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Forecasting the weather
- ensemble techniques
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Development and application of a convection-permitting ensemble system using a variation of soil moisture initial fields

L. Gantner, V. Klüpfel, and N. Kalthoff

Karlsruhe Institute of Technology (KIT), Institute for Meteorology and Climate Research (IMK), Germany
(leonhard.gantner@kit.edu)

In the African Sahelian and Sudanian climate zone convective systems contribute substantially to the annual rainfall. Thus, they play a key role in the water cycle of West Africa. Their rainfall, however, is highly variable in space as well as in time. Recent research shows that land-atmosphere feedbacks play an important role for the life-cycle and physics of convective systems. This is in particular the case in the region of West Africa, where gradients of soil moisture are common.
Significant uncertainty is associated with determining initial soil moisture for a numerical model. For example, satellite measurements of surface soil moisture can show a quite remarkable discrepancy from in situ data and initial fields of soil moisture can vary quite a lot in different forecast models.

This is the motivation to develop and apply an ensemble system with one component being different initial conditions of soil moisture. The presentation will describe the design of the ensemble, where the COSMO model is used with a convection-permitting horizontal resolution. We use soil moisture data from the AMSR-E satellite, which is adapted to the SVAT model TERRA. The new system is applied for different episodes e.g. in autumn 2009, where flooding occurred in some West African countries.