HOMPRA Europe - HOMogenized PRecipitation Analysis of European in-situ data

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Reliable observational data is essential for robust climate, especially trend analysis. This paper introduces a gridded, homogenized monthly precipitation data set, covering Europe.

The data base consists of 5373 homogenized monthly time series, a carefully chosen subset of the precipitation series being held by the Global Precipitation Climatology Centre (GPCC). The requirements on the selected data include 55 years of data spanning the years 1951-2005.

Due to the large number of stations to be homogenized an automated algorithm had to be used. Therefore, appropriate software was developed covering three steps:

* First selection of overlapping station networks in same precipitation regime, based on rank correlation and Ward's Minimum Variance Method. Since the time series ought to be as homogenous as possible, the selection is performed on the deterministic first derivative to remove artificial biases.
* Secondly break-points are detected on annual totals. High correlated neighbor series are used to build a reference series. This allows the removal of natural trends and changes and ensures that only artificial changes are detected. The actual detection is based on the Caussinus-Mestre method (Caussinus-Mestre, 2004).
* During the last step, the detected breaks are corrected using multiple linear regression on monthly standardized logarithmic series (Mestre, 2003).

For the automation of the homogenization process, special focus is set on proper validation of the algorithm yielded. In doing so an artificial data set is constructed and homogenized. In addition, sensitivity studies are performed to identify the impact of the applied correction to the neighbor series. If available, meta data is utilized to identify temporal biases in the break-point detection and validate corrected series.

Finally, the HOMPRA Europe product is built by interpolating the resulting homogenized series to a 1° spaced grid using a modified SPHEREMAP (Willmott et al., 1985) method. Across Europe, the product will represent the long-time awaited update of the global VASClimO product (Beck et al., 2005) that has been widely used also for the trend analysis of the 2007 IPCC AR4 report, and remains the recommended product for trend analysis in the global scale until completion of a HOMPRA Global product.

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