
Supplementary Information

Vegetation Dynamics and Its Response to Extreme Climate on the Inner Mongolian Plateau during 1982–2020

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Table S1. Definitions of extreme climate indices

Category	ID	Name	Definition	Unit
Extreme temperature				
Intensity indices	TNn	Min Tmin	Monthly minimum value of daily minimum temperature	°C
	TXn	Min Tmax	Monthly maximum value of daily minimum temperature	°C
	TNx	Max Tmin	Monthly maximum value of daily minimum temperature	°C
	TXx	Max Tmax	Monthly maximum value of daily maximum temperature	°C
Frequency indices	Tx90p	Warm days	Count of days where TX>90 th percentile	days
	Tn90p	Warm nights	Count of days where TN>90 th percentile	days
	Tx10p	Cold days	Count of days where TX<10 th percentile	days
	Tn10p	Cold nights	Count of days where TN<10 th percentile	days
Duration indices	GSL	Growing season length	Annual number of days between the first occurrence of 6 consecutive days with Tmean >5 °C and first occurrence of consecutive 6 days with Tmean <5 °C	days

Extreme precipitation				
Intensity indices	Rx1day	Maximum one-day precipitation	Maximum precipitation amount in one-day period	mm
			Maximum total precipitation amount in consecutive five- day	
	Rx5day	Maximum five-day precipitation	period	mm
Frequency indices	R10	Number of heavy precipitation days	Annual count of days when precipitation ≥ 10 mm	d
		Number of very heavy precipitation		
	R20	days	Annual count of days when precipitation ≥ 20 mm	d
			Maximum number of consecutive days with precipitation < 1	
Duration indices	CDD	Consecutive dry days	mm	d
	CWD	Consecutive wet days	Maximum number of consecutive days with precipitation ≥ 1 mm	d

