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Comparative analysis of CLM simulations using different soil information

I. Anders, B. Rockel, B. Geyer

Institute for Coastal Research, GKSS Research Center, Geesthacht, Germany
(Ivonne.Anders@gkss.de)

In past projects (e.g. PRUDENCE or MERCURE) several intercomparisons of regional climate models over Europe have been carried out. Compared to observed data most of the models simulated too dry and too warm climate during summer period north and east of the Black Sea mainly in the Ukraine and Moldova. The area represents continental climate with strong winters and warm summers. The main part of this area belongs to the catchment of the Dnipro. Hagemann et al. found out for some of the models systematic errors in the dynamics are one possible reason for the phenomena of summer drying. But also deficiencies in parametrisation of land surface can be a reason. The solution of this problem is one of a very important research topic in climate modelling. This study presents a comparison of model simulations using two different definitions and distributions of underlying soil types. The regional model simulations are performed with CLM, Climate version of LM (Lokal-Modell) the weather forecast model of the German Weather Service (DWD).

In general the distribution of soil types used in CLM simulations is derived from soil type textures for the whole globe developed by FAO. For this study information from "International map of Soil types" by H. Stremme was used additionally. The main difference in these two datasets is a big fraction of silt loam in South-East of Europe in the map of Stremme. FAO defines sandy loam in this area. Two simulations have been carried out using these different soil definitions covering the time from 1989 to 2005 forced by NCEP/NCAR reanalysis data. The spatial resolution of the model was 0.44°. Soil moisture and temperature have been initialised by NCEP reanalysis. The first 4 years have been used as spin up for the soil part of the model. The model results have been compared for the time period 1993 to 2002 to observation dataset CRU. We found that in this area the soil moisture during the whole year was higher

then in the standard simulation. Especially during summer period there is more soil moisture available, the evaporation is higher and the air does not heat up. To analyse the changes in more detail for single stations the results of several surface variables will be compared to datasets of ECA and CEOP.