



Air pollution episodes in larger area of Bucharest

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In view of the fact that aerosol burdens in Eastern Europe may be heavily impacted by regional anthropogenic sources, this research is focused on analyses of air pollution episodes with the goal to quantify this impact in larger area of Bucharest. **City of Bucharest** is large size city (population 2.8 million) located in the Romanian Plain, characterised by environmental problems and meteorology typical for several cities in South-eastern Europe. It experiences intense photochemical processes. City environment includes intense emissions from traffic, thermo-electrical power-generation stations (CETs) that use mainly fossil fuels for power generation and domestic heating, and from industry.

The data (PM_{10} , SO_2 , CO , NO_x) were collected at eight sampling sites in and around the urban area of Bucharest (three industrial and two traffic sites, one EPA urban background site, one suburban site and one regional site situated outside of Bucharest). Mass concentrations spanning over one year (2005 year) of continuous sampling were taken from data provided by the Air Quality Monitoring Network of the city. Analyses of temporal and spatial variability of PM_{10} were correlated with data of SO_2 , CO , NO_x .

The criterion for selecting the pollution episodes was the daily average concentration of PM_{10} to exceed by 35 times per year the limit value of $50\mu\text{gm}^{-3}$ (in accordance with Romanian Ministry Order 592/2002 criterion). Exceedances were considered as strong pollution events and were studied related to local pollution and long-range transport of pollutants provided by back-trajectories of air masses.

As a general characteristics, the main contribution to the aerosol mass is due to anthropogenic local sources, but natural sources play a role, as well. The comparison between the concentration values at different sites indicates that industrial sources are responsible for a large part of the high concentrations in urban area followed by the traffic sources. The urban impact on nearby Bucharest sites has been estimated.

With respect to the seasonal variation, mass concentrations in urban area were found to be significantly higher during winter and late autumn; this can be partly explained through the pollution determined by space heating. Correlation between PM_{10} mass concentrations and the air mass trajectories emphasized the role of the meteorological conditions in temporal evolution of the aerosol concentrations.

Excepting the summer period, air pollution episodes were found not to be isolated ones but appearing with a high frequency.

An interesting situation was found for pollution level at EPA background urban site because of meteorological conditions and local conditions, namely the presence of the nearby lake (Lacul Morii) and influences from the Thermal Power Station CET West.

The data presented here give an overview of the range of air pollution concentrations to expect under typical meteorological and seasonal conditions in South-eastern Europe.