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Heavy Metals' Spatial Distribution Characteristics in a Copper Mining Area of Zhejiang Province

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ABSTRACT

The spatial distribution characteristics of six heavy metals and metalloid in soil of Zhuji Lipu copper mining area, Zhejiang Province, was studied by using geostatistics approaches combined with GIS. These elements included Pb, As, Cr, Cu, Zn and Ni. The statistical analyses showed that concentrations of these elements were lognormal distribution. Concentrations of Pb, As, Cu, Zn and Ni were strongly correlated with each other indicating that these elements in soils may be from the same pollution source. However, accumulation of Cr was unique with its geometric mean being close to that in the control soil. This indicates that Cr content was mainly influenced by soil factors. The Kriging method was applied to estimate the unobserved points. The Kriging interpolation maps reflected significant spatial distribution of these elements as influenced by both pollution and geological factors. The present study indicated that GIS based geostatistics method could accurately analyze the spatial variation of heavy metals and metalloid in the mining area. Overall, higher concentrations of heavy metals and metalloid were found in the center of both the north and south sides. The content of copper in the south was significantly higher than that in the north due to paddy field land uses. In addition, the terrain of four terraces tilted to the center and the broad irrigation accident occurred in the 4th trench in the south of sampling area were also contributed to the higher concentrations of these elements.

KEYWORDS

Copper Mining Area; Heavy Metals; Spatial Characteristics; GIS

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