

Risk Assessment of Contamination by Heavy Metals in Sarcheshmeh Copper Complex of Iran Using Topsis Method

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Abstract : In recent years, the study of soil contamination problems surrounding mines and smelting plants has attracted some serious attention of the environmental experts. These elements due to the non- chemical disintegration and nature are counted as environmental stable and durable contaminants. Variability of these contaminants in the soil and the time and financial limitation for the favorable environmental application, in order to reduce the risk of their irreparable negative consequences on environment, caused to apply the favorable grading of these contaminant for the further success of the risk management processes. In this study, we use the contaminants factor risk indices, average concentration, enrichment factor and geoaccumulation indices for evaluating the metal contaminant of including Pb, Ni, Se, Mo and Zn in the soil of Sarcheshmeh copper mine area. For this purpose, 120 surface soil samples up to the depth of 30 cm have been provided from the study area. And the metals have been analyzed using ICP-MS method. Comparison of the heavy and potentially toxic elements concentration in the soil samples with the world average value of the uncontaminated soil and shale average indicates that the value of Zn, Pb, Ni, Se and Mo is higher than the world average value and only the Ni element shows the lower value than the shale average. Expert opinions on the relative importance of each indicators were used to assign a final weighting of the metals and the heavy metals were ranked using the TOPSIS approach. This allows us to carry out efficient environmental proceedings, leading to the reduction of environmental risks from the contaminants. According to the results, Ni, Pb, Mo, Zn, and Se have the highest rate of risk contamination in the soil samples of the study area.

Keywords : contamination coefficient, geoaccumulation factor, TOPSIS techniques, Sarcheshmeh copper complex

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