

**Independent assessment of microwave temperature in the lower stratosphere from 2001 to 2010 using GPS RO calibrated microwave temperature climate data records**Shu-Peng Ho<sup>†</sup>;<sup>†</sup> COSMIC/UCAR, USALeading author: [spho@ucar.edu](mailto:spho@ucar.edu)

In this study, we use FORMOSAT-3/Constellation Observing System for Meteorology, Ionosphere, and Climate (COSMIC) Global Positioning System (GPS) radio occultation (RO) data and CHALLENGING Minisatellite Payload (CHAMP) data to simulate satellite Advanced Microwave Sounding Unit (AMSU) brightness temperatures for the lower stratosphere (TLS) and compare them to AMSU TLS from different National Oceanic and Atmospheric Administration (NOAA) missions from 2001 to 2010. Our analysis shows that because RO data do not contain mission-dependent biases and orbit drift errors, and are not affected by on-orbit heating and cooling of the satellite component, they are very useful to identify the AMSU time/location dependent biases for different NOAA missions. Using RO simulated AMSU brightness temperatures, we calibrate AMSU TLS from different NOAA missions in the same month. A new microwave sensor temperature climate data record in the lower stratosphere from 2001 to 2010 is constructed. The derived TLS climate data record is compared with the newly available TLS datasets provided by Remote Sensing Systems (RSS) and University of Alabama in Huntsville (UAH). The causes of the TLS differences among these datasets are discussed. Results from this study are directly related to global temperature assessment in the Intergovernmental Panel on Climate Change (IPCC) the Fifth Assessment Report (AR5).