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Li et al., Evidence of a large $\delta^{13}C_{carb}$ and $\delta^{13}C_{org}$ depth gradient for deep-water anoxia during the late Cambrian SPICE event: Geology, https://doi.org/10.1130/G40231.1.

Analytical methods

Two hundred and thirty seven samples were collected from the Wa'ergang, Dubian B, and Duibian A sections in this study. Fresh chips of carbonate rocks were sampled, avoiding fractures and recrystallized portions, and ground to a fine powder (<200 mesh). The powders were then split and prepared for carbonate and organic isotope analysis in the Biogeochemical Lab at the University of Science and Technology of China, Hefei, China. All isotope values are expressed in per mil (‰) notation relative to the Vienna Pee Dee Belemnite standard (VPDB), and are presented Tables DR1-DR3.

For $\delta^{13}C_{carb}$ and $\delta^{18}O_{carb}$ analyses, approximately 150 μg of this carbonate powder was reacted at 70°C with 102-105% anhydrous phosphoric acid in a Kiel IV carbonate device to generate CO_2 gas. After cryogenic cleaning, the extracted CO_2 gas was isotopically analyzed on a ThermoFinnigan MAT 253 Mass Spectrometer. Precision and calibration of the data were monitored through routine analysis of an in-house carbonate standard (GBW04416) for every nine samples. Precision was better than 0.05‰ for $\delta^{13}C$ and 0.06‰ for $\delta^{18}O$.

For $\delta^{13}C_{org}$ and total organic carbon content, samples were decalcified with 6N HCl for 24 hours, buffered back to a neutral pH, filtered, and dried at 75°C. Homogenized carbonate-free residues were weighted into tin capsules and flash combusted at 950°C in an Elemental Analyzer attached to a ThermoFinnigan MAT 253. Standard of IAEA-600 (caffeine) was used to monitor the external and internal uncertainty that was better than 0.1‰ for $\delta^{13}C_{org}$.

SA Data Depository Tables and Figures:

Table DR1: $\delta^{13}C_{carb}$ and $\delta^{13}C_{org}$ data for the Wa'ergang section

Table DR2: $\delta^{13}C_{carb}$ and $\delta^{13}C_{org}$ data for the Duibian B section

Table DR3: $\delta^{13}C_{carb}$ and $\delta^{13}C_{org}$ data for the Duibian A section

Figure DR1: Cross plots of $\delta^{13}C_{carb}$ and $\delta^{18}O$ (A), and TOC and $\delta^{13}C_{org}$ (B) of the three sections

Figure DR2: Cross plot of $\delta^{13}C_{carb}$ and $\delta^{13}C_{org}$ of the three sections

Table DR1: $\delta^{13}C$ and $\delta^{13}C_{org}$ data for the Wa'ergang section

