THE GEOCHRONOLOGY OF THE RATON-CLAYTON VOLCANIC FIELD, WITH IMPLICATIONS FOR VOLCANIC HISTORY AND LANDSCAPE EVOLUTION

by

Joseph R. Stroud

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Department of Earth and Environmental Science
New Mexico Institute of Mining and Technology
Socorro, New Mexico

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Abstract

^{40}Ar/^{39}Ar data from the Raton-Clayton Volcanic Field, New Mexico, provide a concise record of the eruptive history and landscape evolution in the field. Previous workers have examined the field relations, petrology and geochemistry of the field, but only a limited geochronologic effort has been made. Sixty-five basaltic to andesitic groundmass concentrates were analyzed by ^{40}Ar/^{39}Ar step heating. Eruption ages were determined from well-defined age spectra plateaus or from isochrons. Precision of individual age determinations is typically ±2-8% (2 sigma). The results indicate that the geochemically defined Raton phase was erupted in two distinct episodes: 9.0-7.3 Ma and 5.6-3.5 Ma. The Clayton phase erupted from 3.0-2.2 Ma, and the Capulin phase from 1.68 Ma-56 ka. Volcanic activity at Sierra Grande stratovolcano overlaps in time with the Raton and Clayton phases from 3.8-2.6 Ma.

Elevation of mesa tops coupled with age determinations can be used to estimate rates of erosion in the volcanic field. Erosion rates in the east/central portion of the field are minimal; lavas as old as 3.5 Ma have no significant erosional relief. Erosion is greater in the northwestern portion of the field where mesas stand as high as 490 m above the local base level. Basalt flows capping the mesas near Raton have been dated at 7.8 Ma and 3.6 Ma, with only a small difference in elevation between them. This suggests little or no erosion occurring between 7.8 Ma and 3.6 Ma. The erosional relief of the ca. 3.6 Ma mesa, together with a 1.2 Ma basalt flow with 120 m of erosional relief, suggests an average erosion rate of 115 m/Ma since 3.6 Ma. The onset of increased erosion around 3.6 Ma may reflect climate change in this area.

THE GEOCHRONOLOGY OF THE RATON-CLAYTON VOLCANIC FIELD, WITH IMPLICATIONS FOR VOLCANIC HISTORY AND LANDSCAPE EVOLUTION

Introduction:

The Raton-Clayton volcanic field is located in the northeastern corner of New Mexico, where it lies on the edge of the Great Plains, along the foothills of the Sangre de Cristo Mountains (figure 1). It is adjacent to the Rio Grande Rift system and represents the easternmost extent of Neogene-Quaternary volcanic activity in the United States. The Raton-Clayton volcanic field consists mainly of alkali olivine basalt flows and cones, with smaller amounts of basaltic andesite and feldspathoidal flows and cones, andesite/dacite domes, and one andesite stratovolcano. Volcanic activity in the field is contemporaneous with other volcanic fields in the Rio Grande rift system, including the nearby Ocate and Taos Plateau volcanic fields (O'Neill and Mehnert, 1988; Dungan et al, 1989). Some researchers consider the Raton-Clayton field to represent the northeasternmost extension of the Jemez lineament, a linear arrangement of volcanic fields and centers ranging from eastern Arizona to northeast New Mexico (Calvin, 1987; Baldwin and Muehlberger, 1959). A striking feature of the Raton-Clayton volcanic field is the inverted topography of the lava flows in the western and northern portions of the field where the oldest flows cap the highest topography and the youngest flows occupy the valley floors.

The main objective of this study is to develop an accurate chronology for volcanic activity in the Raton-Clayton volcanic field. Research to further define the ages of the units in the volcanic field via the $^{40}Ar/^{39}Ar$ dating technique was accomplished using groundmass concentrates taken from a

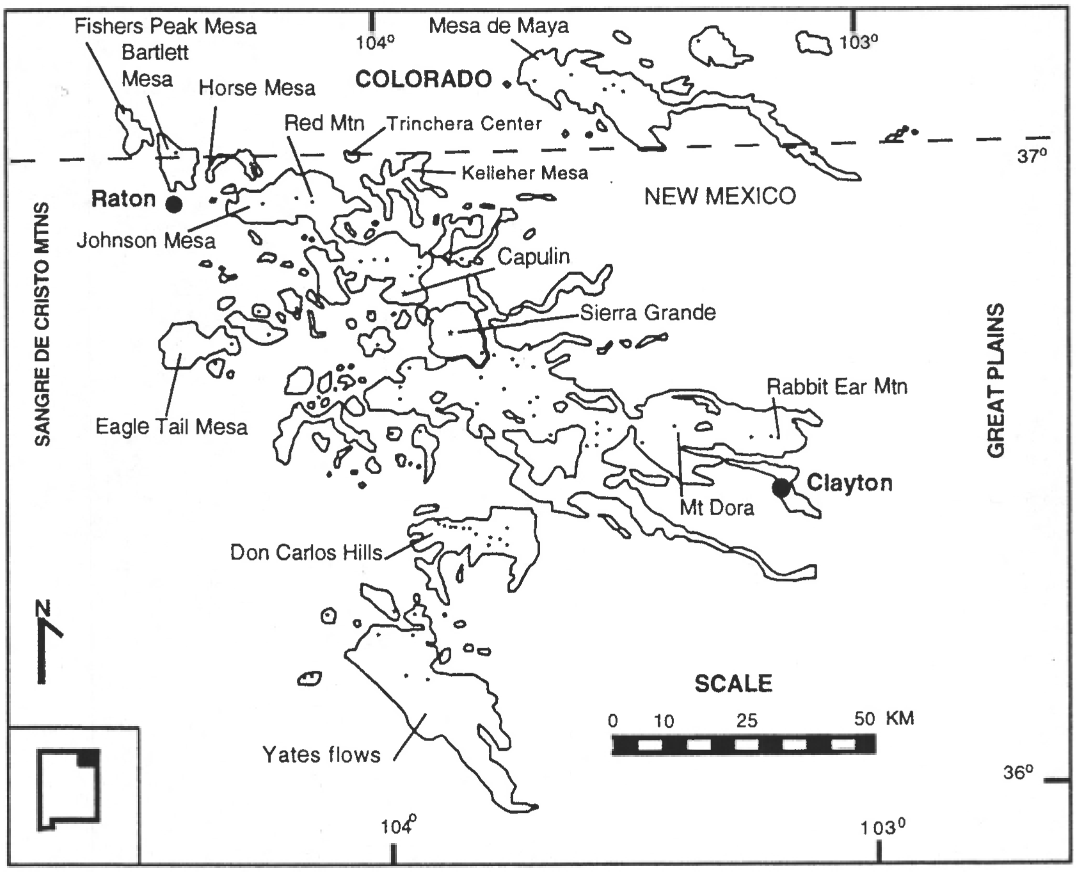

Figure 1. General location map of the Raton-Clayton volcanic field. The volcanic field is bordered on the west by the foothills of the Sangre de Cristo Mountains and on the south and east by the edge of the Great Plains. It lies east of the Rio Grande Rift and is thought by some to represent the northeasternmost extension of the Jemez Lineament (Calvin, 1987)(Baldwin and Muehlberger, 1959).

variety of volcanic centers and flows. Previous work on dating the volcanic rocks in this area has been limited to K/Ar dating of some of the basalt-capped mesas, flows lacking erosional relief and the rhyodacite domes, but a comprehensive geochronologic study of the volcanic field has not been undertaken.

A second objective is to address the landscape evolution in the field. Dating the volcanic features in the Raton-Clayton field offers the opportunity to not only reconstruct the volcanic history of the region, but also to constrain the timing and rates of erosional processes in these areas. With comprehensive geochronologic coverage, it is possible to estimate the rate of the landscape evolution in the volcanic field from the time of flow emplacement to the present day.

Geologic Setting and Previous Work:

The Raton-Clayton volcanic field is located mainly between the cities of Raton and Clayton, New Mexico (figure 1)(Baldwin and Muehlberger, 1959; Stormer, 1972a). Part of the field extends into Colorado, including two basalt capped mesas, Fishers Peak and Mesa de Maya. Mesa de Maya and an unnamed cluster of flows in the southernmost section of the field (hereafter termed the Yates flows) have not been previously included in maps of the Raton-Clayton volcanic field, but are considered to be part of the field in this study because of their proximity and similar geologic characteristics to other units within the volcanic field.

The northern and western segments of the Raton-Clayton field are dominated by flow-capped mesas that stand out above a broad expanse of prairie. The prairie itself is cut by local drainages, including the southward flowing Canadian River. The central segment of the field has young flows lacking erosional relief adjacent to low elevated mesas capped by basalt flows. Topographically dominating this central segment is the stratovolcano Sierra Grande, which lies at the center of the volcanic field. The western boundary of the Great Plains overlaps the eastern and southern segments of the field.

Three phases of volcanic activity, namely the Raton, Clayton, and Capulin phases, have been previously subdivided by geochemistry, petrology and limited K/Ar dating. Although there have been disagreements on the boundaries of these phases and on which units are included in which phase (Baldwin and Muehlberger, 1959; Stormer, 1972; Kudo, 1976), there has been a general consensus on the three-phase subdivision (Calvin, 1987).

The oldest pulse of volcanism is represented by the Raton basalts, which cap the local mesas (200-500 m above local base levels) near the city of Raton, New Mexico. This unit consists of alkali olivine basalts which disconformably overlie the Raton Formation (Paleocene) and the Trinidad Sandstone and Pierre Shale (Cretaceous). These basalts have variable K/Ar dates between 7.2 and 3.2 Ma (Calvin, 1987; Stormer, 1972), and as old as 8.2 Ma (Scott et al, 1990).

The second volcanic pulse is represented by the Clayton basalts. The Clayton basalts are classified as transitional olivine basalts and cover extensive topography east of Sierra Grande, capping the locally dominant Dakota Sandstone (Dungan et al, 1989). Parts of the Clayton basalts in the central part of the volcanic field form escarpments 50-100 m above the local base level, indicating post-emplacement erosion around these units. These units have been K/Ar dated at approximately 2.5 Ma (Stormer, 1972).

Contemporaneous with the first and second pulse of volcanism was the eruption of the Red Mountain rhyodacite domes and the Sierre Grande andesite. These units represent more intermediate and silicic volcanism, compositionally similar to other volcanic fields in New Mexico, such as the Taos Plateau volcanic field (Dungan et al, 1989). The Red Mountain rhyodacite is present in scattered domes in the western and central portion of the field (Scott and Pillmore, 1993). The unit was named after the Red Mountain dome, a prominent feature located on Johnson Mesa (figure 1). The age of the Red Mountain rhyodacite units is approximately 7 Ma, based on K/Ar studies (Scott et al, 1990). The Sierre Grande andesite, which has a single K/Ar date of 1.9 ± 0.05 Ma (Stormer, 1972; Kudo, 1976) is present only on Sierra Grande, the central stratovolcano in the volcanic field.

The third pulse of volcanism in the field is represented by the Capulin phase. These volcanic units occupy the lowest topography in the central portion of the field and form escarpments 30-165 m above local base levels in the western portion of the field. The units consist mainly of olivine basalts that are geochemically classified as basalt to basaltic andesite in composition (Dungan et al, 1989) and two feldspathoidal flows which are present at Carr Mountain and Yankee volcano. Some olivine basalts also contain reaction-rimmed quartz and resorbed plagioclase xenocrysts. Muehlberger (1955) estimated an eruption age for Capulin volcano as between 4 -10 ka. This age was obtained by correlating an alluvial unit covered by a Capulin volcano flow with a C^{14} dated alluvial unit at the nearby Folsom site (Baldwin and

Muehlberger, 1959). The western flows that form escarpments above local base levels were K-Ar dated at 1.27±0.6 to 0.66±0.12 Ma by Scott et al (1990), but were still classified as Clayton basalts by these authors.

Methods:

Field Work

Samples were collected from sixty-five localities throughout the Raton-Clayton volcanic field with the objective of providing a representative sampling of most of the volcanic features in the field (figure 2). At each locality, 1-2 hand samples were collected from a volcanic feature, such as a flow or cone. Hand samples consisted of 1-2 kg of fresh, non-vesicular lava or the central portions of volcanic bombs.

Sample preparation

Hand samples were initially crushed and sieved as a first step in obtaining groundmass concentrates. Groundmass concentrates were prepared from the 1.18 to 0.850 mm fraction by hand-picking fragments devoid of visible phenocrysts under a binocular microscope. For seven samples, concentrates were also prepared from the 300 μm-250 μm, 250 μm-180 μm and 180 μm-150 μm sieve fractions. The nonmagnetic and highly magnetic portions of these samples were removed with a Franz magnetic separator prior to irradiation in an attempt to eliminate xenocrysts from the groundmass concentrates.

The sample grains were treated in a solution of dilute (10%) HCl, then ultrasonically cleaned in distilled H_20. Samples were placed in aluminum irradiation trays along with alternating flux monitors of the Fish Canyon Tuff

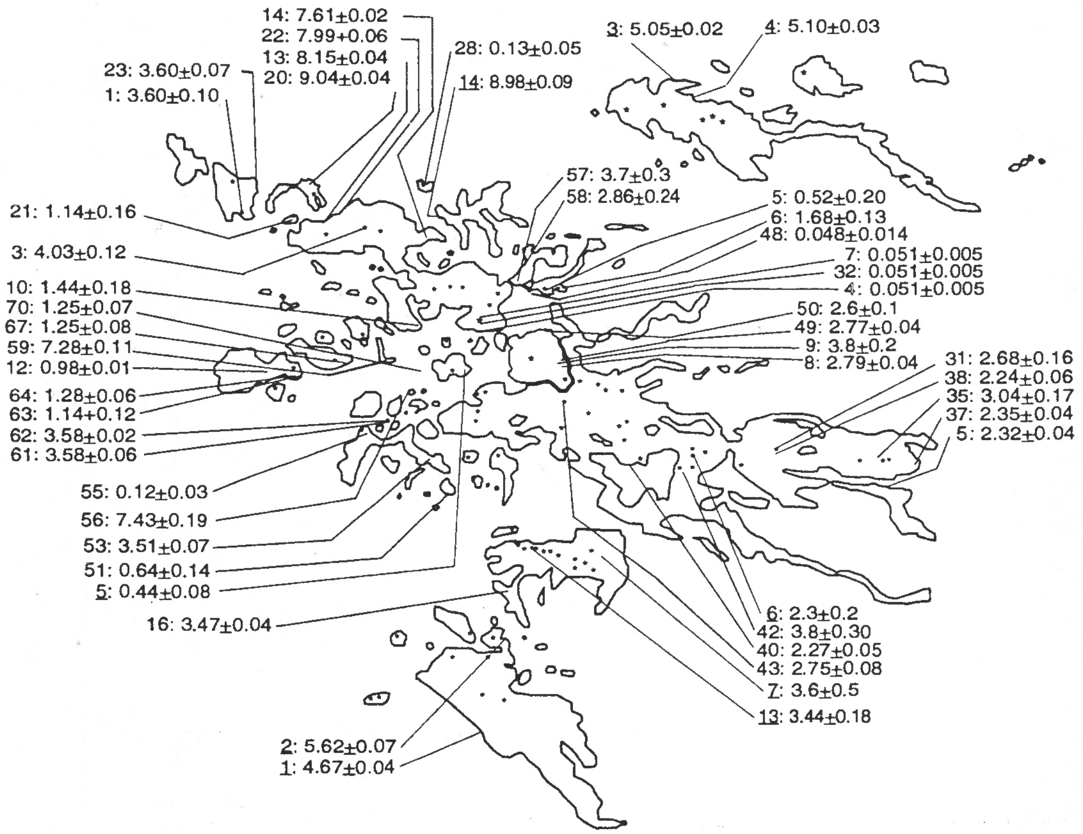

Figure 2: Sample Collection Map. Asterisks denote eruptive vents.
Font denotes sample number prefix: JS-94-4 = **4**, JS-95-4 = 4, JS-96-4 = 4.

sanidine (27.84 Ma relative to Mmhb-1 hornblende at 520.4 Ma; Samson and Alexander, 1987) and were irradiatiated between one to ten hours in the reactor at Texas A & M or the Ford reactor at the University of Michigan. The samples were analyzed two to five months following irradiation in order to allow decay of ^{37}Ar, which can degrade the mass spectrometer performance. In addition, some samples were prepared in much larger quantities (400-500 mg) as part of an experiment designed to increase the precision by increasing the ^{36}Ar signal. The effects of the discrimination and other correction factors on these samples would also be observed. A second experiment was conducted utilizing variable grain sizes (850-150 μm) in an attempt to eliminate excess argon derived from xenocrysts present in the sample. A third experiment was conducted to measure the presence, if any, of excess ^{40}Ar in olivine present in sample JS-94-4.

Laboratory analysis

Analyses were performed at the New Mexico Geochronology Research Laboratory at the New Mexico Institute of Mining and Technology. This facility includes a MAP 215-50 mass spectrometer attached to a computer-automated all-metal argon extraction line. Sanidine flux monitors were fused by a CO_2 laser for 5 seconds and reactive gases were removed by a SAES GP-50 getter prior to gas expansion into the mass spectrometer. A double-vacuum Mo resistance furnace was used to heat the groundmass concentrate samples. Samples were incrementally heated in eleven steps from 500°C to 1650°C. Heating times of eight to ten minutes were simultaneous with reaction with an

AP-10 getter. Additional gas cleanup was conducted by reaction with a GP-50 getter for five to ten minutes. Isotopic data are corrected for extraction line blank, which for furnace analyses ranged from 3 x 10^{-16} to 3 x 10^{-15} moles ^{40}Ar and from 2 x 10^{-18} to 9 x 10^{-18} moles ^{36}Ar.

^{40}Ar/^{39}Ar Results:

Results of incremental heating analysis

Sixty-five samples were analyzed for age determination. One to five replicate analyses were performed on seven samples while the remainder were analyzed only once. Results of the step-heating and isochron analyses from each sample are tabulated in Appendix A and displayed in Appendix B as age spectra and isochron diagrams. Age spectra are accompanied by plots of apparent K/Ca values and the radiogenic yield percentage.

The error for the initial and final groups of heating steps is relatively large; in most cases these can be attributed to the low radiogenic yield. Many of the samples have decreasing K/Ca ratios for the higher temperature steps, which probably reflects degassing of intergrain boundaries followed by degassing dominated by the plagioclase groundmass, and ending with increasing degassing of retentive, low-K/high Ca groundmass pyroxene. This behavior is similar to results reported from young alkali basalts at other locations (Singer and Pringle, 1996; McIntosh and Cather, 1994; Laughlin et al, 1993). The attempt to increase the precision of selected samples using larger sample sizes did succeed in some cases, but not in over half of the samples tested in this fashion. Despite attempts to remove xenocrystic material from groundmass concentrates and utilizing variable grain sizes, no discernible improvement in the age spectra of sample JS-94-4 was observed. ^{40}Ar was found in small quantities in the olivine of sample JS-94-4, suggesting the presence of inclusions in the olivine.

Classification of incremental heating analyses

The eruption ages are summarized in Table 1. These ages are determined by one of two methods: 1) age spectra plateau ages or 2) isochron ages based on the regression technique of York (1969). A "plateau" in this paper is defined as a series of at least three contiguous heating steps that agree in age at two sigma and contain at least 50% of the total ^{39}Ar released (Fleck et al, 1977). Isochron data was evaluated based on the mean square weighted deviate (MSWD), the distribution of data along the isochron line, and the ^{40}Ar/^{36}Ar intercept being within 2σ of the atmospheric value of 295.5.

Results from sample analyses were not always consistent in data quality. There is a range of geochronologic results where some data are considered more reliable in quality than other data. For instance, the ^{40}Ar/^{36}Ar intercept varied considerably in value in relation to atmospheric argon and the percentage of ^{39}Ar defining the plateau of several samples ranged from 44-100%. In order to address this quality issue, the results from each sample were assigned to a classification scheme. This classification scheme provides a method of comparing the quality of the results to one another and is used to determine an eruption age for a sample. The age spectra and isochron data can be categorized into the following classes:

Table 1: Eruption age summary

Sample	Location	Class	Eruption Age (Ma)	±Error(2σ) (Ma)
JS-94-4	3rd basalt flow, Capulin Volcano	C	0.225	0.058
JS-94-5	Clayton basalt, 2.9 km N of Clayton	A	2.32	0.04
JS-95-1	Raton basalt flow, Bartlett Mesa	B2	3.60	0.1
JS-95-3	Dale Mtn flow, Johnson Mesa	A	4.03	0.12
JS-95-5	Basalt flow, Purvine Hills	B1	0.52	0.20
JS-95-6	Carr Mtn flow, feldspathoidal	B2	1.68	0.13
JS-95-7	5th basalt flow, Capulin Volcano	*	0.056	0.008
JS-95-8	Sierra Grande flow, stream cut	A	2.79	0.04
JS-95-9	Sierra Grande flow, eroded vent	A	3.8	0.2
JS-95-10	Basalt flow, E. edge, Chaco Arroyo	B1	1.44	0.18
JS-95-12	Basalt flow, E. Eagle Mtn	B2	0.98	0.01
JS-95-13	Lowermost Basalt flow, Johnson Mesa	B2	8.15	0.04
JS-95-14	Andesite, E. rim of Johnson Mesa	A	7.61	0.02
JS-95-15	Bomb, Capulin Volcano	B2	0.034	0.019
JS-95-16	Basalt flow, Ute Creek	B2	3.47	0.04
JS-95-17	Boca, Capulin Volcano	B2	0.050	0.030
JS-95-18	Flow, 35 m below edge of Johnson Mesa	A	7.98	0.03
JS-95-20	Basalt flow, E. Barrela Mesa	B2	9.04	0.04
JS-95-21	Basalt flow, Yankee volcano	B2	1.14	0.16
JS-95-22	Basalt flow, 50 m below N. Johnson Mesa	B2	7.99	0.06
JS-95-23	Raton basalt flow, Little Horse Mesa	B1	3.60	0.07
JS-95-27	Block, Trinchera Creek eruptive center	B1	19.78	0.24
JS-95-28	Basalt flow, Trinchera Creek center	B2	0.13	0.05
JS-95-29	Sierra Grande, E. base flow	B2	2.97	0.11
JS-95-31	Basalt ridge, Mt. Dora summit	B2	2.68	0.16
JS-95-32	Basalt in crater, Capulin Volcano	*	0.065	0.049
JS-95-34	Clayton basalt flow, E. of Sierra Grande	B1	2.44	0.08
JS-95-35	Basalt flow, Rabbit Ears Volcano	B2	3.04	0.17
JS-96-36	Raton Dike	B2	19.7	0.5
JS-95-37	Clayton basalt flow, NE of Clayton	B2	2.35	0.06

Table 1: Eruption age summary (continued)

Sample	Location	Class	Eruption Age (Ma)	±Error(2σ) (Ma)
JS-95-38	Basalt flow, mid-Mt Dora	A	2.24	0.06
JS-95-40	Clayton basalt flow, SW of Chavez Mtn	B2	2.87	0.13
JS-95-42	Block, parasitic cone from Tripod Mtn	B2	3.6	0.3
JS-95-43	Basalt flow, NW flank of Cow Mtn	B2	2.71	0.09
JS-95-48	Basalt flow, Twin Mtn	B2	0.048	0.014
JS-95-49	Sierra Grande flow, E. edge	A	2.77	0.04
JS-95-50	Sierra Grande flow, N flank	A	2.6	0.09
JS-95-51	Basalt flow, Las Maetas (South)	B2	0.64	0.14
JS-95-52	Phonolite intrusion, Chico Hills	B1	22.8	0.23
JS-95-53	Basalt flow, Rd 193, stream cut	B2	3.51	0.07
JS-95-55	Basalt flow remnant, The Crater	A	0.124	0.03
JS-95-56	Basalt flow remnant, Kiowa Mesa	B2	7.43	0.19
JS-95-57	Basalt flow, upper Folsom Falls	B2	3.7	0.3
JS-95-58	Basalt flow, lower Folsom Falls	B1	2.86	0.24
JS-95-59	Basalt flow, Mesa Larga	B2	7.28	0.11
JS-95-61	Basalt flow (Tb), below mid-Pine Butte	B1	3.58	0.06
JS-95-62	Andesite ridge, mid-Pine Butte	A	3.58	0.02
JS-95-63	Basalt flow, Qb old, S. of Red Mtn	B1	1.14	0.12
JS-95-64	Basalt flow, Qb young , S. of Red Mtn	B1	1.28	0.06
JS-95-66	Basalt flow, remnant	B1	1.05	0.19
JS-95-67	Basalt flow, Qtb, E. Blosser Mesa	B2	1.25	0.08
JS-95-70	Basalt ridge, Qtb, cone, Blosser Mesa	B1	1.25	0.07
JS-96-01	Roy flow - roadcut	B1	4.67	0.04
JS-96-02	Roy flow near Gladstone	B2	5.62	0.07
JS-96-03	Mesa de Maya flow, NW	A	5.05	0.02
JS-96-04	Mesa de Maya flow, NE	A	5.10	0.03
JS-96-05	Horseshoe Crater flow	B2	0.44	0.08
JS-96-06	flow, base of Mt Clayton	A	2.3	0.2
JS-96-07	Don Carlos Hills, base flow	B2	3.6	0.5
JS-96-13	Don Carlos Hills, W., cone flow	B1	3.44	0.18
JS-96-14	Kellagher Mesa flow, Trinchera Pass	B1	8.98	0.09

* Eruption age determined from weighted mean of multiple age spectra plateaus.

Class A: Flat age spectra and favorable isochron: The results in this class have an age spectra which meets the above defined plateau criteria. The isochron in this class has selected steps with an MSWD <2.5 and the $^{40}Ar/^{36}Ar$ intercept is within 2σ of the atmospheric value of 295.5. Twenty-two percent of the samples analyzed from the Raton-Clayton volcanic field fall within this classification. Sample JS-95-18 (figure 3a) is representative of this class of spectra. Dates that fall into this class are considered to give the most reliable estimate for an eruption age.

Class B1: Favorable isochron: The results in this class have an age spectra which does not meet the above defined plateau criteria. The isochron has selected steps with an MSWD that is <2.5 and the $^{40}Ar/^{36}Ar$ intercept is within $2\ \sigma$ of the atmospheric value of 295.5. Twenty-six percent of the samples analyzed fall within this classification. Sample JS-95-52 (figure 3b) is representative of this class and the isochron age is considered reliable for eruption age determination.

Class B2: Flat age spectra: The results in this class have an age spectra in which at least 3 heating steps meet the above defined plateau criteria. The isochron in this class has selected steps with an MSWD >2.5 and/or the $^{40}Ar/^{36}Ar$ intercept is not within $2\ \sigma$ of the atmospheric value of 295.5. Forty-seven percent of the samples analyzed fall within this classification. Sample JS-95-20 (figure 3c) is representative of this class and the plateau age is considered reliable for eruption age determination.

Class C: Disturbed age spectra and unfavorable isochron: The results in this class have an age spectra that does not meet the above defined plateau

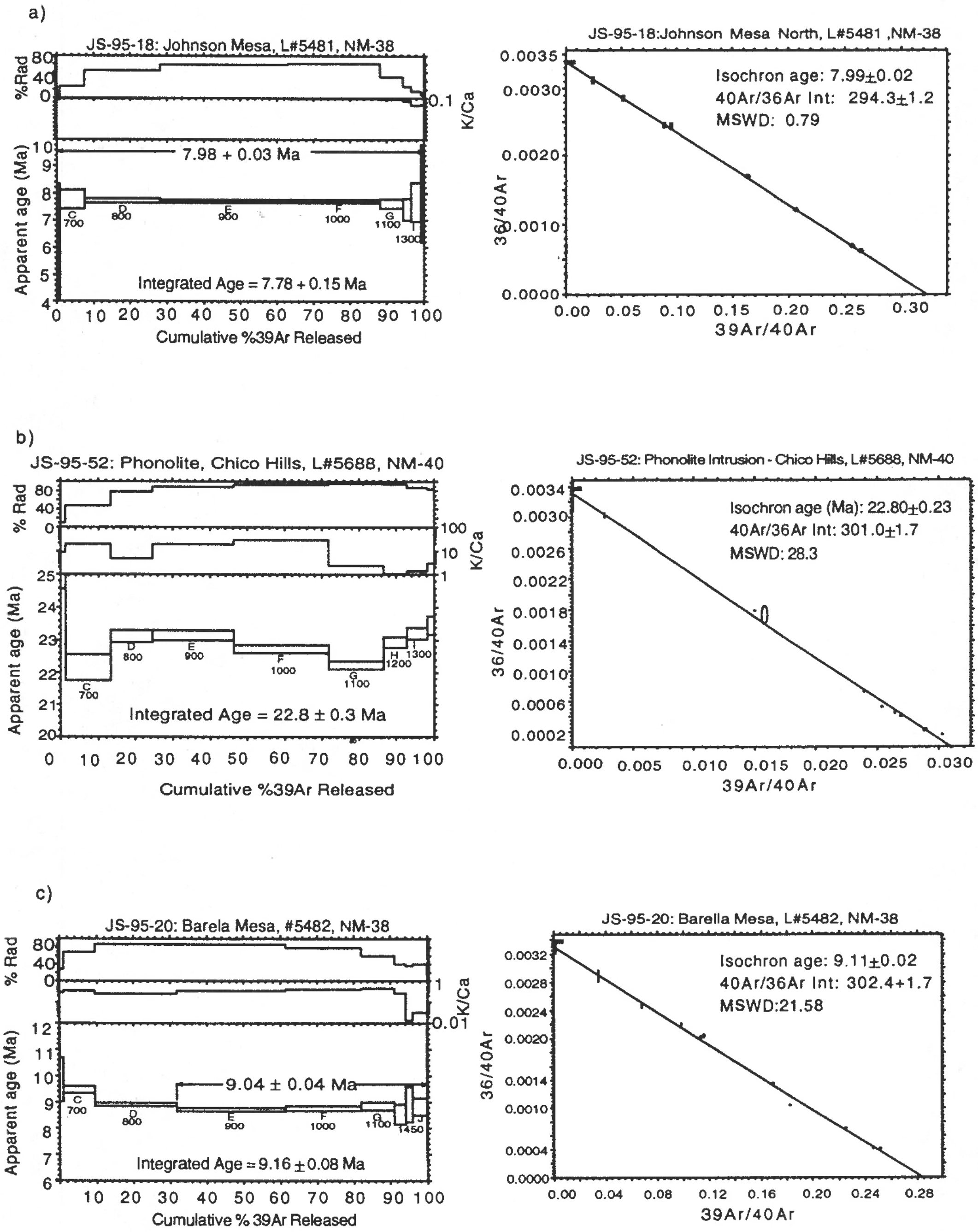

Figure 3. Classification of incremental heating analysis: a) class A results, b) Class B1 results, c) class B2 results, d) Class C results. See text for basis of spectra classification.

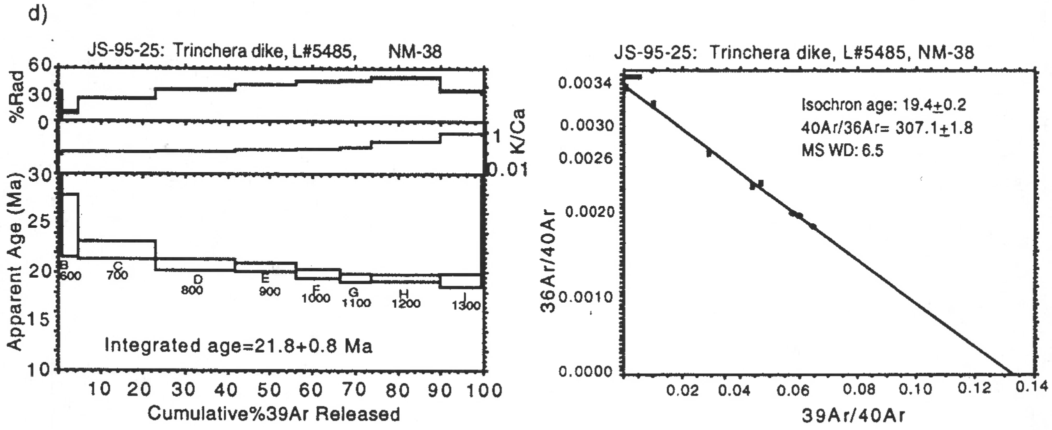

Figure 3. Continued.

criteria. The isochron in this class has selected steps with an MSWD >2.5 and/or the $^{40}Ar/^{36}Ar$ intercept is not within 2 σ of the atmospheric value of 295.5. Five percent of the samples analyzed fall within this classification. Sample JS-95-25 (figure 3d) is representative of this class of spectra and isochron. The results in this class are considered unreliable and are not utilized in the geologic interpretations of this study.

Discussion:

Extraneous Argon

It was noted in K/Ar studies during the late 1960's that $^{40}Ar/^{36}Ar$ ratios greater than atmosphere could occur due to the incorporation of extraneous argon in crystal phases of magma before eruption (McDougall et al, 1969). Extraneous argon is defined as the additional ^{40}Ar that is present in a sample which has a $^{40}Ar/^{36}Ar$ ratio greater than atmospheric argon (McDougall and Harrison, 1988). Extraneous argon is divided into two subcategories: excess argon and inherited argon. Excess argon is considered to be incorporated into minerals by processes other than in-situ decay of ^{40}K (Lanphere and Dalrymple, 1976). Inherited argon is considered ^{40}Ar that is introduced into a rock or mineral sample by physical contamination from older material (McDougall and Harrison, 1988).

