

Conventionally, sea ice motion from passive microwave observations is extracted from aggregated brightness temperature daily products covering the entire Arctic or Antarctic domains.

This paper investigates the possibility of deriving sea ice motion vectors directly from the overlapping AMSR2 individual swaths (S2S scenario) as opposed to the daily products (DM scenario) and implications on the future ESA CIMR mission. A well-established ice motion tracking algorithm based on the Continuous Maximum Cross-Correlation (CMCC) approach was applied to derive ice motion vectors in both the S2S and DM scenarios. The authors demonstrated that a much larger number of ice motion vectors with higher accuracy (as validated against in-situ buoys) is derived in the case of S2S compared to DM scenario. The S2S ice motion extraction scenario is recommended to be applied to the future CIMR mission, which will provide a higher spatial resolution compared to AMSR2. This is an interesting paper, but I have the following comments which need to be addressed before the manuscript can be considered for publication.

Major comments:

1. In this study, the authors used only winter time periods for both the Arctic and Antarctic. What about the summer time? Could S2S approach provide better (or any reasonable) ice motion tracking results compared to the DM approach in summer time? Would lower remote sensing frequencies be recommended in that case (due to the larger penetration depth) as opposed to the higher frequencies? I think the paper will look much better if quantitative evaluation of ice motion provided by S2S versus DM during the summer time is presented.
2. The authors discuss the differences in sea ice motion tracking from different frequency channels (mainly Ka and W due to their relatively high spatial resolution). However, polarization options were not discussed. What are the differences in terms of the number and accuracy of ice motion vectors derived from the horizontal and vertical polarization swaths? What optimum polarization option or polarization combinations are recommended for the ice motion tracking?

Technical corrections:

There is some language inaccuracies in the paper. I tried to point out some of them below with suggested changes.

Consider to mark figure panels with letters (a), (b), etc.

Line 37. “These can...”. It seems that some word between “These” and “can” is missing.

Line 194. “over a Northern and a Southern Hemisphere grid.”. Should “a” be replaced with “the”?

Line 232. “A first” → “The first”.

Line 234. "...very different characteristics to the DM products..." → "...very different characteristics **compared** to the DM products..."

Line 242. "...these mean times associated with the DM ice drift product are averaged values..." → "...these mean times associated with **the fact that** the DM ice drift product are averaged values..."

Line 278. "...the low number of validation data..." → "...the **lower** number of validation data **points**..."

Line 284. "...but this time studying..." → "...but this time **we consider**..."

Line 285 and 289, and throughout the text. "100 mn → "100 **min**".

Line 318. "Fig. 6 is a repeat of Fig. 5... ". In fact, Fig. 6 is similar to Fig. 5 (left, NH) and not the entire Fig. 5. Please reflect it accordingly in the text.

Fig.7 and Fig.8. Please move the figure title to the figure caption.