

Spatiotemporal Distribution of Precipitation over the Mongolian Plateau during 1976–2017

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Table S1 Altitude statistics of Mongolian Plateau stations

Elevation/m	<500	500-1000	1000-1500	1500-2000
Stations	3	7	121	4
Proportion	2%	5%	90%	3%

Table S2 The forecasted annual average precipitation using different interpolation methods during 1976-2017

Station	Measured value	Predictive value	
		IDW	Kriging
Bayankhongor	195.17	217.55	212.2
Buyante	92.51	140.03	141.64
Dalanzadgad	128.33	110.11	109.14
Zamyn-Uud	136.87	136.12	152.21
Altai	179.46	191.81	165.96
Qiaoyier	174.41	164.36	140.48
Baruunturuun	225.09	177.55	163.43
Ulaangom	142.99	133.53	143.01
Bulgan	328.45	293.42	275.42
Olgii	120.40	130.49	128.19
Zhu Rihe	202.69	277.21	270.51
Huade	318.61	319.26	328.47
Linxi County	366.32	342.9	343
Kailu County	326.15	351.48	377.24
New Chen Balhu Left Banner	279.02	306.58	319.88
New Chen Balhu Right Banner	237.48	285.37	274.72
Baotou	305.79	316.77	298.78
Hohhot	405.08	396.13	359.83
East Ujimqin Banner	250.45	285.06	290.96
West Ujimqin Banner	328.13	335.09	324.26

Table S3 The interpolation analysis of the mean annual precipitation during 1976-2017

Test indicators	Interpolation method	
	IDW	Kriging
MAE	23.71	29.87
RMSE	30.02	36.04

Table S4 Annual precipitation in different stages and its correlation with EASMI and WI

Stage	1976-1982	1983-1998	1999-2010	2011-2017
Annual average precipitation/mm	230.6	255.1	212.6	258.4
Correlation between precipitation and EASMI	0.42	0.46	0.31	0.69
Correlation between precipitation and WI	-0.09	-0.28	-0.22	-0.52

Table S5 Precipitation change rate at 135 stations during 1976-2017 in the Mongolian Plateau

Season	Significant increase ($P < 0.05$)		Not significant increase ($P > 0.05$)		Stable ($P > 0.05$)		Not significant decrease ($P > 0.05$)		Significant decrease ($P < 0.05$)	
	Stations	Percentage	Stations	Percentage	Stations	Percentage	Stations	Percentage	Stations	Percentage
Annual	6	4%	34	25%	55	41%	37	28%	3	2%
Spring	23	17%	63	47%	42	31%	5	4%	2	1%
Summer	4	3%	14	10%	45	33%	63	47%	9	7%
Autumn	25	19%	48	36%	53	38%	9	7%	0	0
Winter	31	23%	45	33%	41	31%	14	10%	4	3%

Table S6 Precipitation change rate at 135 stations during 1976-2017 in the Mongolian Plateau

Arid types	Precipitation /mm	Significant increase ($P < 0.05$)		Not significant increase ($P > 0.05$)		Stable ($P > 0.05$)		Not significant decrease ($P > 0.05$)		Significant decrease ($P < 0.05$)	
		Stations	Percentage	Stations	Percentage	Stations	Percentage	Stations	Percentage	Stations	Percentage
Semi-wet area	400-600	0	0	1	0.7%	5	3.4%	5	4%	0	0
Semi-dry area	200-400	0	0	13	10%	28	20.8%	26	19.2%	3	2.1%
Dry area	100-200	4	3%	16	11.8%	21	16%	6	4%	0	0
Extreme dry area	<100	2	1.4%	4	3%	1	0.7%	0	0	0	0

Table S7. Analysis of Partial between precipitation and atmospheric circulation factors during 1976–2017 in the Mongolian Plateau.

