

Interactive comment on “Evaluation and comparison of MAIAC, DT and DB aerosol products over China” by Ning Liu et al.

Anonymous Referee #1

Received and published: 15 February 2019

General comments: Validation of the aerosol products derived from the satellite observation is an important issue. This study gives a compressive assessment for the AOD products based three aerosol retrieval algorithms in MODIS sensor using ground-truth measurements from Aerosol Robotic Network (AERONET) sites over China. This manuscript is logically organized, the analysis methods are technically sound but not novel, and the results are interesting albeit some points not adequately illustrated. I have some comments on interpretation of the major results. As such, I recommend its publication pending the following concerns satisfactorily addressed.

Specific comments: 1. Page 3, Line5-10: the description of ‘shortwave infrared band, e.g. 212 nm’ is wrong. The authors mistook the unit. 2. Page 4, Line26-28: how to get the AOD at 550 nm using Ångström exponent in the two neighboring bands at

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500 nm and 675 nm, which should be shown. It is a key to confirm the reliability of AERONET data as a reference to evaluate the MODIS products. 3. Page 4, line 25-31, these are about the AERONET data introduction, what's more, these are about why you choose the AERONET data as a reference to evaluate the MODIS products, which are omitted, including the reliability of AERONET measurements in China (e.g. Liu et al., Aerosol optical properties and radiative effect determined from sky-radiometer over Loess Plateau of Northwest China. 2011, ACP; Bi et al., Dust aerosol characteristics and shortwave radiative impact at a Gobi Desert of Northwest China during the spring of 2012. 2014, J. Meteor. Soc. Jp; Che et al., Column aerosol optical properties and aerosol radiative forcing during a serious haze-fog month over North China Plain in 2013 based on ground-based sunphotometer measurements. 2014, ACP). 4. The authors introduced the statistical approach, however, what's meaning of 'QA filter'? furthermore, what's meanings of 'before QA filter' and 'after QA filter'? What's the relation between the statistical approach with QA filter? These should be added in statistical approach. 5. According to the information of AERONET sites, as listed in Table 2, the time durations of data are significantly different among the sites, and the MODIS products are from 2000-2017. So, the problem is how to exclude the limitation of different temporal scales? Additionally, a table on the summary of comparison samples at each AERONET station with three MODIS products is needed. 6. In Figure 3-5, the seasonal variation of the land cover has not been considered, the land type is determined one type in entire year, as listed Table 2. However, the land cover varies in different seasons. Thus, there may be inaccuracy to evaluate the products under different land type. So, I suggest you can consider the seasonal land type in monthly and seasonal evaluation of MODIS products. 7. Figure 12 shows that the QA filter indicates little influence on the MAIAC product itself, similar to DT product. Therefore, what's the importance or role of the QA filter? 8. I suggest the authors can combine Figure 13 and 14 into one graph. 9. The time period should be described for Figure 12-14. 10. In the abstract and conclusion, the authors need tell us clearly which product is better to use under which kind of land cover type instead of specifics of bias, correlation coefficient

and so on. I suggest the authors rephrase the abstract more general.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-1339>, 2019.

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