

Interactive comment on “A SMAP-Based Drought Monitoring Index for the United States” by S. Sadri et al.

Anonymous Referee #1

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With interest I have read the manuscript entitled “A SMAP-Based Drought Monitoring Index for the United States”, it is interesting and well written (although I am not a native English speaker!). It is certainly of interest for HESS readers. The manuscript details a new SMAP-based index for drought monitoring over the Continental US (although the title mentions “[...] the United States). The methodology stems on previous work from Sheffield et al., 2004 and is applied to the recent SMAP data. The resulting drought index is then compared to other already existing index like SPI-1&3, and another one GRACE-based. While the article is clear (at least to me), I am missing some more analyses of the drought Index for the manuscript to go from ‘[...] a demonstration of the reliability [...]’ with lot of text to a proper journal article (There is no results section?). Authors present several comparisons but not a proper evaluation of the added value

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of this index. Some more in depth analyses of the added value of the new Index otherwise it is simply one Index amongst many other. For example, if you were using NASA’s Catchment LSM (i.e., without assimilation of any SMAP data) would you have different results? How could you / would you quantify/highlight the added value of SMAP?

Below are some suggestions/corrections that have to be accounted for before the manuscript deserves publication.

Abstract General comment : Some parts seem awkwardly written and are not self explanatory, not all acronyms are given and some very specifics information are given making it difficult to follow for the Reader. P.1,L.5: ‘[...] so the 33 months [...]’, when does it starts and when does it stops? P.1,L.6: Please clarify SPL4SMAU, while I assume it is the level 4 products it might not be obvious for everyone. P.1,L.10: if your intention is to say that your drought index is based on the level 4 product (SPL4SMAU), simply say it. P.1,L.12: it might not be obvious for everyone what is VIC, please clarify. P.1,L.13: ‘[...] 57% of grids[...]’, please clarify. P.1,L.16-17: Not obvious what is D0-D4, GRACE and W0-W4, please clarify.

Introduction General comment: Some paragraphs are a bit long and could be shortened (it is just my opinion so I let this comment to Author’s discretion). P.2, L.8: what is NCEI? P.2, L.10: what is UNPD P.3, L30: ‘[...] differs a great deal [...]’, please consider rephrasing. P.4, L.5: ‘[...] and others [...]’, please consider using ‘et. al.’ P.4, Is the last paragraph of the introduction in agreement with the four point described above (I am thinking of point 3 in particular). Maybe a link could be made with long data record of soil moisture from satellite derived surface soil moisture like the ESA-CCI data set (e.g., Dorigo et al., 2017, see reference below). P.4, L.18 : please clarify W0-W4 (I guess W is for week...) Dorigo, W., Wagner, W., Albergel, C. Albrecht, F., Balsamo, G., Brocca, L., Chung, D., Ertl, M., Forkel, M., Gruber, A., Haas, E., Hamer, P. D., Hirschi, M., Ikonen, J., de Jeu, R., Kidd, R., William Lahoz g, Liu, Y. Y., Miralles, D., Mistelbauer, T., Nicolai-Shaw, N., Parinussa, R., Pratola, C., Reimer, C., van der Schalie, R., Senevi-

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ratne, S. I., Smolander, T., and Lecomte, P.:ESA CCI soil moisture for improved Earth system understanding: state-of-the art and future directions, *Remote Sens. Environ.*, 201, RSE-10331, <https://doi.org/10.1016/j.rse.2017.07.001>, 2017.

Data and Methods General comment : I believe consistency is a key element that could be improved. P.4, L.22: 'Since 31 March [...]', in the introduction it is since April. P.4, L.26-27: please rephrase to mention Level 3; Level 4... P.4, L.33: If it is the case (and I think it is from the introduction), the SMAP L-band Tb that are assimilated to produce the SPL4SMAU are the SPL3SMAU data (?) if so, please simply say it. P.5, L.9, what is 'L4', please clarify. P.5, L.27, '33 months' sometimes, '1009 days' some others, please be consistent if you are talking about the same thing. P.6, L.15, please rephrase question. P.6, L.29, what is 'mpas' ? Please correct typo ('maps' I guess) Figure 2: units? P.8, L.1: Please comment on correlation values and their significance.

Comparison to other indices General comment : I am missing some in depth analyses of the added value of the new Index otherwise it is simply one Index amongst many other. For example, if you were using NASA's Catchment LSM (i.e., without assimilation of any SMAP data) would you have different results? P.10, I think a word is missing in the second sentence (?) P.11, why are the figures embedded in the conclusion? '[...][...]'

Conclusions Some sentences really look like introduction to me.

Interactive comment on *Hydrol. Earth Syst. Sci. Discuss.*, <https://doi.org/10.5194/hess-2018-182>, 2018.