Interactive comment on "The CALIPSO Version 4 Automated Aerosol Classification and Lidar Ratio Selection Algorithm" by Man-Hae Kim et al.

Anonymous Referee #3
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We thank the referee for their careful reading of our manuscript and their thoughtful comments. We have reproduced the referee's comments below (in black) and included our responses in-line (in blue).

This paper introduces CALIPSO V4 updates in the L2 aerosol subtyping algorithms, investigates the resulting AOD differences between V3 and V4, and compares CALIOP AOD with AERONET and MODIS. This paper adequately summarizes information on the updates of the algorithms and characteristics of the products, includes useful information on them, and is well written. Thus this paper will be published after some minor revisions.

(1)Title of this paper seems to be inadequate. The key topic of this paper is to evaluate the algorithm to create the Version 4 L2 subtyping products by comparing with Version 3 products. The current title rather gives us impression that this study developed the algorithm.
> This paper is submitted as a part of the AMT special issue, "CALIPSO version 4 algorithms and data products" which introduces new algorithm updates for the CALIPSO version 4 products. The primary purpose is to introduce the new elements and refinements to the V4 algorithm that were developed by this study. The current tile is also consistent with the title of Omar et al. (2009) which introduce the aerosol subtyping algorithm for the previous version (V3). For these reasons, we did not change the title.
(*Omar, A., D. Winker, C. Kittaka, M. Vaughan, Z. Liu, Y. Hu, C. Trepte, R. Rogers, R. Ferrare, R. Kuehn, C. Hostetler, 2009: "The CALIPSO Automated Aerosol Classification and Lidar Ratio Selection Algorithm", J. Atmos. Oceanic Technol., 26, 1994-2014, doi:10.1175/2009JTECHA1231.1.*)

(2) "Section 2" Section 2 seems to be too long and may mislead. The key part of this paper is thought to be section 3 (and section 4), however, section 2, which explains the updates of the algorithms and products and is not essential to this paper, looks the key of this paper.
> Section 2 is key topic of this study rather than Sections 3 and 4 as mentioned above. Sections 3 and 4 evaluate the consequences of changes described in Section 2 and seeks to demonstrate that improvements were made. We think that the order and importance of section 2 is fine the way it is. We slightly modified the last paragraph in Section 1 to make the purpose of the paper clear.

(3) minor comments and typos
P2 L6: "(AOD" => (AOD)
> It is corrected.

P11 L20: "aa" => "a"
> It is corrected.

P14 Fig 9 (b): X-axis of Fig. (b) seems different from the other figures (a and b).
> It is corrected.

P14 L7 "releasereleases" => release
> It is corrected.

P18 L13: "Based on an assumed external mixture of ~~~(65:35 by surface area)" What is 65:35? You should explain more on this point.
> We added "mixing ratio of 65:35" instead of "65:35".

P21 Table 4: This table is very complicated and it is difficult to understand it. You need to explain more to let readers understand this table.
> We think the title of the table explains fully about the table.

P24 L15: "WhileWhile"
> It is corrected.

P32 Table 8 :Are the values of the MODIS (Land) negative? (e.g., 0.069 => -0.069)
> Positive values are correct. The mean CALIOP AOD is larger than the mean MODIS AOD over land for both V3 and V4 in this study. Large differences over the mid and south Africa (CALIOP is much larger as shown in Figure 16) are responsible for these results. But as mentioned in the text, the values in Table 8 are averaged values for all collocated data points between CALIOP and MODIS. They are not the mean values for gridded-averaged AOD differences. Further studies for the validation should be followed as mentioned in the last paragraph of Conclusion.