Precipitation	ENSO	EASMI	NAO	AO	PDO	SO	SH	WI
Annual	0.06	0.45**	-0.36*	0.22	-0.07	-0.22	0.07	-0.32*
Spring	0.38*	0.27	0.01	0.02	-0.14	0.26	0.13	-0.24
Summer	-0.15	0.40**	-0.31	0.28	0.05	-0.34*	-0.02	0.12
Autumn	0.15	0.11	-0.24	-0.12	-0.21	-0.04	0.13	-0.05
Winter	0.21	-0.31	-0.03	-0.14	-0.32*	0.10	-0.44**	0.01

** . Correlation at 0.01; * . Correlation at 0.05

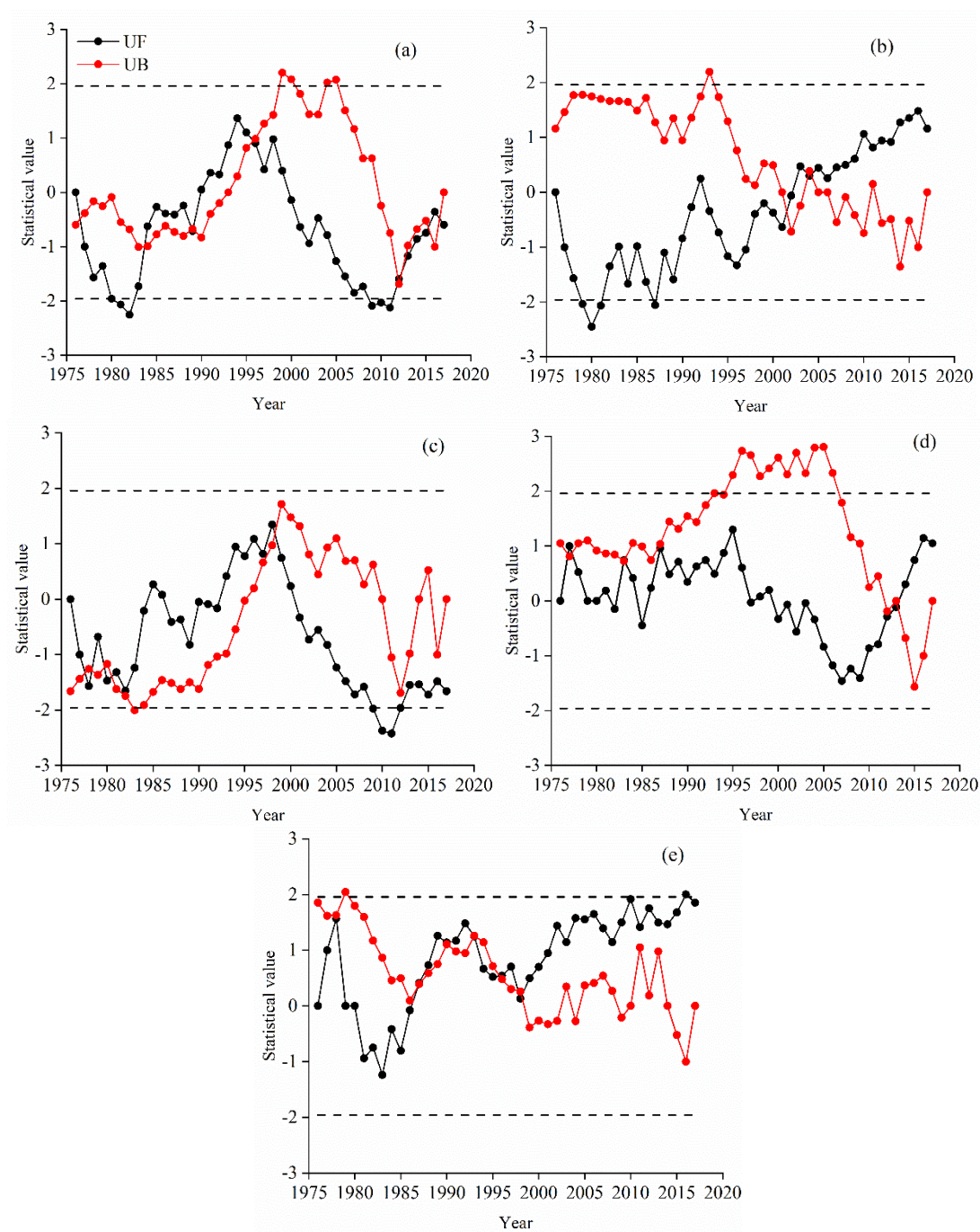


Figure S1. MK test of precipitation in Mongolian Plateau during 1976 to 2017 ((a) Annual, (b) Spring, (c) Summer, (d) Autumn, (e) Winter).

