

Interactive comment on “Greenland Ice Mapping Project: Ice Flow Velocity Variation at submonthly to decadal time scales” by Ian Joughin et al.

Anonymous Referee #1

Received and published: 11 April 2018

This study builds on previous work by the authors to create a long-term record of ice flow on the Greenland Ice Sheet with a variety of satellite data. This manuscript describes new velocity products derived from Landsat-8 and Sentinel 1A/B, demonstrates that there is good agreement across platforms, and uses the extended velocity record to analyze velocity variations at different points on the ice sheet. The paper clearly demonstrates the importance of having a long, high resolution velocity time series for interpreting changes in Greenland. I thought the paper was well written and easy to follow. I have only a few comments.

p. 2, l. 9: Perhaps point out that Sentinel 1A/B are SAR satellites, since the previous paragraph mentions radar and optical imagery and to avoid confusion with Sentinel 2.

p. 3, l. 30: I would've liked to see a few statements about how Landsat-8 velocity

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fields produced for the GIMP are different/better than others – or is it just that you use a control point procedure and previous studies didn't? Maybe then just say "... unlike in previous work, we use a control point procedure..." (I realize that this is discussed a bit in Joughin et al., 2017, but I still think a couple of sentences here would help the reader.)

Fig. 6: I don't understand what exactly is being plotted here. This needs some explanation. Is each data point the sum of all of the velocity pixels for a given glacier? Or are you sequentially adding the velocity time series somehow?

p. 11 / Fig. 7: Even if the trends in this data aren't as strong as reported by Tedstone et al., there does appear to be some slow down along the margins and some flow acceleration near the snowline. Can't that be taken as an indication of hydrologically driven changes? Or am I misunderstanding the figure? I would've like to have seen a little more detail regarding the comparison of these data with the figures from Tedstone et al., such as the average trend over the region and the percentage change. Anyway, it seems that the comments already posted to the manuscript discussion will help to clarify any confusions here.

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-40>, 2018.