

Li M., Zhang X., Tong Y., Cao Z., Huang J., Zhang S., Xu S., Ding Y., Wang W., Maimaiti A., Wang L., Zang R, 2024. Mean annual temperature mainly drives spatial pattern of plant functional traits in inland arid and semi-arid areas.

Table S1 Description of all environmental factors

Environmental factors	Abbreviation	Source	Access time
Climate factors (21)			
1. Mean Annual Temperature (°C)	MAT	http://www.worldclim.org	2022.05
2. Mean Diurnal Range (°C)	MDR	http://www.worldclim.org	2022.05
3. Isothermality	Iso	http://www.worldclim.org	2022.05
4. Temperature Seasonality	TS	http://www.worldclim.org	2022.05
5. Maximum Temperature of Warmest Month (°C)	MTWM	http://www.worldclim.org	2022.05
6. Minimum Temperature of Coldest Month (°C)	MTCM	http://www.worldclim.org	2022.05
7. Temperature Annual Range (°C)	TAR	http://www.worldclim.org	2022.05
8. Mean Temperature of Wettest Quarter (°C)	MTWeQ	http://www.worldclim.org	2022.05
9. Mean Temperature of Driest Quarter (°C)	MTDQ	http://www.worldclim.org	2022.05
10. Mean Temperature of Warmest Quarter (°C)	MTWaQ	http://www.worldclim.org	2023.05
11. Mean Temperature of Coldest Quarter (°C)	MTCQ	http://www.worldclim.org	2022.05
12. Annual Precipitation (mm)	AP	http://www.worldclim.org	2022.05
13. Precipitation of Wettest Month (mm)	PWM	http://www.worldclim.org	2022.05
14. Precipitation of Driest Month (mm)	PDM	http://www.worldclim.org	2022.05
15. Precipitation Seasonality	PS	http://www.worldclim.org	2022.05
16. Precipitation of Wettest Quarter (mm)	PWeQ	http://www.worldclim.org	2022.05
17. Precipitation of Driest Quarter (mm)	PDQ	http://www.worldclim.org	2022.05
18. Precipitation of Warmest Quarter (mm)	PWaQ	http://www.worldclim.org	2022.05
19. Precipitation of Coldest Quarter (mm)	PCQ	http://www.worldclim.org	2022.05
20. Potential Evapotranspiration (mm)	PET	https://cgiarcsi.community	2022.07
21. Aridity Index	AI	https://cgiarcsi.community	2022.07
Soil factors (5)			
22. Soil pH	pH	http://www.geodata.cn	2022.06
23. Soil Organic Carbon Content (g/kg)	SOC	http://www.geodata.cn	2022.06
24. Soil Cation Exchange Capacity (cmol (+)/kg)	CEC	http://www.geodata.cn	2022.06
25. Soil Total Nitrogen (g/kg)	TN	http://www.geodata.cn	2022.06
26. Soil Total Phosphorus (g/kg)	TP	http://www.geodata.cn	2022.06
Habitat heterogeneity factors (3)			
27. Elevational Range (m)	ER	Transformed from elevation data	/
28. Mean Annual Temperature Range (°C)	TR	Transformed from MAT	/
29. Mean Annual Precipitation Range (mm)	PR	Transformed from AP	/

Table S2 Pearson correlation analysis of climate factors

	MAT	MDR	Iso	TS	MTWM	MTCM	TAR	MTWeQ	MTDQ	MTWaQ	MTCQ	MAP	PWM	PDM	PS	PWeQ	PDQ	PWaQ	PCQ	PET	AI
MAT	1.00																				
MDR	0.51	1.00																			
Iso	-0.15	0.67	1.00																		
TS	0.64	0.01	-0.73	1.00																	
MTWM	0.98	0.47	-0.25	0.76	1.00																
MTCM	0.93	0.46	0.02	0.36	0.86	1.00															
TAR	0.77	0.36	-0.45	0.93	0.87	0.49	1.00														
MTWeQ	0.98	0.46	-0.25	0.75	0.99	0.86	0.85	1.00													
MTDQ	0.90	0.67	0.20	0.33	0.84	0.93	0.53	0.83	1.00												
MTWaQ	0.98	0.42	-0.30	0.78	1.00	0.86	0.87	0.99	0.82	1.00											
MTCQ	0.94	0.62	0.14	0.35	0.87	0.98	0.53	0.87	0.96	0.86	1.00										
MAP	-0.52	-0.74	-0.46	-0.09	-0.49	-0.51	-0.34	-0.50	-0.67	-0.46	-0.60	1.00									
PWM	-0.69	-0.65	-0.22	-0.32	-0.69	-0.66	-0.53	-0.67	-0.76	-0.65	-0.71	0.93	1.00								
PDM	-0.19	-0.65	-0.65	0.27	-0.12	-0.24	0.03	-0.17	-0.41	-0.09	-0.34	0.80	0.55	1.00							
PS	-0.34	0.43	0.75	-0.60	-0.40	-0.27	-0.42	-0.35	-0.11	-0.42	-0.15	-0.34	0.02	-0.69	1.00						
PWeQ	-0.65	-0.66	-0.25	-0.30	-0.65	-0.62	-0.50	-0.63	-0.73	-0.61	-0.67	0.94	0.99	0.58	-0.03	1.00					
PDQ	-0.19	-0.65	-0.66	0.27	-0.12	-0.23	0.03	-0.17	-0.40	-0.09	-0.34	0.79	0.54	1.00	-0.71	0.56	1.00				
PWaQ	-0.65	-0.65	-0.23	-0.31	-0.66	-0.63	-0.51	-0.64	-0.74	-0.62	-0.67	0.93	0.99	0.54	0.00	1.00	0.52	1.00			
PCQ	-0.18	-0.64	-0.65	0.27	-0.11	-0.22	0.03	-0.16	-0.37	-0.08	-0.33	0.76	0.50	0.99	-0.73	0.53	0.99	0.48	1.00		
PET	0.88	0.61	-0.03	0.60	0.89	0.77	0.76	0.90	0.80	0.88	0.82	-0.69	-0.78	-0.37	-0.10	-0.76	-0.37	-0.76	-0.37	1.00	
AI	-0.58	-0.62	-0.27	-0.24	-0.57	-0.56	-0.44	-0.57	-0.65	-0.55	-0.61	0.92	0.91	0.61	-0.17	0.92	0.60	0.92	0.58	-0.73	1.00

Table S3 Multicollinearity test of 9 environmental factors

ENV	MAT	MDR	TS	MAP	PS	pH	CEC	ER	PR
VIF	5.47	4.30	3.66	5.15	3.01	4.89	5.54	4.61	5.18

Table S4 Comparison of AIC values in unary regression models

Trait	Longitude		Latitude		Elevation	
	AIC1	AIC2	AIC1	AIC2	AIC1	AIC2
MPH	1209.413	1210.109	1071.8797	885.5732	351.824	271.6738
LS	946.6768	947.5422	369.7844	326.4829	700.1351	616.6691
FFT	-240.9111	-239.9863	-494.0764	-707.0112	-1081.607	-1232.295
FD	-89.51976	-87.72137	-82.53911	-349.48574	-605.4542	-740.088

Note: We selected the best models according to the AIC weight. AIC1 represents the linear regression fitting value, and AIC2 represents the quadratic regression fitting value. The model fit was quadratic regression in latitudinal and elevational gradient, and linear in longitudinal gradient.