

## Identifying secondary dispersion halos and geochemical element distribution in soils on the Tarikdarreh Au-W prospect area, north of Torbat-e-Jam, NE Iran

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(Received: 18/10/2011, in revised form: 20/2/2012)

**Abstract:** Tarikdarreh prospect area is situated in northeastern Iran at the boundary between Central Iran and Kopet-Dagh structural zones. Torbat-e-Jam granitoid intrusion of Triassic age is the main magmatic display in the district. These plutonic rocks with NW-SE trending intruded Miankouhi Formation (Upper Triassic) consisting of coaly shale, siltstone and sandstone converting those to hornfels for tens of meters around the plutons. Heavy mineral studies resulted in detecting minerals such as gold, scheelite, arsenopyrite, malachite, barite, jarosite, hematite, magnetite, specularite, galena, pyrite and garnet. Stream sediment analysis have shown anomalies of As, Cu, Bi, Co, W, Fe and Ti and a positive relationship between gold and As, Bi and Cu. Further exploration based on systematic sampling of soils around the plutonic rocks through determining statistical parameters for distribution of elements and fitting variogram of logarithmic data, has determined the anomaly threshold and quantified possible and probable anomalies. According to multi-variable statistics and factor analysis, the As, Cu, Au, Co, Fe, Mn and Ti, (W, Sb) package has a meaningful relationship with gold mineralization. The accomplished studies, as well as findings from heavy mineral, stream sediment and soil sampling show an interesting display of As, Au and to some extent Cu anomalies. Secondary dispersion halo maps for gold and its pathfinder elements such as As, Cu and Bi as well as factor analysis and additive index imply a high potential for gold in the Tarikdarreh prospect area.

**Keywords:** *gold; pathfinder elements; secondary dispersion halos; soil geochemical anomalies Tarikdarreh, Iran.*

متن فارسی اصل مقاله از صفحه ۱۰۷ تا ۱۲۰ در این شماره به چاپ رسیده است.

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