The Cryosphere Discussions

The Cryosphere Discuss., referee comment RC2
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Comment on tc-2022-95

Anonymous Referee #2

Referee comment on "Inter-comparison and evaluation of Arctic sea ice type products" by Yufang Ye et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2022-95-RC2, 2022

General comment

This manuscript presents the inter-comparison of various SIT products from microwave remote sensing data. The performance of the SIT products was evaluated and the causes of differences in the products were analyzed. SIT has been used as an important information in research for global climate change and future prediction. Therefore, a comparative study on the performance of the operationally used SIT products is of high importance.

The manuscript is well written, and appropriate tables and figures are used to explain the results. It seems very meaningful to analyze the comparison results in time and space. However, in order for this manuscript to be published in the Cryosphere, more descriptions should be added about the data and methodology used in the study (requires a section on methodology). More discussion of the results is required.

Specific comments

Abstract: Specify the names of the SIT products (algorithms) analyzed in this study.

Line 27: Please state clearly why sea ice is a sensitive indicator of climate change.

Line 29: It would be nice if it quantitatively indicated how much the thickness and volume of sea ice decreased.

Line 35-37: Please specify how sea ice patterns affect Arctic and mid-high latitude regions and how they affect Arctic ecosystems.

Line 68: The authors did three scientific questions, but the second question (how we choose SIT product for different applications) is lacking in discussion.

Line 83: How are the microwave scattering and radiometric characteristics of MYI and FYI different?

Line 77: Each product has a different grid size. It should be explained how it was dealt with in the comparative evaluation.

Line 78-143: Please describe in more detail how FYI and MYI are distinguished due to which characteristics in each SIT algorithm. For example, if a SIT product is produced based on PR and GR, an explanation is required for the differences between the values â□□â□□of PR and GR of ice types â□□â□□and why the differences occur.

Line 150: NSIDC-SIA was used as reference data. How accurate is NSIDC-SIA?

Line 153: How and what information was retrieved from the SAR images for the SIT products evaluation should be described.

Line 173: Is it the result of this study that different SIT distribution patterns were found in the regions selected by the authors?

Line 185-186: Is ‘divergent movements’ the only cause of increase in the MYI extent?

Line 263: The authors compared SIT daily products with the SAR images. It is necessary to discuss the comparison between the image captured at a specific time and the daily product.

Line 263: The authors identified the distribution of MYI by visually analyzing the SAR image. It would be better if MYI could be determined by quantitatively analyzing backscattering or textures from the SAR images.

Line 368-371: How are the input parameters affected by atmospheric factors and surface features? More discussion is needed.

Line 393: Explain clearly about the training dataset.

Technical comments

Line 157: SAR Wide B à SAR Wide Beam

Line 199: What does (2000) mean?

Line 402: Is [55] a reference number?

Figure 4: Delete 'Jan' on the horizontal axis.