

CONSIDERATION OF THE GEOLOGICAL CONDITIONS FOR CORRECT GEOSTATISTICAL EVALUATION: EXAMPLE FROM ELATSITE COOPER DEPOSIT IN BULGARIA

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The Elatsite copper-porphyry deposit situated in the West Balkan metallogenic zone is of hydrothermal medium-temperature genesis, related to Late Cretaceous medium-acid magmatism. It is embedded in Early-Paleozoic shists, overthrusting the Late-Paleozoic granodiorites. The exploration was performed through 152 drill holes, at grids 100 x 100 m and 71 x 71 m. The evaluation of the resources by the method of geological blocks gave an amount of 550 million tons, with a copper grade 0.32%. The deposit is mined by open pit. A reevaluation of the reserves was decided to be made using geostatistical approach. The preliminary statistical analysis detected significant differences in the ore-mineralization distribution in the various rock types, as well as in the two tectonic blocks, formed by movements before and after the ore formation along a regional fault. Initially variogram analyses and kriging of the two blocks only were carried out. The comparison with the results from the already mined areas showed some discrepancy for the volumes of rejected ore. It was necessary to develop the model taking into account the basic lithological varieties - primary and contact-altered shists and granodiorites. 3D-models of the geological bodies in the two tectonic blocks were created. The metal grades for every of these bodies were evaluated by variogram analyses and ordinary kriging on 30x30x15 m blocks. The complex consideration of the geological conditions - tectonic and lithological - resulted in a significant improvement of the estimations, and the divergence between evaluated and mined ore was reduced to 3 - 5%.