Extraneous argon presents problems in the dating of minerals and rocks by yielding mineral and rock apparent ages higher than the true eruption age. This can be a serious problem with the K/Ar method, where the only way to infer that extraneous argon is present in a sample is by comparing the K/Ar age with other independent geologic data. The advantage of the $^{40}Ar/^{39}Ar$ method over the K/Ar method in detecting extraneous argon is the ability to see variations in the distribution of incremental heating steps in an age spectra and an isochron (figure 4). This has been seen in step heating spectra from high ages in initial and latter steps during $^{40}Ar/^{39}Ar$ analysis (Heizler and Harrison, 1988; Harrison, 1983, Harrison and McDougall, 1981). Problems associated with extraneous argon in volcanic samples has been documented by many studies to date (Lo et al, 1994; Kyser and Rison, 1982; McDougall et al, 1969).

Some of the $^{40}Ar/^{39}Ar$ results in this study show characteristic signs of the presence of extraneous argon, such as the geologically unrealistic old ages in samples JS-94-4 and JS-95-17 as well as $^{40}Ar/^{36}Ar$ trapped components that are more than 2 sigma greater than atmospheric ratios (JS-95-28). Inherited argon from xenocrysts has caused problems with data interpretation in the dating of young basalts (McDougall and Harrison, 1988; Gillespie et al, 1983). Quartz and potassium bearing xenocrysts are present in many of the Capulin phase basalt flows, suggesting inherited argon is the likely cause for the anonymously old apparent ages.

Suspected xenocryst-bearing samples with anonymously high apparent ages were subjected to a reanalysis with a more extensive sample preparation process. The groundmass concentrate for JS-94-4 was separated into several sieve sizes (850-150 µm), then processed through a Frantz magnetic separator. Thirty percent of the groundmass concentrate that consisted of nonmagnetic and highly magnetic groundmass was removed from the remaining groundmass concentrate in an attempt to remove xenocrysts (and potentially

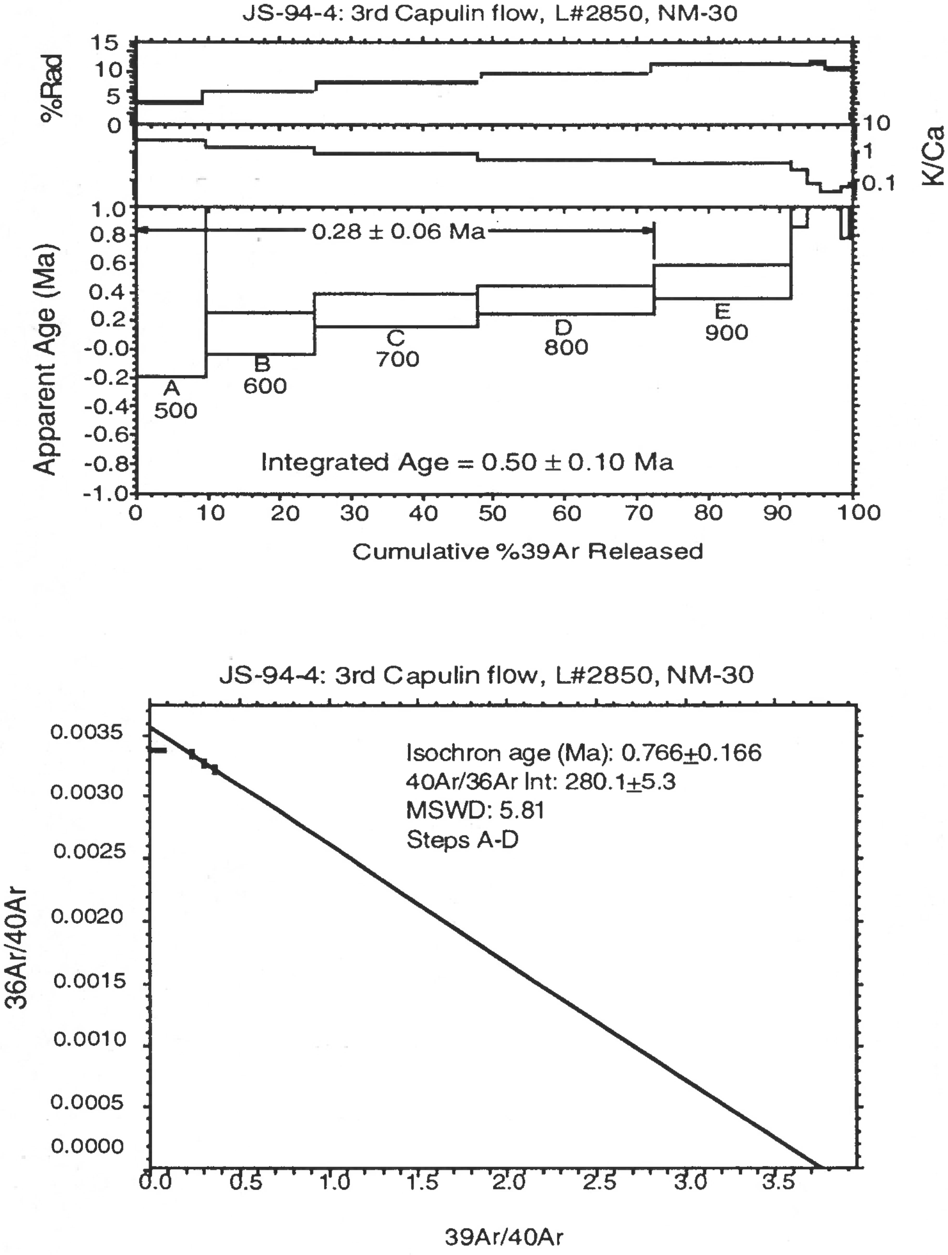

Figure 4. Example of inherited argon in an age spectra. The calculated eruption age for this sample is 56 ± 8 ka.

inherited argon) from the sample. However, there is no significant change in the results compared to the initial analysis with larger grain sizes and no magnetic separation (figure 5). The source of extraneous argon in this sample must be concentrated in the groundmass. The presence of xenocrysts in the samples appears to have a direct link with the presence of excess argon in the age spectra; attempts to remove xenocrysts in order to obtain a more accurate eruption age were unsuccessful.

Inclusions in olivine is a suspected source of excess argon that could be affecting the results in this study (McDougall et al, 1969). One sample in particular, JS-94-4, displayed a wide range of apparent ages that made determining an eruption age for this sample difficult. JS-94-4 olivine was hand picked under a binocular microscope from the sample, then irradiated. A 31.8 mg aliquot of olivine was analyzed and yielded 4.45 X 10^{-16} moles/mg of ^{40}Ar. Utilizing a mass balance calculation that compared the known age with the older sample age, the amount of extraneous ^{40}Ar in this whole rock sample was determined to be 3.81 X 10^{-15} moles/mg. Olivine comprises at most 10% of the separate used in this experiment, thus the maximum contribution of olivine is 4.45 X 10^{-17} moles ^{40}Ar /mg of sample, or approximately 1% of the total extraneous argon in the sample. Therefore, olivine is not the major source of excess argon in this sample. Major sources of extraneous argon in this sample must be present in other forms, such as potassium feldspars and quartz inclusions.

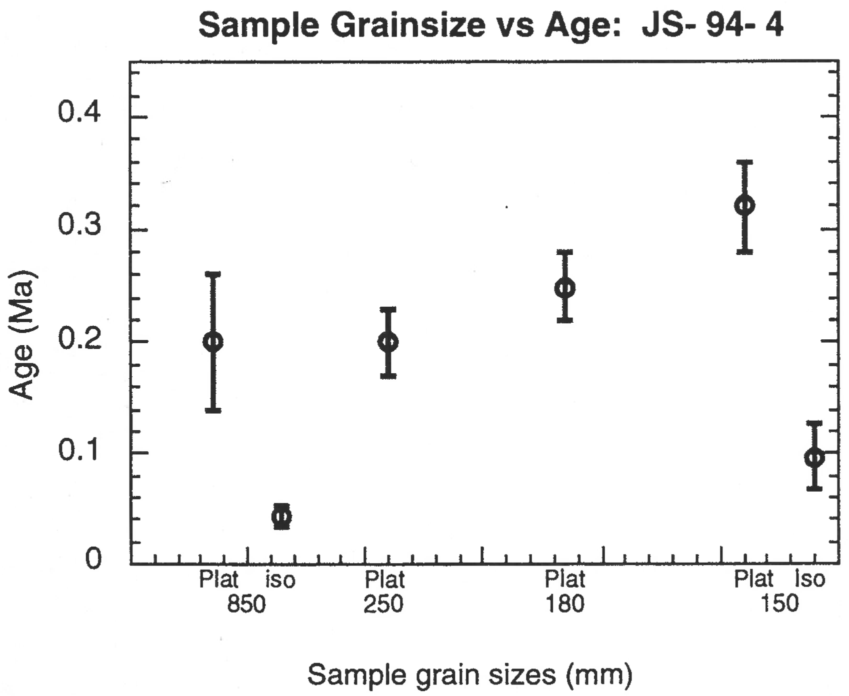

Figure 5. Sample grain size vs age for JS-94-4.
Plat = plateau age, Iso = isochron age.

Effects of sample weight on results

The effect of sample weight on analytical results was examined because a larger amount of groundmass concentrate will increase the ^{36}Ar signal, which might reduce the analytical uncertainty in the samples. An experiment was performed using larger groundmass concentrate aliquots (400-500 mg) of the young samples that initially gave very imprecise results. Seven samples were selected for this experiment (table 2). A sample of the age spectra from both the original and larger sample results is shown in figure 6.

Sample size can affect the precision for the eruption age determination; in some cases, a larger sample size can show a significant reduction in the ages of individual heating steps. Three of the larger samples yielded improved precision for the ages of individual steps as well as more precise plateau ages. More precise determinations of the eruption age for half of the samples resulted from the increase in sample size. Four samples analyzed in this fashion did not display any significant reduction in uncertainty (figure 7).

There are some possibilities as to why the sample weight can affect precision of heating steps. The increased signal in the ^{36}Ar measurement of a larger sample size may increase the precision of the analysis and reduce the error in the ^{36}Ar measurement. The higher weight samples that did show an improvement in precision have an increased ^{36}Ar measurement and a reduction in ^{36}Ar measurement error that are 2-10 times better than smaller samples, but so did those samples where precision was not increased. The blank measurements between the smaller and larger sample sizes show no consistent pattern between the samples that had an increase in precision and

Table 2: Sample weight and grain size experiments

Sample	Sieve Size (µm)	Sample size (mg)	Plateau Age (Ma)	Error (Ma)	Isochron: selected steps	Error (Ma)
JS-94-4	850	80	0.28	0.06	0.77	0.17
	850	120	0.18	0.06	0.004	0.004
	250	502	0.20	0.02	-0.10	0.02
	180	504	0.25	0.03	0.068	0.05
	150	499	0.21	0.03	0.035	0.02
JS-95-7	850	100	0.046	0.018	0.016	0.01
	250	406	0.047	0.01	0.034	0.001
JS-95-15	850	100	0.034	0.02	0.027	0.01
	250	498	*	*	0.067	0.01
JS-95-17	850	120	0.14	0.06	0.05	0.04
	150	502	0.36	0.07	0.036	0.07
JS-95-28	850	100	0.03	0.03	-0.27	0.27
	250	435	0.13	0.05	-0.62	0.16
JS-95-32	850	120	0.08	0.02	0.02	0.01
	250	459	0.08	0.02	0.064	0.022
JS-95-48	850	120	0.048	0.014	0.064	0.02
	250	501	0.14	0.02	0.048	0.01

*sample did not meet plateau requirements (see classification of incremental heating analysis section)

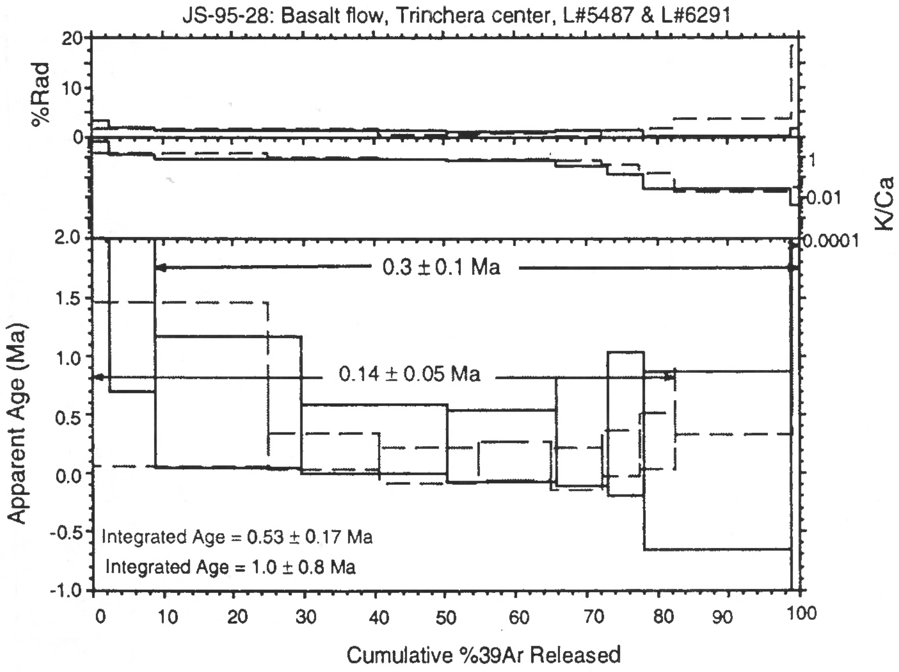

Figure 6. Sample size experiment example. The dashed spectra is the larger sample size compared to the original spectra in black. Notice the increase of precision in the heating steps as well as the younger plateau and integrated age with the larger sample.

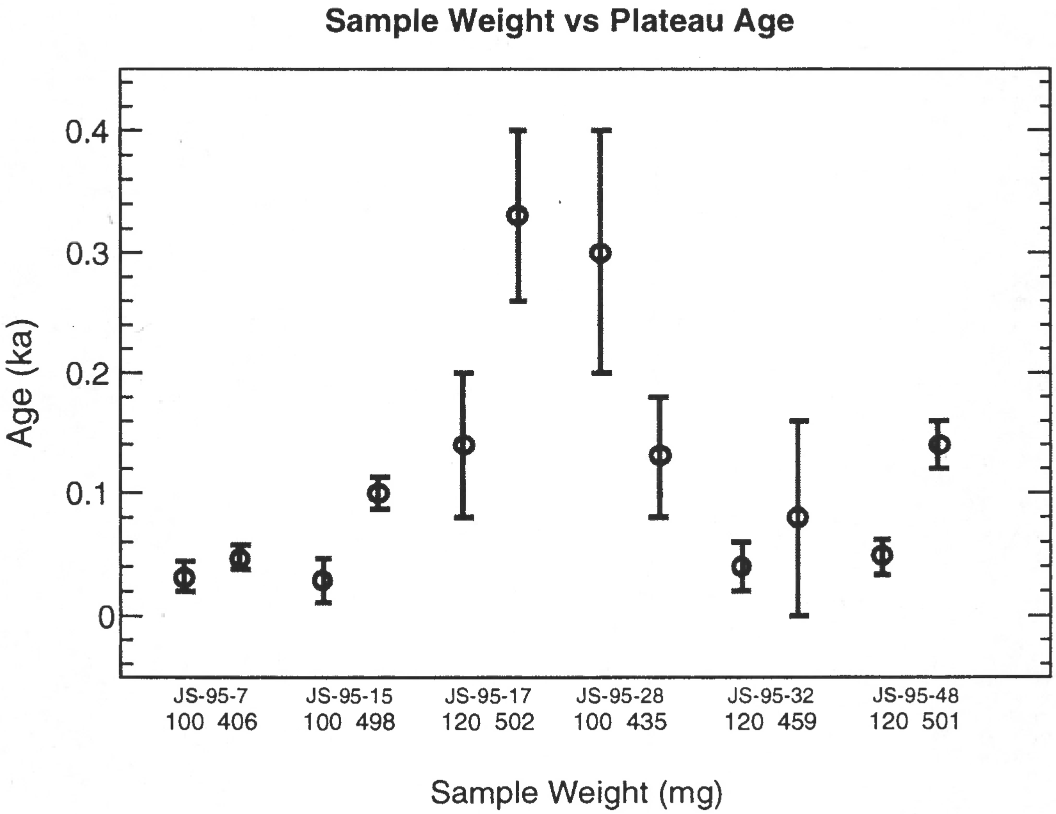

Figure 7. Sample weight experiment. Several samples that are younger than 400 ka are compared to one another after reanalysis of the same sample,but with a larger sample weight. In many instances, the larger sample weights yield ages that are older and larger in uncertainty than the smaller sample weights.

those that did not. The sources of uncertainty in these analyses must come from other sources.

Factors that did affect the uncertainty in these analyses are the discrimination and the measurement capabilities of the mass spectrometer. The discrimination measurement applied to the age determination calculations accounts for 40-50% of the error involved with these measurements. The ability of the mass spectrometer to measure the small amounts of gases being generated from these young samples accounts for the majority of the balance of the remaining error. With current technology, the mass spectrometer can not measure these smaller quantities of gases without substantial error. In order for this experiment to work, discrimination factors must have less error and future technology must be developed which will enable the measurement of these small quantities of gas with much less error.

Capulin volcano

Capulin volcano is the central feature of Capulin Volcano National Monument, a popular tourist attraction in northeastern New Mexico. The volcano is the youngest and most perfectly-formed cinder cone in the volcanic field (National Park Service, 1994). Muehlberger (1955) extrapolated an eruption age of 4-10 ka based on a radiocarbon date (C^{14}) from charcoal present in an uncovered alluvial unit at the Folsom Early Man Site, located 11 km northeast of Capulin volcano. This unit was correlated with an alluvial unit near the volcano covered by a Capulin flow. In contrast, however, cosmogenic helium studies of the lava flows at Capulin volcano indicate a minimum eruption age of ca 55 ka (Micheal Ort, oral communication).

In order to better constrain the eruption age of the volcano, several samples were obtained from lava flows and bombs at the volcano. These samples yielded a wide range of ages and uncertainties. The plateau and isochron ages from each sample are plotted together in figure 8 and summarized in table 3. Isochrons for most of the Capulin samples are poorly defined, because of low radiogenic yields. The errors and reproducibility of isochron ages (table 3, figure 8b) are generally inferior to ages determined from age spectra. The plateau ages from Capulin volcano range from 30 ka to 740 ka (figure 8a). Plateau ages from sample JS-95-7 are tightly clustered, with a weighted mean age of 56 ± 8 ka. Plateau ages from JS-95-15, JS-95-17, and JS-95-32 are much less reproducible. Some are similar to JS-95-7, ranging from 30 to 80 ka; others are considerably older, ranging from 270 to 360 ka. Plateau ages from JS-94-4 are all anomalously old, ranging from 200 to 740 ka. Samples JS-94-4 and JS-95-17 contain abundant xenocrysts. It is likely that the anomalous results from these samples, and perhaps from JS-95-15 and JS-95-32, are related to the presence of variable amounts of inherited extraneous argon. The weighted mean age of JS-95-7 of 56 ± 8 ka is judged to be the most accurate estimate for the eruption age of Capulin Volcano.

Volcanic History:

^{40}Ar/^{39}Ar results support the previously recognized three phase division of volcanism in the Raton-Clayton volcanic field, which was based on geochemical and K/Ar studies. The larger database (figure 2) and the higher precision of the ^{40}Ar/^{39}Ar analysis allow for more detailed interpretation

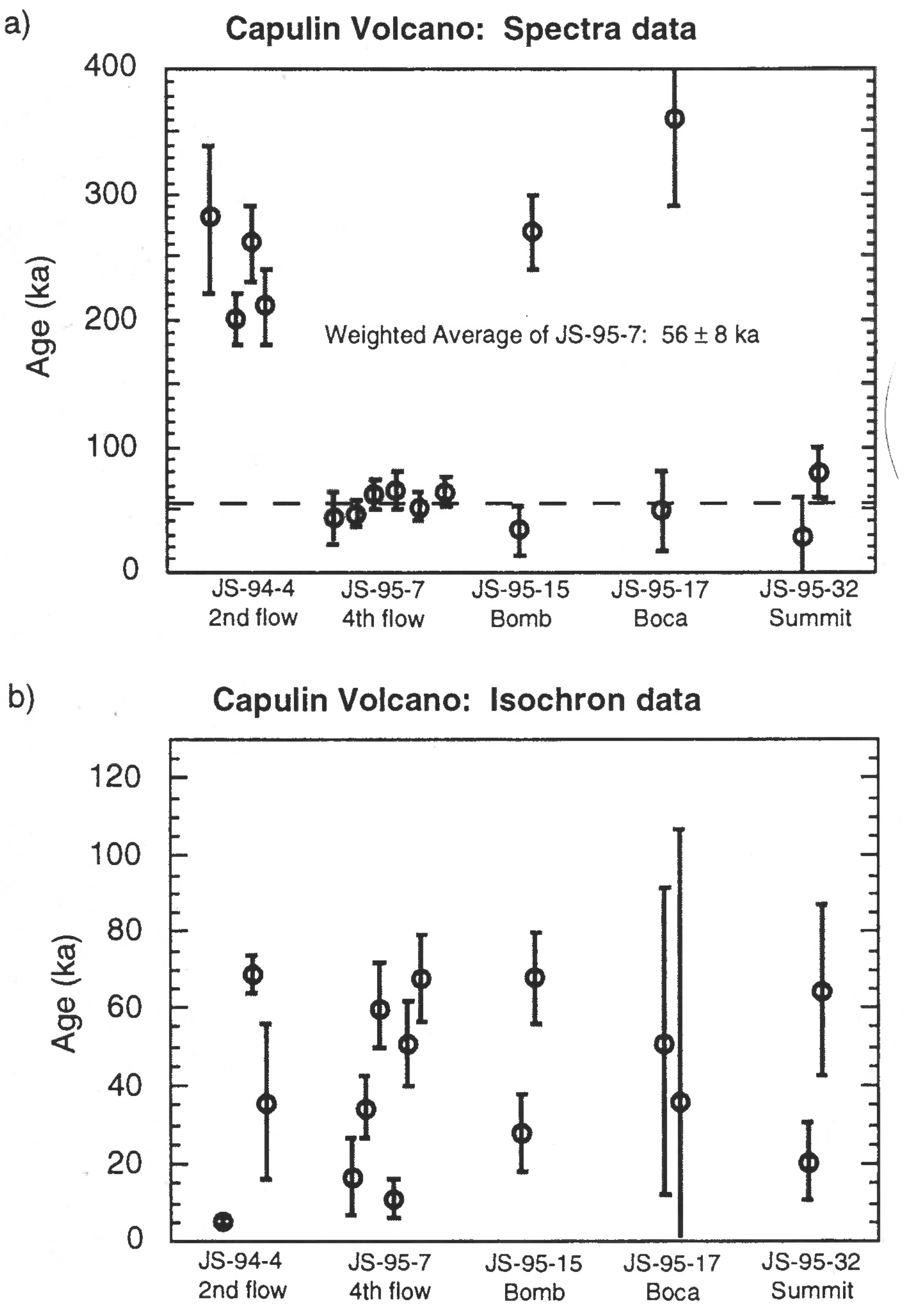

Figure 8. Summary of $^{40}Ar/^{39}Ar$ results from Capulin volcano : a) spectra and b) isochron ages. The weighted average (Taylor, 1982) of all analyses of JS-95-7 is considered the best estimate of the eruption age for Capulin volcano. Some samples ages which fall off the plotting area are not shown.

Table 3: Summary of $^{40}Ar/^{39}Ar$ results from Capulin volcano.

		Isochron					Plateau	
Sample	Lab #	$^{40}Ar/^{36}Ar$	±Err	MSWD	Age (ka)	±Err (2σ)	Age (ka)	±Err (2σ)
JS-94-4	2850-01	280.1	5.3	5.8	766	166	280	60
	5677-01	304.5	3.1	1.1	4	1	740	150
	6296-01	316.9	1.9	1.4	-100	20	200	20
	6297-01	309.4	8.5	0.9	68	5	260	30
	6298-01	307.6	9.5	3.6	35	20	210	30
	weighted mean						**225**	**58**
JS-95-7	5169-01	299.6	2.3	1.4	16	10	46	18
	6287-01	297.4	1.4	1.9	34	8	47	10
	6963-01	297.5	1.6	0.8	60	11	62	12
	6963-02	306.9	2.4	1.0	10	5	65	15
	6963-03	298.2	2.3	0.4	50	11	53	12
	6963-04	294.6	2.1	0.9	67	11	64	11
	weighted mean						**56**	**8**
JS-95-15	5383-01	297.2	2.8	2.1	27	10	**34**	**19**
	6291-01	302.1	1.9	2.9	67	12	270	30
JS-95-17	5384-01	295.6	3.3	0.2	51	40	**50**	**30**
	6295-01	302.8	2.8	0.6	36	70	360	70
JS-95-32	5385-01	296.4	2.0	1.9	20	10	30	30
	6287-01	296.3	1.4	0.7	64	22	80	20
	weighted mean						**65**	**49**
Eruption age of Capulin volcano								
	best estimate is mean age of JS-95-7						**56**	**8**

note: Age determinations shown in bold are used as ages in Table 2.

regarding the timing of the eruptions for the volcanic field (figure 9). Table 4 summarizes the eruptive history of the volcanic field.

The Raton phase consists of the following volcanic units: the Raton basalts, the Red Mountain rhyodacite domes, early feldspathoidal basalts, the Yates and Mesa de Maya flows, the Bartlett Mesa basalts and the Sierra Grande and Pine Butte andesites (figure 1). The Raton basalts have widespread coverage in the field, with an eruptive sequence from 9.04±0.04-7.43±0.19 Ma. These alkali olivine basalts filled local topographic lows, probably valley floors and plains, at the time of eruption (figure 10a). The Red Mountain rhyodacite domes were extruded ca 7 Ma (Scott et al, 1990), then small feldspathoidal basalt eruptions occurred on Johnson Mesa around 6 Ma (Scott et al, 1990) and 4.03±0.12 Ma. The Yates olivine basalt flows were erupted between 5.62±0.07-4.67±0.04 Ma, and the transitional olivine basalts of Mesa de Maya were emplaced at 5.10±0.03-4.67±0.04 Ma. The Bartlett Mesa basalts erupted around 3.6±0.1Ma. The Bartlett Mesa basalts were originally considered as part of the Raton basalts due to geochemical and geomorphological similarities, however, because the Bartlett Mesa basalts erupted 3.8 m.y. later than the youngest Raton basalts, they are classified separately here (Table 4). The only stratovolcano in the field, Sierra Grande, began erupting at ca. 3.8±0.2 Ma and the eruptive activity continued into the Clayton phase. The 3.58±0.02 Ma Pine Butte andesite dome is the only other andesite unit in the Raton-Clayton volcanic field.

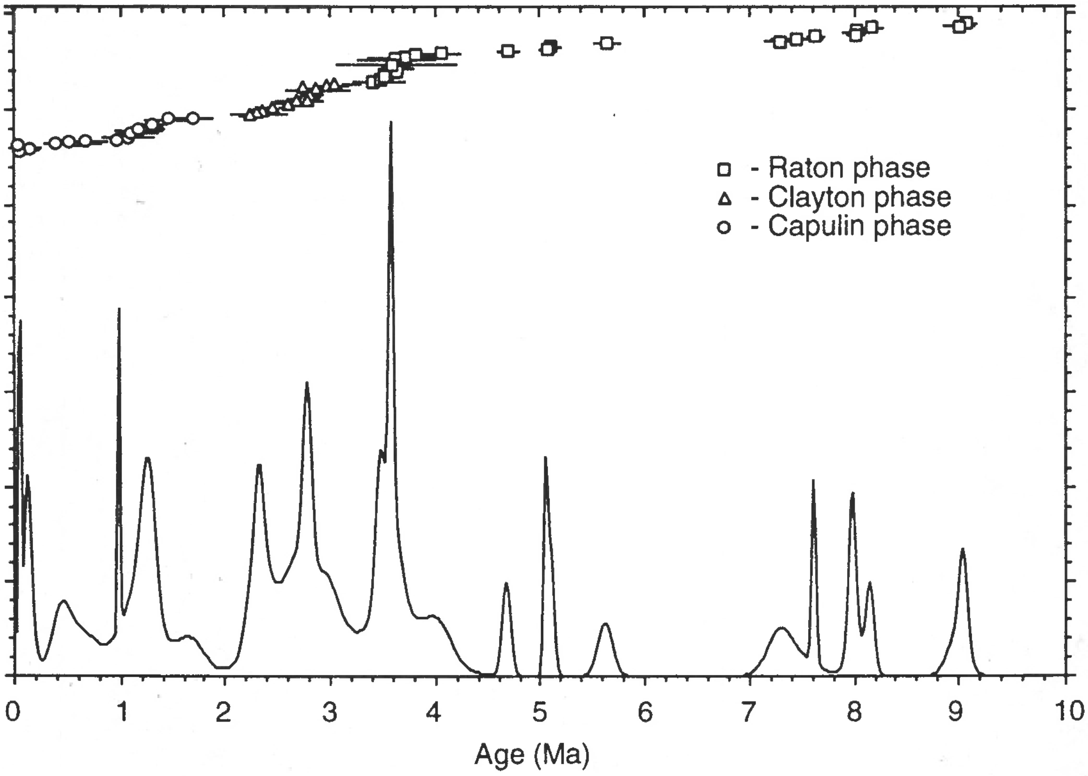

Figure 9: Probability distribution diagram of all ^{40}Ar/^{39}Ar eruption ages from the Raton-Clayton volcanic field.

Table 4: Raton-Clayton volcanic field eruptive phases, volcanic units, previous nomenclature and $^{40}Ar/^{39}Ar$ ages (in part from Calvin, 1987)

Phase	Volcanic Unit	n	Age Range (Ma)
Raton	Raton basalt	11	9.04 ± 0.04 - 7.43 ± 0.19
	Red Mountain rhyodacite*	-	6.8 ±1.4 - 6.3 ±1.4
	Yates basalt	2	5.62 ± 0.07 - 4.67 ± 0.04
	Mesa de Maya basalt	2	5.10 ± 0.03 - 5.05 ± 0.02
	Early feldspathoidal basalt	1	4.03 ± 0.12
	Sierra Grande andesite	1	3.8 ± 0.2
	Bartlett Mesa basalt **	2	3.6±0.1
	Pine Butte andesite	1	3.58 ± 0.02
Clayton	Clayton basalts	13	3.04 ± 0.17 - 2.24 ± 0.06
	Sierra Grande andesite	5	2.97 ± 0.11 - 2.6 ± 0.09
Capulin	Late feldspathoidal basalts***	2	1.68 ± 0.13 - 1.14 ± 0.16
	Capulin basalts	17	1.44 ± 0.18 - 0.056 ± 0.008

* based on several K/Ar ages (Scott et al, 1990)

** formerly included in the Raton basalt (Stormer, 1972 a,b)

*** formerly termed the Folsom sequence of Clayton basalts by Baldwin & Muehlberger, 1959; the feldspathoidal lavas by Stormer, 1972a; and the Folson basalts by Kudo, 1976

a) Raton phase: ca. 9-3.6 Ma

b) Clayton phase: ca. 3.0-2.2 Ma

c) Capulin phase: ca. 1.7 Ma - 56 ka

Figure 10. The Raton-Clayton volcanic field eruptive phase coverage. a) Raton phase, b) Clayton phase and c) Capulin phase. Asterisks mark eruptive centers.

The Clayton phase is limited to flows and eruptive centers located in the central and eastern sections of the volcanic field (figure 10b). This phase contains the Clayton basalts and the younger eruptive sequence of Sierra Grande. The Clayton basalts consist of voluminous transitional olivine basalts interpreted as having erupted from several fissure eruptions which were subsequently covered by younger cinder cones of subsequent eruptions (Dungan et al, 1989). Eruptions began near the town of Clayton, NM, at 3.04±0.17 Ma at the Rabbit Ears vent (figure 1), then spread across the landscape to the base of Sierra Grande. Ages obtained from the andesite flows of Sierra Grande indicate an active eruption cycle shortly after the eruption at the Rabbit Ears vent and contemporaneous with the beginning of the eruption of the Clayton basalts. The final eruption of the Clayton basalts was at Mt. Dora, a shield volcano lying between Clayton and Sierra Grande, at 2.24±0.06 Ma.

The last phase of volcanism consists of the Capulin basalts and feldspathoidal flows (figure 10c). After a 0.5 m.y. lapse in volcanism starting about 2.2 Ma, eruption of the feldspathoidal Carr Mountain flow at 1.68 ±0.13 Ma signaled the beginning of the Capulin phase. The Capulin olivine basalts began erupting at 1.44±0.18 Ma and have continued erupting to the latest activity at Capulin volcano, which has an eruption age of 56±8 ka. These Capulin basalts crop out in the western and central part of the volcanic field and occupy the present day valley floors. The exception to this is in the western part of the field, where the flows are old enough to have 30-165 m of erosional relief above local base levels. These flows have been considered as part of the

Clayton basalts (Scott et al, 1990), but their $^{40}Ar/^{39}Ar$ age range and petrologic properties (Dungan et al, 1989) place them within the Capulin basalts.

Landscape Evolution:

The erosional evolution of volcanic features has received limited study compared to other disciplines in volcanology and geomorphology. An erosional process termed "volcanic inversion of relief" (Cotton, 1969) occurs when basalt flows initially bury valley floors, then erode less readily than the sides of the valley. Over time, these basalt flows eventually became ridges themselves. Late Miocene/Pliocene landscape development in New Mexico has been discussed in some geochronologic studies of volcanic fields (McIntosh and Cather, 1994; Scott et al, 1990; O'Neill and Mehnert, 1988), but no attempt has been made to quantify erosion rates utilizing this data.

