THE ATMOSPHERIC CHEMISTRY EXPERIMENT (ACE): RECENT INTER-COMPARISON AND SCIENTIFIC RESULTS

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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 and has been operational for the last 2 years. 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 aerosols and clouds at 0.525 and 1.02 microns. The secondary instrument is a dual UV-visible-NIR spectrophotometer called ACE-MAESTRO (Measurement of Aerosol Extinction in the Stratosphere and Troposphere Retrieved by Occultation) which extends the wavelength coverage of the mission into the 280-1030 nm spectral region.

The primary measurement technique for the ACE instruments is solar occultation. From these measurements, atmospheric profiles of 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 focus on the Arctic region. Recent scientific results from SCISAT-1 measurements and validation inter-comparisons with other remote sensing instruments will be presented in this paper.