

Paper Number: 3333

## **Thesaurus and DataViewer application tool – knowledge representation to define concepts and visualize geoscientific data**

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The increasing amount of geoscientific spatial data together with the growing demand for interoperability and interdisciplinary usage via the internet requires sophisticated management of the existing knowledge about basic data. As geoscientific data cannot be used successfully if the basic structure and interpreted results are not understandable for everyone within a certain community, a comprehensible (transparent) knowledge representation is an important precondition.

At the Geological Survey of Austria (GBA), the GBA-Thesaurus and the DataViewer based thereon are one approach to face that challenge. The GBA-Thesaurus (<http://resource.geolba.ac.at/>) started in 2011 as the LinkedOpenData project primarily to fulfil the implementation of INSPIRE (Infrastructure for Spatial Information in the European Community), a directive of the European Union transposed into Austrian law in 2010. One major aim of INSPIRE is the achievement of interoperability across the European Community by either changing (harmonizing) and storing existing data sets or by transforming them via services for publication in the INSPIRE infrastructure [1]. As no machine readable code lists have been provided by INSPIRE to attribute geologic feature object data, the GBA developed its GBA-Thesaurus to bridge this gap. This bilingual controlled vocabulary is based on the Simple Knowledge Organization System (SKOS) using the Resource Description Framework (RDF). In detail, each term (SKOS-concept) holds its own unique web address, the so called URI (Unique resource identifier), which is used to encode the geological feature object data. Due to the semantic web capabilities (RDF/SKOS-URI), it is possible to refer to other LinkedData resources like the BGS rock classification system, DBpedia, GeoSciML, and by now also INSPIRE, to fulfil the official mandate of data harmonization. In summary, the GBA-Thesaurus is designed as knowledge representation of the Austrian Geological Survey and provides a platform for geologists to discuss terminology and classification issues.

In addition, the available open access service interface allows building external applications that evolve from the GBA-Thesaurus. Therefore, the DataViewer application has been developed. It is a tool based on the INSPIRE data model for geology, especially designed to search and analyze geological data (please see example link where you search for geologic features in Austria attributed with "breccia": <http://gisgba.geologie.ac.at/DataViewer/tdv/Index.aspx?url=http://resource.geolba.ac.at/lithology/182&lang=en>). It consists of: (1) a map display shown via ArcGIS web services and an attached leaflet to show the geometry, (2) a concept area with semantic data from Thesaurus queries using SPARQL endpoint, (3) a filter bar with SQL queries directly from the relational data base using an ashx handler. The purpose of this application is to provide geologists with a possibility to explore the database, to understand the advantages of a sophisticated structured database, and to move from the display of geological maps towards a view of geological data. Ultimately, its benefits are the improvement of both the quality and the harmonizing process of datasets. In addition, by providing a live access to the process of harmonizing geological data, it may be useful for a compilation of geological data all over the country and for error identification in geological map data. In future prospective, it should be possible to

detect, define, and visualize cross-bordering geological features by using the GBA-Thesaurus and DataViewer to support a common transboundary cooperation regarding geoscientific challenges.

*References:*

[1] INSPIRE Thematic Working Group Geology (2013) D2.8.II.4 INSPIRE Data Specification on Geology – Technical Guidelines:p. 362

