

Table S3 Zircon in-situ Lu-Hf isotope compositions for pyroclastic rocks and sedimentary rocks from the Laofengkou area, West Junggar

Sample	T/Ma	$^{176}\text{Yb}/^{177}\text{Hf}$	2 σ	$^{176}\text{Lu}/^{177}\text{Hf}$	2 σ	$^{176}\text{Hf}/^{177}\text{Hf}$	2 σ	$^{176}\text{Hf}/^{177}\text{Hf}_i$	$\varepsilon_{\text{Hf}}(0)$	$\varepsilon_{\text{Hf}}(t)$	T _{DM1} (Ma)	T _{DM2} (Ma)	f _{Lu/Hf}
The dark green lithic crystal tuff (19TL-82)													
19TL-82-01	388	0.034383	0.000074	0.001051	0.000002	0.282857	0.000017	0.282849	3.0	11.3	561	664	-0.97
19TL-82-02	389	0.057769	0.000172	0.001814	0.000005	0.282847	0.000019	0.282834	2.7	10.8	587	698	-0.95
19TL-82-14	390	0.021047	0.000025	0.000695	0.000001	0.282798	0.000022	0.282793	0.9	9.3	638	790	-0.98
19TL-82-17	381	0.019735	0.000049	0.000558	0.000002	0.282808	0.000020	0.282804	1.3	9.5	622	771	-0.98
19TL-82-22	385	0.030603	0.000213	0.001005	0.000006	0.282837	0.000021	0.282830	2.3	10.5	588	710	-0.97
19TL-82-23	383	0.061297	0.001090	0.002002	0.000033	0.282793	0.000029	0.282799	0.7	8.7	668	827	-0.94
19TL-82-24	381	0.050771	0.000208	0.001674	0.000009	0.282835	0.000022	0.282823	2.2	10.2	602	727	-0.95
19TL-82-25	394	0.027074	0.000190	0.000798	0.000005	0.282830	0.000020	0.282824	2.0	10.5	596	718	-0.98
19TL-82-27	382	0.049773	0.001700	0.001359	0.000044	0.282886	0.000020	0.282877	4.0	12.1	523	605	-0.96
19TL-82-28	380	0.068230	0.000357	0.002242	0.000010	0.282815	0.000022	0.282799	1.5	9.3	640	782	-0.93
19TL-82-29	380	0.037145	0.000185	0.001123	0.000005	0.282876	0.000019	0.282868	3.7	11.8	535	627	-0.97
19TL-82-30	388	0.028992	0.000311	0.000893	0.000007	0.282840	0.000020	0.282834	2.4	10.7	582	699	-0.97
19TL-82-32	421	0.024319	0.000199	0.000774	0.000005	0.282855	0.000022	0.282849	2.9	12.0	559	643	-0.98
19TL-82-38	383	0.064018	0.000147	0.001715	0.000006	0.282907	0.000019	0.282895	4.8	12.8	499	564	-0.95
19TL-82-40	381	0.051318	0.000143	0.001609	0.000007	0.282906	0.000019	0.282895	4.7	12.7	498	565	-0.95
19TL-82-42	386	0.059650	0.000382	0.002009	0.000013	0.282837	0.000029	0.282823	2.3	10.3	604	725	-0.94
19TL-82-44	387	0.030665	0.000061	0.000965	0.000002	0.282860	0.000019	0.282853	3.1	11.4	555	656	-0.97
19TL-82-47	387	0.032903	0.000148	0.001138	0.000004	0.282886	0.000029	0.282878	4.0	12.3	521	600	-0.97
19TL-82-50	393	0.047671	0.000378	0.001615	0.000012	0.282697	0.000032	0.282685	-2.7	5.6	799	1032	-0.95
The gray-green fine sandstone (19TL-90)													
19TL-90-02	349	0.053913	0.000116	0.001633	0.000004	0.282901	0.000019	0.282891	4.6	11.9	505	595	-0.95

