

# Downscaling and monitoring the extreme flood events in the Yangtze River Basin based on GRACE/GRACE-FO satellites data

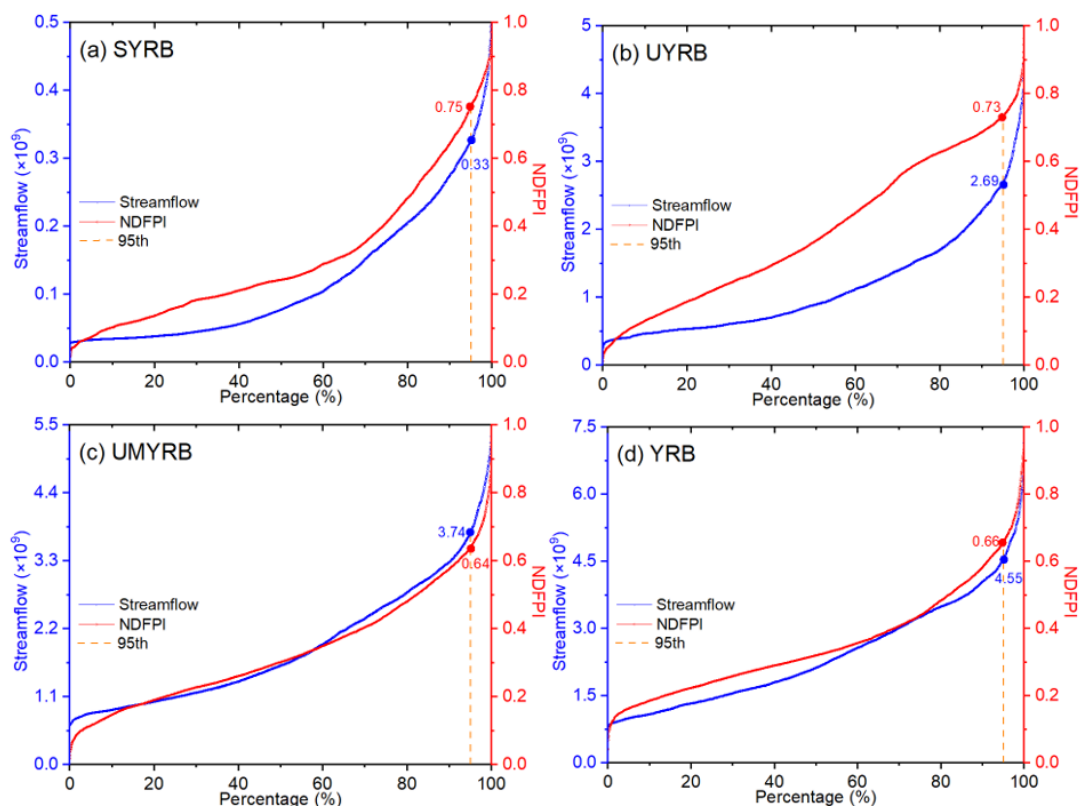
Jingkai Xie<sup>1</sup>, Yue-Ping Xu<sup>1</sup>, Hongjie Yu<sup>1</sup>, Yan Huang<sup>2</sup>, Yuxue Guo<sup>1</sup>

<sup>1</sup>Institute of Hydrology and Water Resources, Zhejiang University, Hangzhou, 310058, China

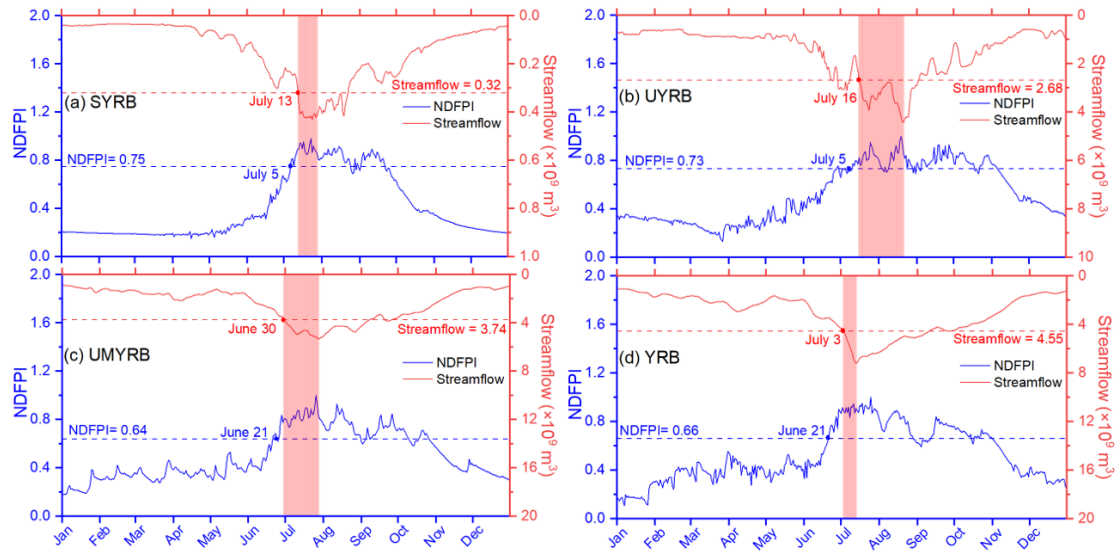
5 <sup>2</sup>Changjiang Water Resources Commission of the Ministry of Water Resources, Wuhan, 43000, China

