

## ***Interactive comment on “Stratigraphy and paleoenvironments of the early to middle Holocene Chipalamawamba Beds (Malawi Basin, Africa)” by B. Van Bocxlaer et al.***

**B. Van Bocxlaer et al.**

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First of all, we thank the referee for his time and insightful comments that will considerably improve our manuscript. To be as specific as possible, we will copy the relevant sections of his comments and formulate replies comment by comment.

- > This paper presents a very thorough description of a newly recognized
- > and established stratigraphic unit of Holocene age representing
- > highstand deposits of Lake Malawi. The authors present exemplary
- > detailed descriptions of the lithostratigraphy and have evidently

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- > made great efforts to accurately date the unconformity bound units
- > that they recognize – notwithstanding the rapid lateral facies changes
- > expected in such nearshore deposits. The basis of the correlations
- > established is also fully detailed and the facies interpretations –
- > though less detailed – appear to be sound.

We thank you for these kind and encouraging words.

- > Comments. I have only a few substantive comments to make though I
- > offer minor comments and corrections to the appended MS.

The minor comments and corrections to the appended manuscript were very insightful and relevant. They all have been adopted, though sometimes we have rephrased sentences slightly different to avoid potential misunderstanding.

- > The MS is generally very well written and fulfils almost all of the
- > 15 refereeing criteria. I think that some images of the dominant
- > malacofaunal elements (e.g. *Melanoides* morphospecies) mentioned
- > (pp. 5804-5) would be very useful.

Such images will be provided.

- > I also think that a photographic image of the exposures would
- > be very instructive.

On most places, modern soil has been eroded out from above and covers the exposures almost entirely, so we had to dig out the relevant layers. As such, images of the exposures will not allow to directly trace the stratigraphy, but we agree with the referee that it would provide a good insight into the environmental setting, add to the objectivity

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of the paper and may help future workers, e.g., what technical issues to anticipate when exploring the area further. Therefore, we will provide some images of the exposures and the sites in general.

- > I may have missed it but in discussing lake levels (pp. 5811-12) I
- > think the authors have neglected to mention Malawi's current high
- > stand water level. A statement and reference should be given.

This information was provided on page 15, line 15 of the discussion paper: 'The current water level was ~473–474m a.s.l., which corresponds well with previous measurements (Bootsma and Hecky, 2003).' We will go through again to evaluate whether we better include a second reference to the modern lake levels elsewhere.

- > The late Quaternary transgressions recorded by the authors perhaps
- > should be placed in better context given the massive changes in lake
- > depth recorded in older sediments. Is there any data about what
- > intervening low stand lake levels might have been to put the
- > amplitude of these presumed transgressive-regressive cycles into
- > context? A clarification on whether other Late Quaternary high
- > stand deposits are preserved around Malawi or whether these might
- > be the only ones described to date would be useful.

This is a justified comment, though somewhat difficult to tackle. The referee is correct that in its past Lake Malawi underwent some major lake level fluctuations. We will add some additional connections to this body of literature. However, we feel the required climate proxy data to make a convincing argument related to the chain of causality and the magnitude of the presumed transgressive and regressive cycles in the Holocene remain largely lacking. We have been discussing this issue with quite a few colleagues,

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e.g., Prof. Dr. T.C. Johnson, but although these discussions gave some interesting insights, we feel that it would be hard to push any argument beyond speculation for now, unless we would discuss the issue on timescales of 100 ka's or millions of years (i.e., timescales far greater than that relevant to this paper). Studying digital elevation models, features that probably represent late Quaternary beach ridges have been observed, and a few other (presumably) Holocene outcrops have been discovered in the Malawi Basin. For completeness references to these will be made.

> Finally (p. 5813), there is just one section in a very thoughtful  
> and carefully written paper that requires serious attention and  
> re-writing. That is the statement (bold text added) that “the  
> extant mollusc communities from Lake Malawi consists of species that  
> descended directly from the fossil lineages, but not necessarily  
> from the exact populations preserved at C. ‘Ancestry’ is an exceedingly  
> thorny issue in palaeontology and I believe most mainstream  
> macropaleontologists would regard its demonstration in this sense  
> as impossible – as for inferring their ancestry as lying within the  
> exact populations – this I believe can only be a fantasy, especially  
> given Genner et al.’s (2007) inference of close relationship of  
> Malawian and non-Malawian taxa.

The referee makes a valid point. In light of this comment and those of anonymous referee #4, this section will be revised.

We thank the referee for the many useful remarks!

Sincerely, Bert Van Bocxlaer (on behalf of all co-authors)

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Interactive comment on Biogeosciences Discuss., 9, 5793, 2012.

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