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Probabilistic projections of extremes for point locations constructed using a combined statistical and dynamical downscaling approach.

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Dynamical and statistical methods are typically seen as alternative approaches to downscaling for the construction of high-resolution climate change projections. Here, the two approaches are used together in order to construct probabilistic projections of changes in daily temperature and precipitation (including indices of extremes) for 13 European station locations. The PDFs are constructed using 'climate change factors' from 17 ENSEMBLES RCM runs to perturb the parameters of a weather generator trained on station data. The weather generator is stochastic and is run 100 times for each set of change factors (i.e., 17 x 100 runs). A weighting scheme (based on the ability of the RCMs to simulate various aspects of present-day climate when forced with reanalysis data) is used to sample from the outputs: sampling future minus present-day changes more frequently from the higher-ranked models. The resulting PDFs allow consideration of a number of issues including: their sensitivity to weighting; the contribution of different sources of uncertainty; and, the value and potential dangers in providing users with probabilistic projections.