



Investigation of the emissions and profiles of a wide range of VOCs during the Clean air for London project

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The majority of the World's population live in polluted urbanized areas. Poor air quality is shortening life expectancy of people in the UK by an average 7-8 months and costs society around £20 billion per year.[1] Despite this, our understanding of atmospheric processing in urban environments and its effect on air quality is incomplete. Air quality models are used to predict how air quality changes given different concentrations of pollution precursors, such as volatile organic compounds (VOCs).

The urban environment of megacities pose a unique challenge for air quality measurements and modelling, due to high population densities, pollution levels and complex infrastructure. For over 60 years the air quality in London has been monitored, however the existing measurements are limited to a small group of compounds. In order to fully understand the chemical and physical processes that occur in London, more intensive and comprehensive measurements should be made. The Clean air for London (ClearfLo) project was conducted to investigate the air quality, in particular the boundary layer pollution, of London.

A relatively new technique, comprehensive two dimensional gas chromatography (GC×GC) [2] was combined with a well-established dual channel GC (DC-GC) [3] system to provide a more comprehensive measurement of VOCs. A total of 78 individual VOCs (36 aliphatics, 19 monoaromatics, 21 oxygenated and 2 halogenated) and 10 groups of VOCs (8 aliphatic, 1 monoaromatic and 1 monoterpene) from C₁-C₁₃₊ were quantified. Seasonal and diurnal profiles of these VOCs have been found which show the influence of emission source and chemical processing. Including these extra VOCs should enhance the prediction capability of air quality models thus informing policy makers on how to potentially improve air quality in megacities.

References

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