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基于Kriging插值的路旁土壤重金属含量空间分布 ——以310国道郑州-开封段为例

Spatial distribution of heavy metals in roadside soils based on Kriging interpolation: A case study of Zhengzhou-Kaifeng section along the 310th national highway

关键词: [310国道](#) [路旁土壤](#) [重金属污染](#) [空间分布](#)

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摘要: 分别在G310国道郑州-开封段的杏花营路段两侧150 m×150 m范围内布设7条垂直于公路的采样子断面,从路肩向两侧每隔10 m采集1个表土混合样,共采集226个样品(包括2个对照样品),用ICP-MS测定了土壤重金属(Pb、Cu、Zn、Cd、Cr和Ni)含量,并用Universal Kriging插值法分析路旁土壤重金属空间分布特征.结果表明,路旁土壤重金属呈与道路平行的带状分布,表明6种重金属含量均受公路交通影响,属于公路源重金属.土壤Cr和Cu含量在路基处含量最高,向两侧逐渐下降,呈指数分布;土壤Pb、Zn、Cd和Ni含量在距路基30~50 m处出现峰值,呈偏态分布.路旁土壤Pb、Cu、Zn、Cd、Cr和Ni均为交通源重金属.

Abstract: Xinghuaying part of Zhengzhou-Kaifeng section along the 310th national highway was chosen as soil sampling region to investigate the spatial distribution of heavy metals in roadside soils. Seven sampling sub-transects were designed to be perpendicular to the road within the sampling area of 150 m×150 m covering both sides of the Highway. On each sub-transect, mixed topsoil samples (0~15 cm) were collected at 10 m intervals from the roadbed to the outside end. The total number of samples collected is 226 including two control samples. The concentrations of Pb, Cu, Ni, Cr, Cd and Zn in soils were detected by the inductively coupled plasma mass spectrometry (ICP-MS) according to the recommended standard method. The spatial distribution of heavy metal concentrations in roadside soils was characterized by applying Universal Kriging interpolation model. The results show that concentrations of all the six soil heavy metals varies significantly, and the mean concentrations of six heavy metals are much higher than that in control soils. The distribution of heavy metal concentrations are strips parallel to the highway stretching, which indicates that the six heavy metals in roadside soils are affected by the traffic. The concentrations of Cr and Cu decrease exponentially with the distance from the roadbed, and their highest values are found at the roadbed. However, the concentrations of other metals (Cd, Pb, Ni and Zn) reveal an asymmetrical distribution with the distance, which increase firstly, reach their highest values between 30 and 50 m away from the roadbed, then gradually decrease to the control values. The metals of Pb, Cu, Zn, Cd, Cr and Ni are all traffic-source related.

Key words: [310th national highway](#) [roadside soils](#) [heavy metal contamination](#) [spatial distribution](#)

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