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Statistical Evaluation of the Geochemical Data from Akoluk Epithermal Gold Area (Ulubey-Ordu), NE Turkey

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There are several economic epithermal gold deposits in the eastern Pontide arc basin in northeast of Turkey. These mineralizations are generally found as veins in NE-SW and NW-SE trending shear fractures. The presence of faults and associated suitable hydrothermal alteration in the study area has been important guide for the gold exploration. Since region is intensely covered with thick soil and rocks are exposed in limited areas, stream sediment and soil geochemistry studies are the most commonly used methods in the exploration of mineral deposits. In this study, the applicability of soil geochemistry surveys in the exploration of mineral deposits in areas of intense overburden is tested using statistical methods.

A vein type gold occurence is confined to the fault zones crossing dacitic tuffs of Upper Cretaceous age. Faults appear to be a conjugate set of a shear system, striking N 45–50 E, and N 55–60 W dipping 80–85 SE and 70–80 NW respectively. Mineralization occurs generally as replacement of dacitic tuffs along the fault planes and less of void fillings. Main ore minerals are native gold, stibnite, zinkenite, pyrite, marcasite, realgar, orpiment, sphalerite, galena, chalcopyrite, malachite, and azurite, and the most common gangue mineral is barite.

Soil is residual and well developed ranging in thickness from 0.5 m to 1 m. Elements analyzed and interpreted are the ones which are known to have close association with gold. Of these Au, Ag, Sb, As, Zn, Mo, W, and Ba show a single very significant anomaly pattern although several other small isolated anomalies are also recorded. The latter must be related to sampling artifacts. The significant one is circular in shape and has a diameter of approx. 200 m. It is strikingly of interest that anomaly shape does not imitate fracture system. This may be due to the fact that sampling interval is wider than the fault zones. However the circular pattern may suggest a granitic intrusion in subcrop as the main controller of the element distribution in overlying soils. Cluster and factor analyses revealed that Zn, Mo, and W form a different suite. These elements are not either related to same mineralizing system as gold or form the deeper section of the mineralization which is partly exposed in the area. Since their anomalous patterns are coinciding with that of gold, the former appears be the case.