

As one of the reviewers of the original submission of this manuscript for 'Climate of the Past', I have already evaluated the paper once before transfer to GMD. My advice was publication with minor revisions. Reexamining the paper now, I confirm this judgment and note that the few suggestions I had, have all been addressed in the present version of the manuscript. I came across a few more minor points that can be addressed without the need for me to see the paper again.

We thank the Reviewer for their positive comment and careful review, which helped improve the manuscript. Please find our answer to comments in blue as well as suggested text changes in green.

Minor points:

P1 L2 Consider defining an abbreviation for "penultimate glacial maximum", which occurs several time throughout the manuscript (p8, p20, p25). Note that in one instance it is referred to as "(MIS 6)".

We are following the reviewer's suggestion and using the abbreviation PGM for "penultimate glacial maximum" throughout the manuscript. MIS 6 was also replaced by PGM.

P2 L21 The interglacial states are different, which is important motivation for your experiment. Consider reformulation: Each of these long glacial periods were followed by relatively rapid multi-millennial-scale warmings into consecutive interglacial state\*s\*

This has been amended, thank you.

P2 L22 Consider explicitly adding 'deglaciations' here instead of line 24-25: These glacial-interglacial transitions, also called deglaciations, represent the largest natural global warmings and large-scale climate reorganisations across the Quaternary.

The beginning of the sentence L.22 was amended as follows:

"These deglaciations represent the largest..."

And the sentence L. 24-25 was taken out.

P2 L23 Avoid confusion with term "climate sensitivity": Hence, they provide a great opportunity to study the interaction between the different components of the Earth System and climate\*s\*s\* sensitivity to changes in radiative forcing.

This has been amended, thank you.

P2 L24 "radiative forcing". At this point in the text, it has not yet been made clear that glacial-interglacial transitions are forced by orbital changes. So this comes a bit unexpected. consider reordering.

The first paragraph was re-ordered so that the importance of orbital changes is stated earlier on p2, L. 23.

P2 L30 Consider moving (Fig. 1) reference to the end of the sentence to avoid triple brackets.

This has been amended, thank you.

P2 L32 You are back to discussing five deglaciations, but we are looking at figure 1 now. Consider revising.

It is true that Figure 1 only focuses on the last two deglaciations, which are then discussed in details in the text. However, the two first paragraphs present a broad overview of the deglaciations of the last 450 ka. Therefore, we have kept the mention to the last five deglaciations.

P3 L4 Add 'concurrent' after "supported by the".  
"concurrent" has been added.

P3 L11 "in the \*Northern\* North Atlantic".  
"northern" has been added.

P3 L19 "Antarctic sea ice cover \*change\*"   
We taken out at "changes" in front of "ocean circulation", as the "changes in" L. 18 refers to all the processes discussed, i.e. solubility, alkalinity, iron....

P3 L24 "the last five deglaciations" or "the last two deglaciations".  
We have modified the sentence so that it reads: "the last two deglaciations".

P4 L16 You may want to somehow distinguish between the left and the right side in figure 1 to make your references more specific.  
The reference to the figure now read "Fig. 1, right".

P4 L21 Replace 'find no evidence' by 'provide no evidence'.  
This has been amended, thank you.

P4 L27 Suggest to change the order in this sentence to: The eustatic sea-level during MIS 6 is estimated at 90-100 m lower than present-day (Rabineau et al., 2006; Grant et al., 2012; Rohling et al., 2017), with a relatively large uncertainty range (Rohling et al., 2017). This compares to >130 m lower than present-day during the LGM (Austermann et al., 2013; Lambeck et al., 2014).  
The sentence has been amended as suggested, thank you.

P4 L30 I don't think you have already establish that the Holocene follows the last deglaciation?  
The sentence was amended as follows: "The LIG also bears significant differences to the interstadial that followed the last deglaciation, i.e. the Holocene."

P5 L19 This sentence suggests that climate, vegetation and carbon cycle respond to changes in the oceanic circulation, but they also respond directly to ice sheet disintegration. Suggest to remove

"and thus".

[This has been amended.](#)

P5 L22 add 'forcing' after 'external' and 'dynamics' after 'internal'. Remove 'forcings'.

[This has been amended.](#)

P6 L6 Remove 'the' before 'the'.

[This has been amended.](#)

P6 L8 Reformulate " in concert with paleoclimate records"

[We have taken out " in concert with paleoclimate records".](#)

P6 L9 Add "with coupled AOGCMs" after 140 to 127.

[This has been amended.](#)

P6 L9 Suggest to start a new sentence: "This experiment provides a link" ...

[This has been amended.](#)

P6 l11 Clarify why the forcings at 127 are different. Maybe this should be explained earlier on.

