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Evaluation of the precipitation for south-west Germany from high resolution simulations with regional climate models

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The impact of climate change is expected to vary largely for different parts of the world. Therefore, there is an increasing demand on regional information about climate change. Regional climate models (RCMs) are useful tools for downscaling of the coarse data provided by global models. It is a challenging task to reveal the capabilities of such model systems to give reasonable projections for the future. That applies especially for the precipitation, for which the climate change signals are expected do show even stronger spatial and temporal variations than for the temperature.

In this paper we evaluate the precipitation data from long-term present day climate simulations of two RCMs - namely REMO (10 km resolution) and COSMO-CLM (18 km resolution). The analysis focuses on south-west Germany, a region with complex terrain. The precipitation fields were analyzed with respect to spatial pattern, annual cycle and frequency distributions. The agreement with observation data shows strong seasonal and geographical variations, with smaller deviations during summer for both models. But during winter both models have a tendency to overpredict the precipitation. There are large differences in the spatial pattern produced by the models, especially in regions with steep topography like the Black Forest. These discrepancies are discussed with respect to the model parameterizations and the grid resolution. Moreover we discuss the question of the added value from regional climate modeling, which is an important topic. Therefore, the seasonal cycles of the regional models and of the driving GCM (ECHAM5) are compared. This evaluation study gives indications about

the performance of current RCM simulations on spatial scales below 20 km.