Biogeosciences
Discussions

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Interactive comment on "Environmental factors controlling lake diatom communities: a meta-analysis of published data" *by* S. Blanco

Anonymous Referee #2

Received and published: 10 July 2015

This paper is a meta-analysis of datasets from previous paleolimnological research that used similar multivariate approaches to determine how much variance in diatom assemblage composition is explained by multiple environmental variables. The author argues that this approach will improve understanding of relationships between diatoms and climatic and geographic factors.

This study is an interesting meta-analysis that could provide a synthetic understanding of major drivers of diatom composition in lakes at the global scale. However, there are some major issues. I am in agreement with many of the points made by Anonymous Referee #1, especially the bias of the datasets towards TP and pH reconstructions. It is unclear whether the particular datasets included and the way the datasets were examined is appropriate for answering the central question of this paper. Another issue

is what exactly is the central question of this paper? I do not see a clear statement of objectives and hypotheses or expected findings. Finally, the paper does not really explain why understanding the relationships between diatoms and climate and geography is important or how the findings of this paper can be used in future research. The abstract ends with the sentence, "lake diatoms give a robust indication of past and present environmental conditions." This is already well known and does not contribute new information to the field.

Perhaps the most novel part of this study that could make a contribution to the field is the method of data analysis and the use of many datasets. However, the author needs to provide a stronger justification for the selection of specific datasets and the way the datasets were examined. If "quantitative models...have limited spatial transferability" (pg 15892 line 24), is it appropriate to analyze these disparate datasets together? Or what measures were taken to make the analysis applicable at the global scale? Two fundamental assumptions of paleolimnological reconstructions are that 1) the variable of interest (e.g., TP) is the primary, ecologically important driver of species distribution and abundance (or at least linearly related to the primary driver) and 2) secondary environmental variables are either negligible or not covariable with the primary driver. Is it appropriate to examine the relative influence of environmental variables that could be negligible compared to the primary driver of species distribution and abundance, especially if the datasets were intentionally developed to maximize coverage of the primary driver gradient?

1. Does the paper address relevant scientific questions within the scope of BG? a. It could if the question about how climatic and geographic factors affect diatoms is made more clearly.

2. Does the paper present novel concepts, ideas, tools, or data? a. The meta-analysis of paleolimnological datasets seems novel, but the ideas/conclusions are not.

3. Are substantial conclusions reached? a. Currently, no.

4. Are the scientific methods and assumptions valid and clearly outlined? a. No, not clearly outlined, especially the assumptions for examining multiple paleolimnological datasets.

5. Are the results sufficient to support the interpretations and conclusions? a. No, but possibly yes if the interpretation of the loadings are more clearly explained in relation to climatic and geographic factors.

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? a. Yes, I think so.

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? a. Yes.

8. Does the title clearly reflect the contents of the paper? a. No, I think "environmental factors" is too general.

9. Does the abstract provide a concise and complete summary? a. No, it contains some unnecessary background information, not enough about the specific contribution of the current study.

10. Is the overall presentation well structured and clear? a. Well structured, but not clear.

11. Is the language fluent and precise? a. No.

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? a. Yes.

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? a. No.

14. Are the number and quality of references appropriate? a. Yes.

15. Is the amount and quality of supplementary material appropriate? a. No, needs a table detailing the datasets used.