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An upper tropospheric humidity data set derived from thirty years of homogenised High-Resolution Infrared Radiation Sounder observations.

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Water vapour in the upper troposphere (UTWV) is a key climate variable, being responsible for a significant fraction of the atmospheric greenhouse effect. Indeed, this variable is also an important feedback parameter that may act to amplify the response of the climate system to anthropogenic greenhouse gas emissions under the expectation that total water vapour amount will increase as the climate warms. Hence, it is vitally important to construct a long term data set of UTWV measurements, over as large a fraction of the globe as possible, not just for long term trend/variability analysis but also for evaluating climate models and to serve as input for reanalysis.

Observations taken by the High-Resolution Infrared Radiation Sounder (HIRS) instrument, which has been deployed on over a dozen polar orbiting satellites since 1978, have great potential to meet the needs of the community for a climate quality data set of UTWV. Here we detail work being performed to construct such a record which aims to account for: intersatellite bias and diurnal sampling variations due to the orbital drift suffered by each satellite over its operational lifetime combined with an improved technique to identify observations effected by clouds in the mid to upper troposphere.