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Discrimination and mapping of REEs litho-geochemical anomalies by multi-fractal modeling

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The purpose of this paper is to delineate and map of anomalies of rare earth elements (REEs), Dy in this paper, using the litho-geochemical data in Saghand area, Central Iran. In Saghand area, REEs deposits were generated in the form of metasomatism, especially metasomatite rock units. Alkaline magmatism and metasomatism phenomena progressively have caused the transformation of the primary rocks of the area into metasomatite rocks, including amphibol-albite metasomatite, albitite metasomatite and amphibole metasomatite [1]. Dy anomalies, in the western parts of the area, are in microdiorite, metasomatite porphyry and acidic volcanic rocks. These rock units are suitable for substitution of REEs in radioactive minerals and related to epidote alterations. In the central part of the study area, Dy is located in metasomatite rocks and sub-volcanic quartz-diorite units with metamorphosed volcanic rocks and related to chloritic alterations. The concentration-area (C-A) fractal model applied to classify the Dy anomalies in the study area describes the spatial distribution of geochemical data based on the spatial relationship of geochemical concentrations with the occupied areas [2, 3]. Considering the thresholds obtained by the C-A log-log plots of Dy (i.e., 100 ppm, 157.76 ppm and 251.18 ppm), the final litho-geochemical anomaly models were generated and correlated with the geological map (Figs. 1). Considering the generated models, high intensive geochemical anomalies of Dy are situated in the western and central parts of the study area within the metasomatic, porphyry microdioritic and acidic volcanic rocks associated with epidote alterations.

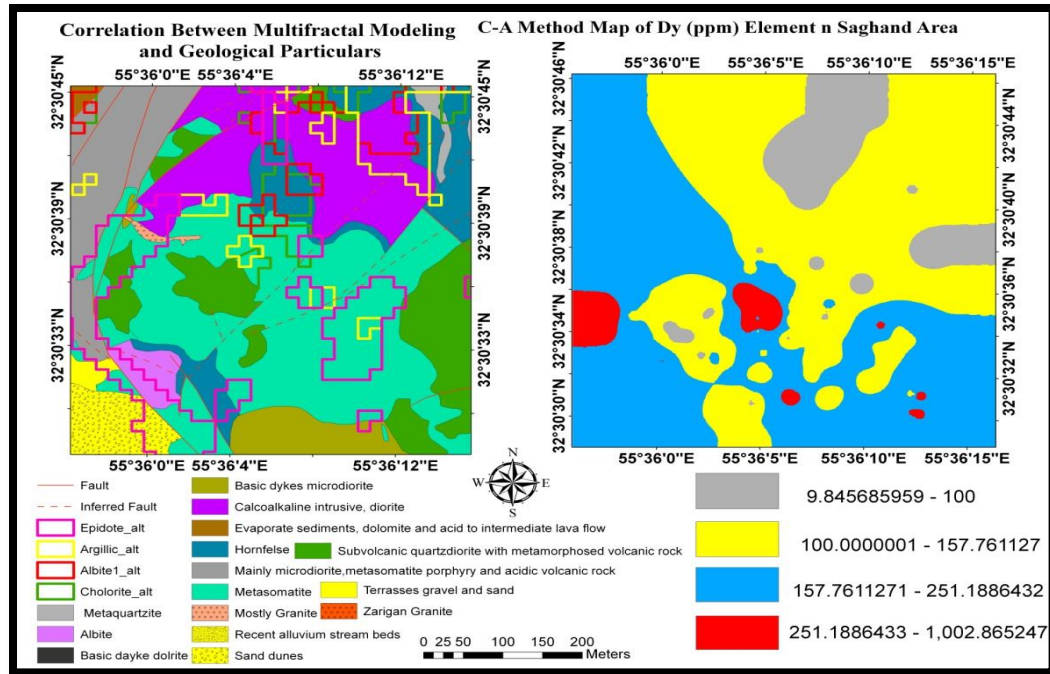


Figure 1: Geochemical anomalies of Dy correlated with the geological map of the study area

References:

- [1] Samani B et al. (1978) Atomic Energy Organization of Iran
- [2] Cheng Q et al. (1994) J Geochem Explor 51: 109–130
- [3] Cheng Q et al. (1996) J Geochem Explor 56 (3): 183–195