Point-to-point responses to comments

RC1:

Dear authors,

I am impressed by the wealth of data that the authors present in this study. An important issue to be considered in this investigation is the conducting of field research, which is not at all easy. The authors present the hydrological behavior and ion concentration in three forests and discuss the variability of this dynamics over 22 years.

Re: Dear referee,

Thank you very much, we are deeply appreciating your recognition of our study work. The constructive comments and suggestions absolutely can improve our manuscript. We carefully considered the comments and made corresponding revisions. Followings are point-to-point responses to your comments. We hope our revision can meet your expectation.

1. My remarks are more related to stemflow. I would like the authors to include basic information on DBH, Ht, and canopy area of the monitored trees. I also suggest including how trunk flow was measured.

Re: The information on DBH, etc. of 8 monitored tree species has been added in Table S2.

Measurement of stemflow: **The ratio of volume (mL) to canopy area (cm^2) is the stemflow (mm).**

Table S2 Growth indicators of 8 monitored tree species in the forests

Forest type	No.		DBH	Height	Crown area
Broadleaf forest	SF1	*Acmena acuminatissima* (Blume) Merr. et Perry	23.6 ± 5.3	12.1 ± 2.1	18.1 ± 8.3
	SF2	*Cryptocarya chinensis* (Hance) Hemsl.	28.8 ± 2.2	16.5 ± 1.4	28.5 ± 5.1
	SF3	*Gironniera subaequalis* Planch.	23.8 ± 0.5	13.8 ± 0.7	26.3 ± 1.9
	SF4	*Schima superba* Gardn. et Champ.	30.6 ± 1.7	20.4 ± 0.5	21.9 ± 2.9
Mixed broadleaf-pine forest	SF5	*Castanea henryi* (Skam) Rehd. et Wils.	24.9 ± 3.2	12.2 ± 1.5	34.9 ± 1.0
	SF6	*Schima superba* Gardn. et Champ.	21.6 ± 1.2	13.2 ± 0.8	18.1 ± 2.2
	SF7	*Pinus massoniana* Lamb.	35.7 ± 1.5	15.2 ± 0.8	27.5 ± 7.4
Pine forest	SF8	*Pinus massoniana* Lamb.	34.9 ± 1.2	10.2 ± 2.6	27.1 ± 7.2

DBH: diameter at breast height. 3 replications of each tree species, Mean ± SD

2. Did the authors believe that climate change might have caused any alterations in the data over time? Considering the ongoing global climate changes, it is conceivable that the authors may find it pertinent to include a statement regarding the potential influence of such environmental shifts on the observed data trends.

Re: Thank you for mentioning the topic of climate change and rainfall redistribution patterns, which prompts us to think and discuss it deeply. Currently, trends on the impact of climate change (global warming) on rainfall redistribution patterns are not well reported. We all know that throughfall and stemflow are part of rainfall and are an important player in the water cycle process. Based on the linkage of the water cycle to precipitation and temperature, we hypothesize that frequency of extreme events (heavy rainfall, droughts) and reduced biodiversity may affect rainfall redistribution and solute transport within forests, which in turn may affect the water cycle and biogeochemical cycles.

In this study, the 2008 rainfall data can be used as an example under extreme event. In 2008, extreme weather events occurred in China. In South China (subtropical region), freezing events of rain and snow occurred in the dry/winter season. In the wet/summer season, continuous heavy rain and typhoon events occurred, and the rainfall was larger than other years, with the annual rainfall of 2361.1 mm (22-year average annual rainfall of 1848.6 mm) (Fig. 1). At the same time, a total of 26 throughfall events were collected in 2008. According to the M-K test, the throughfall and stemflow trend of different forests presented different degree of disturbance under the background of mutation of open rainfall. In this process, the driving effect of forest structure and rainfall on throughfall and stemflow mutation is synchronous. Under the limited amount of data of extreme events, our study provides such hypothesis. More data and modeling are needed to support the relevant study about effect of climate change on rainfall redistribution in the future.

