Data Repository item 2003094

Cenozoic Tectonic Evolution of the White Mountains, California and Nevada

Stockli, D.F. et al.

A. $^{40}Ar/^{39}Ar$ analytical procedures

High-purity mineral separates and whole rock samples were prepared by standard heavy liquid and magnetic separation techniques. Final mineral separates were all carefully handpicked and ultra-sonically cleaned to remove any impurities, composite mineral grains, and alterations. Biotite (~5-20 mg), hornblende (~15-28 mg), and whole-rock (~15-30 mg) separates were loaded into high-purity 99.99% copper foil packets. The samples were irradiated at the Oregon State University TRIGA reactor facilities for 2 hours with sanidine flux monitors. Sanidine from the Taylor Creek Rhyolite (standard 85G003) with an assumed age of 27.92 ± 0.05 Ma (Duffield and Dalrymple, 1990) was used as the flux monitor between each 4 samples. Step heating experiments on andesitic to basaltic whole rock samples (13 steps, 650-1400˚C), biotite separates (8 steps, 700-1400˚C), and hornblende (13 steps, 800-1300˚C), using a Staudacher-type double-vacuum resistance furnace, were performed at the Stanford University $^{40}Ar/^{39}Ar$ laboratory. Biotite multi-grain laser total fusion experiments were carried out employing a Nd:YAG laser probe. In both cases, laser total fusion and step heating experiments, the extracted gas was purified using SAES getters for 5 minutes and subsequently analyzed for 10 minutes in a high sensitivity MAP 216 noble-gas mass spectrometer with Baur-Signer ion source. Mass spectrometer sensitivities were about $2x10^{-14}$ moles per nanoamp of signal. Resistance furnace static blanks for ^{40}Ar ranged from $3x10^{-14}$ moles at 800˚C to $8x10^{-14}$ moles at 1200˚C. Analyses of dynamic blanks for ^{40}Ar yielded values of about $8x10^{-14}$ moles. Isotope ratios were determined with precisions of about ± 0.1% (1-ω). Measured isotopic ratios were corrected for irradiation-induced production of Ar from K, Ca, and Cl, radioactive decay of ^{37}Ar and ^{39}Ar, extraction line blanks, and spectrometer mass discrimination. Corrected raw data were reduced using the program EyeSoreChron written by B. Hacker (see Hacker, 1993). Data reduction includes calculations employing isochron diagrams (e.g., Roddick, 1978), isotope correction techniques (e.g., Dalrymple et al., 1981), and recommended elemental abundances and radioactive decay constants (Steiger and Jaeger, 1977). All quoted uncertainties on plateau ages and laser total fusion ages are 1-sigma including the error in J. $^{40}Ar/^{39}Ar$ data are presented as cumulative ^{39}Ar release spectra and inverse isochron plots and ages are given as weighted mean plateau ages (WMPA), and total fusion gas ages (TFA), or inverse isochron ages. Inverse isochron ages were calculated using the regression equations of York (1969) for correlated data and applying statistical goodness-of-fit calculations of the mean square of weighted deviates (MSWD).

B. $^{40}Ar/^{39}Ar$ Analytical Data Tables

Samples from the eastern White Mountains (see Table 4 for sample locations)
t = dwell time in minutes.
40(mol) = moles corrected for blank and reactor-produced 40.
Ratios are corrected for blanks, decay, and interference.
× 39Ar is cumulative, 40Ar* = rad fraction.

96WM-008 hornblende J=0.0005199

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
700	8	1.7e-15	18.0243	8.2099	0.0428	0.060	0.03208	0.298	5.0 ± 0.4
800	8	2.1e-15	10.4982	4.8121	0.0183	0.10	0.07492	0.486	4.8 ± 0.2
860	8	2.0e-15	10.1314	3.0871	0.0183	0.16	0.11780	0.465	4.4 ± 0.2
900	8	1.5e-15	10.7835	2.0667	0.0204	0.24	0.14738	0.441	4.5 ± 0.3
950	8	1.1e-15	9.1593	1.7897	0.0133	0.27	0.17355	0.570	4.9 ± 0.3
975	8	7.8e-16	8.8801	2.9283	0.0148	0.17	0.19261	0.507	4.2 ± 0.4
985	8	5.0e-16	8.3541	2.2223	0.0088	0.22	0.20557	0.689	5.4 ± 0.6
995	8	5.0e-16	8.8387	1.6622	0.0132	0.29	0.21796	0.558	4.6 ± 0.6
1000	8	4.4e-16	9.2816	1.2601	0.0125	0.39	0.22834	0.603	5.2 ± 0.7
1010	8	5.7e-16	9.9209	2.0901	0.0177	0.23	0.24087	0.474	4.4 ± 0.6
1020	8	7.8e-16	11.9883	2.3173	0.0241	0.21	0.25498	0.407	4.6 ± 0.5
1030	8	8.9e-16	12.4971	2.1359	0.0281	0.23	0.27044	0.336	3.9 ± 0.5
1050	8	1.7e-15	12.4227	4.2883	0.0286	0.11	0.30037	0.319	3.7 ± 0.3
1070	8	4.0e-15	10.4949	4.8427	0.0209	0.10	0.38466	0.412	4.0 ± 0.1
1120	8	1.1e-14	7.1811	5.4005	0.0096	0.091	0.73253	0.606	4.1 ± 0.1
1150	8	8.5e-15	7.4083	6.0367	0.0095	0.081	0.98229	0.620	4.3 ± 0.1
1200	8	6.8e-16	8.8188	20.9114	0.0091	0.023	0.99936	0.695	5.7 ± 0.4
1400	8	1.9e-16	80.8898	261.971	0.1367	0.002	1.00000	0.501	37.6 ± 12

Total fusion age, TFA= 4.20 ± 0.04 Ma (including J)
Weighted mean plateau age, WMPA= 4.23 ± 0.04 Ma (including J)
Inverse isochron age =4.23 ± 0.15 Ma. (MSWD =3.48; 40Ar/36Ar=296.0 ± 13.1)
Steps used: 800, 860, 900, 950, 985, 995, 1000, 1010, 1020, 1030, 1050, 1070, 1120, 1150, (3–17/19 or 93% × 39Ar).

