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Response to Reviewers

Dear Editor Dr. Hogan,

Thank you for giving us the opportunity to submit a revised version of the manuscript to Atmospheric Measurement Techniques. We are grateful to all reviewers for their constructive comments and suggestions that have allowed us to improve the quality of the manuscript. In our revised manuscript, we have made corrections based on comments by Reviewer 2 and the title is improved as suggested by the Editor.

Here is our point-by-point response to the reviewers' comments.

Author's response to reviewer report 1

This manuscript has been improved and clarified by the addition of further details about the context of this products within the JAXA production model, the future plans for the addition of Doppler velocity, and the detailed descriptions of both the preprocessing and the microphysical assumptions used within these retrievals. We thank the authors for their very thorough response to feedback.

I now recommend this paper for publication.

Thank you very much for your great efforts in reviewing our paper.

Author's response to reviewer report 2

The revised paper is significantly improved. But there are a few minor issues need to be addressed before publication.

1. The abbreviations of products (C-CLP, AC-CLP, and ACM-CLP) could be defined better in the abstract and text. But, the C-CLP, used in the title and abstract, was not used in the text (was replaced by CPR_CLP). Also, AC-CLP, and ACM-CLP in the title and abstract were written as AC_CLP, and ACM_CLP.

Response: Thank you for pointing this out. C-CLP, AC-CLP and ACM-CLP have been corrected to CPR_CLP, AC_CLP, ACM_CLP, respectively. We have included the definitions of C-CLP, AC-CLP and ACM-CLP in the abstract (Lines 16-17) and text (Lines 55-56) as follows;

Abstract (Lines 16-17)

“i.e., The cloud radar standalone cloud product (CPR_CLP), the radar-lidar synergy cloud product (AC_CLP), and the radar-lidar-imager cloud product (ACM_CLP).”

Section 2.1.1 (Lines 55-56)

“Standard cloud property (CLP) products (i.e., CPR standalone CPR_CLP product, CPR-ATLID synergy AC_CLP product, and CPR-ATLID-MSI synergy ACM_CLP product) include”

2. Line 16-17: here only two instruments are mentioned here. For ACM-CLP, you need MSI, which is not defined in the paper.

Response: MSI is added to Lines 17-19 as,

“Combined with 94-GHz Doppler cloud profiling radar (CPR), 355-nm high-spectral-resolution lidar (Atmospheric Lidar: ATLID) and Multi-Spectral Imager (MSI),...”

3. Lines 103-104: Cloud particles and large particles referred here are confusion. Cloud particles have different sizes, thus, there are small and large even in a single-phase clouds. When you consider ice and liquid phase for a gird, the ice phase has large size than liquid phase. Furthermore, precipitation particles are larger than cloud particles.

Response: Thank you for your comment. The text (Lines 104-106) has been corrected to,

“ Z_c is less sensitive to cloud particles in the presence of precipitation particles in ice- or liquid clouds, and Z_c is less sensitive to liquid cloud particles in the presence of ice particles in mixed phased clouds. In such cases, ...”

4. Line 125: Should "inputs" be "outputs".

Response: We have corrected it (Line 128). Thank you.

5. Figure 1: The symbols given in Fig. 1 need to be defined. in the text or figure caption.

Response:

We have provided the definition of the symbols in the figure caption as follows;

“JAXA L2 Echo product contains the radar reflectivity factor (Z_e), Doppler velocity (V_D), normalized radar cross-section (σ_0), pulse integrated attenuation (PIA). JAXA L2 ATLID product contains the extinction coefficient (α_{ext}), attenuated (β_{att}) and true backscattering coefficient (β), and depolarization ratio δ .”

In addition to the above comment, we have corrected “Multi-Spectral Information” in the figure caption to “Multi-Spectral Imager (Line 155) and in Table 1. (Line 124)”.

Thank you for your useful suggestions.