

Simulation of present and expected future runoff in a complex terrain Alpine catchment with EURO-CORDEX data

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Data from seven regional climate models, run within the Coordinated Regional Climate Downscaling Experiments (EURO-CORDEX) experiments are applied to evaluate the reproduction of observed runoff and access its expected future changes of a mesoscale Alpine river by applying the distributed hydrological simulation model WaSiM. The modeling domain covers the complex terrain of the Ammer catchment located in the German Alps. Its size is round 600 km² and the elevation ranges from 500 to 2000 m. The hydrology model is operated with a spatial resolution of 100 m and with a daily time step with temperature, precipitation, wind, relative humidity and shortwave radiation input. The investigated periods are 1981-2008 for the data from CORDEX evaluation runs, 1975 - 2005 for the historical runs and 2050 - 2100 for RCP4.5 scenario runs.

The contribution investigates the bias present in the CORDEX precipitation data and discusses the necessity and approaches of a bias correction for all variables. We finally analyze present and future river discharge based on simulated flow duration curves (FDCs). Obtained results show an increase in high flows in the future. Flow return periods obtained from a larger sample of highest flows over 50 years reveal for 2050 - 2100 lower return periods for high runoff values compared to 1955 - 2005.