

SUPPLEMENTARY FILE 6 TS Ar-Ar DATA

Tulloch-GNS, P75047, Muscovite, 3.28 mg, J = 0.001732 ± 0.24%

4 amu discrimination = 1.0533 ± 1.41%, 40/39K = 0.04795 ± 48.28%, 36/37Ca = 0.000260 ± 6.87%, 39/37Ca = 0.000677 ± 5.05%

step	T (C)	t (min.)	36Ar	37Ar	38Ar	39Ar	40Ar	%40Ar*	% 39Ar rlsd	Ca/K	40Ar*/39ArK	Age (Ma)	1s.d.
1	750	12	0.346	0.235	0.208	9.523	391.499	75.9	2.3	0.14752459	31.277062	95.18	2.00
2	800	12	1.998	0.150	0.570	13.393	1025.76	45.5	3.2	0.066953522	35.126447	106.55	3.40
3	830	12	0.186	0.091	0.362	24.340	905.642	94.6	5.9	0.022349878	35.459592	107.53	1.92
4	860	12	0.240	0.050	0.208	13.041	499.990	87.1	3.2	0.022919942	33.555537	101.92	1.94
5	890	12	0.127	0.044	0.209	13.645	489.355	93.4	3.3	0.019276717	33.631735	102.14	1.92
6	930	12	0.153	0.061	0.458	33.009	1144.10	96.5	8.0	0.011047153	33.730975	102.43	1.81
7	970	12	0.162	0.091	0.735	55.741	1906.21	97.8	13.5	0.009759316	33.762817	102.53	1.80
8	1010	12	0.135	0.127	0.666	49.485	1686.80	97.9	12.0	0.015342057	33.703877	102.35	1.79
9	1060	12	0.137	0.235	0.579	43.658	1504.70	97.7	10.6	0.032178042	33.973894	103.15	1.81
10	1110	12	0.135	0.425	0.557	39.925	1391.09	97.5	9.7	0.06363611	34.289799	104.08	1.84
11	1160	12	0.127	0.810	0.593	42.985	1491.61	98.0	10.4	0.112650719	34.285053	104.07	1.82
12	1210	12	0.132	0.994	0.741	54.704	1887.61	98.3	13.3	0.10862572	34.233182	103.92	1.81
13	1270	12	0.138	1.459	0.234	15.245	553.050	94.3	3.7	0.572206103	34.239623	103.94	1.86
14	1400	12	0.308	2.978	0.110	3.616	218.176	63.4	0.9	4.93034784	37.993127	114.97	2.81
Cumulative %39Ar rlsd =										100.0	Total gas age =	103.45	1.03
note: isotope beams in mV, rlsd = released, error in age includes J error, all errors 1 sigma											Plateau age =	103.52	1.12
(36Ar through 40Ar are measured beam intensities, corrected for decay for the age calculations)											(steps 2-13)		
											No isochron		

Tulloch-GNS, P63138, Muscovite, 4.12 mg, J = 0.001711 ± 0.23%

4 amu discrimination = 1.0533 ± 1.41%, 40/39K = 0.04795 ± 48.28%, 36/37Ca = 0.000260 ± 6.87%, 39/37Ca = 0.000677 ± 5.05%

