



Non-climatic changes in the early instrumental period

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The early instrumental period, covering the late 18th century and the 19th century, was characterized by prominent non-climatic changes due to important changes in the way temperature and precipitation was measured.

Important non-climatic temperature changes were due to changes in the observation times and the way daily averages were computed and from improvements in exposure.

In the early period precipitation gauges were often installed on roofs, nowadays they are installed near the ground. Especially in snow-rich countries wind shield have recently been installed around gauges. Both reduce losses due to undercatchment.

In the early instrumental period, temperature measurements were often made on North walls, later on stands and half open screens. Nowadays measurements are performed in Stevenson screens and automatic weather stations. The improvements in exposure are expected to have reduced radiation errors. They thus increase the maximum temperature and reduce the minimum temperature.

Parker (1994) estimated these changes to be less than 0.2°C for the mean temperature, but this mainly based on parallel measurements (old and new collocated) from North-West Europe, which may have less problems with exposure.

Several recent parallel data studies for the transition to Stevenson screens suggest larger biases: A North wall measurement in Kremsmünster, Austria showed a bias of 0.2°C. Half-open Wild screens at two locations in Spain showed biases of 0.5 and 0.6°C. Older parallel measurements in tropical countries also showed a larger bias: India 0.42°C and Sri Lanka 0.37°C.

Exposure will also change the estimates of weather variability and extremes as well as the diurnal and the annual cycle.

Statistical homogenization needs well-correlated neighbouring stations, which are rare in the early instrumental record. Parallel measurements are therefore very important. This kind of research would be much facilitated by a global reference database with parallel measurements. We have started an initiative collecting parallel datasets, which is an expert team of the International Surface Temperature Initiative. Its aims will be explained and its progress will be presented. Any help would be appreciated.