MIREU KNOWLEDGE PORTAL SERVICES AND APPLICATIONS

D7.3 Deliverable
29/November/2019

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Deliverable administration					
No & name	**D7.3 Final version of the MIREU portal**				
Status		**Due**	M24	**Date**	2019-11-29
Author(s)	Guillaume Bertrand, Jean Goncalves and MIREU WP7 partners				
Description of the related task and the deliverable. Extract from DoA	This deliverable is the final output of tasks T7.2 (MIREU Knowledge Portal; BRGM; M1–24) and T7.3 (Dedicated services/applications; BRGM; M6-24) of work package 7 (Knowledge Management) of the MIREU project. According to the DoA: "The purpose of T7.2 is to develop the MIREU Knowledge Portal. It will include data management tools to perform the following functions: • Feeding and indexing: All the knowledge uploaded in the portal (produced and collected by other work packages) will be fully indexed and accompanied by its metadata (using widely recognized metadata standard such as Dublin Core). This knowledge will be delivered in supports of various types, either semi-structured (e.g. datasets) or non-structured (e.g. reports, abstracts, charts, graphs, etc.). • Searching & retrieval: The MIREU Portal will be endowed with Search Capability, allowing to search at the same time in the data, in the documents and in their associated metadata. The search can be performed using full text, a specific location or using a simplified geographic interface allowing delimiting an area. The list of results will show a brief description of the documents retrieved and the geographic area covered in a small spatial viewer. The MIREU Knowledge Portal will be freely accessible on the internet and hosted on BRGM's servers during the lifetime of the project (note that a perennial solution for hosting the portal beyond the lifetime of the project will have to be sought). Practically, it will benefit from developments for other past and on-going H2020 projects (Minerals4EU, SCRREEN, EURARE, etc.), in order to maximize efficiency of EC funding. Also, it will be made fully compatible with (i) the Minerals4EU European Minerals Knowledge Data Platform (EU-MKDP, see http://minerals4eu.brgm-rec.fr/), and (ii) the JRC Raw Materials Information System 2.0 (RMIS 2.0), depending on its specifications (unknown yet), in order to facilitate the link between the platforms." And "the purpose of T7.3 is to develop pertinent services/applications on top of the knowledge portal, in order to facilitate diffusion of knowledge and ease networking and exchange of information and/or best practices between mining regions. Defining these services requires inputs from both other WPs of the projects and stakeholders, in terms of "what information do we need to see?" and "how do we want to see it?" After confirming their feasibility with regards to the resources of the project, they should be implemented in the final version of the MIREU knowledge portal. "				
Participants	BRGM and all knowledge producing WPs				

	Comments		
V	Date	Authors	Description
0	29 Nov. 2019	G. Bertrand, J Goncalves and WP7 partners	Preliminary version

Dissemination level		
PU	Public	X
CO	Confidential, only for members of the consortium (including the Commission Services)	

MIREU Deliverable Evaluation Checklist	√
The deliverable uses the template structure for elaborating task and implementation of project activities.	
The deliverable has been checked against the Grant Agreement to identify discrepancies.	
The deliverable complies with the necessary data management and ethics requirements outlined in the GA, the project Data Management Plan and the Internal Ethics guidelines.	
The deliverable has been completed in compliance with the project identity (if relevant).	
The deliverable has been completed in compliance the project style guide (see internal project guidelines).	
The necessary spelling/grammar checks have been conducted and the deliverable can be easily understood.	
The deliverable has been proofread by a person commanding a high English proficiency (only relevant for "Cross-check WP Leader" stage and beyond)	

Please ensure all items above have been completed and the delete this page (and the checklist) from the final document.

About MIREU

The project MIREU aims to establish a network of mining and metallurgy regions across Europe with a view to ensure the sustained and sustainable supply of mineral raw materials to the EU. The network will help the regions to share knowledge and experiences when facing the challenge to establish and maintain an extractive industry. MIREU will facilitate an exchange between all interested stakeholders in the regions, namely regulatory authorities, political and administrative bodies, development agencies, mining companies, non-government organisations, as well as the general public. The project will develop a shared knowledge base, taking into account the region-specific geographic and economic features, cultural, societal and language diversity, and their historical developments. The network will also learn from experience in other regions of the World. This knowledge base will allow to understand what has been conducive and what hampering to the development of extractive and metallurgical industries. It will also provide the context for a bottom-up integration of these activities into their respective socio-economic and socio-cultural context. Development is about people and, therefore, bringing people into the decision-finding procedure in order to achieve a 'social license to operate' will be a key aspect of the project. Guidelines and recommendations for actions to be taken to foster a sustained and sustainable development of the extractive industries will be developed in close co-operation with a range of selected regions from the European Union. These regions will form a nucleus and multipliers for a more extensive network beyond the life-time of the project.

