Evaluation of Spatial Distribution Prediction for Site-Scale Soil Contaminants Based on Partition Interpolation

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Abstract : Soil pollution has become an important issue in China. Accurate spatial distribution prediction of pollutants with interpolation methods is the basis for soil remediation in the site. However, a relatively strong variability of pollutants would decrease the prediction accuracy. Theoretically, partition interpolation can result in accurate prediction results. In order to verify the applicability of partition interpolation for a site, benzo (b) fluoranthene (BbF) in four soil layers was adopted as the research object in this paper. IDW (inverse distance weighting)-, RBF (radial basis function)-and OK (ordinary kriging)-based partition interpolation accuracies were evaluated, and their influential factors were analyzed; then, the uncertainty and applicability of partition interpolation were determined. Three conclusions were drawn. (1) The prediction error of partitioned interpolation decreased by 70% compared to unpartitioned interpolation. (2) Partition interpolation reduced the impact of high CV (coefficient of variation) and high concentration value on the prediction accuracy. (3) The prediction accuracy of IDW-based partition interpolation was higher than that of RBF- and OK-based partition interpolation, and it was suitable for the identification of highly polluted areas at a contaminated site. These results provide a useful method to obtain relatively accurate spatial distribution information of pollutants and to identify highly polluted areas, which is important for soil pollution remediation in the site.

Keywords : accuracy, applicability, partition interpolation, site, soil pollution, uncertainty

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