

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC3
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Comment on nhess-2021-176

Anonymous Referee #3

Referee comment on "Hydrological Drought across Peninsular Malaysia: Implication of drought index" by Hasrul Hazman Hasan et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-176-RC3>, 2021

General Comments

The manuscript is investigating hydrological drought in Malaysia employing the Streamflow Drought Index and the run theory, which is of interest to the Journal's audience. However, since both techniques are established, the authors should emphasize the significance and the contribution of their work. In addition, there are technical issues that the authors need to rectify in order for the analysis to be accurate. The language of the manuscript needs some improvement. My evaluation is that the manuscript does not meet NHESS's scientific quality standards and I suggest rejection of the manuscript or conditional acceptance after major revisions.

Specific Comments

- In the introduction, the authors need to create a narrative, based on pertinent literature, that explains the contribution of their study to the reader. Lines 71-80 do not contribute towards this goal. Information about SDI in different regions does not need to be included with such detail. On the contrary, the authors need to cite and elaborate on drought studies for Malaysia in order to establish what is the new knowledge that this study is offering.
- Malaysia has a high hydropower potential and several dams (including ones for storage) constructed since the 1960s until recently. The authors also mention at lines 91-93 that seven dams had significantly lower water levels due to drought conditions in 2016. Have the authors performed flow naturalization to remove the effects of upstream flow regulations for the gauges that have a dam upstream? If no, why? For the provided figures it is not clear if there are dams upstream of the gauges. Anthropogenic interventions need to be excluded if the authors intend to evaluate how hydrological drought characteristics have changed throughout the study period. In addition, this

comment is critical for the spatial analysis of hydrological drought characteristics across Malaysia.

- Based on run theory and the authors' definition of drought characteristics, drought severity is equal to the shaded area below the threshold --- here set to -1 --- (Yevjevich 1967), not the shaded area below the horizontal axis. Equation 4 should reflect that. The analysis needs to be redone.
- The authors at Line 135 state that they include in their analysis 42 gauge stations with 40 years of continuous streamflow data. In line 141 the authors state that 17 of those have a record of less than 40 years. However, Table 2 indicates that there are 12 stations with less than 30 years of record, with the smallest time series being just 12 years. It is recommended to have a record of 30 years or more to accurately compute a standardized drought index (e.g. SPI, SDI, etc.). Nalbantis & Tsakiris (2009) used a record of 30 years. The gauges with data less than 30 years need to be dropped from the analysis.
- I second the comment of Anonymous Referee #2 about what the results section is missing.