IMPACT OF MINES AND THAR DESERT ON THE DISTRIBUTION OF MAJOR OXIDES IN THE SOILS OF KHETRI COPPER MINE REGION

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Abstract

The present study was carried out to assess distribution of major oxides in the soil of Khetri Copper Mine region which lies in close proximity to Aravalli Ranges and the Thar Desert. Major oxide geochemistry of soil shows similarity with both parent rock and the loess of the Thar Desert soil. Wide variation in Loss on Ignition (LOI) indicates the presence of different types of soils such as sediments and aeolian in the region. Average FeO content is found to be higher compared to Upper Continental Crust (UCC) and the World Average Shale (WAS), indicating the abundance of either pyrite or an pyrrhotite or an impact of mine activity. A-CN-K diagram has confirmed the close resemblance of soils with WAS and loess. A-CN-K-FM indicates the presence of both felsic and mafic rocks in the region. Negative correlation of SiO₂ with Al₂O₃, P₂O₅, TiO₂, FeO and MnO confirms the origin of soils due to weathering of the parent rock. Calculated weathering indices such as the chemical index of alteration (CIA) and chemical index of weathering (CIW) indicate moderate weathering in the region compared to UCC. The study confirms significant impact of mines and the Thar Desert as well on the distribution of major oxides in this semi-arid region.

Keywords: Soil; Major oxides; Geochemistry; Weathering; Khetri Copper Mines.