Trend in SO$_2$, NO$_2$, PM$_{10}$, CO, Benzene and O$_3$ concentrations at traffic stations

At traffic locations clear differences in recent trends are observed for the various pollutants. The graph below shows a steady decrease in the (indexed) concentrations of benzene (annual mean), SO$_2$ (annual mean) and CO (annual mean of 8-h running daily maximum). The CO concentration trend mimics the trend in road transport emissions of CO: a decrease of 30-35% over the period 2001-2005. For SO$_2$ the trend observed at traffic stations parallels the trend observed at (sub)urban background stations. The contribution of road traffic to the SO$_2$ emissions is less than 1.5% resulting in minor difference between concentrations at traffic hot-spot situations and the (sub)urban background. A direct comparison of the benzene concentration trend with emission data is not possible due to lack of information. A strong reduction in benzene levels has been observed prior to 2001 as the result of limiting the benzene fraction in gasoline. The benzene emissions from road transport are still reducing due to the penetration of cars complying with the the latest and most stringent emission standards. In 2001 about 70% of the petrol cars was fitted with a catalytic converter in EU15. In 2005 this increased to about 85%; nearly 40% of the gasoline passenger cars is in compliance with the EURO-3 standards (Siannouli & Mellios, 2006).

In contrast to these three pollutants the concentrations of NO$_2$ (annual mean), PM$_{10}$ (annual mean) and ozone (annual mean of 8h-running daily maximum) are virtually constant. Possible explanations for the absence of a NO$_2$ concentration trend while the NOx road transport emissions decreased with 16% between 2001 and 2005, are given in the section on NO$_2$.

PM$_{10}$ concentrations at traffic locations are slightly higher than in the urban background; the largest contributions to the concentration at street level are from the urban and rural background. The road transport emissions of primary PM$_{10}$ were reduced by about 10% between 2001-2005 but contribute only 15% to the total primary PM$_{10}$ emissions. No differences in trends at traffic and urban background stations are therefore expected. Why there is no clear trend at any of the station types is still an open question (Harrison et al., 2008).

Several reasons may explain the absence of a trend in ozone levels: the absence of a trend in the rural background levels and the decreasing NOx emission of road transport resulting in less depletion by NO-titration, will be the most important reasons at the local scale.

![Traffic stations, indexed concentration changes](image)

*Figure 26. Indexed concentration changes on traffic stations; concentrations are annual means, based on daily averages for SO$_2$, NO$_2$, PM$_{10}$ and Benzene, and based on daily running 8h maximum for CO and O$_3$*