

Table S2: Model output and calculation of the SSB, durations of carbon excursion, substage and hiatus, and detailed model parameters for each age depth model of each section

Model Parameters								
	Laren			Qiakong			Shanggan	
#d.min	0			0			0	
#d.max	2075			1700			2000	
#d.by	1			1			1	
#depths.file	0			0			0	
#slump								
#acc.mean	0.4	1		1.6	0.24	0.8	0.4	0.8
#acc.shape	1.5	1.5		1.5	1.5	1.5	1.5	1.5
#mem.mean	0.2			0.2			0.2	
#mem.strength	1.5			1.5			1.5	
#boundary		NA		NA			NA	
#hiatus.depths	775			40	1410		780	
#hiatus.max	5.00E+05			5.00E+05			5.00E+05	
#hiatus.max	5.00E+05			5.00E+05			5.00E+05	
#BCAD	0			0			0	
#cc	1			1			1	
#postbomb	0			0			0	
#cc1		IntCal13			IntCal13		IntCal13	
#cc2		Marine13			Marine13		Marine13	
#cc3		SHCal13			SHCal13		SHCal13	
#cc4		ConstCal			ConstCal		ConstCal	
#unit		cm			cm		cm	
#normal	1			1			1	
#t.a	23			23			23	
#t.b	24			24			24	
#delta.R	0			0			0	
#d.STD	0			0			0	
#prob	0.95			0.95			0.95	

Input ages and ash layer depth					
Laren		Qiakong		Shanggan	
labid,age,error,depth,cc		labid,age,error,depth,cc		labid,age,error,depth,cc	
CHIN10,248853,043,0,0		qia13t,248250,033,0,0		SHA301t,248860,055,0,0	
230214,248870,125,35,0		qia12t,248893,046,330,0		sha306t,249070,045,530,0	
230214,248970,080,319,0		qia11t,248950,245,770,0		SHA359T,249341,050,840,0	
LAR206,249344,065,809,0		qia9t,249110,044,1346,0		SHA339T,249740,060,1362,0	
CHIN40,250647,032,2075,0		qia7t,249292,044,1547,0		SHA303T,250116,042,1710,0	

Table S2 (continued)

Qiakong	Depth (cm)	Age [ka]					Duration [ka]		2σ	Duration[ka]	2σ
		min	max	median	mean	2σ					
Black Band Marker (Base)	1098	248997	249120	249059	249059	62	Black Band Marker (after SSB) Hiatus (equiv. NZ) Preserved CIE, only in Qiakong (Pink) Preserved CIE (Blue only)	74	87		
								64	105		
Base nodular limestone	1409.9999	249071	249194	249134	249133	62		95	122		
Below nodular Limestone	1410	249117	249287	249196	249197	85		328	140		
QIA7T					249292	88					
							Total CIE (incl. Hiatus)			487	126
							Total CIE (Blue + Pink)			423	139
Base positive CIE	1940	249514	249733	249618	249620	110	Response time atmospheric C reservoir	135	164		
Base Black Shales	2108	249637	249881	249754	249755	122	Duration Unit IVb			622	137
Laren	Depth (cm)	Age [ka]					Duration [ka]		2σ	Duration[ka]	2σ
		min	max	median	mean	2σ					
TAZ	659	249035	249202	249118	249118	84	Duration TAZ	49	120		
CHIN10	0				248853	86	Early Spathian	314	122		
Black Band Marker (Base)	649	249021	249189	249104	249104	84	Black Band Marker (after SSB) Total CIE (incl. Hiatus) Hiatus Duration GXZ Duration AWZ Preserved CIE				
								63	121		
Base nodular limestone	774.9999	249080	249253	249166	249167	87				444	144
Below nodular Limestone carbon peak	775	249202	249429	249315	249315	114		148	143		
GXZ	830	249264	249478	249371	249371	107					
	830	249264	249478	249371	249371	107		76	153		
	905	249339	249558	249447	249447	110					
AWZ	1008	249441	249667	249552	249552	113		105	157		
Base positive CIE	1065	249496	249727	249610	249611	116					
Base Early Spathian		250615	250679		250647	32		296	162		
Shanggang	Depth (cm)	Age [ka]					Duration [ka]		2σ	Duration[ka]	2σ
		min	max	median	mean	2σ					
Black Band Marker (Base)	580	249018	249166	249091	249091	74	Black Band Marker (after SSB) Hiatus Preserved CIE Total CIE (incl. Hiatus)				
								81	112		
Base nodular limestone	779.9999	249089	249258	249172	249172	85		127	137		
Below nodular Limestone carbon peak	780	249185	249401	249301	249299	108		251	143		
GXZ										378	126
AWZ	908	249316	249490	249401	249402	87					
	1071	249442	249629	249535	249535	94	Duration AWZ	133	128		
Base positive CIE	1089	249457	249643	249550	249550	93					

