

Long-term Validation for the Atmospheric Chemistry Experiment (ACE) Satellite Mission

Kaley A. WALKER¹, Patrick E. SHEESE¹, Jiansheng ZOU¹, Chris BOONE² and C. Thomas MCLEROY³

¹ *University of Toronto, Department of Physics, Toronto, Canada*

² *University of Waterloo, Department of Chemistry, Waterloo, Canada*

³ *York University, Department of Earth and Space Science and Engineering, Toronto, Canada*

The Canadian-led Atmospheric Chemistry Experiment (ACE) satellite mission has completed fourteen years of measurements from orbit. It uses infrared and UV-visible spectroscopy to investigate the chemistry and dynamics of the Earth's atmosphere. The two instruments on-board are the ACE Fourier Transform Spectrometer (ACE-FTS), a high-resolution (0.02 cm^{-1}) FTS operating between 750 and 4400 cm^{-1} , and a dual UV-visible-NIR spectrophotometer called ACE-MAESTRO (Measurements of Aerosol Extinction in the Stratosphere and Troposphere Retrieved by Occultation), which extends the ACE wavelength coverage to the 280 - 1030 nm spectral region. The ACE instruments make solar occultation measurements from which altitude profiles of atmospheric trace gas species, temperature and pressure are retrieved. The 650 km altitude, 74 degree circular orbit provides global measurement coverage with a focus on the Arctic and Antarctic regions. This paper will describe recent validation results for the ACE-FTS and ACE-MAESTRO data sets and describe the analyses that are being undertaken to characterize the ACE-FTS data to enable the generation of climate data records.

Key words: ACE-FTS, ACE-MAESTRO, validation, time-series characterization