



Changing precipitation extremes in Europe

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A growing number of studies indicate trends in precipitation extremes over Europe during recent decades. These results are generally based on descriptive indices of extremes which occur on average once (or several times) each year (or season). An example is the maximum 1-day precipitation amount per year. Extreme value theory complements the descriptive indices, in order to evaluate the intensity and frequency of more rare events. Trends in more rare extremes are difficult to detect, because per definition only few events exist in the observational series. Although single extreme events cannot be simply and directly attributed to anthropogenic climate change, as there is always a finite chance that the event in question might have occurred naturally, the odds may have shifted to make some of them more likely than in an unchanging climate (IPCC, 2007).

In this study we focus on climate extremes defined as rare events within the statistical reference distribution of rainfall that is monitored daily at a particular place. We examine the daily precipitation series from the European Climate Assessment and Dataset (ECA&D) project. We use the maximum 1-day and maximum 5-day precipitation amounts in summer and winter and determine the trends in 5- to 20-year events by fitting an extreme value distribution to the data in consecutive 20-year periods of the record. The trends in multi-year return levels are determined for Northern and Southern Europe.