$^{40}Ar/^{39}Ar$ Data Appendix for

^{40}AR/^{39}AR DATING, SANIDINE CHEMISTRY, AND POTENTIAL SOURCES OF THE LAST TABLAS TUFF, NORTHERN NEW MEXICO

by

Matthew J. Zimmerer[1] and William C. McIntosh[2]

[1]Department of Earth and Environmental Sciences, New Mexico Institute of Mining and Technology, Socorro, NM 87801; mjz1983@nmt.edu

[2]New Mexico Bureau of Geology and Mineral Resources, New Mexico Institute of Mining and Technology, Socorro, NM 87801; mcintosh@nmt.edu

Table 1. $^{40}Ar/^{39}Ar$ analytical data for Tetilla Peak and Las Tablas Tuff.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$^{40}Ar^*$ (%)	Age (Ma)	±1σ (Ma)
MZQ-17, Sanidine, J=0.0008936±0.05%, D=1.002±0.001, NM-196K, Lab#=56277								
12	18.39	0.0063	3.605	15.427	81.6	94.2	28.128	0.069
04	17.65	0.0042	1.047	17.940	120.1	98.2	28.139	0.060
13	17.91	0.0062	1.910	23.950	81.9	96.9	28.152	0.056
09	17.85	0.0064	1.692	10.246	79.4	97.2	28.159	0.083
01	17.53	0.0103	0.5023	24.063	49.6	99.2	28.205	0.051
02	17.66	0.0083	0.9275	18.310	61.7	98.5	28.224	0.063
03	18.04	0.0099	2.145	12.451	51.5	96.5	28.245	0.072
05	18.78	0.0050	4.635	6.323	102.8	92.7	28.26	0.12
15	17.78	0.0132	1.193	10.225	38.6	98.0	28.285	0.082
08	17.69	0.0037	0.8398	7.432	136.3	98.6	28.30	0.10
07	17.51	0.0037	0.2021	7.114	136.8	99.7	28.32	0.10
11	18.18	0.0037	2.454	5.869	138.3	96.0	28.33	0.12
06	17.46	0.0032	-0.0016	4.048	159.0	100.0	28.34	0.18
10	17.72	0.0049	0.8342	5.928	105.2	98.6	28.37	0.12
14	17.54	0.0058	0.1732	9.481	88.7	99.7	28.391	0.082
Mean age ± 2σ	n=15	MSWD=1.09		95.4	±73.8		28.222	0.051
MZQ-42, Sanidine, J=0.002254±0.04%, D=1.005±0.001, NM-227A, Lab#=59200								
15	6.924	0.0077	0.1516	36.543	66.0	99.4	28.128	0.045
07	6.909	0.0088	0.0551	50.059	57.9	99.8	28.181	0.039
04	7.016	0.0103	0.4077	32.474	49.6	98.3	28.194	0.050
12	6.944	0.0091	0.1472	75.306	56.0	99.4	28.215	0.036
05	6.930	0.0063	0.0605	48.641	80.8	99.7	28.262	0.039
09	7.109	0.0123	0.6564	32.879	41.4	97.3	28.275	0.049
14	6.968	0.0064	0.1689	43.393	79.9	99.3	28.285	0.042
06	6.998	0.0062	0.2597	51.345	82.0	98.9	28.297	0.039
10	6.999	0.0059	0.2624	77.477	87.2	98.9	28.297	0.038
03	7.158	0.0169	0.7714	86.143	30.2	96.8	28.338	0.039
13	6.949	0.0076	0.0573	45.215	67.4	99.8	28.342	0.042
01	6.961	0.0071	0.0834	41.893	72.3	99.7	28.358	0.041
08	6.978	0.0064	0.1230	25.412	79.7	99.5	28.379	0.052
11	6.988	0.0063	0.1444	78.263	81.0	99.4	28.397	0.038
02	6.955	0.0059	0.0173	43.652	86.7	99.9	28.415	0.043
Mean age ± 2σ	n=15	MSWD=3.92		67.9	±34.9		28.292	0.049
MZQ-44, Sanidine, J=0.0022517±0.04%, D=1.005±0.001, NM-227A, Lab#=59201								
05	6.913	0.0064	0.0662	34.207	80.2	99.7	28.157	0.048
06	6.919	0.0080	0.0673	27.558	63.5	99.7	28.178	0.051
03	6.942	0.0069	0.1467	27.481	74.0	99.4	28.179	0.051
15	6.940	0.0046	0.1151	18.046	110.6	99.5	28.206	0.061
09	6.920	0.0064	0.0466	31.903	79.3	99.8	28.208	0.044
14	6.958	0.0053	0.1543	27.588	95.6	99.4	28.233	0.049
12	6.929	0.0065	0.0494	14.720	78.0	99.8	28.242	0.069
11	6.968	0.0067	0.1690	16.631	76.4	99.3	28.258	0.062
02	6.944	0.0058	0.0553	45.156	87.3	99.8	28.296	0.042
04	6.949	0.0056	0.0704	29.494	91.0	99.7	28.298	0.048
07	6.944	0.0053	0.0526	28.963	97.2	99.8	28.299	0.047
10	6.980	0.0074	0.1608	13.142	68.5	99.3	28.314	0.073
13	7.025	0.0052	0.2609	28.110	98.6	98.9	28.376	0.051
01	6.980	0.0061	0.0703	16.573	83.3	99.7	28.423	0.068
08	6.988	0.0073	0.0807	27.085	70.2	99.7	28.446	0.049
Mean age ± 2σ	n=15	MSWD=2.81		83.6	±26.0		28.271	0.051

