Geophysical Research Abstracts,
Vol. 11, EGU2009-2041-1, 2009
EGU General Assembly 2009

Statistical downscaling of extreme daily precipitation using extreme value theory

P. Friederichs
University Bonn, Meteorological Institute, Bonn, Germany (pfried@uni-bonn.de)

Although present day weather forecast models usually cannot provide realistic descriptions of local and particularly extreme weather conditions, they provide reliable forecasts of the atmospheric circulation that encompasses the sub-scale processes leading to extremes. Hence, forecasts of extreme events can only be achieved through a combination of dynamical and statistical analysis methods, where a stable and significant statistical model based on a-priori physical reasoning establishes a-posterior a statistical-dynamical model between the local extremes and the large scale circulation.

Here we present the development and application of such a statistical model calibration (downscaling) on the basis of extreme value theory, in order to derive probabilistic estimates for (extreme) local precipitation. Besides a semi-parametric approach that employs censored quantile regression we use parametric extreme value distributions to derive conditional quantile estimates. The performance of two parametric approaches is compared, which use a Poisson point process with non-stationary parameters but a constant threshold, and the non-stationary generalized Pareto distribution and a variable threshold.

The downscaling applies to ERA40 reanalysis, in order to derive estimates of the conditional quantiles of daily precipitation accumulations at more than 2000 German weather stations.