

Interactive comment on “Brief Communication: 2014 velocity and flux for five major Greenland outlet glaciers using ImGRAFT and Landsat-8” by A. Messerli et al.

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Messerli et al (2014) provide a test of the ImGRAFT toolbox and Landsat 8 imagery for derivation of surface velocity on Greenland outlet glaciers. They focus on five of the largest volume outlet glaciers. The comments below indicate a need for more detail in the existing brief discussion of glacier characteristics as causation of velocity change. Secondly there is need for validation data to be presented in a quantitative fashion. The match with SAR velocity data looks good in Figure 2, but this is not sufficient. This will be a useful short comment if the validation and general description is more complete.

6237-7: . . . surface mass balance “loss” (Howat, 2011).

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6237-24: ImGRAFT offers what spatial and temporal resolution or efficiency advantages for velocity assessment?

6238-28: The SAR data is used as validation in Figure 2. A better numerical comparison is warranted for validation of the observed velocities whether this is the SAR data or not.

6240-15 or 6241-15: It is worth noting that the seasonal velocity change on Jakobshavn was not evident before the recent terminus retreat resulted in the loss of most of the floating terminus tongue. Pelto et al (1989) and Echemlmeyer et al (1990) both note this fact; particularly Fig. 3 and 4 in the latter paper illustrate this. The lateral convergence of Jakobshavn also should be noted as important to the increase in velocity in the lower portion of the glacier. This has been a long term feature even prior to retreat and acceleration, again going back to the aforementioned studies.

6242-33: The ice shelves are not small on Petermann or Nioghalvfjærdsfjorden by GIS standards, only by Antarctic standards. Petermann Glacier has a floating section that is approximately 50 km long and 15-20 km wide (Munchow et al., 2014), Nioghalvfjærdsfjorden has an even larger floating tongue. It would be worth adding the area of the floating tongues to Table 1. Also the number of days over which velocity is measured is noted in Table 1, but how many intervals for each glacier are utilized, each indicating a separate measure.

Figure 2: This is not an acceptable figure visually. Petermann and Nioghalvfjærdsfjorden could be in a single figure, Jakobshavn in a second figure and Helheim and Kangerdlugssuaq a third. These pairings combine similar glacier velocity profile too.

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