

Air quality: New tools for investigating pollution

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Introduction:

Air quality continues to be a major issue facing both developed and developing countries, with outdoor pollution estimated to annually cause around 3 million premature deaths worldwide. A variety of sources of pollutants contribute, which include road vehicles, industry, domestic heating, cooking, power generation and agriculture. While pollutants such as carbon monoxide and sulphur dioxide are no longer deemed to be an issue in the UK, nitrogen dioxide continues to be a problem, associated with emissions from diesel engines. It is also recognised that pollutants such as particulate matter (PM) associated with the rising popularity of wood burning are posing an emerging threat. Furthermore, emerging metrics of air quality such as black carbon (BC) and ultrafine particles (UFP) that require further investigation. The Centre for Atmospheric Science at The University of Manchester has long been involved in the investigation of pollutants in cities in the UK and worldwide and been at the forefront of using detailed online measurements of the composition of particulates to infer their sources.

Project Summary:

This work will follow on from previous work investigating air quality in the UK and abroad, involving state-of-the-art instrumentation and data analysis methodologies. This will involve both making new measurements, in terms of long-term monitoring activities and short-term 'intensive' measurements, and the further analysis of existing datasets. As well as measurements of established pollution metrics, the work will involve the use of aerosol mass spectrometry (AMS) to measure particulate composition, optical measurements of black carbon (e.g. with the multiwavelength Aethalometer) and measurements of particle number and size. Also, more novel measurement techniques could also be explored. There will be opportunities to apply detailed mathematical techniques such as positive matrix factorization to evaluate the sources of pollution. There will be many opportunities for engaging with a number of partners. This may include other collaborating institutes studying different aspects of air pollution as part of the same or related projects, a network of European scientists developing the techniques being used, scientists in related disciplines (e.g. those studying impacts on health) and stakeholders in local government.

References

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Image 1 Piccadilly Gardens Monitoring Station, Manchester (image: DEFRA)

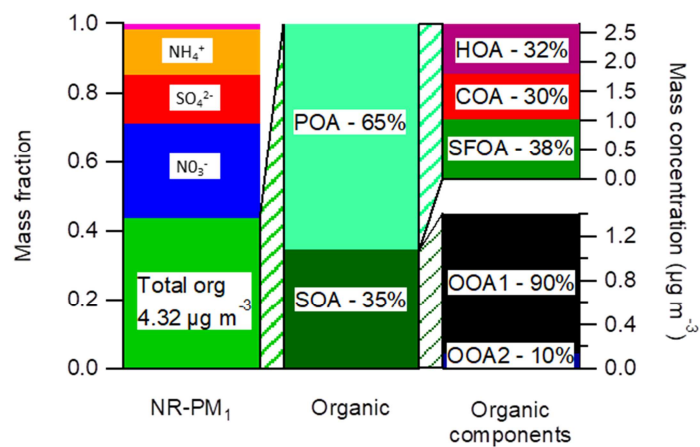


Image 2 Organic particulate apportionment in London (Young et al., 2015)