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Regional climate simulations using MM5 in the European Alpine region.

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Precipitation is one of the most important meteorological variables to be predicted. This is even more true for a project focusing on the hydrological cycle like GLOWA-Danube. Yet the realistic simulation of rainfall is still one of the major challenges in numerical meteorological studies particularly in areas with complex orography such as in our research area, the upper Danube catchment area, which extends into the European Alps.

As a first step of our study an optimised configuration of MM5 is used over Central Europe with a horizontal resolution of 45km to simulate the present day climate conditions for the years 1971 to 2000 forced by ECMWF ERA40 reanalysis data. This gave us a basis to assess the quality of our modelling setup which performed well based on data of the German and Austrian observation network. The next step consisted in replacing the forcing ERA40 data with the simulation output of the ECHAM5 global climate model (Max Planck Institute for Meteorology, Hamburg) for present day climate conditions, again comprising the last three decades of the last century. The resulting regional datasets of the MM5 simulations cannot be expected to give comparable results on a day to day or even a monthly basis for the different forcing global datasets. Yet in a climatological sense the simulated meteorological datasets like rainfall and e.g. near surface temperature ideally should be in good agreement for both cases. Our results however show substantial deficiencies in the annual cycle of climatological monthly rainfall when using the ECHAM5 dataset to run the MM5. Further investigations suggest that one of the probable reasons lies in some inaccuracies of the global climate model in correctly simulating the large-scale circulation patterns in the Alpine region, i.e. the ECHAM5 climatology indicates somewhat too many intense low pres-

sure systems reaching the Alps in the cold season. Via the mechanism of orographic lifting this eventually strongly influences the regional climatology of precipitation in this area.