

Seminar Series 2016 - 2017

Southern Ontario Centre for Atmospheric Aerosol Research
University of Toronto

Linking Tailpipe to Ambient: Atmospheric Evolution of Combustion Emissions

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Emissions from motor vehicles, wildfires, and other combustion processes are major contributors to atmospheric fine particle mass. These emissions are a complex mixture of organic and inorganic species. Some of these species are directly emitted as particles, but the vast majority of the emissions are gases and vapors. Upon entering the atmosphere, emissions are exposed to oxidants and sunlight, which causes them to evolve chemically and physically, generating secondary particulate matter. To develop effective control strategies one must understand the overall contribution of emissions from combustion processes to ambient particulate matter -- both direct particle emissions and particle mass formed in the atmosphere. This talk will synthesize results from source testing, tunnel experiments, ambient measurements and chemical transport modeling to investigate the atmospheric evolution of emissions from combustion processes, focusing on organic aerosols. The results reveal a dynamic picture in which secondary organic aerosol formed in the atmosphere dramatically exceeds the direct particle emissions, especially for low emitting sources. Both speciation data and mass closure analysis indicate that low-volatility vapors are an important class of secondary organic aerosol precursors. The talk concludes with a brief discussion of the implications of these findings on human exposures, climate, and the design of regulations to control pollutant emissions.

Wednesday, February 1, 2017, 3:00 – 4:00 PM

Wallberg Building, 200 College Street, Room 407



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