

## ***Interactive comment on “Paleo ice flow and subglacial meltwater dynamics in Pine Island Bay, West Antarctica” by F. O. Nitsche et al.***

### **Anonymous Referee #2**

Received and published: 6 December 2012

Nitsche et al have written a well-organized and beautifully illustrated paper. Most of the figures are both necessary to the story and clearly explained. With that said, most of this data has been previously published in smaller pieces and is simply compiled and integrated here. Thus, most of my suggestions below are focused on better development of the literature review and citations of other work.

Page 4268: Line 25: Understanding behavior of past ice streams as a way to understand future behavior has been stated goal of many papers. Why pick these particular two papers to cite?

Page 4269: Line 2: Is most of the WAIS really grounded below sea level? Or, just a lot? Can a % be cited? Line 10-11: Explain the end of that sentence. Line 16: Retreated “considerably.” How much? Line 28: Retreat dates cited without any reference. The

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retreat dates and discussion of cores need to be better explained and better cited throughout paper. Understood this paper only geophysics. But, if want to call on cores as additional evidence, need to do it more thoroughly. As it is, core information is just tossed in as a crutch, without being developed. In this particular location the retreat dates are cited with no reference at all.

Page 4270: Lines 5-15: Cite Lowe and Anderson and explain original dates vs. newer dates. (Line 14: “Respectively” not need there, but it is at end of sentence.) Line 24: Mention of subglacial substrate not given context or explanation or reference.

Page 4271: Line 24-25: What does that sentence mean? bottom: the other cruises from which swath data is being used also collected subbottom data. Explain that only certain cruises are being used, but others also collected.

Page 4273: Line 2-10: Why alternate from drumlin-shaped ridges, then drumlinoids, then later drumlins? If they are being used to mean different things, explain. Otherwise, be consistent. Line 16-18: Again, the core date is totally unexplained and just tossed in. If want to mention sediment information, it needs to be much more developed.

Page 4275: Line 4-7: Give context for cores, explain and develop. Line 20: Is the core number from Lowe and Anderson important? Why do we need to know it was PC46? It would be much more helpful to know location, or length, or more than just “it was consistent” and what number it was.

Page 4276: Line 9: Why “must” the sediment be of post-glacial origin? Explain, don’t just make claims.

Page 4277: bottom: Could a figure show previously published data limits and highlight the new data? Or, show the Lowe and Anderson zones? Hard to follow the discussion of differences in the new compilation with just the figures here.

Page 4283: 4.4 header: “flow events” too vague. Give clearer header.

Figure 5: Needs to be darker to be seen.

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Figure 6: Seismic line should have NW and SW labels.

Figure 7: Very interesting and I would like to study details, but can't see the difference in the colors.

This paper has done a good job of illustrating some details beyond was previously known about Pine Island Bay bathymetry and geomorphology, and the presence of the sedimentary substrate in the inner basin is important to understanding possible future behavior. While the abstract and conclusions clearly focus on this discovery, much of the middle of the paper buries it. The paper would be well-served by a better explanation/illustration of the literature covering Pine Island Bay and related areas, and then a streamlining of some of the discussions of more superfluous details in the middle. The meltwater story presented is not much advanced beyond that of Lowe and Anderson, yet the title and parts of paper want to focus on that. Paper should focus on what new observations add to story.

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Interactive comment on The Cryosphere Discuss., 6, 4267, 2012.

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