

Interactive comment on “A multi-model CMIP6 study of Arctic sea ice at 127 ka: Sea ice data compilation and model differences” by Masa Kageyama et al.

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Received and published: 13 March 2020

This paper makes a very important contribution to the quest to understand Arctic Sea-Ice during the LIG, contains interesting diagnostics, a great model-data comparison, and I enjoyed reading it. Because this topic is so important, I'd like to request a few extra figures that may help us understand the models and the LIG Arctic sea ice better. Is there any chance you can produce (perhaps in the supplement?) any of the following variables for the various models for the pre-industrial and LIG? In order of preference:

- Sea-ice drifts or surface currents: Was the surface circulation at the LIG different from today and what are the models showing for the PI? Do they have a realistic PI

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circulation?

- Winds or windstress over the ocean: This will drive sea-ice export as well as influence sea-ice distributions. It would be interesting to see if there are any consistent changes between the PI and LIG that could be useful in interpreting the data or model differences.

- The barotropic streamfunction or upper layer circulation if different from the surface: Are the models getting the Arctic gyres right and do these gyres systematically change at the LIG? This may also indicate what may happen in the Atlantic layer which is thought to affect sea-ice, at least in the Barents Sea.

- SLP patterns: This should be a straight forward plot indication atmospheric circulation differences between the different models and between the PI and LIG

A point I'd like to challenge is that models produce a similar response to future CO₂ warming and the LIG forcing (Figure 10). If one takes away the one outlier (INMCM4-8) then the correlation breaks down. The response to 1pctCO₂ is much stronger in some models than others model, while the response to LIG forcing is similar in the models.

Figure 5 is very interesting and I keep coming back to it but find it very difficult to dissect what the different models are showing because the symbols overlap to much or are hidden behind the lines.

Thanks for a great paper and I am hoping you will have the means to make some of these clarifying figures. Agatha de Boer

Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2019-165>, 2020.

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