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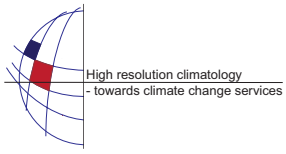

A Majorca case study of daily extreme temperatures homogenization

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Detecting sudden jumps in daily climatological data is a problematic task due to the low signal/noise ratio. For this reason, usual methodologies begin by the detection of the jumps in annual, seasonal or monthly series at most, followed by the computation of the correction terms or factors, which are then applied to the daily data.

However, sometimes it is necessary to detect the jumps directly on the daily series. An example is presented from Majorca, where meta-data indicates that, during an approximate period of three months at the beginning of 1961, a different thermometer was used in a particular station to measure extreme daily temperatures, resulting in a systematic error of around 5°C in these data. As there was no indication neither of the exact amount of the error nor of the precise initial and final days when this anomalous thermometer was used, a homogenization procedure was applied to the daily data to determine this details.

The process consisted in comparing one year of extreme daily temperatures of the problem station with contemporary data from the other five available stations in the island at that time. After removing the annual cycle, the R homogenization package "Climatol" was used to detect the timing of the shifts and evaluate their magnitude. Results suggest a correction of -7°C, and show some uncertainty in the first thermometer change, although a more precise date for the replacement of the original instrument can be assessed.