

## ***Interactive comment on “Observation of the 2018 North Greenland polynya with a new merged optical and passive microwave sea ice concentration dataset” by Valentin Ludwig et al.***

### **Anonymous Referee #1**

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The significance of the research presented is the high-resolution SIC dataset generated from merging of data from optical and microwave sensors. In the Introduction you state “This paper for the first time presents a merged product. . .” The research has potential use for all polynyas not just this unusual North Greenland polynya of 2018. The title clearly states that a new SIC dataset is created. The first paragraph of the Summary & Conclusions should be the only objective of the paper. Of the questions addressed, only question 1 should be answered in this paper, and probably should be expanded to include how much more information about a polynya can be discovered with this method compared to coarser resolution SIC data sets. Discussion and explanation of this polynya has been presented in Moore et al., (2018). Explanation of this

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polynya should not be an objective of this paper. The authors could present explanation and affects, e.g. how much sea ice grew, of this polynya in a different paper. I think the authors should focus on the method of creating their SIC dataset in this paper and that it can contribute to gathering more and/or better information about a polynya. A major revision would probably be necessary to narrow the focus. Sections 5 and 6 could probably be omitted or greatly reduced, as only some general statement(s) on the significance of this unusual polynya event would need to be made.

I was most focused on the new method for SIC and its evaluation as the primary objective of the paper. The reasons for the polynya formation and processes that occurred in it Sections 5 and 6 were less interesting and seem to lack relevance to the new method. I agree that you need to demonstrate the method on a polynya, and that this was an interesting one and you gave a reason for studying it but I think it unnecessary to discuss in detail the environment and processes that happened in this polynya.

Specific comments: Check that all the paragraphs all start with the same indent, or no indent, and space between paragraphs is consistent.

Quality of the graphics is good.

Abstract Line 4 change “which combines” to combining Line 7 change “as” to at Line 13 clarify that it is growth of sea ice thickness

Page 2 line 10 – 11. Give the instrument name AMSR2 first, then the band and algorithm. Page 3 line 30 Change “this February” to February 2018; give the dates that the polynya existed. Page 4 line 1 delete word “additionally” Page 4 line 5 change “we use” to used In both 2.1.1 and 2.1.2 add some information on the orbit characteristics of the platforms and a URL to those mission or instrument home pages. 2.1.1 Are both the swath and daily grid data publically available? 2.1.2 Delete “flies”. In some way more clearly state that the data records start in 1999 and 2002. Add URL for NSIDC DAAC for this data product. 2.2.1 EASE-Grid or EASE-Grid2? Explicitly state. 2.2.3 delete “seaice.dk” in first sentence, it’s irrelevant there. It is given as the url for the University in

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last sentence. 2.2.7 please give name of organization at <https://seaice.uni-bremen.de> along with the URL 2.2.8 delete the paragraph at end of first sentence. The sentence is not a paragraph by itself.

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Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2019-23>, 2019.