Page	Line/ fig/ table	Section	Reviewer	Comment	Response
838	16	0	1	Page 838, line 16 (abstract): 'models shows and increase' ! 'models show an increase'	done
838	17	0	2	Pg 838: line 17: Reorganize to say "We present sensitivity studies : : :. "	done
838	19	0	2	Pg. 838 line 19: ": : : simulations are presented, which : : :" to "simulations indicating the : : :"	followed the sentiment of this comment I hope.
839	12	1	2	Pg. 839 line12 ": : : period which : : : " to " : : : period that : : :"	done
839	21	1	2	Pg. 839 lines 21-25: break into 2 sentences. E.g., ": : : 2011). We also provide : : :"	done
840	12	2.1	1	Page 840, line 12: 'specifies' ! 'specified'	The atmosphere-only model uses specifies 12 mid-monthly fields changed to The atmosphere-only model specifies 12 mid-monthly fields
840	12	2.1	2	Pg. 840 line12: ": : : model uses specifies 12 : : :" to ": : : model specifies 12 : : :"	see above
840	14	2.1	2	Pg 840 line 14: ": : : due to Gregory" to " developed by Gregory: : :"	done
841	5	2.2	2	Pg. 841 line 5: " : : : versions, : : :"	done
841	22	2.3	2	Pg 841 line 22: "single-cell"	done
842	14	2.3	1	Page 842, line 14: 'Mcwilliams' ! 'McWilliams' (ditto, page 853, line 26)	Changed in reference software > citation and bibliography updated.
842	20	2.4	2	Pg 842 line 20: "due to" to "from"	change to "of"
842	21	2.4	1	Page 842, line 21: The two phrases need to be joined with a conjunction or split into two separate sentences, e.g. '...freezing in leads. Also ice can form...'	Split into 2 sentences.
842	23	2.4	1	Page 842, line 23: As above, e.g. '...is assumed for ice. Excess salt...'	connected with "with" to draw connection between 2 statements.
842	24	2.4	1	Page 842, line 24: As above, e.g. '...in the top layer and converging ice has...'	connected with "but" to draw connection between 2 statements.
843	8	3	2	Pg 843 line 8: "additional fully coupled Pliocene simulation: : :"	done
843	14	3.1	2	Pg 843 lines 14-17: Sentence structure could be rewritten to be more clear.	I have tried to clarify this sentence.
847	6	3.10	2	Pg 847 line 6: was this run for a total of 500 yrs? i.e., how long was the original experiment?	Add in reference to total integration length of control run of 1238 years. Control: 1238 years total (200 yr run continued from 1038 yr history) Plio: 500 year run continued from 1070 yr history (PRISM2)
847	21	4.2	1	Page 847, line 21: Change to 'falls close to' or 'falls to nearly', etc.	The profile over the non-polar oceans falls to close to 0 °C around the equator; changed to The difference profile over the non-polar oceans falls close to 0°C around the equator
847	21	4.2	2	Pg. 847 line 21-22: Specify the panel you are referring to so it becomes more clear for the reader: e.g., Figure 4a.	Included panel references
848	2	4.2	2	Pg. 848 line2. "Polar amplification of XXX degrees : : :"	Mean values of polar amplification calculation over latitudes beyond 60 for each hemisphere, quoted in text and tabulated in new table 3.
848	17	4.2	1	Page 848, line 17: Change to 'rainfall in the Pliocene, especially in the extent...'	done
848	20	4.3	2	1. Section 4.3: I found this section comparing latitudinal gradients to be confusing. Both experiments 1 and 2 have polar amplification and a reduced latitudinal gradient relative to the control. The comparison between the two experiments highlights their relative magnitudes. However, the discussion leaves the impression that Exp 2 polar temperatures actually cooled relative to the control. By clarifying that you are comparing relative magnitudes of warming, rather than referring to an "increased latitudinal temperature gradient" for Exp 2 you will help the reader understand what you are comparing.	Section 4.3 rewritten, hopefully more clearly with reference to polar amplification values given in table 3.

Page	Line/ fig/ table	Section	Reviewer	Comment	Response
848	20	4.3	2	2. Section 4.3: Can you make meaningful comparisons of TS over the oceans since SSTs are fixed for Exp 1?	Although the surface air temperatures over the oceans are strongly constrained by the specified SST, they are free to vary, and you can also assess the continuity with land air temperatures in the plots.
849	1	4.3	1	Page 849, line 1: I assume that the word 'increased' is used in comparison with experiment 1 since the actual latitudinal temperature gradient in experiment 2 appears to be smaller than that of the control. Perhaps the authors should write something along the lines of 'a latitudinal temperature gradient which, although has decreased, is larger than that of experiment 1'.	See above (p848 line 20)
849	11	4.3	1	Page 849, line 11: It may be better to simply say that there is 'a lack of warming' or 'less warming' and avoid the use of the word 'cooling' as this may give the impression that Pliocene temperatures in the far north Atlantic are lower than those of the control experiment.	This sentence has been rewritten to try to be clearer about what is happening in this area of the North Atlantic.
849	23	4.3	2	Pg 849 line 23: " .. over the oceans with a rise on the order : : :"	of the order of
849	24	4.3	1	Page 849, line 24 and page 850, line 12: How does the circulation change? A small description would suffice.	This description has been expanded to include discussion of location of NADW formation.
