6b.4 Wet scavenging of soluble trace gases in deep convective storms

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Deep convection affects the vertical distribution of chemical species through vertical transport and wet scavenging of soluble trace gases as well as aqueous and ice chemistry. The impact of convective storms on ozone (O3) precursors, many of which are soluble, is especially important because O3 production in the boundary layer and upper troposphere affects air quality and climate. We examine the fraction removed of soluble species by a multi-cellular storm system in Oklahoma on May 29-30, 2012 observed during the Deep Convective Clouds and Chemistry (DC3) field campaign. High-resolution WRF-Chem simulations of this case represent the storm location, size, and structure as compared with NEXRAD reflectivity, but the storm triggers in the model approximately 40 minutes later than observed. Simulated tracer transport is within the error bars of the aircraft observations. By varying the fraction of each species retained in ice when cloud droplets freeze, we are able to simulate the fraction removed of each soluble species within the uncertainty of the observations. However, this simulation requires the assumption of complete rejection of CH2O from ice. Future work will determine whether this assumption has physical basis or indicates needed improvements in model microphysics and chemistry.