Boundary Ages [ka]		2σ	Duration substages [ka]		2σ
EMTB	247050	160	Early Triassic	4852	162
Pooled Age Base Nodular Limestone (SSB)	249157	78	Spathian	2107	178
			Smithian	1480	92
PTB	251902	24	Sm+Di+Gs	2745	81

Qiakong	Depth (cm)	Ages [ka]					UAZ Duration [ka]		Separation Interval [ka]	
		min	max	median	mean	2σ	min	max		2σ
UAZ1	out of age model									
UAZ2	out of age model									
UAZ2	out of age model									
UAZ2	out of age model									
UAZ3	24.59	249898	250190	250037	250038	146	157	198		
	22.64	249751	250019	249879	249881	134			24	188
UAZ4	22.34	249729	249992	249855	249857	132	338	165		
	18.15	249423	249623	249518	249519	100			28	139
UAZ5	17.80	249398	249592	249490	249491	97	38	134		
	17.33	249365	249549	249452	249453	92			189	120
UAZ6	14.96	249191	249346	249263	249264	78	134	99		
	13.96	249068	249190	249130	249130	61			10	86
UAZ7	13.53	249058	249180	249120	249120	61	274	88		
	2.15	248782	248908	248846	248846	63				
UAZ8	out of age model									
	out of age model									

Laren	Depth (m)	Ages [ka]					UAZ Duration [ka]		Separation Interval [ka]	
		min	max	median	mean	2σ	min	max		2σ
UAZ1	20.55	250562	250691	250628	250628	65	52	98		
	20.13	250502	250649	250577	250576	74			127	115
UAZ2	18.86	250358	250536	250450	250449	89	239	139		
	16.51	250100	250314	250211	250210	107			361	159
UAZ3	12.98	249730	249965	249850	249849	118	281	163		
	10.23	249456	249683	249567	249568	114			34	160
UAZ4	9.90	249421	249647	249534	249534	113	69	158		
	9.22	249356	249577	249464	249465	111			109	153
UAZ5										
UAZ6	8.16	249252	249463	249356	249356	106	26	151		
	7.90	249223	249439	249330	249330	108			224	137
UAZ7	6.28	249022	249190	249106	249106	84	157	112		
	2.44	248874	249022	248949	248949	74				
UAZ8	out of age model									
	out of age model									

Shanggang	Depth (m)	Ages [ka]					UAZ Duration [ka]		Separation Interval [ka]	
		min	max	median	mean	2σ	min	max		2σ
UAZ1	out of age model									
UAZ1	out of age model									
UAZ2	19.85	250204	250439	250313	250315	118	701			
	11.67	249521	249704	249614	249614	92			53	131
UAZ3										
UAZ4	11.03	249468	249655	249561	249561	94	138	129		
	9.34	249336	249513	249422	249423	89			37	123
UAZ5	8.89	249302	249472	249386	249386	85	21	118		
	8.63	249284	249449	249365	249365	83			236	114
UAZ6						0	0	0		
						0				
UAZ7	6.75	249051	249207	249129	249129	78	197	109		
	1.86	248856	249007	248932	248932	76			7	107
UAZ8	1.69	248849	249000	248925	248925	76	69	108		
	0	248778	248932	248857	248856	77				

	Depth (cm)	Ages [ka]					Duration [ka]		2σ
		min	max	median	mean	2σ	[ka]	2σ	
Age of the SSB, interval of separation GXZ and TAZ (Laren)	Base nodular limestone (=Base TAZ)	775	249080	249253	249166	249167	86.5	204	138
	GXZ	830	249264	249478	249371	249371	107		
Separation AWZ - OZ Laren	Base AWZ	1008	249441	249667	249552	249552	113	136	162
	Top OZ	1140	249573	249806	249687	249688	117		
Interval of Separation UAZ 5 and 6 Qiakong	Base UAZ 6	1496	249191	249346	249263	249264	77.5	189	120
	Top UAZ5	1732	249365	249549	249452	249453	92		