

Interactive comment on “Aerosol optical properties during dust and biomass burning episodes retrieved from sun-photometer over Shanghai” by C. Shi et al.

Anonymous Referee #1

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The work by Shi et al. studies the aerosol optical properties of desert dust and biomass burning episodes in the Shanghai area. Undoubtedly, a study of these characteristics in this specific area is of great interest as it is pointed out in the introduction of the paper. However, I have two major concerns that have motivated my decision to not accept the manuscript for publishing.

The first one is the data treatment described mainly in section 2.2 (I will comment later several points). The second concern is the insufficient number of data used to fulfill a study of these characteristics. I reckon that three months of data, from March to June not including July and August, potentially affected by biomass burning episodes as the

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authors assert, is not enough to properly describe the events that occur in the area. As a result, the authors only have considered 10 days with 5-day data for each type of aerosol which in my criteria is not representative enough for evaluating “Aerosol optical properties during dust and biomass burning episodes”.

Major comments: a) Section 2.2

1.- There is no a single reference about direct sun calibration. Where, when, method etc. 2.- It is not true that the method suggested by Li et al. 2008 is an improvement for the classic algorithm (Pag. 11017 line 13-16). The used of “an alternative calibration method” is much more appropriate. Note that afterwards the authors contradict themselves (in pag. 11018 line 6.) since they state that the method has a comparable accuracy to the laboratory “AERONET” method. 3.- Pag. 11018 - Line 9-10. AERONET inversion algorithm uses geographically and temporally varying (16 day averages throughout the annual cycle) surface albedos for Version 2 retrievals. These spectral surface albedos are midday black sky albedos from Moody et al. (2005), and are based on MODIS data averaged over a 5km radius of each AERONET site (see Eck et al., 2008; section 2.3). Therefore, I would like to know which improvements are contained in the method proposed here.

b) Rest of the manuscript

Pag. 11012. Line 5. The sentences is confusing and imprecise. Note that aerosol properties such as scattering, asymmetry, and particle size distribution are not inverted, they are obtained through the inversion of AOD (thickness as the authors say) and radiance measurements.

Pag. 11012. Line 7. Note that $\alpha=0.7$ can not be considered as “small” value while studying desert dust events. This value is more representative of mixed aerosols (fine and coarse mode size mixture) with desert dust. See Kim et al. (2011; ACP) and Eck et al. (2010; JGR) for more information.

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Pag. 11015. Line 19-22. When the authors state that they used an optimized algorithm based on the classic one introduced by Dubovik and King (2000), do they mean that they use a new algorithm or is it just the data treatment? Which kind of advantages does this new algorithm have?

Pag. 11020. Line 7-10. Statements of these characteristics can not be done comparing 5-day data of each type. The same reasoning would be valid for multiple points along section 3.

Minor comments:

Pag. 11012. Abstract. The authors use several acronyms along the abstract without defining previously: AOD, SSA, YTD, etc.

Pag. 11016. Line 5. Is it really necessary to know that the sun-photometer is located on the roof number 4?

Pag. 11025. Line 22-24. I do not think that the definition of AOD and alpha should be done in the section "results".

Pag. 11025. Line 20. "The peak at fine mode was sharper than coarse one". That means that mode width of the fine mode was smaller than the coarse one?

Pag. 11029. Line 12. The ASY is not inverted as the first moment of scattering phase function. It is simply calculated. The parameters retrieved from AERONET code are the size distribution, the refractive index and the sphericity parameter. The other aerosol products are derived from them, including the phase function and by extension the ASY.

Pag. 11033. Line 8-10. This can not be considered as a conclusion from the present study.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 11011, 2013.