

## ***Interactive comment on “Evolution of ancient Lake Ohrid: a tectonic perspective” by N. Hoffmann et al.***

### **Anonymous Referee #1**

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This paper can be accepted following minor revision.

The strong part of this paper is that it deals with an area which is characterized by poor literature data. The latter indicates that each new contribution is of significant importance since it adds up to the current incomplete pattern and therefore is welcomed.

This is a complicated area regarding not only the older structures (which mark the transition from convergence to extension) and how they interrelate with the new ones, but with the present-day extension itself. For example, there are Pleistocene and present day normal fault patterns at right angles to each other (N-S and E-W trending).

Authors provide evidence that the N-S trending normal faults are the predominant system in their study area and have clear imprints that show that they are also seismically

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active posing a seismic hazard as well. These I think are two of the most important outcomes from this paper.

English and figures are OK. (I have some notes/corrections regarding spelling, English and figure notes on the attached pdf version of the paper).

I have a few remarks and some questions regarding parts of the paper. In particular,

1) I think that authors need to separate their data from the literature. It is not always clear which is their contribution.

2) They refer to silken slides in the conclusions and the text but no data is actually shown.

3) Reporting fault lengths and seismic sources or an assessment on maximum expected magnitude would be a significant contribution for seismic hazard assessment.

4) No subduction process is taking place at present day. No oceanic crust (Tethyan remnant) is subducting at present day below the Adriatic foreland. This has to be mentioned and commented not only in the text but maybe also in Figure 1. There are thrusts but no subduction (maybe change symbols, to show the Hellenic subduction zone from Crete to Kephallonia Transfer fault, where it ends, no active subduction occurs north of the Kephallonia transfer fault).

5) Authors mention in Section 4 line 10 that from Pliocene to Present, E-W extension prevails resulting in a general uplift with local subsidence (Aliaj, 2000). Herein, something is missing or I disagree with the reference comment. Extension can not result in a general uplift. When an area is extending the mean altitude is getting lower, unless some other process is operating too that causes uplift and has to be mentioned.

Other secondary points

In the abstract (line 10) authors refer to three major deformation phases that lead to the basin formation. There are three deformation phases but I do not understand how the

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predominantly the first a) the Late Cretaceous- Miocene shortening and accordingly the second phase has lead to the basin formation. I think that the sentence lead to the basin formation has to be deleted and add it up only following the third deformation phase.

Authors mention (abstract line 15) that seismic hazard is among the highest in the Balkan Peninsula. I do not fully agree. It is not among the highest. Actually this area has the same characteristics with the lowest zone of seismic hazard based on the official hazard map of Greece. I think that is of medium hazard for the Balkans, but maybe of high hazard for FYROM. For example, they refer that the slip-rate is lower than 2mm/yr. This is one order of magnitude less than the slip-rate in the Gulf of Corinth, or the North Anatolian Fault, or the Kephallonia transfer fault, or the Hellenic trench itself that is around 15-20mm/yr.

The focal depth of the earthquake was at 2km (Section 2.1 line 18). Not sure I believe it, this focal depth is probably due to insufficient data caused by the sparse (not dense) seismic network, better erase it.

Section 4 line 10 you may add that activity may have shifted to the lower major fault following a progressive hangingwall directed migration within the fault zone (Stewart and Hancock, 1994)

Page 4652 line 2. are definitely the youngest (but why? You have to show the evidence ...this is one of the most important outcomes and you have the data to support it).

Some references are missing from the text. See also the comments on the attached pdf Armijo, R., Meyer, B., Hubert, A., Barka, A., 1999. Westward propagation of the North Anatolian fault into the Northern Aegean: timing and kinematics. *Geology* 27, 267–270.

Burchfield et al. 2008 in Geosphere version

McKenzie, D., 1972. Active tectonics of the Mediterranean region. *Geophysical Journal*

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of the Royal Astronomical Society 30, 109–185.

Papanikolaou, D., Alexandri, M., Nomikou, P., 2006. Active faulting in the North Aegean basin. In: Dilek, Y., Pavlides, S., (Eds.), *Postcollisional Tectonics and Magmatism in the Mediterranean Region and Asia*. Geological Society of America Special Paper 409, pp. 189–209, Doi:10.1130/2006.2409.

Stewart, I.S., and Hancock, P.L., 1994. Neotectonics. In *continental deformation* Hancock, P.L. (ed), Pergamon Press, 370-409.

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/7/C2201/2010/bgd-7-C2201-2010-supplement.pdf>

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Interactive comment on Biogeosciences Discuss., 7, 4641, 2010.

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