Extreme value models with time dependent parameters and their application in climate change studies

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Abstract

Several extraordinary climatic anomalies occurred in central Europe in recent years; high summer temperatures and their prolonged periods in 2003 were among the most severe. The aims of this project are to develop statistical models of extreme events with time-dependent parameters under the point process approach, to apply these models to extreme temperature events in the observed data and to compare their performance with simpler ‘block maxima’ and ‘peak over threshold’ methods as well as with stochastic time series models, and to utilize the extreme value models in time series simulated by current climate models, in particular regional climate models (RCMs). Scenarios of changes in temperature extremes in a perturbed future climate will be constructed on the basis of the statistical approach and climate model outputs. In addition to the methodological innovations, the project will also help to quantify risks of the recurrence of recently observed temperature anomalies associated with enormous impacts on the human society.