



Atmospheric Chemistry
Observations & Modeling

ACOM Seminar

Using infrared satellite-based measurements to map the emissions and chemistry of atmospheric volatile organic compounds

Dylan Millet

University of Minnesota

Date: MONDAY, October 7th, 2024, 3:00 pm – 4:00 pm (MT)
FL2-1022

Link: <https://operations.ucar.edu/live-acom>

ABSTRACT

Volatile organic compounds (VOCs) are precursors of tropospheric ozone and particulate matter, which are components of smog and key climate forcing agents. Tropospheric VOCs also help control the abundance of hydroxyl radicals (OH), which are the atmosphere's main oxidizing agent and the primary sink for methane and other pollutants. Our ability to model and predict these effects has been limited by the scant observations available to characterize VOC sources and understand their atmospheric chemistry. Here I will present our group's recent work developing new satellite-based VOC measurements in the thermal infrared, and show some applications of these observations to better understand VOC sources and their atmospheric effects. I will first discuss isoprene, which is emitted naturally by plants and the most important atmospheric VOC. Combining space-based measurements of this species with concurrent measurements of its oxidation product formaldehyde can elucidate ecosystem-atmosphere exchange processes and map changes in the atmosphere's oxidizing capacity over time. I will also present a first space-borne retrieval of tropospheric ethane, illustrating its utility for diagnosing oil and gas emissions, and discuss retrieval capabilities for other anthropogenic and biogenic VOCs.

For more information, please contact Qing Ye (qingye@ucar.edu) or Kyle Zarzana (kzarzana@ucar.edu).

The NSF National Center for Atmospheric Research is operated by the University Corporation for Atmospheric Research under the sponsorship of the National Science Foundation