Table DR1: Pioneer Mountains, Idaho
Wildhorse detachment transect at Kane Creek

FIELD sample ID	SAMPLE	DELTA D	DEPTH	coordinates NAD83
PM244	WLM-1	-147.3	100	0726580, 4853074
PM245	WLM-2, 3	-146.6	90	0726595, 4853720
CE-1	WLM-4	-147.1	80	0726530, 4853934
PM246	WLM-5	-147.7	70	0726622, 4853708
CE-2	WLM-6	-127	60	0726638, 4853707
CE-3	WLM-7	-119.9	50	0726665, 4853731
PM247	WLM-8	-121.4	40	0726682, 4853711
PM248	WLM-9	-141.8	30	0726695, 4853696
PM249	WLM-10, 11	-144.6	20	0726721, 4853713
PM250	WLM-12	-121.1	10	0726739, 4853683

Age summary and analytical methods.

Summary

Sample	L#	Plateau					Isochron						
		Age	±	MSWD	$\%^{39}Ar$	n	Age	±	$^{40}Ar/^{36}Ar_i$	±	MSWD	Steps	n
KE08-047	59593	50.72	0.06	1.8	95.0	11	50.80	0.08	286.6	6.3	1.8	E-O	11
							50.61	0.24	332	14	0.86	B-F	5
KE08-039	59594	50.46	0.06	0.70	62.2	9	50.37	0.09	303.2	5.3	0.46	G-O	9
							50.76	0.11	334.5	8.7	4.1	B-F, P-Q	7
KE08-045	59596	50.55	0.08	1.9	68.2	10	50.57	0.10	293	11	2.1	G-P	10
							50.79	0.13	345	15	4.3	B-F, Q-S	8
KE08-044	59595	50.83	0.06	1.8	85.2	9	50.80	0.06	301.3	2.9	1.5	E-M	9
							46.69	0.45	846	47	40	B-E	4
KE08-049	59597	50.08	0.12	1.8	80.2	8	50.09	0.21	295	19	2.1	B-I	8
KE08-032	59598	50.57	0.07	3.0	88.3	9	50.57	0.05	295.5	3.0	3.4	F-N	9
							50.44	0.32	448	71	1.4	B-E	4

L# = Lab number
n = number of steps for plateau or isochron used for age calculation.
$\%^{39}Ar$ = percentage of total ^{39}Ar comprising the plateau steps.
All errors at 1σ, including error in J.

Methods

Sample preparation and irradiation:
Samples prepared with standard heavy liquid, magnetic and hand-picking methods.
Separates were loaded into machined Al discs and irradiated for 7 hours in central thimble, USGS TRIGA reactor, Denver, CO.
Neutron flux monitor Fish Canyon Tuff sanidine (FC-2). Assigned age = 28.02 Ma (Renne et al., 1998).

Instrumentation:
Mass Analyzer Products 215-50 mass spectrometer on line with automated all-metal extraction system.
All samples were step-heated within a double vacuum resistance furnace.
Heating time = 8 min.
Reactive gases removed during heating by exposure to one SAES GP-50 getter operated at ~450°C.
Additonal gas clean up with two SAES GP-50 getters. One operated at ~450°C and one at 20°C.
Gas also exposed to a W filament operated at ~2000°C and a cold finger operated at -140°C.

Analytical parameters:
Electron multiplier sensitivity averaged 1×10^{-16} moles/pA.
Total system blank and background = 200, 1.8, 0.2, 1.5, 0.7 x 10^{-17} moles for masses 40, 39, 38, 37, 36, respectively.
J-factors determined to a precision of ~± 0.1% by CO_2 laser-fusion of 6 single crystals from 6 radial positions around the irradiation tray.
Correction factors for interfering nuclear reactions were determined using K-glass and CaF_2 and are as follows:
$(^{40}Ar/^{39}Ar)_K = 0.010 \pm 0.002$; $(^{36}Ar/^{37}Ar)_{Ca} = 0.00028 \pm 0.00002$; and $(^{39}Ar/^{37}Ar)_{Ca} = 0.00070 \pm 0.00005$.

