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Analysis of CO, CH4 and AOD distributions over Eurasia and estimates of their long-term tendencies based on spectroscopic ground-based and satellite observations

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Analysis of the CO and CH4 total column (TC) measurements and AOD data in urban and background regions of Eurasia for period from 1998 to 2016 years is presented. The trends estimates based on spectroscopic ground-based datasets of OIAP, SPSU, IAP CAC, NPO “Typhoon” and NDACC were compared with similar ones obtained with use of orbital data (MOPITT v6J and AIRS v6).
Total decrease of CO TC in both urban (Moscow and Beijing) and background regions (ZSS, Peterhof, Obninsk, European NDACC sites) in 1998-2016 years changed to increase of CO in summer and autumn months in almost all background regions of Northern Eurasia after 2007.
Negative trends of AOD were obtained for Europe, West Siberia and China for different seasons (including summer and autumn months) for time periods 2000-2016 and 2007-2016 with using both AERONET and MODIS Terra/Aqua datasets; AOD trends over East Siberia were positive that dui to influence of strong wild fires in 2010-2016 years in Siberia.
Rate of CO TC decrease obtained with orbital data using are less than the same for ground based data with factor 1.5-2.0 for both urban and background regions.
Rate of CH4 TC increased after 2007 in North-West Eurasian regions and didn’t change in most of North-East regions.
The negative AOD trends over Europe and West Siberia indirectly point to non-increase of wild-fires emissions over this region in latest years. Therefore the positive CO TC trends 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.
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