

Table DR1. UW-Madison standard intercomparison

Standard	n	UW-Madison Age (Ma) ± 2 §	MSWD	Accepted Age (Ma) ± 2 ††
GA1550	7*	98.69 ± 0.57 [#]	0.48	[98.79 ± 0.54] ^{§§}
MMhb	8*	522.39 ± 2.98 ^{**}	17.7	523.1 ± 2.6 ^{##}
SB-3	7 [†]	165.72 ± 0.85 ^{**}	5.21	[162.9 ± 1.8] ^{***}
FCs	17*	28.02 ± 0.14 [#]	0.81	28.02 ± 0.16 ^{†††}

*single crystal laser fusions
[†]multigrain fusions
[§]intercalibration uncertainties relative to 28.34 ± 0.16 Ma for Taylor Creek Rhyolite sanidine (Duffield and Dalrymple, 1990; Renne et al., 1998)
[#]weighted mean age
^{**}total fusion age, reported when MSWD >2
^{††}intercalibration uncertainties relative to 98.79 ± 0.54 Ma for GA1550 biotite (Renne et al., 1998)
^{§§}primary standard biotite (isotope dilution, McDougall and Roksandic, 1974; Renne et al., 1998)
^{##}McClure Mountain syenite hornblende (Sampson and Alexander, 1987; Renne et al., 1998)
^{***}USGS standard biotite (Lanphere and Dalrymple, 2000); note that the value reported here for SB-3 (relative to 28.34 ± 0.16 for TCs) is 1.73% older than the age reported by Lanphere and Dalrymple (2000); it is, however, consistent with the GA1550 age adopted by Renne et al. (1998), which is 1.85% older than the age determined by Lanphere and Dalrymple (2000)
^{†††}Fish Canyon tuff sanidine (Renne et al., 1998)
Note: Values shown in brackets represent K-Ar ages for primary standards

Figure DR1. Positions of samples and standards in irradiations UW-06 and UW-11 with J values

