

عنوان مقاله:

Application of multivariate decision-making algorithms in the mineral potential mapping; Case study: West Basiran, South Khorasan Province

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خلاصه مقاله:

Identifying composite geochemical anomalies is one of the most essential goals in regional-scale exploration studies. In this paper, the results of chemical analysis of 18 elements in 191 geochemical stream sediment samples have used to evaluate potential for poly-metallic mineralization in an exploration area. The study area is located in the western part of Basiran 1:100000 scale geological map in the south of Birjand, South Khorasan Province. In terms of the geological- structural division of Iran, this area is located in the Lut block, and for this reason, it is very promising for various mineralization. Composite geochemical anomalies were determined by three multivariate decision-making methods such as Simple Additive Weighting (SAW), Integrated Determination of Objective Criteria Weights (IDOCRIW) and Weighted Aggregated Sum Product Assessment (WASPAS) algorithms in the study area. The results of SAW, IDOCRIW and WASPAS algorithms show five geochemical anomalies with a total area of 30.4, 26.8 and 24.8 square kilometers, respectively. These anomalies have the same locations and shapes. The II and V anomalies are the most significant mineralization zones in the study area. The I anomaly, located in the southwest of the study area, is related to diorite and micro granodiorite igneous rocks, while the II anomaly is related to acidic tuffs rocks. The II, IV and V anomalies are also associated with deep to semi-deep acidic to intermediate rocks in the north to northeast of Bisheh village. The surface and core drilling studies show high concentrations of Fe, Cu, Au, Zn, Pb, Ti, W, Co and Bi elements in these anomalies. This point can confirm the correctness of the algorithms used in identifying composite geochemical anomalies. Therefore, this paper proposes the algorithms mentioned above as an exploration data integration method.

کلمات کلیدی:

Composite geochemical anomaly, Multivariate decision-making method, IDOCRIW algorithm, WASPAS algorithm, Basiran region

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