

Appendix Table 1. Trace and rare earth elements contents in samples of Well W01

depth/m	ω (test program) / (mg/kg)										
	Sr	Ba	Zr	Rb	Th	U	Zn	Cu	V	Ni	Ce
1515.20	5616	921	6.46	16.7	1.84	9.09	50.5	18.8	28.9	12.4	8.89
1524.05	451	818	113	126	12.8	4.72	106	28.3	112	44.2	60.6
1532.80	202	528	131	150	14.4	2.72	103	23.9	129	39.6	70.6
1533.83	194	531	141	145	13.3	2.59	102	22.4	131	41.0	67.5
1535.05	261	495	127	145	12.5	2.93	103	26.1	126	40	64.8
1536.46	219	516	142	144	12.9	2.65	103	24.1	133	42.3	66.3
1538.70	282	473	134	139	11.6	2.69	101	23.3	109	38.7	63.9
1539.95	324	473	128	127	11.3	2.6	102	23.6	112	40.0	61.6
1556.75	451	1088	113	127	12.2	3.09	105	25.6	102	45.9	62.1
1558.30	411	703	113	131	12.9	3.05	109	24.4	109	44.6	63.2
1560.20	295	845	125	136	12.3	2.55	110	27.5	122	46.7	66.2
1561.20	308	689	125	139	12.6	2.5	111	26.0	121	46.8	65
1563.10	323	646	123	138	12.5	2.44	112	26.7	126	44.1	63.6
1565.65	363	825	126	132	13.4	3.67	104	26.8	115	42.5	64.2
1566.20	245	557	140	141	13.8	3.38	101	25.2	117	41.2	69.5
1568.65	202	668	321	82.9	11.5	2.2	71.0	12.1	74.6	28.6	69.1
1576.70	200	413	654	69.5	20.2	3.11	56.9	8.68	63.7	21.9	97.3
1578.90	228	441	258	82.9	10.1	2	69.9	8.22	67.3	23.3	66.3
1579.85	343	565	108	141	13.2	3.42	112	32.1	127	48.7	66
1580.15	293	546	118	145	13.1	3.26	112	34.0	131	50.0	66.3
1582.70	303	581	128	131	12	2.82	108	28.9	125	51.7	63.6
1584.55	269	586	123	139	12.5	3.15	105	26.6	122	43.7	67
1585.20	243	559	143	140	12.4	2.46	104	25.3	124	45.6	65.5
1587.20	216	520	175	122	11.6	2.18	92.2	20.4	110	41.4	64.9
1588.70	343	509	127	126	11.3	2.61	100	23.4	116	42.6	61.9
1590.70	382	594	123	129	13	3.49	100	24.7	115	41.6	66.9
1592.18	291	515	148	130	12.5	3.01	102	23.0	112	41.6	66.7
1593.70	313	663	135	135	12.9	3.1	102	23.7	122	42.8	69
1595.70	381	543	138	124	13.3	4.23	99.3	24.8	108	38.3	67
1598.64	247	558	113	153	14.2	3.02	107	23.4	126	46.8	70.6
1670.10	243	618	142	140	13.1	2.87	106	18.7	112	45.2	68
1673.10	191	544	151	140	11.7	2.29	102	19.1	126	39.9	66.6
1674.20	235	482	147	138	11.5	2.69	98.8	15.6	122	39.2	65.2

