

### **Water isotopes in the UTLS derived from ACE-FTS satellite measurements**

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High quality satellite observations from the Atmospheric Chemistry Experiment Fourier Transform Spectrometer (ACE-FTS) are used to map the global structure of deuterium isotope (HDO) and (HDO/H<sub>2</sub>O) ratios in the upper troposphere and stratosphere. (HDO/H<sub>2</sub>O) fraction exhibit significant spatial and temporal variability, and are closely tied to patterns of climatological deep convection. In the tropics (HDO/H<sub>2</sub>O) exhibits a minimum near 15 km, with a small increase above (isotopic enrichment) to the top of the tropical tropopause layer (20 km). After correction for methane effects, most of the stratosphere shows values consistent with those at the top of the TTL. The ACE-FTS data reveal a significant regional isotopic enrichment in the lower stratosphere associated with the North American summer monsoon. This influence reaches to 20 km, and introduces a NH-SH asymmetry in the lower stratosphere that extends into the tropics, and persists through NH autumn.