



HOMPRA Europe - A gridded precipitation data set from European homogenized time series

Elke Rustemeier (1), Alice Kapala (2), Anja Meyer-Christoffer (1), Peter Finger (1), Udo Schneider (1), Victor Venema (2), Markus Ziese (1), Clemens Simmer (2), and Andreas Becker (1)

(1) Deutscher Wetterdienst, Hydrometeorology, Offenbach, Germany (elke.rustemeier@dwd.de), (2) Meteorological Institute, University of Bonn, Bonn, Germany

Reliable monitoring data are essential for robust analyses of climate variability and, in particular, long-term trends. In this regard, a gridded, homogenized data set of monthly precipitation totals - HOMPRA Europe (HOMogenized PRecipitation Analysis of European in-situ data)- is presented.

The data base consists of 5373 homogenized monthly time series, a carefully selected subset held by the Global Precipitation Climatology Centre (GPCC). The chosen series cover the period 1951-2005 and contain less than 10% missing values.

Due to the large number of data, an automatic algorithm had to be developed for the homogenization of these precipitation series. In principal, the algorithm is based on three steps:

* Selection of overlapping station networks in the same precipitation regime, based on rank correlation and Ward's method of minimal variance. Since the underlying time series should be as homogeneous as possible, the station selection is carried out by deterministic first derivation in order to reduce artificial influences.

* The natural variability and trends were temporally removed by means of highly correlated neighboring time series to detect artificial break-points in the annual totals. This ensures that only artificial changes can be detected. The method is based on the algorithm of Caussinus and Mestre (2004).

* In the last step, the detected breaks are corrected monthly by means of a multiple linear regression (Mestre, 2003).

Due to the automation of the homogenization, the validation of the algorithm is essential. Therefore, the method was tested on artificial data sets. Additionally the sensitivity of the method was tested by varying the neighborhood series. If available in digitized form, the station history was also used to search for systematic errors in the jump detection.

Finally, the actual HOMPRA Europe product is produced by interpolation of the homogenized series onto a 1° grid using one of the interpolation schemes operationally at GPCC (Becker et al., 2013 and Schamm et al., 2014).

Caussinus, H., und O. Mestre, 2004: Detection and correction of artificial shifts in climate series, *Journal of the Royal, Statistical Society. Series C (Applied Statistics)*, 53(3), 405–425.

Mestre, O., 2003: Correcting climate series using ANOVA technique, *Proceedings of the fourth seminar*

Willmott, C.; Rowe, C. & Philpot, W., 1985: Small-scale climate maps: A sensitivity analysis of some common assumptions associated with grid-point interpolation and contouring *The American Cartographer*, 12, 5-16

Becker, A.; Finger, P.; Meyer-Christoffer, A.; Rudolf, B.; Schamm, K.; Schneider, U. & Ziese, M., 2013: A description of the global land-surface precipitation data products of the Global Precipitation Climatology Centre with sample applications including centennial (trend) analysis from 1901-present *Earth System Science Data*, 5, 71-99

Schamm, K.; Ziese, M.; Becker, A.; Finger, P.; Meyer-Christoffer, A.; Schneider, U.; Schröder, M. & Stender, P., 2014: Global gridded precipitation over land: a description of the new GPCC First Guess Daily product, *Earth System Science Data*, 6, 49-60