

Table S1 Zircon U-Pb data of pyroclastic rocks and sedimentary rocks from the Laofengkou area, West Junggar

Spots	Common ^{204}Pb	^{206}Pb	^{232}Th	^{238}U	Th/U	$^{207}\text{Pb}/^{235}\text{U}$		$^{206}\text{Pb}/^{238}\text{U}$		$^{207}\text{Pb}/^{235}\text{U}$		$^{206}\text{Pb}/^{238}\text{U}$		Conc.
	$\times 10^{-6}$			ratios		1 σ	ratios	1 σ	Ma	1 σ	Ma	1 σ		
The dark green lithic crystal tuff (19TL-82)														
19TL-82-01	0.00	25.25	122.59	310.77	0.39	0.4718	0.0110	0.0621	0.0009	392	8	388	6	98%
19TL-82-02	0.00	27.98	165.37	337.60	0.49	0.4633	0.0095	0.0622	0.0007	387	7	389	4	99%
19TL-82-03	0.00	21.09	214.55	238.65	0.90	0.4775	0.0131	0.0632	0.0012	396	9	395	7	99%
*19TL-82-04	2.63	7.95	35.20	95.90	0.37	2.0899	0.4031	0.0932	0.0105	1146	132	575	62	33%
*19TL-82-05	0.00	20.51	123.33	254.43	0.48	0.6322	0.0343	0.0598	0.0008	497	21	374	5	71%
*19TL-82-06	2.23	24.10	200.02	306.81	0.65	0.5260	0.0175	0.0557	0.0007	429	12	349	4	79%
*19TL-82-07	4.46	41.10	313.68	494.86	0.63	0.5877	0.0427	0.0654	0.0022	469	27	408	13	86%
*19TL-82-08	3.59	22.87	173.92	281.65	0.62	0.5048	0.0133	0.0579	0.0006	415	9	363	4	86%
19TL-82-10	4.38	18.37	107.09	234.17	0.46	21.9014	5.2511	0.9900	0.2474	3179	233	4436	801	66%
19TL-82-11	0.47	22.76	156.22	273.06	0.57	0.4567	0.0092	0.0614	0.0007	382	6	384	4	99%
19TL-82-12	0.91	19.38	106.52	236.69	0.45	0.4921	0.0144	0.0628	0.0009	406	10	393	6	96%
*19TL-82-13	0.00	29.84	347.34	348.32	1.00	0.4769	0.0166	0.0571	0.0007	396	11	358	4	89%
19TL-82-14	0.00	5.59	49.38	64.65	0.76	0.4562	0.0194	0.0624	0.0010	382	14	390	6	97%
*19TL-82-15	2.09	22.05	147.51	276.25	0.53	0.6006	0.0502	0.0639	0.0026	478	32	399	16	82%
*19TL-82-16	2.30	29.54	180.07	298.85	0.60	17.0910	10.3212	0.4612	0.1962	2940	579	2445	865	81%
19TL-82-17	0.00	5.65	38.31	68.02	0.56	0.4328	0.0209	0.0608	0.0008	365	15	381	5	95%
19TL-82-18	0.00	14.50	58.86	182.62	0.32	0.5120	0.0194	0.0608	0.0006	420	13	381	4	90%
*19TL-82-19	0.00	15.44	50.06	195.66	0.26	11.9960	4.5124	0.3294	0.0675	2604	353	1836	327	65%
19TL-82-20	3.08	19.51	102.48	236.41	0.43	0.4653	0.0135	0.0625	0.0008	388	9	391	5	99%
*19TL-82-21	3.92	17.31	87.20	217.09	0.40	0.3150	0.0829	0.0597	0.0013	278	64	374	8	70%

