

This PDF file includes:

Figures S1 to S2

Tables S1 to S4

References

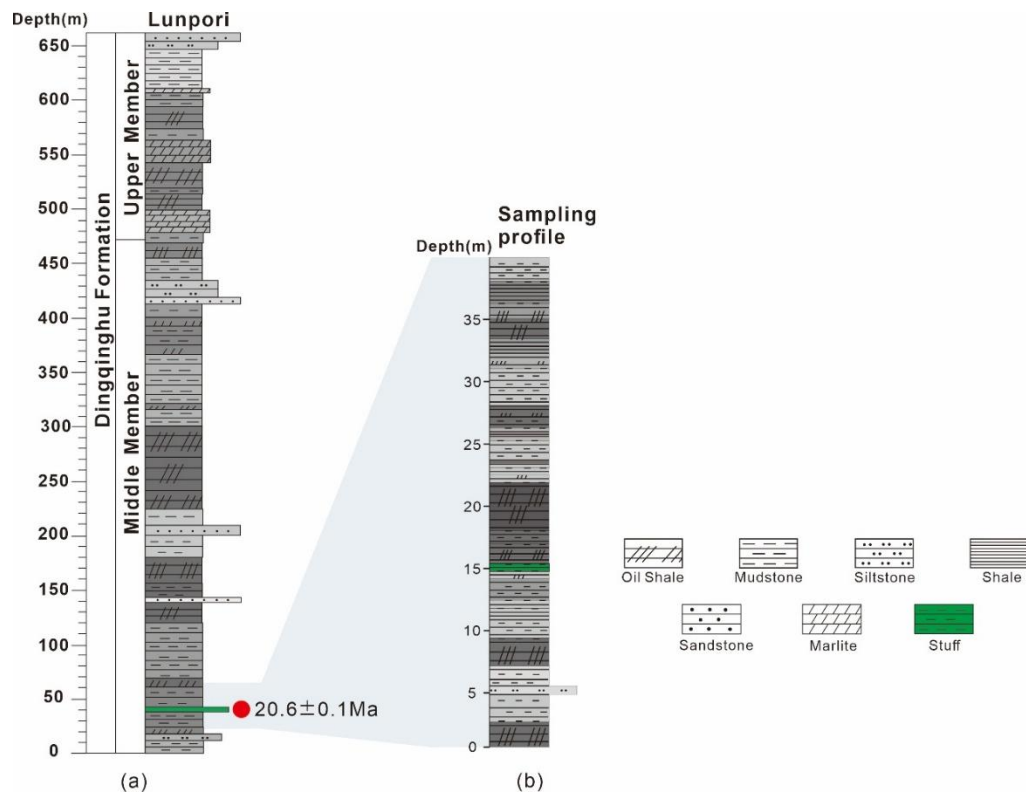


Figure S 1 (a) The stratigraphy sequence and lithology of the middle-upper part of the Dingqinghu Fm. in the Lunpori section (modified from Mao et al.,2019) (b) sampled lithological column.

