

Mineralogical and ecological assessment of heavy metals in the surface sediment of Maharlou Lake, Shiraz, Iran

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Abstract: Maharlou Lake, as the largest water body neighboring to the metropolis of Shiraz, plays a significant role in adjusting the ecosystem of the region. The objective of this study was to evaluate mineralogy and heavy metals enrichment in the surface sediments of the Maharlou Lake. The result showed a decreasing trend of heavy metals concentrations in studied region surface sediments as follows: Sr>Ni>Cr>Zn>Cu>Co>Pb>As>Cd. The XRD analysis revealed that main mineral phases including aragonite, calcite, halite and quartz, with lesser amount of montmorillonite, dolomite and sepolite. The result of Canadian sediment quality guidelines showed a rather toxic situation for investigated heavy metals. In addition, in terms of toxicity unit, the highest measure of generating toxicity for Ni and Cr were calculated. Among all sample stations, the most collected toxic unit and potential ecological risk were related to Lake inlet which is adjacent to the Khoshk River. In order to identify the source of heavy metals concentrations as well as major oxides, the multivariate statistical analysis used method. The result indicated that elements such as Ni, Co and Cr with major mineral-bearing oxides show can have a source from Razak Formation, while the significant relationship between Sr, S, and calcium, magnesium and sodium oxides revealed the source from evaporate and carbonate rocks, which is mainly related to Sachun Formation in the investigated area. Also, the elements Pb, Cu, Cd, Zn and As, in the surface sediments of the lake can be related to human activities around the lake.

Keywords: *Maharlou Lake; surface sediment; Razak Formation; Sachun Formation; heavy metal.*

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