

Table S1 The summary of plant functional trait type and their data type

Functional trait type	Date type	Functional trait
Flowering period	Numerical	The month begins to blossom
Fruit ripening period	Numerical	The month of ripening fruit
Fruit type	Name	1: Caryopsis; 2: Capsule; 3: Achene; 4: Silicle; 5: Nut; 6: Utricle; 7: Berry; 8: Legume; 9: Cremocarp; 10: Follicle; 11: Silique; 12: Cone
Growth form	Name	1: Shrub (SH); 2: Sub-shrub (SS); 3: Perennial bunchgrass (PB); 4: Perennial rhizome grass (PR); 5: Perennial Sedges (PS); 6: Perennial forbs (PF); 7: Annual and biennials herbs (AB)
Inflorescence	Name	1: Capitulum; 2: Spike; 3: Single; 4: Panicle; 5: Monochasium; 6: Raceme; 7: Dichasium; 8: Whorled Umbel; 9: Umbel; 10: Compound Umbel; 11: Compound Capitulum; 12: Corymb
Length of the flowering period	Numerical	Number of months of flowering
Life form	Name	1: Phanerophytes (P); 2: Chamaephytes (C); 3: Hemicryptophytes (H); 4: Cryptophytes (Cr); 5: Therophytes (T)

Petiole	Binary data	0: No; 1: Yes
Phyllotaxy	Name	1: Alternate; 2: Base; 3: Opposite; 4: Fascicled; 5: Scattered; 6: Whorled
Single or Compound leaf	Name	1: Single; 2: Compound leaf
Water ecotypes	Name	1: Superxerophyte (SX); 2: Xerophyte (X); 3: Xero-mesophyte (XM); 4: Meso-xerophyte (MX); 5: Mesophyte (X)
leaf length	Numerical	
leaf width	Numerical	
plant height	Numerical	

Table S2 Principal component analysis (PCA) results of paleoclimate climate change
and current climate variables

Variables		Component 1
Present climate	AI	0.71
	MAT	-0.71
	Cumulative (%)	70.30
Paleoclimate change	AMAT _{mid}	0.62
	AMAT _{lgm}	0.62
	AMAP _{lgm}	-0.48
	Cumulative (%)	64.67