The Austrian national fault database and the pan-European HIKE fault database: The interplay of structured data with Linked Data – challenges and opportunities

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European geology has been studied for almost two centuries and the results have been published in numerous geological maps at different scales. Knowledge of the movement along major fault systems is the key for understanding the tectonic evolution in such a complex environment as Europe. Besides being a typical product of geological mapping and a necessary part of kinematic models, faults are prominent features defining resources (e.g. minerals, thermal conduits) and/or inducing potential hazard to subsurface drilling, injection and extraction activities (e.g. conventional hydrocarbon extraction in Groningen, Netherlands). Furthermore, the knowledge on faults, their subsurface geometry and deformation history has also increased in complexity, eventually showing the limits of printed maps for adequately representing the current state of knowledge. Therefore, collecting and structuring the available information on faults and presenting it in a harmonized and generally accessible way across national borders is a necessary challenge for geologists and geodata providers. In this contribution, we present two new fault databases, the national Austrian and the European HIKE fault databases, in order to illustrate the challenges and opportunities of each approach.

The national and scale-independent fault database of Austria focuses on the kinematic information available on faults and shear zones, which is the most important aspect of understanding faults in the national context. In order to capture the variety of geological environments and the highly varying levels of available data, the European HIKE fault database combines three different aspects of a fault object: fault geometry, kinematic attributes and a linked semantic vocabulary where non-structured information can be stored.
As the European HIKE fault database took inspiration from the Austrian fault database, both share several aspects. In addition to structured information stored in attribute tables, both databases contain a hierarchical classification scheme, which sorts faults and shear zones into groups of local, regional or transregional relevance through a semantic vocabulary of named faults. The vocabulary that has been generated under the principles of Linked Data, which allows storing unstructured information such as geographic description, detailed investigation history, debated theories etc., but also creates a network beyond the actual fault database by including links to other existing fault databases and additional information, e.g. Wikipedia or other semantic vocabularies. With the both examples presented here, we show that a balanced mix of structured information stored in attribute tables and an associated semantic vocabulary provides geologists the opportunity to share complex geodynamic and kinematic information.

The European fault database was developed during the Horizon 2020 GeoERA projekt HIKE and contains data from Geological Survey Organizations in Austria (GBA), the Netherlands (TNO), Germany (BGR, LfU, LAGB, LBGR), Belgium (RBINS-GSB), Iceland (ISOR), Denmark (GEUS), Poland (PIG-PIB), Lithuania (LGT), Italy (ISPRA), France (BRGM), Ukraine (GEOINFORM), Portugal (LNEG), Slovenia (GeoZS), Albania (AGS) and

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