

**Table S1.** Respiration rates in calcareous and red soils

	Calcareous soil				Red Soil			
	KP1	KP2	KP3	Average	NKP1	NKP2	NKP3	Average
Soil respiration rate (mg C m <sup>-3</sup> h <sup>-1</sup> )	107.40 ± 75.64 <sub>b</sub>	171.61 ± 141.97 <sub>a</sub>	138.78 ± 96.71 <sub>ab</sub>	134.84 ± 106.45 <sub>A</sub>	147.44 ± 82.07 <sub>ab</sub>	131.67 ± 89.84 <sub>ab</sub>	130.15 ± 53.50 <sub>ab</sub>	137.93 ± 76.88 <sub>A</sub>
Annual soil emission (t C km <sup>-2</sup> a <sup>-1</sup> )	926.08	1645.45	1342.40	1304.64	1313.02	1083.24	1104.47	1166.91

Data are means ± SD; different lowercase letters indicate differences between soil profiles and uppercase letters indicate population mean differences at  $p = 0.05$ . N=33 in KP1 and NKP1, N=23 in remaining profiles.

**Table S2.** CO<sub>2</sub> Concentrations in different layers in calcareous and red soils

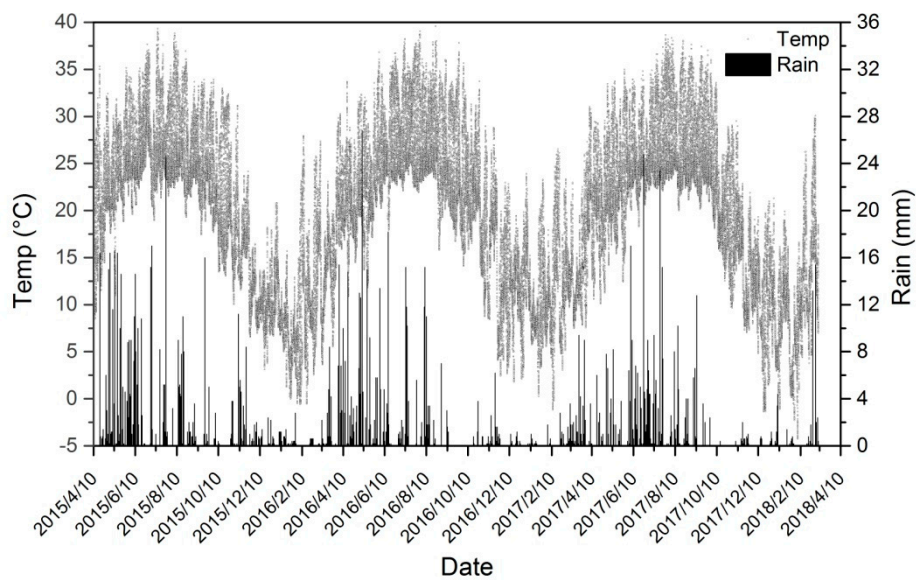
Depth (cm)	Calcareous Soil (%)				Red Soil (%)			
	KP1	KP2	KP3	Average	NKP1	NKP2	NKP3	Average
-10	0.33 ± 0.30	1.15 ± 1.04	0.59 ± 0.49	0.65 ± 0.73 <sub>b</sub>	0.44 ± 0.26	0.51 ± 0.32	0.60 ± 0.44	0.51 ± 0.34 <sub>d</sub>
	0.50 ± 0.46	1.17 ± 1.07	0.58 ± 0.42	0.72 ± 0.74 <sub>ab</sub>		0.65 ± 0.41	0.71 ± 0.44	0.64 ± 0.37 <sub>c</sub>
-20	0.55 ± 0.47	1.38 ± 1.30	0.64 ± 0.52	0.82 ± 0.88 <sub>ab</sub>	0.76 ± 0.32	0.73 ± 0.47	0.68 ± 0.26	0.73 ± 0.35 <sub>bc</sub>
	0.66 ± 0.57	1.11 ± 0.89	0.76 ± 0.54	0.82 ± 0.69 <sub>ab</sub>		0.87 ± 0.46	0.78 ± 0.42	0.80 ± 0.39 <sub>ab</sub>
-30	0.75 ± 0.56	1.29 ± 0.94	0.88 ± 0.54	0.95 ± 0.72 <sub>a</sub>	1.03 ± 0.52	0.83 ± 0.43	0.93 ± 0.44	0.94 ± 0.47 <sub>a</sub>
	0.72 ± 0.54	1.30 ± 0.90	0.94 ± 0.59	0.96 ± 0.71 <sub>a</sub>		0.95 ± 0.65	0.92 ± 0.36	0.87 ± 0.46 <sub>a</sub>
-40	0.77 ± 0.63	1.17 ± 1.02	0.86 ± 0.54	0.91 ± 0.75 <sub>a</sub>	0.78 ± 0.30	0.86 ± 0.43	0.82 ± 0.34	0.81 ± 0.35 <sub>ab</sub>
	0.74 ± 0.49	1.07 ± 0.83	0.58 ± 0.38	0.79 ± 0.61 <sub>ab</sub>		0.69 ± 0.33	0.69 ± 0.31	0.68 ± 0.38 <sub>bc</sub>
Average	0.63 ± 0.16 <sub>c</sub>	1.20 ± 0.11 <sub>a</sub>	0.73 ± 0.15 <sub>bc</sub>		0.73 ± 0.17 <sub>bc</sub>	0.76 ± 0.14 <sub>b</sub>	0.77 ± 0.12 <sub>b</sub>	
	0.83 ± 0.73 <sub>a</sub>				0.75 ± 0.41 <sub>b</sub>			

Data are means ± SD. Different letters within a row indicate differences between profiles; different letters in a column indicate differences among layers at  $p = 0.05$ . N=33 in every layer of KP1 and NKP1, N=23 in different layer of remaining profiles.



			0.30	1.54	ab			3.06	1.86	a
100 (soil)	10.90 ±	6.19 ±	7.48	7.90	8.12 ±	16.07 ±	12.81 ±	10.05	4.89	10.96
	1.65	0.91	±	±	2.05 a	2.35	0.71	±	±	± 4.47
			0.73	1.06				1.64	0.85	b
Average in										
the air (mg										
cm <sup>-2</sup> a <sup>-1</sup> )										
Average in										
the soil										
(mg cm <sup>-2</sup> a <sup>-1</sup> )										
1)										

Data are means ± SD. Different letters within a row indicate differences among profiles; different letters in a column indicate differences among layers at  $p = 0.05$ . N=12 in every layer of calcareous and red soil profiles.



**Figure S1.** Temperature and rainfall in Maocun village