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Supplemental Material

Figure S1. E/I inclination shallowing corrections of the ChRM directions from the studied Yunlong Formation.

Table S1. Cretaceous–Oligocene paleomagnetic results from the Lanping-Simao terrane and the eastern Qiangtang terrane.

Table S2. Paleomagnetic rotation results in the Gonjo, Mangkang, Lanping, Yunlong, and Mengla area.

Supporting Material for

Moderate magnitude clockwise rotation of the Yunlong Basin: implications for synchronous Eocene rotation of the Southeastern Tibetan Plateau

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Tables S1 to S2

Introduction

This supporting information includes one figure and two tables that present the previous published paleomagnetic results and our new result. Figure S1 shows the E/I inclination shallowing correction results. Table S1 is a collection of Cretaceous-Oligocene paleomagnetic results in the Lanping-Simao Terrane and the eastern Qiangtang Terrane. Table S2 is the rotational magnitude of different localities around the Eastern Himalaya Syntaxis.

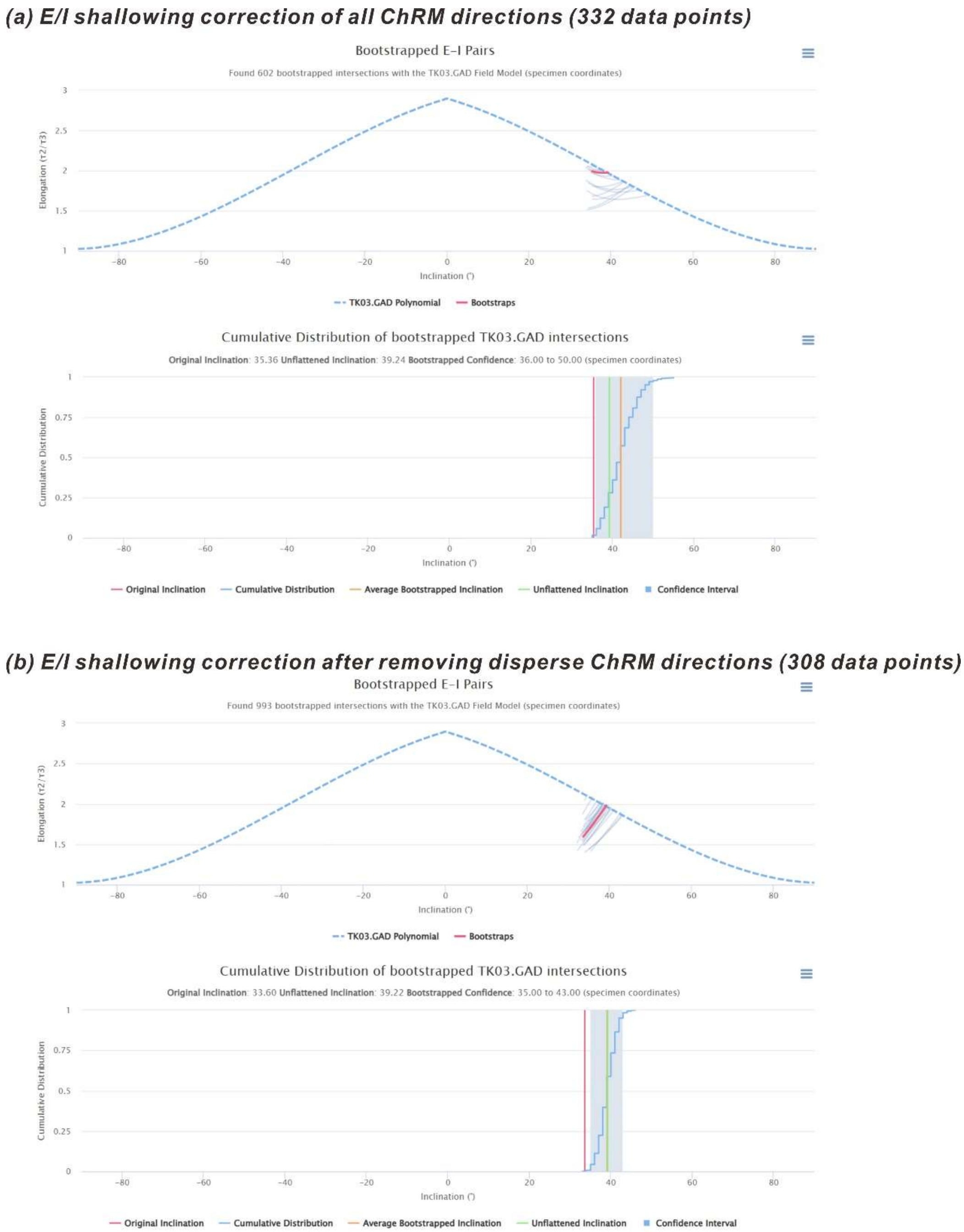

Figure S1. E/I inclination shallowing corrections of the ChRM directions from the studied Yunlong Formation. (a) The mean inclination of 332 ChRM directions increases from 35.36° to 39.24° (confidence interval: 36-50°); (b) The mean inclination of 308 ChRM directions increases from 33.6° to 39.22° (confidence interval: 35-43°) after removing 24 dispersed data points. Given the present latitude of 25.9°N, with respect to the Eurasian reference, it suggests ~530 ± 280 km northward movements of basin since 79-61 Ma.

Table S1. Cretaceous-Oligocene paleomagnetic results from the Lanping-Simao Terrane and the eastern Qiangtang Terrane

Location	Latitude (°/N)	Longitude (°/E)	Formation	N(n)	Age	Dec (s)	Inc (s)	α_{95}	strike	95% CI	δstrike	δD	Reliability criteria	Reference
Lanping-Simao Terrane														
Yunlong	25.8	99.4	Nanxin	20	K1 (126-100 Ma)	40.2	49.9	3.9	146.1	5.5	0	40.2	1,2,4,5	Sato et al. (1999)
