The Cryosphere Discussions

The Cryosphere Discuss., author comment AC4
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Reply on RC1

Grant J. Macdonald et al.

Author comment on "Evolution of the dynamics, area, and ice production of the Amundsen Sea Polynya, Antarctica, 2016–2021" by Grant J. Macdonald et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2022-51-AC4, 2022

We add another reference that supports our definition of 'polynya area' in winter, and the ability to visually interpret this in SAR imagery. Aulicino et al. (2018) manually measure polynya area ('extent') in Terra Nova Bay (Antarctica) in ENVISAT ASAR images, based on visual interpretation, as a form of validation for an approach they develop using MODIS ice surface temperature. They do this during winter, when as in our winter examples, the polynya includes thin ice formation (e.g. frazil ice streaks).

"In the SAR imagery polynyas are clearly visible and well defined thanks to an exceptional spatial resolution (up to 5 m). This resolution decreases to 150 m for the ASAR WS images reported in this study. Nevertheless, they allow us to define the shape of the TNBP [Terra Nova Bay Polynya] and to estimate its area with a remarkable precision as for ASAR images reported in Figures 6c and 7c."

As mentioned in the above quote from the paper, examples of the polynya in winter (August) identified in SAR can be seen in Figures 6c and 7c, with similar characteristics to those observed in our study in the Amundsen Sea using Sentinel-1 SAR (40 m resolution).

We will add this paper as a reference in a revised version.

Aulicino, G., Sansiviero, M., Paul, S., Cesarano, C., Fusco, G., Wadhams, P., and Budillon, G.: A new approach for monitoring the Terra Nova Bay polynya through MODIS Ice Surface Temperature Imagery and its validation during 2010 and 2011 winter seasons, Remote Sens., 10, 366, https://doi.org/10.3390/rs10030366, 2018.