1.048 Source apportionment modelling of OC and NMVOCs in the Berlin urban area.

Presenting Author:
 Erika von Schneidemesser, Institute for Advanced Sustainability Studies, Potsdam, Germany, erika.vons@iass-potsdam.de

Co-Authors:
 Boris Bonn, University of Freiburg, Freiburg, Germany
 Christian Ehlers, Forschungszentrum Jülich, Jülich, Germany
 Holger Gerwig, German Environment Agency, Dessau-Roßlau, Germany
 Ana-Maria Villalobos, University of WI-Madison, Madison, WI, USA
 Dieter Klemp, Forschungszentrum Jülich, Jülich, Germany
 Claudia Kofahl, Forschungszentrum Jülich, Jülich, Germany
 Jürgen Kura, German Environment Agency, Dessau-Roßlau, Germany
 Anja Lüdecke, German Environment Agency, Dessau-Roßlau, Germany
 Axel Pietsch, German Environment Agency, Dessau-Roßlau, Germany
 Rainer Nothard, Senate Department for Urban Development and the Environment, Berlin, Germany
 Klaus Schäfer, Karlsruhe Institute of Technology, Garmisch-Patenkirchen, Germany
 James J. Schauer, University of WI-Madison, Madison, WI, USA
 Julia Schmale, Paul-Scherrer-Institute, Villingen, Switzerland

Abstract:

A 3-month measurement campaign (BAERLIN-2014) was carried out during the summer of 2014 in the urban area of Berlin and Potsdam, Germany. A variety of gas-phase, particulate matter (PM), and meteorology parameters were measured. To investigate source contributions, including the role of anthropogenic vs biogenic influence in the urban area, various source apportionment techniques were applied. Chemical mass balance source apportionment was utilized for PM10 filter samples, specifically the organic carbon (OC) fraction. Higher time-resolution NMVOC data was collected by PTR-MS and used in positive matrix factorization source apportionment analysis. Initial results indicate a significant influence of vegetation as well as traffic for both the OC and NMVOC source apportionment results. In addition, the largest contribution to OC was from secondary organic aerosol (SOA). The OC source apportionment analyses were complemented with air mass back trajectory data and bulk PM composition analysis, including inorganic contributions from sulfate, nitrate, and ammonia, which were significant contributions to the PM mass. Furthermore, the source apportionment results were compared to the existing understanding of sources based on local emission inventories, finding that in the case of NMVOCs, the attribution in the emission inventory to solvents was greatly overestimated relative to the importance of traffic sources. These results are similar to findings comparing measurements to emission inventories for other cities in Germany and Europe.