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Mapping arsenic vulnerability at different spatial scales using statistical and machine learning models

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In the recent years, prediction modelling techniques have been widely used for modelling groundwater arsenic contamination. Determining the accuracy, performance and suitability of these different algorithms such as univariate regression (UR), fuzzy model, adaptive fuzzy regression (AFR), logistic regression (LR), adaptive neuro-fuzzy inference system (ANFIS), and hybrid random forest (HRF) models still remains a challenging task. The spatial data which are available at different scales with different cell sizes. In the current study we have tried to optimize the spatial resolution for best performance of the model selecting the best spatial resolution by testing various predictive algorithms. The model's performance was evaluated based of the values of determination coefficient (R^2), mean absolute percentage error (MAPE) and root mean square error (RMSE). The outcomes of the study indicate that using 100m × 100m spatial resolution gives best performance in most of the models. The results also state HRF model performs the best than the commonly used ANFIS and LR models.