



Two-way coupling the hydrological model PROMET with the regional climate model MM5

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To investigate the interactions between the atmosphere and the land surface in the context of climate change, an approach was developed that fully couples the regional climate model MM5 with the hydrological model PROMET.

Therefore, the down- and upscaling tool SCALMET has been developed to overcome the scale gap between the coarser-resolved atmospheric model and that operating at the land surface in order to investigate climate change impacts at the local scale. Two-way coupling poses certain constraints on the architecture of the hydrological model and requires adaptations to the regional climate model.

By the use of this approach, it is possible to drive the hydrological model PROMET at high spatial resolution (1x1 km) with meteorological data from the regional climate model MM5 (resolution: 45x45 km). Mass and energy fluxes are calculated within the land surface model PROMET, and subsequently provide the lower boundary condition of the regional climate model for each time step of 9 minutes. As a result the regional climate model benefits from the fine spatial resolution of the land surface model.

First results of a fully coupled model run for the central European region are presented and scaling issues as well as differences between the original land surface scheme of MM5 and its replacement through PROMET are discussed.