

General comment

This study analyses the natural variability of the water and soil-related component over the Okavango Delta (OD) region. The authors have used passive microwave (PMW) based Climate Data Record (CDR) obtained through inter-calibration of multiple PMW observations and a particular retrieval model. They compare the CDR to model outputs (ERA-5 Land), infrared-based estimates, and auxiliary datasets. The objective is threefold: 1) analyzing the complex hydrological region of the OD, 2) validating to some extent their CDR using ERA5, and 3) demonstrating the benefit of using PMW information to characterize processes that are not well implemented in the ERA5-L model such as the lateral flow-related soil moisture. The manuscript is well organized and well written, and I have appreciated its perspectives. Nevertheless, I believe additional work is needed to put this work in good shape for publication. In particular, some figures are needed to support statements of the authors and a few experiments could improve the analysis. I listed my comments below, which, I hope, will contribute to the preparation of an improved version of the manuscript.

Majors comments:

1) Concerning the PMW CDR:

- Too little information is given on the inter-calibration and retrieval model. I acknowledge that these two compounds are supported by published materials but the author could add information in an annex on the inter-calibration (such as the cost function used in the optimization during inter-calibration). Also a figure with raw (original) CDR time series over the two regions of interest (ROIs) before retrieving the climatological mean.

- In Table 1, the resolution of the pixel measured by PMW at the surface is needed as it is said that Brightness Temperatures (BT) have been aggregated at 0.25° to obtain gridded products.

- If descending orbit only have been processed such that it can be compared with MODIS, such information is needed p7-L192

2) Concerning the LST analysis:

- Land surface temperature from ERA5 (LSTe5) has been extracted only for the first layer (0-7cm), is there any information on the penetration depth from the PMW observation? The infrared MODIS-based LSTmd is used for comparison, as infrared LST has no penetration depth, how this could impact the analysis. Please comment on p12-L315.

- No Time series is plotted for LSTe5 and LSTmd. For a systematic analysis, these two must be added in Figure 4. It should better support the author's statement on LSTe5 through the manuscript (p22-L533; p23-L564) and in the abstract. This is not shown in the analysis yet.

- I would suggest adding LSTmd climatology in Figure 6

3) Concerning the VOD

- Climatology for ROi1 could be added in an annex to see if the LAI and VOD seasons are less correlated over catchment as it is stated p23-L595.

-Xband is less sensitive to leaves over dense forest, any experiment has been conducted in using/not using Xband for VOD in the omega-tau model?

4) Concerning the Figures:

- All scatterplots must have Xlabel and Ylabel for clearer reading. I suggest introducing correlation numbers inside the figures.
- All correlation numbers must have at most 3 digits as the 4th is not meaningful.
- "Absolute anomalies" in the title is misleading as "absolute" has another mathematical meaning. Replace by "raw"?
- add PRim in Figure 5 as well as PRe5 and PRim for RO1 (can be in annexes) as it is stated that PRe5 has high positive anomalies over the catchment (p21-L478) with no supporting information.

5) Concerning the Linear regression experiment:

- RMSE for Z-score is difficult to analyze, please replace by bias and std metrics in table2
- Please consider doing the Linear regression experiment for the catchment ROI1 to see if the SSM is more related to the precipitation upstream (as stated p22-L517).
- In the Table specify the considered ROI.
- It said that OIAD show some lagging from ORD, could you find optimal lag with cross-correlation between ORD-SSM and SSM-OIAD. This might lead to finding some buffering effect in SSM between ORD and OIAD.

Minors comments :

- p2-L36, miss-record
- p2-L51, "the The"
- p3-L63, BAMS, acronym is not defined
- p3-L93, PMW is not defined,
- p4-L111, use Section instead of "Chapter"
- p4-L114, LPRM is not defined yet E5L should be E5
- p7-L195, The sentence is misleading since not only the Xband is used
- p9-L224, what is an E-type gauge?
- p11-L289, VODCA is not defined
- add Z-score equation
- Caption of figure 3 seems misplaced (not attached to the figure on the same page)
- p21-L474, what "memory" replaces to buffer effect?
- p21-L489, SSM not SM

-In Fig6: +-15d is used for visualization only or to compute anomalies also? If it has been used for computing anomalies, this could lead to over-smooth the anomalies with the 90 days moving average window.

-p23-L534: could you be more specific. The increase of SMM with available solar energy, increases ET and avoids a false increase of LST but how is LSTe5 between 2011-2014?

-p23-L553 verb is missing