

Anthony J. Coletti

6/2/2015

Responses to Anonymous Reviewer #2

Reviewer's comments in black

Authors' comments in red

The figures need to be re-ordered. For example the first reference to a figure is Figure 5, then Figure 3, then Figure 2 then Figure 1.

Fixed. Thank you for your suggestion.

Line 83: replace gasses with gases

Fixed.

Line 100: what surface type do you replace the ice sheet with e.g. bare soil, shrub?

We replaced the ice sheet with bare soil and ran the vegetation model allowing us to simulate vegetation growth in the area without an ice sheet. We have placed that detail into the text. Thank you for this question.

Line 115: InterGlaciation change to interglaciation

Fixed.

Line 116: 12-10kyr, do you mean around 14 kyr?

Fixed.

Line 159: Check your units Wm^2 should be Wm^{-2}

Fixed.

Line 229: Include a reference for carbon dioxide concentration

Fixed.

Line 322: Insert MIS before 31 for clarity

Fixed.

Line 330: Provide a reference for the simulations without vegetation feedbacks

Fixed.

Line 450: The reference provided here only concerns the MIS5e and not interglacials. Furthermore, the simulations with Greenland temperatures greater than 16 Degrees Celsius are those without a Greenland ice sheet used in the coupling methodology and do not actually represent what the Greenland ice sheet was thought to be like at this time.

This is true. This has been made clearer the reference has been taken out. Thank you.

Figure 5: It is difficult to see the transparent lines (especially when printed). I suggest making this more visible.

Thank you for your feedback on this figure.

It would be worth mentioning in your discussion the issues that arise from comparing data from a core record with output from a climate model in terms of temporal and spatial resolution differences.

Thank you for your suggestion. We will make this more clear in the introduction.

Anthony J. Coletti

6/2/2015

Responses to Anonymous Reviewer #1

Reviewer's comments in black

Authors' comments in red

L 86-91: Do the authors use astronomical solution from Berger (see their line 86), from Laskar (their line 91) or their own astronomical solution (their answer to referee #1).

This has been fixed and made clearer. We are using Berger astronomical solutions.

L 87: I thought that the authors choose 9ka for MIS1.

This date was corrected for the timing of peak insolation during MIS1.

L91: "assuming the real climate system equilibrated within a half-precession cycle". I do not understand what this means. Indeed the climate system is probably never at equilibrium.

We are assuming the interglacials reached a somewhat stable climate within ~10-13 kyrs.

L115: LIG is usually defined as last interglacial.

This has been fixed. Thank you.

L159: the units are probably not correct here.

Fixed.

L199: "wetter than observations". Is it really meteorological observation? From which station is it and where is it located and over which time interval? In that case it is present/modern information, not pre-industrial. Is the value (122) an absolute value or a deviation from some reference?

We have reworded this line and removed the comparison with modern meteorological instrument readings so it focuses on pre-industrial climate.

L202: the first figure to be called is figure 3A. The figures should be re-ordered so that the first one to be called is figure 1.

Fixed.

L217: “possibly as a result attributed increased proximity away from a moisture source”. I do not understand what this means.

Fixed and reworded.

L229-231: How do the authors explain the difference between 0.0132Wm^{-2} and -0.0035Wm^{-2}

This has been made clearer. Positive values indicate “more forcing” and negative values is “less forcing”.

L267: The warmer (than) MIS-11c climate

Fixed.

L290-305: The obliquity during MIS-31 is indeed large but it is smaller than during MIS-1 and MIS-5e. The authors indicated large anomalies of insolation but forgot to mention when they occur. They should double check the values provided for temperature anomalies.

Insolation anomalies occur at around 1072 ka. This is referenced in the title of the section. Values provided for temperature anomalies have been checked and corrected.

L372-374: Is this a result from the models or from the proxy data?

Model data. Fixed.

L383: I copied here my earlier comment : “What does ‘annual summer temperature’ refer to?”

This has been made clearer. Annual summer temperature is June-July-August temps.

L405-406 : According to me it is either one maximum or several maxima. Is there a reference for this statement?

Inserted reference.

L451: ‘summer temperatures to increase to almost 16°C warmer ...’ Is there a reference

for this statement?

Reworded and made clearer.

L459: ‘ the model is missing some important regional processes’. Do the authors have any clue for such missing processes?

These processes that may be missing may be too small to be resolved on our grid resolution (~2.5°). Perhaps future simulations involving Lake E could use a higher resolution, such as a regional model set-up with finer grid spacing.

Figure 1 : In the caption the reference is the modern orbit while it is the Pre Ind in the figure. They are most probably the same. However, it would be better to be coherent.

Fixed.

Figure 2 : Except for the colour code figure 2 is exactly the same as in Melles et al (2012), although this paper is not acknowledged in the caption. I have a question to the editor and the production. What about the copyright in such a case? My question to the authors is the following. Do they really need this figure in their paper?

Yes, the figure is important to the paper to show vegetation distribution as the interglacials become more intense. We put a reference to Melles et al. in the caption. To avoid copyright issues, we changed the color of the vegetation distributions. Also, these simulations have been run for ~50 years and some of the distribution is only slightly different but not enough to change our results.

Figure 3 : I do not understand the meaning of ‘Pre-Industrial vegetation corresponding to modern summer anomalies’.

Fixed. Changed to “a modern orbit”.

Figure 5 : this figure is not cited in the text and should therefore disappear.

This is now cited in the text.

Table 2 : the caption should be expanded. The accronyms should be explained.

Caption expanded and explained.