Second Review of Article
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Title: Geodiversity primarily shapes large-scale limnology and aquatic species distribution in the northern Neotropics
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General comments

This is a vastly improved manuscript. There are only two general issues that should be addressed throughout this manuscript; once addressed, I consider the manuscript to be acceptable for publication.

Geodiversity. I appreciate the defining of "geodiversity" at Line 38. It seems that the term "geodiversity" is synonymous with "local environmental conditions", a term that is more clear and is used nearly exclusively (at least in the multiple studies that I have seen). It's not clear why "geodiversity" is preferred, and in fact the term is misleading -- especially the "diversity" part of the word (which implies differences among sites, rather than denoting a fixed set of conditions). The authors should at least indicate this synonymy, e.g. near Line 38. Note that this is especially misleading at Line 618. I encourage the authors to *consider* replacing each "geodiversity" with "environmental conditions" (or a variation thereof) throughout, unless there's a convincing reason that "geodiversity" is indeed the better term.

Sample sizes. Apparently only six individuals (or three?) were identified at some sites, but as many as 60 were at other sites. A better mention of the numbers identified is essential, for example at Line 217. This creates the *potential* for a substantial error due to sampling effort. For sites with six identified individuals, the percentages are coarse approximations at best. This study is still useful – we all deal with compromised or limited data sets -- but this potential limitation must be addressed in the Discussion.

Specific comments

Line 156: Please give the reader an idea of how many samples were *typically* collected. If most lakes were represented by two samples (i.e. 6 individuals) but some were represented by ten samples (i.e. 30 individuals), this may affect the apparent distribution of species as well as the calculated richness and Shannon-Weiner diversity indices.

Line 215: Change "was" to "were".

Line 216: Either transpose "stereomicroscope" and "Leica MZ75", or place "Leica MZ75" in parentheses.

Line 217: It seems that only 3 individuals were identified in each sample, and up to 10 samples were collected at each lake (Line 156); please report the average number of samples per lake. Multiple sampling is appropriate and should be repeated here at Line 217. I'm not familiar with ostracod procedures, but three is a very small number. If this is a reasonable number, please indicate and include references. For example, add "Although a sample size of three is very small, this is consistent with ostracod studies in general (reference, year) in part due to low ostracod abundances in most sediments worldwide (reference, year)." In addition, see comment for Line 379.

Line 244: Delete "the" and transpose "software" and "Canoco version 5".

Line 248: Please specify the software that includes SEM. It may be part of R, but this isn't mentioned until Line 264, so a mention is needed early in this section.

Line 379: Please report the total number of species.

Line 421: I see the groups of ostracods from NMDS is Figure 5(a), but I would very much like to see the eigenvectors from CCA. A figure similar to Figure 4(a), but based on CCA, is important.

Line 423: We're told that local geology is the ultmate driver, and I accept this as true. I think its effect is delivered through evaporative concentration (PCA shows that ionic concentration varies strongly among these systems). In other words, ionic concentration is the immediate cause;

what matters *directly* to ostracods is water conditions, so local geology is an *indirect* factor. A figure with NMDS eigenvectors would be very, very useful for this.

Line 447: Insert comma after "limnology".

Line 460 (Figure 6): I like this figure very much; it's clear yet detailed. I'm somewhat confused, however: doesn't "geodiversity" *include* limnology, conductivity, and elevation? I'm not sure that "NMDS" is needed in the "Species composition" box; please verify and/or put "NMDS" in parentheses.

Line 467: Replace "drives" with "defines".

Line 506: It's not clear that volcanism created most Central American lakes; in my experience, at least as many were formed by mass movement (in higher elevations). At best, the authors could say that "Volcanism is a common mode of formation".

Line 547: Line 217 reports that three ostracods were identified per sample, yet Line 547 reports up to nine species per lake.

Line 551: Collection effort can make a huge difference here. If ten samples were collected from one lake but only two from another, we'd expect greater richness in the 10-sample lake. In addition, two samples may be enough to characterize small lakes (*if* sufficient numbers of ostracods are identified in each sample), but this is less true for larger lakes. At least this should be acknowledged here: "While the number of samples per lake varied from X to Y"….

Line 618: transpose "abundant aquatic systems" and "high geodiversity". If "geodiversity" = "environmental conditions", then this phrase should be "high diversity of environmental conditions" rather than "geodiversity". This is where the "diversity" in "geodiversity" becomes confusing.