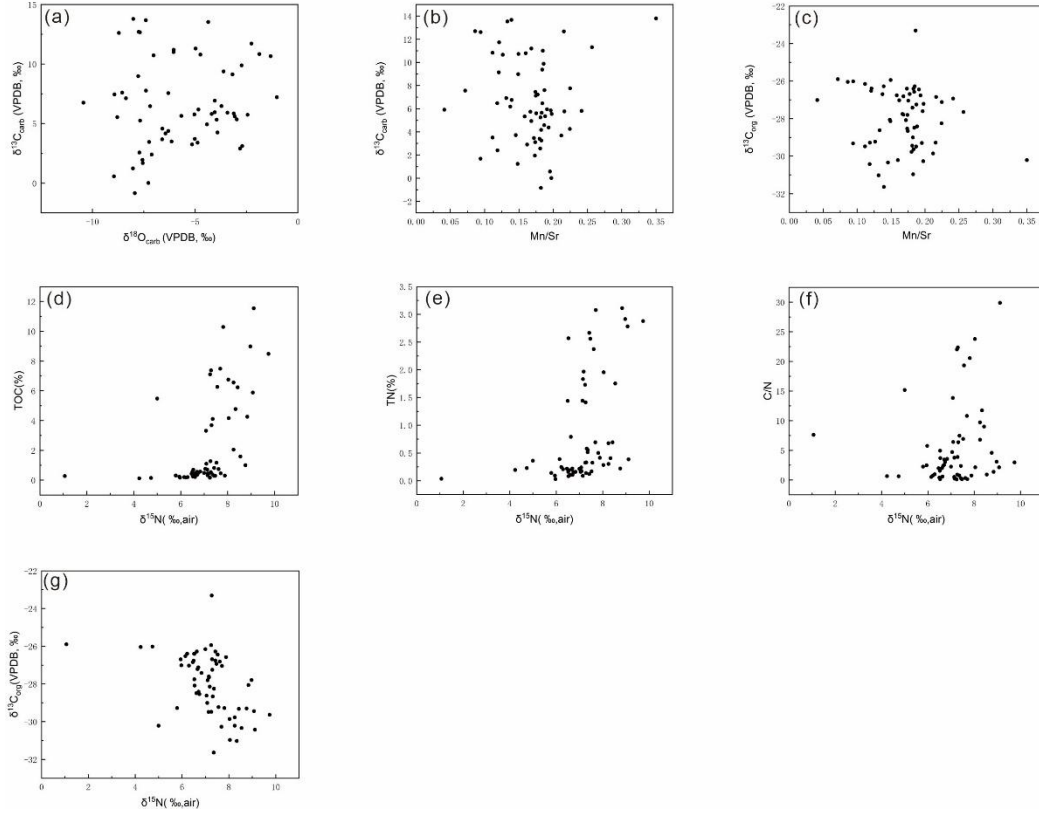


Figure S 2: (a) $\delta^{13}\text{C}_{\text{carb}}$ and $\delta^{18}\text{O}_{\text{carb}}$ ($R^2=0.0132$); (b) $\delta^{13}\text{C}_{\text{carb}}$ and Mn/Sr ($R^2=0.0012$); (c) $\delta^{13}\text{C}_{\text{org}}$ and Mn/Sr ($R^2=0.017$); (d) $\delta^{15}\text{N}$ and TOC ($R^2=0.256$); (e) $\delta^{15}\text{N}$ and TN ($R^2=0.162$); (f) $\delta^{15}\text{N}$ and C/N ($R^2=0.0003$); (g) $\delta^{15}\text{N}$ and $\delta^{13}\text{C}_{\text{org}}$ ($R^2=0.203$). $\delta^{13}\text{C}_{\text{carb}}$ (the Carbonate carbon isotope), $\delta^{18}\text{O}_{\text{carb}}$ (the Carbonate oxygen isotope), $\delta^{13}\text{C}_{\text{org}}$ (the Organic Carbon Isotope), $\delta^{15}\text{N}$ (the Organic Nitrogen isotope).

Table S 1 TOC, Carbonate carbon isotope, Organic Carbon Isotope, Organic Nitrogen isotope, C/N, OCBR and $\Delta^{13}\text{C}$ data in Dingqinghu Formation of lunpola basin.

