

THE ATMOSPHERIC CHEMISTRY EXPERIMENT (ACE): AN OVERVIEW

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The main 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. A comprehensive set of simultaneous measurements of trace gases, thin clouds, aerosols, and temperature will be made by solar occultation from a satellite in low earth orbit.

A high inclination (74 degrees) low earth orbit (650 km) will give ACE coverage of tropical, mid-latitudes and polar regions. The vertical resolution will be better than 4 km from the cloud tops up to about 100 km.

A high-resolution (0.02 cm⁻¹) infrared Fourier Transform Spectrometer (FTS) operating from 2 to 13 microns (750-4100 cm⁻¹) will measure the vertical distribution of trace gases, and the meteorological variables of temperature and pressure.

Aerosols and clouds (e.g., Polar Stratospheric Clouds, PSCs) will be monitored using the extinction of solar radiation at 0.525 and 1.02 microns as measured by two filtered imagers as well as by their infrared spectra. A spectrograph called MAESTRO has been added to the mission to extend the wavelength coverage to the 280-1000 nm spectral region. The PI for MAESTRO is T. McElroy from the Meteorological Service of Canada (MSC). The FTS and Imagers will be built by ABB-Bomem in Quebec City, while the satellite bus will be made by Bristol Aerospace in Winnipeg.

ACE has been selected in the Canadian Space Agency's SCISAT-1 program for a planned launch by NASA in the January 2003.