Table of Contents

1. EXECUTIVE SUMMARY

This document describes the MIREU knowledge portal. As the leader of T7.2 (MIREU Knowledge Portal) and T7.3 (dedicated services/applications), BRGM was tasked with 1) developping the knowledge portal of the project and 2) developping services and/or applications in the portal to facilitate the diffusion of knowledge. The objective of the MIREU knowledge portal is to provide efficient access to the knowledge and data gained by and collected during the project.

In its prototype version, the MIREU knowledge portal structure was relatively simple, with a home page, a restricted access page to add documents (accessible only to registerd users, i.e. data providers), and a search engine and pages of search results (openly accessible to all users). The goal of task 7.3 was be to developp services and/or applications, on top of the prototype version, to facilitate access to pertinent information.

As the MIREU portal is meant to be linked to existing mineral resources knowledge platforms (such as the Minerals4EU European Minerals Knowledge Data Platform, or the JRC Raw Materials Information System 2.0), an OpenSearch API has been developped, that allows external web sites to query it and retrieve information it contains.

In addition, additional services are presently being developed in the portal to better serve outstanding outputs from other WPs. As these outputs are not yet finalyzed and available, the development and testing of these services is delayed and will likely be finalyzed during year 2020.

The MIREU Knowledge Portal is publicly accessible at the following URL: http://knowledge.mireu.eu

2. INTRODUCTION

2.1 Purpose and target group

The purpose of T7.2 was to develop the prototype of the MIREU knowledge portal. The portal is intended to host and manage knowledge and data collected and produced by the project. The knowledge portal has two main objectives that are 1) to allow consortium partners to enter data in the portal, to index it and describe its metadata, and 2) to allow end users to search and retrieve pertinent information in the portal. The prototype version of the portal has been developed and is operational. The purpose of task T7.3 is to improve the prototype version of the portal by developping pertinent services and/or application to facilitate access to the data, and produce the final version of the knowledge portal by M24 of the project timetable.

2.2 Contributions of partners

BRGM is the leader and main contributor of tasks T7.2 and T7.3. However, the services and applications to develop in the portal strongly depend on the data that are produced by other work packages and their views on the best ways to serve them. In this regard, the

development of these services and/or applications is not finalized in this preliminary version of D7.3 as other work packages of the project are still producing important amounts of information that is not yet hosted in the knowledge portal.

2.3 Baseline

The technologies that were used to develop the MIREU knowledge portal are the same than previous portals developed by BRGM for mineral resources, in order to facilitate their compatibility and maximize the efficiency of EC fundings. Such previously existing portals are for instance the Minerals4EU EU-MKDP (European Minerals Knowledge Data Platform) or the EURARE IKMS (Integrated Knowledge Management System).

2.4 Relations to other activities

WP7, Knowledge Management, is the center of knowledge production for the MIREU project. It will provide open access to knowledge gained over the lifetime of the project via the online MIREU knowledge portal. As such, the portal is meant to host, manage and serve the knowledge and data produced and collected by all 'data producing' work packages of the project. These are essentially (but not only) WP3 ("framework conditions for mineral raw materials exploitations"), WP4 ("social license to operate"), WP5 ("identifying and promoting regional synergies for economic growth") and WP6 ("R&I investments and ESIF"). In addition, the MIREU knowledge portal is strongly connected with activities of WP8 ("communication and dissemination") and WP9 ("clustering").

3. OVERVIEW OF THE KNOWLEDGE PORTAL

3.1 Knowledge mapping of task T7.1

In order to properly define the specifications of the MIREU knowledge portal, it was necessary to inventory the types of data that will be collected and/or produced by other 'data producing' WPs of the project.

This 'knowledge mapping' was done in T7.1 that was led by LAY and was completed in due time by M6 (end of May 2018) with the submission of deliverable D7.1. In line with the scope of the task, the purpose of D7.1 was to identify the knowledge produced or collected by other WPs, with its description (type, format, etc.), that will be delivered via the MIREU knowledge portal. This list was compiled by LAY, using an online survey questionnaire that was developed and sent to all WP leaders. The questionnaire and the results of the survey are presented in details in D7.1. To summarize, the main points we learned from this questionnaire are the followings:

- Data in the knowledge portal will be of various types (reports, databases, articles, medias, etc.) and format (pdf, docx, xlsx, raster, video, etc.);
- Existing datasets may be included if they bring useful information for the project/domain;
- Beside these external datasets, no data produced by the project is expected to be georeferenced (as far as what was known at the time of the survey);
- The large majority is open access, but some data might be restricted or confidential.

