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What happens to air pollution when it is cold and dark? Insights from the Wintertime INvestigation of Transport, Emissions, and Reactivity (WINTER) Campaign

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Abstract

Emissions of primary pollutants occur year round. Episodes of significantly degraded air quality can occur during wintertime in mid-latitude urban areas. Yet, the rates and mechanisms by which primary pollutants are transformed under the darker and colder conditions of winter remain poorly understood. I will present on forthcoming results obtained from the Wintertime INvestigation of Transport, Emissions, and Reactivity (WINTER) Campaign, which utilized the NSF/NCAR C-130 aircraft to study trace gas and particulate emissions and chemistry across the eastern U.S. during February - March 2015. These observations suggest significant photochemical oxidation occurs, driven by radical precursors not commonly incorporated in chemical transport models, that are strongly linked to local and regional anthropogenic emissions of nitrogen oxides and short-lived VOC. We find that by reconciling model representations of multiphase reactive nitrogen chemistry, related radical precursors and formaldehyde emission sources are consistent with observations. This allows for an accurate description of secondary nitrate and sulfate aerosol formation and reactive nitrogen partitioning and deposition, which in turn allows for more robust predictions of responses to future changes in emissions.

Joel Thornton is a Professor of Atmospheric Sciences at the University of Washington. He received his PhD from the University of California Berkeley in 2002 and was than a postdoctoral fellow at the University of Toronto from 2002 – 2004, His research focuses on understanding the atmospheric chemistry of reactive nitrogen and organic compounds, with an emphasis on aerosol formation and multiphase chemistry. His group uses a combination of mass spectrometry, method and instrumentation development, laboratory process studies, in situ observations, and modeling.

Date: **Monday, November 27, 2017**
Time: **Refreshments 3:15pm, Seminar 3:30pm**
NCAR Foothills Laboratory
3450 Mitchell Lane, Boulder, CO 80301
FL2-1022, Large Auditorium
Live webcast: http://ucarconnect.ucar.edu/live

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