3.4 Transport and entrainment of trace gases in a modeled and observed SEAC4RS case study of air mass thunderstorms.

Cuchiara, G.C., *National Center for Atmospheric Research (NCAR) and University of Colorado/Institute of Arctic and Alpine Research (CU/INSTAAR)*, M. Barth, *NCAR*, A. Fried, *INSTAAR*, C. Homeyer, *University of Oklahoma/School of Meteorology,* M. Bela, *National Oceanic and Atmosphere Administration, Chemical Science Division,* and N. Heath, *United States Air Force Technical Applications Center*

In order to determine the processes responsible for transport and scavenging of soluble trace gases, an analysis of storms using both observations and modeling must be pursued. This study examines the vertical transport of soluble trace gases in convective storms using a case study on September 2, 2013, which took place during the SEAC4RS campaign. WRF-Chem is implemented in a high-resolution simulation to assess the model's performance in the representation of scavenging, entrainment, and ice retention processes in convective clouds for selected tropospheric ozone precursors such as formaldehyde, hydrogen peroxide, and methyl hydroperoxide. Here, we present an evaluation of the modeled storms compared to NEXRAD observations and an analysis of entrainment from both observations and WRF coupled with tracers. After comparing the cloud's convection initiation time, the vertical development, the height and time of outflow region, and the horizontal extent of observed and simulated clouds, a few modeled storms were selected as being representative of those observed in radar imagery. The results of the tracer experiment in the selected storms reveal that the inflow/outflow regions are responsible for the highest entrainment of air. However, there were different entrainment rates among clouds developing in a similar thermodynamic environment.