

Supplementary materials

Biotic factors dominantly determine soil inorganic carbon stock across Tibetan alpine grasslands

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E-mail address: wangjinsong@igsnr.ac.cn (J. Wang), sniu@igsnr.ac.cn (S. Niu). **Table S1.** The information of sampling sites includes location, grassland type, climatic and plant parameters.

Sites	Sampling date	Latitude (N)	Longitude (E)	Grassland types	MAP (mm)	MAT (°C)	Altitude (m)	PAB (g m ⁻²)	PC (%)
1	8/16/20	32 °43'09"	79 °49'39"	AD	72	-2.93	4735	22.1	10.8
2	8/15/20	32 °23'13"	80 °38'34"	AD	88	-2.48	4772	22.0	11.5
3	8/14/20	32 °10'05"	81 °36'12"	AD	96	-3.90	5016	9.5	10.8
4	8/13/20	32 °15'29"	82 °20'47"	AD	85	0.52	4465	11.4	11.5

5	8/11/20	32 °23'06"	82 °56'25"	AD	74	0.59	4459	12.7	14.0
6	8/10/20	32 °18'19"	83 °45'36"	AD	79	1.21	4379	53.3	17.3
7	8/9/20	31 °57'38"	85 °05'53"	AS	112	0.35	4606	19.4	18.5
8	8/6/20	31 °54'10"	86 °15'32"	AS	157	-0.17	4742	8.8	18.3
9	8/5/20	31 °56'59"	86 °40'27"	AS	193	1.22	4554	8.5	10.5
10	8/4/20	31 °49'55"	87 °38'42"	AS	292	1.82	4510	27.1	15.8
11	8/3/20	31 °50'22"	88 °20'44"	AS	366	1.20	4591	11.8	9.5
12	7/30/20	31 °37'59"	89 °24'13"	AS	443	0.80	4649	63.1	28.8
13	8/22/20	31 °23'24"	90 °13'48"	AS	457	0.24	4629	56.9	34.3
14	8/22/20	31 °23'24"	90 °46'48"	AS	453	0.03	4545	20.8	51.8
15	8/22/20	31 °31'48"	91 °22'48"	AM	454	-0.21	4610	46.5	36.8
16	8/23/20	31 °38'40"	92 °19'19"	AM	483	-0.71	4480	144.0	85.0
17	8/23/20	31 °50'52"	92 °55'54"	AM	539	0.56	4312	146.2	89.0
18	8/24/20	31 °47'06"	94 °29'44"	AM	636	-0.28	4084	105.8	92.8
19	8/24/20	31 °32'28"	95 °15'20"	AM	607	2.41	3928	82.2	82.8
20	8/25/20	31 °06'37"	96 °16'21"	AM	600	-0.07	4197	49.9	97.0
21	8/25/20	31 °07'13"	96 °44'24"	AM	577	2.11	3777	190.7	96.8
22	8/27/20	31 °19'26"	97 °39'16"	AM	579	-0.11	4172	130.3	99.5
23	8/27/20	31 °57'13"	98 °51'60"	AM	631	-2.54	4103	241.6	94.0
24	8/28/20	31 °38'43"	100 °15'33"	AM	648	5.76	3544	157.4	94.8
25	8/28/20	32 °23'04"	102 °25'31"	AM	706	2.43	3500	214.9	94.8
Mean					377	0.31	4374	74.3	49.0

AM, alpine meadow; AS, alpine steppe; AD, alpine desert.

Table S2. The abbreviations of variables in this study.

Variables	Abbreviations	Category	Factors
Soil inorganic carbon	SIC	-	-
Mean annual precipitation	MAP	Climatic factor	Abiotic factor
Mean annual temperature	MAT	Climatic factor	Abiotic factor
Altitude	-	Climatic factor	Abiotic factor
Plant aboveground biomass	PAB	Plant factor	Biotic factor
Plant coverage	PC	Plant factor	Biotic factor
Root biomass	RB	Plant factor	Biotic factor
pH	-	Edaphic factor	Abiotic factor
Soil available nitrogen	AN	Edaphic factor	Abiotic factor
Sand proportion	SP	Edaphic factor	Abiotic factor
Microbial biomass carbon	MBC	Microbial factor	Biotic factor
Bacterial gene abundance	BA	Microbial factor	Biotic factor
Fungal gene abundance	FA	Microbial factor	Biotic factor

Table S3 Pearson correlation coefficients between SIC density and explanatory variables. * and ** indicate significance at $p < 0.05$ and 0.01 (n=25), respectively.

Parameter	MAP	MAT	Altitude	PAB	PC	RB	pH	AN	SP	MBC	BA	FA
Topsoil	-0.59**	0.07	0.43*	-0.56**	-0.67**	-0.41*	0.70**	-0.56**	0.54**	-0.43*	-0.50*	-0.52**
Subsoil	-0.64**	-0.03	0.39	-0.55**	-0.66**	-0.28	0.61**	-0.52**	0.50*	0.02	-0.43	-0.48

