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Climate of the Past Discussions

Interactive comment on "Vegetation response to the African Humid Period termination in central Cameroon (7 N) – new pollen insight from Lake Mbalang" *by* A. Vincens et al.

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The manuscript by Vincens on Lake Mbalang, Cameroon, provides an exceptional record of vegetation and climate changes during the 7 millennia in the equatorial forest domain of Africa. So far there is only little information about past climate and environmental evolution for the study region available, and this work provides genuine and valuable material.

The topic of the paper falls well within the scope of "Climate of the Past" and, therefore, I recommend publication of this paper. Nevertheless, there are still some points which require revision and specification before publication.

The end of the “African Humid Period” appears to have been more complex than previously thought. In her paper, Vincens suggests that the dry season increased as early as 6100 near the Equator leading to the progressive degradation of the landscape which definitively took its modern aspect at 2400 cal BP.

This interpretation is based on the analysis of the behaviour of semi-deciduous forest elements which record variations in percentages related, according to the author, to the yearly distribution of rainfall. This demonstration, based on a thorough knowledge of the local vegetation and flora, is very convincing. However, the presence of montane pollen types such as *Olea, Rubus* and *Podocarpus*, with percentages high enough to testify for the proximity of the source plants, suggest a more complex situation since semi-deciduous forests and montane forests belong today to distinct forest belts.

Olea has been found in pollen sequences from the northern edge of the equatorial forest massif not only at Tilla and Bosumtwi as noted by Vincens but also at Lake Chad (Maley, 1981) at levels dated from the last glacial-deglacial transition and the beginning of the Holocene. In these sites, they probably acted as pioneer species during the first phase of forest expansion. As soon as the climate became warmer and wetter, they were progressively replaced by other species (mainly Euphorbiaceae) probably more adapted to higher temperatures (and/or higher rainfall).

Contrary to that stated by Vincens (page 2586, line 25) the presence of *Olea* and/or *Podocarpus* has been reported elsewhere in Cameroon during the late Holocene: at Lake Baleng (Tamura, 1990) 7 km north of Bafoussam in Western Cameroon and also at lower altitude, near the littoral at Lake Ossa (Farrera et al., 1996). Even in small quantities, their occurrence has been interpreted as reflecting the larger extension of montane forests elements during the Holocene, up to 2500-2900 BP. At Ossa, Farrera et al (1996) suggest that “ the expansion of these montane forests is linked to the seasonal development of stratiform clouds and mist ” (probably in the Cameroon highlands?). Could you go deeper in your interpretation of the expansion of these montane elements at Mbalang and discuss previous interpretations of Farrera at the light of your

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new data and interpretations?

In conclusion: the pollen diagram of Mbalang seems to have recorded at least two specific stories:

- that of the semi-deciduous forest mainly linked to “long term” changes in rainfall distribution (this paper): in this case, vegetation adaptation is gradual from 6.1 to 3 ka.

- that of the montane forest which abruptly disappeared from the Mbalang area ca 2500 BP. The climate mechanisms at the origin of the disappearance of *Olea*, *Podocarpus* and other montane elements from low and mid-latitudes in Cameroon and their recent (post- 2700 BP) migration toward higher elevations have to be explored.

Specific comments:

Page 2581 line 19: several? Is that relevant?

Page 2582 line 9: ca 150 years. Is that possible to increase the resolution of your analysis in order to catch the sensitivity of the ecosystems to short-term climate fluctuation? For instance: fluctuations of reed swamp populations linked to lake level changes?

Page 2584 line 11: is the dominant taxon (and not taxa)

Page 2586 line 23-24: “at the expense of the sub-montane. . . .” Could you develop this point?

Page 2588: a long dry season: how many months? What is a “dry season”: no rain? No mist?

Page 2588 line 10-11: increased rainfall seasonality (see above) and increased temperature: give amounts

Page 2590 line 6: Yoa and not Oya!!

Page 2590 line 23: you never discuss hydrology in your paper

Interactive comment on Clim. Past Discuss., 5, 2577, 2009.