96WM008 biotite J=0.0005181

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
laser	8	1.5e-13	22.5610	0.0454	0.0638	11	0.16308	0.164	3.5 ± 0.2
laser	8	6.8e-14	16.3559	0.1891	0.0389	2.6	0.26165	0.298	4.5 ± 0.2
laser	8	5.9e-14	13.4415	0.0427	0.0321	11	0.36579	0.294	3.7 ± 0.1
laser	8	6.0e-14	14.0687	0.1083	0.0359	4.5	0.46695	0.246	3.2 ± 0.1
laser	8	1.3e-13	17.0257	0.1277	0.0443	3.8	0.64191	0.231	3.7 ± 0.1
laser	8	9.5e-14	14.9793	0.0905	0.0357	5.4	0.79314	0.297	4.1 ± 0.1
laser	8	1.5e-13	17.4625	0.0935	0.0456	5.2	1.00000	0.229	3.7 ± 0.2

Total fusion age, TFA= 3.77 ± 0.06 Ma (including J)
Weighted mean plateau age, WMPA= 3.63 ± 0.04 Ma (including J)
Inverse isochron age =3.70 ± 0.71 Ma. (MSWD =20.35; 40Ar/36Ar=294.3 ± 22.0)
Steps used: 9.99, 9.99, 9.99, 9.99, 9.99, 9.99, 9.99, (1–7/7 or 100% × 39Ar).

96WM009.2 biotite J=0.0005172

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
laser	8	6.3e-15	14.6229	0.0471	0.0325	10	0.01438	0.343	4.7 ± 0.3
laser	8	5.1e-14	13.1006	0.0517	0.0258	9.5	0.14361	0.418	5.1 ± 0.0
laser	8	4.7e-14	9.7235	0.0613	0.0156	8.0	0.30547	0.525	4.8 ± 0.0
laser	8	8.1e-14	11.9375	0.0466	0.0221	11	0.53176	0.452	5.0 ± 0.0

laser	8	3.8e-14	11.8541	0.1824	0.0217	2.7	0.63742	0.459	5.1 ± 0.1
laser	8	1.2e-13	10.6211	0.0780	0.0176	6.3	1.00000	0.510	5.0 ± 0.0

Total fusion age, TFA= 5.00 ± 0.02 Ma (including J)
Weighted mean plateau age, WMPA= 5.05 ± 0.02 Ma (including J)
Inverse isochron age =4.98 ± 0.14 Ma. (MSWD =1.46; 40Ar/36Ar=299.1 ± 7.2)
Steps used: 9.99, 9.99, 9.99, 9.99, 9.99, (1–6/6 or 84% × 39Ar).

97WM007 hornblende J=0.000530

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
950	8	2.0e-16	39.0053	0.8997	0.1280	0.54	0.00139	0.030	1.1 ± 4.4
1000	8	1.4e-15	30.5149	0.8725	0.0822	0.56	0.01340	0.204	5.9 ± 0.5
1066	8	4.4e-16	35.2800	1.4298	0.0993	0.34	0.01680	0.168	5.7 ± 1.7
1100	8	3.1e-16	30.7235	1.6322	0.0666	0.30	0.01953	0.359	10.5 ± 2.0
1133	8	4.5e-16	31.9608	2.5821	0.0768	0.19	0.02352	0.290	8.8 ± 1.4
1166	8	1.6e-15	26.2238	4.7208	0.0713	0.10	0.04157	0.197	4.9 ± 0.3
1200	8	5.1e-15	18.2217	5.3204	0.0434	0.092	0.12676	0.297	5.2 ± 0.1
1250	8	1.0e-14	11.4954	5.6084	0.0199	0.087	0.39582	0.488	5.4 ± 0.0
1300	8	1.8e-14	9.18520	5.9176	0.0121	0.083	1.00000	0.612	5.4 ± 0.0

Total fusion age, TFA= 5.37 ± 0.04 Ma (including J)
Weighted mean plateau age, WMPA= 5.36 ± 0.04 Ma (including J)
Inverse isochron age =5.42 ± 0.05 Ma. (MSWD =1.18; 40Ar/36Ar=291.2 ± 2.5)
Steps used: 1000, 1066, 1166, 1200, 1250, 1300, (2–9/9 or 99% × 39Ar).

97WM008 hornblende J=0.0005292

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
800	8	1.0e-14	55.0527	0.5607	0.2103	0.87	0.02377	-0.129	-6.8 ± 2.3
850	8	2.2e-15	43.7251	0.4068	0.1348	1.2	0.03033	0.089	3.7 ± 0.8
900	8	1.9e-15	21.6754	0.2108	0.0505	2.3	0.04128	0.311	6.4 ± 0.4
950	8	1.9e-15	19.9595	0.1774	0.0462	2.8	0.05357	0.316	6.0 ± 0.3
1000	8	1.4e-15	14.6268	0.1620	0.0272	3.0	0.06603	0.451	6.3 ± 0.3
1033	8	1.0e-15	11.5499	0.1766	0.0196	2.8	0.07719	0.499	5.5 ± 0.3
1066	8	1.1e-15	12.8190	0.2353	0.0223	2.1	0.08793	0.485	5.9 ± 0.3
1100	8	1.0e-15	13.1269	0.3369	0.0237	1.5	0.09771	0.466	5.8 ± 0.4
1133	8	2.1e-15	16.2018	1.4501	0.0348	0.34	0.11492	0.366	5.6 ± 0.2
1166	8	5.9e-15	27.2973	3.5389	0.0719	0.14	0.14510	0.221	5.8 ± 0.1
1200	8	2.3e-14	15.3501	5.1070	0.0316	0.096	0.36291	0.391	5.7 ± 0.1
1250	8	1.9e-14	9.6488	5.1529	0.0125	0.095	0.65432	0.618	5.7 ± 0.0
1300	8	2.6e-14	11.2723	6.6243	0.0173	0.074	1.00000	0.546	5.9 ± 0.0

Total fusion age, TFA= 5.47 ± 0.07 Ma (including J)
Weighted mean plateau age, WMPA= 5.70 ± 0.04 Ma (including J)
Inverse isochron age =5.67 ± 0.06 Ma. (MSWD =0.20; 40Ar/36Ar=297.2 ± 0.9)
Steps used: 1066, 1100, 1133, 1166, 1200, 1250, (7–12/13 or 58% × 39Ar).