849	26	4.3	2	Pg 849 line 26: " : : : and is reduced in : : :"	done
850	3	5.1	2	3. Section 5.1: Are the proxy data shown from PRISM3_MASST_anomaly.nc? Just checking since you refer to the PRISM3 dataset, yet you have derived independent anomalies?	Extra text added to clarify: Pliocene mean annual SSTs taken from Dowsett et al, 2012. Figure updated to illustrate confidence levels, also caption.
850	9	5.1	2	Pg 850: line 9: ".. warmth that are not : : :"	done
850	11	5.1	2	Pg 850: line 11: " : : : Kuroshio Current off the East coast of Japan : : :"	done
850	12	5.1	1	Page 849, line 24 and page 850, line 12: How does the circulation change? A small description would suffice.	See related comment, p849 line 24
850	12	5.1	1	Page 850, line 12: 'the model, however there is' ! 'the model. However, there is'	added a ; and a ,
850	20	5.2	2	Pg 850 line 20: " : : : Previous simulations have been : : :"	done
850	22	5.2	2	Pg 850 line 22: " : : : 200 years. Figure 13 : : :"	done
851	5	5.2	1	Page 851, line 5: 'Hemisphere is has' ! 'Hemisphere has'	done
851	11	5.3	2	4. Section 5.3: I got lost here. The text could be improved by consistently referring to the experiments and corresponding vegetation datasets according to the definitions in Table 1.	Text and Table 1 title altered to refer to control simulation using alternative vegetation as "BAS_Modern".
851	11	5.3	2	5. Section 5.3: Do you know how sensitive the model is to vegetation? How do you separate the vegetation signal from the climate signal?	The only change between the 2 sets of simulations was the choice of vegetation in the control simulations.
851	16	5.3	2	Pg 851 line 16: Reference and/or define "WHS". Which experiments used it?	WHS referred to the standard Wilson Henderson Sellers dataset described in section 3.3. This text has been re-written to remove this confusion.
852	7	6	1	Page 852, line 7: Following on from the above point, any sign of polar amplification in experiment 2 (with the coupled model) should be stated in the paper, even if it is weaker than that in experiment 1. In figures 7d-f, the increase in zonal average temperature is clearly much greater at high latitudes.	Rewritten conclusion point 2.
852	10	6	2	Lines 10-13: Ambiguous sentence: " resulting in a higher mean latitudinal gradient similar to that in the control simulation : : :"	See above
852	18	6	2	Line 18: ".. PRISM3 data that : : :"	done
852	20	6	1	Page 852, line 20: 'significantly, no evidence' ! 'significantly, although there is no evidence'	, but no evidence ...
852	20	6	2	Line 20: " : : : significantly. There is no evidence : : :"	see above
852	22	6	1	Page 852, lines 22-23: It may be helpful to describe the feature in one to a few words e.g. 'a significant warming feature'	The discussion of this feature has been expanded here and more extensively in section 4.3.
852	22	6	1	Page 852, line 22: Change to 'in the model. In the data'	changed in course of addressing comment above

Page	Line/ fig/ table	Section	Reviewer	Comment	Response
852	22	6	2	Line 22: " ... The model shows evidence of a distinct : : :...model. The data also show a significa: : :"	see above
853	5	6	2	6. Conclusions: (p. 853): (same as point 5) I wasn't clear whether you also had a control with the potential natural vegetation. Perhaps I missed this. Otherwise it would be difficult to separate the effects of veg from the Pliocene forcings.	I hope the text now explains this more clearly - this section compares 2 different control simulations and their implications for Pliocene-control temperature anomalies.
853	26	7	1	Page 842, line 14: 'Mcwilliams' ! 'McWilliams' (ditto, page 853, line 26)	Changed in reference software > citation and bibliography updated.
Figures	0	9	1	Some of the figures (and the labels on the colour bars) seem too small considering the amount of detail in them, although the final appearance may change significantly after typesetting. In the case where there are 3 sub-figures in one row, it may help to either place colour bars below the figures or just replace multiple colour bars with just one if they are exactly the same.	I have removed the individual colour bars and replaced with global colour bars under relevant blocks of plots.
Figures	3	9	2	Fig 3: lower 2 panel legends show 3 colors/labels but only 2 lines.	There are 3 lines, the lower lines are 2 different runs of 200 years, I have made the lines thicker, hopefully this will be clear now.
Figures	4	9	2	Fig 4: Extend vertical scale to include polar amplification in panel 4.e	done
Figures	6	9	2	Overall, the figures may be more effective if the panels showing absolute T/PPT are removed and only anomalies are shown. Little additional information is gained from the absolute T and PPT, and the resulting difference figures may be larger and easier to read. (e.g., Figure 6a,b,d,e,g,h)	The absolute plots are required by the PlioMIP protocol and also give context to the anomaly plots. The figures are all available electronically with high resolution.
Figures	10	9	1	Also, figure 10 could be split into two separate figures, one with a-f, and the other with g-j.	I have split Figure 10 as suggested.
Figures	10	9	2	Fig 10. Break into two figures, using panels c and f, and g-j.	See above 2 comments.
Figures	12	9	2	Fig 12. Change "Contours show : : :" to "background color contours show : : :"	done
Figures	12	9	2	Fig 12. I am confused by the data shown. How do these proxy records relate to PRISM3_MASST_anomaly.nc from the PRISM3D database?	Figure, caption and associated text updated to explain this derivation more clearly.