Goldschmidt 2026 Abstract
https://doi.org/10.46427/gold2026.37835

Examining the impacts of climate change and biomass burning on air quality in the 21st century

DREW R GENTNER[1], MITCHELL ROGERS[1], TAEKYU JOO[2], TORI HASS-MITCHELL[1], LIJIN ZHANG[1], DAVID LUNDERBERG[1], DEXTER RESTA[1], JO MACHESKY[1], MIA TRAN[1], MINGUK SEO[1], MICHELLE BELL[1], SEULKEE HEO[1], CATELYNN SOONG[1], ALBERT PRESTO[3], ZIHENG ZENG[3], HABINEZA THEOBARD[3], SINA TAYYEBI NIA[4], NAZIFA SAYEED[4], ABHISHEK ANAND[5], GABRIEL ISAACMAN-VANWERTZ[4], MANJULA CANAGARATNA[6], JOSEPH R. ROSCIOLI[7], ANDREW LAMBE[6], JORDAN KRECHMER[6], BENJAMIN NAULT[6], BRIAN LERNER[6], MEGAN CLAFLIN[6], DANIEL BLOMDAHL[8], PAWEL MISZTAL[8], NGA LEE NG[9], ARMISTEAD RUSSELL[9], ANN DILLNER[10] AND ROYA BAHREINI[11]

[1]Yale University
[2]Korea University
[3]Carnegie Mellon University
[4]Virginia Institute of Technology
[5]Columbia University
[6]Aerodyne Research Inc.
[7]Aerodyne Research, Inc.
[8]UT Austin
[9]Georgia Institute of Technology
[10]UC Davis
[11]UC Riverside

Wildfires and heatwaves pose substantial air quality challenges that are exacerbated by climate change. Examining their influence on atmospheric composition and chemistry is important to understand their impacts during both major events and also with overall increases in wildland fires and greater summertime temperatures. As part of the Atmospheric Science and Chemistry mEasurement NeTwork (ASCENT) and New York City metropolitan Measurements of Emissions and TransformationS (NYC-METS) campaigns in New York City, we evaluated the impacts of biomass burning emissions, heatwaves, and increasing summertime temperatures. Organic aerosol with less- and more-oxidized signatures (i.e., oxidized organic aerosol; OOA), which comprises the majority of summertime organic aerosol and fine-mode particulate matter (PM2.5) in New York City, are highly influenced by both temperature and biomass burning, with major enhancements during heatwaves and wildfire smoke transport events. Here, we present results across multiple studies examining the impacts of biomass burning and increased ambient temperatures on atmospheric chemistry and air quality across a range of environmental conditions and evaluate their representation in emissions inventories and model results. With major contributions from biomass burning, even far downwind from wildfires, and strong temperature sensitivity, the results highlight the importance of understanding and properly modeling secondary organic aerosols under a changing climate in the 21st century.