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CONVECTION-PERMITTING ENSEMBLE SIMULATIONS FOR WEST AFRICA

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Résumé :

During the first phase of AMMA, the convection-permitting Consortium for Small-scale Modeling (COSMO) model was used at Karlsruhe Institute of Technology (KIT) to investigate the initiation and intensification of a mesoscale convective system (MCS) over Burkina Faso. It was found that the simulated MCS and its precipitation were sensitive to the initial soil moisture of the model simulation, which was confirmed by further studies. Nevertheless, no systematic relationship could be identified between lower or higher soil moisture values and the amount of simulated precipitation. One reason is the importance of horizontal heterogeneities in the soil fields that have a larger influence on convection initiation than absolute values. This fact is used to generate an ensemble of convection-permitting model simulations with the COSMO model by creating different perturbations of the soil that reflect the uncertainty of surface-conditions in the initial state of the model. They differ in the patterns as well as in absolute values. Furthermore, four different members out of the ensemble prediction system (EPS) of ECMWF are taken as initial and boundary conditions for the year 2011. The whole ensemble consequently consists of different boundary conditions multiplied with the soil perturbations. It can now be used to investigate the soil moisture – precipitation feedback more systematically, but also as a tool to learn more about the predictability of MCSs in this region.

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