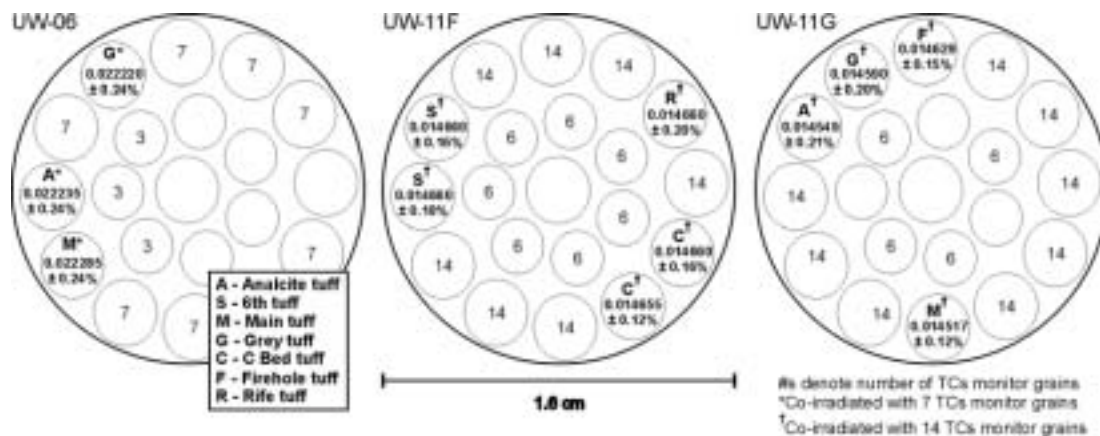


Table DR2. Complete $^{40}\text{Ar}/^{39}\text{Ar}$ results

Sample Experiment	xtal #	$^{40}\text{Ar}/^{39}\text{Ar}$	$^{37}\text{Ar}/^{39}\text{Ar}$	$^{36}\text{Ar}/^{39}\text{Ar}$	$^{40}\text{Ar}^*$ (10^{-16} mol)	% $^{40}\text{Ar}^*$	K/Ca	Apparent Age ± 2 μMa	
Rife tuff BT-18									
biotite $J = 0.014710 \pm 0.16\%$ $\mu = 1.0025$									
UW11F2A	3	2.982 \pm 0.008	0.00038 \pm 0.00064	0.003427 \pm 0.000073	14.53	65.90	1131	51.43 \pm 1.13	
*UW11F2B	3	2.621 \pm 0.007	0.00058 \pm 0.00097	0.002043 \pm 0.000031	9.64	76.79	744	52.64 \pm 0.53	
UW11F2C	3	2.556 \pm 0.007	0.00026 \pm 0.00045	0.001947 \pm 0.000097	6.13	77.31	1628	51.69 \pm 1.50	
UW11F2D	3	2.516 \pm 0.007	0.00036 \pm 0.00061	0.001874 \pm 0.000042	9.34	77.80	1198	51.21 \pm 0.70	
*UW11F2E	3	2.553 \pm 0.004	0.00044 \pm 0.00080	0.001789 \pm 0.000095	8.43	79.12	969	52.83 \pm 1.45	
UW11F2F	3	2.488 \pm 0.008	0.00047 \pm 0.00084	0.001881 \pm 0.000069	16.00	77.48	920	50.45 \pm 1.10	
*UW11F2G	3	2.183 \pm 0.005	0.00036 \pm 0.00064	0.000422 \pm 0.000057	9.63	94.08	1207	53.69 \pm 0.89	
*UW11F2H	3	2.647 \pm 0.008	0.00045 \pm 0.00081	0.002054 \pm 0.000063	10.74	76.90	953	53.23 \pm 1.01	
*UW11F2I	3	2.607 \pm 0.008	0.00047 \pm 0.00085	0.001889 \pm 0.000071	11.25	78.41	914	53.45 \pm 1.14	
UW11F2J	3	2.922 \pm 0.010	0.00046 \pm 0.00083	0.003290 \pm 0.000066	12.72	66.57	935	50.89 \pm 1.06	
UW11F2K	3	2.974 \pm 0.010	0.00080 \pm 0.00144	0.003516 \pm 0.000104	11.49	64.91	539	50.52 \pm 1.60	
*UW11F2L	3	2.329 \pm 0.008	0.00038 \pm 0.00069	0.001047 \pm 0.000057	9.30	86.51	1129	52.69 \pm 0.94	
*UW11F2M	3	2.903 \pm 0.005	0.00071 \pm 0.00129	0.002689 \pm 0.000130	8.31	72.48	606	54.99 \pm 1.97	
UW11F2N	3	2.376 \pm 0.007	0.00062 \pm 0.00113	0.001457 \pm 0.000091	9.38	81.69	694	50.79 \pm 1.42	
UW11F2O	3	3.112 \pm 0.009	0.00072 \pm 0.00131	0.003959 \pm 0.000131	7.72	62.27	599	50.71 \pm 2.02	
UW11F2P	3	2.546 \pm 0.009	0.00071 \pm 0.00130	0.001866 \pm 0.000141	6.41	78.16	603	52.05 \pm 2.19	
UW11F2Q	3	2.359 \pm 0.006	0.00033 \pm 0.00060	0.001301 \pm 0.000028	17.33	83.51	1312	51.54 \pm 0.50	
UW11F2R	3	2.398 \pm 0.005	0.00074 \pm 0.00135	0.001542 \pm 0.000102	8.28	80.80	581	50.69 \pm 1.57	
*UW11F2S	3	2.577 \pm 0.005	0.00077 \pm 0.00141	0.001866 \pm 0.000056	9.54	78.43	562	52.86 \pm 0.87	
*UW11F2T	3	2.987 \pm 0.011	0.00038 \pm 0.00070	0.003257 \pm 0.000068	11.30	67.62	1142	52.81 \pm 1.11	
*UW11F2U	3	2.234 \pm 0.006	0.00034 \pm 0.00062	0.000683 \pm 0.000030	15.72	90.76	1282	53.01 \pm 0.53	
UW11F2V	3	3.605 \pm 0.009	0.00060 \pm 0.00112	0.005500 \pm 0.000114	6.41	54.79	712	51.68 \pm 1.73	
*UW11F2W	3	2.364 \pm 0.008	0.00030 \pm 0.00056	0.001040 \pm 0.000070	7.28	86.81	1425	53.66 \pm 1.13	
UW11F2X	3	2.409 \pm 0.006	0.00035 \pm 0.00064	0.001440 \pm 0.000097	5.72	82.15	1245	51.77 \pm 1.51	
Isochron age ± 2 μ					51.41 \pm 0.68		Total fusion age ± 2 μ		52.10 \pm 0.25
