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Estimating long term persistence in discharge series on European scale

Elena Szolgayova (1,2), Gunter Blöschl (2), and Christian Bucher (3)

(1) Vienna University of Technology, Centre for Water Resource Systems (CWRS), (2) Vienna University of Technology, Institute of Hydraulic Engineering and Water Resources Management, (3) Vienna University of Technology, Institute of Building Construction and Technology

When observing runoff processes on larger scale, especially over longer periods of time, patterns showing long term variations, dependent on local physiographic conditions of the areas studied may become apparent. Several large scale studies observing long term variations in river discharges have been conducted in the past, showing the presence of either trends in European flows, or interdependencies of runoff fluctuations based on geographical position of the flows. Therefore, attention needs to be paid to the long term persistence properties of discharge series on various temporal and spatial scales as well.
The presence of one kind of long term persistence, the so called long memory in the data is usually numerically expressed by the Hurst coefficient. The main point of interest here is the observation of this phenomenon depending on geographic location of the rivers, since climatic conditions may influence the long memory effect. For that the long term persistence of discharges of a large number of rivers over Europe (with data obtained from the Global Runoff Data Centre) will be studied. It is also important to consider the capability of the estimator to handle the limited length of the time series. There are several methods for the estimation of this statistics, both in the temporal and the frequency domain; one of the crucial parameters in the analysis is the time series length. In order to find the balance between the temporal resolution and data availability, various estimation methods as well as different data types were considered. Time series of daily discharges (where more analysis methods are available), and series of annual and seasonal extremes (where the problem of data scarcity occurs, sometimes limiting the possibility of analysis in general) will be analyzed.
The conclusions aim to provide a Europe wide overview of the presence of long term variation patterns based on long term persistence and thus forming a basis for regional analysis and interpretation and further development of modeling techniques, both of the data-driven and of the statistical type, aimed at forecasting discharges over medium to long time horizons in various parts of Europe.