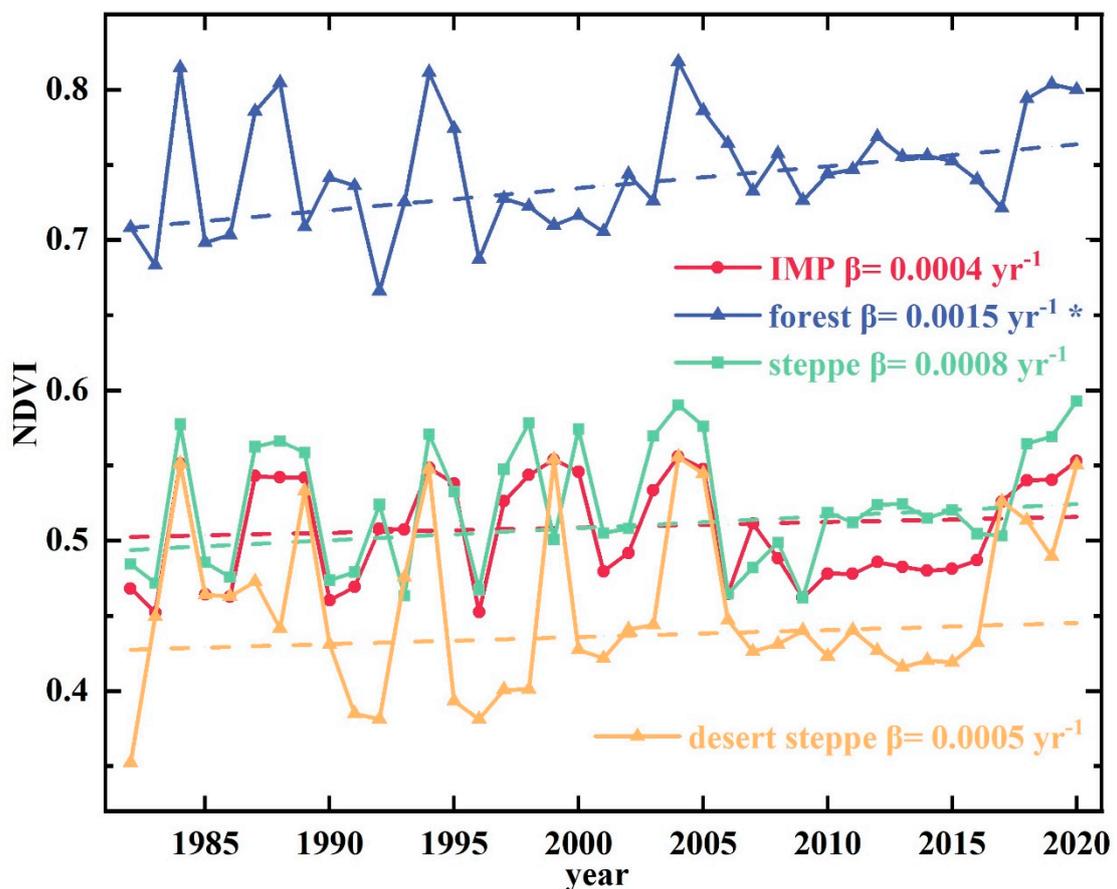


Figure S1. Changes in annual NDVI in the IMP during 1982–2020. Notes: “*” indicates statistical significance at the 95% confidence level.

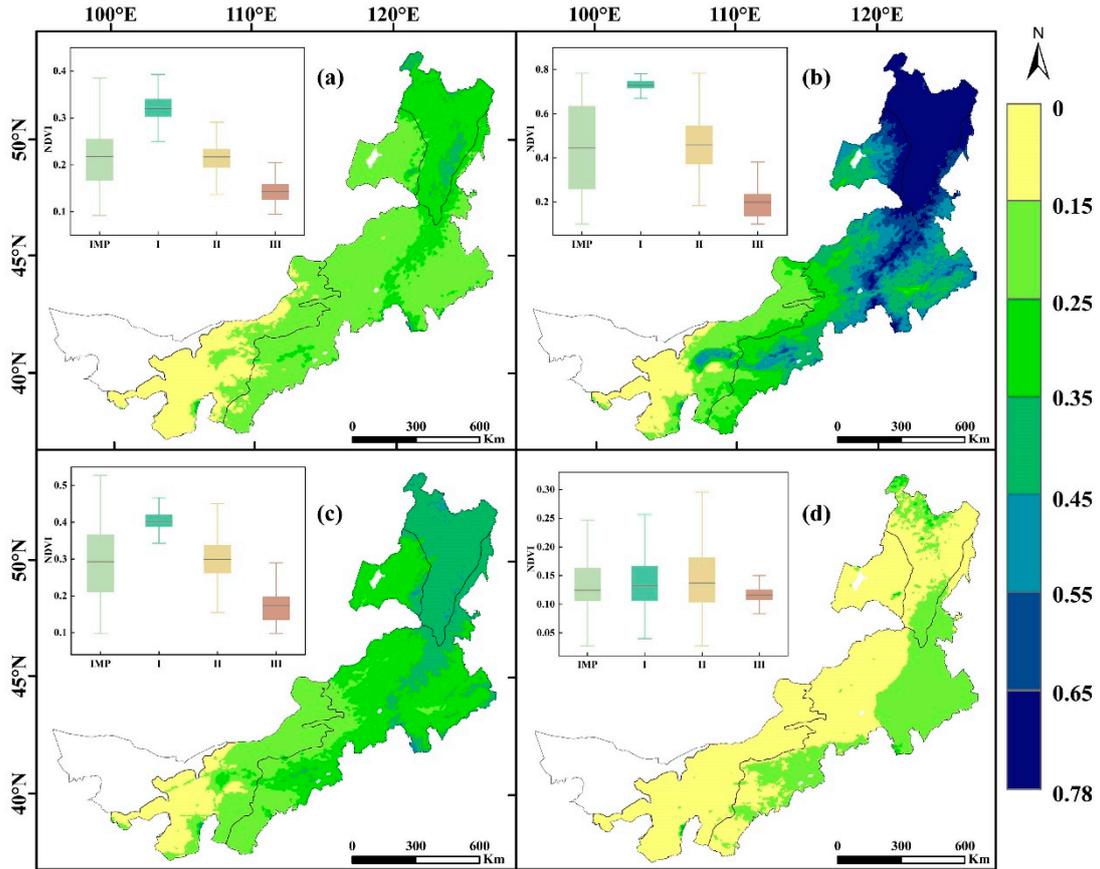


Figure S2. Spatial distribution of the seasonal Normalized Difference Vegetation Index (NDVI) on the Inner Mongolian Plateau (IMP) during 1982-2020 (a: spring; b: summer; c: autumn; d: winter). Notes: I, II and III represent forest, steppe and desert steppe, respectively. The gray line within the boxes shows the mean value of NDVI.

