

General comments

This is a well-written and well-focused short paper that continues the series of papers on improving performance of the atmospheric correction algorithm MAIAC developed earlier by A. Lyapustin and his team. This time the paper addresses discrimination between biomass burning aerosol and clouds. To detect small sub-pixel clouds and discriminate clouds from smoke, the authors developed and implemented two new tests that are based on (1) the standard deviation of four 0.5 km pixels inside each 1 km pixel and (2) the spectrally absorbing properties of black and organic carbons.

I enjoyed reading the manuscript and I'm sure it will be well cited by the community that uses MAIAC for atmospheric correction and 1 km aerosol products. Below I listed some minor comments and suggestions that might be useful for improving the clarity of the manuscript.

Minor issues

1. I found two important references missing:

Martins J. V., D. Tanre, L.A. Remer, Y.J. Kaufman, [S. Mattoo](#), and R. Levy (2002). MODIS cloud screening for remote sensing of aerosol over oceans using spatial variability. *Geophys. Res. Lett.*, 2910.1029/2001GL01352.

Koren I., L. Oreopoulos, G. Feingold, L.A. Remer, and O. Altaratz (2008). How small is a small cloud? *Atmos. Chem. Phys.*, 8(2), 6379-6407doi:10.5194/acpd-8-6379-2008

I am sure the authors know these papers. The first one is for the spatial variability test and the second one is for the abundance of sub-pixel clouds.

2. Equation (5). I believe it's a misprint and the exponent ' b ' should go without '-'.

3. Figure 2 is a mess and it's hard to get through. I understand that the authors wanted to show more cases with different geometry and different cloud and smoke properties. I suggest limiting the case with only two viewing angles. Also use thick solid lines for thick clouds, thin solid lines for thin clouds and just symbols for different smokes. This will improve the clarity of the Figure. I would also add there a separation line defined by Eq. (6).

4. Page 18658. Interestingly, spectrally neutral imaginary index leads to the decreasing smoke SSA while spectrally varying imaginary index leads to the

almost constant SSA. It is worthwhile to mention in the paper. It was not clear for me if Rayleigh molecules were included in the SSA or it's a pure smoke.

5. In the legend to Figs. 1 and 3, indicate that 'CM' stands for clod mask.