

Biao Chang, Junhua Huang, Thomas J. Algeo, Richard D. Pancost, Xiaoqiao Wan, Yunsong Xue, Jianzhong Jia, Zhou Wang, Jun Hu, Jiasheng Wang, Sheng Wang, Jiaqi Wu, and Shucheng Xie, 2022, Episodic massive release of methane during the mid-Cretaceous greenhouse: GSA Bulletin, <https://doi.org/10.1130/B36169.1>.

Supplemental Material

Figure S1. Biostratigraphy and lithostratigraphy of the Qiangdong section, showing the distribution of the nine methane-related carbonate beds (QDS-1 to QDS-9) and outcrop photos.

Figure S2. Sample distribution for 2010, 2011, 2013 and 2016 field seasons.

Figure S3. Microscale $\delta^{13}\text{C}_{\text{carb}}$ (‰, VPDB) variation in carbonate concretions.

Figure S4. XRD traces of the different carbonate phases (*mm*, *sp*, *b*, *w*).

Figure S5. The REE patterns of the different carbonate phases (*mm*, *sp*, *b*, *w*).

Table S1. Lithologic and geochemical data of Gambadongshan Formation samples (non-limestone only).

Table S2. Lithologic and geochemical data of Gambadongshan Formation samples (9 limestone nodule horizons).

Table S3. Rare earth element + yttrium (REE+Y) concentration data of Qiangdong section samples (carbonate phase).

Table S4. The isotope data ($\delta^{13}\text{C}$, $\delta^{18}\text{O}$, Δ_{47}) of MDCs.

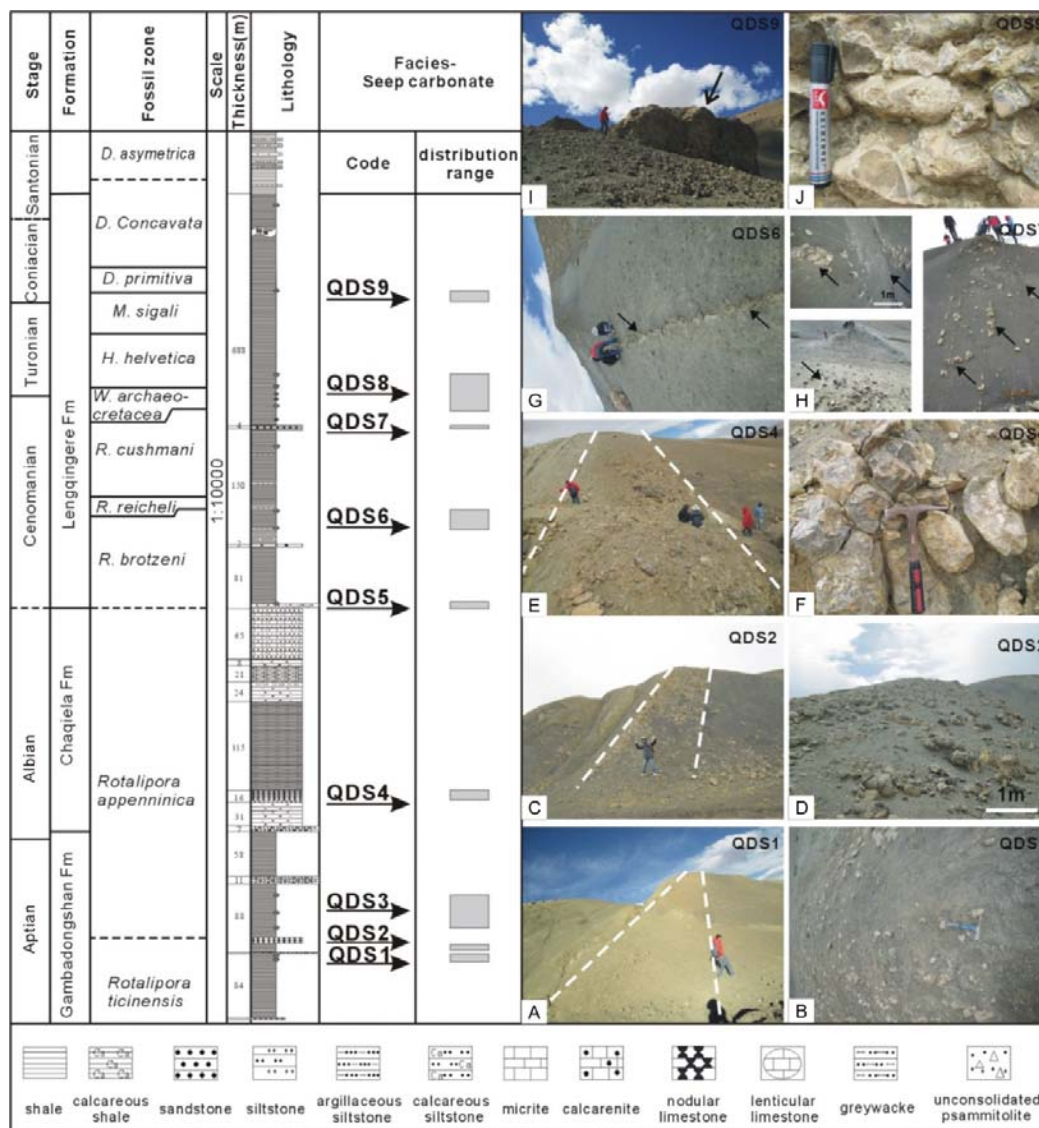


Fig. S1 Biostratigraphy and lithostratigraphy of the Qiangdong section, showing the distribution of the nine methane-related carbonate beds (QDS-1 to QDS-9) and outcrop photos. Note: in A, C and E, the dashed lines bracket the QDS-1, QDS-2, and QDS-4 horizons, respectively; in G, H and I, the black arrows point to methane-related carbonate nodules.

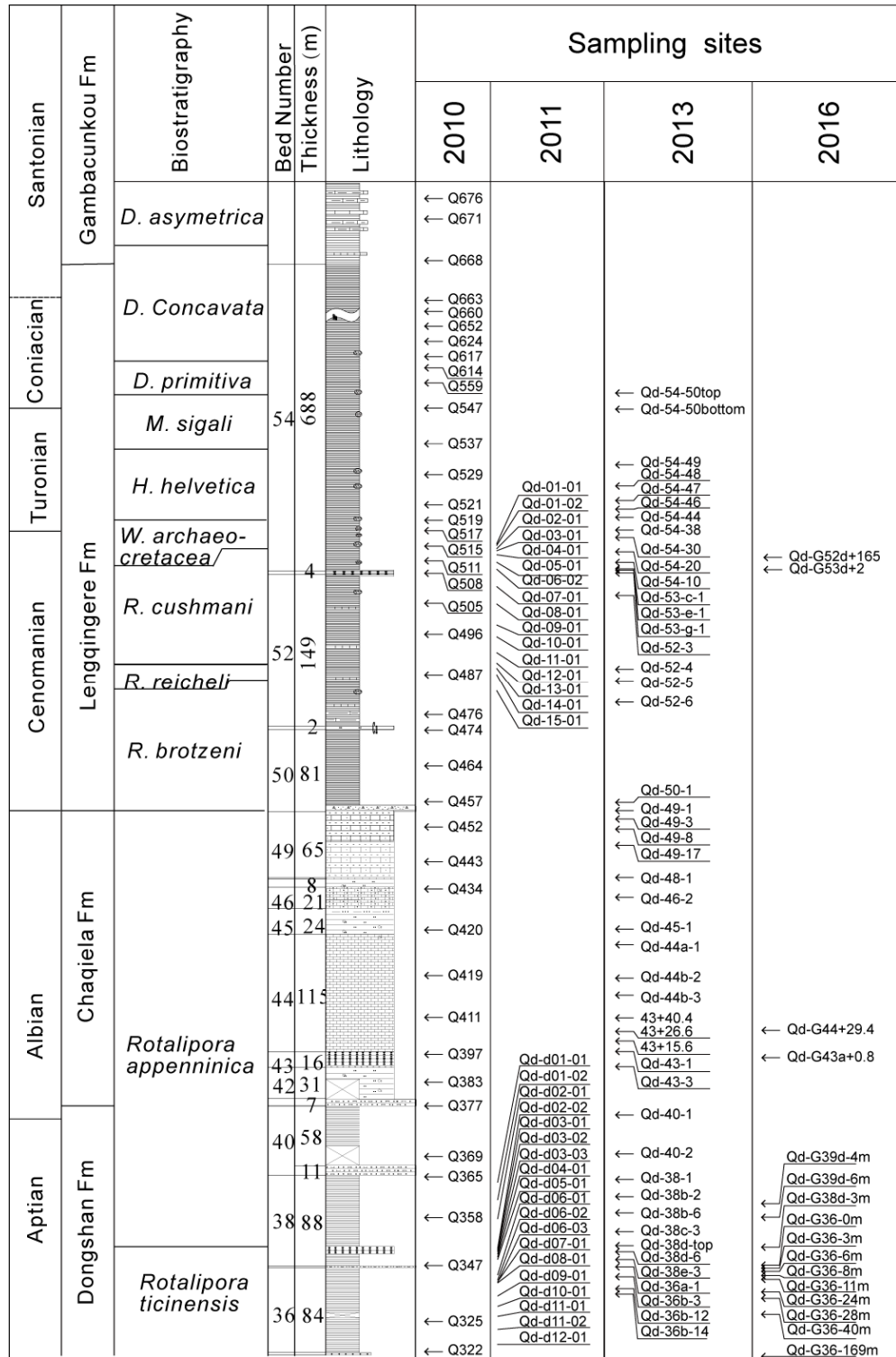


Fig. S2 Sample distribution for 2010, 2011, 2013 and 2016 field seasons. In 2010, the whole section was sampled with a quasi-uniform distribution; in 2011, sampling focused on the QDS-1, QDS-2 and QDS-7 horizons; in 2013, sampling focused on the QDS-1, QDS-4 and QDS-8 horizons with a few samples from other horizons; and in 2016, sampling focused on the QDS-1, QDS-2, QDS-3, QDS-4 and QDS-7 horizons.

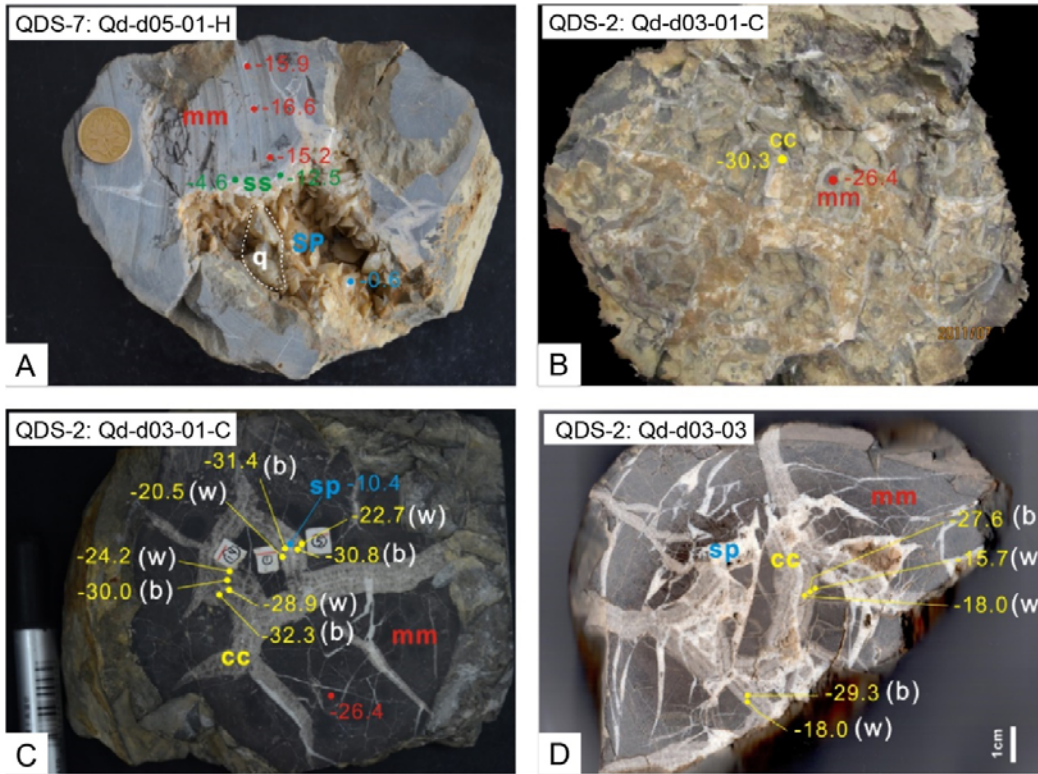


Fig. S3 Microscale $\delta^{13}\text{C}_{\text{carb}}$ (‰, VPDB) variation in carbonate concretions. Abbreviations: micrite matrix (*mm*), calcite cements (*cc*) [including clotted calcite (*clot*), botryoidal calcite (*bc*), finely-crystalline sparite (*sp*) with both of small crystals calcite (*ss*) and equant blocky calcite (*bloc*), yellow calcite (*yc*), black calcite (*b*) and white calcite (*w*)] and quartz (*q*).

