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Climate of the Past Discussions

Interactive comment on "Long term trends in aquatic diversity, productivity and stability: a 15,800 year multidecadal diatom study from Lake Baikal, southern Siberia" *by* Anson W. Mackay et al.

Anonymous Referee #2

Received and published: 16 October 2020

Review of "Long term trends in aquatic diversity, productivity and stability: a 15,800 year multidecadal diatom study from Lake Baikal, southern Siberia" by Mackay et al. for Climate of the Past – Discussions. This manuscript presents a high resolution diatom record (ca. six-decade) of Termination 1 and the Holocene and uses diversity, species abundances, and paleoproductivity measures to explore the relationships among diversity, resilience, and stability change as a result of climate drives over the last 15800 yrs. The manuscript is well-written and conceived, reaches solid conclusions, and I recommend its acceptance following minor corrections and revisions as

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Discussion paper

discussed below. Nice paper.

Broader comments:

Figures – several of the figures are wanting for reproducibility or interpretibility. If they are to be produced at the size provided in the review copy, they are unacceptable for publication. A reader should not have to get a hand lens out to interpret a figure. This is especially apparent in Figs 2, 3, 6. A few other notes, what is meant by the (agg) in Aulacoseira skvortzowii in Fig 3, meyeri misspelled in Fig 3, units on seasonal BVAR does not use a mu symbol for μm and the μm3 and cm2 do not have superscripted exponents in Fig. 3. In Figure 4 and 5 the record is truncated at aout 14500 yBP. The core is clearly shown to be 15800 yBP old, why the truncated records in Figs 4, 5?

M&M – the section on diatom analysis is strangely variable in detail. Diatoms are described for a general audience, but then there analysis is described as though everyone knows how they are treated in sediment analysis. For example, what is meant by 5 mm resolution? Valves per gram of what. Add that they "possess a silica shell called valves. . ."

Taxonomic names – care should be taken to make sure taxonomic names are correctly spelled and formatted throughout the manuscript. Stephanodiscus meyeri (single -i at end), the v. in variety radians should be in Roman font, not italicized.

Discussion – has there been similar detailed approaches taken on other long records? This seems to be a novel approach for considering the relations between diversity/stability and climate, but that aspect is not highlighted by the authors and it should be! Has this approach of melding resource ecology and diversity been applied to other climate records, perhaps from varved lakes and accounting for Holocene scale records (LIA, MCA, HCM)?

Discussion – earlier efforts by Khursevich et al. (2001, 2005) and Edlund (2006) have considered the longer Baikal records, but in lower resolution and and with fewer mea-

sures of diversity and productivity. How does this new record compare or contrast with those earlier approaches to examine the full Baikal record. Is the Pleistocene/Holocene transition unique? For example, this paper suggests higher valve flux and BVAR in glacial times (T1) vs Holocene (see Table 1). This seems to contrast with many of the diatom depauperate regions characteristic of other glacial periods in Baikal's history.

Discussion – the Baikal diatom community is characterized by high endemicity. Is there any reason to believe that this endemic flora drives the patterns shown in your data, i.e. is the resiliency a byproduct of endemicity? ln 521-533

Minor corrections ln 52, understanding...is ln 117, remove comma after "...2018) restricted..." ln 130, change to "...diveristy that is not experienced..." ln 133, change to "...events disrupt these ..." ln 140/41, odd expression outside of UK, change to "...due to its diverse flora..." ln 142, provide refernce to endemicity of Baikal ln 145, italicize the ship's name. She deserves that. ln 149-50, add space before meter abbreviation in 3 places. Check rest of msc for same. ln 160/61, superscript 14 in 14C, check rest of msc for same, also noted for μm3 (ln 215), etc. ln 222, clarify what is meant by PDR? Is PDR the relationship between paleoproductivity and N2 or is it N2? If it is the relationship, how is it calculated? Fig 5 seems to be reporting this "PDR" but PDR is not described or connected to Fig 5. What am I missing as a reader here? Is Fig 6b also related to PDR? ln 399, "...Bolling, the pre-Bolling diatom..." ln 415, why is the there a delay in the N2 diversity decline? Would be worth some speculation. ln 456, skvortzowii misspelled ln 475, close parenthesis after 2011) ln 475, verb agreement "shows" ln 509, check msc for formatting of N2, N0, N1, italicized N and Roman 2 seems the standard. ln 541, close parenthesis after Fig. 3)

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