



Reducing uncertainties of early upper air time series using surface data only reanalyses.

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Quantifying and reducing uncertainties in the instrumental record of early pilot balloon and radiosonde observations of wind and temperature before the International Geophysical Year (IGY, 1958) poses many challenges since the observation practices were not standardized and documentation of the measurements is often incomplete. Yet these data, some of which have been digitized only recently within the 7th framework programme ERA-CLIM, can potentially improve the quality of reanalyses of the early 20th century.

Quality control is considerably facilitated if there exists a reliable reference to compare with. Constructing such a reference from neighboring stations, as is often done with surface data, is impractical due to data sparsity. However, the NOAA 20th century reanalysis as well as the emerging ERA-20C surface data only reanalysis produced at ECMWF provide full 4D global coverage of the atmosphere with remarkable quality and they should be also temporally quite homogeneous since the input data (SSTs and surface pressure and marine wind observations) do not change much in quality and density with time.

The feasibility of automatic break detection of time series by comparison with synthetic reference series from those reanalysis is demonstrated. Also adjustment of the breaks, while more delicate, yields promising and plausible results.

With the RAOBCORE 2.0 homogenization system using NOAA 20th century reanalyses we investigate Temperature and Wind records and many spurious shifts are identified and removed.