Review comments are in black
Authors' responses are in blue, with proposed **new text** in bold. All line numbers refer to line numbers in the original/unrevised manuscript.

Referee #1: César Deschamps-Berger
I am satisfied with the answer that the authors provided to my comments.
I particularly appreciated that they added the suggested Figure A7.
I am only left with small concerns which should not prevent publication of the article, nor another round of review.

1. Code should be shared.
   We have created a repository and archived it on Zenodo: https://doi.org/10.5281/zenodo.14777816

2. It is quite intriguing that the Planet-derived shoreline falls between the ICESat-2 upper and lower shoreline. It really makes me curious to see a quick comparison with external data (e.g. Sentinel, Landsat) to, maybe, rule out systematic geolocation error in, at least, one of the products.
   While we agree that a comparison with additional datasets would be informative, we feel that it would be best to not introduce a new dataset at this stage. We also note that given the published uncertainties of each dataset are not large enough to fully explain the discrepancies. We have updated the text as follows:

   "**Given the published geolocation errors from ICESat-2, (up to 4.8 m, Luthcke et al. (2021)) and Planet (< 10 m, Planet Team (2023)), the difference between ICESat-2 and Planet derived shorelines is not thought to be due to a consistent geolocation offset between the two satellite estimates**. The difference could be explained by a consistent landward bias in our NDWI thresholding technique (Section 2.3) or differences introduced by snow cover and variations in the local water level."

3. I do not understand why the increase of coastal reatreat since 2000 is not believed to be an actual signal. It is true that measurements periods are shorter, but they are consitstent with Jones et al. (2018) and averaged together, they show an acceleration compared to similar period duration of Jones et al. (2009). I would repeat that clearly in conclusion as it is an interesting finding of this work.
   We have rephrased this paragraph to better distinguish between the comparison of our rates to short-term recent rates (2002 onwards) and long term historical (pre 2002) rates:

   "Our estimates of spatially averaged (regional) mean annual shoreline change (-10.5 m a−1 to -23.7 m a−1) across our study region are higher than long-term historical estimates and similar to recent observations (Fig. A7). Gibbs and Richmond (2015) estimated a regional mean of -6.3 m a−1 and a local maximum of -18.6 m a−1 between Drew Point and Cape Halket between 1947 and 2002. Jones et al. (2009) estimated shoreline change across this region over multiple

time intervals and found -6.8 m a−1 of change between 1955 and 1979, -8.7 m a−1 between 1979 and 2002, and -13.6 m a−1 between 2002 and 2007. A follow-up study by Jones et al. (2018) estimating shoreline change over a 9 km region covering our study area found a 10-year mean shoreline change rate of -17.2 m a−1 between 2007 and 2016. In addition to estimating a 10-year mean, Jones et al. (2018) reported regional year-to-year rates, which ranged from -6.7 m a−1 to -22.6 m a−1. Our mean retreat rates in 2020 and
2021 fall within the range of year-to-year rates observed by Jones et al. (2018) whereas our mean retreat in 2019 (-23.7 m) slightly exceeds that range. Our 3-year mean of observed retreat rates (-16.5 m) is similar to the decadal-scale estimate from Jones et al. (2018), and consistent with an increase in local shoreline change rates compared to 2002-2007 (Jones et al., 2009).
Our retreat estimates and the post-2002 estimates of Jones et al. (2009) and Jones et al. (2018) are all higher than the pre-2002 decadal-scale estimates of Gibbs and Richmond (2015) and Jones et al. (2009). This increase could be reflective of a long-term increase in retreat rates, although it may also be due to differences in time scales between studies, as short-term estimates of shoreline change tend to be higher in magnitude than long-term estimates (Sadler and Jerolmack, 2015).”

L17: “complimentary”?
We have corrected this to “complementary”

L60 “10m” missing a space
We have added a space

L96: “m a−1” The author’s guide does not seem to require units to be in italic
We thank the reviewer for bringing this to attention, and have removed the italics for all units in the text and figure A7.

L113 “and evidence that retreat rates are increasing in recent years”
L122 “CNES Airbus”
We have capitalized “Airbus”

L143 “thermal mechanical abrasion” thermo-mecanical? Thermal and mechanical?
We have updated this to “thermal **and** mechanical”

L213 “3r,2r” missing space
We have added a space

L232 “the background-corrected standard deviation” thanks for adding more details about this error. However, this term remains unclear. “Background” is never used elsewhere in the text. And“standard deviation” of what?

We have updated the text to clarify the terms used and refer readers to Smith et. al for the full definition:

"The photon elevation error is assumed to be uniform for a given segment, and is estimated as the maximum of the segment RMS error and the ~~background-corrected standard deviation (Smith et al., 2019)~~ **robust spread of photons as defined by Smith et al. (2019)**. **This robust spread is based on the vertical distribution of signal photon heights and the estimated rate of background photons (i.e., photons that are not surface signals).**"

L286 "a position change estimate uncertainty" thanks for adding "position", maybe "estimate" can now be deleted?
We agree and have removed "estimate"

L297 "in 2020 (-16.8 m) and in 2021 (-17.7 m)"
We have added "and" per this suggestion.