19TL-82-22	3.11	9.54	69.65	112.59	0.62	0.5012	0.0186	0.0616	0.0009	413	13	385	6	93%
19TL-82-23	1.96	12.77	64.24	159.80	0.40	0.5130	0.0253	0.0611	0.0010	420	17	383	6	90%
19TL-82-24	0.00	31.57	202.29	375.04	0.54	0.4622	0.0084	0.0609	0.0006	386	6	381	4	98%
19TL-82-25	0.00	7.05	44.89	82.88	0.54	0.4625	0.0184	0.0631	0.0009	386	13	394	5	97%
*19TL-82-26	0.70	19.72	98.32	234.44	0.42	10.8713	6.2116	0.2124	0.0639	2512	531	1241	340	32%
19TL-82-27	3.41	9.07	95.63	98.97	0.97	0.4437	0.0185	0.0611	0.0009	373	13	382	6	97%
19TL-82-28	0.00	29.16	206.15	344.76	0.60	0.4783	0.0112	0.0608	0.0007	397	8	380	4	95%
19TL-82-29	1.95	33.09	231.03	406.53	0.57	0.4560	0.0103	0.0607	0.0006	382	7	380	3	99%
19TL-82-30	0.00	16.87	109.26	200.24	0.55	0.4954	0.0130	0.0620	0.0008	409	9	388	5	94%
19TL-82-31	0.00	20.25	99.10	251.52	0.39	0.4943	0.0133	0.0628	0.0009	408	9	392	6	96%
19TL-82-32	1.22	6.86	25.80	83.91	0.31	0.4980	0.0219	0.0675	0.0011	410	15	421	7	97%
*19TL-82-33	0.04	27.76	184.34	323.10	0.57	0.5239	0.0212	0.0618	0.0006	428	14	387	4	89%
19TL-82-34	2.71	15.93	67.30	198.54	0.34	0.5010	0.0142	0.0634	0.0010	412	10	397	6	96%
*19TL-82-35	0.00	37.86	174.83	421.98	0.41	0.6521	0.0378	0.0687	0.0008	510	23	428	5	82%
19TL-82-36	0.00	22.57	150.05	264.62	0.57	0.4779	0.0111	0.0639	0.0011	397	8	399	6	99%
*19TL-82-37	0.00	27.51	173.42	333.03	0.52	53.8311	29.9932	0.7521	0.1929	4066	555	3615	710	88%
19TL-82-38	0.00	30.79	299.59	345.27	0.87	0.4706	0.0096	0.0612	0.0007	392	7	383	4	97%
*19TL-82-39	0.00	9.65	70.95	113.88	0.62	8.5440	5.3220	0.2793	0.1076	2291	566	1588	542	63%
19TL-82-40	2.96	14.43	62.21	187.01	0.33	0.4701	0.0116	0.0608	0.0007	391	8	381	5	97%
*19TL-82-41	0.00	20.41	134.86	273.70	0.49	17.4240	11.7630	0.7203	0.1731	2958	648	3497	648	83%
19TL-82-42	0.00	20.23	158.61	245.58	0.65	0.5020	0.0237	0.0617	0.0010	413	16	386	6	93%
19TL-82-43	0.00	7.14	58.15	82.71	0.70	0.4440	0.0170	0.0618	0.0008	373	12	386	5	96%
19TL-82-44	1.76	8.00	34.88	99.65	0.35	0.4532	0.0148	0.0618	0.0007	380	10	387	4	98%
*19TL-82-45	0.00	26.17	226.99	307.13	0.74	0.6908	0.0304	0.0632	0.0006	533	18	395	4	70%
19TL-82-46	0.00	16.27	73.76	199.47	0.37	0.4674	0.0132	0.0635	0.0010	389	9	397	6	98%