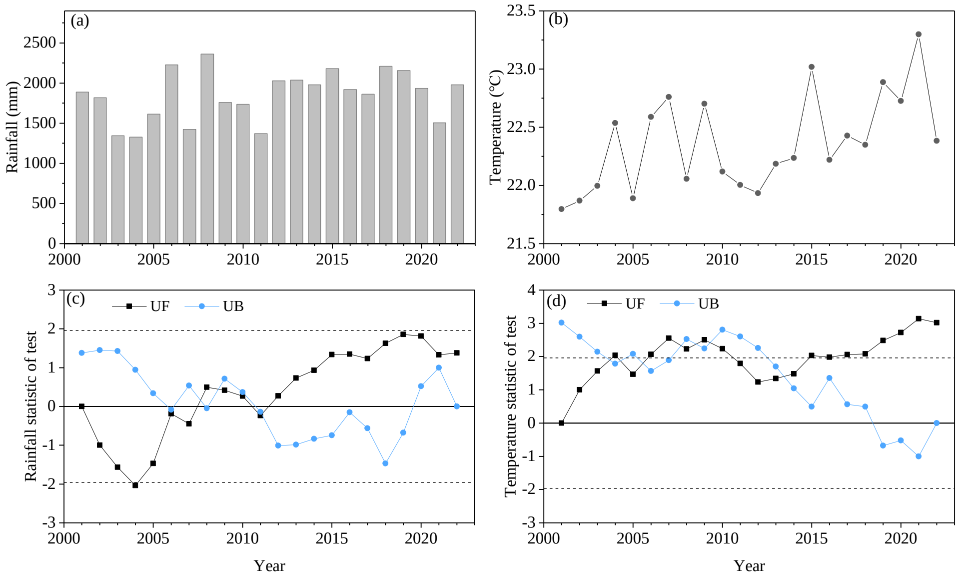

Fig. 1 (a) and (b) annual rainfall and temperature of 2001-2022, respectively, (c) and (d) rainfall and temperature statistic of Mann-Kendall test, respectively. UF (Unadjusted Forward) > 0 indicate a continuous increasing trend ($P < 0.05$). The intersection points of UF and UB (Unadjusted Backward) is the mutation time point. Within the confidence interval [-1.96, 1.96], the variable presents a significantly mutation growth state ($P < 0.05$).

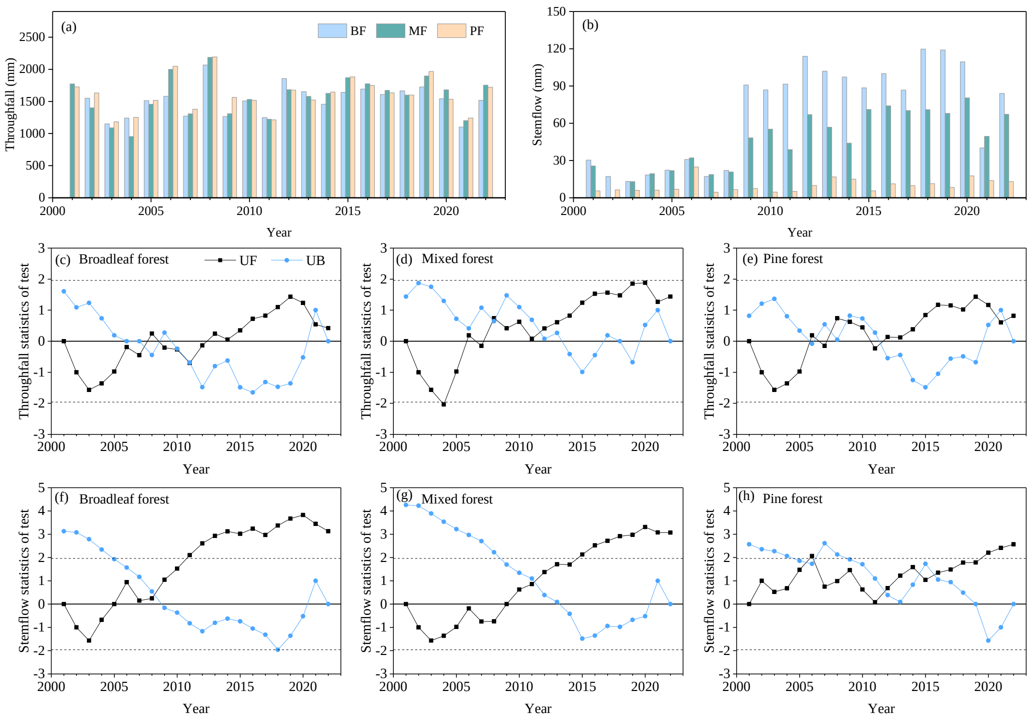

Fig. 2 (a) and (b) Annual throughfall and stemflow in the broadleaf forest (BF), mixed pine and broadleaf forest (MF) and pine forest (PF) from 2001–2022, respectively, (c) ~ (h) rainfall and stemflow statistic of Mann-Kendall test, respectively. UF (Unadjusted Forward) > 0 indicate a continuous increasing trend ($P < 0.05$). The intersection points of UF and UB (Unadjusted

Backward) is the mutation time point. Within the confidence interval [-1.96, 1.96], the variable presents a significantly mutation growth state at this time point ($P < 0.05$).

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