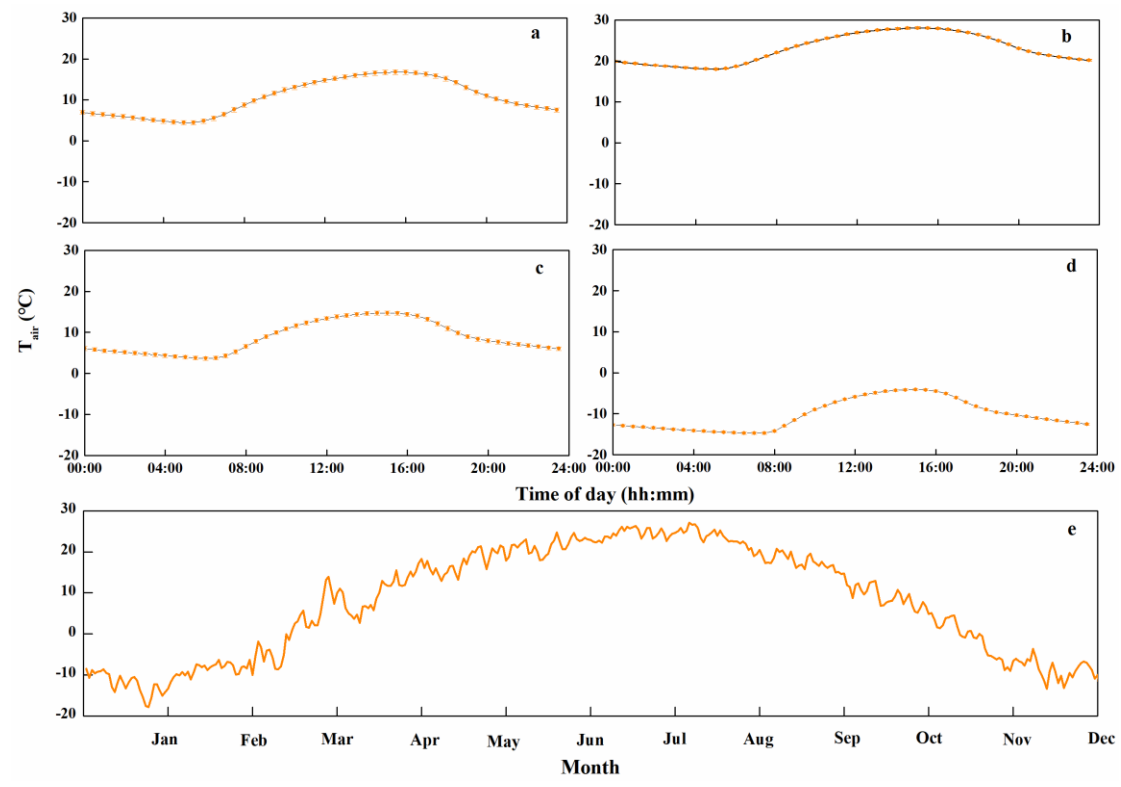


1 *Supplement of*

2 **Variations in diurnal and seasonal net ecosystem carbon dioxide**  
3 **exchange in a semiarid sandy grassland ecosystem in China's Horqin**  
4 **Sandy Land**

