



## **Identification of transport pathways using modeled and observed CO-O<sub>3</sub> correlations**

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To better understand and characterize the transport pathways of air masses from the Earth's surface in the extra-tropical tropopause region the Stratosphere-Troposphere Analyses of Regional Transport (START08) experiment was developed by the NCAR UTLS initiative in collaboration with colleagues from several universities. Here we present a model study based on measurements conducted during two START08 flights. These flights are performed to study a tropospheric intrusion on April 18th, 2008 and a stratospheric intrusion on April 28th, 2008 over Central USA. To analyze the measurements we use the chemistry-transport model CLaMS. CLaMS is based on a unique Lagrangian formulation of the tracer transport. In CLaMS a deformation driven mixing scheme is implemented, which allows to simulated tracer correlations in the vicinity of the tropopause. Using artificial tracers that mark particular regions in the atmosphere allows to investigate the contribution of air mass origin in every individual CLaMS air parcel. Thus CLaMS identifies the degree of mixing between certain air masses since the beginning of the model simulation. A CLaMS simulation was performed for April and May 2008. In CO-O<sub>3</sub> correlations we found in both the measurements and the simulations that different mixing lines and regions occurred depending on the origin of the air masses. We connect these lines to different transport pathways of the air masses across the tropopause depending on their location related to the jet streams. In particular evidences of deep tropospheric intrusions into the lowermost stratosphere could be found both in measured CO-O<sub>3</sub> correlations and in CLaMS simulations.