



Homogenization of ECA&D temperature series

Antonello A. Squintu (1), Gerard van der Schrier (1), Yuri Brugnara (2), Petr Stepanek (3), and Albert Klein Tank (1)

(1) Royal Netherlands Meteorological Institute (KNMI), De Bilt, Netherlands, (2) Institute of Geography, University of Bern, Bern, Switzerland, (3) Global Change Research Institute of the Czech Academy of Sciences, Brno, Czech Republic

Homogenization of temperature series is a fundamental step in climatological analysis. This is of great importance due to artificial signals introduced by changing features of the stations throughout the years. Relocation, replacement of the instrument or changes in the surrounding introduce step-like or more complicated signals that can deeply affect the quality of indices and trend calculations. Such errors may lead to erroneous estimates of climate change. For these reasons, the change points need to be recognized and corrected, which requires identifying their timing and amplitude. Metadata can be present to help in this process, but most of the times statistical methods are required to identify these breaks, because often metadata is absent. A large set of break detection methods have been developed and published in recent years. These have been compared and combined to find the most efficient procedure for the identification of change points in the temperature series. Once the breaks have been found, the series need to be corrected by calculating the amplitude of the change points. This can be done looking at changes in the (yearly or monthly) means or in the higher orders (such as percentile values) of the temperature distribution. The different methods have been compared using manually homogenized series provided by national meteorological services as benchmarks. The combination of homogenization methods that better approaches, in terms of indices and trends, the benchmark series has been chosen and applied to the European ECA&D dataset. The new homogenized dataset has then been compared with the original one, looking at changes in extremes, trends and climate indices.