



Carbon Monoxide Pollution Study of the Atmosphere over Moscow by a Spectroscopic Method

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Abstract — The results of measurements of the carbon monoxide total content using the atmospheric absorption of solar radiation in the atmospheric column over Moscow are given for the period 1993 — 2007. These total content values are compared with the Zvenigorod Scientific Station (ZSS 56°N, 38°E in 60km in western direction from Moscow in rural zone) measurements (E. Grechko et al.– EGU2008, AS3.04). Two identical grating spectrometers of medium resolution (0.2cm^{-1}) with a solar tracker are used. The application of that spectroscopic method is able to provide averaged air pollution values for significant city area. The total content of CO over the city varies significantly from day to day from the background Zvenigorod values to values that are 2.5 — 3 times greater. The number of days with such CO content is 3% of the total number of measurement days. High CO content is mostly observed during the cold seasons. During the warm seasons, in most cases, slight excesses of the CO background values are observed in the urban atmosphere. Variations in the \tilde{N} content are depended mainly on wind-velocity variations and temperature inversions. The simultaneous measurements of the regional background contents of carbon monoxide over a rural area (ZSS) and city contents over Moscow made possible to allow a seasonal course and to separate an urban part of the CO content. From 2005 the permanent sounding of boundary layer using the acoustic locator (SODAR) has been carried out. Using SODAR data the correlation coefficients of urban part CO content with average wind speed (in layers equal to 300m and 160m) were obtained. In 2002, the high values of CO content were caused by forest and peatbog fires. On some days, over the ZSS, the CO content were so high as never before. Over this measurement period

(14 years), urban part of the CO content in the surface air layer over the city did not increase in spite of more than tripled number of motor-vehicles in Moscow. So the application of that spectroscopic method is able to obtain the air pollution trend from averaged air pollution values.

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