



## **Assessing radiosonde temperature trends and their uncertainties**

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It is vital to understand the uncertainty in estimates of temperature aloft so that we can establish whether observed features, such as the reported lack of warming in the tropical troposphere, are robust. However, radiosonde based climate dataset development has traditionally been manually intensive, and relies heavily on subjective expert decisions. Such data sets are therefore time-consuming to construct, and the resulting trend estimates are highly dependent on the homogenisation method and the choices made, which are generally non-repeatable, and hence the absolute uncertainty is poorly understood.

We have modified our current quality control procedure used in the production of HadAT (<http://www.hadobs.org>) to develop an automated system that can rapidly undertake the homogenisation of the radiosonde data record. This has allowed us to create reproducible, multiple realisations of radiosonde datasets by employing a wide range of plausible approaches to dataset homogenisation. Although each dataset will suffer to some extent because manual intervention is required for certain decisions, this cost will tend to be outweighed by the opportunities presented to assess structural uncertainty aspects of the dataset creation process in a formal and reproducible manner.

We discuss our initial assessment of temperature trends in the free atmosphere and the uncertainties that result. These have been gained from two approaches: firstly a series of random tests by altering the tuneable parameters within the system; and secondly targeted experiments that have been used to investigate the effects of specific accusations previously directed at radiosonde datasets and their development.