

Interactive comment on “Dynamic diatom response to changing climate 0–1.2 Ma at Lake El’gygytgyn, far east Russian Arctic” by J. A. Snyder et al.

Anonymous Referee #2

Received and published: 14 October 2012

Dynamic diatom response to changing climate 0–1.2Ma at Lake El’gygytgyn, far east Russian Arctic J. A. Snyder et al.

Since learning of this unique ancient lake many years ago, I have been fascinated with its setting and potential sediment diatom record. The composition and diversity of species in ancient lakes are of great scientific interest and in El’gygytgyn, Pliocaenicus seczkiniae is one of the stars. Like other very old lakes, the sediments hold diatom microfossils and, put together over time, their morphological and evolutionary change perhaps in relation to climate (as in Bradbury and Krebs 1995, Theriot et al. 2006). This paper documents the changes in abundance of the planktonic diatom genera and

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periphytic diatoms over this million year plus record, in association with June insolation and $\delta^{18}\text{O}$. This publication follows the exciting release of the physical and chemical sediment record of El'gygytgyn (Melles et al. 2012).

The focus of the manuscript seems to be off the mark, however. While it claims that the diatom record is correlated with the temperature record, that relationship is weak, at least the way that it is presented. The correlation does not appear to have been formally tested. Diatom abundance certainly responds to the dramatic MIS 1, MIS 11 and MIS 31, but not in a synchronous manner and the diatom record in this lake is a poor proxy for climate. Perhaps the authors use “dynamic” in the title and “preserves a complex cyclicity” on page 4605 to indicate their equivocation. The second line of the abstract promises that the diatoms provide “a means to create and test hypotheses concerning the lake’s response to changing climates”, yet the authors neither mention stating, nor testing of hypotheses again. It may be that the diatom record does relate strongly to climate and it might be worth examining the entire assemblage (or “concentration, preservation, valve size, and species assemblage”) in ordination space and rates of change in composition. Now, it is difficult to follow the story telling style of diatom change. If the manuscript is to relate to climate, additional work is needed to make that case.

The maps and graphs are generally well done.

P. 4604 line 25. “lumped” is an awful word. I am not sure why it has established itself in common use to describe combining taxonomic groups, or treating groups as one.
P. 4607 line 18. Periphyton species change is described, but the species changes are not clear in the plots. P. 4608. Description of the dominant taxa in each stage takes up a great deal of the text, yet these changes do not seem to be climate related. P. 4611. “To explain the occurrence of these taxa also observed to occur during peak warmth intervals, one must consider the timeframe represented by sediment samples” This paragraph does not help in furthering a climate connection.

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