

研究报告

利用辅助变量对污染土壤锌分布的克里格估值

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摘要

采用协同克里格及与回归相结合的克里格方法,以36个下层(10~20 cm)土壤锌数据为目标变量、另36个下层土壤锌数据为校验数据、72个上层(0~10 cm)土壤锌为辅助变量,对沈阳市南郊某有色金属加工厂附近农田0.1 mol·L⁻¹ HCl浸提态土壤锌进行插值分析,并对这两种利用辅助变量的克里格方法在土壤锌空间分布研究中的适用性进行评价.结果表明,与回归相结合的克里格的估值效果明显优于协同克里格及普通克里格法.结合回归模型的变异函数理论模型决定系数较大、残差较小,估值精度比普通克里格法提高4%,且基于回归克里格的土壤锌分布图与利用72个样点普通克里格插值图具有高度的相似性.而协同克里格与普通克里格相比未表现出明显优势.借助辅助变量,采用基于回归模型的克里格方法是进行土壤重金属空间分布估值的一种有效方法.

关键词 [土壤污染](#) [锌](#) [空间变异](#) [克里格](#)

分类号

Kriging prediction of soil zinc in contaminated field by using an auxiliary variable

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Abstract

In this study,two kriging methods using an auxiliary variable, *i.e.*,ordinary cokriging (OCK) and ordinary kriging combined with regression (OKR) were used for the interpolation of soil zinc (0.1 mol·L⁻¹ HCl extractable Zn) in a 17.6 hm² field at the vicinity of a metal manufacturer in southern suburb of Shenyang,China.A total of 36 measured data of soil Zn content at the depth of 10~20 cm (subsoil Zn) was selected as target variable,72 measured data at the depth of 0~10 cm (topsoil Zn) as auxiliary variable,while other 36 measured data of subsoil for validation.The two interpolation methods were evaluated for the suitability of estimating the spatial distribution of soil Zn by using an auxiliary variable.The results showed that OKR gave better results than OCK or ordinary kriging (OK).The theoretical model obtained from OKR exhibited higher coefficient of determination and lower residual sums of squares than that from OCK or OK.The prediction accuracy of soil Zn was increased by 4% with OKR than with OK.The map of soil Zn obtained with OKR was quite similar with that obtained with OK,by using 72 measured Zn data.However,no advantages were found between OCK and OK.It was suggested that OKR was an effective way to estimate the distribution of soil heavy metals by using auxiliary variables.

Key words [Soil pollution](#) [Zinc](#) [Spatial variability](#) [Kriging](#)

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