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Precipitation extremes in a EURO-CORDEX 0.11 ensemble at hourly resolution

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Sub-daily precipitation extremes have received relatively little attention in evaluations of regional climate models. This is to a large extent due to lack of data, regarding both observations and models. Here (Berg et al., 2018), depth duration frequency (DDF) analysis is performed for precipitation extremes with durations of one to 12 hours in the EURO-CORDEX 0.11 ensemble, which are then evaluated with national data sets for selected countries around Europe. The analyzed RCMs (RCA, HIRHAM, REMO and RACMO) mainly underestimate depths at short durations, but do better at 12 h duration. The reproduction of the observed spatial patterns of extremes over Germany is reasonable at 12 h duration, but shows little to no resemblance at shorter durations. For France, the more large-scale forced spatial pattern is better reproduced also at shorter durations, although with strongly underestimated depths.

Future projections under RCPs 4.5 and 8.5 in several time-slices are investigated by relating changes in depths to mean temperature changes. There is a strong relationship between extreme depths and temperature across sub-regions of Europe, the emission scenario and future time period. The projected changes in 12 h depths are about equally affected by the driving global model, as by the regional model, with scaling in the range of 1–10%/K at 12 h duration, and generally higher values at shorter durations.

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