The Cryosphere Discuss.,
https://doi.org/10.5194/tc-2019-220-RC2, 2019

The Cryosphere Discussions
Open Access
EGU

Interactive comment on "Variability Scaling and Consistency of Airborne and Satellite Altimetry Measurements of Arctic Sea Ice" *by* Shiming Xu et al.

Anonymous Referee #2

Received and published: 12 December 2019

The paper presents a new and interesting view on covariability in radar and laser altimeter data of sea-ice and its snow cover. The paper is well written and results are presented in a clear way, so most of my comments below refer to what may be typos.

Detailed comments: P1L10: despite over 5 years' the time difference -> despite the over 5 year time difference

P2L12: perspective -> perspectives

P2L17: in-situ observations of sea ice concentration is I believe equally chellenging

P2L24: added?? I suppose you mean that the local SSH is subtracted from the local

Printer-friendly version

Discussion paper

floe's height

P2L28: too many "main/mainly"

The main backscattering plane mainly resides close to the surface of the snow cover, and the main target is the retrieval of the snowfreeboard (Fs). -> The main backscattering plane resides close to the surface of the snow cover, and the target is the retrieval of snow freeboard (Fs).

P2L34:corrected freeboard ice freeboard -> corrected freeboard is called ice freeboard

P3L1: effective freeboard -> apparent freeboard

P3L12+13: You should indicate which is for radar and which is for laser

P4L17: parameter and its -> parameters and their

P4L24: sea floes -> ice floes

Figure 1: In the top part there is significant discrepancy between variable names in figure and in the paper text. Check the use of capital letters, subscript and superscript. (h_subscript_s_superscript_*, C_subscript_s etc)

P6L6: utilizes -> performs

P6L26: footprint -> footprints

P6L29: You should refer to Eq 1 here.

P7L10: that radar -> that the radar

P7L15: This is where the discrepancy in nomenclature with Figure 1 is most apparent, for example c_subscript_s should be C_subscript_s according to figure 1). Also explain what c is (speed of light in vacuum?).

P7L18: all these three products adopt threshold -> att three products adopt a threshold

P7L22: under same -> under the same

Printer-friendly version

Discussion paper

P8L12: campaigns collocated -> campaigns have been colocated

P8L14-15: we use dataset -> we use a dataset

P8L20: under certain knowledge of -> under certain assumptions about

P8L26: several -> a few

P9L1: I suggest that you mention here that the ice drift will be discussed later. Also, there are many versions of the EASE grid. I gather that you are using a 12.5 kilometer EASE grid (or EASE2?)

P10L30: collocating -> colocation

P11L8: speed -> rate

P11L20: if slow -> if a slow

P11L20: can be induced -> can be inferred

P12L5: Speckle noise should reduce by sqrt(M) whereas SSH correction will have much longer autocorrelation length scale.

P12L8: in range -> in the range

P12L17-18: This indicates ..... Please explain better. Why does a faster decrease indicate that the snow is relatively more homogenous?

P13L7-8: Quite a mix of data sources, why? Have you checked for inconsistencies between the two datasets?

P13L20: Your estimates of noise levels would benefit from an estimate of the errorbars on the estimates. How accurate do you think your estimates are, and is 14 significantly larger that 10?

Figure 4: In the figure captions (or even better titles on the figures) you should be more clear about the difference between a) and b).

P14 and following you should change the 1000s separator "’" to "," or remove it. It is not necessary.

P15L8: This results -> This result

P16L4: You introduce two measurement error terms (e and epsilon). You should explain whet they are/represent.

P20L34: have underestimation -> may have underestimation

P22L4: requires -> require

P22L11. systematic observation -> systematic observations

Interactive comment on The Cryosphere Discuss., https://doi.org/10.5194/tc-2019-220, 2019.