6.008 Seasonal variation of nitro-aromatic constituents in size segregated water soluble organic aerosols .

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Abstract:

Organic carbon represents a substantial fraction of atmospheric aerosol; hence, it is a very important contributor to the Earth's climate, defining air quality and adverse health effects. It has profound influence on atmospheric chemistry. Besides altering the hygroscopic properties, surface tension and effective densityof aerosol, water soluble organic carbon (WSOC) exhibits also light-absorbing properties ("brown carbon" - BrC). The colored light-absorbing compounds are very complex, and our understanding of the relationship between the chemical composition and optical properties of BrC remains limited.

Nitro-aromatic compounds (NAC) absorb UV/VIS light, and hence, could affect the radiative balance. Studies on the composition of BrC in humic-like substances isolated from biomass-burning aerosols have demonstrated the presence of yellow-colored nitrocatechols[2]. In addition to 4-nitrocatechol as the prevailing NAC, several other NAC have been identified and quantified in PM_{10}[3]. Although knowledge of the size distribution of aerosol components provides important information about their sources, formation and aging mechanisms in the atmosphere, the size distribution of NAC and their quantitative contribution to WSOC is completely unknown.

A comprehensive study on seasonal aerosol size-segregated WSOC, with an emphasis on its NAC (4-nitrocatechol; methyl nitrocatechols, (di)nitrophenols, methyl nitrophenols, nitrosalicylic acids, (di)nitroguaiacols) through investigation of their molecular level speciation and quantification will be presented. Size-segregated aerosols (size range: 0.038-15.6 ?m) were collected in the urban background environment of Ljubljana, Slovenia. Chemical characterization of WSOC included measurements of their light absorption properties by UV-VIS spectrometry and molecular level determination of target NAC by applying LC-MS. The obtained data were correlated with those for levoglucosan as a tracer for biomass burning emissions as well as with aerosol mass, total carbon (TC), and carbon content in WSOC.

References:

1. Claeys, M. et al. (2012) *Environ. Chem.* **9**, 273–284.
2. Kitanovski, Z. *et al.* (2012) *J. Chromatogr. A* **1268**, 35-43.