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Integrated representation of data on geological structure, prognosis and mineral resources location regularities, based on international formats, to ensure efficiency improvement of mineral resources development

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In course of systematic regional geological studies of the Russian territory as part of works at the State Geological Map at 1:1,000,000 scale and 1:200,000 scale, a great number of territories perspective for mineral deposits are discovered. Subsequent to the results of carried out works, a number of various maps are published such as geological maps, maps of mineral resources, maps showing mineral resources location regularities, etc. Nevertheless, this kind of information is not always widely available for consumers, users of subsurface resources or potential investors. In this regard, the top priority of efficiency improvement of mineral resources development becomes provision of an easy and free access to all accumulated geological data, both, approved during geological prospecting and exploration activities, as well as not approved, but deduced from proprietary assessments.

In 2012-2015, specialist from VNIIGeosystem and VSEGEI executed works on converting geological maps' data into GeoSciML format. That ensured prerequisites for developing technologies that use EarthResourceML format to provide data from maps of mineral resources and maps showing mineral resources location regularities, including description of ore control zones, their relations to the geological structure and areas perspective for further exploration and prospecting of mineral resources.

In order to use EarthResourceML, it is necessary to build the most suitable and optimal data set ensuring that the provision of information is simple and clear. The mentioned data set is formed by taking advantage of the information from geological maps, maps of mineral resources, and maps showing mineral resources location regularities. Then the set of parameters is brought to conformity with EarthResourceML and GeoSciML's database scheme. For this purpose, we have developed an interlayer-converter determining if the integrated data set corresponds to attributes of EarthResourceML's logical scheme. We have also correlated the elements of the prepared data set and elements of the logical scheme EarthResourceML – GeologicFeature (from GeoSciML), EarthResource, EarthResourceMaterial, MineralDepositSystem, OreMeasure, and Reserve.

Integrated representation of data on geological structure, occurrences and properties of ore control zones, as well as information on prognostic resources, both, approved by field-oriented institutes, and those emerging from a subjective view of authors, serves as a simple and evident tool for searching territories perspective for mineral resources. All that, taking into account simplified procedure of issuance of a license for the use of subsurface resources in the Russian Federation, acts as a perfect incentive to attract new companies, including junior ones, into the geological business.