Table S2. Trend rates (unit:yr⁻¹) of extreme climate indices in each ecological zone.

	forest	steppe	desert steppe
TNn	0.008	-0.009	-0.024
TXn	0.023	-0.017	-0.046
TNx	0.051*	0.048*	0.054*
TXx	0.083*	0.058*	0.040*
Tx90p	0.177*	0.188*	0.270*
Tn90p	0.185*	0.227*	0.302*
Tx10p	-0.115*	-0.105*	-0.098*
Tn10p	-0.078	-0.118*	-0.127*
GSL	0.409*	0.343*	0.528*
Rx1day	0.046	-0.005	0.07
Rx5day	0.012	-0.132	0.112
R10	0.008	-0.007	0.029
R20	0	-0.006	0.008
CDD	-0.023	-0.321	-0.177

CWD

-0.013

-0.011**

-0.002

Notes: "**" indicates the significance at 95% confidence level.

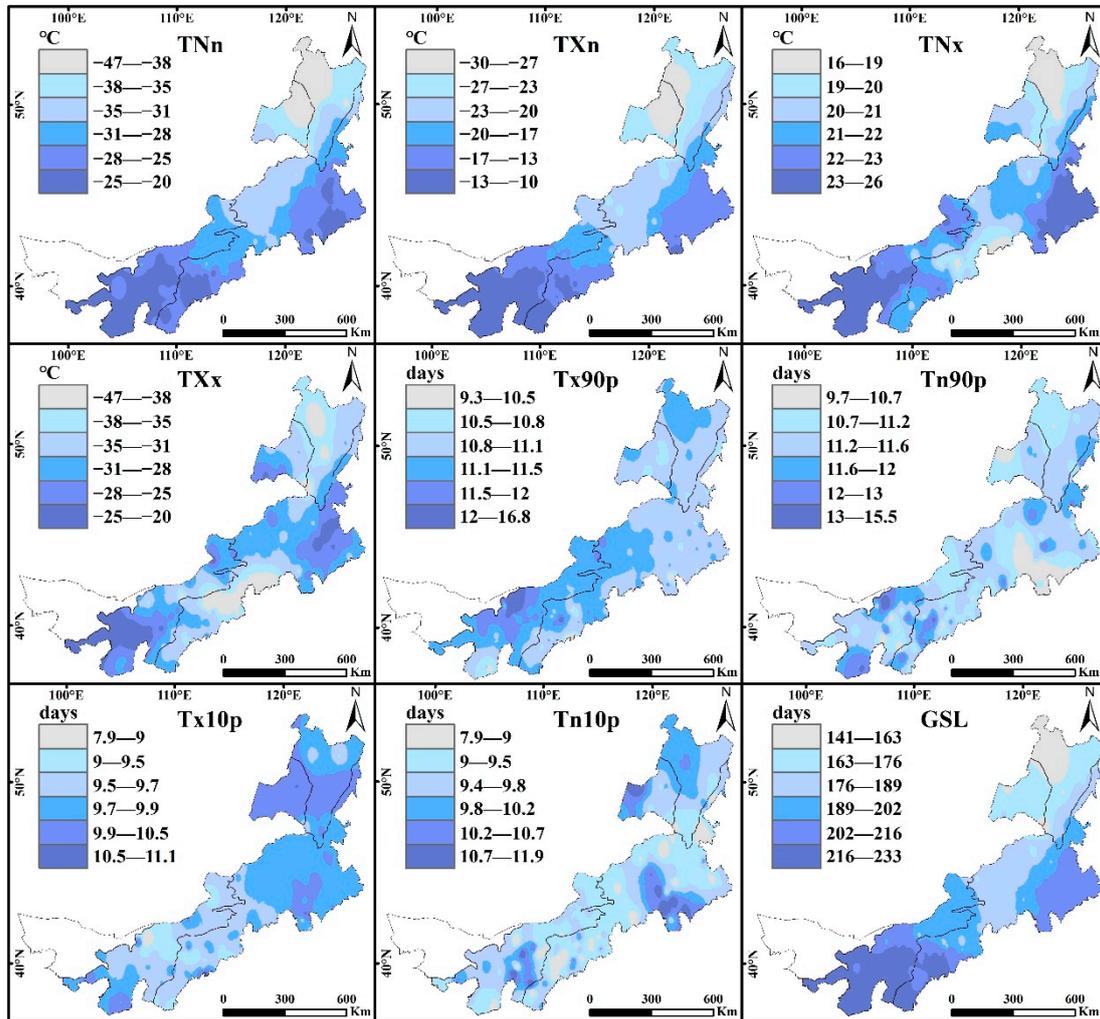


Figure S3. Spatial distribution of extreme temperature indices on the Inner Mongolian Plateau (IMP) during 1982-2020.