Sample	Depth (m)	$\delta^{13}C_{carb}$	$\delta^{18}O$	$\delta^{13}C_{org}$	$\Delta^{13}C$	TOC (%)
WGB9	150.0	3.63	-11.34	-27.44	31.07	0.08
WGB7	148.0	3.87	-10.81	-27.85	31.72	0.09
WGB3	144.0	4.34	-10.82	-27.51	31.85	0.13
WGB2	143.0	4.22	-10.56	-27.66	31.88	0.16
WG118.5	118.5	3.96	-9.85	-27.29	31.25	0.14
WG118	118.0	4.10	-9.76	-27.37	31.47	0.13
WG117	117.0	3.95	-10.41	-27.23	31.18	0.07
WG115	115.0	3.98	-10.28	-27.04	31.02	0.11
WG114	114.0	3.96	-10.80	-27.33	31.29	0.16
WG113	113.0	3.95	-10.88	-27.59	31.54	0.19
WG112	112.0	3.72	-11.79	-27.63	31.35	0.19
WG111	111.0	3.93	-11.16	-27.75	31.68	0.29
WG110	110.0	3.78	-11.26	-27.17	30.95	0.08
WG109	109.0	3.81	-11.81	-27.68	31.49	0.12
WG108	108.0	3.87	-9.11	-27.79	31.66	0.52
WG107	107.0	4.00	-10.94	-27.39	31.39	0.28
WG106	106.0	4.18	-11.08	-27.27	31.45	0.22
WG105	105.0	3.89	-11.16	-27.65	31.54	0.28
WG104	104.0	3.57	-10.32	-27.49	31.06	0.28
WG103	103.0	4.14	-10.84	-27.52	31.66	0.24
WG101	101.0	3.69	-10.95	-27.11	30.80	0.11
WG100	100.0	3.64	-11.61	-27.24	30.88	0.12
WG99	99.0	4.09	-10.68	-27.13	31.22	0.09
WG98	98.0	4.61	-10.38	-27.41	32.02	0.14
WG97	97.0	5.06	-10.30	-27.21	32.27	0.22
WG96	96.0	4.66	-10.23	-26.98	31.64	0.15
WG95	95.0	4.50	-10.61	-26.93	31.43	0.12
WG94	94.0	4.24	-10.45	-27.01	31.25	0.15
WG91	91.0	4.18	-10.69	-27.18	31.36	0.13
WG89.8	89.8	4.67	-10.25	-27.17	31.84	0.16
WG88.8	88.8	4.43	-10.14	-27.27	31.70	0.20
WG87.8	87.8	4.42	-10.44	-26.78	31.20	0.12
WG86.8	86.8	4.57	-10.11	-27.17	31.74	0.18
WG85.8	85.8	4.58	-9.39	-26.82	31.40	0.07
WG84.8	84.8	4.34	-10.24	-27.32	31.66	0.12
WG83.8	83.8	3.87	-11.07	-27.17	31.04	0.09
WG82.8	82.8	4.05	-10.66	-27.30	31.35	0.16
WG80.8	80.8	4.07	-10.73	-26.67	30.74	0.07
WG79.8	79.8	3.97	-10.50	-27.43	31.40	0.30

WG78.8	78.8	3.79	-10.26	-27.49	31.28	0.16
WG77.8	77.8	4.19	-10.57	-26.83	31.02	0.08
WG76.8	76.8	4.00	-10.71	-26.59	30.59	0.10
WG75.3	75.3	3.72	-10.98	-27.16	30.88	0.09
WG74.3	74.3	3.54	-10.49	-27.28	30.82	0.10
WG70.3	70.3	3.87	-9.95	-26.93	30.80	0.15
WG69.3	69.3	3.83	-10.12	-27.01	30.84	0.09
WG68.3	68.3	3.78	-10.68	-27.03	30.81	0.26
WG67.3	67.3	3.75	-10.70	-26.64	30.39	0.18
WG66.3	66.3	4.10	-10.56	-27.18	31.28	0.51
WG65.3	65.3	3.68	-10.65	-27.17	30.85	0.53
WG64.3	64.3	3.40	-11.08	-27.27	30.67	0.07
WG63.3	63.3	3.69	-10.80	-26.78	30.47	0.09
WG62.3	62.3	3.69	-10.69	-27.17	30.86	0.09
WG61.8	61.8	3.88	-10.44	-26.82	30.70	0.10
WG60.8	60.8	3.71	-10.95	-27.32	31.03	0.10
WG59.8	59.8	3.85	-10.84	-27.10	30.95	0.11
WG58.8	58.8	4.08	-10.68	-27.09	31.17	0.12
WG56.8	56.8	3.39	-10.96	-27.23	30.62	0.12
WG55.8	55.8	3.27	-11.22	-27.02	30.29	0.07
WG54.8	54.8	3.97	-10.63	-27.17	31.14	0.07
WG53.8	53.8	3.92	-11.01	-26.93	30.85	0.07
WG50.8	50.8	3.70	-10.91	-27.30	31.00	0.14
WG49.8	49.5	3.87	-9.93	-27.10	30.97	0.08
WG48.8	48.8	3.62	-10.23	-27.55	31.17	0.16
WG46.8	46.8	3.36	-10.47	-27.50	30.86	0.12
WG44.8	44.8	3.45	-10.88	-27.57	31.02	0.11
WG43.8	43.8	3.54	-10.78	-27.44	30.98	0.14
WG42.8	42.8	3.92	-10.18	-27.28	31.20	0.13
WG41.8	41.8	3.76	-10.81	-27.34	31.10	0.12
WG40.8	40.8	3.57	-10.75	-27.30	30.87	0.11
WG37.8	37.8	3.68	-10.54	-27.64	31.32	0.20
WG36.8	36.8	3.57	-10.99	-27.43	31.00	0.17
WG35.8	35.8	3.40	-12.05	-27.11	30.51	0.07
WG30	30.0	3.45	-11.45	-27.13	30.58	0.09
WG27	27.0	3.43	-11.00	-27.89	31.32	0.15
WG26	26.0	3.21	-11.19	-27.59	30.80	0.15
WG24	24.0	3.29	-10.76	-27.86	31.15	0.15
WG23	23.0	3.64	-10.56	-27.57	31.21	0.20
WG19	19.0	2.84	-11.12	-27.39	30.23	0.10
WG17	17.0	2.63	-11.23	-27.32	29.95	0.08
WG15	15.0	2.90	-11.00	-28.14	31.04	0.11
WG14	14.0	2.66	-11.14	-28.10	30.76	0.10
WG13	13.0	2.67	-10.24	-27.98	30.65	0.08

