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Discussions

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Interactive comment on "What historical landfast ice observations tell us about projected ice conditions in Arctic Archipelagoes and marginal seas under anthropogenic forcing" *by* Frédéric Laliberté et al.

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This manuscript describes an analysis of landfast ice (or slow compacted ice) from observations and a series of model simulations. Overall, I believe this work is important and is the right approach for comparing models and observations. That said, I have some fairly major suggestions to the authors which I believe will improve the manuscript.

1. There is always a concern about comparing apples to apples in these studies. Can

one derive a similar (slow, compacted ice) metric from the obs so this can be more directly compared to models? Also, what about the sensitivity to the thresholds of ice concentration and velocity?

2. Figure 1 is problematic for me. There is way too much going on here and the colours make it difficult to see the lines of importance. I would suggest changing the point measurments to black symbols instead of yellow and magenta. Also, the percentile ranges should be much lighter in colour.

3. Figures 2-5 and 10. Similarly, these panels are very hard to see and I would suggest just focussing on the CAA region for these. Then figure 10 could be moved into Figure 2. Plus I'm not sure you need all 8 panels. You could remove 4 panels and just talk about them in the text. This is a very qualitative picture as is, so more panels are not really necessary. Similarly with Figure 3. You could reduce this to 4 panels and then only show the CAA. Then maybe have a separate figure set of the Siberian/Laptev Seas.

4. Figure 4 is more quantitative, but could still be reduced to 4 panels and just discuss the other four in the text. I think it would be good as well for the text discussion of Figure 4 on the trends to have overall numbers for the trends in the CAA versus the Laptev. Again focussing on just the CAA and Siberian/Laptev Seas would be good here.

5. Figure 6 also cries out for some trend analysis along with significance. There is a bit of this in the text, but it could be expanded.

6. Is it possible to add the observations to the distributions in Figures 8 and 9. It would be good to know where in the model distributions the obs are.

7. There are a few minor grammatical errors. "their dynamic takes into account" for example. There are a number of acronyms and model parameters in the discussion and it would be good to spell these out and describe them more. In particular, k_1 and k_2 are what exactly in the Lemieux et al. model.

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