

Source apportionment of ambient aerosol applying PMF on AMS mobile and stationary data

Two Aerodyne Aerosol Mass Spectrometer (AMS) were deployed together with additional instrumentation in the metropolitan area of Zurich in Winter 2006, Summer 2007 and Winter 2007/2008. The high-resolution time-of-flight AMS was stationed at an urban background site in the centre, 30 meters from and shielded against direct traffic emissions. The quadrupole-based AMS was deployed in a mobile van allowing for on-road submicron aerosol composition measurements, and investigations into the spatial variability of aerosol concentration and composition.

For the summer 2007 data, Positive Matrix Factorization (PMF), a statistical based source apportionment tool that uses constrained, weighted least squares estimation to determine source profiles and strengths, was applied on the organic aerosol component for on-road and background sites. Hydrocarbon-like organic aerosol (HOA) dominates the on-road aerosol composition, consistent with its identification as a marker for traffic emissions (Lanz et al. 2007), together with elemental carbon (EC). EC was monitored with the MAAP (multi angle absorption photometer). The contribution of oxygenated organic aerosol (OOA), mostly secondary, at the background site is higher, since it is less influenced by primary emissions. Measurements from winter 2008, of which results will be presented as well, indicate similar patterns but a higher contribution from OOA and NO_3 . Data from outside Zurich show a clear dominance of OOA in aerosol source contributions.

Estimates of contributions from wood burning (Alfarra et al., 2007) and traffic emissions aerosol from Rheintal region dataset using simple formulas based on characteristic mass fragments show good agreement with PMF factors for 2007 measurements.

Additional PMF analysis of AMS data and recent mobile AMS measurements will also be presented.

Lanz, V. A., et al. (2007). *Atmos. Chem. Phys.*, 7: 1503-1522

Alfarra, M. R., et al. (2007). *Environ. Sci. Technol.*, 41: 5770 - 5777.