

The Cryosphere Discuss., referee comment RC1
<https://doi.org/10.5194/tc-2022-198-RC1>, 2022
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Comment on tc-2022-198

Anonymous Referee #1

Referee comment on "Seasonal and interannual variability of the landfast ice mass balance between 2009 and 2018 in Prydz Bay, East Antarctica" by Na Li et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2022-198-RC1>, 2022

This study employed the observation data from Antarctic ZS and DS station, and covered 2009–2010, 2013–2016 and 2018 ice seasons. They aimed to quantify and explain the seasonal and interannual variations in the landfast ice mass balance for these two stations. The manuscript is basically well written and the contents are of worth to the Antarctic LFI observation and modeling community. However, the novel finding of this study is not well summarized. The following questions should be addressed before publication.

Major Comments 1:

What does the negative F_w mean as shown in Figure 7? In general, the ice base temperature is higher than the sea water temperature, which indicates the positive F_w . Does the significantly negative F_w occurred in DS2015 and DS2018b mean the existence of supercooled water? Or is it just a modelled error? How large are the modelled errors for heat flux components? If it is difficult to quantify these errors, the uncertainties of modelling results should be discussed at least.

Major Comments 2:

I realize that this study provides abundant helpful information about LFI evolution based on observations. However, these findings are not well summarized. I would suggest the authors to add a sketch map to summarize the key findings and related mechanism, especially for describing the critical factors/ thermodynamic processes that are responsible for the LFI variabilities.

Other specific comments:

Figure1: the expression in Figure 1(a) could be easily misunderstood. The whole Antarctica and the study region in east Antarctica should be given separately.

Table2: add a column to present the type of buoys.

An additional table is needed to summarize the observed variables of each buoy, and give the corresponding key technical specifications (e.g., precision, uncertainty, measurement range).

What does vertical red bars represent in Figure 6b and Figure 9d?