



Testing goodness-of-fit of the GEV distribution for sub-daily precipitation extremes in RCM-simulated and observed data

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The study evaluates statistical characteristics of sub-daily precipitation extremes in regional climate model (RCM) simulations (with 50 and 25 km resolutions) over the Czech Republic. Warm season (May–September) maxima of 1h to 24h aggregations are analyzed with respect to goodness-of-fit of the Generalized Extreme Value (GEV) distribution and estimates of the GEV distribution shape parameter. Observed sub-daily precipitation data are represented by a set of 54 stations. Goodness-of-fit tests (Cramér-von Mises, Kolmogorov-Smirnov, and Anderson-Darling) indicate that the GEV distribution is an applicable model for the observed as well as RCM-simulated precipitation maxima. However, the RCMs are not able to capture the range of the shape parameter estimates of short-duration precipitation extremes (1h, 2h and 3h) realistically, either leading to too many (nearly all; HadRM3) or too few (RCA4) grid boxes in which the shape parameter estimate corresponds to a heavy tail. This suggests that the distributions of maxima of sub-daily precipitation amounts are severely distorted in the RCM-simulated data and do not match reality well. Projected changes of sub-daily precipitation extremes in climate change scenarios based on RCMs that do not resolve convection therefore need to be interpreted with caution.