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The statistical distribution pattern of zinc concentrations at Belousovskoye deposit (Rudny Altai)

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Abstract. The geochemical pattern of the Belousovskoye base-metal sulphide deposit was examined by sampling its largest and richest ore body #5. The samples were analyzed for copper, lead and zinc. In this paper we discuss data of zinc analyses only. The statistical distribution of elements within the deposit was analyzed using histograms that were plotted in a logarithmic scale. The distribution of metal concentrations serves as a base for the construction of reference models that will utilize a new approach for prognosis of new mineral deposits.

Detailed assay of the histogram pattern (the empirical analogue of frequency function of statistical distribution) of the sample group at the deposit ascertained that mostly the metal concentration distribution is polymodal. It consists of several constants, close to lognormal elementary components. [1].

The histogram visualizes random value action. It shows the amplitude and frequency of the values. The histogram shape also bears useful information. The histogram mode corresponds to the maximum frequency. Three morphological ore body types are allocated at the deposit. The first type contains the thickest and the richest bodies, located in the Shipulinskaya suite. They are represented by compact ribbon bodies, having the tilted yoke shape in the axial section. The bodies inside the Glubochanskaya subsuite pertain to the second type. They are characterized by asymmetrical crescent shape. The third type bodies are located in the north-east wing of the structure in the upper parts of the Glubochanskaya subsuite, where they are stowed as a system of small imbricate lodes and lenticular bodies with the shape of short ribbons. The proportion of width and length is 1:25 to 1:60 at the thickness of less than a meter to 10-15 m. Numerous apophyses and parallel lenses as well as ore bodies of complex morphology are especially common for the second type of ore bodies.

Thus, the study of the statistical distribution provides information on boundaries of ores, ore types and ore grades, and allows identification of morphological types of ore deposits. Another important practical application of the data on the patterns of statistical distribution lies in the ability to model ore objects using specifics of distribution at each level of metal concentrations. This approach was used for modeling of the gold deposit Akbakai (Kazakhstan) and showed that it is possible to obtain more accurate models and more reliable determination of the average metal content and metal resources in small blocks. [2].

The study of statistical distribution of metals is not an absolute innovation in forecasting of new deposits and unfortunately this approach is rarely used in studies of mineral deposits of Kazakhstan as a whole,

and in particular of the Rudny Altai. These studies are so far fragmental, and our goal is to use this approach more routinely in describing and predicting new mineral deposits.

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All references are in Russian.