

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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In general, the paper by Munoz and Wellner is good. It reports new sea-floor observations from the bays of the AP and makes a sound attempt at analysing the differences between the various sites in terms of geomorphology and relationship to glacier behaviour.

The datasets presented are original, and the results will add nicely to the inventory of shelf and coastal locations already studied along the West Antarctic margin.

The purpose of the work is mostly clear, but the authors might want to consider their

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method and whether it is still adequate to simply present sea-floor data without a clear and objective mapping of the landforms alongside. I feel the science has moved on from simply making observations from multibeam data to a more rigorous landform mapping based approach, underpinned by clear metrics. As a minimum, I expected a clearer separation of the descriptions and interpretations of the landforms in the results section, and I feel this is an area where the paper still needs a little more work. Alongside that, some of the interpretations themselves need some better explanation supported by more in-depth analysis and relevant literature. See comments on the attached PDF, but the crevasse-squeeze ridges are a prime example. Some of the multibeam observations might also be better supported by a closer integration and more widespread study of sub-bottom profiler data that is presented as a scheme early on in Fig 3 but referred to only a handful of times before the discussion. Why take an acoustic facies approach if you don't then use it to produce a series of maps?

The discussion is fair/good. There is a bit of repetition which could be lost, and I suggest a few areas where the authors could expand. I remain a little unconvinced by the correlation of landform number to bay size. It seems logical to me that smaller fjords will contain fewer landforms than larger ones. But I am open to persuasion in the authors' response as to whether this constitutes a significant finding or not.

I cannot fault the general attempt to try and correlate the geomorphology to catchment size and geometry, and there are some useful observations borne out by the work. The comparisons to other locations are a little cursory and I would like a more definitive assessment of how AP bays are unique (or similar) to assemblages found in comparable settings around the globe. The LIA discussion is interesting but I felt under-developed. Is it feasible to form a fjord GZW of the sizes you are observing during and since the LIA, based on what you know about sediment fluxes? Why are these all LIA age when Fig 12i clearly shows one of the wedges at least to lie coincidental with a mid-20th century glacier front position?

The paper is likely to make some impact on the community. It spurs on research into

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the timing of deglaciation through these various systems, and underpins wider habitat and ecology work in the fjords and bays. To that end, landform and substrate maps would really be useful as an additional product of this work.

Overall, I suggest some moderate revisions based on these comments and those included in the annotated PDF. However, I think all are achievable and the paper will sit well in The Cryosphere with a bit of further refinement.

Please also note the supplement to this comment:

<https://www.the-cryosphere-discuss.net/tc-2017-108/tc-2017-108-RC1-supplement.pdf>

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2017-108>, 2017.