

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 ClO, 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, HO2, CO, HCN, CH3CN, N2O, HNO3, HCl, HOCl, ClO, BrO, volcanically-injected SO2, temperature, and geopotential height), and mesosphere (e.g., H2O, OH, HO2, 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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