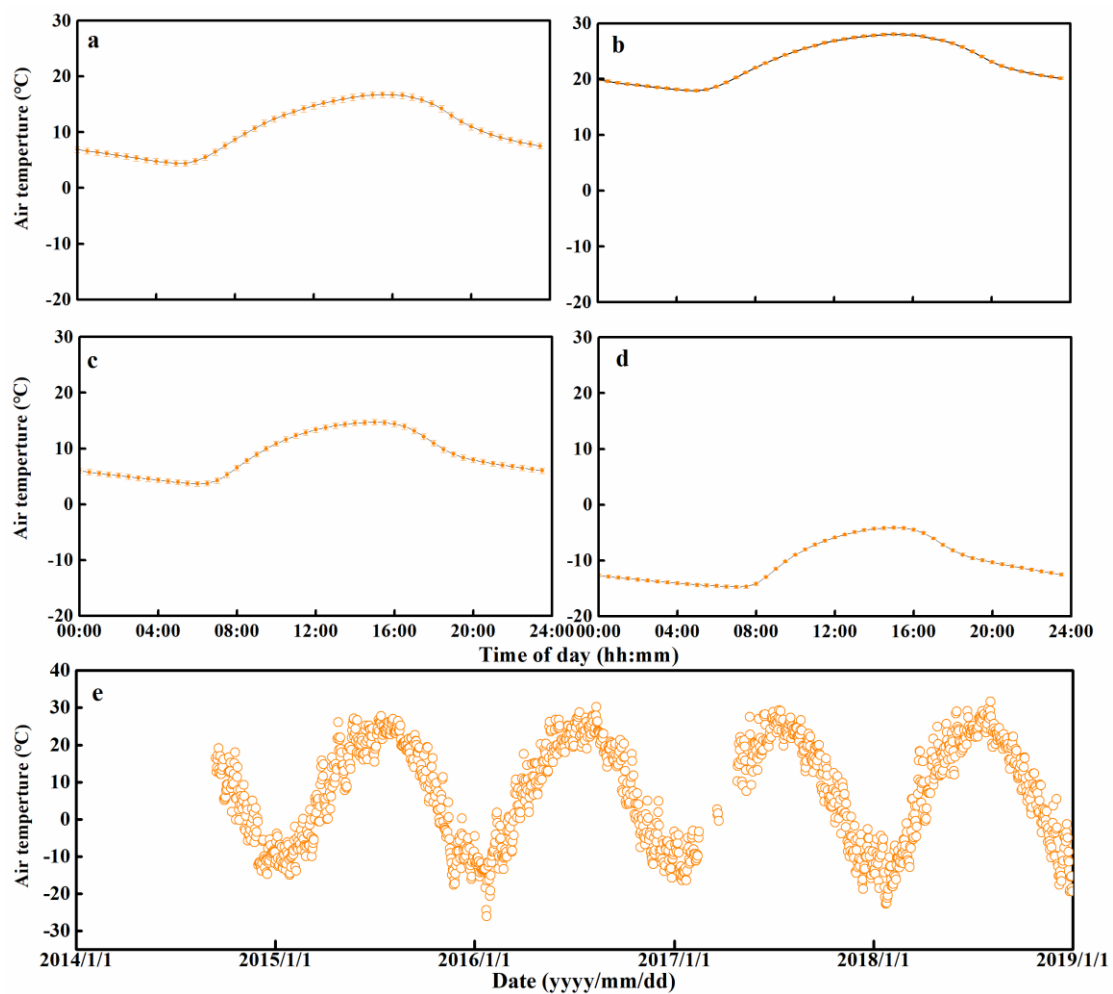


1 *Supplemental material*

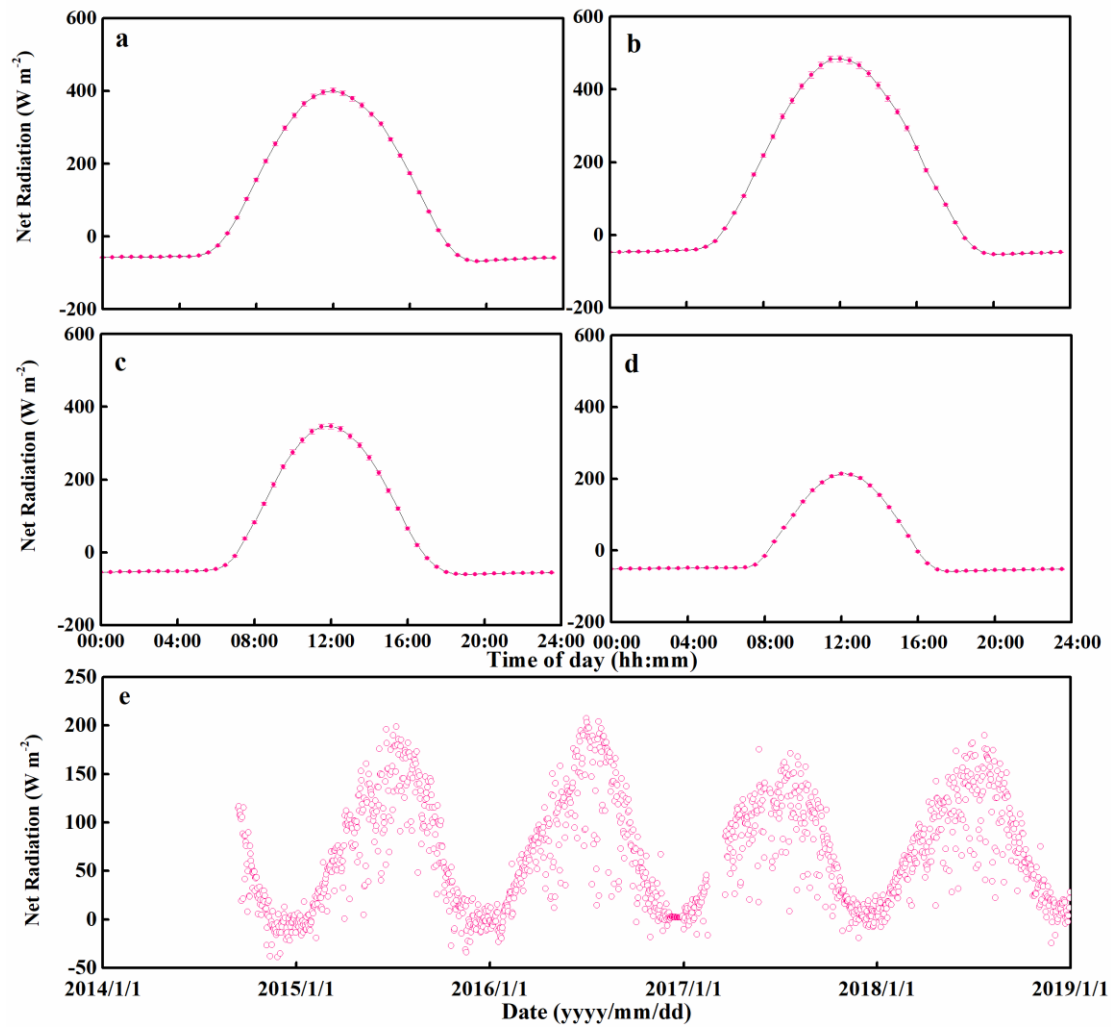
2 **Variations in diurnal and seasonal net ecosystem carbon dioxide**
3 **exchange in a semiarid sandy grassland ecosystem in China's Horqin**
4 **Sandy Land**

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) **Seasonal and inter-annual variation in daily average T_{air} from late 2014**
11 **to late 2018.**



