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Discussions

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Interactive comment on "Operational algorithm for ice/water classification on dual-polarized RADARSAT-2 images" *by* Natalia Zakhvatkina et al.

Anonymous Referee #3

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Operational algorithm for ice/water classification on dual-polarized RADARSAT-2 images by Zakhvatkina and others.

General Comments: 1. Too often are new image classification algorithms just assessed on a few test images and as a result are not very robust. A strength of this paper is that the algorithm the authors present is tested over a great number of images. In this regard, the classification results are very good over the annual cycle and while their Table nicely summarizes this result it would be useful to showcase the classification results in more detail. Specifically, I think readers would like to actually see (visually) the performance of this algorithm during the summer melt or more difficult classifications – I know, I did after reading this paper. I suggest adding a few more examples or even a panel figure of classification comparisons with ice charts highlighting algorithm performance visually. They do not have to be perfect but for operations that does not

matter – ice analysts want to see how the algorithm will perform in the most difficult conditions.

2. The English structure requires some serious attention. There are numerous passages that are difficult to follow or just do not make sense. I suggest a thorough English edit be required before publication.

3. The manuscript structure can be improved by combining the results (Section 4) and discussion (Section 5) sections. As it reads now, certain sub-sections of the discussion do not reference material created in the analysis which they should do (i.e. 5.1, 5.2). For example, the discussion on incidence angle has no reference to the correction the authors applied. Validation and Sources of Error can be easily compared and would make for a better read.

4. Perhaps more important than 2 and 3, it is not clear from the text (4.2/5.2) how the optimal texture combinations where chosen? I think this needs to be addressed in the methodology not the results. Nevertheless, this a remains a major problem that needs to be clarified.

Overall, I think the algorithm presented in this paper is worthy of publication when the comments outlined above and below are taken into consideration.

Specific Comments/Questions P1L22: I don't think exploring is the correct word. Perhaps quantifying?

P1L24: regions not region

P1L25: such as ERS-1/2

P1:30: that extend operational utility.

P2L1: The objective of sea ice classification is to identify sea types and open water. You do not need "based on" unless you are going to mention everything taken into consideration.

P2L5: That is basically all factors. Why not just say discriminating between open water that is wind roughened and sea ice is difficult? P3L4: The CIS did not developed MAGIC. To my knowledge it was developed by Dr. Clausi at the University of Waterloo.

P3L20: The goal is not to extend ENVISAT single polarization, it is simply to utilize dual polarization data for ice classification.

P3L30: ice conditions.

P4L10-20: No need to describe what HV is. Start with: The HV channel...but this is a difficult passage to follow on the physics as to why HV is darker than HH in RADARSAT-2. I suspect English is the root cause. Revise.

P4L22-33: It would be better if the methodology was written out in paragraph form rather than numbered points. You can still include numbers (i.e. i, ii, iii, etc) in the text.

P5L13: Why not just simply state that the imagery was normalized to 35 degrees and move on? IA correction does not require a separate sub-heading.

P5L30: Unclear what is meant by Manual classification has be done...? Did the author's manually classify the imagery? It is unclear what is trying to be communicate in this sub-heading.

P6L10: Are all the texture features used in the classification or just some? How are certain ones selected over others? This needs to be clear in the text. See General Comment 4.

P8L5: Is there a website link to the MET ice charts? Do they use RADARSAT-2 imagery? If they do not, this should be mentioned as they are an independent source for comparison.

P8:10: Why is figure 6 being introduced before the other figures?

P13L6: developed, not proposed.

Figure 2: Needs some latitude/longitude information for reference

Figure 3: Needs geography similar to Figure 2. The line graphs need to include axis labels and the font needs to be bigger.

Figure 6. Labels a) and b) are not included on the image.