Yunlong	25.7	99.4	Nanxin+Hutousi	9	K1 (126-100 Ma)	34.0	52.4	7.3	146.1	5.5	0	34.0	1,2,3,4,5	Yang et al.(2001a)
Yongping	25.5	99.5	Jingxing	12	K1 (126-100 Ma)	42.0	51.1	15.7	150.1	6.2	4.0	38.0	1,2,4,5	Funahara et al. (1993)
Weishan	25.2	100.2	Nanxin+Hutousi	18	K1 (126-100 Ma)	64.3	48.5	4.7	169.7	9.2	23.6	40.7	1,2,3,4,5	Tong et al. (2014)
Jingdong	24.5	100.8	Nanxin	13	K1 (126-100 Ma)	8.3	48.8	7.7	152.3	4.0	6.2	2.1	1,2,4,5	Tanaka et al. (2008)
Zhenyuan	24.0	101.1	Nanxin	7	K1 (126-100 Ma)	61.8	46.1	8.1	172.1	5.7	26.0	35.8	1,2,4,5	Tanaka et al. (2008)
Zhenyuan	23.94	101.24	Mangang	8	K1 (126-100 Ma)	52.4	45.5	6.3	172.1	5.7	26.0	26.4	1,2,3,4,5	Zhang et al. (2012)
Jinggu	23.5	100.4	Mangang	47	K1 (126-100 Ma)	77.0	43.0	2.9	190.2	3.8	44.1	32.9	1,2,3,4,5	Gao et al. (2015)
Puer	23.0	101.0	Nanxin+Jingxing	25	K1 (126-100 Ma)	59.9	45.2	5.1	156.7	3.1	10.6	49.3	1,2,3,4,5	Sato et al. (2007)
Puer	22.74	101.11	Mangang	14	K1 (126-100 Ma)	46.2	46.6	5.6	156.7	3.1	10.6	35.6	1,2,3,4,5	Zhang et al. (2012)
Zhengwan	22.8	100.9	Nanxin	11	K1 (126-100 Ma)	51.8	47.9	6.9	156.1	3.1	10.0	41.8	1,2,4,5,6	Kondo et al. (2012)
Mengla	21.5	101.7	Mangang&Wushahe	14	K1 (126-100 Ma)	46.9	42.2	7.7	164.1	9.5	18.0	28.9	1,2,3,4,5	Tong et al. (2013)
Mengla	21.4	101.6	Nanxin&Jingxing	13	K1 (126-100 Ma)	51.2	46.4	5.6	164.1	9.5	18.0	33.2	1,2,4,5	Tanaka et al. (2008)
Dadugang	22.4	101.0	Nanxin	12	K1 (126-100 Ma)	64.1	48.1	7.3	144.1	5.6	-2.0	66.1	1,2,4,5	Kondo et al. (2012)
Menglun	21.9	101.2	Mangang&Wushahe	19	K1 (126-100 Ma)	46.2	45.9	11.0	113.9	9.8	-32.0	78.4	1,2,3,4,5	Tong et al. (2013)
Yunlong	25.8	99.4	Yunlong	34	75-61 Ma	56.0	34.3	2.7	146.1	5.5	0	56.0	1,2,3,5,6	This study
Lanping	26.0	99.4	Baoxiangsi&Denghei	9	E (56-34 Ma)	86.1	39.8	11.2	191.5	6.3	45.4	40.7	1,2,4,5	Sato et al. (2001)
Lanping	26.0	99.4	Baoxiangsi	12	E (56-34 Ma)	84.5	39.4	9.6	191.5	6.3	45.4	39.1	1,2,3,4,5	Yang et al. (2020)
Mengla	21.5	101.7	Xiaoyakou	11	E (56-34 Ma)	51.7	33.4	8.7	164.1	9.5	18.0	33.7	1,2,3,4,5,6	Yang et al. (2001b)
Mengla	21.5	101.7	Datangwan	17	E-O (56-23 Ma)	41.8	23.8	5.8	164.1	9.5	18.0	23.8	1,2,3,4,5	Tong et al. (2013)

