Comparing univariate ARMA and ARFIMA model for forecasting daily streamflows

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Abstract The performances of two types of univariate time series model, i.e. the autoregressive moving average (ARMA) model and the long-memory fractionally integrated autoregressive moving average model (ARFIMA) model, for forecasting daily streamflows, are investigated in the present study. Both models are applied to four daily average discharge series of medium-sized watersheds in cold mountainous regions, and built on the basis of deseasonalized series. The result shows that both the ARMA model and the ARFIMA model work well for forecasting short-term daily average discharges, and the performance of the ARFIMA model is generally slightly better than that of the ARMA model. The use of the ARFIMA model is therefore recommended as an alternative to the conventional ARMA model for modelling univariate daily streamflow processes for the cold mountainous regions from the perspective of forecasting.

Key words streamflow process; ARMA model; long memory; ARFIMA model; time series analysis; hydrological forecast