Response to the editors and reviewers:

We sincerely thank the editors and reviewers for taking the time to review our manuscript and providing constructive feedback. We have revised the manuscript following reviewers' suggestions. Below are the point-by-point responses with the original comments in black and our responses in blue. We have also uploaded a revised version of the manuscript that highlights the changes using track changes in Microsoft Word. This should help the reviewers track the changes in the manuscript (note the line numbers are different from the "clean" resubmitted manuscript used in this document).

Reviewer #1
Comments:

Page 3; line 85 since October of that year (). Even though mentioned in the intro, for readability please make it since October 2018 (),
This has been changed as suggested by the reviewer.

Page 5: line 141: Maybe consider adding A-LAY in the ATLID only retrievals, which provides CTH from lidar and aerosol layer descriptor. The GLOVE products should help evaluate this product very nicely.
ATLID cloud top height and aerosol layer descriptor (A-LAY) has been added as a 6th group to this paragraph.

Page 5: line 158. The validated operational EarthCARE L1 & L2a products…..
This has been changed as suggested by the reviewer.

Page 7: Lines 207-212 The CPL … 2002). Double information in these sentences, please combine
This paragraph has been re-arranged, and redundant information has been removed.

Page 7 Line 218: Do you also have ICESat-2 and ATLID extinction coefficient uncertainties as reference next to the once quoted from CPL?
ICESat-2 atmospheric products do not include extinction retrievals, so we've added the ICESat-2 calibration uncertainties (10-20%) to lines 228-229. Based on correspondence with members of the ATLID team, there aren't any publications that quantify the extinction or cloud top height uncertainties, so we have referenced the requirements (15% for extinction and 300 m for CTH) on lines 233 and 234.

Page 9: Line 273: Same for the CPR Doppler and Reflectivity uncertainties in the sentence " This performance, …." . It would also be good to discuss the Doppler spectrum width evaluation here, as it seems the CPR is doing really well in this respect.
Similar to ATLID, there aren't any publications that quantify the CPR Doppler and Reflectivity uncertainties, so we have referenced the requirements (1.0 m/s for Doppler) on lines 298-299. We've also added discussion on the Doppler spectrum width and resolution (lines 300-302).

Table 1 ATLID resolution: 103m/500m
This has been changed as suggested by the reviewer.

Table 2 CPR is oversampled at 100m resolution, maybe good to add in the vert. Res. Box
This has been added to Table 2 as suggested by the reviewer.

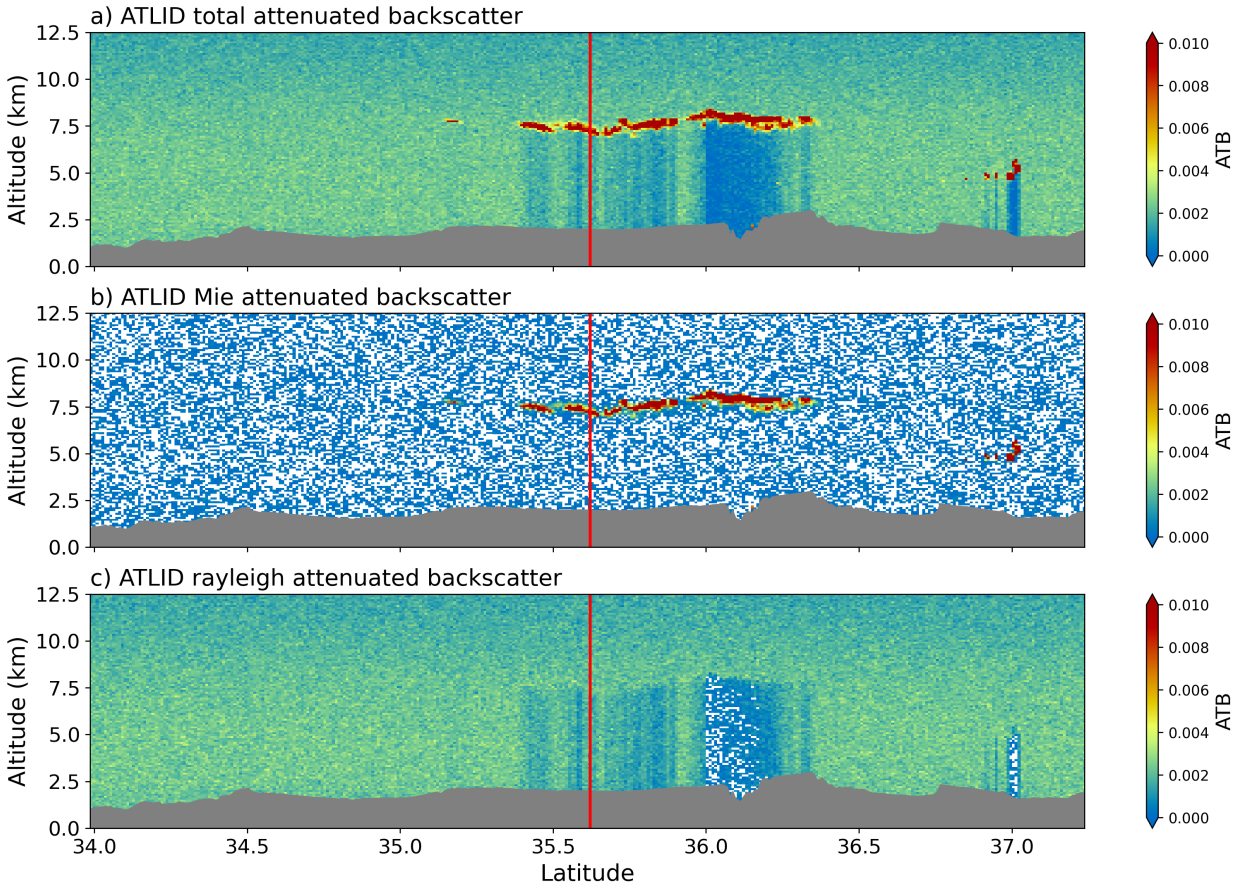
Table 4 was a bit confusing. I had to verify that it indeed gave the number count (since 1, 2 and 3 are also separately defined for Glove Objectives….and as a too fast reader it confused a bit). Suggest to change the caption into " Targeted number of scenes for EarthCARE and ICESat-2 ….."
This is a good point by the reviewer. We've changed the objectives to letters instead of numbers to try to alleviate confusion and updated the table caption.