Appendix Table 2. Major element contents in samples of Well 01

depth/m	ω (test program) / (%)								
	MgO	CaO	Ca ₂ O ₃	K ₂ O	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	MnO	Org·C
1515.20	0.18	47.37	85.60	0.47	1.36	0.95	0.031	0.013	0.67
1524.05	1.98	11.28	19.31	2.57	13.69	4.90	0.59	0.091	1.03
1532.80	2.70	4.44	7.26	3.02	13.15	5.78	0.71	0.080	0.75
1533.83	2.82	4.56	7.56	3.08	14.62	5.85	0.74	0.092	0.78
1535.05	2.70	6.17	10.63	3.03	13.66	5.70	0.68	0.088	0.81
1536.46	2.94	5.60	8.98	3.20	15.54	5.94	0.77	0.12	0.84
1538.70	2.70	7.08	11.88	3.12	14.99	5.95	0.73	0.096	0.82
1539.95	2.51	7.68	13.47	2.80	11.91	5.40	0.66	0.099	0.86
1556.75	2.30	10.90	18.69	2.75	14.53	5.62	0.62	0.13	0.70
1558.30	2.30	9.25	16.45	2.70	12.42	5.31	0.62	0.15	0.70
1560.20	2.41	6.84	11.92	3.01	13.03	5.72	0.69	0.13	0.71
1561.20	2.34	6.97	12.33	2.93	13.16	5.63	0.67	0.13	0.71
1563.10	2.28	7.12	12.85	2.92	13.10	5.49	0.67	0.13	0.75
1565.65	2.43	9.29	15.01	3.02	15.27	5.82	0.70	0.083	0.87
1566.20	2.42	5.76	10.30	2.85	12.92	5.91	0.69	0.073	0.79
1568.65	1.03	4.01	7.29	1.76	13.99	3.34	0.55	0.058	0.34
1576.70	1.33	3.73	5.54	1.80	6.98	3.39	0.76	0.058	0.21
1578.90	1.56	4.53	7.35	2.01	7.67	3.50	0.56	0.063	0.37
1579.85	2.55	7.92	14.26	2.91	12.82	5.50	0.61	0.14	1.21
1580.15	2.79	7.43	12.70	3.24	15.64	5.92	0.66	0.13	1.16
1582.70	2.44	7.17	12.48	2.86	12.49	5.54	0.69	0.083	0.79
1584.55	1.67	6.10	11.64	2.60	18.32	5.43	0.65	0.082	0.69
1585.20	2.71	6.05	9.83	3.15	15.56	6.00	0.77	0.12	0.66
1587.20	2.37	4.82	8.10	2.71	11.88	5.32	0.74	0.11	0.57
1588.70	2.15	8.22	14.74	2.65	12.10	5.23	0.65	0.10	0.85
1590.70	2.05	9.07	16.00	2.69	12.38	5.33	0.66	0.095	0.85
1592.18	2.34	7.02	11.90	2.94	15.24	6.23	0.75	0.082	1.07
1593.70	2.23	6.88	12.07	0.47	12.95	5.60	0.71	0.082	0.85
1595.70	1.89	8.73	15.48	2.57	12.05	5.16	0.70	0.069	1.07
1598.64	2.14	5.24	10.09	3.02	19.53	5.37	0.62	0.11	0.68
1670.10	2.31	5.37	9.50	3.08	13.08	5.92	0.76	0.078	0.85
1673.10	2.41	3.93	6.14	3.03	13.06	5.88	0.79	0.068	0.66
1674.20	2.18	4.75	8.44	3.20	13.96	5.36	0.76	0.065	0.59

Appendix Table 3. AMS-14C ages of bivalve shells in SCS(data from zhang et al., 2023)

Sample	Depth (mbsf)	Conventional ¹⁴ C age (ka BP)	Calibrated ¹⁴ C age (ka BP)	2σ	δ ¹³ C (‰,VPDB)	δ ¹⁸ O (‰,VPDB)
W08B-2018-002	1.4–1.5	40.0	42.7	0.47	0.4	4.2
W09B-2018-001	0.12–0.13	14.6	17.0	0.27	−4.6	5.3
W09B-2018-002	0.28–0.29	13.4	15.4	0.26	0.3	4.3
W09B-2018-004	1.71–1.73	20.4	23.8	0.29	−3.9	5.6
W01B-2019-001-1	0–0.51	9.56	10.4	0.21	−5.7	4.0
W01B-2019-001-3	0–0.51	9.58	10.5	0.21	−5.4	3.4