THE ATMOSPHERIC CHEMISTRY EXPERIMENT (ACE): RESULTS FROM THE FIRST YEAR OF OPERATION

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The Atmospheric Chemistry Experiment (ACE), also known as SCISAT-1, is a Canadian scientific satellite designed to perform remote sensing measurements of the Earth's atmosphere. It was launched on August 12, 2003 into a 650 km altitude, 74 degree circular orbit. The primary instrument on-board SCISAT-1 is a high-resolution (0.02 cm^{-1}) Fourier Transform Spectrometer (ACE-FTS) operating between 750 and 4400 cm^{-1}. It also contains two filtered imagers to measure atmospheric extinction due to clouds and aerosols at 0.525 and 1.02 microns. The secondary instrument is a dual UV-visible-NIR spectrograph called MAESTRO (Measurement of Aerosol Extinction in the Stratosphere and Troposphere Retrieved by Occultation) which extends the wavelength coverage to the 280-1030 nm spectral region.

The primary measurement technique for both instruments is solar occultation. From these measurements, altitude profiles of atmospheric trace gas species, temperature and pressure are obtained. The primary goal of the ACE mission is to measure and to understand the chemical and dynamical processes that control the distribution of ozone in the upper troposphere and stratosphere, with a particular emphasis on the Arctic region. Observations from the first year of SCISAT-1 operation and validation comparisons with other satellite remote sensing instruments will be presented in this paper.