Table DR3. White mica 40Ar/39Ar data from the Wildhorse Detachment in the Pioneer MCC

	ID	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	WLM-2, 3, Muscovite, 6.59 mg, J=0.001596±0.06%, D=1.005±0.001, NM-233K, Lab#=59592-01										
X	A	550	31.07	0.0176	80.63	1.79	29.0	23.3	0.6	20.72	0.89
X	B	600	19.93	0.0123	27.06	1.46	41.6	59.9	1.1	34.01	0.64
	C	650	18.46	0.0055	18.84	2.49	92.3	69.8	2.0	36.70	0.43
	D	700	16.23	0.0029	11.12	4.20	173.7	79.7	3.5	36.87	0.23
	E	730	15.22	0.0016	7.674	4.60	323.2	85.1	5.1	36.89	0.21
	F	770	15.76	0.0015	10.34	6.88	336.0	80.6	7.4	36.18	0.16
	G	800	15.67	0.0018	9.558	7.90	284.3	82.0	10.2	36.59	0.17
	H	820	16.04	0.0005	10.35	8.42	1113.5	80.9	13.1	36.96	0.17
	I	840	16.49	0.0007	11.66	12.4	781.7	79.1	17.4	37.13	0.14
	J	860	14.96	0.0004	6.160	20.7	1150	87.8	24.6	37.41	0.10
	K	880	13.76	0.0005	2.784	20.1	1121	94.0	31.6	36.838	0.082
	L	920	13.86	0.0006	2.864	22.1	823.2	93.9	39.3	37.053	0.082
	M	960	13.90	0.0009	3.742	20.5	551.6	92.0	46.4	36.433	0.083
	N	1020	14.20	0.0005	4.251	25.5	969.2	91.1	55.3	36.858	0.091
	O	1080	14.21	0.0010	4.371	26.9	519.7	90.9	64.6	36.79	0.10
	P	1140	13.84	0.0007	2.737	60.0	683.6	94.2	85.5	37.122	0.061
	Q	1200	13.61	0.0009	1.438	38.7	557.5	96.9	98.9	37.530	0.070
	R	1650	38.00	0.0283	83.76	3.03	18.0	34.9	100.0	37.74	0.62
	Integrated age ± 1σ			n=18		287.7	390.3	K2O=10.51%		36.905	0.065
	Plateau ± 1σ steps C-R			n=16	MSWD=11.37	284.461			98.9	37.00	0.091
	WLM-8 Muscovite, 7.77 mg, J=0.0015838±0.07%, D=1.005±0.001, NM-233M, Lab#=59602-01										
X	A	550	26.92	0.0245	60.12	1.73	20.8	34.0	0.5	25.95	0.66
	B	600	20.27	0.0142	24.65	2.24	36.0	64.1	1.2	36.70	0.45
	C	650	17.89	0.0054	15.84	2.75	94.7	73.8	2.1	37.33	0.37
	D	700	16.55	0.0033	11.31	6.90	154.6	79.8	4.2	37.33	0.19
	E	750	16.25	0.0013	10.40	9.62	397.2	81.1	7.1	37.23	0.15
	F	800	17.07	0.0013	12.62	14.0	401.2	78.1	11.4	37.69	0.15
	G	850	17.02	0.0004	12.14	36.6	1450	78.9	22.6	37.96	0.11
	H	880	14.63	0.0005	3.949	42.1	1114	92.0	35.4	38.036	0.072
	I	900	14.38	0.0002	3.547	23.5	2720	92.7	42.6	37.681	0.087
	J	930	14.56	0.0001	4.657	19.3	3732	90.5	48.5	37.256	0.087
	K	960	14.75	0.0009	5.909	17.2	548.7	88.2	53.8	36.758	0.099
	L	990	14.95	0.0003	5.986	15.6	1971	88.2	58.5	37.26	0.10
	M	1020	14.91	0.0002	5.882	16.2	2557	88.3	63.5	37.21	0.11
	N	1040	14.69	0.0001	5.294	17.6	5885	89.3	68.9	37.10	0.10
	O	1060	14.58	0.0001	4.011	24.1	7448	91.9	76.2	37.835	0.093
	P	1080	14.26	0.0004	2.636	32.0	1290	94.5	86.0	38.073	0.075
	X	1110	13.96	-0.0001	1.358	32.1	-	97.1	95.8	38.290	0.071
	Y	1140	13.84	0.0001	0.7757	12.5	6017	98.3	99.6	38.453	0.092
	Z	1170	14.71	0.0033	4.004	1.30	153.5	92.0	100.0	38.21	0.60
	Integrated age ± 1σ			n=19		327.2	747.5	K2O=10.21%		37.659	0.066
	Plateau ± 1σ steps B-Z			n=18	MSWD=23.49	325.448			99.5	37.72	0.122

