عنوان مقاله:

Application of Probabilistic Clustering Algorithms to Determine Mineralization Areas in Regional-Scale Exploration Studies

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خلاصه مقاله:

In this work, we aim to identify the mineralization areas for the next exploration phases. Thus, the probabilistic clustering algorithms due to the use of appropriate measures, the possibility of working with datasets with missing values, and the lack of trapping in local optimal are used to determine the multi-element geochemical anomalies. Four probabilistic clustering algorithms, namely PHC, PCMC, PEMC, PDBSCAN, and ۴۱۳۸ stream sediment samplings, are used to divide the samples into the three clusters of background, possible anomaly, and probable anomaly populations. In order to determine these anomalies, ten and eight metal elements are selected as the chalcophile and siderophile elements, respectively. The results obtained show the areas of approximately ۵۰۰ and ۵,۰۰۰ km۲ as the areas of the probable and possible anomalies, respectively. The composite geochemical anomalies of the chalcophile and siderophile elements are mostly dominant in the metamorphic-acidic-intermediate rock units and the alkaline-metamorphic-intermediate rock units of the studied area, respectively. Besides, the obtained anomalies of the four clustering algorithms also cover about ۶۵% of the mineralized areas, all mines, and almost ۶۰% of the alteration areas. The validity criterion of the clustering methods show more than ۷۰% validity for the obtained anomalies. The results obtained indicate that the probabilistic clustering algorithms can be an appropriate statistical tool in the regional-scale geochemical explorations.

کلمات کلیدی:

Probabilistic clustering algorithms, Composite geochemical anomaly, Geochemical potential mapping, Hydrothermal alterations, Deh-Salm quadrangle