step	T (C)	t (min.)	36Ar	37Ar	38Ar	39Ar	40Ar	%40Ar*	% 39Ar rlsd	Ca/K	40Ar*/39ArK	Age (Ma)	1s.d.
1	750	12	0.112	0.015	0.023	0.461	45.394	34.5	0.1	0.198530559	31.708072	95.31	4.13
2	800	12	0.107	0.023	0.039	1.393	76.118	64.4	0.2	0.100739839	33.807320	101.45	2.55
3	830	12	0.074	0.028	0.037	1.481	67.216	74.0	0.3	0.115353127	32.046630	96.30	2.11
4	860	12	0.150	0.026	0.065	2.932	138.760	71.9	0.5	0.054103823	33.505815	100.57	2.24
5	890	12	0.231	0.025	0.118	5.369	244.167	74.7	0.9	0.028409389	33.864896	101.62	2.16
6	930	12	1.124	0.028	0.472	19.563	975.21	67.9	3.4	0.008732435	34.121314	102.37	2.33
7	970	12	1.064	0.032	1.450	95.392	3443.23	91.3	16.8	0.00204668	33.333544	100.07	1.83
8	1010	12	0.348	0.024	1.791	134.015	4478.45	97.8	23.6	0.001092621	33.050754	99.24	1.74
9	1060	12	0.457	0.022	1.592	116.589	3951.70	96.7	20.5	0.001151269	33.158583	99.56	1.76
10	1110	12	0.468	0.026	0.849	59.332	2072.42	93.8	10.5	0.0026736	33.086353	99.34	1.79
11	1160	12	0.218	0.025	1.090	82.501	2763.62	97.9	14.5	0.001848812	33.131881	99.48	1.74
12	1210	12	0.057	0.020	0.556	43.056	1425.16	99.3	7.6	0.002834055	33.121611	99.45	1.73
13	1270	12	0.045	0.022	0.061	3.998	139.739	96.2	0.7	0.03357344	32.529678	97.72	1.76
14	1400	12	0.045	0.017	0.030	1.672	67.533	99.8	0.3	0.062034349	34.328103	102.97	2.05
Cumulative %39Ar rlsd =										100.0	Total gas age =	99.64	1.06
note: isotope beams in mV, rlsd = released, error in age includes J error, all errors 1 sigma											Plateau age =	99.73	1.08
(36Ar through 40Ar are measured beam intensities, corrected for decay for the age calculations)											(steps 1-14)		
											Isochron age =	99.50	0.75
											(steps 1-13)		

SUPPLEMENTARY DATA FILE 6 ctd

Tulloch-GNS, OU21581, K-spar, 9.66 mg, J = 0.001739 ± 0.24%

4 amu discrimination = 1.0533 ± 1.41%, 40/39K = 0.04795 ± 48.28%, 36/37Ca = 0.000260 ± 6.87%, 39/37Ca = 0.000677 ± 5.05%

