

Diurnal, seasonal and long-term variations of CO total content over Moscow area

A. Dzhola (1), E. Fokeeva (1), E. Grechko (1), V. Rakitin (1), and L. Yurganov (2)

(1) Obukhov Institute of Atmospheric Physics, RAS, Moscow, Russian Federation, (2) Joint Center for Earth System Technology, University of Maryland Baltimore County, Baltimore, MD, USA

The long-term datasets of the carbon monoxide total content (TC) measured by two grating spectrometers over Moscow and Zvenigorod are presented. An increase in the rural CO total column for 1972-1985 has transformed into its virtually stable amount in between of 1986 to 2000, changed to a decrease for 2001-2009. We note the 2007-2009 period as “the years of the rural and urban CO TC minimum” over the past decade. Trajectory analysis of long-term rural measurements allows us to conclude on the effect of urban sources on the CO total column in rural area as being small.

The rate of decrease in the CO column urban part amounts to 1% per year for 1986-2010 in spite of more than quintuple increase of the motor-vehicles number in Moscow. This estimate may be due to anomalously low values of the annually averaged total column values for 2007-2009. The systematization of CO diurnal variations for different meteorological conditions has been performed. The use of acoustic soundings data allows for evaluation of an impact of meteorological conditions within atmospheric boundary layer on the CO content. The analysis of data sets has shown preeminent effect of the wind within boundary layer (up to 300m) over the CO ventilation. The observations of CO TC and its concentrations during wild fires in summer 2010 and further retrievals allowed to estimate the depth of pollution layer over Moscow as 200÷1000 m.