



Multi-Year Comparison of OH*(3,1) Rotational Temperature and Kinetic Temperature from 15 μm CO₂ Limb Emissions in Nearly Coincident Air Masses

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Three years (2003-2005) of kinetic temperatures (87 km) measured by the Sounding the Atmosphere using Broadband Emission Radiometry (SABER) instrument onboard the TIMED satellite are compared to OH*(3,1) rotational temperatures measured by the Ground Based Infrared P-Branch Spectrometer (GRIPS) located at 7.2°E, 51.3°N in Wuppertal, Germany. Both instruments agree well within their combined error bars when confining the comparison to nearly coincident air masses. OH*(3,1) rotational temperatures are systematically higher by ~ 5 K than the SABER temperatures derived from 15 μm CO₂ limb emissions. This result is consistent with the bias between GRIPS temperatures and 15 μm kinetic temperatures derived from Cryogenic Infrared Spectrometers and Telescopes for the Atmosphere (CRISTA) data. The observed temperature biases are almost independent of year and season thus providing estimates of the uncertainties of mean temperature and wave activity trends inferred from long-term measurements of OH*(3,1) rotational temperature. The comparison provides additional confidence into allocating the mean altitude of the OH* emission layer to a constant value of 87 km for long-term trend analyses.