Geophysical Research Abstracts, Vol. 7, 01867, 2005
SRef-ID: 1607-7962/gra/EGU05-A-01867

Regional analysis of extreme precipitation events in the Czech Republic

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The L-moment based method of the regional frequency analysis of maximum annual 1- to 7-day precipitation amounts is utilized for the area of the Czech Republic. Daily precipitation totals measured at 78 stations over 1961-2000 are used as an input dataset. Regions are formed by the cluster analysis of site characteristics (longitude, latitude, elevation, mean annual precipitation, mean ratio of summer to winter half-year precipitation, and mean annual number of dry days) and statistical tests for the regional homogeneity (based on the 10-yr event, L-moment ratios, and the variation of L-moment statistics). In compliance with results of the tests, the area of the Czech Republic is divided into four homogeneous regions according to the characteristics of extreme precipitation events. These regions enter next steps of the regional frequency analysis which concern selection of the most appropriate distribution (candidate distributions include generalized logistic, generalized extreme value, lognormal and Pearson type III), and estimation of parameters and quantiles of the fitted distribution together with their uncertainty. Advantages of the regional analysis compared to the at-site analysis are evaluated. Since the regions formed reflect also climatological differences in precipitation regimes and synoptic patterns causing high precipitation amounts, their future application may not be limited to the frequency analysis of extremes. The study is supported by the Grant Agency of AS CR under project B3042303.