Sample	Depth(m)	$\delta^{13}\text{C}_{\text{carb}}$ (VPDB, ‰)	1 σ (‰)	$\delta^{18}\text{O}_{\text{carb}}$ (VPDB, ‰)	$\delta^{13}\text{C}_{\text{org}}$ (VPDB, ‰)	1 σ (‰)	$\delta^{15}\text{N}_{\text{org}}$ (‰, air)	TN (%)	TOC	C/N	OCBR (g/cm ³ /kyr)	$\Delta^{13}\text{C}$ (VPDB, ‰)
LPR-1	39.1	12.70	0.04	-7.74	-26.04	0.03	4.24	0.19	0.12	0.63	0.33	38.74
LPR-2	38.5	3.24	0.05	-5.15	-26.41	0.03	6.53	2.57	0.29	0.11	0.77	29.66
LPR-3	37.9	12.61	0.09	-8.70	-26.02	0.08	4.74	0.23	0.14	0.62	0.38	38.63
LPR-4	37.3	13.68	0.06	-7.40	-26.28	0.02	6.64	0.79	0.45	0.57	1.21	39.96
LPR-5	36.7	4.17	0.09	-6.44	-30.97	0.11	8.05	1.95	4.16	2.13	11.14	35.14
LPR-6	36.1	6.76	0.07	-10.43	-31.64	0.08	7.36	0.51	0.38	0.75	1.02	38.40
LPR-7	35.5	4.38	0.07	-6.30	-26.76	0.06	6.50	1.44	0.56	0.39	1.49	31.14
LPR-8	34.9	5.65	0.10	-5.67	-29.64	0.08	9.74	2.88	8.48	2.95	22.69	35.28
LPR-9	34.3	4.93	0.07	-4.42	-27.79	0.11	8.97	2.91	8.98	3.08	24.02	32.72
LPR-10	33.3	2.57	0.07	-7.71	-29.44	0.08	9.08	2.78	5.88	2.11	15.73	32.01
LPR-11	32.7	9.89	0.10	-2.74	-23.31	0.09	7.27	1.41	1.27	0.90	3.38	33.19
LPR-12	32.1	4.57	0.07	-6.59	-29.49	0.08	7.14	1.44	0.70	0.49	1.88	34.06
LPR-13	31.5	3.72	0.09	-5.01	-30.34	0.08	8.54	1.75	1.59	0.91	4.25	34.06
LPR-14	30.9	11.30	0.07	-4.98	-27.65	0.08	7.15	1.83	0.44	0.24	1.19	38.96
LPR-15	30.3	11.72	0.06	-2.26	-26.40	0.06	6.22	0.25	0.19	0.76	0.50	38.12
LPR-16	29.7	5.60	0.08	-3.07	-27.04	0.08	7.71	3.08	0.45	0.15	1.21	32.64
LPR-17	29.1	11.20	0.06	-6.04	-26.82	0.06	7.61	2.37	0.74	0.31	1.97	38.01
LPR-18	28.5	9.38	0.06	-3.61	-26.58	0.05	7.88	0.41	0.30	0.74	0.81	35.95
LPR-19	27.9	1.23	0.08	-8.02	-28.06	0.08	8.84	3.11	4.25	1.37	11.38	29.29
LPR-19up	27.3	8.98	0.06	-7.77	-28.14	0.04	7.18	1.97	0.43	0.22	1.14	37.13

LPR-20	26.7	9.13	0.08	-3.18	-26.52	0.05	6.15	0.39	0.20	0.50	0.53	35.66
LPR-21	26.1	5.33	0.08	-3.95	-26.76	0.07	7.43	2.67	0.81	0.30	2.17	32.08
LPR-22	25.5	5.80	0.07	-4.19	-26.94	0.08	7.47	2.56	0.29	0.11	0.77	32.74
LPR-23	24.9	10.73	0.08	-7.02	-25.94	0.09	7.24	1.73	0.16	0.09	0.43	36.68
LPR-24	24.3	10.83	0.07	-1.87	-26.15	0.07	7.00	0.21	0.48	2.24	1.28	36.99
LPR-25	23.7	12.67	0.09	-7.68	-29.28	0.11	5.79	0.14	0.31	2.24	0.83	41.95
LPR-26	23.1	10.79	0.04	-4.74	-30.22	0.04	5.00	0.36	5.48	15.18	14.65	41.01
LPR-27	22.9	0.56	0.10	-8.95	-29.30	0.08	8.76	0.22	1.00	4.58	2.68	29.86
LPR-28	22.3	7.60	0.04	-8.54	-27.25	0.02	7.30	0.33	7.37	22.34	19.71	34.85
LPR-29	21.7	3.40	0.07	-4.88	-29.77	0.04	8.25	0.68	6.56	9.71	17.54	33.17
LPR-30	21.1	3.68	0.12	-6.60	-29.86	0.09	8.03	0.28	6.75	23.78	18.07	33.54
LPR-31	20.5	13.53	0.08	-4.36	-28.62	0.08	7.05	0.16	0.75	4.69	2.01	42.15
LPR-32	19.9	6.47	0.09	-3.71	-30.42	0.16	9.11	0.39	11.54	29.88	30.87	36.89
LPR-33	19.3	10.66	0.03	-1.33	-29.23	0.06	7.56	0.32	6.26	19.32	16.76	39.89
LPR-34	19	3.50	0.14	-6.14	-29.48	0.32	7.25	0.32	7.11	22.02	19.01	32.98
LPR-35	18.4	7.21	0.08	-1.02	-26.69	0.06	7.29	0.14	0.53	3.87	1.41	33.90
LPR-36	17.8	7.44	0.08	-8.92	-27.81	0.03	7.09	0.17	1.10	6.40	2.93	35.25
LPR-37	17.2	2.40	0.12	-7.11	-29.28	0.07	7.81	0.50	10.29	20.54	27.52	31.68
LPR-38	16.2	5.95	0.07	-4.04	-26.45	0.07	7.52	0.17	1.17	6.92	3.12	32.40
LPR-39	15.2	7.56	0.05	-6.30	-25.90	0.04	1.06	0.04	0.27	7.61	0.71	33.46
LPR-40	14.6	-0.84	0.15	-7.93	-29.00	0.07	7.08	0.24	3.31	13.82	8.86	28.16
LPR-41	14	6.18	0.05	-4.84	-26.70	0.06	5.95	0.09	0.23	2.47	0.60	32.88
LPR-42	13.4	6.45	0.07	-7.18	-28.49	0.04	6.61	0.10	0.20	2.00	0.55	34.94
LPR-44	12.2	2.90	0.09	-2.81	-27.03	0.09	6.30	0.21	0.20	0.96	0.53	29.93
LPR-45	11.6	1.95	0.07	-7.56	-26.40	0.05	6.52	0.16	0.25	1.55	0.66	28.35

