ERA40 driven CLM simulations in the European and the south Asian region

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In this contribution, regional climate simulations by the CLM in a European and a south Asian domain are considered. The simulations are driven by ERA40 reanalysis data and have a grid resolution of 0.44°. To assess the question of generality the same model configuration is used in the two domains. This configuration includes physical parametrization tuned to the European domain and the model shows better performance in the European domain than in the south Asian domain. Here, the CLM shows some substantial deficiencies in the spatial and temporal distribution of precipitation especially in the Monsoon months (JJAS). As an additional challenge, a robust model bias estimation for the winter months (DJF) in this region is not possible, since precipitation shows almost no events during winter. This makes any model bias correction very difficult.

To find possible reasons for the CLM shortcomings in simulating precipitation in the Monsoon months, different indices (based on e.g. the all Indian Monsoon rainfall and the vertical wind shear) are calculated. The CLM simulations are compared to observations and ERA40 and NCEP reanalysis data with respect to these indices. While the climatologies over the years 1960-2000 mostly agree, the correlations between the time series of the different indices vary considerably. For instance, there is high correlation between the vertical wind shear of the zonal and meridional winds in the CLM model and the ERA40 reanalysis data. Contrary, the correlation between the observed all Indian Monsoon rainfall and the all Indian Monsoon rainfall simulated by the CLM is very low. We conclude that the model dynamics can be applied to different climate zones, but the physical parametrization are less transferable.