

2021-02-11

Submission tc-2020-270

Thank you for your submission to be considered for publication in The Cryosphere. The authors did significant amount of work to improve from the initial version of the paper, with a significant amount of new data that was added to enhance the validation. The new data also increases the validation period which was a key element to be improved from the initial submission.

A main point of concern for me is the SPS derived information. On fig 3, it is suggested that SPS of columns are present at the surface on Greenland. I don't see how this would be possible simply from a metamorphic perspective in such environment. Especially since it covers a very large portion so a clear explanation on why columns would be found on the surface is required. Same is observed on fig 7 where columns are derived in northern Canada and Russia which is not plausible. The SPS really needs better description, given also that most of the Canadian Arctic Archipelago is covered with aggregates of 8 columns which is simply not the case.

At this stage, I will provide here several minor comments that may help further polish the manuscript.

- The introduction in this paper includes more motherhood material on the importance of snow that I think should be moved and used into Part 1 companion paper. Part 1 paper introduction falls short in explaining the 'snow problem' from a remote sensing perspective, and the impact climate change has on snow. However, this is described in Part 2, where I think it should be the opposite. The authors should consider moving text into Part 1 introduction. This would also help reducing the introduction which I think is too long at this stage.
- Fig 1c) is not a detailed example of measured roughness the wording should be changed. The photo is a surface based passive microwave radiometer;

- The text on flowchart has varying fonts, I would suggest removing bold in the green boxes;

Regards,

Prof. Dr. Alexandre Langlois

Associate editor, *The Cryosphere*