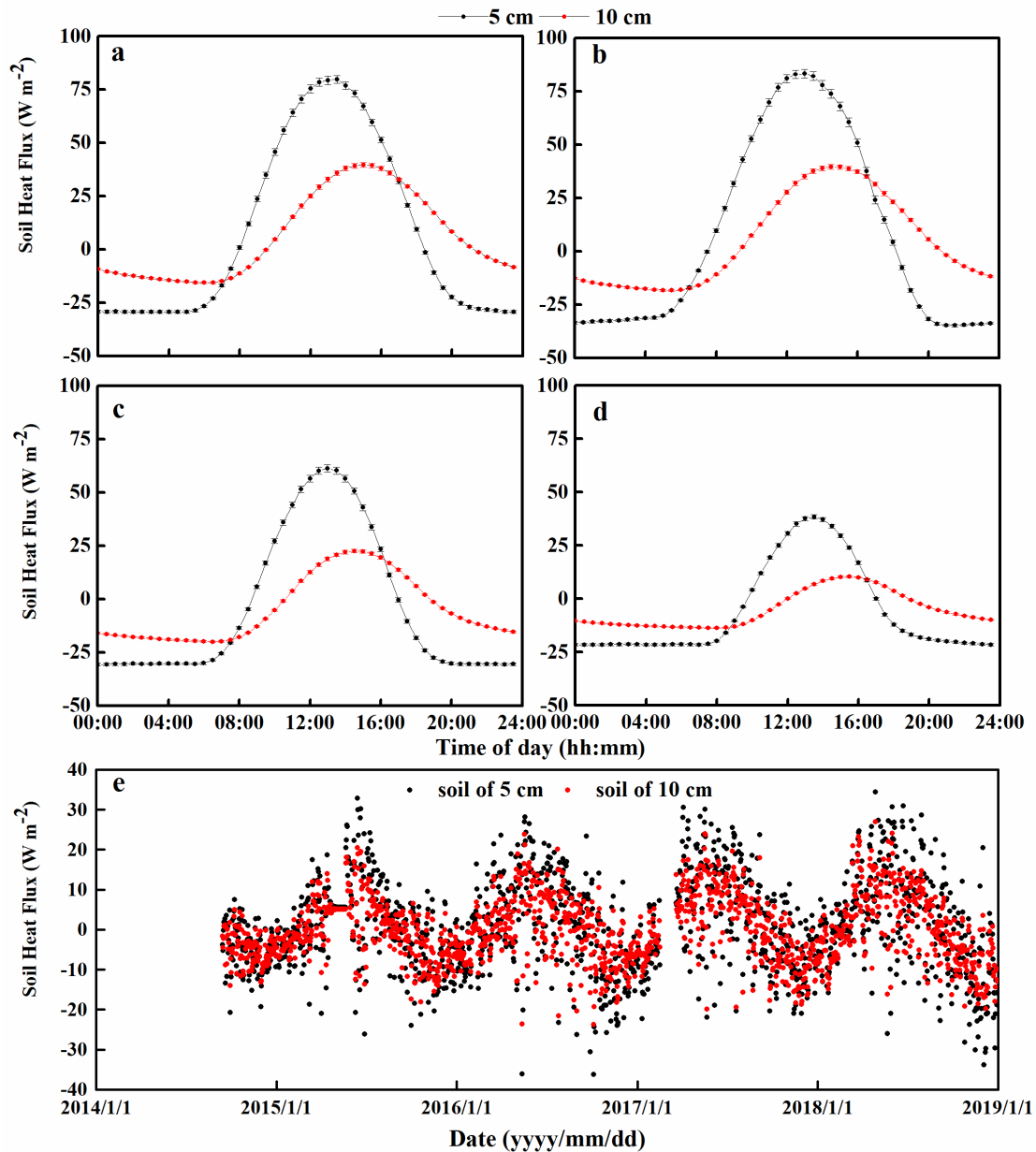
12

13 **Fig. S2** | Net radiation (R_n) measured 2 m above the ground surface: (a), (b), (c), and

14 (d) are half - hourly mean values in spring, summer, autumn, and winter, respectively;

15 (e) Seasonal and inter-annual variation in daily average R_n from late 2014 to late 2018.