Table DR3. White mica 40Ar/39Ar data from the Wildhorse Detachment in the Pioneer MCC

	ID	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	WLM-9 Muscovite, 6.84 mg, J=0.0015783±0.05%, D=1.005±0.001, NM-233M, Lab#=59601-01										
X	A	550	23.23	0.0681	45.80	2.01	7.5	41.7	0.7	27.39	0.57
X	B	600	15.23	0.0567	9.265	2.09	9.0	82.0	1.4	35.21	0.37
X	C	650	14.68	0.0121	6.566	2.92	42.2	86.8	2.4	35.88	0.29
X	D	700	14.09	0.0033	4.242	6.72	154.8	91.1	4.7	36.16	0.15
X	E	750	14.66	0.0036	6.177	8.42	142.1	87.5	7.5	36.16	0.15
X	F	800	16.01	0.0019	10.07	10.6	262.0	81.4	11.1	36.72	0.15
	G	850	15.69	0.0016	7.547	24.5	322.8	85.8	19.4	37.893	0.092
	H	880	14.09	0.0006	2.355	29.9	867.1	95.1	29.5	37.711	0.073
	I	900	13.63	0.0010	1.723	17.5	500.3	96.3	35.4	36.945	0.082
	J	930	13.64	0.0015	1.939	16.8	347.7	95.8	41.1	36.810	0.080
	K	960	13.76	0.0014	2.375	17.2	362.7	94.9	46.9	36.771	0.083
	L	990	13.80	0.0009	2.382	16.9	539.7	94.9	52.7	36.873	0.083
	M	1020	13.87	0.0012	2.380	16.6	439.6	94.9	58.3	37.086	0.081
	N	1040	13.81	0.0010	2.160	15.1	517.5	95.4	63.4	37.102	0.076
	O	1060	13.85	0.0012	2.206	15.7	420.8	95.3	68.7	37.153	0.080
	P	1080	13.83	0.0009	1.742	21.6	564.9	96.3	76.0	37.497	0.079
	Q	1110	13.74	0.0004	1.206	28.5	1192	97.4	85.7	37.692	0.069
	R	1140	13.69	0.0012	0.7108	24.4	434.9	98.5	93.9	37.955	0.075
	S	1170	13.92	0.0026	1.017	11.2	197.0	97.8	97.7	38.332	0.086
X	T	1220	15.53	0.0099	4.324	3.41	51.3	91.8	98.9	40.12	0.23
X	U	1350	24.15	0.0647	30.30	1.41	7.9	62.9	99.4	42.74	0.68
X	V	1650	57.21	0.0281	143.9	1.86	18.2	25.6	100.0	41.3	1.1
	Integrated age ± 1σ			n=22		295.2	183.2	K2O=10.50%		37.311	0.058
	Plateau ± 1σ steps G-S			n=13	MSWD=38.37	255.799			86.7	37.38	0.137

Table DR3. White mica 40Ar/39Ar data from the Wildhorse Detachment in the Pioneer MCC

