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Long-term CO total column variations and an influence of Moscow CO emissions on air pollution in city outskirts.

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The results of the CO content spectroscopic measurements over Moscow and Zvenigorod for period from 1972 to 2010 years are presented. It is shown that the increase in the rural CO total column (TC) for 1972-1985 had transformed into it virtually stability for 1986-2000, changed then to decrease for 2001-2009. The rural CO TC decreases by about 0.4% per year for 1972-2009. We characterize the 2008-2009 as "the years of the rural CO TC minimum" over the past decade. Trajectory analysis of long-term data allows us to estimate the effect of urban sources influence on the CO rural area pollution as being small, i.e. on a level of 3% of the totality of measurements.
The rate of decrease in the CO TC urban part may be estimated as 0.5% per year for 1986-2009 in spite of more than quintuple increase of the motor-vehicles number in Moscow. This estimate may be due to anomalously low yearly TC for 2007-2009. A decrease in high daily TC values along with an increase in low and medium values for 2007-2009 was revealed in a contrast to previous years of observing.
The systematization of CO TC diurnal variations for different meteorological conditions has been performed. The intensity of CO sources in Moscow has been estimated. The analysis of acoustic sounding data has shown the wind velocity within relatively low boundary layer (up to 300m) played dominant role in the CO ventilation.