[The sentence: "albeit with some differences in the ice-sheet and meltwater forcings at 127 ka." was deleted. The difference between the end of the penultimate deglaciation experiments and the lig127k experiment is mentioned in section 7 \(p19, L.29-31\):](#)

["Finally, the proposed experiment will provide a link to the PMIP4 transient simulation of the LIG \(127 to 121 ka\) as well as the PMIP4 127 ka timeslice experiment \(liig127k\) \(Otto-Bliesner et al., 2017\), even though the protocol of the LIG experiments includes pre-industrial continental ice-sheets."](#)

P6 L11-13 Consider adding section numbers to this manuscript overview.

[Section numbers have been added to this overview.](#)

P9 L13 Remove "shallow" here as it is mentioned in l14.

[This has been amended.](#)

P9 L16 Reference Payne 1999 is undefined. Maybe Payne, A.J., 1999, A thermomechanical model of ice flow in West Antarctica : Climate Dynamics. 15, p.115 - 125. However, if this is a Weertman type sliding law, a reference to Weertman seems more appropriate, especially because Payne 1999 is for an Antarctic case. Please also check all the other references once more.

[The reference to Payne 1999, Climate Dynamics has been added.](#)

[In the IcIES model the sliding velocity is related to the gravitational driving stress, as defined in Payne, 1999.](#)

P10 L18 Still unclear what the first 240 ka model run looks like and why that is needed. Is it identical to the first run?

In order to get a good representation of the evolution of the Greenland ice-sheet over the penultimate deglaciation, a proper 140 ka state is needed. Given that with active bed thermodynamics (down to 4km), the thermodynamic equilibration timescale is greater than 100 kyr for GRIS, the most appropriate method is to start the run at 240ka.

The text has been amended as follows:

“Given that with active bed thermodynamics (down to 4km), the thermodynamic equilibration timescale is greater than 100 ka for the Greenland ice-sheet, the most appropriate method is to start the run during the previous interglacial period. Therefore, the model runs start at 240 ka with present-day ice and bedrock geometry...”

P10 L21 Add "a" before '2-way'.

This has been amended.

P10 L30 "Greenland loses its glacial grounded ice volume" is still confusing to me. It is not really possible to spatially distinguish glacial ice from the rest. I think you try to say that in this period the GrIS loses the ice mass in excess of the total present-day value and more. Maybe "In this simulation, the main phase of Greenland deglaciation occurs between 130 and 127 ka, during which Greenland first loses an ice mass of 2.9 m sle in excess of the total pre-industrial value, and then an additional 1.5 m sle."

The sentence has been amended as suggested.

P27 Data availability I would reserve this section to information on where the forcing data can be accessed and move the instruction for the participating groups to elsewhere (e.g. section 8.4). I am not sure if a wiki page is acceptable as data source for GMD under the new editorial, but leave it to the editor to negotiate that.

We have removed the sentence with respect to uploading results to the ESGF database, as it is already included in section 6.3.

All the forcings are either included in the supplement (freshwater, ice-sheet forcing), already include a DOI (GHGs), or have now been assigned a DOI (ice-sheet). The data availability section now reads:

“The combined ice-sheet and meltwater scenarios are available in the Supplement. The GHG data can be found at [\url{https://doi.org/10.1594/PANGAEA.871273}](https://doi.org/10.1594/PANGAEA.871273). The combined ice-sheet, as well as the Northern Hemispheric and Greenland ice-sheets are also publicly available on the Research Data Australia repository (doi:).

In addition, all the forcing files as well as the paleo-data described in the manuscript are available on the PMIP4 wiki: [\url{https://pmip4.lsce.ipsl.fr/doku.php/exp\\_design:degla\\_t2}](https://pmip4.lsce.ipsl.fr/doku.php/exp_design:degla_t2).”

P45 Table3 - Is it clear which variables are XY, XZ and so on, or should this be clarified in the table?

A system of superscript was inserted in the table with <sup>(1)</sup> for 1-dimensional variables, and <sup>(X,Y)</sup> and <sup>(Y,B)</sup> for (longitude, latitude) and (latitude, basin) variables, respectively.

P50 Fig 1

- Is it necessary to clarify that the summer solstice happens at different moments in SH and NH?

A sentence has been added in the legend:

“This corresponds to June 21st in the Northern Hemisphere and December 21st in the Southern Hemisphere;”

- Could you clarify in the text what motivates the relative alignment of these time windows?

The sentence below has been added in the Introduction (p3, L. 23-24):

“Figure 1 shows the evolution of key variables across 15 ka, from glacial maxima to peak interglacial conditions.”

- "Unless specified \*differently\*, all ...".

This has been amended.

P54 Fig 5 - Correct some plotting artefacts:

- Close the grounding lines, e.g. in the NE in b)

- What does an inland closed circle GL mean? Does the calving flux go into a lake?

We have now corrected the plotting artifacts in the Greenland figure.

P55 Fig 6 - Can the plotting artefact at the date line be avoided? - remove '0' label on the grounding line contour.

The artefact at the date line has been fixed and the 0 'label' removed.