

Supplementary Materials

Annexed Table S1. The original data of major elements in Chang 7 outcrop shale.

No.	Stratum	Al ₂ O ₃	Fe ₂ O ₃	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	MnO	TiO ₂	SiO ₂
H1	Chang 7 ₂	11.32	11.32	1.46	2.19	0.75	1.90	0.24	0.09	0.43	36.42
H2	Chang 7 ₂	13.38	10.50	0.87	0.98	0.95	2.25	0.29	0.06	0.32	40.61
H3	Chang 7 ₂	10.73	9.50	0.86	1.67	1.39	1.86	0.45	0.05	0.46	46.90
H4	Chang 7 ₃	14.20	8.13	1.70	1.23	1.25	2.50	0.40	0.20	0.51	44.44
H5	Chang 7 ₃	13.46	7.26	1.78	2.11	1.34	2.25	0.40	0.20	0.53	46.51
H6	Chang 7 ₃	15.80	7.62	2.03	1.18	1.16	2.88	0.29	0.17	0.63	48.17
H7	Chang 7 ₃	11.50	9.88	1.06	1.65	1.46	2.13	0.38	0.12	0.40	45.36
H8	Chang 7 ₃	12.93	9.67	1.15	2.60	1.45	2.05	0.40	0.20	0.36	43.58
H9	Chang 7 ₃	13.96	7.85	1.12	1.97	1.30	2.37	0.45	0.25	0.40	46.09
H10	Chang 7 ₃	13.54	7.00	0.76	0.40	0.97	3.65	0.25	0.10	0.30	45.73
H11	Chang 7 ₃	12.52	8.85	0.97	1.62	1.43	1.50	0.34	0.08	0.32	43.33
H12	Chang 7 ₃	12.56	9.63	0.98	1.25	1.01	2.35	0.29	0.09	0.41	44.26

Annexed Table S2. The original data of trace elements in Chang 7 outcrop shale.

No.	Stratum	Cr	Sr	Zr	Ba	Sc	V	Cu	Zn	Th	U	Co	Ni	Nb	Cd	Hf	Ta	Mo	B	Eu
H1	Chang 7 ₂	78.65	153.20	117.80	439.40	13.40	286.40	153.60	100.70	11.90	61.80	18.20	31.10	20.00	0.88	4.14	0.50	24.90	21.00	1.23
H2	Chang 7 ₂	81.50	163.20	121.00	516.70	11.50	283.00	137.20	107.60	14.90	53.20	20.90	35.40	13.90	0.91	5.14	0.80	52.20	31.60	1.19
H3	Chang 7 ₂	62.23	230.00	136.00	462.40	13.90	235.50	144.00	116.80	10.90	62.80	16.00	30.20	9.30	0.76	4.45	0.85	76.40	15.52	1.29
H4	Chang 7 ₃	68.50	193.50	128.10	652.20	15.90	186.30	97.00	100.70	13.90	17.50	17.00	36.50	20.00	0.61	5.85	2.13	14.30	29.50	1.28
H5	Chang 7 ₃	76.40	1824.00	134.30	610.00	15.00	180.00	96.30	95.30	12.60	21.50	18.10	36.60	19.20	0.69	5.88	1.78	28.90	42.70	1.20
H6	Chang 7 ₃	58.12	178.50	133.20	663.20	16.10	171.20	64.70	100.00	14.40	12.90	17.10	36.70	18.80	0.64	5.59	1.50	24.90	51.00	1.39
H7	Chang 7 ₃	56.13	187.30	121.10	563.40	10.40	254.50	139.70	100.20	15.80	68.60	16.80	27.65	13.00	0.98	5.00	0.83	52.76	18.50	1.16
H8	Chang 7 ₃	71.50	435.90	127.50	766.60	17.00	300.00	141.20	116.50	9.90	51.40	17.50	29.00	6.70	1.08	3.85	0.55	58.43	20.00	1.42
H9	Chang 7 ₃	55.30	426.30	146.00	848.50	12.10	248.30	123.70	98.40	15.40	47.50	17.40	30.00	20.30	1.14	6.00	0.68	62.20	27.60	1.84
H10	Chang 7 ₃	39.12	112.40	135.60	381.10	10.20	123.00	91.70	117.90	22.60	26.50	12.90	23.60	21.60	0.78	7.10	1.00	45.00	21.50	1.04
H11	Chang 7 ₃	57.70	385.20	133.40	775.00	14.70	306.30	142.80	122.20	9.10	59.90	14.50	25.50	7.90	0.78	4.68	0.54	76.00	14.60	1.42
H12	Chang 7 ₃	69.40	327.90	146.80	793.00	13.50	315.00	133.80	67.80	12.50	46.00	14.60	27.00	12.60	0.92	4.82	0.83	74.00	20.00	1.46