Hybrid deterministic – stochastic model for forecasting of monthly river flows

D. Svetlíková, J. Szolgay, S. Kohnová, M. Komorníková, and D. Szökeová

Slovak Technical University, Bratislava, Slovakia (svetlikova@svt.stuba.sk, jan.szolgay@stuba.sk, silvia.kohnova@stuba.sk, magda@math.sk, szoke@math.sk)

Flows of the Váh River and its tributaries in the Tatry alpine mountain region in Slovakia are predominantly fed by snowmelt during the spring period and convective precipitation in the summer. Therefore their regime properties exhibit clear seasonal patterns. Moreover left and right side tributaries of the Váh River spring in different physiographic conditions in the High and Low Tatry Mountains. This provides intuitive justification for the application of nonlinear two-regime models for modelling and forecasting of monthly time series of these rivers. In the poster the forecasting performance of several linear and nonlinear time series models is compared with respect to their capabilities of forecasting monthly flows into the Liptovská Mara reservoir. ARMA and SETAR regime switching models were identified for each tributary respectively and forecasts of the tributary flows were composed through a simple water balance model into the forecast of the overall reservoir inflow. The combined hybrid (deterministic-stochastic) forecast, which preserves both the specific regime of the tributaries and the water balance in the catchments, was compared against different forecasts set up for the overall reservoir inflow.