The inverted topography of the Raton-Clayton volcanic field's lava flows varies considerably in magnitude, depending on the location and age of the flows. The oldest flows, the 9.04±0.04-7.43±0.19 Ma Raton basalts, cap the highest mesas in the region (Fishers Peak Mesa, Barela Mesa and the western portion of Johnson Mesa, see figure 1), and cover the remnants of the Ogallala formation. Bartlett Mesa and Horse Mesa, capped by the 3.60±0.1 Ma Bartlett Mesa basalts) are ~50 m lower than the Raton basalt capped mesas. The 3.04±0.17-2.24±0.06 Ma Clayton basalt flows cap the current base level east of Sierra Grande, but form escarpments above the Capulin flows north and west of Capulin volcano. The Capulin basalts cap the present erosional surfaces in the central portion of the volcanic field area, but in the western portion of the field form mesas as much as 165 m above the present base level.

The $^{40}Ar/^{39}Ar$ results used to define the volcanic history of the Raton-Clayton volcanic field can also be employed to estimate the rates of erosion in the field. Contour profiles drawn from the top of the basalt capped mesas to the local base level (figure 11) provide a means of quantifying post-emplacement erosion. The average erosion rate since the eruption of a lava was estimated by dividing the elevation difference between the mesa capped flows and the current base level (i.e. stream, etc.) by the age of that particular flow. These average erosion rates were then plotted on a map of the volcanic field to examine the distribution of rates within the field (figure 12).

As shown in figure 12, erosion is not uniform across the Raton-Clayton volcanic field. Erosion in the east/central portion of the field is low; flows as old as 3.5 Ma have no significant erosional relief. Erosion increases to the west and is greatest in the northwestern portion of the field where mesas stand as high as 490 m above the local base level. Geochronologic and elevational differences among the mesas in the northwestern portion of the volcanic field can be used to interpret differing erosion rates over time.

Further insights into the erosion rates of the Raton-Clayton volcanic field can be gleaned from geologic relationships in the Yankee quadrangle, New Mexico. There is a 360 m difference in elevation between the local base level and the top of Horse and Johnson Mesa. The Yankee volcano and its flow (figure 13), which has an eruption age of 1.14±0.16 Ma, is 120 m above the current base level and it is also one-third the way up the slope of the western portion of Johnson Mesa.

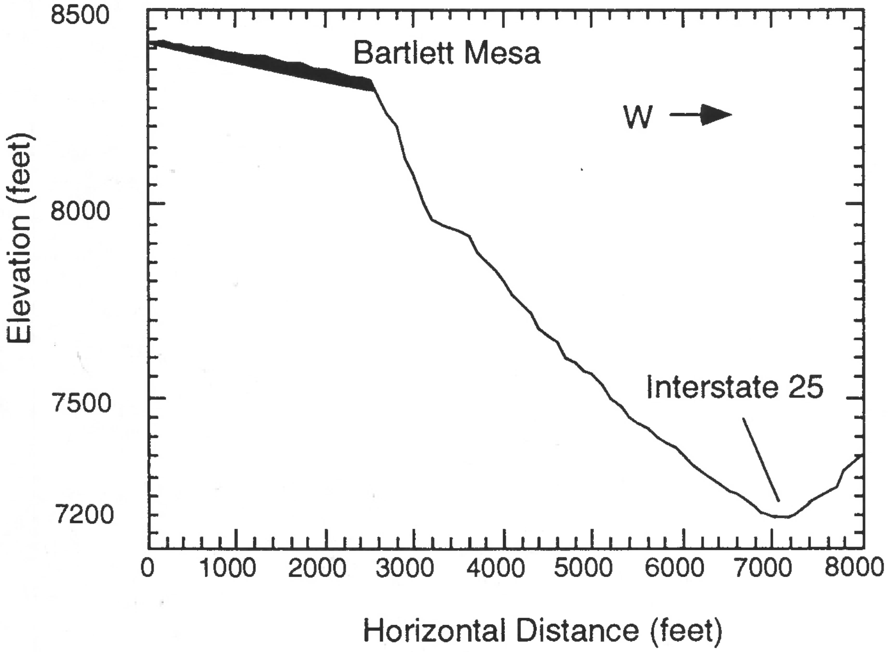

Figure 11. Contour profile, Raton Pass, New Mexico.

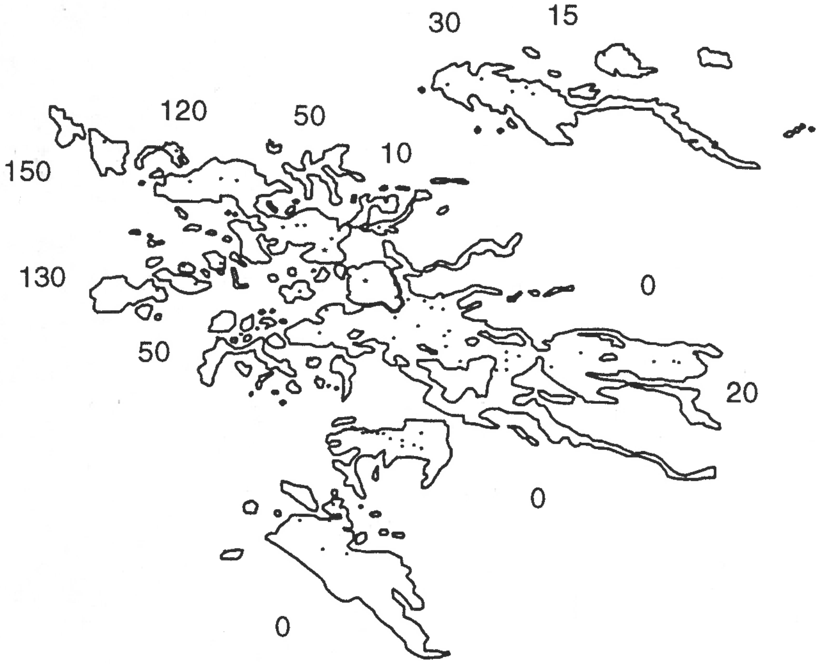

Figure 12. Erosion rate map. Numbers shown above are in meters/Ma.

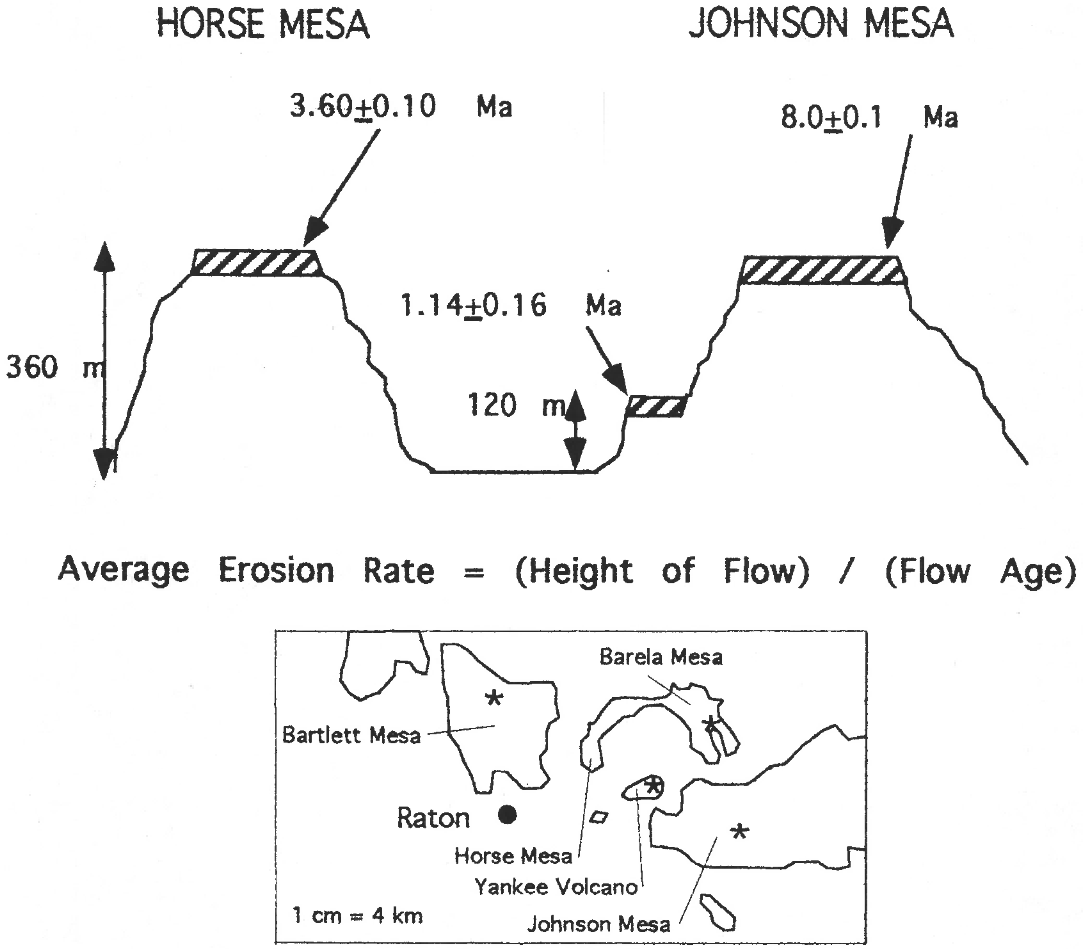

Figure 13. Yankee quadrangle landscape development, New Mexico. Asterisks denote eruptive centers.

Since there is only a 50 m elevational difference between the Raton flows (9.0 Ma) and the Bartlett Mesa flows (3.6 Ma) in this area, it appears that there was little erosion occurring during this time interval (12 m/Ma). After 3.6 Ma, 360 m of erosion occurred, suggesting a substantial increase in the erosional processes in this area. An erosion rate calculation based on the Yankee flow yields an average erosion rate of 115 m/Ma, which is equal to the post-Bartlett Mesa erosion rate over time. This suggests that erosion rates have been relatively constant during the last 3.6 Ma in this quadrangle.

Possible causes of increased erosion about 3.6 Ma:

There are several possible explanations for the increase of erosion rates at about 3.6 Ma. However, it is likely that one major process was dominant. Possible causes of rapid erosion include localized or epeirogenic uplift, rapid climate change, or headward erosion.

The Front Range in Colorado has been postulated as having localized uplift since 5.5 Ma (Epis and Chapin, 1975). This provides a source for lowered base level and ensuing rapid erosion, leaving an inverted topography similar to the northwest section of the Raton-Clayton volcanic field (O'Neill and Mehnert, 1988; Epis and Chapin, 1975; Scott, 1975). MacGinitie (1953) used paleobotany to estimate the paleoelevation in central Colorado. The plant fossils present at the Florissant beds were inferred to have been deposited at a paleoelevation of less than 915 m, much less than the current elevation of 2,500 m. However, the Wall Mountain Tuff (36 Ma), an ignimbrite that crosses the Front Range and flows in drainages across to the Great Plains, does not show significant fault offset where it crosses the Front Range. In light of the lack of major displacement and subsequent reinterpretations of the paleobotany at the Florissant beds, large localized uplift is not currently favored as having occurred along the eastern edge of the Rocky Mountains during the late Miocene/Pliocene (Chapin and Cather, 1994; Gregory and Chase, 1994).

Localized uplift has been postulated as the source of the inverted topography of volcanic flows in the Ocate volcanic field, 50 km southwest of the Raton-Clayton volcanic field. The Ocate volcanic field is located approximately 150 km southwest of the Raton-Clayton volcanic field. The Ocate volcanic field overlaps the Southern Rocky Mountain province (O'Neill, 1988), whereas the Raton-Clayton volcanic field falls within the Great Plains province (Lipman and Mehnert, 1975). The Ocate volcanic field is close to the Rio Grande rift extensional system and a major Neogene normal fault does run through the volcanic field (O'Neill, 1988). The Raton-Clayton volcanic field has no major faults in or around it and is not directly subjected to the faulting of the Rio Grande rift extensional system. The differences between the Ocate and Raton Clayton volcanic fields, in combination with the lack of major uplift along the Colorado Front range, indicate that localized uplift is not the major cause behind increased erosion rates in the Raton-Clayton volcanic field.

Epeirogenic uplift is another process which could be responsible for changes in erosion rates of the Raton-Clayton volcanic field. It has been proposed that epeirogenic uplift has been occurring in the Southern Rocky Mountains area and the Great Plains since the Pliocene (Epis et al, 1980; Davis, 1911). Epeirogenic uplift would account for the deep erosional cuts in the late Eocene erosion surface present along the Front Range in Colorado, also known as the Rocky Mountain erosion surface (Evanoff and Chapin, 1994).

This is similar to the northwest corner of the Raton-Clayton volcanic field where a late Miocene erosional surface is buried beneath the basalt flows capping the mesas near Raton.

Recent research suggests, however, that epeirogenic uplift since the Pliocene is not necessarily required to explain the present elevation in the Front Range and the Great Plains. Utilizing a multivariate climate model that incorporates physiognomy of fossil leaves at the Florissant beds, Gregory and Chase (1992) and Meyer (1986) suggest that the paleobotanical evidence points to a paleoelevation of the Eocene erosional surfaces of 2,000 m or more, meaning the Pliocene fluvial incision of the erosional surface was not tectonically controlled (Molnar and England, 1990). Studies of sediment balance for this erosional surface, isostatic modeling, and a numerical model of fluvial erosion and deposition over time show that the Rocky Mountain erosion surface could have formed at the present elevation without incision (Gregory and Chase, 1994). Ruddiman and Kutzbach (1989) experimented with a world-wide climatic model in which epeirogenic uplift was assumed to have caused changes in the western United States. They intended to test the model with previous paleobotanical research in the areas of concern. While the model was generally successful in predicting world-wide climate changes, it did not work with epeirogenic uplift occurring in the Southern Rockies and Great Plains during the late Miocene and the Pliocene. Paleobotanical research shows a drier climate than the model predicted with possibly wetter summers due to a monsoonal season (Axelrod, 1950; Axelrod, 1977).

A third explanation for increased erosion around 3.6 Ma is a change in climatic conditions. A climate change (Molnar and England, 1990) could account for the substantial increase in the average erosion rate in the Yankee quadrangle, from 12 m/Ma to 115 m/Ma, as well as the rest of the volcanic field.

Several studies support climatic changes occurring in the late Miocene and Pliocene. Studies of Cenozoic sediment deposits in the northwestern Gulf of Mexico and its drainage basin show an appreciable increase in sediment deposition at ca. 5 Ma with a massive influx of sediment at ca. 2 Ma (Hay et al, 1989), most of which as been attributed to erosion of the Rocky Mountains. Fleming (1994) conducted pollen studies that also suggested that a climate change over the Colorado Plateau occurred between 3.9 and 4.5 Ma, greatly increasing rates of erosional processes. There is disagreement as to what type of climate change occurred during the Pliocene in this region; some propose a drier, cooler climate (Molnar and England, 1990; Smith *et al*, 1993) while others believe a warming trend occurred (Willard *et al*, 1993; Thompson, 1991). There does appear to be a consensus between these authors that there was a major change in climate between 4-3 Ma. The data that supports such a change includes a change in C_3 vs. C_4 plants (Smith et al, 1993), vertebrate and plant fossil studies (Thompson, 1991), and from marine microfossils (Willard *et al*, 1993).

Gregory and Chase (1994) proposed that a post-Eocene climate that was drier but stormier in nature could have caused the incision of the Rocky Mountain erosion surface at the Front Range, which appears to agree with the paleobotanical data of Axelrod (1977) for the Southern Rockies and Great Plains. The erosional impact of fewer, but more violent, storms would be more significant than continuous precipitation of a gentler nature (Molnar and

England, 1990; Barron, 1989) and could have played a major role in the high erosion rates present in the western portion of the Raton-Clayton volcanic field.

Headward erosion of local drainages provides another possible explanation for the increased erosion rates in the field area. Precipitation on high relief features of the area provides large amounts of potential energy for erosion. Cotton (1969) identified alcoves along the Snake River that were produced through headward erosion of the basalt plain in Idaho. Headward erosion would lead to uncertainty in trying to establish an average erosion rate over time in the Raton-Clayton volcanic field by allowing for a large amount of erosion to occur over a short time interval. This would render any attempt at calculating an average erosion rate over millions of years as unreliable at best. However, based on the ^{40}Ar/^{39}Ar ages of the flow-capped mesas in the Yankee quadrangle (figure 12), there appears to be little headward erosion in that immediate area since at least 1.2 Ma. If the model for continuous erosion over time since 3.6 Ma is correct for the Yankee quadrangle, then headward erosion does not play a major role as a cause for the increased erosion rates. This does not rule out headward erosion occurring elsewhere in the northwest section of the Raton-Clayton volcanic field, but it does not seem to be a major cause for increased erosion in the Yankee quadrangle.

After examination of possible causes for increased erosion in the northwestern portion of the Raton-Clayton volcanic field, a change in climate in the region about 3.6 Ma appears to be the likely cause responsible for the increase of erosion rates. Localized uplift is not considered a cause for the increase of erosion at about 3.6 Ma. Epeirogenic uplift could be a cause, but recent research suggests a different interpretation. Headward erosion is a distinct possibility, but the geomorphology of volcanic features in the Yankee quadrangle suggest that a continual erosional process is more likely.

Conclusions

The $^{40}Ar/^{39}Ar$ results from the Raton-Clayton volcanic field provide a concise record of the eruptive history and landscape evolution in the field. Sixty-five basaltic to andesitic groundmass concentrates from a representative sampling of the field gave ages ranging from 9.0 Ma-56 ka. Over 95% of the results are considered to yield reliable plateaus and/or isochron ages which provide eruption ages with precisions of typically ± 2-8% (2 sigma).

Extraneous argon appears to be present in eight percent of the samples. Experimentation showed that excess ^{40}Ar in olivine contributed only one percent of the total amount of extraneous argon present in one sample. An experiment to produce a geologically realistic eruption age from samples containing extraneous argon was conducted by attempting to remove xenocrysts. Despite the removal of nonmagnetic and high magnetic groundmass phases, the experiment did not appear to be successful. Since the $^{40}Ar/^{39}Ar$ results were influenced by the presence of extraneous argon in some cases, it is important to be able to recognize the presence of extraneous argon in the sample results.

The $^{40}Ar/^{39}Ar$ results of this study support the three phase division of volcanism in the Raton-Clayton volcanic field previously recognized by geochemistry and K/Ar geochronology. The Raton phase consists mainly of alkali olivine basalts, with lesser volumes of rhyodacite, feldspathoidal and andesite flows and vents that were erupted from 9.0-3.6 Ma. The Clayton phase erupted from 3.0-2.2 Ma and consists of transitional olivine basalts.

Sierra Grande, the only andesite stratovolcano in the field, had eruptive activity that overlapped the Raton and Clayton phases from 3.0-2.6 Ma. The Capulin phase erupted from 1.7 Ma to 56 ka and consists of alkali olivine basalts, basaltic andesites and two feldspathoidal basaltic eruptive centers.

The $^{40}Ar/^{39}Ar$ data was used to estimate the erosion rates in the Raton-Clayton volcanic field. Erosion in the east/central portion of the field is minimal. In the northwestern portion of the field, erosion is much greater and the $^{40}Ar/^{39}Ar$ results in combination with measured erosional relief allow calculation of average erosion rates. Between 9.0 and 3.6 Ma, an average erosion rate of 12m/Ma is suggested in the northwest portion of the volcanic field. Erosion rates increased at about 3.6 Ma, as implied by the features of the Yankee quadrangle, giving an average erosion rate of 115 m/Ma. Possible causes of the increase in erosion rates at 3.6 Ma include localized uplift, epeirogenic uplift, rapid climate change, or headward erosion of local drainages. The evidence supports climate change as the major cause of increased erosion rates since 3.6 Ma.

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Appendix A

Explanation of Data

The following table contains all of the $^{40}Ar/^{39}Ar$ analytical data from this study. The information given with each sample includes the sample number (ie JS-94-4), irradiation shipment number (ie NM-40), the J-value, and the discrimination factor (ie Disc: 1.0071±0.00002). The samples are listed according to their intra-laboratory run identification number (L#). The isotopic ratios in columns 3, 4 and 5 are corrected for system blank, nuclear interference reactions and radioactive decay ($^{37}Ar_{Ca}$). Nuclear interference correction factors for potassium and calcium, in addition to mass spectrometer discrimination values, are given in the table below. The elemental ratios K/Ca and Cl/K are calculated using the constants {0.510 X ($^{39}Ar/^{37}Ar_{Ca}$)} and {0.277 X ($^{39}Ar/^{37}Ar_{Ca}$)}, respectively. Percent radiogenic ^{40}Ar ($^{40}Ar^*$) assumes a trapped $^{40}Ar/^{36}Ar$ ratio of 295.5. All ages are quoted at the 1σ confidence level and propagate uncertainties in J-value (+0.25%), system blank, isotopic peak height and mass discrimination. Plateau ages are calculated from those heating steps listed by weighting the inverse of the variance at the 2σ confidence level. Total gas ages are weighted according to $\%^{39}Ar$ released. All ages are calculated using the decay constants recommended by Steiger and Jagar (1977).

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
JS-94-4, c1:30, jrs, J=0.001545964±0.00002						Disc: 1.0072±0.0017					
2850-01A	500	2.52E+01	1.84E-01	8.45E-02	3.7E-14	2.8E+00	6.3E-02	0.9	9.8	0.63	0.41
2850-01B	600	4.34E+00	3.36E-01	1.46E-02	5.7E-14	1.5E+00	4.2E-02	0.9	24.7	0.11	0.07
2850-01C	700	3.37E+00	5.51E-01	1.12E-02	8.7E-14	9.3E-01	3.0E-02	2.9	47.8	0.28	0.05
2850-01D	800	2.82E+00	8.65E-01	9.27E-03	9.4E-14	5.9E-01	1.6E-02	4.4	72.5	0.35	0.05
2850-01E	900	3.30E+00	1.19E+00	1.08E-02	7.2E-14	4.3E-01	1.4E-02	5.2	91.6	0.48	0.06
2850-01G	1100	5.06E+00	2.14E+00	1.62E-02	8.5E-15	2.4E-01	2.4E-02	8.0	93.9	1.13	0.13
2850-01H	1200	1.23E+01	6.88E+00	3.97E-02	6.3E-15	7.4E-02	2.8E-02	8.3	95.5	2.85	0.25
2850-01I	1300	9.32E+00	1.36E+01	3.27E-02	1.1E-14	3.7E-02	2.2E-02	7.2	98.3	1.89	0.18
2850-01J	1400	7.11E+00	9.31E+00	2.49E-02	4.8E-15	5.5E-02	2.0E-02	6.4	99.6	1.28	0.19
2850-01K	1650	9.54E+00	7.31E+00	2.37E-02	1.5E-15	7.0E-02	1.4E-02	32.1	100.0	8.57	0.38
		total gas age		n=10	3.8E-13	9.5E-01	8.8E-01			0.49	0.10
		plateau age					A-D	72.0		0.28	0.06
		isochron age		40Ar/36Ar=	280.1±5.3		MSWD = 5.81			0.77	0.17
JS-94-4, J1:NM40, Joe S., J=0.0003976±0.000004						Disc: 1.0071±0.0020					
5677-01B	600	1.70E+03	9.74E-02	5.69E+00	7.8E-17	5.2E+00	2.2E-03	1.1	0.1	13.00	20.30
5677-01C	700	9.98E+01	5.95E-01	3.28E-01	9.9E-15	8.6E-01	1.2E-03	2.8	14.7	2.04	0.48
5677-01D	800	1.89E+01	8.30E-01	6.25E-02	2.0E-14	6.1E-01	2.3E-04	2.6	44.3	0.35	0.09
5677-01E	900	7.36E+00	1.05E+00	2.46E-02	2.3E-14	4.9E-01	2.5E-04	2.4	77.7	0.13	0.04
5677-01F	1000	9.07E+00	1.40E+00	3.00E-02	1.2E-14	3.7E-01	3.2E-04	3.3	95.4	0.22	0.05
5677-01G	1100	1.45E+01	1.83E+00	4.32E-02	3.1E-15	2.8E-01	4.2E-04	12.8	100.0	1.33	0.09
		total gas age		n=6	6.8E-14	5.5E-01	1.9E+00			0.56	0.15
		plateau age					D-F	78.0		0.18	0.06
		isochron age		40Ar/36Ar=	304.5±3.1		MSWD = 1.10			0.004	0.004
JS-94-4, H1 & H2:46, JRS, J=0.00021503±0.000002						Disc: 1.0112±0.0020					
6296-01B	700	1.42E+01	5.46E-01	4.60E-02	2.1E-14	9.4E-01	3.4E-04	4.5	17.9	0.25	0.04

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
6296-01C	750	1.26E+01	6.96E-01	4.07E-02	1.0E-14	7.3E-01	3.1E-04	4.7	27.0	0.23	0.04
6296-01D	825	9.64E+00	9.53E-01	3.16E-02	3.0E-14	5.4E-01	2.3E-04	4.0	53.0	0.15	0.03
6296-01E	875	1.13E+01	1.14E+00	3.65E-02	1.3E-14	4.5E-01	1.6E-04	5.2	64.3	0.23	0.03
6296-01F	975	1.13E+01	1.59E+00	3.66E-02	2.1E-14	3.2E-01	2.4E-04	4.9	82.3	0.21	0.03
6296-01G	1100	2.42E+01	2.31E+00	7.83E-02	1.2E-14	2.2E-01	7.3E-04	5.1	92.8	0.48	0.07
6296-01H	1250	6.01E+01	1.72E+01	1.97E-01	3.4E-15	3.0E-02	1.4E-03	5.4	95.8	1.27	0.17
6296-01I	1650	4.72E+01	9.58E+00	1.50E-01	4.8E-15	5.3E-02	7.8E-04	7.7	100.0	1.41	0.13
		total gas age		n=8	1.1E-13	5.1E-01	3.2E-01			0.32	0.04
		plateau age					B-F	84.0		0.20	0.02
		isochron age		40Ar/36Ar= 316.9±1.9			MSWD =1.4			(0.10)	0.02
JS-94-4, H3 & H4:46, JRS, J=0.00021501±0.000002						Disc: 1.0112±0.0020					
6297-01B	700	1.54E+01	5.47E-01	4.95E-02	1.6E-14	9.3E-01	3.9E-04	5.7	17.4	0.34	0.04
6297-01C	750	1.38E+01	6.70E-01	4.42E-02	5.9E-15	7.6E-01	2.1E-04	5.6	23.9	0.30	0.04
6297-01D	825	1.01E+01	9.71E-01	3.28E-02	2.6E-14	5.3E-01	2.2E-04	5.1	52.6	0.20	0.03
6297-01E	875	1.13E+01	1.15E+00	3.65E-02	9.0E-15	4.4E-01	2.6E-04	5.3	62.5	0.23	0.03
6297-01F	975	1.12E+01	1.64E+00	3.57E-02	1.9E-14	3.1E-01	3.6E-04	6.6	83.6	0.28	0.03
6297-01G	1100	2.31E+01	2.38E+00	7.36E-02	1.0E-14	2.1E-01	7.9E-04	6.7	94.6	0.60	0.06
6297-01H	1250	6.02E+01	2.10E+01	1.83E-01	2.1E-15	2.4E-02	1.5E-03	13.0	96.9	3.08	0.16
6297-01I	1650	6.30E+01	1.21E+01	1.85E-01	2.8E-15	4.2E-02	9.6E-04	14.8	100.0	3.63	0.16
		total gas age		n=8	9.1E-14	5.0E-01	3.3E-01			0.47	0.04
		plateau age					B-F	84.0		0.26	0.03
		isochron age		40Ar/36Ar= 309.4±8.5			MSWD = 0.85			0.068	0.05
JS-94-4, H5 & H6:46, JRS, J=0.000215±0.000002						Disc: 1.0082±0.0018					
6298-01B	700	1.75E+01	5.86E-01	5.59E-02	1.3E-14	8.7E-01	5.0E-04	5.9	15.8	0.40	0.05
6298-01C	750	1.47E+01	8.00E-01	4.76E-02	8.2E-15	6.4E-01	2.0E-04	4.7	25.9	0.27	0.04
6298-01D	825	1.09E+01	1.06E+00	3.51E-02	2.2E-14	4.8E-01	2.5E-04	5.4	52.5	0.23	0.03
6298-01E	875	1.14E+01	1.32E+00	3.75E-02	1.0E-14	3.9E-01	2.8E-04	3.7	64.8	0.16	0.03

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
6298-01F	975	1.23E+01	1.80E+00	3.89E-02	1.4E-14	2.8E-01	4.4E-04	7.7	81.5	0.37	0.03
6298-01G	1100	2.31E+01	2.47E+00	7.12E-02	1.1E-14	2.1E-01	6.1E-04	9.7	94.9	0.87	0.05
6298-01H	1250	6.25E+01	2.00E+01	1.74E-01	1.4E-15	2.6E-02	1.5E-03	20.1	96.7	4.93	0.16
6298-01I	1650	8.20E+01	1.24E+01	1.84E-01	2.7E-15	4.1E-02	5.5E-04	34.7	100.0	11.09	0.16
		total gas age		n=8	8.1E-14	4.5E-01	2.9E-01			0.81	0.04
		plateau age					C-E	50.0		0.21	0.03
		isochron age		40Ar/36Ar=	307.6±9.5		MSWD = 3.5			0.035	0.02
JS-94-5, b3:30, jrs,	J=0.001558844±0.00002					Disc:	1.0072±0.0017				
2848-01A	500	1.98E+02	5.86E+00	6.69E-01	1.5E-15	8.7E-02	1.9E+00	0.3	1.0	1.65	4.08
2848-01B	600	5.10E+00	3.09E+00	1.50E-02	8.4E-15	1.7E-01	8.0E-02	17.3	6.6	2.48	0.11
2848-01C	700	1.76E+00	2.37E+00	3.69E-03	3.6E-14	2.2E-01	7.3E-03	47.1	30.8	2.33	0.03
2848-01D	800	1.29E+00	2.23E+00	2.11E-03	5.3E-14	2.3E-01	2.2E-03	63.2	66.2	2.30	0.02
2848-01E	900	1.57E+00	1.81E+00	2.91E-03	2.2E-14	2.8E-01	3.2E-03	52.7	81.1	2.34	0.03
2848-01F	1000	2.73E+00	2.92E+00	6.86E-03	1.0E-14	1.7E-01	6.9E-03	33.1	88.1	2.54	0.06
2848-01G	1100	1.10E+01	3.57E+00	3.41E-02	6.7E-15	1.4E-01	1.8E-02	10.7	92.5	3.33	0.23
2848-01H	1200	1.23E+01	1.21E+01	3.87E-02	3.8E-15	4.2E-02	3.0E-02	14.6	95.1	5.11	0.27
2848-01I	1300	9.34E+00	4.93E+01	4.05E-02	2.9E-15	1.0E-02	2.3E-02	12.2	97.1	3.32	0.31
2848-01J	1400	1.29E+01	3.73E+01	4.87E-02	3.1E-15	1.4E-02	1.7E-02	10.3	99.1	3.84	0.34
2848-01K	1650	1.75E+01	4.02E+01	6.13E-02	1.3E-15	1.3E-02	1.5E-02	14.0	100.0	7.07	0.61
		total gas age		n=11	1.5E-13	2.1E-01	9.7E-02			2.55	0.11
		plateau age					B-E	80.0		2.32	0.04
		isochron age		40Ar/36Ar=	297.6±1.7		MSWD = 1.2			2.30	0.03
JS-95-1, b1:30, jrs,	J=0.001553979±0.00002					Disc:	1.0072±0.0017				
2847-01B	600	4.62E+01	2.44E+00	1.53E-01	8.0E-15	2.1E-01	3.8E-02	2.6	4.2	3.38	0.85
2847-01C	700	1.17E+01	1.84E+00	3.58E-02	3.3E-14	2.8E-01	9.6E-03	10.4	21.6	3.38	0.24
2847-01D	800	5.76E+00	1.31E+00	1.55E-02	5.5E-14	3.9E-01	4.4E-03	21.7	50.8	3.51	0.10
2847-01E	900	5.63E+00	1.45E+00	1.49E-02	3.9E-14	3.5E-01	4.1E-03	23.4	71.4	3.70	0.08

Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
2847-01F	1000	6.80E+00	2.08E+00	1.87E-02	2.1E-14	2.5E-01	7.6E-03	20.6	82.6	3.92	0.11
2847-01G	1100	1.46E+01	3.15E+00	4.47E-02	1.2E-14	1.6E-01	1.6E-02	11.4	88.9	4.68	0.25
2847-01H	1200	3.61E+01	8.47E+00	1.17E-01	4.4E-15	6.0E-02	3.2E-02	5.8	91.2	5.89	0.64
2847-01I	1300	2.52E+01	2.62E+01	8.62E-02	8.0E-15	1.9E-02	3.1E-02	6.6	95.5	4.77	0.48
2847-01J	1400	2.38E+01	2.38E+01	8.09E-02	5.2E-15	2.1E-02	2.6E-02	7.2	98.3	4.87	0.54
2847-01K	1650	2.06E+01	2.62E+01	6.27E-02	3.2E-15	2.0E-02	2.3E-02	19.9	100.0	11.69	0.60
		total gas age		n=10	1.9E-13	2.8E-01	1.4E-01			3.93	0.21
		plateau age					A-E	72.0		3.6	0.1
		isochron age		40Ar/36Ar= 303.4±1.3			MSWD = 1.7			3.37	0.1
JS-95-3, a1:30, jrs, J=0.001556419±0.00002						Disc: 1.0072±0.0017					
2844-01B	600	8.71E+00	1.28E+00	2.48E-02	8.2E-15	4.0E-01	5.7E-01	16.7	9.6	4.08	0.20
2844-01C	700	3.02E+00	1.50E+00	6.06E-03	2.1E-14	3.4E-01	3.7E-02	43.7	33.6	3.70	0.11
2844-01D	800	2.11E+00	1.32E+00	2.56E-03	1.9E-14	3.9E-01	1.8E-02	67.9	55.3	4.03	0.06
2844-01E	900	2.43E+00	2.17E+00	3.60E-03	8.3E-15	2.3E-01	6.8E-02	62.2	64.9	4.24	0.09
2844-01F	1000	2.57E+00	3.85E+00	3.26E-03	5.2E-15	1.3E-01	2.1E-01	73.2	71.0	5.30	0.11
2844-01G	1100	1.39E+01	8.12E+00	4.31E-02	3.8E-15	6.3E-02	2.8E-01	12.7	75.5	4.99	0.32
2844-01H	1200	6.47E+00	2.05E+01	2.14E-02	9.9E-15	2.5E-02	2.3E-01	26.4	87.0	4.85	0.14
2844-01I	1300	1.24E+01	4.71E+01	4.96E-02	1.0E-14	1.1E-02	3.1E-01	10.7	98.7	3.83	0.30
2844-01J	1400	8.97E+01	9.26E+01	3.17E-01	5.2E-16	5.5E-03	2.4E-01	3.4	99.3	9.16	3.08
2844-01K	1650	5.27E+01	4.59E+01	1.74E-01	6.4E-16	1.1E-02	5.6E-02	8.9	100.0	13.55	1.82
		total gas age		n=10	8.6E-14	2.4E-01	1.6E-01			4.27	0.17
		plateau age					B-E	64.0		4.03	0.12
		isochron age		40Ar/36Ar= 303.0±1.1			MSWD = 14.9			4.05	0.07
JS-95-5, c3:30, jrs, J=0.001556498±0.00002						Disc: 1.0072±0.0017					
2851-01B	600	1.01E+02	1.10E+00	3.38E-01	1.4E-14	4.7E-01	1.0E-01	1.5	8.4	4.15	1.76
2851-01C	700	2.08E+01	1.73E+00	6.99E-02	9.4E-15	2.9E-01	1.8E-02	1.4	14.0	0.79	0.36
2851-01D	800	1.18E+01	1.81E+00	3.90E-02	2.8E-14	2.8E-01	1.2E-02	3.1	30.7	1.04	0.19

Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
2851-01E	900	1.14E+01	1.89E+00	3.82E-02	3.3E-14	2.7E-01	1.2E-02	2.2	50.7	0.72	0.18
2851-01F	1000	1.39E+01	2.28E+00	4.62E-02	1.9E-14	2.2E-01	1.5E-02	2.7	61.9	1.04	0.23
2851-01G	1100	2.64E+01	2.81E+00	8.68E-02	1.3E-14	1.8E-01	1.9E-02	3.4	69.8	2.52	0.47
2851-01H	1200	1.79E+01	6.87E+00	5.99E-02	4.8E-14	7.4E-02	2.0E-02	3.9	98.3	1.96	0.29
2851-01I	1300	1.40E+01	1.48E+01	3.71E-02	2.8E-15	3.4E-02	1.1E-02	29.7	100.0	11.77	0.32
		total gas age		n=8	1.7E-13	2.2E-01	1.4E-01			1.78	0.39
		plateau age					B-F	62.0		0.91	0.17
		isochron age		40Ar/36Ar=	298.7±1.9		MSWD = 0.91			0.53	0.20
JS-95-6, B5:30, jrs, J=0.001553377±0.00002						Disc: 1.0072±0.0017					
2849-01C	700	4.03E+01	9.16E-01	1.33E-01	2.4E-15	5.6E-01	1.1E-01	2.5	10.8	2.85	0.87
2849-01D	800	1.18E+01	6.79E-01	3.81E-02	4.1E-15	7.5E-01	1.1E-02	4.6	29.7	1.53	0.27
2849-01E	900	5.08E+00	1.32E+00	1.56E-02	5.4E-15	3.9E-01	2.7E-02	10.8	54.2	1.54	0.13
2849-01F	1000	5.95E+00	2.08E+00	1.83E-02	4.0E-15	2.5E-01	6.1E-02	11.3	72.7	1.89	0.15
2849-01G	1100	5.81E+00	6.17E+00	1.90E-02	2.3E-15	8.3E-02	1.5E-01	11.2	83.1	1.83	0.31
2849-01H	1200	1.81E+01	4.26E+01	6.82E-02	3.1E-15	1.2E-02	3.9E-01	6.5	97.3	3.37	0.48
2849-01I	1300	5.32E+01	2.90E+02	2.51E-01	3.5E-18	1.8E-03	5.1E-01	2.6	97.4	4.78	1.67
2849-01J	1400	8.86E+01	1.20E+02	3.26E-01	1.4E-16	4.2E-03	3.8E-02	1.6	98.0	4.42	6.42
2849-01K	1650	2.79E+01	2.27E+01	8.74E-02	4.3E-16	2.2E-02	-3.9E-03	13.6	100.0	10.75	1.70
		total gas age		n=9	2.2E-14	3.5E-01	2.8E-01			2.24	0.38
		plateau age					D-G	64.0		1.68	0.13
		isochron age		40Ar/36Ar=	301.5±1.2		MSWD = 2.53			1.43	0.11
JS-95-7 A:7:34, matt, J=0.001418493±0.000002						Disc: 1.0050±0.0020					
5169-01B	600	2.05E+01	8.40E-01	6.85E-02	9.7E-16	6.1E-01	1.2E-03	1.6	0.8	0.83	0.47
5169-01C	700	4.51E+00	7.04E-01	1.51E-02	8.7E-16	7.3E-01	8.1E-04	2.4	1.6	0.28	0.23
5169-01D	775	9.88E-01	5.90E-01	3.39E-03	1.4E-14	8.7E-01	5.1E-05	3.1	14.0	0.08	0.02
5169-01E	825	6.22E-01	7.26E-01	2.22E-03	2.0E-14	7.0E-01	1.2E-04	3.3	30.9	0.05	0.02
5169-01F	900	6.62E-01	1.09E+00	2.49E-03	3.0E-14	4.7E-01	1.9E-04	1.5	56.5	0.03	0.02

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
5169-01G	1000	6.51E-01	1.50E+00	2.54E-03	2.6E-14	3.4E-01	2.3E-04	2.3	79.3	0.04	0.02
5169-01H	1100	1.22E+00	1.69E+00	4.56E-03	9.0E-15	3.0E-01	5.3E-04	0.1	87.1	0.00	0.04
5169-01I	1200	9.12E+00	3.00E+00	3.11E-02	1.1E-14	1.7E-01	8.7E-04	1.9	96.6	0.44	0.17
5169-01J	1300	2.94E+00	2.82E+01	1.69E-02	2.6E-15	1.8E-02	1.1E-03	3.9	98.8	0.30	0.13
5169-01K	1650	5.44E+00	1.38E+01	1.91E-02	1.4E-15	3.7E-02	8.2E-04	15.6	100.0	2.19	0.21
		total gas age		n=10	1.2E-13	4.7E-01	3.0E-01			0.12	0.04
		plateau age					B-H	86.0		0.046	0.018
		isochron age		40Ar/36Ar= 299.6±2.3			MSWD = 1.41			0.016	0.01
JS-95-7, E3:46, JRS, J=0.00022293±0.000002						Disc: 1.0112±0.0020					
6287-01A	625	9.79E+01	7.61E-01	3.30E-01	6.9E-15	6.7E-01	9.1E-04	0.4	4.1	0.17	0.28
6287-01B	700	9.66E+00	7.90E-01	3.28E-02	2.8E-14	6.5E-01	1.0E-04	0.4	20.8	0.02	0.03
6287-01C	750	5.58E+00	8.76E-01	1.86E-02	2.5E-14	5.8E-01	5.7E-05	2.9	35.4	0.07	0.02
6287-01D	825	3.73E+00	1.06E+00	1.24E-02	4.6E-14	4.8E-01	1.2E-04	3.7	62.7	0.06	0.01
6287-01E	875	4.68E+00	1.37E+00	1.59E-02	2.2E-14	3.7E-01	2.2E-04	1.6	75.5	0.03	0.02
6287-01F	975	6.99E+00	1.49E+00	2.38E-02	1.7E-14	3.4E-01	3.6E-04	1.0	85.2	0.03	0.02
6287-01G	1100	1.29E+01	1.93E+00	4.35E-02	1.1E-14	2.6E-01	8.5E-04	1.1	91.6	0.06	0.04
6287-01H	1250	2.42E+01	1.08E+01	8.28E-02	1.2E-14	4.7E-02	7.6E-04	2.4	98.9	0.24	0.07
6287-01I	1650	9.67E+01	1.05E+01	3.14E-01	1.9E-15	4.9E-02	7.3E-04	4.9	100.0	1.93	0.30
		total gas age		n=9	1.7E-13	4.5E-01	2.3E-01			0.08	0.04
		plateau age					B-G	86.0		0.047	0.01
		isochron age		40Ar/36Ar= 297.4±1.4			MSWD = 1.91			0.034	0.01
JS-95-7, F1:54 119.61 mg wr, Joe S., J=0.000772727±0.000002							Disc: 1.0082±0.0018				
6962-01B	700	9.63E+00	6.85E-01	3.23E-02	2.7E-15	7.4E-01	3.0E-04	1.5	0.61	0.203	0.118
6962-01C	775	2.05E+00	6.28E-01	6.76E-03	2.7E-15	8.1E-01	2.8E-04	4.8	1.22	0.136	0.044
6962-01D	850	8.95E-01	8.09E-01	3.07E-03	3.1E-14	6.3E-01	1.5E-04	5.7	8.26	0.071	0.010
6962-01E	925	9.11E-01	1.18E+00	3.30E-03	2.7E-14	4.3E-01	2.1E-04	2.9	14.28	0.037	0.010
6962-01F	1000	1.25E+00	1.46E+00	4.46E-03	1.3E-14	3.5E-01	3.5E-04	3.7	17.30	0.064	0.016

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
6962-01G	1100	2.97E+00	1.48E+00	1.03E-02	7.5E-15	3.4E-01	6.0E-04	1.5	18.98	0.061	0.033
6962-01H	1250	5.22E+00	4.91E+00	1.87E-02	9.5E-15	1.0E-01	9.3E-04	1.5	21.13	0.111	0.054
6962-01I	1650	4.94E+00	1.56E+01	1.80E-02	3.3E-15	3.3E-02	6.3E-04	16.8	21.87	1.168	0.074
		total gas age		n=6	4.4E-13	8.9E-01	1.9E+00			0.498	0.109
		plateau age					B-H	95.0		0.062	0.012
		isochron age		40Ar/36Ar= 297.5±1.6			MSWD = 0.81			0.060	0.011
JS-95-7, F1:54 120.28 mg wr, Joe S., J=0.000772727±0.000002							Disc: 1.0082±0.0018				
6963-02B	700	6.94E+00	6.75E-01	2.20E-02	3.1E-15	7.6E-01	5.6E-04	7.2	2.80	0.698	0.085
6963-02C	775	1.83E+00	6.36E-01	6.04E-03	2.9E-15	8.0E-01	3.6E-04	5.0	5.43	0.127	0.048
6963-02D	850	9.74E-01	8.00E-01	3.32E-03	3.2E-14	6.4E-01	8.5E-05	5.5	34.71	0.074	0.012
6963-02E	925	6.78E-01	1.16E+00	2.50E-03	2.5E-14	4.4E-01	2.1E-04	4.4	57.75	0.041	0.010
6963-02F	1000	9.29E-01	1.41E+00	3.40E-03	1.4E-14	3.6E-01	3.6E-04	3.5	70.82	0.046	0.016
6963-02G	1100	1.77E+00	1.48E+00	6.10E-03	7.8E-15	3.5E-01	6.5E-04	4.6	77.92	0.114	0.026
6963-02H	1250	3.59E+00	4.97E+00	1.30E-02	9.4E-15	1.0E-01	9.2E-04	3.5	86.51	0.175	0.042
6963-02I	1650	4.48E+00	1.46E+01	1.71E-02	3.6E-15	3.5E-02	6.8E-04	12.1	89.75	0.767	0.061
		total gas age		n=7	1.1E-13	5.3E-01	3.1E-01			0.268	0.040
		plateau age					C-H	96.0		0.065	0.015
		isochron age		40Ar/36Ar= 306.9±2.4			MSWD = 0.98			0.010	0.005
JS-95-7, F2:54 127.51mg wr, Joe S., J=0.000772727±0.000002							Disc: 1.0082±0.0018				
6964-03B	700	1.17E+01	6.62E-01	3.84E-02	2.4E-15	7.7E-01	5.7E-04	3.6	1.79	0.583	0.132
6964-03D	850	8.90E-01	7.78E-01	3.08E-03	3.5E-14	6.6E-01	9.6E-05	4.4	27.71	0.055	0.011
6964-03E	925	7.40E-01	1.16E+00	2.66E-03	2.7E-14	4.4E-01	2.1E-04	6.0	48.02	0.062	0.009
6964-03F	1000	1.04E+00	1.45E+00	3.84E-03	1.6E-14	3.5E-01	3.2E-04	1.1	59.53	0.016	0.015
6964-03G	1100	1.87E+00	1.52E+00	6.50E-03	8.1E-15	3.4E-01	5.7E-04	3.3	65.57	0.085	0.028
6964-03H	1250	3.59E+00	5.32E+00	1.33E-02	8.9E-15	9.6E-02	9.6E-04	1.8	72.16	0.091	0.042
6964-03I	1650	5.62E+00	1.42E+01	2.10E-02	3.5E-15	3.6E-02	7.3E-04	9.1	74.75	0.723	0.073

Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
		total gas age		n=4	1.3E-13	4.5E-01	2.2E-01			0.395	0.053
		plateau age					D-H	94.0		0.053	0.012
		isochron age		40Ar/36Ar= 298.2±2.3			MSWD = 0.41			0.050	0.011
JS-95-7, F2:54 133.28mg wr, Joe S., J=0.000772727±0.000002							Disc: 1.0082±0.0018				
6965-04B	700	1.19E+01	6.89E-01	3.91E-02	2.5E-15	7.4E-01	4.5E-04	3.2	1.59	0.536	0.132
6965-04C	775	8.07E+00	6.15E-01	2.66E-02	1.6E-15	8.3E-01	4.7E-04	3.1	2.59	0.352	0.147
6965-04D	850	9.25E-01	7.65E-01	3.15E-03	3.6E-14	6.7E-01	5.6E-05	5.6	25.26	0.072	0.009
6965-04E	925	7.92E-01	1.12E+00	2.83E-03	3.3E-14	4.6E-01	2.0E-04	5.5	45.93	0.060	0.010
6965-04F	1000	1.25E+00	1.37E+00	4.48E-03	1.6E-14	3.7E-01	2.3E-04	2.8	56.02	0.048	0.014
6965-04G	1100	2.68E+00	1.50E+00	9.29E-03	1.1E-14	3.4E-01	5.9E-04	1.8	63.03	0.066	0.031
6965-04H	1250	4.16E+00	5.81E+00	1.55E-02	8.4E-15	8.8E-02	8.3E-04	0.8	68.29	0.049	0.050
6965-04I	1650	4.59E+00	1.51E+01	1.79E-02	3.8E-15	3.4E-02	7.8E-04	9.9	70.68	0.639	0.063
		total gas age		n=7	1.6E-13	4.4E-01	2.1E-01			0.487	0.043
		plateau age					C-H	94.0		0.064	0.011
		isochron age		40Ar/36Ar= 294.6±2.1			MSWD = 0.91			0.067	0.010
JS-95-8, a3:30, jrs, J=0.00156881±0.00002						Disc: 1.0072±0.0017					
2845-01B	600	9.27E+00	8.09E-01	2.79E-02	2.0E-14	6.3E-01	1.4E-02	11.5	5.0	3.01	0.16
2845-01C	700	2.42E+00	8.39E-01	4.59E-03	6.3E-14	6.1E-01	6.1E-03	45.8	21.3	3.14	0.04
2845-01D	800	1.35E+00	7.55E-01	1.31E-03	1.2E-13	6.8E-01	5.0E-03	73.9	50.8	2.83	0.01
2845-01E	900	1.30E+00	6.98E-01	1.21E-03	9.2E-14	7.3E-01	6.1E-03	74.9	74.4	2.75	0.01
2845-01F	1000	2.00E+00	6.62E-01	3.52E-03	5.0E-14	7.7E-01	1.5E-02	49.4	87.2	2.79	0.03
2845-01G	1100	3.13E+00	6.45E-01	7.21E-03	2.8E-14	7.9E-01	2.1E-02	32.8	94.3	2.90	0.06
2845-01H	1200	6.13E+00	1.76E+00	1.61E-02	1.6E-14	2.9E-01	1.8E-02	24.5	98.4	4.25	0.12
2845-01I	1300	1.51E+01	1.56E+01	4.89E-02	4.0E-15	3.3E-02	5.2E-02	12.1	99.4	5.21	0.33
2845-01J	1400	2.45E+01	2.28E+01	8.12E-02	2.3E-15	2.2E-02	7.5E-02	9.0	100.0	6.32	0.58

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
		total gas age		n=9	3.9E-13	6.7E-01	3.1E-01			2.97	0.04
		plateau age					D-G	74.0		2.79	0.04
		isochron age		40Ar/36Ar=	300.9±2.7		MSWD = 13.05			2.76	0.04
JS-95-9, a5:30, jrs, J=0.001549671±0.00002						Disc: 1.0072±0.0017					
2846-01B	600	2.85E+01	6.33E-01	9.26E-02	6.9E-15	8.1E-01	2.2E+00	4.0	11.4	3.15	0.59
2846-01C	700	1.39E+01	5.16E-01	4.24E-02	1.1E-14	9.9E-01	2.3E-01	10.0	29.4	3.88	0.32
2846-01D	800	1.06E+01	5.49E-01	3.18E-02	1.1E-14	9.3E-01	2.9E-02	12.0	48.0	3.58	0.22
2846-01E	900	1.24E+01	9.35E-01	3.73E-02	7.8E-15	5.5E-01	6.9E-02	11.5	61.0	4.00	0.25
2846-01F	1000	1.36E+01	3.32E+00	4.10E-02	4.5E-15	1.5E-01	1.8E-01	12.7	68.4	4.82	0.33
2846-01G	1100	1.20E+01	1.21E+01	3.89E-02	3.5E-15	4.2E-02	2.5E-01	11.8	74.1	4.00	0.27
2846-01H	1200	1.55E+01	2.41E+01	5.33E-02	8.8E-15	2.1E-02	3.2E-01	10.6	88.8	4.66	0.32
2846-01I	1300	1.78E+01	1.27E+02	8.87E-02	4.7E-15	4.0E-03	4.6E-01	7.7	96.5	4.23	0.63
2846-01J	1400	1.76E+01	2.60E+01	5.23E-02	1.1E-15	2.0E-02	3.0E-02	23.4	98.3	11.68	0.58
2846-01K	1650	2.07E+01	1.79E+01	5.83E-02	1.0E-15	2.9E-02	4.5E-03	23.4	100.0	13.72	0.72
		total gas age		n=10	6.1E-14	5.3E-01	4.2E-01			4.29	0.36
		plateau age					B-E	60.0		3.8	0.2
		isochron age		40Ar/36Ar=	297.3±2.8		MSWD = 3.18			3.87	0.32
JS-95-10, c5:30, jrs, J=0.001538838±0.00002						Disc: 1.0072±0.0017					
2852-01B	600	3.57E+01	8.11E-01	1.20E-01	2.3E-14	6.3E-01	4.3E-02	0.5	11.2	0.46	0.62
2852-01C	700	1.78E+01	1.34E+00	5.90E-02	3.4E-14	3.8E-01	3.3E-02	2.4	27.7	1.19	0.40
2852-01D	800	1.15E+01	1.82E+00	3.84E-02	4.2E-14	2.8E-01	2.1E-02	2.2	48.0	0.69	0.26
2852-01E	900	9.86E+00	2.14E+00	3.26E-02	3.1E-14	2.4E-01	1.8E-02	3.7	63.1	1.00	0.18
2852-01F	1000	1.05E+01	2.67E+00	3.46E-02	1.5E-14	1.9E-01	2.0E-02	4.0	70.6	1.17	0.19
2852-01G	1100	8.85E+00	3.46E+00	2.90E-02	1.4E-14	1.5E-01	1.8E-02	5.9	77.5	1.46	0.18
2852-01H	1200	8.76E+00	8.09E+00	3.04E-02	3.7E-14	6.3E-02	2.0E-02	4.4	95.6	1.08	0.15
2852-01I	1300	1.03E+01	1.44E+01	3.64E-02	6.2E-15	3.5E-02	8.4E-03	6.0	98.6	1.74	0.25

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
2852-01J	1400	6.75E+00	8.87E+00	2.00E-02	2.8E-15	5.8E-02	8.1E-03	22.2	100.0	4.19	0.28
		total gas age		n=9	2.1E-13	2.6E-01	1.9E-01			1.03	0.28
		plateau age					B-I	98.0		1.14	0.13
		isochron age		40Ar/36Ar=	292.8±2.8		MSWD = 2.57			1.43	0.18
JS-95-12 A:1:34, matt, J=0.001418493±0.000002						Disc: 1.0050±0.0020					
5164-01B	600	1.56E+01	1.21E+00	5.16E-02	6.4E-16	4.2E-01	4.5E-04	2.7	0.5	1.06	0.47
5164-01C	700	2.40E+00	1.04E+00	6.98E-03	1.7E-15	4.9E-01	3.0E-04	17.5	1.9	1.08	0.11
5164-01D	775	1.08E+00	1.05E+00	2.62E-03	1.8E-14	4.9E-01	1.8E-04	35.8	16.8	0.99	0.02
5164-01E	825	8.61E-01	1.44E+00	2.03E-03	2.7E-14	3.5E-01	1.5E-04	43.2	38.6	0.95	0.01
5164-01F	900	7.72E-01	1.35E+00	1.66E-03	3.3E-14	3.8E-01	1.8E-04	50.0	65.8	0.99	0.01
5164-01G	1000	9.08E-01	1.18E+00	2.08E-03	2.5E-14	4.3E-01	1.7E-04	42.3	86.3	0.98	0.02
5164-01H	1100	1.88E+00	1.58E+00	5.51E-03	6.4E-15	3.2E-01	1.8E-04	20.0	91.5	0.97	0.05
5164-01I	1200	3.36E+00	3.83E+00	1.13E-02	4.5E-15	1.3E-01	5.7E-04	9.1	95.1	0.78	0.08
5164-01J	1300	4.12E+00	2.68E+01	1.99E-02	4.3E-15	1.9E-02	9.8E-04	7.5	98.7	0.80	0.12
5164-01K	1650	1.38E+01	3.22E+01	5.19E-02	1.7E-15	1.6E-02	6.6E-04	6.7	100.0	2.43	0.33
		total gas age		n=10	1.2E-13	3.7E-01	1.8E-01			0.99	0.03
		plateau age					B-J	98.0		0.98	0.2
		isochron age		40Ar/36Ar=	291.1±1.3		MSWD = 2.51			1.0	0.01
JS-95-13A, e1:38, Joe S., J=0.001438±0.000002						Disc: 1.0071±0.0020					
5478-01B	600	3.37E+01	6.54E-01	1.04E-01	1.9E-15	7.8E-01	1.0E-03	9.3	1.9	8.10	0.69
5478-01C	700	6.35E+00	3.89E-01	1.06E-02	1.6E-14	1.3E+00	6.5E-04	51.1	18.1	8.40	0.07
5478-01D	800	4.09E+00	3.40E-01	3.21E-03	2.9E-14	1.5E+00	4.9E-04	77.4	47.7	8.20	0.04
5478-01E	900	4.05E+00	4.97E-01	3.26E-03	2.4E-14	1.0E+00	3.5E-04	77.2	71.9	8.10	0.04
5478-01F	1000	4.37E+00	1.09E+00	4.40E-03	9.5E-15	4.7E-01	3.2E-04	72.2	81.4	8.18	0.06
5478-01G	1100	4.68E+00	1.94E+00	6.01E-03	5.7E-15	2.6E-01	4.1E-04	65.3	87.2	7.93	0.08
5478-01H	1200	8.20E+00	1.23E+01	2.10E-02	1.0E-14	4.2E-02	7.3E-04	35.7	97.3	7.65	0.13

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
5478-01I	1300	1.41E+01	5.52E+01	5.30E-02	2.5E-15	9.2E-03	1.1E-03	18.7	99.8	7.09	0.38
5478-01J	1450	5.97E+01	5.95E+01	2.08E-01	1.9E-16	8.6E-03	2.9E-03	4.7	100.0	7.62	2.85
		total gas age		n=9	9.9E-14	9.8E-01	5.8E-01			8.10	0.08
		plateau age					D-F	62		8.15	0.04
		isochron age		40Ar/36Ar=	289.8±1.3		MSWD = 8.91			8.19	0.03
JS-95-13 A:2:34, matt, J=0.001418493±0.000002						Disc: 1.0050±0.0020					
5165-01C	700	1.12E+02	1.44E+00	3.65E-01	3.6E-16	3.5E-01	1.3E-03	3.4	0.6	9.79	2.27
5165-01D	775	7.21E+00	5.22E-01	1.30E-02	5.9E-15	9.8E-01	2.7E-04	47.1	10.5	8.67	0.10
5165-01E	825	4.08E+00	4.02E-01	3.49E-03	8.0E-15	1.3E+00	1.1E-04	75.5	24.0	7.87	0.04
5165-01F	900	3.56E+00	4.13E-01	1.88E-03	1.5E-14	1.2E+00	1.6E-04	85.3	50.0	7.75	0.03
5165-01G	1000	3.70E+00	6.64E-01	2.50E-03	1.7E-14	7.7E-01	1.8E-04	81.5	78.9	7.70	0.03
5165-01H	1100	5.05E+00	1.88E+00	7.33E-03	4.6E-15	2.7E-01	2.8E-04	59.9	86.7	7.73	0.07
5165-01I	1200	6.99E+00	6.22E+00	1.51E-02	3.3E-15	8.2E-02	4.3E-04	43.1	92.2	7.74	0.13
5165-01J	1300	1.59E+01	3.52E+01	5.28E-02	3.6E-15	1.5E-02	1.2E-03	18.7	98.4	7.78	0.30
5165-01K	1650	2.38E+01	5.49E+01	8.41E-02	9.5E-16	9.3E-03	9.6E-04	13.2	100.0	8.32	0.57
		total gas age		n=9	5.9E-14	8.4E-01	5.2E-01			7.87	0.09
		plateau age					F-K	76.0		7.73	0.03
		isochron age		40Ar/36Ar=	297.2±1.2		MSWD = 2.67			7.74	0.02
JS-95-14 A:3:34, matt, J=0.001418493±0.000002						Disc: 1.0050±0.0020					
5166-01D	775	7.02E+00	7.69E-01	1.39E-02	9.0E-15	6.6E-01	1.2E-04	42.5	4.6	7.62	0.09
5166-01E	825	4.10E+00	5.88E-01	3.94E-03	1.9E-14	8.7E-01	1.8E-04	72.7	9.8	7.61	0.03
5166-01F	900	3.47E+00	5.31E-01	1.80E-03	4.0E-14	9.6E-01	2.1E-04	85.8	20.8	7.61	0.02
5166-01G	1000	3.19E+00	5.80E-01	8.51E-04	8.0E-14	8.8E-01	2.1E-04	93.5	42.9	7.62	0.02
5166-01H	1100	3.34E+00	6.65E-01	1.36E-03	3.0E-14	7.7E-01	1.7E-04	89.5	51.3	7.64	0.02
5166-01I	1200	4.01E+00	7.98E-01	3.83E-03	1.6E-14	6.4E-01	2.8E-04	73.3	55.8	7.52	0.03
5166-01J	1300	8.54E+00	9.50E+00	2.17E-02	6.3E-15	5.4E-02	4.4E-04	33.5	57.6	7.35	0.13
5166-01K	1650	2.61E+01	1.59E+01	8.19E-02	7.1E-15	3.2E-02	8.3E-04	11.7	59.5	7.90	0.43

Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
		total gas age		n=7	3.6E-13	9.9E-01	9.4E-01			0.41	0.10
		plateau age					D-K	100.0		7.61	0.02
		isochron age		40Ar/36Ar=	293.3±1.1		MSWD = 2.40			7.62	0.02
JS-95-15, c1:37, Joe S., J=0.000219071±0.000002						Disc: 1.0071±0.0020					
5383-01C	700	5.30E+00	1.11E+00	1.82E-02	2.2E-15	4.6E-01	1.4E-04	0.3	19.5	0.01	0.03
5383-01D	800	2.17E+00	8.21E-01	7.27E-03	3.1E-15	6.2E-01	-1.6E-05	4.0	47.0	0.03	0.02
5383-01E	900	2.31E+00	1.03E+00	7.72E-03	2.2E-15	5.0E-01	8.8E-05	4.8	66.1	0.04	0.02
5383-01F	1000	4.69E+00	1.39E+00	1.65E-02	9.7E-16	3.7E-01	8.0E-05	-1.8	74.6	0.03	0.06
5383-01G	1100	1.34E+01	1.46E+00	4.64E-02	6.8E-16	3.5E-01	-1.7E-04	-1.4	80.6	0.07	0.08
5383-01H	1200	1.56E+01	5.00E+00	5.26E-02	1.9E-15	1.0E-01	1.2E-03	2.6	97.3	0.16	0.06
5383-01I	1300	2.73E+01	1.59E+01	7.76E-02	2.8E-16	3.2E-02	-2.5E-04	20.3	99.7	2.22	0.22
5383-01J	1450	4.97E+01	1.99E+01	1.09E-01	2.5E-17	2.6E-02	-1.5E-02	38.2	99.9	7.61	1.94
5383-01K	1650	5.17E+02	4.87E+00	1.62E+00	7.3E-18	1.0E-01	-4.8E-02	7.3	100.0	14.82	22.93
		total gas age		n=9	1.1E-14	4.3E-01	2.2E-01			0.13	0.06
		plateau age					C-H	96.0		0.034	0.02
		isochron age		40Ar/36Ar=	297.2±2.8		MSWD = 2.14			0.027	0.01
JS-95-15, F3 & F4:46, JRS, J=0.00022113±0.000002						Disc: 1.0112±0.0020					
6291-01D	825	5.56E+00	9.80E-01	1.82E-02	5.3E-14	5.2E-01	-1.1E-05	4.4	44.2	0.10	0.01
6291-01E	875	4.89E+00	8.17E-01	1.60E-02	2.1E-14	6.2E-01	1.0E-05	4.8	61.8	0.09	0.02
6291-01F	975	7.55E+00	1.39E+00	2.44E-02	2.0E-14	3.7E-01	1.4E-04	6.1	78.2	0.18	0.02
6291-01G	1100	1.54E+01	1.73E+00	5.03E-02	1.3E-14	3.0E-01	1.9E-04	4.3	88.7	0.26	0.04
6291-01H	1250	2.30E+01	1.14E+01	6.92E-02	1.4E-14	4.5E-02	1.5E-03	14.8	100.0	1.37	0.06
		total gas age		n=5	1.2E-13	4.4E-01	2.2E-01			0.27	0.02
		plateau age								na	na
		isochron age		40Ar/36Ar=	302.1±1.9		MSWD = 2.4			0.067	0.012

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
JS-95-16 A:4:34, matt, J=0.001418493±0.000002						Disc: 1.0050±0.0020					
5167-01B	600	4.25E+02	1.26E+00	1.42E+00	4.6E-16	4.1E-01	5.0E-03	1.4	0.8	15.55	8.26
5167-01C	700	5.84E+01	9.75E-01	1.90E-01	4.5E-16	5.2E-01	7.4E-04	4.2	1.5	6.24	1.27
5167-01D	775	5.00E+00	8.43E-01	1.22E-02	9.9E-15	6.1E-01	3.0E-04	28.8	17.6	3.69	0.07
5167-01E	825	3.00E+00	8.58E-01	5.71E-03	9.5E-15	5.9E-01	2.9E-04	46.0	33.2	3.53	0.05
5167-01F	900	2.22E+00	1.13E+00	3.17E-03	9.8E-15	4.5E-01	2.5E-04	61.7	49.2	3.51	0.04
5167-01G	1000	1.88E+00	1.88E+00	2.38E-03	6.8E-15	2.7E-01	3.8E-04	70.4	60.3	3.39	0.03
5167-01H	1100	1.44E+00	3.30E+00	1.21E-03	4.4E-15	1.5E-01	4.2E-04	92.8	67.4	3.42	0.05
5167-01I	1200	1.76E+00	4.24E+00	2.53E-03	6.7E-15	1.2E-01	4.4E-04	76.1	78.4	3.44	0.04
5167-01J	1300	3.43E+00	2.06E+01	1.29E-02	9.1E-15	2.5E-02	5.8E-04	34.8	93.2	3.10	0.08
5167-01K	1650	8.35E+00	1.94E+01	2.84E-02	4.1E-15	2.6E-02	6.5E-04	17.2	100.0	3.73	0.17
		total gas age		n=10	6.1E-14	3.3E-01	2.3E-01			3.58	0.13
		plateau age					E-K	82.0		3.47	0.03
		isochron age		40Ar/36Ar= 304.5±1.9			MSWD = 2.06			3.40	0.11
JS-95-17, c3:37, Joe S., J=0.0002189328±0.000002						Disc: 1.0071±0.0020					
5384-01B	600	5.56E+01	1.26E+00	1.88E-01	5.3E-16	4.1E-01	-7.9E-05	0.1	3.5	0.02	0.23
5384-01C	700	1.19E+01	1.08E+00	4.01E-02	2.5E-15	4.7E-01	2.5E-05	1.4	19.9	0.07	0.05
5384-01D	800	6.56E+00	9.30E-01	2.20E-02	3.3E-15	5.5E-01	6.2E-05	1.8	41.6	0.05	0.03
5384-01E	900	5.15E+00	7.69E-01	1.56E-02	2.6E-15	6.6E-01	2.2E-04	11.7	58.5	0.24	0.03
5384-01F	1000	7.45E+00	1.17E+00	1.98E-02	1.3E-15	4.4E-01	-1.8E-04	22.5	67.0	0.66	0.04
5384-01G	1100	1.10E+01	1.54E+00	2.55E-02	1.1E-15	3.3E-01	4.4E-04	32.7	74.2	1.42	0.06
5384-01H	1200	2.74E+01	4.65E+00	8.16E-02	1.8E-15	1.1E-01	8.2E-04	13.3	86.1	1.44	0.08
5384-01I	1300	5.34E+01	1.36E+01	1.32E-01	9.4E-16	3.7E-02	5.7E-04	28.7	92.3	6.09	0.16
5384-01J	1450	6.87E+01	2.47E+00	2.54E-02	4.2E-16	2.1E-01	-7.1E-04	89.3	95.1	24.12	0.17
5384-01K	1650	7.81E+01	1.17E-01	2.11E-02	7.5E-16	4.4E+00	-4.8E-04	92.0	100.0	28.19	0.13
		total gas age		n=10	1.5E-14	6.2E-01	1.3E+00			2.83	0.07
		plateau age					B-D	42.0		0.05	0.03
		isochron age		40Ar/36Ar= 295.6±3.3			MSWD = 0.15			0.051	0.04

