1.1.

Relative Abundances			^{36}Ar [fA]	%1σ	^{37}Ar [fA]	%1σ	^{38}Ar [fA]	%1σ	^{39}Ar [fA]	%1σ	^{40}Ar [fA]	%1σ	$^{40}Ar^*/^{39}Ar_K \pm 1\sigma$	J-value ± 1σ (Flux Monitor)	$^{40}Ar^*$ (%)	K/Ca ± 1σ
89_VU101-F8	8 °C	4	0.0023325	7.783	0.1766093	13.824	0.281934	0.313	24.52996	0.111	123.6373	0.032	5.01160 ± 0.00619	0.0030962 ± 0.0000038	99.43	59.7 ± 8.3
90_VU101-F8	8 °C	4	0.0053753	4.566	0.5152000	5.297	0.658957	0.285	56.69098	0.105	286.3546	0.030	5.02273 ± 0.00564	0.0030893 ± 0.0000035	99.44	47.3 ± 2.5
91_VU101-F8	8 °C	4	0.0034662	6.178	0.4003544	5.455	0.624089	0.284	53.85904	0.104	271.2900	0.033	5.01757 ± 0.00561	0.0030925 ± 0.0000035	99.61	57.8 ± 3.2
93_VU101-F8	8 °C	4	0.0057754	4.479	0.5377946	5.473	0.747863	0.271	64.62421	0.105	326.5690	0.030	5.02650 ± 0.00562	0.0030870 ± 0.0000035	99.47	51.7 ± 2.8
94_VU101-F8	8 °C	4	0.0040615	6.849	0.3097059	7.437	0.493975	0.299	42.44287	0.110	214.2608	0.048	5.01938 ± 0.00632	0.0030914 ± 0.0000039	99.43	58.9 ± 4.4
95_VU101-F8	8 °C	4	0.0033149	7.601	0.3712244	8.414	0.380756	0.307	32.79453	0.109	165.3203	0.038	5.01098 ± 0.00621	0.0030966 ± 0.0000038	99.40	38.0 ± 3.2
97_VU101-F8	8 °C	4	0.0054969	4.487	0.3703941	7.504	0.573981	0.263	49.86371	0.107	252.1712	0.031	5.02405 ± 0.00579	0.0030885 ± 0.0000036	99.34	57.9 ± 4.3
98_VU101-F9	8 °C	4	0.0029331	6.617	0.2187775	9.277	0.327366	0.389	28.36214	0.107	142.9799	0.030	5.01012 ± 0.00593	0.0030971 ± 0.0000037	99.38	55.7 ± 5.2
99_VU101-F9	8 °C	4	0.0060354	3.666	0.3069693	8.170	0.440956	0.323	38.51916	0.109	195.0851	0.035	5.01764 ± 0.00602	0.0030925 ± 0.0000037	99.07	54.0 ± 4.4
101_VU101-F9	8 °C	4	0.0023126	7.755	0.1294320	13.935	0.225340	0.269	19.51844	0.113	98.4678	0.029	5.00917 ± 0.00646	0.0030977 ± 0.0000040	99.29	64.8 ± 9.0
102_VU101-F9	8 °C	4	0.0026934	10.987	0.4345913	6.486	0.672145	0.286	58.17969	0.108	292.7887	0.038	5.01842 ± 0.00594	0.0030920 ± 0.0000037	99.72	57.6 ± 3.7
103_VU101-F9	8 °C	4	0.0027532	8.723	0.1584047	12.672	0.426519	0.290	36.86053	0.109	185.8884	0.031	5.02021 ± 0.00602	0.0030909 ± 0.0000037	99.55	100.1 ± 12.7
109_VU101-F9	8 °C	4	0.0020503	11.920	1.8253917	1.955	0.547128	0.287	47.56467	0.106	239.6392	0.028	5.02760 ± 0.00572	0.0030863 ± 0.0000035	99.79	11.2 ± 0.2
110_VU101-F9	8 °C	4	0.0107944	2.332	0.4022729	5.441	0.459329	0.308	39.66995	0.106	202.3024	0.031	5.01837 ± 0.00584	0.0030920 ± 0.0000036	98.41	42.4 ± 2.3
111_VU101-F10	8 °C	4	0.0097333	2.791	0.3894811	8.058	0.495213	0.285	42.78403	0.106	218.3414	0.030	5.03531 ± 0.00588	0.0030816 ± 0.0000036	98.67	47.2 ± 3.8
113_VU101-F10	8 °C	4	0.0076113	3.590	0.3724742	6.321	0.658973	0.300	57.08002	0.111	289.1362	0.036	5.02532 ± 0.00606	0.0030877 ± 0.0000037	99.21	65.9 ± 4.2
114_VU101-F10	8 °C	4	0.0039631	6.766	0.2509541	11.090	0.392589	0.273	33.62278	0.117	170.4084	0.033	5.03281 ± 0.00657	0.0030832 ± 0.0000040	99.30	57.6 ± 6.4
115_VU101-F10	8 °C		0.0148724	2.192	0.4442223	8.374	0.783011	0.276	67.26624	0.104	343.4622	0.031	5.03968 ± 0.00568	0.0030789 ± 0.0000035	98.70	65.1 ± 5.5
117_VU101-F10	8 °C	4	0.0030722	8.855	0.2273613	11.222	0.274930	0.352	23.86694	0.113	120.6397	0.036	5.01617 ± 0.00686	0.0030934 ± 0.0000042	99.24	45.1 ± 5.1
118_VU101-F10	8 °C	4	0.0057086	4.744	0.4722994	5.943	0.493993	0.252	42.71198	0.107	216.3405	0.028	5.02525 ± 0.00587	0.0030878 ± 0.0000036	99.21	38.9 ± 2.3
119_VU101-F10	8 °C	4	0.0018802	16.263	0.2044352	13.869	0.398795	0.285	34.32335	0.105	172.9431	0.028	5.02192 ± 0.00608	0.0030898 ± 0.0000037	99.67	72.2 ± 10.0
	Σ		0.1062364	1.099	8.5183497	1.448	10.357841	0.066	895.13519	0.024	4528.0260	0.008				

1.2.

