

Interactive comment on “Pliocene to Pleistocene climate and environmental history of Lake El’gygytgyn, Far East Russian Arctic, based on high-resolution inorganic geochemistry data” by V. Wennrich et al.

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Review of “Pliocene to Pleistocene climate and environmental history of Lake El’gygytgyn, Far East Russian Arctic, based on high-resolution inorganic geochemistry data” by Wennrich et al. submitted to Climate of the Past. The authors rely primarily on downcore variations in a selection of elements (and element ratios) measured by Itrax XRF-scanning to reconstruct environmental and climatic changes in a composite core from the El’gygytgyn impact crater lake in NE Siberia. The study is well written, the topic suitable for Climate of the Past, and of great interest not only to the paleo-Arctic

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community, but also to the general paleoclimate community.

Specific comments to the manuscript: P5902, line 10: I am not a native speaker, but I find the phrase “highly masked” strange. I understand what is meant, but it feels awkward.

P5902, line 27-28: I think one sentence explaining why TOC & TN increase can be attributed to the intensification of the glacial intensity would be appropriate.

P5902, Intro, line 13. I think an “is” is missing between “as” and “often”

P5908 3.4 TOC, TIC, line 11: What is meant by “in aqueous suspension”?

P5910, line 10: The interpretation of Ti as an Aeolian proxy by Yancheva et al. has been challenged (I think on solid grounds) by Zhou, H., Wang, B.S., Guan, H., Lai, Y.J., You, C.F., Wang, J. and Yang, H.J., 2009. Constraints from strontium and neodymium isotopic ratios and trace elements on the sources of the sediments in Lake Huguang Maar. *Quaternary Research*, 72(2): 289-300. Yancheva, G., Nowaczyk, N.R., Mingham, J., Dulski, P., Schettler, G., Negendank, J.F.W., Liu, J., Sigman, D.M., Peterson, L.C. and Haug, G.H., 2007. Yancheva et al. reply. *Nature*, 450(7168): E11-E11. Zhang, D.e. and Lu, L., 2007. Anti-correlation of summer/winter monsoons? *Nature*, 450(7168): E7-E8. Zhou, H., Guan, H. and Chi, B., 2007. Record of winter monsoon strength. *Nature*, 450(7168): E10-E11.

P5912, line 23: change “well correlate” to “correlate well”

P5912, line 27-28: Awkward sentence: “Further-on, strong short-term fluctuations that can be attributed to glacial/interglacial variations.” Something is missing in this sentence.

P5915, line 3-8: Are the element ratios molar-ratios, weight-ratios, or count-ratios?

P5916, line 17: remove “an” before “interglacial/glacial timescales”

P5917. line 23: what is meant by “hardly masked”?

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P5918, line10: The M2 cooling event has not been mentioned before and isn't really explained. The manuscript would benefit from a brief paragraph explaining the significance of this cooling event.

P5918, line 14: "seams" should read "seems"?

P5920, line 1: What is mean by "addressed" in the sentence "Facies A sediments are addressed to sedimentation processes under a perennial ice cover (Melles et al., 2007, 2011) implying that during MIS 104 for the first time mean annual temperatures at the lake fell below a critical threshold of 5.5 ± 1.0 C below modern that is required to initiate multi-year lake ice and to eliminate oxygen exchange 5 with the atmosphere (Nolan, 2013)."

P5922, line 17: Why does the sentence start with "Their"? Whose results are meant?

P5923, line 1-2: I don't quite understand why the permafrost would develop AFTER the cooling event, wouldn't climate become warmer after a cooling event?

Figure 3: I guess "matric" should read "matrix"?

Figure 5: I may be helpful to popint out that the scale for Rb/Sr is "upsidedown, as the casual reader may fail to notice this (as I did when I tried to understand why the curves seemed to go in the wrong directions. . .).

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