Title: The role of traffic in modifying air quality in a medium-sized city, Szeged, Hungary
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Introduction/Aim: One of the main pollution sources is the motor vehicle traffic, which heavily affects air quality in densely urbanised regions. In Hungary, traffic is responsible for the following ratios of the total emissions: 70 % for CO, 55 % for NO_x and 14 % for PM. Transport system of Szeged is overcrowded. Among vehicles, motor cars give the overwhelming part (84 %) of traffic. The aim of the study is to analyse, how traffic modifies air quality at a busy crossing.

Methods: The database of the study consists of 30-minute averages of the main air pollutants (CO, NO, NO_2, NO_x, SO_2, O_3 and PM) for the three-year period between January 1, 1997 – December 31, 1999. The data come from the air quality monitoring station in Szeged downtown, located at a busy crossing. In order to clarify potential effect of traffic to the concentration of the main air pollutants, traffic census was performed at the crossing in clear weather during a one-day period, from 9^{30} a.m. September 12^{th}, until 9 a.m. September 13^{th}, 2000.

Results: Ratio of NO_2/NO depends not primarily on wind speed (in this case NO_2/NO > 1) but, through ozone concentration, on radiation and NO emissions. Daytime, the ratio NO_2/NO > 1 can be explained by the rapid oxidation of NO ($NO + O_3 \longrightarrow NO_2 + O_2$). Daily courses of CO, NO and NO_2 concentrations show characteristic, synchronous double waves, which can be traced back to traffic origin of CO and NO, since maxima occur during mourning and evening peak hours. As the station is located close to a highway, CO concentrations are higher for the whole year, than those in districts with less traffic. Little ratios of both SO_2/CO and NO_x/CO indicate that there are no industrial activities near the station. Ratio of NO/NO_2 shows oxidation capacity of the atmosphere, which is clearly presented between the difference of the summer and winter ratios.

Discussion/Conclusion: Concentrations of both CO and NO are in reverse connection with wind speed. Daily average concentrations of CO, NO_x, SO_2 and PM are higher in weekdays and lower during weekends. Considering average daily courses of CO, NO and NO_2 concentrations, their greatest differences can be observed between 6-9 a.m. and 6-10 p.m., which include peak hours. The concentration of O_3 presents an opposite trend. Considering average annual concentrations, SO_2 is one-tenth of the limit value; NO_2 and NO_x are half of that, respectively; while PM is just below the limit, though it exceeds that in the winter half-year. However, CO exceeds considerably (about 2.5 times) its air quality limit value, which clearly indicates the role of traffic.

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