



Homogenized radiosonde data for climate reanalyses

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It is well known that radiosonde data need bias correction before they can be used for climate reanalyses. Variational approaches have so far not achieved satisfactory results for this type of data. Therefore most reanalyses rely on bias corrections calculated offline using (semi)automatic homogeneity adjustment methods. One approach is to analyse time subdaily time series of differences between background forecasts of a previous reanalysis cycle (bg) and observation records (obs) for break detection. For break adjustment, one can either use again the bg-obs time series or one can use composites of neighboring radiosondes. Adjustments from both methods (called RAOB-CORE/RICH) have been used in most contemporary reanalyses assimilating these data. Improvements to these methods to deal with annual variations of the radiosonde observation biases are described as well as improvements due to the use of better quality background departure time series. The adjustments are expected to reduce differences with independent satellite data as well as the rejection rate of radiosonde temperature observations and are used also in the first COPERNICUS climate reanalysis ERA5. Efforts on radiosonde humidity homogenization are presented as well.