

Table S2 Rare earth element compositions ($\times 10^{-6}$) of zircons for pyroclastic rocks and sedimentary rocks from the Laofengkou area, West Junggar

Sample	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
The dark green lithic crystal tuff (19TL-82)														
19TL-82-01	0.00	19.51	0.03	0.60	1.76	0.93	11.28	4.10	51.91	21.53	108.34	26.79	288.49	67.78
19TL-82-02	0.00	33.78	0.04	0.89	2.77	1.51	20.42	7.75	100.74	42.77	217.35	52.08	546.96	128.18
19TL-82-03	0.03	17.79	0.07	1.29	2.51	0.89	14.45	5.27	67.20	29.58	153.60	37.08	393.49	91.28
19TL-82-04	0.04	8.17	0.06	1.03	2.34	0.81	12.15	4.14	52.79	23.20	117.85	28.57	305.44	71.95
19TL-82-05	0.10	20.86	0.08	0.93	1.94	1.09	11.97	4.23	55.12	23.46	122.11	29.81	321.04	77.75
19TL-82-06	0.07	27.10	0.11	1.35	2.82	1.75	18.76	6.60	81.41	33.63	164.76	39.27	409.06	95.71
19TL-82-07	0.03	36.11	0.07	1.30	3.23	1.88	20.75	7.25	87.58	35.68	175.00	40.95	422.19	98.27
19TL-82-08	0.01	19.73	0.04	0.71	1.81	1.16	12.77	4.59	56.43	24.37	124.63	30.14	325.50	79.99
19TL-82-10	0.06	20.36	0.08	1.24	2.62	1.46	16.62	5.77	74.19	30.53	154.57	37.63	394.93	93.41
19TL-82-11	0.02	16.63	0.06	0.85	1.63	0.88	9.71	3.49	43.11	18.56	97.04	23.53	254.42	63.18
19TL-82-12	0.01	18.30	0.03	0.64	1.50	0.98	11.79	4.16	57.44	24.36	129.22	31.91	342.18	84.51
19TL-82-13	0.02	54.37	0.19	3.14	8.59	2.65	56.11	19.81	246.18	97.01	439.23	90.63	804.38	166.75
19TL-82-14	0.01	8.67	0.10	1.18	1.40	0.95	6.00	1.67	19.97	8.39	44.94	12.11	143.89	39.16
19TL-82-15	0.03	23.86	0.06	1.03	2.43	1.26	14.57	5.01	63.33	26.41	134.08	32.60	346.40	83.04
19TL-82-16	0.03	24.75	0.05	0.99	2.58	1.45	16.26	6.09	75.84	32.92	167.70	41.04	433.35	102.37
19TL-82-17	0.00	16.45	0.03	0.69	1.56	0.71	8.03	2.68	30.95	12.48	58.57	13.48	134.16	28.55
19TL-82-18	0.03	12.65	0.04	0.59	1.51	0.88	9.85	3.92	52.03	21.64	116.11	28.65	314.06	78.14
19TL-82-19	0.02	9.79	0.03	0.42	0.92	0.42	5.37	1.74	22.23	9.67	49.44	12.44	139.43	33.88
19TL-82-20	0.05	16.11	0.03	0.51	1.46	0.88	9.52	3.59	46.10	20.02	105.15	26.26	284.40	70.50
19TL-82-21	0.03	16.31	0.05	0.72	1.96	1.00	12.49	4.38	54.80	23.70	121.14	30.16	324.84	79.40
19TL-82-22	0.00	10.85	0.04	0.58	1.20	0.62	6.05	2.03	25.35	10.46	55.01	13.11	142.79	35.21

19TL-82-23	0.01	13.24	0.04	0.64	1.59	0.92	10.38	4.03	50.68	22.26	114.99	28.27	302.64	75.77
19TL-82-24	0.01	27.61	0.04	0.83	2.27	1.21	15.84	5.53	69.61	29.26	147.66	35.91	379.49	90.90