Correspondence to: Yue-Ping Xu ([yuepingxu@zju.edu.cn](mailto:yuepingxu@zju.edu.cn))

## Supplementary Information

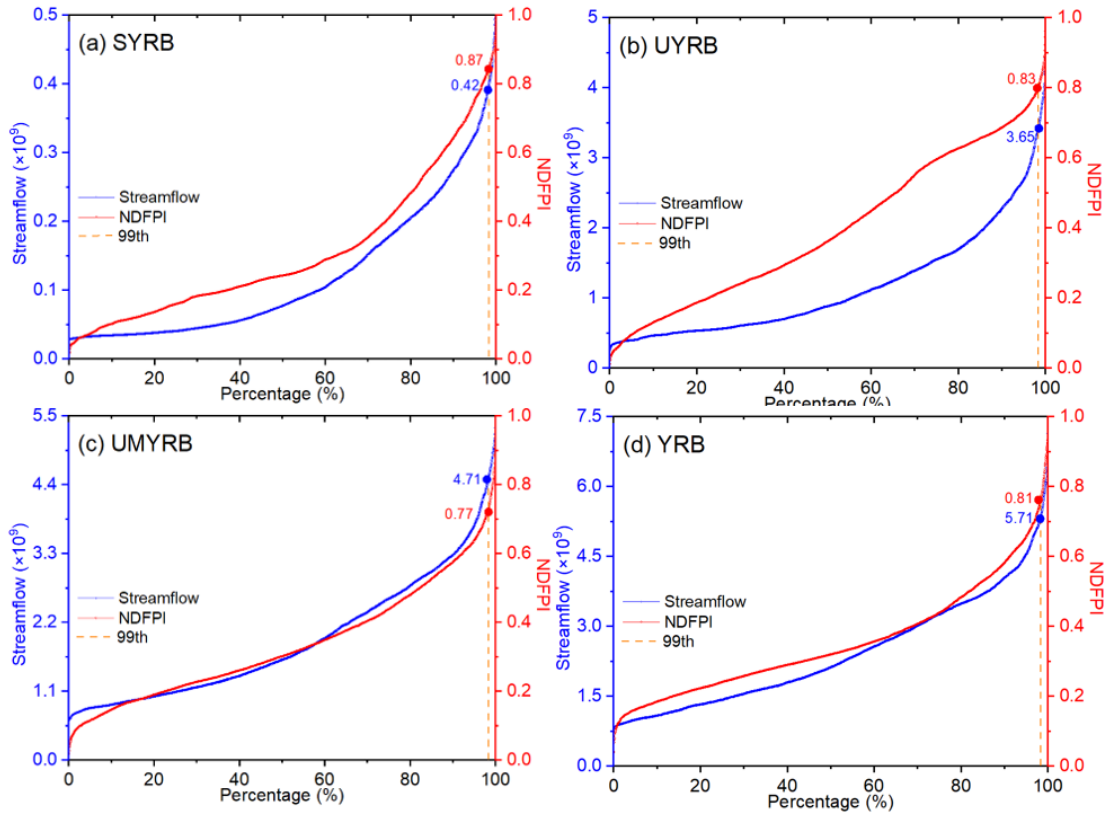


**Figure S1.** Percentile duration curves of daily streamflow observations and NDFPI for the 95th percentile floods across (a) the SYRB, (b) the UYRB, (c) the UMYRB and (d) the YRB respectively during 2003-2020. The red dots and blue dots represent threshold values of daily streamflow and NDFPI for the 95th percentile flood across different regions. SYRB = Source regions of Yangtze River Basin; UYRB = Upper regions of Yangtze River Basin; UMYRB = Upper and middle regions of Yangtze River Basin; YRB = Yangtze River Basin.