Information on Analysis and Constants Used in Calculations	
Sample = VU101-F8 - F9 - F10	Age Equations = Min et al. (2000)
Material = sanidine	Negative Intensities = Allowed
Location = FishCanyon	Decay Constant 40K = 5.460 ± 0.053 E-10 1/a
Analyst = K. Kuiper / F. Markovic	Decay Constant 39Ar = 2.940 ± 0.016 E-07 1/h
Project = VU101	Decay Constant 37Ar = 8.230 ± 0.012 E-04 1/h
Mass Discrimination Law = LIN	Decay Constant 36Cl = 2.257 ± 0.015 E-06 1/a
Irradiation = VU101	Decay Activity 40K(EC,β⁺) = 3.310 ± 0.030 1/gs
	Decay Activity 40K(β⁻) = 27.890 ± 0.150 1/gs
Fish Canyon = 28.201 ± 0.023 Ma	Atmospheric Ratio 40/36(a) = 298.56 ± 0.31
IGSN = Undefined	Atmospheric Ratio 38/36(a) = 0.1885 ± 0.0003
Experiment Type = Undefined	Production Ratio 39/37(ca) = 0.000673 ± 0.000004
Extraction Method = Undefined	Production Ratio 36/37(ca) = 0.000264 ± 0.000002
Heating = 45 sec	Production Ratio 40/39(k) = 0.000860 ± 0.000070
Isolation = 5.00 min	Production Ratio 38/39(k) = 0.012110 ± 0.000030
	Production Ratio 36/38(cl) = 262.80 ± 1.71
	Scaling Ratio K/Ca = 0.430
	Abundance Ratio 40K/K = 1.1700 ± 0.0100 E-04
	Atomic Weight K = 39.0983 ± 0.0001 g

1.3.

Results	$^{40}Ar_A/^{36}Ar_A \pm 1\sigma$	$^{40}Ar^*/^{39}Ar_K \pm 1\sigma$	J-value ± 1σ (Flux Monitor)	MSWD	N	K/Ca ± 1σ
Weighted mean J		5.02075 ± 0.00157 ± 0.03%	0.0030906 ± 0.0000010 ± 0.03%	1.37 13% 1.32 1.1719	20 1σ Confidence Limit Error Magnification	13.6 ± 2.2
Total Fusion J		5.02297 ± 0.00135 ± 0.03%	0.0030892 ± 0.0000008 ± 0.03%		21	45.2 ± 0.7
Normal Isochron	270.54 ± 31.25 ± 11.55%	5.02484 ± 0.00384 ± 0.08%	0.0030880 ± 0.0000024 ± 0.08%	1.73 3% 1.33 1.3146 1 0.0000010278	20 1σ Confidence Limit Error Magnification Number of Iterations Convergence	
Inverse Isochron	323.60 ± 26.98 ± 8.34%	5.01803 ± 0.00350 ± 0.07%	0.0030922 ± 0.0000022 ± 0.07%	1.39 12% 1.33 1.1790 3 0.0001557119 1%	20 1σ Confidence Limit Error Magnification Number of Iterations Convergence Spreading Factor	

2.1.

Relative Abundances			^{36}Ar [fA]	%1σ	^{37}Ar [fA]	%1σ	^{38}Ar [fA]	%1σ	^{39}Ar [fA]	%1σ	^{40}Ar [fA]	%1σ	$^{40}Ar^*/^{39}Ar_K \pm 1\sigma$	Age ± 1σ (Ma)	$^{40}Ar^*$ (%)	K/Ca ± 1σ
129_VU101-R2	8 °C	4	0.0135454	1.517	37.80022	0.833	0.0414716	0.801	3.551181	0.228	10.44119	0.102	2.65858 ± 0.02069	14.99 ± 0.12	89.77	0.040 ± 0.000
131_VU101-R2	8 °C	4	0.0143895	2.523	39.97288	0.818	0.0516754	0.622	4.411567	0.195	12.81004	0.091	2.65945 ± 0.02648	14.99 ± 0.15	91.03	0.047 ± 0.000
122_VU101-R2	8 °C	4	0.0132076	2.244	36.75849	0.816	0.0538798	0.799	4.452256	0.217	12.94729	0.090	2.68718 ± 0.02207	15.15 ± 0.12	91.89	0.052 ± 0.000
121_VU101-R2	8 °C	4	0.0167614	1.580	39.63710	0.840	0.0521478	0.696	4.270410	0.189	13.35176	0.085	2.70234 ± 0.02101	15.23 ± 0.12	85.89	0.046 ± 0.000
123_VU101-R2	8 °C		0.0238272	1.442	52.05310	0.818	0.1127186	0.356	9.127010	0.130	27.80559	0.064	2.72623 ± 0.01288	15.37 ± 0.07	89.14	0.075 ± 0.001
130_VU101-R2	8 °C		0.0128609	1.914	33.36867	0.849	0.0681448	0.872	5.842057	0.166	17.10004	0.059	2.72964 ± 0.01436	15.39 ± 0.08	92.90	0.075 ± 0.001
126_VU101-R2	8 °C		0.0158322	1.924	43.89354	0.856	0.0647320	0.595	5.433110	0.159	16.10785	0.060	2.74560 ± 0.01878	15.48 ± 0.11	92.10	0.053 ± 0.000
125_VU101-R2	8 °C		0.0161414	1.967	44.09337	0.823	0.0664039	0.623	5.590181	0.205	16.72728	0.084	2.76571 ± 0.01929	15.59 ± 0.11	91.94	0.054 ± 0.000
127_VU101-R2	8 °C		0.0134158	2.588	42.58682	0.860	0.0751477	0.598	6.312892	0.157	18.09525	0.059	2.77538 ± 0.01808	15.64 ± 0.10	96.38	0.063 ± 0.001
133_VU101-R2	8 °C		0.0280806	1.382	29.00053	0.872	0.2912686	0.341	24.645337	0.106	75.00564	0.033	2.79733 ± 0.00574	15.77 ± 0.03	91.84	0.365 ± 0.003
		Σ	0.1680621	0.588	399.16473	0.267	0.8775902	0.182	73.636000	0.053	220.39193	0.020				

2.2.