These points led to the conclusions that the MIREU knowledge portal has to handle non-structured data of various types and formats, that it has to handle restricted or confidential information and that it does not need a map viewer as no georeferenced data was *a priori* expected to be produced by 'data producing' work packages.

3.2 Overview of the knowledge portal specification

The conclusions derived from the work conducted in task T7.1 allowed to define the specifications of the MIREU knowledge portal, in order to develop it in task T7.2. Detailed specifications were established, of which the main points are the followings:
- The MIREU knowledge portal was basically designed as a document management system;
- The core of the MIREU knowledge portal is data management tools, which purpose are to i) feed and index information in the portal (for knowledge providers), and ii) search and retrieve pertinent information (for end users);
- The knowledge portal disseminates technical information that will be produced and/or collected by MIREU consortium partners while the project web site provides information on the project itself; However, technical information that are already in the web site (e.g. region factsheets) will not be duplicated but referenced in the knowledge portal;
- The visual identity of the knowledge portal has been harmonized with the project web site, as both are closely connected;
- The MIREU portal uses technologies that are identical (or at least compatible) with knowledge portals from former EU funded mineral resources projects developped by BRGM, and especially the Minerals4EU European Minerals Knowledge Data Platform (EU-MKDP), in order to facilitate their possible integration in the future.

The architecture of the MIREU knowledge portal includes a limited number of pages that are the followings:
- Home page (visible to all users);
- Page "Add a document" (back office, login required);
- Page "Search the MIREU KMS" (or "data search", visible to all users);
- Page of search results (visible to all users).

These pages are described in more details in the following sections, with screenshots of the knowledge portal (in its present version).

3.3 The Home page

The Home page of the MIREU knowledge portal (Figure 1) is publicly accessible at this URL: http://knowledge.mireu.eu

A backup URL is also available, that is:

http://mireu.brgm.fr

As the whole knowledge portal, it has been designed to be fully compatible with the project web site, in terms of visual identity (layout, fonts, colors, pictures, etc.). It offers a main menu with 3 items: "Home", "Search the MIREU KMS" and "Project web site" (plus an additional "Add a document" menu for logged-in registered users), plus a discreet "login" menu at the bottom of the page (intended for registered users). This configuration is rather basic but additional items can be added to the main menu.

No block for editorial news has been included as one already exists in the project web site, which is easily accessible via a link "project web site" in the main menu. The EU logo and legal mention on EU's H2020 funding are displayed at the bottom of the Home page.
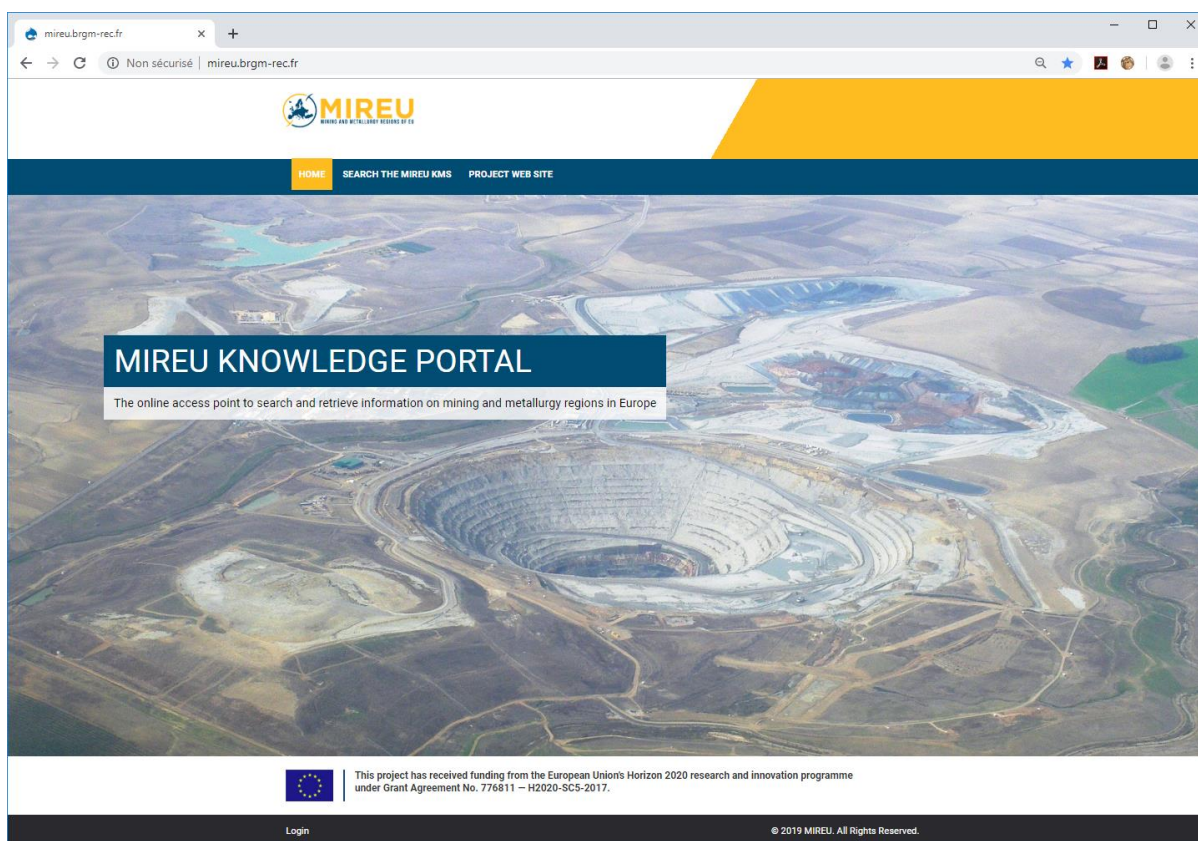

