

Interactive comment on “Brief Communication: Heterogenous thinning and subglacial lake activity on Thwaites Glacier, West Antarctica” by Andrew O. Hoffman et al.

Anonymous Referee #1

Received and published: 18 May 2020

General comments: This paper describes the behaviour of subglacial lakes in the Thwaites Glacier region. It describes an extension to an existing dataset with valuable new observations. It is well-suited for a 'brief communication' as it is timely and of relevance to ongoing research in this area. The authors use the new data to support the conclusion that subglacial lakes have a small effect on overall ice flow and conclude that their fill-drain cycles can be largely ignored when interpreting long-term trends due to the negligible effect on basal friction. The results are concisely presented.

Specific comments: Both the filling and draining of lakes have a small effect on the instantaneous velocity, but it seems that the long-term effect on the rate of acceleration

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is more ambiguous. There is definitely a change in acceleration between 2010-12 and 2014-15. Is the authors' opinion that this is as a result of the lake drainage or driven by change elsewhere on the glacier? The lack of acceleration across the GNSS data gap in 2013-2014 followed by a faster rate of acceleration afterwards requires additional explanation. Contrary to the main conclusion, this overall long-lasting drop of ~5% in velocity relative to the 2010-2012 trend may still have some importance in decadal trends. Despite these minor details the overall conclusions of the paper appear reasonable.

Technical comments: Fig 1: needs a/b labels

Fig 2: I would swap the y-axes for ease of reading, given the temporal distribution of the data.

Line 85: does this refer to the filling rate or the draining rate?

Line 95: what is the evidence that it is driven from upstream and not downstream?

Line 100: reword the sentence "This roughly..." for clarity

Line 135: reword the sentence "Enhanced lubrication..." for clarity

Supplement: I assume the figure at the bottom of page 5 is the panelled image referred to in S4? Perhaps consider renaming it to S5.

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2020-80>, 2020.

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