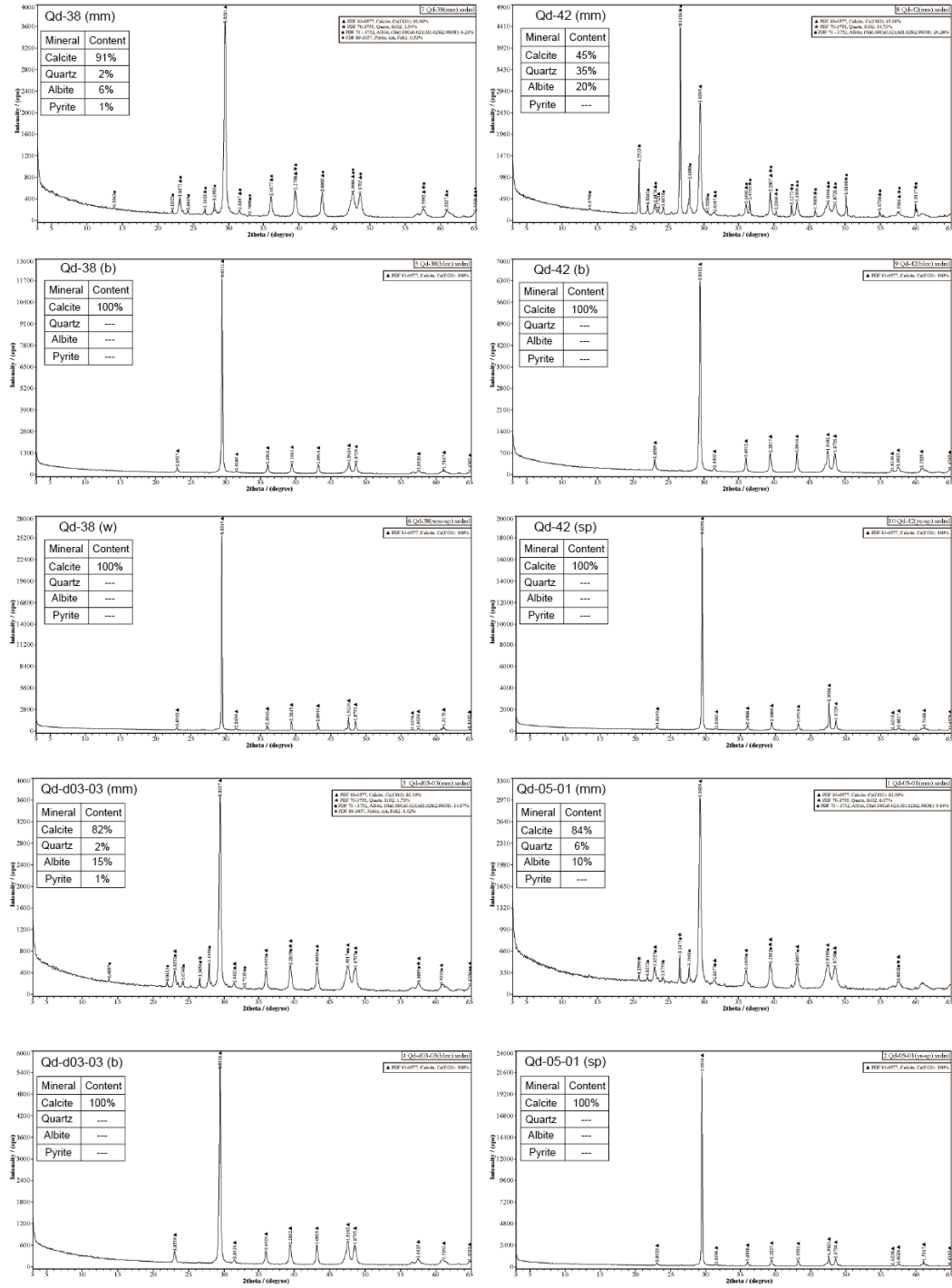


Fig. S4 XRD traces of the different carbonate phases (*mm*, *sp*, *b*, *w*). The *mm* of limestone is mainly composed of calcite, quartz, albite and pyrite, and the *sp*, *b* as well as *w* are almost pure calcite.

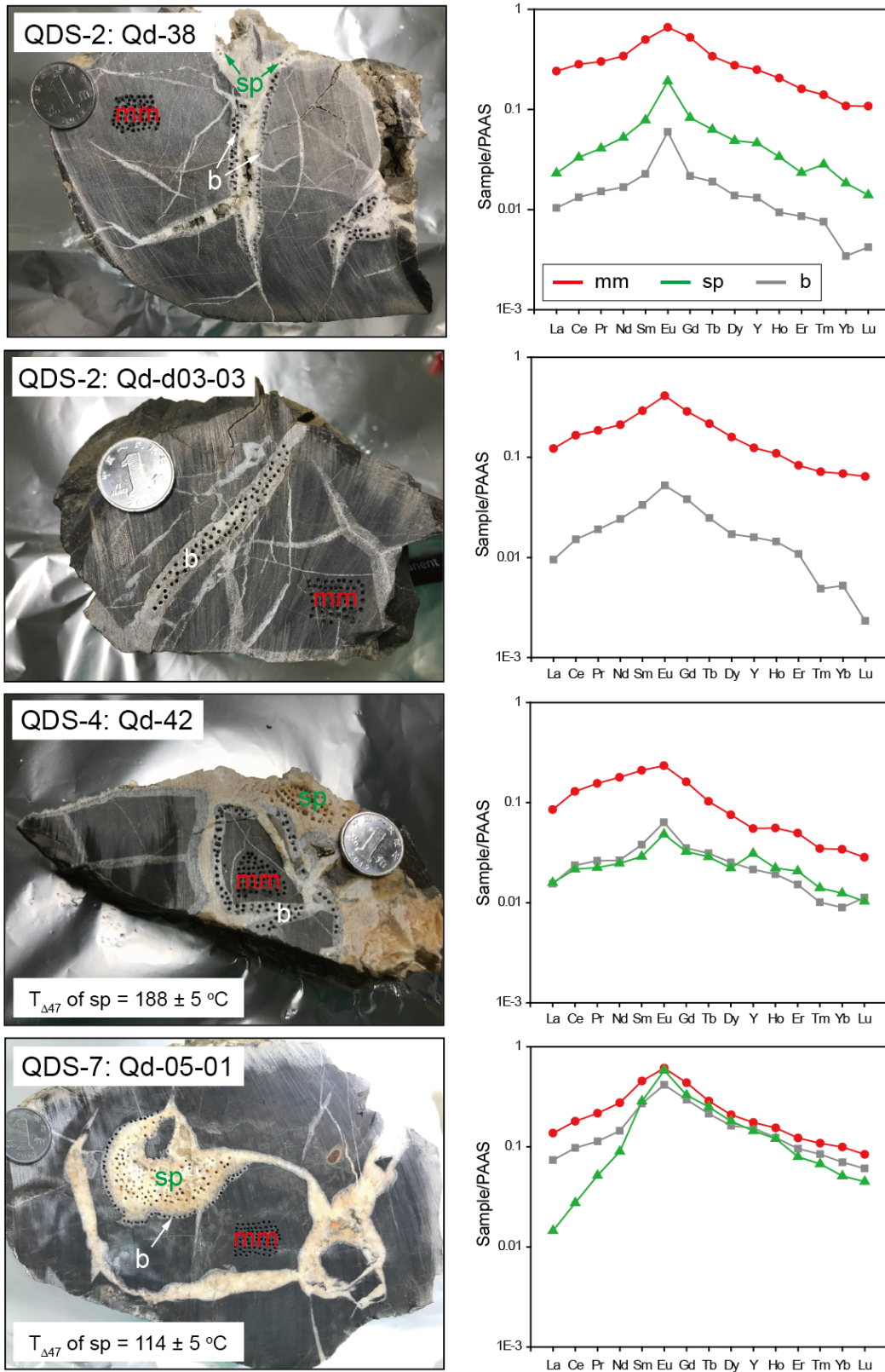


Fig. S5 The REE patterns of the different carbonate phases (*mm*, *sp*, *b*, *w*).

Table S1. Lithologic and geochemical data of Gambadongshan Formation samples (non-limestone only)

Sample No.	Lithology	Depth (m)	$\delta^{13}\text{C}_{\text{carb}}$ (VPDB, ‰)	$\delta^{18}\text{O}_{\text{carb}}$ (VPDB, ‰)	$\delta^{13}\text{C}_{\text{org}}$ (VPDB, ‰)	TOC (%)	TIC (%)
Q559	calcareous mudstone	931.4	0.73	-9.13	-25.31		
Q558	calcareous mudstone	927.8	0.63	-10.02	-25.21		
Q557	calcareous mudstone	923.8	0.77	-8.79	-25.60		
Q555	calcareous mudstone	917.4	1.00	-8.42			
Q555	calcareous mudstone	917.4	1.00	-8.42	-25.21		
Q554	calcareous mudstone	913.8	0.90	-8.43	-25.03		
Q553	calcareous mudstone	910.2	0.85	-9.23	-24.39		
Q552	calcareous mudstone	907.0	0.62	-9.64			
Q546	calcareous mudstone	891.0	0.67	-9.96	-25.19		
Q544	calcareous mudstone	883.4	0.69	-12.52	-25.03		
Q542	calcareous mudstone	875.8	0.04	-14.47	-24.97		
Qd-54-49	calcareous mudstone	839.0	0.90	-9.83	-25.23	0.26	35.3
Qd-54-48	black and grey calcareous mudstone	824.0	0.59	-9.37	-25.04	0.36	43.0
Qd-54-47	black and grey calcareous mudstone	814.0	0.66	-10.01	-24.95	0.39	37.2
Qd-54-46	black and grey calcareous mudstone	808.0	0.58	-9.24	-24.84	0.56	36.7
Qd-54-45	black and grey calcareous mudstone	804.0	0.16	-9.50	-24.98		
Qd-54-44	black and grey calcareous mudstone	802.0	-0.55	-9.86	-29.37	0.11	81.1
Qd-54-43	black and grey calcareous mudstone	800.0	0.46	-9.75	-24.92		
Qd-54-42	black and grey calcareous mudstone	798.5	0.66	-9.24	-24.83	0.41	89.6
Qd-54-41	black and grey calcareous mudstone	797.0	0.53	-9.65	-24.78		
Qd-54-40	black and grey calcareous mudstone	795.0	0.56	-9.53	-24.87	0.41	35.5