97WM008 biotite J=0.0005284

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
700	8	3.5e-14	59.2882	0.2894	0.1767	1.7	0.05377	0.119	6.7 ± 2.4
800	8	9.3e-15	45.0673	0.2037	0.1309	2.4	0.07269	0.142	6.1 ± 1.3
900	8	8.3e-15	28.5178	0.0684	0.0805	7.2	0.09922	0.166	4.5 ± 0.2
950	8	5.5e-15	19.6666	0.0280	0.0498	17	0.12449	0.252	4.7 ± 0.1
1000	8	1.3e-14	11.9987	0.0185	0.0244	27	0.22530	0.399	4.6 ± 0.0
1050	8	1.2e-14	7.2984	0.0108	0.0083	45	0.38040	0.665	4.6 ± 0.0
1100	8	1.4e-14	6.1018	0.0073	0.0042	67	0.59513	0.797	4.6 ± 0.0
1150	8	1.7e-14	6.7063	0.0168	0.0064	29	0.82209	0.719	4.6 ± 0.0
1200	8	1.5e-14	7.7677	0.3078	0.0099	1.6	1.00000	0.624	4.6 ± 0.0

Total fusion age, TFA= 4.75 ± 0.14 Ma (including J)
Weighted mean plateau age, WMPA= 4.61 ± 0.03 Ma (including J)

Inverse isochron age =4.61 ± 0.03 Ma. (MSWD =2.06; 40Ar/36Ar=295.0 ± 1.7)
Steps used: 700, 800, 900, 950, 1000, 1050, 1100, 1150, 1200, (1–9/9 or 100% × 39Ar).

97WM014 biotite J=0.0005272

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
700	8	2.4e-14	53.2793	0.1862	0.1719	2.6	0.05691	0.047	2.4 ± 1.5
800	8	1.6e-14	44.4834	0.1910	0.1391	2.6	0.10200	0.076	3.2 ± 1.3
900	8	6.3e-15	32.5503	0.1817	0.0922	2.7	0.12594	0.163	5.0 ± 0.6
950	8	9.8e-16	16.5653	0.2084	0.0474	2.4	0.13331	0.155	2.4 ± 0.4
1000	8	5.3e-15	8.6559	0.0837	0.0125	5.9	0.20873	0.572	4.7 ± 0.0
1050	8	1.1e-15	7.6495	0.0826	0.0097	5.9	0.22656	0.627	4.6 ± 0.1
1100	8	7.1e-16	7.3219	0.0853	0.0075	5.7	0.23855	0.699	4.9 ± 0.2
1150	8	1.0e-14	7.1185	0.0313	0.0073	16	0.41420	0.696	4.7 ± 0.0
1200	8	3.1e-14	6.5539	0.0251	0.0059	20	1.00000	0.736	4.6 ± 0.0

Total fusion age, TFA= 4.42 ± 0.11 Ma (including J)
Weighted mean plateau age, WMPA= 4.60 ± 0.03 Ma (including J)
Inverse isochron age =4.58 ± 0.07 Ma. (MSWD =9.76; 40Ar/36Ar=300.0 ± 9.4)
Steps used: 700, 800, 900, 1000, 1050, 1100, 1150, 1200, (1–9/9 or 99% × 39Ar).

97WM016 whole rock J=0.0005231

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
650	8	1.4e-13	34.9993	0.2586	0.0931	1.9	0.13811	0.214	7.1 ± 1.8
700	8	2.4e-14	26.8660	0.5090	0.0687	0.96	0.16976	0.244	6.2 ± 1.0
750	8	1.7e-14	14.7082	0.9409	0.0344	0.52	0.21218	0.309	4.3 ± 0.4
800	8	1.3e-14	7.6352	1.0487	0.0096	0.47	0.27254	0.628	4.5 ± 0.1
850	8	1.3e-14	5.7806	0.8292	0.0043	0.59	0.35388	0.781	4.3 ± 0.0
900	8	1.5e-14	5.0005	0.5828	0.0028	0.84	0.46043	0.832	3.9 ± 0.0
950	8	1.6e-14	4.7783	0.4554	0.0021	1.1	0.58267	0.869	3.9 ± 0.0
1000	8	1.6e-14	4.7394	0.4120	0.0020	1.2	0.70394	0.873	3.9 ± 0.0
1050	8	1.4e-14	5.0012	0.3964	0.0029	1.2	0.80029	0.830	3.9 ± 0.0
1100	8	1.2e-14	5.9518	0.4158	0.0063	1.2	0.87117	0.686	3.8 ± 0.0
1150	8	1.1e-14	7.4017	0.4644	0.0113	1.1	0.92425	0.548	3.8 ± 0.0
1200	8	1.0e-14	9.0057	1.1628	0.0166	0.42	0.96482	0.456	3.9 ± 0.0
1400	8	1.3e-14	17.8490	11.6878	0.0422	0.042	1.00000	0.302	5.1 ± 0.0

Total fusion age, TFA= 4.53 ± 0.26 Ma (including J)
Weighted mean plateau age, WMPA= 3.90 ± 0.03 Ma (including J)
Inverse isochron age =3.92 ± 0.03 Ma. (MSWD =3.68; 40Ar/36Ar=291.1 ± 3.2)
Steps used: 900, 950, 1000, 1050, 1100, 1200, (6–12/13 or 56% × 39Ar).

97WM020 whole rock J=0.0005221

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
650	8	1.1e-15	29.5462	0.1022	0.0863	4.8	0.00124	0.137	3.8 ± 0.6
700	8	1.0e-14	16.3139	0.1168	0.0404	4.2	0.02093	0.269	4.1 ± 0.2
750	8	5.6e-15	13.1994	0.0815	0.0314	6.0	0.03444	0.297	3.7 ± 0.2
800	8	4.3e-15	11.9246	0.0742	0.0269	6.6	0.04591	0.335	3.8 ± 0.2
850	8	4.4e-15	11.4597	0.0690	0.0247	7.1	0.05824	0.362	3.9 ± 0.2
900	8	2.8e-14	11.2014	0.0586	0.0238	8.4	0.13986	0.372	3.9 ± 0.2
950	8	5.8e-15	7.9214	0.0335	0.0120	15	0.16327	0.551	4.1 ± 0.1
1000	8	1.5e-13	7.0751	0.0200	0.0088	25	0.85327	0.631	4.2 ± 0.0
1050	8	2.0e-14	7.8888	0.0270	0.0115	18	0.93587	0.569	4.2 ± 0.0
1100	8	6.5e-15	8.3796	0.0408	0.0132	12	0.96077	0.536	4.2 ± 0.0
1150	8	5.0e-15	8.6885	0.0818	0.0140	6.0	0.97934	0.522	4.3 ± 0.1
1200	8	2.6e-15	9.0780	0.1784	0.0154	2.7	0.98856	0.499	4.3 ± 0.1
1400	8	3.1e-15	8.6802	0.1677	0.0137	2.9	1.00000	0.535	4.4 ± 0.1

