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Stratospheric circulation impact on composition and structure of the tropopause region

Thursday, December 10, 2009

ATS room 101; Discussion will begin at 3:30pm

Refreshments will be served at 3:00pm in the coffee lounge

The stratospheric circulation (often referred to as Brewer-Dobson circulation) is a mechanically driven global scale circulation that transports mass and constituents (e.g. ozone and water vapor) from the cold tropical tropopause to the warmer extratropical regions. This circulation induces adiabatic cooling within its tropical upwelling branch and adiabatic warming within its extratropical downwelling branch. In the first part of this talk it will be shown that these dynamical effects significantly modify the global tropopause structure. More than half of the equator-to-pole contrast in tropopause height is found to be due to the stratospheric circulation with the dominant changes taking place in the tropics. In the second part of this talk transport within the stratospheric circulation is studied using residual circulation trajectories, i.e. trajectories driven by the residual mean meridional and vertical velocities. Residual transit times of air traveling from the tropical tropopause to the extratropical lowermost stratosphere along the residual circulation streamfunction are evaluated and their seasonal cycle is discussed in light of observed mean age of air estimates.