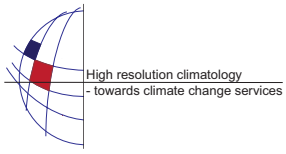
EMS Annual Meeting Abstracts
Vol. 7, EMS2010-231, 2010
10th EMS / 8th ECAC



Comparison of convective precipitation in COSMO model runs by variation of the initial soil moisture fields

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

Karlsruhe Institute of Technology (KIT), Institute for Meteorology and Climate Research, Germany
(vera.kluepfel@imk.fzk.de)

The prediction of convective precipitation is still a challenging task. Advances in this field of research are especially important in tropical regions like West Africa where mesoscale convective systems predominantly evoke the precipitation of the rainy season. In the sparsely vegetated area of the Sahel, land-atmosphere feedbacks are known to play a crucial role in the physics of the evolution of convective systems. Recent work implies particularly the importance of soil moisture. However, information about the soil moisture for West Africa comprises a great uncertainty.
A case study from the AMMA campaign (African Monsoon Multidisciplinary Analyses) was chosen to evaluate the model runs effectuated with COSMO.
To examine the impact of soil moisture uncertainty on the model precipitation, the original soil moisture field of the special AMMA reanalysis experiment of the ECMWF was replaced with several other soil moisture fields. Those were the ECMWF operational analysis, the GME analysis, the ALMIP experiment (AMMA Land Surface Model Intercomparison Project) and the AMSR-E soil moisture fields. They proved to produce a significant model spread in the precipitation sum after 36 hours associated with large differences in the domain averaged convection related parameters like CAPE and boundary layer conditions as well as surface fluxes. Compared to the global forecasts from GME and IFS, all high resolution model runs initialized from the same meteorological fields as the global models show a considerable improvement of the simulated precipitation sum in regard to the available precipitational observations.