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
JS-95-17, G5 & G6:46, JRS, J=0.00021861±0.000002						Disc: 1.0112±0.0020					
6295-01B	700	5.50E+01	1.25E+00	1.82E-01	6.4E-15	4.1E-01	3.2E-04	2.3	7.6	0.50	0.14
6295-01C	750	4.52E+01	9.61E-01	1.51E-01	2.6E-15	5.3E-01	4.8E-04	1.6	10.7	0.29	0.12
6295-01D	825	2.64E+01	1.01E+00	8.73E-02	2.3E-14	5.0E-01	2.5E-04	2.6	38.6	0.27	0.06
6295-01E	875	5.00E+01	8.60E-01	1.65E-01	1.4E-14	5.9E-01	1.2E-04	2.4	55.1	0.48	0.12
6295-01F	975	5.17E+01	1.03E+00	1.70E-01	1.5E-14	5.0E-01	1.0E-04	2.7	73.4	0.56	0.13
6295-01G	1100	6.67E+01	1.73E+00	2.18E-01	8.5E-15	2.9E-01	5.9E-04	3.5	83.5	0.92	0.16
6295-01H	1250	6.27E+02	5.48E+00	2.04E+00	8.6E-15	9.3E-02	3.2E-03	3.9	93.7	9.61	1.65
6295-01I	1650	8.29E+01	2.27E+01	2.59E-01	5.3E-15	2.2E-02	1.1E-03	9.8	100.0	3.24	0.19
		total gas age		n=8	8.4E-14	4.2E-01	2.1E-01			1.58	0.27
		plateau age					B-F	74		0.36	0.07
		isochron age		40Ar/36Ar=	302±2.8		MSWD = 0.56				
JS-95-18, e4:38, Joe S., J=0.001438±0.000002						Disc: 1.0071±0.0020					
5481-01B	600	6.03E+01	1.27E+00	1.96E-01	1.2E-15	4.0E-01	4.7E-04	4.0	0.7	6.17	1.22
5481-01C	700	1.14E+01	7.68E-01	2.82E-02	1.1E-14	6.6E-01	2.9E-04	27.3	7.4	8.03	0.17
5481-01D	800	4.85E+00	6.05E-01	6.12E-03	3.4E-14	8.4E-01	1.8E-04	63.7	28.1	8.00	0.04
5481-01E	900	3.91E+00	5.55E-01	2.93E-03	5.7E-14	9.2E-01	2.4E-04	78.9	63.0	7.98	0.03
5481-01F	1000	3.79E+00	6.67E-01	2.58E-03	4.1E-14	7.6E-01	1.6E-04	81.3	88.1	7.98	0.03
5481-01G	1100	6.14E+00	1.00E+00	1.07E-02	1.0E-14	5.1E-01	3.1E-04	49.6	94.5	7.88	0.09
5481-01H	1200	1.06E+01	3.07E+00	2.67E-02	3.5E-15	1.7E-01	3.3E-04	27.8	96.6	7.66	0.21
5481-01I	1300	1.94E+01	2.58E+01	6.20E-02	4.4E-15	2.0E-02	8.5E-04	15.5	99.3	7.93	0.36
5481-01J	1450	4.15E+01	1.87E+01	1.35E-01	1.2E-15	2.7E-02	7.3E-04	7.6	100.0	8.30	0.93
		total gas age		n=9	1.6E-13	7.7E-01	3.5E-01			7.96	0.07
		plateau age					B-J	100.0		7.98	0.03
		isochron age		40Ar/36Ar=	294.3±1.1		MSWD = 0.79			7.99	0.02

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
JS-95-20, e5:38, Joe S., J=0.001438±0.000002						Disc: 1.0071±0.0020					
5482-01B	600	1.47E+01	1.75E+00	3.69E-02	8.9E-16	2.9E-01	-9.9E-05	26.8	0.9	10.20	0.43
5482-01C	700	5.47E+00	1.43E+00	6.08E-03	8.3E-15	3.6E-01	1.4E-04	69.2	9.4	9.80	0.07
5482-01D	800	4.06E+00	2.01E+00	2.21E-03	2.2E-14	2.5E-01	6.9E-05	87.7	31.8	9.22	0.03
5482-01E	900	3.97E+00	1.46E+00	2.05E-03	2.9E-14	3.5E-01	2.6E-04	87.6	61.4	9.01	0.03
5482-01F	1000	4.43E+00	1.29E+00	3.50E-03	2.0E-14	3.9E-01	2.4E-04	78.9	82.2	9.06	0.04
5482-01G	1100	5.90E+00	1.12E+00	8.29E-03	8.8E-15	4.5E-01	3.8E-04	59.9	91.2	9.15	0.09
5482-01H	1200	8.61E+00	1.93E+00	1.81E-02	3.0E-15	2.6E-01	5.1E-04	39.5	94.2	8.82	0.20
5482-01I	1300	9.92E+00	3.57E+01	3.11E-02	1.7E-15	1.4E-02	5.0E-04	35.0	96.0	9.21	0.35
5482-01J	1450	8.68E+00	1.55E+01	2.16E-02	3.7E-15	3.3E-02	3.4E-04	40.2	99.8	9.13	0.17
5482-01K	1650	2.86E+01	2.42E+01	8.89E-02	2.1E-16	2.1E-02	3.6E-04	14.7	100.0	11.09	2.03
		total gas age		n=10	9.8E-14	3.3E-01	1.6E-01			9.16	0.07
		plateau age					E-J	68.0		9.04	0.04
		isochron age		40Ar/36Ar=	302.4±1.7		MSWD = 21.58			9.11	0.02
JS-95-21, e6:38, Joe S., J=0.001438±0.000002						Disc: 1.0071±0.0020					
5483-01B	600	1.95E+02	9.13E-01	6.41E-01	1.7E-15	5.6E-01	8.9E-04	3.1	2.2	15.80	3.56
5483-01C	700	3.34E+01	8.04E-01	1.11E-01	1.1E-14	6.3E-01	2.7E-04	2.4	15.5	2.08	0.57
5483-01D	800	1.11E+01	8.12E-01	3.63E-02	2.0E-14	6.3E-01	2.3E-04	4.3	39.5	1.24	0.19
5483-01E	900	8.12E+00	8.61E-01	2.64E-02	1.9E-14	5.9E-01	2.2E-04	4.7	61.9	0.99	0.15
5483-01F	1000	1.29E+01	1.45E+00	4.21E-02	1.0E-14	3.5E-01	5.6E-04	4.2	74.0	1.41	0.24
5483-01G	1100	3.83E+01	3.67E+00	1.27E-01	3.8E-15	1.4E-01	1.6E-03	2.4	78.5	2.41	0.70
5483-01H	1200	7.02E+01	1.96E+01	2.35E-01	1.6E-14	2.6E-02	2.5E-03	3.0	97.2	5.55	1.24
5483-01I	1300	1.92E+02	8.07E+01	6.49E-01	2.5E-15	6.3E-03	8.1E-03	3.1	100.2	16.47	3.66
		total gas age		n=8	8.5E-14	4.3E-01	2.7E-01			2.92	0.63
		plateau age					C-G	72.0		1.14	0.16
		isochron age		40Ar/36Ar=	301.1±2.6		MSWD = 0.32			0.65	0.24

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
JS-95-22, f7:38, Joe S., J=0.001438±0.000002						Disc: 1.0071±0.0020					
5492-01B	600	3.97E+02	2.07E+00	1.31E+00	7.7E-16	2.5E-01	3.0E-03	2.8	0.7	28.22	8.15
5492-01C	700	2.49E+01	1.45E+00	7.30E-02	5.9E-15	3.5E-01	2.6E-04	14.0	6.1	9.04	0.41
5492-01D	800	7.02E+00	1.28E+00	1.36E-02	1.6E-14	4.0E-01	3.0E-04	44.2	20.3	8.03	0.10
5492-01E	900	5.27E+00	7.82E-01	7.74E-03	2.3E-14	6.5E-01	2.6E-04	57.7	41.6	7.88	0.06
5492-01F	1000	5.49E+00	9.80E-01	8.26E-03	2.2E-14	5.2E-01	2.1E-04	56.9	61.8	8.08	0.06
5492-01G	1100	6.74E+00	1.25E+00	1.26E-02	1.7E-14	4.1E-01	2.6E-04	46.1	77.4	8.04	0.09
5492-01H	1200	1.20E+01	2.52E+00	2.96E-02	1.3E-14	2.0E-01	2.2E-04	28.5	89.3	8.85	0.18
5492-01I	1300	1.89E+01	1.29E+01	5.00E-02	8.5E-15	3.9E-02	4.0E-04	27.3	97.1	13.50	0.31
5492-01J	1450	1.68E+01	1.38E+01	4.77E-02	3.2E-15	3.7E-02	4.4E-04	22.5	100.0	9.86	0.32
		total gas age		n=9	1.1E-13	4.1E-01	2.1E-01			8.79	0.19
		plateau age					D-G	68.0		7.99	0.06
		isochron age		40Ar/36Ar=	306.2±1.4		MSWD = 4.32			7.76	0.05
JS-95-23, e7:38, Joe S., J=0.001438±0.000002						Disc: 1.0071±0.0020					
5484-01B	600	1.17E+02	1.48E+00	3.78E-01	1.3E-15	3.4E-01	2.9E-04	4.3	1.9	12.83	2.18
5484-01C	700	1.42E+01	1.13E+00	4.21E-02	1.0E-14	4.5E-01	1.7E-04	12.8	17.6	4.70	0.25
5484-01D	800	5.26E+00	9.90E-01	1.29E-02	1.9E-14	5.2E-01	2.0E-04	29.1	46.3	3.97	0.09
5484-01E	900	4.34E+00	1.42E+00	1.00E-02	1.4E-14	3.6E-01	1.6E-04	34.4	67.1	3.86	0.07
5484-01F	1000	5.43E+00	2.82E+00	1.44E-02	6.3E-15	1.8E-01	2.1E-04	25.6	76.6	3.61	0.13
5484-01G	1100	8.00E+00	4.09E+00	2.45E-02	3.7E-15	1.2E-01	-8.0E-05	13.4	82.2	2.78	0.20
5484-01H	1200	1.83E+01	9.28E+00	5.91E-02	7.3E-15	5.5E-02	7.6E-04	8.6	93.2	4.10	0.35
5484-01I	1300	6.52E+01	3.39E+01	2.16E-01	4.5E-15	1.5E-02	1.6E-03	5.9	100.0	10.24	1.18
		total gas age		n=8	6.6E-14	3.3E-01	1.9E-01			4.57	0.26
		plateau age					D-F	58.0		3.9	0.1
		isochron age		40Ar/36Ar=	306.2±1.4		MSWD = 0.28			3.6	0.07
JS-95-24, e8:38, Joe S., J=0.001438±0.000002						Disc: 1.0071±0.0020					
5485-01B	600	1.00E+02	6.27E-01	3.05E-01	3.2E-15	8.1E-01	-2.5E-05	9.9	3.9	25.52	1.63

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
5485-01C	700	3.45E+01	5.99E-01	8.68E-02	1.5E-14	8.5E-01	1.3E-04	25.8	22.5	22.98	0.47
5485-01D	800	2.27E+01	7.33E-01	4.90E-02	1.6E-14	7.0E-01	1.6E-04	36.6	41.7	21.46	0.29
5485-01E	900	1.97E+01	9.73E-01	3.90E-02	1.2E-14	5.2E-01	2.8E-04	41.8	56.4	21.19	0.23
5485-01F	1000	1.73E+01	1.22E+00	3.21E-02	8.5E-15	4.2E-01	1.8E-04	45.8	66.7	20.50	0.23
5485-01G	1100	1.67E+01	1.54E+00	3.06E-02	6.1E-15	3.3E-01	2.8E-04	46.6	74.1	20.06	0.21
5485-01H	1200	1.54E+01	5.80E+00	2.75E-02	1.4E-14	8.8E-02	4.6E-04	50.2	90.5	20.05	0.18
5485-01I	1300	2.09E+01	3.52E+01	5.44E-02	7.8E-15	1.4E-02	7.2E-04	35.9	100.0	19.82	0.32
		total gas age		n=8	8.3E-14	4.8E-01	3.1E-01			21.27	0.34
		plateau age								na	na
		isochron age		40Ar/36Ar=	307.1±1.8		MSWD = 6.5			19.4	0.2
JS-95-27, f8:38, Joe S., J=0.001438±0.000002						Disc: 1.0071±0.0020					
5486-01B	600	1.02E+02	6.32E-01	3.07E-01	4.7E-15	8.1E-01	8.9E-04	10.6	5.3	27.74	1.62
5486-01C	700	3.32E+01	5.97E-01	8.22E-02	1.8E-14	8.5E-01	3.2E-04	26.9	24.8	22.96	0.45
5486-01D	800	2.57E+01	7.27E-01	5.76E-02	1.5E-14	7.0E-01	3.2E-04	34.0	42.1	22.54	0.32
5486-01E	900	2.49E+01	9.19E-01	5.39E-02	1.3E-14	5.6E-01	2.7E-04	36.3	56.4	23.28	0.32
5486-01F	1000	1.74E+01	1.13E+00	3.15E-02	9.1E-15	4.5E-01	2.8E-04	46.8	66.5	20.98	0.20
5486-01G	1100	1.76E+01	1.65E+00	3.36E-02	7.6E-15	3.1E-01	4.2E-04	44.3	75.0	20.09	0.23
5486-01H	1200	2.11E+01	7.73E+00	4.40E-02	1.6E-14	6.6E-02	6.6E-04	41.3	93.2	22.60	0.26
5486-01I	1300	2.22E+01	4.12E+01	5.25E-02	6.1E-15	1.2E-02	1.0E-03	44.3	100.0	26.08	0.32
		total gas age		n=8	9.0E-14	4.9E-01	3.2E-01			22.89	0.38
		plateau age					C-E	50.0		22.9	0.3
		isochron age		40Ar/36Ar=	302.2±2.2		MSWD = 1.35			21.88	0.35
JS-95-28, f2:38, Joe S., J=0.001438±0.000002						Disc: 1.0071±0.0020					
5487-01A	500	2.70E+02	8.33E-02	8.83E-01	1.6E-15	6.1E+00	2.1E-03	3.4	2.4	23.93	4.85
5487-01B	600	3.76E+01	3.93E-01	1.25E-01	4.2E-15	1.3E+00	5.8E-04	2.1	8.8	2.08	0.69
5487-01C	700	1.51E+01	5.58E-01	5.06E-02	1.4E-14	9.1E-01	3.3E-04	1.5	29.7	0.61	0.28
5487-01D	800	7.95E+00	6.39E-01	2.67E-02	1.4E-14	8.0E-01	3.4E-04	1.4	50.6	0.29	0.15

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
5487-01E	900	7.24E+00	6.99E-01	2.44E-02	1.0E-14	7.3E-01	3.9E-04	1.2	66.1	0.23	0.15
5487-01F	1000	1.01E+01	1.36E+00	3.40E-02	4.7E-15	3.7E-01	8.0E-04	1.4	73.3	0.36	0.23
5487-01G	1100	1.21E+01	3.79E+00	4.13E-02	3.3E-15	1.3E-01	1.9E-03	1.3	78.3	0.42	0.30
5487-01H	1200	1.05E+01	1.97E+01	4.06E-02	1.3E-14	2.6E-02	3.5E-03	0.4	98.9	0.11	0.22
5487-01I	1300	2.75E+01	1.16E+02	1.22E-01	7.5E-16	4.4E-03	3.7E-03	1.8	100.0	1.37	1.04
		total gas age		n=9	6.6E-14	7.4E-01	1.9E+00			1.01	0.36
		plateau age					C-I	90.0		0.3	0.1
		isochron age		40Ar/36Ar=	302.4±2.5		MSWD = 6.4			(0.27)	(0.27)
JS-95-28, E1:46, JRS, J=0.00022435±0.000002						Disc: 1.0112±0.0020					
6280-01B	725	2.66E+01	5.12E-01	8.86E-02	1.2E-14	1.0E+00	3.0E-04	1.8	21.2	0.20	0.08
6280-01C	775	2.64E+01	6.05E-01	8.89E-02	1.0E-14	8.4E-01	6.0E-05	0.7	40.2	0.07	0.08
6280-01D	825	2.67E+01	6.21E-01	8.96E-02	7.8E-15	8.2E-01	4.3E-05	1.0	54.3	0.10	0.08
6280-01E	875	3.02E+01	7.15E-01	1.02E-01	5.3E-15	7.1E-01	4.2E-04	0.3	64.0	0.04	0.09
6280-01F	950	3.25E+01	1.18E+00	1.09E-01	4.0E-15	4.3E-01	1.0E-03	1.3	71.2	0.17	0.10
6280-01G	1050	3.93E+01	2.91E+00	1.32E-01	3.7E-15	1.8E-01	1.5E-03	1.7	78.0	0.28	0.12
6280-01H	1200	3.96E+01	2.79E+01	1.36E-01	1.2E-14	1.8E-02	4.3E-03	3.8	100.0	0.61	0.12
		total gas age		n=7	5.5E-14	6.0E-01	3.7E-01			0.24	0.09
		plateau age					B-G	78.0		0.13	0.05
		isochron age		40Ar/36Ar=	315.1±0.16		MSWD = 1.78			(0.62)	(0.16)
JS-95-29, f3:38, Joe S., J=0.001438±0.000002						Disc: 1.0071±0.0020					
5488-01B	600	2.14E+02	5.99E-01	7.03E-01	8.0E-16	8.5E-01	4.4E-04	2.7	1.1	14.78	4.33
5488-01C	700	2.69E+01	5.49E-01	8.64E-02	6.2E-15	9.3E-01	-4.7E-06	5.4	9.9	3.74	0.51
5488-01D	800	7.22E+00	6.80E-01	2.04E-02	1.3E-14	7.5E-01	7.8E-05	17.0	28.0	3.18	0.12
5488-01E	900	5.49E+00	6.56E-01	1.50E-02	1.7E-14	7.8E-01	1.1E-04	20.0	51.8	2.85	0.09
5488-01F	1000	9.08E+00	7.26E-01	2.71E-02	1.3E-14	7.0E-01	2.6E-04	12.5	70.2	2.95	0.16
5488-01G	1100	1.94E+01	7.20E-01	6.23E-02	7.6E-15	7.1E-01	4.9E-04	5.6	81.0	2.83	0.35
5488-01H	1200	4.67E+01	2.44E+00	1.51E-01	7.8E-15	2.1E-01	5.9E-04	4.8	92.1	5.85	0.84

Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
5488-01I	1300	4.53E+01	6.98E+00	1.48E-01	3.8E-15	7.3E-02	7.4E-04	4.7	97.5	5.52	0.82
5488-01J	1450	4.15E+01	4.43E+00	1.35E-01	1.8E-15	1.2E-01	4.8E-04	4.5	100.0	4.90	0.89
		total gas age		n=9	7.1E-14	6.5E-01	3.4E-01			3.67	0.36
		plateau age					C-G	80.0		2.97	0.11
		isochron age		40Ar/36Ar=	296.2±2.7		MSWD = 2.45			2.84	0.15
JS-95-31, f4:38, Joe S., J=0.001438±0.000002						Disc: 1.0071±0.0020					
5489-01B	600	2.54E+02	1.12E+00	8.44E-01	1.2E-15	4.6E-01	1.8E-04	1.8	1.5	11.68	4.84
5489-01C	700	2.86E+01	8.56E-01	9.14E-02	1.1E-14	6.0E-01	3.1E-05	5.7	14.8	4.22	0.50
5489-01D	800	8.71E+00	7.33E-01	2.63E-02	2.1E-14	7.0E-01	1.2E-04	11.5	40.4	2.60	0.14
5489-01E	900	9.07E+00	1.03E+00	2.76E-02	1.8E-14	5.0E-01	2.4E-04	11.1	62.5	2.61	0.15
5489-01F	1000	1.63E+01	2.10E+00	5.26E-02	9.8E-15	2.4E-01	2.1E-04	5.9	74.5	2.50	0.31
5489-01G	1100	1.64E+01	2.71E+00	5.22E-02	7.9E-15	1.9E-01	3.6E-04	7.4	84.2	3.16	0.32
5489-01H	1200	3.08E+01	7.13E+00	1.01E-01	4.9E-15	7.2E-02	8.4E-04	4.9	90.3	3.89	0.57
5489-01I	1300	6.10E+01	2.69E+01	2.05E-01	6.5E-15	1.9E-02	1.4E-03	4.3	98.3	6.96	1.10
5489-01J	1450	1.29E+02	1.74E+01	4.23E-01	1.2E-15	2.9E-02	1.3E-03	4.1	99.8	13.87	2.74
5489-01K	1650	4.91E+02	2.32E+01	1.58E+00	1.5E-16	2.2E-02	2.9E-03	5.3	100.0	66.89	18.44
		total gas age		n=10	8.1E-14	4.3E-01	2.6E-01			3.71	0.48
		plateau age					D-H	78.0		2.68	0.16
		isochron age		40Ar/36Ar=	303.3±1.2		MSWD = 1.25			2.03	0.14
JS-95-32, c5:37, Joe S., J=0.0002190862±0.000002						Disc: 1.0071±0.0020					
5385-01C	700	1.95E+01	2.18E+00	6.59E-02	1.8E-15	2.3E-01	5.6E-04	0.8	16.0	0.06	0.07
5385-01D	800	1.33E+01	1.92E+00	4.51E-02	3.1E-15	2.7E-01	1.9E-04	1.0	43.3	0.05	0.05
5385-01E	900	5.68E+00	1.91E+00	1.96E-02	3.3E-15	2.7E-01	1.4E-05	0.6	72.1	0.01	0.03
5385-01F	1000	7.26E+00	2.60E+00	2.48E-02	1.8E-15	2.0E-01	1.3E-04	1.9	87.6	0.06	0.03
5385-01G	1100	1.94E+01	3.20E+00	6.86E-02	4.9E-16	1.6E-01	1.2E-03	-3.1	91.9	-0.24	0.11
5385-01H	1200	9.08E+01	6.37E+00	3.06E-01	9.3E-16	8.0E-02	1.0E-03	0.8	100.0	0.28	0.29

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
		total gas age		n=6	1.1E-14	2.3E-01	7.2E-02			0.05	0.07
		plateau age					C-H	100.0		0.03	0.03
		isochron age		40Ar/36Ar=	296.4±2.0		MSWD = 1.9			0.02	0.01
JS-95-32, E5:46, JRS, J=0.00022294±0.000002						Disc: 1.0112±0.0020					
6289-01B	700	2.45E+01	2.05E+00	8.27E-02	1.1E-14	2.5E-01	3.1E-04	0.8	12.9	0.07	0.07
6289-01C	750	1.63E+01	1.86E+00	5.53E-02	9.4E-15	2.7E-01	2.1E-04	0.4	24.1	0.03	0.05
6289-01D	825	1.26E+01	1.66E+00	4.26E-02	2.0E-14	3.1E-01	1.7E-04	1.5	48.3	0.08	0.04
6289-01E	875	9.76E+00	1.89E+00	3.26E-02	1.4E-14	2.7E-01	1.8E-04	2.7	64.7	0.10	0.03
6289-01F	975	1.36E+01	2.51E+00	4.62E-02	1.1E-14	2.0E-01	1.0E-04	1.2	77.9	0.06	0.04
6289-01G	1100	4.06E+01	2.85E+00	1.38E-01	4.2E-15	1.8E-01	3.3E-05	0.1	82.9	0.02	0.14
6289-01H	1250	7.25E+01	1.04E+01	2.45E-01	1.3E-14	4.9E-02	8.5E-04	1.1	98.0	0.31	0.20
6289-01I	1650	1.26E+02	1.67E+01	4.28E-01	1.6E-15	3.1E-02	5.6E-04	0.7	100.0	0.36	0.40
		total gas age		n=8	8.4E-14	2.3E-01	1.0E-01			0.11	0.08
		plateau age					B-I	100.0		0.08	0.02
		isochron age		40Ar/36Ar=	296.3±1.4		MSWD = 0.68			0.064	0.022
JS-95-34, f6:38, Joe S., J=0.001438±0.000002						Disc: 1.0071±0.0020					
5491-01B	600	9.53E+01	5.40E-01	3.10E-01	2.9E-15	9.4E-01	1.1E-03	3.8	2.9	9.31	1.67
5491-01C	700	1.32E+01	4.11E-01	4.02E-02	2.0E-14	1.2E+00	1.7E-04	10.1	22.9	3.46	0.22
5491-01D	800	5.03E+00	4.52E-01	1.34E-02	3.0E-14	1.1E+00	1.2E-04	22.0	52.8	2.87	0.08
5491-01E	900	5.09E+00	7.79E-01	1.38E-02	1.3E-14	6.5E-01	1.8E-04	20.8	66.4	2.74	0.09
5491-01F	1000	6.34E+00	1.19E+00	1.83E-02	5.1E-15	4.3E-01	2.5E-04	16.1	71.6	2.65	0.14
5491-01G	1100	8.04E+00	1.72E+00	2.45E-02	3.5E-15	3.0E-01	3.0E-04	11.5	75.1	2.39	0.21
5491-01H	1200	2.38E+01	6.13E+00	7.71E-02	1.9E-14	8.3E-02	5.0E-04	6.1	94.5	3.78	0.41
5491-01I	1300	4.90E+01	3.28E+01	1.65E-01	5.4E-15	1.6E-02	1.5E-03	5.4	100.0	7.00	0.91
		total gas age		n=8	9.9E-14	7.5E-01	4.7E-01			3.53	0.27
		plateau age					D-G	52.0		2.76	0.09
		isochron age		40Ar/36Ar=	304.0±1.3		MSWD = 2.54			2.44	0.08

Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
JS-95-35, J2:NM40, Joe S., J=0.00039799±0.000004						Disc: 1.0071±0.0020					
5678-01B	600	6.70E+02	9.54E-01	2.20E+00	6.0E-16	5.3E-01	2.9E-03	3.2	3.8	15.41	3.83
5678-01C	700	9.70E+01	1.43E+00	3.08E-01	5.7E-15	3.6E-01	8.8E-04	6.4	40.0	4.49	0.46
5678-01D	800	3.50E+01	1.86E+00	1.05E-01	4.2E-15	2.8E-01	4.6E-04	11.7	66.6	2.93	0.17
5678-01E	900	4.28E+01	2.91E+00	1.32E-01	1.7E-15	1.8E-01	6.3E-04	9.2	77.6	2.82	0.23
5678-01F	1000	4.77E+01	5.08E+00	1.48E-01	1.1E-15	1.0E-01	8.8E-04	9.2	84.5	3.17	0.31
5678-01G	1100	7.60E+01	1.05E+01	2.45E-01	5.7E-16	4.8E-02	2.4E-03	5.6	88.1	3.09	0.49
5678-01H	1200	7.68E+01	2.69E+01	2.52E-01	4.1E-16	1.9E-02	3.6E-03	6.0	90.7	3.35	0.60
5678-01I	1300	5.68E+01	4.56E+01	1.88E-01	1.0E-15	1.1E-02	3.0E-03	8.4	97.1	3.52	0.38
5678-01J	1450	7.64E+01	4.43E+01	2.50E-01	3.5E-16	1.2E-02	4.6E-03	7.7	99.3	4.35	0.68
5678-01K	1650	1.11E+02	4.71E+01	3.67E-01	1.1E-16	1.1E-02	2.8E-03	6.0	100.0	4.97	1.61
		total gas age		n=10	1.6E-14	2.5E-01	1.8E-01			4.07	0.49
		plateau age					D-K	60.0		3.04	0.17
		isochron age		40Ar/36Ar=	303.0±3.2		MSWD = 0.73			2.31	0.33
JS-36, E1:43, JRS, J=0.00065966±0.000002						Disc: 1.0051±0.0020					
5963-01C	825	2.10E+02	9.19E-01	6.33E-01	1.1E-14	5.6E-01	1.3E-03	11.0	24.7	27.20	1.62
5963-01D	885	9.16E+01	7.07E-01	2.59E-01	6.3E-15	7.2E-01	4.8E-04	16.6	39.1	18.07	0.65
5963-01E	965	6.18E+01	5.47E-01	1.57E-01	5.9E-15	9.3E-01	2.8E-04	24.8	52.5	18.17	0.39
5963-01F	1050	4.77E+01	9.70E-01	1.11E-01	6.7E-15	5.3E-01	3.2E-04	31.1	67.7	17.61	0.29
5963-01G	1125	4.39E+01	3.05E+00	1.02E-01	4.2E-15	1.7E-01	4.9E-04	31.8	77.1	16.58	0.28
5963-01H	1200	6.02E+01	1.68E+01	1.57E-01	8.5E-15	3.0E-02	1.2E-03	25.3	96.5	18.25	0.41
5963-01I	1275	7.33E+01	5.74E+01	2.26E-01	1.6E-15	8.9E-03	2.2E-03	15.0	100.0	13.57	0.64
		total gas age		n=7	4.4E-14	4.7E-01	3.6E-01			20.01	0.72
		plateau age					D-H	70.0		19.7	0.5
		isochron age		40Ar/36Ar=	309.4±2.2		MSWD = 3.0			15.37	0.39

Run ID#	Temp (°C)	$^{40}\text{Ar}/^{39}\text{Ar}$	$^{37}\text{Ar}/^{39}\text{Ar}$	$^{36}\text{Ar}/^{39}\text{Ar}$	$^{39}\text{Ar}_K$ (moles)	K/Ca	Cl/K	$^{40}\text{Ar}^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
JS-95-37, J3:NM40, Joe S., J=0.00039773±0.000004						Disc: 1.0071±0.0020					
5679-01C	700	9.79E+01	1.50E+00	3.14E-01	2.7E-15	3.4E-01	6.1E-04	5.4	11.3	3.76	0.48
5679-01D	800	1.21E+01	1.10E+00	3.03E-02	8.6E-15	4.6E-01	2.9E-04	26.5	47.4	2.30	0.05
5679-01E	900	9.43E+00	1.00E+00	2.10E-02	6.5E-15	5.1E-01	1.7E-04	35.0	74.9	2.37	0.04
5679-01F	1000	1.36E+01	1.81E+00	3.57E-02	3.1E-15	2.8E-01	-2.6E-05	23.2	88.1	2.26	0.08
5679-01G	1100	2.53E+01	3.62E+00	7.39E-02	1.8E-15	1.4E-01	2.2E-04	14.7	95.6	2.68	0.15
5679-01H	1200	3.05E+01	7.68E+00	9.64E-02	1.0E-15	6.6E-02	6.0E-04	8.6	100.0	1.90	0.20
		total gas age		n=6	2.4E-14	4.0E-01	1.7E-01			2.49	0.12
		plateau age					D-G	84.0		2.35	0.06
		isochron age		40Ar/36Ar=	299.1±1.8		MSWD = 4.27			2.26	0.05
JS-95-38, J4:NM40, Joe S., J=0.00039708±0.000004						Disc: 1.0071±0.0020					
5680-01C	700	4.02E+01	9.24E-01	1.24E-01	4.4E-15	5.5E-01	1.4E-04	8.9	16.3	2.56	0.20
5680-01D	800	1.13E+01	6.86E-01	2.75E-02	8.6E-15	7.4E-01	2.1E-04	28.4	48.3	2.29	0.05
5680-01E	900	1.28E+01	8.74E-01	3.33E-02	3.8E-15	5.8E-01	8.6E-05	23.7	62.6	2.18	0.06
5680-01F	1000	1.65E+01	1.52E+00	4.57E-02	3.4E-15	3.4E-01	4.3E-04	19.0	75.2	2.25	0.09
5680-01G	1100	2.06E+01	2.57E+00	6.10E-02	2.4E-15	2.0E-01	5.3E-04	13.4	84.2	1.98	0.11
5680-01H	1200	2.77E+01	5.92E+00	8.53E-02	1.2E-15	8.6E-02	1.6E-03	10.8	88.6	2.15	0.19
5680-01I	1300	5.75E+01	2.50E+01	1.90E-01	9.7E-16	2.0E-02	2.0E-03	6.0	92.2	2.52	0.41
5680-01J	1450	5.77E+01	2.19E+01	1.88E-01	1.9E-15	2.3E-02	1.6E-03	6.7	99.4	2.82	0.31
5680-01K	1650	1.06E+02	3.23E+01	3.49E-01	1.6E-16	1.6E-02	5.2E-03	5.5	100.0	4.28	1.27
		total gas age		n=9	2.7E-14	4.8E-01	2.8E-01			2.34	0.13
		plateau age					C-J	100.0		2.24	0.06
		isochron age		40Ar/36Ar=	298.3±1.5		MSWD = 2.09			2.16	0.06
JS-95-40, J5:NM40, Joe S., J=0.00039669±0.000004						Disc: 1.0071±0.0020					
5681-01C	700	4.37E+02	3.50E+00	1.43E+00	8.5E-16	1.5E-01	9.4E-04	3.4	4.6	10.62	2.22
5681-01D	800	3.68E+01	3.21E+00	1.11E-01	5.0E-15	1.6E-01	3.4E-04	11.4	31.6	3.00	0.17
5681-01E	900	2.23E+01	2.51E+00	6.31E-02	5.6E-15	2.0E-01	2.3E-04	17.2	61.7	2.75	0.11