WG12.4	12.4	2.56	-10.93	-27.58	30.14	0.06
WG10.8	10.8	2.72	-10.89	-28.44	31.16	0.09
WG10	10.0	2.40	-10.44	-27.91	30.31	0.05
WG9.47	9.5	2.30	-10.19	-27.58	29.88	0.04
WG8.47	8.5	2.10	-10.50	-28.50	30.60	0.10

Table DR2: $\delta^{13}C$ and $\delta^{13}C_{org}$ data for the Duibian B section

Sample	Depth (m)	$\delta^{13}C_{carb}$	$\delta^{18}O$	$\delta^{13}C_{org}$	$\Delta^{13}C$	TOC (%)
DB-B 47.5	47.5	0.71	-10.03	-29.91	30.62	0.22
DB-B 45.5	45.5	0.99	-9.99	-29.40	30.39	0.20
DB-B 44.5	44.5	1.48	-8.78	-29.64	31.12	1.01
DB-B 43	43.0	1.13	-10.52	-29.23	30.36	0.16
DB-B 41	41.0	1.15	-10.31	-29.20	30.35	0.12
DB-B 40	40.0	1.17	-10.26	-29.24	30.41	0.27
DB-B 39	39.0	1.44	-10.53	-29.25	30.69	0.22
DB-B 38.3	38.3	1.30	-10.18	-28.78	30.08	0.13
DB-B 37.3	37.3	1.07	-11.37	-28.82	29.89	0.13
DB-B 36.5	36.5	1.17	-11.15	-28.98	30.15	0.15
DB-B 34.8	34.8	1.21	-10.31	-29.40	30.61	0.30
DB-B 34	34.0	1.20	-10.57	-29.58	30.78	0.15
DB-B 33.2	33.2	1.15	-10.47	-29.04	30.19	0.12
DB-B 32.7	32.7	1.19	-11.71	-29.04	30.23	0.23
DB-B 32.2	32.2	1.16	-11.15	-29.40	30.56	0.20
DB-B 31.7	31.7	0.89	-9.93	-29.02	29.91	0.10
DB-B 31.2	31.2	0.82	-10.33	-29.13	29.95	0.10
DB-B 30.5	30.5	0.88	-10.31	-29.50	30.38	0.14
DB-B 28.8	28.8	1.78	-9.18	-28.81	30.59	0.10
DB-B 28	28.0	2.09	-9.86	-28.48	30.57	0.08
DB-B 26.5	26.5	2.12	-8.71	-28.67	30.79	0.16
DB-B 26	26.0	1.97	-9.86	-28.63	30.60	0.11
DB-B 25.4	25.4	2.21	-9.30	-28.41	30.62	0.15
DB-B 25	25.0	2.18	-9.90	-28.48	30.66	0.20
DB-B 24	24.0	2.21	-9.23	-28.26	30.47	0.15
DB-B 22	22.0	2.30	-10.35	-28.22	30.52	0.09
DB-B 21.5	21.5	2.67	-9.29	-28.17	30.84	0.10
DB-B 21	21.0	2.69	-9.14	-28.63	31.32	0.22
DB-B 20.5	20.5	2.77	-9.83	-28.26	31.03	0.23
DB-B 20	20.0	2.71	-9.54	-28.22	30.93	0.39
DB-B 19.5	19.5	2.75	-10.03	-28.10	30.85	0.12
DB-B 19.1	19.1	2.75	-10.28	-28.07	30.82	0.11
DB-B 18.5	18.5	2.78	-10.28	-28.10	30.88	0.17
DB-B 18	18.0	2.82	-10.09	-28.18	31.00	0.17
DB-B 17.5	17.5	2.89	-9.36	-27.86	30.75	0.13
DB-B 15.8	15.8	3.14	-9.45	-27.96	31.10	0.14
DB-B 15.2	15.2	2.79	-10.09	-27.90	30.69	0.12
DB-B 14.2	14.2	3.07	-9.28	-28.23	31.30	0.17
DB-B 13.7	13.7	3.10	-10.16	-28.19	31.29	0.19
DB-B 12.7	12.7	3.19	-8.84	-28.32	31.51	0.19

