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Results of the GLACE2 experiment for Europe

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The Second Global Land Atmosphere Coupling Experiment (GLACE2) is designed to explore the improvement of forecast skill of summertime temperature and precipitation up to 8 weeks ahead by using realistic soil moisture initialization. We show that for temperature the skill does indeed increase up to 6 weeks, but areas with (statistically significant) lower skill also exist at longer lead times for the European continent. The skill improvement is smaller than shown earlier for the US, partly because of a lower potential predictability of the European climate at seasonal time scales. Selection of extreme soil moisture conditions or a subset of models with similar initial soil moisture conditions does improve the forecast skill, and sporadic positive effects are also demonstrated for precipitation. Using realistic initial soil moisture data increases the interannual variability of temperature compared to the control simulations in the South-Central European area at longer lead times. Also better temperature forecasts are generated in a remote area in Western Europe. However, the covered range of forecast dates (1986 – 1995) is too short to isolate a clear physical mechanism for this remote correlation.