Combined deterministic – stochastic forecasting of monthly river flows

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In the poster the forecasting performance of nonlinear time series models is evaluated with respect to their capabilities of forecasting monthly flows into the Liptovská Mara reservoir in the Tatry alpine mountain region in Slovakia. Flows of the Váh River and its tributaries are predominantly fed by snowmelt in the spring and convective precipitation in the summer. Therefore their regime properties exhibit clear seasonal patterns. Moreover the 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 these time series. First the capability of SETAR regime switching models is tested for the reservoir inflow from the Váh River. Next a simple deterministic water balance scheme is set up for the reservoir inflow, which consists of the linear combination of the measured tributary flows weighted by catchment area attributed to each tributary with measured flows according to the similarity of their physiographic conditions. SETAR regime switching models are identified for each tributary respectively and forecasts of the tributary flows are composed by the water balance model to the combined forecast of reservoir inflow. The combined hybrid (deterministic-stochastic) forecast, which preserves the specific regime of the tributaries and the water balance in the catchments, is compared by the forecast set up for the overall reservoir inflow.