



Recurrence Analysis of Flood Events

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Extreme hydrological events such as floods severely affect the communities living in the corresponding river basins and result in tremendous loss of property and wealth.

The aim of this work is to investigate flood behavior with respect to local effects, e.g. implementation of flood retention basins, and external controls by using recurrence analysis. Flood events occur at irregular time intervals and hence such data often requires data preprocessing. In this study, we use the TACTS approach in combination with recurrence plot and recurrence quantification analysis to investigate flood events, which occur on irregular time scales.

The TACTS approach allows us to construct a recurrence plot from the irregularly spaced flood event series, and the recurrence-based characteristics help to quantify how the dynamics of the flood occurrence have changed over time. We apply our approach to the 150-year river discharge data from the river Elbe and study the dynamic interactions of different variables such as precipitation, temperature and catchment wetness.