



## Trends in ambient $\text{NO}_x$ concentrations as recorded in the Czech Republic over the past two decades

Iva Hunova and Vit Baumelt

Czech Hydrometeorological Institute, Ambient Air Quality Department, Prague, Czech Republic (hunova@chmi.cz)

Nitrogen oxides (further  $\text{NO}_x$ ), i.e. a mixture of nitrogen oxide (NO) and nitrogen dioxide ( $\text{NO}_2$ ) as denoted in atmospheric chemistry, play an important role in ambient air (Seinfeld, Pandis, 1998), and have strong environmental impacts. They are involved in complicated tropospheric  $\text{O}_3$  chemistry, they are precursors of fine  $\text{NO}_3$ - particles, and contribute to atmospheric deposition of nitrogen.  $\text{NO}_x$ , per se, are toxic both for human health ( $\text{NO}_2$  in particular) and ecosystems (WHO, 1987, 2006), and therefore they are criteria pollutants (EC, 2008).

The aim of this paper is to analyse the trends in ambient NO,  $\text{NO}_2$  and  $\text{NO}_x$  concentrations at selected long-term monitoring sites representing different environments. Moreover, the ratio in  $\text{NO}_2/\text{NO}_x$  at different types of sites and its changes over time is examined. We assume that there are significant time trends in ambient NO,  $\text{NO}_2$  and  $\text{NO}_x$  concentrations and  $\text{NO}_2/\text{NO}_x$  due to emission reduction and to changes in relative contribution of different emission sectors, and that there are distinct differences in  $\text{NO}_2/\text{NO}_x$  ratio at different types of stations (rural, mountain, industrial, urban background, traffic).

We performed our analysis for selected measuring sites in the Czech Republic, the country with a long air pollution history, where the ambient air pollution has improved considerably but still is far from satisfactory (CHMI, 2017; EEA, 2016; Hunova et al., 2014). We used NO,  $\text{NO}_2$  and  $\text{NO}_x$  data measured continuously, year-round, within the national ambient air quality monitoring network by chemiluminescence, the EC reference method (EC, 2008). The samplers were set up within the breathing zone, some 2 m above the ground. The equipment and procedures did not change over the whole time series. Standard quality assurance/quality control (QA/QC) procedures were applied (EC, 2008). The input data were 1 h mean concentrations, the basic values stored in the nation-wide ambient air pollution database ISKO (CHMI, 2017).

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