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Regional climate model data used within the SWURVE project – 2: addressing uncertainty in regional climate model data for five European case study areas

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Abstract. To aid assessments of the impact of climate change on water related activities in the case study regions (CSRs) of the EC-funded project SWURVE, estimates of uncertainty in climate model data need to be developed. This paper compares two methods for estimating uncertainty in annual surface temperature and precipitation for the period 2070–2099. Both combine probability distribution functions for global temperature increase and for scaling variables (i.e. the change in regional temperature/precipitation per degree of global annual average temperature change) to produce a probability distribution for regional temperature and precipitation. The methods differ in terms of the distribution used for the respective probability distribution function. For scaling variables, the first method assumes a uniform distribution, whilst the second method assumes a normal distribution. For the probability distribution function of global annual average temperature change, the first method uses a uniform distribution and the second uses a log-normal approximation to a distribution derived from Wigley and Raper, 2001. Although the methods give somewhat different ranges of change, they agree on how temperature and precipitation in each of the CSRs are likely to change relative to each other. For annual surface temperature, both methods predict increases in all CSRs, although somewhat less so for NW England (5th and 95th percentiles vary between 1.1–1.9°C to 3.8–5.7°C) and about 1.7–3.1°C to 5.3–8.6°C for the others. For precipitation, most probability distributions (except for NW England) show predominantly decreasing precipitation, particularly so for the Iberian CSR (5th and 95th percentiles vary from –29.3 to –44% to –9.6 to –4%).

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