

### Formation and sources of atmospheric brown carbon: Field observations from tropical urban environment and laboratory studies for aqueous-phase processing



**Dr. Alex Lee**

Research Scientist

Air Quality Research Division a  
Environment and Climate Change Canada (ECCC)

Atmospheric carbonaceous aerosols can have significant impacts on both air quality and climate. However, impacts of atmospheric brown carbon (BrC), the light absorbing fraction of organic aerosols (OAs) that can heat up the atmosphere, on global and regional climate are subject to large uncertainties due to the lack of understanding on their sources, formation processes and atmospheric evolution. While biomass burning has been recognized as the major sources of atmospheric BrC in global scale, the contributions of other primary sources and secondary processes to atmospheric BrC remain less understood. The first part of this talk will focus on the field observations in Singapore, a well-developed coastal city in warm and humid tropical region, based on a novel combination of high resolution aerosol mass spectrometry and aethalometer measurements. The results provide evidence that local combustion emissions and fresh secondary OA (SOA) formed with industrial influence can be important sources of BrC in urban environments, and biomass burning-derived BrC observed during the haze episode in the Southeast Asian region are susceptible to significant degradation in light absorptivity during regional transport. The second part will present laboratory observations that shows the dynamic impacts of relative humidity on secondary BrC formation in aqueous-phase upon fast droplet evaporation that is relevant to atmospheric cloud processing. The potential effects of anthropogenic-biogenic interactions on secondary BrC formation via aqueous-phase processing will be also discussed.

**Wednesday, March 1, 2023 3:00PM - 4:00PM EDT**

**In Person: Wallberg Building, 200 College Street, Room 407**  
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