Information on Analysis and Constants Used in Calculations	
Sample = VU101-R2	Age Equations = Min et al. (2000)
Material = volcanic glass	Negative Intensities = Allowed
Location = Jovac	Decay Constant 40K = 5.460 ± 0.053 E-10 1/a
Analyst = K. Kuiper / F. Markovic	Decay Constant 39Ar = 2.940 ± 0.016 E-07 1/h
Project = VU101	Decay Constant 37Ar = 8.230 ± 0.012 E-04 1/h
Mass Discrimination Law = LIN	Decay Constant 36Cl = 2.257 ± 0.015 E-06 1/a
Irradiation = VU101	Decay Activity 40K(EC,β⁺) = 3.310 ± 0.030 1/gs
J = 0.00309060 ± 0.00000309	Decay Activity 40K(β⁻) = 27.890 ± 0.150 1/gs
Fish Canyon = 28.201 ± 0.023 Ma	Atmospheric Ratio 40/36(a) = 298.56 ± 0.31
IGSN = Undefined	Atmospheric Ratio 38/36(a) = 0.1885 ± 0.0003
Preferred Age = Undefined	Production Ratio 39/37(ca) = 0.000673 ± 0.000004
Classification = Undefined	Production Ratio 36/37(ca) = 0.000264 ± 0.000002
Experiment Type = Undefined	Production Ratio 40/39(k) = 0.000860 ± 0.000070
Extraction Method = Undefined	Production Ratio 38/39(k) = 0.012110 ± 0.000030
Heating = 45 sec	Production Ratio 36/38(cl) = 262.80 ± 1.71
Isolation = 5.00 min	Scaling Ratio K/Ca = 0.430
Instrument = HELIX	Abundance Ratio 40K/K = 1.1700 ± 0.0100 E-04
Lithology = Undefined	Atomic Weight K = 39.0983 ± 0.0001 g
Lat-Lon = Undefined - Undefined	
Feature = Undefined	

2.3.

Results	$^{40}Ar_A/^{36}Ar_A \pm 1\sigma$	$^{40}Ar^*/^{39}Ar_K \pm 1\sigma$	Age ± 1σ (Ma)	MSWD	N	K/Ca ± 1σ
Weighted mean age		2.67826 ± 0.01112 (± 0.42%)	15.10 ± 0.06 (± 0.43%)	0.96		0.046 ± 0.002
				41%	4	
		Full External Error ± 0.17		1.82	1σ Confidence Limit	
		Analytical Error ± 0.06		1.0000	Error Magnification	
Total fusion age		2.74801 ± 0.00455 (± 0.17%)	15.49 ± 0.03 (± 0.19%)		10	0.079 ± 0.000
		Full External Error ± 0.16				
		Analytical Error ± 0.03				
Normal Isochron	346.66 ± 47.56 (± 13.72%)	2.62538 ± 0.05241 (± 2.00%)	14.80 ± 0.29 (± 1.99%)	0.67		
No Convergence				51%	4	
		Full External Error ± 0.33		2.00	1σ Confidence Limit	
		Analytical Error ± 0.29		1.0000	Error Magnification	
				100	Number of Iterations	
				0.0001212391	Convergence	
Inverse Isochron	348.33 ± 47.23 (± 13.56%)	2.62531 ± 0.05114 (± 1.95%)	14.80 ± 0.29 (± 1.94%)	0.70		
				49%	4	
		Full External Error ± 0.33		2.00	1σ Confidence Limit	
		Analytical Error ± 0.29		1.0000	Error Magnification	
				2	Number of Iterations	
				0.0012211843	Convergence	
				6%	Spreading Factor	

3.1.

