

Groundwater Contamination Mapping Using Integrated GIS and Neural Networks: A Sensitivity Analysis

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Integrated Geographic Information System (GIS) and Neural Networks (NN) -based mapping tools provide economic alternatives to assess contamination potential risk of ground water in a regional scale. These maps are frequently used to prioritize those wells located in potentially highly contaminated areas for testing of contaminants. However resolution of the input GIS data may affect model predictions and accuracy. Intensive monitoring at regional scale is expensive and so is high resolution data, therefore, it is important to understand the sensitivity of these integrated GIS-based NN models to the resolution of input data. This sensitivity analysis is necessary to avoid implementation of ineffective sampling strategies and costly data collection and analysis. The data layers used in this study were: depth to ground water, net recharge, aquifer media, soil media, slope, thickness of the clay cap, hydraulic conductivity, soil drainage class, soil hydrologic groups and landuse. Impacts of varying spatial resolution were measured with the following data sets: 30m, 90m, 240m and 480m. Preliminary results show that the integrated GIS-based NN models were sensitive to the resolution of the input data.