step	T (C)	t (min.)	36Ar	37Ar	38Ar	39Ar	40Ar	%40Ar*	% 39Ar rlsd	Ca/K	40Ar*/39ArK	Age (Ma)	1s.d.
1	421.884	11	0.611	0.025	0.192	1.084	1090.64	84.9	0.090894989	0.135548088	863.3584057	1654.055	21.401
2	421.884	21	0.082	0.018	0.025	0.086	29.781	43.3	0.007211226	1.230542655	85.70124347	250.626	11.909
3	473.234	10	0.372	0.021	0.118	0.858	685.895	85.5	0.071944557	0.143851945	688.8125943	1420.67	19.391
4	473.234	20	0.075	0.017	0.019	0.164	30.05	58.1	0.01375164	0.609324023	62.05592063	184.882	7.733
5	524.584	9	0.249	0.027	0.101	1.623	859.652	92.6	0.136090929	0.097773933	494.3687874	1119.284	15.548
6	524.584	20	0.049	0.019	0.017	0.44	23.104	99.5	0.036894645	0.253804145	22.75010779	69.998	2.067
7	575.934	12	0.173	0.024	0.09	2.584	527.875	92.3	0.216672187	0.05458723	188.2701303	510.957	13.492
8	575.934	22	0.042	0.02	0.031	1.281	31.363	99.5	0.107413727	0.091760958	13.22964719	41.035	1.302
9	627.284	12	0.121	0.032	0.106	4.958	375.675	93	0.415735566	0.03793269	69.82689738	206.754	5.091
10	627.284	22	0.048	0.028	0.051	3.078	47.991	99.5	0.258094811	0.053464018	10.93007503	33.969	0.664
11	678.634	12	0.144	0.058	0.182	10.712	430.97	92.3	0.898216899	0.031821954	36.96908814	112.407	2.043
12	678.634	22	0.056	0.034	0.111	7.549	102.273	97.7	0.632994713	0.026470261	11.57419219	35.951	0.66
13	729.984	12	0.089	0.05	0.193	13.739	294.148	94	1.152035285	0.021388629	19.86731861	61.277	1.118
14	729.984	22	0.069	0.061	0.161	11.085	169.585	96.2	0.929493495	0.032341757	13.68176716	42.421	0.804
15	781.334	13	0.071	0.043	0.229	16.399	320.006	96.1	1.375080183	0.015410559	18.50434017	57.139	1.061
16	781.334	23	0.071	0.037	0.163	11.944	216.112	96.8	1.001521904	0.018206212	16.53425478	51.141	0.921
17	822.414	19	0.086	0.047	0.197	13.51	265.836	95.8	1.132833299	0.020446099	18.18825213	56.178	1.015
18	842.954	19	0.071	0.036	0.155	10.799	239.83	97.2	0.905511976	0.019592362	20.72464929	63.875	1.144
19	884.034	19	0.077	0.045	0.209	14.328	307.637	97.2	1.201423798	0.018458425	20.28031999	62.529	1.114
20	909.709	19	0.06	0.039	0.145	10.161	205.068	98.3	0.852014741	0.022557781	18.87162151	58.255	1.033
21	935.384	19	0.058	0.035	0.134	9.537	186.929	98.5	0.799691427	0.021568719	18.24316898	56.345	1.003
22	961.059	19	0.062	0.039	0.145	10.139	197.665	97.9	0.850170009	0.022606728	18.11690071	55.961	0.999
23	976.464	19	0.062	0.034	0.138	9.36	184.3	97.8	0.784849717	0.021348686	18.0179436	55.66	0.998
24	1002.139	19	0.076	0.044	0.181	12.887	266.832	96.9	1.080593836	0.020066367	19.24901252	59.401	1.068
25	1017.544	19	0.079	0.049	0.2116	15.152	323.832	97.1	1.270517405	0.019006139	20.11699845	62.034	1.108
26	1038.084	19	0.098	0.058	0.271	18.141	392.746	96.2	1.521149436	0.018790335	20.34302097	62.719	1.283
27	1089.434	13	0.123	0.083	0.466	33.93	787.351	96.8	2.845080225	0.014376773	22.45328582	69.102	1.231
28	1089.434	23	0.145	0.105	0.579	42.247	987.351	97.3	3.542472864	0.014606987	22.65899162	69.723	1.238
29	1089.434	57	0.286	0.168	1.142	81.842	1995.63	97.7	6.862571641	0.012064239	23.64909134	72.709	1.286
30	1089.434	117	0.429	0.233	1.427	103.478	2629.49	98.2	8.676781948	0.013233506	24.49909808	75.271	1.329
31	1192.134	11	0.227	0.3	1.451	106.314	2869.76	98	8.914584705	0.016584343	26.67226597	81.796	1.442
32	1243.484	11	0.329	0.582	3.644	273.919	7538.3	98.7	22.96850958	0.012487278	27.47126882	84.19	1.473
33	1346.184	11	0.362	0.389	4.105	310.528	8825.73	99	26.03822788	0.007362327	28.39875907	86.965	1.518
34	1397.534	11	0.165	0.057	0.407	28.729	869.194	97.7	2.408968753	0.011660608	29.00448586	88.775	1.565
									Cumulative %	100	Total gas age	83.42993476	0.434390705

note: isotope beams in mV, rlsd = released, error in age includes J error, all errors 1 sigma
(36Ar through 40Ar are measured beam intensities, corrected for decay for the age calculations)

Spell-UNLV, P57235 - Pakakaki, K-spar, 9.45 mg, J = 0.003960 ± 0.5%

4 amu discrimination = 1.01817 ± 0.03%, 40/39K = 0.02163 ± 20.91%, 36/37Ca = 0.0002630 ± 0.97%, 39/37Ca = 0.0006724 ± 2.49%

