

Recent changes in atmospheric compositions in different regions of Eurasia

Vadim Rakitin (1), Nikolai Elansky (1), Yury Shtabkin (1), Anatoly Dzhola (1), Natalia Pankratova (1), Alexandra Rakitina (1), Maria Makarova (2), and Arseny Shilkin (3)

(1) Obukhov Institute of Atmospheric Physics, RAS, Moscow, Russian Federation (vadim@ifaran.ru), (2) St. Petersburg State University, Saint-Petersburg, Russian Federation (zaits@troll.phys.spbu.ru), (3) RPA "Typhoon" RosHydroMet, Obninsk, Russian Federation (post@rpatyphoon.ru)

Analysis of the CO and CH₄ total column (TC) measurements and AOD data in urban and background regions of Eurasia for period before and after 2007 year is presented.

The trends estimates based on spectroscopic ground-based datasets of OIAP RAS, SPSU, IAP CAS, RPA "Typhoon" and NDACC network were compared with similar ones obtained with use of orbital data (MOPITT v6J and AIRS v6).

Total decrease of CO TC in both urban sites (Moscow and Beijing) was found for different time-periods and seasons of 1998-2017 years.

For background or low-polluted sites (ZSS, Peterhof, Obninsk, European NDACC stations) a slow CO TC decrease was found for the same time-period for annual means. But after 2007 we've obtained an increase (0,5-1,5%/yr) of CO for summer and autumn months in almost all of background regions of Northern Eurasia.

The negative AOD trends over Europe and West Siberia obtained from AERONET and MODIS/Terra/Aqua datasets indirectly point to non-increase of wild-fires emissions over this region in latest years. Additionally a decrease of emissions from wild-fires at least for West Eurasia was found from GFED data-base. Therefore the positive CO TC trends for summer and autumn months cannot be explained only by increase of wild-fires impact and anthropogenic emissions. Possible reasons of such CO tendencies could be the changes in all atmospheric photochemistry system.

Rate of CH₄ TC increased after 2007 in North-West Europe and tropical Eurasian regions and hasn't changed in most of East polar regions.

We are grateful to scientific teams of NDACC and AERONET stations as well as MOPITT, AIRS and MODIS projects for possibility of using their observations data.

This work was supported by the Russian Scientific Foundation under grant №14-47-00049 (in part of NDACC, AERONET and satellite trends estimates), under grant №16-17- 10275 (in part of analysis of observations in Moscow megacity and Obninsk)