

Towards homogenization of radiosonde wind data

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Global radiosonde datasets include time series reaching back more than 50 years. These datasets are used to study climate variability and serve as important input data for reanalysis efforts. Inhomogeneities mainly due to instrument changes are a drawback of radiosonde time series hampering calculation of trends or causing temporal inconsistencies in reanalyses. To account for these deficiencies, homogenization of radiosonde data is done. In the past, emphasis has been given to the homogenization of temperature data sets due to their obvious relevance for climate change studies. However, the inhomogeneities are not restricted to temperature time series only.

In this presentation we focus on the homogeneity of wind time series. According to the authors' knowledge inhomogeneities in radiosonde wind time series have not been studied extensively before. We present the characteristics of breaks that appear in wind time series. More than 1000 stations from the Integrated Global Radiosonde Archive (IGRA) and from the ECMWF (European Centre for Medium Range Weather Forecasts) 40-year reanalysis project ERA40 are considered. The break detection method applied is based on differences between radiosonde data and ERA40 background forecasts which are assumed to be homogeneous. The validity of this assumption will be discussed. Moreover, simultaneous breaks in temperature and wind time series are explored to allow for a more comprehensive understanding of upper-air data. Based on these results, challenges related to the planned homogenization of wind time series are discussed.