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# Understanding upwelling near the tropical tropopause and its effects on tracer transport


## Marta Abalos,

**Universidad Complutense de Madrid, Spain**


**Monday, June 24th, 3:30 p.m.**

**3:00 p.m. – Refreshments & Socializing**

**3:30 p.m. – Seminar**

**Foothills Lab 2, Room 1022**


## Abstract

The zonal mean mass circulation of the stratosphere (i.e. the Brewer-Dobson circulation) is characterized by upwelling in the tropics and downwelling at high latitudes. The ascent near the tropical tropopause largely controls the composition of air entering the stratosphere. Despite its relevance, tropical upwelling is poorly constrained by observations and its magnitude, variability and specific forcings are currently uncertain.

The variability of upwelling is especially evident on tracers with steep vertical gradients across the tropical tropause, such as ozone and carbon monoxide. We use satellite observations of these tracers to investigate the circulation near and above the tropical tropopause, and compare different indirect estimates of upwelling. The observations are complemented by parallel analyses using WACCM, and we quantify the influence of tropical upwelling and eddy transport on tracer variability spanning daily to seasonal timescales.

Finally, we identify the dynamical forcings leading to the observed sub-seasonal fluctuations in upwelling (linked to variability in the tracers). The Brewer-Dobson circulation is dynamically driven, and our results demonstrate the importance of extratropical synoptic-scale and planetary waves in forcing upwelling across the tropical tropopause.