19TL-82-25	0.01	14.65	0.05	0.98	1.63	0.74	8.41	2.70	31.15	12.64	61.08	14.44	152.62	34.50
19TL-82-26	0.09	18.41	0.07	0.81	1.60	0.85	11.20	3.94	49.21	21.23	107.32	26.14	281.44	66.78
19TL-82-27	0.02	12.69	0.14	2.23	4.49	1.25	23.10	7.71	89.99	35.13	161.43	34.98	330.63	70.65
19TL-82-28	0.06	31.92	0.09	1.41	3.65	1.84	22.15	8.25	101.16	42.82	211.40	50.75	528.16	125.13
19TL-82-29	0.02	28.05	0.05	0.87	2.75	1.49	17.64	6.25	78.99	32.21	158.70	37.86	388.42	90.71
19TL-82-30	1.21	17.62	0.46	2.46	1.56	0.72	8.40	2.98	37.61	16.47	83.33	20.72	227.40	55.54
19TL-82-31	0.03	20.44	0.04	0.59	1.75	1.11	12.70	4.71	61.37	26.38	134.21	33.07	357.35	85.98
19TL-82-32	0.00	6.33	0.02	0.20	0.40	0.25	3.36	1.14	15.20	6.93	36.29	9.50	107.28	26.62
19TL-82-33	0.00	25.45	0.04	0.64	1.82	1.00	12.57	4.56	61.11	25.57	131.08	31.17	334.16	79.46
19TL-82-34	0.01	13.49	0.02	0.48	1.37	0.69	8.81	3.38	43.67	18.99	99.82	25.26	280.56	67.40
19TL-82-35	0.21	14.26	0.10	1.41	2.63	1.07	15.25	5.33	67.10	28.29	141.62	33.99	359.36	87.80
19TL-82-36	0.01	21.28	0.03	0.57	1.72	0.91	12.18	4.43	58.12	24.65	124.18	30.15	323.05	76.60
19TL-82-37	0.06	27.60	0.08	1.25	3.11	1.65	19.63	6.88	83.31	33.33	166.86	39.36	419.75	97.17
19TL-82-38	0.01	24.82	0.21	3.82	9.00	1.20	59.84	21.19	259.90	100.57	448.74	91.56	813.19	160.24
19TL-82-39	0.03	9.86	0.05	0.90	1.96	0.71	10.69	4.00	52.03	22.80	116.66	28.43	304.05	70.42
19TL-82-40	0.05	9.87	0.04	0.58	1.30	0.39	9.06	3.57	48.55	21.42	114.19	27.72	295.57	69.15
19TL-82-41	0.13	26.06	0.07	1.15	2.63	1.33	16.70	6.25	82.06	34.64	178.66	42.92	457.90	108.75
19TL-82-42	0.02	18.13	0.03	0.73	1.69	1.09	11.99	4.30	55.87	23.89	121.84	29.90	319.41	77.57
19TL-82-43	0.55	18.38	0.20	2.31	3.44	1.46	16.11	4.83	53.98	20.63	95.15	21.33	207.00	43.27
19TL-82-44	0.01	7.95	0.03	0.36	0.84	0.48	5.39	1.96	26.26	11.23	59.05	15.20	170.17	42.97
19TL-82-45	0.96	15.25	0.66	5.63	4.75	1.69	19.69	6.21	73.80	31.43	152.27	35.36	368.76	86.08
19TL-82-46	0.00	17.88	0.03	0.48	1.40	0.86	10.63	4.06	52.81	23.35	119.69	29.61	318.75	75.90
19TL-82-47	0.01	11.26	0.03	0.45	1.04	0.69	7.50	2.84	37.28	16.63	88.72	22.06	245.00	60.78

19TL-82-48	0.02	12.00	0.07	0.91	2.15	0.78	11.31	4.43	57.43	25.24	126.69	29.96	309.00	70.39
19TL-82-49	0.57	21.79	0.17	1.10	1.61	0.90	10.55	3.59	46.32	20.27	104.68	25.64	280.03	67.61
19TL-82-50	0.01	13.46	0.03	0.49	1.42	0.79	9.52	3.56	45.94	20.71	109.90	27.57	301.04	74.69
