**Response to the review of the discussion paper by Cvetkoska et al., (2015)**

We thank both reviewers, Dr. Jane Reed (Ref.1) and the Anonymous Referee (Ref.2) for their reviews of the revised version of our discussion paper. Their comments and suggestions are greatly appreciated and were helpful for improving the quality of the revised version. The responses to their comments are presented separately.

**Reply to comments provided by Referee #1**

1. *You need to add a short paragraph to the discussion in which you assess critically the degree to which the stratigraphic diatom data do actually record a real shift in ecology. This needs to be disentangled from the effects of physical changes in habitat distribution with lake-level change (in Prespa, rather than Ohrid), such that assemblage composition would change at the coring site, but no real ecological change may have occurred. Where planktonic species composition changes, this hails ecological change. Where there is simply a relative increase or decrease in benthic taxa but no change in planktonic dominants, this might not represent a 'regime shift'.*

We thank the referee for this comment. A short paragraph is provided:

"In case of Lake Prespa, multiple shifts between planktonic and benthic species-dominated assemblages mark the stratigraphic diatom data. The dominance of benthic diatom assemblages reflects the lower lake-level regimes, and the related physical changes in habitat distribution, but does not indicate higher lake productivity. Indeed, shifts in Lake Prespa trophic regimes are marked by changes within the planktonic diatom assemblages, (e.g. from *Cyclotella* to *Aulacoseira* dominated assemblages)."

2. *p11 ln 5. This sentence is a response to the suggestion that the lack of abrupt, major peaks in Ohrid during the earlier record provides useful corroboration that Prespa's dynamics do not drive directly those of Ohrid. The sentence would be better incorporated specifically in discussion of the relevant part of the sequence.*

The sentence is incorporated into the discussion (pp 12, ln 16, 17).

3. *p12 ln 14. This sentence is not clear. A small increase... correlates with rather than marks?*

The sentence is modified: "Small increase in the abundance of *C. fottii* at ca. 76.5 ka, correlates with a return to dominance of the typical *C. ocellata* morphotypes."

4. *Figure 2: Cyclotella minuscula spelling*

Spelling is corrected.

5. *A comment not addressed in the response is the suggestion that the small peak in Aulacoseira granulata in Ohrid, which seems to correlate with the major peak in this taxon during MIS 5a in*

*Prespa, should be given attention. It may indeed be evidence of some influence of Prespa during extreme low lake levels.*

After re-assessment of this identification, we found that the species identified previously as *A. granulata* is an unknown species of *Aulacoseira* with a similar morphology as *A. muzzanensis* (as identified by Levkov et al., 2007). Although at low abundances this species is present also in the other periods of the DEEP site sequence and have been observed in the contemporary diatom flora of Lake Ohrid. The identification is corrected to *Aulacoseira* sp. 1 and based on our personal observation, to this stage we do not consider this species as an eutrophic indicator. Also ca. 5 % abundance is very low to state that this is related to any influence from Prespa.

**Reply to the comments provided by Referee #2**

ABSTRACT

1. *Line 17: suggest specify aquatic ecosystem interactions*

The sentence is changed accordingly: "We reconstruct the aquatic ecosystem interactions since the last interglacial period….."

2. *Line 21: suggest modify to ''interglacial and interstadial'' and ''glacial''*

The suggestion is accepted and the sentence is modified.

3. *Line 22: 'appear synchronous in both lakes' Given the uncertainties in correlating these two sequences, could you qualify this statement?*

We have modified the statement: "The short-term ecosystems reorganizations, e.g. regime shifts within these cycles substantially differ between the lakes, as evident from the inferred amplitudes of variation."

4. *Line 25: Suggest also specify lake level changes alongside trophic status changes in Prespa.*

The lake-level changes are specified as suggested.

5. *Line 26: … Could you specify what aspect of Lake Ohrid is resistant (e.g. changes in trophic state etc)?*

The sentence is changed: "Due to the high level of ecosystem stability (e.g. trophic status, lake-levels), Lake Ohrid appears relatively resistant to external forcing, such as climate and environmental change."

