

# A Study on Sensitivities of Tropical Forest GPP Responding to the Characteristics of Drought—A Case Study in Xishuangbanna, China

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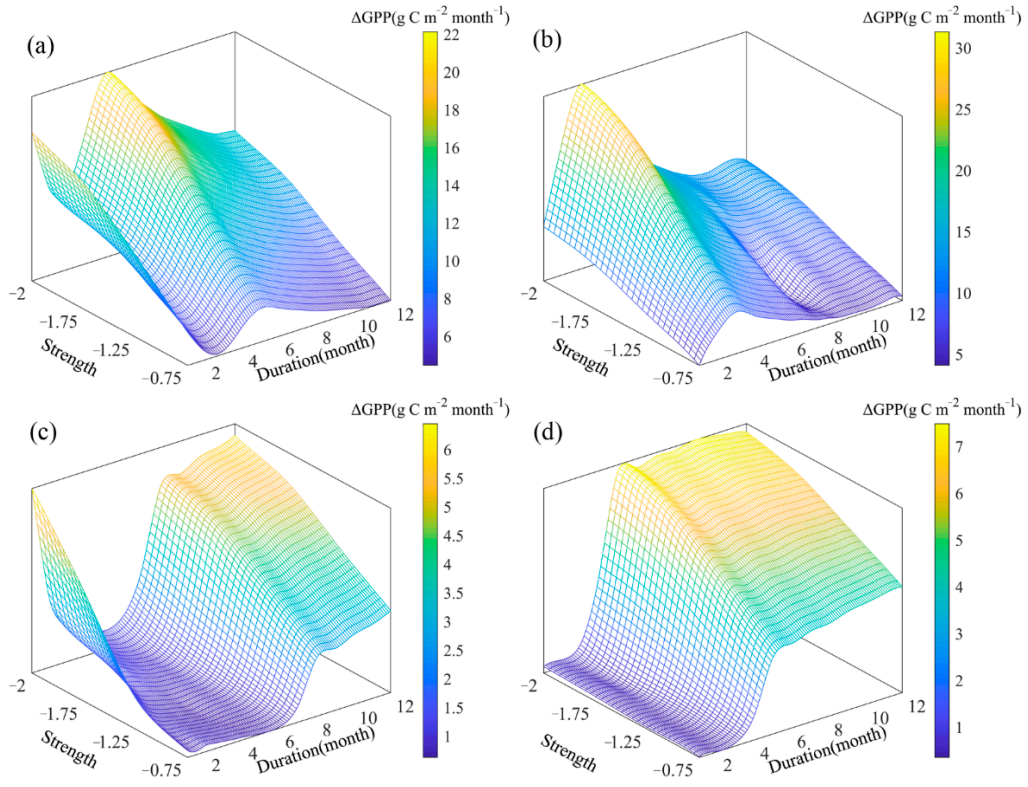
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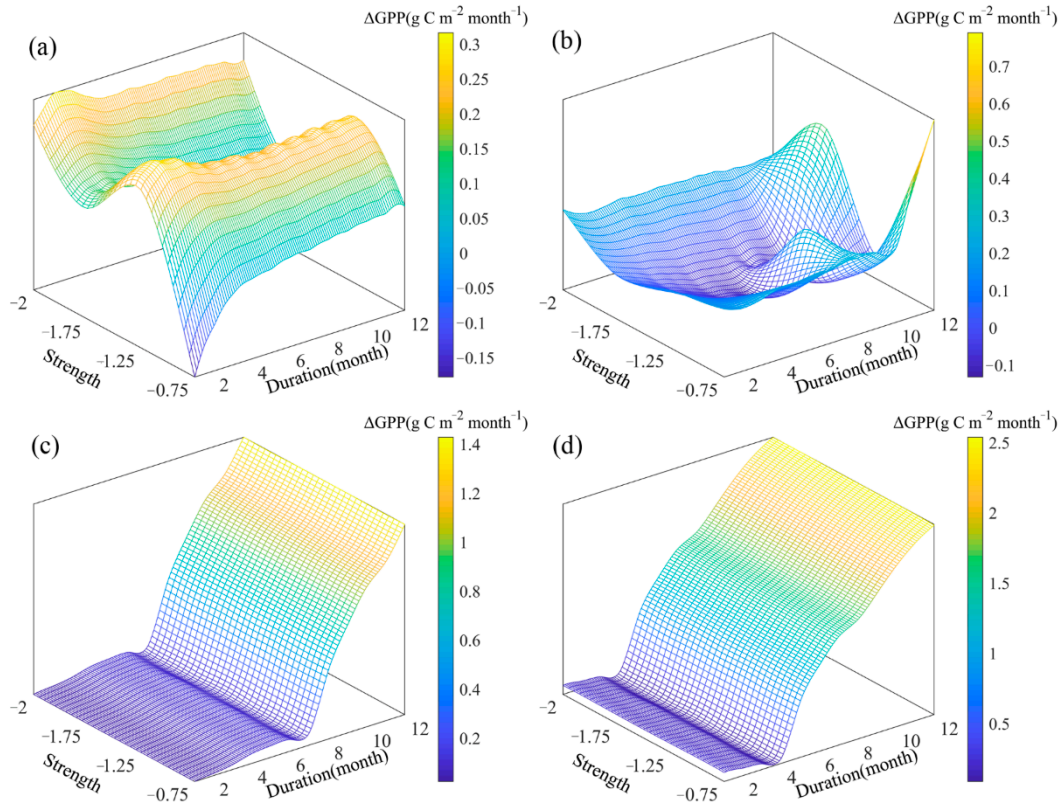
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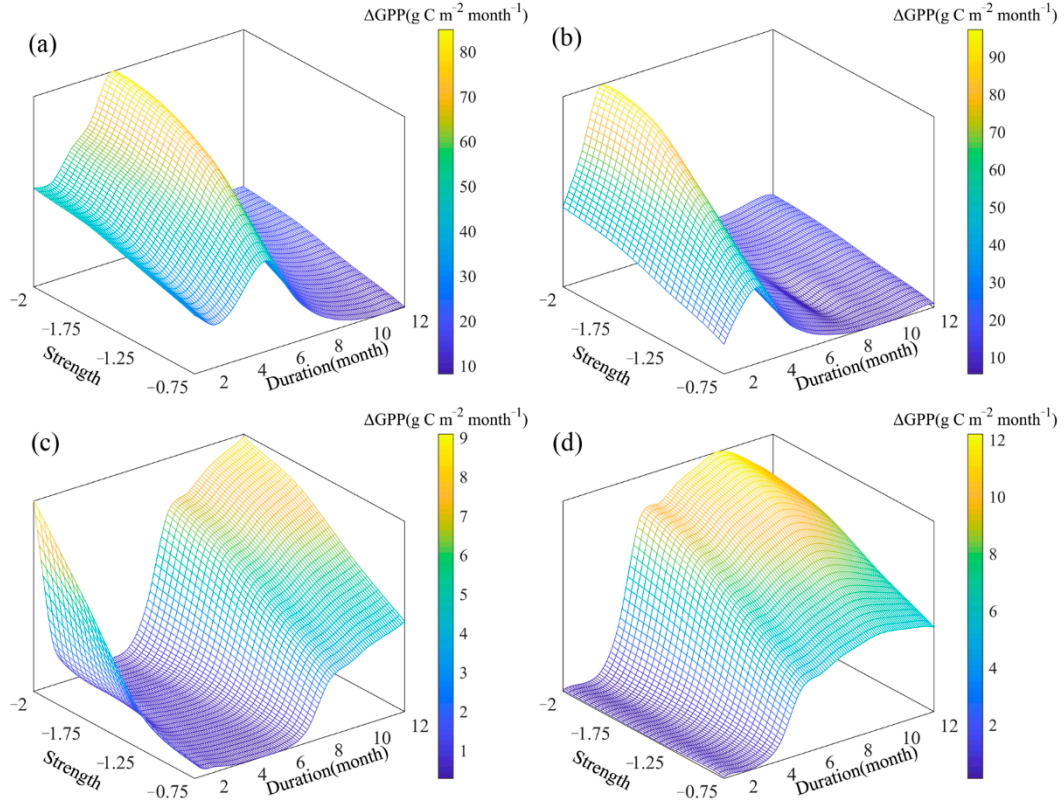
Except for SPI\_1, the tropical rainforest in Xishuangbanna under other time scales is affected by different drought characteristics, and the trend of GPP is roughly the same. Among them, the GPP loss under SPI\_3 is the most serious (Figure S2, Figure S7 and Figure S11), up to  $96.81 \text{ g C m}^{-2} \text{ month}^{-1}$ , and the fluctuation of GPP under SPI\_12 is the smallest (Figure S5, Figure S9 and Figure S13), and its maximum value is  $22.35 \text{ g C m}^{-2} \text{ month}^{-1}$ . SPI\_12 considers 12-month precipitation changes, can capture longer dry and rainy seasons, and determine the impact of long-term drought on the hydrology and water resources of a certain area, which often shows the persistence of drought; a shorter time scale (less than 6 months) is more suitable for monitoring the sensitivity of ecosystems to changes in drought duration and intensity.



