

Interactive comment on “Neotectonics, flooding patterns and landscape evolution in southern Amazonia” by U. Lombardo

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General comments The paper by Lombardo investigates the influence of neotectonic movements in the evolution of the highly dynamic fluvial landscape of the Llanos de Moxos. Lombardo presents convincing evidence that at least two tectonic events, including uplifting in the north Moxos, produced dramatic changes in fluvial/lacustrine morphology, edaphics, and distribution of vegetation in the LM. He goes on to conclude that these environmental changes influenced the history of human occupation in the basin. A central and important conclusion of the paper is that neotectonics and geomorphological change should be taken into account when reconstructing the evolution of a landscape. The interdependence of tectonics, climate and vegetation is well summarised in the following sentence: “Therefore, as floods determine the savannah-

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forest ecotone, drainage determines how floods respond to precipitation and neotectonics determines drainage, it can be concluded that uplifts in northern LM could have been a determining factor in the evolution of the savannah-forest ecotone in central and southern LM during the Holocene”.

Specific comments

“Up to now, paleoecological reconstructions in the Bolivian Amazon have been mostly based on pollen and charcoal archives from lakes located outside the margins of the LM (Mayle et al., 2000; Burbridge et al., 2004; Whitney et al., 2011; Urrego et al., 2013)”. What about the recent studies from Lagunas San José (Whitney et al. 2013), El Cerro and Frontera (Whitney et al. 2014)? Admittedly these records do not extend back beyond the late Holocene, but they are located in the central/western Llanos de Moxos.

“These archives have been interpreted as the result of changes in climate and pre-Columbian human impacts, implicitly assuming that other factors, such as neotectonics, did not play an important role in the evolution of the landscape during the Holocene”. I would not say that these studies are ignorant of geomorphology. There is often in-depth consideration of changes in sedimentation regime brought about by river/lake evolution and changes in water inputs/flooding regime. However, I would agree that there is little/no discussion of larger-scale tectonic patterns. The records from Noel Kempff Mercado National Park are from lakes located on the Brazilian Shield east of the LM and arguable represent a much less geomorphologically/tectonically dynamic landscape than the LM.

Radiocarbon dating: It appears that most of the dating of your soil cores comes from single r.c. dates taken from a basal position in the core or from a single palaeosol horizon, which you use as a relative age marker horizon across sites. I’m concerned that this limits your ability to comment on the timing of events. In the L. Rogaguado core, you have presumably interpolated a straight line from the r.c. date to the surface

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and assumed that the surface represents 0 years BP. How confident are you that sedimentation rates in the lake have been consistent between these two points? Gaining a better chronology of the timing of major depositional events in the late Holocene may be important for determining whether increased discharge is in fact a result of higher precipitation regime. At the moment, the discussion of the timing of these events is a bit vague, referring to the mid to late Holocene.

It would be nice to have a table reporting the full radiocarbon data from your lake core i.e. date in radiocarbon years plus error, calibrated age range, lab codes and details of the method used to calibrate your dates.

“The damming of the valleys that formed these lakes was likely caused by the infilling of the valleys’ bottom with sediments from the Mamoré river” – page 652, paragraph 1. What leads you to this conclusion?

Technical corrections

The spelling of Rogaguado varies throughout the text.

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