



Regional climate modelling of European summer climate variability over the period 1958-2001

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Recent extreme events such as the devastating 2003 European summer heatwave highlight the importance of a better understanding of the key processes and feedbacks relevant for the continental-scale summer climate. We analyse a 44-year long regional climate simulation to investigate European summer climate variability with a focus on anomalously warm and dry periods.

We use the regional climate model CHRM to perform a multi-year regional climate simulation for the period 1958-2001. Our simulation is driven by lateral boundary conditions and sea-surface temperatures from the ECMWF re-analysis (ERA-40). Independent observations are used for validation. We investigate the influence of spring and summer soil moisture on the European summer climate. Circulation anomalies and soil water evolution of anomalously warm summer periods are analysed.

In comparison, the Central European summer 2003 is shown to be highly anomalous not only in terms of surface temperature, but also regarding the persistence of short-wave radiation anomalies and the lack of precipitation during January-August 2003. Previous summer warm anomalies during the period 1958-2001 were shorter-lasting or spatially confined to smaller regions. The multi-year climate simulation reveals a strong negative relation between summer temperature and preceding soil moisture, especially in anomalously warm summers.