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Reply on RC1

Hasrul Hazman Hasan et al.

Author 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-2021-249-AC2>, 2021

Comment on nhess-2021-249

Anonymous Referee #1

Authors try to do their best for improving this manuscript. However, the authors were not able to positively address some of my previous comments.

The authors used only one index [Streamflow Drought Index (SDI)] for monitoring drought across Peninsular Malaysia. Also, the specific manuscript was presented with no innovative point of view regarding the advantages in drought and water scarcity monitoring, modeling, and forecasting.

Response: We are grateful to the reviewer for their time and suggestions in helping to improve the manuscript.

One merit point of this manuscript could be the determination of a method to select the most appropriate time scale for drought assessment, especially in tropical countries, as the authors mentioned in the end of the introduction section. Specifically, the authors conclude that "Among the SDI time scales, SDI-3 is the most suitable for effectively tracking hydrological drought. For tropical regions, this is the scale that is most sensitive to changes in streamflow" However, I cannot find in this manuscript a robust scientific method / technique which could prove this result, on the contrary the authors mentioned in many different parts of this paper controversial aspects concerning this point.

For instance:

"SDI-12 is more suitable for water management applications" (PAGE 14, LINE 432)

"The spatial and temporal SDI analysis revealed that the SDI-3 and SDI-6 could be misleading in the regions that are normally dry for six months. The SDI-3 can be used to determine when the dry season begins and ends. However, a drought index for longer periods is essential. For example, a three-month drought may occur in the middle of a prolonged drought, but this would only be noticeable over longer periods such as 12 months" (PAGE 11, LINES 321-324)

Response:

For the next correction, the authors will test the performance of different probability distributions (assuming that each month fits different probability distributions) to calculate the streamflow drought index (SDI). It is well known that in hydrological studies based on frequency analysis, there are often uncertainties in sampling due to the limited data length and discontinuity of the observed streamflow series compared to meteorological data. The required procedure for estimating the parameters for the PDF implies that the calculation of the SDI from specific samples depends significantly on the characteristics of the sample and the size of the observed streamflow series.

This has enabled the authors of this paper to propose an accurate procedure to obtain a hydrological drought index useful for spatial and temporal comparisons over a wide range of flow regimes and flow characteristics.