Geophysical Research Abstracts
Vol. 17, EGU2015-9745, 2015
EGU General Assembly 2015

Background carbon monoxide and methane total content: long-term trends and abnormal variations

Eugeny Grechko, Anatoly Dzhola, Vadim Rakitin, and Yury Shtabkin
Obukhov Institute of Atmospheric Physics, RAS, Moscow, Russian Federation (vadim@ifaran.ru)

The results of regular ground-based spectroscopic measurements of CO and CH4 atmospheric total content (TC) in Zvenigorod (ZSS station, Moscow region, 53 km toward west from the center of Moscow), the station ZOTTO (Central Siberia) and in Beijing. For ZSS the longest in the world measuring data-set of these impurities TC (from 1970 to present) were analyzed. Several characteristic periods of interannual variations of total CO at ZSS are highlighted: an increase in the 70-80s of last century (1.8%/year), the stabilization in the 80s and a significant decrease since 2001 (2.5%/ year). Moscow's influence leads to a 10% increase in background CO columns only in 5 % cases of all ZSS measurements number. A method for calculating the average seasonal variation of background CO, taking into account factors of atmospheric pollution transportation from industrial regions.
CH4 content on ZSS was increasing during 1974-2014 with the rate 0.5 % / year.
For the district of Beijing-site, which has no measurement of CO at background stations the seasonal CO variations have obtained as minimum measured values. Character, magnitude and the absolute value of these seasonal variations are in good agreement with the same parameters for the Moscow region. Just as in Moscow area, background level of CO in Beijing decreased (1 % /year for the period 2000-2013).
Total content of CO during episodes of abnormal disturbances (summer wildfires of 2010 in Moscow region and 2011, 2012 in Central Siberia) exceeded the typical background TC at 2-5 times.
Analysis of satellite CO TC (AIRS v.6) for time-period 2007-2014 years had demonstrated insignificant positive CO trend in polar regions of Eurasia.