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Observations of thermodynamic variables are sparse in the upper-air region, especially when considering measurements capable of detecting changes in the climate state. In the upper troposphere/lower stratosphere, temperature measurements with global coverage, high vertical resolution, and high quality are provided by the GPS Radio Occultation (RO) satellite dataset. GPS RO now provides 15 years of observations, and while this is still a short record from a climate perspective, its properties enable a long-term stable and consistent global data record. Due to its unique properties, also other upper-air measurement systems such as the Advanced Microwave Sounding Unit (AMSU) or the global radiosonde network can be validated.

In this study we use the whole GPS RO record to calculate differences in anomalies between GPS RO, AMSU, and high-quality radiosondes (Vaisala) to determine potential biases. We base these comparisons on layer-integrated brightness temperatures for the lower stratospheric channel of AMSU, where we expect best quality from GPS RO. We investigate irregularities in the anomaly difference time series, and compare to ECMWF model results.

We also take advantage of the good vertical resolution of the radiosonde dataset to investigate differences in the observed vertically resolved atmospheric trend signals between GPS RO and radiosondes.

OSTS session

Regional and Global CAL/VAL for Assembling a Climate Data Record

Meeting name

Joint COSMIC Tenth Data Users' Workshop and IROWG-6 Meeting

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