Total fusion age, TFA= 4.16 ± 0.03 Ma (including J)
Weighted mean plateau age, WMPA= 4.21 ± 0.03 Ma (including J)

Inverse isochron age =4.22 ± 0.07 Ma. (MSWD =3.15; 40Ar/36Ar=294.2 ± 6.3)
Steps used: 650, 800, 850, 900, 950, 1000, 1050, 1100, 1150, 1200, 1400, (1–13/13 or 97% × 39Ar).

97WM024 whole rock J=0.0005152

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
600	8	4.1e-14	51.6958	0.8334	0.1239	0.59	0.06476	0.292	11.5 ± 0.1
650	8	3.4e-14	35.2194	0.8477	0.0657	0.58	0.14289	0.449	12.1 ± 0.1
700	8	4.3e-14	28.2836	0.7159	0.0416	0.68	0.26597	0.565	12.3 ± 0.1
750	8	4.3e-14	22.1623	0.4511	0.0207	1.1	0.42202	0.724	12.4 ± 0.0
800	8	4.2e-14	19.5893	0.3829	0.0123	1.3	0.59689	0.815	12.3 ± 0.0
850	8	3.7e-14	19.3011	0.4179	0.0097	1.2	0.75345	0.852	12.7 ± 0.1
900	8	2.4e-14	18.6296	0.5830	0.0104	0.84	0.85613	0.835	11.9 ± 0.1
950	8	1.3e-14	21.0695	0.8529	0.0173	0.57	0.90646	0.758	12.3 ± 0.1
1000	8	8.9e-15	25.0823	1.9278	0.0314	0.25	0.93530	0.630	12.1 ± 0.1
1050	8	1.0e-14	32.7620	3.4285	0.0599	0.14	0.96034	0.459	11.5 ± 0.2
1100	8	1.0e-14	45.6929	5.6730	0.1048	0.086	0.97889	0.322	11.2 ± 0.1
1150	8	4.1e-15	68.9576	26.6641	0.1797	0.018	0.98382	0.230	12.2 ± 0.4
1200	8	8.3e-15	108.451	28.0936	0.3155	0.017	0.99020	0.140	11.6 ± 0.5
1400	8	5.9e-15	49.8561	13.2491	0.1137	0.037	1.00000	0.326	12.5 ± 0.3

Total fusion age, TFA= 12.22 ± 0.05 Ma (including J)
Weighted mean plateau age, WMPA= 12.28 ± 0.04 Ma (including J)
Inverse isochron age =12.38 ± 0.08 Ma. (MSWD =15.91; 40Ar/36Ar=292.1 ± 2.5)
Steps used: 650, 700, 750, 800, 850, 900, 950, 1000, 1050, 1150, 1200, 1400, (2-14/14 or 92% × 39Ar).

97WM030 whole rock J=0.0005212

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
650	8	8.1e-14	48.6339	0.5014	0.1391	0.98	0.12452	0.155	7.1 ± 1.8
700	8	2.5e-14	31.2802	0.4323	0.0872	1.1	0.18470	0.176	5.2 ± 1.3
750	8	2.7e-14	26.9178	0.4987	0.0749	0.98	0.26072	0.178	4.5 ± 1.0
800	8	9.4e-15	12.8582	0.7422	0.0281	0.66	0.31597	0.355	4.3 ± 0.2
850	8	8.0e-15	9.4964	0.5785	0.0163	0.85	0.37925	0.492	4.4 ± 0.1
900	8	9.2e-15	9.7345	0.5154	0.0183	0.95	0.44973	0.444	4.1 ± 0.0
950	8	8.6e-15	8.6047	0.7571	0.0144	0.65	0.52458	0.506	4.1 ± 0.0
1000	8	7.8e-15	7.6659	1.1170	0.0109	0.44	0.60165	0.580	4.2 ± 0.0
1050	8	6.2e-15	7.1968	1.1970	0.0094	0.41	0.66755	0.614	4.1 ± 0.0
1100	8	6.0e-15	7.2461	0.8979	0.0096	0.55	0.73057	0.609	4.1 ± 0.0
1150	8	1.9e-15	5.9453	1.0099	0.0051	0.49	0.75427	0.748	4.2 ± 0.1
1200	8	4.1e-15	6.4845	1.1279	0.0071	0.43	0.80289	0.677	4.1 ± 0.0
1400	8	1.9e-14	8.5139	6.0702	0.0119	0.081	1.00000	0.588	4.7 ± 0.0

Total fusion age, TFA= 4.72 ± 0.25 Ma (including J)
Weighted mean plateau age, WMPA= 4.13 ± 0.03 Ma (including J)
Inverse isochron age =4.17 ± 0.05 Ma. (MSWD =1.21; 40Ar/36Ar=292.0 ± 3.9)
Steps used: 700, 750, 800, 900, 950, 1000, 1050, 1100, 1150, 1200, (2–12/13 or 62% × 39Ar).

97WM032 biotite J=0.0005260

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
700	8	8.4e-14	49.4973	0.0928	0.1491	5.3	0.10705	0.110	5.2 ± 1.1
800	8	2.0e-14	24.0275	0.0664	0.0668	7.4	0.15945	0.179	4.1 ± 0.3
900	8	2.6e-14	14.4655	0.0371	0.0374	13	0.27424	0.236	3.2 ± 0.0
950	8	1.9e-14	8.3125	0.0228	0.0156	21	0.41630	0.445	3.5 ± 0.0
1000	8	1.9e-14	6.3718	0.0191	0.0089	26	0.60030	0.590	3.6 ± 0.0
1050	8	1.3e-14	5.9636	0.0194	0.0075	25	0.73792	0.628	3.6 ± 0.0
1100	8	1.4e-14	7.8055	0.0213	0.0138	23	0.85205	0.479	3.5 ± 0.0
1150	8	1.2e-14	8.9559	0.0268	0.0175	18	0.93464	0.421	3.6 ± 0.0
1200	8	8.6e-15	8.2402	0.0349	0.0153	14	1.00000	0.451	3.5 ± 0.0

Total fusion age, TFA= 3.71 ± 0.12 Ma (including J)

Weighted mean plateau age, WMPA= 3.55 ± 0.02 Ma (including J)
Inverse isochron age =3.55 ± 0.04 Ma. (MSWD =3.71; 40Ar/36Ar=294.8 ± 3.0)
Steps used: 800, 950, 1000, 1050, 1100, 1150, 1200, (2–9/9 or 78% × 39Ar).

