Natural Hazards and Earth System Sciences Discussions

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Comment on nhess-2021-73

Anonymous Referee #2

Referee comment on "Drought evolution characteristics of the Qinghai-Tibet Plateau over the last 100 years based on SPEI" by Shengzhen Wang et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2021-73-RC2, 2021

I have reviewed the manuscript nhess-2021-73 "Drought evolution characteristics of the Qinghai-Tibet Plateau over the last 100 years based on SPEI" by Wang et al. The paper attempts at a description of drought features over the Tibet Plateau by means of a statistical analysis of the SPI index over a very long period of time. The topic of the research is up to date and coherent with the scope of the journal and the specific case study is potentially interesting but I regret to say that the current version of the manuscript represents for presentation, methodology, analysis and results commenting a poor contribution to the current and relevant scientific literature. I would not recommend the paper for publication and warmly invite authors for an in-depth revision of the research framework prior to a further submission.

In the following some specific comments.

1)Title: the title only refers to the SPEI index but in the end the paper also analyses the precipitation and temperature trends.

2)Abstract: it is a confuse description of the research idea and content of the paper, it highlights the fact authors need to revise the research framework.

2)Introduction: after a fair introduction of the current relevant literature, it confusedly presents the proposed research work.

3)Method: the description of the methodology is not exhaustive. In the presentation of the results, I only saw representation of one single time series. What does it represent? Is it

the average over the region? If so, I do not believe the average over a large region is sufficient to explain a behaviour. Provided the fact that in the results also gridded maps are represented, I guess more time series should be available, one for each cell of the grid. How do authors deal with the spatial dimension of the problem then? And also how do authors deal with the temporal dimension of the problem? It is well known the SPEI, such as SPI, can be assessed over different accumulation time scales, each of which has a specific significance. This specific issue is never discussed in the paper.

4)Data and preprocessing: overall the data are very poorly described. The climate data are poorly presented, probably a graphical comparison between rain gauge and grid data could have been important to explain the need for the use of CRU 4.03. The geographical context is not described at all. It is not clear what drought hazard data are. Data processing: how? But more importantly why?

5) Results and discussion: these sections are very poor for both the content and the interpretation provided. The feeling is that the authors are not familiar with statistical analysis of time series or at least with the interpretation of the relevant results. The time scale and the spatial scale of the problem are not considered properly, as previously mentioned. Figures are not well described, captions are not complete, frequently the reader does not know what is looking at and sometimes the interpretation of the results are wrong.

What is Figure 1 representing? The average SPEI? What is a typical annual drought frequency? How do we guess from Figure 1 and 2 there is a good agreement between SPEI and drought frequency (who is it assessed?) for the case study? Unless the legend of Figure 2 is wrong, the two panels (upper and lower) describe different spatial patterns. Drought frequency is large in the northern area which is instead the region with the lower SPEI (again what index are we looking at?).

Figure 3: again, which index is this?

Figure 4: we cannot assess temporal trends over short period of time (or at least we can but there is no meaning), so how authors assessed the interplay for an increasing and decreasing trend in the single seasonal time series? This makes no sense to my opinion.

Figure 5: the legend should illustrate number not just quality of the mapped attributes.

Figure 6-7: the wavelet analysis, which authors mentioned to engage in the abstract is very poorly undertaken. What is the physical meaning? How does it compare or add to the previous results of the time series analysis?

Figure 8: what does Figure 8 illustrate? According to the caption and axes titles, should be the trend of temperature and precipitation. But this should be an univocal number for each single time series. Additionally in the methodology authors never say how they assess the magnitude of the trend, which is not provided by the Mann-Kendall test. In the first and third panels, what does the pattern illustrate? Why are they depicted in blue and red?

Figure 9: again the legend should illustrate number not just quality of the mapped attributes.