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
5681-01F	1000	4.10E+01	1.45E+00	1.25E-01	4.0E-15	3.5E-01	9.1E-05	10.0	83.4	2.93	0.19
5681-01G	1100	6.50E+01	1.53E+00	2.04E-01	1.6E-15	3.3E-01	8.3E-04	7.5	92.0	3.48	0.37
5681-01H	1200	4.37E+02	5.51E+00	1.41E+00	6.0E-16	9.3E-02	2.8E-03	4.4	95.3	13.72	2.37
5681-01I	1300	1.69E+02	4.32E+01	5.58E-01	1.9E-16	1.2E-02	1.6E-03	4.2	96.3	5.21	1.46
5681-01J	1450	2.52E+02	3.89E+01	8.18E-01	6.8E-16	1.3E-02	3.3E-03	5.2	100.0	9.66	1.54
		total gas age		n=8	1.9E-14	2.2E-01	1.3E-01			3.92	0.40
		plateau age					D-G	88.0		2.87	0.13
		isochron age		40Ar/36Ar=	305.0±1.3		MSWD = 0.67			2.26	0.12
JS-95-42, J6:NM40, Joe S., J=0.00039695±0.000004						Disc: 1.0071±0.0020					
5682-01B	600	2.97E+03	1.32E+00	9.65E+00	2.1E-16	3.9E-01	8.8E-03	4.0	0.1	82.64	23.56
5682-01C	700	4.00E+02	7.52E-01	1.29E+00	2.8E-15	6.8E-01	2.8E-03	5.0	0.8	14.30	1.99
5682-01D	800	9.16E+01	5.24E-01	2.93E-01	4.1E-15	9.7E-01	2.5E-04	5.6	2.0	3.67	0.42
5682-01E	900	7.57E+01	5.75E-01	2.40E-01	3.2E-15	8.9E-01	8.6E-04	6.3	2.8	3.42	0.39
5682-01F	1000	8.45E+01	1.87E+00	2.69E-01	1.5E-15	2.7E-01	7.5E-04	6.2	3.3	3.72	0.46
5682-01G	1100	2.03E+02	9.27E+00	6.66E-01	6.2E-16	5.5E-02	3.9E-03	3.4	3.4	4.91	1.13
5682-01H	1200	4.14E+02	2.96E+01	1.36E+00	8.4E-16	1.7E-02	7.3E-03	3.7	3.7	11.11	2.13
5682-01I	1300	3.03E+02	7.14E+01	9.78E-01	2.0E-15	7.1E-03	9.4E-03	6.6	4.2	14.92	1.53
		total gas age		n=7	3.6E-13	9.9E-01	9.4E-01			0.41	0.10
		plateau age					D-G	62.0		3.6	0.3
		isochron age		40Ar/36Ar=	306.4±1.6		MSWD = 0.95			1.46	0.36
JS-95-43, K1:NM40, Joe S., J=0.00039396±0.000004						Disc: 1.0071±0.0020					
5683-01C	700	8.65E+01	3.72E+00	2.74E-01	1.4E-15	1.4E-01	1.2E-04	6.7	0.3	4.15	0.46
5683-01D	800	2.58E+01	3.09E+00	7.57E-02	3.0E-15	1.7E-01	2.5E-04	14.4	1.0	2.64	0.13
5683-01E	900	2.19E+01	2.39E+00	6.17E-02	3.5E-15	2.1E-01	5.7E-04	17.4	1.8	2.71	0.11
5683-01F	1000	3.30E+01	2.22E+00	9.90E-02	2.2E-15	2.3E-01	7.3E-04	12.0	2.3	2.81	0.17
5683-01G	1100	9.39E+01	2.81E+00	2.99E-01	1.7E-15	1.8E-01	1.2E-03	6.1	2.7	4.10	0.48
5683-01H	1200	7.03E+01	4.95E+00	2.25E-01	8.6E-16	1.0E-01	1.0E-03	6.1	2.9	3.07	0.45

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
5683-01I	1300	1.61E+02	2.82E+01	5.24E-01	7.4E-16	1.8E-02	2.3E-03	5.2	3.0	6.11	0.89
5683-01J	1450	1.14E+02	1.79E+01	3.64E-01	2.0E-15	2.9E-02	1.7E-03	6.8	3.5	5.56	0.57
		total gas age		n=6	4.4E-13	8.9E-01	1.9E+00			0.50	0.11
		plateau age					D-F	56.0		2.71	0.09
		isochron age		40Ar/36Ar=	305.5±1.4		MSWD = 0.96			2.18	0.12
JS-95-48, K2:NM40, Joe S., J=0.00039392±0.000004						Disc: 1.0071±0.0020					
5684-01C	700	4.88E+00	2.03E+00	1.67E-02	5.0E-15	2.5E-01	-2.7E-05	2.1	4.6	0.07	0.03
5684-01D	800	1.76E+00	1.63E+00	6.30E-03	7.6E-15	3.1E-01	1.2E-04	1.6	11.5	0.02	0.02
5684-01E	900	1.29E+00	1.60E+00	4.65E-03	1.1E-14	3.2E-01	2.0E-04	3.2	21.6	0.03	0.01
5684-01F	1000	1.50E+00	1.91E+00	5.23E-03	8.1E-15	2.7E-01	1.7E-04	6.6	29.0	0.07	0.01
5684-01G	1100	5.81E+00	2.09E+00	1.94E-02	1.5E-15	2.4E-01	2.7E-04	3.9	30.3	0.16	0.10
5684-01H	1200	6.49E+00	7.46E+00	2.36E-02	1.3E-15	6.8E-02	3.5E-04	1.5	31.5	0.07	0.10
5684-01I	1300	5.06E+00	8.88E+00	1.89E-02	1.7E-15	5.7E-02	6.4E-04	3.3	33.0	0.12	0.08
5684-01J	1450	5.12E+00	8.48E+00	1.92E-02	5.5E-15	6.0E-02	6.5E-04	2.1	38.0	0.08	0.05
		total gas age		n=7	1.1E-13	5.3E-01	3.1E-01			0.27	0.04
		plateau age					C-J	100.0		0.048	0.014
		isochron age		40Ar/36Ar=	297.3±2.6		MSWD = 0.22			0.064	0.018
JS-95-48, F5 & F6:46, JRS, J=0.00022113±0.000002						Disc: 1.0112±0.0020					
6292-01A	625	2.57E+01	2.14E+00	8.53E-02	8.9E-15	2.4E-01	3.4E-04	2.7	9.8	0.27	0.08
6292-01B	700	1.07E+01	1.81E+00	3.57E-02	1.1E-14	2.8E-01	2.0E-04	2.6	21.4	0.11	0.03
6292-01C	750	9.74E+00	1.53E+00	3.19E-02	1.0E-14	3.3E-01	1.6E-04	4.5	32.6	0.18	0.03
6292-01D	825	1.02E+01	1.38E+00	3.40E-02	6.8E-15	3.7E-01	1.2E-04	3.0	40.1	0.12	0.03
6292-01E	875	1.22E+01	1.41E+00	4.08E-02	7.6E-15	3.6E-01	-5.6E-05	2.5	48.5	0.12	0.04
6292-01F	975	1.04E+01	1.66E+00	3.49E-02	2.3E-14	3.1E-01	1.1E-04	2.5	74.2	0.11	0.03
6292-01G	1100	3.53E+01	2.14E+00	1.17E-01	1.5E-14	2.4E-01	3.6E-04	2.5	91.0	0.36	0.10
6292-01H	1250	2.07E+01	1.37E+01	7.25E-02	7.6E-15	3.7E-02	1.1E-03	1.5	99.4	0.12	0.06
6292-01I	1650	1.85E+01	1.22E+01	6.35E-02	3.9E-15	4.2E-02	9.5E-04	3.7	103.7	0.27	0.06

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
		total gas age		n=8	9.1E-14	5.0E-01	3.3E-01			0.47	0.04
		plateau age					A-I	100.0		0.14	0.02
		isochron age		40Ar/36Ar=	301.5±2.0		MSWD = 1.37			0.048	0.01
JS-95-49, K3:NM40, Joe S., J=0.00039385±0.000004						Disc: 1.0071±0.0020					
5685-01B	600	8.16E+01	6.64E-01	2.62E-01	7.4E-16	7.7E-01	8.7E-04	5.3	0.5	3.09	0.48
5685-01C	700	1.53E+01	6.34E-01	3.85E-02	6.0E-15	8.1E-01	3.9E-04	26.0	4.2	2.83	0.07
5685-01D	800	6.88E+00	7.58E-01	1.01E-02	1.0E-14	6.7E-01	2.5E-04	57.6	10.4	2.82	0.02
5685-01E	900	5.72E+00	7.83E-01	6.55E-03	9.7E-15	6.5E-01	1.7E-04	67.2	16.4	2.73	0.02
5685-01F	1000	7.01E+00	8.54E-01	1.13E-02	6.0E-15	6.0E-01	3.7E-04	53.4	20.1	2.66	0.03
5685-01G	1100	1.24E+01	8.86E-01	3.03E-02	3.1E-15	5.8E-01	5.4E-04	28.3	22.0	2.50	0.06
5685-01H	1200	1.94E+01	2.69E+00	5.67E-02	9.6E-16	1.9E-01	1.1E-03	14.6	22.6	2.01	0.16
5685-01I	1300	2.54E+01	1.36E+01	7.05E-02	4.6E-16	3.7E-02	4.7E-04	22.1	22.9	4.03	0.24
5685-01J	1450	2.55E+01	1.36E+01	7.65E-02	9.4E-16	3.7E-02	9.3E-04	15.5	23.5	2.84	0.18
		total gas age		n=9	1.6E-13	4.5E-01	2.7E-01			0.81	0.04
		plateau age					B-F	70.0	2.77	0.04	
		isochron age		40Ar/36Ar=	295.5±1.6		MSWD = 8.5		2.74	0.03	
JS-95-50, K4:NM40, Joe S., J=0.00039382±0.000004						Disc: 1.0071±0.0020					
5686-01C	700	5.45E+01	2.77E-01	1.73E-01	5.6E-15	1.8E+00	7.2E-04	6.4	3.9	2.46	0.26
5686-01D	800	2.27E+01	5.44E-01	6.37E-02	5.7E-15	9.4E-01	6.6E-04	17.0	7.9	2.74	0.10
5686-01E	900	1.40E+01	1.31E+00	3.51E-02	3.4E-15	3.9E-01	5.9E-04	26.6	10.3	2.65	0.07
5686-01F	1000	1.08E+01	2.16E+00	2.56E-02	1.4E-15	2.4E-01	7.1E-04	31.5	11.3	2.42	0.09
5686-01G	1100	7.93E+00	2.00E+00	2.19E-02	4.5E-16	2.5E-01	7.1E-04	20.4	11.6	1.15	0.19
5686-01H	1200	9.86E+00	5.32E+00	1.38E-02	7.3E-17	9.6E-02	-5.9E-04	62.8	11.6	4.41	0.86
5686-01I	1300	2.05E+01	4.74E+01	7.47E-02	1.1E-16	1.1E-02	5.9E-03	10.3	11.7	1.55	0.77
5686-01J	1450	2.80E+01	2.78E+01	9.34E-02	1.4E-16	1.8E-02	6.3E-03	8.9	11.8	1.79	0.71

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
		total gas age		n=8	1.4E-13	2.1E-01	9.2E-02			2.49	0.06
		plateau age					C-F	95.0		2.60	0.09
		isochron age		40Ar/36Ar=	296.8±2.4		MSWD = 3.09			2.56	0.09
JS-95-51, K5:NM40, Joe S., J=0.00039386±0.000004						Disc: 1.0071±0.0020					
5687-01B	600	2.57E+02	2.43E-01	8.60E-01	7.4E-16	2.1E+00	3.8E-05	1.2	0.4	2.28	1.42
5687-01C	700	7.43E+01	4.12E-01	2.45E-01	7.6E-15	1.2E+00	8.3E-04	2.7	4.8	1.42	0.36
5687-01D	800	2.86E+01	5.76E-01	9.48E-02	1.2E-14	8.9E-01	1.4E-04	2.3	12.0	0.48	0.14
5687-01E	900	2.75E+01	7.51E-01	9.10E-02	1.2E-14	6.8E-01	2.9E-04	2.4	19.2	0.47	0.13
5687-01F	1000	3.78E+01	9.79E-01	1.25E-01	8.2E-15	5.2E-01	3.2E-04	2.6	24.0	0.71	0.18
5687-01G	1100	6.58E+01	9.49E-01	2.17E-01	4.4E-15	5.4E-01	9.2E-04	2.5	26.6	1.17	0.32
5687-01H	1200	4.87E+01	1.01E+00	1.61E-01	6.4E-15	5.1E-01	7.3E-04	2.6	30.3	0.89	0.24
5687-01I	1300	3.61E+01	1.97E+00	1.16E-01	4.7E-15	2.6E-01	9.0E-04	5.7	33.1	1.47	0.17
5687-01J	1450	3.23E+01	6.48E+00	1.01E-01	5.7E-16	7.9E-02	1.6E-03	8.9	33.4	2.05	0.31
		total gas age		n=7	1.7E-13	3.1E-01	1.1E-01			3.71	0.18
		plateau age					B-H	92.0		0.64	0.14
		isochron age		40Ar/36Ar=	301.5±1.9		MSWD = 0.42			0.13	0.05
JS-95-52, K6:NM40, Joe S., J=0.00039393±0.000004						Disc: 1.0071±0.0020					
5688-01B	600	3.78E+02	5.85E-02	1.14E+00	5.2E-16	8.7E+00	1.5E-03	10.7	0.2	28.44	1.94
5688-01C	700	6.68E+01	2.57E-02	1.20E-01	5.5E-15	2.0E+01	5.0E-04	47.0	2.4	22.16	0.21
5688-01D	800	4.18E+01	1.07E-01	3.07E-02	5.2E-15	4.8E+00	4.2E-04	78.3	4.4	23.13	0.09
5688-01E	900	3.72E+01	2.68E-02	1.49E-02	9.9E-15	1.9E+01	4.7E-04	88.1	8.4	23.16	0.07
5688-01F	1000	3.46E+01	1.78E-02	8.07E-03	1.2E-14	2.9E+01	5.4E-04	93.1	13.0	22.73	0.06
5688-01G	1100	3.31E+01	2.14E-01	5.47E-03	6.7E-15	2.4E+00	7.7E-04	95.2	15.7	22.23	0.06
5688-01H	1200	3.47E+01	4.80E-01	7.67E-03	2.9E-15	1.1E+00	6.3E-04	93.6	16.8	22.95	0.08
5688-01I	1300	3.78E+01	3.59E-01	1.68E-02	2.4E-15	1.4E+00	4.5E-04	86.9	17.8	23.22	0.09
5688-01J	1450	3.94E+01	1.70E-01	2.09E-02	8.4E-16	3.0E+00	6.4E-04	84.4	18.1	23.47	0.14

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
		total gas age		n=7	2.5E-13	2.9E-01	1.3E-01			3.98	0.19
		plateau age								na	ma
		isochron age		40Ar/36Ar=	301.0±1.7		MSWD = 28.3			22.8	0.23
JS-95-53, L1: NM40, Joe S., J=0.00039194±0.000004						Disc: 1.0071±0.0020					
5689-01C	700	6.90E+01	1.04E+00	2.11E-01	7.0E-15	4.9E-01	5.0E-04	9.9	4.1	4.84	0.32
5689-01D	800	1.60E+01	9.57E-01	3.73E-02	1.4E-14	5.3E-01	3.4E-04	31.7	12.1	3.59	0.06
5689-01E	900	1.35E+01	8.20E-01	2.95E-02	1.2E-14	6.2E-01	1.7E-04	36.1	19.3	3.45	0.05
5689-01F	1000	2.64E+01	7.68E-01	7.26E-02	5.4E-15	6.6E-01	2.4E-04	18.8	22.5	3.50	0.12
5689-01G	1100	6.36E+01	1.11E+00	1.95E-01	2.4E-15	4.6E-01	5.2E-04	9.6	23.9	4.30	0.31
5689-01H	1200	5.32E+01	2.36E+00	1.59E-01	2.2E-15	2.2E-01	4.4E-04	11.8	25.2	4.45	0.26
5689-01I	1300	1.16E+02	1.04E+01	3.64E-01	2.2E-15	4.9E-02	1.7E-03	8.3	26.5	6.87	0.54
5689-01J	1450	3.44E+02	1.37E+01	1.10E+00	1.4E-15	3.7E-02	3.4E-03	6.2	27.3	15.19	1.75
		total gas age		n=6	1.7E-13	2.7E-01	1.5E-01			2.88	0.32
		plateau age					D-F	68.0		3.51	0.07
		isochron age		40Ar/36Ar=	307.1±1.1		MSWD = 2.56			3.21	0.06
JS-95-55, L2: NM40, Joe S., J=0.0003917±0.000004						Disc: 1.0071±0.0020					
5690-01B	600	9.40E+01	1.55E+00	3.16E-01	3.3E-16	3.3E-01	6.9E-04	0.8	0.2	0.52	0.70
5690-01C	700	7.72E+00	1.36E+00	2.58E-02	5.6E-15	3.7E-01	8.0E-05	2.7	3.1	0.15	0.05
5690-01D	800	2.45E+00	1.01E+00	7.98E-03	8.6E-15	5.1E-01	2.2E-04	7.1	7.6	0.12	0.02
5690-01E	900	2.81E+00	1.02E+00	9.54E-03	7.1E-15	5.0E-01	1.7E-04	2.4	11.4	0.05	0.02
5690-01F	1000	6.69E+00	1.67E+00	2.20E-02	3.6E-15	3.0E-01	1.9E-04	4.5	13.2	0.21	0.05
5690-01G	1100	3.19E+01	3.19E+00	1.09E-01	1.3E-15	1.6E-01	6.6E-04	0.0	13.9	0.00	0.20
5690-01H	1200	7.27E+01	5.00E+00	2.49E-01	7.3E-16	1.0E-01	7.7E-04	-0.7	14.3	0.39	0.45
5690-01I	1300	3.90E+01	1.50E+01	1.39E-01	6.9E-16	3.4E-02	-2.5E-04	-2.7	14.7	0.74	0.31
5690-01J	1450	2.66E+01	1.36E+01	9.20E-02	2.3E-15	3.8E-02	7.5E-04	1.7	15.9	0.33	0.17
5690-01K	1650	3.43E+01	1.40E+01	1.17E-01	1.0E-15	3.6E-02	8.9E-04	2.0	16.4	0.48	0.26

Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
		total gas age		n=8	1.9E-13	2.3E-01	2.6E-01			1.96	0.38
		plateau age					B-E	70.0		0.10	0.03
		isochron age		40Ar/36Ar=	296.8±1.2		MSWD = 1.17			0.24	0.02
JS-95-56, L3: NM40, Joe S., J=0.00039217±0.000004						Disc: 1.0071±0.0020					
5691-01C	700	8.18E+02	9.77E-01	2.69E+00	8.1E-16	5.2E-01	6.0E-03	2.9	0.9	16.58	4.32
5691-01D	800	2.14E+02	6.27E-01	6.79E-01	1.7E-15	8.1E-01	1.6E-03	6.1	2.9	9.23	0.98
5691-01E	900	2.97E+02	5.62E-01	9.54E-01	2.4E-15	9.1E-01	1.7E-03	5.2	5.6	10.91	1.39
5691-01F	1000	1.59E+02	6.47E-01	4.93E-01	5.0E-15	7.9E-01	5.3E-04	8.2	11.4	9.23	0.71
5691-01G	1100	5.96E+01	5.84E-01	1.67E-01	4.6E-15	8.7E-01	4.6E-04	17.2	16.6	7.26	0.26
5691-01H	1200	4.04E+01	8.45E-01	1.02E-01	2.7E-15	6.0E-01	1.2E-04	25.5	19.8	7.27	0.18
5691-01I	1300	5.83E+01	5.85E+00	1.62E-01	4.9E-15	8.7E-02	5.5E-04	18.6	25.3	7.67	0.25
5691-01J	1450	7.44E+01	5.06E+00	2.16E-01	1.9E-15	1.0E-01	5.9E-04	14.9	27.5	7.83	0.35
		total gas age		n=6	8.7E-14	5.6E-01	1.9E-01			0.61	0.12
		plateau age					G-J	60.0		7.43	0.19
		isochron age		40Ar/36Ar=	301.2±1.3		MSWD = 0.36			6.86	0.20
JS-57, E2:43, JRS, J=0.0006631918±0.000002						Disc: 1.0051±0.0020					
5964-01C	815	1.57E+02	1.48E+00	4.86E-01	1.7E-14	3.5E-01	1.5E-03	8.8	9.2	16.46	1.16
5964-01D	875	2.52E+01	1.28E+00	7.61E-02	1.8E-14	4.0E-01	4.3E-04	11.3	19.0	3.42	0.19
5964-01E	950	5.32E+01	1.39E+00	1.69E-01	5.7E-15	3.7E-01	4.8E-04	6.4	22.2	4.08	0.41
5964-01F	1040	9.69E+01	1.74E+00	3.13E-01	5.2E-15	2.9E-01	5.1E-04	4.6	25.1	5.33	0.76
5964-01G	1115	6.57E+01	2.34E+00	2.10E-01	3.1E-15	2.2E-01	7.5E-04	5.8	26.8	4.52	0.54
5964-01H	1190	6.60E+01	1.05E+01	2.15E-01	1.4E-15	4.9E-02	1.8E-03	5.0	27.6	4.00	0.64
5964-01I	1275	1.17E+02	3.26E+01	3.83E-01	6.1E-15	1.6E-02	2.4E-03	5.2	31.0	7.38	0.97
5964-01J	1350	1.46E+02	2.95E+01	4.75E-01	3.2E-16	1.7E-02	2.3E-03	5.1	31.2	9.00	1.80
		total gas age		n=6	1.8E-13	5.1E-01	3.0E-01			0.12	0.05
		plateau age					D-H	58.0		3.7	0.3
		isochron age		40Ar/36Ar=	303.9±1.6		MSWD = 0.78			2.58	0.28

Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
JS-58, E6:43, JRS,		J=0.00072±0.000002				Disc: 1.0051±0.0020					
5965-01C	815	3.79E+01	1.38E+01	1.15E-01	9.6E-16	3.7E-02	5.4E-05	13.3	0.1	6.59	0.46
5965-01D	875	1.08E+01	1.61E+01	3.12E-02	8.5E-16	3.2E-02	1.3E-04	26.0	0.1	3.69	0.21
5965-01E	950	1.11E+01	1.36E+01	3.14E-02	3.5E-16	3.8E-02	6.1E-04	25.9	0.1	3.78	0.38
5965-01F	1040	1.85E+01	1.37E+01	5.31E-02	4.5E-16	3.7E-02	1.0E-03	20.7	0.2	5.01	0.40
5965-01G	1115	3.31E+01	1.81E+01	1.11E-01	1.0E-16	2.8E-02	1.2E-03	5.1	0.2	2.21	1.60
		total gas age		n=39	1.5E-12	5.9E-01	2.7E-01			0.31	0.06
		plateau age								na	na
		isochron age		40Ar/36Ar= 320.6±4.2			MSWD = 3.0			2.86	0.24
JS-59, E4:43, JRS,		J=0.00066926±0.000002				Disc: 1.0051±0.0020					
5966-01C	815	5.04E+01	8.17E-01	1.40E-01	9.7E-15	6.2E-01	9.6E-04	18.2	1.4	11.07	0.35
5966-01D	875	1.56E+01	7.86E-01	3.24E-02	1.2E-14	6.5E-01	3.9E-04	38.9	3.1	7.31	0.09
5966-01E	950	1.93E+01	7.50E-01	4.45E-02	1.3E-15	6.8E-01	-1.7E-04	32.3	3.3	7.52	0.19
5966-01F	1040	1.71E+01	1.21E+00	3.81E-02	7.8E-15	4.2E-01	4.4E-04	34.6	4.5	7.14	0.11
5966-01G	1115	3.35E+01	2.12E+00	9.11E-02	1.5E-15	2.4E-01	9.2E-04	20.0	4.7	8.09	0.28
5966-01H	1190	4.87E+01	5.77E+00	1.41E-01	9.6E-16	8.8E-02	1.4E-03	15.1	4.8	8.88	0.48
5966-01I	1275	1.28E+02	1.22E+01	3.84E-01	8.9E-15	4.2E-02	1.6E-03	12.3	6.1	19.07	0.96
5966-01J	1350	4.92E+02	1.27E+01	1.50E+00	4.5E-16	4.0E-02	6.5E-03	10.0	6.1	59.21	4.64
		total gas age		n=8	7.0E-13	6.8E-01	3.3E-01			2.96	0.04
		plateau age					D-F	56.0		7.28	0.11
		isochron age		40Ar/36Ar= 321.3±1.4			MSWD = 4.98			6.12	0.10
JS-61, E5:43, JRS,		J=0.0006657282±0.000002				Disc: 1.0051±0.0020					
5967-01C	815	5.90E+01	8.01E-01	1.75E-01	4.5E-15	6.4E-01	7.3E-04	12.3	8.6	8.72	0.44
5967-01D	875	1.06E+01	6.44E-01	2.35E-02	1.0E-14	7.9E-01	3.6E-04	34.7	28.4	4.40	0.07
5967-01E	950	9.37E+00	6.06E-01	2.03E-02	5.3E-15	8.4E-01	2.2E-04	36.5	38.5	4.10	0.07
5967-01F	1040	8.91E+00	8.62E-01	1.85E-02	7.4E-15	5.9E-01	3.2E-04	39.3	52.6	4.21	0.06

Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
5967-01G	1115	1.52E+01	1.37E+00	3.94E-02	2.2E-15	3.7E-01	4.7E-04	24.1	56.7	4.40	0.13
5967-01H	1190	2.45E+01	3.64E+00	6.80E-02	2.9E-15	1.4E-01	9.6E-04	18.9	62.3	5.57	0.20
5967-01I	1275	5.18E+01	3.89E+00	1.53E-01	2.0E-14	1.3E-01	7.8E-04	13.2	100.9	8.25	0.38
5967-01J	1350	1.16E+02	4.47E+00	3.51E-01	3.7E-15	1.1E-01	1.3E-03	10.6	107.9	14.74	0.90
		total gas age		n=8	5.3E-14	5.1E-01	4.2E-01			4.25	0.32
		plateau age					D-G	44.0		4.25	0.08
		isochron age		40Ar/36Ar=	321.0±1.3		MSWD = 2.24			3.58	0.06
JS-62, D1:43, JRS,		J=0.0006536225±0.000002				Disc:	1.0051±0.0020				
5957-01D	800	7.60E+00	3.32E-01	1.53E-02	3.6E-14	1.5E+00	2.0E-04	40.8	22.8	3.65	0.04
5957-01E	900	5.04E+00	2.87E-01	6.91E-03	3.9E-14	1.8E+00	3.4E-04	59.9	47.3	3.56	0.02
5957-01F	1000	4.60E+00	4.85E-01	5.39E-03	2.9E-14	1.1E+00	3.1E-04	66.2	65.2	3.59	0.02
5957-01G	1100	6.05E+00	8.50E-01	1.08E-02	4.7E-15	6.0E-01	4.5E-04	48.5	68.2	3.46	0.05
5957-01H	1200	1.12E+01	1.27E+00	2.85E-02	5.0E-15	4.0E-01	8.8E-04	25.5	71.3	3.36	0.09
5957-01I	1300	2.39E+01	1.14E+01	7.43E-02	2.8E-15	4.5E-02	9.9E-04	11.8	73.1	3.34	0.21
5957-01J	1450	3.24E+01	8.92E+00	1.01E-01	1.5E-15	5.7E-02	1.5E-03	10.0	74.1	3.85	0.31
		total gas age		n=6	1.6E-13	3.2E-01	1.8E-01			0.94	0.31
		plateau age					D-F	88.0		3.58	0.03
		isochron age		40Ar/36Ar=	294.0±1.5		MSWD = 3.89			3.58	0.02
JS-63, D2:43, JRS,		J=0.0006584109±0.000002				Disc:	1.0051±0.0020				
5958-01B	775	4.27E+02	1.01E+00	1.32E+00	1.3E-15	5.1E-01	4.6E-03	8.9	0.5	44.88	3.25
5958-01C	850	1.59E+01	1.12E+00	4.74E-02	2.6E-14	4.6E-01	4.2E-04	12.8	9.5	2.42	0.11
5958-01D	925	8.77E+00	6.26E-01	2.53E-02	1.6E-14	8.2E-01	3.4E-04	15.3	15.2	1.60	0.07
5958-01E	1000	1.37E+01	5.91E-01	4.14E-02	7.4E-15	8.6E-01	4.3E-04	11.2	17.7	1.82	0.12
5958-01F	1075	2.81E+01	8.21E-01	8.78E-02	9.5E-15	6.2E-01	5.1E-04	8.1	21.1	2.69	0.22
5958-01G	1150	3.92E+01	1.17E+00	1.22E-01	2.7E-14	4.4E-01	8.0E-04	8.2	30.4	3.82	0.29
5958-01H	1250	2.50E+01	5.98E+00	7.88E-02	8.3E-15	8.5E-02	5.8E-04	8.7	33.3	2.58	0.20
5958-01I	1350	3.04E+01	2.22E+01	1.01E-01	9.4E-16	2.3E-02	2.4E-04	7.6	33.6	2.76	0.38

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
		total gas age		n=6	2.9E-13	3.0E-01	8.6E-02			1.02	0.21
		plateau age								na	na
		isochron age		40Ar/36Ar=	310.3±1.2		MSWD = 0.13			1.14	0.12
JS-64, D3:43, JRS,		**J=0.0006640685±0.000002**				**Disc:**	**1.0051±0.0020**				
5959-01C	850	1.64E+01	9.59E-01	4.77E-02	2.2E-14	5.3E-01	4.3E-04	14.4	14.9	2.81	0.12
5959-01D	925	5.55E+00	1.05E+00	1.49E-02	1.9E-14	4.9E-01	3.4E-04	22.1	28.0	1.47	0.04
5959-01E	1000	7.87E+00	1.59E+00	2.31E-02	4.2E-15	3.2E-01	4.9E-04	14.9	30.8	1.41	0.07
5959-01F	1075	1.08E+01	2.11E+00	3.27E-02	4.2E-15	2.4E-01	4.5E-04	12.1	33.7	1.57	0.11
5959-01G	1150	1.87E+01	2.98E+00	5.93E-02	2.5E-15	1.7E-01	1.0E-03	7.3	35.4	1.64	0.19
5959-01H	1250	2.63E+01	1.07E+01	8.50E-02	1.1E-14	4.8E-02	7.3E-04	7.8	42.9	2.47	0.22
5959-01I	1350	1.80E+02	1.25E+01	5.66E-01	1.6E-15	4.1E-02	1.6E-03	7.8	44.0	16.83	1.42
		total gas age		n=5	1.5E-13	4.7E-01	5.5E-01			1.90	0.05
		plateau age					D-G	48.0		1.47	0.05
		isochron age		40Ar/36Ar=	304.0±2.1		MSWD = 2.51			1.28	0.06
JS-66, D4:43, JRS,		**J=0.0006649375±0.000002**				**Disc:**	**1.0051±0.0020**				
5960-01C	825	1.88E+01	6.10E-01	5.74E-02	2.3E-14	8.4E-01	5.6E-04	9.7	19.7	2.19	0.14
5960-01D	900	1.59E+01	1.07E+00	5.01E-02	6.6E-15	4.8E-01	4.2E-04	7.2	25.3	1.38	0.13
5960-01E	975	1.94E+01	1.51E+00	6.11E-02	2.5E-15	3.4E-01	3.9E-04	7.7	27.4	1.80	0.18
5960-01F	1050	1.77E+01	2.17E+00	5.67E-02	3.5E-15	2.4E-01	6.3E-04	6.5	30.4	1.38	0.16
5960-01G	1125	5.85E+01	1.51E+00	1.92E-01	9.0E-15	3.4E-01	8.1E-04	3.3	38.0	2.30	0.48
5960-01H	1200	3.45E+01	3.88E+00	1.12E-01	2.0E-14	1.3E-01	1.2E-03	5.3	55.0	2.19	0.27
5960-01I	1275	3.19E+01	1.31E+01	1.07E-01	1.5E-15	3.9E-02	1.2E-03	4.3	56.3	1.67	0.31
		total gas age		n=7	1.2E-13	8.5E-01	4.2E-01			8.03	0.10
		plateau age					D-I	66.0		1.58	0.15
		isochron age		40Ar/36Ar=	302.1±1.3		MSWD = 1.13			1.05	1.9

Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
JS-67, D5:43, JRS,		J=0.0006601491±0.000002				Disc: 1.0051±0.0020					
5961-01C	825	1.83E+01	8.06E-01	5.45E-02	2.7E-14	6.3E-01	3.5E-04	12.4	25.7	2.71	0.14
5961-01D	900	6.02E+00	7.88E-01	1.72E-02	4.7E-14	6.5E-01	2.6E-04	16.3	71.0	1.17	0.04
5961-01E	975	6.75E+00	5.30E-01	1.94E-02	2.0E-14	9.6E-01	3.2E-04	15.7	89.7	1.27	0.05
5961-01F	1050	1.06E+01	5.67E-01	3.19E-02	1.9E-14	9.0E-01	4.2E-04	11.8	107.7	1.50	0.08
5961-01G	1125	1.73E+01	1.12E+00	5.26E-02	6.6E-15	4.6E-01	5.6E-04	10.4	114.0	2.13	0.15
5961-01H	1200	1.71E+01	4.02E+00	5.26E-02	6.7E-15	1.3E-01	6.8E-04	11.0	120.4	2.25	0.14
5961-01I	1275	2.09E+01	8.58E+00	6.66E-02	4.9E-15	5.9E-02	1.2E-03	9.2	125.1	2.30	0.17
5961-01J	1400	3.61E+01	5.65E+00	1.13E-01	8.9E-16	9.0E-02	1.7E-03	8.4	126.0	3.63	0.42
		total gas age		n=7	1.0E-13	8.0E-01	4.9E-01			7.81	0.08
		plateau age					D-F	66.0		1.25	0.08
		isochron age		40Ar/36Ar=	317.5±1.8		MSWD = 0.58			0.73	0.06
JS-70, D6:43, JRS,		J=0.00072±0.000002				Disc: 1.0051±0.0020					
5962-01C	825	3.49E+01	1.25E+00	1.05E-01	2.5E-14	4.1E-01	6.1E-04	11.6	28.7	5.24	0.27
5962-01D	885	5.91E+00	1.13E+00	1.65E-02	1.6E-14	4.5E-01	2.0E-04	18.9	47.4	1.45	0.05
5962-01E	965	9.44E+00	1.39E+00	2.79E-02	7.6E-15	3.7E-01	3.0E-04	13.9	56.2	1.71	0.09
5962-01F	1050	1.97E+01	1.59E+00	5.90E-02	5.5E-15	3.2E-01	6.4E-04	12.3	62.5	3.14	0.17
5962-01G	1125	2.23E+01	1.53E+00	7.04E-02	4.7E-15	3.3E-01	4.7E-04	7.1	67.9	2.05	0.20
5962-01H	1200	5.93E+01	2.51E+00	1.91E-01	3.8E-15	2.0E-01	7.4E-04	5.1	72.3	3.95	0.53
5962-01I	1275	6.84E+01	4.99E+00	2.17E-01	2.0E-14	1.0E-01	1.3E-03	6.6	95.1	5.89	0.58
5962-01J	1350	3.78E+01	4.91E+00	1.22E-01	4.0E-15	1.0E-01	7.3E-04	5.9	99.7	2.92	0.37
		total gas age		n=8	8.6E-14	3.1E-01	1.4E-01			3.29	0.28
		plateau age								na	na
		isochron age		40Ar/36Ar=	306.0±1.6		MSWD = 0.58			1.25	0.07
JS-96-1, D1:49, JS,		J=0.0008558144±0.000002				Disc: 1.0082±0.0018					
6533-01A	625	1.71E+02	8.60E-01	5.59E-01	5.5E-15	5.9E-01	8.0E-04	3.3	26.7	8.75	1.74
6533-01B	700	1.64E+01	9.53E-01	4.46E-02	1.3E-14	5.4E-01	2.8E-04	20.1	90.8	5.08	0.14

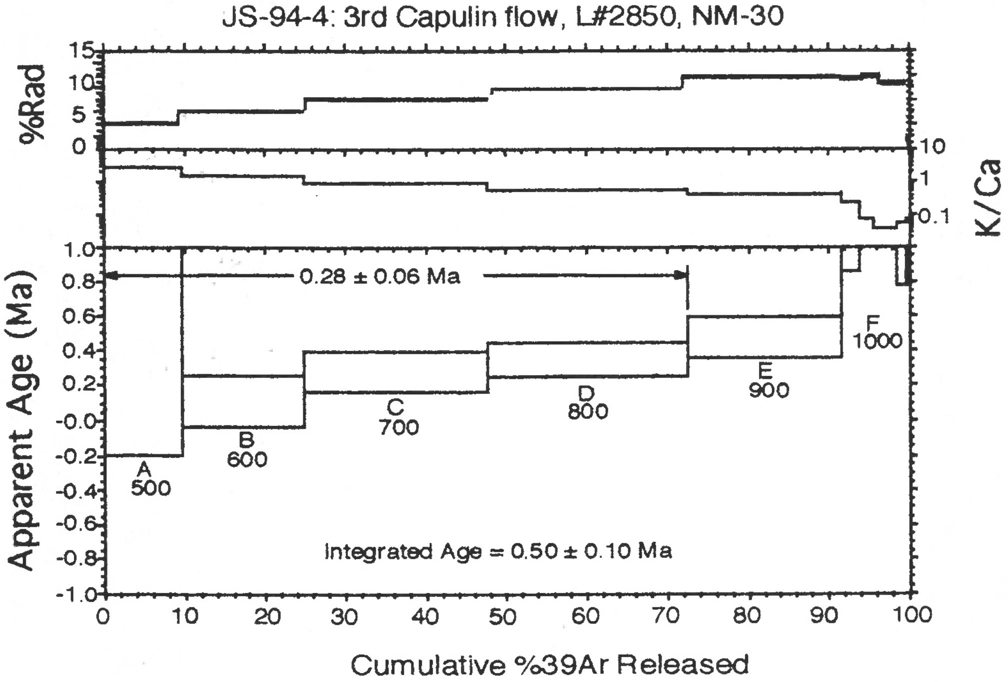
Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
6533-01C	750	1.05E+01	1.08E+00	2.50E-02	9.9E-15	4.7E-01	3.0E-04	30.3	139.0	4.91	0.08
6533-01D	800	8.11E+00	1.25E+00	1.69E-02	9.3E-15	4.1E-01	2.8E-04	39.6	184.0	4.96	0.06
6533-01E	875	6.16E+00	1.63E+00	1.07E-02	7.6E-15	3.1E-01	1.7E-04	50.5	220.7	4.80	0.05
6533-01F	975	5.64E+00	2.49E+00	9.50E-03	5.9E-15	2.1E-01	2.7E-04	53.6	249.4	4.67	0.05
6533-01G	1075	5.60E+00	2.85E+00	9.64E-03	6.0E-15	1.8E-01	2.6E-04	53.0	278.4	4.59	0.05
6533-01H	1250	1.22E+01	1.33E+01	3.45E-02	1.4E-14	3.8E-02	6.5E-04	24.9	347.9	4.74	0.11
6533-01I	1650	5.60E+01	1.68E+01	1.78E-01	2.6E-15	3.0E-02	1.0E-03	8.3	360.7	7.28	0.57
		total gas age		n=9	2.1E-14	4.2E-01	2.2E-01			0.15	0.06
		plateau age					B-E	54.0		4.89	0.06
		isochron age		40Ar/36Ar=	302.0±1.5		MSWD = 2.43			4.67	0.04
JS-96-2, D2:49, JS,		**J=0.0008558234±0.000002**				**Disc: 1.0082±0.0018**					
6534-01A	625	3.32E+02	9.13E-01	1.10E+00	3.7E-15	5.6E-01	1.1E-03	2.1	2.0	10.92	3.27
6534-01B	700	3.72E+01	8.92E-01	1.11E-01	9.7E-15	5.7E-01	5.2E-04	11.7	7.1	6.74	0.34
6534-01C	750	1.96E+01	9.04E-01	5.41E-02	9.8E-15	5.6E-01	6.4E-04	18.9	12.3	5.74	0.17
6534-01D	800	1.32E+01	9.62E-01	3.24E-02	1.2E-14	5.3E-01	4.2E-04	28.1	18.5	5.72	0.11
6534-01E	875	1.04E+01	1.18E+00	2.32E-02	1.1E-14	4.3E-01	4.1E-04	35.1	24.2	5.63	0.08
6534-01F	975	1.40E+01	1.56E+00	3.59E-02	7.5E-15	3.3E-01	3.8E-04	25.1	28.2	5.44	0.12
6534-01G	1075	1.53E+01	1.92E+00	3.99E-02	4.4E-15	2.7E-01	3.5E-04	23.8	30.5	5.62	0.14
6534-01H	1250	2.92E+01	1.42E+01	8.81E-02	1.0E-14	3.6E-02	8.1E-04	14.5	36.0	6.57	0.26
6534-01I	1650	8.94E+01	1.16E+01	2.83E-01	4.2E-15	4.4E-02	1.4E-03	7.5	38.3	10.43	0.96
		total gas age		n=7	1.9E-13	4.1E-01	1.8E-01			0.37	0.05
		plateau age					C-G	62.0		5.62	0.07
		isochron age		40Ar/36Ar=	302.8±1.2		MSWD = 2.58			5.29	0.08
JS-96-3, D3:49, JS,		**J=0.0008558322±0.000002**				**Disc: 1.0082±0.0018**					
6535-01A	625	4.80E+01	1.59E+00	1.52E-01	3.4E-15	3.2E-01	4.4E-04	6.9	3.6	5.08	0.50
6535-01B	700	4.55E+00	1.51E+00	4.82E-03	9.2E-15	3.4E-01	9.9E-05	71.3	13.5	5.01	0.03
6535-01C	750	4.02E+00	1.53E+00	3.02E-03	1.2E-14	3.3E-01	2.6E-04	80.7	26.2	5.01	0.02

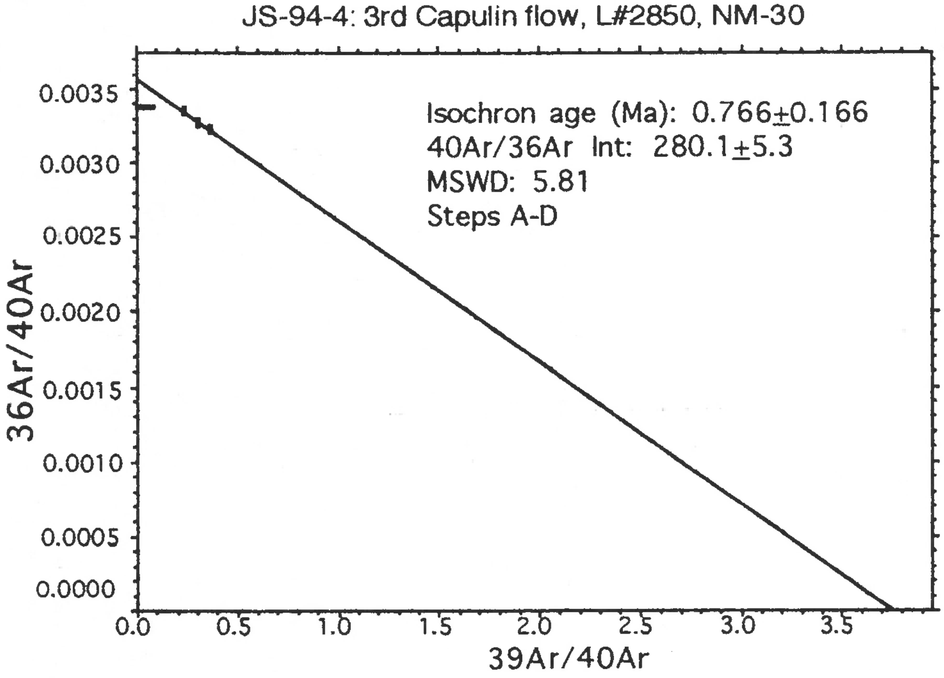
Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
6535-01D	800	3.87E+00	1.50E+00	2.50E-03	1.5E-14	3.4E-01	1.3E-04	83.9	42.5	5.02	0.02
6535-01E	875	3.91E+00	1.28E+00	2.45E-03	1.7E-14	4.0E-01	2.4E-04	84.0	60.3	5.07	0.02
6535-01F	975	4.24E+00	1.33E+00	3.55E-03	1.3E-14	3.8E-01	1.7E-04	77.6	73.9	5.07	0.02
6535-01G	1075	4.69E+00	1.85E+00	5.15E-03	7.4E-15	2.8E-01	2.0E-04	70.6	81.9	5.11	0.03
6535-01H	1250	1.06E+01	1.66E+01	2.99E-02	6.2E-15	3.1E-02	3.7E-04	28.5	88.6	4.69	0.10
6535-01I	1650	1.19E+01	1.57E+01	3.33E-02	3.9E-15	3.3E-02	3.1E-04	27.5	92.8	5.11	0.14
		total gas age		n=7	9.3E-14	2.6E-01	1.5E-01			3.49	0.11
		plateau age					A-I	100.0		5.05	0.02
		isochron age		40Ar/36Ar=	292.6±1.3		MSWD = 5.37			5.06	0.02
JS-96-4, D4:49, JS, J=0.0008558406±0.000002						Disc: 1.0082±0.0018					
6536-01B	700	1.11E+01	2.03E+00	2.65E-02	8.3E-15	2.5E-01	2.7E-04	30.7	38.4	5.26	0.10
6536-01C	750	6.87E+00	2.17E+00	1.25E-02	1.0E-14	2.3E-01	1.9E-04	48.6	85.9	5.16	0.05
6536-01D	800	5.41E+00	1.93E+00	7.55E-03	1.3E-14	2.6E-01	1.6E-04	61.5	145.3	5.13	0.04
6536-01E	875	4.46E+00	1.37E+00	4.22E-03	1.5E-14	3.7E-01	1.4E-04	74.4	217.1	5.13	0.03
6536-01F	975	4.29E+00	9.65E-01	3.64E-03	1.6E-14	5.3E-01	2.4E-04	76.6	293.0	5.07	0.02
6536-01G	1075	5.23E+00	8.72E-01	6.88E-03	1.2E-14	5.8E-01	2.7E-04	62.4	346.6	5.04	0.03
6536-01H	1250	8.84E+00	8.31E+00	2.10E-02	1.2E-14	6.1E-02	4.1E-04	37.2	400.7	5.10	0.07
6536-01I	1650	2.29E+01	1.13E+01	6.76E-02	4.2E-15	4.5E-02	3.8E-04	16.6	420.0	5.90	0.22
		total gas age		n=7	2.2E-14	6.5E-01	1.5E+00			3.95	0.07
		plateau age					B-H	94.0		5.10	0.03
		isochron age		40Ar/36Ar=	298.5±1.7		MSWD = 2.16			5.07	0.02
JS-96-5, D5:49, JS, J=0.0008558486±0.000002						Disc: 1.0082±0.0018					
6537-01A	625	2.93E+01	5.65E-01	9.76E-02	1.3E-14	9.0E-01	1.0E-04	1.8	8.0	0.82	0.29
6537-01B	700	8.64E+00	7.05E-01	2.87E-02	1.8E-14	7.2E-01	1.6E-04	2.6	19.6	0.35	0.09
6537-01C	750	1.02E+01	9.16E-01	3.39E-02	1.2E-14	5.6E-01	2.3E-04	2.8	27.0	0.44	0.11
6537-01D	800	1.24E+01	1.06E+00	4.12E-02	1.1E-14	4.8E-01	2.1E-04	2.1	33.6	0.39	0.13
6537-01E	875	1.41E+01	1.36E+00	4.66E-02	8.6E-15	3.7E-01	3.5E-04	2.9	39.0	0.64	0.15

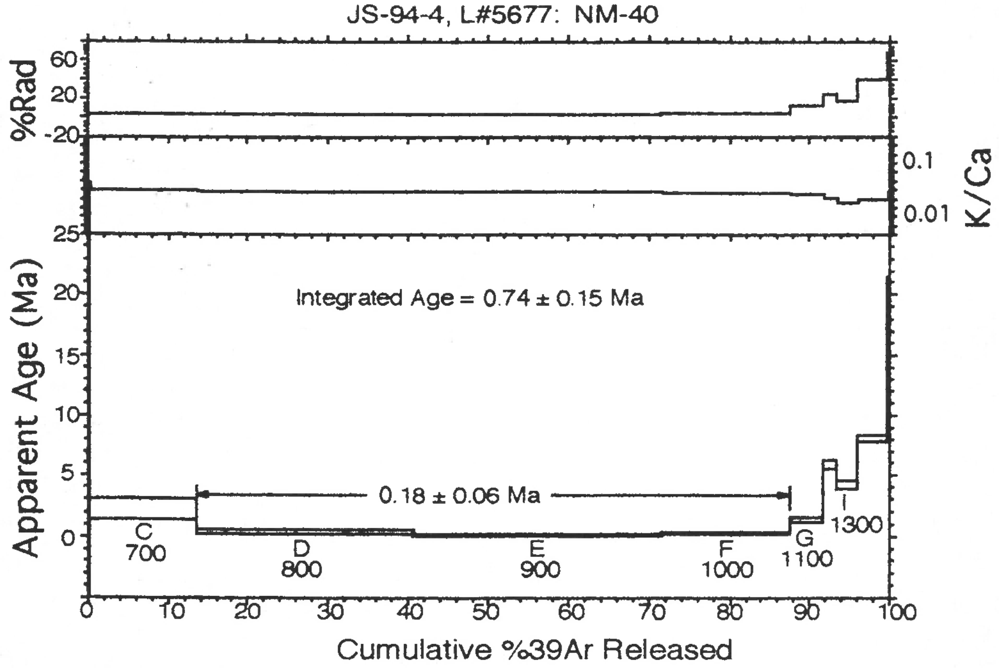
Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
6537-01F	975	2.24E+01	1.83E+00	7.38E-02	5.3E-15	2.8E-01	5.8E-04	3.4	42.3	1.20	0.23
6537-01G	1075	9.45E+01	1.60E+00	3.12E-01	7.5E-15	3.2E-01	6.4E-04	2.4	47.0	3.55	0.91
6537-01H	1250	3.76E+01	4.80E+00	1.23E-01	3.8E-14	1.1E-01	7.5E-04	4.5	70.8	2.60	0.36
6537-01I	1650	6.64E+01	1.26E+01	1.34E-01	1.2E-15	4.1E-02	4.8E-04	41.7	71.5	42.63	0.55
		total gas age		n=8	1.6E-13	4.2E-01	2.2E-01			1.65	0.28
		plateau age					A-F	56.0		0.44	0.08
		isochron age		40Ar/36Ar=	300.5±2.7		MSWD = 0.43			0.16	0.10
JS-96-6; F3, Joe S., J=0.000772865±0.000002						Disc: 1.0082±0.0018					
6966-01C	750	1.86E+02	9.15E-01	6.25E-01	3.1E-16	5.6E-01	6.3E-03	0.8	0.2	2.05	2.35
6966-01D	800	1.22E+02	8.40E-01	4.08E-01	1.8E-15	6.1E-01	1.7E-03	1.4	1.3	2.41	1.08
6966-01E	875	8.40E+01	8.89E-01	2.81E-01	2.6E-15	5.7E-01	1.9E-03	1.3	2.9	1.48	0.74
6966-01F	975	4.64E+01	8.03E-01	1.50E-01	4.2E-15	6.4E-01	1.4E-03	4.8	5.5	3.09	0.71
6966-01G	1075	2.18E+01	9.36E-01	6.87E-02	4.0E-15	5.5E-01	1.1E-03	7.1	8.0	2.16	0.21
6966-01H	1250	2.91E+01	1.16E+01	9.53E-02	1.5E-14	4.4E-02	1.5E-03	6.1	17.4	2.51	0.24
		total gas age		n=9	1.6E-13	7.7E-01	3.5E-01			7.96	0.07
		plateau age					C-H	100.0		2.3	0.02
		isochron age		40Ar/36Ar=	295.2±1.5		MSWD = 0.95			2.36	0.25
JS-96-7, D6:49, JS, J=0.0008558564±0.000002						Disc: 1.0082±0.0018					
6538-01B	700	1.08E+02	7.00E-01	3.56E-01	2.6E-15	7.3E-01	4.4E-04	2.3	2.9	3.89	1.05
6538-01C	750	7.09E+01	8.25E-01	2.34E-01	4.4E-15	6.2E-01	3.1E-04	2.5	7.6	2.79	0.71
6538-01D	800	8.39E+01	9.58E-01	2.76E-01	5.5E-15	5.3E-01	4.6E-04	2.9	13.6	3.73	0.80
6538-01E	875	1.56E+02	1.20E+00	5.17E-01	6.4E-15	4.3E-01	2.5E-04	2.0	20.5	4.75	1.47
6538-01F	975	2.08E+02	1.37E+00	6.95E-01	2.5E-15	3.7E-01	5.4E-04	1.4	23.2	4.62	2.02
6538-01G	1075	8.40E+01	1.90E+00	2.77E-01	3.6E-15	2.7E-01	4.4E-04	2.8	27.2	3.68	0.83
		total gas age		n=3	9.2E-14	4.3E-01	9.4E-02			3.52	0.68
		plateau age					B-G	100.0		3.6	0.05
		isochron age		40Ar/36Ar=	298.4±1.4		MSWD = 0.20			2.18	0.08

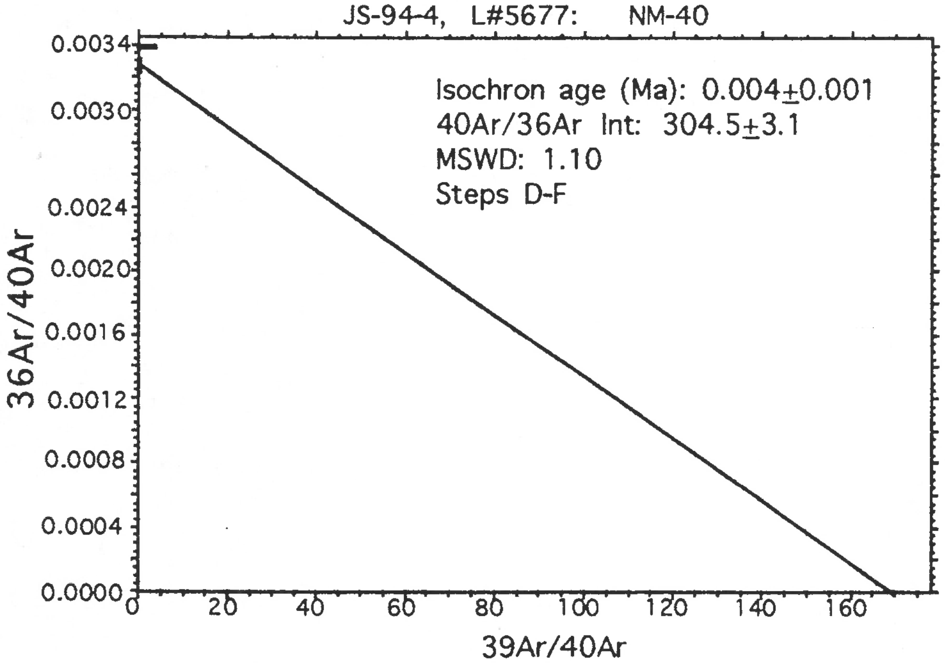
Run ID#	Temp (°C)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar$_K$ (moles)	K/Ca	Cl/K	^{40}Ar* (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
JS-96-11, C4:50, JS,		J=0.0007668133±0.000002				Disc: 1.0082±0.0018					
6621-01A	625	8.51E+01	1.68E+01	2.75E-01	6.4E-15	3.0E-02	8.3E-04	6.1	3.9	7.22	0.74
6621-01B	700	1.35E+01	1.83E+01	2.90E-02	7.2E-15	2.8E-02	8.1E-04	47.1	8.3	8.93	0.09
6621-01C	750	1.06E+01	1.76E+01	1.68E-02	5.1E-15	2.9E-02	5.0E-04	66.1	11.5	9.81	0.07
6621-01D	800	1.23E+01	1.71E+01	2.14E-02	5.0E-15	3.0E-02	4.6E-04	59.2	14.6	10.14	0.09
6621-01E	875	1.64E+01	1.86E+01	3.48E-02	5.4E-15	2.7E-02	4.6E-04	45.9	17.9	10.52	0.12
6621-01F	975	2.52E+01	1.82E+01	6.44E-02	5.9E-15	2.8E-02	6.6E-04	30.2	21.5	10.64	0.19
6621-01G	1075	1.86E+01	2.26E+01	4.24E-02	5.8E-15	2.3E-02	6.6E-04	41.9	25.1	10.92	0.13
6621-01H	1250	2.16E+01	2.34E+02	5.54E-02	1.1E-14	2.2E-03	4.8E-03	107.4	31.6	37.90	0.23
6621-01I	1650	2.78E+01	1.92E+02	7.59E-02	2.8E-15	2.7E-03	4.0E-03	72.2	33.4	31.77	0.31
		total gas age		n=7	1.6E-13	3.7E-01	1.8E-01			8.75	0.20
		plateau age					C-G	48.0		10.3	0.2
		isochron age		40Ar/36Ar=	303.4±1.4		MSWD = 33.5			9.90	0.06
JS-96-12, C5:50, JS,		J=0.0007648229±0.000002				Disc: 1.0082±0.0018					
6622-01A	625	5.48E+01	2.41E+01	1.61E-01	3.1E-15	2.1E-02	1.1E-03	16.3	3.2	12.50	0.47
6622-01B	700	8.40E+00	1.59E+01	6.86E-03	7.8E-15	3.2E-02	3.8E-04	90.4	11.2	10.56	0.04
6622-01C	750	7.35E+00	1.26E+01	3.30E-03	1.0E-14	4.1E-02	4.0E-04	99.9	21.7	10.19	0.03
6622-01D	800	7.09E+00	1.13E+01	2.56E-03	1.3E-14	4.5E-02	4.3E-04	101.6	35.0	9.98	0.03
6622-01E	875	6.87E+00	1.21E+01	1.79E-03	1.7E-14	4.2E-02	3.6E-04	105.8	52.5	10.09	0.03
6622-01F	975	6.73E+00	1.74E+01	1.42E-03	1.6E-14	2.9E-02	4.4E-04	113.6	68.7	10.65	0.03
6622-01G	1075	6.94E+00	3.00E+01	2.49E-03	8.9E-15	1.7E-02	7.1E-04	122.6	77.8	11.96	0.05
6622-01H	1250	1.63E+01	1.69E+02	3.57E-02	9.7E-15	3.0E-03	3.2E-03	115.0	87.7	29.16	0.15
6622-01I	1650	2.30E+01	2.05E+02	5.90E-02	3.9E-15	2.5E-03	4.2E-03	92.6	91.7	34.04	0.24
		total gas age		n=9	9.8E-14	3.3E-01	1.5E-01			9.16	0.06
		plateau age					C-E	44.0		10.08	0.09
		isochron age		40Ar/36Ar=	317.5±2.0		MSWD = 88.6			10.19	0.03

Run ID#	Temp (°C)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	$^{39}Ar_K$ (moles)	K/Ca	Cl/K	$^{40}Ar^*$ (%)	^{39}Ar (%)	Age (Ma)	± Err (1σ)
JS-96-13; F5, Joe S., J=0.000773548±0.000002						Disc: 1.0082±0.0018					
6964-01B	700	8.55E+01	5.25E-01	2.80E-01	3.4E-15	9.7E-01	3.1E-04	3.3	5.0	3.92	0.79
6964-01C	750	3.79E+01	5.54E-01	1.19E-01	4.6E-15	9.2E-01	5.6E-04	7.3	11.8	3.83	0.34
6964-01D	800	4.41E+01	6.39E-01	1.38E-01	1.3E-14	8.0E-01	4.2E-04	7.8	31.5	4.82	0.36
6964-01E	875	2.60E+01	7.87E-01	7.81E-02	1.5E-14	6.5E-01	4.8E-04	11.7	53.2	4.24	0.21
6964-01F	975	1.89E+01	1.10E+00	5.46E-02	1.1E-14	4.6E-01	4.3E-04	15.3	70.2	4.03	0.15
6964-01G	1075	1.92E+01	1.53E+00	5.66E-02	8.0E-15	3.3E-01	4.5E-04	13.3	82.3	3.56	0.15
6964-01H	1250	4.73E+01	5.16E+00	1.49E-01	2.4E-14	9.9E-02	8.1E-04	7.8	117.6	5.16	0.40
6964-01I	1650	6.65E+01	1.71E+01	2.17E-01	2.5E-15	3.0E-02	1.6E-03	5.7	121.4	5.32	0.60
		total gas age		n=6	6.7E-14	5.5E-01	2.0E-01			1.78	0.37
		plateau age					B-F	58.0		4.14	0.17
		isochron age		40Ar/36Ar=	300.9±1.5		MSWD = 2.66			3.44	0.18
JS-96-14; F5, Joe S., J=0.000774093±0.000002						Disc: 1.0082±0.0018					
6965-01C	750	2.14E+02	1.05E+00	6.95E-01	6.1E-16	4.9E-01	2.6E-03	3.9	0.7	11.52	2.20
6965-01D	800	2.95E+02	1.00E+00	9.62E-01	3.6E-15	5.1E-01	1.5E-03	3.5	4.9	14.42	2.72
6965-01E	875	1.59E+02	8.80E-01	5.02E-01	9.4E-15	5.8E-01	1.3E-03	6.9	16.0	15.28	1.42
6965-01F	975	8.14E+01	7.93E-01	2.45E-01	1.8E-14	6.4E-01	5.4E-04	11.1	37.7	12.59	0.66
6965-01G	1075	2.30E+01	6.90E-01	5.55E-02	1.5E-14	7.4E-01	2.2E-04	29.1	55.7	9.33	0.15
6965-01H	1250	1.55E+01	2.47E+00	3.08E-02	2.2E-14	2.1E-01	3.6E-04	42.6	81.5	9.22	0.09
6965-01I	1650	1.69E+01	2.94E+00	3.51E-02	3.1E-14	1.7E-01	3.7E-04	39.9	118.3	9.39	0.10
		total gas age		n=5	8.5E-14	3.0E-01	3.3E-01			5.55	0.37
		plateau age					G-I	68.0		9.30	0.09
		isochron age		40Ar/36Ar=	302.1±1.1		MSWD = 2.41			8.98	0.09

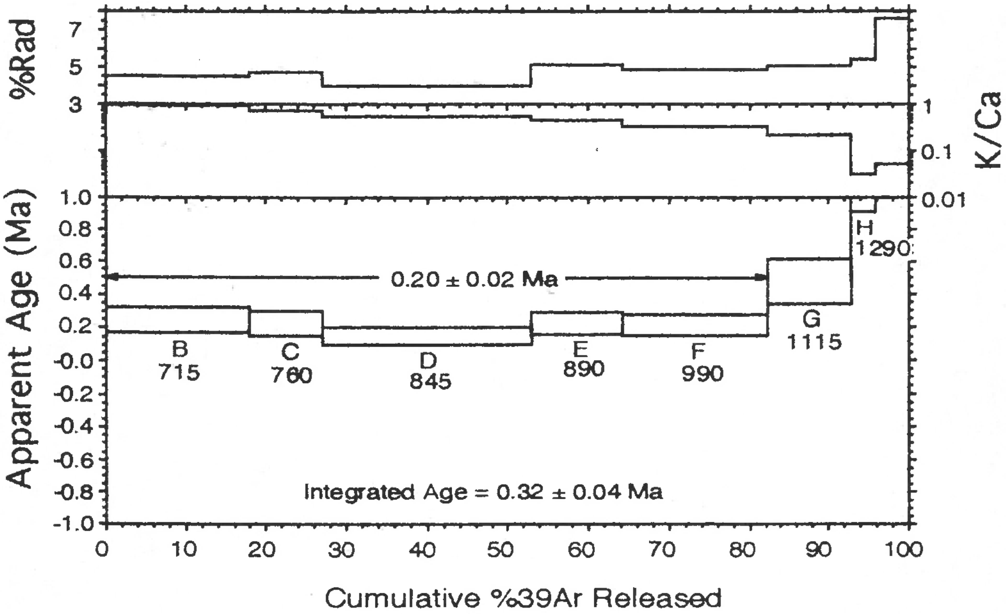

JS-94-4: 3rd Capulin flow, L#2850, NM-30
%Rad
15
10
5
0
K/Ca
10
1
0.1
Apparent Age (Ma)
1.0
0.8
0.6
0.4
0.2
-0.0
-0.2
-0.4
-0.6
-0.8
-1.0
0.28 ± 0.06 Ma
A
500
B
600
C
700
D
800
E
900
F
1000
Integrated Age = 0.50 ± 0.10 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released


JS-94-4: 3rd Capulin flow, L#2850, NM-30
Isochron age (Ma): 0.766±0.166
40Ar/36Ar Int: 280.1±5.3
MSWD: 5.81
Steps A-D
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
39Ar/40Ar

