Project: 937

Project title: Influence of land-use transformations on local and regional climate in Germany

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We successfully performed hindcast simulations with the new model version of the regional climate model COSMO-CLM (version 5.0_clm9) forced with ERAInterim in convection-permitting mode on high horizontal resolution (3 km) on Mistral for the period 1980-2010.

The first run in the first half of this year resulted in unreliable results since strange extreme rainfall bands occurred in the simulation, which were related to the old mistral configuration. After an update of mistral in early summer simulations performed well.

We tested several model output statistics against observational data. Area and time averaged mean annual cycle of precipitation for the period 1980-2000 shows a reasonable bias compared to HYRAS data set with an underestimation of about 0.6 mm/day in the mean (Fig. 1).

Figure 2 shows the area and time averaged diurnal cycle of precipitation for the whole year of 2007 for different downscaling procedures. The red line represents a direct downscaling of ERAInterim data to a 3 km horizontal resolution grid. In addition, results are shown from further downscalings of the Miklip 0.22 simulations with 1 hourly forcing (green) and 6 hourly forcing (blue) to 3 km resolution. The direct downscaling procedure shows the lowest precipitation values in the morning hours and the latest rainfall peak in the afternoon.

Based on the results we aim for climate simulations as the next step for climate feedbacks of local land use changes.



Figure 1: Area and time averaged mean annual cycle of precipitation compared to observations for the time period 1980-2000.



Figure 2: Area and time averaged diurnal cycle of precipitation for the whole year of 2007.