Step	T (C)	t (min.)	36Ar	37Ar	38Ar	39Ar	40Ar	%40Ar*	% 39Ar rlsd	Ca/K	40Ar*/39ArK	Age (Ma)	1s.d.
1	475	15	5.075	0.182	5.518	22.294	11398.6	87.3	0.295381012	0.076254107	44.71196733	1838.466	5.903
2	500	15	0.352	0.067	0.454	14.354	753.825	88.8	0.190181172	0.043599092	45.6039253	299.505	1.44
3	500	40	0.281	0.083	0.393	19.96	547.788	98	0.264457028	0.038841189	23.56583193	160.959	0.823
4	550	15	0.511	0.085	1.111	40.204	1543.762	91.5	0.532678872	0.019747955	34.83760939	233.149	1.176
5	550	40	0.231	0.094	0.724	47.389	809.132	99.8	0.627873453	0.018527747	15.63243713	108.36	0.54
6	600	15	0.484	0.118	1.585	78.46	2084.746	94.1	1.03954401	0.014047707	24.86172272	169.407	0.824
7	600	40	0.211	0.126	1.057	79.552	1184.683	99.8	1.054012301	0.014794192	14.04256109	97.632	0.489
8	650	15	0.484	0.152	1.569	90.288	1961.312	93.7	1.196257324	0.015724813	20.22913276	139.023	0.685
9	650	40	0.192	0.117	1.243	94.919	1434.042	99.9	1.257615064	0.011513413	14.39993281	100.049	0.496
10	700	15	0.358	0.143	1.591	100.264	1999.44	95.7	1.32843284	0.013321792	18.96195712	130.622	0.648
11	700	40	0.196	0.123	1.158	89.423	1350.361	99.7	1.184796636	0.012847761	14.33380439	99.602	0.5
12	750	15	0.278	0.136	1.26	83.713	1548.263	95.9	1.109142847	0.015174622	17.58311198	121.436	0.595
13	800	15	0.818	0.224	2.867	166.839	3278.04	93.2	2.210508325	0.012540705	18.27706071	126.065	0.62
14	850	15	0.44	0.216	2.598	181.62	3019.974	96.3	2.406346969	0.011108653	15.96768064	110.614	0.547
15	900	15	0.281	0.223	2.453	182.838	2797.991	97.7	2.422484677	0.011392257	14.89575154	103.397	0.51
16	925	15	0.15	0.16	1.603	125.582	1829.085	98.6	1.663879887	0.011900468	14.25527044	99.071	0.492
17	950	15	0.167	0.175	1.546	116.237	1715.126	98.2	1.54006471	0.014062592	14.37640875	99.89	0.494
18	975	15	0.225	0.185	1.634	120.657	1827.549	97.4	1.598628837	0.014321581	14.64432102	101.7	0.506
19	990	15	0.188	0.167	1.386	103.609	1576.862	97.7	1.372751917	0.01505535	14.73245035	102.295	0.509
20	1015	15	0.27	0.195	1.695	121.253	1914.707	96.8	1.60652345	0.015021523	15.18570112	105.352	0.52
21	1030	15	0.264	0.196	1.577	114.391	1840.484	96.8	1.51560641	0.016004282	15.46185291	107.212	0.528
22	1045	15	0.315	0.204	1.669	116.994	1955.565	96.2	1.550094468	0.016286906	15.9779498	110.683	0.545
23	1060	15	0.363	0.223	1.969	129.935	2239.391	96	1.721554308	0.016030634	16.46969175	113.984	0.561
24	1075	15	0.439	0.262	2.298	152.708	2711.378	95.9	2.023281758	0.016025496	16.96830943	117.325	0.575
25	1085	15	0.442	0.271	2.586	163.75	2959.682	96.2	2.169581082	0.015458234	17.33962562	119.809	0.588
26	1095	15	0.472	0.303	2.798	183.266	3325.687	96.4	2.428155399	0.015443034	17.44809734	120.534	0.592
27	1100	20	0.56	0.371	3.594	233.51	4225.441	97	3.093855746	0.014840217	17.49194724	120.827	0.593
28	1100	25	0.549	0.379	3.635	240.414	4309.123	97.1	3.18532926	0.014724863	17.35174237	119.89	0.588
29	1100	40	0.677	0.463	4.47	295.149	5279.462	96.5	3.910532438	0.014652491	17.26888067	119.336	0.586
30	1100	60	0.664	0.454	4.419	297.66	5324.129	98.4	3.943801557	0.014246465	17.29609957	119.518	0.586
31	1100	75	0.613	0.422	3.599	243.934	4436.147	99	3.231966972	0.016158912	17.51275225	120.966	0.595
32	1100	75	0.514	0.297	2.568	174.842	3256.487	99.7	2.316542874	0.015866555	17.83341179	123.107	0.604
33	1100	75	0.468	0.247	2.051	136.37	2590.954	100	1.806813876	0.016918046	18.06939405	124.681	0.617
34	1100	75	0.437	0.225	1.637	111.945	2167.364	99.8	1.483198499	0.018773712	18.14244493	125.168	0.616
35	1100	90	0.477	0.204	1.702	113.187	2232.001	99.2	1.499654192	0.016834713	18.41339101	126.973	0.625
36	1100	120	0.589	0.224	1.893	126.671	2557.317	99.8	1.678308429	0.016517445	18.40332905	126.906	0.626
37	1150	20	0.21	0.188	0.905	56.348	1161.195	96.6	0.746574381	0.031164008	19.56034346	134.594	0.668
38	12												