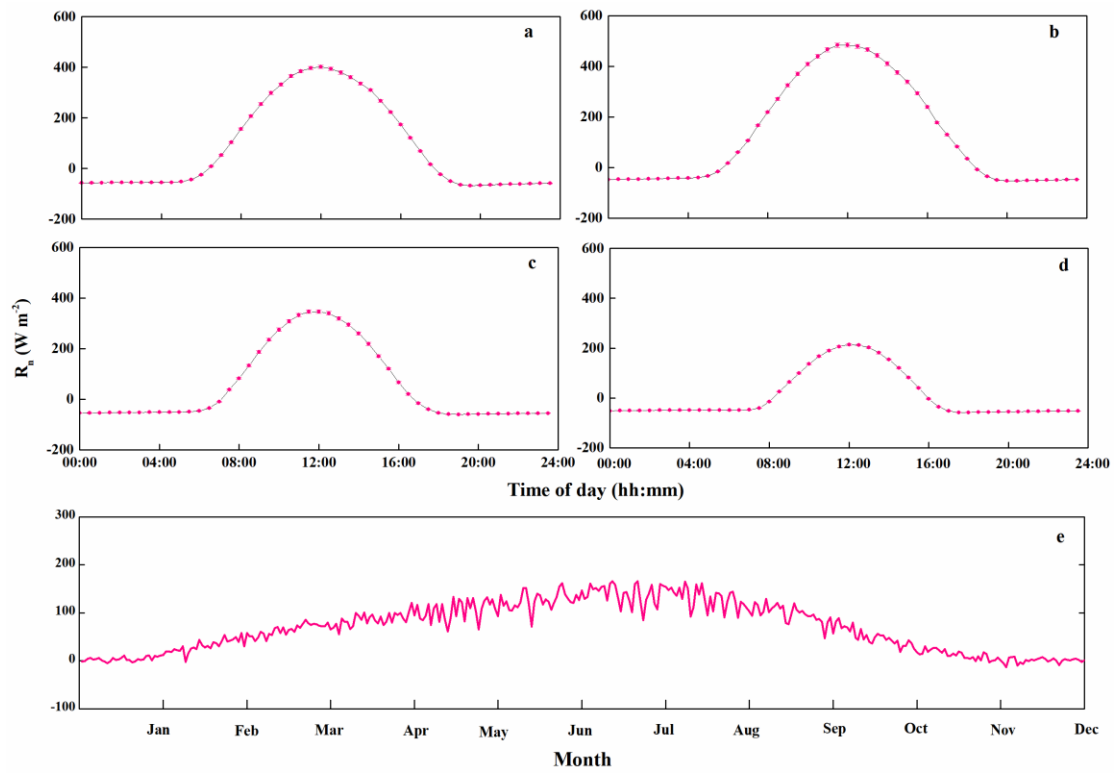
5 Yayi Niu et al.

6 *Correspondence to:* Yuqiang Li (liyq@lzb.ac.cn)



