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研究论文

纵向岭谷区公路沿线土壤表层重金属空间分异特征

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摘要 以纵向岭谷区内云南省境内的丽江—景洪公路沿线作为案例研究区，根据路段所处的地理位置、公路等级、修建的时段，将其分为北段、中段和南段。通过公路沿线94个样点的土壤表层重金属全量分析，研究了土壤重金属沿公路的纵向、横向和垂向分异特征性。在纵向上，Cu，Zn，Pb，Cr，Cd，As，Mg和Mn等8种重金属全量存在北段高于中段和南段的特征；相关性分析结果表明公路建设对铅、镉、锌的纵向差异存在一定影响。横向空间分异性显示，虽然在不同的土壤种类和利用方式下，土壤重金属含量值差异很大，但公路沿线重金属与公路距离之间存在显著相关关系，表明公路对横向的空间分异性存在决定性影响，影响带宽度约为50m；垂向分析结果表明，自然土壤中重金属的垂向分异性不如横向分异明显，仅显示在近公路处有重金属富集现象；而在公路施工区，受人工护坡等工程的局部影响，垂向分异性不显著。

关键词 重金属；“三向”分异特征；公路沿线；纵向岭谷区

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Spatial distribution and variability of heavy metals contents in the topsoil along roadside in the Longitudinal Range-Gorge Region in Yunnan Province

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Abstract Heavy metals accumulated in soils were characterized by polluting large area, non-degradation, and difficulty to clean etc. With human activities, the pollution of heavy metals becomes more and more serious and arouses more attentions by environmentalists and correlative scholars. Longitudinal Range-Gorge Region, located in South-West of China, has many mountain ridges and valleys stretching from north to south. Because of the local native environment, road is the major traffic method. By far the majority of the studies on the impact of road construction on the contents of heavy metals in roadside soils was conducted on the small scale.

We report the spatial distribution and variation of heavy metal contents in the roadside topsoils along the longitudinal, transverse and upright directions on the large scale. In order to provide available study instruct and method on macroscopy scale, the road was divided into three segments: north, middle and south segment. Soil samples were taken at 94 locations from roadside soils along the north, middle and south parts of the Lijiang-Jinghong road in Yunnan Province. The total contents of heavy metals in the soil samples were determined. The following results were found:

(1) In longitudinal direction, the concentrations of Cu, Zn, Pb, Cr, Cd, As, Mg and Mn in roadside soils were higher for the north segment than those for the middle and south segments. Correlation analysis indicated that the construction of road absolutely impacted the longitudinal distribution of Pb, Cd and Zn content in the roadside soils.

(2) In transverse direction, the contents of heavy metals in roadside soils varied in uniform trend with soil types and soil utilization manners, indicating that the construction of road had crucial impact on the transverse spatial variability of heavy metal contents. This impact extended to 50 m away from the road.

(3) In vertically direction, the spatial variability of heavy metal contents in native soils was not signi

ficant and heavy metals were concentrated only in the roadside soils close to the road. Because o f the local influence of artificial counterfort, there was no vertical spatial variability in constructing a rea.

Key words heavy metals；three-side spatial variability；roadside；longitudinal range-gorge region

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