General comments

The ICDP project SCOPSCO delivered an important record that will add considerably to our knowledge of Eastern Mediterranean paleoclimate. The manuscript "Sedimentological processes and environmental variability at Lake Ohrid (Macedonia, Albania) between 640 ka and the present" of Francke et al., compiles a large set of data covering the uppermost 248 m of the Lake Ohrid sediment core. Although some of the data are published separately, this manuscript lays groundwork for future investigations of this paleoclimate archive. It presents the lithostratigraphy, confirms the completeness of the record, builds a chronology, and characterizes interglacial and glacial conditions at Lake Ohrid. It is sometimes challenging to find the right level of detail in building a lithostratigraphic framework of highly variable lake drilling sequences. The authors were able to find a level to present the big picture of this 640 ka record as the manuscript reads smoothly. This is an important contribution, but there are a few inconsistencies and shortcomings that require clarification before the manuscript can be accepted for publication.

My major concerns are that the authors build their interpretation of lithology mostly on variations of TIC, TOC, TOC/TN, without taking account of additional information that can be gleaned from careful evaluation of sediment bedding patterns. The authors show that mixing processes are a critical component of interpreting this record (and the proxies it contains) but the implications of the conclusion that all three lithotypes have bioturbated sections are not addressed. Evidence leading to the interpretation that the "mottled" (information lacks completely) sediments are actually "bioturbated" sediments should be shown and discussed. On page 15121, line 8 the authors give sub-lithotypes (massive, bioturbated and finely laminated) for the carbonate-rich lithotype 1, but never come back to that point. Similarly, two of the three sub-lithotypes (massive and bioturbated) are found for lithotype II and III but this evidence is not utilized in the discussion. Instead the authors rely on the proxy records to interpret sedimentary processes (section 4.2.1.). To discuss the sediment bedding more in detail, I would suggest showing Fig. 3 before Fig. 2 and restructuring 4.2.1. according to their lithotypes, including the depositional differences of bioturbated, massive and laminated sediments instead of following the order of proxy records. This could also address reasons that laminated sediments only found in the uppermost part of the core. Could this represent a significant environmental shift, or is this a reflection of sedimentary processes within the lake?

Another concern stems from inconsistencies in the interpretation of TOC/TN and incomplete line of argue of the TOC. Holtvoeth et al., 2015 report that present day terrestrial OM is the main source of the OM, whereas the authors here state that the TOC/TN indicates predominantly aquatic OM. Later the authors use this ratio as indicator of OM degradation controlled by mixing, which from their perspective is controlled duration of the seasons and its effect on lake temperatures. Two issues need to be discussed in more detail (for TOC/TN and TOC): the origin of OM and the role of changing lake volume on mixing processes and on the extent of oxidation/mineralization of OM. The authors associate OM degradation to oxidation at the sediment-water interface only and lack to assess the maybe even more important OM oxidation within the water column itself (see examples from ocean and lake studies; Wakeham et al., 1997, Müller et al., 2005). What matters is the transition time of OM being exposed to oxygen and time it takes to settle to the lake bottom. This depends on factors such on the thickness of the oxic water layer and consequently lake volume or lake level. This issue must be addressed before reconstructing the length of seasons and temperature changes.

Following up on this issue, I strongly suggest that the authors consider excluding the TOC and TOC/TN to orbital parameters from the tuning.

My last major point is that the interpretations drawn in section 6 ask to show sedimentation and mass accumulation rates. Please provide them in one of the figures.

Minor comments or technical corrections

The manuscript sometimes would benefit from some shortening. For instance the description and reaction of the sediment to 10 % HCl. It is mostly a repetition to the TIC results.

Page 15111: title should be "…and the present" and not "and present day"

Page 15115, line 24: add 248 m

Page 15117, line 9: add water depth

Page 15121, line 6: In Figure 2 the lithotypes have names such as calcareous silty clay. Please add those to all three cases.

Page 15121, line 8: at to each sub-lithotype the reference to the corresponding image in Fig. 3 (same for page 15121/line27 and 15122/11). It would be easier to read and more informative to label the images in Fig. 3 with A, B etc. and give the composite depth in the figure caption instead of the long label of the section.

Page 15121, line 21: "…42 %"..this is a lot.

Page 15121, line 22: "…low abundance.." – low compared to which fraction (bulk, allochthonous)?

Page 15121, line 22: delete "…and diatom frustules can be abundant."

Page 15122, line 8: re-write sentence"BSi contents are moderate to high (2 to 27.9%) and clastic contents are moderate (Fig. 2, K-intensities)."

Page 15122, line 11: be more specific in separating MMDs and tephras by referring to the individual images of Fig. 3

Page 15123, line 1: just refer to Fig. 3X and 3X and delete all other details. It would be easier to read and pick up in the image.

Page 15123, line 9-12: repetition of the sentence above, re-write

Page 15123, line 26: "sediments of Lake Ohrid" - specify the sediments for which this analysis were done. Recent or Holocene?

Page 15124, line 17: "can be observed" or has been observed?

Page 15125, line 16: From Lake Baikal it is known that oxidation of OM occurs to a large share in the water column during settling next to OM mineralization at the water-sediment interface (Mueller et al., 2015). The time OM spends in oxic part of the water column, the more it is degraded. The thickness of the water column is critical.

Page 15125, line 23-26: At odds with the statement in line 5 that TOC/TN imply origin of OM. Please check.

Page 15126, line 15: delete ", as"

Page 15127, line 4: specify long time periods: years, decades, ..?

Page 15127, line 16: delete "At Lake Ohrid.."

Page 15127, line 19: delete "strong"

Page 15127, line 25: add "identified"

Page 15128, line 3-4: repetition

Page 15128, line 9: sentence needs to be better embedded in context

Page 15128, line 16: "would have prevented"

Page 15128, line 19: Do you actually mean "tephrostratigraphy" instead of "radiometric ages"? The tephras found within the cores were not directly dated if I understood correctly.

Page 15129, line 29: This teleconnection has been shown and should be referenced.

Page 15146: add "composite" in table caption. A elegant way to cut down this table would be to give the numbers of columns 3 and 4 in parenthesis in column A and B.

Page 15147: Its unclear why cal. 14C ages if this are recalculated Ar/Ar-dated tephrostratigrapic tie points?

Fig. 1: add legend for bathymetry, spell out FYROM in caption, delete "pollen record"

Fig. 2: add y-axis label, just use Fig.3X, 3X..as suggested above

Fig. 3: add A, B, C to images and mcb on the image, in the caption or main text body

Fig. 4: would be nice to be complemented with a SEM image of Siderite

Fig. 5: This figure is hard to read due to all the vertical lines. TOC/TN tie points are weak and suggested (see above to be deleted) in order to improve the age model and leave room for upcoming findings. Add y-axis labels. Lacks specification of definition of "local" and winter season length.

Fig. 6: green and purple dots are hard to differentiate

Fig. 7: add x-axis label

Referred literature:

Mueller, B., Maerki, M., Schmid, M., Vologina, E.G., Wehrli, B., Wuest, A. and Sturm, M. (2005) Internal carbon and nutrient cycling in Lake Baikal: sedimentation, upwelling, and early diagenesis. Global Planet. Change, 46, 101–124.

STUART G. WAKEHAM, CINDY LEE, JOHN I. HEDGES, PETER J. HERNES, and MICHAEL L. PETERSON (1997) Molecular indicators of diagenetic status in marine organic matter, Geochimica et Cosmochimica Acta, Vol. 61, No. 24, pp. 5363-5369