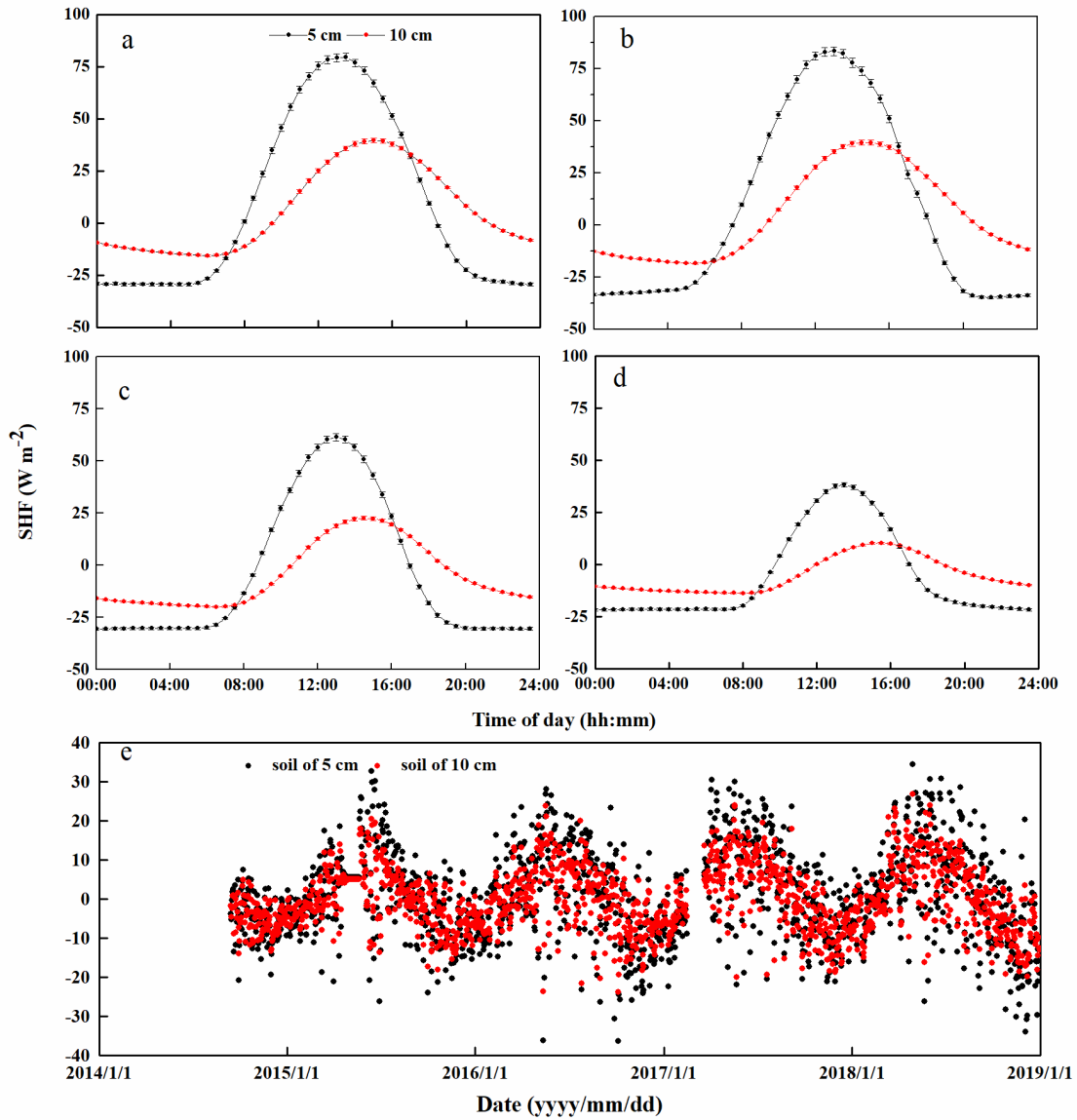
7

8 **Fig. S1** | Air temperature ( $T_{air}$ ) measured 2 m above the ground surface: (a), (b), (c),  
9 and (d) are half-hourly mean values in spring, summer, autumn, and winter,  
10 respectively; (e) shows diurnal-scale mean values from 2014 to 2018.



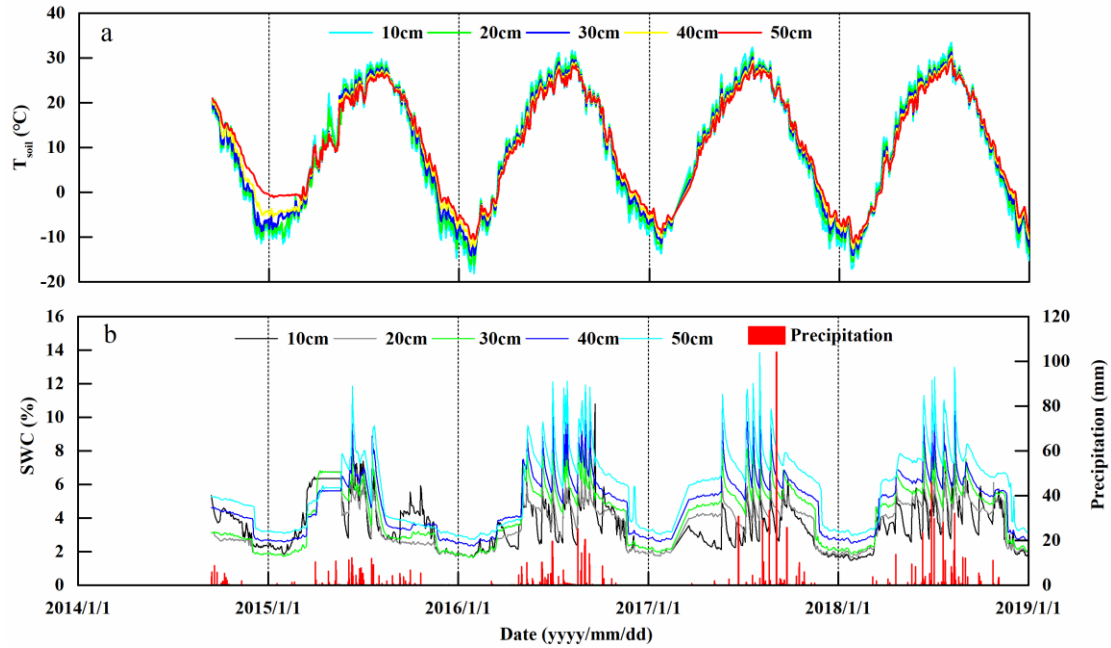
11

12 **Fig. S2** | Net radiation ( $R_n$ ) measured 2 m above the ground surface: (a), (b), (c), and  
 13 (d) are half - hourly mean values in spring, summer, autumn, and winter, respectively;  
 14 (e) shows diurnal mean values from 2014 to 2018.



