

## ***Interactive comment on “Pollen, biomes, forest successions and climate at Lake Barombi Mbo (Cameroon) during the last ca. 33 000 cal yr BP – a numerical approach” by J. Lebamba et al.***

### **Anonymous Referee #1**

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This article opens the discussion to numerous key questions. It has however to be completely re-written:

(1) the resolution of the data: It would be preferable to clearly indicate to the reader what is the temporal resolution of the analysis (about 400 years or more between samples). In this context, it is clear that this "historic" series, outstanding at the time, only gives access to major trends in the environment and climate evolution and does not allow (or difficultly) discussion of the high frequency variability of the environment and the climate over time.

C1356

The "dynamic" aspects of vegetation, presented by the authors as stages of mature forest, forest regrowth or secondary forest must be justified in considering the temporal resolution of the study. A forest may not remain in a pioneering or a regrowth stage during a so long period of several centuries to several millennia except if continually subjected to a succession of stresses.

This point needs to be discussed in depth or reformulated.

(2) I am very surprised that the reconstructions of forest environments and climate conditions of the past have not been validated against modern data at the core site. There is, to my knowledge, a modern pollen sample from Lake Barombi Mbo studied by Farrera in 1991, the counts of which are available. It is essential to test the statistical methods applied to the Barombi Mbo series to this specific sample for which the modern vegetation and weather conditions are known. The first reference to a reconstruction of precipitation measurements at present is line 21 on page 2722, i.e., in conclusion. Based on this single example, the reliability of the ANN method announced in the abstract seems more than questionable. It is not enough to accumulate statistical methods, it is still necessary to discuss them in depth. Why such differences (eg between 600-700mm per year on average (this study) and 200mm per year (literature) during the LGM) and how to improve the overall climate reconstructions in central Africa? Lebamba suggests improving the modern pollen dataset. It could have been of interest to apply the method developed by Kuhl and colleagues in Europe based on the current climate space of plants that would overcome the problem of incomplete representation of forest formations by modern pollen samples. This would at least have been an opportunity to discuss the environmental changes during the Holocene. But the question of glacial climates and environments remains open given the influence of CO<sub>2</sub> changes on vegetation (Wu et al., 2007).

I have not seen any discussion on previous climate reconstructions by Peyron et al (2007). Could you explain in which extent your reconstructions differ from them and why?

C1357

The paper must clearly indicate in the introduction that the authors use the pollen record published in 1998 by Maley and Brenac. It is therefore an early study, reinterpreted in light of new statistical analysis. The title of the article should be modified accordingly.

The final discussion follows a linear plan which is tedious and not very powerful. It would be better if it is organized around key issues so that we fully understand the challenges of such work.

In conclusion, this article offers climate reconstruction that would benefit from confrontation with global or regional climate model simulations. The differences between statistical methods used here and/or already published are not analyzed.

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Interactive comment on Clim. Past Discuss., 6, 2703, 2010.