Ground-level ozone – seasons, relationships, conjunctions

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Abstract

Episodes of increased ground-level ozone concentrations change with the environment. While in urban areas are the increased concentrations irregular and remain short in the ground-level of atmosphere, in the background environment and higher altitude areas they last longer with very low amplitude. From the urban areas to background areas increase annual mean concentration of ground-level ozone as well. Ground-level ozone is secondary pollutant – its concentration depends on amount of precursors in the atmosphere and on meteorological conditions. Dependence on ozone precursors is changing progressively with the type of environment while meterological conditions play relatively same role in all types of environment. In urban areas, relation to ozone precursors is quite strong, in contrast with background areas where no significant relation is registered (the same correlation can be observed with increasing altitude). Therefore a distant transmission is considered as the dominant source of ground-level ozone in the background areas.

Relationships between ground-level ozone and its precursors within the scope of daily regime are further studied in this work. Resulting curve in a chart has octal shape and can be divided into 4 main (and one subsidiary) periods. Those periods are closely connected with radiation and temperature-humidity daily regime. So called „weekend effect“ is also described (using study area of Prague city). Short-term sudden decrease of traffic intensity during weekend means forceful descrease of ozone precursor emissions. This results in increase of ground-level ozone concentrations until the traffic intensity is restored back to workday level. This phenomena is most typical for large cities.

In last chapter is studied and discussed frequency of imission limit violation (8-hours running average 160μg.m^{-3}) at selected stations. From the tracking period 1995-2000 two most outstanding episodes was taken and meteorologically analyzed in details.