

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2  
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## **Comment on hess-2022-168**

Anonymous Referee #2

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Referee comment on "Monitoring the extreme flood events in the Yangtze River basin based on GRACE and GRACE-FO satellite data" by Jingkai Xie et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-168-RC2>, 2022

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### **Comments on Manuscript "Downscaling and monitoring the extreme flood events in the Yangtze River Basin based on GRACE/GRACE-FO satellites data", Xie et al.**

This study highlights use of GRACE satellite data on monitoring flood events over the Yangtze River Basin (YRB), which is affected mostly by the Asia monsoon and plagued by extreme floods. To overcome the coarse resolution of original GRACE satellites data, monthly TWSA estimates are temporally downscaled at finer temporal scales based on three learning-based models. Furthermore, a new index incorporating temporally downscaled TWSA estimates combined with daily average precipitation anomalies is proposed and then applied to monitor severe flood events at a daily time scale in the YRB basin. This work is valuable for facilitating the development of early warning systems for hydrologic extremes, having the potential of expanding applications of GRACE satellites to a wider range of hydrological monitoring and prediction.

I would recommend publication of this paper after the following minor issues are fully addressed.

General comments for the authors' reference:

(1) Line 32-34: "During the past decades, the increasingly intensified human activities and climate change have significantly changed the hydrological cycles in the YRB and thus accelerated the variation of flood characteristics in this region". This statement seems too general for readers. Please provide relevant citations to support this statement.

(2) Section 3.1: Please consider adding some additional sentences to describe the difference between these three GRACE solutions used in this study, which are applied to

characterize the variations of TWSA in the YRB and its individual basins during the study period.

(3) Line 390: When explaining the results shown in Figure 6(a), the authors simply attributed it to the relatively poor relationship between TWSA estimates and hydro-climatic factors for this region that is described in Fig. 5(a). This statement is not convincing enough. If possible, please consider to provide more details to explain the results shown in Figure 6(a)

(4) The section of Conclusion could have been improved by mentioning more informative results. For example, as stated in Section 5.5, the proposed NDFPI can reach the threshold values earlier than that of daily streamflow observations for the 90th, 95th and 99th percentile floods, which has not been mentioned in the section of Conclusion.

Minor comments:

(1) Line 29-30: There is no need for citing so many papers only to explain the topic of monitoring extreme flood events. Please keep the most relevant ones.

(2) Line 171-173: This sentence seems a bit confused. Please rewritten it to avoid ambiguity

(3) Line 312: Remove the word of "different" in this sentence.

(4) Line 347: Please replace the "shows" by "show".

(5) Line 408: This sentence is confused. Please clarify.

(6) Line 510: This sentence can be removed since it repeats information from the section of Method.

(7) Figure 9 and Figure 10: Please add the meaning of acronyms, such as NDFPI in the

captions of these figures.

(8) Table 2: Please carefully check the abbreviations of all items shown in this table.