Wintertime Aerosol Source Apportionment in Prague

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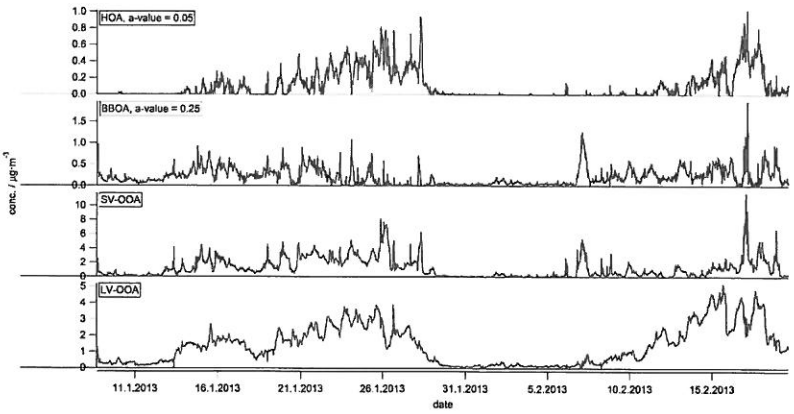
Organic aerosol (OA) is the most abundant but still poorly characterized component of airborne particulate matter. This situation is even more complicated in large cities where many anthropogenic sources of primary organic aerosol (POA) are situated. In recent years, aerosol mass spectrometry has been increasingly applied to obtaining highly time-resolved chemical composition of ambient aerosol. This is considerably important for clarification of organic aerosol life cycles and sources. During six weeks in January and February 2012 the measuring campaign was performed at suburban site Prague – Suchdol. Aerosol data were measured by Aerodyne compact time-of-flight aerosol mass spectrometer (AMS) which is able to characterize chemical and size composition of submicron (PM_1) fraction.



Organic aerosol data were averaged to 30 min. intervals and analyzed by receptor modelling based on positive matrix factorization. Multi-linear engine (ME-2) (Paatero, 1999) firstly identified set of factors by unconstrained technique. These factors correspond both to primary organic aerosol sources and secondary organic aerosol (SOA). Primary sources include hydrocarbon-like organic aerosol (HOA) from

traffic and OA emitted by coal and biomass burning (BBOA) in local heating. POA portion was ranging from 10% to 30% of organic aerosol. SOA consists of two types of oxygenated organic aerosol differing in volatility. Semi-volatile oxygenated organic aerosol (SV-OOA) shows maximal concentration during the night and minima in the afternoon. Low-volatile oxygenated organic aerosol (LV-OOA) has an opposite daily pattern and is more oxidized then SV-OOA. Retrieved factors were then specified by ME-2 partially constrained technique: a-value approach (Canonaco, 2013).

Acknowledgement

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References

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2. Paatero, P.: J. Comput. Graph. Stat. 8, 854–888, 1999.