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Biogeosciences Discussions

Interactive comment on "Dryland vegetation functional response to altered rainfall amounts and variability derived from satellite time series data" *by* Gregor Ratzmann et al.

Anonymous Referee #2

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This paper reported vegetation responses to annual rainfall along two precipitation gradients in South West Africa and West Africa, respectively. The authors used Normalized Difference Vegetation Index (NDVI) derived from satellite data as proxy of vegetation productivity and the linear slope coefficients of NDVI with rainfall as the responses of vegetation productivity to rainfall. I read through this paper many times since the day I was asked to review it, but unfortunately I cannot understand how their conclusions are supported by their analyses. To me, the paper is poor written and the conclusions are NOT supported by their data and analyses overall.

For example, in Abstract, the authors claim "higher rainfall amount variability enhances regional-scale vegetation response to rainfall plasticity and thus dryland ecosystem

resilience to dry periods" (lines 26-27 Page 1). I don't find any evidence in this paper showing that, because only NDVI and rainfall data are in this paper and there is nothing that can show it. This is just authors' speculation. In the last sentence of abstract, the phrase "recovering from drought" is misleading and over-interpret their results.

Specific comments:

Line 11, page 1: "Vegetation net productivity" what is "net productivity"?

Line 27, page 1: what is "rainfall plastiticity"?

Line 30, page 3: what is "cyclic part"?

Line 22, page 4: "temporal window W". I would like to add the unit of W here as "temporal window W (years)".

Line 27, page 4: I would add "years" after "7, 11,15, and 21".

Line 8, page 5: "response function". It should be "response curves", rather than "functions".

Line 23, page 5: "43

Lines 27 29, page 6: the sentence "We have shown that a shifting linear regression model can successfully . . .". I don't see this from the results.

Lines 34-35, page 6: the sentence " Moreover, SWA shows . . ." needs to be reworded. And "hydroclimatic periods" is too ambiguous. I'd rather use "dry vs. wet periods" directly.

And, there are many ambiguous terms throughout this paper, for example, "beta plasticity" in the next line. What is it?

Lines 8 15, page 7. This paragraph is to explain why the slope beta changes with the temporal window (W). But I still cannot understand it after reading it.

The authors should explain it clearly because the major results of this paper relate

to the temporal window. I'm confused at it when reading this paper because of the temporal window.

Line 42, page 7: "hydroclimatic control" What is it? If it is rainfall, just say "rainfall".

Line 1, page 8: what is "systematic response" here? I don't think the authors have done anything related to "systematic".

Lines 1 3, page 8: this whole sentence needs to be reworded.

Lines 4 15, page 8: I cannot understand this paragraph.

Line 23, page 8: the phrase "grass and crop type vegetation" is weird. I prefer "grasses and crops".

Lines 26, page 8: this claim ". . . further support the finding that . . ." is not supported by any data in this paper.

Lines 28 42, page 8: this paragraph should be re-written and the conclusion in this paragraph is not supported by their results.

Lines 8 9, page 9: This sentence describes vegetation differences in these two regions. And I expect to see the explanations of how different vegetations affect NDVI responses to rainfall. But I didn't see it. So, it doesn't explain anything.

Line 26, page 9: "recovering from severe drought periods of . . ." is mis-leading, because it implies a role of previous drought and the processes of vegetation recovery. But these points are not discussed before and they should not be in the "Conclusion" section.

Lines 28 29, page 9: the claim "less susceptible to changes in water availability given its widespread relatively high beta values". Why? "widespread beta values" can be a proof of high sensitivity.

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