



## **Joint RCM - distributed hydrological model simulations in Alpine terrain: technical implementation and evaluation**

Gerhard Smiatek (1) and Harald Kunstmann (1,2)

(1) Institute of Meteorology and Climate Research, Karlsruhe Institute of Technology, Campus Alpin, Garmisch-Partenkirchen, Germany, gerhard.smiatek@kit.edu, (2) Institute of Geography, University of Augsburg, Augsburg, Germany

We investigate the reproduction of observed river discharge in a coupled system consisting from a regional climate model (RCM) and a distributed hydrology model (HM), where the HM is applied to route the runoff simulated by the RCM. The coupled system joins MPI and OpenMP based parallel codes of the COSMO-CLM (CCLM) regional climate model version 5 and the hydrology model WaSiM-ETH version 9 within the coupling environment provided by the OpenPALM model coupler.

Application area is the complex terrain catchment of the Ammer River (600 km<sup>2</sup>) located in the Ammergau Alps in Southern Germany, where the HM runs on a 100 m grid in UTM projection with RCM input on rotated grid coordinates that is received every full model hour and interpolated on to this grid by the IDW method.

Our contribution addresses general issues of hydrological simulations driven with biased RCM data input. Then it presents the coupled model system, its advantages and limitations, and the evaluation of the obtained results in comparison with measurements from river gauges and climate stations operated within the long term TERENO preAlpine observatory. Special attention is given to the investigation of periods with extremely high river flows applying highly resolved RCM runs in convection permitting mode at 0.03 degree and 0.01 degree grids.