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# Air temperature fluctuations in the Czech Republic in the period of instrumental measurements

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Analysis of monthly air temperature averages was performed over the area of the Czech Republic during the period of instrumental measurements (1771-2000). The author collected almost 200 series with minimum length of 20 years using most of the available resources. In order to provide meaningful climate change studies it is important that the fluctuations detected in the analysed time series are caused solely by climate variations. That is why considerable attention was given to the homogenisation of all included time series. Since station's metadata are rarely complete and moreover statistical test results do not allow accepting found inhomogeneities without doubts (e.g. thanks to big noise in the series), some techniques were sought, proposed and used in this work leading to more reliable inhomogeneity estimation. Subsequently, homogeneous series of 174 stations were analysed. Using correlation analysis, relations among individual stations were assessed, together with its change of this relation in time and space. Further, the series statistical structure was analysed, again with its change both in space and time. The most important components explaining series variance were searched by applying multidimensional methods for data dimension reduction such as cluster and principal component analysis. Using the homogenized series, average temperature series for the Czech Republic was calculated, then compared to averaged series of the northern hemisphere. Statistically significant cycles and their share on series variance were also investigated by means of spectrum analysis (MESA). Multiple linear regression was applied for finding relation of air temperature to climate forcing and the appropriate maximum signals (influence on air temperature) were also evaluated. For homogenisation, the AnClim software, and for data processing ProClimDB database software, developed by the author, have been used. These softwares are at disposal for those interested (http://www.klimahom.com/software).