Relative Abundances			^{36}Ar [fA]	%1σ	^{37}Ar [fA]	%1σ	^{38}Ar [fA]	%1σ	^{39}Ar [fA]	%1σ	^{40}Ar [fA]	%1σ	$^{40}Ar^*/^{39}Ar_K \pm 1\sigma$	Age ± 1σ (Ma)	$^{40}Ar^*$ (%)	K/Ca ± 1σ
163_VU101-R6	8 °C	4	0.0046999	4.563	3.73917	1.409	0.0090790	1.846	0.740826	0.912	3.01411	0.342	2.58021 ± 0.09118	14.55 ± 0.51	63.20	0.085 ± 0.001
153_VU101-R6	8 °C	4	0.0104225	2.375	5.95677	1.163	0.0145071	1.806	1.088176	0.757	5.49671	0.170	2.63202 ± 0.07184	14.84 ± 0.40	51.91	0.078 ± 0.001
179_VU101-R6	8 °C	4	0.0051711	4.350	6.07914	1.170	0.0140692	1.627	1.113099	0.518	4.00384	0.233	2.64936 ± 0.06294	14.94 ± 0.35	73.38	0.078 ± 0.001
175_VU101-R6	8 °C	4	0.0071964	4.475	5.29734	1.116	0.0133086	1.419	1.059390	0.496	4.53339	0.152	2.65333 ± 0.09240	14.96 ± 0.52	61.80	0.086 ± 0.001
161_VU101-R6	8 °C	4	0.0044480	4.291	5.67944	1.061	0.0124666	2.006	1.055330	0.613	3.72341	0.202	2.70293 ± 0.05739	15.24 ± 0.32	76.33	0.080 ± 0.001
155_VU101-R6	8 °C	4	0.0049349	5.250	5.59972	1.244	0.0125439	2.401	1.060322	0.674	3.89022	0.234	2.70437 ± 0.07618	15.24 ± 0.43	73.45	0.081 ± 0.001
154_VU101-R6	8 °C	4	0.0047215	4.988	5.78539	1.026	0.0141135	1.530	1.151661	0.630	4.06595	0.204	2.71077 ± 0.06421	15.28 ± 0.36	76.52	0.085 ± 0.001
166_VU101-R6	8 °C	4	0.0116881	2.348	5.34338	1.103	0.0139116	1.681	1.050145	0.796	5.95670	0.264	2.75896 ± 0.08293	15.55 ± 0.47	48.47	0.084 ± 0.001
173_VU101-R6	8 °C	4	0.0037302	6.745	5.53174	1.210	0.0126864	2.299	1.038421	0.822	3.55593	0.227	2.78087 ± 0.07675	15.67 ± 0.43	80.92	0.080 ± 0.001
178_VU101-R6	8 °C	4	0.0036334	6.457	5.76773	1.221	0.0112837	1.257	0.955174	0.782	3.29326	0.218	2.79859 ± 0.07749	15.77 ± 0.43	80.84	0.071 ± 0.001
177_VU101-R6	8 °C	4	0.0046286	5.305	4.52306	1.353	0.0106405	1.871	0.857734	0.793	3.46925	0.258	2.85847 ± 0.08957	16.11 ± 0.50	70.42	0.081 ± 0.001
157_VU101-R6	8 °C	4	0.0095439	2.556	8.79593	1.057	0.0201950	1.261	1.625679	0.438	6.78790	0.136	2.85869 ± 0.04736	16.11 ± 0.27	68.22	0.079 ± 0.001
167_VU101-R6	8 °C		0.0031101	7.419	4.93554	1.270	0.0110378	1.786	0.958169	0.835	3.30015	0.199	2.89030 ± 0.07664	16.29 ± 0.43	83.63	0.083 ± 0.001
159_VU101-R6	8 °C		0.0124989	2.512	6.69431	1.168	0.0160745	1.862	1.173621	0.498	6.61682	0.168	2.91827 ± 0.08233	16.44 ± 0.46	51.56	0.075 ± 0.001
158_VU101-R6	8 °C		0.0061468	5.540	5.20975	1.431	0.0124439	1.658	0.961452	0.735	4.24271	0.192	2.94101 ± 0.10888	16.57 ± 0.61	66.40	0.079 ± 0.001
151_VU101-R6	8 °C		0.0049868	5.901	7.56159	1.105	0.0140799	1.579	1.193920	0.351	4.39505	0.189	2.94506 ± 0.07523	16.59 ± 0.42	79.66	0.068 ± 0.001
165_VU101-R6	8 °C		0.0027495	11.022	3.46378	1.307	0.0078722	2.215	0.639388	1.009	2.47996	0.364	3.03196 ± 0.14613	17.08 ± 0.82	77.89	0.079 ± 0.001
174_VU101-R6	8 °C		0.0213796	1.762	4.83505	1.392	0.0141003	1.400	0.866298	0.769	8.69274	0.112	3.11687 ± 0.13339	17.56 ± 0.75	30.95	0.077 ± 0.001
181_VU101-R6	8 °C		0.0040638	6.156	9.04791	1.168	0.0117348	1.601	0.959908	0.671	4.01609	0.235	3.68534 ± 0.08335	20.74 ± 0.47	87.53	0.045 ± 0.001
162_VU101-R6	8 °C		0.0086448	2.581	5.58981	1.243	0.0252203	1.082	2.100699	0.288	27.10545	0.051	11.90462 ± 0.04738	66.17 ± 0.26	92.10	0.161 ± 0.002
		Σ	0.1383987	0.865	115.43656	0.272	0.2713688	0.377	21.649412	0.142	112.63964	0.038				

3.2.

Information on Analysis and Constants Used in Calculations	
Sample = VU101-R6	Age Equations = Min et al. (2000)
Material = volcanic glass	Negative Intensities = Allowed
Location = Laz	Decay Constant 40K = 5.460 ± 0.053 E-10 1/a
Analyst = K. Kuiper / F. Markovic	Decay Constant 39Ar = 2.940 ± 0.016 E-07 1/h
Project = VU101	Decay Constant 37Ar = 8.230 ± 0.012 E-04 1/h
Mass Discrimination Law = LIN	Decay Constant 36Cl = 2.257 ± 0.015 E-06 1/a
Irradiation = VU101	Decay Activity 40K(EC,β⁺) = 3.310 ± 0.030 1/gs
J = 0.00309060 ± 0.00000309	Decay Activity 40K(β⁻) = 27.890 ± 0.150 1/gs
Fish Canyon = 28.201 ± 0.023 Ma	Atmospheric Ratio 40/36(a) = 298.56 ± 0.31
IGSN = Undefined	Atmospheric Ratio 38/36(a) = 0.1885 ± 0.0003
Preferred Age = Undefined	Production Ratio 39/37(ca) = 0.000673 ± 0.000004
Classification = Undefined	Production Ratio 36/37(ca) = 0.000264 ± 0.000002
Experiment Type = Undefined	Production Ratio 40/39(k) = 0.000860 ± 0.000070
Extraction Method = Undefined	Production Ratio 38/39(k) = 0.012110 ± 0.000030
Heating = 45 sec	Production Ratio 36/38(cl) = 262.80 ± 1.71
Isolation = 5.00 min	Scaling Ratio K/Ca = 0.430
Instrument = HELIX	Abundance Ratio 40K/K = 1.1700 ± 0.0100 E-04
Lithology = Undefined	Atomic Weight K = 39.0983 ± 0.0001 g
Lat-Lon = Undefined - Undefined	
Feature = Undefined	

3.3.

Results	$^{40}Ar_A/^{36}Ar_A \pm 1\sigma$	$^{40}Ar^*/^{39}Ar_K \pm 1\sigma$	Age ± 1σ (Ma)	MSWD	N	K/Ca ± 1σ
Weighted mean age		2.73571 ± 0.02584 ± 0.94%	15.42 ± 0.15 ± 0.95%	1.64		0.080 ± 0.001
				8%	12	
		Full External Error ± 0.22		1.43	1σ Confidence Limit	
		Analytical Error ± 0.15		1.2799	Error Magnification	
Total fusion age		3.72708 ± 0.01757 ± 0.47%	20.98 ± 0.10 ± 0.48%		20	0.080 ± 0.000
		Full External Error ± 0.24				
		Analytical Error ± 0.10				
Normal Isochron	297.25 ± 12.64 ± 4.25%	2.72643 ± 0.06017 ± 2.21%	15.37 ± 0.34 ± 2.20%	1.73		
Error Chron				7%	12	
		Full External Error ± 0.37		1.45	1σ Confidence Limit	
		Analytical Error ± 0.34		1.3141	Error Magnification	
				58	Number of Iterations	
				0.0000249938	Convergence	
Inverse Isochron	297.59 ± 13.01 ± 4.37%	2.74045 ± 0.06036 ± 2.20%	15.45 ± 0.34 ± 2.20%	1.80		
Error Chron				5%	12	
		Full External Error ± 0.38		1.45	1σ Confidence Limit	
		Analytical Error ± 0.34		1.3427	Error Magnification	
				3	Number of Iterations	
				0.0000695995	Convergence	
				32%	Spreading Factor	

4.1.