Figure 1 – Screenshot of the MIREU knowledge portal Home page.

3.4   The 'Add a document' page

The "Add a document" page can be accessed by registered users only (i.e. projects partners) via login and password. It allows 'data provider' to upload documents (reports, articles, abstracts, maps, etc.) in the system, index them and provide their metadata via a recognized metadata standard (i.e., Dublin Core). Basicaly, the "Add a document" page is a form that data providers have to fill to properly add documents in the system (Figure 2). This will ensure that documents are properly described and indexed in order to facilitate their retrieval.

For restricted or confidential documents, only metadata is provided with the URL of the source of the document (e.g. article page in a journal editor web site). By doing so, the MIREU knowledge portal does not provide confidential documents (for which it does not have the rights to do so), but informs about the existence of these documents and were they can be obtained (for instance, purchase of a scientific article in the web site of an editor).

Figure 2 – Screenshot of the MIREU knowledge portal "Add a document" page, showing some fields data providers have to fill to describe and index documents added or referenced in the portal.

As the MIREU project focuses on mining and metallurgy regions of Europe, a field allows to index a document by country or region. This field uses a code list of countries/regions that has been built from the Eurostat NUTS2 list. Finally, a mini-map allows data providers to manually draw the geographic coverage of a document.

3.5 The 'Data search' page

The "Data search" page (or, more precisely, "Search in the MIREU KMS" page) allows end users to search in all data entered in the system by keywords, terms in title, creator, publisher or contributor, in order to retrieve pertinent information (Figure 3). A search by country and/or region, via a drop-down list, is also available. It uses the same code list, derived from the NUTS2 list of countries/regions, than the "Add a document" page. A simplified "mini-map" viewer also allows users to manually draw their area of interest.

