

Urban PM in Eastern Germany: Source apportionment and contributions from different spatial scales

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Understanding the contributions of particulate matter (PM) sources and the source areas impacting total PM levels in a city are important requirements for further developing clean air policies and efficient abatement strategies. This presentation reports on two studies in Eastern Germany providing a detailed picture of present-day urban PM sources and discriminating contributions of local, regional and long-range sources.

The „Leipzig Aerosol 2013-15“ study yielded contributions of 12 sources to coarse, fine, and ultrafine particles, resolved by Positive Matrix Factorization (PMF) from comprehensive chemical speciation of 5-stage Berner impactor samples at 4 different sites in the Leipzig area. Dominant winter-time sources were traffic exhaust and non-exhaust emissions, secondary aerosol formation, and combustion emissions from both biomass and coal burning with different relative importance in different particle size ranges. Local sources dominated PM levels in ultrafine and coarse particles (60% - 80%) while high mass concentrations in accumulation mode particles mainly resulted from regional import into the city (70%).

The “PM-East” study compiled PM₁₀ mass and constituents’ concentrations at 10 urban and rural sites in Eastern Germany during winter 2016/17, which included a 3-week episode of frequent exceedances of the PM₁₀ limit value. PMF source apportionment is performed for a subset of the sites, including the city of Berlin. Contributions from short-, mid-, and long-range sources, including trans-boundary pollution import from neighbouring countries, are quantitatively assessed by advanced back trajectory statistical methods. Data analysis in PM-East is ongoing and final results will be available by November.

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