



The soil moisture – precipitation feedback in Southern Germany during the ScaleX field campaign

Maximilian Graf (1), Benjamin Fersch (2), Joel Arnault (2), Harald Kunstmann (1,2)

(1) Augsburg University, Institute of Geography, Augsburg, Germany, (2) Karlsruhe Institute of Technology, IMK-IFU, Garmisch-Partenkirchen, Germany

Advanced modeling systems in the field of hydro-meteorology are now at hand to address questions in land – atmosphere interaction processes through improved and coupled hydrological and weather modeling systems. An example is the coupled atmospheric hydrological Weather and Forecasting model (WRF-Hydro). Comprehension of the physics behind these interactions are necessary to further improve hydro-meteorological predictions. In this study, the soil moisture - precipitation feedback is investigated for the case of South Germany, in the context of the ScaleX field campaign. With spatial resolution up to 1 km and temporal resolution up to 10 minutes, the differences between an atmospheric-hydrological coupled (WRF-Hydro) and uncoupled (WRF) model system are examined. The focus is on the influence of soil moisture spatial and temporal distribution on atmospheric variables like heat and water fluxes, moisture divergence and Convective Available Potential Energy (CAPE). The influence of soil moisture anomalies on mentioned atmospheric variables is investigated by statistical and pattern analysis. The improved physical consistency of soil water processes in WRF-Hydro leads to improved representation of soil moisture patterns and provides an advanced insight in the soil moisture – precipitation feedback.