Evaluation of drought forecasting models in Pinios river basin, Greece

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Droughts are the world's costliest natural disasters that occur virtually in all landscapes causing significant damage both in natural environment and in human lives. Early indication of possible drought can help to set out drought mitigation strategies and proactive measures. Drought forecasting plays an important role in the planning and management of natural resources and water resource systems of a river basin. Due to the random nature of contributing factors, occurrence and severity of droughts can be treated as stochastic in nature. This study uses linear stochastic models eg. Autoregressive Integrated Moving Average (ARIMA), multiplicative Seasonal ARIMA (SARIMA)models, and nonlinear artificial neural network models to forecast droughts based on the procedure of model development. The models are applied to forecast droughts using standardized precipitation index (SPI) timeseries at multiple timescales in the Pinios river basin in Thessaly, which lies in the central district of Greece. The results obtained from the study models and their potential to forecast drought over different lead times are presented and compared with the observed SPI timeseries. The predicted results show reasonably good agreement with the actual data for short lead times and the forecasting accuracy decreases with increase in lead-time. Hence, the models could be operationally used to forecast droughts for civil protection services.