



## **Exploring the climate-flood link by analyzing the underlying common climatic (spatio-temporal) structure in extreme floods in Germany**

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The climate-flood linkages are explored by analyzing the underlying common climatic spatio-temporal structure in extreme floods in Germany. Long-term flood variation – in magnitude, frequency, and seasonality – are studied within the climatic framework of the global and regional atmospheric circulation patterns and processes that drive changing combinations of meteorological elements at the catchment scale. Specifically it is carried out: a) a frequency domain analysis of floods and their teleconnections; b) a diagnostic evaluation of the patterns of atmospheric moisture transport for floods in the region of interest, using historical data, ERA-40 re-analysis (ERA\_interim) and retrospective GCM integrations; c) an application of statistical methods to identify the links between floods and large-scale circulations. Multitaper Spectral analysis with Singular Value Decomposition and wavelet analysis are used to analyse the secular and quasi-oscillatory trends in extremes, and their temporal and spatial coherence. The Randomized Dependence Coefficient is used as a measure of non-linear dependence extreme floods and large-scale circulation variables.