15

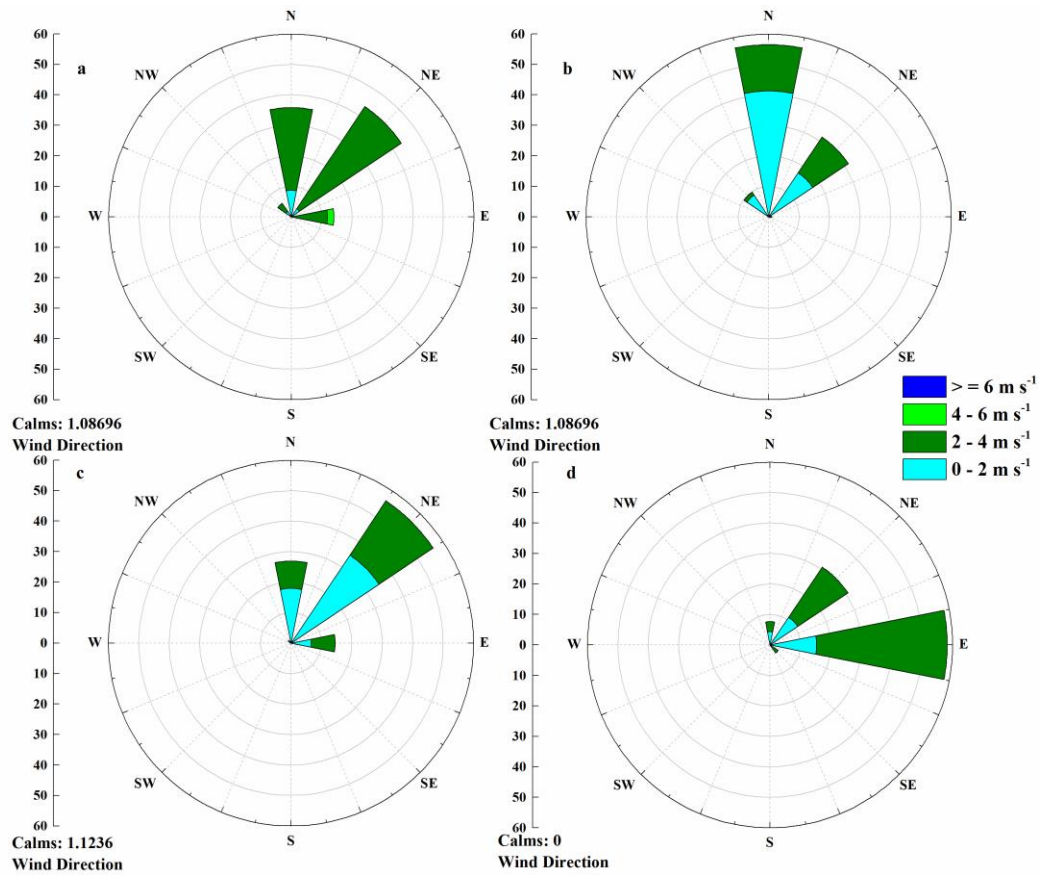
16 **Fig. S3** | Soil heat flux (SHF) at depth of 5 cm and 10 cm: (a), (b), (c), and (d) are half -  
 17 hourly mean values in spring, summer, autumn, and winter, respectively; (e) shows  
 18 diurnal mean values from 2014 to 2018.



19

20 **Fig. S4** | (a) Soil temperature ( $T_{soil}$ ) and (b) soil water content (SWC) at depths of 10,

21 20, 30, 40, 50 cm and precipitation from 2014 to 2018.



22

23 **Fig. S5** | Diurnal mean wind speeds and directions between 2015 and 2018: (a) spring,

24 (b) summer, (c) autumn, and (d) winter. Note the wind direction means the direction the

25 wind blows *from*.

26 **Table S1** | Seasonal-scale correlation coefficients (Pearson's  $r$ ) between net ecosystem exchange ( $r_{NEE}$ ), gross primary productivity ( $r_{GPP}$ ), and  
 27 ecosystem respiration ( $r_{Rec}$ ) and the key environmental factors. N represents the sample size. Abbreviations:  $T_{air}$ , air temperature;  $R_n$ , net solar  
 28 radiation; SHF, soil heat flux; SWC, soil water content;  $T_{soil}$ , soil temperature. \*\*,  $p < 0.01$ ; \*,  $p < 0.05$ .

