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Homogenisation of longterm daily temperature series in Sweden, method and trend evaluation

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The current societal debate about climate change highlights the need to describe, with the best possible accuracy, its observed variability across spatial and temporal scales. In this regard, the MORA database of meteorological records across Sweden (maintained by SMHI) represents a unique collection of sub-Arctic climate observations, with dense daily measurements since 1960. While the quality of reported measurements has been checked during digitalisation, other phenomenon can introduce variations which are not related to climate: the meteorological station might have been relocated (e.g. in pace with increasing urbanisation), or measurement methods might have evolved over time. It is therefore necessary to perform an homogenisation of the dataset, in order to isolate the "pure" climate variability.

The present study focuses on the homogenisation of daily temperature (minimum, mean and maximum) over the following subset of the MORA database: 50 stations representing a national climate network over Sweden, over the 1950-2018 period, almost 70 years of data. We use the "climatol" package (developed by José A. Guijarro, version 3.1.1, <https://CRAN.R-project.org/package=climatol>). The selected dataset will also be homogenized with the alternative homogenisation methods Homer and Splidhom, and the results will be compared. When working with both minimum, mean and maximum temperature the break detection of the methods will be evaluated with the aspects of if certain types of inhomogeneities are better detected by one or two of the three studied parameters.
To further elongate the study, the daily series will be extended with monthly homogenized temperature records back to 1860 and the temperature trends for different parts of Sweden and seasons will be studied.