عنوان مقاله:

Discriminating copper geochemical anomalies and assessment of their reliability using a combination of sequential Gaussian simulation and gap statistic methods in Hararan area, Kerman, Iran

محل انتشار:

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نویسندگان:

S. Abbaszade - *Department of Mining and Metallurgical Engineering, Yazd University, Yazd, Iran*

F. Mohammad Torab - *Department of Mining and Metallurgical Engineering, Yazd University, Yazd, Iran*

A. Alikhani - *Mines and Metals Development Investment Company, Iran*

H. Molayemat - *Department of Mining and Metallurgical Engineering, Yazd University, Yazd, Iran*

خلاصه مقاله:

In geochemical exploration, there are various techniques such as univariate and multivariate statistical methods available for recognition of anomalous areas. Univariate techniques are usually utilized to estimate the threshold value, which is the smallest quantity among the values representing the anomalous areas. In this work, a combination of the Sequential Gaussian Simulation (SGS) and Gap Statistics (GS) methods was utilized as a new technique to estimate the threshold and to visualize the anomalous regions in the Hararan area, which is located in SE Iran, and consists of copper mineralization that seems to be connected to a porphyry Cu-Mo system. Furthermore, the most important advantage of this method is the reliable assessment of the anomalous areas. In other words, the anomalous areas were discriminated in terms of their probability values. The regions with high probability values were reliable and appropriate to locate the drilling points for a detailed exploration. It not only decreases the risk, cost, and time of exploration but also increases the drilling point reliability and precision of reserve estimation after drilling. In this research work, the results of analysis of 607 lithogeochemical samples for the element Cu were used. The SGS method was performed on the transformed data and 50 realizations were obtained. In the next step, the back-transformed realizations were utilized to obtain an E-type map, which was the average of 50 realizations. Moreover, the results of the GS method showed that the Cu threshold value was 228 ppm in the area. Therefore, using the E-type map, areas with values greater than 228 ppm were introduced as the anomalous areas. Finally, the probability map of the exceeding threshold values was acquired, and the anomalous districts located in the southern part of the studied area were considered as more reliable regions for future detailed exploration and drilling.

کلمات کلیدی:

Sequential Gaussian Simulation, Threshold, Gap Statistics, Reliability, Hararan District