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Climate of the Past Discussions

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

B. Chapligin et al.

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Dear Bernd Wagner,
we corrected and improved the commented passages. Since you had very few comments, the changes are rather minor.

As requested, the MIS boundaries in Fig 7 and 8 were corrected. We are grateful for this comment which helped improving the manuscript. However, this change neither influences the discussion and interpretation of the data as the correct age was always stated in the text (apart from one sentence about MIS 4, which you marked in your attachment and which is corrected now) nor the correlations of $\delta^{18}O_{diatom}$ with $\delta^{18}O$ LR04 or δD Epica (as the correct ages were compared).

Regarding a suggested brief comparison of MIS 5 versus Holocene data we added the following sentences in Section 4.4:

(...) According to the presented $\delta^{18}O_{diatom}$ record of Lake El'gygytgyn, similar temperatures occurred in the time of the HTM, MIS 3 and MIS 7, whereas the MIS 5.5 interglacial was warmer than the Holocene. Comparing similar peak average $\delta^{18}O$ values from HTM (+22.8‰; 11.1-8.4 ka) and MIS 7 (+22.6‰; 244.0-202.8 ka) with $\delta^{18}O$ values from the time corresponding to MIS 5.5 (+23.6‰; 127.2-123.6 ka) the values differ by 0.8-1.0‰ equivalent to about 1 to 1.5°C difference in mean annual air temperature (MAAT) (Dansgaard, 1964; Rozanski et al., 1993; calculated as described in section 4.1.4). This is in the range of the pollen spectra temperature reconstructions by Melles et al. (2012) who found the MIS 5.5 to have slightly higher mean temperatures of the warmest month (MTWM, i.e. July; difference ~1°C) as compared to the HTM data. The most recent $\delta^{18}O$ value of +21.4‰ is around 1.5‰ below the HTM $\delta^{18}O$ value corresponding to a temperature decrease of about 2° to 2.5°C which slightly exceeds pollen-based reconstructions by Melles et al. (2012)(~1° to 2°C difference between today and both HTM and MIS 5e = MIS 5.5).

Additionally we added one sentence for comparing the peak-to-peak amplitude between the $\delta^{18}O_{diatom}$ record and the pollen based reconstructions from Melles et al. (2012) in section 4.1.4:

(...) If only condensation temperature controlled this peak-to-peak amplitude of $\delta^{18}O$=5.3‰, this would correspond to a mean annual air temperature change of about 9°C between LGM and MIS 5.5 interglacial (Dansgaard, 1964). This temperature difference is in line with pollen-based reconstructions by Melles et al. (2012) who found a difference in mean temperatures of the warmest month between LGM and MIS 5.5 of about 9°C.

A more intense discussion between MIS 1, 5 and 11 as performed in Melles et al. (2012) can be done after we have finished analysing MIS11. However, this comparison

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of warmer periods which includes the so-called “super-interglacial” MIS 11 is beyond the topic for this manuscript and will be part of the next paper.

References:

Melles, M., Brigham-Grette, J., Minyuk, P. S., Nowaczyk, N. R., Wennrich, V., DeConto, R. M., Anderson, P. M., Andreev, A. A., Coletti, A., Cook, T. L., Haltia-Hovi, E., Kukkonen, M., Lozhkin, A. V., Rosén, P., Tarasov, P., Vogel, H., and Wagner, B., 2012. 2.8 Million Years of Arctic Climate Change from Lake El’gygytgyn, NE Russia. Science, 337, 315-320.