Weighted mean age ± 2 μ					51.25 \pm 0.31				51.25 \pm 0.31
Firehole tuff FC-2									
sanidine $J = 0.014629 \pm 0.14\%$ $\mu = 1.0025$									
UW11G12A	3	7.716 \pm 0.033	0.00014 \pm 0.00017	0.019617 \pm 0.000560	5.53	24.82	3050	49.85 \pm 8.40	
UW11G12B	12	6.734 \pm 0.016	0.00010 \pm 0.00012	0.016056 \pm 0.000160	22.72	29.48	4193	51.65 \pm 2.21	
UW11G12C	6	9.625 \pm 0.027	0.00010 \pm 0.00012	0.025634 \pm 0.000304	15.76	21.26	4305	53.20 \pm 4.34	
UW11G12D	6	5.042 \pm 0.008	0.00008 \pm 0.00009	0.010363 \pm 0.000154	10.20	39.17	5377	51.38 \pm 2.24	
UW11G12E	6	18.077 \pm 0.031	0.00024 \pm 0.00027	0.054620 \pm 0.000279	34.85	10.70	1828	50.32 \pm 2.61	
UW11G12F	6	5.270 \pm 0.014	0.00011 \pm 0.00013	0.011430 \pm 0.000128	8.62	35.83	3893	49.15 \pm 1.81	
UW11G12G	5	2.043 \pm 0.005	0.00010 \pm 0.00013	0.000372 \pm 0.000035	4.25	94.40	4445	50.20 \pm 0.59	
UW11G12H	15	2.020 \pm 0.003	0.00012 \pm 0.00015	0.000230 \pm 0.000031	15.77	96.40	3748	50.66 \pm 0.49	
UW11G12I	5	2.091 \pm 0.005	0.00015 \pm 0.00020	0.000461 \pm 0.000028	7.33	93.27	2870	50.74 \pm 0.49	
UW11G12J	5	2.120 \pm 0.006	0.00016 \pm 0.00022	0.000459 \pm 0.000064	3.82	93.39	2639	51.50 \pm 1.00	
UW11G12K	15	2.054 \pm 0.003	0.00010 \pm 0.00013	0.000352 \pm 0.000027	15.32	94.72	4495	50.63 \pm 0.43	
UW11G12L	15	2.041 \pm 0.003	0.00012 \pm 0.00016	0.000309 \pm 0.000023	19.77	95.30	3682	50.61 \pm 0.37	
UW11G12M	15	2.028 \pm 0.003	0.00011 \pm 0.00014	0.000266 \pm 0.000018	18.60	95.90	4032	50.60 \pm 0.29	
UW11G12N	20	2.076 \pm 0.003	0.00013 \pm 0.00017	0.000405 \pm 0.000009	21.47	94.01	3415	50.79 \pm 0.19	
Isochron age ± 2 μ					50.70 \pm 0.15		Total fusion age ± 2 μ		50.76 \pm 0.26
Weighted mean age ± 2 μ					50.70 \pm 0.14				50.70 \pm 0.14
C Bed tuff FC-3									
biotite $J = 0.014660 \pm 0.16\%$ $\mu = 1.0025$									
UW11F4A	3	2.311 \pm 0.009	0.00015 \pm 0.00024	0.001252 \pm 0.000020	5.47	83.79	2903	50.50 \pm 0.52	
UW11F4B	3	2.538 \pm 0.008	0.00067 \pm 0.00106	0.002004 \pm 0.000082	8.15	76.48	644	50.61 \pm 1.27	
*UW11F4C	3	2.621 \pm 0.006	0.00028 \pm 0.00044	0.001946 \pm 0.000090	5.83	77.89	1540	53.21 \pm 1.38	
UW11F4D	3	2.619 \pm 0.008	0.00104 \pm 0.00166	0.002239 \pm 0.000044	7.36	74.56	412	50.91 \pm 0.72	
UW11F4E	3	2.379 \pm 0.006	0.00060 \pm 0.00095	0.001559 \pm 0.000044	7.71	80.44	719	49.93 \pm 0.72	
UW11F4F	3	2.443 \pm 0.005	0.00042 \pm 0.00067	0.001644 \pm 0.000086	5.51	79.92	1019	50.90 \pm 1.32	
UW11F4G	3	2.701 \pm 0.008	0.00030 \pm 0.00048	0.002539 \pm 0.000113	7.75	72.06	1429	50.76 \pm 1.74	
UW11F4H	3	4.944 \pm 0.012	0.00083 \pm 0.00132	0.010075 \pm 0.000114	12.74	39.69	519	51.17 \pm 1.67	
*UW11F4I	3	2.398 \pm 0.010	0.00031 \pm 0.00050	0.001016 \pm 0.000061	4.28	87.29	1372	54.53 \pm 1.04	
UW11F4J	3	2.489 \pm 0.007	0.00022 \pm 0.00035	0.001822 \pm 0.000059	5.53	78.19	1973	50.76 \pm 0.95	
UW11F4K	3	2.768 \pm 0.006	0.00065 \pm 0.00104	0.002769 \pm 0.000056	6.47	70.28	661	50.72 \pm 0.88	

