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Comparison of the multiyear measurements of carbonaceous aerosols at the ZOTTO station with the MERRA-2 reanalysis data

Sergey Vlasenko[1] , Anastasia Mikhailova[1] , Eugene Mikhailov[1] , Eugene Nebosko[1]

[1] St Petersburg University

Sergey_Vlasenko@mail.ru

Since 2010, filter measurements of organic and black (elemental) carbon concentrations contained in atmospheric aerosol have been carried out at the background station ZOTTO located near the Zotino in central Siberia (60.80°N, 89.35°E). The obtained multiyear (2020-2024) time series are compared with the MERRA surface mass concentration of black and organic carbon. It is shown that the measurement data correlate well with the reanalysis data. The correlation coefficient for black carbon is 0.79±0.04, and for organic carbon 0.70±0.04. However, there is a systematic exceeding, about 4 times, of the MERRA OC and BC concentrations over the measured concentrations of these components. The most probable reasons for this discrepancy is the fact that sampling at ZOTTO station is conducted at a height of 300 m above the surface, while MERRA gives surface concentrations. Particularly strong discrepancy between the measurement and reanalysis data is observed during periods of strong aerosol pollution caused by forest fires in the region.

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