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Interactive comment on "Sharp ecotones spark sharp ideas: comment on "Structural, physiognomic and above-ground biomass variation in savanna-forest transition zones on three continents – how different are co-occurring savanna and forest formations?" by Veenendaal et al. (2015)" *by* A. Staal and B. M. Flores

Anonymous Referee #1

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The opinion piece written by Staal and Flores touches on important processes controlling vegetation dynamics in forest-savanna transitions, which could indeed have been more explicitly addressed by Veenendaal et al. The manuscript merits publication. However, the authors should reconsider some of their assumptions to address two specific issues:

First, the influence of nutrient-disturbance interaction is misrepresented. Figure 2 is over-simplistic and the authors should revisit the citations used to support that conceptual representation (e.g. Hoffmann et al. 2012 Eco Letters) and include more comprehensive conceptual models such as that proposed by Franco et al. 2014 in Theor. Exp. Plant Physiol addressing "Cerrado: The role of functional types, resource availability and disturbance in regulating plant community responses to rising CO2 levels and climate warming".

Second, the multimodal distribution shown in Fig 1 could be explained by how different plant communities respond to soil resource availability and disturbance. This is a critical point that is surprisingly absent in the current version of the manuscript. Many of the studies cited by the authors have emphasized the existence of nutritional and disturbance thresholds for tree establishment and forest expansion into savannas. A recent meta-analysis by Silva, Hoffmann, et al. 2013 (Can savannas become forests? A coupled analysis of nutrient stocks and fire thresholds in central Brazil. Plant & Soil) demonstrate that the ability of trees to reach a fire-resistant size under nutrient limitation depends on the functional group in question. Those authors concluded that "forest species require a lower nutrient supply to attain closed canopies and suppress fires; therefore, the ingression of forest trees into savannas facilitates the transition to forest". The authors also asserted that in central Brazil soils of many savannas have "sufficient N, K, and Mg, but require additional P and Ca to build high-biomass forests". In other words tradeoffs between nutrient requirements and adaptations to fire reinforce savanna and forest as alternate stable states, explaining the long-term persistence of vegetation mosaics in the seasonal tropics, and probably the multimodal distribution shown here in figure 1.

Interactive comment on Biogeosciences Discuss., 12, 10707, 2015.