Table 4 and 5 are very much linked, one thing mising in Table 4 is the NPP, it would be nice to add a column for when NPP measurements can be used for validation, i.e. bonus validation, to link the two tables better.
This is also a good point by the reviewer. We've added a column for NPP to Table 4.

Table 5: second row. Maybe add an EarthCARE note, even if it was just continental clear air (still good for Depol. Bias estimates).
Cirrus clouds, small-scale cumulus clouds, and clean continental air (see Figure 8) were observed during this EarthCARE underflight. We've added text to Table 5 to communicate this, which was missing. Thank you to the reviewer for pointing this out. We've also added references to figures for specific flights.

Figure 4: Please ensure that the color scheme is accessible to individuals with color vision deficiencies, as I am not able to assess this myself but have the feeling that this may be an issue (maybe also Fig 3).
We've updated Figures 3 and 4 using the widely-accepted Bang Wong color palette for color blind friendly visualization.

Figure 8: shown is a figure of the ATLID Co-polar Mie channel ATB, please update caption
The figure depicts the total (Mie + Rayleigh) attenuated backscatter as we are reading the variable named "total_attenuated_backscatter_355nm" in the EarthCARE Level 2A file (ECA_EXAC_ATL_EBD_2A_20250204T213904Z_20250204T232016Z_03920D.h5). For reference, the Figure below shows the Total ATB, Mie ATB, and Rayleigh ATB for the same day in Figure 8.



Reviewer #2 (Stefano Letizia)
Comments:

L101: “30m” should be “30-m”.
This has been changed as suggested by the reviewer but using a space instead of a dash based on the formatting guidelines of ESSD. We also found other instances without a space between the number and unit, which we corrected.

L120: Please justify through a reference that the CPL represents the gold standard for cloud detection.
Six references (McGill et al., 2007; Yorks et al., 2011b; Hlavka et al., 2012; Yorks et al., 2016; Pauly et al., 2019; Palm et al., 2021) have been added to that sentence to demonstrate the capability of CPL as a spaceborne lidar validation tool.

Tables 1,2,3: Please add scanning direction if available.
None of the airborne or spaceborne instruments mechanically scan to our knowledge, so we assume the reviewer is asking for nadir/off-nadir pointing. We’ve added the pointing information to these tables.

Table 4: Please define 4,5,6 objectives.

These were number of cases, not objectives. The other reviewer also pointed out the confusing nature of Table 4, so we've changed the objectives to letters instead of numbers to try to alleviate confusion and updated the table caption.

L 352: It would be beneficial to comment on the implication of having limited data during nighttime. Please make the fonts consistent among the different figures.
Sentences have been added to the end of this paragraph to discuss the value of day vs night cases.

Please make the fonts consistent among the different figures.
Figures 5, 6, and 8 now have consistent fonts. Figures 5 and 8, given they both show lidar curtain plots, now use the same color bars (HomeyerRainbow) that are appropriate for color blind friendly visualization.