

Flood synchronicity at confluences in the Danube river basin

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The flood synchronicity at river confluences is of interest because of its impact on the design of bridges and flood control structures located near the junction of two (or more) streams and, more generally, for understanding the flood propagation along river networks. Since floods at the confluences are determined by high flows from either streams or both, we define the flood synchronicity based on the relationship between the coincident exceedence probabilities on the confluent streams and the time lag between the flood waves. We are interested at two problems: (1) how are the flood peak occurrences in the upstream streams related? (2) how does the upstream peaks combine to produce the flood peak after the confluence? We use here a downward approach where flow data at (up- and downstream) confluences in the Danube river basin are collected and coincident events are identified and analysed. The characterisation of the flood synchronicity at different confluences along the river network will help us to understand how flood peaks and their probabilities combine at confluences and what are the major controls on it. The practical value is to provide means to assist/enhance regional flood frequency analyses, i.e. to use the information on data dependency to improve flood peak estimation in ungauged catchments rather than considering it as a problem when pooling regional data.