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Comparative analysis of changes in atmospheric compositions over China and different regions of Eurasia

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Analysis of the CO and CH4 total column (TC) as well as aerosol optical depth (AOD) data in urban and background regions of Eurasia for different seasons and time intervals from 1998 to 2017 years is presented. CO and CH4 trends estimates based on long-term spectroscopic datasets of OIAP RAS for stations Moscow, Zvenigorod (ZSS, Moscow province), Zotino (ZOTTO, Central Siberia), Beijing (joint site of OIAP RAS and IAP CAS), and NDACC network located in Eurasia were compared between themselves and with similar assessments obtained from satellite data of AIRS v6 (CH4 and CO). Significant decrease of anthropogenic CO in megacities Beijing (1.4±1.4% yr-1) and Moscow (3.5±2.2% yr-1) in autumn months of 1998−2017 were found according to ground-based spectroscopic observations. In spite of total anthropogenic CO emissions decrease (for Europe and China) and absence of wild-fires emissions growth in 2007−2016 we found that CO TC in background regions of Northern Eurasia has stabilized or increased in summer and autumn months of 2007−2016. Decrease of AOD over China (1−5% yr-1depending on site) has been observed after 2007 according to AERONET observations. Since 2007 an increase in CH4 TC trends over tropical belt of Eurasia as well as over Northern Europe has been obtained. Analysis of CO and CH4 TC satellite observations of AIRS v6 and AOD MODIS/Terra confirmed the ground-based estimates of trends.
Also the long-transport of CO emitted from Central China provinces toward East and North-East Russian regions was investigated using Geos-Chem retrievals. Insignificant influence of these emissions on most of East-Siberian arias including Baikal-lake region was established.
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