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Nitrate Spatial Variability Estimation Using Kriging and Neurofuzzy Approaches (Case Study, Karaj City Aquifer in Iran)

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Abstract: The nitrate value is one of the most important pollutants in some urban and rural aquifers in Iran due to agricultural, urban and industrial activities. For any modelling and management purpose an estimation of spatial variability of this pollutant is required. Karaj aquifer is situated in 40 kilometres of West of Iranian capital, Tehran. An investigation of groundwater sampling of 179 drinking water wells during year of 2000-2005 shows a variation of 20 to 105 mg/l of Nitrate in this aquifer. Due to this critical situation, a groundwater management program has been established for this city. In the first step of this program, a spatial variability of Nitrate has been studied using a geostatistical (Kriging) and fuzzy logic (ANFIS) approaches. The data of one year of sampling has been used for initial values and the four other years data has been applied for covariate of input variable for kriging model and as the input variables for neuro fuzzy model. The results of this research showed that Anfis model has a significant performance in comparison of Kriging. So this method can be used for Nitrate spatial variability in this area.
Key words: Nitrate Pollutant- Urban aquifer- kriging-Neurofuzzy-Karaj-Iran