

Precipitation event extremity evaluation across Germany: analysis of observed and synthetic data from a stochastic weather generator

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In order to estimate the frequency of the precipitation event responsible for the devastating flood that struck western Germany and surrounding areas in mid-July 2021. The extremeness of the various precipitation events occurred in the last 71 years (1951-2021) was estimated utilizing the recently developed cross space-time scale weather extremity index xWEI. The probability analysis based on GEV distribution indicates that the 2021 precipitation event, with the estimated return period exceeding 2000 years, is the most extreme event in the Ahr and Erft catchments over the specified period. The set-up stochastic weather generator can reproduce precipitation events with similar xWEI to mid-July 2021 event, while it tends to underestimate very-extreme precipitation events and overestimate less-extreme events.

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