Table DR2. Complete $^{40}\text{Ar}/^{39}\text{Ar}$ results

Sample Experiment	xtal #	$^{40}\text{Ar}/^{39}\text{Ar}$	$^{37}\text{Ar}/^{39}\text{Ar}$	$^{36}\text{Ar}/^{39}\text{Ar}$	$^{40}\text{Ar}^*$ (10^{-16} mol)	% $^{40}\text{Ar}^*$	K/Ca	Apparent Age ± 2 μMa
C Bed tuff cont...								
UW11F4L	3	2.435 \pm 0.005	0.00053 \pm 0.00085	0.001617 \pm 0.000099	6.96	80.19	806	50.91 \pm 1.53
*UW11F4M	3	2.609 \pm 0.009	0.00024 \pm 0.00038	0.001767 \pm 0.000082	10.00	79.80	1817	54.24 \pm 1.30
UW11F4N	3	2.451 \pm 0.011	0.00015 \pm 0.00025	0.001752 \pm 0.000024	8.17	78.69	2829	50.31 \pm 0.65
UW11F4O	3	2.364 \pm 0.004	0.00043 \pm 0.00072	0.001441 \pm 0.000050	5.97	81.80	993	50.44 \pm 0.78
UW11F4P	3	2.636 \pm 0.022	0.00019 \pm 0.00032	0.002198 \pm 0.000125	6.64	75.18	2251	51.66 \pm 2.19
UW11F4Q	3	2.530 \pm 0.005	0.00043 \pm 0.00071	0.001956 \pm 0.000116	4.67	76.98	1012	50.79 \pm 1.77
*UW11F4R	3	2.542 \pm 0.006	0.00037 \pm 0.00062	0.001671 \pm 0.000119	4.83	80.40	1166	53.26 \pm 1.82
*UW11F4S	3	2.627 \pm 0.008	0.00006 \pm 0.00010	0.001234 \pm 0.000026	4.07	85.95	7556	58.76 \pm 0.53
UW11F4T	3	2.348 \pm 0.007	0.00065 \pm 0.00108	0.001279 \pm 0.000138	3.61	83.71	664	51.26 \pm 2.11
Isochron age ± 2 μ					50.35 \pm 0.45	Total fusion age ± 2 μ		50.60 \pm 0.31
Weighted mean age ± 2 μ					50.56 \pm 0.26			
Grey tuff WN-1								
sanidine $J = 0.02222 \pm 0.24\%$ $\mu = 1.0035$								
UW0612A	10	1.329 \pm 0.004	0.00257 \pm 0.00006	0.000147 \pm 0.000022	16.40	96.40	168	50.64 \pm 0.59
UW0612B	20	1.363 \pm 0.007	0.00293 \pm 0.00006	0.000273 \pm 0.000015	34.45	93.77	147	50.53 \pm 0.63
UW0612C	10	1.346 \pm 0.004	0.01507 \pm 0.00018	0.000213 \pm 0.000013	13.21	95.08	29	50.60 \pm 0.44
UW0612D	10	1.339 \pm 0.003	0.00233 \pm 0.00010	0.000204 \pm 0.000020	15.34	95.17	185	50.36 \pm 0.53
UW0612E	10	1.345 \pm 0.005	0.00264 \pm 0.00010	0.000192 \pm 0.000021	11.22	95.46	163	50.74 \pm 0.65
UW0612F	10	1.324 \pm 0.003	0.00239 \pm 0.00008	0.000128 \pm 0.000003	12.04	96.80	180	50.64 \pm 0.30
UW0612G	10	1.328 \pm 0.006	0.00259 \pm 0.00005	0.000155 \pm 0.000028	14.59	96.21	166	50.50 \pm 0.80
UW0612H	10	1.411 \pm 0.003	0.00329 \pm 0.00009	0.000430 \pm 0.000048	10.31	90.69	131	50.58 \pm 1.13
UW0612I	10	1.350 \pm 0.007	0.00259 \pm 0.00007	0.000212 \pm 0.000032	9.61	95.03	166	50.70 \pm 0.90
UW0612J	10	1.311 \pm 0.003	0.00259 \pm 0.00005	0.000132 \pm 0.000021	13.08	96.69	166	50.13 \pm 0.56
sanidine $J = 0.01459 \pm 0.20\%$ $\mu = 1.0025$								
UW11G11A	10	2.058 \pm 0.004	0.00010 \pm 0.00014	0.000388 \pm 0.000043	9.79	94.20	4219	50.31 \pm 0.67
UW11G11B	10	2.343 \pm 0.004	0.00020 \pm 0.00027	0.001352 \pm 0.000022	18.73	82.76	2131	50.34 \pm 0.35
UW11G11C	10	2.109 \pm 0.003	0.00024 \pm 0.00032	0.000559 \pm 0.000023	15.40	91.95	1798	50.34 \pm 0.36
UW11G11D	10	2.063 \pm 0.003	0.00011 \pm 0.00015	0.000417 \pm 0.000016	18.89	93.80	3943	50.23 \pm 0.27
UW11G11E	10	2.084 \pm 0.004	0.00028 \pm 0.00037	0.000470 \pm 0.000011	13.38	93.12	1562	50.38 \pm 0.22
UW11G11F	10	2.173 \pm 0.004	0.00021 \pm 0.00028	0.000785 \pm 0.000004	19.73	89.11	2056	50.27 \pm 0.19
UW11G11G	10	2.115 \pm 0.003	0.00018 \pm 0.00024	0.000555 \pm 0.000019	15.58	92.02	2455	50.51 \pm 0.31
UW11G11H	10	2.280 \pm 0.004	0.00030 \pm 0.00040	0.001140 \pm 0.000031	20.70	85.02	1458	50.32 \pm 0.49
Isochron age ± 2 μ					50.55 \pm 0.21	Total fusion age ± 2 μ		50.44 \pm 0.17
Weighted mean age ± 2 μ					50.39 \pm 0.13			
Main tuff TR-1								
sanidine $J = 0.02228 \pm 0.24\%$ $\mu = 1.0035$								
UW069A	10	1.269 \pm 0.002	0.00373 \pm 0.00006	0.000032 \pm 0.000007	32.78	99.14	115	49.86 \pm 0.24
UW069B	10	1.271 \pm 0.005	0.00390 \pm 0.00007	0.000043 \pm 0.000011	24.84	98.90	110	49.85 \pm 0.44
UW069C	10	1.271 \pm 0.002	0.00357 \pm 0.00005	0.000033 \pm 0.000003	64.41	99.14	121	49.95 \pm 0.22
UW069D	10	1.274 \pm 0.002	0.00358 \pm 0.00005	0.000036 \pm 0.000003	63.75	99.07	120	50.01 \pm 0.23
UW069E	10	1.279 \pm 0.004	0.00366 \pm 0.00003	0.000050 \pm 0.000003	89.97	98.74	117	50.05 \pm 0.30
UW069F	10	1.268 \pm 0.002	0.00354 \pm 0.00005	0.000029 \pm 0.000014	33.28	99.23	122	49.87 \pm 0.37
UW069G	10	1.282 \pm 0.005	0.00373 \pm 0.00004	0.000056 \pm 0.000005	38.65	98.61	115	50.10 \pm 0.42
UW069H	10	1.295 \pm 0.003	0.00372 \pm 0.00004	0.000114 \pm 0.000003	99.57	97.29	116	49.94 \pm 0.28
UW069I	10	1.286 \pm 0.004	0.00524 \pm 0.00010	0.000088 \pm 0.000006	23.31	97.88	82	49.92 \pm 0.32
UW069J	10	1.288 \pm 0.004	0.00524 \pm 0.00010	0.000088 \pm 0.000006	23.35	97.88	82	50.01 \pm 0.32
UW069K	10	1.273 \pm 0.003	0.00481 \pm 0.00007	0.000021 \pm 0.000011	25.02	99.41	90	50.17 \pm 0.33
UW069L	10	1.298 \pm 0.006	0.00582 \pm 0.00008	0.000125 \pm 0.000019	21.30	97.07	74	49.98 \pm 0.67
UW069M	10	1.269 \pm 0.003	0.00466 \pm 0.00008	0.000029 \pm 0.000017	23.90	99.22	92	49.94 \pm 0.45
UW069N	10	1.277 \pm 0.005	0.00490 \pm 0.00006	0.000045 \pm 0.000008	22.46	98.85	88	50.08 \pm 0.45
UW069O	10	1.408 \pm 0.003	0.00516 \pm 0.00006	0.000493 \pm 0.000016	25.27	89.57	83	50.02 \pm 0.43
UW069P	10	1.280 \pm 0.006	0.00486 \pm 0.00006	0.000032 \pm 0.000013	29.26	99.16	89	50.32 \pm 0.55
UW069Q	10	1.276 \pm 0.003	0.00491 \pm 0.00006	0.000055 \pm 0.000008	29.82	98.63	88	49.90 \pm 0.30
UW069R	10	1.276 \pm 0.006	0.00489 \pm 0.00012	0.000033 \pm 0.000014	9.49	99.13	88	50.15 \pm 0.57
UW069S	10	1.274 \pm 0.004	0.00517 \pm 0.00006	0.000035 \pm 0.000013	27.94	99.08	83	50.05 \pm 0.46
UW069T	10	1.284 \pm 0.004	0.00488 \pm 0.00005	0.000075 \pm 0.000006	34.63	98.19	88	50.01 \pm 0.37
UW069U	10	1.275 \pm 0.002	0.00496 \pm 0.00007	0.000027 \pm 0.000006	25.77	99.28	87	50.20 \pm 0.25

