Highly-time resolved aerosol particle characteristics and source apportionment in Prague and small settlement in summer 2008

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Transient particulate matter (PM) events are well documented in many studies conducted mainly in urban atmosphere. Such PM events, though they may have specific health effect, are undetected with traditional time-integrated measurements when sampling times are far longer than time scales for changes in source strengths and important meteorological parameters. The accompanying homogenization of source signals by this practice severely reduces the resolving power of correlation techniques. In contrast highly-time resolved data involve fewer sources contributing to the sample, which improve the precision with which source contributions to the sample are estimated. To reveal possible resources/processes lying behind the transient PM events, highly-time resolved data of aerosol size distribution (10-10000 nm, 5 min) by SMPS and APS and elemental composition for 3 aerosol sizes sampled by DRUM sampler (TSP-1.15, 1.15-0.34, 0.34-0.15micrometers, 90 minutes) were recorded. The aerosol data were complemented by 5 minute integrates of gaseous components (CO, SO$_2, NO$_x and O$_3), and complete meteorology (WS/D, UV-A,B, RH, T). Summer sampling campaigns went for 21and 17 days at Prague centre (50 deg. 4' 17.46" N, 14 deg. 25' 14.92" E.) and in small settlement near open pit coal mine (50deg.24'6.68"N, 13°25'16.25"E) respectively. Usually about 60% of PM mass was formed by particles smaller than 250 nm though the proximity to mine at the settlement. PM episodes were characterized by high Se and S values indicating relevancy of high temperature processes. In Prague, PM was comprised by coarse aerosol fraction, indicated by Si. Fine fraction, indicated by S and Se, contributed significantly during last four days of the campaign due to different meteorology conditions. First results of application of advanced receptor models to the datasets to discriminate aerosol sources are also discussed.
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