

**Review report for:
“Recent acceleration of Denman Glacier (1972-1 2017), East Antarctica, driven by
grounding line retreat and changes in ice tongue configuration.”**

General comments

In this manuscript by Miles et al., the authors explore the connection between surface ice velocity acceleration and calving events for Denman Glacier, East Antarctica. Particularly, to explore this connection, the authors apply several tools ranging from remote sensing observations to ice sheet modelling to grasp which mechanisms might explain the acceleration and ground line retreat of Denman Glacier.

The manuscript is very well written and flows quite smoothly in the description of the methods and the used ice sheet models. As a remote sensing expert, I really liked the contribution brought by the historical remote sensing data, which are generally very difficult to find.

The main hassle for me was going through all the figure. The absence of system coordinates makes very difficult to go from one figure to the other and make connections and comparisons between the figure. Therefore, I recommend the paper to be published after major revisions.

In the following, some additional comments.

1. Line 11, identifying Denman glacier as the largest is really vague. For a reader, it would be nice to specify that e.g. this glacier is the largest contributor to sea level rise in East Antarctica (after Totten Glacier)
2. One of the major statements of the paper is that to explain the acceleration pattern of Denman Glacier it is required to have a combination of grounding line retreat, changes in ice shelf thickness and unpinning of ice from Chugonov Island (lines 331-334). I am wondering if the unpinning of Chugonov Island comes from observations. Did the authors observe the unpinning in their data?
3. Line 94-95 and line 109-112. Have the authors quantitatively determined the uncertainty of surface ice velocity obtained from historical data? Instead of providing a ball park number, it would be nice to have a section in the supplementary describing how they quantified this uncertainty.
4. To my understanding, to perform their analysis the authors have used the Measure grounding line product for Denman. Do you know to which sensor and which year this grounding line belongs to? Also, have the authors tried to include more recent grounding line products?
5. I find really difficult to go through all the model experiments that the authors have performed. Is there a way to visually summarize them in the manuscript, e.g. using a table?
6. To explain the acceleration of Denman glacier, in Section 5.2 the authors discuss whether this is driven by warm water intrusion (e.g. ice-ocean interactions) or calving events. I find this section a bit confusing especially because it introduces a lot of elements which have not previously discussed in the manuscript. Do the authors simulate with their ice model

the effect of the ice-ocean interaction? Also, does the model take into account the effect of basal melt of Denman ice shelf?

7. As a general comment, ALL figures need to have coordinates grid. For me it was extremely difficult to move from one
8. I find the colorbar in figure 1-a to be confusing. Maybe all areas with an elevation over 0 should be marked with the same color, e.g. white.
9. Without coordinates is a bit difficult to link Fig.1b and Fig.1c. I would recommend to highlight the area in Fig.1c using a box in Fig.1b
10. Date of used Landsat images and acknowledgement for the used Landsat product should be included in the figure caption. Please, see USGS website for getting the proper data citation.
11. For Fig.2, each panel focus on a different area of the ice shelf. I would recommend to have a bigger picture of the ice shelf on the side and try to help the reader understand on which areas you are focusing/zooming on. Please, include latitude and longitude (or polar stereographic) coordinates for each figure.