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The Cryosphere Discussions

Interactive comment on "Monitoring ice shelf velocities from repeat MODIS and Landsat data – a method study on the Larsen C ice shelf, Antarctic Peninsula, and 10 other ice shelves around Antarctica" *by* T. Haug et al.

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Answer to Mauri Pelto

We appreciate very much the careful and constructive comments! We plan to respond to these as follows:

Figure 10 needs a scale, and additional places identified.

Scale and additional places will be added.

Page 47: It is noted that the 4 southernmost streamlines identified in Figure 10 are different from the visible flow features, indicating a change in flow directions. It is suggested that this is due change in flow rate of; Lewis, Ahlmann, Bills and/or Daspit Glacier. This is an important point and warrants further discussion. Figure 4k of Cook and Vaughan (2009) of Larsen C indicates a large terminus change in front of these streamlines, due to a large calving event north of the Gipps Ice Rise in 1986, though it is labeled Gibbs Ice Rise in that figure. Prior to the calving event Larsen C floated free north of Gipps Ice Rise (Cook and Vaughan, 2009). The ice rise had acted as a pinning point prior to that event as evidenced by the large rifts (Skvarca, 1994). Is there anything further that can identify the potential impact of this change in the constraining ability of Gipps Ice Rise and the change in frontal position.

Thanks a lot for this useful hint! We agree that also significant changes in ice front position would potentially impact the ice shelf flow field. We will discuss the change in flow direction found more openly, including also changes in calving front position (see also review by W. Rack). It will, however, be outside of the scope of our paper to do detailed ice-flow physical analyses to more closely examine the reason for the change in flow direction.

In Figure 10 the streamlines from south of Churchill Peninsula and north of Cole Peninsula have prominent flow features that I assume are very much in line with the streamlines. If so this is worth noting specifically.

Useful point! We will stress more that and where streamlines actually are much in line with the flow features. This might not at all be as well-expected as it was (perhaps naively) for us. In particular in the area mentioned by you where we found acceleration. It is thus certainly worth mentioning that the flow direction seems to be stable.

Page 52: It is noted that one section of the northern portion of Larsen C has accelerated, which part more specifically?

This will be pointed out more clearly.

Figure 1 should have additional place locations on the Larsen C image, such as the Jason Peninsula, Churchill Peninsula and Gipps Ice Rise.

Additional names will be written on the figure.

An additional table listing the mean and maximum velocity and acceleration of the other ice shelves would be useful. This request is prompted in part from viewing Figure 12 to the eye it seems that Mertz Ice Shelf has the highest mean velocity, Shackleton Ice Shelf is noted as having the highest maximum, and West Ice Shelf a low velocity, yet West appears faster than Shackleton, something is amiss.

It will be pointed out that the velocity arrows are of different scale. The velocity numbers given in the text will be removed and instead a small table showing the mean and maximum velocity will be included.

Interactive comment on The Cryosphere Discuss., 4, 31, 2010.