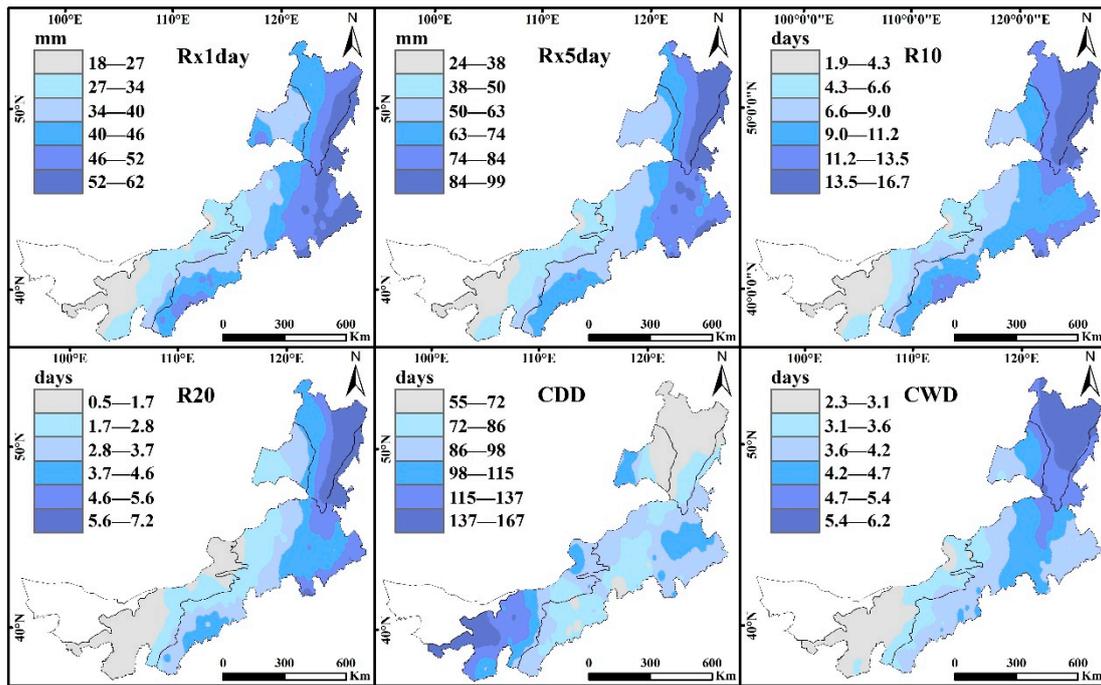


Figure S4. Spatial distribution of extreme precipitation indices on the Inner Mongolian Plateau (IMP) during 1982-2020.

