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Validation of ACE-FTS ozone and ozone related species

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The Atmospheric Chemistry Experiment – Fourier Transform Spectrometer (ACE-FTS) instrument, on the Canadian SCISAT satellite, observes the Earth’s limb in solar occultation. Atmospheric absorption measurements in the infrared ($750\text{--}4400\text{ cm}^{-1}$) are used to derive volume mixing ratio (VMR) profiles of over 30 trace gas species, including O_3 and many O_3 -related species, ranging from the upper troposphere to the lower thermosphere. ACE-FTS was launched in 2003, and measurements began in February 2004 and are currently ongoing. In this study, we validate the most recent version (v3.5) of the ACE-FTS O_3 data using correlative satellite and ozonesonde data sets. In the lower to mid stratosphere, ACE-FTS ozone is in excellent agreement with correlative World Ozone and Ultraviolet Radiation Center (WOUDC) ozonesonde data, typically within $\pm 2\text{--}4\%$, depending on the coincidence criteria. When comparing with satellite-based limb sounders, ACE-FTS tends to exhibit a $\sim 5\%$ positive bias in the stratosphere and a $\sim 12\%$ positive bias in the stratopause region. We also compare ACE-FTS VMR profiles of CFC-11, CFC-12, and ClONO_2 with collocated data from the Michelson Interferometer for Passive Atmospheric Sounding (MIPAS) instrument on the Envisat satellite, and we compare VMR profiles of O_3 -related species with collocated data from other satellite limb sounders.