Relative Abundances			^{36}Ar [fA]	%1σ	^{37}Ar [fA]	%1σ	^{38}Ar [fA]	%1σ	^{39}Ar [fA]	%1σ	^{40}Ar [fA]	%1σ	$^{40}Ar^*/^{39}Ar_K \pm 1\sigma$	Age ± 1σ (Ma)	$^{40}Ar^*$ (%)	K/Ca ± 1σ
193_VU101-R7	8 °C	4	0.0159890	1.895	39.41153	0.837	0.0495800	0.568	4.139366	0.184	12.37153	0.083	2.60179 ± 0.02402	14.67 ± 0.13	86.49	0.0449 ± 0.000
194_VU101-R7	8 °C	4	0.0171836	1.505	48.75740	0.814	0.0583399	0.715	4.865156	0.171	13.92638	0.070	2.61466 ± 0.01864	14.74 ± 0.10	90.73	0.0426 ± 0.000
185_VU101-R7	8 °C	4	0.0110715	2.474	30.87482	0.825	0.0398130	0.719	3.155407	0.311	9.21809	0.118	2.66175 ± 0.02878	15.01 ± 0.16	90.51	0.0437 ± 0.000
189_VU101-R7	8 °C	4	0.0101852	2.926	26.06134	0.837	0.0340507	0.880	2.740711	0.265	8.25218	0.104	2.66716 ± 0.03452	15.04 ± 0.19	88.01	0.0449 ± 0.000
190_VU101-R7	8 °C		0.0139201	2.403	38.79632	0.864	0.0537881	0.642	4.352513	0.226	12.74455	0.085	2.69112 ± 0.02519	15.17 ± 0.14	91.36	0.0480 ± 0.000
187_VU101-R7	8 °C		0.0120688	2.793	38.11509	0.850	0.0366099	0.782	3.100359	0.255	8.94644	0.116	2.71400 ± 0.03520	15.30 ± 0.20	93.27	0.0347 ± 0.000
183_VU101-R7	8 °C		0.0106672	3.297	24.83340	0.796	0.0356623	0.862	2.868956	0.254	9.01734	0.102	2.73030 ± 0.03826	15.39 ± 0.21	86.36	0.0494 ± 0.000
182_VU101-R7	8 °C		0.0268724	1.398	37.22994	0.847	0.0462461	0.614	3.640101	0.268	15.04373	0.068	2.75295 ± 0.03320	15.52 ± 0.19	66.15	0.0418 ± 0.000
186_VU101-R7	8 °C		0.0131945	2.146	33.24870	0.876	0.0377463	0.710	3.168763	0.217	10.00735	0.124	2.76061 ± 0.02926	15.56 ± 0.16	86.80	0.0407 ± 0.000
191_VU101-R7	8 °C		0.0153418	1.711	40.34068	0.842	0.0485828	0.890	4.029500	0.206	13.87028	0.072	3.11468 ± 0.02241	17.55 ± 0.13	89.88	0.0427 ± 0.000
		Σ	0.1464941	0.670	357.66922	0.270	0.4404190	0.234	36.060832	0.073	113.39787	0.029				

4.2.

Information on Analysis and Constants Used in Calculations	
Sample = VU101-R7	Age Equations = Min et al. (2000)
Material = volcanic glass	Negative Intensities = Allowed
Location = Cucerje	Decay Constant 40K = 5.460 ± 0.053 E-10 1/a
Analyst = K. Kuiper / F. Markovic	Decay Constant 39Ar = 2.940 ± 0.016 E-07 1/h
Project = VU101	Decay Constant 37Ar = 8.230 ± 0.012 E-04 1/h
Mass Discrimination Law = LIN	Decay Constant 36Cl = 2.257 ± 0.015 E-06 1/a
Irradiation = VU101	Decay Activity 40K(EC,β⁺) = 3.310 ± 0.030 1/gs
J = 0.00309060 ± 0.00000309	Decay Activity 40K(β⁻) = 27.890 ± 0.150 1/gs
Fish Canyon = 28.201 ± 0.023 Ma	Atmospheric Ratio 40/36(a) = 298.56 ± 0.31
IGSN = Undefined	Atmospheric Ratio 38/36(a) = 0.1885 ± 0.0003
Preferred Age = Undefined	Production Ratio 39/37(ca) = 0.000673 ± 0.000004
Classification = Undefined	Production Ratio 36/37(ca) = 0.000264 ± 0.000002
Experiment Type = Undefined	Production Ratio 40/39(k) = 0.000860 ± 0.000070
Extraction Method = Undefined	Production Ratio 38/39(k) = 0.012110 ± 0.000030
Heating = 45 sec	Production Ratio 36/38(cl) = 262.80 ± 1.71
Isolation = 5.00 min	Scaling Ratio K/Ca = 0.430
Instrument = HELIX	Abundance Ratio 40K/K = 1.1700 ± 0.0100 E-04
Lithology = Undefined	Atomic Weight K = 39.0983 ± 0.0001 g
Lat-Lon = Undefined - Undefined	
Feature = Undefined	

4.3.

