



## **Homogenization of radiosonde temperature and wind data**

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There is an ongoing debate on an apparent discrepancy between observed temperature trends in the tropics and the predicted trends from climate models. Whereas models show a warming maximum in the tropical upper troposphere, raw radiosonde temperature data show cooling. Several homogenization methods that make use of the background forecasts of climate data assimilation systems (reanalyses) have been developed, which allow homogenization of this important but spatially rather sparse dataset. It could be shown that the tropical and global mean trends in the upper troposphere from homogenized radiosonde data show more than 0.3K/decade more warming than the raw data. The methods analyze the time series of differences between background forecasts from a climate data assimilation system (such as ERA-40) with a variant of the Standard Normal Homogeneity Test. Radiosonde data pose special problems (daily data, very short intervals between breaks, annual cycles in difference time series) which must be dealt with in the homogeneity testing method. Adjustments are made using either the ERA-40 background forecast time series as reference or composite time series from neighboring radiosonde stations. Using different reference series for adjusting the same breakpoints is quite useful for revealing the uncertainties involved in the homogenization process.