Comment on nhess-2021-176
Anonymous Referee #2
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-RC2, 2021

General comment
The manuscript illustrates the application of a standard hydrological drought index (Streamflow Drought Index, SDI) for the detection at the regional scale of drought events; the case study is the peninsular Malaysia. This work contributes to the state of the art on the topic by improving the knowledge about the hydrology of the case study region. The topic is of interest for the hydrologic community, yet the manuscript needs additional efforts from the Authors to clarify some aspects that are fundamental for the reader understanding; further, a deeper analysis based on the available data is expected. Specific comments follow.
Response: We are grateful to the reviewer for their time and suggestions in helping to improve the manuscript.

Specific comments
From the abstract alone it is not clear which is the content and main objective of this work; further, it appears that this work is simply a case study application of methods already known in the literature. If this is true, it should be emphasized the innovative contribution provided by this work.
Response: We thank you for these comments. We have revised the summary based on your recommendation on page 1, lines 11-17 and lines 24-26. We have rewritten the abstract to better understand the research objectives and edited it so that the methods are reflected in the results and the data support the conclusions.

Also the Introduction Section needs additional efforts from the Authors to better state the research gaps that justify the proposed work and to avoid repetitions. I'm not sure that the literature review covers properly what has been already proposed in the literature in terms of drought indexes development and application. Further, while the Authors states that there are not many work on SDI (l. 108-109), they report a non-negligible number of reference on its application at several time-scales (l. 151-156).
Response: Thank you very much for your suggestion. We agree with the reviewer. We have revised the manuscript based on your recommendation. Please refer to page 3 (lines 91-96) and page 4 lines 99 to 101, 106-120, 127-128, 133-134.

It is not clear which is the motivation for the choice of the period within the year where SDI is computed, starting in January and covering 3, 6, 9 and 12 months (l. 165-67). In other words, its should be explained why, e.g., the 9-months SDI refers to the period from January to September and not to another one (e.g. from April to December).
Response: There were no four seasons in Peninsular Malaysia which is tropical country. Therefore, we can define the hydrological year as beginning each year with January. This corresponds to the tropical climate of Peninsular Malaysia with various monsoons and monsoon transitions. A detailed analysis of the definition of the hydrological year can be found in Hirsch and Fisher (2014).

SDI is an index that allows to detect drought events when it is below a given threshold value. To compute drought frequency it should be first defined a drought event; hence, section 2.3 should follow 2.4.

Response: We agree with the reviewer. Therefore, section 2.4 has been included in section 2.3 Identification of drought events (page 7).

Why depicting results averaged over 10-years time windows? Which is the difference between depicting the number of droughts and the frequency of drought events? Which is the statistical significance of frequency computed over a short time period of 10 years? I personally believe that the presentation of results should be improved and more details should be added.

Response: Thank you for your comments. The use of a time interval of 10 years or decades is due to the fact that many equations for hydrological modelling or projection use decades to overcome the degree of bias in the models towards underestimation of streamflow (Daniels, 2014). Besides, this is one of the objectives of the present work. We have improved the presentation of the results in Table 3 and page 13 (lines 399-408 and 417-426), page 14 (lines 419-420 and 434-437). The reviewer may also refer to Figures 3-6.

Drought events can be quantified (as indicated in the Methodology Section) in terms of three different quantities, intensity, duration and severity. How do those quantities are used here to understand drought phenomenon over Malaysia? I personally believe that available data are not exploited enough for drought understanding.

Response: Thank you very much for your suggestion. This study focused on the hydrological characteristics of droughts in terms of the number of drought events and the frequency of occurrence of droughts at different time scales.

Results are presented in detail yet not discussed in terms of possible physical explanation of the observed phenomenon. Hydrological droughts result from different processes, as clearly mentioned in the introduction section; yet, there is not reference to such processes.

Response: Thank you for your suggestion. We have improved the results sections to meet the objectives of the study.

Reference

Daniels, B. J.: Effects of climate nonstationarity on low-flow models for southern New England. [online] Available from: http://160.75.22.2/docview/1613245669?accountid=11638%5Cnhttp://re5tm7xf6s.search.serialssolutions.com/?ctx_ver=Z39.88-2004&ctx_enc=info:ofi/enc:UTF-8&rfr_id=info:sid/ProQuest+Dissertations+%26+Theses+Global&rft_val_fmt=info:ofi/fmt:kev:mtx:dissertation&r, 2014.

Hirsch, R. M. and Fisher, G. T.: Past, Present, and Future of Water Data Delivery from the U.S. Geological Survey, J. Contemp. Water Res. Educ., 153(1), 4–15, doi:10.1111/j.1936-704x.2014.03175.x, 2014.