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

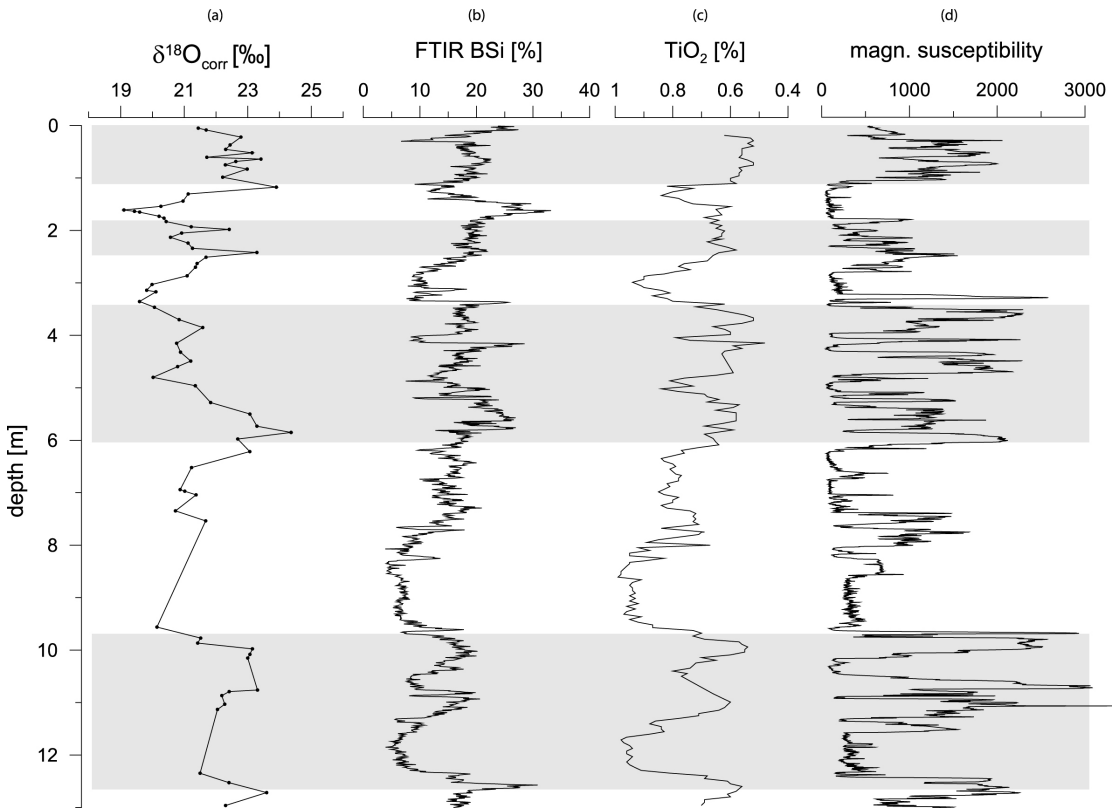

Fig. 1. Fig. 7 - revised

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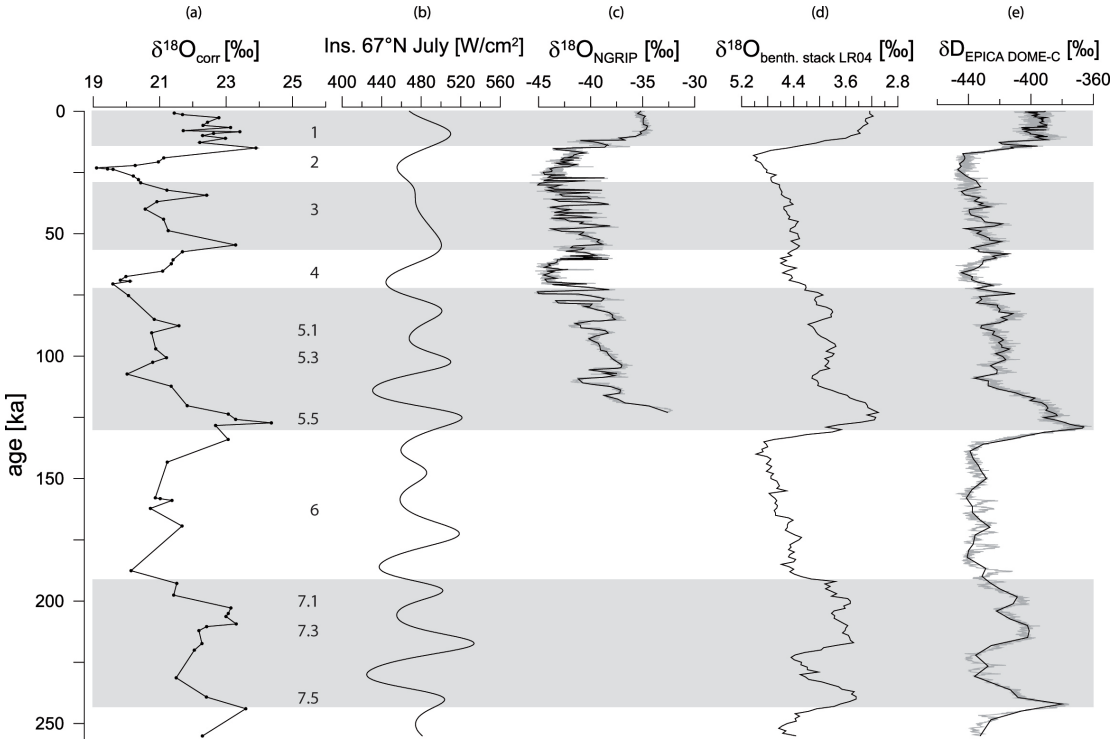

Fig. 2. Fig. 8 - revised

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