DB-B 12.2	12.2	3.23	-9.05	-27.67	30.90	0.12
DB-B 11.7	11.7	3.06	-8.82	-27.93	30.99	0.09
DB-B 11.2	11.2	3.28	-9.50	-28.10	31.38	0.14
DB-B 10.7	10.7	3.29	-9.66	-27.59	30.88	0.14
DB-B 10.2	10.2	3.59	-9.29	-28.13	31.72	0.17
DB-B 9.6	9.6	3.16	-10.20	-28.14	31.30	0.22
DB-B 9	9.0	3.34	-9.60	-28.00	31.34	0.33
DB-B 8	8.0	3.51	-9.85	-27.99	31.50	0.19
DB-B 7.6	7.6	3.51	-10.08	-27.79	31.30	0.16
DB-B 6.5	6.5	3.54	-10.47	-27.72	31.26	0.16
DB-B 6	6.0	3.49	-10.73	-27.61	31.10	0.16
DB-B 5	5.0	3.57	-9.38	-27.55	31.12	0.11
DB-B 4.6	4.6	4.02	-9.97	-27.87	31.89	0.21
DB-B 4.2	4.2	3.69	-12.32	-27.69	31.38	0.14
DB-B 3.5	3.5	3.84	-11.98	-27.48	31.32	0.15
DB-B 3	3.0	3.92	-10.65	-27.47	31.39	0.09
DB-B 2.6	2.6	3.96	-10.04	-27.72	31.68	0.17
DB-B 2	2.0	3.82	-9.70	-27.27	31.09	0.13
DB-B 1.5	1.5	3.85	-9.70	-27.27	31.12	0.09
DB-B 0.95	1.0	4.09	-8.80	-27.65	31.74	0.20
DB-B 0.5	0.5	4.07	-8.77	-27.65	31.72	0.15
DB-B 0	0.0	4.02	-9.11	-27.68	31.70	0.14

Table DR3: $\delta^{13}C$ and $\delta^{13}C_{org}$ data for the Duibian A section

