

Interactive comment on “Tidally-induced velocity variations of the Beardmore Glacier, Antarctica, and their representation in satellite measurements of ice velocity” by O. J. Marsh et al.

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We thank the reviewer for their comments and have rearranged the structure of the paper in accordance with their suggestions, adding more to the discussion, removing some discussion from the conclusions and separating past results into a study area section. We have cited previous work relating to the measurement of grounding line location using speckle tracking (Joughin et al., 2010) and removed reference to this being a new technique. The paper has been modified in line with the reviewer's specific suggestions in most places where we agree that the changes add clarity or improve readability. Some of the longer comments requiring more explanation are addressed

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point by point below:

1763-2/3: We agree that this may have been confusing. We were trying to say that upstream of the grounding line is generally a region of net accumulation and downstream generally a region of net ablation and have reworded accordingly.

1764-25: We meant by this sentence that data from Swithinbank et al. (1963) recorded over 1 year was compared (by them) with their data recorded over 14 days and showed no seasonal variability during the 1960-61 season. We have revised to make this clearer.

1766-11: The 6-hour smoothed velocities are shown in red in Figure 2a on the right hand vertical axis. The amplitude of the diurnal signal decreases rapidly inland and is <5% of the total velocity at the next GPS upstream – we have added another figure relating to the change in phase of the tidal signal upstream (see response to anonymous referee #2 below).

1770-15-17: We have reworded this sentence to highlight that speckle tracking is useful where fringes are not resolved in the grounding zone and phase information cannot be unwrapped to a suitable ground control point or known stationary point.

Interactive comment on The Cryosphere Discuss., 7, 1761, 2013.

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