

## ***Interactive comment on “Impacts of the seasonal distribution of rainfall on vegetation productivity across the Sahel” by Wenmin Zhang et al.***

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The manuscript titled, “Impacts of the seasonal distribution of rainfall on vegetation productivity across the Sahel” uses gridded climate and vegetation data to determine the impact of seasonal rainfall metrics (typically ignored over large areas) on NPP. The analysis is performed over the Sahel where NPP estimates are used extensively for food security analysis and other important areas of drylands research. The manuscript is generally well written and organized. The analysis is thorough and sufficiently addresses the objectives of the manuscript. The discussion and summary adequately capture the major findings. I believe the manuscript should be accepted by Biogeosciences after the authors address the few questions/comments below

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1) Regarding grammar: the sentences in the introduction and discussion tend to be long-winded, omit commas, and confuse “that” and “which.” Sections, subsections, etc. should be numbered 1., 1.1, 1.1.1. throughout the manuscript. Use past tense for tasks performed and present tense for general statements. There are other minor grammatical and spelling errors that should be addressed.

2) The methods section would flow better if rainfall and NDVI were detailed in their own data subsection.

3) RFE-2.0 is no longer a “state of the art” dataset and is not appropriate for daily rainfall estimation. RFE-2.0 is primarily used at 10-day intervals. The developers caution against using the daily product, because the estimates are statistically disaggregated from the 10-day data and therefore may or may not represent the physical reality. Why was the RFE successor CHIRPS not used for the analysis? It is higher resolution and I would suspect provides more realistic daily rainfall estimates. . .Why was daily data necessary if it was compared alongside 8-day MODIS?

4) Regarding MOD09Q1. . .the 8-day composites are quite noisy over the Sahel due to persistent cloud cover. Was any filtering done prior to S-G? Was the optimized MODIS S-G used? If so, please provide citation. Otherwise, how did you determine the smoothing terms? Certainly not a requirement for this manuscript, but the authors should consider using eMODIS in the future, since it is a 10-day product intended to be analyzed alongside RFE-2.0 or CHIRPS for food security applications.

5) The relationships in Figure 5 are non-linear. Why were they not fit with an exponential curve? How do you take into account the non-linearity of NDVI in highly productive grid cells?

Minor

Ln 54-57: Sentence beginning with “Recent studies. . .” is difficult to understand and should be reworded.

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Ln 100: Typo “(R. Fensholt and Rasmussen, 2011)”

Ln 117-130: Consider using a different nomenclature for climatological and dynamic rainfall anomalies.

Font sizes in the figures are too small.

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