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Integration of Geological Data as a Knowledge Graph

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Geological data are accumulated, analyzed and converted into cartographic works (usually, maps), generalizing current data. The maps are the main result of geologists' scientific research, but they cannot account the current state of the geological process. Understanding this issue, researchers created dynamic GIS based interactive resources accounting seismic and volcanic events, allowing one to query the databases for the phenomena, constructing a cartographic work on request with the filtered data. However, the similar phenomena can be observed at different locations, as well as various conclusion can be drawn from the whole body of the analyzed observation.

The knowledge revealing natural laws of good quality are obtained on the base of mathematical models application to the known geological data. Nowadays, technologies implementing computer simulation services are implemented as web processing services (WPS). To support research activity, data integration between databases, cartographic services and should be implemented.

Since 2001, Semantic Web (SW) data publishing techniques are developing in the direction of information systems integration within internet and local area network. The technologies integrate the systems, which design and implementation principles are varying drastically. The data to be published and acquired are accompanied by their metadata, allowing to develop of correct interpretation within the integration. A number of data format, processing procedures and interfaces have been developed, namely, Resource Description Framework (RDF), Knowledge Graphs (KG), and SPARQL. The flexibility of tools allows one to implement integration on various levels: databases, federated queries and document data.

The aim of the research is to raise the level of integration of geodata by introduction of the Linked Open Data (LOD) SW technologies into existing services of geological data publishing. This will allow developing flexible systems of knowledge acquisition and representation as subgraphs of a global geological graph of knowledge, as well as propose generic interactive publishing tools in the field of geological science.

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