



Hydraulic reconstruction of historical floods at the Danube-Carpathian basin

José Luis Salinas and Andrea Kiss

Institute of Hydraulic Engineering and Water Resources Management, Vienna University of Technology, Vienna, Austria

Estimation of flood quantiles with high return periods (i.e. low exceedance probabilities) is a key step in designing hydraulic structure and developing flood protection strategies. These estimates are always linked with a high prediction uncertainty that increases with larger return periods. One way to reduce this uncertainty is by introducing additional information in the analysis beyond the instrumental peak annual flow time series (Merz and Blöschl 2008 ab).

In this study, values from historical floods from the Danube-Carpathian basin during the last 500 years are reconstructed from detailed archive information about cross section geometry, flood plain extent and water level. The historical information was mainly found in official documents and registers. Including this information into the analysis allows to verify or deny the stationarity assumption on which most of the flood quantiles estimation methods are based. On a second step we are able to introduce information about the historical floods into the prediction with the help of a Bayesian framework (Viglione et al. 2013). If the stationarity assumption is sufficiently fulfilled, this temporal expansion of information will reduce dramatically the uncertainty bounds of the flood frequency curve and provide more accurate estimates for high return periods.

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