

Application of Various Methods for Evaluation of Heavy Metal Pollution in Soils around Agarak Copper-Molybdenum Mine Complex, Armenia

Authors : K. A. Ghazaryan, H. S. Movsesyan, N. P. Ghazaryan

Abstract : The present study was aimed in assessing the heavy metal pollution of the soils around Agarak copper-molybdenum mine complex and related environmental risks. This mine complex is located in the south-east part of Armenia, and the present study was conducted in 2013. The soils of the five riskiest sites of this region were studied: surroundings of the open mine, the sites adjacent to processing plant of Agarak copper-molybdenum mine complex, surroundings of Darazam active tailing dump, the recultivated tailing dump of "ravine - 2", and the recultivated tailing dump of "ravine - 3". The mountain cambisol was the main soil type in the study sites. The level of soil contamination by heavy metals was assessed by Contamination factors (Cf), Degree of contamination (Cd), Geoaccumulation index (I_{geo}) and Enrichment factor (EF). The distribution pattern of trace metals in the soil profile according to Cf , Cd , I_{geo} and EF values shows that the soil is much polluted. Almost in all studied sites, Cu, Mo, Pb, and Cd were the main polluting heavy metals, and this was conditioned by Agarak copper-molybdenum mine complex activity. It is necessary to state that the pollution problem becomes pressing as some parts of these highly polluted region are inhabited by population, and agriculture is highly developed there; therefore, heavy metals can be transferred into human bodies through food chains and have direct influence on public health. Since the induced pollution can pose serious threats to public health, further investigations on soil and vegetation pollution are recommended. Finally, Cf calculating based on distance from the pollution source and the wind direction can provide more reasonable results.

Keywords : Agarak copper-molybdenum mine complex, heavy metals, soil contamination, enrichment factor (EF), Armenia

Conference Title : ICEWM 2016 : International Conference on Environment and Waste Management

Conference Location : Barcelona, Spain

Conference Dates : August 11-12, 2016