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Homogenisation of Mean Air Temperature Data Series from Serbia

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Standard Normal Homogeneity Test (SNHT) was applied for the detection of inhomogeneities in the time series of mean monthly moving average air temperature data at 2 m above ground for 29 stations in Serbia for the period 1949-2008.
In time series of nine stations missing data have been found, but gaps do not exceed 5% of dataset. These gaps have been filled in with values from the three best correlated neighbouring stations.
Twenty-nine series of the moving average multi-annual mean air temperature have been investigated. For inhomogeneity detection of these time series AnClim software package has been used, while further analysis used various statistical methods.
Reference series have been chosen from 2 to 10 stations, based on distance, similar latitudes and correlation coefficient higher than 0.7. SNHT has been applied for detecting abrupt homogeneity breaks. The critical value of this test was 95%.
Detected break points were compared to metadata records in order to diagnose causes of featured inhomogeneities. That type of information was crucial for applying calculated corrections of investigated series.
After the homogenisation process, the adjustment values have been analysed. The highest positive and negative homogeneity adjustments have been detected in East part of Serbia. Differences between homogenised and original raw twenty-nine moving average time series are mostly within range from 0 to 0.5ºC.
Differences between total linear trends for the homogenised and original 29 series have been calculated. According to low difference data, the results present very similar trends of homogenised and original time series for Serbia. Still, there is a significant change of spatial trend distribution pattern. The pattern for homogenised series is more regular, due to successful application of homogenisation process, making the image of climate variations in Serbia more reliable.

Key words: mean air temperature series, homogenisation, SNHT, metadata, Serbia