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Interactive comment on “A 350 kyr record of climate change from Lake El’gygytgyn, Far East Russian Arctic: refining the pattern of climate modes by means of cluster analysis” by U. Frank et al.

U. Frank et al.

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Dear Editor,

based on the comments by the two reviewers I made some modifications on my manuscript, including some corrections errors in spelling and grammar as suggested by Referee #1. Below you will find my replies to the comments.

Kind regards,

Ute Frank

C3071

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In my opinion the intention of this paper is clearly explained within the introduction, giving the access of detailed information on the sediment characteristics of the climatic phases and the presentation of unpublished data sets from LZ1324 as the motivation for this study.

5114/3 The paragraph on the statistical analysis was extended, giving a reference for a former use of this method and its advantages for sediment studies.

5114/8 The explanation is now worded as: “the records of κ LF, S-ratio, TOC and BSi were re-sampled by matching these records to the sampling depth given by the inorganic geochemistry samples”. It is neither a statistically nor a physically type of subsampling.

5114/21-26 The results of a cluster analysis strongly depend on the absolute values of the single data sets which can best be seen in the BSi values of LZ1024. Thus congruence in the shape of the record did not necessarily mean that the results of the cluster analysis are identical in parallel cores, although it should be. Here, the agreement of the results of the cluster analysis is to be expected since the sedimentology of both cores investigated is very similar, and this result is therefore self-explanatory. Every other result would need a copious discussion.

5121/all To initiate a discussion if the response is “clipped” at high temperatures and therefore did no show in the cluster analysis, it would be necessary to have results of cluster analysis for the complete Holocene or stage 11 for comparison. Since this data is not available we can only speculate about the reasons for the non-showing of the stage 5e. One reasonable explanation, in accordance with the data base of our study,

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is given within the discussion. Other explanations might be arising due to the future work on the ICDP core 5011-1.

5122/28 the section after (a) was reworded using either / or instead of a) and b)

To Referee #2 W. Dean

Reply to to the specific comments:

I agree that the size of the figures is something that needs to be discussed with the production office. It was not my intention that Fig. 4a and 4b) are squeezed together on one page, rather than on separate pages. I assume that they will be distinctively better to when the manuscript is printed in portrait rather than in landscape format.

It is the intention of this manuscript to use cluster analysis on well discussed data sets, in order to back up their interpretation with regard to climate change by statistics and not to repeat in detail the results from Melles et al. Thus the reader is referred to this paper and others from the same special issue of JOPL for the deep background.

The redox-sensitive trace elements are not part of this analysis but should be published elsewhere.

The part on the sampling steps or intervals of the single parameters was specified according to the information given in the cited papers.

There is now a sentence dealing with the interpretation of the S-ratio.

S and N are not part of the anorganic geochemical data set used for this study.

This manuscript deals not with the results from ICDP-core 5011-1, only the modified depth-age model for PG1351 and LZ1024 is derived from this core as published in Melles et al., 2012.

The results of the cluster analysis are shown colour and symbol coded because they can then be shown together with the original data sets, thus having a direct link be-

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tween cluster and data. This explanation was added to the paragraph dealing with the cluster analysis.

I agree that it is useful to have a legend in Fig. 5, showing the bi-plots of some parameters together with the results of the cluster analysis. By arranging the symbols in a specific pattern within the legend, it also helps to identify the assumed mixing lines in Figs. 5b and 5e. These lines will not be plotted within the figures since it will not contribute to the clarity of the figure. Within figures 4 and 6 there is and will be a legend for the climatic phases, respectively, which can easily be utilized by the reader to address the main clusters. The figure captions were accordingly changed.

Interactive comment on Clim. Past Discuss., 8, 5109, 2012.

CPD

8, C3071–C3074, 2013

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