

Biogeosciences Discuss., referee comment RC2
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Comment on bg-2022-113

Anonymous Referee #2

Referee comment on "Ice nucleating properties of the sea ice diatom *Fragilariopsis cylindrus* and its exudates" by Lukas Eickhoff et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2022-113-RC2>, 2022

This is a sound set of experiments showing an increase of 7.2 °C in the ice nucleation temperatures for seawater containing *F. cylindrus* diatoms when compared to pure seawater. The laboratory study seem carried out well and the literature review is state of the art. There are two important aspect to be considered before this paper can be accepted

1) The paper does not read well and it seems a bit too long. I suggest to merge the results discussion implication or to short by half all the text in the last two section. Once have a feeling there are many sentences saying the same and not really giving a clear simple message. Clean up and make a simple clear concise message.

2) It seems to be that in the abstract and conclusion, and also in the introduction (well written) one of the main result is the results "that *F. cylindrus* diatom cells as well as cell fragments suspended in seawater can induce heterogeneous ice nucleation, while ice-binding proteins produced by *F. cylindrus* such as *fcIBP11* have negligible ice nucleation activity.". This is important and also compared with the literature, but what is the reason? Any literature support any speculation and possible reasons? This is in stark contrast with other literature supporting the idea of proteins being important in INP, but little is discuss in the text of this paper. I suggest to expand this extensively given it seems a major result. It is also important to give possible biogeochemical reasons of cell fragments being more important than proteins.

I think once the two points can be carefully addressed this paper may be accepted if the two points are well addressed.