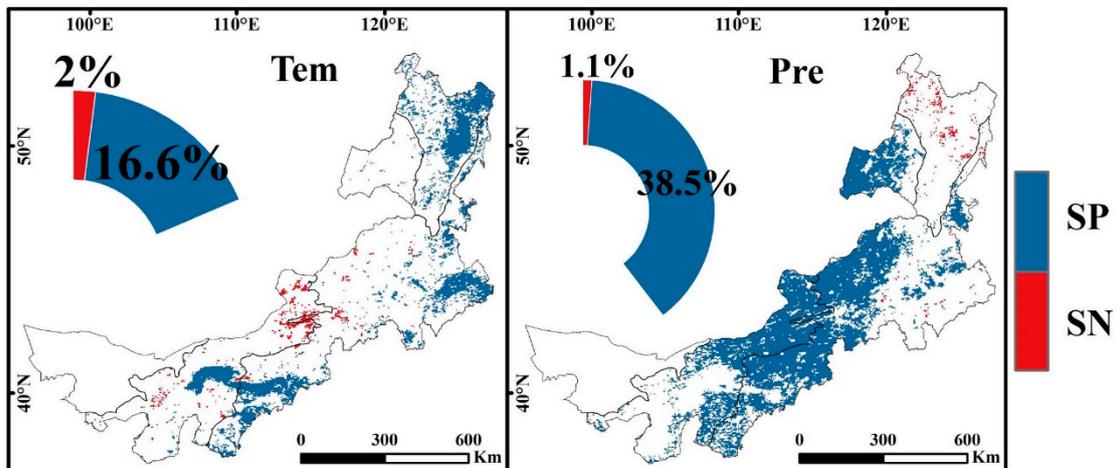


Figure S5. Correlation between annual Normalized Difference Vegetation Index (NDVI) and average climate. Notes: SP and SN means significant positive and significant negative, re-spectively.

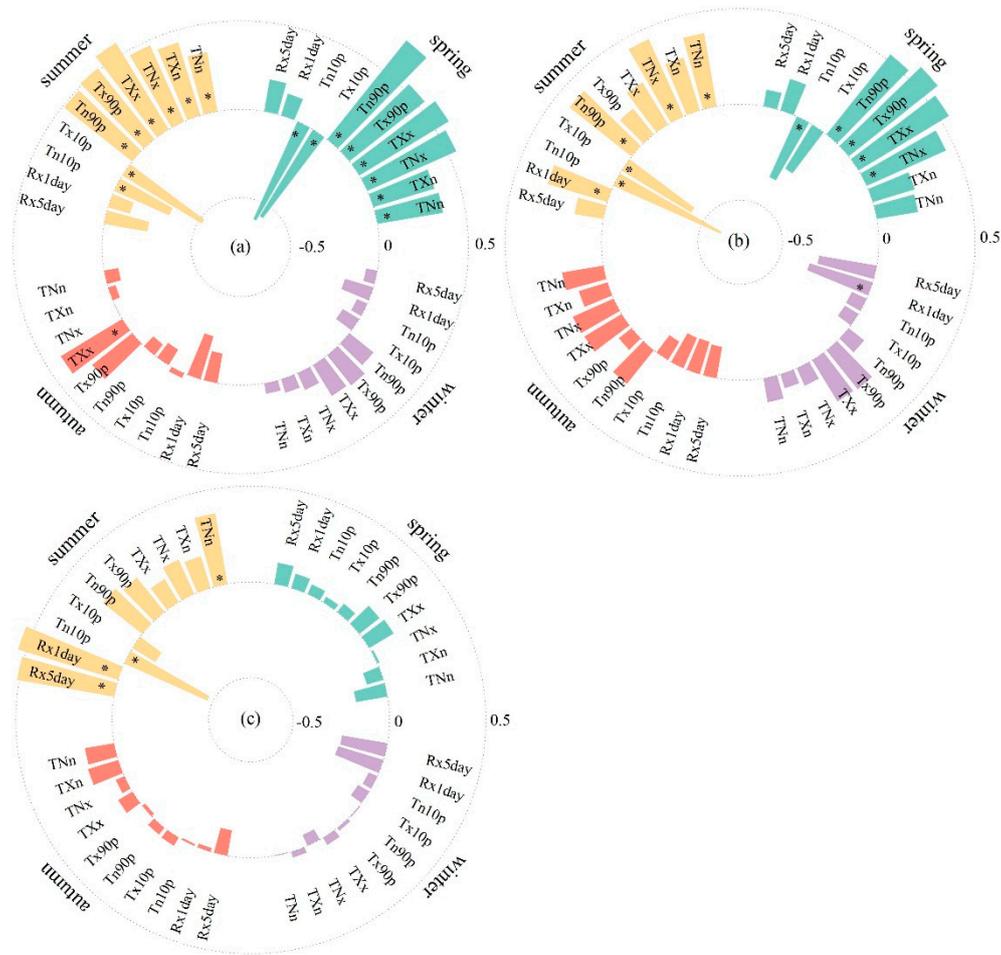


Figure S6. Correlation between seasonal Normalized Difference Vegetation Index (NDVI) and extreme climate indices in each ecological zone of the Inner Mongolian Plateau (IMP). (a) forest; (b) steppe; (c) desert steppe. Notes: "*" indicates the correlation passed the 95% significance level.

