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Performance assessment of data reconstruction and correction in meteorological timeseries

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Models that consume meteorological data have often requirements that are quite incompatible with the realities of continuously measured data: they require gapless data when datasets have gaps, they require sampling rate matching the phenomena of interest when datasets use a sampling rate dictated by energy and storage capacities, they require 'perfect' data when sensors have flaws.

The MeteolO library [1] has been designed to solve this discrepancy as a meteorological data preprocessing library for numerical models (as well as other applications consuming such data), able to read measured data from a variety of sources and to standardize it into a unique representation (parameters naming and units) as well as filter, correct, resample and spatially interpolate it according to the end user's configuration. From its very beginning, it aimed to be a toolbox that allows the user to choose from a large panel of published methods for each of the processing steps

Unfortunately, until now there has been no systematic assessment of the performance of the available methods nor recommendations on best strategies. Based on an extensive network of Automatic Weather Stations (AWS) located around Davos, Switzerland, we present our preliminary recommendations for data reconstruction and corrections. Artificially degraded data allow us to compare the reconstruction with the original data, either exclusively based on the local data or by using neighboring stations. The high quality instruments available at Davos Weissfluhjoch (2536m a.s.l.) similarly allow us to compare various correction methods applied to the simpler kind of sensors normally found on regular AWS.

[1] Bavay, M. and Egger, T., "*MeteolO 2.4.2: a preprocessing library for meteorological data*", Geosci. Model Dev., 7, 3135-3151, doi:10.5194/gmd-7-3135-2014, 2014.

