Evaluation of heavy precipitation from regional climate simulations for south-west Germany

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To estimate the impact of climate change is one of the most urgent and challenging tasks of environmental research today. Generally, climate change is simulated using global scale climate models. However, the impact varies substantially on local and regional scales in particular for climate extremes. The existent scale difference can be overcome by the use of regional scale atmospheric models (RCMs). To draw reliable conclusions on consequences of the change necessitates realistic and solid climate simulations and thus, elaborated evaluations.

The aim of the present study is to assess the ability of two RCMs to realistically simulate regional scale precipitation extremes at various return periods and to estimate the uncertainty of the return values of precipitation (RV) due to different settings.

The evaluation of heavy precipitation has been performed for south-west Germany. We analyzed the results of present day climate simulations with two different RCMs: the so-call consortial runs performed with the CLM at 18 km and the REMO-UBA simulations commissioned by the German Federal Environmental Agency at 10 km horizontal resolution. The evaluation basically consists of a comparison between simulated and observed RVs for various return periods. To calculate these RVs the time series of the 24 h precipitation of the 30-years time period 1971 - 2000 at each grid was fitted to pre-postulated distributions using the L-moments method. Moreover, our investigation comprises the comparison of the RVs resulting from different distributions like the generalized Pareto distribution and the Kappa distribution. Another focus of our study is put on the influence of different thresholds on the RVs. In addition we

analyze the impact of the different settings on the confidence intervals of the RVs.