidreason
- prod_commoditydbk
- prod_sourcecommodityvoidreason
- mo_geometry
- mfo_miningfeatureoccurredbk

Layer 6: mintell.DBO.m4eu_commodity_prosum (mining waste)



Fields:

- OBJECTID
- mo_mineraloccurrencedbk
- mo_inspireid
- mo_inspirens
- mo_inspireversionid
- mo_inspireversionidvoidreason
- mo_name
- mo_namevoidreason

- ty
- mo_country
- mo_dimensionvoidreason
- mo_minarea
- mo_maxarea
- mo_areavoidreason
- mo_uomarea
- mo_mindepth
- mo_maxdepth
- mo_uomdepth
- mo_depthvoidreason
- mo_minlength
- mo_maxlength
- mo_uomlength
- mo_lengthvoidreason
- mo_minwidth
- mo_maxwidth
- mo_uomwidth
- mo_widthvoidreason
- mo_expression
- mo_expressionvoidreason
- mo_classificationvoidreason
- mo_depositgroup
- mo_deposittype
- mo_deposittypevoidreason
- mo_occurrencetype
- mo_associationtype
- mo_geologichistoryvoidreason
- mo_formvoidreason
- mo_linearorientationvoidreason
- mo_planarorientationvoidreason
- mo_shapevoidreason
- mo_sourcereferencevoidreason
- mo_explorationhistoryvoidreason
- mo_resourceextractionvoidreason
- mo_oreamountvoidreason
- mo_endusepotentialvoidreason
- mo_geneticdescriptionvoidreason
- mo_compositionvoidreason
- co_commodity
- co_mineralproducingcountrydbk
- co_importance
- co_importancevoidreason
- co_rank
- co_rankvoidreason
- pma_miningfeatureoccurrencedbk
- pma_minedbk
- pma_mineralproducingcountrydbk
- pma_begintime
- pma_endtime

- pma_oreprocessed
- pma_uom
- pma_oreprocessedvoidreason
- pma_associatedminevoidreason
- pma_depositvoidreason
- pma_rawmaterialvoidreason
- pma_producedwastevoidreason
- pma_producedmaterialvoidreason
- pmw_miningfeatureoccurrencedbk
- pmw_prtransformationactivitydbk
- pmw_wastetype
- pmw_storagetypevoidreason
- pmw_materialvoidreason
- pmw_wastemeasurevoidreason
- pmw_environmentalimpactvoidreas
- mine_vw_inspireid
- mine_vw_name
- mm_rawmaterialrole
- mm_minproportion
- mm_maxproportion
- mm_proportionvoidreason
- prod_product
- prod_grade
- prod_uomgrade
- pei_environmentalimpact
- pws_wastestoragetype pmwm_miningwasteclassifmethodus
- pmwm_date
- pmwm_proposextractmeth
- pmwm_proposextractmethvoidrea
- pmwm_amountestimatmethused
- pmwm_amountestimatmethusedvoidr
- pmwm_composestimamethused
- pmwm_composestimamethusedvoidr
- pmwm_minwaste
- pmwm_maxwaste
- pmwm_uomwaste
- pmwm_wastevoidreason
- pmwm_dimensionvoidreason
- pwd_minarea
- pwd_maxarea
- pwd_areauom
- pwd_areavoidreason
- pwd_minvolume
- pwd_maxvolume
- pwd_volumeuom
- pwd_volumevoidreason
- pwd_mindensity
- pwd_maxdensity
- pwd_densityuom
- pwd_densityvoidreason

- pwcm_commoditydbk
- pwcm_minamount
- pwcm_maxamount
- pwcm_uomamount
- pwcm_amountvoidreason
- pwcm_mincutoffgrade
- pwcm_maxcutoffgrade
- pwcm_uomcutoffgrade
- pwcm_cutoffgradevoidreason
- pwcm_mingrade
- pwcm_maxgrade
- pwcm_uomgrade
- pwcm_gradevoidreason
- mo_geometry