97WM033 hiotite J=0.0005247

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
700	8	6.8e-14	59.4530	0.0764	0.1863	6.4	0.04949	0.074	4.2 ± 0.7
800	8	3.0e-14	29.5906	0.0333	0.0876	15	0.09310	0.125	3.5 ± 0.2
900	8	5.9e-14	14.9595	0.0107	0.0366	46	0.26189	0.277	3.9 ± 0.0
950	8	2.9e-14	9.1450	0.0072	0.0167	68	0.39788	0.460	4.0 ± 0.0
1000	8	2.6e-14	7.7295	0.0069	0.0120	71	0.54101	0.542	4.0 ± 0.0
1050	8	2.3e-14	7.5057	0.0063	0.0111	77	0.67551	0.565	4.0 ± 0.0
1100	8	3.0e-14	11.4566	0.0097	0.0245	51	0.78894	0.368	4.0 ± 0.0
1150	8	2.9e-14	12.5135	0.0146	0.0281	33	0.88764	0.336	4.0 ± 0.0
1200	8	2.7e-14	10.1755	0.0142	0.0203	34	1.00000	0.411	4.0 ± 0.0

Total fusion age, TFA= 3.96 ± 0.05 Ma (including J)
Weighted mean plateau age, WMPA= 3.98 ± 0.03 Ma (including J)
Inverse isochron age =4.00 ± 0.03 Ma. (MSWD =2.43; 40Ar/36Ar=294.3 ± 1.2)
Steps used: 700, 900, 950, 1000, 1050, 1100, 1150, 1200, (1–9/9 or 96% × 39Ar).

97WM041 whole rock J=0.0005201

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
650	8	5.8e-14	98.0556	0.9584	0.3294	0.51	0.03706	0.007	0.7 ± 2.5
700	8	3.5e-14	47.7210	1.1977	0.1494	0.41	0.08261	0.075	3.3 ± 1.1
750	8	1.9e-14	17.3416	1.5829	0.0444	0.31	0.15158	0.244	4.0 ± 0.3
800	8	1.4e-14	8.1762	1.3566	0.0120	0.36	0.25544	0.567	4.3 ± 0.1
850	8	1.2e-14	6.1626	1.0367	0.0054	0.47	0.37202	0.741	4.3 ± 0.0
900	8	8.2e-15	5.8527	0.9261	0.0047	0.53	0.45943	0.762	4.2 ± 0.0
950	8	5.8e-15	6.1696	1.0605	0.0062	0.46	0.51772	0.703	4.1 ± 0.0
1000	8	5.1e-15	6.0565	1.4038	0.0059	0.35	0.57083	0.712	4.0 ± 0.0
1050	8	3.9e-15	6.2213	1.7275	0.0064	0.28	0.61048	0.694	4.0 ± 0.0
1100	8	3.2e-15	6.6286	1.8398	0.0081	0.27	0.64161	0.640	4.0 ± 0.1
1150	8	3.0e-15	7.1255	1.9199	0.0100	0.26	0.66849	0.587	3.9 ± 0.1
1200	8	3.9e-15	6.8724	1.9661	0.0094	0.25	0.70443	0.596	3.8 ± 0.0
1400	8	3.1e-14	7.4122	6.1088	0.0096	0.080	1.00000	0.618	4.3 ± 0.0

Total fusion age, TFA= 4.01 ± 0.11 Ma (including J)
Weighted mean plateau age, WMPA= 4.24 ± 0.03 Ma (including J)
Inverse isochron age =4.21 ± 0.08 Ma. (MSWD =18.80; 40Ar/36Ar=295.7 ± 8.9)
Steps used: 650, 700, 750, 800, 850, 900, 950, 1000, 1050, 1100, 1150, 1400, (1–13/13 or 96% × 39Ar).

97WM046 whole rock J=0.0005181

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
650	8	5.4e-14	83.7307	0.4461	0.2612	1.1	0.18450	0.078	6.1 ± 3.0
700	8	1.6e-14	53.3341	0.4669	0.1633	1.0	0.26786	0.095	4.7 ± 2.1
750	8	2.0e-14	49.3022	0.5805	0.1476	0.84	0.38385	0.116	5.3 ± 2.0
800	8	1.3e-14	42.2237	1.0450	0.1277	0.47	0.47247	0.106	4.2 ± 1.6
850	8	5.5e-15	33.8403	2.4179	0.1005	0.20	0.52108	0.123	3.9 ± 0.9
900	8	1.2e-15	25.0434	3.4063	0.0633	0.14	0.53635	0.253	5.9 ± 0.6
950	8	9.5e-16	21.4563	3.5062	0.0558	0.14	0.55011	0.232	4.6 ± 0.5
1000	8	6.6e-15	16.0583	3.1091	0.0347	0.16	0.67631	0.361	5.4 ± 0.1
1050	8	1.2e-15	13.8583	2.1017	0.0325	0.23	0.70104	0.307	4.0 ± 0.3
1100	8	7.2e-16	14.9956	2.3292	0.0280	0.21	0.71536	0.448	6.3 ± 0.4
1150	8	2.4e-15	16.4139	4.0391	0.0365	0.12	0.76157	0.343	5.3 ± 0.1
1200	8	4.9e-16	10.3579	3.4862	0.0176	0.14	0.77633	0.499	4.8 ± 0.4
1400	8	1.5e-14	36.1490	31.2022	0.0865	0.016	1.00000	0.293	9.9 ± 0.1

Total fusion age, TFA= 6.25 ± 0.64 Ma (including J)

Weighted mean plateau age, WMPA= 5.36 ± 0.08 Ma (including J)
Inverse isochron age =5.37 ± 0.19 Ma. (MSWD =1.34; 40Ar/36Ar=295.2 ± 5.0)
Steps used: 650, 700, 750, 800, 900, 950, 1000, 1100, 1150, 1200, (1–12/13 or 70% × 39Ar).

