

Atmos. Chem. Phys. Discuss., referee comment RC2
<https://doi.org/10.5194/acp-2022-176-RC2>, 2022
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Comment on acp-2022-176

Anonymous Referee #3

Referee comment on "Monitoring multiple satellite aerosol optical depth (AOD) products within the Copernicus Atmosphere Monitoring Service (CAMS) data assimilation system" by Sebastien Garrigues et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-176-RC2>, 2022

The authors did a lot of work on comparing multiple satellite AOD products over land and ocean. The paper is good and some interesting conclusions are included. Nevertheless, the presentations need to be further improved, the study period needs to be expanded, and more discussions are needed. I have some suggestions to improve the study listed as below:

Please spell out the new terms, e.g., PMap and SLSTR, in the Abstract, and double-check and address such issues throughout the paper.

The authors are suggested to summarize the previous studies focusing on MODIS and VIIRS AOD validation and comparison in the Introduction since a large number of related studies have been carried out.

Suggest adding related references for each AOD product in the Table 1.

Information on AERONET measurements is missing. What version and level of AERONET data used in the current study and how to obtain the measurements at 550nm?

My major concern is the study period since the authors only chose a Two 3-month period including DJF and MAM. In fact, we know that AOD shows strong seasonal cycles, which are much more obvious in regional scales, e.g., East Asia or Western U.S. What are the results in summer and autumn for the northern hemisphere? It is suggested to extend the study period (at least one year) to make the results more convincing.

Line 245: mean deviation (MD)? Do you mean bias?

Tables 2-3: Suggest showing the defined ROIs in a Figure to make readers clearer.

Sections 4.1 and 4.2: In addition to simple descriptions on intuitive results, readers prefer to see the reasons for the differences among different aerosol products. The authors need to focus on analyzing these regions with large differences, also, relevant literature support is needed.

Besides mean maps, I would also like to see the differences in spatial coverage among different aerosol products, especially over land (e.g., bright surfaces).

Also, the validation and comparison in performance over different underlying surfaces (surface brightness) are also interesting.