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Soil-moisture temperature feedbacks in dynamical and statistical downscaling

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Regional climate change projections for different emission scenarios have been carried out for the 21th century using a dynamical and a statistical approach. The simulation area was Germany. Both methods performed a downscaling of a global coupled atmosphere-ocean simulation carried out with the model system ECHAM5-MPIOM. The dynamical downscaling approach was done with the Regional Climate Model REMO, the statistical with the WETTREG model.

Differences in the evolution of the projected mean 2m-temperature especially in the 2nd half of the 21th century could be attributed to a dynamical feedback process in the dynamical downscaling procedure. Within REMO less precipitation during summer leads to lower soil moisture content, which in turns decreases evapotranspiration. This enhances the temperature increase and therefore leads to a stronger climate change signal. In the statistical downscaling methode this feedback is not included, so that the temperature signal is less strong. More details will be presented at the conference.