Notes:
x (or i) symbol preceding sample ID denotes analyses excluded from plateau (or isochron) age calculations.
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.

Age calculations:
Ages calculated relative to FC-2 Fish Canyon Tuff sanidine interlaboratory standard (28.201 Ma, Kuiper et al., 2008).
Mean age is weighted mean age of Taylor (1982). Mean age error is weighted error
of the mean (Taylor, 1982), multiplied by the root of the MSWD where MSWD>1, and also
incorporates uncertainty in J factors and irradiation correction uncertainties.
MSWD values are calculated for n-1 degrees of freedom for plateau age.
Isochron ages, $^{40}Ar/^{36}Ar_i$ and MSWD values calculated from regression results obtained by the methods of York (1969).
Decay constants and isotopic abundances after Min et al. (2001).
All errors reported at $\pm 2\sigma$, unless otherwise noted.

Sample preparation and irradiation:
Sanidine separates prepared using crushing, dilute HCl acid treatment, Franz magnetic separator, and hand-picking techniques.
Samples were loaded into machined Al discs and irradiated in 2 separate positions (NM-196K and NM-227A)
for 7 hours at , Nuclear Science Center, College Station, TX.
Neutron flux monitor Fish Canyon Tuff sanidine (FC-2).

Instrumentation:
Mass Analyzer Products 215-50 mass spectrometer on line with automated all-metal extraction system.
Samples were fused using a CO2 laser (heating duration 30 seconds).
Reactive gases removed during laser analysis by reaction with 2 SAES GP-50 getters, 1 operated
at ~450°C and 1 at 20°C. Gas also exposed to a W filament operated at ~2000°C.

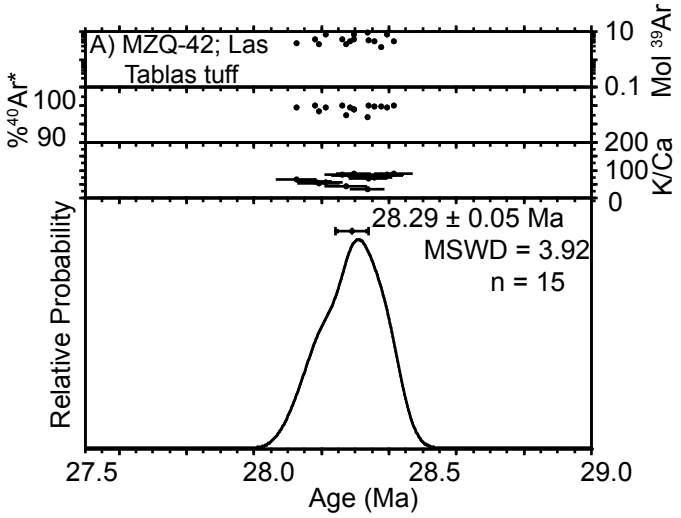
Analytical parameters:
Electron multiplier sensitivity ranged from 4.75 x 10-17 moles /pA to 5.28 x 10-17 moles /pA.
Total system blank and background for the laser averaged 581, 9.77, 1.89,4.47, 12.2 x 10^{-18} moles at masses
40,39,38,37 and 36 respectively
J-factors determined to a precision of ± 0.1% by CO_2 laser-fusion of 6 single crystals from each of 10 radial positions
around the irradiation tray.
Correction factors for interfering nuclear reactions were determined using K-glass and CaF_2 and are as follows:

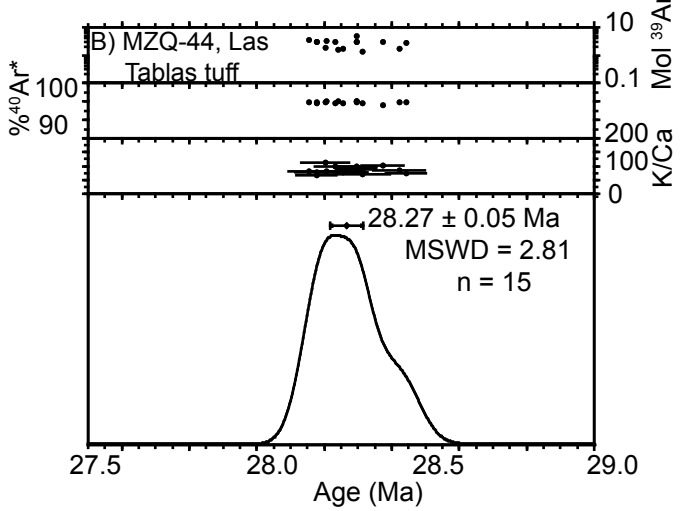
$(^{39}Ar/^{37}Ar)_{Ca}$ = 0.00068 ± 2e-05

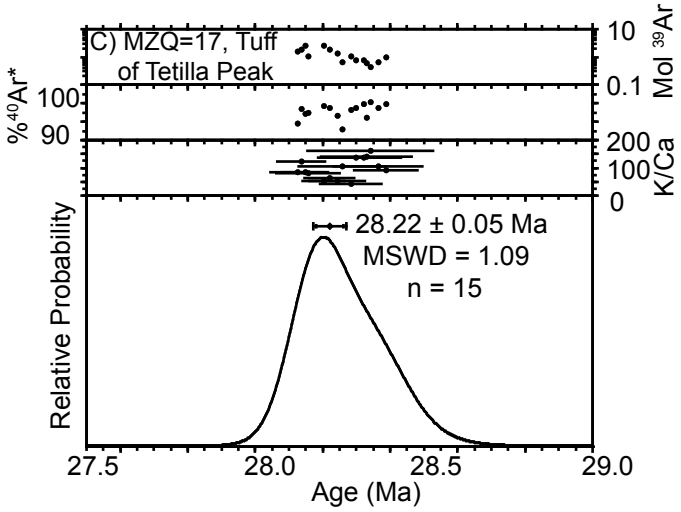
$(^{36}Ar/^{37}Ar)_{Ca}$ = 0.00028 ± 1e-05

$(^{38}Ar/^{39}Ar)_{K}$ = 0.013 ± 5e-04

$(^{40}Ar/^{39}Ar)_{K}$ = 0 ± 4e-04


A) MZQ-42; Las Tablas tuff
%40Ar*
100
90
10
0.1
Mol 39Ar
200
100
0
K/Ca
28.29 ± 0.05 Ma
MSWD = 3.92
n = 15
Relative Probability
27.5
28.0
28.5
29.0
Age (Ma)


B) MZQ-44, Las Tablas tuff
%40Ar*
100
90
10
0.1
Mol 39Ar
200
100
0
K/Ca
28.27 ± 0.05 Ma
MSWD = 2.81
n = 15
27.5
28.0
28.5
29.0
Age (Ma)


C) MZQ=17, Tuff of Tetilla Peak
%40Ar*
100
90
10
0.1
Mol 39Ar
200
100
0
K/Ca
28.22 ± 0.05 Ma
MSWD = 1.09
n = 15
Relative Probability
27.5
28.0
28.5
29.0
Age (Ma)