Sample	Depth (m)	$\delta^{13}C_{carb}$	$\delta^{18}O$	$\delta^{13}C_{org}$	$\Delta^{13}C$	TOC (%)
DB-AS 0	212.2	1.34	-10.31	-29.22	30.56	0.17
DB-AS 1	211.2	0.94	-9.20	-29.12	30.06	0.10
DB-AS 2	210.2	0.82	-9.41	-29.36	30.18	0.10
DB-AS 4	208.2	1.72	-9.10	-28.57	30.29	0.09
DB-AS 7	205.2	1.85	-8.78	-28.41	30.26	0.11
DB-AS 8	204.2	2.08	-9.72	-28.47	30.55	0.17
DB-AS 9	203.2	2.25	-9.21	-28.22	30.47	0.15
DB-AS 10	202.2	2.44	-8.90	-28.36	30.80	0.17
DB-AS 11	201.2	2.13	-9.61	-27.88	30.01	0.06
DB-AS 12	200.2	2.34	-9.80	-28.26	30.60	0.16
DB-AS 15	197.2	2.74	-9.38	-27.55	30.29	0.15
DB-AS 16	196.2	2.71	-10.37	-27.80	30.51	0.12
DB-AS 17	195.2	3.29	-8.05	-28.38	31.67	0.44
DB-AS 18	194.2	3.04	-9.26	-28.04	31.08	0.19
DB-AS 19	193.2	3.14	-9.09	-27.91	31.05	0.18
DB-AS 20	192.2	3.34	-8.45	-28.00	31.34	0.13
DB-AS 21	191.2	3.27	-8.57	-28.37	31.64	0.16
DB-AS 22.5	189.7	3.31	-9.23	-27.69	31.00	0.23
DB-AS 25.5	186.7	3.50	-9.28	-27.70	31.20	0.12
DB-AS 27	185.2	3.61	-10.10	-27.51	31.12	0.19
DB-AS 28	184.2	3.75	-12.10	-27.73	31.48	0.08
DB-AS 32	180.2	3.68	-11.25	-27.49	31.17	0.17
DB-AS 38	174.2	3.09	-13.06	-27.61	30.70	0.26
DB-AS 40	172.2	2.73	-14.59	-27.21	29.94	0.23
DB-AS 42	170.2	3.07	-12.50	-27.44	30.51	0.20
DB-AS 43	169.2	3.20	-11.98	-27.42	30.62	0.30
DB-AS 45	167.2	3.19	-12.00	-27.20	30.39	0.19
DB-AS 47	165.2	3.50	-10.55	-27.65	31.15	0.22
DB-AS 48	164.2	3.04	-12.05	-27.11	30.15	0.22
DB-AS 50	162.2	2.82	-11.96	-27.86	30.68	0.18
DB-AS 51	161.2	3.08	-11.11	-27.46	30.54	0.13
DB-AS 52	160.2	2.92	-10.87	-27.46	30.38	0.11
DB-AS 53	159.2	2.63	-12.44	-27.41	30.04	0.73
DB-AS 56	156.2	3.27	-9.64	-27.74	31.01	0.21
DB-AS 58	154.2	3.27	-9.64	-27.60	30.87	0.20
DB-AS 59	153.2	3.57	-8.17	-27.75	31.32	0.54
DB-AS 60	152.2	3.05	-10.12	-27.39	30.44	0.14
DB-AS 62	150.2	2.91	-9.91	-27.43	30.34	0.93
DB-AS 64	148.2	2.69	-9.47	-27.63	30.32	0.24

DB-AS 65	147.2	2.65	-9.11	-27.71	30.36	0.24
DB-AS 66	146.2	2.57	-8.42	-27.93	30.50	0.40
DB-AS 67	145.2	3.11	-7.57	-27.94	31.05	0.56
DB-AS 68	144.2	2.70	-9.36	-27.86	30.56	0.29
DB-AS 69	143.2	2.45	-10.29	-27.95	30.40	0.41
DB-AS 70.5	141.7	2.46	-9.18	-27.69	30.15	0.15
DB-AS 71.5	140.7	2.18	-9.01	-27.71	29.89	0.10
DB-AS 72.5	139.7	2.38	-9.16	-28.14	30.52	0.20
DB-AS 73.5	138.7	2.28	-8.69	-28.07	30.35	0.13
DB-AS 74.5	137.7	2.17	-8.77	-27.97	30.14	0.17
DB-AS 77	135.2	2.63	-10.50	-27.85	30.48	0.14
DB-AS 78	134.2	2.51	-10.93	-27.43	29.94	0.18
DB-AS 79	133.2	2.41	-11.73	-27.82	30.23	0.15
DB-AS 80	132.2	2.24	-12.19	-27.38	29.62	0.20
DB-AS 81	131.2	2.38	-10.49	-27.85	30.23	0.12
DB-AS 82	130.2	2.23	-11.42	-27.72	29.95	0.41
DB-AS 83	129.2	2.34	-10.09	-27.87	30.21	0.15
DB-AS 84	128.2	2.54	-9.94	-28.35	30.89	0.26
DB-AS 85	127.2	2.20	-10.87	-28.23	30.43	0.20
DB-AS 86	126.2	1.96	-12.84	-27.56	29.52	0.16
DB-AS 87	125.2	1.93	-12.34	-28.30	30.23	0.14
DB-AS 88	124.2	2.19	-11.17	-27.91	30.10	0.10
DB-AS 89	123.2	1.72	-13.42	-28.01	29.73	0.18
DB-AS 90	122.2	1.90	-10.77	-28.15	30.05	0.28
DB-AS 91	121.2	1.19	-12.51	-28.48	29.67	0.13
DB-AS 92	120.2	1.44	-12.60	-28.72	30.16	0.16
DB-AS 97	115.2	1.37	-8.76	-29.15	30.52	0.15
DB-AS 99	113.2	1.29	-9.24	-28.70	29.99	0.08
DB-AS 102	110.2	1.23	-10.09	-29.04	30.27	0.09
DB-AS 103	109.2	1.12	-10.05	-28.75	29.87	0.11
DB-ASP 106	106.2	2.21	-9.98	-28.32	30.53	0.15
DB-ASP 107	105.2	2.08	-10.26	-28.54	30.62	0.26
DB-ASP 113	99.2	1.27	-8.73	-28.67	29.94	0.12
DB-ASP 114.5	97.7	1.30	-9.46	-28.62	29.92	0.09
DB-ASP 116	96.2	1.03	-9.52	-28.72	29.75	0.14
DB-ASP 117.5	94.7	1.21	-8.82	-28.88	30.09	0.08
DB-ASP 119	93.2	1.46	-8.43	-28.88	30.34	0.11
DB-ASP 120.5	91.7	1.24	-8.69	-28.76	30.00	0.12
DB-ASP 123.5	88.7	1.18	-8.92	-28.86	30.04	0.09
DB-ASP 124.5	87.7	1.40	-8.21	-29.00	30.40	0.18
DB-ASP 126	86.2	1.33	-9.09	-28.91	30.24	0.09
DB-ASP 128	84.2	0.97	-8.51	-29.33	30.30	0.22
DB-ASP 130	82.2	0.77	-9.66	-29.23	30.00	0.16
DB-ASP 131.5	80.7	0.78	-9.55	-29.86	30.64	0.50

