

Interactive comment on “Wet and dry spells in Senegal: Evaluation of satellite-based and model re-analysis rainfall estimates” by Cheikh Modou Noreyni Fall et al.

Anonymous Referee #2

Received and published: 21 October 2019

This manuscript compares the representation of wet and dry spells in Senegal based on rainfall estimates from different sources ranging from satellite retrievals to rain gauges and reanalysis data. Even though the manuscript initially aims to address the very important question of robustness of different metrics for wet and dry spells given the spread between available rainfall datasets, it does not succeed in delivering any coherent message. Unfortunately, the language does not allow to scrutinise the results and overall presentation is below-acceptable. My recommendation is a fundamental revision of this manuscript with hopefully some in-depth involvement of the co-authors in presenting, interpreting and structuring the results. In its current state I recommend to reject this manuscript for publication in NHESS.

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General comments:

- The language of this manuscript is imprecise and altogether not of acceptable quality, which makes it difficult to review in the first place
- Interpretation and putting into context of the presented work / comparison with existing literature on dry and wet spells in the region is essentially entirely missing
- The goal of evaluating the performance of different datasets for dry spell and wet spell identification was not achieved as there is hardly any information that goes beyond a pure description of given plots, leaving it to the reader to come up with a conclusion
- Figures need to be revised (axis, overall readability, caption descriptions, annotations and plots cut off)
- Conclusion only summarises plots all over again

Specific comments, which are not exhaustive:

p5 Methodological approach: This section is too short – were the metrics calculated on the entire time series / per month / per pixel etc? Please also say something about the usefulness of those metrics. For example, WS99P seems to be an unnecessary metric as, per definition, the “number of extreme days” is will be 1% of the number of identified ≥ 1 mm wet days.

- Could you state the rationale behind looking at 90 - 99th centile ‘wet spells’ only, rather than including lower thresholds that are agriculturally relevant?
- Please show the number of rainy days per dataset as that’s what the other metrics are based on

p5 ll 25-26: “The duration categories of wet spells are chosen to correspond to the different synoptic systems causing rain in West Africa (Froidurot and Diedhiou, 2017).” What does that mean? How does it address the “different synoptic systems”?

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p6 l113-14: why does the TRMM radar explain this?

p6 p15: Please indicate on the map where the Peanut Basin is

Figure2: While larger patterns are reflected in the datasets, local differences in the transition zone can be large. Please consider to show all datasets as a difference from OK (since OK is used as reference dataset later on) to help the reader spot biases more easily

p6 17-19: how was this % of dry days calculated? Is it this per day and pixel or is a “dry day” when the entirety of Senegal is < 1mm?

- Generally, please consider adding 1-2 further maps that can take into account the extreme rainfall gradient and illustrate regional differences in those metrics

p 6 l24: why is this a paradox? Also, what is the take-away message for the reader from this section?

p6 l26: “ Fig. 3 also illustrates a higher variability from the seasonal scale to intra-seasonal scale.” please explain more clearly

Figure 4 has boxes cut off – please replot

p7 l111-12: “The seasonal cycle of dry spell shows slight differences between products which confirm that this events characterize false start and early cessation of season in Senegal. “ Please explain more clearly

p7 l113-14: what does illustrate the severity of DSC and DS? What is this severity?

P7 l16 It's rather within the seasonal cycle than at a given date

Figure 6: what is the x axis? Where does the “0” belong? Please provide complete descriptions in your figure captions

Figure 10: why does the daily rainfall only start at about 15mm per day?

P9 l5: worth to note that WSM 99P is only the rarest because it is the only defined wet

spell metric that does not have a predefined number of occurrences per definition of percentile thresholds

p9 ll 8-9: please explain the part with the fraction more clearly

Generally, this is a section when having a map would be interesting in order to see in which region the dry spells are particularly hard to catch for certain datasets

Figure 12: It's very difficult to make out the different datasets in this plot (please improve) and the last two years of OK look rather questionable - can you comment on that? Please explain where you see a clear increase in this.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2019-185>, 2019.

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