EMS Annual Meeting Abstracts
Vol. 10, EMS2013-659, 2013
13th EMS / 11th ECAM

Validation of WRF simulated PBL height and soil moisture in dry summer conditions

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Using the WRF model, simulations with the WRF-SCM and WRF-ARW are performed over Hungary for the late summer in 2012, in order to analyze the effect of soil moisture on planetary boundary layer (PBL). Derived PBL height from radiometer and windprofiler measurements at one station was compared to the simulations. Alongside the PBL sensitivity, the reliability of the Noah scheme for simulating soil moisture is also tested. Soil moisture measurements took place around the upper air measurement site at five locations within a 4 km^2 area, with 5 different cultivations and 2 different soil types.

The weather conditions during the measurement period proved to be dry, as there was no precipitation for at least a month as opposed to the average 50 mm/month. Precipitation events were mostly local convective storms. The soil moisture measurements indicated below wilting point water content, as a result most of the cultivated vegetation (corn, maize) dried out. In these conditions it was in our interest to investigate the modeling capabilities of the WRF model. Simulations with the WRF-ARW were nested around around the measurement area using about 2 km grid resolution. Since in this case the surface information for the WRF-ARW is of importance, the CORINE land cover and the Digital Kreybig Soil Information System provided soil texture was used over Hungary, both with 30" resolution.