

## Abstract

The effective air quality management in the heavy polluted areas has to be based on high-quality monitoring with properly designed monitoring network and targeted measurements, which provided information required to source apportionment.

The thesis aim was to apportion sources of atmospheric aerosol based on highly time resolved data of mass concentration of size segregated aerosol, its temporal and spatial variability, elemental composition, OC/EC and size distribution of carcinogenic polyaromatic hydrocarbons.

Sampling campaigns went during winter and summer in small settlement Březno by Chomutov, residential area Ostrava – Radvanice a Bartovice and Mladá Boleslav in the years 2008 – 2010, 2012, 2013.

We determined mass concentrations of  $PM_{10}$ ,  $PM_{1-10}$ ,  $PM_{1.15-10}$  and  $PM_{0.15-1.5}$  and their size fraction ratios. Based on the size ratios, the source apportionment of fine fraction ( $PM_{0.15-1.5}$ ) with focus on  $PM_{0.34-1.15}$  is crucial.

We examined seasonal and spatial variability of  $PM_{10}$ ,  $PM_{2.5}$ ,  $PM_1$  and  $PM_{1-10}$ . Based on the examination, we obtained representative highly-time resolved data with regards to season and sampling locality.

We analysed dynamic of size distribution of particle-bound eight carcinogenic polycyclic hydrocarbons. Based on the results the source apportionment of  $PM_{0.34-1.15}$  is crucial.

We identified  $PM_{1-10}$ ,  $PM_{1.15-10}$  a  $PM_{0.15-1.15}$  sources. Coal combustion and biomass burning were in winter dominant sources of  $PM_{0.15-1.15}$  in Mladá Boleslav and Ostrava – Radvanice Bartovice, of  $PM_{1-10}$  in Březno by Chomutov, and of  $PM_{1.15-10}$  in Mladá Boleslav. Road dust re-suspension was a dominant source during winter season of  $PM_{1.15-10}$  Ostrava – Radvanice Bartovice. In summer the main  $PM_{1-10}$  sources in Březno by Chomutov were soil re-suspension and primary biological aerosol – bioaerosol. Based on previous results, we conclude that stringent regulation of all type combustion sources and consistent landfill technology application may help to improve air quality in the region.

The resolving different sources of fossil combustion ratio in Ostrava – Radvanice a Bartovice require a comprehensive measurement approach.

The source apportionment method cited in the PhD thesis is part of the methodology 34840/ENV/14 authorized by Ministry of Environment of Czech Republic.