

## ***Interactive comment on “Spatial distribution of environmental indicators in surface sediments of Lake Bolshoe Toko, Yakutia, Russia” by Boris K. Biskaborn et al.***

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This manuscript presents an extensive, multiproxy investigation of Bolshoe Toko, a large lake in Yakutia (northern Russia). In this study, the authors measured and analyzed a series of environmental indicators from the lake in order to better understand how it functions with the goal of making an informed decision on the best regions to retrieve sediment cores in order to provide the best possible sedimentary sequences to infer past environmental changes in the lake, its catchment and the region. Abiotic (sedimentological, isotopic, etc) and biotic (diatom, chironomid) components of the system were investigated, allowing for an in-depth analysis of the current state of the

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lake.

I think that this type of investigation should be standard when large lakes are targeted for paleoenvironmental studies. This team of researchers has done an excellent job of establishing current links between environmental variables and their effects on the various abiotic and biotic components of the Bolshoe Toko system. With their holistic and regional-scale understanding of the current lake system, they will be very well prepared and equipped to analyze the data from a long sediment core.

The text is well-written and easy to understand, albeit with some small grammatical errors that can easily be fixed (see specific comments below). The figures are clear and eye-pleasing.

There are two things that the authors could have included in their investigation that could add even more useful information to refine the interpretation of future results obtained from sediment cores: 1) lake residence time and 2) assessment of a possible reservoir effect/input of old carbon from the catchment to the lake basin (dating of surface sediments provides a straightforward indication of the presence of these). Perhaps these can be mentioned in the text as possible ways to improve this type of preliminary study in future, especially in northern regions, where obtaining reliable chronologies can be challenging.

The manuscript is long due to the high number of components investigated. I suggest putting the two tables in Supplementary Materials in order to shorten the main text. I would also like to see the diatom (and chrysophyte) and chironomid data in Supplementary Materials. The authors should make an effort to be extra concise in their wording.

Specific comments: Figure 6B: Adjust the axes in this figure; shorter axes will allow a better view of the variability in the data.

Please replace the term "fossil" when referring to biotic components found in the sedi-

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ment. This is an incorrect use of the word. You can either use sedimentary remains or sub-fossils, for example.

Sometimes, the references are underlined. Please make sure to remove this.

The Results section should be written in past tense. Make sure that this is the case (there are some sentences written in the present tense).

The Discussion should begin with a statement of your main finding(s).

Line 85: remove the "s" in content Line 168: length instead of diameter Line 173: remove "The" at the beginning of the sentence Line 183: replace "northern direction" with North Line 213: please include the years on which the mean temperatures are calculated Lines 285-292: this information belongs in the Results section Line 291: before and prior mean the same thing; remove one Line 403: information is missing in this sentence (where or what was the data derived from?) Line 647: remove the capital "S" in sand Line 870: what does "quitter" mean? Did you mean quieter (less turbulent)? Line 894: remove the "s" in content Lines 957-958: You mention "several studies" but you only cite one. Line 1043: remove the "s" from diatom Line 1256: Aside from (not of) Line 1290: replace "is matching" with matches

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