

Interactive comment on “Overview of areal changes of the ice shelves on the Antarctic Peninsula over the past 50 years” by A. J. Cook and D. G. Vaughan

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Cook and Vaughan (2009) provide an exceptionally important and useful comprehensive review of the changes in ice shelf extent and behavior on the Antarctic Peninsula. The following points are relatively minor and are suggested to enhance the quality of an already fine paper.

1) In several instances the area of grounded ice feeding an ice shelf is referred to. It would be useful if the ratio of grounded supplying ice to floating ice shelf was listed for each ice shelf. The ratio of grounded to floating ice may be of importance to ice shelf health as the authors suggest with respect to the Wilkins Ice Shelf.

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2) The series of maps in Figure 4 are of exceptional value. A qualitative observation is that the ice shelves with rather open embayments and poor frontal pinning points have fared poorly: Gustav, Muller, Wordie, Larsen A and Larsen B. Larsen C falls into the same category, but is ok. The degree to which the ice front is pinned would be important to identify. Is there any way to easily quantify the percentage of the current or former ice shelf front that is or was unpinned? Maybe a simple means of quantifying this is the length of unpinned ice front versus total ice shelf area, or versus floating ice perimeter. By this measure it seems that Bach, Stange and George IV Ice Shelves are in good shape. It has been noted that during breakup the pinning can become points of weakness. However, prior to the preconditioning-thinning- the pinning points are stabilizers.

3) 587-8: Elaborate on how the differing configuration and pinning points impacted the different response of the east and west sections of the Jones Ice Shelf.

4) 588-20: The term no change in the relative dominance of the tributary glaciers is used. Dominance with respect to what?

5) 590-3: Why is the George IV ice front so much thicker to the south?

6) 603-3: The importance of the locations of pinning points is mentioned here. The example of the Wordie where the pinning points weakened the ice shelf should be contrasted to a case where pinning points have acted to strengthen the ice shelf.

7) 603-8: The role of in-situ accumulation is referred to, which brings us back to the point of feeding grounded ice area. Is there anyway to estimate the degree to which each ice shelf relies upon in-situ accumulation?

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