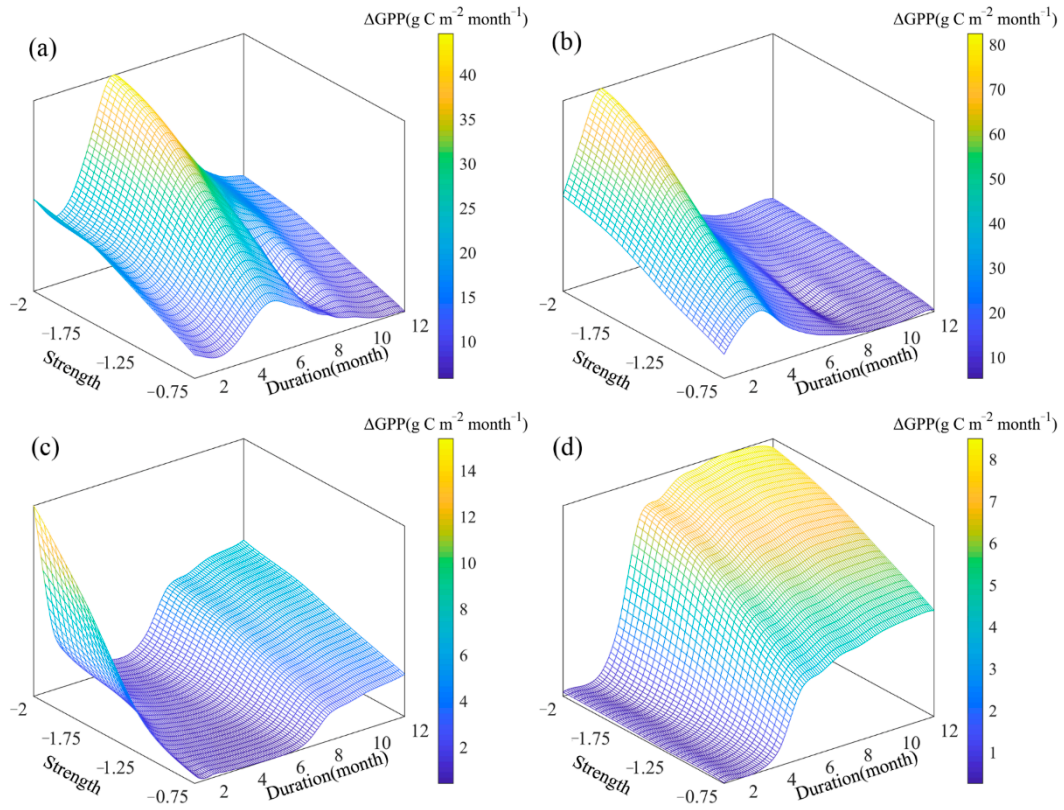
**Figure S1.** Under SPI\_9 (a) CD; (b) HD; (c) ER and (d) MLR initiate drought, the difference between the average monthly GPP in standard climate and the average GPP in arid climate month ( $\Delta GPP = GPP_{Sta} - GPP_{Mod}$ ) varies with the duration and strengths of the drought.



