

# Virtual ACOM Seminar

## Impact of Numerics on Stratospheric Transport: Insight from Theory, Idealized and Comprehensive Models

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**Date: Monday, September 12th, 2022, 3:30pm – 4:30pm**

**Link: <https://operations.ucar.edu/live-acom>**

### ABSTRACT

Trace gas transport continues to be a challenge for climate models. Accurate representation of stratospheric trace gas transport is important for accurate ozone modeling and climate projection. Intermodel spread in transport can arise from differences in the representation of transport by the diabatic (overturning) circulation versus comparatively faster adiabatic mixing by breaking waves, or through numerical errors, primarily diffusion. We propose benchmark tests to assess stratospheric transport in state-of-the-art dynamical core solvers. The tests reveal the dichotomy between finite volume and spectral-based dynamical cores in their representation of tropical stratospheric dynamics. Differences in simulated tropical winds impact the tracer transport globally through modulation of wave-induced mixing fluxes. Nudging the winds to be identical across different dynamical cores results in similar tracer profiles in all models. It is concluded that fundamental differences rooted in dynamical core formulation can account for a substantial fraction of transport bias between climate models.

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