13th International Atmospheric Limb Workshop



Contribution ID: 22

Type: Talk

## Vertical and meridional stratospheric transport calculated from MLS water vapour

The budget of stratospheric water vapour is primarily controlled by the tropical upwelling of tropospheric air masses past the cold point tropopause and into the lower stratosphere. The strength of the tropical upwelling influences the thermal characteristics of the transition region between the troposphere and stratosphere (tropical tropopause layer), constraining water vapour transport to the stratosphere through dehydration. Due to the lack of direct measurements and small magnitude of vertical velocities, it is difficult to determine interannual and long-term variability of tropical upwelling.

Here we use measurements of water vapour from the MLS (Microwave Limb Sounder) instrument to determine seasonal, interannual, and long-term changes in lower-stratospheric vertical and meridional transport for 2005-2021. This analysis is performed separately for the Northern Hemisphere and Southern Hemisphere tropics to delineate contributions from different tropical regions. Our velocity calculations make use of the propagation of the water vapour tape recorder signal and represent an effective velocity, giving an estimate for the speed of the vertical and meridional branches of the stratospheric circulation. O3 measurements from the OSIRIS (Optical Spectrograph and InfraRed Imaging System) instrument and GNSS-RO (Global Navigation Satellite System –Radio Occultation) temperatures are contrasted with the calculated velocities to better understand the variability of O3 and temperature in the tropical tropopause layer.

## Topic

Atmospheric composition (Earth and planets), chemistry and transport

Authors: BREHON, Meghan (University of Saskatchewan); TEGTMEIER, Susann; BOURASSA, Adam (University of Saskatchewan)

Presenter: BREHON, Meghan (University of Saskatchewan)