19TL-82-47	6.05	14.23	63.61	180.15	0.35	0.5089	0.0192	0.0619	0.0009	418	13	387	6	92%
19TL-82-48	0.00	11.84	107.34	132.14	0.81	0.4862	0.0143	0.0617	0.0008	402	10	386	5	95%
*19TL-82-49	5.36	21.30	144.82	263.11	0.55	0.5885	0.0572	0.0587	0.0008	470	37	368	5	75%
19TL-82-50	4.48	13.51	63.01	166.06	0.38	0.5072	0.0177	0.0629	0.0009	417	12	393	5	94%
The gray-green fine sandstone (19TL-90)														
19TL-90-01	0.00	23.10	179.91	313.14	0.57	0.4114	0.0091	0.0560	0.0009	350	7	351	5	99%
19TL-90-02	0.00	8.22	55.08	114.07	0.48	0.4105	0.0142	0.0557	0.0006	349	10	349	4	99%
19TL-90-03	1.50	10.67	90.47	128.16	0.71	0.4585	0.0153	0.0611	0.0009	383	11	382	5	99%
19TL-90-04	0.00	24.82	187.79	333.22	0.56	0.4140	0.0092	0.0561	0.0007	352	7	352	5	99%
19TL-90-05	0.00	8.50	49.07	123.25	0.40	0.4124	0.0159	0.0544	0.0007	351	11	341	5	97%
19TL-90-06	4.31	6.51	56.81	85.57	0.66	0.4209	0.0164	0.0545	0.0006	357	12	342	4	95%
19TL-90-07	1.44	28.92	255.90	383.25	0.67	0.4065	0.0080	0.0552	0.0006	346	6	346	4	99%
19TL-90-08	0.00	8.70	61.11	120.80	0.51	0.4108	0.0152	0.0551	0.0007	349	11	346	4	98%
19TL-90-09	3.82	24.91	203.86	319.38	0.64	0.4195	0.0104	0.0565	0.0008	356	7	354	5	99%
19TL-90-10	0.00	29.69	215.34	401.47	0.54	0.4129	0.0101	0.0563	0.0009	351	7	353	6	99%
19TL-90-11	0.66	22.53	159.11	303.87	0.52	0.4045	0.0106	0.0564	0.0008	345	8	354	5	97%
19TL-90-12	0.00	33.03	374.82	402.84	0.93	0.4082	0.0098	0.0564	0.0008	348	7	354	5	98%
19TL-90-13	1.69	9.00	72.93	119.71	0.61	0.4086	0.0171	0.0554	0.0008	348	12	347	5	99%
19TL-90-14	6.53	28.97	285.22	351.98	0.81	0.4358	0.0104	0.0575	0.0008	367	7	361	5	98%
19TL-90-15	0.00	11.73	84.54	157.53	0.54	0.4011	0.0129	0.0558	0.0007	342	9	350	4	97%
19TL-90-16	4.28	32.64	312.48	409.83	0.76	0.4089	0.0091	0.0560	0.0007	348	7	351	4	99%
19TL-90-17	0.00	8.63	54.55	119.00	0.46	0.4226	0.0187	0.0577	0.0012	358	13	362	7	98%
19TL-90-18	0.10	10.55	91.38	124.92	0.73	0.4517	0.0150	0.0592	0.0009	378	11	371	6	97%
19TL-90-19	0.44	38.63	519.07	465.80	1.11	0.4129	0.0094	0.0547	0.0006	351	7	343	4	97%
19TL-90-20	2.83	7.02	39.26	98.07	0.40	0.4036	0.0151	0.0558	0.0008	344	11	350	5	98%

