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Sequential Gaussian Simulation in the Gangjiang Copper-polymetallic Deposit of Nimu, Tibet, China

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Main aim of this paper is the study of the variability of the copper ore body of the north area of Gangjiang polymetallic copper deposit with Sequential Gaussian Simulation (SGS) based on drill core data in order to delineate the copper ore body.

For better understanding of the grade variability, it is very important to predict the spatial distribution of the grade within the desired ore deposit [2]. Geostatistics has been used for spatial variability characterization and prediction of grade. Ordinary kriging is the most useful geostatistical estimation technique which is called also the “best linear unbiased estimator” [1]. The most important negative characteristics of moving averages estimators such as kriging is smoothing effect and reducing the range of variation of the variables. Geostatistical simulation is widely used to overcome this problem and avoiding the smoothing effect of such estimation methods. SGS is a means for generating multiple equiprobable realizations of the grade, rather than simply estimating the mean. These realizations gives us a means for quantifying grade uncertainty.

In this paper, we collected 106 drill holes and 33 exploratory trenches in the Gangjiang polymetallic copper deposit and built the drilling database. Geostatistical studies and visualizations were done with SGeMS and Datamine studio. The descriptive statistics and the histogram of copper grades show that the distribution of Cu data is lognormal . The Cu grade data was transformed by using a normal score transformation. The experimental semi-variograms shows that the east copper body moves toward the north-south, the tendency is west, and the inclination Angle is 75 °, the north orebody moves toward the east-west, tends to the south, and the inclination Angle is 20 °, the west orebody moves to 310 °, ,the tendency angle 40 °, the inclination angle is 20 °; Based on SGS modelling, ten realizations of Cu spatial distributions are generated on a 30m×30m×6m grid within the study area. Each realization represents a realistic spatial distribution of Cu without a smoothing effect. Based on the simulation results, we analysed the variability of the ore body.

References:

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