Geostatistical Simulation Used for Assessing the Uncertainty of Mapping Heavy Metals in Contaminated Soils. (S11-juang031657-Poster)

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Abstract:

It is essential to map soil pollutants in a contaminated site for delineating hazardous areas. Currently, the geostatistical estimation, kriging, is increasingly used for mapping soil pollutants. However, the kriging estimate is a kind of weighted average of observed values. The smoothing effect of kriging estimation usually masks the uncertainty of mapping. In this study, the geostatistical simulation approach, sequential indicator simulation (SIS), was used to model the uncertainty of mapping heavy metal in contaminated soils. A real data set of soil Cu concentrations in Taiwan was used for illustration. Contour maps of Cu concentrations generated from the SIS realizations and the kriging estimates were used to show the uncertainty of mapping and the smoothing effect of kriging. To measure the uncertainty of delineating hazardous areas, the joint probability (Probj) of Cu concentrations at several locations simultaneously being higher than the given threshold, which is for declaring hazardous areas, was also calculated by using the SIS realizations. The results indicated that SIS realizations without the smoothing effect that usually occurs in kriging estimation could show all possible spatial distributions of heavy metal in soils. One can use a quantity of realizations to assess the uncertainty of mapping soil heavy metals. The values of Probj for suspicious hazardous areas delineated also could be used to assess the uncertainty of delineation.

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