



Stochastic vs. conceptual models for river flow forecasting

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The paper compares two models for river flow forecasting at monthly and daily scale recalling the connections between stochastic and conceptual models pointed out by a number of different authors in the past. The models are different in that one belongs to the class of stochastic models of the ARMA family and the other to the class of hybrid metric-conceptual models which combine the use of observations (the metric paradigm) and other prior knowledge with the testing of hypotheses about the structure of component hydrological stores (the conceptual paradigm) at catchment scale. More in detail, the stochastic model is an ARMAX model (Autoregressive Moving average with Exogenous input), that has been already been employed for real time forecasting of streamflows at daily scale and snowmelt runoff and the conceptual model is the IAHCRES (Identification of Hydrographs And Components from Rainfall Evaporation and Streamflow), a conceptual model that allows flexible schematizations of both surface and groundwater flow by combining channels and reservoirs in different ways using a conceptual parsimonious and not over-parameterised. The study aims at highlighting the different performances of the two types of models when applied to forecasting river flows of Alcantara river, a 400 km² catchment in eastern Sicily with a significant groundwater component.