

Interactive comment on “Evolution of DARDAR-CLOUD ice cloud cloud retrieval: new parameters and impacts on the retrieved microphysical properties” by Quitterie Cazenave et al.

Anonymous Referee #1

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Considering the DARDAR product is widely used for modeling community, documentation of the algorithm evolution is critical. Thus, publishing the paper is important. Although there are few issues could be better addressed, the paper is clearly presented. I suggest it for publication after the following issues are properly addressed.

Major issues:

1. In the abstract, the impacts of changes are presented in an inconsistent way. The impact for IWC is provided with the upper range while the range for size is given. Up

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to 50% for IWC is a huge difference. It will be better that the impacts are accessed in term of mean changes and ranges.

2. The quality of the figures is poor. The x-axis and y-axis titles are too small, and units also need to be correctly displayed.

3. It is not clear why short periods of data were selected for comparison. It will be great that results on seasonal and global scales are presented to document the impacts due to algorithm changes.

4. The algorithm outputs lidar ratio, which has limited information from observations directly. The V1 lidar ratio a prior was clearly wrong. The V2 results are more reasonable. However, the results of lidar ratio should be compared with CALIPSO results. Also, it is important to discuss on how multiple scattering is treated in the algorithm because it is directly tied to effective lidar ratio selection.

Minor issues:

1. Page 3, line 23: Change “restate” to “summarize”.

2. Page 4, Line 3: change “apparent” to “attenuated”.

3. Page 4, lines 11-14: the equivalent diameter discussion here is confusion.

4. Page 4, line 24: “the LUT” refers which LUT. Is there only one LUT for the algorithm?

5. Page 5, lines 4-5: The logic does not make sense. Maintaining continuity does not mean accurate results.

6. Page 13, lines 9-10: The two extremes of radar-only results seems indicating that the algorithm for the radar-only region is not very stable.

7. Table 1: use the formal way to represent the constant coefficients.

8. Fig. 5a and 5b: It is hard to separate the two line styles. How about using color lines for them?

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9. Fig. 9 figure caption: What does “33.2” mean here?

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-397, 2018.

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