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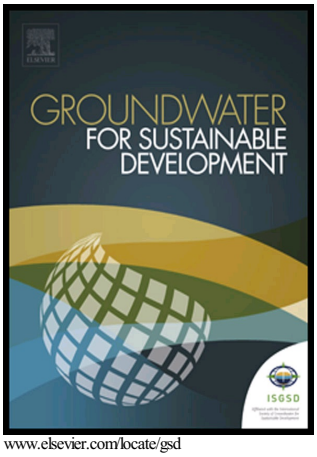

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Spatial variability in the distribution of trace metals in groundwater around the Rooppur nuclear power plant in Ishwardi, Bangladesh

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Abstract

Evaluation of groundwater quality is a significant concept for water resources monitoring and management. In this study, we examined the quality of groundwater of Ishwardi Upazila in Pabna District of Bangladesh. This paper has evaluated the spatial pattern and prediction of trace metals in groundwater in the study area with the help of geostatistical model. The best fitted geostatistical model has been used to identify the spatial distribution and prediction that are shown on maps. The best fitted geostatistical model was selected on the basis of experimental semivariogram values of twelve water quality trace metal parameters. The best-fitted model's semivariogram values have been verified by using different parameters used to evaluate the quality of geostatistical models (i.e., mean square error (MSE), root mean square error (RMSE), average standard error (ASE) and root mean square standardized error (RMSSE)). The values of Barium (maximum 420.30 µg/L), Iron (maximum 0.4967 mg/L) and Arsenic (maximum 0.4983 mg/L) found in this study exceed the safe limit of Bangladesh and World Health Organization for drinking water. The results of this study demonstrate that the groundwater quality is no longer suitable for drinking purpose due to the high concentration of trace metals.

Graphical abstract

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