

## ***Interactive comment on “Amplified bioproductivity during Transition IV (332 000–342 000 yr ago): evidence from the geochemical record of Lake El’gygytgyn” by L. Cunningham et al.***

### **Anonymous Referee #2**

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The manuscript presents a multi-proxy record from Lake El’gygytgyn showing a large changes in productivity over Transition IV which is delayed relative to other proxy data. Given the scarcity of other lacustrine records over this interval, particularly from the Arctic Circle, this record should be of considerable interest to the academic community. The paper should therefore be published after consideration of the points raised below.

Detailed comments:

Samples: In the methods section please can the authors distinguish between what samples are being presented here for the first time and what samples have already been published by Melles et al. (2012). As the text stands I get the impression that

some data has already been published in the Melles paper but I can not be certain.

The manuscript also repeatedly states that the data in this paper is at a higher resolution than the Melles (2012) and Frank (submitted) papers. Please can the authors state the number of samples analysed in this paper and how this compares to other work.

BSi interpretation: Page 5344: “At Lake El’gygytgyn, BSi is positively related to temperature as increasing temperatures decrease the duration of lake-ice cover, thus increasing light availability and enhancing primary production”. This is only half the story. Lake El’gygytgyn is ultra-oligotrophic, therefore BSi must also be influenced via increased/decreased nutrient input to the photic zone – indeed the strong correlation to the Si/Ti record confirms this.

The authors assume that the BSi record can be faithfully interpreted as a record of siliceous productivity. This is true, but it should be considered that only c. 5% of diatoms from the photic zone are preserved in the sediment record. Could some of the increase (or lack of an increase) over the analysed interval be explained by preservation?

Other issues:

Page 5344 – line 12. Make it clear that you are referring here to surface air temperature.

Page 5344 – line 13. What about snow cover as well as ice-cover being important?

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Interactive comment on Clim. Past Discuss., 8, 5341, 2012.

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