

## ***Interactive comment on “Seasonal velocities of eight major marine-terminating outlet glaciers of the Greenland ice sheet from continuous in situ GPS instruments” by A. P. Ahlstrøm et al.***

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Ahlstrøm et al (2013) provide a temporally detailed velocity record from eight Greenland outlet glaciers. This will be a valuable data set. The method of data acquisition is straight forward and well described. There is one substantial issue that deserves further attention. There is a pattern of mid-summer deceleration that is as marked as the early summer acceleration. The early summer acceleration has been evident in a number of data sets to date, the mid-summer deceleration has not been as well quantified in other data sets as here.

Specific Comments: 29-6: A pattern of equal importance and often greater magnitude

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to the early ablation season speedup is the late ablation season deceleration. This should be noted in abstract.

30-24: “too far apart” is too vague give the range of dates used.

30-25: The series of maps showing seasonal velocity change have what temporal period, 3-6 months I think? How does the temporal resolution compare to that of Howat et al (2010)?

36-27: or 37-11: It is evident in the graphs that the mid-summer deceleration is comparable in significance to the speedup and warrants focus. This is a more unique observation that this data set can make, that has been missing from most other data sets. Howat et al (2010) should be referenced; they observed that except for Rinks Isbrae the other outlet glaciers undergo a mid-summer deceleration indicative of subglacial drainage system evolution.

Sermilik Brae has a similar deceleration after early June as before that.

Kangiata Sermia indicates a late July maximum that is more significant than the early melt season speedup; May 1 to June 1 +200 m/s, June 1 to Aug. 1 -400 m/s.

Sermeq Avanerleq indicates same thing; May 1-June 1 +100 m/a, June 1 to Aug 1 -250 m/a.

Store Glacier has a -550 m/s slow down at the ARGOS station from July 1 to Aug. 1

Upernavik GPS 3's most significant trend is the decline at the end of the melt season in 2011.

Rinks Isbrae also shows a late summer deceleration of at least equal magnitude to the speed up.

37-14: A notable aspect of many of the velocity plots is the double or single velocity cycle per month. Petermann, Humboldt and Sermeq in particular indicate this. Attribution at this point is not possible, but how statistically significant are these cycles, is this

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signal or noise?

Howat, I.M.: Seasonal variability in the dynamics of marine-terminating outlet glaciers in Greenland. *J Glaciol.*, 56, 198, 601-613, 2010.

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