

Seminar Series 2012-2013

Southern Ontario Centre for Atmospheric Aerosol Research
University of Toronto

Applications of Single Particle Mass Spectrometry in Urban Environments



*Dr. Robert Healy,
Marie-Curie Research Fellow,
University of Toronto*

Atmospheric particulate matter has a variety of anthropogenic and natural sources, and can impact upon air quality and climate. Routine measurements typically involve analysis of particulate matter bulk composition. Determination of “single” particle composition, however, can be a powerful tool for distinguishing the different sources producing particulate matter. The relative impact of these sources upon air quality can then be estimated. This seminar describes the application of an Aerosol Time-of-Flight Mass Spectrometer (ATOFMS) in two urban locations in Europe. Firstly, air quality was investigated in a port environment in Cork City, Ireland. This site is characterised by low background levels of particulate matter, and air quality is affected almost exclusively by local sources. The ATOFMS instrument enabled the identification of a unique particle type from local ship exhaust containing soot, vanadium, iron and sulfate. Distinct particles from traffic and home heating were also identified. Secondly, the ATOFMS was deployed as part of the European Union’s “MEGAPOLI” field study in Paris, France. Traffic and domestic wood combustion were found to be the major sources of particulate matter. However, the majority of these particles were not emitted locally and were instead found to arise from sources outside France. This indicates that poor air quality episodes in Paris are not necessarily a result of local emissions. Single particle mass spectrometry represents a useful method for identifying and apportioning sources of particulate matter in diverse environments.

October 3, 2012, 3 - 4 pm

Wallberg Building, 200 College Street, Room 407