Qd-54-39	black and grey calcareous mudstone	794.0	0.64	-9.45	-24.85	0.43	34.9
Qd-54-38	black and grey calcareous mudstone	793.0	1.30	-9.78	-26.66	0.38	30.5
Qd-54-37	black and grey calcareous mudstone	792.0	0.74	-10.28	-24.85	0.38	37.2
Q517	black and grey calcareous mudstone	789.4	0.70	-9.70	-24.98		
Qd-54-32	black and grey calcareous mudstone	789.0	0.93	-9.93	-24.91	0.42	34.1
Qd-54-31	black and grey calcareous mudstone	788.0	0.80	-10.28	-24.81		
Qd-54-30	black and grey calcareous mudstone	787.0	0.63	-9.75	-24.77	0.43	31.7
Qd-54-29	black and grey calcareous mudstone	786.0	0.59	-9.85	-24.86	0.42	33.8
Qd-54-28	black and grey calcareous mudstone	785.0	0.66	-10.19	-24.92		
Qd-54-27	black and grey calcareous mudstone	784.0	-0.01	-9.80	-24.83	0.41	35.4
Qd-54-26	black and grey calcareous mudstone	783.0	0.30	-9.79	-24.80	0.03	93.2
Qd-54-25	black and grey calcareous mudstone	782.0	0.65	-9.82	-24.79		
Qd-54-24	black and grey calcareous mudstone	781.0	0.40	-9.83	-24.69		
Qd-54-23	black and grey calcareous mudstone	780.0	0.26	-9.99	-24.74	0.36	38.9
Qd-54-22	black and grey calcareous mudstone	779.0	0.65	-9.77	-24.71		
Qd-54-21	black and grey calcareous mudstone	777.5	0.52	-9.76	-24.62	0.37	38.7
Q515	black and grey calcareous mudstone	776.6	0.84	-8.82	-24.24		
Qd-54-20	calcareous mudstone	776.5	0.28	-9.89	-24.65		
Qd-54-19	calcareous mudstone	775.5	0.69	-9.65	-24.33		
Qd-54-18	calcareous mudstone	774.5	0.59	-9.60	-24.38	0.35	43.6
Qd-54-17	calcareous mudstone	773.5	0.90	-9.70	-24.32		
Qd-54-16	calcareous mudstone	772.5	0.66	-9.67	-24.43		
Qd-54-15	calcareous mudstone	772.0	0.72	-9.77	-24.53		
Qd-54-14	calcareous mudstone	771.5	0.83	-9.66	-24.48	0.45	35.2
Qd-54-13	calcareous mudstone	771.0	0.91	-9.55	-24.52		
Qd-54-12	calcareous mudstone	770.5	1.26	-9.42	-24.31		

Qd-54-11	calcareous mudstone	770.0	1.00	-9.44	-24.48		
Qd-54-10	calcareous mudstone	769.5	1.25	-9.27	-24.44		
Qd-54-9	calcareous mudstone	769.0	0.72	-9.37	-24.46		
Qd-54-8	calcareous mudstone	768.5	0.66	-9.57	-24.44		
Qd-54-7	calcareous mudstone	768.0	0.65	-9.50	-24.39		
Qd-54-6	calcareous mudstone	767.5	0.82	-9.47	-24.38		
Qd-54-5	calcareous mudstone	767.0	0.89	-9.44	-24.11		
Qd-54-3	calcareous mudstone	766.5	-0.58	-9.94	-24.81		
Qd-54-2	calcareous mudstone	766.0	-0.82	-10.07	-24.90	0.32	34.0
Qd-54-1	calcareous mudstone	765.5	0.02	-9.99	-24.94		
Qd-53-a-3	calcareous mudstone	764.0	0.91	-9.90	-24.83	0.31	35.9
Qd-53-b-1	calcareous mudstone	763.15	0.31	-9.68	-24.21	0.30	35.9
Qd-53-d-1	calcareous mudstone	762.15	-2.69	-9.57	-24.80		
Qd-04-01	calcareous mudstone	762.0	-0.05	-9.44	-25.02	0.35	37.7
Qd-53-f-1	calcareous mudstone	761.65	-1.55	-9.67	-24.88	0.34	41.1
Qd-06-01A	calcareous mudstone	761.0	-0.42	-8.80			
Qd-02-01	calcareous mudstone	760.5	0.67	-9.04	-24.27	0.35	40.0
Qd-01-02	calcareous mudstone	759.0	0.98	-9.20	-24.32		
Qd-07-01-2	calcareous mudstone	757.8	0.46	-10.20	-24.94		
Qd-07-01-1	calcareous mudstone	757.8	0.24	-9.43	-24.83	0.29	46.0
Qd-01-01	calcareous mudstone	757.0	0.59	-9.98	-24.44	0.51	31.7
Q505	calcareous mudstone	743.8	0.40	-9.66			
Qd-08-01	calcareous mudstone	737.0	0.20	-9.19	-25.09	0.37	39.0
Qd-09-01	calcareous mudstone	720.5	-0.08	-9.71	-25.25	0.23	44.0
Q499	calcareous mudstone	719.8	-0.15	-9.97	-25.15		
Qd-10-01	calcareous mudstone	700.0	0.05	-9.19	-24.71	0.21	51.3

Q493	calcareous mudstone	688.2	-0.22	-9.26	-25.09		
Qd-11-01	calcareous mudstone	688.0	-0.08	-9.71	-24.80	0.31	43.8
Q491	calcareous mudstone	679.4	-2.23	-9.29	-25.18		
Qd-12-01	calcareous mudstone	673.0	-0.08	-10.42	-24.74	0.20	31.8
Qd-13-01	calcareous mudstone	662.0	-1.78	-9.95	-25.40	0.14	71.0
Qd-14-01	pyritic calcareous mudstone	657.0	-1.36	-9.63		0.25	47.2
Qd-14-01	calcareous shale	652.0			-26.47		
Qd-15-02	calcareous shale	635.5	-0.20	-10.27	-25.36	0.41	39.5
Q473	calcareous shale	612.2	-1.12	-10.06			
Q457	calcareous shale	555.7	-0.57	-10.71	-25.26		
Q456	calcareous shale	553.3	-0.80	-10.32	-25.37		
Qd-50-2	calcareous mudstone	532.3	-0.70	-13.57		0.08	75.0
Q454	calcareous siltstone	531.1	-0.11	-10.19	-24.69		
Qd-49-1	calcareous siltstone	529.3	-0.73	-11.53			
Qd-49-3	calcareous siltstone	525.6	0.43	-9.84		0.07	49.0
Qd-49-2	calcareous siltstone	525.6	0.04	-9.41			
Q452	calcareous siltstone	525.1	0.12	-9.22	-24.60		
Qd-49-4	calcareous siltstone	524.6	0.49	-8.20		0.06	56.3
Qd-49-5	calcareous siltstone	522.6	0.30	-9.84		0.11	46.6
Qd-49-6	calcareous siltstone	520.1	0.87	-9.05		0.06	54.0
Qd-49-8	calcareous siltstone	516.1	0.52	-8.64		0.11	57.1
Q449	calcareous siltstone	515.3	0.18	-11.94	-24.60		
Qd-49-9	calcareous mudstone	514.6	-0.08	-9.31			
Qd-49-10	calcareous siltstone	511.6	0.47	-9.20		0.10	52.5
Qd-49-11	calcareous siltstone	510.1	0.66	-8.91			
Qd-49-12	calcareous mudstone	508.1	0.93	-8.71		0.16	52.3

Q444	calcareous siltstone	507.5	0.99	-8.55	-25.34		
Qd-49-13	marl	506.1	0.72	-9.17			
Qd-49-14	calcareous siltstone	503.6	0.89	-10.19			
Qd-49-17	calcareous siltstone	499.1	-0.67	-12.04			
Q443	calcareous siltstone	476.5	0.74	-8.95	-24.85		
Q442	calcareous siltstone	475.3	0.89	-8.74	-25.54		
Q441	calcareous siltstone	473.3	0.71	-9.84	-24.78		
Q439	calcareous siltstone	467.7	-0.27	-12.25	-25.15		
Q437-B	marl	464.6	1.04	-10.90	-25.32		
Q437	marl	464.6	1.07	-9.82			
Qd-48-1	marl	464.45	1.24	-9.35		0.09	58.0
Qd-46-1	calcareous siltstone	454.7	0.63	-9.38		0.10	59.9
Q434	calcareous siltstone	453.8	0.80	-10.58	-24.70		
Q432	calcareous siltstone	448.2	1.60	-8.34	-24.77		
Q430	calcareous siltstone	445.2	2.35	-8.00	-23.93		
Qd-46-2	calcareous siltstone	444.2	2.61	-8.17		0.09	69.5
Q428	calcareous siltstone	439.0	1.45	-9.10	-25.24		
Qd-46-3	calcareous siltstone	435.5	0.49	-11.54			
Q425	calcareous siltstone	434.5	0.82	-11.83	-25.37		
Q421	calcareous siltstone	433.7	1.36	-11.50	-25.26		
Q420	calcareous siltstone	432.9	1.36	-11.53	-25.18		
Q424	calcareous siltstone	432.5	1.14	-10.32	-25.51		
Q423	calcareous siltstone	426.9	1.16	-11.20	-25.14		
Qd-45-1	calcareous siltstone	415.3	0.86	-12.98			
Qd-44a-1	calcareous shale	400.9	1.11	-11.84			
Qd-44-b-1	calcareous mudstone	388.9	0.61	-12.16			

Qd-44-b-2	calcareous mudstone	373.9	0.52	-12.52		0.36	28.7
Qd-44-b-3	calcareous mudstone	355.9	0.71	-10.71			
Q419	calcareous mudstone	353.9	-1.49	-8.10			
Q418	calcareous mudstone	351.1	1.93	-10.29	-25.43		
43+40.4	calcareous mudstone	336.3	0.62	-10.87	-25.42	0.15	61.8
Q414	calcareous mudstone	335.9	-1.18	-9.67	-25.04		
43+37.4	calcareous mudstone	333.3	-3.03	-9.74	-25.57		
43+36.8	calcareous mudstone	332.7	-1.84	-10.77	-24.82	0.21	48.8
Q413	calcareous mudstone	330.3	2.47	-7.61	-25.14		
43+33.8	calcareous mudstone	329.7	0.93	-11.31	-24.67	0.26	50.6
Q412	calcareous mudstone	328.7	1.79	-10.35	-25.34		
43+31.8	calcareous mudstone	327.7	0.32	-10.97	-24.86	0.26	56.3
43+30.8	calcareous mudstone	326.7	-0.55	-9.69	-25.20	0.11	79.1
Qd-44-b-4	calcareous mudstone	325.9	0.50	-10.87			
43+29.1	calcareous mudstone	325.0	0.92	-10.30	-25.03	0.10	76.9
43+27.6	calcareous mudstone	323.5	0.64	-10.32	-24.75	0.38	31.4
Q410	calcareous mudstone	323.1	1.91	-9.84	-25.45		
43+26.6	calcareous mudstone	322.5	1.23	-10.98	-24.84		
43+25.6	calcareous mudstone	321.5	1.25	-10.66	-24.61	0.23	52.2
Q408	calcareous mudstone	321.5	1.74	-10.43	-25.38		
43+23.6	calcareous mudstone	319.5	1.70	-11.70	-25.12	0.30	55.0
43+22.9	calcareous mudstone	318.8	1.51	-10.89	-25.19	0.16	60.8
43+21.9	calcareous mudstone	317.8	1.77	-10.72	-25.23		
43+20.8	calcareous mudstone	316.7	1.45	-11.62	-25.30	0.30	56.2
43+19.9	calcareous mudstone	315.8	1.98	-10.34	-25.50	0.31	59.4
43+18.8	calcareous mudstone	314.7	1.78	-9.68	-25.37	0.09	83.5

