

***Interactive comment on “ Late Quaternary
palaeoenvironmental reconstruction from Lakes
Ohrid and Prespa (Macedonia/Albania border)
using stable isotopes” by M. J. Leng et al.***

Anonymous Referee #1

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General comments

This is an important and timely paper that provides a valuable synthesis of recently published sedimentological and geochemical data from Lakes Prespa and Ohrid with newly generated geochemical analyses. The authors use these combined datasets firstly to reconstruct climate fluctuations in the region throughout the late Pleistocene and Holocene, and secondly to compare their interpretations with the wider Mediterranean record. This is a paper that sits well within the Special Issue and requires only minor amendments; it is entirely appropriate for publication in BG.

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Specific comments

There are a few areas of the paper that need minor attention. Firstly, there are no references to the hypotheses that are being tested. What are the big research questions that are being tackled here and why are these particular lakes the right ones to address these questions? The authors need to provide some clarification of these issues, which will then help to justify the selection of the particular cores / sites used in this study. In addition, something needs to be said upfront about why data from two lakes are required (the authors allude to the reasons for this later in the paper, but reasons need to be spelled out early on).

Secondly, there needs to be a short discussion of why exactly these specific new geochemical parameters are being analysed in this study. If there has been a clear statement about the exact focus / research questions being addressed at the beginning, then the use of specific techniques can be clearly justified. A few lines of text from later sections of the paper could be brought forward to address this matter.

Thirdly, more detail needs to be provided on how the age models of the three cores have been derived. Whilst chronologies have been published previously, it is difficult to appraise them on the basis of the information provided here. For example, there is confusion over how potential hard-water effects have been overcome. Earlier publications make reference to disregarding dates from all but the humic acid fraction of bulk organic matter, yet here reference is only made to indeterminate macrofossils (floral? faunal?) that, as far as I am aware, are not discussed in earlier publications (clarification is therefore necessary). Along with the expanded text it might be useful to provide a summary table detailing the radiocarbon and tephra dates used in generating the age model for each sequence.

Finally, whilst there are numerous last glacial and Holocene geochemical records available from the Mediterranean, one of the novelties / advantages of the Ohrid record is its temporal length. More comment would therefore have been welcome on the compar-

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ison between the last interglacial record from Ohrid with the few other Mediterranean records of similar age and resolution.

Technical corrections

The paper shows signs of being submitted in a hurry and would benefit from a careful copy editor's eye. A few of the more obvious technical corrections are listed here, but it is recommended that the authors revisit the text and deal with the minor grammatical errors accordingly. I have not double-checked the list of references.

Abstract. Line 13: 'are complacent; in contrast, Lake Prespa...'

P3817. Line 18: '(ostracod shells); these data...'. Line 26: define 'a.s.l.' at first usage.

P3818. Line 1: 'both lakes are developed...'. Line 14: '(46%), the latter leading...'. Line 19: '9 years, meaning that the lake water is...'. Line 21: 'wind0induced mixing leads to...'. Line 23: 'waters in summer and an average...'

P3819. Line 19: mis-spelling of 'hydroacoustic'.

P3820. Line 13. Define IGG and NIGL at first usage.

P3821. Line 15: 'down to approximately the base of each...'

P3822. Line 15/16: be more explicit about 'quite a lot of samples'.

P3823. The Chronology section needs rewriting (see comments above) but attention needs to be given to defining 'reliable ages' (line 9). Line 11: 'online' needs to be a superscript. Line 15: '(ca. 30ka), whereas core...'. Line 23: 'Significant hiatuses have...'. Line 24: 'Lake Ohrid cores. In Lz1120...'

P3824. Line 9: 'ca. 14 ‰ suggesting a component of meteoric...'. Line 14: 'infill' is inappropriate. Line 17: 'are supplied from...'. Line 17/18: end of sentence makes no sense. Line 20: 'and -32 ‰ respectively, although...'

P3825. Line 10: St Naum does not appear on the map and needs explanation. Line

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12 onwards: move to discussion section?

P3826. Line 8: 'a spike towards the top' – rephrase. Line 11: '2 and 13...'. Line 11: C/N values are only slightly higher in the Holocene from what I can see. Incidentally, the authors may wish to consider providing expanded figures for the Holocene intervals of each core sequence, given that this is where most of the variability is encountered. Line 24: 'similar, fluctuating...'. Line 27: 'rise from very low values in...'

Page 3827. Line 8: '2.5 % and, as with...'. Line 12: Overall values [of what?] increase until the top...'. Do not use 'till' to mean 'until' (please carry out a global change throughout the document). Line 14: 'similar, fluctuating...'. Line 18/19: use 'maximum' and 'minimum' instead of 'high' and 'low'.

P3828. Some repetition in the first part of the Discussion with earlier sections of the paper. Line 10: 'surface run-off into the lake and direct precipitation will dilute the lake waters. This is counter-balanced by...'. Line 28: insert 'higher' at beginning of line.

P3829. Line 8: '(for sample thicknesses of...'. Line 21: 'an isotopic...'

P3830. Line 8/9: Lz1120 does not show a spike at 9.5ka. Please clarify. Line 16: 'conditions'. Line 16: '>E); this is not...'. Line 27: rewrite first phrase of sentence. Line 29: 'buffered' instead of 'damped'?

P3831. Line 2: Not clear why fig 6 is referenced.

P3832. Line 20. Sentence beginning 'While' is not a sentence. Line 28: 'protracted' instead of 'profound'?

P3833. Line 9: 'CO₂, while high...'. Line 12: 'δ¹³C having values between...'. Line 19: hyphenate 'co-varying' (and elsewhere in the MS). Line 26: 'at least...'

P3834. Line 6: bicarbonate, but analysis of four out of the five geological units in the catchment provide mean values of...'. Line 12: 'rocks. Moreover, in...'. Line 23: 'namely oxidation...'. Line 26: 'Co1204; these...'. Line 27: 'the problems with dating'

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have never previously been explained or alluded to – please clarify or ensure that the re-written chronology paragraph provides the necessary information.

P3835. Line 3: 'However, this...'. Line 7: 'and during MIS 5'. Line 16: 'productivity, which...'.
P3836. Line 13: 'glacial, but...'. Line 14: '(4–12), suggesting...'. Line 25: 'Therefore, changes...'.
P3837. Line 4: 'Prespa, may be a function...'. Line 14: which interglacial is being referred to? Line 22: 'low TOC; this might indicate...'.
P3838. Line 3: 'values, but...'. Line 7: to what does 'it' refer? Line 11: '40 ka; Co1202...'. Line 20: 'within-lake'. Line 26: 'complacent, whereas Lake...'.
P3839. Line 16: 'Ohrid, within...'. Line 17: 'The later half of...'. Last sentence: needs clarifying a little – could more be said specifically from these new data about the differences between this region and the Med?

Table 1. Incorrect spelling of 'hydraulic'.

Fig 2. Incorrect spelling of 'Meteoric'.

Figs 3-5. Negative ages on the y-axis make no sense.

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