

Atmos. Chem. Phys. Discuss., referee comment RC1  
<https://doi.org/10.5194/acp-2021-517-RC1>, 2021  
© Author(s) 2021. This work is distributed under  
the Creative Commons Attribution 4.0 License.

## **Comment on acp-2021-517**

Anonymous Referee #1

---

Referee comment on "Aerosol properties and aerosol–radiation interactions in clear-sky conditions over Germany" by Jonas Witthuhn et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-517-RC1>, 2021

---

### **General comments**

Witthuhn et al. utilize seven clear sky models in order to retrieve aerosol optical depth and the direct radiative effect of aerosols over Germany. Then, they estimate the aerosol direct radiative effect for the same region by performing radiative transfer simulations with inputs of aerosol optical properties and trace gases from CAMS re-analysis. In all cases their results are evaluated using ground based measurements.

The manuscript is well written and well-structured and contains a large amount of new information which is useful for the study of aerosol – radiation interactions. The manuscript is within the scope of ACP. I recommend publication of the manuscript after a few minor (mainly technical) corrections are applied. A detailed list of the proposed corrections is provided in the following.

### **Specific comments**

L49: "spent" instead of "spend"

L167: Have the authors used the Level 2 aeronet product?

L169: Do the authors refer to standard or to expanded uncertainty?

L183: "analyses" instead of "analysis"

L310: Delete "also"

L384: Given that the AOD values are low over Germany, the authors have possibly used the Level 1.5 AERONET inversion products (which should be specified here).

L395: "a RMSE" instead of "an RMSE"

L488: In the case of MBE the AOD uncertainty is less significant than the AE uncertainty

L490: "are" instead of "is"

Table 3: It looks that the performance of the Solis simple model is generally better than that of the other models (at least regarding MBE and RMSE). Please comment.

Table 4: Please move the Table to section 4.2.2

L548: "irradiances" instead of "irradiance"

Table 5: Define the symbols for mean values (e.g., is he average for )

L565: Can the authors assume why the best agreement is found for the referred cases?

L570: "except for winter and fall seasons". Any possible explanation?

L599: "show" instead of "shows"

Figure 7 and Table 8 should be moved to the following section.

L612 – 613: "To avoid ... surface albedo". I did not understand what the authors did here.

L617: "METSTAT" instead of "MESTAT"

L643: "models" instead of "model"

L673: Delete "models"

Figure 10: "a station" instead of "an station"

L684: "show" instead of "shows"

L735: "in 2015"

L739: Delete "in"

L743: "means" instead of "mean"

L759: "were" instead of "where"

L835: "the use of simulations based on explicit radiative transfer simulations": please rephrase