

The Cryosphere Discuss., referee comment RC1  
<https://doi.org/10.5194/tc-2021-114-RC1>, 2021  
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## **Comment on tc-2021-114**

Mats Granskog (Referee)

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Referee comment on "Meltwater sources and sinks for multiyear Arctic sea ice in summer"  
by Don Perovich et al., The Cryosphere Discuss.,  
<https://doi.org/10.5194/tc-2021-114-RC1>, 2021

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### *Overall assessment*

Perovich et al provide an elegant analysis of legacy SHEBA data to resolve the fate of snow and ice melt water during Arctic summer. This paper is concise and clearly written, and provides new insights into the fate of summer snow/ice meltwater in a multi-year ice pack. This paper is acceptable after some minor revisions, which are relatively simple to address.

### *Major points*

Be consistent in the use of terms related to the melt water quantified. If salinity is not taken into account it is more accurate to call it "melt water" and not "freshwater". Also make sure you use the terms consistently in the text, figure labels and legends and captions. "melt water" and "fresh water" are not interchangeable terms IMHO.

Add some relevant citations from work on melt ponds and support some statements with citations. Indicated in the attached pdf. Already Nansen did observe such meltwater layers.

It would be also useful to early in the paper describe the composition and properties of the ice pack where the SHEBA study took place. Typical information on snow depth, ice thickness etc. of the ice pack would be useful to have at least briefly described.

### *Detailed comments*

The above and some more minor suggestions are included in the annotated supplement pdf

Please also note the supplement to this comment:

<https://tc.copernicus.org/preprints/tc-2021-114/tc-2021-114-RC1-supplement.pdf>