

## 5.041 Space-based Constraints on the Terrestrial Variability of VOCs through Formaldehyde and Glyoxal.

Early Career Scientist

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Abstract:

Atmospheric volatile organic compounds (VOCs) are important contributors to the oxidative capacity of the atmosphere and are precursors to many surface pollutants and climate forcers. Despite their substantial influence on the composition and chemistry of the atmosphere, VOCs remain poorly observed at the global scale. Recent developments in the retrieval of VOC concentrations from the OMI instrument allow for improved terrestrial characterization of two common VOCs, glyoxal and formaldehyde. Both glyoxal and formaldehyde are chemically formed and directly emitted, but the rates of formation and emission vary by region and source. Taking advantage of the differential formation properties of both chemicals can lead to constraints on the speciation of many VOCs, not just glyoxal and formaldehyde. In this work, we explore the magnitude and variability of VOCs across the globe using these satellite retrievals and the chemical transport model GEOS-Chem. We assess the value and explore challenges of inferences of total VOC speciation using only observations of glyoxal and formaldehyde. Finally, we provide recommendations for future observing systems, including the potential value added from geostationary satellites.