Clicking on the "Search" button closes the "Data search page" and open a new page were results from the search engine are provided.
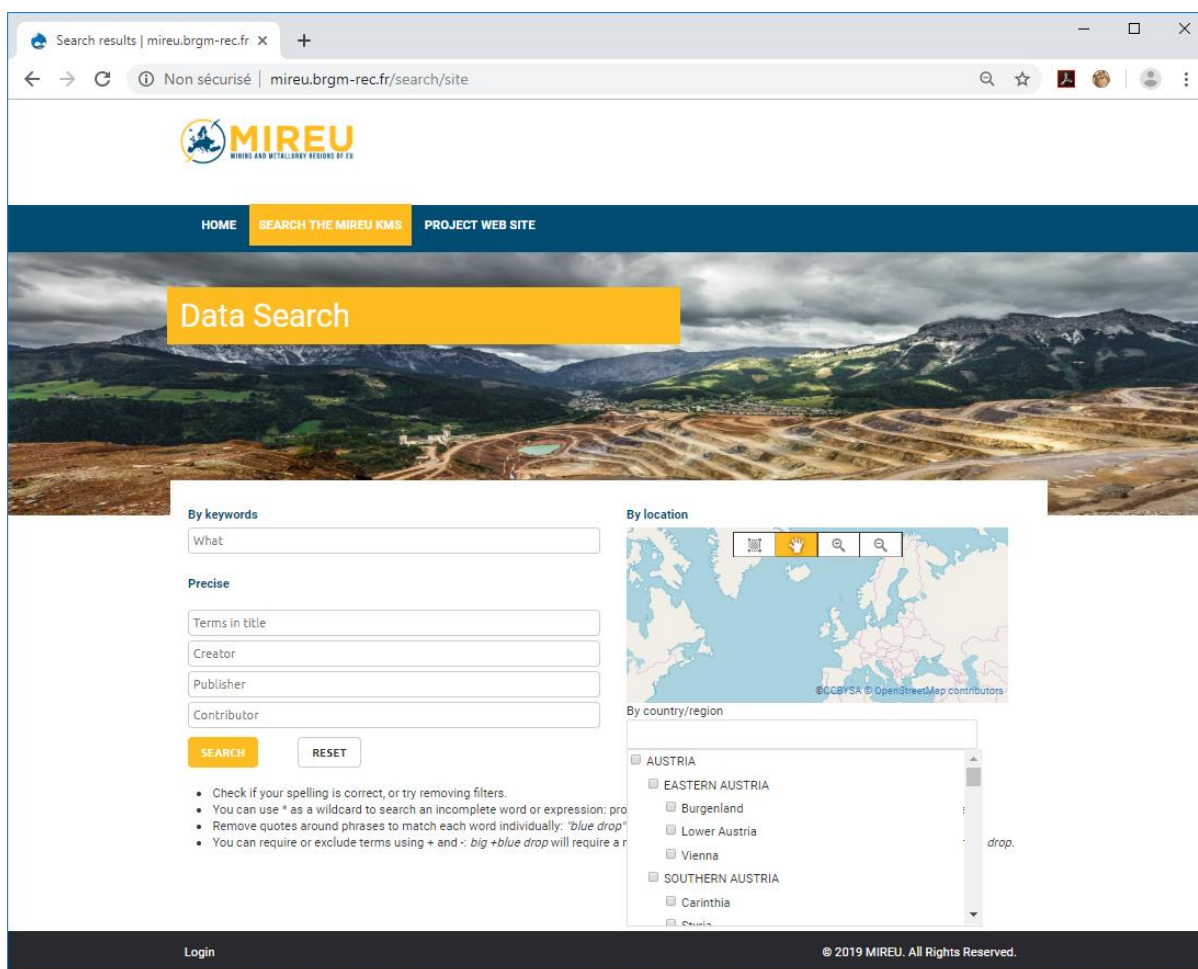

F*igure 3 - Screenshot of the MIREU knowledge portal "Search in the MIREU KMS" page, showing the search fields (left), geographic window (right) and countries/regions drop-down list (bottom right).*

3.6   The page of search results

Results of the search engine are displayed in a new page (Figure 4). This page provides different information that is organized in three columns:

- A synthetic list of document types, languages and content types, in the left column, that allows to quickly refine the search;
- A list of results, in the central column, that shows a brief overview of each document (names and types) retrieved;
- A mini-map, in the right column, with the geographic coverage (if any) of the retrieved documents;

