Quality control and homogenization of the Belgian historical temperature data

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Long-term, high-quality and reliable instrumental climate records are indispensable pieces of information required for undertaking robust and consistent studies to better understand, detect, predict and respond to climate variability and change. Thanks to the digitization projects funded by the Belgian Science Policy Office, Royal Meteorological Institute has undertaken the digitization of the climate observations conducted in the period 1880–1953 by the Belgian climatological network.

Because only a few stations in the network are sufficiently long and suitable for use in climate analysis, it was necessary to construct long time series by merging temperature records from neighbouring stations. From this a new dataset of quality controlled and homogenized monthly mean air temperature for Belgium has been created. After in-depth data quality control, monthly maximum and minimum temperature time series have been homogenized with the HOMER software on the basis of available metadata. Homogenization results are provided for 61 series over the period 1954–2015 and for 16 series starting before 1931 including eight covering the full time period 1880 2015. This new dataset of monthly homogenized temperature series allows to make a robust analysis of the temperature evolution in Belgium at a local scale from 1880 to nowadays.

This contribution presents the development of this new dataset (e.g., QC procedures and monthly homogenization) as well as analysis results from the derived time series (e.g., temperature trends). These analyses provide an insight of the current temperature trends with an emphasis on the different climatic areas of the country. Thanks to the 61 series over the period 1957-2015, seasonal trends for both minimal and maximal temperatures highlight specific spatial patterns which are consistent with those already characterized in neighbouring countries.

Thanks to the ongoing digitization project, we expect in the coming years to extend this dataset with additional series starting in the early 20th century.