

Interactive comment on “Multi-model evaluation of aerosol optical properties in the AeroCom phase III Control experiment, using ground and space based columnar observations from AERONET, MODIS, AATSR and a merged satellite product as well as surface in-situ observations from GAW sites” by Jonas Gliß et al.

Anonymous Referee #1

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Review report of acp-2019-2014 manuscript

The submitted work deals with the intercomparison of models contributing to the AE-ROCOM initiative as well as to the evaluation of key simulated aerosol optical properties against corresponding measurements provided by ground-based networks and satellite sensors. It is clear that the topic fits well to the scientific purposes of ACP.

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Nevertheless, after reading carefully the text I have the feeling that it looks more as a technical report rather than a scientific paper. My concern is that there is a “disparity” between the number of figures (including also Appendices) and the discussion (interpretation) of the outcomes. Moreover, it is needed a reconstruction of the structure in order to facilitate the reader to understand the tools, the methods and the findings. Summarizing, the submitted paper can be published after taken into account the comments listed below.

1. The abstract is too long providing a lot of numbers. It is better to reduce it, highlighting the major findings of your work without stating in detail the metrics obtained from the evaluation/intercomparison analysis.
2. Section 2: I cannot understand why you have to discuss your results here. It is more straightforward to move them in a sub-section of the relevant part of the manuscript (i.e., Results). Also, consider renaming Methods to Observations and models (or Data).
3. Section 2.2: Introduce here all the models used in your analysis.
4. Section 2.2 must be improved. Please consider rewriting both paragraphs.
5. I would suggest changing the title in Section 2.4. Please move this part to Results. Also, in this section (as well as in many parts of text) the interpretation is poor containing just statements from the metrics.
6. Why is useful for your analysis the evaluation of the satellite products since their reliability has been assessed in depth in previous relevant studies?
7. In general, it is missing the inter-comparison (connection) of your results with those reported in Kinne et al. (2006).
8. Line 132: Provide wavelengths for AERONET AOD and Angstrom.
9. Line 173: Why the AAE is universally constant and not aerosol-type dependent?
10. Lines 177-179: Please be more specific on how the corrections of PAMB and TAMB are applied.
11. Lines 184-189: Provide a short description and interpretation of the obtained findings, both for scattering and absorption coefficients.
12. Please put more effort on explaining the results for the absorption coefficient.
13. Figure 2: Could you please explain how the discrimination of fine and coarse AOD has been done for MODIS? Why for MODIS-Terra there are results for fine/coarse AODs and not for MODIS-Aqua?
14. Section 4: See my comment 3. Present the results based on the considered parameters instead

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of separately for each model. 15. Lines 560-561: Clarify better this sentence.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-1214>, 2020.

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