Geophysical Research Abstracts
Vol. 12, EGU2010-14421, 2010
EGU General Assembly 2010

Origins of differences between CMSAF Satellite products and high resolution CCLM simulation results in the CORDEX-EU domain

Andreas Will (1), Michael Woldt (1), and Rainer Hollmann (2)

(1) BTU Cottbus, Environmental Meteorology, Cottbus, Germany (will@tu-cottbus.de, +49 355 69 1128), (2) CMSAF at DWD, Offenbach, Germany

The satellite products have the potential to substantially extend the set of available model evaluation data. However the accuracy of the satellite products, their inhomogenity and the very short time scale available make the interpretation of the result difficult.

A set of systematic simulations at 0.44, 0.165 and 0.0825 horizontal resolution has been conducted for the CORDEX-EU domain for the time period 2001-2008 using the COSMO-CLM and GME boundary conditions having a horzontal resolution of 40km. The results are compared with the products of the Climate Monitoring Satellite Application Facility (CMSAF) of EUMETSAT and with each other. CMSAF offers a set of atmospheric variables (radiation components, cloud cover and humidity quantities) derived from space born observations for the time period 2005-2008 for Europe. This opens the opportunity to evaluate a set of model variables in order to get more insight into the models quality and behaviour. Since the CMSAF products might also have substantial errors the question arises, what the origin of the differences between model and data might be.

The study is based
• on the accuracy statements of the SAF products derived from comparisons with other land based observations,
• on the comparison of model results with each other (inernal variability and resolution dependence) and
of model results with CMSAF products.
We investigated
- annual and monthly means,
- annual and daily cycles of 40 selected regions and
- vertical profiles of vertically resolved variables.

All differences between model and CMSAF exceeding the accuracy of CMSAF on space scales larger than 500 x 500 km2 have been regarded as significant and the analysis was restricted to the significant differences.

Selected results will be shown exhibiting the resolution dependence in comparison with that the combination of typical space-time structures of errors (e.g. day-night change for CMSAF data), consistency of model variables (e.g. surface energy budget) and knowledge about the physics and dynamics of the atmosphere allow to identify the origins of several difference patterns and allow to draw conclusions on necessary improvement of the satellite data products and to identify model deficiencies. In this sense the results exhibit the potential of a set of complementary observables and the need to investigate the relevant variabilities in space and time (e.g. the daily cycle).