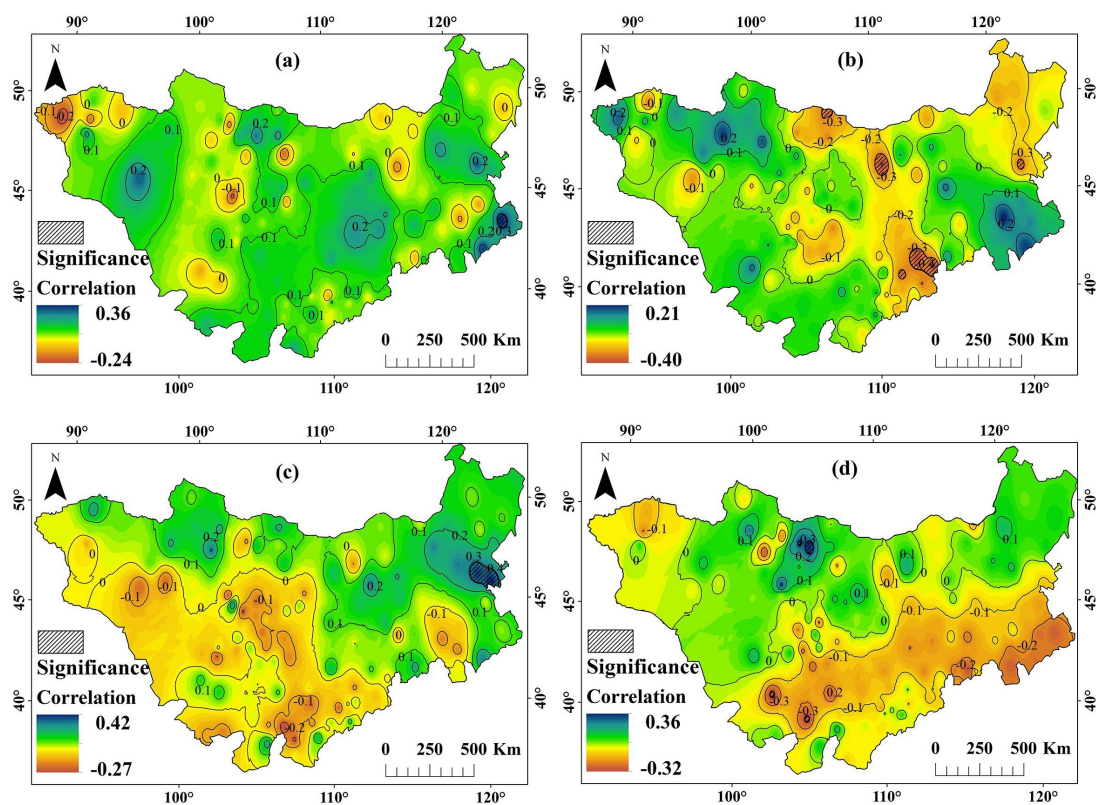


Figure S2. The spatial distribution of the correlation between precipitation and East Asian Summer Monsoon Index ((a) Spring, (c) Autumn), the correlation between precipitation and Westerly Index ((b) Spring, (d) Autumn) (Shaded indicates $P < 0.05$).

