

Interactive comment on “Assessing the impact of Laurentide Ice-Sheet topography on glacial climate” by D. J. Ullman et al.

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The sensitivity of the LGM climate to ice sheet boundary conditions is a foundational question for climate sensitivity, ice sheet sensitivity and model validation, as the authors note. This is therefore a very interesting paper that should ultimately be published with CP but I suspect major changes are unavoidable.

I got a lot from reading it but feel that more could be done to help the reader get to the key conclusions amidst a lot of detailed reporting of results. It has taken a heroic effort to write the paper in such a comprehensive way but now it takes a heroic effort to read it! I think the authors need to rethink how they structure the paper and what information to prioritise. In this regard I think the authors must find ways to:

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1. clearly distinguish results from discussion sections, e.g. in the titles of sections 3 and 4 include the word 'results' and group the discussion sections (5,6,7,8,9) as 5.1, 5.2, 5.3 etc
2. greatly expand the conclusion section to include the issues developed in the discussion (detail below)
3. prioritise the key information in the expansive results sections around discussing the ice sheet boundary conditions. Currently the comparison of both simulations with the control is an entire results section of its own and is distracting. Much of section 3 is effectively a repetition of other LGM modelling papers. Section 4 is the key original material, which is much more exciting and needs highlighting.

Regarding point 3, I think the authors have a few options:

option A) Splitting this into two papers, one the LGM to control comparison, on the comparison between the two different BC runs. This may not work because the LGM to modern control comparison would not be very original.

option B) Put the discussion of LGM climates into supplementary information.

option C) Is there a way of dealing with the LGM to control comparison in a summarised tabular form? This gets around that the issue that this material is less original (LGM simulations are relatively common) while allowing the reader to evaluate how meaningful the simulations are.

Detailed comments:

4. P3242 and elsewhere - I suggest Andre Ganopolski's work on dust forcing in CLIMBER requires a mention. This could be in the context of a note on the importance of these issues also for EMICs
5. P3243,L5-please check that Abe-Ouchi has no more recent results that are relevant here

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6. P3245,L1 - does this migration of the coast allow for GIA??
7. P3245,L8- suggest you write 'Bab al Mandab (Red Sea)'
8. P3245,L25 - why use maximum reconstructions when your aim is to get a lower bound?
9. P3268L29 - should be in conclusions
10. Conclusions - mention changes in atmospheric circulation and in particular the polar jet. You need to summarise what is affected by the different ice sheet BCs and what isn't (just as important to know). In each of the discussion sections (5,6,7,8,9) you draw out important information, summarise that here.

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