Trent University
Chemistry/Physics Seminar Series

Dr. Patrick L. Hayes
Department of Chemistry and Biomolecular Sciences
Université de Montréal

Wednesday, March 30, 2016
11:00 a.m. to 11:50 a.m.
Science Complex Room 115

Measuring and modeling atmospheric aerosols: from megacities to the High Arctic

Airborne particulate matter less than 2.5 μm in diameter ($PM_{2.5}$) negatively impacts air quality in cities throughout the world. For this reason, $PM_{2.5}$ standards have been established by many countries and the World Health Organization. While $PM_{2.5}$ is often reported as a single atmospheric species, it is actually a mixture of organic and inorganic compounds. The organic fraction, termed organic aerosol (OA), contributes approximately 20 – 70% of the $PM_{2.5}$ mass globally. Examples of sources of OA include fossil fuel combustion, forest fires, and cooking.

This seminar will present two studies in which field measurements were used to characterize particulate matter. The first study was carried out in Los Angeles, California. Several distinct components of OA were quantified including primary OA (POA) and secondary OA (SOA). POA is directly emitted into the atmosphere, whereas SOA is formed by the oxidation of gaseous emissions. Traditional models for air quality such as those used by the US Environmental Protection Agency predict SOA concentrations that are an order-of-magnitude lower than measurements. Several new parameterizations for predicting SOA formation and chemical evolution were tested using the field measurements. While the performance of the new parameterizations is significantly better, large uncertainties in the model parameters remain.

In the second study, ongoing measurements are being carried out in the High Arctic where particulate matter has an important impact on climate. In the summer months, new-particle formation and growth is predominant resulting in high concentrations of particles with diameters smaller than 100 nm. Chemical composition measurements indicate that condensation of organic vapors is responsible for the particle growth events and possibly particle nucleation.

patrick.hayes@umontreal.ca
https://sites.google.com/site/hayesgroupatmontreal/home

All Welcome!

This event supported by the Visiting Scholar in Chemistry Fund