43+17.8	calcareous mudstone	313.7	1.94	-9.75	-25.44	0.08	84.6
Q406	calcareous mudstone	313.1	2.81	-8.46	-25.17		
43+16.6	calcareous mudstone	312.5	1.80	-10.12	-25.26	0.17	65.5
43+15.6	calcareous mudstone	311.5	1.84	-9.84	-25.38	0.14	69.2
43+13.6	calcareous mudstone	309.5	1.52	-10.36	-25.19	0.16	65.0
43+11.1	calcareous mudstone	307.0	1.92	-11.03	-25.55	0.27	60.2
43+9.6	calcareous mudstone	305.5	2.25	-9.81	-25.40	0.19	69.6
43+8.8	calcareous mudstone	304.7	2.09	-10.22	-25.39	0.17	70.4
43+8.2	calcareous mudstone	304.1	2.42	-9.89	-25.32	0.15	72.4
43+6.2	calcareous mudstone	302.1	2.51	-9.92	-25.33	0.10	76.7
43+5.2	calcareous mudstone	301.1	2.26	-9.65	-25.40	0.04	91.0
Qd-44-b-5	calcareous mudstone	300.9	2.55	-9.94			
43+3.7	calcareous mudstone	299.6	1.95	-10.07	-25.42	0.15	75.7
43+2	calcareous mudstone	297.9	1.93	-9.64	-25.40	0.15	82.7
Q401	calcareous mudstone	297.1	2.12	-10.80	-25.08		
Q400	calcareous mudstone	296.5	2.41	-10.33	-25.07		
Q399	calcareous mudstone	296.3	2.59	-9.79	-25.27		
Q397	calcareous siltstone	287.9	-0.22	-12.07	-25.31		
Q396	calcareous siltstone	284.7	1.37	-11.28	-25.01		
Q395	calcareous siltstone	283.5	-0.11	-11.52	-24.78		
Q394	calcareous siltstone	282.3	0.09	-13.61	-25.06		
Q392	calcareous siltstone	281.3	-0.52	-14.24	-24.67		
Q387	calcareous siltstone	272.5	-0.03	-12.07			
Q385	calcareous siltstone	268.1	0.44	-12.05	-24.98		
Q384	calcareous siltstone	265.1	-0.85	-11.86	-25.12		
Q379	calcareous siltstone	248.9	0.19	-9.16	-25.56		

Qd-42-b-1	calcareous siltstone	248.9	4.29	-13.11		
Qd-41-1	calcareous siltstone	245.6	1.85	-14.41		
Q377	calcareous shale	229.7	-0.37	-13.73	-24.83	
Qd-40-2	calcareous mudstone	184.3	-0.09	-10.14		
Qd-38-1	calcareous mudstone	169.7	0.28	-11.45		
Qd-d01-02	calcareous mudstone	159.2	-0.06	-13.43		
Qd-d01-02	calcareous mudstone	159.2	-0.06	-13.43	-25.12	
Qd-38b-1	calcareous shale	158.7	1.16	-12.65		
Qd-38b-5	calcareous mudstone	150.2	1.13	-14.71		
Qd-38b-6	calcareous mudstone	142.2	-0.01	-13.05		
Qd-38C-2	calcareous mudstone	137.2	0.46	-11.83		
Qd-38C-3'''	calcareous mudstone	124.7	0.23	-11.86		
Qd-38C-4	calcareous mudstone	123.7	0.01	-12.39		
Qd-38C-5	calcareous mudstone	122.2	0.00	-12.44		
Qd-38C-6	calcareous mudstone	121.2	0.30	-14.16		
Qd-38C-7	calcareous mudstone	120.2	0.40	-12.83		
Qd-38C-8	calcareous mudstone	119.2	0.23	-13.00		
Qd-38C-9	calcareous mudstone	118.2	-0.04	-12.84	0.49	25.8
Qd-38C-10	calcareous mudstone	116.7	-0.31	-12.62		
Qd-38C-12	calcareous mudstone	114.7	0.66	-12.93		
Qd-38C-13	calcareous mudstone	113.2	0.04	-13.01		
Qd-d02-02	calcareous mudstone	112.7	-1.77	-14.54	-24.60	
Qd-38C-14	calcareous mudstone	111.7	0.50	-13.41		
Qd-38d-1'	calcareous mudstone	111.2	-0.99	-12.53		
Qd-38d-3	calcareous mudstone	110.0	-2.80	-11.18		
Qd-38d-4	calcareous mudstone	108.2	-2.19	-11.50		

Qd-38d-5	calcareous mudstone	107.2	-0.75	-11.47			
Qd-38d-6	calcareous mudstone	106.2	-0.20	-11.85			
Qd-38e-1	calcareous mudstone	103.2	-0.38	-11.58			
Qd-38e-2	calcareous mudstone	101.2	2.06	-13.47			
Qd-38e-3	calcareous mudstone	98.2	-0.36	-11.72			
Qd-38e-4	calcareous mudstone	95.7	-0.13	-13.28			
Qd-38e-5	calcareous mudstone	92.2	-0.34	-12.38		0.86	29.7
Qd-37-1	calcareous siltstone	84.45	-1.89	-12.19			
Qd-36a-6'	calcareous mudstone	82.0	2.76	-14.48			
Qd-d05-01	calcareous mudstone	81.0	-0.72	-12.12	-24.05		
Qd-36a-9'	calcareous mudstone	79.5	1.11	-12.09			
Qd-36b-1'	calcareous shale	77.0	-1.23	-12.47			
Qd-d08-01	calcareous shale	69.0	1.41	-14.02	-24.11		
Qd-36a-7'	calcareous shale	69.0	1.15	-9.86		0.97	21.1
Qd-36b-12'	calcareous shale	62.0	3.39	-15.96	-24.67		
Qd-d10-01	calcareous shale	49.0	-1.24	-11.86	-24.78		
Qd-d11-01	calcareous shale	37.0	-1.40	-12.03	-24.36	0.81	8.4
Qd-d12-01	calcareous shale	37.0	-1.08	-11.54	-24.88		

Table S2. Lithologic and geochemical data of Gambadongshan Formation samples (9 limestone nodule horizons)

Horizon	Sample No.	Lithology	Carbonate fabric	Depth (m)	$\delta^{13}\text{C}_{\text{carb}}$ (VPDB, ‰)	$\delta^{18}\text{O}_{\text{carb}}$ (VPDB, ‰)	$\delta^{13}\text{C}_{\text{org}}$ (VPDB, ‰)	TOC (%)	TIC (%)
QDS9 (10 m)	Qd-54-50-top	nodular carbonate	micrite matrix (mm)	883.0	-13.53	-5.15			
	Qd-54-50-4	nodular carbonate	micrite matrix (mm)	878.0	-17.98	-4.86		0.05	49.5
	Qd-54-50-3	nodular carbonate	micrite matrix (mm)	878.0	-18.28	-5.22		0.04	91.2
	Qd-54-50-2	nodular carbonate	micrite matrix (mm)	878.0	-14.60	-6.17			
	Qd-54-50-1	nodular carbonate	micrite matrix (mm)	878.0	-14.72	-5.66			
	Qd-54-50-bottom	nodular carbonate	micrite matrix (mm)	873.0	-3.19	-6.63	-25.92	0.09	85.1
QDS8 (19 m)	Q524	carbonate	micrite matrix (mm)	793.0	-12.59	-6.76	-27.91		
	Q523	carbonate	micrite matrix (mm)	791.16	-12.43	-7.34	-27.77		
	Qd-54-44'	carbonate concretion	micrite matrix (mm)	786.0	-15.71	-7.06	-25.05		
	Q520	carbonate	micrite matrix (mm)	785.4	-12.97	-9.11	-28.67		
	Q518	carbonate	micrite matrix (mm)	777.0	-13.82	-6.89	-27.20		
	Qd-54-38'	carbonate concretion	micrite matrix (mm)	777.0	-12.75	-8.34	-24.75		
	Qd-54-36	carbonate concretion	micrite matrix (mm)	775.4	-14.69	-7.55	-26.06		
	Qd-54-35'	carbonate concretion	micrite matrix (mm)	774.9	-16.54	-6.64	-26.63		
	Qd-54-35	black shale	micrite matrix (mm)	774.9	-13.10	-7.92	-25.10	0.31	38.4
	Qd-54-34	carbonate concretion	micrite matrix (mm)	774.4	-12.07	-7.23	-26.96		
	Qd-54-33	carbonate concretion	micrite matrix (mm)	774.0	-13.45	-6.68	-28.31	0.12	75.5
QDS7 (20 m)	Q514	carbonate	micrite matrix (mm)	759.8	-15.27	-6.48		0.01	97.4
	Qd-54-4	carbonate concretion	micrite matrix (mm)	750.8	-9.57	-5.64			
	Qd-03-01	carbonate concretion	micrite matrix (mm)	750.0	-18.11	-5.29			
	Qd-53-a-5	carbonate	micrite matrix (mm)	749.0	-22.63	-5.52	-26.13	0.05	90.9
	Qd-53-a-4	carbonate	micrite matrix (mm)	748.3	-19.43	-5.67	-26.08	0.06	88.3
	Q510	grey nodular	bulk rock	748.1	-17.13	-6.15	-27.16		

	carbonate					
Qd-53-a-2	carbonate	micrite matrix (mm)	748.0	-17.98	-5.51	-26.00
Qd-53-a-1	carbonate	micrite matrix (mm)	747.8	-18.80	-6.15	-26.92
Qd-53-C-3	carbonate	micrite matrix (mm)	747.4	-18.49	-5.26	-25.72
Qd-05-01-I-14	nodular carbonate	botryoidalis calcite (bc)	747.15	-20.67	-2.65	
Qd-05-01-I-13	nodular carbonate	botryoidalis calcite (bc)	747.15	-17.78	-3.72	
Qd-05-01-I-9	nodular carbonate	botryoidalis calcite (bc)	747.15	-20.26	-2.57	
Qd-05-01-I-8	nodular carbonate	micrite matrix (mm)	747.15	-10.62	-10.80	
Qd-05-01-I-7	nodular carbonate	micrite matrix (mm)	747.15	-16.01	-6.33	
Qd-05-01-I-6	nodular carbonate	micrite matrix (mm)	747.15	-10.10	-8.31	
Qd-05-01-I-5	nodular carbonate	clotted calcite (clot)	747.15	-21.22	-3.54	
Qd-05-01-I-4	nodular carbonate	clotted calcite (clot)	747.15	-16.93	-6.70	
Qd-05-01-I-2	nodular carbonate	micrite matrix (mm)	747.15	-22.15	-5.34	
Qd-05-01-I-3	nodular carbonate	micrite matrix (mm)	747.15	-22.78	-5.58	
Qd-05-01-I-2	nodular carbonate	micrite matrix (mm)	747.15	-22.82	-5.60	
Qd-05-01-I-1	nodular carbonate	micrite matrix (mm)	747.15	-23.30	-5.63	
Qd-05-01-H-20	nodular carbonate	micrite matrix (mm)	747.15	-15.13	-5.49	
Qd-05-01-H-18	nodular carbonate	micrite matrix (mm)	747.15	-16.93	-3.62	
Qd-05-01-H-14	nodular carbonate	yellow sparite (sp)	747.15	-0.91	-13.38	
Qd-05-01-H-13	nodular carbonate	yellow sparite (sp)	747.15	-1.18	-10.40	
Qd-05-01-H-12	nodular carbonate	yellow sparite (sp)	747.15	-0.34	-12.59	
Qd-05-01-H-11	nodular carbonate	yellow sparite (sp)	747.15	-3.04	-14.27	
Qd-05-01-H-10	nodular carbonate	yellow sparite (sp)	747.15	-13.63	-3.78	
Qd-05-01-H-9	nodular carbonate	micrite matrix (mm)	747.15	-17.14	-4.49	
Qd-05-01-H-9	nodular carbonate	yellow sparite (sp)	747.15	-4.34	-9.42	
Qd-05-01-H-7	nodular carbonate	yellow sparite (sp)	747.15	-4.59	-9.99	

