

The Cryosphere Discuss., referee comment RC1
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Comment on tc-2021-316

Anonymous Referee #1

Referee comment on "Rectification and validation of a daily satellite-derived Antarctic sea ice velocity product" by Tian R. Tian et al., The Cryosphere Discuss.,
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Validation of a daily satellite-derived Antarctic sea ice velocity product: impacts on ice kinematics by Tian and others.

Summary:

Tian and others evaluate the KIMURA sea ice motion algorithm (Kimura et al., 2013) over Antarctic sea ice. They discovered problems with the existing algorithm in the Antarctic and subsequently generated a new dataset. The new dataset was validated using 3 buoy trajectories in Ross and Weddell Seas. Based on the buoy comparison they reported an RMSE between 4.4-5.8 km/day. Overall, this is a useful study/dataset but I think a little more rigor is required. I hope my comments improve the paper.

Major Comment:

I can see the justification for this work in that the previous paper (Kimura et al., 2013) only focused on the Arctic. Further, the improved version corrects problems in the previous version of the data. However, this paper is mostly just a comparison exercise and I am not convinced by the author's justification for not comparing it to the more widely used NSIDC and OSI-SAF sea ice motion products. I think it is important for readers to see how well this new KIMURA dataset compares with these more widely used datasets regardless if the spatiotemporal domains are different. If the other products are not as good it does not hurt to quantitatively show this. A comparison to other datasets will make this manuscript more comprehensive, ensure a larger readership, and encourage the utilization of the new KIMURA sea ice motion dataset.

Minor Comments:

1. I think the title is a bit miss-leading. The manuscript is about specifically about i) generating new KIMURA sea ice motion dataset and ii) validating it. I think the title needs to be changed to reflect that.

2. I found the structure of the paper could be improved with respect to the methods. In Section 2.1, the reader needs more details about how the KIMURA sea ice motion dataset is derived. Following this should be the identified problems and then specific details on how they are corrected for the new dataset. In its current form, the methods describing KIMURA sea ice motion dataset lack sufficient detail.

3. In Table 2 how many points were used in the comparison? I think a scatterplot needs to be included as a Figure in the manuscript as it is the standard with most sea ice motion comparison studies.

4. There is no mention of how well the product performs during the melt season. I realize sea ice motion is more challenging in the summer but this needs to at least be mentioned.

5. There are no examples of the new product other than Figure 3. I think perhaps an example with some sea ice motion vectors need to be shown. Perhaps together in a panel with Figure 8?

6. When I go online it seems as though data is only available for 2 seasons. Is the complete dataset available? I think it should be.