

Upper tropospheric water vapor observed by microwave limb and hyperspectral nadir satellite sounders and in situ sensors

Eric J. Fetzer (1), William G. Read (1) and Holger Vömel (2)

(1) Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, USA,
(2) Cooperative Institute for Research in the Environmental Sciences / Earth System Research Laboratory, Boulder, Colorado, USA

We compare observations of upper tropospheric water vapor (UTWV) mixing ratios from the Earth Observing System Microwave Limb Sounder (EOS MLS) instrument on the Aura satellite, and the Atmospheric Infrared Sounder (AIRS) Instrument on the Aqua satellite during 2005. Aura and Aqua fly in NASA's A-Train satellite formation, and MLS and AIRS are coordinated to observe the same scene nearly simultaneously. Their UTWV observations overlap between 300 and 150 hPa. Agreement in UTWV is particularly good at 250 hPa in the tropics and subtropics. Poorer agreement at other pressures and latitudes can be attributed to the response characteristics of either instrument. A set of balloon-borne dedicated frostpoint hygrometers launched during A-Train overpasses is used to further resolve any discrepancy between the two satellite instruments. The combination of AIRS and MLS provide detailed climatologies of upper tropospheric water vapor mixing ratios along with temperature and cloud properties.