Geophysical Research Abstracts
Vol. 16, EGU2014-12643, 2014
EGU General Assembly 2014

Chemical composition and sources of organic aerosols over London from the ClearfLo 2012 campaigns

Emanuela Finessi (1), Rachel Holmes (1), James Hopkins (1), James Lee (1), Roy Harrison (2,3), and Jacqueline Hamilton (1)

(1) Wolfson Atmospheric Chemistry Laboratories, Department of Chemistry, University of York, York YO10 5DD, UK, (2) Division of Environmental Health & Risk Management, School of Geography, Earth & Environmental Sciences, University of Birmingham, Birmingham B15 2TT, UK, (3) Department of Environmental Sciences / Center of Excellence in Environmental Studies, King Abdulaziz University, PO Box 80203, Jeddah, 21589, Saudi Arabia

Air quality in urban areas represents a major public health issue with around one third of the European population concentrated in cities and numbers expected to increase at global scale, particularly in developing countries. Particulate matter (PM) represents a primary threat for human health as numerous studies have confirmed the association between increased levels of cardiovascular and respiratory diseases with the exposure to PM. Despite considerable efforts made in improving air quality and progressively stricter emissions regulations, the PM concentrations have not changed much over the past decades for reasons that remain unclear, and highlight that studies on PM source apportionment are required for the formulation of effective policy. We investigated the chemical composition of organic aerosol (OA) collected during two intensive field campaigns held in winter and summer 2012 in the frame of the project Clean air for London (http://www.clearflo.ac.uk/). PM samples were collected both at a city background site (North Kensington) and at a rural site 50 km southeast of London (Detling) with 8 to 24 hours sampling schedule and analysed using off-line methods. Thermal-optical analysis was used to quantify OC-EC components while a suite of soft ionization mass spectrometric techniques was deployed for detailed chemical characterization. Liquid chromatography mass Spectrometry (LC-MSn) was mostly used for the simultaneous detection and quantification of various tracers for both primary and secondary OA sources. Well-established markers for wood burning primary OA like levoglucosan and azelaic acid were quantified together with various classes of nitroaromatics including methyl-nitrocatechols that are potential tracers for wood burning secondary OA. In addition, oxidation products of biogenic VOCs such as isoprene and monoterpenes were also quantified for both seasons and sites. A non-negligible contribution from biogenic SOA to urban OA was found in summertime measurements. It is hoped that these data will provide an insight into the sources and chemical processing of organic aerosol in London and help to evaluate the effects of this megacity on the surrounding areas.