



Hourly air temperature data homogenisation over Romania

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Meteorological observations may be affected by events unrelated to spatio-temporal variability specific to weather phenomena (errors in transmitting or measuring). Independent of natural weather and climate variability and change, the shifts in the measuring instruments, and changes in the location or the surroundings of the stations can influence meteorological measurements. Findings of meteorological and climatic studies may be altered when they are based on data sets that contain inhomogeneities; therefore, in order to reduce or eliminate the false signals from the climatic data series, methods of homogenisation were developed.

In this work, the homogenisation and data filling of the hourly air temperature data, measured on the territory and in the immediate vicinity of Romania, were performed using the R package climatol: Climate Tools (Series Homogenization and Derived Products). Four data sources have been used: Romanian National Meteorological Administration Network, Romanian National Air Quality Monitoring Network, Regional Basic Synoptic Networks and Meteorological Aerodrome Report Network.

By using the climatol homogenization method, values related to unrealistic changes in the natural meteorological and climatic system were identified and corrected. Also, missing data were filled by considering the similarities between the data from each station and the reference series (records from the stations which are best correlated with the values of the analysed station). Comparing the homogenization results with the initial (non-homogenized) data revealed that by removing the breakpoints and correcting the analysed series, the statistical properties of the homogenized data set do not differ significantly from those computed from raw data. The main result of this study is a homogenized hourly air temperature dataset at country scale which combines data from several networks of measurements.

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