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Bayesian framework for Flood Frequency Hydrology

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Merz & Blöschl (2008a, 2008b) proposed the concept of Flood Frequency Hydrology, which highlights the importance of using a maximum of hydrologic information from different sources in flood frequency analysis. In the present work, flood peaks at the site of interest are combined, through a "formal" Bayesian framework, with three additional types of information: temporal, spatial and causal information. While most of the previous studies combined flood data with one extra piece of information (either temporal or spatial), all three types (temporal, spatial and causal) are used here and the uncertainty inherent to them is accounted for. For some pieces of information, such as historic floods and estimates from regionalisation methods, a range of formal methods are available while the use of causal information (e.g., qualitative soft data such as expert knowledge on the site-specific flood behavior) is more difficult: a method for specifying a-priori distributions of the model parameters is proposed, which is the main challenge from a hydrological perspective.

Merz, R., and G. Blöschl (2008a), Flood frequency hydrology: 1. temporal, spatial, and causal expansion of information, Water Resources Research, 44, W08432, doi:10.1029/2007WR006744.

Merz, R., and G. Blöschl (2008b), Flood frequency hydrology: 2. combining data evidence, Water Resources Research, 44, W08433, doi:10.1029/2007WR006745.