97WM048 whole rock J=0.0005171

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
650	8	6.1e-14	53.7487	0.9186	0.1745	0.53	0.14443	0.041	2.0 ± 2.0
700	8	8.8e-15	25.8888	1.3305	0.0707	0.37	0.18803	0.193	4.6 ± 0.7
750	8	9.3e-15	14.7989	1.5807	0.0325	0.31	0.26991	0.352	4.8 ± 0.3
800	8	8.0e-15	8.3881	1.4811	0.0128	0.33	0.39339	0.548	4.3 ± 0.1
850	8	7.5e-15	6.8214	1.3039	0.0078	0.38	0.53501	0.661	4.2 ± 0.0
900	8	6.4e-15	7.1185	1.3126	0.0089	0.37	0.65159	0.628	4.2 ± 0.0
950	8	5.2e-15	8.1842	1.5693	0.0129	0.31	0.73354	0.534	4.1 ± 0.1
1000	8	1.7e-15	10.7609	2.1425	0.0204	0.23	0.75400	0.439	4.4 ± 0.2
1050	8	2.7e-15	12.2346	2.1497	0.0259	0.23	0.78339	0.374	4.3 ± 0.1
1100	8	2.9e-15	14.1616	2.3748	0.0317	0.21	0.81053	0.338	4.5 ± 0.1
1150	8	2.9e-15	17.6588	3.3233	0.0447	0.15	0.83311	0.253	4.2 ± 0.2
1200	8	4.0e-15	19.3601	3.8936	0.0507	0.13	0.86195	0.226	4.1 ± 0.1
1400	8	2.4e-14	54.0133	51.6067	0.1514	0.009	1.00000	0.172	8.6 ± 0.1

Total fusion age, TFA= 4.58 ± 0.29 Ma (including J)
Weighted mean plateau age, WMPA= 4.18 ± 0.03 Ma (including J)
Inverse isochron age =4.17 ± 0.05 Ma. (MSWD =1.91; 40Ar/36Ar=296.6 ± 3.3)
Steps used: 700, 800, 850, 900, 950, 1000, 1050, 1100, 1150, 1200, (2–12/13 or 64% × 39Ar).

97WM051 whole rock J=0.0005156

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
750	8	3.8e-15	51.8777	0.6335	0.1526	0.77	0.00620	0.131	6.3 ± 1.8
800	8	5.7e-15	38.6983	0.6459	0.1123	0.76	0.01869	0.142	5.1 ± 1.6
850	8	4.8e-15	36.1084	0.5573	0.0909	0.88	0.02999	0.256	8.6 ± 1.4
900	8	5.0e-15	33.9111	0.6499	0.0945	0.75	0.04239	0.177	5.6 ± 1.4
950	8	3.6e-15	32.5925	0.6756	0.0951	0.73	0.05164	0.138	4.2 ± 1.3
1000	8	7.5e-14	10.4283	0.9467	0.0224	0.52	0.66250	0.364	3.5 ± 0.3
1050	8	2.2e-15	6.3803	1.2916	0.0045	0.38	0.69241	0.790	4.7 ± 0.1
1100	8	3.0e-15	6.6847	1.2818	0.0060	0.38	0.73165	0.735	4.6 ± 0.1
1150	8	3.8e-15	6.6800	1.3902	0.0067	0.35	0.78050	0.706	4.4 ± 0.1
1200	8	4.2e-15	7.4704	1.8277	0.0092	0.27	0.82921	0.638	4.4 ± 0.1

Total fusion age, TFA= n/a (including J)
Weighted mean plateau age, WMPA= 4.47 ± 0.04 Ma (including J)
Inverse isochron age =4.48 ± 0.11 Ma. (MSWD =5.22; 40Ar/36Ar=294.6 ± 13.5)
Steps used: 750, 900, 950, 1000, 1050, 1100, 1150, 1200, (2–11/12 or 81% × 39Ar).

97WM052 whole rock J=0.0005145

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
650	8	7.5e-15	74.4603	1.0369	0.2287	0.47	0.01370	0.093	6.4 ± 2.5
700	8	3.4e-14	47.7803	0.6710	0.1434	0.73	0.11028	0.113	5.0 ± 2.0
750	8	1.5e-14	37.6673	0.6992	0.1082	0.70	0.16318	0.151	5.3 ± 1.5
800	8	4.4e-15	33.4223	0.8346	0.0978	0.59	0.18088	0.136	4.2 ± 1.3
850	8	2.4e-15	35.2387	1.0349	0.1001	0.47	0.19016	0.161	5.3 ± 1.4
900	8	1.9e-15	29.9771	1.0550	0.0854	0.46	0.19897	0.158	4.4 ± 1.1
950	8	3.9e-16	28.8463	1.5493	0.0391	0.32	0.20082	0.200	5.0 ± 2.0
1000	8	4.2e-14	25.2747	1.7057	0.0706	0.29	0.43138	0.175	4.1 ± 0.3
1050	8	2.2e-15	7.5900	1.3431	0.0091	0.36	0.47016	0.646	4.5 ± 0.1
1100	8	1.3e-15	6.4239	1.2512	0.0047	0.39	0.49724	0.782	4.7 ± 0.1
1150	8	1.3e-14	6.1116	1.0306	0.0055	0.48	0.77821	0.736	4.2 ± 0.0
1200	8	3.2e-15	5.8014	0.8230	0.0044	0.60	0.85274	0.778	4.2 ± 0.1
1400	8	7.4e-15	6.8066	1.1851	0.0080	0.41	1.00000	0.651	4.1 ± 0.0

Total fusion age, TFA= 4.38 ± 0.22 Ma (including J)
Weighted mean plateau age, WMPA= 4.16 ± 0.03 Ma (including J)
Inverse isochron age =4.14 ± 0.05 Ma. (MSWD =3.62; 40Ar/36Ar=299.4 ± 5.1)
Steps used: 650, 700, 750, 800, 850, 900, 1000, 1050, 1100, 1150, 1200, 1400, (1–13/13 or 100% × 39Ar).

