



Metal toxicity in the stream sediments surrounding sungun porphyry copper deposit, NW, Iran

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Sungun porphyry copper deposit is located 75 km North West of Ahar city and 100 km North East of Tabriz in the Azarbaijan province (46° 45' 35" E, 38° 38' N). Intensified industrialization and mining activity have resulted in the resale of various contaminants into the environment. Among these, potentially toxic metals are widespread due to mineralization and mining activity. The degree of sediment contamination is evaluated using Risk Assessment Ecological (RI), Sediment Pollution Index (SPI) and Enrichment Factor (EF). The results reveal the role of anthropogenic activity such as discharge of mine and concentration plant effluents in polluting stream sediments. Surface sediments in the ephemeral rivers following in the vicinity of sungun porphyry copper deposit are classified as natural sediment with no ecological risk according to Sediment Pollution Index (SPI). Se and As show the highest Enrichment Factor in the sampled sediments. BCR sequential extraction analysis reveals that the speciation of contaminant metals in the sediments strongly depend on the contamination source and adsorption process by Mn-Fe oxy-hydroxides. Sequential extraction results display that except for Cd, the speciation patterns of metals are mostly associated with residual phases. Also, calculations of mobility factor and risk assessment code indicate that Cd is easily mobile and has high potential risk for aquatic ecosystems. It is notable that long term changes in sediment condition such as pH and Eh can release heavy metals in to the environment.

Key words: potential toxic metal, enrichment factor, Sungun porphyry copper, Sequential extraction, mobility factor.