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Mapping of Au anomalies in drainage sediments by multifractal modeling

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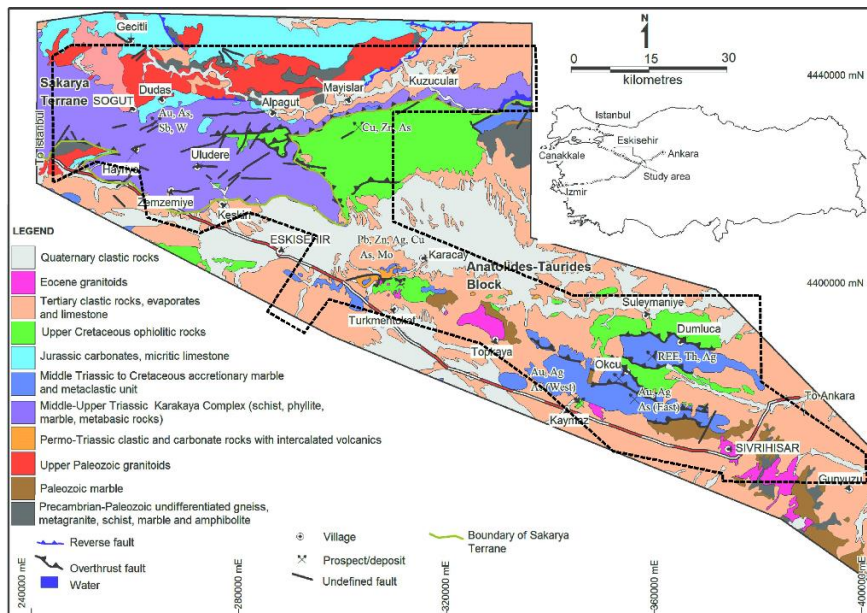
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This study aims to recognize and map Au anomalies from bulk leach extractable gold (BLEG; ignoring drainage sediment dilution) and catchment area weighted BLEG (CW-BLEG; considering drainage sediment dilution) data from an area (ca. 1500 km x 100 km) in the Usak-Esme region in Western Turkey. In this area, gold-bearing crystalline quartz veins, of probable orogenic type, containing up to 20 g/t Au occur in low-grade schists and marbles of the Karakaya Complex in the vicinity of Sogut area [1]. The number-size (N-S) fractal model [2] was applied to classify the BLEG and CW-BLEG data separately in order to compare the resulting Au anomaly maps. Au anomaly maps were classified using the derived thresholds from the N-S model obtained for the BLEG data (0.467 ppb, 6.606 ppb and 9.12 ppb) and for the CW-BLEG data (1.819 ppb, 6.165 ppb and 128.825 ppb). Moderate to strong BLEG anomalies are concentrated in the west (Fig. 2A), whereas moderate CW-BLEG anomalies are present not only in the west but also in the central and eastern parts of the study area (Fig. 2B). Both maps show Au anomalies associated with known gold mineralization (e.g., Sogut, Mayislar) hosted by the Karakaya Complex in the west, but the CW-BLEG anomaly map additionally shows Au anomaly due to the Dumluca mineralization in the east. Therefore, although BLEG data are useful in geochemical exploration for gold, the effect of drainage sediment dilution should be considered and catchment area is a good spatial proxy to address that issue.



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Figure 1: Geological map of the study area.

(A)

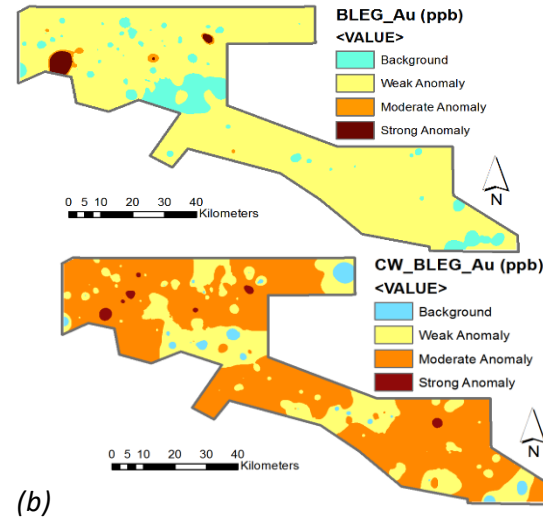


Figure 2: Au geochemical anomalies based on (A) BLEG values and (B) (CW-BLEG) values.

References:

- [1] Yilmaz H (2003) J Geochem Explor 80:117-135
- [2] Mandelbrot B B (1983) The Fractal Geometry of Nature: W.H. Freeman