



Modelling the water balance under changing climate conditions in Alpine regions – a numerical WaSiM experiment for the Berchtesgaden Alps (Germany)

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In the BIAS II project, funded by the Bavarian State Ministry of the Environment and Consumer Protection, the effects of climate change on the hydrology of the area of the National Park Berchtesgaden are investigated. For this purpose, we combine regional climate simulations with hydrological process modeling for the period 2006-2100. The coupled model is specifically adapted to the complex topography of the catchment, 432 km² in size and ranging from 450 to 2713 m a.s.l. in elevation. For this reason, the hydrological model has a spatial resolution of 50 m.

We use the physically based and distributed Water Balance Simulation Model WaSiM which has been extended with a snow-vegetation interaction model. With the new model version snow hydrological processes in forest canopies such as interception, sublimation, melt and fall down are considered, as well as a modification of the inside-canopy meteorological conditions affecting the snow cover on the ground. WaSiM is driven by one hour temporal and 5 km spatial resolution regional climate scenario simulations based on the emission scenario RCP4.5. The used RCM is the Weather Research and Forecasting Model (WRF). The coupling of these high-resolution regional climate scenarios with the hydrological model enables estimations of the change of typical high mountain processes such as seasonal snow dynamics. We assess such changes of the water balance components at different scales.