LPR-46	11	5.25	0.08	-7.68	-27.42	0.08	6.83	0.16	0.57	3.54	1.52	32.67
LPR-47	10.4	5.77	0.07	-5.03	-26.85	0.07	6.46	0.22	0.43	1.96	1.15	32.62
LPR-48	9.8	5.54	0.13	-8.78	-27.21	0.09	6.67	0.21	0.50	2.41	1.32	32.75
LPR-49	9.2	7.76	0.07	-7.39	-27.12	0.08	6.70	0.22	0.56	2.53	1.49	34.88
LPR-50	8.6	6.92	0.06	-4.04	-31.03	0.09	8.34	0.41	4.77	11.73	12.75	37.95
LPR-51	8	4.25	0.10	-3.91	-28.25	0.02	7.37	0.55	4.11	7.44	10.99	32.50
LPR-52	7.4	0.01	0.10	-7.27	-30.27	0.07	7.69	0.69	7.49	10.80	20.02	30.27
LPR-53	6.4	5.73	0.06	-2.45	-27.76	0.05	6.53	0.08	0.40	4.94	1.08	33.49
LPR-54	5.8	5.34	0.05	-2.97	-28.42	0.05	6.71	0.11	0.37	3.43	0.98	33.76
LPR-55	5.2	5.85	0.08	-3.12	-27.61	0.07	7.15	0.09	0.33	3.74	0.88	33.45
LPR-56	4.6	5.91	0.06	-3.42	-27.02	0.04	5.97	0.03	0.17	5.75	0.45	32.93
LPR-57	4	3.46	0.11	-7.24	-28.08	0.10	6.54	0.19	0.70	3.68	1.87	31.54
LPR-58	3.4	3.11	0.08	-2.71	-28.54	0.08	6.74	0.15	0.47	3.02	1.25	31.65
LPR-59	2.4	11.01	0.09	-6.05	-26.28	0.08	7.43	0.12	0.28	2.35	0.75	37.29
LPR-60	1.8	13.79	0.06	-8.01	-30.21	0.04	8.25	0.30	2.04	6.78	5.47	44.00
LPR-61	1.2	1.68	0.15	-7.54	-29.33	0.03	8.43	0.69	6.23	9.00	16.66	31.01
LPR-62	0.6	7.12	0.05	-8.36	-28.67	0.05	7.32	0.58	3.68	6.37	9.86	35.79

