DETERMINATIVE AND STOCHASTIC MAPPING OF AIR POLLUTION USING SPARSE SPATIAL OBSERVATIONS FOR TOTAL HEALTH RISK ASSESSMENT STUDIES

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Abstract: The development of models to assess air pollution exposures within cities have been identified as a priority area for future research in many countries. The first stage of such studies is to validate different exposure assessment methods before adopting the estimates to assess and evaluate health risk. The present paper focuses on the prediction of the pollutant concentration fields using measures from monitoring network being operational in Mississippi. Various statistical interpolation methods namely kriging, spatial averaging, nearest neighborhood and inverse distance weighting are used for predicting the spatial pattern of pollutant levels. Method specific differences in approximation quality are estimated by leave one out cross validation tests. Validation results are assessed using statistical parameters such as correlation coefficient, variation and standard deviation. It is observed that the quality of the approximation significantly depends on the number of monitoring locations and its spatial distribution.

Keywords: GIS, interpolation, kriging, health exposure studies, geo-statistics