Geophysical Research Abstracts
Vol. 12, EGU2010-10732-1, 2010
EGU General Assembly 2010

Impact of resolution and uncertainties on the determination of return values for extreme precipitation from observations and models

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To assess the risks caused by extreme precipitation caused by convective events during summer it is crucial to achieve reliable estimates of the return values of rare precipitation events, in effect over return periods of several years.
With respect to the determination of return values of extreme precipitation events all available data sources comprise some deficits. Station data are generally to sparsely available to cover larger areas within their range of representativity. Therefore, local observations will miss extreme events completely or at least are not likely to catch the intensity peaks. Gridded observation data sets tend to smooth out the local observations, leading to further under-estimation of the extreme tail of the distribution. Regional climate models on the other hand have the advantage that they cover the complete area of their grid boxes and are in principle able to capture all extreme events. But the resolution of current high (e.g. 25 – 7 km) resolution regional climate models is still to coarse to sufficiently resolve single events. In addition the models have to parameterize certain processes as convection or soil interaction and are therefore a bias of the models is to be expected.
Within this work return values derived from widely used gridded observation data sets (like E-OBS, REGNIE) are compared to station data. This gives indications on the reliability and uncertainty of these data sets for the purposes of extreme value statistics.
In addition the results from high resolution climate simulations with COSMO-CLM with different resolution will be compared to the available observations (Früh et al., 2010). The effect of bias correction methods on the representation of the tail of the precipitation PDF by the models will be discussed.