

Interactive comment on “Laboratory Study of the Properties of Frazil Ice Particles and Flocs in Water of Different Salinities” by Christopher C. Schneck et al.

Anonymous Referee #3

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General Comments

The authors have conducted a very thorough analysis of the effect of various levels of salinity on frazil ice formation and flocculation. The manuscript is very well organized and written, and fits nicely within the scope of the journal. It fills a gap in the literature and will be well received by the river and sea ice researchers. I recommend that the paper be accepted.

The introduction provides the reader with a good appreciation of the current state of knowledge and clearly outlines the contribution of this paper. Throughout the paper the authors do a good job of comparing with previous experiments and field measurements

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and highlighting similarities and differences.

The experimental setup is described well, and the authors have conducted an impressive 9 runs of each test condition to evaluate the reproducibility of the experiments. The data is presented well and the analysis is thorough. The conclusions are supported by the data. The entire study is tied up quite nicely by the end.

Specific Comments

Page 2, line 29. Am I correct that the authors are implying that this polynya is always there? I understand that polynya's are persistent, but is this one permanent? Should also be 'produces' rather than 'produce'.

Page 3, line 12 – might be nice to report the salinities of the Ushio and Wakatsuchi study rather than just saying low and high salinities.

Page 3, line 19 – Frazil 'deposits'. Line 22 – '44 ‰ water' should be reworded. Interchangeable use of disc and disk. As well as inconsistent hyphenation disc-shaped vs disc shaped, disk-like, etc.

If space is limited, Figure 2 could be removed. The experimentally-measured supercooling plot in Fig. 3 would be sufficient, and the 'theoretical' declining temperature of the residual supercooling level could just be described. COV is only defined in a figure caption.

Page 9, line 31 – should be Eq. (2) rather than 1.

The volume of particles being negligible compared to flocs is interesting, and a reader might question this based on the number of particles in Fig. 6 for example. Perhaps consider summing up the number and volume of particles and flocs in Fig. 6 and reporting them to help support your statement.

Page 11, line 10 – the eccentricity statements could appear near Eq. (1).

At a glance, Figure 9 and 10 show numbers and sizes of frazil particles that don't

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appear to be much different than those of the frazil floes. Have the size distributions plotted separately for Figs. 13 and 14 also make it difficult to compare. Consider combining these two figures.

Page 14, Line 9 – Latent heat of fusion of ice seems to be in J/g, rather than J/kg. The discussion sometimes switches from past to present tense in a way that doesn't seem to always be correct.

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2019-99>, 2019.