Interactive comment on "Seafloor geomorphology of western Antarctic Peninsula bays: a signature of ice flow behaviour" *by* Yuribia P. Munoz and Julia S. Wellner

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This is an interesting, well written paper that compiles glacial geomorphological evidence within a large number of bays across the western Antarctic Peninsula and South Shetland Islands. The information is used to investigate former ice flow behaviour and to infer a Little Ice Age response in the region. The results are novel and could make a nice contribution to TC, but requires major revisions. In particular, I found some of the discussion to be rather weak or speculative in its current state. But the data you have is very nice and so I think the focus should be on doing a really good job of mapping and characterising the glacial imprint of these bays and putting them in the context of other

areas. Some of the more speculative discussion could be chopped and more made of, for instance, the spatial pattern of landforms, variations between location, and data you have compiled on moraines and their location.

General Comments:

1. The authors present the work as a mapping study, following on from other recent publications that have started to do this in Antarctica. However, no mapping is presented in the results/figures. Certainly, this paper would be considerably stronger if the authors could present the mapping results of their work as a series of maps. It would make it much easier for the readers to pick out features and for spatial patterns to be identified and justified. If no mapping was carried out then the term should not be used, although I think this then weakens the paper.

2. The methods is rather short. In particular, there is no clear rationale of how the authors identified the glacial features and interpreted them. I suggest they include a table similar to the one in Graham et al. (2009) – Table 2, or Livingstone et al. (2013) – Table 1. Maybe because of the lack of detail on these landforms I was also left unconvinced about some of the interpretations. For example, you use the term grounding zone wedge (GZW) throughout. But what differentiates them from moraines if they are symmetrical (i.e. without the characteristic 'wedge' shape)? I would stick to the term moraine unless there is clear morphological or stratigraphic (from the CHIRP) evidence that they are GZWs. Similarly, some of the fluting you point out seem more of the scale of lineations, while if drumlins are composed of bedrock maybe whaleback is a better term?

3. The data is really nice and I think a lot more could be made of the results. In particular, some sections lack thorough characterisations of the glacial features (e.g. length, width, shape). Some results and interpretations are mixed up. I always find these section are much clearer when the data is presented first and then interpreted, with support from the literature. For example, on page 5, lines 19-26, you interpret

transverse ridges as crevasse squeeze ridges without limited further details of what characteristics allow you to make this leap, and no references to similar interpretations. Some of these issues could be resolved by my suggestion for point 2.

4. The methods describe CHIRP data you have, but this is not really presented until section "5.2.4. Seafloor substrate" in the discussion. This really needs to come in the results, as this provides further evidence that will allow you to interpret the landforms. It would also be useful to identify regions with thick sequences of postglacial infill that could have buried landforms, as this must be an important process (as per the Chile comparison).

5. Meltwater channels. In the discussion, you distinguish between proglacial, post-glacia and subglacial channels, but it is not clear what evidence you base this on. In the methods can you outline the criteria you use, and then distinguish between types in the results so it is very clear?

6. The section of basin area and catchment area (and length and width too) is weak. It seems a flawed analysis as of course if you look over a larger area you will find more landforms. Similarly, irrespective of catchment area the number of landforms is likely to be the result of the area you look over, and could be strongly influenced by postglacial burial. The conclusions you draw from this are self-evident.

7. The data you have on moraine/GZW positions is nice, but I think more could be made of it. Why not compile data on their size and where they occur? Do they occur at narrowings or in other contexts (e.g. upglacier of confluences)? Can you investigate whether bays with large changes in width/height have more ice-marginal landforms indicating a stepped pattern of retreat vs. consistent widths, where you might expect more consistent retreat and less evidence of moraines/GZWs.

Specific Comments: See attached pdf.

Please also note the supplement to this comment:

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https://www.the-cryosphere-discuss.net/tc-2017-108/tc-2017-108-RC2-supplement.pdf

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