

Interactive comment on “Soil moisture and streamflow deficit anomaly index: An approach to quantify drought hazards by combining deficit and anomaly” by Eklavya Popat and Petra Döll

Anonymous Referee #2

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Dear Authors, Dear Editor,

I read with interest this manuscript for its publication in NHES journal. The work proposes a new formulation for deficit and anomalies indices. Specifically, authors revised the existing Drought Severity Index (DSI) developed by Cammalleri et al., (2016) for soil moisture drought and introduce a new indicator for streamflow drought; both the indicators combine deficit and anomaly aspects of drought.

The paper is well written and organized; the presentation quality is good. The adopted methods are scientifically robust and of interest for the scientific community. I only have some observations and minor comments that can be read in the following.

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1. As I understood, distribution functions (gamma and beta) are fitted cell by cell (and for 12 months) all over the globe. Indeed, for some cells the fits were rejected. Have you thought of carrying out a cluster or regionalization analysis to identify areas with similar parameters thus to improve the fitting? 2. The d_{soil} component has an almost regular seasonal cycle, as expected. The SMDAI, thus, results to be particularly sensitive to the second component, i.e. the p_{soil} , which depends on statistical fitting. Clearly, SMDAI is high only when d_{soil} and p_{soil} are 'in phase', that means, for the case of the German cell in figure 1, when p_{soil} is high during summer season. This highlights the importance of the fitting process and the utility of possible analyses over regions (previous comment). 3. How long the used monthly time series are? 4. Are there any other recorded drought events against which results can be compared? Summer 2017 was particularly critical for Europe (WWA, 2017). Please discuss.

World Weather Attribution (2017). Euro-Mediterranean Heat - Summer 2017. Report, September 2017

Specific comments L. 165: I would avoid terms such as “unnecessarily complex”; modify in “we have simplified the approach of Cammalleri et al., (2016)”. L326-328: please review sentence, something is missing. FIGURES: please, improve quality of map figures. Table 1: specify that the anomaly component p is for both SMDAI and QDAI.

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