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# Homogenization of historical time series on a subdaily scale

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Homogeneous long-term climatological time series provide useful information on climate back to the preindustrial era. High temporal resolution of climate data is desirable to address trends and variability in the mean climate and in climatic extremes. For Switzerland, three long (∼250 yrs) historical time series (Basel, Geneva, Gr. St. Bernhard) that were hitherto available in the form of monthly means only have recently been digitized (in cooperation with MeteoSwiss) on a subdaily scale. The digitized time series contain subdaily data (varies from 2–5 daily measurements) on temperature, precipitation/snow height, pressure and humidity, as subdaily descriptions on wind direction, wind speeds and cloud cover.

Long-term climatological records often contain inhomogeneities due to non climatic changes such as station relocations, changes in instrumentation and instrument exposure, changes in observing schedules/practices and environmental changes in the proximity of the observation site. Those disturbances can distort or hide the true climatic signal and could seriously affect the correct assessment and analysis of climate trends, variability and climatic extremes. It is therefore crucial to detect and eliminate artificial shifts and trends, to the extent possible, in the climate data prior to its application. Detailed information of the station history and instruments (metadata) can be of fundamental importance in the process of homogenization in order to support the determination of the exact time of inhomogeneities and the interpretation of statistical test results.

While similar methods can be used for the detection of inhomogeneities in subdaily or monthly mean data, quite different correction methods can be chosen. The wealth of information in a high temporal resolution allows more physics-based correction methods. For instance, a detected radiation error in temperature can be corrected with an error model that incorporates radiation and ventilation terms using the subdaily information on cloud cover and wind from the station. The basic approach will be demonstrated.