



## **Detection and correction of inhomogeneities of long-term precipitation series in Germany**

Elke Rustemeier (1), Alice Kapala (1), Hermann Mächel (2), Victor Venema (1), and Clemens Simmer (1)

(1) Bonn University, Meteorological Institute, Germany (elke.rustemeier@uni-bonn.de), (2) Deutscher Wetterdienst Offenbach

The aim of the study is the construction of long-term homogeneous precipitation series that allow a robust time series analysis amongst others.

The initial data base consists of 118 series of daily values, spanning a period of 100 years each. They have been digitized by the DWD and the Meteorological Institute of the University of Bonn, classified into regional networks of related precipitation characteristics and homogenized using an automatic version of the Caussinus-Mestre method (Caussinus and Mestre, 2004).

Our objective method to define networks of related precipitation is a correlation-based (rank and pearson correlation) principal component analysis. Input parameter are, among others, precipitation sums, intensity and days after the removal of the 30 years moving trend. The resulting leading Eigen vectors are rotated according to the varimax criterion, which leads to much better defined regions.

Yearly and seasonal parameters indicate sharply bounded regions. Three of these networks are located in the North German Plain and one describes the foothills of the Alps. The other regions subdivide the Central German Uplands. Since there is only incomplete meta data statistical methods are needed for homogenization. For detection ratios of the candidate time series and the neighbor stations are calculated and investigated by means of the Caussinus-Mestre method. The detected inhomogeneities are corrected using multiple regression.

A new approach is that we do not only consider precipitation sums, but also other indices such as intensity and number of days and an objective determination of networks.