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Does realistic land surface initialization improve the subseasonal precipitation and air temperature forecast?

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To forecast air temperature, precipitation, and other meteorological parameters weeks to months in advance, prediction systems must take advantage of Earth system components that are predictable to such a long time scale or which have a memory of several weeks. These components can transfer the predictability to the atmosphere. The ocean is a typical example given its heat capacity. But the ocean has limited impact on climate in many land regions. In particular in transitional regions between wet and dry climates, soil moisture is an important driver for climate variability in spring to summer (Koster et al. 2004). This is also the case in the Mediterranean region in present climate, and is expected to become more significant in Central Europe in coming decades (Seneviratne et al. 2006).
The second phase of the Global Land-Atmosphere Coupling Experiment (GLACE-2) was aimed at quantifying the degree to which realistic soil moisture initialization contributes to the seasonal forecasting of temperature and precipitation. For this purpose, different seasonal forecast systems and climate models performed the same set of simulations (Koster et al., 2010). This experiment demonstrated moderately enhanced skill for seasonal forecasting of temperature and in some cases precipitation in some regions, when realistic soil moisture initialization was used. Detailed analyses for single modeling systems were not presented yet. Here, we will present results of the simulations performed with the climate model ECHAM5-JSBACH. Thereby our focus is on regions in Europe and Asia. As an average about the years 1986-1995 first results show an observable increase of skill in predicting temperature for Eastern Europe during May, July, and August, consistent with multi-model analyses of the GLACE-2 ensemble (van den Hurk et al. 2010).

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