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Sample Experiment	xtal #	$^{40}\text{Ar}/^{39}\text{Ar}$	$^{37}\text{Ar}/^{39}\text{Ar}$	$^{36}\text{Ar}/^{39}\text{Ar}$	$^{40}\text{Ar}^*$ (10^{-16} mol)	% $^{40}\text{Ar}^*$	K/Ca	Apparent Age ± 2 μMa
Main tuff (sanidine) cont...								
sanidine $J = 0.014517 \pm 0.12\%$ $\mu = 1.0025$								
*UW11G6A	10	2.935 \pm 0.005	0.00008 \pm 0.00009	0.002718 \pm 0.000079	10.97	72.48	5354	54.87 \pm 1.18
UW11G6B	10	4.115 \pm 0.010	0.00008 \pm 0.00009	0.007426 \pm 0.000129	12.87	46.56	5329	49.50 \pm 1.93
UW11G6C	10	2.359 \pm 0.009	0.00012 \pm 0.00014	0.001281 \pm 0.000069	7.74	83.76	3598	51.01 \pm 1.12
UW11G6D	10	2.118 \pm 0.005	0.00006 \pm 0.00008	0.000581 \pm 0.000039	6.27	91.68	6698	50.16 \pm 0.64
UW11G6E	10	2.174 \pm 0.004	0.00007 \pm 0.00008	0.000803 \pm 0.000009	28.66	88.88	6080	49.92 \pm 0.19
UW11G6F	10	1.975 \pm 0.003	0.00009 \pm 0.00011	0.000124 \pm 0.000003	37.52	97.90	4859	49.93 \pm 0.10
UW11G6G	10	1.987 \pm 0.003	0.00007 \pm 0.00008	0.000180 \pm 0.000008	25.71	97.09	6115	49.83 \pm 0.18
UW11G6H	10	2.065 \pm 0.003	0.00008 \pm 0.00010	0.000420 \pm 0.000010	25.60	93.76	5117	50.02 \pm 0.18
UW11G6I	10	2.078 \pm 0.003	0.00012 \pm 0.00015	0.000487 \pm 0.000010	40.67	92.86	3494	49.85 \pm 0.16
UW11G6J	10	2.071 \pm 0.003	0.00008 \pm 0.00009	0.000440 \pm 0.000008	53.47	93.50	5641	50.01 \pm 0.17
Isochron age ± 2 μ					49.98 \pm 0.09	Total fusion age ± 2 μ	50.03 \pm 0.09	
Weighted mean age ± 2 μ					49.96 \pm 0.08			
Main tuff TR-1b								
biotite $J = 0.014517 \pm 0.12\%$ $\mu = 1.0025$								
*UW11G6bA	3	2.019 \pm 0.011	0.00001 \pm 0.00001	0.000166 \pm 0.000053	6.74	97.34	78213	50.74 \pm 0.97
*UW11G6bB	3	2.106 \pm 0.005	0.00002 \pm 0.00003	0.000387 \pm 0.000076	5.29	94.35	20892	51.31 \pm 1.15
UW11G6bC	3	2.005 \pm 0.007	0.00000 \pm 0.00001	0.000477 \pm 0.000153	2.43	92.74	327094	48.05 \pm 2.33
UW11G6bD	3	2.138 \pm 0.007	0.00003 \pm 0.00003	0.000669 \pm 0.000065	4.89	90.54	15936	49.99 \pm 1.03
UW11G6bE	3	5.675 \pm 0.011	0.00003 \pm 0.00003	0.012526 \pm 0.000172	17.48	34.69	14956	50.84 \pm 2.49
UW11G6bF	3	2.513 \pm 0.011	0.00005 \pm 0.00006	0.002041 \pm 0.000069	3.34	75.81	8504	49.21 \pm 1.15
*UW11G6bG	3	2.306 \pm 0.006	0.00002 \pm 0.00002	0.001132 \pm 0.000015	29.65	85.30	26336	50.79 \pm 0.35
UW11G6bH	3	2.059 \pm 0.007	0.00001 \pm 0.00002	0.000337 \pm 0.000026	32.99	94.93	37218	50.48 \pm 0.53
UW11G6bI	3	2.050 \pm 0.010	0.00001 \pm 0.00002	0.000405 \pm 0.000029	14.38	93.94	29751	49.74 \pm 0.66
UW11G6bJ	3	2.083 \pm 0.007	0.00002 \pm 0.00003	0.000489 \pm 0.000023	18.43	92.84	19527	49.95 \pm 0.49
*UW11G6bK	3	2.042 \pm 0.003	0.00001 \pm 0.00001	0.000279 \pm 0.000013	27.37	95.74	54740	50.48 \pm 0.23
*UW11G6bL	3	2.066 \pm 0.006	0.00002 \pm 0.00002	0.000326 \pm 0.000024	12.44	95.12	25457	50.74 \pm 0.48
*UW11G6bM	3	2.075 \pm 0.004	0.00001 \pm 0.00002	0.000343 \pm 0.000034	6.72	94.89	33503	50.84 \pm 0.54
*UW11G6bN	3	2.417 \pm 0.006	0.00001 \pm 0.00001	0.001533 \pm 0.000015	22.90	81.07	59608	50.60 \pm 0.32
UW11G6bO	3	2.121 \pm 0.005	0.00001 \pm 0.00001	0.000590 \pm 0.000011	22.43	91.56	58057	50.15 \pm 0.27
*UW11G6bP	3	2.054 \pm 0.006	0.00003 \pm 0.00004	0.000244 \pm 0.000014	14.09	96.26	16013	51.06 \pm 0.36
UW11G6bQ	3	2.019 \pm 0.006	0.00001 \pm 0.00001	0.000324 \pm 0.000030	11.06	95.02	51079	49.57 \pm 0.54
UW11G6bR	3	2.104 \pm 0.005	0.00001 \pm 0.00002	0.000575 \pm 0.000027	11.36	91.71	37217	49.83 \pm 0.46
*UW11G6bS	3	2.044 \pm 0.006	0.00001 \pm 0.00001	0.000209 \pm 0.000024	16.73	96.75	55867	51.06 \pm 0.46
UW11G6bT	3	2.143 \pm 0.008	0.00002 \pm 0.00003	0.000696 \pm 0.000032	12.76	90.19	21085	49.92 \pm 0.60
*UW11G6bU	3	2.044 \pm 0.005	0.00002 \pm 0.00002	0.000222 \pm 0.000039	10.68	96.57	23618	50.96 \pm 0.63
UW11G6bV	3	2.091 \pm 0.007	0.00002 \pm 0.00002	0.000506 \pm 0.000025	19.20	92.63	23824	50.02 \pm 0.50
UW11G6bW	3	2.063 \pm 0.005	0.00001 \pm 0.00002	0.000389 \pm 0.000028	11.00	94.21	39885	50.20 \pm 0.48
UW11G6bX	3	2.330 \pm 0.007	0.00002 \pm 0.00003	0.001342 \pm 0.000030	14.62	82.78	21105	49.83 \pm 0.56
*UW11G6bY	3	2.099 \pm 0.006	0.00001 \pm 0.00002	0.000429 \pm 0.000020	12.65	93.74	34418	50.81 \pm 0.41
*UW11G6bZ	3	2.044 \pm 0.007	0.00003 \pm 0.00003	0.000219 \pm 0.000017	17.12	96.60	16895	51.00 \pm 0.42
*UW11G6bAA	3	2.196 \pm 0.008	0.00003 \pm 0.00003	0.000413 \pm 0.000012	22.17	94.23	17148	53.39 \pm 0.43
UW11G6bBB	3	2.148 \pm 0.008	0.00002 \pm 0.00003	0.000710 \pm 0.000057	10.00	90.01	21194	49.94 \pm 0.93
UW11G6bCC	3	2.102 \pm 0.006	0.00001 \pm 0.00002	0.000519 \pm 0.000025	19.00	92.49	36768	50.20 \pm 0.45
*UW11G6bDD	3	2.260 \pm 0.006	0.00001 \pm 0.00002	0.000948 \pm 0.000036	15.64	87.40	40088	51.00 \pm 0.60
Isochron age ± 2 μ					50.00 \pm 0.20	Total fusion age ± 2 μ	50.56 \pm 0.12	
Weighted mean age ± 2 μ					50.01 \pm 0.15			
6th tuff TR-5								
sanidine $J = 0.014660 \pm 0.18\%$ $\mu = 1.0025$								
*UW11F9A	3	2.612 \pm 0.015	0.00003 \pm 0.00006	0.000470 \pm 0.000102	3.15	94.50	13112	64.14 \pm 1.71
UW11F9B	3	2.348 \pm 0.022	0.00021 \pm 0.00032	0.001559 \pm 0.000344	1.18	80.19	2014	49.12 \pm 5.35
*UW11F9C	3	8.198 \pm 0.037	0.00067 \pm 0.00099	0.005996 \pm 0.000306	3.65	78.33	642	162.31 \pm 4.61
*UW11F9D	3	5.055 \pm 0.032	0.00007 \pm 0.00036	0.006972 \pm 0.000830	0.89	59.16	6604	77.41 \pm 12.48
*UW11F9E	3	3.065 \pm 0.030	0.00011 \pm 0.00017	0.001312 \pm 0.000194	1.91	87.20	3884	69.33 \pm 3.28
*UW11F9F	3	4.580 \pm 0.013	0.00010 \pm 0.00015	0.008006 \pm 0.000332	6.11	48.25	4277	57.52 \pm 5.00
UW11F9G	3	3.626 \pm 0.057	0.00003 \pm 0.00016	0.007330 \pm 0.001551	0.55	40.14	16657	38.09 \pm 23.86
*UW11F9H	3	226.013 \pm 3.638	0.00209 \pm 0.00378	0.680216 \pm 0.020623	4.30	11.07	206	563.72 \pm 199.51
*UW11F9I	3	6.057 \pm 0.020	0.00008 \pm 0.00013	0.011030 \pm 0.000485	4.72	46.12	5269	72.41 \pm 7.26
UW11F9J	3	3.674 \pm 0.029	0.00009 \pm 0.00014	0.006424 \pm 0.000524	1.95	48.20	4937	46.24 \pm 8.06
*UW11F9K	3	4.713 \pm 0.010	0.00008 \pm 0.00012	0.006181 \pm 0.000192	5.39	61.15	5661	74.66 \pm 2.87

