The Cryosphere Discussions

The Cryosphere Discuss., referee comment RC1
https://doi.org/10.5194/tc-2021-119-RC1, 2021

Comment on tc-2021-119

Anonymous Referee #1

Referee comment on "Cross-platform classification of level and deformed sea ice considering per-class incident angle dependency of backscatter intensity" by Wenkai Guo et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2021-119-RC1, 2021

Cross-platform application of a sea ice classification method considering incident angle dependency of backscatter intensity and its use in separating level and deformed ice by Guo and others

General Comments:
This study has two inter-related objectives. The first investigates the utility of cross-platform (i.e. difference satellite sensors) transferability of training sites between S1 and RADARSAT-2 using the GIA classifier. The second is to evaluate if separation from level and deformed ice is possible with HH and HV channels of C-band SAR imagery. I liked both of the objectives of this study, but I was particularly intrigued with the idea of objective 1 and think it could find utility for the operational ice services whereby a database of training data could be created, utilized and refined. Overall, the results are clear and show cross-platform re-training at C-band is possible with the exception of leads. My only major concern is I felt that the parcel tracking did not really add much to the analysis. It is mostly qualitatively and subjective in my opinion the authors can make their case without it.

In terms of minor criticisms, I felt the introduction was thorough but too verbose. Even the authors felt the need to summarize their own introduction. Perhaps some of the information could be moved to the data and methods or elsewhere to tighten it up. With respect to parcel tracking, should the authors decide to keep this component, some additional details on the uncertainty are required. Further, a more quantitative comparison would be better as up until that point in the paper there is a nice balance between qualitative (visual) and quantitative results.

Specific Comments:
Line 41
Perhaps mention this will continue with the recent launch of the RADARSAT Constellation Mission (RCM)

Line 56
Perhaps better to rephrase and state that the scattering coefficient is controlled by incidence angle, surface roughness and the dielectric constant

Line 64
Suggest over-reaching or ultimate instead of terminal

Line 68
are instead of is

Line 95
Remove also or additionally in this sentence

Line 119-121
Why talk about data you are not able to use? Remove.

Line 124
As defined by Barber et al. (2001) based on the time series evolution of the backscatter coefficient at C-band.

Line 136
Is the ice concentration from OSI-SAF?

Line 173
Remove for this purpose

Line 224
I would suggest groups instead of labels. i.e. MYI and DFYI are grouped together.

Line 235
Maybe I missed it but about what leads that are wind-roughened? How are they dealt with?

Line 239

are used

Line 280
affected

Line 304
Would it not be initiative to correlate the original GIA to the retrained data? This would add robustness to the results.

Line 331
So, I guess this impacts lead orientation in the imagery? If the leads are in the near-range and oriented vertically in the imagery then they would be identified correctly by S1? Does a caveat like this need to be added in the text?

351
You could add they are only applicable in the near range of IA's. Classification of leads is challenging with S1.

Line 364
Remove also or additionally in this sentence

450
I think the results are compelling except for leads.

Figure 3
Useful to put the training sites on both images. In fact, is there a need to show all these examples? I suggest just showing one and zoom in so readers can see the details. I do not think the photos of NICE add anything to this Figure. I realize they are referenced latter in the text for a different situation. In this case, it might be better to create a new Figure with the photos for the young ice and LFYI situation.

Figure 4.
The caption is missing accuracy. i.e. Classification accuracy (CA)

Figure 5
I like this Figure, but it would be better with some text on the panels to help the reader similar to Figure 6. The Figure caption is also very confusing. I think some refinement is needed because this is a key Figure. I also think you do not need to show all 5 panels.

Perhaps just 1 S1, 1 RS2, and RS2 FQ.