



European weather extremes as simulated by the Rossby Centre Regional Climate Model

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An ensemble of regional climate simulations is utilized to evaluate statistics of temperature, precipitation and wind extremes over Europe for the control (1961-1990, CTL) and a possible future (2071-2100, SCN) climate under the SRES A1B emission scenario. The ensemble consists of six members and is based on the Rossby Centre Regional Climate Model - RCA3 that is driven by six different GCMs (ECHAM5, CCSM3, HadCM3, CNRM, BCM and IPSL). The extremes are expressed in terms of the 20-year return values of annual temperature and gust wind extremes and seasonal (summer and winter) precipitation extremes.

For the control period a degree of dependency of all simulated extremes on a driving GCM is very large since differences among the individual simulations can reach 20 °C for temperature extremes, several tens of percents for precipitation extremes and 10 m s⁻¹ for wind extremes. The projected climate changes show strongest reduction of recurrence time of warm extremes over southern Europe (from 20 to 1-2 years) and in less degree over Scandinavia (to 5 years). The cold extremes, occurring once in 20 years in CTL, almost disappear in the future. The recurrence time of excessive precipitation reduces to 6-10 years in SCN over northern and central Europe in summer and even more to 2-4 years in Scandinavia in winter. The projected changes in wind extremes have a large spread among the six simulations and the ensemble mean shows a weak spotty tendency (1-2 m s⁻¹) of strengthening north of 45°N and weakening south of it. At the same time regional details of the ensemble mean changes in wind extremes are sensitive to the number of simulations in the ensemble.

For the present ensemble of regional climate simulations the future changes in temperature extremes are more robust to a choice of a driving GCM than ones in precipitation extremes while confidence on the projected changes in wind extremes is very low.