Qd-05-01-H-6	nodular carbonate	yellow sparite (sp)	747.15	-12.51	-6.13
Qd-05-01-H-5	nodular carbonate	micrite matrix (mm)	747.15	-5.84	-9.40
Qd-05-01-H-4	nodular carbonate	micrite matrix (mm)	747.15	-15.13	-5.49
Qd-05-01-H-3	nodular carbonate	micrite matrix (mm)	747.15	-15.15	-6.01
Qd-05-01-H-2	nodular carbonate	micrite matrix (mm)	747.15	-16.61	-5.64
Qd-05-01-H-2	nodular carbonate	micrite matrix (mm)	747.15	-16.63	-5.78
Qd-05-01-H-1	nodular carbonate	micrite matrix (mm)	747.15	-15.87	-5.60
Qd-05-01-G-1	nodular carbonate	micrite matrix (mm)	747.15	-20.85	-5.97
Qd-05-01-F-8	nodular carbonate	micrite matrix (mm)	747.15	-23.28	-6.17
Qd-05-01-F-7	nodular carbonate	micrite matrix (mm)	747.15	-23.63	-5.25
Qd-05-01-F-6	nodular carbonate	micrite matrix (mm)	747.15	-25.73	-5.27
Qd-05-01-F-5	nodular carbonate	micrite matrix (mm)	747.15	-26.15	-5.50
Qd-05-01-F-5	nodular carbonate	micrite matrix (mm)	747.15	-26.43	-5.55
Qd-05-01-F-4	nodular carbonate	micrite matrix (mm)	747.15	-20.97	-6.07
Qd-05-01-F-1	nodular carbonate	micrite matrix (mm)	747.15	-22.00	-5.12
Qd-05-01-E-2	nodular carbonate	micrite matrix (mm)	747.15	-20.68	-6.44
Qd-05-01-E-1	nodular carbonate	micrite matrix (mm)	747.15	-20.80	-5.44
Qd-05-01-D-5	nodular carbonate	micrite matrix (mm)	747.15	-22.00	-4.95
Qd-05-01-D-4	nodular carbonate	micrite matrix (mm)	747.15	-21.31	-5.10
Qd-05-01-D-3	nodular carbonate	micrite matrix (mm)	747.15	-23.46	-5.04
Qd-05-01-D-2	nodular carbonate	micrite matrix (mm)	747.15	-23.38	-5.05
Qd-05-01-D-1	nodular carbonate	micrite matrix (mm)	747.15	-23.50	-5.02
Qd-05-01-C-3	nodular carbonate	micrite matrix (mm)	747.15	-20.97	-5.68
Qd-05-01-C-2	nodular carbonate	micrite matrix (mm)	747.15	-21.59	-5.84
Qd-05-01-C-1	nodular carbonate	micrite matrix (mm)	747.15	-21.15	-5.72
Qd-05-01-B-8	nodular carbonate	yellow calcite (yc)	747.15	-1.26	-8.63

	Qd-05-01-B-7	nodular carbonate	yellow calcite (yc)	747.15	-1.11	-8.56			
	Qd-05-01-B-6	nodular carbonate	yellow calcite (yc)	747.15	-1.46	-8.96			
	Qd-05-01-B-5	nodular carbonate	micrite matrix (mm)	747.15	-11.28	-7.74			
	Qd-05-01-B-4	nodular carbonate	micrite matrix (mm)	747.15	-19.02	-6.65			
	Qd-05-01-B-3	nodular carbonate	micrite matrix (mm)	747.15	-20.62	-5.64			
	Qd-05-01-B-2	nodular carbonate	micrite matrix (mm)	747.15	-22.60	-5.27			
	Qd-05-01-B-1	nodular carbonate	micrite matrix (mm)	747.15	-21.67	-5.25			
	Qd-05-01-A-4	nodular carbonate	yellow sparite (sp)	747.15	-0.81	-8.47			
	Qd-05-01-A-3	nodular carbonate	micrite matrix (mm)	747.15	-14.23	-7.43		0.03	95.4
	Qd-05-01-A-2	nodular carbonate	micrite matrix (mm)	747.15	-21.07	-5.61	-28.87	0.05	90.4
	Qd-05-01-A-1	nodular carbonate	micrite matrix (mm)	747.15	-18.74	-5.89	-26.26	0.08	85.0
	Qd-53-c-2	carbonate	micrite matrix (mm)	746.8	-18.72	-6.08	-26.15		
	Qd-53-c-1	carbonate	micrite matrix (mm)	746.4	-23.50	-5.18	-25.88	0.08	90.2
	Qd-53-e-1	carbonate	micrite matrix (mm)	745.85	-16.45	-5.45	-25.75	0.17	62.6
	Q509	nodular carbonate	bulk rock	745.7	-19.83	-5.98	-22.26		
	Qd-53-g-1	carbonate	micrite matrix (mm)	745.4	-13.42	-5.48	-26.26	0.03	92.3
	Qd-52-1	carbonate concretion	micrite matrix (mm)	743.3	-9.78	-6.47			
	Qd-52-2	mudstone	micrite matrix (mm)	741.3	-8.34	-8.16		0.33	47.7
	Qd-52-3	carbonate concretion	micrite matrix (mm)	716.3	-13.06	-7.44			
	Qd-52-4	carbonate concretion	micrite matrix (mm)	646.3	-1.22	-9.80		0.14	71.8
	Qd-52-5	carbonate concretion	micrite matrix (mm)	633.3	-13.59	-8.30		0.14	74.1
	Qd-15-01f	carbonate concretion	micrite matrix (mm)	619.5				0.08	86.7
QDS6	Qd-15-01-2	carbonate concretion	micrite matrix (mm)	619.5	-17.76	-6.20			
(23 m)	Qd-15-01-2	carbonate concretion	micrite matrix (mm)	619.5	-17.86	-6.38			
	Qd-15-01-1	carbonate concretion	micrite matrix (mm)	619.5	-15.40	-6.62			
	Qd-52-6-A	carbonate concretion	micrite matrix (mm)	610.3	-16.11	-6.87			

	Qd-52-6-B	carbonate concretion	micrite matrix (mm)	610.3	-15.34	-6.84		
QDS5 (17 m)	Qd-50-1	carbonate concretion	micrite matrix (mm)	516.5	-17.52	-4.94	0.08	83.7
	Qd-50-3	carbonate concretion	micrite matrix (mm)	514.8	-16.58	-5.22	0.05	93.3
	Qd-50-2	carbonate concretion	micrite matrix (mm)	514.8	-18.37	-5.67		
	Qd-49-7	carbonate concretion	micrite matrix (mm)	518.6	-0.41	-8.99		
	Qd-49-15	carbonate concretion	micrite matrix (mm)	501.6	0.08	-9.46	0.10	61.3
	Qd-49-16	carbonate concretion	micrite matrix (mm)	500.6	-1.06	-9.23	0.08	56.3
	43+37	carbonate concretion	micrite matrix (mm)	332.9	-6.85	-8.23	-24.86	0.06
QDS4 (6 m)	Qd-43-1-B	nodular carbonate	micrite matrix (mm)	278.4	-1.23	-9.14		
	Qd-43-1-A	nodular carbonate	micrite matrix (mm)	278.4	2.72	-9.52	0.08	87.3
	Qd-43-2(5)-C	nodular carbonate	calcite cement (cc: b or w)	272.4	-2.10	-11.20		
	Qd-43-2(5)-B	nodular carbonate	white calcite (w)	272.4	-16.54	-2.47		
	Qd-43-2(5)-A	nodular carbonate	micrite matrix (mm)	275.4	-17.37	-10.70	-25.86	
	Qd-43-2(4)-E	nodular carbonate	calcite cement (cc: b or w)	275.4	-1.80	-11.00		
	Qd-43-2(4)-D	nodular carbonate	white calcite (w)	275.4	-1.64	-7.97		
	Qd-43-2(4)-C	nodular carbonate	micrite matrix (mm)	275.4	-13.44	-11.04		
	Qd-43-2(4)-B	nodular carbonate	micrite matrix (mm)	275.4	-20.52	-7.05		
	Qd-43-2(4)-A	nodular carbonate	black calcite (b)	275.4	-18.83	-3.38		
	Qd-43-2(3)-C	nodular carbonate	white calcite (w)	275.4	-2.81	-9.71		
	Qd-43-2(3)-B	nodular carbonate	black calcite (b)	275.4	-12.10	-8.38	0.05	88.3
	Qd-43-2(3)-A	nodular carbonate	micrite matrix (mm)	275.4	-20.71	-5.99		
	Qd-43-2(2)-C	nodular carbonate	calcite cement (cc: b or w)	275.4	-0.80	-11.40		
	Qd-43-2(2)-B	nodular carbonate	calcite cement (cc: b or w)	275.4	-3.05	-8.81		
	Qd-43-2(2)-A	nodular carbonate	micrite matrix (mm)	275.4	1.21	-5.80		
	Qd-43-2(1)-C	nodular carbonate	calcite cement (cc: b or w)	275.4	-1.70	-10.80		
Qd-43-2(1)-B	nodular carbonate	calcite cement (cc: b or w)	275.4	-5.89	-10.02	0.02	97.5	

	Qd-43-2(1)-A	nodular carbonate	micrite matrix (mm)	275.4	-16.32	-8.22	0.02	94.9
	Qd-43-3-A	carbonate concretion	micrite matrix (mm)	272.4	-12.24	-7.62		
	Qd-43-3-B	carbonate concretion	botryoidalis calcite (bc)	272.4	-13.93	-4.28		
	Q393	carbonate concretion	micrite matrix (mm)	265.9	-0.85	-13.21		
	Q389	carbonate concretion	micrite matrix (mm)	263.9	-4.88	-10.35	-26.68	
	Qd-40-1	carbonate concretion	micrite matrix (mm)	234.3	-3.28	-10.59	0.24	24.8
QDS-3 (33 m)	Qd-38b-1'	carbonate concretion	micrite matrix (mm)	142.4	-4.66	-11.60		
	Qd-38b-1	carbonate concretion	micrite matrix (mm)	142.4	-6.03	-10.28		
	Qd-38b-2	carbonate concretion	micrite matrix (mm)	139.2	-10.26	-9.52	0.18	62.7
	Qd-38b-3	carbonate concretion	micrite matrix (mm)	137.2	-8.18	-10.37		
	Qd-38b-4	carbonate concretion	micrite matrix (mm)	136.2	-5.77	-9.93		
	Qd-38b-5'	nodular carbonate	micrite matrix (mm)	134.2	-6.36	-11.05		
	Qd-38b-6'	carbonate concretion	micrite matrix (mm)	126.2	-16.53	-9.67		
	Qd-38C-1	carbonate concretion	micrite matrix (mm)	125.2	-12.57	-9.79		
	Qd-38C-3	carbonate concretion	micrite matrix (mm)	110.2	-13.17	-9.85		
	Qd-38C-3'	carbonate concretion	micrite matrix (mm)	109.7	-12.64	-9.92		
	Qd-38C-3"	carbonate concretion	micrite matrix (mm)	109.2	-15.05	-9.92		
	Qd-38d(top)-C	nodular carbonate	white calcite (w)	95.2	-3.13	-12.90		
	Qd-38d(top)-B	nodular carbonate	micrite matrix (mm)	95.2	-25.60	-8.22		
	Qd-38d(top)-A	nodular carbonate	calcite cement (cc: b or w)	95.2	-27.29	-3.43	0.24	88.1
QDS-2 (5 m)	Qd-38d-1	carbonate concretion	micrite matrix (mm)	95.2	-23.61	-9.43		
	Qd-do3-01-D-6	nodular carbonate	micrite matrix (mm)	95.2	-10.52	-11.49		
	Qd-do3-01-D-4	nodular carbonate	micrite matrix (mm)	95.2	-20.36	-9.34		
	Qd-do3-01-D-3	nodular carbonate	micrite matrix (mm)	95.2	-25.91	-4.22		
	Qd-do3-01-D-2	nodular carbonate	micrite matrix (mm)	95.2	-28.54	-5.25		
	Qd-do3-01-D-1	nodular carbonate	micrite matrix (mm)	95.2	-26.95	-6.65		

