عنوان مقاله:

A comparison between knowledge-driven fuzzy and data-driven artificial neural network approaches for prospecting porphyry Cu mineralization; a case study of Shahr-e-Babak area, Kerman Province, SE Iran

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خلاصه مقاله:

The study area, located in the southern section of the Central Iranian volcano–sedimentary complex, contains a large number of mineral deposits and occurrences which is currently facing a shortage of resources. Therefore, the prospecting potential areas in the deeper and peripheral spaces has become a high priority in this region. Different direct and indirect methods try to predict promising areas for future explorations, most of which are very time-consuming and costly. The main goal of mineral prospecting is applying a transparent and robust approach for identifying high potential areas to be explored further in the future. This work presents the procedure taken to create two different Cu-mineralization prospectivity maps. The first map is created using a knowledge-driven fuzzy technique and the second one by a data-driven Artificial Neural Network (ANN) approach. In this study aim is to investigate the results of applying the ANN technique and to compare them with the outputs of applying the fuzzy logic method. The geo-datasets employed for creating evidential maps of porphyry Cu mineralization include the solid geology map, alteration map, faults, dykes, airborne total magnetic intensity, airborne gamma-ray spectrometry data (U, Th, K and total count), and known Cu occurrences. Based on this study, the ANN technique is a better predictor of Cu mineralization compared to the fuzzy logic method. The ANN technique, due to capabilities such as classification, pattern matching, optimization, and prediction, is useful in identifying the anomalies associated with the Cu mineralization.

کلمات کلیدی:

Mineral Potential Mapping, Artificial Neural Network, fuzzy logic, Cu Mineralization, Shahr-e-Babak

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