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Atmospheric Measurement Techniques Discussions

Interactive comment on "CALIPSO lidar level 3 aerosol profile product: version 3 algorithm design" *by* Jason L. Tackett et al.

Anonymous Referee #2

Received and published: 27 April 2018

The paper by Tackett *et al.* is very well written and provides the necessary information and guidance to construct the CALIPSO level 3 data product and, furthermore, to understand the ramifications of the quality screening procedure. The methodology employed for averaging extinction coefficient profiles and calculating the AOD as well as the filtering steps is clearly documented and accompanied by clear paradigms. The discussion on the impact of the quality screening criteria altogether and separately, both globally and regionally, demonstrates the choice of the relevant filtering steps. The paper reads very well and is appropriate for AMT. Minor revisions are given for consideration:

Specific comments

Pg3Ln28–34 & P4Ln1-6 & Fig.1: The choice of integrated aerosol information for constructing level 3 profiles sounds wrong to start with. The authors can keep the relevant discussion if they think it adds to the clarity of the document.

Pg6Ln19: Why not the other aerosol subtypes, in particular polluted continental?

Pg11Ln10: Could the differences between the version 3 level 3 quality screening strategy and the one reported in Winker et al. (2013) be described?

Pg19Ln3: A couple of lines could be spent to explain better how you arrived at the value of 4 km. What about higher latitudes?

Pg26 Fig.18: To my opinion, the area 160°–180° W and 20°–30° N should be boxed in as the effect of the filter is also evident.

Pg27 Fig.20: Will the "misclassified cirrus fringe filter" have the same impact for different height thresholds, smaller or greater to 4 km?

Technical corrections

Pg1Ln22: Add "the" before "version".

Pg2Ln29: Replace "335" with "333".

Pg3Ln24: Replace "a level 2" with "an".

Pg10Ln1 & Ln5: The triple bar could be avoided.

Pg10Ln8: Remove “Aerosol optical depth” and the parenthesis.

Pg10Ln8: Replace “passive satellites” with “spaceborne passive sensors”.

Pg11Ln13–15: You can insert the subsection number to these main issues. For example, it can be “noise misclassified as aerosol (Sect. 5.1), clouds misclassified as aerosol (Sect. 5.2)”.

Pg18Ln18: Fix the citation as “(Vernier et al., 2011, 2015)”.

Pg19Ln3: Remove “the” before “having” and “is” before “less”.

Pg21Ln26 & Ln28: The triple bars could be avoided.

Pg21Ln31: Remove “, however”.

Pg23Ln4: I think something is missing after “likely” or consider removing “because overlying layers are more likely”.

Pg23 Fig.16: Add the units for $\Delta\sigma$ in the caption.

Pg23Ln19: Give the acronym for ITCZ.

Pg25 Fig.18a: Add the colorbar.

Pg26 Fig.18b: What LL3 stands for?

Pg29Ln4: Add “shown in” before “Fig.S7”.

Pg31Ln9: Replace “on” with “for” after “guidance”.

Pg31Ln15: Add “of” after “levels”.

Pg31Ln18: Add “the” after “and”.

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