

REVIEW of the paper

Establishing the dominant source of uncertainty in drought indicators

Authors: Naumann et al.

Manuscript Number: 10, 13407–13440, 2013

Submitted: Hydrol. Earth Syst. Sci. Discuss.

This paper investigates the drought indicators using hydrometrological data from different sources. The five precipitation datasets are compared using four drought indicators. The study was performed for four river basins located in different climatic regions of Africa. In general the paper is well written and structured. It's worth to be published after some moderate changes. I have a few comments.

I felt that the title is misleading. There is no thorough investigation of dominant source of uncertainty in the paper. Uncertainty is only mentioned at the very end of the result section (page 13419). The authors argued that precipitation datasets are the main sources of errors. What are the other sources of uncertainty in drought indicators? Why they are not so important? Unless the authors explicitly compare the different source of uncertainty, it is hard to draw the conclusion that the precipitation datasets are the main sources of errors. I highly recommend changing the title of the paper to something like assessment of drought indicators

Too many acronyms are used in the paper. There are some acronyms (e.g. RFE, FEWSNET, TMPA, DMSP, IR, AIRS etc) which are not used in the paper at all. I recommend removing such acronyms and reducing its number. Some acronyms are not also defined, e.g. RMS, RSE etc.

Figures are in general too small and poorly explained in the text. The texts in the figures are illegible. I suggest to enlarge figures and increase the font of text in the figures.

P13410, L22: How Rainfall Estimation Algorithm works? One sentence or two require here to understand the algorithm.

P13411, L16: resolution. The GPCP full reanalysis version 5 ... (*Missing full stop*)

P13411, L16: Rudolf or Rudolph ?

P13412, L18-L20: Be consistent while using acronyms, e.g. ERA-I vs ERAI, SPI vs SPI-3 etc.

P13412, L17-L20: I suggest rephrasing the sentence "*The three drought indicators.... while the SMA are derived from ERA-I simulations.*" as in current form it is confusing. I

understand why all indicators cannot be derived from all data sources but it might be worth describing here.

P13415, L9-L21: It is difficult to follow the text as I am unfamiliar with the regions described in the text (e.g. tropical savannahs, Sahel). I suggest labelling such regions in Fig. 1.

P13416, L25: “*There is a generally good spatial correspondence between all the indicators over the study period*”. I do not agree with this. SPI indicators show that there is no drought in the middle region of the Africa (first rows in Fig. 4) whereas SPEI indicators show that these regions are in severe drought (4th and 5th rows).

Fig 5: It is difficult to get the clear message from Fig. 5. Authors are mixing indicators and datasets in one figure. I suggest to compare drought indicators for a given data set at once. E.g. first row will be SPI, second row – SPEI, third row – PET, and fourth row – SMA. Then first column will be between ERAI vs GPCP, second column – ERAI vs TRMM, third column – GPCV vs TRMM (?). Do not compare both at once i.e. panel d in Fig 5.

P13416, L 28: Since authors are referring to a value of 0.6, it would be useful to have another line showing 0.6 in Fig 5. What does box and whisker plot represent here? Is this sampling uncertainty?

P13416, L27-L28: “*Overall, the index of agreement (d) shows that greater than 0.6 for almost all the comparisons (Fig. 5)*”. I do not agree with this statement as d values are less than 0.6 for about 40% of the cases in Fig 5. The percentage is even less if you consider box and whisker plot.

Fig7: Use the consistent acronym in the legend as well. Are SPI, SPI3 and SPI-3 same? (why 3?).

P13417, L16: How do you compute duration of dry spells?

Fig 8: I suggest removing plot of TRMM from first row in Fig 8 as you are comparing four drought indicators with single data set ERAI and combining four drought indicators in one figure using line plots (each line for each indicator). So you will have 5 (OER, NIG, ENL, LIM and GHA) by 1 plots.

P13417, L20-L24: I suggest swapping these two sentences (first refer to the Fig before describing it).

P13418, L28- P13419, L2: The problem with zero or near zero precipitation can be solved treating zero value occurrences as censored data having unknown precise values but known to be below or equal to zero.

P13420, L8: ... including the Greater Horn of Africa where there...(replace were with where)