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Climate of the Past Discussions

Interactive comment on "High-latitude environmental change during MIS 8–12: biogeochemical evidence from Lake El'gygytgyn, Far East Russia" *by* R. M. D'Anjou et al.

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Dear Anonymous Reviewer #2,

The authors want to thank you for taking the time to review our paper.

In accordance with your suggestions, we made the following changes:

Anonymous Reviewer #2 C1:

"Title does not exactly reflect the article papers. Very few is provided for MIS 12, 10 and even less for MIS 8."

Response Anonymous Reviewer #2 C1:

The authors agree that insufficient data is provided for MIS 8, 10, and 12. As such we will adjust the title accordingly in revision.

Anonymous Reviewer #2 C2:

"it seems that MIS11 lasts from 420 to 400 kyrs rather than 430-390 kyrs as highlighted on the figure. Does this study bring some new information on MIS11 duration? or is it the result of chronological approximation?"

"p.4759, lines 16-20 it seems also by focusing on CPI and TAR amongst others that MIS 11 duration is much lower than shown by gray rectangle: 420-400 kyr BP rather than 430-190kyr. Can you propose an explanation?"

Response Anonymous Reviewer #2 C2:

We agree the gray bars used to highlight MIS 9 and 11 are indeed inexact and are not bolstered by our presented data. They are meant to represent approximate times for marine isotope stages as defined by global records. We will attempt to make the figures and figure captions more clearly depict what we are trying to represent. Due to the coarse resolution of this record and chronological uncertainties inherent to the age/depth model, we do not attempt to address the exact timings and durations of interglacial periods, nor do we state that this study provides new information regarding the timing of interglacial periods.

Anonymous Reviewer #2 C3:

"p. 4748, lines 5-6: detail acronyms MBT, CBT and GDCT. Provide BIT equation in Table 1 and refer to this table in the text. "

Response to Anonymous Reviewer #2 C3:

In the revised manuscript, we will provide the details regarding the MBT, CBT, and GDGT acronyms, as well as include the BIT equation in Table 1.

Anonymous Reviewer #2 C3:

“p. 4749, line 10: in the present state, Fig. 1 does not indicate the ICDP drill. Red star indicate the Lake but there is no symbol for the drill on the small map. Please add it.”

Response to Anonymous Reviewer #2 C3:

We will add a symbol representing the drill site to the inset of the lake location figure.

Anonymous Reviewer #2 C4:

“I definitively a continuous sampling rather than discrete sampling: to study climatic and environmental changes, smoothing the signal is definitively less serious than an random sampling of the original climatic signal. You definitively miss real extrema, even rapid changes and can artificially create new extrema. That’s not your choice but you might consider this point for the future study. Try both approach on a highly resolved climatic signal (any out of ice core), extract one point at "varying depth intervals" and compare the resulting signal with what you would have had by integrating the original signal on a few centimeters. Which one better fit with the original one?”

Response to Anonymous Reviewer #2 C4:

The goal of this study was to examine organic geochemical compounds preserved in the lake sediments, and to look at changes in these compounds over prominent glacial-interglacial transitions. This study is not a high resolution study detailing rates of changes between glacial-interglacial periods or extreme events. We feel this point is adequately addressed throughout the manuscript, hence our conservative approach to interpreting the timing and rates of climatic driven changes in our record, as well as clearly stating the limitations inherent to this study. We note that there are ongoing research efforts in our group to substantially improve the resolution of the MIS 9-11 records.

Anonymous Reviewer #2 C5

“p. 4749, line 16: can you shortly provide information on the chronology precision, especially for the MIS of interest.”

Response to Anonymous Reviewer #2 C5

We kindly refer to Melles et al. (2012) in which the details concerning the age/depth model, its construction and its chronological uncertainties can be found.

Anonymous Reviewer #2 C6

“p.4752, line 25: between 420 and 400 kyr, you only have 5 points, including extrema, this means one point for 50 kyr. In contrary, end of MIS9 is much higher resolved. Be more exact.”

Response to Anonymous Reviewer #2 C6

We recognize parts of the record have low resolution, which is considered in our interpretations and we feel is adequately addressed. We will add necessary statements in this section concerning the resolution of this study in the manuscript to reiterate this fact.

Anonymous Reviewer #2 C7

“Figure 2: is the one point Crenarchaeol peak at 422 kyr real? or can it be an experimental artefact? same question for the oldest point.”

Response to Anonymous Reviewer #2 C7

Samples for GDGT measurements were all run in at least duplicate, and often in triplicate. Experimental error is discussed in the text, and cannot account for the change in concentrations. Furthermore contamination with crenarchaeol is highly unlikely. A high resolution study of Lake El’gygytgyn core Lz1024 (Castañeda, unpublished data) reveals numerous brief intervals characterized by elevated crenarchaeol concentrations. Similarly, Snyder et al. (this volume) note a number of brief and cold productive intervals in the Lake El’gygytgyn diatom record and suggest that these are driven

by changes in lake circulation. One of these cold productive intervals occurs during MIS 2 (the last glacial maximum) and elevated crenarchaeol concentrations are also observed at this time (Holland et al., 2013). Thus, brief excursions to elevated crenarchaeol concentrations seem to be a characteristic feature of the Lake El'gygytgyn record.

Anonymous Reviewer #2 C8

"Figure 3: it is perhaps still more visual to present all reconstructed temperatures with the same scale."

Response to Anonymous Reviewer #2 C8

We agree with this statement, and we have revised Figure 3 so that all MBT/CBT temperatures are now plotted on the same scale.

Anonymous Reviewer #2 C9

"p.4750, line 14: keep n-alkane with a lower case N, even at the beginning of the sentence. p. 4750, lines 15-16: please refer to Table 1 for CPI and TAR equations. . ."

Response to Anonymous Reviewer #2 C8

All stylistic and editorial corrections are noted and have been incorporated into the revised manuscript.

We appreciated the time you spent on these revisions, and feel that incorporating your suggestions into the revised manuscript will improve the final version.

Yours sincerely,

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Please also note the supplement to this comment:
http://www.clim-past-discuss.net/8/C3260/2013/cpd-8-C3260-2013-supplement.pdf

Interactive comment on Clim. Past Discuss., 8, 4745, 2012.