L302 "We find that 24%…" to avoid starting a sentence with a number.
We have added "**We found that**…" to the beginning of the sentence

L408 "characterized" twice in the same sentence
To avoid this redundancy, we updated this sentence to:

"The eastern edge of Region 3 is characterized as inundated tundra, which refers to areas ~~characterized by high~~ **where** thaw subsidence and surface ponding **are present**"

L431 "that that"
We have removed the extra "that"

L437 "(-20.3 m to - 67.2 m) change" move the numbers after "change"? Or even after "boundaries"
We have moved the number after "change":

"The changes in slope between 2019 and 2020 and between early and late 2021 were driven by high and variable ~~(-20.3 m to - 67.2 m)~~ change **(-20.3 m to - 67.2 m)** in both the upper and lower boundaries…"

Figure 6 "SlideRulederived" missing "-" or a space.
"Overlain"
We have updated this sentence in the caption to:

"ATL03 photon clouds from each ICESat-2 pass, with the SlideRule-derived (ATL06-SR) elevation profile overlai~~n~~**d on the photon clouds** for…"

Figure 7 This figure could be about twice smaller. Text size is huge at the moment.
We have reduced the figure width from 0.9 to 0.6 of the columnwidth. We have also slightly reduced the font size of the title and axes.

Figure A7 is not cited in the text, it could fit in 4.1.
We thank the reviewer for bringing this to our attention, and have added it to the first sentence of 4.1 (L361):

"Our estimates of spatially averaged (regional) mean annual shoreline change (-10.5 m a^{-1} to -23.7 m a^{-1}) across our studyregion are higher than long-term historical estimates and similar to recent observations **(Fig A7)**."

Other edits

-We have added copyright statements to the captions of Figure 1, Figure 2, Figure 3 and Figure 6.

-L195: added additional explanation and a reference for our transect generation process:

"Transects were generated every 10 m along the baseline **using a modified version of the SDS_transects routine (Vos, 2024) from the CoastSat Toolbox (Vos et al., 2019) that generates transects that bisect the shoreline**~~,~~**.** ~~and~~ ~~t~~**T**he change along each transect was calculated between each successive shoreline."

Vos, K.: SDS_transects.py, https://github.com/kvos/CoastSat/blob/master/coastsat/SDS_transects.py, 2024.

-L206-207: Added the following clarification:
"We calculated the ~~residuals~~ **cross-shore difference** between each shoreline position and the mean position of its cluster and pooled the residuals across all shorelines"

-L46, L95, L403, L404: replaced "coastline" with "shoreline" for consistency

-L317-320: updated sentence for clarity:
"However, we found that the Planet-derived land-water boundary consistently falls landwards **(south)** of the ICESat-2-derived lower boundary (by 8.6 ± 4.2 m to 41.1 ± 4.5 m) and either seawards (by up to to 36.0 m ± 4.5 m) or slightly landward of the ICESat-2-derived upper boundary (by up to 3.3 ± 4.0 m) (Fig. 4), **such that it is located on the backshore or onshore section of the elevation profiles.**"

-Corrected the following typos:
L448: ~~35.2~~ 35.3
L450 :~~9th~~ 8th

-L514: rephrased sentence:
"Overall, we found that annual retreat rates from both datasets are ~~comparable to previous~~ **consistent with recent** estimates of shoreline change over the last decade
"

-Replaced the data availability statement with a code availability statement

-Updated Acknowledgements

-Table A1: The standard deviation of individual clusters were updated based on the transition from north-south to cross-shore distance. We note that all changes were <= 0.1 m, and that the final uncertainty estimate did not change within the reported precision.

-Updated the following references:

~~-Arndt, P. and Fricker, H. A.: A 550 Framework for Automated Supraglacial Lake Detection and Depth Retrieval in ICESat-2 Photon Data Across the Greenland and Antarctic Ice Sheets [preprint], EGUsphere, 2024, 1–41, https://doi.org/10.5194/egusphere-2024-1156, 2024.~~
Arndt, P. S. and Fricker, H. A.: A framework for automated supraglacial lake detection and depth retrieval in ICESat-2 photon data across the Greenland and Antarctic ice sheets, The Cryosphere, 18, 5173–5206, https://doi.org/10.5194/tc-18-5173-2024, 2024.

Smith, ~~B., S. A. B. M. C. D. F. H. A. F. A. G. N. H. J. L. J. N. F. S. P. M. R. S. T. S~~. **Adusumilli, S., Csathó, B. M., Felikson, D., Fricker, H. A., Gardner, A., Holschuh, N., Lee, J., Nilsson, J., Paolo, F. S., Siegfried, M. R., Sutterley, T** and the ICESat-2 Science Team.: ATLAS/ICESat-2 L3A Land Ice Height, Version 6, https://doi.org/10.5067/ATLAS/ATL06.006, 2023.

Timmermans, M. L. and Labe, Z.: NOAA Arctic Report Card 2023: Sea Surface Temperature, https://doi.org/10.25923/E8JC-F342, publisher: ~~[object Object]~~, 2023.