

Trends in ambient ozone as recorded in the Czech Republic over the past two decades

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Despite several decades of control in North America, Europe and Japan, ambient ozone (O_3) remains a serious air pollution problem (O_3) of Northern Hemisphere, and still represents a major threat both for human health and ecosystems. In Europe, the critical levels of O_3 are permanently exceeded over vast areas (EEA, 2016).

In the Czech Republic (CR), monitoring of O_3 has been operated since 1993, currently at 50 sites, including both rural and urban stations covering the country (CHMU, 2016). O_3 exposures in the CR are relatively high (Hůnová, Schreiberová, 2012), and may result in negative endpoints, both regarding human health (Hůnová et al. 2013) and vegetation (Hůnová et al., 2011). O_3 is highly meteorology dependent and shows considerable year-to-year variations. Nevertheless, a two-decade time series allows for a sound trend analysis. The aim of the contribution is to analyse measured O_3 concentrations for trends at Czech long-term monitoring sites over 1995–2015.

We used real-time O_3 concentration data measured in the nationwide monitoring network by UV-absorbance, the EC reference method, with thorough quality control/ quality assurance procedures applied. We considered annual and summer means, the 98th percentiles and exposure index AOT40F. For trend analysis we used Mann-Kendall non-parametric test.

Our results show that statistically significant decreasing trends were recorded at about one half of the examined sites, while the other half showed no trends. We obtained similar results both for urban and rural sites. There is an obvious geographical pattern in recorded O_3 trends. Most of the sites with no significant trend are situated in North-western region of the CR, with numerous energy-producing large emission sources, which have been partly denitrified in recent years. Decrease in NO_x emissions is expected to result in decreased titration of O_3 , and hence in higher O_3 levels in the area.

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