Comment on tc-2021-258

Anonymous Referee #1

Referee comment on "Satellite passive microwave sea-ice concentration data set intercomparison using Landsat data" by Stefan Kern et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2021-258-RC1, 2021

Title: Satellite Passive Microwave Sea-Ice Concentration Data Set Inter-comparison using Landsat data

Author(s): Stefan Kern et al.

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General Comments

The authors compare sea ice concentration from 10 global passive microwave products with that estimated from visible/near-infrared Landsat images. This highly detailed analysis is an important piece of work: the passive microwave record constitutes the longest existing record of global sea ice cover and it is crucial that users of these data understand when and where we have good confidence in particular products. One particularly useful aspect of this work is the comparison with the range of different ice regimes and an assessment of confidence in this comparison. This work highlights the need to assess satellite products under a range of different ice conditions and to consider concomitant processes that influence the sea ice concentration.

The authors provide good context by highlighting some of the limitations of the previous work on which this study builds and highlighting the reasons why a comparison of products such as this one is needed. They also provide the background and support needed to justify the datasets they are using to make the comparison.

This is a robust piece of work. The authors have given thorough consideration to any bias their method introduces to the estimation of sea ice concentration in the Landsat images and have made a rigorous comparison for different ice types. The case studies provide One thing I am not sure about is the accessibility to a wide readership. It is (necessarily) a dense read packed with technical details but as a reader, it is quite hard to keep track of all this detail. However, this is an important and well-conducted contribution to the literature and I recommend this manuscript for publication. I have noted some minor points below.

Line 45-46: I am not sure what you mean by "convergent high-concentration ice situations".

Fig 11: it is quite hard to read the text and there is no accompanying table. Perhaps you could move the legend into the white space below the Landsat 5 figure and increase the size of the text?

Line 43: suggest changing "are" to "a"

Line 44: you might consider changing the first instance of "used" to "assessed".

Line 85: you could just quote the number here to aid the reader, e.g. "an order of magnitude smaller than the 300 scenes used in this study".

Line 101: suggest changing "satisfying" to "satisfactory".

Line 107: suggest adding "that are" in between "polygons" and "highly".

Line 121-123: there is something not quite right with the grammar here.

Line 127: suggest changing "of" to "from".

Line 130: suggest changing the second instance of "of" to "from".

Line 153-154: suggest changing both instances of "is" to "are".

Line 296: suggest changing "quantifying" to "to quantify".

Line 308: do you mean "cases" instead of "cased"?

Line 599: suggest "also is" instead of "is also".

Line 642: suggest deleting ", which is".