

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1  
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## Comment on nhess-2021-267

Muhammad Zaman (Referee)

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Referee comment on "Spatio-temporal Evolution of Wet-dry Event Features and their Transition across Upper Jhelum Basin (UJB)-South Asia" by Rubina Ansari and Giovanna Grossi, Nat. Hazards Earth Syst. Sci. Discuss.,  
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### General Comments

In this paper authors investigate the evolution of wet and dry events collectively in space and time over Upper Jhelum Basin for a period of 1981-2014. They use SPEI index calculated from distribution mapping based corrected ERA5 precipitation estimates and observed temperature data, and locate the hotspot regions for wet, dry and both wet-dry rapid transit events. The idea of the analysis is interesting and the potential for the results is high, however the manuscript remains mostly descriptive.

The paper is well written, with a clear, fluent and concise language and a well organised structure. I think that the manuscript can provide new insights into understanding the evolution of compound extreme events. Hence, my assessment of the manuscript is overall positive. However, some revision is needed before the work can be accepted for publication in the journal. Below detailed comments are listed:

### Minor comments:

**C1:** Figure 1 is not well explained. I suggest that the authors should revise the figure by showing name or number of the gauging stations. I suggest to present a detail figure of study area.

**C2:** The writing and English need thorough polishing. Numerous grammatical and rhetorical issues too.

**C3.** I have some concerns about the introduction section. I think that if the authors wish this paper is well considered by experts, more attention should be devoted to discuss the extreme events in the area. Moreover, this section is lacking clarity and sufficient motivations. I suggest to improve it or better explain with realistic examples. Kindly go through the Zaman et al (2020) for extreme events in the UIB.

**Zaman, M.;** Ahmad, I.; Usman, M.; Saifullah, M.; Anjum, M.N.; Khan, M.I.; Uzair Qamar, M. Event-Based Time Distribution Patterns, Return Levels, and Their Trends of Extreme Precipitation across Indus Basin. *Water* **2020**, 12, 3373

**C4:** As the data use to carry out a research work is the base of a research work and the most important ingredient. The authors have not provided any detail of the data they have used to carry out their work. I suggest that the authors must provide the complete detail of the data they have used in this research work. Moreover, the authors have applied any homogeneity test on the data to ensure the data quality? In data description section the authors did not mention from where they took observed data and what is the ethnicity of the data. I suggest the authors to go through the Zaman et al 2020 for the data quality and presentation.

**Zaman, M.;** Ahmad, I.; Usman, M.; Saifullah, M.; Anjum, M.N.; Khan, M.I.; Uzair Qamar, M. Event-Based Time Distribution Patterns, Return Levels, and Their Trends of Extreme Precipitation across Indus Basin. *Water* **2020**, 12, 3373

**C5:** Line 138, I would strongly suggest adding 2-3 sentences why authors prefer to use distribution mapping method of bias correction of ERA5 precipitation and which frequency distribution was employed/fitted to the precipitation data.

**C6:** Authors used gridded ERA5 precipitation and observed temperature based potential evapotranspiration for the calculation of SPEI index. Would you please just clarify the reason why authors use gridded and observed data combination instead of use only gridded or observed datasets for both variables?

**C7:** From line 152 onward. Overall, the explanation of SPEI is very easy to understand and I think it should not be substituted by merely a reference to another publication. However, would it be possible to add basic equations to guide some type of readers?

**C8:** The authors used monthly time scale to detect floods and flash droughts. What do you mean by flash drought? Please explicitly define somewhere in manuscript.

**C9:** Figure 8, what are the units of transition time? Kindly mention it.

**C10:** Geographical coordinates are provided in figure 7 only. It would be better to add geographical coordinates to all figures or remove it from figure 7.

**C11:** Rapid transition of wet-to-dry or dry-to-wet event refers to the one extreme event is followed by the opposite event. It must not necessarily happen with similar severity level.

**C12:** Line 261-263, rephrase the sentence.

Please also note the supplement to this comment:

<https://nhess.copernicus.org/preprints/nhess-2021-267/nhess-2021-267-RC1-supplement.pdf>