Table S 2 The TC and TS data in Dingqinghu formation of Lunpola basin

Sample	TC (%)	TS(%)	Sample	TC (%)	TS(%)	Sample	TC (%)	TS(%)
LPR-1	7.23628	0.00005	LPR-21	4.10465	0.03956	LPR-42	3.30834	0.13727
LPR-2	5.86669	0.01109	LPR-22	12.70436	0.01712	LPR-44	7.94259	0.13848
LPR-3	8.22886	0.00761	LPR-23	3.30038	0.12452	LPR-45	10.28094	0.01243
LPR-4	11.87204	0.00005	LPR-24	13.14072	0.22041	LPR-46	1.85627	0.02784

LPR-5	2.77537	0.03653	LPR-25	3.08122	0.0488	LPR-47	2.54635	0.19463
LPR-6	3.27705	0.0511	LPR-26	1.89504	0.1013	LPR-48	10.67051	0.00266
LPR-7	11.40244	0.00005	LPR-27	9.05911	0.20915	LPR-49	1.92226	0.10921
LPR-8	6.09224	0.01097	LPR-28	6.88841	0.3028	LPR-50	2.30285	0.03486
LPR-9	4.21319	0.01267	LPR-29	14.68434	0.33884	LPR-51	1.48224	0.01392
LPR-10	5.63356	0.02046	LPR-30	11.31936	0.09589	LPR-52	4.20063	0.0299
LPR-11	7.55406	0.46278	LPR-31	7.13466	0.10705	LPR-53	7.96636	0.24065
LPR-12	4.00548	0.16334	LPR-32	7.44192	0.39712	LPR-54	10.44576	0.24205
LPR-13	7.2606	0.08661	LPR-33	2.06511	0.09066	LPR-55	10.09585	0.20747
LPR-14	3.7095	0.03897	LPR-34	6.4342	0.12271	LPR-56	1.86429	0.05843
LPR-15	1.84137	0.04207	LPR-35	11.23213	0.01627	LPR-57	9.66346	0.01723
LPR-16	2.51582	0.03902	LPR-36	6.33929	0.11733	LPR-58	5.2496	0.07581
LPR-17	3.35283	0.0505	LPR-37	10.94941	0.00059	LPR-59	6.68755	0.08708
LPR-18	2.15036	0.03179	LPR-38	1.47194	0.1675	LPR-60	11.10511	0.031
LPR-19	1.93038	0.03011	LPR-39	2.36399	0.15481	LPR-61	1.96546	0.10206
LPR-19up	5.40969	0.04092	LPR-40	1.93039	0.26992	LPR-62	11.25198	0.03599
LPR-20	5.59255	0.02687	LPR-41	10.01441	0.01768			

Table S 3 The representative trace elemental ratios in samples and Lu et al (2019) from the Lunpola Basin.

Sample	Depth (m)	Sr/Ba	V/(V+Ni)	Sr/Cu	Ca/Mg	Sample	Depth(m)	Sr/Ba	V/(V+Ni)	Sr/Cu	Ca/Mg
13NO.21-1	26.8	2.354762	0.650831		1.439779	LPR-1	39.1	1.041156			0.906088
13NO.21-2	26	2.027714	0.677282		1.576825	LPR-2	38.5	0.887879	0.73262	9.451613	
13NO.21-3	25.2	2.103837	0.620767		1.667728	LPR-3	37.9	1.044291			0.990403
13NO.21-4	24.4	2.295122	0.625282		1.625307	LPR-4	37.3	1.517333			1.426643

