P18 Characterization of stratospheric ozone intrusion into the troposphere based on the hemispheric-scale modeling.

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Stratosphere-to-troposphere transport (STT) of ozone (O3) commonly occurring in the mid-latitudes during spring and winter can enhance tropospheric O3 levels. Quantifying the impacts of STT is difficult because (1) routine unique measurements of stratospheric O3 attribution are lacking and (2) the ability of atmospheric chemistry-transport models in representing the spatial-temporal distribution of stratospheric O3 intrusion is not well characterized. Recently, the Community Multiscale Air Quality (CMAQ) Modeling System driven by the Weather Research and Forecasting (WRF) model has been extended to hemispheric scales. In this modeling system, the vertical layer structure was revised to better represent the STT and a seasonally and spatially varying potential vorticity-based function was developed to specify stratospheric O3. In this study, by applying this hemispheric-scale WRF-CMAQ modeling system, we will quantify the stratospheric impacts on tropospheric O3 during April 2010 when the exceedances of the U.S. National Ambient Air Quality Standard (NAAQS) for O3 were widely observed across the U.S. Our analysis will help better understand the relative roles of stratospheric impacts, long-range transport and local production on ozone and related species distributions.