New Approaches to Hydrological Prediction in Data-sparse Regions (Proc. of Symposium HS.2 at the Joint IAHS & IAH Convention, Hyderabad, India, September 2009). IAHS Publ. 333, 2009, 101-111.

Modelling hydrological time series data using wavelet neural network analysis

Y. R. SATYAJI RAO & B. KRISHNA

Deltaic Regional centre, National Institute of Hydrology, Siddartha Nagar, Kakinada-3, Andhra Pradesh, India
yrs_rao@yahoo.com

Abstract Time series analysis requires mapping complex relationships between input(s) and output(s), because the forecasted values are mapped as a function of patterns observed in the past. In order to improve the precision of the forecasts, a Wavelet Neural Network (WNN) model, based on a combination of wavelet analysis and Artificial Neural Network (ANN), has been proposed. The WNN and ANN models have been applied to daily streamflow and monthly groundwater levels series where there is a scarcity of other hydrological time series data. The calibration and validation performance of the models is evaluated with appropriate statistical indices. The results of daily streamflow and monthly groundwater level series modelling indicated that the performances of WNN models are more effective than the ANN models. This paper also highlights the capability of WNN models in estimating low and high values in the hydrological time series data.

Key words time series; ANN; WNN; streamflow; groundwater levels; India