

Review on the paper

Aerosol optical properties during dust and biomass burning episodes retrieved from sun-photometer over Shanghai

by Shi et al.

General comments:

The authors make use of observations collected in over Shanghai from a sun-photometer to retrieve and analyze the aerosol optical depth, wavelength exponent, size distribution, single scattering albedo and asymmetry factor during the dust and biomass burning episodes. The study is well written and what has been done is easy to understand and relatively well described. My major concerns about this study are related to its relevance. More specifically, I would like the authors to address the following major concerns:

(1). Obviously, this kind of study is not so original. I do not understand what is new in this study and if there is enough original content in term of science. I see applications of well-established methods for the analysis of a few pollution case studies but it is not clear to me what we are learning beyond that different measurements illustrate the natural geophysical variability. I recommend you improve clarity on what is new in your research with the inclusion of an explicit discussion.

(2). By using the backwards air trajectories only, it is hard to say that the dust aerosols observed at the surface are contributed to the long-range transport from the dust regions, such as the regions of Gobi desert and Inner Mongolia. Since the observe site locates in the urban, there are many local emission, such as the construction dust, road traffic. The high surface wind speed during the dust episodes will benefit to the local emission. To identify the long-range dust transport, studies usually combined several ways, such as the backwards air trajectories, CALIPSO measurements and aerosol modeling (Huang et al., 2008; Liu et al., 2011;...). Are there dust activities near the dust source regions before the dusts are captured by your study in Shanghai?

Huang, J., P. Minnis, B. Chen, Z. Huang, Z. Liu, Q. Zhao, Y. Yi, and J. K. Ayers (2008), Long-range transport and vertical structure of Asian dust from CALIPSO and surface measurements during PACDEX, *J. Geophys. Res.*, 113, D23212, doi:10.1029/2008JD010620.

Liu, J., Y. Zheng, Z. Li, C. Flynn, E. J. Welton, and M. Cribb (2011), Transport, vertical structure and radiative properties of dust events in southeast China determined from ground and space sensors, *Atmospheric Environment*, 45(35), 6469-6480.

Specific Comments:

P11017, line 2-4:

Where are the locations of the observation sites? How far from your site? How many sites are used in this study?

P11017

In section 2.2, compared with the original algorithm, two parts were optimized in your study; my concern is how much to improve the retrieval accuracy after optimizing.

P11022, Line 2:

Figure 5 should be Figure 4

P11024, Line 16:

As mentioned above, the dust may source from the local dust emission;

P11030, section 3.6

Usually, the dust particles are non-spherical. Do your retrievals assume the non-spherical treatment of dust? Do the satellite retrievals assume a similar non-spherical treatment of dust? With other words are your retrievals and satellite results more comparable?

Do your have any ideas about that why the MODIS retrieved AOD values during dust and biomass burning episodes are significantly smaller than those retrieved from surface in your studies?