Yunlong	*25.7*	*99.4*	*Jingxing*	*(23)*	*K1*	*59.7*	*41.0*	*11.9*	*146.1*	*5.5*			*1,5,6*	*Yang et al. (2001a)*
Wuyin	*25.1*	*100.1*	*Jingxing*	*6*	*K1*	*15.4*	*44.8*	*4.6*	*154.9*	*11.0*			*1,3,4,5*	*Tong et al. (2014)*
Zhenyuan	*24.0*	*101.1*	*Nanxin*	*4*	*K1*	*324.2*	*-49.4*	*6.4*	*172.1*	*5.7*			*1,4,5*	*Tanaka et al. (2008)*
Jinggu	*23.5*	*100.7*	*Mengla*	*(32)*	*E-O*	*84.7*	*38.9*	*7.6*	*190.2*	*3.8*			*1,2,5*	*Chen et al. (1995)*
Jinggu	*23.5*	*100.8*	*Mengla*	*6*	*E3-O*	*73.1*	*39.9*	*11.8*	*190.2*	*3.8*			*1,2,5*	*Yang et al.(2001b)*
Jinggu	*23.5*	*100.8*	*Mengyejing*	*(35)*	*P*	*23.9*	*51.6*	*7.8*	*190.2*	*3.8*			*1,2,5*	*Chen et al. (1995)*
Jinggu	*23.5*	*100.7*	*Mengyejing*	*12*	*P*	*36.1*	*31.5*	*8.4*	*190.2*	*3.8*			*Remag*	*Li et al. (2017)*
Jinggu	*23.5*	*100.7*	*Lower Denghei*	*12*	*E*	*35.2*	*35.7*	*6.5*	*190.2*	*3.8*			*Remag*	*Li et al. (2017)*
Jinggu	*23.5*	*100.7*	*Upper Denghei*	*18*	*E*	*53.0*	*33.6*	*4.3*	*190.2*	*3.8*			*Remag*	*Li et al. (2017)*
Jinggu	*23.5*	*100.7*	*Lower Mengla*	*11*	*E-O*	*38.4*	*37.3*	*9.7*	*190.2*	*3.8*			*Remag*	*Li et al. (2017)*
Jinggu	*23.5*	*100.7*	*Middle Mengla*	*17*	*E-O*	*38.6*	*33.0*	*5.7*	*190.2*	*3.8*			*Remag*	*Li et al. (2017)*
Jinggu	*23.5*	*100.7*	*Upper Mengla*	*14*	*E-O*	*50.8*	*31.8*	*5.8*	*190.2*	*3.8*			*Remag*	*Li et al. (2017)*
Jinggu	*23.4*	*100.9*	*Mangang*	*8*	*K1*	*79.4*	*43.3*	*9.1*	*190.2*	*3.8*			*1,2,5*	*Huang et al. (1993)*
Jinggu	*23.4*	*100.6*	*Mangang*	*7*	*K1*	*295.8*	*-36.0*	*6.3*	*190.2*	*3.8*			*1,4,5*	*Chen et al. (1995)*
Jinggu	*23.4*	*100.4*	*Jingxing*	*(10)*	*K1*	*84.4*	*39.6*	*17.8*	*190.2*	*3.8*			*1,5*	*Chen et al. (1995)*
Menglun	*21.9*	*101.2*	*Mankuanhe*	*6*	*K2*	*33.2*	*30.9*	*8.2*	*113.9*	*9.8*			*1,3,4,5*	*Tong et al. (2013)*
Mengban	*21.8*	*101.6*	*Mengyejing& Xiaoyakou*	*6*	*P+E*	*43.5*	*2.0*	*13.4*	*158.4*	*12.0*			*1,3,5*	*Tong et al. (2013)*
Mengban	*21.8*	*101.6*	*Mankuanhe& Mangang*	*4*	*K1*	*50.5*	*31.0*	*6.4*	*158.4*	*12.0*			*1,3,4,5*	*Tong et al. (2013)*
Mengla	*21.6*	*101.4*	*Mangang*	*10*	*K1*	*60.8*	*37.8*	*7.6*	*167.7*	*9.5*			*1,2,5*	*Huang et al. (1993)*
Yunlong (mean)	25.7	99.4	Nanxin+Hutousi	29	K1 (126-100 Ma)	37.6	51.1	3.6	146.1	5.5	0	34.0	1,2,3,4,5	Yang et al.(2001a)
Lanping-Simao (mean)					K1	36.3	47.2	2.8						
Lanping-Simao (mean)					E	37.7	37.6	7.1						

