

Geostatistics and GIS: Tools for Characterizing Environmental Contamination

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Geostatistics is a set of statistical techniques used in the analysis of georeferenced data that can be applied to environmental contamination and remediation studies. In this study, the 1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene (DDE) contamination at a Superfund site in western Maryland is evaluated. Concern about the site and its future clean up has triggered interest within the community because residential development surrounds the area. Spatial statistical methods, of which geostatistics is a subset, are becoming increasingly popular, in part due to the availability of geographic information system (GIS) software in a variety of application packages. In this article, the joint use of ArcGIS software and the R statistical computing environment are demonstrated as an approach for comprehensive geostatistical analyses. The spatial regression method, kriging, is used to provide predictions of DDE levels at unsampled locations both within the site and the surrounding areas where residential development is ongoing.

KEY WORDS: 1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene (DDE); 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane (DDT); kriging; R; Superfund.