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Linking a stochastic weather generator with regional climate model output in a probabilistic framework

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A stochastic weather generator has been used to construct daily scenarios for 17 station locations (10 in the UK, the others in Switzerland, Romania, Serbia, Sweden and Russia). The weather generator produces daily time series with the characteristics of the station location, which can be input directly to impacts models. Seasonal indices of extremes are calculated from the daily series to allow comparison with observed data (performance is generally good, although dry-day persistence is underestimated) and to explore future changes.

This weather generator has been combined with RCM output from the PRUDENCE project (http://prudence.dmi.dk) to construct daily probabilistic scenarios for the 2080s conditional on the IPCC SRES A2 scenario. The scenarios are presented in a number of different formats (histograms, probability and cumulative density functions, percentiles, class probabilities and event thresholds) to suit the needs of a range of different users.

The UK probabilistic scenarios (available from http://www.cru.uea.ac.uk/cru/projects/cranium/) were developed within the context of the CRANIUM project and provide a valuable resource for preparing UK users for the move towards probabilistic climate scenarios. While this move is consistent with the move towards risk-based impacts assessments, it raises many scientific and communication challenges (e.g., http://www.k4cc.org/events/workshops/probablistic-scenarios-workshop-review).

The CRANIUM scenarios are unweighted, i.e., they do not take any account of differences in model performance for the present day. Within the European Union ENSEMBLES project (http://www.ensembles-eu.org/), simple weighting schemes (based on

comparison of RCM output with observations) have been developed and applied. The weighted and unweighted PDFs appear very similar. In part, this is due to the spread of uncertainty coming from the different RCM boundary conditions (four different driving GCMs are used) and the stochastic variability of the weather generator. Further work is, however, needed to develop and evaluate more sophisticated weighting schemes in order to improve the credibility of regional probabilistic scenarios.