16



17

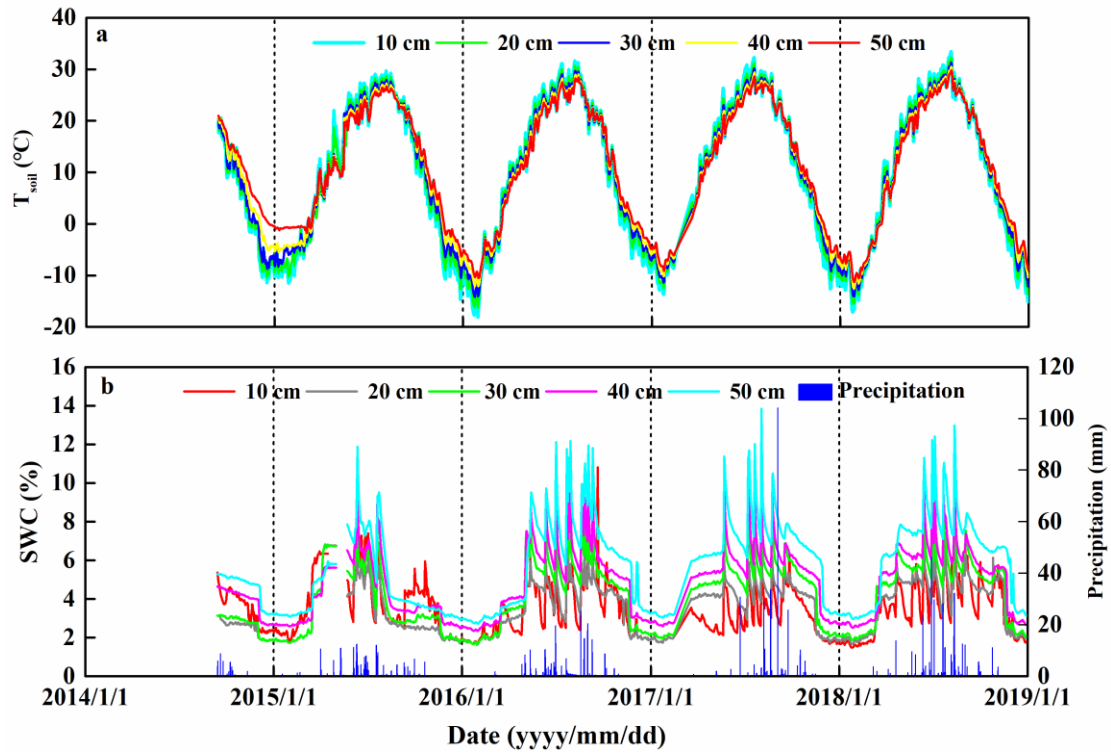
18 **Fig. S3** | Soil heat flux (SHF) at depths of 5 cm and 10 cm: (a), (b), (c), and (d) are

19 half - hourly mean values in spring, summer, autumn, and winter, respectively; (e)

