

## Novel Flood Detection and Analysis Method Using Recurrence Property

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Temporal changes in flood hazard are known to be difficult to detect and attribute due to multiple drivers that include processes that are non-stationary and highly variable. These drivers, such as human-induced climate change, natural climate variability, implementation of flood defence, river training, or land use change, could impact variably on space-time scales and influence or mask each other. Flood time series may show complex behavior that vary at a range of time scales and may cluster in time.

This study focuses on the application of recurrence based data analysis techniques (recurrence plot) for understanding and quantifying spatio-temporal changes in flood hazard in Germany. The recurrence plot is known as an effective tool to visualize the dynamics of phase space trajectories i.e. constructed from a time series by using an embedding dimension and a time delay, and it is known to be effective in analyzing non-stationary and non-linear time series. The emphasis will be on the identification of characteristic recurrence properties that could associate typical dynamic behavior to certain flood situations.