13NO.21-5	23.6	2.055437	0.632258		1.669604	LPR-5	36.7	0.710914	0.770642	9.269231	
13NO.21-6	22.8	0.458629	0.564809	7.40458	1.4	LPR-6	36.1	2		7.363636	
13NO.21-7	22	0.588235	0.594091	9.961686	2.53668	LPR-7	35.5	0.6175	0.590909	10.73913	0.627922
13NO.21-8	21.2	0.57177	0.545116	9.676113	2.066667	LPR-8	34.9	0.711921		7.413793	1.439781
13NO.21-9	20.4	0.507071	0.58517	9.160584	1.895833	LPR-9	34.3	0.767584	0.592784	4.403509	1.24143
13NO.21-10	19.6	0.618005	0.557165	9.304029	2.14652	LPR-10	33.3	0.619355	0.656109	3.147541	0.981803
13NO.21-11	18.8	0.516544	0.597464	13.06977	2.432886	LPR-11	32.7	0.946629	0.702247	8.02381	1.645109
13NO.21-12	18	0.746512	0.601679	12.29885	3.1	LPR-12	32.1	0.691275	0.62963	12.24	1.109955
13NO.21-13	17.6	0.674877	0.58971	11.81034	2.817164	LPR-13	31.5	0.473684	0.731429	11.61905	0.508862
13NO.21-14	17.2	0.525126	0.616953	6.040462	2.107143	LPR-14	30.9	0.625	0.716763	7.777778	0.790921
13NO.21-15	16.8	0.598131	0.655442	7.975078	2.595041	LPR-15	30.3	3.145299			1.084993
13NO.21-16	16.4	0.646192	0.608047	6.74359	2.816239	LPR-16	29.7	0.695238	0.542857	12.69565	2.059738
13NO.21-17	16	0.598997	0.642674	5.117773	2.416309	LPR-17	29.1	0.590062	0.578313	5.906977	0.655837
13NO.21-18	15.6	0.604336	0.58186	5.837696	1.464151	LPR-18	28.5	3.947368		28.125	1.097874
13NO.21-19	15.2	0.677922	0.623896	5.97254	1.418605	LPR-19	27.9	0.526119	0.705426	5.23913	0.566623
13NO.21-20	14.8	0.6703	0.618615	5.565611	1.234957	LPR-19up	27.3	0.576446	0.717949	14.7037	1.013021
13NO.21-21	14.4	0.590452	0.558195	4.947368	1.149153	LPR-20	26.7	5.061224			1.109875
13NO.21-22	14	0.542056	0.567105	2.442105	2.02439	LPR-21	26.1	0.744186	0.607595	13.18519	1.3617
13NO.21-23	13.6	0.814241	0.549206	2.728216	1.6125	LPR-22	25.5	0.782991	0.647368	9.206897	1.663896
13NO.21-24	13.2	0.754476	0.577576	5.7393	1.968847	LPR-23	24.9	0.592466	0.774704	6.657895	0.515701
13NO.21-25	12.8	0.732394	0.477723	4.094488	1.403226	LPR-24	24.3	3.292929			0.945751
13NO.21-26	12.4	0.481481	0.614849	6.65529	1.731707	LPR-25	23.7	1.265957	0.8	7.933333	1.01747
13NO.21-27	12	0.488722	0.60264	6.435644	1.60251	LPR-26	23.1	2.522634			1.053163
13NO.21-28	11.6	0.442577	0.661007	3.853659	0.873874	LPR-27	22.9	0.705463	0.538095	5.033898	2.579643
13NO.21-29	11.2	0.537736	0.562471	2.775974	1.017094	LPR-28	22.3	0.667546	0.616216	6.170732	1.087898

