

**IN SITU MEASUREMENTS OF HDO, H₂¹⁶O, H₂¹⁸O, AND
H₂¹⁷O IN THE UPPER TROPOSPHERE AND LOWER
STRATOSPHERE USING TUNABLE LASER ABSORPTION
SPECTROSCOPY**

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For the first time, simultaneous in situ measurements of HDO, H₂¹⁶O, H₂¹⁸O, and H₂¹⁷O have been made in the UT/LS in and out of clouds, including the region of the Tropical Tropopause Layer (TTL). These measurements were made using tunable diode laser (TDL) and quantum-cascade laser (QCL) sources of the Aircraft Laser Infrared Absorption Spectrometer (ALIAS) instrument on the WB-57 aircraft. The ALIAS instrument uses a fast flow, heated, isokinetic inlet to produce total water in a multipass sample cell, recording mid-IR (6.7 μm) rovibrational absorption lines of all four isotopic species in single spectral scans. Data will be presented from 10 flights out of Key West, Florida as part of the July 2002 CRYSTAL-FACE Mission. Comparison with model predictions will be made.