

Frequency analysis of precipitation extremes by the region-of-influence approach and non-stationary extreme value distributions

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Abstract

Extreme precipitation events have serious negative consequences for the human society. Since climate change is likely to lead to an increased frequency of precipitation extremes (PE) over large parts of Europe, it is desirable to investigate the probabilities of recurrences of the observed extremes in a non-stationary climate. Among the aims of the project are (i) to develop a 'region of influence' approach to the frequency analysis of PE, (ii) to incorporate a time-dependency into the frequency analysis of PE and to analyse trends in the observed extreme precipitation events using extreme value models, (iii) to estimate frequency distributions and return periods of recent PE under the regional approach and compare them with at-site estimates, (iv) to apply non-stationary extreme value models into climate model transient simulations, and (v) to construct scenarios of future changes based on a combination of climate model outputs and a statistical approach.