19TL-90-21	0.00	8.31	45.00	113.19	0.40	0.4095	0.0155	0.0565	0.0008	349	11	354	5	98%
19TL-90-22	0.20	12.42	100.36	160.84	0.62	0.4154	0.0105	0.0561	0.0009	353	8	352	5	99%
19TL-90-23	0.00	24.62	259.82	285.09	0.91	0.4525	0.0140	0.0594	0.0013	379	10	372	8	98%
19TL-90-24	0.00	11.58	85.10	150.68	0.56	0.4082	0.0165	0.0566	0.0007	348	12	355	4	97%
19TL-90-25	0.00	49.36	538.70	605.17	0.89	0.4066	0.0078	0.0547	0.0007	346	6	343	4	99%
19TL-90-26	2.04	35.53	312.79	455.25	0.69	0.4158	0.0086	0.0545	0.0006	353	6	342	4	96%
19TL-90-27	0.00	23.23	208.64	291.45	0.72	0.4037	0.0095	0.0548	0.0006	344	7	344	3	99%
19TL-90-28	0.66	14.97	86.42	205.74	0.42	0.4101	0.0148	0.0542	0.0007	349	11	340	4	97%
19TL-90-29	6.22	9.13	66.64	111.40	0.60	0.4117	0.0188	0.0575	0.0008	350	14	360	5	97%
19TL-90-30	3.64	30.97	242.84	387.69	0.63	0.4259	0.0107	0.0554	0.0008	360	8	347	5	96%
19TL-90-31	0.00	20.92	170.94	265.88	0.64	0.4283	0.0141	0.0559	0.0008	362	10	351	5	96%
19TL-90-32	0.15	33.78	352.71	419.90	0.84	0.4053	0.0093	0.0561	0.0008	346	7	352	5	98%
19TL-90-33	1.84	24.68	219.37	315.04	0.70	0.4149	0.0102	0.0565	0.0008	352	7	354	5	99%
19TL-90-34	1.38	7.48	40.52	105.78	0.38	0.4151	0.0157	0.0561	0.0009	353	11	352	5	99%
19TL-90-35	3.02	37.13	307.91	498.52	0.62	0.4007	0.0089	0.0549	0.0007	342	6	344	4	99%
19TL-90-36	2.45	12.79	75.04	181.40	0.41	0.4206	0.0131	0.0560	0.0008	357	9	351	5	98%
19TL-90-37	1.75	20.54	187.69	280.62	0.67	0.4160	0.0093	0.0543	0.0006	353	7	341	4	96%
19TL-90-38	2.59	25.69	200.79	359.59	0.56	0.4092	0.0095	0.0548	0.0007	348	7	344	4	98%
19TL-90-39	2.42	28.40	243.23	390.79	0.62	0.4030	0.0080	0.0550	0.0006	344	6	345	4	99%
19TL-90-40	0.00	32.87	340.61	442.36	0.77	0.4057	0.0083	0.0555	0.0008	346	6	348	5	99%
19TL-90-41	6.85	16.59	138.25	230.08	0.60	0.4171	0.0125	0.0558	0.0007	354	9	350	4	98%
19TL-90-42	0.00	25.33	296.22	329.77	0.90	0.4089	0.0122	0.0561	0.0008	348	9	352	5	98%
19TL-90-43	0.00	17.12	119.65	248.81	0.48	0.4225	0.0133	0.0562	0.0007	358	9	352	4	98%
19TL-90-44	0.00	19.35	126.65	279.25	0.45	0.4190	0.0121	0.0564	0.0008	355	9	353	5	99%
19TL-90-45	0.00	31.01	268.87	433.28	0.62	0.4281	0.0095	0.0569	0.0009	362	7	356	5	98%

*19TL-90-46	0.00	7.80	62.18	109.33	0.57	0.4838	0.0212	0.0561	0.0009	401	15	352	5	87%
19TL-90-47	0.00	7.08	61.08	99.79	0.61	0.4273	0.0204	0.0559	0.0008	361	15	350	5	96%
19TL-90-48	0.00	8.44	48.91	119.70	0.41	0.4276	0.0143	0.0583	0.0007	361	10	365	4	99%
*19TL-90-49	0.00	7.87	73.43	108.89	0.67	0.4643	0.0177	0.0556	0.0007	387	12	349	4	89%
19TL-90-50	0.43	31.45	309.26	427.92	0.72	0.4274	0.0106	0.0566	0.0009	361	8	355	5	98%

* refer to invalid U-Pb dating spots with discordance greater than 10%.