The gray-green fine sandstone (19TL-90)														
19TL-90-01	0.05	20.07	0.04	0.63	1.64	0.49	10.20	4.21	55.91	24.84	128.65	32.34	348.68	81.16
19TL-90-02	0.00	8.68	0.05	0.77	1.87	0.84	10.78	4.31	60.48	27.42	146.05	35.68	377.63	90.24
19TL-90-03	0.01	25.11	0.04	0.85	2.42	0.49	15.53	6.35	87.20	36.86	180.95	42.28	423.31	91.01
19TL-90-04	0.60	23.94	0.21	1.39	1.99	0.58	12.83	4.95	67.67	31.26	166.55	41.71	454.93	105.84
19TL-90-05	0.01	8.23	0.02	0.61	1.35	0.58	9.67	3.90	53.92	24.37	129.75	32.72	350.15	85.19
19TL-90-06	0.00	7.23	0.09	1.63	3.22	1.14	15.77	5.34	65.58	26.58	129.21	30.24	306.69	69.20
19TL-90-07	0.21	24.65	0.16	1.47	2.08	0.78	13.92	5.28	73.68	32.18	168.23	40.80	436.14	102.83
19TL-90-08	0.01	8.20	0.07	1.04	2.25	0.73	13.56	5.03	62.97	25.81	129.67	30.00	300.82	67.45
19TL-90-09	0.28	15.37	0.17	1.84	3.19	1.17	18.61	7.10	93.75	39.82	202.05	48.63	507.47	118.91
19TL-90-10	0.00	26.18	0.03	0.61	1.94	0.55	13.10	5.26	74.09	33.85	179.38	44.82	480.70	113.73
19TL-90-11	0.04	16.50	0.06	1.00	2.29	0.66	14.62	5.52	74.81	32.31	169.35	41.72	455.72	108.68
19TL-90-12	0.04	29.10	0.05	0.81	2.38	0.77	16.87	6.48	83.50	36.11	183.16	43.75	456.84	106.37
19TL-90-13	1.21	13.48	0.34	1.98	1.67	0.53	8.87	3.38	44.04	18.84	96.02	23.24	246.46	56.86
19TL-90-14	1.63	25.21	0.55	4.23	5.15	1.58	28.11	9.76	121.90	50.17	244.95	56.99	581.38	134.61
19TL-90-15	2.12	18.86	0.80	4.44	2.62	0.91	11.30	4.27	56.86	25.40	135.55	33.19	360.46	85.03
19TL-90-16	0.00	26.63	0.04	0.82	2.12	0.66	13.70	5.35	73.43	32.56	173.34	42.54	463.78	109.59
19TL-90-17	0.00	8.74	0.04	0.58	1.68	0.62	10.32	4.04	55.42	24.99	132.59	32.97	359.16	83.71
19TL-90-18	0.31	12.09	0.15	1.05	1.58	0.46	9.43	3.41	44.18	18.62	95.12	23.13	243.09	55.95
19TL-90-19	0.08	38.39	0.22	3.85	7.24	3.83	38.02	12.38	146.91	59.83	285.90	64.00	651.37	147.87
19TL-90-20	0.00	6.63	0.01	0.35	0.95	0.34	6.16	2.48	32.96	14.39	75.70	18.49	198.67	46.63
19TL-90-21	0.01	7.78	0.02	0.53	1.43	0.52	8.94	3.59	47.66	21.56	116.78	29.16	316.13	76.91

19TL-90-22	2.46	14.69	0.64	3.29	2.23	0.72	10.19	3.94	52.19	23.31	118.32	28.98	312.22	73.57
19TL-90-23	0.01	15.91	0.09	1.75	4.10	1.69	27.16	9.65	123.62	50.87	239.40	53.10	514.23	112.09
19TL-90-24	0.00	10.16	0.02	0.51	1.56	0.38	10.48	3.91	50.41	21.15	104.69	23.81	237.13	52.88
19TL-90-25	0.78	32.73	0.92	6.39	5.03	1.70	22.21	8.08	101.90	43.55	221.49	52.91	548.44	124.72
