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Precipitation modeling in Europe and South-Asia

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The regional climate model CLM is used for dynamical downscaling of global ERA40 reanalysis data. To evaluate the transferability of the model, it is applied in two computational domains with different climatology and orography, one being situated in South-Asia the other in Europe. The method is tested on daily precipitation and compared to two statistical downscaling methods (SDMs) in the upper Brahmaputra river basin and the upper Danube river basin. Additionally, two bias correction methods (BCMs) are used to remove model biases from the CLM. Here, the BCMs and the SDMs we use are based on the same empirical relationships between the simulated precipitation and observations. To this end, a gridded reference data set of daily precipitation based on observational data is needed in both river basins. The methods are then applied locally at every grid point of the reference data set. Additional hydrometeorological station data has been collected in the South-Asian region and is used for evaluation of the CLM performance. In the European region, the CLM performs good and bias correction works well, too. In the South-Asian domain, the model performs less good and bias correction fails at some locations. This paper discusses the reasons for the worse performance of the CLM and of the statistical methods in the Brahmaputra river basin.