



Are flood-rich and flood-poor periods coherent across Germany?

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The question whether flood-rich and flood-poor periods are coherent in space has large relevance for large-scale risk reduction, disaster management and the insurance industry. Despite this relevance, this question has hardly been addressed in quantitative terms. We investigate fluctuations in annual maximum streamflow for 68 catchments across Germany for the joint period 1932-2005. Although the flood regime varies across Germany with different flood seasonality and generation processes in different regions, we find remarkable spatial coherence in flood-rich and flood-poor years. To better understand this coherence, we propose to differentiate between event-type and non-event-type coherence which characterizes whether the annual maxima tend to occur within one or a few events or whether they are spread out across the hydrological year, respectively. There are quite a number of years with considerable non-event-type coherence, i.e. the annual maxima of the 68 gauges spread out through the year but are in the same magnitude range. Years with extreme flooding tend to be of event-type and non-coherent, i.e. there is at least one precipitation event that affects many catchments to various degree. Our findings indicate that spatial coherence is caused rather by persistence in catchment wetness than by persistent periods of higher/lower event precipitation.