Results	$^{40}Ar_A/^{36}Ar_A \pm 1\sigma$	$^{40}Ar^*/^{39}Ar_K \pm 1\sigma$	Age ± 1σ (Ma)	MSWD	N	K/Ca ± 1σ
Weighted mean age		2.62647 ± 0.01476 ± 0.56%	14.81 ± 0.08 ± 0.57%	1.45 23%	4	0.0439 ± 0.000
		Full External Error ± 0.18		1.82	1σ Confidence Limit	
		Analytical Error ± 0.08		1.2042	Error Magnification	
Total fusion age		2.73091 ± 0.00888 ± 0.33%	15.39 ± 0.05 ± 0.34%		10	0.0431 ± 0.000
		Full External Error ± 0.17				
		Analytical Error ± 0.05				
Normal Isochron No Convergence	297.26 ± 81.42 ± 27.39%	2.62324 ± 0.08844 ± 3.37%	14.79 ± 0.50 ± 3.36%	1.91 15%	4	
		Full External Error ± 0.52		2.00	1σ Confidence Limit	
		Analytical Error ± 0.50		1.3818	Error Magnification	
				100	Number of Iterations	
				0.0001484535	Convergence	
Inverse Isochron Error Chron	323.66 ± 102.41 ± 31.64%	2.59993 ± 0.09980 ± 3.84%	14.66 ± 0.56 ± 3.82%	2.11 12%	4	
		Full External Error ± 0.58		2.00	1σ Confidence Limit	
		Analytical Error ± 0.56		1.4510	Error Magnification	
				4	Number of Iterations	
				0.0000737669	Convergence	
				4%	Spreading Factor	

5.1.

Relative Abundances			^{36}Ar [fA]	%1σ	^{37}Ar [fA]	%1σ	^{38}Ar [fA]	%1σ	^{39}Ar [fA]	%1σ	^{40}Ar [fA]	%1σ	$^{40}Ar^*/^{39}Ar_K \pm 1\sigma$	Age ± 1σ (Ma)	$^{40}Ar^*$ (%)	K/Ca ± 1σ
207_VU101-R9	8 °C		1.7044141	0.462	8.424777	0.976	0.4536470	0.325	12.40920	0.121	531.35779	0.033	1.86570 ± 0.19468	10.53 ± 1.10	4.36	0.63 ± 0.01
197_VU101-R9	8 °C	4	0.0111327	3.034	5.583872	1.089	0.2247165	0.375	19.33322	0.108	52.05184	0.041	2.54283 ± 0.00601	14.34 ± 0.03	94.43	1.49 ± 0.02
211_VU101-R9	8 °C	4	0.0052452	4.995	11.781819	1.051	0.4791445	0.261	41.75628	0.116	107.32202	0.047	2.55456 ± 0.00372	14.40 ± 0.02	99.37	1.52 ± 0.02
195_VU101-R9	8 °C	4	0.0093560	2.803	9.121925	1.017	0.2296483	0.380	19.80711	0.130	52.75824	0.067	2.55881 ± 0.00549	14.43 ± 0.03	96.04	0.93 ± 0.01
199_VU101-R9	8 °C		0.0051009	4.939	8.701540	1.103	0.1133891	0.475	9.80567	0.123	26.24853	0.054	2.59219 ± 0.00848	14.61 ± 0.05	96.78	0.48 ± 0.01
205_VU101-R9	8 °C		0.0093705	3.289	16.345210	0.879	0.2131660	0.415	18.03734	0.116	48.57273	0.043	2.60995 ± 0.00610	14.71 ± 0.03	96.86	0.47 ± 0.00
212_VU101-R9	8 °C	4	0.0021877	12.848	7.124404	1.150	0.0536189	0.664	4.72142	0.195	12.69932	0.097	2.67218 ± 0.01879	15.06 ± 0.11	99.25	0.28 ± 0.00
198_VU101-R9	8 °C	4	0.0087367	3.497	5.223656	1.511	0.2407301	0.465	20.82423	0.114	58.33110	0.062	2.69522 ± 0.00563	15.19 ± 0.03	96.20	1.71 ± 0.03
210_VU101-R9	8 °C	4	0.0035512	7.522	6.169784	1.177	0.0246348	1.042	2.22924	0.318	6.81907	0.142	2.80582 ± 0.03731	15.81 ± 0.21	91.56	0.16 ± 0.00
206_VU101-R9	8 °C	4	0.0080037	3.767	10.373247	1.100	0.0306545	1.171	2.46794	0.253	8.54691	0.072	2.83338 ± 0.03760	15.97 ± 0.21	81.58	0.10 ± 0.00
		Σ	1.7670986	0.448	88.850233	0.348	2.0633497	0.136	151.39164	0.047	904.70755	0.021				

5.2.

Information on Analysis and Constants Used in Calculations	
Sample = VU101-R9	Age Equations = Min et al. (2000)
Material = volcanic glass	Negative Intensities = Allowed
Location = Njezic	Decay Constant 40K = 5.460 ± 0.053 E-10 1/a
Analyst = K. Kuiper / F. Markovic	Decay Constant 39Ar = 2.940 ± 0.016 E-07 1/h
Project = VU101	Decay Constant 37Ar = 8.230 ± 0.012 E-04 1/h
Mass Discrimination Law = LIN	Decay Constant 36Cl = 2.257 ± 0.015 E-06 1/a
Irradiation = VU101	Decay Activity 40K(EC,β+) = 3.310 ± 0.030 1/gs
J = 0.00309060 ± 0.00000309	Decay Activity 40K(β-) = 27.890 ± 0.150 1/gs
Fish Canyon = 28.201 ± 0.023 Ma	Atmospheric Ratio 40/36(a) = 298.56 ± 0.31
IGSN = Undefined	Atmospheric Ratio 38/36(a) = 0.1885 ± 0.0003
Preferred Age = Undefined	Production Ratio 39/37(ca) = 0.000673 ± 0.000004
Classification = Undefined	Production Ratio 36/37(ca) = 0.000264 ± 0.000002
Experiment Type = Undefined	Production Ratio 40/39(k) = 0.000860 ± 0.000070
Extraction Method = Undefined	Production Ratio 38/39(k) = 0.012110 ± 0.000030
Heating = 45 sec	Production Ratio 36/38(cl) = 262.80 ± 1.71
Isolation = 5.00 min	Scaling Ratio K/Ca = 0.430
Instrument = HELIX	Abundance Ratio 40K/K = 1.1700 ± 0.0100 E-04
Lithology = Undefined	Atomic Weight K = 39.0983 ± 0.0001 g
Lat-Lon = Undefined - Undefined	
Feature = Undefined	

5.3.

