

عنوان مقاله:

Adaptive Network-based Fuzzy Inference System-Genetic Algorithm Models for Prediction Groundwater Quality Indices: a GIS-based Analysis

محل انتشار:

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خلاصه مقاله:

The prediction of groundwater quality is very important for the management of water resources and environmental activities. The present study has integrated a number of methods such as Geographic Information Systems (GIS) and Artificial Intelligence (AI) methodologies to predict groundwater quality in Kerman plain (including HCO_3^- concentrations and Electrical Conductivity (EC) of groundwater). This research has investigated the abilities of Adaptive Neuro Fuzzy Inference System (ANFIS), the hybrid of ANFIS with Genetic Algorithm (GA), and Artificial Neural Network (ANN) techniques as well to predict the groundwater quality. Various combinations of monthly variability, namely rainfall and groundwater levels in the wells were used by two different neuro-fuzzy models (standard ANFIS and ANFIS-GA) and ANN. The results show that the ANFIS-GA method can present a more parsimonious model with a less number of employed rules (about 300% reduction in number of rules) compared to ANFIS model and improve the fitness criteria and so model efficiency at the same time (38.4% in R^2 and 44% in MAPE). The study also reveals that groundwater level fluctuations and rainfall contribute as two important factors in predicting indices of groundwater quality.

کلمات کلیدی:

Groundwater quality, GIS, Genetic Algorithm, Neuro-Fuzzy, ANN

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