Clicking on a result in the central column will display additional information and a "view more" button (Figure 5). This button allows to access the full description of the document in a separate page.
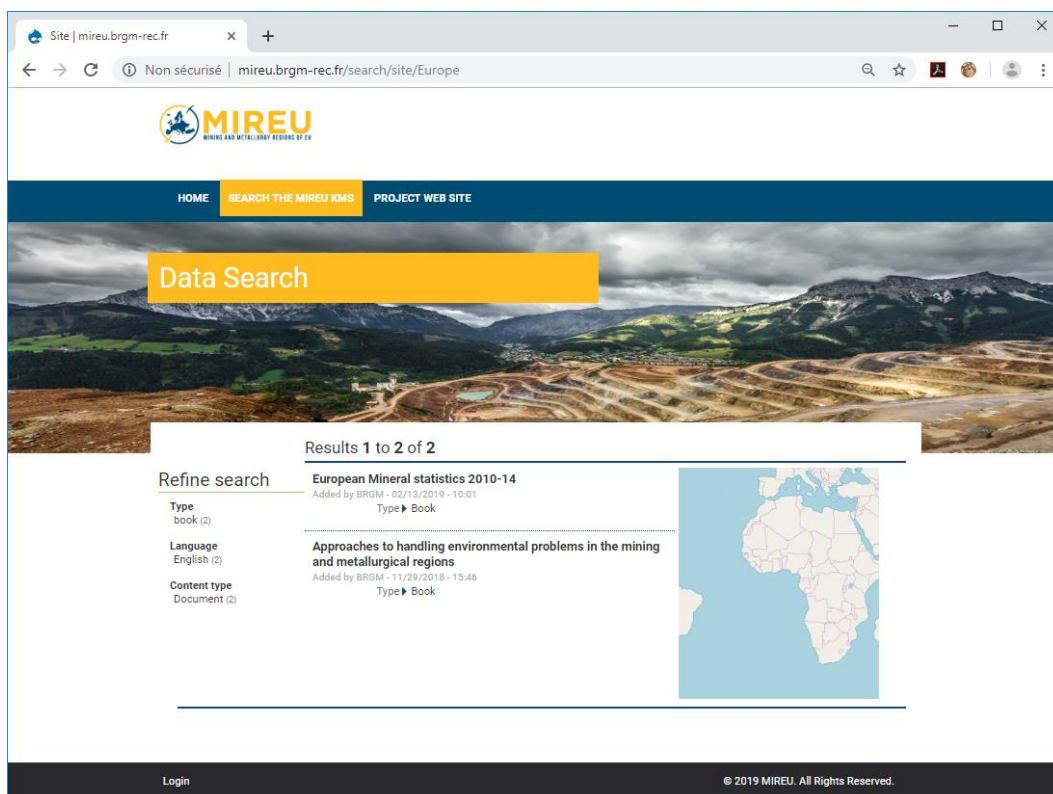

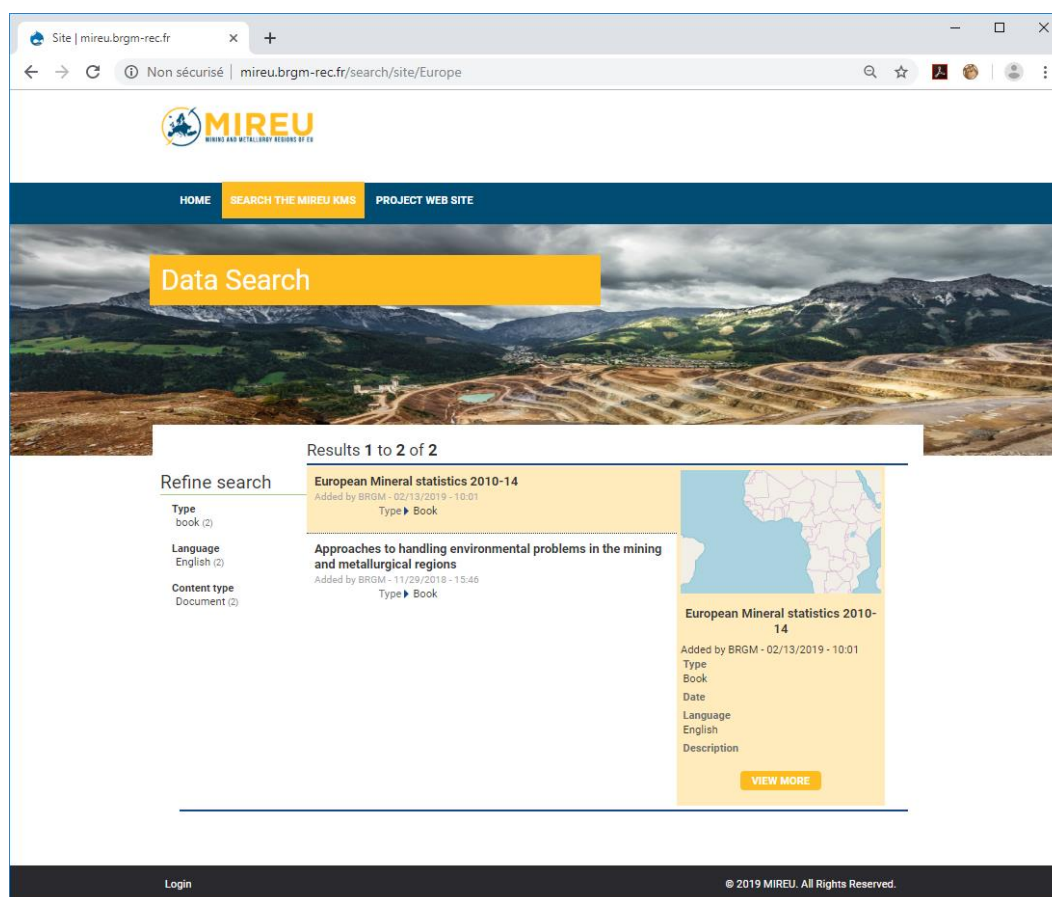Figure 4 - Screenshot of the MIREU knowledge portal "Search results" page.

