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The Role of Geological Map for the Study of Mineral Reserves

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Abstract: The article deals with the method of creating a geological map in General, and specifically the creation of geological maps. In this regard, during the writing of the thesis was to analyze the state geological mapping to date, were digested subsequently creating a geological map exploration of ore deposits, were also fully justified methods for calculating mineral resources and the improvement of methods of creating geological maps of the ore deposit.

Keywords: Deposit, geological map, forecast map, tectonic map, quarry.

INTRODUCTION

One of the urgent tasks is to conduct geological research to determine the location of minerals and create geological maps. Geological maps also serve as the basis for setting up other search methods, since knowledge of the geological structure of the study area, along with other factors, allows you to correctly select search methods, determine their scale, direction of search lines, density of observation points, and, most importantly, correctly interpret the actual materials obtained as a result of work. Finally, information about the geological structure of the area under study, in combination with other materials collected during the search, makes it possible to make a reasonable geological assessment of the prospects of the identified object and to predict its possible industrial significance[1].

Currently, in geological research, data from aerial surveys and surveys from automatic satellites of near-Earth orbits are mainly used. Remote sensing materials make it possible to identify almost the entire complex of geological and tectonic elements that are objects of study in geological surveys: areal and stratified and non-stratified objects and tracing their boundaries, individual layers and marker horizons, dikes, faults, identification of tectonic blocks of folded and ring structures, location and features of igneous rocks, as well as to solve a number of search problems: the identification of ore-controlling structures, the establishment of areas of hydrothermal-metasomatic altered rocks, the location of oxidation zones, etc.

Conventional signs play the main role in the creation of geological maps. They are necessary to indicate on the map: a) the composition, age, origin and conditions of occurrence of rocks; b) boundaries between geological formations and faults, as well as their morphological features and other structural elements; c) minerals, paleontological and other finds [2]. Some of these signs are used in the compilation of stratigraphic columns and geological sections. There are three main types of symbols:

a) - color; b) graphic (dashed and mottled); c) - alphabetic and numeric. In addition, conventional signs are divided into large-scale (contour and off-contour), off-scale (linear) and point. Contour signs are colored, dashed and can be supplemented with specks.

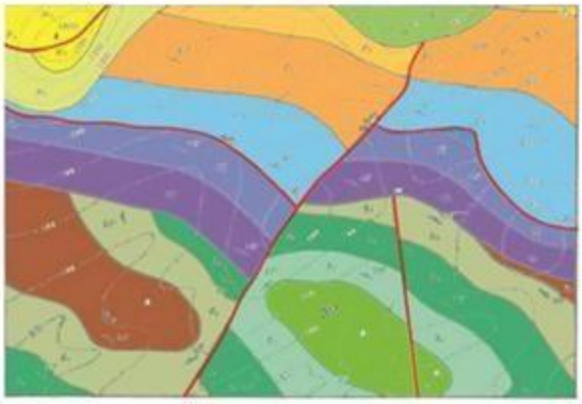
a) Color signs in accordance with the recommendations serve to indicate the age of sedimentary, volcanogenic and metamorphic rocks, the composition of intrusive rocks, the composition of metamorphic rocks and metamorphic facies, the composition of Quaternary volcanogenic rocks, the genetic types of Quaternary formations, and more.

b) Graphic signs (dash marks and dots) - to indicate the composition of rocks, dash marks are often used in the form of parallel or mesh (square, diamond-shaped, etc.) and other hatching in different directions, with different distances between lines and with different line thicknesses.

c) Alphabetic and numerical signs - are used to designate stratigraphic units of different ranks, as well as the genesis and composition of rocks.

Each petrographic group on the map is painted with its own color with a certain speck and is indicated by the corresponding index, and its age is indicated by the indices used for stratified deposits (Fig. 1).

Geological plan. Scale - 1:50000



Rice. 1. Scheme of the geological plan.

A geological profile is a cross-section of the upper layers of the earth's crust, which shows the position of rocks, faults and other geological structures that lie under the surface of the Earth.

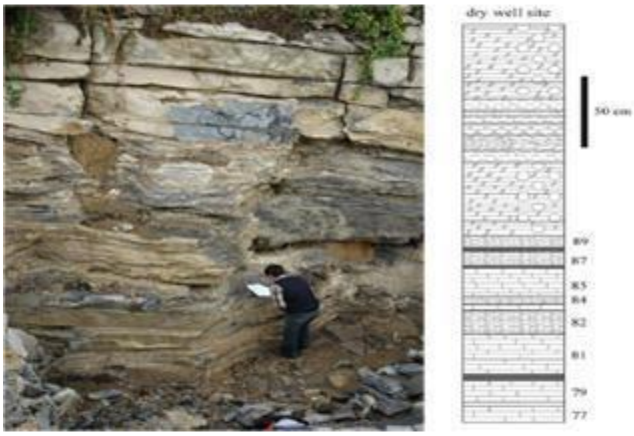


Fig.2. Creation of a stratigraphic column.

