ANSWERS TO REFEREE #1

We thank Referee #1 for these positive remarks and comments. The comments have been addressed below and have been taken into account for revising the manuscript. The responses are below after the reviewer points that are in italics.

In my opinion the authors have improved the manuscript based on the recommendations. Concerning my initial review comments, I just would like to mention:

Comment 1- Authors dealing with the uncertainty analysis would be complete if you could add the figure from which the (new) equation 8 has been extracted.

Thanks. Done as requested.

Comment 2- concerning cloud cover, the 3 points per day availability is the best existing. So I understand the limitations. However, it is quite simple to think that during all days with 0 cloud cover over these 3 measurements during the day there will be a number of days with some (e.g. cirrus) clouds in between. That will systematically bias the AOD retrieval to higher values. I guess authors just have to mention this possibility?

Thank you for this remark. Since both referees found the analysis we carried out on this issue very interesting, and in order to help AMT readers to clearly understand it, we have included in the manuscript a new sub-section Section 6.1 (6-hourly *vs* 1-hourly cloud cover data for the selection of cloud-free days) where we mentioned the possibility as requested by referee #1 in more details.

ANSWERS TO REFEREE #2

We thank Referee #2 for these positive remarks and comments. The comments have been addressed below and have been taken into account for revising the manuscript. The responses are below after the reviewer points that are in italics.

Comment-1. It is not clear if the authors investigated the possibility of using remote sensing cloud cover products in the study. The authors must mention in the manuscript if it is feasible or not to use this type of data in the reconstruction of AOD.

Thank you for this remark. We have mentioned the possibility in the relevant part of the text as follows:

"Another way for cloud screening would be to use remote sensing cloud cover products. Unfortunately, this type of data suffers from a lack of temporal availability, especially before the 1980s, and their spatial resolution is neither good enough. This is why using ground-based measurements of total cloud cover is still the most reasonable way for the selection of cloud-free days for the scope of this study."

Comment-2. Although the authors mention in the answer to my main comment that: "In this study, a cloud-free day is assumed when the mean daily value of TCC is rounded to 0 okta. That average value is computed from three-daily observations, typically at 06:00, 12:00 and 18:00 UTC.", the ATB of the ECAD daily data reveals that "Daily mean cloud cover CC: Whenever synoptical cloud cover data is available at 00, 06, 12 and/or 18 UT, mean daily cloud cover is calculated as the average of the available values" (in document https://eca.knmi.nl//documents/atbd.pdf, page 9). The authors must clarify this aspect.

Thanks for this remark. After checking the meta-information in more detail for each station used, we have included a clarification in the relevant part of the text as follows:

"For each station selected for this study, daily means are obtained from the average of at least 3 observations per day taken at around 06:00, 12:00 and 18:00 UT".

Comment-3. The authors must verify the link which points to the ECAD dataset (Section 2.2); the link assigned belongs to the Finish Met. Institute.

Thanks. Done as requested.

Comment-4. Apparently, there is a typo in the caption of figure 5.

Thanks. Done as requested.