13NO.21-30	10.8	1.054545	0.581186	3.914511	1.328336	LPR-29	21.7	0.909639	0.757576	5.298246	2.215578
13NO.21-31	10	0.96988	0.550879	3.922046	1.438152	LPR-30	21.1	0.825175	0.698492	6.051282	1.452483
13NO.21-32	9.2	1.110465	0.619772	10.73034	1.582474	LPR-31	20.5	2.534483			1.100212
13NO.21-33	8.4	0.77686	0.512591	2.860041	1.394822	LPR-32	19.9	0.797235	0.498208	2.402778	0.651836
13NO.21-34	7.6	0.754386	0.501875	6.586433	2.697959	LPR-33	19.3	0.543544	0.751412	3.12069	0.820239
13NO.21-35	6.8	0.761658	0.537457	5.240642	1.56	LPR-34	19	0.714912	0.705394	2.762712	1.704196
13NO.21-36	6.4	0.740157	0.461426	4.585366	1.802198	LPR-35	18.4	0.688272	0.555556	10.09375	0.662857
13NO.21-37	6	0.857939	0.480161	3.259259	2.612167	LPR-36	17.8	0.800654	0.540741	9.078947	3.597545
13NO.21-38	5.6	0.806283	0.616324	7.897436	1.965753	LPR-37	17.2	1.537931	0.579909	5.126437	
13NO.21-39	5.2	0.758065	0.651057	7.598152	2.057895	LPR-38	16.2		0.625954	8.805556	
13NO.21-40	4.8	0.586854	0.579937	2.656748	1.937759	LPR-39	15.2	1.897959			0.931488
13NO.21-41	4	0.821346	0.640878	11.02804	2.027548	LPR-40	14.6	0.545455	0.633065	2.8	0.697968
13NO.21-42	3.2	0.856305	0.687309	11.36187	1.656934	LPR-41	14	1.909091	0.711268		1.328823
13NO.21-43	2.4	2.591078	0.653846		1.697297	LPR-42	13.4	1.309816			1.202052
13NO.21-44	1.6	2.498221	0.612844		1.715458	LPR-44	12.2	0.696319	0.682051	8.107143	1.168561
13NO.21-45	0.8	3.727749	0.631902		1.58109	LPR-45	11.6	0.569767	0.701754	11.5	1.311914
13NO.21-46	0	3.716667	0.685279		1.604058	LPR-46	11	0.811659	0.628743	9.05	1.46408
						LPR-47	10.4	0.86478		9.482759	1.125827
						LPR-48	9.8	0.60401	0.52459	7.30303	0.806494
						LPR-49	9.2	0.92219	0.690323	10	1.093426
						LPR-50	8.6	1.17027	0.640244	10.825	1.486719
						LPR-51	8	0.562176	0.682028	6.2	1.172133
						LPR-52	7.4	0.828125	0.555556	6.022727	
						LPR-53	6.4	1.496212			1.41942
						LPR-54	5.8	0.97654	0.672566		1.957701

						LPR-55	5.2	1.751969			1.744657
						LPR-56	4.6	6.015			0.554722
						LPR-57	4	0.933333	0.668639	11.74194	2.027739
						LPR-58	3.4	0.59364	0.535714		2.736596
						LPR-59	2.4	3.487395			1.026882
						LPR-60	1.8	1.663014			1.065954
						LPR-61	1.2	0.890957	0.58794	7.613636	3.51075
						LPR-62	0.6	0.722561	0.61165	4.016949	3.167386

	Lu et al.,2023	This Study
	average	average
Sr/Ba	1.0567850	1.284337
V/(V+Ni)	0.594882766	0.648629
Sr/Cu	6.682476364	8.266161
Ca/Mg	1.836318248	1.33372

The trace element data measured by XRF used in this study are similar to the average and range of change after comparing with the previous data, which can be used to indicate the environmental changes of the Dingqinghu Formation.

Table S 4 The full 62-sample dataset with CH₄ flux

Sample	Depth (m)	$\delta^{13}\text{C}_{\text{carb}}$ (‰)	$\Delta\delta^{13}\text{C}$ (+2)	1-f (Fraction of methane lost)	OCBR (g C cm ⁻² kyr ⁻¹)	F _{CH₄} (g CH ₄ m ⁻² kyr ⁻¹)
LPR-1	39.1	7.12	5.12	0.226	9.857	29.7
LPR-2	38.5	1.68	-0.32	0.016	16.659	3.5

