

Review: “Evolution of Maud Rise Polynya during the last 250 years – a multiproxy ice core reconstruction from coastal Dronning Maud Land, Antarctica”

by Dey et al.

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1 General

In this paper, the authors analyze ice core proxies for the opening of a large polynya near Maud Rise. Polynyas are important for a host of reasons, e.g., they are biological hotspots, they affect the regional weather, and are a location of deep ocean water formation. We don't know why the Maud Rise Polynya forms in some years and not in others. It makes sense that this variability is advected onto Antarctica where it is preserved in ice cores. The goal of the present work is to infer the link using numerous proxies within the ice core, e.g, sodium, $\delta^{18}\text{O}$, snow accumulation. I think the paper is straightforward and worthy of publication after some minor revisions. I outline some comments below.

2 Specific comments

1. line 19: I think that ‘before the satellite era’ would make more sense than ‘beyond the satellite era’ in this context.
2. line 37: can you be more specific than ‘global climate processes’?
3. line 74: where is the Goosse ice core from? Is it the same location?
4. lines 120-249: I think that a bunch of this information can go into the appendix. It currently breaks the flow of reading the paper.
5. line 252: ‘imagery is’?
6. line 361: I would say that these are potential polynya years since we have no way to verify that there was a polynya there at that time, right?
7. line 369: the 1833–1884 window is very long! I think this is a typo?
8. Figure 7: I think it is worth labeling the grey bars as polynyas. Why are they multiple shades of grey?
9. Figure 8: It would be valuable to have the grey bars on again to show the recent polynyas. Also is the accumulation difference helpful? I think a single plot that compare directly compares the Goosse data (e.g., Stat) to the new index would be helpful.