19TL-90-03	382	0.053332	0.000097	0.001492	0.000003	0.282951	0.000021	0.282941	6.3	14.4	432	460	-0.96
19TL-90-04	352	0.052805	0.000367	0.001607	0.000010	0.283001	0.000018	0.282991	8.1	15.5	361	366	-0.95
19TL-90-05	341	0.039902	0.000376	0.001212	0.000010	0.282949	0.000022	0.282941	6.2	13.5	432	486	-0.96
19TL-90-07	346	0.057189	0.000257	0.001700	0.000007	0.282941	0.000021	0.282930	6.0	13.2	449	508	-0.95
19TL-90-09	354	0.066536	0.000396	0.001974	0.000015	0.282930	0.000018	0.282916	5.6	12.9	469	533	-0.94
19TL-90-11	354	0.047565	0.000217	0.001459	0.000006	0.282903	0.000020	0.282894	4.6	12.1	500	586	-0.96
19TL-90-12	354	0.062401	0.000430	0.001873	0.000011	0.282890	0.000018	0.282878	4.2	11.5	525	621	-0.94
19TL-90-13	347	0.054741	0.000066	0.001601	0.000004	0.282925	0.000019	0.282914	5.4	12.7	471	542	-0.95
19TL-90-17	362	0.041868	0.000125	0.001240	0.000004	0.282932	0.000022	0.282923	5.7	13.3	457	512	-0.96
19TL-90-18	371	0.064669	0.000490	0.001882	0.000013	0.282905	0.000020	0.282892	4.7	12.4	503	578	-0.94
19TL-90-20	350	0.025465	0.000264	0.000776	0.000007	0.282936	0.000020	0.282931	5.8	13.3	445	502	-0.98
19TL-90-22	352	0.045650	0.000092	0.001379	0.000002	0.282885	0.000018	0.282876	4.0	11.4	525	626	-0.96
19TL-90-23	372	0.099333	0.000364	0.002699	0.000007	0.282898	0.000022	0.282879	4.5	12.0	526	606	-0.92
19TL-90-24	355	0.034814	0.000254	0.000988	0.000007	0.282955	0.000015	0.282949	6.5	14.1	421	460	-0.97
19TL-90-26	342	0.073939	0.000537	0.002136	0.000013	0.282897	0.000019	0.282883	4.4	11.5	519	617	-0.94
19TL-90-28	340	0.068048	0.000215	0.001996	0.000004	0.282901	0.000021	0.282888	4.6	11.6	511	607	-0.94
19TL-90-29	360	0.036242	0.000293	0.001092	0.000009	0.282934	0.000021	0.282926	5.7	13.4	452	507	-0.97
19TL-90-30	347	0.063680	0.000707	0.001866	0.000020	0.282892	0.000020	0.282880	4.3	11.5	522	620	-0.94
19TL-90-32	352	0.054965	0.000171	0.001628	0.000006	0.282940	0.000018	0.282930	6.0	13.3	449	505	-0.95
19TL-90-35	344	0.049086	0.000205	0.001490	0.000007	0.282933	0.000018	0.282923	5.7	12.9	458	524	-0.96
19TL-90-37	341	0.049459	0.000037	0.001564	0.000001	0.282943	0.000022	0.282933	6.1	13.2	444	503	-0.95
19TL-90-40	348	0.068047	0.001020	0.002009	0.000031	0.282933	0.000021	0.282920	5.7	12.9	464	528	-0.94
19TL-90-41	350	0.072054	0.000591	0.001922	0.000018	0.282913	0.000020	0.282900	5.0	12.2	493	573	-0.94
19TL-90-43	352	0.094981	0.001200	0.002641	0.000031	0.282918	0.000025	0.282901	5.2	12.3	495	570	-0.92
19TL-90-45	356	0.054763	0.000197	0.001665	0.000004	0.282980	0.000019	0.282969	7.4	14.8	392	413	-0.95

19TL-90-48	365	0.052054	0.000196	0.001524	0.000007	0.282951	0.000020	0.282941	6.3	14.0	432	471	-0.95
19TL-90-50	355	0.051277	0.000184	0.001545	0.000005	0.282934	0.000018	0.282923	5.7	13.2	458	517	-0.95

Note: $(^{176}\text{Hf}/^{177}\text{Hf})_i = (^{176}\text{Hf}/^{177}\text{Hf})_s - (^{176}\text{Lu}/^{177}\text{Hf})_s \times (e^{\lambda t} - 1)$

$\varepsilon_{\text{Hf}}(t) = 10000 \times \{ (^{176}\text{Hf}/^{177}\text{Hf})_i / [(^{176}\text{Hf}/^{177}\text{Hf})_{\text{CHUR},0} - (^{176}\text{Lu}/^{177}\text{Hf})_{\text{CHUR}} \times (e^{\lambda t} - 1)] - 1 \};$

$T_{\text{DM1}} = 1/\lambda \times [1 + [(^{176}\text{Hf}/^{177}\text{Hf})_s - (^{176}\text{Hf}/^{177}\text{Hf})_{\text{DM}}] / [(^{176}\text{Lu}/^{177}\text{Hf})_s - (^{176}\text{Lu}/^{177}\text{Hf})_{\text{DM}}]];$

$T_{\text{DM2}} = T_{\text{DM1}} - (T_{\text{DM1}} - T) \times (f_{\text{cc}} - f_s) / (f_{\text{cc}} - f_{\text{DM}});$

$f_{\text{Lu/Hf}} = (^{176}\text{Lu}/^{177}\text{Hf})_s / (^{176}\text{Lu}/^{177}\text{Hf})_{\text{CHUR}} - 1;$

s=sample; $\lambda = 1.867 \times 10^{-11}$.