This Short Comment focuses exclusively on correcting some inaccurate representations of our findings that we reported in Khazendar et al. (2019). We gratefully thank the authors in advance for their kind consideration.

- The authors incorrectly characterize one of the main conclusions of our study in Lines 276-282: "Maximum melt rates for 2012 to 2015 are estimated to be ~8-10 m/yr for concentrated plumes with limited spatial extent, or about a factor 3 less if the melt water emerges with a uniform distribution from beneath the grounded ice (Khazendar et al., 2019). Whether concentrated or evenly distributed, the factor-of-3 reduction should roughly represent the average melt rate across the terminus. Thus, scaling the plume rates from Khazendar et al. (2019) by a factor of 3 yields approximate average melt between ~3.5 m/yr during the summers with warmest water and ~1.9 m/yr during the summers when the water was coolest."

In their argument, the authors take our values of *maximum* melt rates and translate them to lower mean rates. Yet, we opted to present the maximum melting rates purposefully. For deep glaciers such as Jakobshavn Isbrae, ocean-induced melting at the front tends to reach its maximum value within ~100 m of the grounding line up the face of the glacier (Carroll et al., 2016). This enhanced melting has been observed to produce widespread undercutting of the glacier fronts (Fried et al., 2015; Rignot et al., 2015), which could lead to increased calving, frontal retreat and reduced resistance to flow. Observations and theoretical work have suggested that calving can be a direct response to undercutting at the front (Bartholomaus et al., 2013; Luckman et al., 2015) and that submarine melting and undercutting can contribute to calving that is several times the melting rate (O'Leary and Christoffersen, 2013; Benn et al., 2017; Todd et al., 2018). Therefore, rather than scaling our quoted melt rates down, it is more likely that the melt rates should be scaled up to represent their potential impact on the calving rate.

Furthermore, we emphasized in our paper that while we found that the glacier's thickness changes had a strong correlation with ocean temperature variability, the former was even more strongly correlated with the variability in submarine melting rates.

- The authors then continue on Lines 289-291 with another argument to justify rejecting the relevance of submarine melting: "Although submarine melt should have been substantially reduced in the summer of 2016 (Khazendar et al., 2019), the maximum retreat was virtually identical to that of the four prior years and speeds were only slightly reduced, suggesting melt is not directly controlling retreat."

This is a mischaracterization of our data and approach.

It is clear from the Davis Strait mooring data (Figure 3 in Khazendar et al., 2019) that cold water started arriving in Disko Bay in June or July of 2016, and in fact Figure 2 of Joughin et al. shows that glacier speeds in 2016 at Tmax-1km, M6 and M9 all experienced the smallest increases between the spring minimum and the summer peak than any other summer since 2011. Our Figure 3 shows the same.

As we state in our paper, the ocean properties and subglacial discharge volumes we use in calculating submarine melting rates are from the summer of each year, while the thickness changes of Jakobshavn are from the following spring, when the altimetry data were acquired. Regarding the year 2016, this is what we stated: "Most prominently, the sharp drop in ocean temperatures in 2016 and 2017 by 2 °C relative to the peak temperature in 2014 corresponds to the slowing and dramatic thickening of the glacier in 2017 and 2018." Indeed, our observations (Fig. 3 in Khazendar et al., 2019) show that the flow speed of Jakobshavn starts a significant slowdown in the summer of 2016, around the time of the observation of the large drop in ocean temperatures and submarine melting rates. The glacier then reaches its slowest flow speeds in the spring of 2017, coinciding with our measurement of significant thickening. The flow speed then stages only a weak recovery in the summer of 2017. This pattern is also shown by the data in Figure 2 of Joughin et al.

Our rendering of the events and their relative timing is consistent, so we request that authors remove the text on Lines 289-291 in its current form as it misconstrues our findings.

More generally, we aimed to be careful in framing the conclusions of our study as not to claim that ocean temperature variability and submarine melting are the *sole* explanations of Jakobshavn's dynamic evolution. We wrote that we "find the evidence sufficient to conclude that ocean temperature variability, through its influence on submarine melting rates, has been a main, and sometimes dominant, factor in shaping Jakobshavn Isbrae's interannual dynamic evolution since the disintegration of the ice shelf in 2003." We feel this conclusion holds without us having to dismiss the possibility that other processes might also have had a role in shaping the evolution of Jakobshavn. We dedicated parts of our paper (both in the main text and the Supplementary Info) to a discussion of those other potential influences.

- Finally, the authors acknowledge on Lines 284-285 that they "… cannot entirely rule out melt serving in some way as a "catalyst" (e.g., by undercutting the front) to accelerate calving, …" Other statements in the manuscript, however, read as if the role of submarine melting, as presented in our study, has been entirely and conclusively ruled out. Such statements appear on Lines 20-21, 274-275 and 330-331. In light of our responses above, we ask the authors to consider either a) providing evidence that justifies those statements, b) adding nuance to those statements to reflect the fact that the conclusions of our study have not been refuted here, or c) simply removing the parts of those statements that concern our study.

With thanks and best wishes to all,

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