

The Cryosphere Discuss., author comment AC1
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Reply on RC1

Tian R. Tian et al.

Author 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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Thanks so much the reviewer for their comments. Author comment on behalf of all Co-Authors has listed as following, with the bold format. Also the original comments from reviewer are attached.

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.

We thank the reviewer for their comment. We gladly note that during the preparation of this manuscript we compared the NSIDC and OSI SAF velocity products with the same buoys used in this paper. While an important part of the story, we originally deemed the presentation of these findings outside the scope of this manuscript. We agree now that the presentation of this information will add value to the manuscript, and will now add this velocity comparison (NSIDC & OSI SAF with buoys) in an appendix, following the format given in Table 2, and some scatterplots suggested later in this review. We will draw attention to this appendix in section 4.2 of the manuscript.

Minor Comments:

- 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.

We thank the reviewer for helping hone the title. We propose the following title which emphasises the generation of the new dataset:

- Validation and rectification of a daily satellite-derived Antarctic sea ice velocity product: impacts on ice kinematics

- 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 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.

While we are generally happy to reference prior methods, we recognise that some more detail here will help the reader understand the techniques without reading the original manuscript. As such, we will provide more details on the derivation of the KIMURA sea ice motion in the Datasets subsection.

We found that, due to uncovering the dataset issues midway through our study, the structure of this manuscript was difficult to present in a logical order. We decided to include the vector issues in the results section, since this is a major result of our study. We prefer to keep the overall structure as it currently stands, and hope that the addition of more details of the KIMURA dataset derivation in the methods section will help alleviate the reviewer's concerns with the structure. However, we are happy to revisit this decision at the reviewer's insistence.

- 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.

We have produced a scatterplot comparing KIMURA and buoy ice-motion data and will add this to Table 2. As the data shown in this table are monthly, and the satellite product is daily, there are 30 data points for each comparison.

- 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.

The buoys in this deployment unfortunately demised prior to the summer/melt season. The longest lasting buoy reported until early November, and was far from the ice edge at that time. We plan to include a comment in the manuscript about possible seasonal performance issue of the ice-motion product, and agree that a follow-up study assessing melt season performance would be interesting.

- 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?

We thank the reviewer for suggesting the map of sea ice motion vectors, it will be suitable to show the improvement of sea ice motion in the new product. Rather than the suggestion of adding to Figure 8, we think the motion vectors will be a better companion to Figure 3. Thus, we will add the new panel of KIMURA sea ice motion vectors to Figure 3.

- 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.

Currently our dataset is only available for the years discussed in this manuscript (i.e., covering the buoy deployments). Co-author Noriaki Kimura is working to

produce (and release) updates of the corrected data.