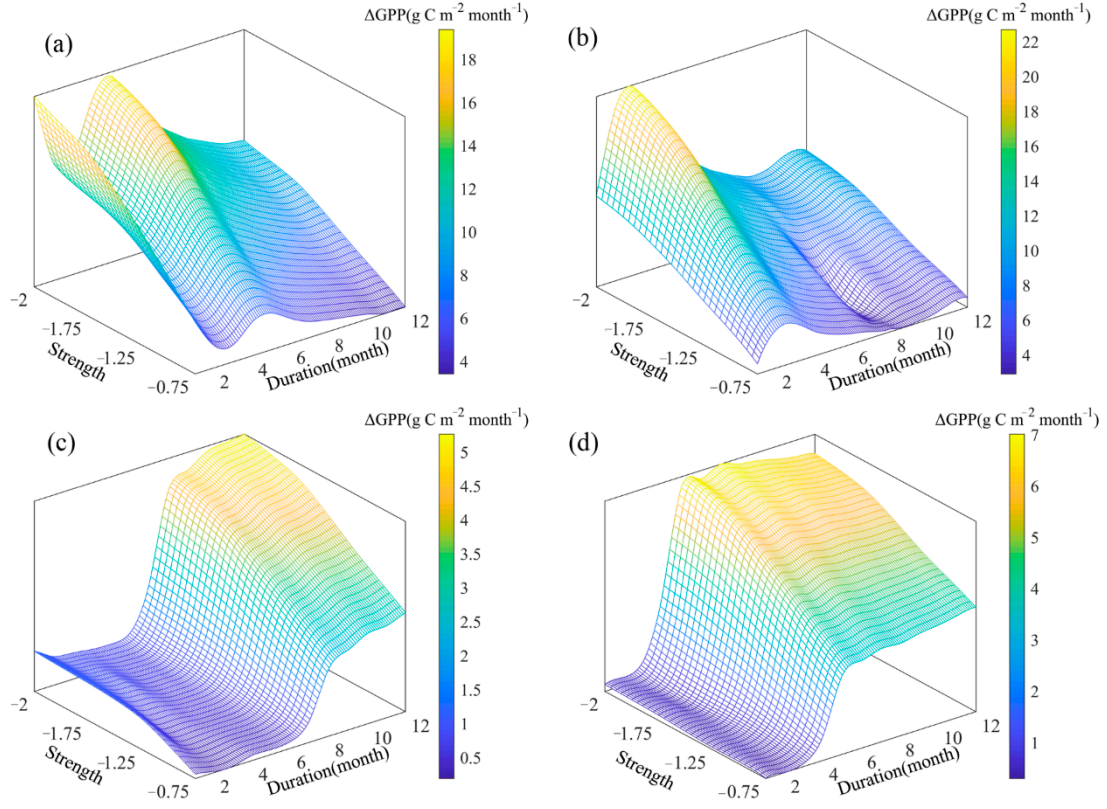
**Figure S2.** Under SPI\_1 (a) CD; (b) HD; (c) ER and (d) MLR initiate drought, the  $\Delta GPP$  varies with the duration and strengths of the drought.



