

Evaluating and Diagnosing the Transport of Trace Gases to the Upper Troposphere / Lower Stratosphere in the CAM-Chem Model using Aura Microwave Limb Sounder Measurements

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We present an evaluation of the climatology and spatial, seasonal, and interannual variability of a range of trace gas species over the tropical continental convection regions (South America / Africa / Indonesia) and in the Asian summer monsoon anticyclone in the Specified Dynamics version of the NCAR Community Atmosphere Model with Chemistry (CAM-Chem-SD) against more than 10 years of observations from the Aura Microwave Limb sounder (MLS) satellite instrument. We examine whether the model correctly reproduces the observed trace gas distributions and variations, as well as whether it captures the observed relationships of these trace gases to meteorological variations such as deep convective intensity and tropospheric jet position and strength. We also use the model to aid in interpretation of the trace gas measurements and help understand what they can tell us about variations in transport processes and source strength and location. Our results indicate, for example, that the model does not accurately reproduce observed trace gas ratios that assess the relative strength of vertical transport over the tropical convection regions and does not fully capture the observed isolation of trace gases within the Asian monsoon anticyclone.