Characterization of Particulate Matter in Support of Air Quality Programs: a Canadian Perspective

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Atmospheric particulate matter (PM) and its impact on global climate, public health and local visibility in urban areas, has been longstanding concern of the air quality management community and regulatory authorities. Understanding the adverse effects of particles and devising control strategies require spatial and temporal information on their mass concentration, aerodynamic size and chemical composition.

In Canada, the National Air Pollution Surveillance (NAPS) program, a cooperative program of the federal, provincial, territorial and some municipal governments, supports various air quality programs across the country for over 40 years. The primary purposes of this presentation are (1) to describe the particulate measurements taken within the NAPS PM$_{2.5}$ speciation program established in 2003, and (2) to examine and compare the chemical characteristics of PM$_{2.5}$ (fine particles with an aerodynamic diameter less than 2.5 $\mu$m) at various sampling locations across Canada.

This presentation will also discuss current challenges and research directions for the improved chemical characterization of PM and its sources. Novel methodologies using various separation and spectrometric techniques (e.g. IC-PAD, LC-MS, FT-ICR-MS, ICP-MS) to identify and determine organic and inorganic species, which may be useful as marker compounds for sources and/or atmospheric transformation processes, will be highlighted.