LPR-3	37.9	13.79	11.79	0.438	5.47	31.9
LPR-4	37.3	11.01	9.01	0.362	0.752	3.6
LPR-5	36.7	3.11	1.11	0.054	1.252	0.9
LPR-6	36.1	3.46	1.46	0.07	1.871	1.7
LPR-7	35.5	5.91	3.91	0.177	0.447	1.1
LPR-8	34.9	5.85	3.85	0.175	0.879	2
LPR-9	34.3	5.34	3.34	0.154	0.981	2
LPR-10	33.3	5.73	3.73	0.17	1.081	2.4
LPR-11	32.7	0.01	-1.99	-0.095*	20.024	0.0*
LPR-12	32.1	4.25	2.25	0.106	10.988	15.6
LPR-13	31.5	6.92	4.92	0.218	12.755	37.1
LPR-14	30.9	7.76	5.76	0.25	1.494	5
LPR-15	30.3	5.54	3.54	0.162	1.325	2.9
LPR-16	29.7	5.77	3.77	0.172	1.145	2.6
LPR-17	29.1	5.25	3.25	0.15	1.518	3
LPR-18	28.5	1.95	-0.05	0.002	0.663	0
LPR-19	27.9	2.9	0.9	0.044	0.528	0.3
LPR-19UP	27.3	6.45	4.45	0.2	0.548	1.5
LPR-20	26.7	6.18	4.18	0.189	0.603	1.5
LPR-21	26.1	-0.84	-2.84	-0.132*	8.86	0.0*
LPR-22	25.5	7.56	5.56	0.242	0.715	2.3
LPR-23	24.9	5.95	3.95	0.179	3.118	7.4
LPR-24	24.3	2.4	0.4	0.02	27.52	7.3
LPR-25	23.7	7.44	5.44	0.238	2.933	9.3
LPR-26	23.1	7.21	5.21	0.229	1.415	4.3

LPR-27	22.9	3.5	1.5	0.072	19.007	18.3
LPR-28	22.3	10.66	8.66	0.352	16.756	78.6
LPR-29	21.7	6.47	4.47	0.2	30.87	82.3
LPR-30	21.1	13.53	11.53	0.433	2.01	11.6
LPR-31	20.5	3.68	1.68	0.081	18.068	19.5
LPR-32	19.9	3.4	1.4	0.067	17.542	15.8
LPR-33	19.3	7.6	5.6	0.244	19.709	64.2
LPR-34	19	0.56	-1.44	-0.069*	2.681	0.0*
LPR-35	18.4	10.79	8.79	0.356	14.648	69.6
LPR-36	17.8	12.67	10.67	0.415	0.834	4.6
LPR-37	17.2	10.83	8.83	0.358	1.278	6.1
LPR-38	16.2	10.73	8.73	0.354	0.43	2
LPR-39	15.2	5.8	3.8	0.173	0.766	1.8
LPR-40	14.6	5.33	3.33	0.153	2.175	4.4
LPR-41	14	9.13	7.13	0.3	0.526	2.1
LPR-42	13.4	8.98	6.98	0.295	1.14	4.5
LPR-44	12.2	1.23	-0.77	-0.038*	11.377	0.0*
LPR-45	11.6	9.38	7.38	0.308	0.813	3.3
LPR-46	11	11.2	9.2	0.368	1.97	9.7
LPR-47	10.4	5.6	3.6	0.164	1.206	2.6
LPR-48	9.8	11.72	9.72	0.385	0.499	2.6
LPR-49	9.2	11.3	9.3	0.372	1.187	5.9
LPR-50	8.6	3.72	1.72	0.083	4.248	4.7
LPR-51	8	4.57	2.57	0.121	1.883	3
LPR-52	7.4	9.89	7.89	0.327	3.384	14.8

LPR-53	6.4	2.57	0.57	0.028	15.725	5.9
LPR-54	5.8	4.93	2.93	0.136	24.022	43.6
LPR-55	5.2	5.65	3.65	0.167	22.693	50.5
LPR-56	4.6	4.38	2.38	0.112	1.489	2.2
LPR-57	4	6.76	4.76	0.212	1.021	2.9
LPR-58	3.4	4.17	2.17	0.103	11.139	15.3
LPR-59	2.4	13.68	11.68	0.436	1.211	7
LPR-60	1.8	12.61	10.61	0.413	0.378	2.1
LPR-61	1.2	3.24	1.24	0.06	0.768	0.6
LPR-62	0.6	12.7	10.7	0.416	0.325	1.8

*Note: For samples where $\Delta\delta^{13}\text{C} < 0$, the calculated methane loss fraction (1-f) yields a negative value. This has no physical meaning in the context of methane ebullition-driven positive excursions and indicates either negligible methane release or net methane oxidation/consumption within the system. Accordingly, flux values for these samples are set to 0 g CH₄ m⁻² yr⁻¹.

References

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