Table DR2. Complete $^{40}\text{Ar}/^{39}\text{Ar}$ results

Sample Experiment	xtal #	$^{40}\text{Ar}/^{39}\text{Ar}$	$^{37}\text{Ar}/^{39}\text{Ar}$	$^{36}\text{Ar}/^{39}\text{Ar}$	$^{40}\text{Ar}^*$ (10^{-16} mol)	% $^{40}\text{Ar}^*$	K/Ca	Apparent Age ± 2 \downarrow Ma
6th tuff (sanidine) cont...								
*UW11F9L	3	2.641 \pm 0.014	0.00022 \pm 0.00033	0.000634 \pm 0.000029	2.53	92.73	1999	63.63 \pm 0.79
*UW11F9M	3	3.028 \pm 0.012	0.00009 \pm 0.00013	0.001866 \pm 0.000112	3.08	81.64	5062	64.22 \pm 1.76
*UW11F9N	3	3.079 \pm 0.012	0.00004 \pm 0.00007	0.001089 \pm 0.000117	3.36	89.40	10413	71.37 \pm 1.84
*UW11F9O	3	3.039 \pm 0.012	0.00005 \pm 0.00008	0.000517 \pm 0.000289	2.10	94.82	8654	74.64 \pm 4.38
UW11F9P	3	7.254 \pm 0.031	0.00018 \pm 0.00027	0.018333 \pm 0.000505	3.45	25.26	2434	47.82 \pm 7.59
*UW11F9Q	9	6.224 \pm 0.013	0.00013 \pm 0.00019	0.013610 \pm 0.000080	10.95	35.31	3420	57.20 \pm 0.86
UW11F9R	3	2.005 \pm 0.019	0.00012 \pm 0.00018	0.000487 \pm 0.000191	1.42	92.59	3641	48.43 \pm 3.06
UW11F9S	3	2.338 \pm 0.011	0.00012 \pm 0.00019	0.001361 \pm 0.000078	2.85	82.60	3471	50.36 \pm 1.28
*UW11F9T	3	2.601 \pm 0.006	0.00004 \pm 0.00006	0.000347 \pm 0.000067	5.11	95.88	11262	64.79 \pm 1.05
*UW11F9U	3	2.465 \pm 0.015	0.00014 \pm 0.00021	0.000914 \pm 0.000054	2.63	88.86	3152	57.01 \pm 1.08
UW11F9V	3	2.018 \pm 0.012	0.00016 \pm 0.00025	0.000380 \pm 0.000213	1.85	94.20	2631	49.59 \pm 3.30
UW11F9W	3	1.953 \pm 0.014	0.00011 \pm 0.00017	0.000237 \pm 0.000266	1.30	96.18	3975	49.00 \pm 4.11
*UW11F9X	3	2.168 \pm 0.007	0.00019 \pm 0.00028	0.000175 \pm 0.000063	3.08	97.40	2300	55.01 \pm 1.02
*UW11F9Y	12	10.275 \pm 0.018	0.00009 \pm 0.00013	0.025541 \pm 0.000237	21.51	26.51	5038	70.63 \pm 3.19
Isochron age ± 2 \downarrow					49.98 \pm 1.20	Total fusion age ± 2 \downarrow		63.63 \pm 0.73
					Weighted mean age ± 2 \downarrow		49.79 \pm 1.04	