Layer 7: mintell.DBO.m4eu_commodity_transf_plant

Fields:

- OBJECTID
- mo_mineraloccurrencedbk
- mo_inspireid
- mo_inspirens
- mo_inspireversionid
- mo_inspireversionidvoidreason
- mo_name
- mo_namevoidreason
- ty
- mo_country
- mo_dimensionvoidreason
- mo_minarea
- mo_maxarea
- mo_areavoidreason
- mo_uomarea
- mo_mindepth
- mo_maxdepth

- mo_uomdepth
- mo_depthvoidreason
- mo_minlength
- mo_maxlength
- mo_uomlength
- mo_lengthvoidreason
- mo_minwidth
- mo_maxwidth
- mo_uomwidth
- mo_widthvoidreason
- mo_expression
- mo_expressionvoidreason
- mo_classificationvoidreason
- mo_depositgroup mo_deposittype
- mo_depositypevoidreason
- mo_occurrencetype
- mo_associationtype
- mo_geologichistoryvoidreason
- mo_formvoidreason
- mo_linearorientationvoidreason
- mo_planarorientationvoidreason
- mo_shapevoidreason
- mo_sourcereferencevoidreason
- mo_explorationhistoryvoidreason
- mo_resourceextractionvoidreason
- mo_oreamountvoidreason
- mo_endusepotentialvoidreason
- mo_geneticdescriptionvoidreason
- mo_compositionvoidreason
- co_commodity co_mineralproducingcountrydbk
- co_importance
- co_importancevoidreason
- co_rank
- co_rankvoidreason
- pma_miningfeatureoccurrencedbk
- pma_minedbk
- pma_mineralproducingcountrydbk
- pma_begintime
- pma_endtime pma_oreprocessed
- pma_uom
- pma_oreprocessedvoidreason
- pma_associatedminevoidreason
- pma_depositvoidreason
- pma_rawmaterialvoidreason
- pma_producedwastevoidreason
- pma_producedmaterialvoidreason
- pmw_miningfeatureoccurrencedbk
- pmw_prtransformationactivitydbk
- pmw_wastetype
- pmw_storagetypevoidreason

- pmw_materialvoidreason
- pmw_wastemeasurevoidreason
- environmentalimpactvoidreason
- mo_geometry

APPENDIX B:

Example of harvested data report – September 2019

Harvesting database: 2018-09-06		30	31	32	33	34	36	40	41	43	44	45	46	47	48	351	353	357	358	380	385	386	420	421
M4EU & ProSUM tables	**record#**	GR	NL	BE	FR	ES	HU	RO	CH	AT	GB	DK	SE	NO	PL	PT	IE	CY	FI	UA	HR	SI	CZ	SK
alterationdescription	323				92											183		2			46			
alterationdistribution	83															83								
commodity	140.379	934	6	684	6.444	38.541	1.594	579	2.000	4.068	25.107	1.125	24.423	18.875	385	3.130	381	199	4.300	5.799	46	220	977	562
commoditymeasure	20.542	1.868			12.888						6	234	1.066	7			208	398	495					3.372
earthmaterial	64.642	504	5		11.466						21.928	81	29.765	9		614		224			46			
earthresourcematerial	82.047	504	5		16.375			1			21.928	81	30.044	9		734		322	5.228	6.770	46			
endowment	1.278											154												1.124
endusepotential	52.700		5			18.797	804	364	1.290		30.082	230			316						46	204		562
environmentaldomain	2.031		16				1.268															185		562
environmentalimpact	114															17					46		51	
explorationactivity	12.895							53			34	16					281		12.465		46			
explorationresult	382										32	23					281				46			
geologicevent	33.904							292			21.886	641	8.754			203			1.316		46	204		562
legislationcitation	16		16																					
linearorientation	807							1								35			163		46			562
managementzone	4.699		16				1.268													2.668		185		562
mine	33.656	236	205	314	4.214	18.809	1.268		154			1	676			455	166	172	346	5.119	46	206	707	562
minedmaterial	5.550												676							4.828	46				
minename	41.616	472	384	314	8.834	18.809	2.536		154			1	676			488	166	275	346	5.119	92	412	1.414	1.124
mineral	19.305		5		7.642							56	11.173	9		211		209						
mineraloccurrence	116.013	236	5	573	4.214	31.129	1.268	386	1.290	3.474	22.576	893	18.279	18.862	302	2.277	281	172	1.908	6.309	46	206	707	620
mineralproducingcountry	5.691		1	1			1										1			5.122	1	1	1	562
mineremark	72															72								
miningactivity	17.260	236	223	314	4.214	2.971	1.268		154			2	676			39	166	172	168	5.119	46	223	707	562
miningfeatureoccurrence	41.423	472	428	314	8.428	18.809	2.536		308			6	676	137		1.452	332	344	514	5.119	46	223	717	562
miningwaste	747											1	676			14					46		10	
occurrenceform	17.600				4.214	10.291		298			29	542	66			182	281	172	963					562
occurrencemanagementzone	3.190		6				1.268													1.731		185		
occurrencename	13.868	236	5		4.620		1.268									89	281	103		6.309	46	204	707	
occurrenceremark	11.226	471			8.744						1.560	18				31	109	293						
occurrenceshape	27.261				4.214			297			21.895	15				158		172	464		46			
oremeasure	16.090	472			8.428						6	316	438	7		2.277	176	344	244			10		3.372
planarorientation	31.776	236			4.214	25.936										57		172	599					562
processingtransformationactivity	5.165																			5.119	46			
processingtransformationplant	5.165																			5.119	46			
processingtransformationplantname	5.165																			5.119	46			
product	15.319	934	223		6.444								1.674					199		5.799	46			
prosumminingactivity	764											1	676							12	46	19	10	
prosumminingwaste	225											1		137						12	46	19	10	
prosumminingwastemeasure	148											1		137									10	
prosumwastecommoditymeasure	14																						14	
prosumwastedimension	145													137									8	
reserve	5.918	236			4.214							1	31			106	4	172	20			10		1.124
resource	8.893	236			4.214						6	160	407	7		2.171	172	172	224					1.124
rockmaterial	45.231	406			3.824						21.928	25	18.592			403		7			46			
rockmaterial1lithology	71.200	406			3.732						48.257	17	18.517			220		5			46			
thematicid	16		16																					
unfclassification	1											1												
wastestorage	70															14					46		10	
record# sum::	982.625	9.095	1.570	2.514	141.673	184.092	16.347	2.271	5.350	7.542	237.260	4.643	167.961	38.333	1.003	15.715	3.286	4.300	29.763	81.192	1.335	2.716	6.060	18.604
record# sum without rock*:	866.194	**8.283**	**1.570**	**2.514**	**134.117**	**184.092**	**16.347**	**2.271**	**5.350**	**7.542**	**167.075**	**4.601**	**130.852**	**38.333**	**1.003**	**15.092**	**3.286**	**4.288**	**29.763**	**81.192**	**1.243**	**2.716**	**6.060**	**18.604**
2018-08-14 record# sum without rock*:	812.828	7.114	1.055	2.514	134.117	184.092	4.934	2.271	5.350	7.542	167.075	4.601	126.477	38.333	1.003	15.092	3.286	3.918	29.763	45.668	1.243	2.716	6.060	18.604

Notes:
> The line above prosumminingactivity denotes countries that do not have impled service for prosum.
> For rock* (rockmaterial, rockmaterial1lithology) tables the number of records in harvested database is not neccesary to be equal to the number of records in local county database because it depends on country harvesting order and already harvested records.
The number of records in the rockmaterial and rockmaterial1lithology tables will be the same to the number of records in local country database if only that country is harvested.