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Biogeosciences Discussions

Interactive comment on "Environmental changes on the Balkans recorded in the sediments from lakes Prespa and Ohrid" *by* B. Wagner et al.

J. Brigham-Grette (Referee)

juliebg@geo.umass.edu

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Wagner et al, Biogeosciences

The purpose of this paper is to document paleoenvironmental changes in new cores from Lake Prespa and compare these records with those from nearby Lake Ohrid. The two lakes are hydrologically connected via karst aquifers yet differ in mean depth and in the flow and resonance time of waters that fill them. There are also significant differences in the faunal composition of the two lake systems. Dating control is based on calibrated radiocarbon age estimates of plant and fish remains and the occurrence of at least 3 tephra. The base of the new core from Lake Prespa bottoms out at about 48 ka. The significance of the emerging paleoclimate records from lakes Ohrid and Prespa is that these are among the oldest lakes in Europe and Lake Ohrid is home

to a remarkable 200 endemic species. Lake Ohrid is a UNESCO world heritage site and Lake Prespa is now a national park. Most importantly, these lakes are sited along the northern margin of the Mediterranean Sea with the potential of recording shifts in temperature and precipitation linking the subtropics with the mid to high latitudes. Lake Ohrid is a potential drilling site for the International Continental Drilling Program. Hence this paper lays out the results of some of their preliminary site surveys. The paper is well organized but the entire paper needs to have the English reworded to add clarity to the text and significance to the scientific results. My detailed comments are indicated below on specific aspects of the paper:

Table 1: calendar age of KIA36356 must have a typographical error and is the only calibrated older age so this needs to be corrected. Maybe its supposed to be 37,990?

Fig. 1 Add the names of the countries to the maps and the political boundaries to the shaded relief map.

Fig. 2 – perhaps need to add arrow so show circulation? Nothing is clear in my printed version. What are the regional winds that control surface mixing and how are past changes in the winds related to what is known about large scale Earth system dynamics in the Mediterranean. I don't see this addressed in the text (or I missed it?)

Fig. 3 – Laminated intervals are not shown here with any clarity. Could a close up be added to figure 4? Fig 3 also needs to have the interval of the line scan at the right edge show with arrows between the Mn column and the scan. This would make it clear that there is an intentional scale change here to show details of the transition between depositional units.

Fig. 5 – add error bars to the radiocarbon ages.

Fig 6. And 7. – These figures are fine but would be improved by adding the names of the lakes next to the core names. There is plenty of room for that. Fig. 7 – One can't really see the link for the 8.2 event in Lake Ohrid vs. Lake Prespa. Perhaps you need

to add a dashed line for this – I don't see any connection or there is something funny about the way the columns are lined up here (I suspect the latter based on your text).

Abstract: line 3 to 7 should read – From Lake Ohrid, several sediment cores up to 15 m long have been studied over the past few years. Here we document the first long sediment core from nearby Lake Prespa to clarify the influence of Lake Prespa on Lake Ohrid and the environmental history of the region.

Abstract line 8 – should read. . ...dated tephra layers provide robust age control. . ..

Page 3367 – Not sure why Lake Ohrid is the only ancient lake in Europe. What does ancient mean geologically?

Page 3367 – line 6 – by faunal compositions, do you mean modern faunal inhabitants? Or extant faunas, is another way to say this.

Page 3367 – line 8 – lake diversity and surface area? Relationship/significance unclear. If the lake is smaller with the same number of species is it more diverse?

Page 3367 – line 16 . . .. During the past few decades. . ..

Page 3367 – 0mit the sentence in line 20.

Page 3367 – line 24 – Until this study, the sedimentary . . ..

Page 3367 – line 26 – from both lakes document their recent eutrophication and. . ..

Page 3367 – line 28 – Longer sediment sequences recovered so far only from Lake Ohrid indicate that. . ...

I can't redo all of the English for this review but above gives you an idea of what I think the paper needs.

Page 3369 – throughout this page – instead of mixis, I would use " mixing", given that this is not a limnology journal.

Page 3370 – first sentence should read: An 8.85 m long sediment record was recov-

ered from Lake Ohrid in 1973. . ...

Page 3370, line 16 – Correlation of individual sediment cores measuring up to 3 m in length, but taken during different coring drives, was accomplished using . . .. The composite record totals 10.5 m below lake floor.

Page 3371 – line 25. I suggest calling the IRD something like "lake IRD" or LIRD, to make it clear that you are not implying that glaciers were calving into these lakes. In figure 7, you have IRD for the marine cores so you don't want to confuse readers by your meaning.

Page 3372 – line 1-2; should read: gravel and coarse sand were transported by ice floes. . ..

Page 3372 – lines 20-25 needs to be rewritten into parallel construction for each tephra. Better yet, I suggest you put the tephra IDs, ages and chemistry into a new table.

Page 3372 – line 28 – reference back to Fig. 5 here where you show the tephras.

Page 3373 – line 6 – age munsell colors to olive and grayish – you probably have these numbers anyway.

Page 3373 – line 8-9 – by "relatively calm sedimentation conditions"? so do you mean normal or undisturbed pelagic sedimentation? I think you do.

Page 3374 – lines 10-13 – this is a run on sentence and needs to be rewritten into 2-3 sentences.

Page 3374 – line 17: Start sentence here. . ..Other evidence for stronger aeolian activity. . ..

Page 3374 Interpretation section:

There are several places in this section that make reference to temperature but its all rather indirect. The pollen data is provided for trees and shrubs without reference

to paleotemperatures from these data. Are there no diatoms in the lake to provide paleotemperature information? Also I see that Roelofs and Kilham is listed for diatom work in the references but this reference is not used in the paper. (or there is a spelling error somewhere). It would be extremely useful if the critical paleo data like the diatom data could be added to figure 7.

Page 3376 – line 3, add reference to figure 3 here next to figure 7 for the carbonate proxy data to really be seen well.

Page 3376 – can you add some discussion here about the variations in strength of the Henrich events in Lake Prespa/Ohrid. Is there evidence for differences in the strength to which the ITCZ was deflected southward during these events across Europe. Is H4 less pronounced in other records as one gets more far a field from the North Atlantic?

The Mn counts and the carbonate proxy (TIC) in Lake Prespa for H0, H1, H2 and H3 are all very different in character and imply something more complex than just lake level lowering (text around line 14). What more might be different about the response of these lakes to these events?

Page 3378 – line 13 – more work needs to be done on fig 7 to show evidence of any 8.2 event in Lake Ohrid. Or why would this be recorded well in Lake Prespa but not in Lake Ohrid? This is not addressed or I am missing something.

I suggest this paper be published but only after some major revisions. The record is very important and these revisions would make this a much stronger paper. Revisions of the English will make it flow better as well.

Interactive comment on Biogeosciences Discuss., 7, 3365, 2010.