An Overview of the EOS Microwave Limb Sounder Experiment

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The Microwave Limb Sounder (MLS) experiments provide vertical profiles
of atmospheric composition, temperature, and pressure by measuring
millimeter- and submillimeter-wavelength thermal emission from the
limb of Earth’s atmosphere. The first MLS experiment in space, onboard
NASA’s Upper Atmosphere Research Satellite (UARS), provided profiles of
C10, O3, H2O, HNO3, SO2 (when enhanced following volcanic eruptions),
and CH3CN in the stratosphere and H2O in the upper troposphere.

A second-generation MLS is on NASA’s Earth Observing System (EOS)
Aura (formerly known as CHEM) mission, scheduled to begin operations in
December 2003 with a 5-year design lifetime. The capability of EOS MLS is
greatly enhanced over that of UARS MLS. Improvements relevant to studies
of polar processes in the lower stratosphere include: better spatial
resolution (165 km along-track separation between adjacent limb scans),
better spatial coverage (82N to 82S on each orbit), better precision
and an extended vertical range for several species, and measurement of
additional chemical constituents. EOS MLS will have radiometers in five
broad spectral bands centered near 118, 190, 240, 640, and 2500 GHz to
measure key species in the upper troposphere (e.g., H2O, O3, CO, HCN,
N2O, HCl, cirrus ice, temperature, and geopotential height), stratosphere
(e.g., O3, H2O, OH, H02, CO, HCN, CH3CN, N2O, HNO3, HCl, HOC1, C10, BrO,
volcanically-injected SO2, temperature, and geopotential height), and
mesosphere (e.g., H2O, OH, H02, O3, HCl, CO, and geopotential height).
All measurements are obtained both day and night, including in the
presence of dense volcanic aerosol and ice clouds. This poster will
present an overview of the EOS MLS instrument and measurement capabilities
and will highlight the expected vertical ranges and precisions of several
key species, with an emphasis on those products of particular relevance
to polar processing and ozone depletion in the polar lower stratosphere.

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