



Differences in trends and anomalies of upper-air observations from GPS RO, radiosondes, and AMSU

Florian Ladstädter, Hallgeir Wilhelmsen, and Andrea K. Steiner

University of Graz, Wegener Center for Climate and Global Change, Graz, Austria (florian.ladstaedter@uni-graz.at)

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 global radiosonde network can be validated.

In this study we use the whole GPS RO record to calculate differences in anomalies between GPS RO and high-quality radiosondes (Vaisala) to determine potential biases. We also investigate differences in the observed vertically resolved atmospheric trend signals between these datasets. Finally we present comparisons to layer-integrated brightness temperatures from AMSU for upper tropospheric/lower stratospheric channels.