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# Regional amplification of projected changes in extreme temperatures strongly controlled by soil moisture-temperature feedbacks

Martha Marie Vogel (1), René Orth (1), Frederique Cheruy (2), Stefan Hagemann (3), Ruth Lorenz (1,4), Bart van den Hurk (5), and Sonia Isabelle Seneviratne (1)

(1) ETH Zürich, IAC, D-USYS, Zürich, Switzerland (martha.vogel@env.ethz.ch), (2) LMD/IPSL, Université Pierre et Marie Curie, Paris, France, (3) Max Planck Institute for Meteorology, Hamburg, Germany, (4) ARC Center of Excellence for Climate System Science and Climate Change Research Center, UNSW Australia, Sydney, Australia, (5) Royal Netherlands Meteorological Institute, De Bilt, Netherlands

Regional hot extremes are projected to increase more strongly than global mean temperature, with substantially larger changes than 2°C even if global warming is limited to this level. We investigate here the role of soil moisture-temperature feedbacks for this response based on multi-model experiments for the 21st century with either interactive or fixed (late 20th century mean seasonal cycle) soil moisture. We analyze changes in the hottest days in each year in both sets of experiments, relate them to the global mean temperature increase, and investigate physical processes leading to these changes. We find that soil moisture-temperature feedbacks significantly contribute to the amplified warming of hottest days compared to that of global mean temperature. This contribution reaches more than 70% in Central Europe and Central North America and between 42%-52% in Amazonia, Northern Australia and Southern Africa. Soil moisture trends (multi-decadal soil moisture variability) are more important for this response than short-term (e.g. seasonal, interannual) soil moisture variability. These results are relevant for reducing uncertainties in regional temperature projections.

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