Qd-do3-01-C-20	nodular carbonate	micrite matrix (mm)	95.2	-24.54	-4.90		
Qd-do3-01-C-18	nodular carbonate	micrite matrix (mm)	95.2	-20.27	-8.43		
Qd-do3-01-C-16	nodular carbonate	white calcite (w)	95.2	-24.24	-7.35		
Qd-do3-01-C-15	nodular carbonate	black calcite (b)	95.2	-29.96	-2.48		
Qd-do3-01-C-14	nodular carbonate	white calcite (w)	95.2	-28.94	-4.52		
Qd-do3-01-C-13	nodular carbonate	black calcite (b)	95.2	-32.29	-1.59		
Qd-do3-01-C-12	nodular carbonate	black calcite (b)	95.2	-28.14	-2.37		
Qd-do3-01-C-11	nodular carbonate	white calcite (w)	95.2	-25.35	-5.93		
Qd-do3-01-C-10	nodular carbonate	black calcite (b)	95.2	-31.09	-1.62		
Qd-do3-01-C-9	nodular carbonate	white calcite (w)	95.2	-19.35	-8.30		
Qd-do3-01-C-8	nodular carbonate	white calcite (w)	95.2	-22.73	-7.60		
Qd-do3-01-C-7	nodular carbonate	black calcite (b)	95.2	-30.83	-1.72		
Qd-do3-01-C-5	nodular carbonate	black calcite (b)	95.2	-31.43	-0.99		
Qd-do3-01-C-4	nodular carbonate	white calcite (w)	95.2	-20.46	-8.01		
Qd-do3-01-C-3	nodular carbonate	calcite cement (cc: b or w)	95.2	-22.16	-7.15		
Qd-do3-01-C-2	nodular carbonate	calcite cement (cc: b or w)	95.2	-30.30	-2.20		
Qd-do3-01-C-1	nodular carbonate	micrite matrix (mm)	95.2	-26.39	-9.19	0.08	91.2
Qd-do3-01-B-6	nodular carbonate	micrite matrix (mm)	95.2	-21.19	-4.46		
Qd-do3-01-B-5	nodular carbonate	micrite matrix (mm)	95.2	-28.16	-5.59		
Qd-do3-01-B-4	nodular carbonate	micrite matrix (mm)	95.2	-25.69	-6.89		
Qd-do3-01-B-3	nodular carbonate	micrite matrix (mm)	95.2	-16.46	-6.85		
Qd-do3-01-B-2	nodular carbonate	calcite cement (cc: b or w)	95.2	-19.72	-6.10		
Qd-do3-01-B-1	nodular carbonate	micrite matrix (mm)	95.2	-19.78	-8.39		
Qd-do3-01-A-5	nodular carbonate	calcite cement (cc: b or w)	95.2	-28.85	-4.48		
Qd-do3-01-A-3	nodular carbonate	micrite matrix (mm)	95.2	-19.06	-10.08		
Qd-do3-01-A-2	nodular carbonate	micrite matrix (mm)	95.2	-29.17	-4.56		

Qd-do3-01-A-1	nodular carbonate	micrite matrix (mm)	95.2	-27.26	-7.00	0.13	90.5
Qd-38d-3'	nodular carbonate	micrite matrix (mm)	94.0	-26.18	-8.23	0.12	89.1
Qd-do3-02-C-3	nodular carbonate	calcite cement (cc: b or w)	93.2	-24.12	-5.02		
Qd-do3-02-C-2	nodular carbonate	calcite cement (cc: b or w)	93.2	-20.26	-6.21		
Qd-do3-02-C-1	nodular carbonate	micrite matrix (mm)	93.2	-21.35	-10.14		
Qd-do3-02-B-7	nodular carbonate	micrite matrix (mm)	93.2	-28.15	-2.66	0.10	90.4
Qd-do3-02-B-6	nodular carbonate	micrite matrix (mm)	93.2	-28.24	-2.76		
Qd-do3-02-B-5	nodular carbonate	micrite matrix (mm)	93.2	-26.99	-9.16		
Qd-do3-02-B-3	nodular carbonate	calcite cement (cc: b or w)	93.2	-13.84	-9.38		
Qd-do3-02-B-2	nodular carbonate	micrite matrix (mm)	93.2	-15.89	-11.06		
Qd-do3-02-B-1	nodular carbonate	micrite matrix (mm)	93.2	-26.56	-4.37		
Qd-do3-02-A-2	nodular carbonate	calcite cement (cc: b or w)	93.2	-23.74	-5.62		
Qd-do3-02-A-1	nodular carbonate	micrite matrix (mm)	93.2	-29.58	-6.22	0.10	91.1
Qd-38d(mid)-B	nodular carbonate	micrite matrix (mm)	92.7	-19.68	-13.15		
Qd-38d(mid)-A	nodular carbonate	micrite matrix (mm)	92.7	-22.28	-10.44		
Qd-38d	nodular carbonate	micrite matrix (mm)	92.7	-19.44	-9.51		
Qd-38d-5'	nodular carbonate	micrite matrix (mm)	91.2	-25.84	-8.54		
Qd-do3-03-17	nodular carbonate	micrite matrix (mm)	90.2	-15.34	-10.67		
Qd-do3-03-16	nodular carbonate	black calcite (b)	90.2	-29.34	-2.90		
Qd-do3-03-15	nodular carbonate	white calcite (w)	90.2	-17.97	-9.10		
Qd-do3-03-14	nodular carbonate	white calcite (w)	90.2	-17.99	-7.30		
Qd-do3-03-13	nodular carbonate	black calcite (b)	90.2	-27.54	-3.64		
Qd-do3-03-12	nodular carbonate	white calcite (w)	90.2	-15.72	-9.73		
Qd-do3-03-11	nodular carbonate	black calcite (b)	90.2	-28.22	-4.03		
Qd-do3-03-10	nodular carbonate	white calcite (w)	90.2	-16.01	-8.79		
Qd-do3-03-9	nodular carbonate	black calcite (b)	90.2	-15.83	-7.24		

	Qd-do3-03-8	nodular carbonate	white calcite (w)	90.2	-15.82	-9.32			
	Qd-do3-03-7	nodular carbonate	black calcite (b)	90.2	-17.18	-6.42			
	Qd-do3-03-6	nodular carbonate	white calcite (w)	90.2	-26.96	-3.45			
	Qd-do3-03-5	nodular carbonate	black calcite (b)	90.2	-27.01	-3.80			
	Qd-do3-03-4	nodular carbonate	white calcite (w)	90.2	-23.48	-6.71			
	Qd-do3-03-2	nodular carbonate	calcite cement (cc: b or w)	90.2	-21.42	-5.48			
	Qd-do3-03-1	nodular carbonate	micrite matrix (mm)	90.2	-15.03	-10.63			
	Qd-38d(bottom)-B	nodular carbonate	micrite matrix (mm)	90.2	-26.13	-8.91			
	Qd-38d(bottom)-A	nodular carbonate	calcite cement (cc: b or w)	90.2	-28.83	-3.21		0.14	68.3
QDS-1 (4 m)	Qd-d06-01-2	carbonate concretion	micrite matrix (mm)	67.0	-19.05	-8.33	-25.65		
	Qd-d06-01-1	carbonate concretion	micrite matrix (mm)	68.0	-10.23	-11.14	-25.21	0.17	70.8
	Qd-d06-02-2	carbonate concretion	micrite matrix (mm)	65.0	-11.64	-11.29			
	Qd-d06-02-1	carbonate concretion	micrite matrix (mm)	66.0	-9.52	-11.07	-25.76		
	Qd-d06-03-3	carbonate concretion	micrite matrix (mm)	65.0	-5.46	-12.43	-23.75		
	Qd-d06-03-2	carbonate concretion	micrite matrix (mm)	65.0	-5.67	-11.03			
	Qd-d06-03-1	carbonate concretion	micrite matrix (mm)	65.0	-8.35	-12.89		0.09	78.6
	Qd-36a-1	carbonate concretion	micrite matrix (mm)	68.0	-14.45	-10.43			
	Qd-36a-2	carbonate concretion	micrite matrix (mm)	67.6	-16.97	-12.16			
	Qd-36a-3	carbonate concretion	micrite matrix (mm)	67.4	-20.12	-10.87			
	Qd-36a-4	carbonate concretion	micrite matrix (mm)	67.3	-30.53	-8.97		0.21	55.3
	Qd-36a-5(2)	carbonate concretion	micrite matrix (mm)	66.9	-26.07	-10.48			
	Qd-36a-5(1)	carbonate concretion	micrite matrix (mm)	66.9	-23.66	-10.49			
	Qd-36a-6(2)	carbonate concretion	micrite matrix (mm)	66.0	-7.08	-11.18			
	Qd-36a-6(1)	carbonate concretion	micrite matrix (mm)	66.0	-24.20	-8.76		0.15	60.3
		Qd-36a-7	carbonate concretion	micrite matrix (mm)	65.6	-13.81	-12.48		
	Qd-36a-8	carbonate concretion	micrite matrix (mm)	65.0	-19.26	-14.02			

Qd-36a-9	carbonate concretion	micrite matrix (mm)	63.5	-5.04	-13.18			
Qd-36a-10	carbonate concretion	micrite matrix (mm)	63.0	-2.81	-11.68			
Qd-36b-1	carbonate concretion	micrite matrix (mm)	62.0	-0.32	-9.47			
Qd-36b-2	carbonate concretion	micrite matrix (mm)	60.0	-0.55	-11.04			
Qd-36b-3	carbonate concretion	micrite matrix (mm)	58.0	-4.58	-5.44			
Qd-36b-4	carbonate concretion	micrite matrix (mm)	57.4	-0.23	-9.99			
Qd-36b-5	carbonate concretion	micrite matrix (mm)	56.0	-1.21	-9.77		0.17	91.2
Qd-36b-6	carbonate concretion	micrite matrix (mm)	55.0	-0.15	-9.93			
Qd-36b-7	carbonate concretion	micrite matrix (mm)	51.0	-2.91	-10.94			
Qd-36b-8	carbonate concretion	micrite matrix (mm)	50.0	-1.26	-9.18			
Qd-36b-10	carbonate concretion	micrite matrix (mm)	48.0	0.31	-9.70		0.23	51.5
Qd-36b-11	carbonate concretion	micrite matrix (mm)	47.0	0.71	-10.99	-24.01		
Qd-36b-12	carbonate concretion	micrite matrix (mm)	46.0	0.15	-11.85	-24.17		
Qd-36b-13	carbonate concretion	micrite matrix (mm)	44.0	0.56	-8.41	-24.81	0.34	50.6
Qd-36b-14	carbonate concretion	micrite matrix (mm)	42.0	-0.58	-9.83			

Table S3. Rare earth element + yttrium (REE+Y) concentration data of Qiangdong section samples (carbonate phase)
[Whole rock and carbonate(carb-) fraction]