Results	$^{40}Ar_A/^{36}Ar_A \pm 1\sigma$	$^{40}Ar^*/^{39}Ar_K \pm 1\sigma$	Age ± 1σ (Ma)	MSWD	N	K/Ca ± 1σ
Weighted mean age		2.55318 ± 0.00395 ± 0.15%	14.40 ± 0.03 ± 0.18%	2.08		1.17 ± 0.20
				13%	3	
		Full External Error ± 0.15		2.00	1σ Confidence Limit	
		Analytical Error ± 0.02		1.4408	Error Magnification	
Total fusion age		2.53744 ± 0.01610 ± 0.63%	14.31 ± 0.09 ± 0.64%		10	0.73 ± 0.00
		Full External Error ± 0.18				
		Analytical Error ± 0.09				
Normal Isochron	286.15 ± 25.31 ± 8.84%	2.55497 ± 0.00749 ± 0.29%	14.41 ± 0.04 ± 0.31%	3.26		
Error Chron				7%	3	
		Full External Error ± 0.16		2.41	1σ Confidence Limit	
		Analytical Error ± 0.04		1.8044	Error Magnification	
				1	Number of Iterations	
				0.0000001872	Convergence	
Inverse Isochron	284.48 ± 25.42 ± 8.94%	2.55626 ± 0.00745 ± 0.29%	14.41 ± 0.04 ± 0.31%	3.24		
Error Chron				7%	3	
		Full External Error ± 0.16		2.41	1σ Confidence Limit	
		Analytical Error ± 0.04		1.8012	Error Magnification	
				4	Number of Iterations	
				0.0000765828	Convergence	
				5%	Spreading Factor	

5.4.

Results	$^{40}Ar_A/^{36}Ar_A \pm 1\sigma$	$^{40}Ar^*/^{39}Ar_K \pm 1\sigma$	Age $\pm 1\sigma$ (Ma)	MSWD	N	K/Ca $\pm 1\sigma$
Weighted mean age		2.69834 ± 0.01476 ± 0.55%	15.21 ± 0.08 ± 0.55%	7.81		0.13 ± 0.04
			Full External Error ± 0.18	0%	4	
			Analytical Error ± 0.08	1.82	1σ Confidence Limit	
				2.7953	Error Magnification	
Total fusion age		2.53744 ± 0.01610 ± 0.63%	14.31 ± 0.09 ± 0.64%		10	0.73 ± 0.00
			Full External Error ± 0.18			
			Analytical Error ± 0.09			
Normal Isochron	384.97 ± 24.68 ± 6.41%	2.66497 ± 0.01118 ± 0.42%	15.02 ± 0.06 ± 0.43%	0.75		
			Full External Error ± 0.17	47%	4	
			Analytical Error ± 0.06	2.00	1σ Confidence Limit	
				1.0000	Error Magnification	
				1	Number of Iterations	
				0.0000004665	Convergence	
Inverse Isochron	388.81 ± 25.31 ± 6.51%	2.66428 ± 0.01137 ± 0.43%	15.02 ± 0.07 ± 0.44%	1.02		
			Full External Error ± 0.17	36%	4	
			Analytical Error ± 0.06	2.00	1σ Confidence Limit	
				1.0104	Error Magnification	
				3	Number of Iterations	
				0.0000168865	Convergence	
				22%	Spreading Factor	

6.1.

Labbook*	Collector set-up (5 jumps from H2 to L2)	N	$[CO_2]_{H2}/[CO_2]_{L2}$	$[CO_2]_{H1}/[CO_2]_{L2}$	$[CO_2]_{AX}/[CO_2]_{L2}$	$[CO_2]_{L1}/[CO_2]_{L2}$
20141210_CO2_0026	H2F – H1C – AXC – L1C – L2C	10	0.9571±0.0123 (1.29%; n=128)	0.9980±0.0100 (0.45%; n=132)	1.0075±0.0045 (0.45%; n=134)	1.0159±0.0043 (0.42%; n=133)
20141215_CO2_0027	H2F – H1C – AXC – L1C – L2C	35	N/A	1.0006±0.0022 (0.22%; n=490)	1.0109±0.0022 (0.22%; n=488)	N/A
20150105_CO2_0001	H2F – **H1F** – AXC – L1C – L2C	30	0.9570±0.0106 (1.11%; n=699)	0.9775±0.0100 (1.03%; n=701)	1.0025±0.0024 (0.24%; n=702)	1.0124±0.0023 (0.23%; n=709)
20150119_C0002	H2F – H1C – AXC – L1C – L2C	22	0.9282±0.0131 (1.41%; n=260)	0.9957±0.0026 (0.26%; n=265)	1.0041±0.0024 (0.24%; n=263)	1.0140±0.0023 (0.22%; n=261)
20150201_C0003	H2F – H1C – AXC – L1C – L2C	21	0.9602±0.0119 (1.23%; n=290)	0.9951±0.0033 (0.33%; n=290)	1.0054±0.0032 (0.32%; n=287)	1.0119±0.0029 (0.28%; n=287)

Gain factors for different labbooks reported with 1 standard deviation.
*All CO2 experiments are run for 15 cycles with 33s integration time with peak-centering procedure at the start of each run.

7.1.

The bulk tuff samples were crushed or disintegrated and wet sieved over a set of sieves between 63 and 1000 µm. The largest appropriate mineral fraction (125-250 µm or 250-500 µm) was further separated using methylene iodide with densities of 2.54 g/cm^3 and 2.59 g/cm^3. Samples were subjected to standard magnetic separation techniques (non-magnetic fraction was used), leached with 3% HNO_3 in an ultrasonic bath for 5 min. and finally handpicked under a microscope. We were not able to obtain sanidine from these tuffs (too low K/Ca ratio), but dated a volcanic glass fraction instead. We can exclude plagioclase (density >2.61 g/cm^3) or other minerals which have larger densities. There was no alteration on the glass fragments observed. Glass fragments looked very clear, transparent without any sign of alteration.

