

Interactive comment on “Assessments of urban aerosol pollution in Moscow and its radiative effects” by N. Ye. Chubarova et al.

Anonymous Referee #2

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The manuscript presents the results of the simultaneous long-term sun photometer measurements (2006–2009) of the aerosol optical parameters at the two observational sites located in Moscow and the Moscow region (Zvenigorod, ZSS). The CIMEL sun photometers used in the measurements are the part of the AERONET global network. A frequent calibration made in the same laboratory proves their high accuracy. The methods of aerosol retrievals are the same at all sites of the network that permits the comparison of the results obtained at different sites. The measurements at the two sites and the methods of retrievals and averaging are described in the paper in details. The description gives confidence in the presented results which show that the aerosol optical depth (AOD) values are highly correlated at these sites and the difference between the mean AOD values is small. The authors describe the Moscow

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site as the one affected by the city pollution and the ZSS site as the clean one because it is located upwind of the Moscow city. Hence, they attribute the difference in the aerosol loading to the impact of the city pollution only. I think that this conclusion should be revised. In summer (also in part in spring and in fall), the ZSS site can also have some additional aerosols such biogenic aerosols (primary and secondary) from the boreal forest surrounded the site, and mineral aerosols from the soil (the soil is covered by asphalt in Moscow), and some traffic-related aerosols which is smaller than that in Moscow, but it also exists. May be the additional aerosols at the ZSS site is the cause of the small difference between the AOD values at the two sites as well as the cause of the smaller difference in summer conditions than in winter conditions? Are the aerosols in Moscow of the sulphate, mineral and traffic-related types? The analysis of the aerosol types presented at these two sites can not be performed using sun photometer measurements. Only direct measurements of the aerosols could help to clear this issue. But the discussion about the possible aerosol types presented at the two sites and about the main processes of the aerosol formation should be given in the manuscript. Another question: What is the definition of Aerosol Radiative Forcing? Daily mean?

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