



Regional growth curves and improved design value estimates of extreme precipitation events in the Czech Republic

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Regional analysis is utilized to improve estimates of probabilities of extreme precipitation events in the Czech Republic. The identification of four homogeneous regions was based on statistical procedures (cluster analysis of site characteristics and subsequent tests for regional homogeneity), but the regions formed reflect also climatological differences in precipitation regimes. 'Generalized Extreme Value' (GEV) distribution was identified as the most suitable one for modelling maximum annual 1-day to 7-day amounts according to the L-moment ratio diagram and goodness-of-fit tests. Only in the northeast region (which is most prone to the occurrence of extreme high precipitation totals), 'Generalized Logistic' (GLO) distribution should be preferred. The regional approach considerably lessens the between-site variation of estimates of the shape parameter of the GEV/GLO distribution compared to at-site procedures, and the estimates of high quantiles (e.g. 50-yr return values) are more reliable and climatologically consistent. Different shapes of growth curves are characteristic of the four regions, and the between-region variability is larger for multi-day than 1-day events. Particularly noteworthy is the heavy tail of distribution of multi-day extremes in the northeast region, reflected also in the inapplicability of the general four-parameter kappa distribution in regional homogeneity tests. Statistical tests on the value of the tail index support a hypothesis that data in this area may be drawn from a distribution with a very heavy tail.