	ID	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)		K/Ca	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	±1σ (Ma)
	WLM-12, Muscovite, 6.87 mg, J=0.0015758±0.06%, D=1.005±0.001, NM-233M, Lab#=59600-01											
X	A	550	25.18	0.0268	52.37	1.95		19.0	38.5	0.7	27.37	0.71
X	B	600	18.27	0.0214	20.12	2.06		23.9	67.5	1.3	34.69	0.44
X	C	650	17.39	0.0032	15.37	2.69		160.8	73.9	2.3	36.13	0.36
X	D	700	16.13	0.0014	10.86	6.13		371.1	80.1	4.3	36.35	0.21
X	E	750	16.02	0.0005	10.19	8.15		963.4	81.2	7.1	36.57	0.18
X	F	800	16.88	0.0007	12.45	12.0		709.5	78.2	11.1	37.12	0.15
	G	850	15.68	0.0000	7.202	31.7	-		86.4	21.8	38.090	0.096
	H	880	14.07	0.0001	2.437	32.4		5032	94.9	32.7	37.531	0.071
	I	900	13.84	-0.0001	2.048	18.7	-		95.6	39.0	37.203	0.080
	J	930	13.93	0.0001	2.652	16.4		3980	94.4	44.5	36.976	0.087
	K	960	14.09	-0.0004	2.872	15.2	-		94.0	49.6	37.220	0.088
	L	990	14.14	-0.0001	3.147	15.1	-		93.4	54.7	37.144	0.087
	M	1020	14.14	-0.0002	3.374	14.1	-		92.9	59.5	36.954	0.091
	N	1040	14.19	-0.0005	3.030	12.7	-		93.7	63.8	37.37	0.10
	O	1060	14.16	-0.0001	2.865	12.8	-		94.0	68.1	37.442	0.095
	P	1080	14.12	-0.0006	2.791	16.2	-		94.2	73.5	37.371	0.089
	Q	1110	14.03	-0.0001	2.140	27.4	-		95.5	82.7	37.651	0.078
	R	1140	13.80	0.0000	0.9981	30.6	-		97.9	93.1	37.955	0.068
	S	1170	13.87	0.0001	0.8118	16.7		4973	98.3	98.7	38.322	0.080
X	T	1220	15.06	-0.0002	2.730	3.94	-		94.6	100.0	40.06	0.20
	Integrated age ± 1σ			n=20		296.8			K2O=10.53%		37.423	0.059
	Plateau ± 1σ	steps G-S		n=13	MSWD=25.58	259.944				87.6	37.51	0.120

Notes:

Isotopic ratios corrected for blank, radioactive decay, and mass discrimination, not corrected for interfering reactions.

Errors quoted for individual analyses include analytical error only, without interfering reaction or J uncertainties.

Integrated age calculated by summing isotopic measurements of all steps.

Integrated age error calculated by quadratically combining errors of isotopic measurements of all steps.

Plateau age is inverse-variance-weighted mean of selected steps.

Plateau age error is inverse-variance-weighted mean error (Taylor, 1982) times root MSWD where MSWD>1.

Plateau error is weighted error of Taylor (1982).

Decay constants and isotopic abundances after Steiger and Jäger (1977).

X preceding sample ID denotes analyses excluded from plateau age calculations.

- No dectable ^{37}Ar above background level.

D = 1 AMU mass discrimination in favor of light isotopes.

Weight percent K_2O calculated from ^{39}Ar signal, sample weight, and instrument sensitivity.

Ages calculated relative to FC-2 Fish Canyon Tuff sanidine interlaboratory standard at 28.02 Ma

Decay Constant (LambdaK (total)) = 5.543e-10/a

Correction factors:

$(^{39}Ar/^{37}Ar)_{Ca}$ = 0.0007 ± 5e-05

$(^{36}Ar/^{37}Ar)_{Ca}$ = 0.00028 ± 2e-05

$(^{40}Ar/^{39}Ar)_{K}$ = 0.010 ± 0.002