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Discussions

Interactive comment on "CALIPSO Lidar Calibration at 532 nm: Version 4 Daytime Algorithm" *by* Brian J. Getzewich et al.

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This paper provides an overview of CALIOP version 4 daytime 532 nm calibration algorithm and verification of the new algorithm. The quality of the daytime CALIOP data is very critical to data users of both level 1 and level 2 CALIPSO data products, and important to informing future missions. The algorithm is robust and I believe the CALIPSO team has done a great job improving the accuracy of the daytime level 1 data. The paper is well written, clear, and provides impressive results to a very challenging problem. It deserves to be published after a few minor revisions that I believe will strengthen the paper.

The 8 minor issues to be addressed are:

1) Diurnal variability of aerosols: On page 2 line 15, you discuss the assumption that the aerosols within the calibration transfer region are diurnally invariant. This is again discussed on page 5 lines 18-21. Please provide evidence that this is true or cite a paper that makes this claim to support this assumption.

2) Limitations of V3: On page 2 line 21, you say "First, the altitude of the V3 calibration transfer region was too low, and hence the assumed." Was a paper published already that shows this? If so, please cite it here.

3) Latency: Somewhere in Sections 2 and 3, please discuss the total latency of the 532 nm daytime calibration (V3 and V4). On page 3 lines 10-14 you discuss the need to use previous nighttime granules and on page 4 lines 14-15 you say clear air scattering ratios are accumulated for 7 days. Was the latency in V3 7 days? Did the changes for version 4 add additional time?

4) Polar Clouds: On page 8, lines 6-27 you discuss the new calibration transfer region. This is a good discussion, but I found myself wondering what impact PSC's have in the Polar region. Later, I read nice discussions on this in Sections 4.2 and 4.3. I suggest adding a sentence on page 8 stating that PSCs can introduce some uncertainty to the V4 532 nm daytime calibration constants and more details are discussed in those later sections.

5) Grammar errors: On page 8, line 15 the phrase "The work product from this study" is a bit confusing to me. I believe you mean that "The final result of this study. . .". On line 25 of that same page, you have two commas in a row. On page 23, line 13 there does not appear to be a space between "(2018)," and "which".

6) 1064 nm feature detection: I think this is a really good idea. One concern I have though is that you are only identifying layers that are > 1 km thick. Certainly, you can get some very thin volcanic or smoke plumes in the UTLS (I've seen them in CALIOP and CATS data). How much do you think these types of layers contribute to what you see in Figure 9? Please add a sentence or 2 on this subject to Section 4.3.

7) Interpolation of missing data: As I read Section 3.7, I found myself wondering how this interpolation may reduce the calibration accuracy. I later found a nice discussion on page 16. Please add a sentence to Section 3.7 that says something like "the implications of this interpolation on the accuracy of the calibration constant is discussed in Section 4.1 and Figure 5".

8) Figure 9: Something that is confusing me about this figure: Is the white color where the frequency equals 0 and blue is non-zero (1, 2, etc.). Or is the blue zero? The color bar would suggest the latter. Please try to clarify this.