Comment on nhess-2021-176
Anonymous Referee #4

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-RC4, 2021

This study aims at investigating the spatial and temporal variations of hydrological drought in Peninsular Malaysia for the period 1978-2018 by Streamflow Drought Index (SDI) using streamflow data recorded at 42 stations. The drought was also characterized at four time scales of 3-, 6-, 9- and 12-month.
Response: We thank the reviewers for their time and suggestions, which helped to improve the manuscript.

1- My main concern is on the novelty of this work, especially when it was submitted to the special issue "Recent advances in drought and water scarcity monitoring, modelling, and forecasting". Hydrological drought was characterized by Streamflow Drought Index (SDI) as developed by Nalbantis & Tsakiris (2009) without any modification. Drought characteristics were identified by the run theory (Yevjevich 1967) and the interpolation was done by the well-known Inverse Distance Weighting (IDW) method.
Response: Thank you for your comments. We have revised the manuscript based on your recommendation. Please refer to page 4, lines 103 to 128.

2- L147-149: " The main advantage of SDI is that it requires fewer data than other indices, such as the Palmer Hydrological Drought Index, which need streamflow and rainfall data. The selection of SDI is because of the availability of streamflow data." Does it mean rainfall data are not available in Peninsular Malaysia? In addition, as mentioned in lines 64-66 of the manuscript "several indices are using only streamflow data, namely, Regional Streamflow Deficiency Index (RSDI), Standardized Streamflow Index (SSFI), Streamflow Drought Index (SDI), Baseflow Index (BFI) and Regional Drought Area Index (RDAI)". Why was the SDI used here?
Response: Thank you very much for your comment. This study is about determining hydrological drought using streamflow data. In Malaysia, many studies have been conducted on meteorological drought based on rainfall data, e.g. Ahmad and Deni, (2013); Hong and Hong, (2016); Sanusi et al. (2015). So far, only a few studies have been conducted on hydrological drought based on SDI. There is only one study related to the application of SDI, which is the study by Khan et al. (2017). However, this study concentrates on the state of Selangor. In contrast, this paper focused on hydrological drought for all available hydrological stations at Peninsular Malaysia. To our knowledge, this is the first comprehensive study to examine the multi-time scales of observed streamflow at 42 stations on Peninsular Malaysia.

L107: "Due to the scarcity of research on hydrological drought monitoring using SDI". In Peninsular Malaysia? Because there are several studies using SDI in other parts of the world that were not cited in the paper. Have all the above indices been used before in Peninsular Malaysia?
Response: We thank you for your comments. To our knowledge, this is the first comprehensive study to examine multiple time scales using SDI in observed streamflow at 42 stations in Peninsular Malaysia. We have revised the manuscript based on your recommendation on page 3, lines 75 to 84.

Minor comments:

L82-85: It implies that the El Nino event in the year 1997-1998 was caused by climate change. If so, a reference is needed. If not, revise.

Response: Thank you for your suggestions. We have revised the manuscript based on your recommendation on page 3, lines 87-96.

L157: "For a relatively more detailed drought index, the SDI can be computed based on the monthly streamflow value". Most of the drought indices use monthly or smaller-scale data.

Response: Thank you for your suggestions. We agreed with the comment. We have revised the manuscript based on your recommendation on page 6, lines 174-176.

L472: "For tropical regions, it is the most sensitive scale to alterations in streamflow." Isn't it the case everywhere because of the smoothing effect at longer scales?

Response: Thank you very much for your comments. In this study, the running series of total streamflow volumes for 3, 6, 9 and 12 months were used to derive the SDI series. In this way, minor drought or dependent droughts can be taken into account. The time scale of 12-month simplifies the comparison between the long-term variation of the dry climate and the corresponding hydrological variation.

References

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