

Earth Syst. Sci. Data Discuss., referee comment RC1
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Comment on **essd-2022-186**

Lars Kaleschke (Referee)

Referee comment on "A new sea ice concentration product in the polar regions derived from the FengYun-3 MWRI sensors" by Ying Chen et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-186-RC1>, 2022

I am pleased to see that the ASI method is being used successfully on the Chinese satellites FengYun-3B, 3C and 3D. To my knowledge this is the first sea ice product from a Chinese satellite series that covers a long time period. Therefore, I consider this work potentially relevant for the ESSD journal.

I'd like to give only general comments and questions because the information provided with the manuscript does not allow further review in particular with respect to the source data and validation. A code repository is missing, see <https://essd.copernicus.org/articles/10/2275/2018/>

For the introduction of the near 90 GHz method please also refer to the prior work of Svendsen et al. (1987) which forms the basics of the algorithm.

Svendsen, E., Matzler c., and Grenfell, TC. (1987). "A Model for Retrieving Total Sea Ice Concentration from a Spaceborne Dual-Polarized Passive Microwave Instrument Operating Near 90 GHz", International Journal of Remote Sensing, Vol. 8, No. 10, pp. 1479-1487.

I can not judge the quality of the brightness temperature because it is not yet published: The recently re-calibrated brightness temperature (TB) of the MWRI sensors provided by NSMC (Wu et al., 2022) were used in this study

Because ESSD is a journal for "open data" (isn't it?), I also would like to know a bit more about the availability of the source data.

I have not fully understood the concept of the preliminary dynamic tie points. This could be outlined in more detail.

My main concern is insufficient scientific motivation: "In order to promote the application of MWRI sensors, especially to back up the existing sea ice products". Why is there the need for a backup for the existing data? Well, I could understand the argument for the future. This could be further elaborated. However, I think the main advantage of having such a data set is the true independence which potentially allows the application of techniques like triple collocation between different satellite data records. How would you judge the "risk of breaking". For example, we expect the AMSR3 launch in 2023 or 24.

What is meant with "qualified to be integrated into long-term sea ice records" and "The MWRI-ASI SIE can be better integrated into the Sea Ice Index SIE in the Arctic and the OSI-SAF SIE in the Antarctic compared to other products."

Table 1: TB characteristics missing. What about uncertainties? Grid resolution is different from field of view.

Table 1 in Zhao et al. (2021) states across scan resolution of 89 GHz is $9 \times 15 \text{ km}^2$. With a grid spacing of 12.5 km there is significant undersampling in one direction. Why not use a 6 km grid for the sake of Nyquist-Shannon?

The ICDC ASI-SSMI version is probably the 5-day median-filtered version? The single day data are available from IFREMER. Both data sets are different in their characteristics. Probably not too much but this should be considered. This is important also for the discussion of the land spillover because the temporal filter has a strong effect. For potential further improvement I refer to Maaß et al. (2010).

Nina Maaß & Lars Kaleschke (2010) Improving passive microwave sea ice concentration algorithms for coastal areas: applications to the Baltic Sea, *Tellus A: Dynamic Meteorology and Oceanography*, 62:4, 393-410, DOI: 10.1111/j.1600-0870.2009.00452.x