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Future European Summer warming constrained by present-day seasonal cycle

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European summer temperatures in the CMIP5 multi-model ensemble differ by as much as 5 degrees in the present-day and this spread grows to 9 degrees by the end of this century under the RCP8.5 scenario.
This spread is so large since late summer temperatures depend on a number of interacting processes with positive feedbacks during the preceding seasons that are hard to model. These include soil moisture transport and evaporation, atmospheric convection, clouds and circulation. The seasonal cycle is driven by the seasonal change in solar radiation, but these same processes and interactions play a role in the response of the seasonal cycle to an anthropogenically induced change in the radiative forcing. We hypothesize that this is the reason why we find a clear inter-model relationship between the present-day temperature and the projected warming with warm models projecting stronger warming.
This hypothesis is confirmed with additional sensitivity simulations with one member of the CMIP5 ensemble (EcEarth); a change in the model formulation of the soil hydrology makes the model warmer in present-day and at the same time increases the projected warming under the RCP8.5 scenario.
Based on these results we conclude that the warmest projections are unlikely as these models tend to have a warm bias in the present-day climate.