

We would like to thank our editor, Olaf Eisen, for his thorough and helpful comments which have further improved our manuscript. Our responses are below in blue text.

Editor comments

line 136: delete one "where"

Done

249-251: rewrite last sentence, difficult to understand

Changed to:

'Finally, break points in the linear relationship were identified by testing if the new gradient exceeded a specified tolerance from the original estimate.'

281: "glacial" does not fit, I suggest to change to "As RES over ice employs ..."

Done

315: scatterer dimensions are ...: unclear what the numbers mean, relative dimension of dimension of space (then unit is missing)

Good spot. Units of m have been added

334: split sentence: assumes radial isotropy for H and Xi. Since we are ...

Done

338: repetition: Paden already cited above where wavelength is first introduced.

Done

378: Unclear where 0.65 is coming from and what it means here: resolution of number of range cells? If resolution, why? Unit missing?

A good point. We have now been clearer about how we arrive at $C \sim 0.65$:

'For a perfectly specular reflection the pulse is the shape of compressed chirp (absolute value of a sinc function with the width determined by the signal bandwidth). If the depth-range sampling of the waveform (Fig. 4) were the same as the depth-range-resolution then C would be near unity. However, since the depth-range sample spacing (~ 2.8 m) is less than the depth-range resolution (~ 4.3 m), C can be estimated from the number of depth-range cells which fit in the depth-range resolution $C \sim 0.65$.'

413: (5.2) -> (Sect. 5.2)

Done

460: although it clear that: add "is" #

Done

516: 100s km² -> 100s of km²

Done

685: remove () from citation

Done

Figure 1: last sentence: fix grammar "have ... is". Add after last sentence: by a factor of 10.

Done

Figure 6: title and first sentence in caption: northern Greenland -> north-eastern Greenland

Much of our data map and discussion also includes North-central Greenland (e.g. NGRIP). We therefore feel that 'northern Greenland' is more a more encompassing descriptor.

Figure 7: I suggest to use the same scale for y-axes of b, c, d at least, as not only the shape but also the area is important for visual comparison.

Figure 8: Same as for Fig. 7: E.g. c and f look dominant, which is only attributed to the different y-scale

We respectfully wish to keep the y-axis scales as they are. The area of each histogram is self-normalised and it is the relative shape (quantified by mean values, skewness, variance) and the x-axis scale (which is fixed between plots) that is important for the arguments we make in the paper. Additionally, if the y-axis scales are identical then there is an unnecessary large amount of white space for some subplots (and in general the plots are less aesthetically pleasing).

Typesetting:

- unify usage of % without leading space, i.e. 1% not 1 %

Done

- l 309: delete ",," after scattering

Done

- 418: "data, " -> "data "

Done

- 576: "surface, " -> "surface "

Done

- 615: thickness – correlated -> thickness-correlated

Done

- Fig. 6: panel titles and caption: Rms looks unusual. The text uses RES and rms. I suggest to unify by writing RMS throughout the text or at least using RMS here.

Last time we published in TC, we were advised to use rms in the text presentation of root mean square (which is what we have done here). We have therefore amended the figures to also use rms rather than Rms (apologies – this was done for consistency with capitalisation of other fig. labels).

- several very minor aspects are not conform with the typesetting instructions and will be dealt with during copyediting, e.g. usage of multiple braces for references, hyphenations, etc.