Environment factors	Spring				Summer				Autumn				Summer				2014-2018			
	$r_{NEE}$	$r_{GPP}$	$r_{Rec}$	N	$r_{NEE}$	$r_{GPP}$	$r_{Rec}$	N	$r_{NEE}$	$r_{GPP}$	$r_{Rec}$	N	$r_{NEE}$	$r_{GPP}$	$r_{Rec}$	N	$r_{NEE}$	$r_{GPP}$	$r_{Rec}$	N
$T_{air}$	-0.434**	0.653**	0.634**	308	-0.265**	0.371**	0.289**	366	0.249**	0.602**	0.732**	418	-0.138**	0.602**	-0.138**	379	-0.520**	0.725**	0.721**	1467
Wind speed	-0.057	0.084	0.080	308	-0.047	-0.088	-0.253**	366	-0.024	-0.114*	-0.118*	418	0.222**	-0.114*	0.222**	375	0.070**	-0.142**	-0.178**	1463
$R_n$	-0.333**	0.493**	0.480**	314	-0.245**	0.213**	0.010	363	0.175**	0.618**	0.682**	418	0.113*	0.618**	0.113*	378	-0.541**	0.711**	0.672**	1469
SHF at 5 cm	-0.110	0.201**	0.243**	314	-0.331**	0.239**	-0.079	369	0.082	0.343**	0.366**	418	0.082	0.343**	0.082	379	-0.400**	0.451**	0.362**	1476
SHF at 10 cm	-0.070	0.194**	0.306**	314	-0.290**	0.236**	-0.016	369	0.106*	0.376**	0.415**	418	0.170**	0.376**	0.170**	379	-0.390**	0.463**	0.396**	1476
SWC at 10 cm	-0.167**	0.158**	0.038	314	-0.063	0.167**	0.225**	369	0.185**	0.330**	0.442**	418	-0.004	0.330**	-0.004	379	-0.254**	0.370**	0.380**	1476
SWC at 20 cm	-0.356**	0.467**	0.379**	314	-0.060	0.164**	0.223**	369	0.138**	0.453**	0.509**	418	-0.129	0.453**	-0.129	379	-0.391**	0.532**	0.519**	1476
SWC at 30 cm	-0.391**	0.565**	0.533**	314	-0.037	0.170**	0.273**	369	0.163**	0.465**	0.541**	418	-0.255**	0.465**	-0.255**	379	-0.433**	0.609**	0.610**	1476
SWC at 40 cm	-0.371**	0.631**	0.721**	314	-0.062	0.199**	0.288**	369	0.094	0.539**	0.546**	418	-0.210**	0.539**	-0.210**	379	-0.464**	0.660**	0.669**	1476
SWC at 50 cm	-0.338**	0.623**	0.768**	314	-0.168**	0.318**	0.347**	369	0.091	0.515**	0.523**	418	-0.209**	0.515**	-0.209**	379	-0.484**	0.688**	0.696**	1476
Precipitation	0.029	0.034	0.134*	314	0.034	0.030**	0.116*	369	0.081	0.198**	0.240**	418	-0.023	0.198**	-0.023	340	-0.078**	0.161**	0.204**	1437
$T_{soil}$ at 10 cm	-0.507**	0.755**	0.742**	314	-0.337**	0.485**	0.395**	369	0.211**	0.677**	0.765**	418	-0.254**	0.677**	-0.254**	379	-0.549**	0.758**	0.749**	1476
$T_{soil}$ at 20 cm	-0.515**	0.770**	0.760**	314	-0.310**	0.494**	0.457**	369	0.211**	0.678**	0.766**	418	-0.314**	0.678**	-0.314**	379	-0.545**	0.758**	0.753**	1476
$T_{soil}$ at 30 cm	-0.519**	0.773**	0.761**	314	-0.276**	0.490**	0.506**	369	0.211**	0.680**	0.767**	418	-0.362**	0.680**	-0.362**	379	-0.541**	0.756**	0.754**	1476
$T_{soil}$ at 40 cm	-0.524**	0.778**	0.763**	314	-0.244**	0.490**	0.557**	369	0.209**	0.682**	0.767**	418	-0.369**	0.682**	-0.369**	379	-0.535**	0.753**	0.755**	1476
$T_{soil}$ at 50 cm	-0.526**	0.781**	0.765**	314	-0.222**	0.488**	0.591**	369	0.207**	0.682**	0.765**	418	-0.250**	0.682**	-0.250**	379	-0.527**	0.748**	0.756**	1476

29