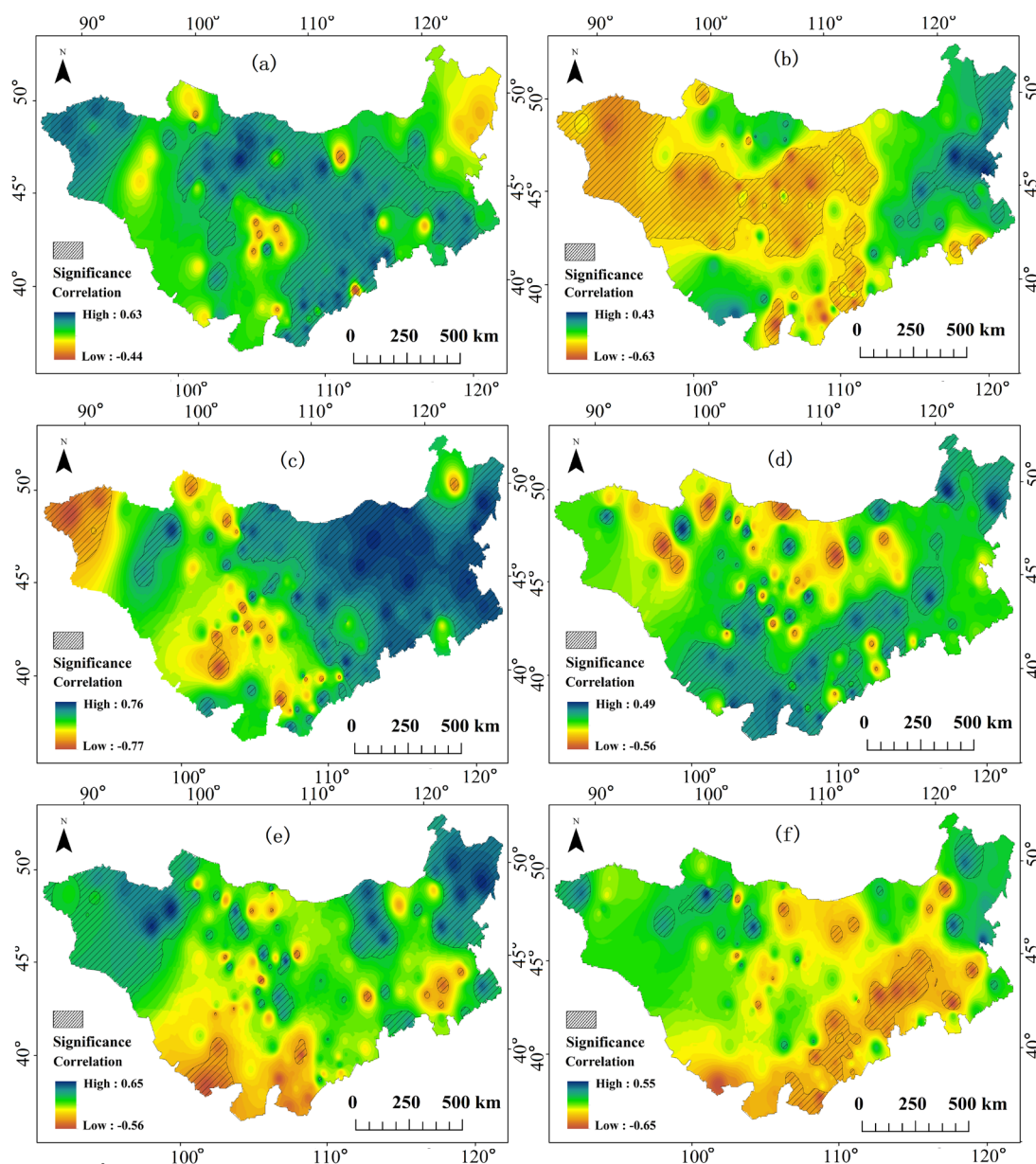


Figure S3. The spatial distribution of the correlation between precipitation and East Asian Summer Monsoon Index ((a) 2015, (c) 1998, (e) 2005), the correlation between precipitation and Westerly Index ((b) 2015, (d) 1998, (f) 2005) (Shaded indicates $P < 0.05$).