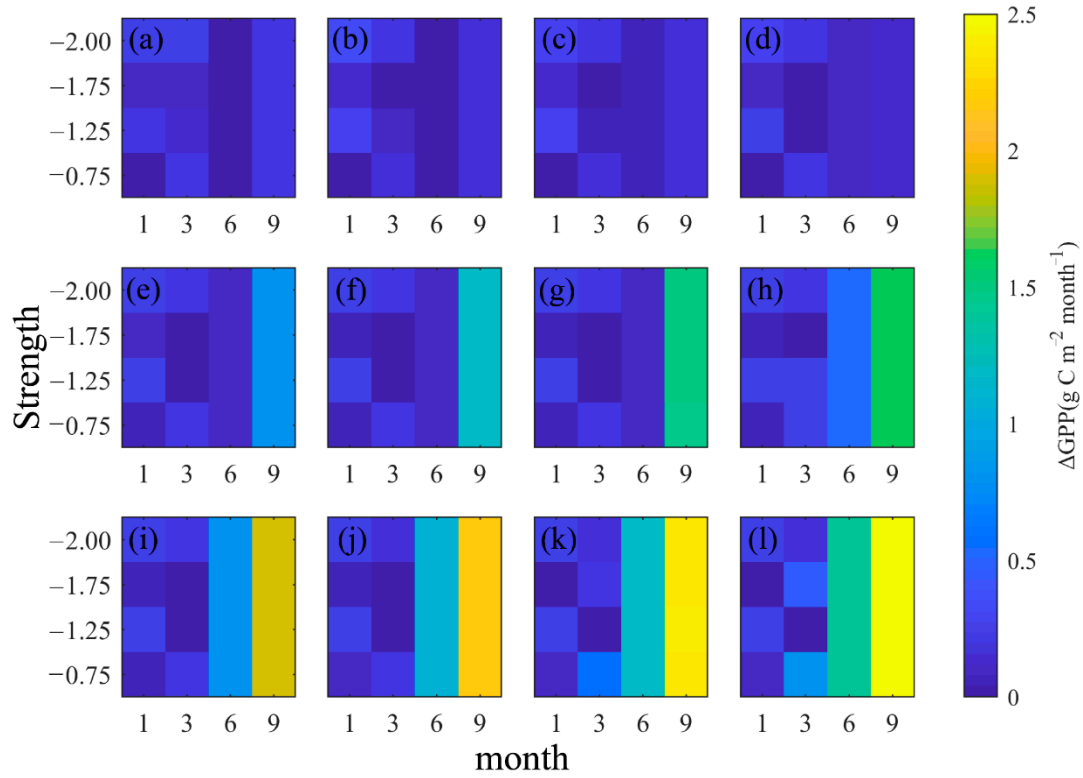
**Figure S3.** Under SPI\_3 (a) CD; (b) HD; (c) ER and (d) MLR initiate drought, the  $\Delta GPP$  varies with the duration and strengths of the drought.



**Figure S4.** Under SPI\_6 (a) CD; (b) HD; (c) ER and (d) MLR initiate drought, the  $\Delta GPP$  varies with the duration and strengths of the drought.

