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Automatic networking for the homogenization of large climatic datasets

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Homogenization can significantly improve the quality of observed climatic data regarding climate variability and climate impact studies. The homogenization of huge datasets including several hundreds or thousands time series needs the use of special statistical tools. Data bases must be divided into climatically nearly homogeneous regions, then the homogenization can be done with some automatic homogenization method separately for each region. A new software has been developed for the automatic networking of such datasets. With this software, distinct networks are constructed for each candidate series of the dataset. The selection of reference composites is based on the spatial correlations and on the coverage of the period of candidate series (target period) with the potential reference composites. Ideally, each data of the candidate series can be paired with at least other 20 synchronous data of the reference composites. When reference composites do not cover fully the target period, more than 20 reference composites are selected to achieve sufficient data coverage in each section of the target period. For datasets with extended ratio of missing data the co-effect of three factors, i.e. spatial correlation, data coverage and the time demand of the homogenization (depending on the number of time series in networks) must be optimized. The software has been used in homogenizing the daily temperature test dataset developed by Rachel Warren and in the homogenization of 702 observed monthly precipitation time series of Ireland. These tests proved the usefulness of the software. The homogenization was done using the newest generation of ACMANT (ACMANT3).