Table S3. Correlation between seasonal Normalized Difference Vegetation Index (NDVI) and average climate in each ecological zone.

		spring	summer	autumn	winter
forest	Tem	0.663*	0.653*	0.053	0.135
	Pre	0.165	-0.306	-0.248	-0.21
steppe	Tem	0.487*	0.365*	0.192	0.134
	Pre	0.172	0.155	-0.171	-0.318*
desert steppe	Tem	-0.004	0.206	0.006	0.037
	Pre	0.129	0.471*	-0.063	-0.251

Notes: "*" indicates the correlation passed the 95% significance level.

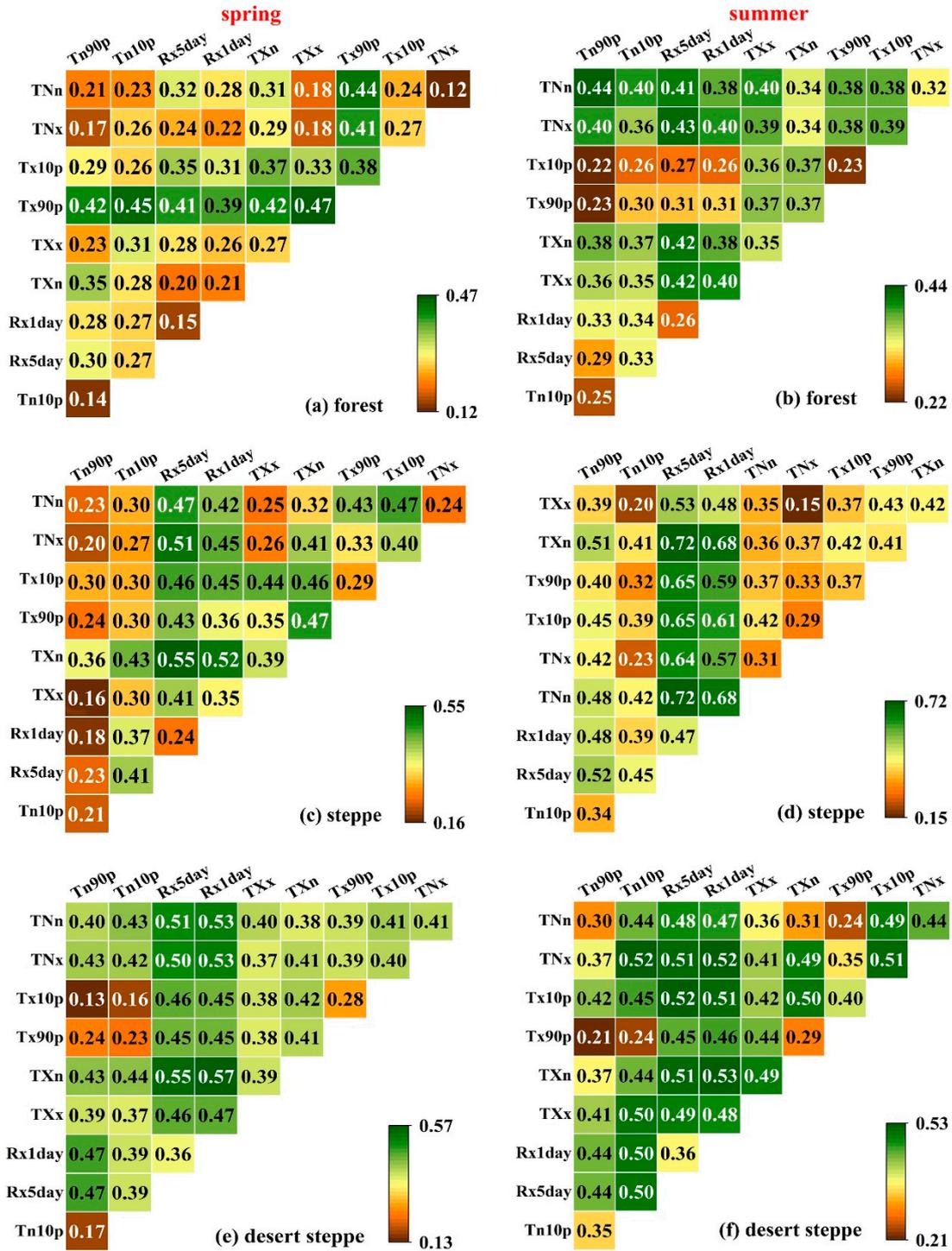


Figure S7. Interactive influence of different extreme climate indices on NDVI changes on a seasonal scale in each ecological zone of the IMP.