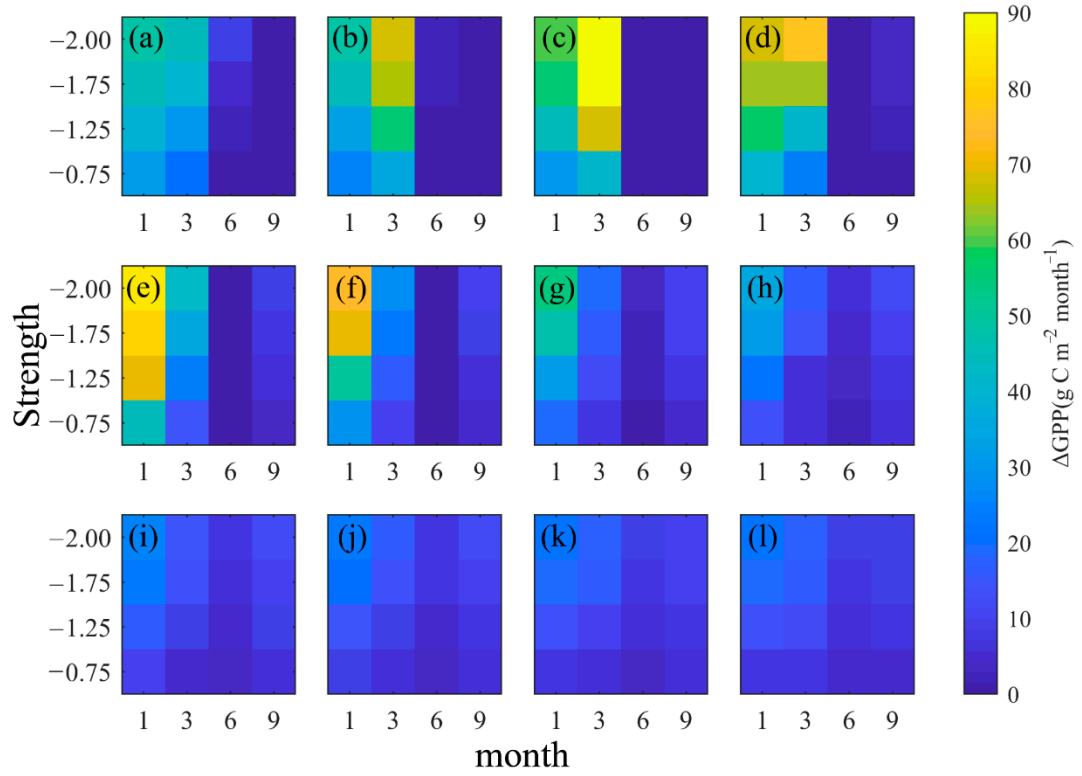


**Figure S5.** Under SPI<sub>12</sub> (a) CD; (b) HD; (c) ER and (d) MLR initiate drought, the  $\Delta\text{GPP}$  varies with the duration and strengths of the drought.

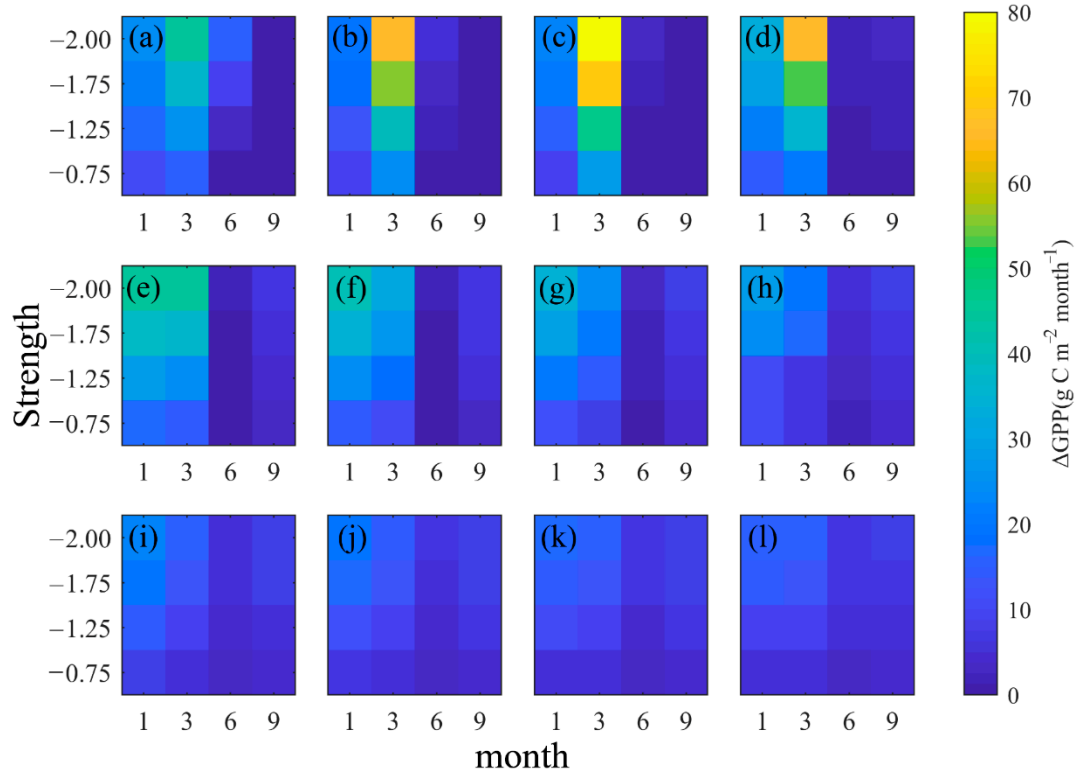


**Figure S6.** Drought duration under SPI<sub>1</sub> (a) 1 month; (b) 2 months; (c) 3 months; (d) 4 months; (e) 5 months; (f) 6 months; (g) 7 months; (h) 8 months; (i) 9 months; (j) 10 months; (k) 11 months and (l) 12 months,  $\Delta\text{GPP}$  varies with drought intensity and initial drought seasonal changes.