Figure 5 - Screenshot of the MIREU knowledge portal "Search results" page, showing additional information below the mini map when a result in the central column is selected.

4. OPENSEARCH API

In order to facilitate the link between the MIREU knowledge portal and other knowledge platforms, a DataSearch service has been developed, that allows automatic querying of portal to retrieve pertinent information. This DataSearch service exposes an API based on the OpenSearch protocol (http://www.opensearch.org).

4.1 Base URL of the API

The OpenSearch description document URL is either:

- http://knowledge.mireu.eu/opensearch/apachesolr_search/
- Or http://mireu.brgm.fr/opensearch/apachesolr_search/

4.2   Origins

For the time being, the API accepts all origins (i.e. *Access-Control-Allow-Origin: **), so all external websites can reuse the data. In the future, if abuses occur, a whitelist of selected origins might be settled up.

4.3   OpenSearch API explanation

4.3.1 DATA RETURNED

All available data and documents present in the MIREU Knowledge portal is exposed via this API and can be retrieved.

4.3.2 SEARCH URI COMPOSITION

The search URI is composed, according to the description document, as this:

http://knowledge.mireu.eu/search/apachesolr_search/{searchTerms}

where you have to replace {searchTerms} with your request. The query is based on the SOLR query language (http://archive.apache.org/dist/lucene/solr/ref-guide/apache-solr-ref-guide-5.5.pdf - section *The Standard Query Parser*). Note that the query result is paginated. To access directly a page you have to add the page parameter in the query string, as this:

http://knowledge.mireu.eu/search/apachesolr_search/{searchTerms}?page=[n]

Note that in these URLs, http://knowledge.mireu.eu can be replaced by http://mireu.brgm.fr.

4.3.3 RESULT FORMAT

The result provided by the OpenSearch API is formatted on the RSS 2.0 normalization (https://validator.w3.org/feed/docs/rss2.html).

4.3.4 OpenSearch Extensions

Some extensions are available as specified in the OpenSearch protocol.

- *opensearch:totalResults*: specify the total results of the search
- *opensearch:startIndex*: specify the index of the first item in the current page
- *opensearch:itemsPerPage*: specify the number of items returns in a page
- *opensearch:Query*: specify the query received

4.3.5 RSS EXTENSIONS

Some link elements (atom:link) are present to facilitate the navigation between the results.

- *rel="prev"*: specify the URL to access to the previous result page. It is not present on the first page.
- *rel="next"*: specify the URL to access to the next result page. It is not present on the last page.

4.3.6 ITEMS CONTENT

Each item in the flow is composed of the following elements:

- *title*: The title of the item, for the mine occurrences and mineral occurrences it's the names of the mine.
- *link*: The link to the detail page of the item.
- *description*: The description of the item. For the documents, it's the subject list.
- *guid*: it's the RSS unique identifier of the item.

4.4 Examples of queries

The following bullet points illustrate possible queries that could be submitted to the OpenSearch:

- http://knowledge.mireu.eu/opensearch/apachesolr_search/environmental

  This request will return all the data where the word **environmental** is present in any field (title, description, subject …)

- http://knowledge.mireu.eu/opensearch/apachesolr_search/sm_field_type:Book

  This request will return all the **books** presents in the knowledge portal (type "Book").

- http://knowledge.mireu.eu/opensearch/apachesolr_search/sm_field_country_code:AT

  This request will return all the **Austrian's** data (Country Code "AT").

- http://knowledge.mireu.eu/opensearch/apachesolr_search/sm_field_country_code:AT%20and%20sm_field_type:Book

  This request will return all the **Austrian's books** presents in the knowledge portal (type "Book" AND Country Code "AT").

