Geophysical Research Abstracts
Vol. 19, EGU2017-4344, 2017
EGU General Assembly 2017

Source apportionment of major and trace elements in aerosols during smog episodes in large cities in China

Markus Furger (1), Pragati Rai (1), Suzanne Visser (2), Miriam Elser (1), Francesco Canonaco (1), Jay G. Slowik (1), Ru-Jin Huang (3), André S.H. Prévôt (1), and Urs Baltensperger (1)

(1) Paul Scherrer Institut, Labor für Atmosphärenchemie, Villigen PSI, Switzerland (markus.furger@psi.ch), (2) Antea Group Nederland, Capelle aan den Ijssel, Netherlands, (3) SKLLQG and Key Lab of Aerosol Chemistry and Physics, Institute of Earth Environment, Chinese Academy of Sciences, Xi'an, China

Air pollution in Chinese cities is one of the environmental problems China has to address to mitigate the impacts on human health, air quality and climate. Average concentrations of particulate matter exceed 100 μg m^{-3} in many places in China, and the government is developing and implementing strategies to reduce the load of pollutants by various measures. A characterization of airborne particulate matter (PM), especially its composition and sources, will help in optimizing reduction and mitigation strategies for air pollution.

We collected PM10 aerosols with a rotating drum impactor (RDI) in Xi'an in December 2013 and in Beijing in January 2014 with 30-min time resolution and for three size ranges (cut-off sizes 10, 2.5 and 1 μm). Each campaign encompassed one or more high pollution episodes in the respective city. Elements from Na to Pb were analyzed with synchrotron radiation induced X-ray fluorescence spectrometry (SR-XRF), and the resulting time series were used for source apportionment performed with the Multilinear-Engine 2 (ME-2) implementation of the Positive Matrix Factorization algorithm.

The preliminary computations yielded 5 factors for Beijing, namely road dust, sea salt, traffic-related, industrial, coal combustion. For Xi'an an additional desert dust factor was found. Further refinement could be expected from including the smaller size fractions, e.g. a sulfur-rich factor for secondary sulfate or a reacted chlorine factor in the fine mode fraction.