

## ***Interactive comment on “Response of Net Primary Productivity of Zambezi teak forests to climate change along a rainfall gradient in Zambia” by Justine Ngoma et al.***

### **Anonymous Referee #1**

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Ngoma and others model net primary productivity in Zambian teak forests in response to projected climate change. The results are interesting but the discussion is rather terse and multiple English usage issues will make it necessary to make substantial improvements before I can recommend the manuscript be published. I find the modeling analysis as a whole to be described well but had a difficult time trying to realize what I had learned from the analysis beyond what was already known about applying models at local scales. Emphasizing the novelty of the study and improving the discussion are necessary steps.

Minor comments: The introduction takes a rather conversational tone with rather obvi-

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ous statements that don't need mentioning like 'Without a doubt, patterns of terrestrial NPP may respond to changes in climatic variables'. Of course they will, people know that plants respond to climate. These things need not be noted. Reference for 'Future climate trends for most of the Zambezian phyto-region point in the direction of increased aridity' Also citation for 'Further, during the past half a century, available evidence show that the temperature increased by 0.5 °C in Africa and minimum temperatures rose more than maximum temperatures'. What evidence? Does 'prediction is for a temperature rise by more than 3.4 oC above the 1981-2000 baseline' refer to maximum temperature, minimum, and average? The preceding sentence discussed minimum temperature. Here: 'Without a doubt, reduced rainfall coupled with an increase in temperature is known to suppress NPP in most terrestrial ecosystems' write instead 'Reduced rainfall coupled with an increase in temperature suppresses NPP in most terrestrial ecosystems' 'Baikiaea Plurijuga', small p. A few too many significant digits in Table 1. The average total rainfall for example doesn't have 5 significant digits and many reported values are reported at a far higher degree of certainty than environmental measurements warrant. Page 7: why were these GCMs chosen? Figure 3 is not convincing; this doesn't validate the model if that is the goal of this analysis. The critique of the default parameters is nice. Figure 7 is very hard to read. I recommend trying a different way to display the data. I'm confused as to why 1.5 m soil depth is chosen if 'In the sites, trees access soil water down to more than 5 m depth according to the trees' rooting depth in the Zambezi teak forests.' This really doesn't make sense to me, even if your measurements suggest that 1.5 is the maximum depth at the sites, it is easy to underestimate rooting depth. What does this mean 'This opens the novel concept to improve and validate LPJ-GUESS model.'. Is this what the subsequent analysis is doing? Please re-read the manuscript carefully for usage, for example 'As a results,' on page 17. And the next sentence, 'to what extent modelling results are realistically since'. 'Activity of photosynthetic enzymes also reduces (Farquhar et al., 1980)'. Lots of wording needs changes. The Discussion was rather short. What sorts of uncertainties need to be reduced, what directed studies would improve results, what

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have we learned from this study?

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