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## Reply on RC1

Guangxu Liu et al.

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Author comment on "Variations and risk of extreme precipitation events with sub-daily data: a case study in the Ganjiang river basin" by Guangxu Liu et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-412-AC2>, 2022

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## Responses to Reveiwer 1

### General comments:

This manuscript focused on analyzing variations and risk of extreme precipitation events in the Gangjing river basin. The authors used sub-daily records and investigated the changes and temporal scales of extreme precipitation with gamma parameters and M-K test. The research is suitable for Natural hazards and earth system.

The research got some interesting findings that the intensity and occasional of extreme precipitations will increase in spring and elevation is correlated with extreme precipitations in the plain areas and basin, which is very helpful for similar researchers and the local authorities.

The manuscript is written clearly. The methods are appropriate and scientific, and the results are clearly presented. From a general point of view I think the reported findings and methods are very interesting and providing a valuable contribution to the related research in the study area. So I suggested that this manuscript should be accepted after minor modifications.

Below are some additional comments which might be helpful in guiding a revision.

**Response:** Thank you for your kind help and encourage of our manuscript. The responses to your comments are listed below point by point.

### Details comments

- Line 12-13: "Extreme precipitations have the characteristics of occasional but sudden occurrence in summer and spring and the intensity and occasional probability will increase in spring in the future in Yifeng, Zhangshu and Ningdu." Too long, please rewrite this sentence.

**Response:** It was rewritten into 2 sentences "Extreme precipitations have the characteristics of occasional but sudden occurrence in summer and spring. The intensity and occasional probability will increase in spring in the future in Yifeng, Zhangshu and Ningdu"

- Line 26: " reached 180 People ", P should be lowercase.

**Response:** We correct it. Thank you.

- Line 43-44, "Cao and Lu find that the biggest increase of summer precipitation in China from 1961 to 2010 were found in the middle and lower reaches of the Yangtze River ". please rewrite this sentence

**Response:** We rewrote it: "Zeng and Lu find that summer precipitation in China from 1961 to 2010 experienced the biggest increase in the middle and lower reaches of the Yangtze River" can correct the author's name.

- Line81: "75.32%, and 75.74% respectively (Ren, Zhang et al. 2014)..", Delete the extra full point

**Response:** We correct it. Thank you.

- Line 91: "contribution to the rise of the frequency of extreme precipitation(Mukherjee et al., 2018)." Delete "of extreme precipitation".

**Response:** We did it. Thanks

- Line 92: "the spatial distribution of monthly and annual precipitation and 1-day extreme precipitation and their trends ", too many and, Rewrite the sentence.

**Response:** We rewrote it as: "Talchabhadel et al. analysed the spatial distribution of monthly and annual precipitation, 1-day extreme precipitation and their trends with the records from 291 stations across Nepal for the period of 1966–2015."

- Line 95: " many researchers" should be replaced by "previous studies" (for example).

**Response:** We changed 'many researchers' in Line 63 to 'previous studies' and 'Many researches' in Line 157 to 'previous studies'. We further corrected other unaccustomed use of 'many' in the manuscript. Thanks.

- Line 106: "but It may cause flash flood and even landslides and debris flows in mountain areas or arid area "I in "It" should be lowercase.

**Response:** We corrected it. Thank you.

- Line 159-160, "extreme events based on intensity such as yearly or seasonal maxima, CWD10, CWD20, R1 day (annual), R10 mm and 160 R20 mm indices from the Expert Team on Climate Change Detection Monitoring Indices (ETCCDMI) (Soro et al., 2016). The sentences is obscure and incomplete. Please rewrite it.

**Response:** We corrected it as "Extreme events are defined according to intensity such as yearly or seasonal maxima, CWD10, CWD20, R1 day (annual), R10 mm and R20 mm indices from the Expert Team on Climate Change Detection Monitoring Indices (ETCCDMI)". Thanks.

- Line 168-169: "The main impact of extreme precipitation on humans is to cause flood

disasters while flood disasters often occur several times in some years and are missing in other years.". Not clear, Please consider to rewrite it.

**Response:** We corrected it as "The impact of extreme precipitation on human beings is to cause flood disasters which often occur several times in some years and are missing in other years."

- Line 197: "The sample L-moments can be computed as the population L-moments of the sample Assume that the variable X follows a certain". There should be a full point after the sameple.

**Response:** We corrected it. Thanks.

- Line 17 3: "and southwest in summer (Yin, Kim et al. 2007).", References section did not list this cited paper.

**Response:** We corrected it and others below:

REN, G., LIU, Y., SUN, X., ZHANG, L., Yuyu, R., Ying, X., Hua, Z., Yunjian, Z., Tao, W., and Yanjun, G.: Spatial and temporal patterns of precipitation variability over mainland China: □ : causes for recent trends, *Advances in Water Science*, 27, 327-348, 2016.

Ren, Z., Zhang, M., Wang, S., Zhu, X., Dong, L., and Qiang, F.: Changes in precipitation extremes in South China during 1961-2011 (in Chinese), *Acta Geographica Sinica*, 69, 640-649, 2014.

Shan, J., Zhang, Y., and Zhang, Y.: Features analysis about weather system to five river basins of Jiangxi province and important precipitation procedure, *JIANGXI METEOROLOGICAL SCIENCE & TECHNOLOGY*, 14-18, 10.3969/j.issn.1007-9033.2001.01.003, 2001.

Yin, J., Kim, M., Feng, K., and Chen, J.: Comparative Analysis of Three Typhoons Hitting Jiangxi on Routes and Mechanisms of Heavy Rainfall, *METEOROLOGY AND DISASTER REDUCTION RESEARCH*, 30, 18-22, 10.3969/j.issn.1007-9033.2007.02.004, 2007.

YIN, Z. e., TIAN, P., and CHI, X.: Multi-scenario-based risk analysis of precipitation extremes in China during the past 60 years (1951-2011) (in Chinese), *Acta Geographica Sinica*, 73, 405r413, 2018.

- Line 321: "the recurrence period is" It should be 'return period'

**Response:** We corrected it. Thanks very much.

- Line 389: "(YIN, TIAN et al. 2018)". References section did not list this cited paper.

**Response:** We corrected it and added the lists.

- Line 398: "Precipitation events, especially high intensity precipitation events, are key to precipitation is highly variable in time. IncorrectedÆ Rewrite it.

**Response:** We corrected it "Precipitation events, especially high intensity precipitation events, are highly variable in time".

- Line 430-431: "Obviously it would be better to use sub-daily precipitation for extremely

events analysis to avoid underestimation potentially dramatic consequences they caused like flood risk.”, Rewrite the sentence.

**Response:** We rewrote it as “Obviously it would be better to use sub-daily precipitation in extreme precipitation studies, which could avoid underestimating potentially dramatic consequences such as floods.”

- Figure 2, “Frequency and contribution of runs of 12-H events.” The Image resolution is low and unclear.

**Response:** Thanks and we redrew the pictures in DPI 350 and change the one in the manuscript.