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Correcting inhomogeneities in daily time series - comparison of methods for various meteorological elements

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The homogenization of climate data is of major importance because non-climatic factors make data unrepresentative of the actual climate variation and the conclusions of climatic studies are potentially biased. Instrumental series of various meteorological elements are often affected by inhomogeneities. Several methods are available for their correction, either on monthly or, in the last decade, also on daily data.
In this work we focused especially on comparison of methods for daily data inhomogeneities correction. Two basic approaches for the adjustment of inhomogeneity were adopted and compared: (i) the "delta" method – the adjustment of monthly series and projection of estimated smoothed monthly adjustments into an annual variation of daily adjustments (e.g. Vincent et al. 2002) and (ii) the "variable" correction of daily values according to the corresponding percentiles, e.g. HOM (Della-Marta and Wanner, 2006), SPLIDHOM (Mestre et al., 2011), DAP (Stepanek 2009) and Quantile Matching (Wang 2009 and 2010). The "variable" correction methods have only emerged in the recent years. They were applied in this work to the COST ESO601 daily validation dataset (air temperature) and also to the various meteorological elements based on the data from the Czech Republic. Their results were mutually compared and investigated.
The results were processed via the software ProClimDB (Štěpánek, 2010, www.climahom.eu) and R (www.r-project.org).