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Specialized GIS-technology for identifying ore-bearing objects, areas and expected reserves evaluation

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Specialized technology is implemented by GIS capabilities using software ArcGIS (ESRI). Capabilities include: creating geo-database linked to the coordinates, creating multi-parameter models, solving problems of optimization and prediction of geological sections. The Geo-database consists of cartographical and attributive geological and geophysical, geochemical and remote sensing data, satellite images, topographic information and others, which were acquired by different researchers, technologies etc. Therefore, for the input data required drawing up common standards for notations, units of measurement, parameters (scale, projection) cartography. Moreover, there is a necessity in modern consistent approach to geology (tectonic characteristics, rocks classifications, stratigraphy, geologic-petrologic-genetic model of the objects, etc.) of the surveyed area.

Methods for studying the geological environment with the help of GIS technologies are built on the principle of analogy objects of study with the reference model. The coefficient of similarity comprises a quantitative estimate.

The forecasting model is formed by structuring of geodata based on detailed analysis and aggregation of geological and formal knowledge bases on a reference model. Development of a bank of models of the analyzed geological structures of various ranges, ore-bearing object, described by numerous prospecting indicators is the way to aggregate geological knowledge.

Generally, in solving geological forecast problems the formalized search characteristics include [1]:

- Presence of fault zones;
- Stage of rock metamorphism;

- Thickness of volcanic strata;

- Spatial and geometric positions of the ore bodies;

- Near surface structure zones;

- Qualitative and quantitative parameters of geophysical fields;

- Other parameters of surroundings rocks and ore control factors, that depend on properties of study area and geology forecast problem.

The final product of the research is to create an interactive GIS-technology, which allows to:

- solve a problem of identifying ore-bearing bodies, areas and evaluation of its expected reserves;
- optimize properties and methodology of fieldwork;
- solve other problems, related to sustainable land use and clever mineral deposit extraction;
- apply created GIS technology for each separate region as a desk (local) systems, integrated to the national geospatial information database with corporate access via local and global networks [2].

References:

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