

Typical and anomalous CO pollution over Moscow, long-term tendency and estimates of fires emissions in summer 2010

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The report presents data from two ground-based spectrometers and two non-dispersive IR analyzers in Moscow city and outskirts (Zvenigorod, 53 km west from the city) during strong forest fires in central Russia, summer 2010. These data were compared to total content (TC) measured by three space-based sounders. TC measured by ground-based spectrometers exceeded more than 3 times that annually averaged; surface concentrations exceeded yearly means more than 10 times for Moscow and more than 20 times for Zvenigorod. In contrast to typical (without fires) situations the surface measurements demonstrated a high correlation between TC and local concentration of CO for both sites. CO TC retrieved from the data of space-based sounders appears to be 2-3 times less than those obtained from the ground for “fires week”, 02.08.2010-09.08.2010. This is due to a low sensitivity of IR satellite sounders in the BL. Comparison of TC measured from the ground and from space in conditions of strong pyrogenic pollution near the surface (up to 10 ppm daily mean) allowed us to give a better estimate of the error of satellite sounders over wild fires. Furthermore, estimates of CO emissions from fires obtained by two different methods are provided. The analysis of long-term data sets of CO TC over Moscow, 1986-2010 and over Zvenigorod, 1974-2010 demonstrated the decrease of TC values over both sites.