20 Seasonal and inter-annual variation in daily average SHF at depths of 5 cm and 10 cm

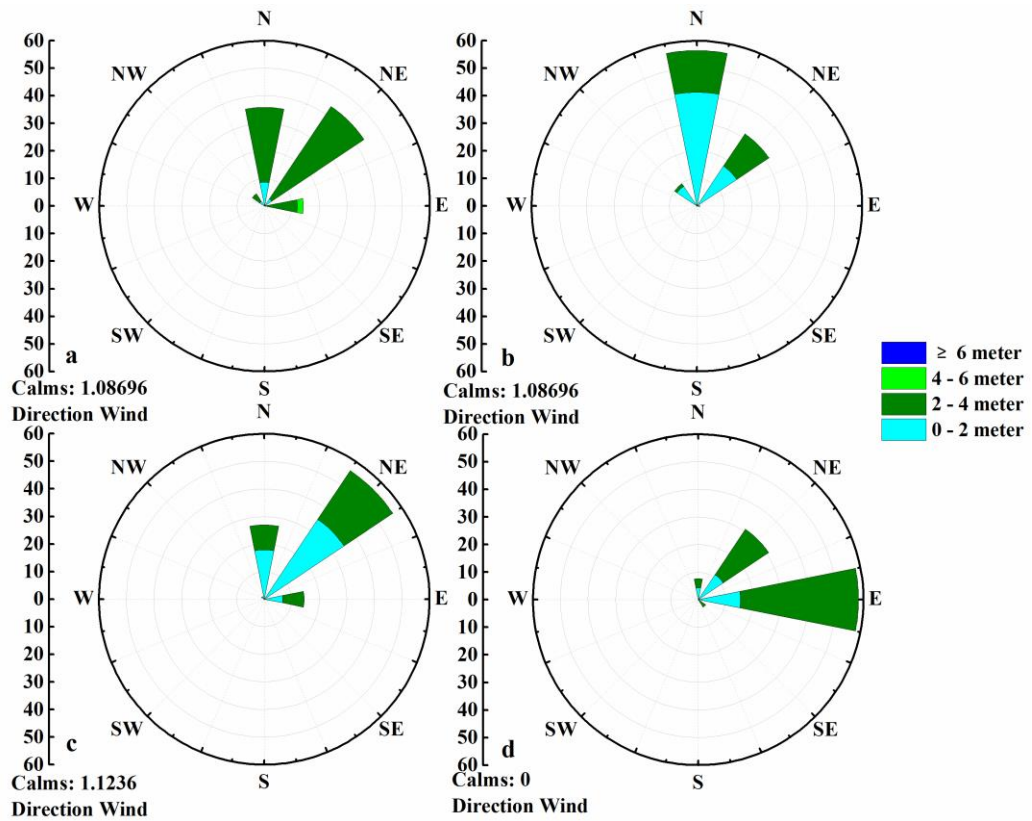
21 from late 2014 to late 2018.

22



23

24 **Fig. S4 | (a) Seasonal and inter-annual variation in daily average soil temperature (T_{soil})**
 25 **and (b) soil water content (SWC) at depths of 10, 20, 30, 40, and 50 cm, and seasonal**
 26 **and inter-annual variation in daily precipitation from late 2014 to late 2018.**



27

28 **Fig. S5** | Diurnal mean wind speeds and directions between 2015 and 2018: (a) spring,
 29 (b) summer, (c) autumn, and (d) winter. Note that the wind direction means the direction
 30 the wind blows *from*.

31 **Table S1** | Seasonal-scale correlations (Pearson's r) between net ecosystem exchange (r_{NEE}), gross primary productivity (r_{GPP}), and ecosystem
 32 respiration (r_{Rec}) and the key environmental factors. N represents the sample size. Abbreviations: SWC, soil water content; T_{soil} , soil temperature.
 33 **, $p < 0.01$; *, $p < 0.05$.

34

Environment factors	Spring				Summer				Autumn				Winter			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_{Rec}	N	r_{NEE}	r_{GPP}	r_{Rec}	N
SWC at 10 cm	-0.167**	0.158**	0.138**	314	-0.063	0.167**	0.225**	369	0.185**	0.330**	0.442**	418	-0.004	-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	-0.129	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**	-0.255**	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**	-0.210**	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**	-0.209**	379	-0.484**	0.688**	0.696**	1476
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**	-0.254**	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**	-0.314**	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**	-0.362**	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**	-0.369**	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**	-0.250**	379	-0.527**	0.748**	0.756**	1476

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