

Review of “*Satellite remote sensing of Asian aerosols: a case study of clean, polluted and dust storm days*” by **K. H. Lee and Y. J. Kim**
submitted to Journal of Atmospheric Measurement Techniques

Overall Recommendation: Paper should be returned to the authors for revision.

General Comments.

The methodology is not well described and cannot be easily followed.

Specific Comments

1. There are several ambiguous and inconsistent statements in this paper. As an example let us consider the following two statements.

First statement: “A LUT is used for the aerosol retrieval in this study. The LUT contains several sets of the pre-computed reflectances for each of the MODIS seven visible channel wavelengths...” (page 2657, block 5).

Second statement: ““LUTs were calculated by the SBDART code... For SBDART running, AOT at 550 nm, spectral aerosol extinction, SSA, and g are required.” (page 2657, block 10).

Do you assume that the AOT is wavelength-independent?

How do you obtain the spectral aerosol extinction?

2. Here is the related issue.

Figures 3 and 4 provide a link between AOT at 550 nm and Reflectance at 470 nm.

The AERONET-retrieved aerosol microphysical (Table 2) allows one to calculate aerosol optical properties (e.g., AOT) at several wavelengths.

Why do you use AOT (550nm) to calculate Reflectance (470 nm)?

3. The authors determined “*Total transmissions and hemispheric reflectance*” (page 2659, block 10) without appropriate description and gave only one reference. Detailed description is needed.
4. The estimation of surface reflectance (page 2659) is unclear. Please provide more details as well.
Do you estimate the surface reflectance for each pixel (1km resolution), seven wavelengths and different viewing geometry?
5. Uncertainties of AOT retrieval. The authors claimed that “*Uncertainty of 0.05 SSA can cause uncertainty in the retrieved AOT by as much as 0.8*” (page 2664, block 15). The typical values of AOT over land are less than 0.8. If I understand correctly, these values are comparable with the uncertainties of retrieved AOT. Is it true?!
6. English usage. There are numerous places in the current version of paper with poor English usage. Here are just three examples:
“*A linear mixing model between vegetation and bare soil spectra estimates the surface reflectance (von Hoyningen et al., 2003) were used to estimate surface reflectance*” (page 2659, block 15).
“*We simulated with the assumed error range of the input parameter and compute*” (page 2660, block 25).
“*...the suggested method, even for clear sky or heavy aerosols in the atmosphere, was enough to be identified by this study.*” (page 2663, block 25)
The authors have to improve English usage.
7. Equation (6). Should the right term take the square?
8. Change “Fig.4a. Figure 4b” by “Fig.7a. Figure 7b” (page 2663, block 15).