



Source apportionment of particulate matter in Chinese megacities: the implication for emission control strategies

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The rapid industrialization and urbanization in developing countries has led to an increase in air pollution, along a similar trajectory to that previously experienced by the developed nations. In China, particulate pollution is a serious environmental problem that is influencing air quality, regional and global climates, and human health. A quantitative understanding of these effects has proven extremely challenging due to spatial and temporal variability in the sources of aerosols and their precursors, the complexity of particle composition, and uncertainties associated with the atmospheric aging of existing particles (Pöschl 2005; Hallquist et al., 2009; Huang et al., 2014).

Nowadays the average PM_{2.5} concentrations in China are approximately one to two orders of magnitude higher than those observed in urban areas in the US and European countries (Cao 2012). This has forced the Chinese government to announce its first national environmental standard for PM_{2.5} in 2012 and to make highly ambitious plans for emission control. The Chinese aim to reduce the PM_{2.5} concentrations by up to 25% of the 2012 levels by 2017, backed by \$277 billion investments from the central government. To achieve this ambitious aim, a better understanding of the aerosol composition, sources, and atmospheric processing is required.

In this study, we present the results from intensive field measurement campaigns carried out in Chinese megacities in 2013/2014. The sources of PM_{2.5} and the organic aerosol (OA) were investigated by applying the multi-linear engine (ME-2) receptor model (Canonaco et al., 2013) to a comprehensive dataset. Primary sources including vehicle emissions, biomass burning, coal burning, and dust-related emissions were identified and quantified. The contributions from secondary aerosol formation processes to total PM_{2.5} mass and OA mass were evaluated. Detailed results will be presented and discussed.

References

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