6. *Line 26: Climate change is the only apparent external forcing mechanism investigated, so is it reasonable to claim that Ohrid will behave in the same way to other external forcings?*

The comment is assessed in the previous sentence (comment 5).

INTRODUCTION

7. *Line 11: would it be more appropriate to specify which continental ecosystems (terrestrial, aquatic) or is statement intentionally broad?*

The statement is internationally broad and we refer to a wide range of ecosystems, including both, terrestrial and aquatic.

8. *Page 3, Line 20: Suggest change the word 'interdependence' to better reflect the one-way influence of Prespa on Ohrid.*

The sentence is modified: "Therefore, parallel analysis of long-term temporal variations under changing climate boundary conditions from Quaternary sedimentary records of both lakes is important for identifying the potential influence of Lake Prespa on Lake Ohrid."

ENVIRONMENTAL SETTING

*9. Page 4, Line 27: specify which summer and winter months (JJA, DJF?). Page 4, Line 28: mean annual precipitation? Based on how many years / which publication?*

We refer to the paper of Wagner et al. (2009) for additional information regarding the environmental setting: "The average monthly air temperature of the surrounding area is 26°C during summer and −1°C in winter and the annual precipitation averages to 750 mm/year (Wagner et al., 2009)."

*10. Page 5, Lines 13-15 (as above).*

"The average monthly temperature in the surrounding area is 21°C in summer and 1°C in winter, and the annual precipitation varies between 720 in the lowlands and 1200 mm × $yr^{-1}$ on the mountains (Hollis and Stevenson, 1997)."

11. *Page 5, Line 17-18: specify cause of 10m lake level decline (abstraction, lower P/E?)*

Changed to: The lake is highly sensitive to external disturbances (e.g. climate change) and water loss; major lake-level fluctuations including a lake-level decline of almost 10 m due to restricted precipitation and increased water abstraction for irrigation have been documented between 1950 and 2009 (Popovska and Bonacci, 2007).

ECOSYSTEM DYNAMICS

*12. Page 11, Line 1: It would be informative to quantify the dating errors within / between the sequences.*

We thank the referee for this comment. The dating errors for both sequences, DEEP and Co1215 are provided in this chapter.

13. *Page 11, Line 5-6: I'm not sure I follow the logic of this. Please explain / justify.*

The sentence is modified and incorporated in discussion.

14. *Page 12, Line 12: …..It may be worth considering the environmental context to further support productivity-driven changes in diatom concentrations (e.g. although other variables are considered, what is the nature of the catchment at this time (densely vegetated?), are there any changes in proxies of sediment in-wash etc?*

The sentence is modified: “In a phase of constant SAR and catchment vegetation dominated by mesophilous/montane trees (Sadori et al., 2016), this implies a temperature-related increase in the diatom productivity.”

15. *Page 12, Line 16-17: what is the regional nature of climate change during this interval? Providing this information will add context.*

Information of regional climate trends is provided and the sentence is modified: “The diatom and geochemistry data show that the overall dynamics of Lake Ohrid DEEP site during MIS 5 are primarily related to the regional trends in climate change, from cold/dry (MIS 5b) to warmer/wetter conditions during MIS 5a (Bar-Matthews et al., 2003; Martrat et al., 2004).”

ECOSYSTEM INTERNAL INTERACTIONS AND DYNAMICS

16. *Page 20, Line 2: Mention is made here and elsewhere that there is no diatom-based evidence for a change in lake level of Ohrid. Perhaps this claim can be made based on isotope evidence, but given that the core site is at >240m water depth, surely any change in lake level would have to be pretty major before the diatoms would respond (via benthic expansion for example)? If the other Ohrid diatom-based records are from shallower core sites then please state (with depth) to make the case that there is no diatom-inferred lake level change.*

We thank the referee for the comment. The statement has been modified: “Distinct water-level reductions are not evident in the DEEP site diatom record from the last ca. 92.0 ka, nor have been observed in the geochemistry and diatom data from the previous studies covering the last interglacial-glacial cycle (Wagner et al., 2009; Reed et al., 2010; Cvetkoska et al., 2015; Zhang et al., 2016).”