Sample No. (carbonate phase)	Whole rock (1) / carb-fr action (0)	Th (ppm)	Zr (ppm)	Rb (ppm)	REE+Y(ppm)														
					La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Y
Q555	1	11.5	255.9	87.2	44.4	93.3	10.8	41.8	8.2	1.9	6.6	1.0	5.4	1.0	2.6	0.4	2.2	0.3	26.7
Q554	1	11.5	258.1	85.2	45.1	95.4	11.0	43.6	8.4	2.1	6.8	1.1	5.6	1.0	2.7	0.4	2.3	0.3	27.2
Q553	1	11.5	256.2	86.3	45.3	96.4	11.1	44.0	8.6	2.1	7.1	1.1	5.6	1.0	2.6	0.4	2.2	0.3	27.6
Q552	1	11.1	251.1	83.3	43.6	91.0	10.6	40.8	8.1	2.0	6.5	1.0	5.4	1.0	2.5	0.4	2.3	0.3	26.5
Qd-54-50-4	1	1.4	37.1	9.5	11.2	23.4	2.8	12.2	3.3	0.9	3.2	0.4	2.0	0.3	0.8	0.1	0.6	0.1	9.6
Qd-54-50-3	1	1.7	39.3	8.8	11.9	25.3	2.9	12.9	3.4	1.0	3.2	0.4	2.3	0.4	0.9	0.1	0.8	0.1	10.4
Q546	1	10.8	246.6	78.2	42.4	88.7	10.1	39.1	7.5	1.8	6.0	0.9	5.2	1.0	2.5	0.4	2.2	0.3	26.1
Q544	1	10.6	234.3	78.8	42.9	91.8	10.7	43.5	8.9	2.2	7.6	1.1	5.8	1.0	2.5	0.4	2.2	0.3	28.2
Q524	1	1.5	35.2	6.8	10.0	22.8	2.9	12.8	3.7	1.1	3.6	0.5	2.4	0.4	0.8	0.1	0.5	0.1	12.0
Q523	1	2.0	45.8	12.9	12.3	28.4	3.4	15.3	4.2	0.9	4.2	0.6	2.8	0.4	1.0	0.1	0.7	0.1	13.6
Q520	1	2.7	62.2	17.9	14.6	33.0	4.0	16.9	4.2	0.9	4.0	0.6	2.9	0.5	1.1	0.1	0.8	0.1	13.9
Q518	1	2.5	58.3	17.1	15.1	35.4	4.3	18.3	4.5	1.4	4.5	0.6	3.2	0.5	1.2	0.2	0.8	0.1	14.7
Q517	1	12.4	277.7	95.3	48.1	102	11.6	45.5	8.7	2.1	7.3	1.1	6.1	1.1	3.0	0.4	2.6	0.4	30.0
Q515	1	11.2	257.4	88.9	43.8	92.4	10.5	41.8	8.1	2.0	6.8	1.0	5.6	1.0	2.7	0.4	2.3	0.3	26.7
Q514	1	1.6	46.4	8.5	11.9	26.0	3.2	13.7	3.3	1.1	2.9	0.4	2.0	0.3	0.8	0.1	0.6	0.1	10.1
Q510	1	1.7	42.7	9.1	12.6	29.6	3.6	16.4	4.5	1.3	3.9	0.5	2.4	0.4	0.9	0.1	0.8	0.1	11.3
Qd-05-01	1	1.6	47.3	5.9	10.9	23.2	2.7	11.5	2.7	0.9	2.4	0.4	1.7	0.3	0.8	0.1	0.6	0.1	9.1
Qd-05-01f	1	1.4	38.6	5.3	8.1	18.1	2.2	9.6	2.0	0.6	1.8	0.3	1.2	0.2	0.6	0.1	0.4	0.1	6.3

Qd-04-01	1	9.7	258.8	93.9	43.0	92.3	11.0	44.0	8.9	2.2	7.3	1.1	5.8	1.0	2.7	0.3	2.3	0.3	27.2
Q509	1	1.6	44.8	6.1	10.4	23.7	2.9	12.6	3.1	1.0	2.8	0.4	1.9	0.3	0.7	0.1	0.6	0.1	9.0
Qd-06-01	1	9.5	251.0	71.3	45.8	98.1	11.6	46.8	9.1	2.3	7.5	1.1	5.7	1.0	2.7	0.3	2.3	0.3	27.6
Qd-03-01	1	8.5	237.4	87.7	38.9	83.1	9.3	36.4	7.3	1.9	6.1	1.0	4.9	0.9	2.4	0.3	2.0	0.3	24.5
Qd-02-01	1	9.6	249.2	64.7	42.8	88.9	10.4	40.6	7.9	2.0	6.6	1.0	5.4	1.0	2.7	0.4	2.3	0.3	27.1
Q507	1	10.7	281.1	102.8	41.8	89.8	10.2	39.5	7.3	1.8	6.0	0.9	5.4	1.0	2.6	0.4	2.2	0.3	25.5
Qd-01-02	1	11.0	266.0	94.1	45.2	95.5	11.1	43.9	8.8	2.2	7.2	1.2	6.1	1.1	2.9	0.4	2.5	0.4	29.5
Qd-07-01A	1	10.7	284.9	96.6	45.1	98.4	11.2	44.9	8.8	2.2	7.0	1.1	5.7	1.1	2.8	0.4	2.2	0.3	26.7
Qd-07-01B	1	10.8	293.9	96.5	44.1	94.6	10.6	41.5	7.6	2.0	6.2	1.0	5.5	1.0	2.7	0.4	2.3	0.3	26.3
Qd-01-01	1	11.3	257.8	93.8	45.3	94.1	11.0	43.3	8.4	2.0	6.9	1.1	5.8	1.1	2.8	0.4	2.4	0.3	28.8
Q505	1	10.6	297.3	99.8	46.2	99.5	11.2	43.1	7.8	2.0	6.6	1.0	5.5	1.0	2.6	0.4	2.3	0.3	26.7
Qd-08-01	1	9.4	252.8	85.8	39.4	84.7	9.7	38.3	7.7	1.9	6.1	0.9	5.0	0.9	2.5	0.3	2.1	0.3	24.5
Q503	1	9.2	265.6	91.5	40.4	86.5	9.9	39.0	7.4	1.8	6.0	0.9	4.9	0.9	2.4	0.3	2.1	0.3	24.2
Q501	1	12.0	370.4	131.6	52.4	112	12.6	50.2	9.2	2.2	7.3	1.1	6.3	1.1	3.0	0.4	2.6	0.4	29.5
Qd-09-01	1	9.6	263.1	89.6	44.3	96.5	11.4	47.0	9.8	2.4	7.7	1.1	5.6	1.0	2.6	0.4	2.1	0.3	26.9
Q499	1	8.3	249.4	83.1	37.1	79.7	9.3	37.1	7.3	1.9	6.0	0.9	5.0	0.9	2.4	0.3	2.0	0.3	23.7
Qd-10-01	1	8.5	251.0	72.6	42.1	99.0	12.9	56.5	12.8	3.3	10.7	1.4	6.9	1.1	2.8	0.3	2.1	0.3	30.2
Q493	1	8.1	237.1	72.7	37.3	79.2	9.2	37.1	7.2	1.8	5.6	0.9	4.8	0.9	2.3	0.3	1.9	0.3	22.9
Qd-11-01	1	7.5	228.6	65.1	34.5	73.0	8.6	34.4	7.0	1.8	5.7	0.9	4.5	0.9	2.3	0.3	1.9	0.3	23.0
Q491	1	9.5	260.8	90.9	48.6	111	14.0	61.3	13.3	3.4	10.9	1.4	6.8	1.2	2.7	0.4	2.3	0.3	31.6
Qd-12-01	1	10.8	312.8	116.9	47.5	101	11.5	45.6	8.4	2.1	6.6	1.1	5.9	1.1	2.8	0.4	2.4	0.3	28.1
Qd-13-01	1	3.2	98.2	30.9	15.9	34.3	4.1	16.5	3.2	0.9	2.9	0.4	2.2	0.4	1.0	0.1	0.9	0.1	11.3
Qd-14-01	1	2.1	56.7	15.6	13.8	32.0	3.6	14.9	3.5	1.0	3.2	0.4	2.3	0.4	1.0	0.2	0.8	0.1	10.6
Qd-14-01pyrite	1	7.4	238.2	73.7	36.6	80.4	9.4	37.9	7.7	2.0	6.2	0.9	4.7	0.9	2.2	0.3	1.9	0.3	22.8
qD-52+37b-ii	1	1.6	46.0	9.5	11.5	25.6	3.2	15.0	4.1	1.4	3.5	0.5	2.1	0.3	0.8	0.1	0.6	0.1	9.4
Qd-15-02	1	9.6	274.8	8.7	38.6	80.1	8.8	33.6	6.1	1.5	5.1	0.8	4.5	0.8	2.4	0.3	2.0	0.3	22.8

Qd-15-01f	1	1.6	48.0	92.8	10.8	25.5	3.2	14.6	4.1	1.4	3.5	0.4	2.0	0.3	0.8	0.1	0.5	0.1	9.2
Q457	1	9.8	283.5	100.9	42.8	91.3	10.8	42.1	8.0	2.1	6.4	1.0	5.4	1.0	2.5	0.4	2.1	0.3	26.3
Q456	1	8.5	247.6	75.3	44.1	94.1	12.0	50.8	10.5	3.0	8.7	1.2	5.9	1.0	2.6	0.3	2.1	0.3	28.8
Q458	1	11.2	354.4	118.7	45.5	92.9	10.4	38.9	6.7	1.7	5.5	0.9	5.3	1.0	2.7	0.4	2.4	0.4	27.6
Q454	1	8.5	361.4	45.0	44.1	84.0	11.1	44.7	8.3	2.3	6.4	0.9	4.7	0.8	2.2	0.3	1.8	0.3	24.2
Q452	1	8.0	386.7	31.7	40.4	77.1	9.9	39.8	7.1	2.0	5.7	0.8	4.3	0.8	2.1	0.3	1.9	0.3	23.4
Qd-49-5	1	6.9	335.9	34.9	40.8	79.9	10.2	42.4	8.2	2.2	6.1	0.9	4.6	0.8	2.1	0.3	1.9	0.3	24.6
Qd-48-1	1	5.2	204.7	39.2	33.9	62.0	8.1	33.2	6.1	1.7	4.7	0.6	3.3	0.6	1.5	0.2	1.3	0.2	17.5
Qd-44-b-2	1	11.5	362.6	114.9	54.3	114	12.9	52.1	9.8	2.3	7.5	1.0	5.6	1.0	2.6	0.4	2.3	0.3	27.0
Qd-44+29.4	1	1.5	47.3	10.7	11.3	22.5	2.7	11.4	2.6	0.9	2.1	0.3	1.4	0.2	0.7	0.1	0.5	0.1	7.8
Qd-39+132	1	5.8	216.3	38.1	35.1	76.0	8.6	36.8	8.2	2.4	6.3	0.8	4.0	0.7	1.7	0.2	1.4	0.2	19.1
Qd-43-5.2	1	3.5	74.2	33.4	18.4	31.5	4.3	17.9	3.5	0.9	3.1	0.4	2.4	0.5	1.2	0.2	1.0	0.1	14.6
Qd-43-2(1)	1	1.9	62.2	13.5	11.2	22.2	2.6	10.4	1.8	0.5	1.5	0.2	1.1	0.2	0.5	0.1	0.5	0.1	5.6
Qd-43-2(3)	1	1.7	56.4	10.7	13.1	25.5	3.1	12.4	2.6	0.7	1.9	0.3	1.3	0.2	0.7	0.1	0.5	0.1	7.0
Qd-43a+2-1	1	2.7	67.2	27.6	16.1	27.7	3.7	15.6	3.2	0.9	2.8	0.4	2.1	0.4	1.0	0.1	0.8	0.1	12.8
Qd-d03-01B	1	2.4	63.4	13.2	13.8	29.9	3.3	13.0	2.6	0.8	2.1	0.3	1.4	0.3	0.6	0.1	0.5	0.1	7.7
Qd-d03-01A	1	1.5	34.4	8.0	9.6	19.6	2.1	8.2	1.6	0.4	1.1	0.2	0.9	0.2	0.4	0.1	0.3	0.0	4.7
Qd-d01-02	1	14.9	497.7	130.3	72.5	152	17.2	65.5	11.9	2.7	8.5	1.2	6.5	1.2	3.0	0.4	2.4	0.4	31.2
Qd-d02-02	1	16.8	552.5	135.3	83.1	198	19.8	75.9	13.5	3.0	9.9	1.5	7.8	1.4	3.5	0.5	3.0	0.4	36.8
Qd-d06-01A	1	8.4	223.3	75.7	39.7	87.1	10.4	42.8	9.1	2.4	7.5	1.1	5.4	1.0	2.4	0.3	2.0	0.3	25.8
Qd-d04-01	1	12.1	89.7	3.7	55.7	121	13.8	55.2	11.3	2.8	8.9	1.2	6.4	1.1	2.8	0.4	2.4	0.4	31.0
Qd-d06-01B	1	2.2	94.0	3.8	13.8	28.4	3.3	13.6	3.1	1.0	2.8	0.4	2.4	0.4	1.0	0.1	0.8	0.1	12.6
Qd-d06-02	1	2.2	378.2	110.6	14.2	29.8	3.5	14.6	3.4	1.1	3.1	0.5	2.5	0.4	1.1	0.1	0.9	0.1	13.1
Qd-d05-01	1	15.0	93.9	3.3	65.4	135	15.6	60.1	11.1	2.6	8.9	1.3	6.8	1.2	3.2	0.5	2.7	0.4	35.3
Qd-d06-03	1	2.2	470.0	98.0	14.2	29.2	3.4	14.1	3.2	1.1	2.9	0.4	2.3	0.4	1.0	0.1	0.8	0.1	13.4
Qd-d08-01	1	13.0	466.4	85.6	62.7	133	15.3	59.5	11.0	2.7	8.7	1.3	7.2	1.3	3.3	0.5	2.8	0.4	33.8