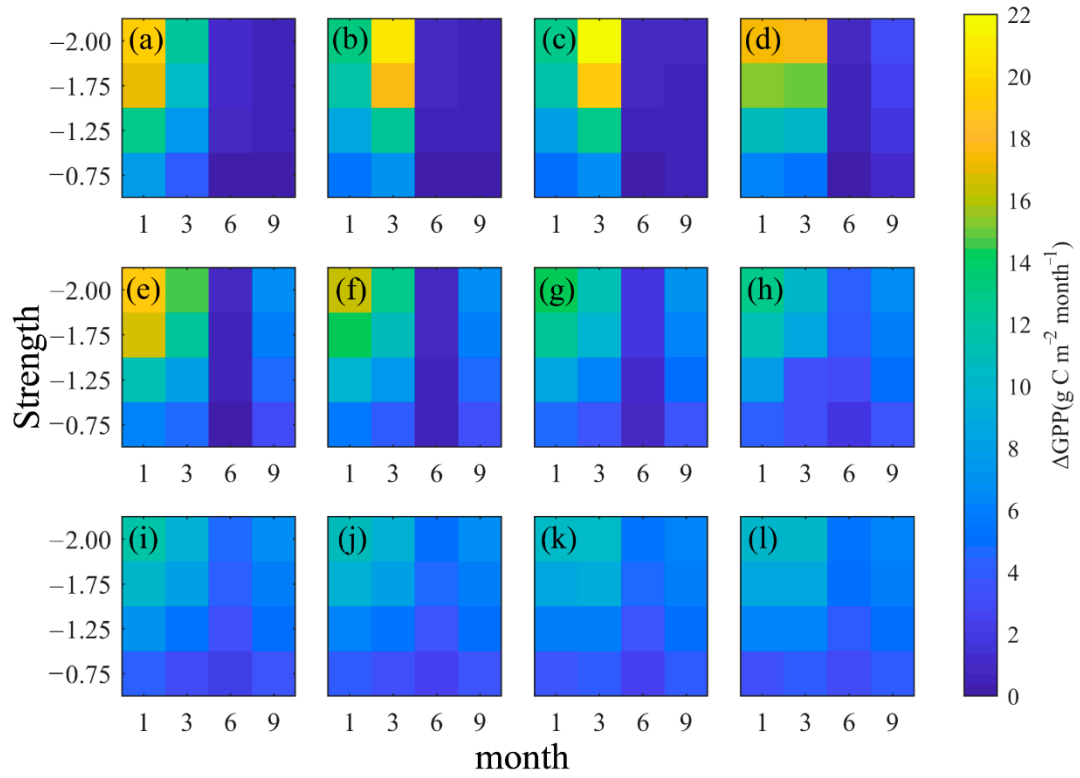




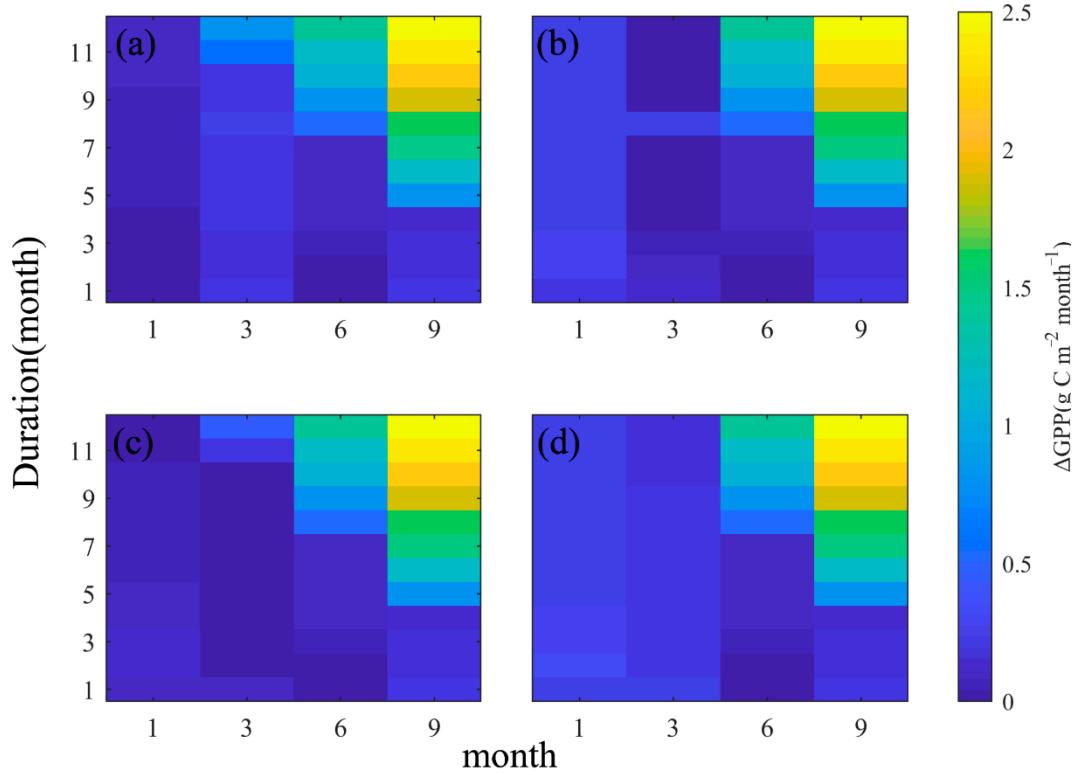
**Figure S7.** Drought duration under SPI\_3 (a) 1 month; (b) 2 months; (c) 3 months; (d) 4 months; (e) 5 months; (f) 6 months; (g) 7 months; (h) 8 months; (i) 9 months; (j) 10 months; (k) 11 months and (l) 12 months,  $\Delta GPP$  varies with drought intensity and initial drought seasonal changes.



