



Assessments of aerosol pollution in Moscow region based on modern satellite data.

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High resolution satellite measurements provide essential information about atmospheric composition. Atmospheric aerosols affect human health, ecosystems and climate change. We obtained distribution of aerosol optical depth (AOD) over the territory of Moscow region with 1 km spatial resolution using a new Multi-Angle Implementation of Atmospheric Correction (MAIAC) algorithm for warm period of 2000 - 2017. Comparisons of satellite AOD retrievals with AERONET observations in Moscow showed significantly better agreement (correlation coefficient=0.95) than that obtained by the standard MODIS algorithm. Some systematic underestimation (about 20%) is revealed for typical aerosol loading in Moscow. The presence of indicators for different types of aerosol used in the MAIAC algorithm makes it possible to reliably distinguish cases with smoke aerosol. For the smoke component AOD 550 nm exceeds the average values by about 1.8 times. It is shown that the use of these indicators helps to more reliably identify cases of urban aerosol pollution. The estimated radiative aerosol effect at the top of the atmosphere is about -10 Wm^{-2} for regional aerosol type. For the smoke aerosol observed in 2002 and 2010, the radiative aerosol effect decreased on average to -57 Wm^{-2} . We also determined spatial and temporal variability of AOD and estimated impact of local and regional pollution. Assessments of urban aerosol pollution in Moscow based on satellite data are about 0.02-0.03 (AOD 550 nm). On average, AOD 550 nm has decreased by 0.03 over the 2011-2017 period compared to the period 2003-2009, which is consistent with the trends obtained from ground-based measurements in Moscow.

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