

Interactive comment on “A 250 ka oxygen isotope record from diatoms at Lake El’gygytgyn, far east Russian Arctic” by B. Chapligin et al.

Anonymous Referee #1

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COMMENTS

Nice study by Chapligin et al. on a 250 ka oxygen isotope record from diatoms at Lake El’gygytgyn, far east Russian Arctic. The authors present that down core variation of oxygen isotope values from $\delta^{18}\text{O}_{\text{diatom}}$ in the upper 13 m dating back ca. 250 ka show glacial-interglacial cycles, and they are mainly controlled by $\delta^{18}\text{O}_{\text{precipitation}}$. Furthermore, the authors addressed contamination to the diatom samples and tested diagenetic effect. The assessments of the contamination and/or diagenetic effect have not been usually carried out in previous studies. Thus, this study would be the model for the routine method of the reconstruction of paleoenvironment by using oxygen isotopic compositions of diatom including the tests of contamination and diagenetic effect. The paper is mostly well written and I do feel that this is potentially important informa-

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tion that is presented, however, I have some concerns about the contents. The author should have a minor revision below:

P1186, I16

Authors indicated that the $\delta^{18}\text{O}$ peaks often occur earlier than TiO₂ minima and or BSi maxima percentages and attributed that to delay of clastic sediment supply or productivity proxy records. However, I wonder the change of sedimentation or nutrient availability could delay from the atmospheric signal in the small lake. Authors might be able to discuss not only the residence time of water but also the nutrient availability response.

P1186, I22, P1188, I14, I25

The $\delta^{18}\text{O}_{\text{diatom}}$ was compared with LR04 or NGRIP. The age model of the studied core is made from magnetic susceptibility. If the $\delta^{18}\text{O}_{\text{diatom}}$ well correlated with these stacked curve or ice core records as authors mentioned, $\delta^{18}\text{O}_{\text{diatom}}$ variation is probably more suitable to make age model. Thus, the discussion about the timing between $\delta^{18}\text{O}_{\text{diatom}}$ and LR04 or NGRIP by using the present age model seems to be no meaning. . .

P1187, I21

The isotopic difference between the core top (21.5‰ and Holocene Thermal Maximum ($\delta^{18}\text{O} \sim +23\%$ 8.9 ka) is about 1.5‰. If the $\delta^{18}\text{O}_{\text{diatom}}$ mainly reflect air temperature, it equals to 2.5°C of air temperature change. Is it reasonable for post HTM-cooling at the studied site?

P1190, I4

Authors presented that there is no general trend between the relative Si-OH bonds percentage toward depth and oxygen isotopic compositions of diatom, and referred Moschen et al. (2006) that the rapid signal alteration during sedimentation is followed by only minor post-sedimentary diagenetic changes which are not detectable in the

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$\delta^{18}\text{O}$ data. I agree with author's interpretation. However the main result of Moschen et al. (2006) is a silica dehydroxylation process as cause for the isotopic enrichment of the bottom sediment, and the isotopic compositions of the diatom on the bottom sediment and epilimnion is different. If authors would like to refer the Moschen et al. (2006), they should clearly note the possibility that the observed oxygen isotopic compositions might be rapidly altered value during settling and sedimentation.

P1203, Fig.5

The figure is difficult to understand. Please add more information in the figure caption. For example, I could not understand what the up pointing arrow (T_{water} or Continental-ity) indicates.

Interactive comment on Clim. Past Discuss., 8, 1169, 2012.