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Minor gases composition variability in surface air in Moscow city

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Since February 2002 continuous measurements of gas and aerosol composition of surface layer of the atmosphere are carried out at the territory of Meteorological observatory of the Moscow State University (MSU). Surface gases measurements are carried out with automated gas analysers for O_3, NO, NO_2, CO, CO_2, CH_4, NH_3, SO_2, THC.

Daily and seasonal variations of the surface concentrations of minor gases in Moscow city, and their links with meteorological parameters and thermal stratification of the lower atmosphere have been investigated. It has been revealed that the daily course of surface ozone in Moscow both in warm season and in transition time (April, October) is characterized by the main daily maximum and the additional nocturnal one. At morning and evening hours the surface concentration of ozone usually is the least. In winter its daily course is smoothed. Daily courses of NO, NO_2 and CO qualitatively are similar to each other and opposite to the daily course of ozone, because all of them have maxima at morning and evening hours and minima at night and in the afternoon. The events of extremely high values of surface concentrations of O_3, NO, NO_2 and CO have been analyzed separately. The area of observations in south-western part of Moscow seems to be not much polluted. It allows to consider that results of measurements in the MSU demonstrate moderate pollution levels inside the city, that is a result of total influence of all emission sources in Moscow. In average of 10 minutes the most surface concentration of NO there is more than 600 ppb, of O_3 – more than 100 ppb, of NO_2 – more than 100 ppb, of CO – nearly of 10 ppm. Usually the highest levels of pollution have been registered in cold season in anticyclone conditions. At this time, as a rule, according to the data of continuous acoustic remote sensing at Meteorological observatory of the MSU, wind speed is close to zero and the thermal stratification is noted by long-living inversion layers in the lower atmosphere, so the mixing layer

height is extremely small. The only except is surface ozone, the most concentrations of which usually take place in the afternoon in warm season, unlike other species.