DB-ASP 134.5	77.7	0.59	-9.38	-29.55	30.14	0.41
DB-ASP 136	76.2	0.00	-10.24	-29.98	29.98	0.52
DB-ASP 137.5	74.7	-0.26	-8.59	-30.05	29.79	0.94
DB-ASP 139	73.2	-0.27	-8.65	-30.01	29.74	0.94

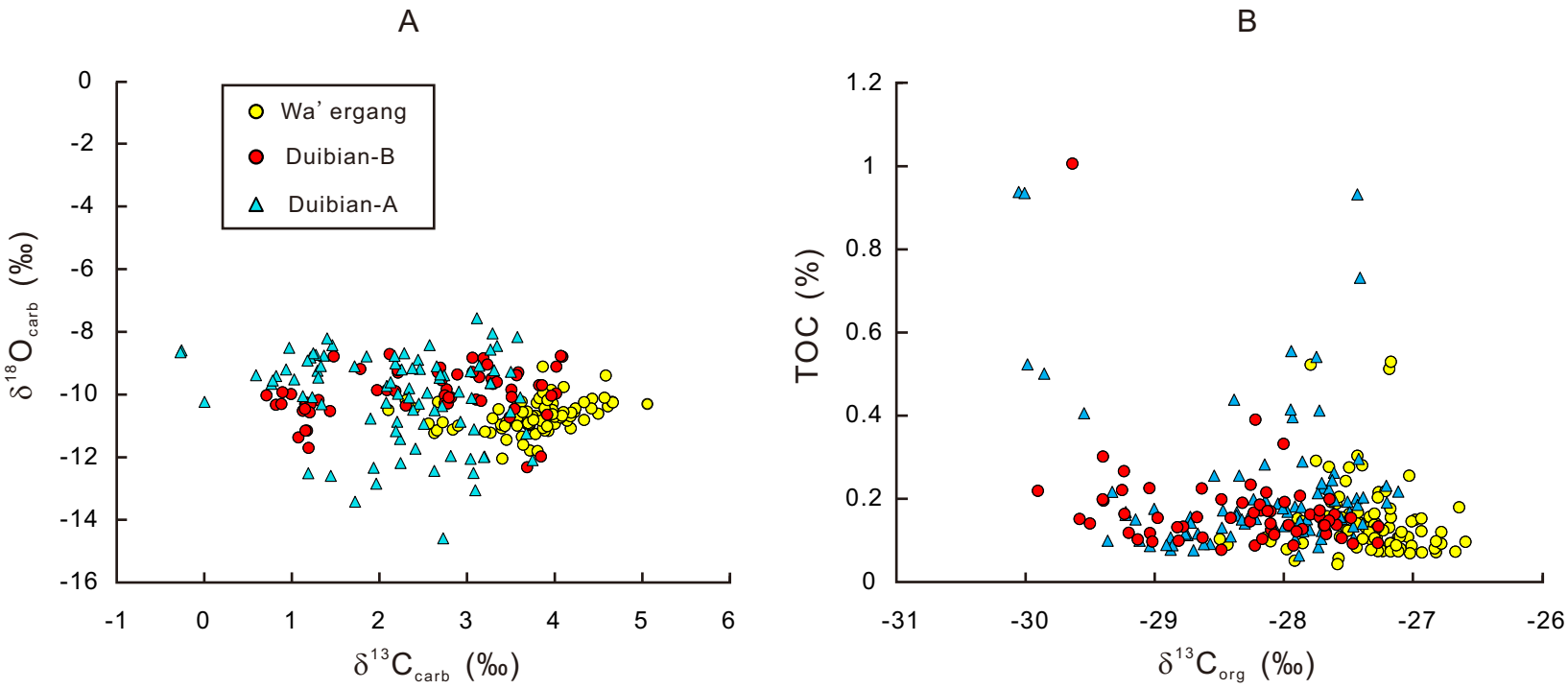
A
B
Wa' ergang
Duibian-B
Duibian-A
δ18Ocarb (‰)
δ13Ccarb (‰)
TOC (%)
δ13Corg (‰)
0
-2
-4
-6
-8
-10
-12
-14
-16
-1
0
1
2
3
4
5
6
1.2
1
0.8
0.6
0.4
0.2
0
-31
-30
-29
-28
-27
-26

