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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Annual Characterization of Regional Hydrological Drought using Auxiliary Information under Global Warming Scenario" *by* Zulfiqar Ali et al.

Anonymous Referee #1

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This study proposed an improved method to calculate regional hydrological drought indices by incorporating auxiliary information, i.e., temperature, which is important to investigate hydrological extremes under global warming. However, the intro, results and discussion can be improved. I do have several concerns that should have been addressed before it can be considered for publication. 1. The authors used a new method to calculate hydrological drought index using temperature (LWSDI). LWSDI is not just a drought index, only when LWSDI is smaller than a threshold, it can be used for drought identification. Most importantly, the authors failed to demonstrate the improved LWSDI is more appropriate than SPI/SPEI (or other hydrological drought indices) in investigating hydrological drought event. Although there are good relationships between

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LWSDI and SPE/SPEI, it is not convinced to prove LWSDI is better than the existing drought indices. 2. The first two sentences of the ABSRACT and INTRODUCTION are the same. Please rewrite. 3. Line 23-33: The authors failed to explain the relationships among different types of droughts."Hydrological drought occurs when dry weather patterns outweigh other climate conditions". This sentence is rather difficult to understand. Generally, hydrological drought is considered as the water shortage in surface/subsurface water during a certain period.The LWSDI is estimated by precipitation and temperature, which might be a kind of meteorological drought index. 4. Page 4 Line 40: 'various survey indicate that there is a positive correlation between rain and temperature. . .'.But in following, the authors indicate there are negative correlations between them (Rajeevan et al., 1998). It seems the method proposed by this study only can be used when there is a positive relationship between precipitation and temptation. Therefore, I strongly recommend the authors to give the relationship between them in the manuscript. 5. Before selecting the appropriate probability distributions, I suggest the authors pay more attention to check whether the precipitation time series are stationary before statistical modelling. 6. The results and discussion are rather poor. The title of this study is "annual characterization. . .".The authors only show the statistics of the employed methods, but don't state the annual characterization of hydrological drought in Pakistan. There might be severe drought in the study area during the study period, it would be better to identify and characterize these droughts, and compare with the other drought indices.

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