

## **An improved neural model of groundwater level prediction**

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**Abstract** Predicting the groundwater system is a complex nonlinear dynamic procedure. It usually shows non-stationary stochastic hydrological characteristics affected by climate and land use characteristics, etc. So, based on autoregressive integrated moving average (ARIMA) theory, neural network modelling and the changing periodic trend of groundwater level in droughty irrigation areas, an improved seasonal prediction model of groundwater hydrology character is preferred. In the model, the character of a relatively integrated period or several periods of groundwater variation can be obtained using only a single period input or from scarce information. Meanwhile, a Fourier data smoothing process is taken according to the different peak value in various periods so as to consider the periodic changing trend of groundwater sufficiently and eliminate white noise and bizarre data, thus to improve the prediction precision. The proposed improved model and approach was tested and operated well in a practical forecasting and hydrological simulation application.

**Key words** dynamic model; groundwater level; hydrological simulation; nonlinear input; period; predict; stochastic

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