2.129 Composition of traffic emitted semi-volatile organic compounds at street canyon and urban background sites in central London, UK.

Early Career Scientist

Presenting Author:
Ruixin Xu, Division of Environmental Health and Risk Management, School of Geography, Earth and Environmental Sciences, University of Birmingham, Edgbaston, Birmingham. B15 2TT, U.K., RXX599@bham.ac.uk

Co-Authors:
Mohammed S Alam, Division of Environmental Health and Risk Management, School of Geography, Earth and Environmental Sciences, University of Birmingham, Edgbaston, Birmingham. B15 2TT, U.K.
Ajit Singh, Division of Environmental Health and Risk Management, School of Geography, Earth and Environmental Sciences, University of Birmingham, Edgbaston, Birmingham. B15 2TT, U.K.
Christopher Stark , Division of Environmental Health and Risk Management, School of Geography, Earth and Environmental Sciences, University of Birmingham, Edgbaston, Birmingham. B15 2TT, U.K.
Roy M Harrison, Division of Environmental Health and Risk Management, School of Geography, Earth and Environmental Sciences, University of Birmingham, Edgbaston, Birmingham. B15 2TT, U.K.

Abstract:

This study collected atmospheric samples from a street canyon and the adjacent park in central London to evaluate the change in composition of SVOC during advection from the traffic to the cleaner atmosphere of the urban background. 24h duration ambient air samples were collected during the winter period 24 Jan to 18 April 2017 at four sites in central London, UK; a kerbside site on the south side of heavily trafficked Marylebone Road (M Road), an urban background site Eltham and simultaneous measurements on the roof of University of Westminster (WM) above M Road site and a roof of Regent's University (RU) located in Regent's Park, about 380m north of M Road. Samples were analysed using thermal desorption coupled to comprehensive two-dimensional gas chromatography time-of-flight mass spectrometry (TD-GC×GC-ToF-MS).

Groups of compounds identified and quantified in gas and particle phase include total alkanes (n-alkanes and branched alkanes), cyclic alkanes, bicyclic alkanes, monocyclic aromatics and PAHs. The chemical composition of SVOC is compared between different sampling sites and the influence of wind direction is discussed. As expected, M Road concentrations were the highest of all sites. The concentrations of hydrocarbons at WM were higher than RU as the particles were diluted with the increase distance away from the traffic emission source. The large SVOC concentrations in the gas phase can

contribute to secondary organic aerosol generation following reaction with atmospheric oxidants. These compounds may also contribute to increased OH reactivity. Gas-particle phase partitioning is also discussed and compared between sites. Pearson correlations between SVOCs and black carbon, and SVOCs and NOx in multiple locations are compared to investigate the influence of traffic sources. While it is clear that traffic is a major contributor at the roadside site, the lower correlations at background sites are indicative of other source contributions and/or differential reactivity.