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The GPS-RO data record begins in 2001 and now spans more than 16 years. Data from the Microwave Sounding Unit (MSU) instrument, and its predecessor AMSU, span a much longer time period, starting in 1979. For MSU/AMSU, time varying biases and inhomogeneous data records derived from different sensors and satellites, have proven to be challenging to handle. We here compare lower and middle stratospheric temperature trends derived from the global GPS-RO multi-mission data set with a suitable set of AMSU data from the NASA Aqua satellite.

After a vertical weighted averaging of the GPS-RO dry temperature profiles, to approximate the Aqua AMSU weighting functions, the trends derived from the two data sets are found to show an excellent agreement, in global data as well as spatially and seasonally resolved. The observed data indicate a statistically significant global cooling in the middle stratosphere (AMSU channels 11 and 12) since 2001. Potential biases due to contributions to the observed AMSU radiances from atmospheric layers not included in the GPS-RO data are discussed, and the potential problem with time-varying AMSU weighting functions is pointed out.
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