6th tuff TR-5b

biotite $J = 0.014660 \pm 0.16\%$ $\mu = 1.0025$

UW11F10A	3	1.976 \pm 0.003	0.00001 \pm 0.00002	0.000232 \pm 0.000016	20.41	96.29	33378	49.64 \pm 0.28
UW11F10B	3	2.067 \pm 0.005	0.00000 \pm 0.00000	0.000568 \pm 0.000024	14.45	91.65	266802	49.43 \pm 0.42
UW11F10C	3	2.037 \pm 0.004	0.00002 \pm 0.00004	0.000431 \pm 0.000033	15.49	93.51	17878	49.69 \pm 0.53
UW11F10D	3	1.996 \pm 0.003	0.00001 \pm 0.00002	0.000263 \pm 0.000036	8.13	95.87	38949	49.90 \pm 0.56
UW11F10E	3	2.048 \pm 0.004	0.00001 \pm 0.00002	0.000500 \pm 0.000025	16.29	92.56	30993	49.45 \pm 0.43
UW11F10F	3	2.097 \pm 0.004	0.00002 \pm 0.00004	0.000588 \pm 0.000022	20.86	91.50	18318	50.06 \pm 0.38
UW11F10G	3	2.003 \pm 0.006	0.00001 \pm 0.00002	0.000304 \pm 0.000027	17.71	95.28	32463	49.78 \pm 0.51
UW11F10H	3	1.993 \pm 0.005	0.00003 \pm 0.00004	0.000261 \pm 0.000032	12.38	95.89	16160	49.86 \pm 0.55
UW11F10I	3	2.270 \pm 0.004	0.00003 \pm 0.00004	0.001252 \pm 0.000059	22.33	83.50	14653	49.44 \pm 0.91
*UW11F10J	3	2.143 \pm 0.004	0.00001 \pm 0.00001	0.000685 \pm 0.000037	10.91	90.34	48214	50.49 \pm 0.58
UW11F10K	3	1.993 \pm 0.004	0.00004 \pm 0.00006	0.000269 \pm 0.000024	16.29	95.78	10496	49.80 \pm 0.40
*UW11F10L	3	1.981 \pm 0.007	0.00001 \pm 0.00001	0.000153 \pm 0.000044	10.08	97.48	566802	50.36 \pm 0.74
UW11F10M	3	2.204 \pm 0.007	0.00001 \pm 0.00001	0.001035 \pm 0.000040	12.03	85.91	52325	49.39 \pm 0.70
UW11F10N	3	1.952 \pm 0.005	0.00002 \pm 0.00003	0.000134 \pm 0.000010	18.42	97.74	19976	49.76 \pm 0.27
UW11F10O	3	1.971 \pm 0.004	0.00049 \pm 0.00073	0.000207 \pm 0.000013	27.52	96.66	878	49.70 \pm 0.26
UW11F10P	3	1.994 \pm 0.005	0.00002 \pm 0.00002	0.000305 \pm 0.000011	20.58	95.25	26486	49.55 \pm 0.27
UW11F10Q	3	2.038 \pm 0.004	0.00002 \pm 0.00003	0.000411 \pm 0.000012	22.51	93.82	22699	49.89 \pm 0.23
UW11F10R	3	2.210 \pm 0.004	0.00003 \pm 0.00004	0.001000 \pm 0.000017	42.55	86.43	17420	49.83 \pm 0.30
UW11F10S	3	2.000 \pm 0.004	0.00001 \pm 0.00002	0.000279 \pm 0.000021	22.68	95.64	32272	49.90 \pm 0.38
*UW11F10T	3	1.966 \pm 0.003	0.00001 \pm 0.00001	0.000137 \pm 0.000012	25.77	97.70	48494	50.11 \pm 0.23
UW11F10U	3	2.034 \pm 0.004	0.00001 \pm 0.00001	0.000424 \pm 0.000013	21.41	93.60	82611	49.66 \pm 0.25
UW11F10V	3	2.001 \pm 0.003	0.00001 \pm 0.00002	0.000317 \pm 0.000002	41.84	95.08	39290	49.63 \pm 0.13
UW11F10W	3	2.053 \pm 0.003	0.00001 \pm 0.00002	0.000492 \pm 0.000015	36.74	92.69	38171	49.64 \pm 0.27
*UW11F10X	3	2.034 \pm 0.006	0.00001 \pm 0.00001	0.000350 \pm 0.000031	23.97	94.69	46534	50.25 \pm 0.53
UW11F10Y	3	2.490 \pm 0.005	0.00001 \pm 0.00002	0.001994 \pm 0.000037	25.94	76.15	38894	49.47 \pm 0.59
UW11F10Z	3	2.139 \pm 0.006	0.00001 \pm 0.00002	0.000770 \pm 0.000014	19.60	89.15	35256	49.74 \pm 0.34
Isochron age ± 2 \downarrow					49.72 \pm 0.14	Total fusion age ± 2 \downarrow		49.77 \pm 0.11
					Weighted mean age ± 2 \downarrow		49.70 \pm 0.10	

Analcite tuff SB-1

sanidine $J = 0.022235 \pm 0.24\%$ $\mu = 1.0035$

UW0610A	10	1.282 \pm 0.005	0.02026 \pm 0.00020	0.000148 \pm 0.000007	44.21	96.59	21	49.02 \pm 0.44
UW0610B	10	1.261 \pm 0.003	0.01585 \pm 0.00018	0.000078 \pm 0.000011	30.68	98.14	27	48.95 \pm 0.36
UW0610C	10	1.256 \pm 0.007	0.01789 \pm 0.00022	0.000054 \pm 0.000010	24.47	98.71	24	49.04 \pm 0.62
UW0610D	10	1.247 \pm 0.004	0.01568 \pm 0.00016	0.000041 \pm 0.000008	30.70	99.00	27	48.85 \pm 0.39
UW0610E	10	1.286 \pm 0.006	0.01873 \pm 0.00021	0.000139 \pm 0.000007	44.21	96.80	23	49.25 \pm 0.49
UW0610F	10	1.279 \pm 0.005	0.02542 \pm 0.00022	0.000155 \pm 0.000008	55.10	96.45	17	48.82 \pm 0.43
UW0610G	10	1.262 \pm 0.003	0.01696 \pm 0.00014	0.000086 \pm 0.000005	48.98	97.97	25	48.94 \pm 0.26
UW0610H	10	1.258 \pm 0.004	0.01826 \pm 0.00016	0.000050 \pm 0.000006	51.84	98.82	24	49.19 \pm 0.38
UW0610I	10	1.272 \pm 0.005	0.02063 \pm 0.00020	0.000086 \pm 0.000009	37.46	98.01	21	49.34 \pm 0.47
UW0610J	10	1.275 \pm 0.005	0.02321 \pm 0.00024	0.000124 \pm 0.000013	22.14	97.15	19	49.01 \pm 0.49