Eastern Qiangtang Terrane														
Mangkang	29.7	98.4	lawula	20	36.4-33.4 Ma	62.2	47.6	5.5	168.4	6.6			1,2,3,4,5	Xu et al., (2024)
Gonjo	31.0	98.2	Gonjo&Ranmugou	27	67-52 Ma	50.1	26.6	2.7	143.1	5.3			1,2,3,4,5,6	Li et al., (2020)
Gonjo	31.0	98.2	Ranmugou	11	48-41 Ma	32.8	24.5	4.0	143.1	5.3			1,2,3,4,5,6	Li et al., (2020)
Mangkang	*29.7*	*98.6*	*Laoran*	*5 (15)*	*K*	*48*	*56*	*8.8*	*168.4*	*6.6*			*5*	Otofuji et al. (1990)

Note: N(n): number of sampling sites(specimens); Dec(s): declinations after tilt-correction; Inc(s): inclinations after tilt-correction; α_{95}: radius of the circle of 95% confidence of the paleomagnetic directions; strikes: mean directions of the tectonic lines; 95% CI: 95% confidence interval of the strikes; δstrike: differences between the strikes and the reference strike (146.1°); δD: declinations after subtracting δstrike; K1: Early Cretaceous; K2: Late Cretaceous; P: Paleocene; E: Eocene; O: Oligocene. Data reliability criteria are referred to Meert et al. (2020). The data in italic are excluded to further analyses due to low reliability.

Table S2. Paleomagnetic rotation results in the Gonjo, Mangkang, Lanping, Yunlong and Mengla area

Name	Location (°N/°E)	Age (Ma)	Middle Age (Ma)	N	Observed poles			R	δR	Reference
					Lat. (°N)	Lon. (°E)	A_{95}			
Gonjo	31/98.2	67-52	59.5	27	41.2	196.8	2.7	37.5	5.7	Li et al. (2020)
Gonjo	31/98.2	48-41	44.5	11	55.9	213.3	3.1	23.9	11.0	Li et al. (2020)
Mangkang	29.7/98.6	36.4-33.4	34.9	20	36.4	173.1	4.8	53.0	8.0	Xu et al. (2024)
Lanping	26/99.4	45-34	39.5	12	14.3	171.2	10.0	74.2	11.7	Yang et al. (2020)
Yunlong	25.8/99.4	79-61	70.0	31	38.1	185.0	2.3	45.2	5.1	This study
Yunlong	25.7/99.4	126-100	113.4	9	59.6	167.4	9.2	23.3	10.6	Yang et al. (2001a)
Yunlong	25.7/99.4	126-100	113.4	20	54.4	171.9	4.4	31.0	7.2	Sato et al. (1999)

Note: N: number of sampling sites; Lat. and Lon.: latitudes, longitudes of the paleomagnetic poles; A_{95}: radius of the circle of 95% confidence of the paleomagnetic poles; R: rotations with respected to Eurasian reference poles; δR: errors of rotations. Rotations are calculated by the online application www.APWP-online.org (Vaes et al., 2023)

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