EMS Annual Meeting Abstracts Vol. 9, EMS2012-172, 2012 12th EMS / 9th ECAC © Author(s) 2012



## Analysis of Extreme Precipitation Using Regional Climate Ensembles generated by Atmospheric Forcing Shifting

R. Sasse, G. Schädler, H. Feldmann, H.-J. Panitz, and Ch. Kottmeier

Karlsruhe Institute of Technology, Institute of Meteorology and Climate Research, Germany (romi.sasse@kit.edu)

Many of the most important impacts of regional climate change on society are associated with changes in extreme precipitation including heavy rainfall and dry spells. In Europe, the large spatial variability of such changes is affected by complex terrain structures and, thus, high-resolution multi-member ensembles are required for appropriate regional climate projections.

In this study, the variability of extreme precipitation in Germany is investigated based on an innovatively generated ensemble using the regional climate model COSMO-CLM. At its lateral boundaries the model is driven by shifted atmospheric forcing data provided by global climate models in order to capture the uncertainties arising from the positioning of the large-scale atmospheric forcing. The COSMO-CLM runs are conducted at horizontal resolutions of 50 km and 7 km, and four shifting scenarios are realised under present climate conditions. The simulation results are combined with existing COSMO-CLM ensembles to obtain and analyse statistically significant values for the likelihoods and intensities of extreme precipitation.

Atmospheric Forcing Shifting (AFS) is shown to have a clear impact on the temporal and spatial precipitation distribution and, moreover, is particularly effective for high-impact weather leading to extreme precipitation. Considering the inflow direction of air masses, moisture and temperature gradients as well as local orography, the reasons for precipitation changes due to AFS and the consequences for projecting extreme precipitation will be discussed. Furthermore, first studies on the variability of the frequency and intensity of extreme precipitation in Germany will be presented.