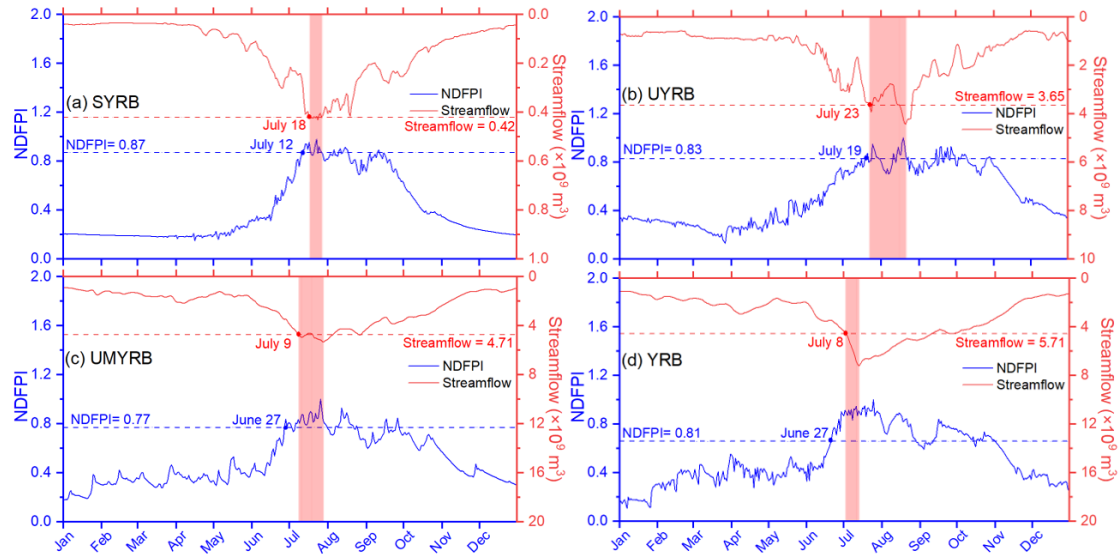


15 **Figure S2.** Comparison between basin averaged NDFPI and daily streamflow observations for the 95th percentile floods in summer 2020 across (a) the SYRM (observed at Shigu station), (b) the UYRB (observed at Yichang station), (c) the UMYRB (observed at Hankou station) and (d) the YRB (observed at Datong station). Pink rectangles denote the duration period between the thresholds of daily streamflow and NDFPI for the 95th percentile floods and peak streamflow observed at the controlling hydrological stations over different regions. The thresholds of daily streamflow and NDFPI for the 95th percentile floods are represented by the red dash lines and blue dash lines respectively. Note that the scales of streamflow shown in each figure are not always same. SYRB = Source regions of Yangtze River Basin; UYRB = Upper regions of Yangtze River Basin; UMYRB = Upper and middle regions of Yangtze River Basin; YRB = Yangtze River Basin.

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25 **Figure S3.** Percentile duration curves of daily streamflow observations and NDFPI for the 99th percentile floods across (a) the SYRB, (b) the UYRB, (c) the UMYRB and (d) the YRB respectively during 2003-2020. The red dots and blue dots represent threshold values of daily streamflow and NDFPI for the 99th percentile flood across different regions. SYRB = Source regions of Yangtze River Basin; UYRB = Upper regions of Yangtze River Basin; UMYRB = Upper and middle regions of Yangtze River Basin; YRB = Yangtze River Basin.



30 **Figure S4.** Comparison between basin averaged NDFPI and daily streamflow observations for the 99th percentile floods in summer 2020 across (a) the SYRM (observed at Shigu station), (b) the UYRB (observed at Yichang station), (c) the UMYRB (observed at Hankou station) and (d) the YRB (observed at Datong station). Pink rectangles denote the duration period between the thresholds of daily streamflow and NDFPI for the 99th percentile floods and peak streamflow observed at the controlling hydrological stations over different regions. The thresholds of daily streamflow and NDFPI for the 99th percentile floods are represented by the red dash lines and blue dash lines respectively. Note that the scales of streamflow shown in each figure are not always same. SYRB = Source regions of Yangtze River Basin; UYRB = Upper regions of Yangtze River Basin; UMYRB = Upper and middle regions of Yangtze River Basin; YRB = Yangtze River Basin.

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