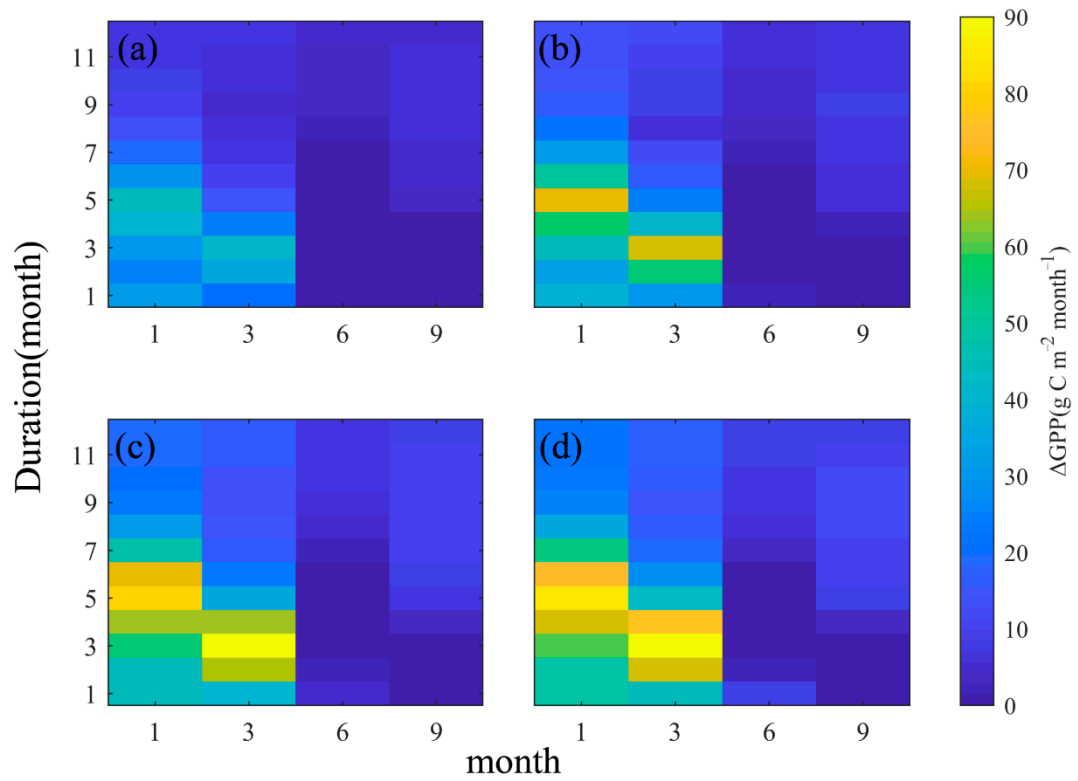
**Figure S8.** Drought duration under SPI\_6 (a) 1 month; (b) 2 months; (c) 3 months; (d) 4 months; (e) 5 months; (f) 6 months; (g) 7 months; (h) 8 months; (i) 9 months; (j) 10 months; (k) 11 months and (l) 12 months,  $\Delta GPP$  varies with drought intensity and initial drought seasonal changes.



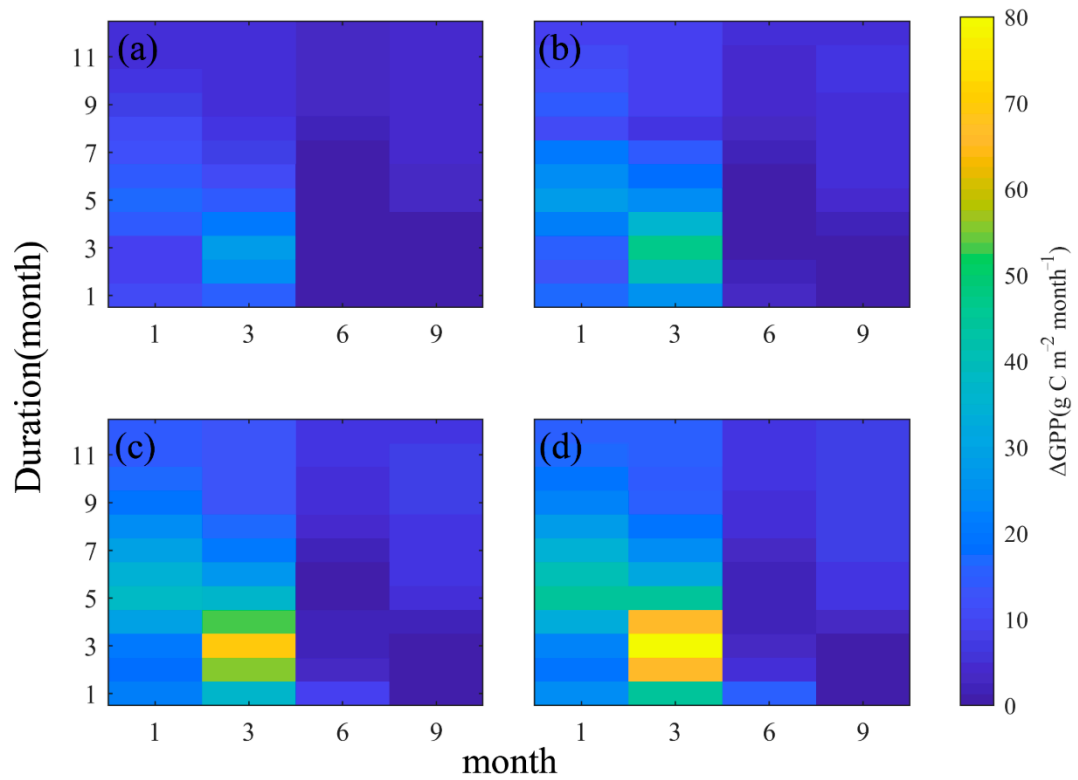
**Figure S9.** Drought duration under SPI<sub>12</sub> (a) 1 month; (b) 2 months; (c) 3 months; (d) 4 months; (e) 5 months; (f) 6 months; (g) 7 months; (h) 8 months; (i) 9 months; (j) 10 months; (k) 11 months and (l) 12 months,  $\Delta GPP$  varies with drought intensity and initial drought seasonal changes.



