

Interactive comment on “Multi-Channel and Multi-Polarization Radar Measurements around the NEEM Site” by Jilu Li et al.

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Received and published: 21 June 2018

General Comments: This is a general well-written manuscript that presents very interesting results comparing multi-channel/multi-polarization radar results to measured crystal orientation fabric from the NEEM ice core. The results show good comparison between the two methods. The methods are well-presented and clear.

Specific Comments: Page 5, Line 6: need more technical information about the GPS receiver Page 9, line 11: The truss, since it has such a large impact on the transmit power mismatch, should be introduced and explained in more detail (geometry? Construction? Materials?) in Section 2. Page 19, section 4: suggest adding a brief description of the COF methods, for instance, in Figure 16 there is mention of thin

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sections. It would probably be good to mention that the COF are obtained from thin sections in the text. (or in the caption of Figure 16, instead of saying “projected into the thin section plane” name what that plane (guessing that it is vertical, but actually not sure). Page 23, line 7: Earlier (Page 9, line 13), there is mention that the power reduction is due to these two factors as well as other unknown factors. That there are unknown factors contributing to the power reduction should also be mentioned in the summary.

Technical Comments: Throughout: don’t need a comma after the name and before “et al.” in citations (i.e., in lines 10 and 11), but do need a comma after et al. (i.e., line 17) Page 1, Line 19: define VHF Page 3, Line 15: Why is km bold and italicized? Page 3, Line 24: should be, “plane also rotates.” (or “the planes also rotate..”) if this is referring to the vertical planes. Page 4, Line 7: should be comma after “Marathe” in citation Page 5, line 4: “snow tractor” is not a term I’ve heard before. We typically call these “tracked vehicles.” Page 5 and throughout: should be consistent if there is a space after period in Fig or not (i.e., there is a space on page 4, Line 25 after Fig. 3, but not on lines 4 and 5 on page 5. Page 6, line 22: why is the m in bold? Page 8, several instances: why is dB in parentheses here, and not above? Should be consistent at least. Page 9, line 9: Fig. 7 should be capitalized Page 11, line 4: seems like you should say something along the lines of, “The plane wave is of linear, circular, or elliptical polarization when this curve is, respectively, a straight line, a circle, or an ellipse, [Ulaby, 1981].” To make this sentence clearer. Page 17, line 15: do the authors mean, optic axis instead of optical axis here? Page 19, line 21: think that this is actually supposed to be referring to Figure 15, not Figure 14. Page 21, line 4: The variable beta should be defined. Page 22, line 21: This is the first mention of thin sections in the text. I think there should be a brief discussion of the methods on Page 16, or refer to these as “samples,” but be consistent. Page 22, line 16: “tile” should be “tilt”

Figure 2: Maybe add a label with the dipole lengths in the figure? Figure 5: Better label the ice divide? Right now, it looks like the “Ice divide” label is associated with the

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arrow, which I think is just supposed to indicate direction of travel. If the Ice divide label and arrow were spaced further apart, it might be more obvious that the ice divide is the path from 2-3. And maybe make the inset a little larger and label the ice divide on the map of Greenland? Also, just a suggestion if it doesn't make it too cluttered is to add more labels (i.e., the 60.7 degrees from north) Figure 6: a-d should be described in the caption, i.e., the caption should say something like, "Averaged power-depth profiles along the straight line perpendicular to the divide for the 4 different polarization combinations (a-d). Figure 14: hard to read all the axis labels due to the resizing of the text, especially the x-axis title and labels, and the vertical labels as well. Figure 16: see note about Page 19. . . should define the thin section plane, or rename it in terms of the ice axis. Also, if the mention of "thin section" is left in this caption, the methods used to determine COF should be better described on page 19. At the very least, thin sections should be mentioned. Figure 17: The text of the figure labels looks strange due to resizing the figure (as do the data markers). Everything looks stretched out.

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-94>, 2018.