19TL-90-26	0.13	26.70	0.15	2.67	5.28	1.78	33.35	12.39	157.11	65.90	327.95	75.39	751.54	170.02
19TL-90-27	0.37	17.81	0.17	1.79	3.66	0.88	20.35	7.54	96.81	41.36	202.50	46.79	467.48	102.35
19TL-90-28	0.00	11.99	0.05	1.04	2.63	0.95	15.93	6.27	84.92	39.33	209.45	51.20	532.03	122.78
19TL-90-29	0.18	10.85	0.09	0.74	1.72	0.44	9.54	3.68	46.73	21.21	109.26	26.52	275.61	66.46
19TL-90-30	0.59	31.67	0.88	5.03	3.60	1.25	15.26	5.90	80.13	35.60	185.94	45.51	471.88	111.19
19TL-90-31	1.37	23.94	1.09	7.55	4.50	1.32	15.27	5.12	68.53	29.61	155.24	37.82	403.37	96.93
19TL-90-32	0.29	23.75	0.16	1.37	2.21	0.61	12.70	4.80	62.27	26.77	134.50	32.70	335.34	77.80
19TL-90-33	0.66	26.09	0.73	5.10	3.54	1.11	14.50	4.95	66.59	29.63	155.34	38.73	418.93	100.55
19TL-90-34	0.00	7.13	0.03	0.36	1.07	0.34	6.90	2.70	36.57	16.66	86.85	21.49	231.40	54.04
19TL-90-35	0.80	39.35	0.27	1.61	2.53	0.66	15.54	6.04	84.03	37.66	195.76	47.21	507.80	117.93
19TL-90-36	0.69	13.52	0.23	1.76	2.79	0.86	15.57	6.27	85.98	38.25	195.84	45.85	473.79	107.79
19TL-90-37	0.01	15.31	0.03	0.72	1.46	0.99	10.40	4.23	61.11	28.35	155.34	38.98	427.42	106.91
19TL-90-38	0.04	24.59	0.07	1.03	2.57	0.81	16.22	6.24	82.28	37.18	198.25	47.62	511.73	121.25
19TL-90-39	0.01	19.68	0.03	0.54	1.79	0.57	12.08	4.77	65.26	29.57	152.73	37.40	399.47	94.04
19TL-90-40	0.28	25.41	0.27	4.36	8.42	2.47	44.40	15.34	186.23	75.85	360.67	82.49	818.22	183.75
19TL-90-41	0.02	11.27	0.15	2.63	5.54	1.09	31.19	10.78	137.23	55.83	269.22	59.22	558.43	119.78
19TL-90-42	0.12	28.98	0.15	1.72	3.26	1.72	23.87	8.85	116.40	49.49	247.12	57.73	609.12	142.70
19TL-90-43	0.03	15.26	0.09	1.56	4.18	1.32	25.80	10.05	135.52	57.88	288.98	66.82	665.11	145.72
19TL-90-44	0.01	16.18	0.01	0.48	1.36	0.45	10.10	4.00	56.51	25.78	139.78	35.28	386.37	92.58
19TL-90-45	1.19	30.82	0.33	2.02	2.24	0.59	14.30	5.44	77.51	34.84	180.15	44.26	475.94	110.37
19TL-90-46	53.97	134.14	15.58	69.33	14.11	2.15	18.62	4.57	48.54	19.42	95.74	23.15	248.35	57.33

19TL-90-47	0.00	9.77	0.02	0.50	1.03	0.41	7.28	2.72	36.11	15.89	83.36	20.27	215.69	50.05
19TL-90-48	1.26	10.64	0.41	2.19	1.80	0.50	8.91	3.35	45.19	20.68	110.53	27.82	302.16	72.81
19TL-90-49	35.80	88.33	10.28	43.31	11.02	2.02	21.89	6.65	75.10	30.40	146.97	34.29	353.04	80.26
19TL-90-50	5.16	39.97	1.40	6.55	3.07	0.62	13.36	5.16	67.46	29.44	152.29	36.70	388.49	88.69