

Interactive comment on “Initial sea-ice growth in open water: properties of grease ice and nilas” by A. K. Naumann et al.

Anonymous Referee #2

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My general impressions are pretty favorable. The study, albeit done in a small tank, has good explanations of the experimental techniques and the resulting variations in ice conditions, comparing quiescent and turbulent growth resulting in the two ice types nilas and grease ice. Comparison of experimental methods for calculating ice production is applicable to both field and similar tank experiments and points out the significant error involved if the salinity of interstitial water is not taken into account. The physics is accurate and described well, as to how the two ice types evolve. The scale of the experiments is limited by tank size, but similar results are seen in both larger tanks and the very few field observations available, suggesting the results are relevant to the natural settings. (I may differ from the other referee in that respect.) The English has some awkward constructions, given that the paper is derivative of Naumann's thesis written in German, so it could use some rewriting, perhaps editing by an English copy

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editor would solve most problems. Some specific examples (not comprehensive) are given in the specific comments.

Specific Comments:

Eq. 5 is for an NaCl solution, not sea water so the phrase: to calculate the salinity of the interstitial water with Eq. (5) (for field use); is probably in error, needs to say that the seawater equivalent of Eq. 5 is to be used.

Awkward English examples:

Abstract. Awkward English Grammar in the phrase: In contrast, the bulk salinity of nilas is in the first hour of ice formation well described by a linear decrease of $2.1 \text{ g kg}^{-1} \text{ h}^{-1}$ independent of 10 air temperature. Such rapid decrease in bulk salinity can be understood qualitatively in the light of a Rayleigh number, the maximum of which is reached while the nilas is still less than 1 cm thick. (REWRITE)

Awkward phrase “which is getting thicker when water molecules freeze to the ice–water interface.” For example, a rewrite might say, “which thickens as water molecules freeze to the ice-water interface.”

Awkward and Unclear: For the experiments with waves, first a pure grease-ice layer appeared, before pancake ice with an ice crystal layer in between formed.

Interactive comment on The Cryosphere Discuss., 6, 125, 2012.