For the mineral separations approximately 2 kg of each sample was used. Most of the samples had very little material in the range 63 – 250 µm, most of it was <63 µm. There was just enough material to get 10 – 20 mg after the separation for irradiation. We did not focus on the accessory mineral fraction, because it does not contain the minerals intended to date with $^{40}Ar/^{39}Ar$ method. Nevertheless attempt of heavy mineral analysis was done on this material. From the 2kg of starting material only one slide with heavy mineral was obtained per sample. Those slides did not contain 300 transparent heavy mineral grains for standard modal analysis so this limited data was not used.

Among available materials for dating we chose volcanic glass. Plagioclase has low K and can be compromised by excess argon. Also for plagioclase we should have been dating >10 grains per fusion to obtain sufficient beam sizes on the mass spectrometer and in these type of settings where reworking can be an issue it is preferred to have the amount of grains fused at once as low as possible. So plagioclase wouldn't be our first choice. Unaltered biotite could have been dated, if present, but generally has some recoil issues, making biotite slightly too old. We had biotite in our samples but not in sufficient quantity in samples from Nježić and Laz. With biotite from Jovac and Čučerje we did an extra heavy liquid step. If biotite is lighter than 3.0 g/cm^3 this is often an indication of minor alteration e.g. to chlorite. That was the case with biotite from Jovac so we have not attempted to date biotite from that sample. Sample from Čučerje had suitable biotite but also had transparent grains of volcanic glass so we chose volcanic glass.

The resulting mineral separates and the standard (Fish Canyon tuff sanidine, FCs, KUIPER et al., 2008) were wrapped in aluminum foil and sent for irradiation (12 hours) at the Oregon State CLICIT facility. Sample and standards were loaded in 185 hole trays in 2mm pits, placed in an ultra-high vacuum system and baked in two steps: during 1 day at 250°C in a vacuum system at <10^{-5} mbar, followed by a 1 day bake out in the extraction line at ~125°C. Samples were fused using a Synrad 48-5 CO_2 laser and custom made beam delivery system. The released gas was purified in an in-house designed sample clean up line (St172, NP10 and Ti getters) and analyzed on a Helix MC noble gas mass spectrometer.

For part of the samples (labbooks 20141223_185_06a and 20141223_185_06b) the five argon isotopes were measured simultaneously with ^{40}Ar and ^{39}Ar on the H2 and H1-Faraday positions with 10^{12} resistor amplifiers, ^{38}Ar on the AX-CDD, ^{37}Ar on the L1-CDD and ^{36}Ar on the L2-CDD in the first jump and ^{39}Ar on the H2-Faraday in jump 2. Gain factors for different labbooks reported with 1 standard deviation can be found in supplementary material – file 1.

Part of the samples (labbook 20150122_T0002) are measured with the five argon isotopes simultaneously with ^{40}Ar on the H2-Faraday position with a 10^{12} resistor amplifier, ^{39}Ar on the H1-CDD, ^{38}Ar on the AX-CDD, ^{37}Ar on the L1-CDD and ^{36}Ar on the L2-CDD.

All samples, blanks, standards and pipettes are measured during 33s integration time for 15 cycles per analysis. Apart from blanks all analyses started with a peak centering routine on L2 (labbooks 20141223_185_06a and 20141223_185_06b) or H2 (labbooks 20150122_T0002). Blanks use the peak positions of the preceding measurements.

We used the regular software controlled gain procedure for the 10^{12} Ohm amplifiers, using a stable reference current to determine the gain calibration factor between the H2 and H1 amplifiers. This approach is not applicable to the CDDs and we therefore developed a different approach.

Gain calibration for the CDDs was done by peak jumping a CO_2 reference beam (mass 43.989829) on all detectors (5 jumps). CO_2 is present in as background in the mass spectrometer and is measured in dynamic mode yielding an intensity of ~2-4 fA of CO_2. Baseline correction is done by subtracting the off peak data for each collector. Ratios of $[CO_2]_{H2}/[CO_2]_{L2}$, $[CO_2]_{H1}/[CO_2]_{L2}$, $[CO_2]_{AX}/[CO_2]_{L2}$, $[CO_2]_{L1}/[CO_2]_{L2}$ are calculated for each cycle and repeated in blocks of 15 cycles. After each block of 15 cycles, a new block starts with a peak centering routine. Uncertainty for Faraday gain corrections is relatively large (~1%) due to the noise of the Faraday cups compared to the baseline.

For data reduction we used the ArArCalc software (KOPPERS, 2002), although it is not fully compatible with the demand of multi-collection–set-up. For unknowns and standards we performed our initial data reduction in ArArCalc. We exported the uncorrected intercept values for blanks, unknowns and standards to an Excel spreadsheet. Gain correction was done in Excel and intercepts values of corrected blanks, unknowns and standards were copied back in the corrected ArArCalc.age file. As a next step the mass discrimination factor based on simultaneous measurement of ^{40}Ar on the H2 Faraday and ^{36}Ar on the L2 CDD is applied. Also these intensities are corrected for gain based on CO_2 measurements. In our calculations we used FCs of 28.201 Ma (KUIPER et al., 2008), MIN et al. (2000) decay constants and the atmospheric air value of LEE et al. (2006).

8.1.

	Jovac	Laz	Čučerje	Nježić
Min. & max. age	14.87-15.80 Ma	14.04 – 18.31 Ma	14.53 – 15.72 Ma	14.30 – 16.18 Ma
Weighted mean age with data points excluded until MSWD < t-test statistic	15.10 ± 0.06 Ma	15.42 ± 0.15 Ma	14.81 ± 0.08 Ma	14.40 ± 0.03 Ma or 15.21 ± 0.08 Ma
Weighted mean age with all data included (except outliers in fig X) and standard error multiplied by square root MSWD	15.57 ± 0.08 Ma	15.68 ± 0.16 Ma	15.05 ± 0.11 Ma	14.59 ± 0.11 Ma
Mean and standard deviation of all data excluding outliers	15.36 ± 0.27 Ma	15.82 ± 0.83 Ma	15.15 ± 0.32 Ma	14.95 ± 0.61 Ma

*Errors are ±1σ analytical errors