Qd-d09-01	1	15.0	485.2	76.8	69.6	148	17.0	66.6	12.5	2.8	9.8	1.5	7.9	1.4	3.6	0.5	2.9	0.4	37.1
Qd-d07-01	1	10.5	363.9	104.5	50.8	109	12.7	50.9	10.5	2.8	8.5	1.3	6.7	1.2	3.0	0.4	2.6	0.4	32.4
Qd-d11-02	1	3.9	125.5	21.5	29.7	59.3	6.9	27.6	5.6	1.7	4.3	0.6	3.3	0.6	1.4	0.2	1.1	0.2	18.1
Qd-d10-01	1	11.6	348.5	87.4	54.3	114	13.4	52.5	10.0	2.6	8.1	1.2	6.3	1.1	2.9	0.4	2.4	0.3	31.1
Qd-d11-01	1	12.1	381.9	81.0	58.8	121	14.2	55.2	10.2	2.5	7.9	1.2	6.6	1.1	3.2	0.4	2.5	0.3	32.6
Qd-d12-01	1	13.0	394.9	84.0	64.7	133	15.7	61.3	11.4	3.0	9.3	1.3	7.1	1.2	3.1	0.5	2.8	0.4	35.5
Qd-G36-103B	1	1.5	58.2	2.6	10.8	23.1	2.6	10.6	2.2	0.6	1.9	0.3	1.3	0.2	0.5	0.1	0.5	0.1	6.8
Qd-G36-106B	1	1.7	61.4	2.8	12.2	25.5	2.9	11.9	2.5	0.7	2.0	0.3	1.4	0.3	0.6	0.1	0.5	0.1	7.4
Qd-54-49 (mm)	0	3.4	0.1	2.7	5.0	16.2	2.6	14.6	4.8	1.2	4.5	0.5	2.3	0.3	0.6	0.1	0.3	0.0	8.4
Qd-09-01 (mm)	0	3.6	0.4	2.8	6.3	23.4	3.9	22.2	7.4	1.9	6.0	0.7	2.7	0.4	0.7	0.1	0.4	0.0	10.0
Qd-49-15 (mm)	0	1.7	8.4	1.1	20.1	43.6	5.9	27.0	5.8	1.6	4.2	0.5	2.6	0.4	1.0	0.1	0.7	0.1	12.8
Qd-46-2 (mm)	0	1.4	2.8	1.2	15.5	27.2	4.8	20.9	3.9	1.0	2.7	0.3	1.5	0.2	0.6	0.1	0.3	0.0	5.9
Qd-44-29-ii (mm)	0	5.2	118.6	46.2	27.8	57.0	7.0	29.1	6.3	1.8	5.0	0.7	3.6	0.7	1.6	0.2	1.4	0.2	18.3
QD-G36-0M-1 (mm)	0	0.1	0.9	0.6	3.7	7.7	0.9	4.1	1.3	0.5	1.3	0.2	0.7	0.1	0.3	0.0	0.2	0.0	3.7
QD-G38d-3 (mm)	0	0.9	2.2	0.8	4.8	12.0	1.4	6.0	1.5	0.5	1.3	0.2	0.7	0.1	0.3	0.0	0.2	0.0	3.4
QD-G38d-lzhy (mm)	0	0.8	2.1	0.7	5.9	13.5	1.5	6.7	1.5	0.5	1.2	0.2	0.8	0.1	0.3	0.0	0.2	0.0	4.1
QD-G53D+2 (mm)	0	0.6	1.0	0.7	3.5	8.6	1.2	5.6	1.8	0.6	1.6	0.2	0.9	0.1	0.3	0.0	0.2	0.0	4.1
QD-G52+37b-1 (mm)	0	0.6	1.4	0.6	4.1	11.6	1.6	8.0	2.9	1.0	2.3	0.3	1.3	0.2	0.4	0.0	0.3	0.0	5.3
QD-G36-3B (mm)	0	0.5	0.2	0.3	3.5	8.8	1.2	5.7	2.0	0.8	2.0	0.3	1.6	0.3	0.6	0.1	0.5	0.1	8.9

QD-G54d-lzhy	0	0.5	0.8	0.6	4.5	10.2	1.2	5.6	1.8	0.7	1.6	0.2	1.0	0.2	0.4	0.0	0.3	0.0	5.0
(mm)																			
QD-G38d+14m	0	0.2	3.6	1.5	5.9	14.3	1.7	8.0	2.5	0.9	2.2	0.2	0.8	0.1	0.3	0.0	0.2	0.0	3.7
(mm)																			
QD-G52+165b-I	0	0.8	0.3	1.1	4.9	13.6	1.7	8.2	2.7	0.8	2.3	0.3	1.4	0.2	0.4	0.1	0.3	0.0	5.8
(mm)																			
QD-G44-29.4-2	0	0.7	0.9	0.5	6.0	14.4	1.8	8.2	2.1	0.9	1.5	0.2	0.8	0.1	0.3	0.0	0.3	0.0	4.4
(mm)																			
Qd-d03-03 (b)	0	0.0	0.2	0.0	0.4	1.2	0.2	0.8	0.2	0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4
Qd-d03-03 (mm)	0	1.3	0.8	0.0	4.7	13.2	1.6	7.2	1.6	0.4	1.3	0.2	0.7	0.1	0.2	0.0	0.2	0.0	3.4
Qd-42 (sp)	0	0.0	0.0	0.6	0.6	1.7	0.2	0.8	0.2	0.1	0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.8
Qd-42 (b)	0	0.0	0.2	0.1	0.6	1.9	0.2	0.9	0.2	0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.6
Qd-42 (mm)	0	1.2	0.2	0.0	3.3	10.3	1.4	6.1	1.2	0.3	0.8	0.1	0.4	0.1	0.1	0.0	0.1	0.0	1.5
Qd-38 (w)	0	0.0	0.0	0.5	0.9	2.7	0.4	1.8	0.4	0.2	0.4	0.0	0.2	0.0	0.1	0.0	0.1	0.0	1.3
Qd-38 (b)	0	0.0	0.6	0.1	0.4	1.1	0.1	0.6	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4
Qd-38 (mm)	0	0.9	1.9	0.0	9.2	22.5	2.7	11.6	2.8	0.7	2.4	0.3	1.3	0.2	0.5	0.1	0.3	0.0	6.8
Qd-05-01 (sp)	0	0.0	0.0	0.8	0.6	2.2	0.5	3.0	1.6	0.6	1.5	0.2	0.8	0.1	0.2	0.0	0.1	0.0	3.9
Qd-05-01 (b)	0	0.3	0.1	0.6	2.8	7.7	1.0	4.9	1.5	0.4	1.4	0.2	0.8	0.1	0.3	0.0	0.2	0.0	4.1
Qd-05-01 (mm)	0	1.2	0.3	0.4	5.2	14.3	1.9	9.3	2.5	0.7	2.0	0.2	1.0	0.2	0.3	0.0	0.3	0.0	4.7

Table S4. The isotope data ($\delta^{13}\text{C}$, $\delta^{18}\text{O}$, Δ_{47}) of MDCs [†]

Sample ID	Horizon	Carbonate phase	$\delta^{13}\text{C}$ (VPDB, ‰)	$\delta^{18}\text{O}$ (VPDB, ‰)	Δ_{47} (‰, ± 1 s.e.) [*]	n	$T_{\Delta 47}$ ($^{\circ}\text{C}$, ± 1 s.e.)
QD-G36-0m-1	QDS-1	<i>mm</i>	-29.74	-8.41	0.476	1	146
QD-G36-3B	QDS-1	<i>mm</i>	-17.62	-11.91	0.402	1	243
QD-G36-6B	QDS-1	<i>mm</i>	-5.59	-12.15	0.450 \pm 0.017	3	174 \pm 18
QD-G36-8B	QDS-1	<i>mm</i>	-0.04	-9.19	0.406 \pm 0.004	2	236 \pm 7
QD-G36-11B	QDS-1	<i>mm</i>	7.98	-0.82	0.618 \pm 0.018	3	53 \pm 8
QD-G36-23B	QDS-1	<i>mm</i>	3.04	-4.20	0.552 \pm 0.001	2	88 \pm 1
QD-G36-28B	QDS-1	<i>mm</i>	0.02	-6.49	0.500 \pm 0.002	2	125 \pm 2
QD-G36-40B	QDS-1	<i>mm</i>	-2.38	-10.09	0.416 \pm 0.001	2	219 \pm 1
QD-G36-169	QDS-1	<i>mm</i>	-4.82	-5.30	0.624 \pm 0.006	2	50 \pm 3
QD-G38d+14m	QDS-2	<i>mm</i>	-14.38	-9.70	0.439 \pm 0.003	2	187 \pm 3
QD-G38d-3	QDS-2	<i>mm</i>	-27.92	-8.23	0.360 \pm 0.020	2	340 \pm 54
QD-G39d-4m	QDS-3	<i>mm</i>	-13.05	-9.44	0.365 \pm 0.006	2	325 \pm 15
QD-G39d-6m	QDS-3	<i>mm</i>	-12.11	-9.63	0.386 \pm 0.001	2	275 \pm 3
QD-G43a+0.8	QDS-4	<i>mm</i>	-2.10	-9.47	0.437 \pm 0.005	2	190 \pm 6
QD-G44+29.4	QDS-4	<i>mm</i>	-11.69	-6.84	0.332 \pm 0.009	3	444 \pm 40
QD-42	QDS-4	<i>sp</i>	-0.12	-14.13	0.438 \pm 0.002	3	188 \pm 5
QD-G52+165	QDS-7	<i>mm</i>	-14.24	-8.05	0.481 \pm 0.010	2	141 \pm 9
QD-G53D+2	QDS-7	<i>mm</i>	-22.62	-5.33	0.374 \pm 0.010	2	301 \pm 24
QD-05-01	QDS-7	<i>sp</i>	-5.68	-11.85	0.513 \pm 0.004	3	114 \pm 5

[†] Δ_{47} values based on Brand parameters (Chang et al., 2019) and derived $T_{\Delta 47}$ values based on corrected Δ_{47} using the temperature calibration of Petersen et al. (2019).

^{*}Standard error (s.e.) was given as 1 s.d./($n^{0.5}$). Standard deviation (s.d.) was derived from duplicate analyses.

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