

## Review for tc-2022-198

Landfast ice (LFI) is one of the predominant features around the Antarctic coastal zone, representing 4-12.8% of the Antarctic sea ice extent while around 28% of the total sea ice volume in the Antarctica. LFI is a sensitive indicator to climate change. Its local and region variations are affected by the atmospheric and oceanic conditions, as well as the local conditions. Prydz Bay in East Antarctica is the third largest bay around the Antarctic continent, with the Chinese Zhongshan Station and the Australian Davis Station in this bay. With the IMB data near the two stations between 2009 and 2018, Li et al. studied the “Seasonal and interannual variations in the landfast ice mass balance between 2009 and 2018 in Prydz Bay, East Antarctica”. They presented the LFI differences between the two stations, identified the differences are due to local differences in topography and katabatic wind regime, and investigated the main factors regulating the LFI mass balance. The manuscript is well structured, and generally well written. More detail comments are given below. After the minor revision, I recommend to publish this manuscript.

Detail comments:

L67, “Of these” can be remove.

L69, Suggest move “the third largest bay around the Antarctic continent” after L67 within the Prydz Bay.

L72-73, “Largely as a result of discontinuous observations associated with logistic difficulties” can be rewritten for concise, e.g., “Due to logistic difficulties for regular observations”

L74-75, Is it “the deployment of the ice mass balance buoy” or “the ice mass balance buoy” permit the continuous monitoring of the sea ice mass balance. Suggest rewrite to “The ice mass balance buoys (IMBs) permit the continuous monitoring of the sea ice mass balance and their deployments are human resources economy.

When the IMBs started to deploy? Please add this information.

L85, Fig. 1: Enlarge the red stars symbols in Fig. 1a.

Can you rotate b) and c) 180° to let stations on the upper right and the sea ice or sea ice/ocean on the lower left?

There are two red stars in Fig. 1b. Are they same as in Fig. 1a?

L106, remove “observed” or “record”

L115, Table 2, Add a column for the type of IMB (CRREL-IMB or SIMBA) deployed

L133, Label “the Russian Progress II station” on Fig. 1.

L223, From Fig. 3d, the wind are dominated by easterly wind and ESE wind at ZS, and dominated by NE, and NNE and ENE at DS station.

L231, where is the Vestfold Hills? Can you label it in Fig. 1?

L249, remove “obtained” and replace “synchronously” with “synchronous”.

L265, Fig. 4, No lines for ZS2014 in Fig. 4a.

L318, replace “; the values” with “which”

L315, Fig. 6b, is it difficult to see the temperature change in S1 and S2, please change another color for them. Or add one figure for temperature gradient? This is related to your statement in L348-349.

L358, “This temporal lag .... within the ice column”. Give a time for this temporal lag change”.

L365, I disagree with “the basal ice growth was primarily regulated by Fc and Fw”. From Fig.7, the basal ice growth was also regulated by Fl. So please also discuss the Fl in the manuscript.

L370, replace “;, this drove” with “which drove”

L402, “For a site”, point out this site is which site in Table 3

L406, the same site, I think you are pointing to S1 in Heil (2006) and Heil et al. (2011). Please add this information in your text.

L429-443, Your LFI mass balance results are from the IMBs point measurements. The point measurements are more related to small-scale processes. How are you related the small-scale results to local-scale, regional-scale? Can you discuss this a little bit?

L448-451, Obviously your description is around DS. Could you add this information clearly in the text?

L452, the largest increase in the simulated LFI thickness, as I see from Fig. 8, occurred at ZS2010 (Fig. 8c), not ZS2013b (Fig. 8e). Can you re-check your results?

L461-462, This sentence can be rewritten as “This difference indicates that the LFI at ZS was more influenced by other factors, such as the oceanic heat flux and katabatic wind, compared at DS.

L470-471, Please make sure that you refer to the right Figures, Fig. 7 or Fig. 8? In Fig. 7i and 7j, one can see the larger influence of FW near ZS than near DS. But you are comparing with and without the oceanic heat flux, Fig 8 might be the right figure you refer to.

L472, Make the sentence to concise. Such as rewrite as “which leads to small contributions to the oceanic heat flux to the LFI mass balance there.”

L475-479, It seems that your increase or decrease of simulated thickness is compared to AT\_obs or AT\_mean. Please clarify this in your text.

L490, using same y-axis ticks in all the subplots for Fig. 8.

L523, remove “explaining” before “why”

L533, “upward shift” or “downward shift”, please recheck. From Fig.2a, the snow-ice interface was downward shift.

L555, not only distribution of snow but also redistribution of snow. Please add this information in your text also.