Fig. DR1

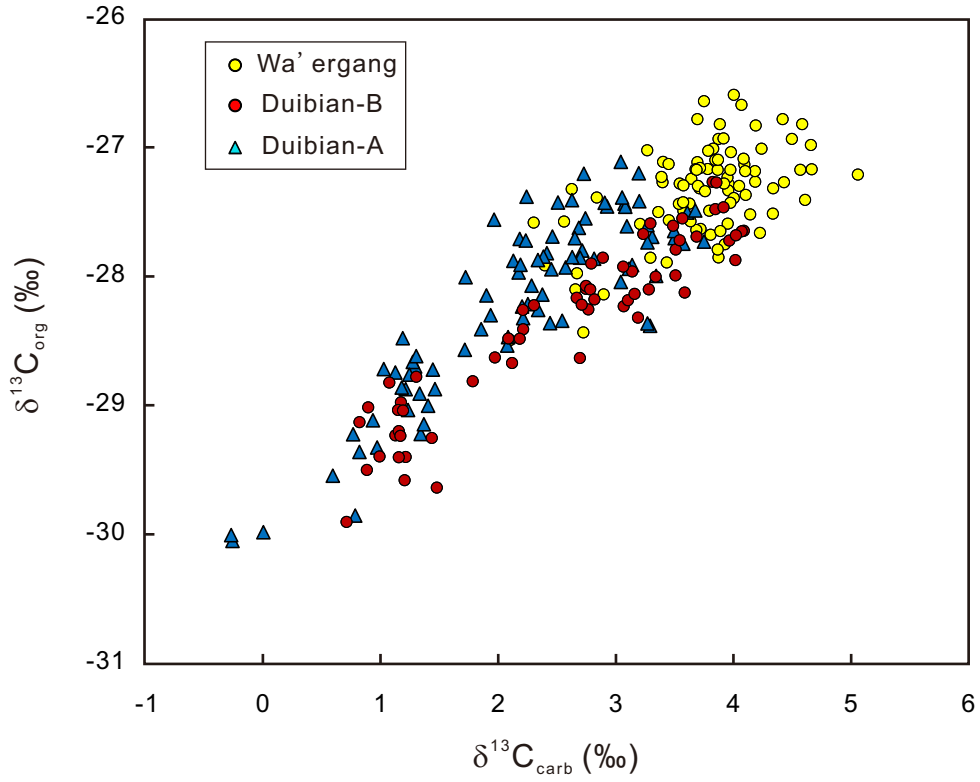
Wa' ergang
Duibian-B
Duibian-A
-26
-27
-28
-29
-30
-31
-1
0
1
2
3
4
5
6
δ13Corg (‰)
δ13Ccarb (‰)

Fig. DR2