Anthropogenic Water Alters Atmospheric Chemistry. What Are The Implications to Air Quality and Exposure in a Changing World?

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0001 Michael Hooker Research Center
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This talk tells a story of research and discovery and the interplay between atmospheric chemistry, engineering and exposure science. The aim is more effective exposure reduction enabled by more accurate linkages between exposures and emissions of particles and their precursor gases.

Ambient particulate matter (PM) exposures are chemical mixtures of primary particle emissions and secondary PM formed through interactions of natural and anthropogenic emissions. Exposure is modified by the addition of sources in close proximity and by differential losses/transformations with outdoor-to-indoor transport. Indoor sources and emissions from personal activities add to these exposures.

My research group makes use of field studies, lab experiments and theory/modeling to investigate selected processes that affect exposure to ambient organic PM. One such process involves the formation of organic PM through aqueous atmospheric chemistry. Gas-phase photochemistry oxidizes and fragments organic emissions, making oxidized water-soluble gases ubiquitous and abundant. The role of anthropogenic atmospheric liquid water in transforming atmospheric gases into highly oxidized, low-volatility (particulate) products has received increasing recognition over the last decade. Progress understanding this chemistry and expected trends based on future emissions projections will be discussed.