97WM054 biotite J=0.0005255

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
700	8	1.0e-15	81.8033	0.3992	0.2586	1.2	0.00897	0.066	5.1 ± 2.0
800	8	1.6e-15	41.7134	0.1690	0.1296	2.9	0.03607	0.082	3.2 ± 0.6
900	8	8.3e-15	36.8372	0.0975	0.1105	5.0	0.19862	0.114	4.0 ± 0.3
950	8	1.2e-15	32.3616	0.1555	0.0970	3.2	0.22601	0.114	3.5 ± 0.5
1000	8	5.6e-15	29.6160	0.0650	0.0847	7.5	0.36079	0.155	4.3 ± 0.1
1050	8	2.3e-15	25.7482	0.0851	0.0724	5.8	0.42500	0.169	4.1 ± 0.3
1100	8	1.6e-15	24.5911	0.0959	0.0699	5.1	0.47050	0.160	3.7 ± 0.3
1150	8	1.2e-14	18.0272	0.0425	0.0455	12	0.93820	0.255	4.4 ± 0.1
1200	8	1.0e-15	11.5732	0.0498	0.0241	9.8	1.00000	0.384	4.2 ± 0.2

Total fusion age, TFA= 4.19 ± 0.07 Ma (including J)
Weighted mean plateau age, WMPA= 4.17 ± 0.05 Ma (including J)
Inverse isochron age =4.21 ± 0.30 Ma. (MSWD =1.33; 40Ar/36Ar=291.0 ± 2.5)
Steps used: 700, 800, 900, 950, 1000, 1050, 1100, 1150, 1200, (1–9/9 or 100% × 39Ar).

97WM056 biotite J=0.0005252

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
700	8	3.2e-14	68.7049	0.2248	0.2233	2.2	0.01719	0.040	2.6 ± 0.9
800	8	2.4e-13	71.6727	0.0565	0.2343	8.7	0.14085	0.034	2.3 ± 0.2
900	8	1.1e-13	53.8851	0.0410	0.1731	12	0.21609	0.051	2.6 ± 0.1
950	8	5.2e-14	48.0888	0.0377	0.1527	13	0.25557	0.062	2.8 ± 0.1
1000	8	1.6e-13	38.4550	0.0320	0.1180	15	0.40975	0.093	3.4 ± 0.0
1050	8	9.8e-14	29.7058	0.0286	0.0864	17	0.53104	0.141	4.0 ± 0.0
1100	8	1.1e-13	28.3668	0.0284	0.0823	17	0.66958	0.143	3.8 ± 0.0
1150	8	1.2e-13	28.6451	0.0326	0.0832	15	0.82292	0.142	3.9 ± 0.0
1200	8	1.3e-13	26.0831	0.0464	0.0745	11	1.00000	0.156	3.9 ± 0.0

Total fusion age, TFA= 3.44 ± 0.04 Ma (including J)
Weighted mean plateau age, WMPA= 3.85 ± 0.03 Ma (including J)
Inverse isochron age =3.96 ± 0.23 Ma. (MSWD =0.26; 40Ar/36Ar=294.1 ± 1.5)
Steps used: 1100, 1150, 1200, (7–9/9 or 47% × 39Ar).

97WM059 whole rock J=0.0005126

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
650	8	1.4e-14	48.7615	0.7237	0.1531	0.68	0.01815	0.072	3.2 ± 1.6
700	8	1.4e-14	36.5888	0.8254	0.1111	0.59	0.04162	0.102	3.5 ± 1.1
750	8	1.0e-14	20.9893	1.1722	0.0560	0.42	0.07141	0.212	4.1 ± 0.4
800	8	7.4e-15	10.2831	1.2747	0.0188	0.38	0.11623	0.460	4.4 ± 0.1
850	8	7.9e-15	6.7918	1.0039	0.0077	0.49	0.18830	0.666	4.2 ± 0.0
900	8	8.6e-15	6.2947	0.6934	0.0061	0.71	0.27247	0.712	4.1 ± 0.0
950	8	1.0e-14	6.3164	0.5319	0.0070	0.92	0.36994	0.671	3.9 ± 0.0
1000	8	1.1e-14	4.5799	0.4241	0.0012	1.2	0.51728	0.922	3.9 ± 0.0
1050	8	9.7e-15	4.5030	0.4134	0.0010	1.2	0.64890	0.931	3.9 ± 0.0
1100	8	7.7e-15	4.5553	0.4359	0.0012	1.1	0.75147	0.921	3.9 ± 0.0
1150	8	6.1e-15	4.7063	0.4692	0.0018	1.0	0.83100	0.887	3.9 ± 0.0
1200	8	5.3e-15	4.7592	0.5115	0.0019	0.96	0.89965	0.880	3.9 ± 0.0
1400	8	8.4e-15	5.6736	4.0420	0.0036	0.12	1.00000	0.813	4.3 ± 0.0

Total fusion age, TFA= 3.97 ± 0.05 Ma (including J)
Weighted mean plateau age, WMPA= 3.88 ± 0.02 Ma (including J)
Inverse isochron age =3.88 ± 0.03 Ma. (MSWD =0.91; 40Ar/36Ar=294.1 ± 3.6)
Steps used: 650, 700, 750, 1000, 1050, 1100, 1150, 1200, (1–12/13 or 60% × 39Ar).

97WM060 whole rock J=0.0005113

T	*t*	*40(mol)*	*40/39*	*37/39*	*36/39*	*K/Ca*	*× 39Ar*	*40Ar**	*Age (Ma)*
700	8	5.7e-14	74.2725	0.7793	0.2465	0.63	0.05358	0.019	1.3 ± 2.9
750	8	8.7e-15	48.8207	0.6023	0.1619	0.81	0.06593	0.020	0.9 ± 2.1
800	8	4.6e-15	47.6733	0.6955	0.1553	0.70	0.07265	0.037	1.6 ± 2.0
850	8	3.7e-15	46.6178	0.6846	0.1480	0.72	0.07820	0.062	2.7 ± 1.9
900	8	3.0e-15	41.4176	0.7545	0.1435	0.65	0.08326	-0.024	-0.9 ± 1.8
950	8	2.9e-15	44.3470	0.7409	0.1350	0.66	0.08787	0.100	4.1 ± 1.8
1000	8	5.4e-14	35.1481	0.8354	0.1189	0.59	0.19582	0.000	0.0 ± 1.5
1050	8	2.5e-15	13.5757	1.0093	0.0344	0.49	0.20868	0.251	3.1 ± 0.3
1100	8	1.3e-15	10.1220	0.9013	0.0259	0.54	0.21786	0.243	2.3 ± 0.2
1150	8	3.9e-14	6.4201	0.7800	0.0076	0.63	0.64223	0.650	3.8 ± 0.0
1200	8	7.0e-15	5.2108	0.6143	0.0037	0.80	0.73565	0.792	3.8 ± 0.0
1400	8	2.2e-14	6.2500	3.9038	0.0057	0.13	1.00000	0.729	4.2 ± 0.0

