

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.

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Response to comments by Reviewer 1 (Dr Jane Reed).

The care and attention to detail shown by this reviewer is greatly appreciated. This reviewer suggested a number of minor corrections. As these suggestions will all be incorporated into the revised version of this manuscript, we don't believe it is necessarily to address each individually here.

Response to comments by Reviewer 2 (anonymous).

We would like to thank this reviewer for their comments. This reviewer asked that

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several points be considered prior to publication of the manuscript. We would like to briefly respond to these here, but would stress that these points will also be addressed in the revised manuscript.

Comment 1. With samples collected every 0.25 cm, the BSi data is presented at 8 x higher resolution than in Melles et al. (2012) and 4 x higher resolution than Frank et al. (this issue). The TOC data is presented at 2 x resolution relative to Melles et al. (2012). This is the first time either of these series have been presented. The MS data has been included in Frank et al. (this issue) while the XRF data was published in Melles et al. (2012). The XRF and MS data are the same resolution as in Frank et al. (submitted) and Melles et al. (2012), however, the latter did not provide an in depth analysis of MIS 9 and transition IV, focusing instead on other interglacial periods (MIS 1, 5e, 11 and 31) during the last 2.8 MA.

Point 2. The interpretation of BSi as primarily reflecting climatic changes does not exclude the influence of nutrient supply. It is likely, however, that changes in nutrient supply will themselves be linked to climate. During glacial periods, there will be limited supply of nutrients into the lake; in warmer periods there will be increased nutrient supply:

- (1) from the catchment as a result of increased presence of vegetation, soil formation, thicker active permafrost layer, enhanced chemical weathering etc.; and,
- (2) through nutrient recycling from the hypolimnion and sediment/water interface as a result of lake ice disintegration promoted by raised summer temperatures.

The issue of bioproductivity amplification by factors other than climate, including nutrients, is discussed on page 5350. Admittedly, this could be expanded to more specifically address nutrient input and raised earlier within the paper, as suggested by this reviewer. These changes will be made within the revised manuscript.