

RC2: ['Comment on egusphere-2022-1435'](#), Anonymous Referee #2, 10 Feb 2023

The paper contains a very thorough analysis of frazil ice streaks in a large polynya using the possibilities of remote sensing. It is a good source of statistical information for further investigation. I particularly like the inclusion of wave modelling, which allows for understanding the significance of the findings better. I recommend publication with minor revisions.

Response: We would like to thank for your review of the manuscript and providing your comments and suggestions to improve the quality of the manuscript. The following responses (in blue font) have been prepared to address all comments point by point.

There are a lot of symbols used in the text, a table with the variable definitions would be helpful.

Response: A table with a list of symbols used and their definitions will be added as an Appendix

The paper also ends quite abruptly, one or two concluding sentences could be nice.

Response below along with the answer to the comment on line 112

Specific comments:

Line 30: perhaps an estimate of what percentage of the heat and moisture fluxes in the ice cover of this region happen over the polynya

Response: We will add relevant literature references:

Due to very strong ocean–atmosphere heat and moisture fluxes and high rates of new ice production with the associated brine rejection, latent heat polynyas play an important role in shaping the local and regional weather patterns, as well as in water mass formation, ocean mixing and baroclinic processes (Nakata et al., 2015, Ohshima et al., 2022).

Line 112 onward: the introduction has changed into a summary, please put this at the end of the paper

Response: As suggested, this part of the text will be moved to the end of the discussion to summarize it. Instead, at the end of the Introduction we will add a few sentences describing the purpose and scope of the work:

The aim of this study is to characterize geometric features of frazil streaks formed in polynyas, based on high-resolution (pixel size 10–15 m) visible satellite imagery recorded over the Terra Nova Bay (TNB; Fig. 1). Polynya size, ice concentration, and geometric properties of streaks are determined and related to the observed air temperature, wind speed and direction to explain observed patterns of frazil at the sea surface and to find simple empirical formulae linking the atmospheric forcing and analysed variables. Additionally, for a subset of satellite scenes in which wind waves are discernible, peak wave length and direction are determined and compared with corresponding open-water wave growth curves computed with a spectral wave model in order to analyse how wave interactions with frazil/grease ice may influence wave growth.

Line 145: the correlation with meteorological data on particular timescales is a result in itself, so this sentence belongs in the results section

Response: We agree, but have chosen not to consider correlations with meteorological data on different time scales. This statement has been included in paragraph "2.1 Dataset" only to explain the length of the meteorological data averaging period. Results of correlations for this particular timescale are presented in the results section.

Line 225: do you mean "For three events"? These specific events have not been introduced before I believe

Response: Thank you for pointing it out. This will be corrected and supplemented with the dates of these events:

For three events (6 and 22 Oct 2016, 8 Oct 2019), there are coinciding pairs of MSI/OLI images, recorded at a time interval of no more than 0.5 hours.

Thank you for the other style suggestions and corrections. All will be revised and corrected accordingly:

Line 9: "as well as" humidity instead of "and"

Line 26: use commas when using "or" for synonyms: Coastal, or latent heat, polynyas etc.

Line 35: please split this sentence in two to make it easier to read

Line 312: "with average"

Line 328: "is shown"

Line 331: "changes"