THE ATMOSPHERIC CHEMISTRY EXPERIMENT, ACE: LATEST RESULTS

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ACE (also known as SCISAT) is making a comprehensive set of simultaneous measurements of numerous trace gases, thin clouds, aerosols and temperature by solar occultation from a satellite in low earth orbit. A high inclination low earth orbit gives ACE coverage of tropical, mid-latitudes and polar regions. The primary instrument is a high-resolution (0.02 cm^{-1}) infrared Fourier Transform Spectrometer (FTS) operating from 750–4400 cm^{-1} that measures the vertical distribution of trace gases, and the meteorological variables of temperature and pressure. Aerosols and clouds are being monitored using the extinction of solar radiation by two filtered imagers as well as by their infrared spectra. Although now in its eighth year, the ACE-FTS is still operating nominally. An short introduction and overview of the ACE mission will be presented (see http://www.ace.uwaterloo.ca for more information and reprints of published papers). Science results discussed will include the observation of organic molecules associated with air pollution, greenhouse gases (including CO_2) and aerosols. ACE retrievals are dependent on line parameters and absorption cross sections measured in the laboratory; the talk will highlight the spectroscopic aspects of the ACE mission including the need for non-Voigt lineshape functions.