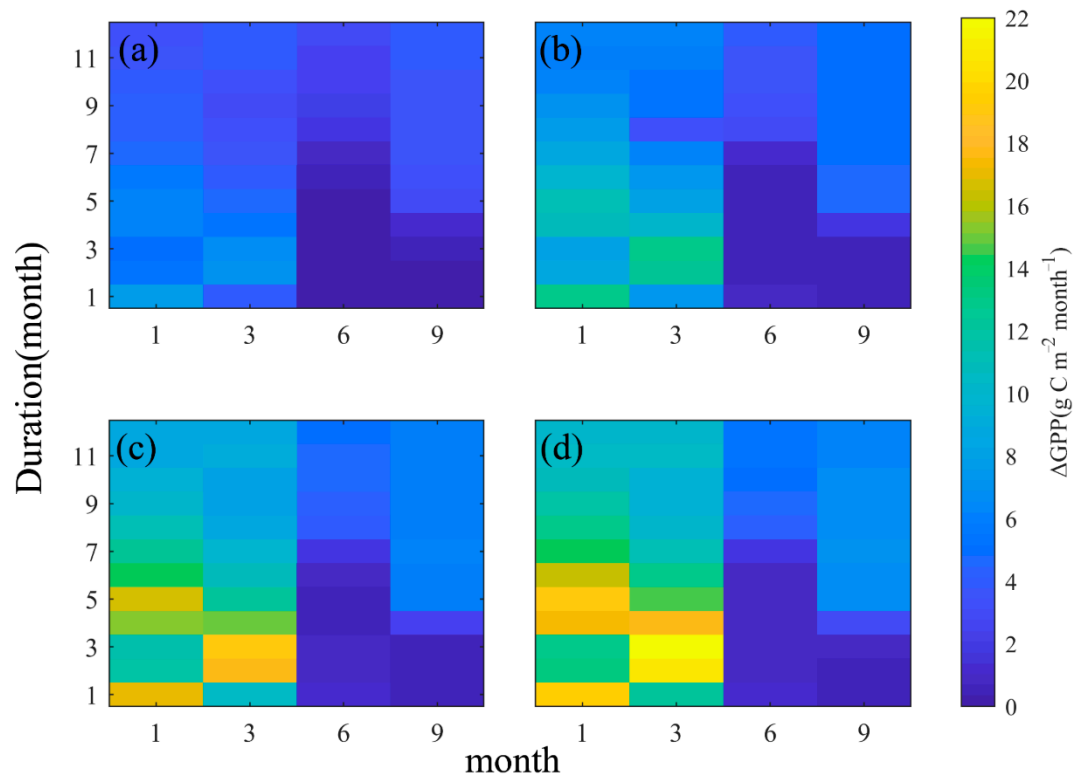
**Figure S10.** The drought intensity under SPI<sub>1</sub> is (a) light drought; (b) moderate drought; (c) severe drought and (d) extreme drought,  $\Delta GPP$  varies with the duration of the drought and the initial drought season.



**Figure S11.** The drought intensity under SPI\_3 is (a) light drought; (b) moderate drought; (c) severe drought and (d) extreme drought,  $\Delta GPP$  varies with the duration of the drought and the initial drought season.



**Figure S12.** The drought intensity under SPI\_6 is (a) light drought; (b) moderate drought; (c) severe drought and (d) extreme drought,  $\Delta GPP$  varies with the duration of the drought and the initial drought season.



**Figure S13.** The drought intensity under SPI\_12 is (a) light drought; (b) moderate drought; (c) severe drought and (d) extreme drought,  $\Delta GPP$  varies with the duration of the drought and the initial drought season.