Total fusion age, TFA= 3.28 ± 0.23 Ma (including J)
Weighted mean plateau age, WMPA= 4.01 ± 0.03 Ma (including J)
Inverse isochron age =4.01 ± 0.39 Ma. (MSWD =260.59; 40Ar/36Ar=291.3 ± 69.7)
Steps used: 950, 1050, 1150, 1200, 1400, (6–12/12 or 80% × 39Ar).

References:

Dalrymple, G.B., Lanphere, M.A., Kraker, G.P., and Alexander, C., 1981, Irradiation of samples for $^{40}Ar/^{39}Ar$ dating using the Geological Survey TRIGA Reactor. United States Geological Survey Professional Paper 1175, p. 208.

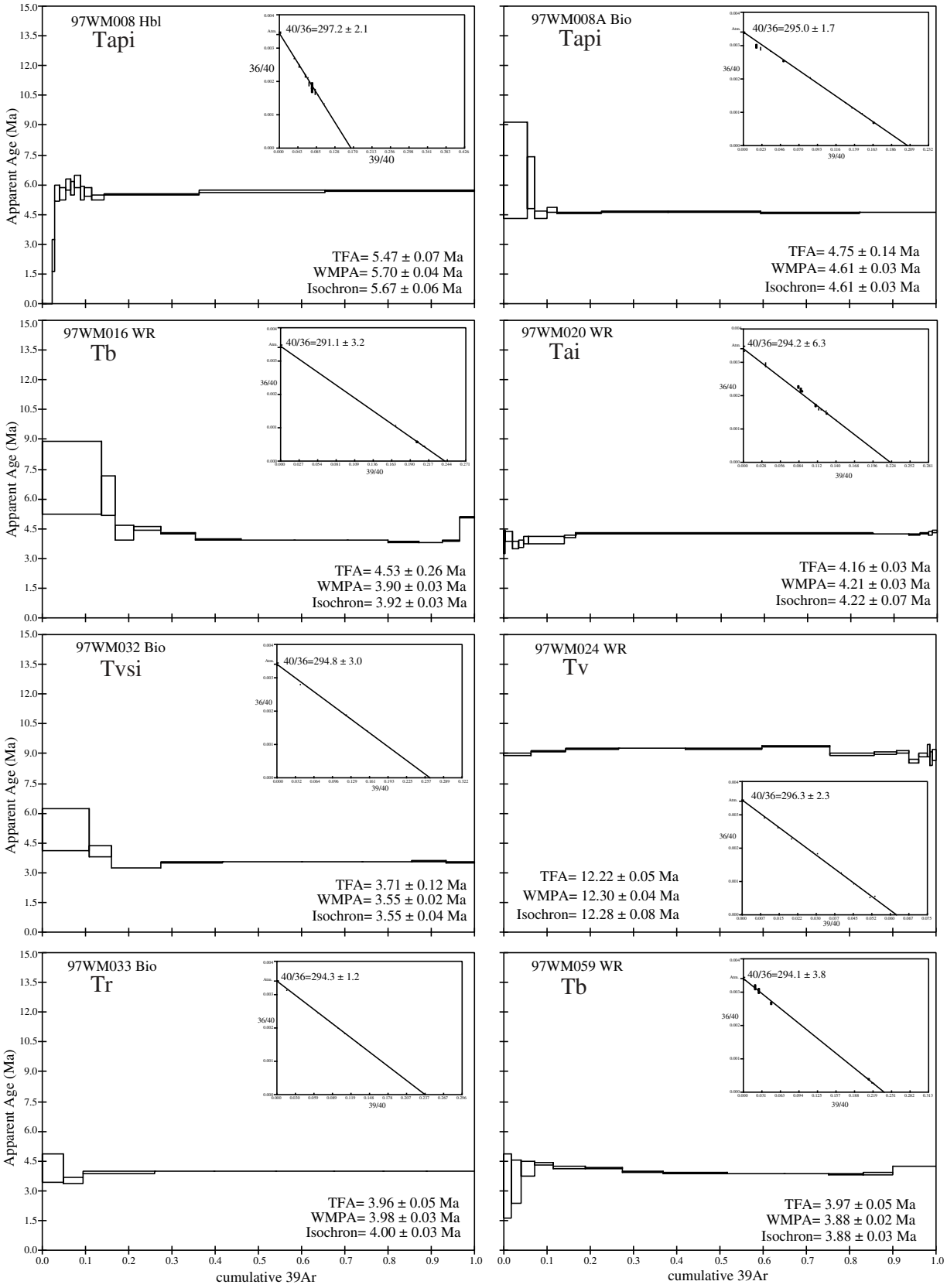
Duffield, W.A. and Dalrymple, G.B., 1990, The Taylor Creek Rhyolite of New Mexico; a rapidly emplaced field of lava domes and flows. Bulletin of Volcanology, v. 52, p. 475-487.

Hacker, B.R., 1993, Evolution of the North Sierra Nevada metamorphic Belt; Petrological, structural, and Ar/Ar constraints. Geological Society of America Bulletin, v. 105, p. 637-656.

Roddick, J.C., 1978, The application of isochron diagrams in $^{40}Ar/^{39}Ar$ dating; a discussion. Earth and Planetary Science Letters, v. 41, p. 233-244.

Steiger, R.H., and Jaeger, E., 1977, Convention on the use of decay constants in geo- and cosmochronology. Earth Planetary Science Letters., v. 36, p. 359-362.

York, D., 1969, Least squares fitting of a straight line with correlated errors. Earth and Planetary Science Letters, v. 5, p. 320-324.



Stockli et al., Data repository supplement