Rapid topographic growth of the Diancang Shan, southeastern margin of the Tibetan Plateau since 5.0–3.5 Ma

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Introduction

This supplementary material contains one section of text (Text S1), one supplementary figure (Figure S1), and one table (Table S1).

Text S1

Climate reconstruction method base on pollen data

The Modern Analogue Technique (MAT) is a commonly used method for reconstructing past climate (Overpeck et al., 1985). This approach was based on the measure of the degree of similarity between fossil pollen and modern pollen (Chevalier et al., 2020).

This analogue-based approach avoided to fit the pollen-climate models, thus outperformed other regression-based approach (such as weighted averaging-partial least squares, WA-PLS) (ter Braak and Juggins, 1993; Zhang et al., 2022). However, this approach might suffer from the so-called 'no-analogue' problem (Chevalier et al., 2020). The pollen taxa-PFT transformation scheme was later developed to address this problem (Peyron et al., 1998). The plant function types (PFTs) are groups of plants characterized by common phenological and climate constraints, thus the taxa with no modern analog can be replaced by other taxa within the same PFT group (Mauri et al., 2015; Prentice et al., 1992). The PFT-based MAT method has been widely employed in the paleoclimate reconstruction (Davis et al., 2003; Peyron et al., 1998; Zhang et al., 2022).
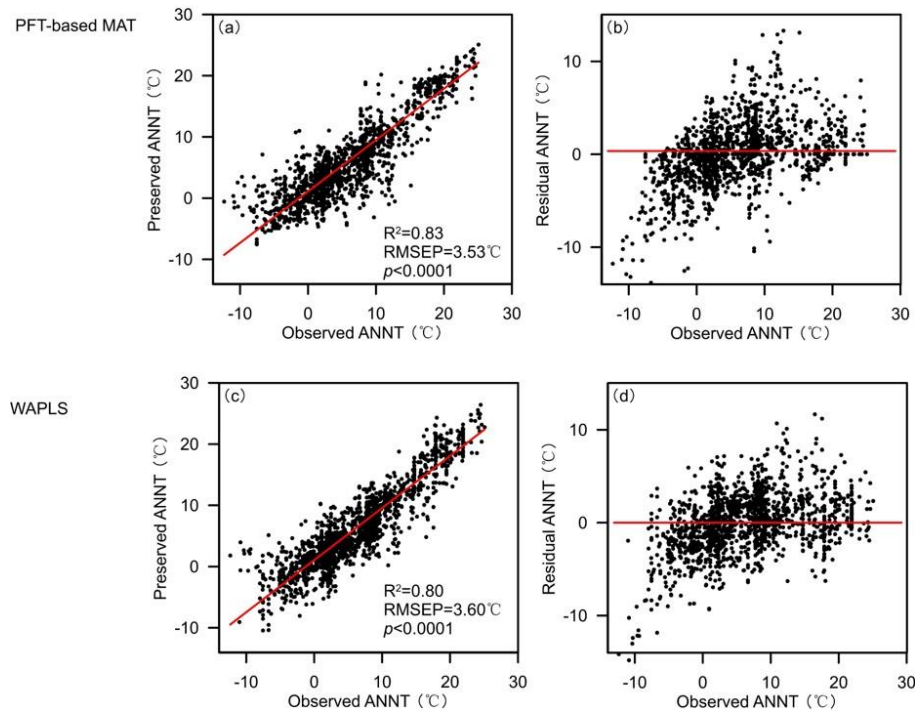

Figure S1. Scatter plots and residuals of observed vs. predicted *ANNT* based on PFT-based Modern Analogue Technique (MAT, k=6) and weighted-average partial least squares (WAPLS, component=3) estimated by bootstrapping cross-validation.

Table S1. Thermochronological data from the eastern and southern margins of DCS

Site	Age (Ma)	Range	Mineral	Reference
	4.3	0.1		
	4.5	-		
	5.0	-	K-feldspar	(Leloup et al., 1993)
	4.5	-		
	4.7	-		
	4.5	-		
Southern margin of DCS	5.97	0.04		
	4.34	0.13		
	5.0	-		
	5.74	0.2	K-feldspar	
	7.0	-		(Cao et al., 2011)
	4.58	0.15		
	7.64	0.04		
	5.1	0.27		
	6.44	0.14	Biotite	
	6.4	0.3		
	6.6	1.3	Biotite	
	5.9	0.4	K-feldspar	
	4.21	0.02		
	3.48	0.17		
	3.99	0.13		
	3.59	0.06		
	4.4	0.11		
	5.96	0.82		
	4.67	0.57		
	6.44	0.05		
	5.22	0.42		
	5.54	1.25		
Eastern margin of DCS	5.44	0.96		
	7.72	0.54		(Li et al., 2012)
	8.22	0.09	Apatite	
	6.47	1.02		
	4.15	2.65		
	5.82	0.44		
	6.02	0.12		
	4.28	0.02		
	3.53	0.17		
	4.04	0.13		
	3.63	0.06		
	4.46	0.11		
	6.07	0.82		
	4.8	0.57		
	6.52	0.05		

5.36	0.43		
5.71	1.26		
5.59	0.96		
7.83	0.55		
3.79	0.09		
6.63	1.03		
8.74	0.11		
4.44	-		
6.1	0.44		
2.72	0.47	Illite	(Han et al., 2011)

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