

عنوان مقاله:

Relationship Between Morphometric Stream Characteristics and Sediment Heavy Metal Pollution in a Mining-Influenced Watershed

محل انتشار:

فصلنامه علوم آب و محیط زیست، دوره 4، شماره 7 (سال: 1399)

تعداد صفحات اصل مقاله: 8

نویسندگان:

A Mohseni - Department of Soil Science, University of Tabriz, Tabriz, Iran

N Mohseni - Department of Geography, Ferdowsi University of Mashhad, Mashhad, Iran

S. R Hosseinzadeh - Department of Geography, Ferdowsi University of Mashhad, Mashhad, Iran

خلاصه مقاله:

Streams located in watershed environments act as a principal component of transportation and reservoir of heavy metals evacuated by mining activities. This study evaluated the relationship between morphometric stream characteristics and variations in the rate of sediment heavy metal pollution in a mining-influenced watershed. The study area was a mining site located in the Anguran region, Zanjan province, Iran. Three rivers were selected that exhibited significant differences in terms of path length and slope. Approximately ۱۵۰۰ g sediment was collected from downstream positions of Kaka River (R₁), Allah Lochay River (R₂), and Shurab River (R₃). Total zinc (Zn), nickel (Ni), lead (Pb), and cadmium (Cd) concentrations and particle size distribution were measured. The pollution load index (PLI) and geo-Accumulation Index (I_{geo}) were then calculated. Based on the results, the sediment particle size distribution significantly decreased in response to an increase in the river length and slope (R₁>R₂>R₃). Stream path length and slope are factors determining the size of bed particles transported by a river. The streams with longer path lengths and steeper slopes could transport finer fractions toward depositional positions. Further, the pollution level of the Kaka River sediment was the highest compared with other rivers. The highest I_{geo} value for the measured heavy metals was also observed in the Kaka River sediment, followed by the sediments of Allah Luchay and Shurab rivers. The regression results illustrated that the heavy metal concentrations were significantly positively correlated with clay and silt contents. These findings unequivocally showed that watershed environments exhibit a high vulnerability to mining activities because the streams can facilitate the transportation of sediment polluted by heavy metals across the landscape. On the other hand, the streams with higher length and slope surrounding mining sites increase the pollution transfer rate and cause a higher level of sediment heavy metal pollution.

کلمات کلیدی:

Fluvial sediment, Stream slope, Stream length, Zn -Pb mine

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1241049>



