

Supplementary materials

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

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Table S1. The information of sampling sites includes location, grassland type, climatic and plant parameters.

| Sites | Latitude (N) | Longitude (E) | Grassland types | MAP (mm) | MAT (°C) | Altitude (m) | PAB (g m ⁻²) | PC (%) |
|-------|-----------------|------------------|--------------------|-------------|-------------|-----------------|-----------------------------|-----------|
| 1 | 32°43'09" | 79°49'39" | AD | 72 | -2.93 | 4735 | 22.1 | 10.8 |
| 2 | 32°23'13" | 80°38'34" | AD | 88 | -2.48 | 4772 | 22.0 | 11.5 |
| 3 | 32°10'05" | 81°36'12" | AD | 96 | -3.90 | 5016 | 9.5 | 10.8 |
| 4 | 32°15'29" | 82°20'47" | AD | 85 | 0.52 | 4465 | 11.4 | 11.5 |
| 5 | 32°23'06" | 82°56'25" | AD | 74 | 0.59 | 4459 | 12.7 | 14.0 |
| 6 | 32°18'19" | 83°45'36" | AD | 79 | 1.21 | 4379 | 53.3 | 17.3 |
| 7 | 31°57'38" | 85°05'53" | AS | 112 | 0.35 | 4606 | 19.4 | 18.5 |
| 8 | 31°54'10" | 86°15'32" | AS | 157 | -0.17 | 4742 | 8.8 | 18.3 |
| 9 | 31°56'59" | 86°40'27" | AS | 193 | 1.22 | 4554 | 8.5 | 10.5 |
| 10 | 31°49'55" | 87°38'42" | AS | 292 | 1.82 | 4510 | 27.1 | 15.8 |
| 11 | 31°50'22" | 88°20'44" | AS | 366 | 1.20 | 4591 | 11.8 | 9.5 |
| 12 | 31°37'59" | 89°24'13" | AS | 443 | 0.80 | 4649 | 63.1 | 28.8 |
| 13 | 31°23'24" | 90°13'48" | AS | 457 | 0.24 | 4629 | 56.9 | 34.3 |
| 14 | 31°23'24" | 90°46'48" | AS | 453 | 0.03 | 4545 | 20.8 | 51.8 |
| 15 | 31°31'48" | 91°22'48" | AM | 454 | -0.21 | 4610 | 46.5 | 36.8 |
| 16 | 31°38'40" | 92°19'19" | AM | 483 | -0.71 | 4480 | 144.0 | 85.0 |
| 17 | 31°50'52" | 92°55'54" | AM | 539 | 0.56 | 4312 | 146.2 | 89.0 |
| 18 | 31°47'06" | 94°29'44" | AM | 636 | -0.28 | 4084 | 105.8 | 92.8 |
| 19 | 31°32'28" | 95°15'20" | AM | 607 | 2.41 | 3928 | 82.2 | 82.8 |
| 20 | 31°06'37" | 96°16'21" | AM | 600 | -0.07 | 4197 | 49.9 | 97.0 |
| 21 | 31°07'13" | 96°44'24" | AM | 577 | 2.11 | 3777 | 190.7 | 96.8 |

| | | | | | | | | |
|------|-----------|------------|----|-----|-------|------|-------|------|
| 22 | 31°19'26" | 97°39'16" | AM | 579 | -0.11 | 4172 | 130.3 | 99.5 |
| 23 | 31°57'13" | 98°51'60" | AM | 631 | -2.54 | 4103 | 241.6 | 94.0 |
| 24 | 31°38'43" | 100°15'33" | AM | 648 | 5.76 | 3544 | 157.4 | 94.8 |
| 25 | 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.

| Abbreviations | Variables |
|---------------|---------------------------|
| SIC | Soil inorganic carbon |
| MAP | Mean annual precipitation |
| MAT | Mean annual temperature |
| PAB | Plant aboveground biomass |
| PC | Plant coverage |
| RB | Root biomass |
| AN | Soil available nitrogen |
| SP | Sand proportion |
| MBC | Microbial biomass carbon |
| BA | Bacterial gene abundance |
| FA | Fungal gene abundance |