Stratigraphic column of rocks - a drawing depicting with special conventional signs on a certain scale the sequence of rock strata in a normal stratigraphic section and the nature of contacts between adjacent stratigraphic units (Fig.2)

The value of the altitude intervals is chosen depending on the scale of the map and on the terrain. For example, on a map at a scale of 1:200000, the main section of the relief is set to 40 m, and in mountainous areas - 80 m. At a scale of 1:50,000, the horizontal section is reduced to 10 and 25 m, respectively. It is important to immediately understand that the topographic basis of the map is not a plane, but a relief surface of complex configuration, largely reflecting the features of the geological structure of the territory.

Geological descriptions were studied [2] due to the exploration of a gold deposit, and the position of creation and the course of geological sections were studied, and on the basis of the collected materials and the geological map, a method for calculating ore deposits was based on the prepared information [2]. On the basis of research on deciphering images of the deposit area, it was possible to create geological, tectonic, metallological maps, as well as give recommendations for conducting field work, using a topographic map as a basis.

The internal structure of the deposit is determined by a system of shear and tear-off fractures and cracks. There is also a submeridional system of steeply dipping cracks filled with post-ore veinlets of milky-white quartz and calcite.

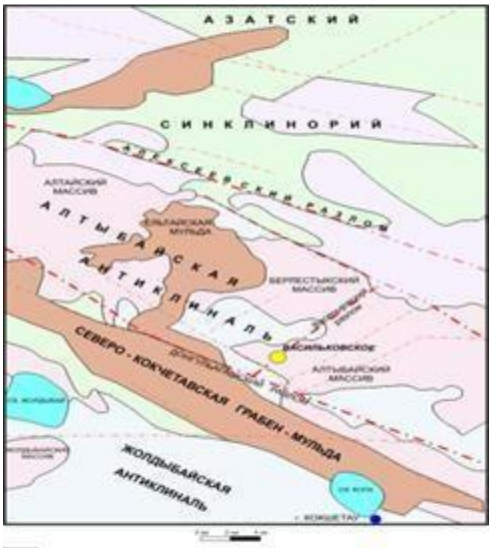
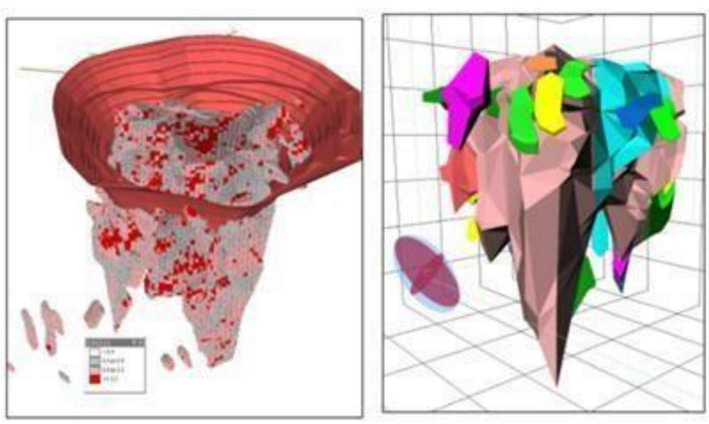


Fig.3.Structural map

Steeply dipping sublatitudinal faults are known, often accompanied by tectonic breccias. There is also a submeridional system of steeply dipping cracks filled with post-ore veinlets of milky-white quartz and calcite. Morphologically, the field is a complex truncated cone, wedging out to a depth(Fig.4,a).

Calculation of stocks. The traditional calculation of reserves, in turn, requires labor-intensive costs associated with calculations and monotonous operations (mathematical, logical, graphical, spatial), which necessitates the use of computer technologies for estimating reserves that minimize manual costs. The creation of computer technologies for estimating reserves is a very urgent task. In world practice, mining and geological information systems (GGIS for short — Gems, Surpac, Micromine, etc.) are actively used at all stages of the development of ore deposits: exploration, assessment of reserves, putting them on balance, in the design and planning of mining[3].



Rice. 4: a - three-dimensional view of the deposit model and the design pit; b-ellipsoid of the search and wireframes of the ore zones of the deposit

Conclusions. At present, for the planned development of the economy, much attention is paid to the study of natural resources. This requires complex geological research when creating a geological map of the Republic. In solving this problem, the use of aerospace images, which have such features as small scale, generalization, and visibility, plays an important role. And the use of computer technology in the calculation of reserves can reduce the time and labor costs for calculating reserves and designing graphic and tabular materials. The developed methodology and flow chart for its implementation are recommended for use in design organizations in assessing the field reserves and putting them on the balance sheet.

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