Table DR2. Complete $^{40}\text{Ar}/^{39}\text{Ar}$ results

Sample Experiment	xtal #	$^{40}\text{Ar}/^{39}\text{Ar}$	$^{37}\text{Ar}/^{39}\text{Ar}$	$^{36}\text{Ar}/^{39}\text{Ar}$	$^{40}\text{Ar}^*$ (10^{-16} mol)	% $^{40}\text{Ar}^*$	K/Ca	Apparent Age ± 2 \downarrow Ma
Analcite tuff (sanidine) cont...								
sanidine $J = 0.014549 \pm 0.21\%$ $\mu = 1.0025$								
UW11G10A	5	1.918 \pm 0.003	0.00026 \pm 0.00035	0.000058 \pm 0.000027	10.20	98.87	1636	49.09 \pm 0.41
UW11G10B	5	1.913 \pm 0.005	0.00035 \pm 0.00047	0.000149 \pm 0.000085	5.64	97.45	1223	48.28 \pm 1.30
UW11G10C	10	1.929 \pm 0.003	0.00029 \pm 0.00038	0.000118 \pm 0.000007	26.15	97.95	1501	48.92 \pm 0.16
UW11G10D	10	1.915 \pm 0.003	0.00030 \pm 0.00041	0.000095 \pm 0.000018	24.15	98.29	1418	48.73 \pm 0.30
UW11G10E	10	1.939 \pm 0.003	0.00032 \pm 0.00043	0.000148 \pm 0.000008	24.35	97.50	1331	48.94 \pm 0.19
UW11G10F	10	1.917 \pm 0.002	0.00036 \pm 0.00048	0.000070 \pm 0.000025	17.81	98.68	1210	48.99 \pm 0.38
UW11G10G	10	1.934 \pm 0.003	0.00083 \pm 0.00111	0.000145 \pm 0.000016	27.32	97.55	518	48.85 \pm 0.26
UW11G10H	10	1.927 \pm 0.003	0.00030 \pm 0.00040	0.000088 \pm 0.000018	22.51	98.42	1458	49.11 \pm 0.29
UW11G10I	15	1.961 \pm 0.003	0.00034 \pm 0.00045	0.000239 \pm 0.000009	32.68	96.17	1270	48.83 \pm 0.19
Isochron age ± 2 \downarrow					49.00 \pm 0.21	Total fusion age ± 2 \downarrow		48.99 \pm 0.14
					Weighted mean age ± 2 \downarrow		48.94 \pm 0.12	

* indicates analyses that have been excluded from age calculations

Note: All ages calculated relative to 28.34 Ma for the Taylor Creek rhyolite sanidine (Renne at al., 1998); using the decay constants of Steiger and Jäger (1977); uncertainties in Ar isotope ratios reported at 1 \downarrow analytical precision, uncertainties in ages reported at 2 \downarrow analytical precision. Corrected for ^{37}Ar and ^{39}Ar decay, half lives of 35.2 days and 269 years, respectively.

Table DR3. Recalibration of Magnetic Chron Boundaries

Chron	Cande and Kent (1995)		This study		% Difference
C19r	42.536	41.521	42.856	41.869	0.80
C20r	46.264	43.789	46.322	44.049	0.36
C21r	49.037	47.906	49.370	48.092	0.53
C22r	50.778	49.714	51.232	50.110	0.85
C23n.1r	51.047	50.946	51.508	51.404	0.90
C23r	52.364	51.743	52.806	52.204	0.87
C24n.1r	52.757	52.663	53.199	53.090	0.82
C24n.2r	52.903	52.801	53.367	53.249	0.86
C24r	55.904	53.347	56.564	53.869	1.08

Note: Boundary ages are shown in Ma. $\pm 2\sigma$ intercalibration uncertainties for calibration points used to interpolate chron boundary ages range from ± 0.2 to 0.5 m.y.

References cited in Data Repository:

- Cande, S.C., Kent, D.V., 1995, Revised calibration of the geomagnetic polarity timescale for the Late Cretaceous and Cenozoic: *Journal of Geophysical Research*, v. 100, no. B4, p. 6093-6095.
- Duffield, W. A., and G. B. Dalrymple, 1990, The Taylor Creek Rhyolite of New Mexico: A rapidly emplaced field of lava domes and flows: *Bulletin of Volcanology*, v. 52, p. 475-487.
- Lanphere, M.A., and Dalrymple, G.B., 2000, First-principles calibration of ^{38}Ar tracers: Implications for ages of $^{40}\text{Ar}/^{39}\text{Ar}$ fluence monitors: US Geological Survey Professional Paper 1621.
- McDougall, I., and Roksandic, Z., 1974, Total fusion $^{40}\text{Ar}/^{39}\text{Ar}$ ages using HIFAR reactor: *Geological Society of Australia Journal*, v. 21, p. 81-89.
- Renne, P.R., Swisher, C. C., Deino, A. L., Karner, D. B., Owens, T. L., and DePaolo, D.J., 1998, Intercalibration of standards, absolute ages and uncertainties in $^{40}\text{Ar}/^{39}\text{Ar}$ dating. *Chemical Geology*, v. 145, p. 117-152.
- Sampson, S.D., and Alexander, E.C.Jr., 1987, Calibration of the interlaboratory $^{40}\text{Ar}/^{39}\text{Ar}$ dating standard, MMhb-1: *Chemical Geology*, v. 66, p. 27-34.
- Steiger, R.H., and Jäger, E., 1977, Subcommittee on geochronology: convention on the use of decay constants in geo- and cosmochemistry, *Earth and Planetary Science Letters*, v. 36, p. 359-362.