EMS Annual Meeting Abstracts
Vol. 14, EMS2017-281, 2017

Assimilation of land surface temperature in the coupled land atmosphere system

Christine Sgoff (1), Annika Schomburg (2), Juerg Schmidli (1), and Jan-Peter Schulz (2)

(1) Institute for Atmospheric and Environmental Sciences, Goethe University, Frankfurt am Main, Germany, (2) Deutscher Wetterdienst (DWD), Offenbach, Germany

The near-surface weather and climate variability is strongly influenced by complex interactions between the land surface and the atmospheric boundary layer. To obtain realistic boundary layer simulations an accurate simulation of the coupling between land surface and boundary layer atmosphere is essential. To improve the simulation of this tightly-coupled system, an observing system simulation experiment (OSSE) is designed to assimilate land surface temperature (LST) derived from geostationary satellites. LST is an important component of the surface energy balance and crucial for the realistic simulation of soil temperature, latent and sensible heat flux. In a first step a model equivalent skin temperature taking into account the canopy had to be derived. For this purpose, a skin layer scheme has been implemented, where the temperature of the skin layer corresponds to the temperature observed by satellites. As “Nature Run” a high-resolution COSMO simulation will be performed and from this “true state” the synthetic observations for the OSSE will be derived. The assimilation process is based on the local ensemble transform Kalman filter (LETKF). Technically this is realized by the LETKF framework used at DWD (KENDA, Schraff et al. 2015). Within this idealized setting, the impact of hourly LST assimilation on soil and lower atmosphere variables and processes will be investigated. To gain improved knowledge about boundary layer processes and evolution, idealized experiments with different surface characteristics and boundary layer regimes will be conducted. First results will be presented.