4.5 Example of response

This example is not representative of the reality of the data present in the knowledge portal. It is meant to illustrate the format of responses generated by the OpenSearch API.

```xml
<?xml version="1.0" encoding="utf-8" ?>
<rss version="2.0" xmlns:atom="http://www.w3.org/2005/Atom"
xmlns:opensearch="http://a9.com/-/spec/opensearch/1.1/" xmlns:relevance="http://a9.com/-
/opensearch/extensions/relevance/1.0/">
  <channel>
    <title>mireu.brgm.fr Site search: sm_field_country_code:AT and
sm_field_commodity_term:tungsten</title>
    <link>http://knowledge.mireu.eu</link>
    <description>Site search results for &quot;sm_field_country_code:AT and
sm_field_commodity_term:tungsten&quot; at scrreen.brgm-rec.fr</description>
    <language>en</language>
    <opensearch:totalResults>1</opensearch:totalResults>
    <opensearch:startIndex>1</opensearch:startIndex>
    <opensearch:itemsPerPage>10</opensearch:itemsPerPage>
    <atom:link rel="self"
href="http://knowledge.mireu.eu/opensearch/apachesolr_search/sm_field_country_code%253AA
T%2Band%2Bsm_field_commodity_term%253Atungsten" type="application/rss+xml" />
    <atom:link rel="search" href="http:// knowledge.mireu.eu/opensearch/apachesolr_search"
type="application/opensearchdescription+xml" />
    <atom:link rel="alternate" href="http:// knowledge.mireu.eu/search/apachesolr_search"
type="text/html" />
    <opensearch:Query role="request" searchTerms="sm_field_country_code:AT and
sm_field_commodity_term:tungsten" />
    <atom:link rel="next" href="http://
knowledge.mireu.eu/opensearch/apachesolr_search/sm_field_country_code%253AAT%2Band%2
Bsm_field_commodity_term%253Atungsten?page=2" type="application/rss+xml" />


    <item>
      <title>Approaches to handling environmental problems in the mining and metallurgical
regions</title>
      <link>http://knowledge.mireu.eu/node/3</link>
      <description>environment, problems, mining, metallurgy, regions, Europe</description>
      <guid isPermaLink="false">http:// knowledge.mireu.eu/node/3</guid>
    </item>
  </channel>
</rss>
```

5. INTERACTIVE COUNTRY/REGION SEARCH MAP

As the MIREU project is focused on the mining and metallurgy regions of Europe, T7.3 is presently developing an interactive search map to help retrieve information related to specific countries or regions. This interactive map will display countries and regions based on the polygons of the NUTS2 list of countries and regions in Europe from Eurostat. Polygons of either countries or regions will be displayed according to the current level of zoom. Each polygon will be color-coded according to the number of documents (either all documents or documents of a selected type) in the system that relates to it. This interactive country/region search map

will be a user-friendly 'geographic' access to the information that should positively complement the thematic keywords-based access provided by the search engine.

Note that at the time of the writing of this preliminary version of D7.3, this interactive country/region search map is still under development. The reason is that the portal does not yet contain a sufficient amount of information to finalize the development of the interactive search map and test it. This section will therefore be updated in forthcoming versions.

6. FORTHCOMING ADDITIONAL SERVICES/APPLICATIONS

Other work packages of the MIREU project (especially the 'data producing' ones) have been solicited to express their view on the diffusion of information they produce. For instance, work packages 2 and 4 have expressed their wish to provide easy access to SWOT analyses, SLO factsheets, SLO toolboxes and possible other outputs via dedicated web pages or queries. Pertinent technical solutions will be investigated when these outputs are finalized and available.

7. CONCLUDING REMARKS

This document describes the current version of the MIREU knowledge portal. Note that all services and/or applications that have been discussed with other 'data producing' WPs are not yet developed, as they will continue producing outputs of various types until the end of the project. Therefore, BRGM will keep improving the MIREU knowledge portal in the coming months, to best disseminate the results of other work packages. As a consequence this document will be updated to incorporate forthcoming developments in the MIREU Knowledge Portal.

8. ACRONYMS AND TERMS (ALL)

API : Application Programming Interface

BRGM: Bureau de Recherches Géologiques et Minières (French geological survey)

D: deliverable

EC: European Commission

ESIF: European Structural and Investment Funds

EU: European Union

EU-MKDP: Minerals4EU European Minerals Knowledge Data Platform

IKMS: Integrated Knowledge Management System

KMS: knowledge management system

LAY: Lapin Yliopisto (University of Lapland)

NUTS: Nomenclature of territorial units for statistics

R&I: Research and Innovation

SLO: Social License to Operate

SWOT: Strengths, Weaknesses, Opportunities, Threats

RSS: RDF (Resource Description Framework) Site Summary

T: task

URL: Uniform Resource Locator

WP: work package

XML: Extensible Markup Language

9. REFERENCES (ALL)

Not applicable.

10. APPENDICES

Not applicable.