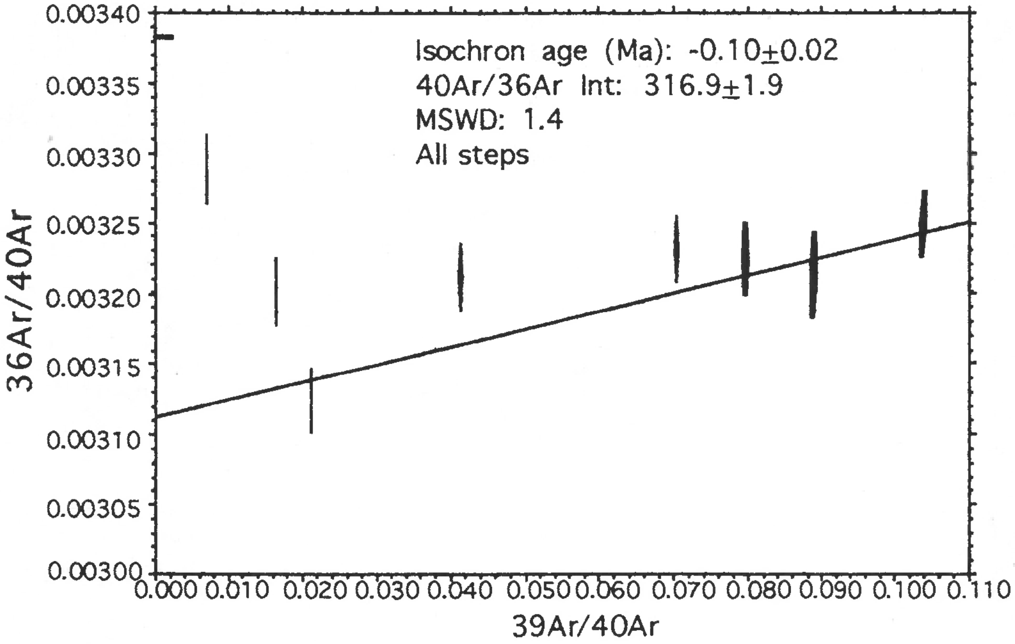

JS-94-4, L#5677: NM-40
%Rad
60
20
-20
K/Ca
0.1
0.01
Apparent Age (Ma)
25
20
15
10
5
0
Integrated Age = 0.74 ± 0.15 Ma
0.18 ± 0.06 Ma
C
700
D
800
E
900
F
1000
G
1100
I
1300
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

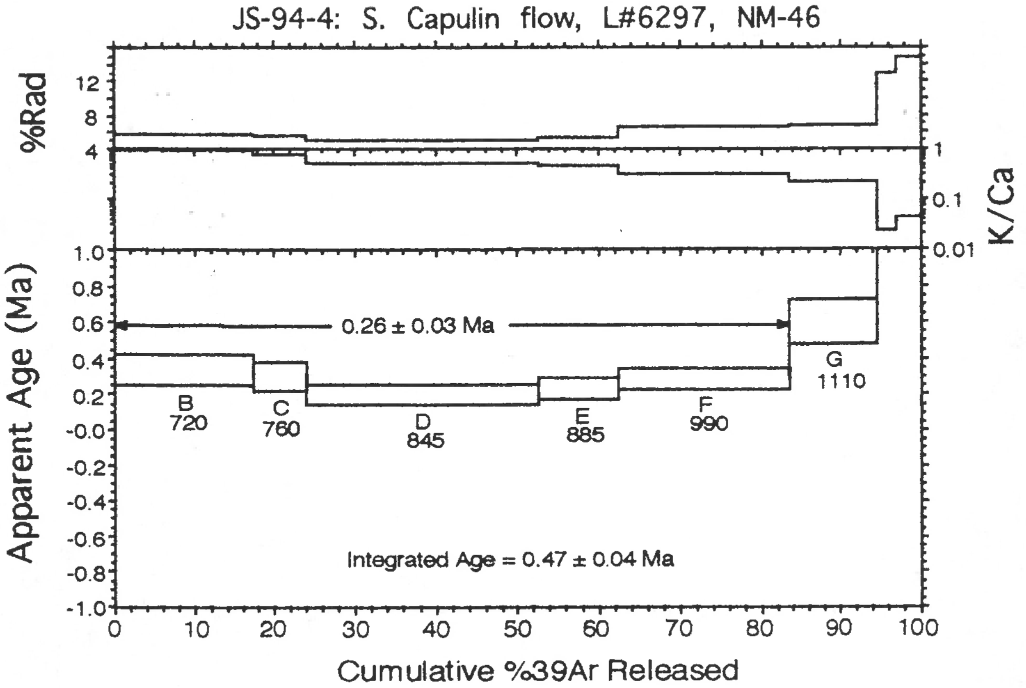

JS-94-4, L#5677: NM-40
Isochron age (Ma): 0.004±0.001
40Ar/36Ar Int: 304.5±3.1
MSWD: 1.10
Steps D-F
36Ar/40Ar
0.0034
0.0030
0.0024
0.0020
0.0016
0.0012
0.0008
0.0004
0.0000
0
20
40
60
80
100
120
140
160
39Ar/40Ar

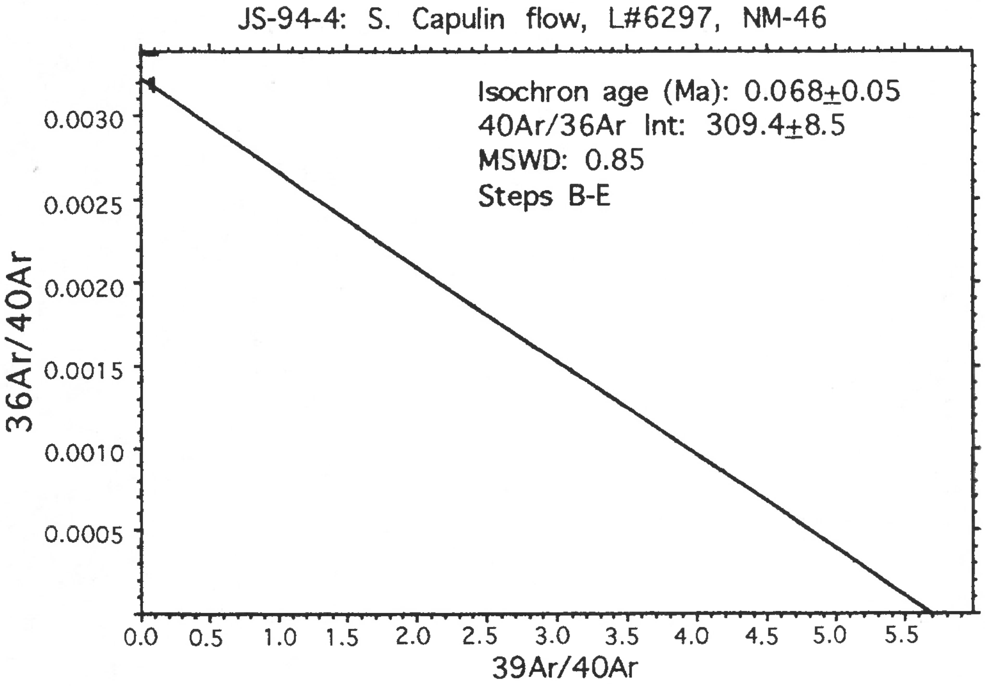
JS-94-4: 3rd Capulin flow (60m), L#6296, NM-46

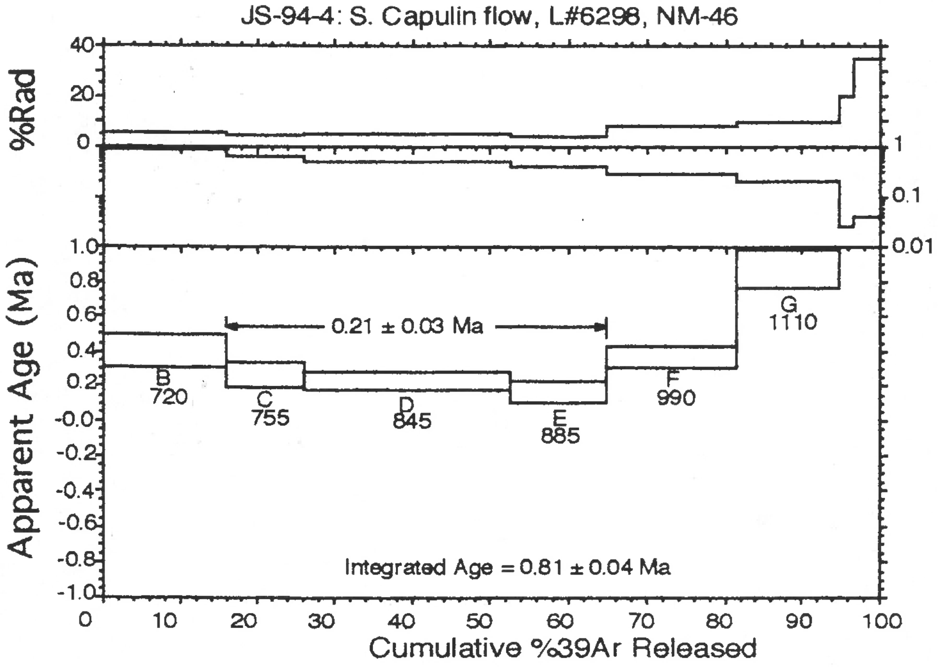


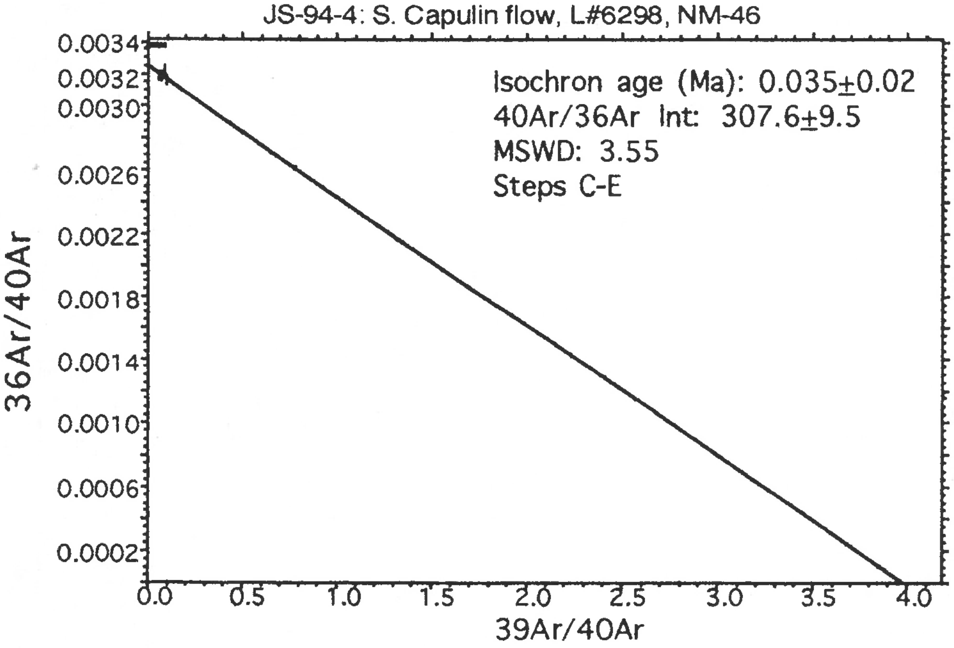
JS-94-4: 3rd Capulin flow (60m), L#6296, NM-46

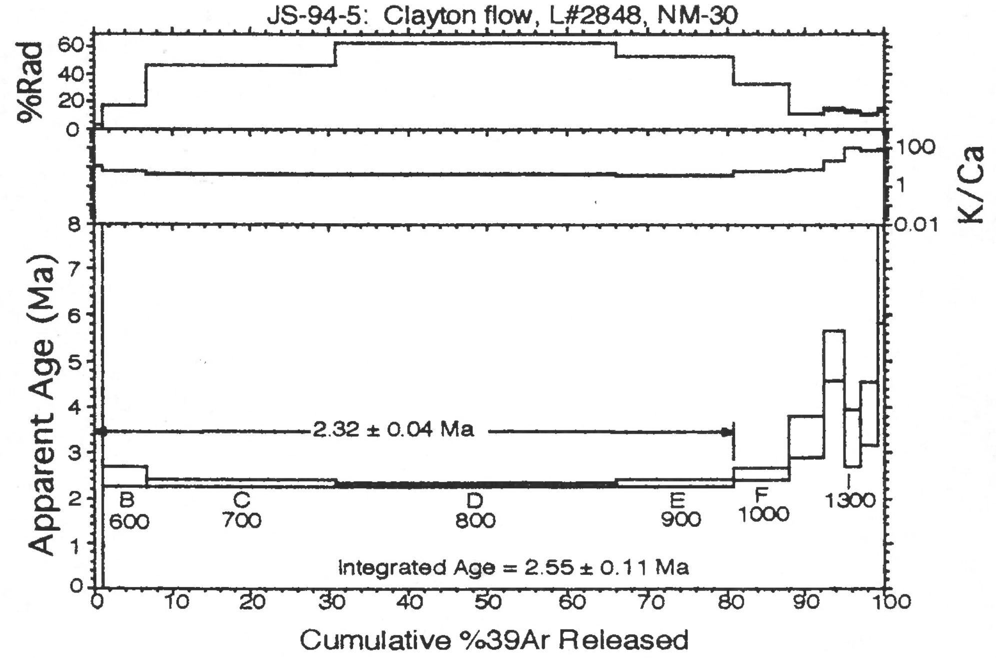


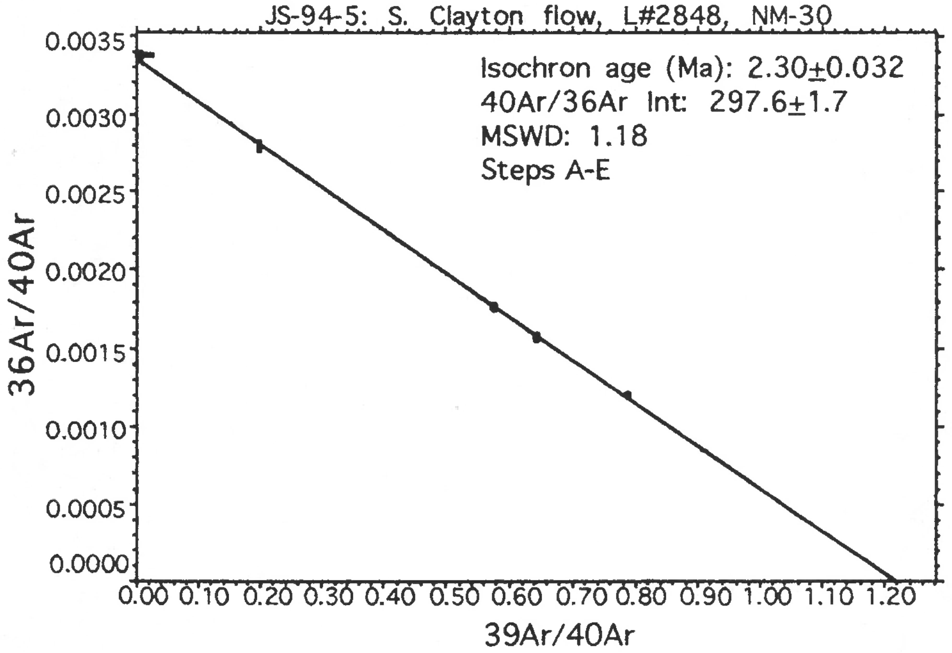

JS-94-4: S. Capulin flow, L#6297, NM-46
%Rad
12
8
4
K/Ca
1
0.1
0.01
Apparent Age (Ma)
1.0
0.8
0.6
0.4
0.2
-0.0
-0.2
-0.4
-0.6
-0.8
-1.0
0.26 ± 0.03 Ma
B
720
C
760
D
845
E
885
F
990
G
1110
Integrated Age = 0.47 ± 0.04 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

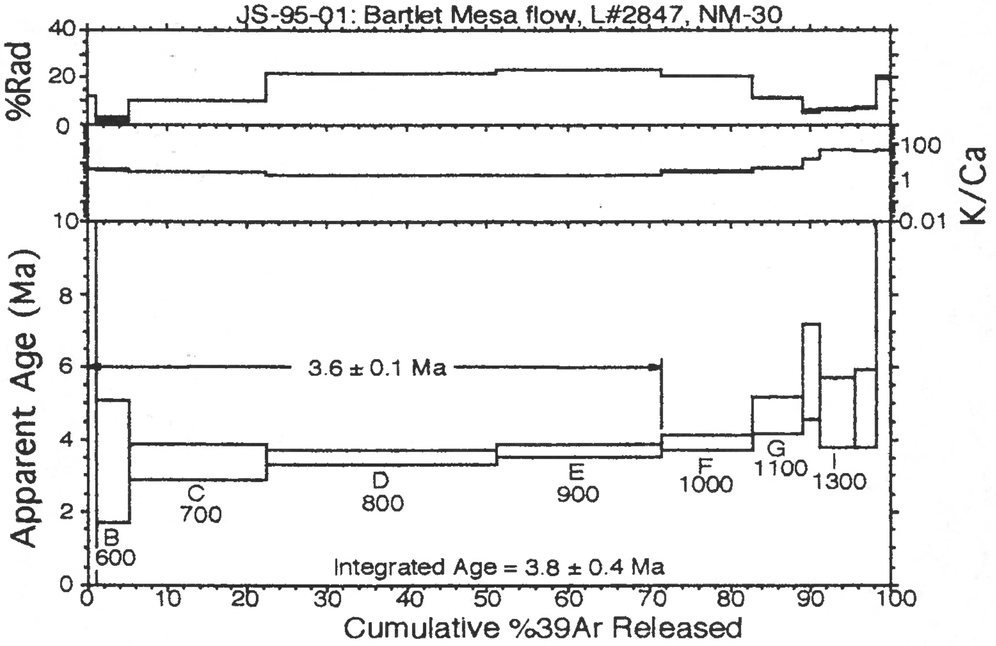

JS-94-4: S. Capulin flow, L#6297, NM-46
Isochron age (Ma): 0.068±0.05
40Ar/36Ar Int: 309.4±8.5
MSWD: 0.85
Steps B-E
36Ar/40Ar
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
39Ar/40Ar

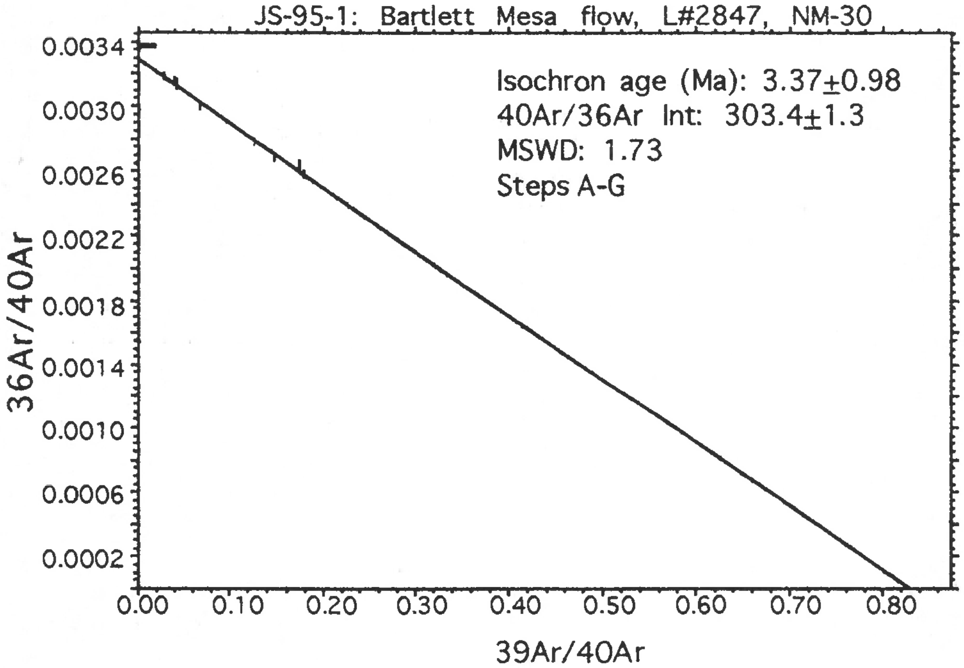

JS-94-4: S. Capulin flow, L#6298, NM-46
%Rad
40
20
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
1.0
0.8
0.6
0.4
0.2
-0.0
-0.2
-0.4
-0.6
-0.8
-1.0
0.21 ± 0.03 Ma
B
720
C
755
D
845
E
885
F
990
G
1110
Integrated Age = 0.81 ± 0.04 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

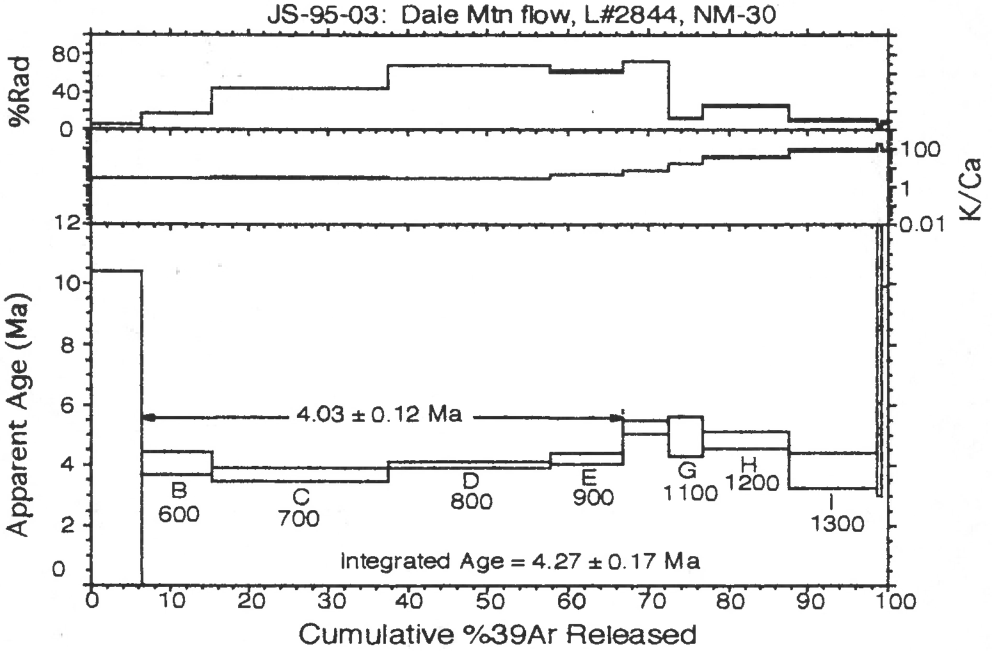

JS-94-4: S. Capulin flow, L#6298, NM-46
Isochron age (Ma): 0.035±0.02
40Ar/36Ar Int: 307.6±9.5
MSWD: 3.55
Steps C-E
36Ar/40Ar
0.0034
0.0032
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
39Ar/40Ar

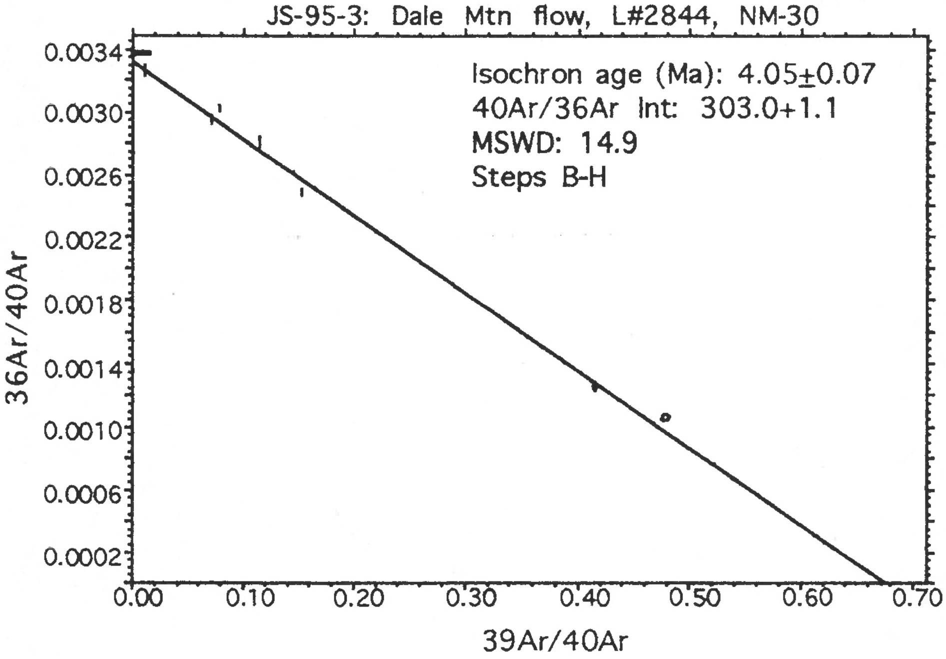

JS-94-5: Clayton flow, L#2848, NM-30
%Rad
0
20
40
60
K/Ca
100
1
0.01
Apparent Age (Ma)
0
1
2
3
4
5
6
7
8
2.32 ± 0.04 Ma
B
600
C
700
D
800
E
900
F
1000
I
1300
Integrated Age = 2.55 ± 0.11 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

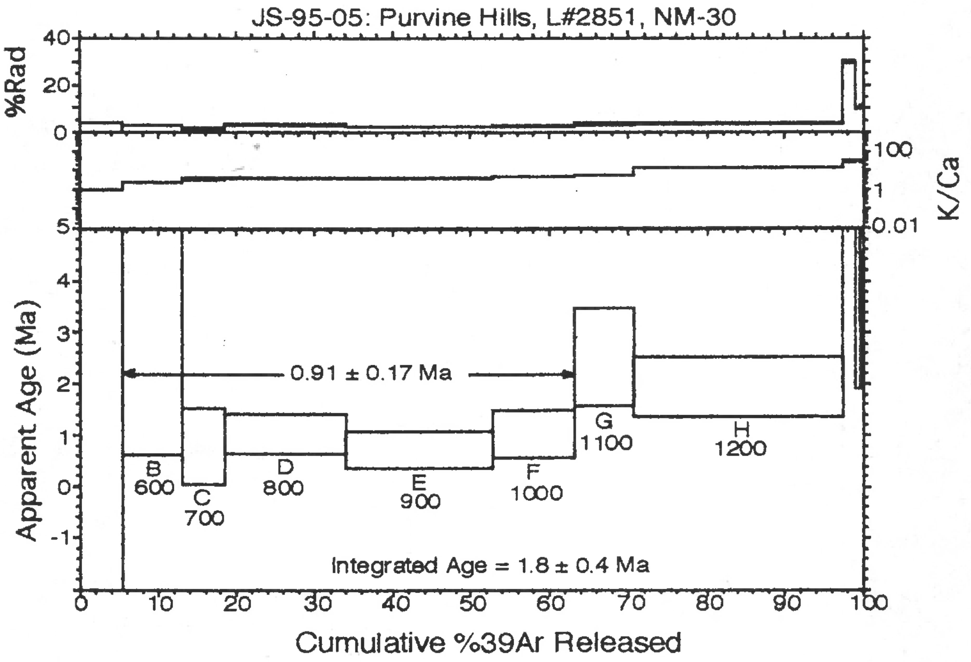

JS-94-5: S. Clayton flow, L#2848, NM-30
Isochron age (Ma): 2.30±0.032
40Ar/36Ar Int: 297.6±1.7
MSWD: 1.18
Steps A-E
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
1.10
1.20
39Ar/40Ar

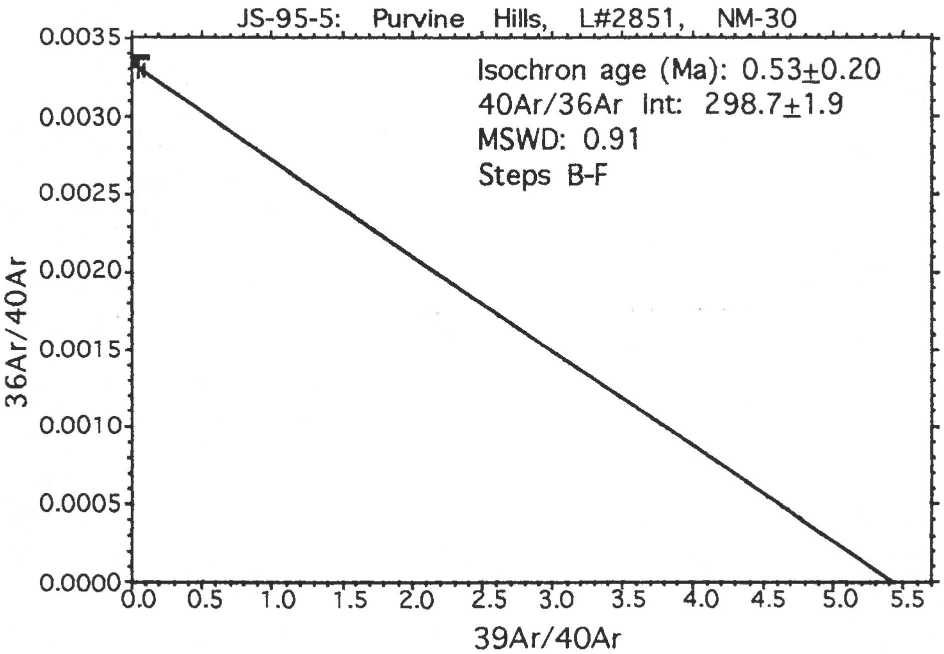

JS-95-01: Bartlet Mesa flow, L#2847, NM-30
%Rad
40
20
0
K/Ca
100
1
0.01
10
8
6
4
2
0
Apparent Age (Ma)
3.6 ± 0.1 Ma
B
600
C
700
D
800
E
900
F
1000
G
1100
I
1300
Integrated Age = 3.8 ± 0.4 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

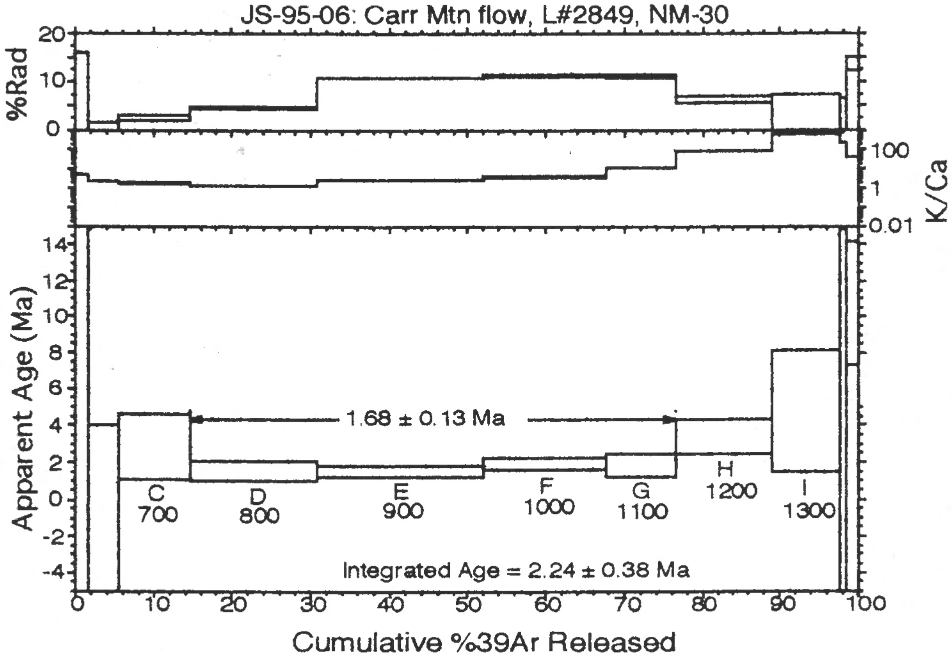

JS-95-1: Bartlett Mesa flow, L#2847, NM-30
Isochron age (Ma): 3.37±0.98
40Ar/36Ar Int: 303.4±1.3
MSWD: 1.73
Steps A-G
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
39Ar/40Ar

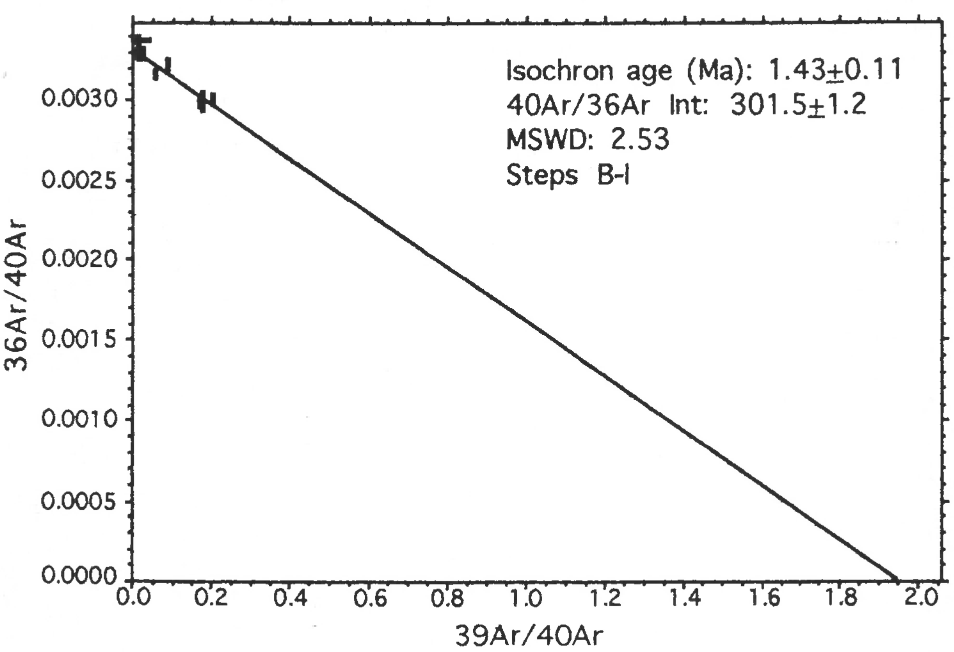

JS-95-03: Dale Mtn flow, L#2844, NM-30
%Rad
80
40
0
100
1
0.01
K/Ca
12
10
8
6
4
2
0
Apparent Age (Ma)
4.03 ± 0.12 Ma
B
600
C
700
D
800
E
900
G
1100
H
1200
I
1300
Integrated Age = 4.27 ± 0.17 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

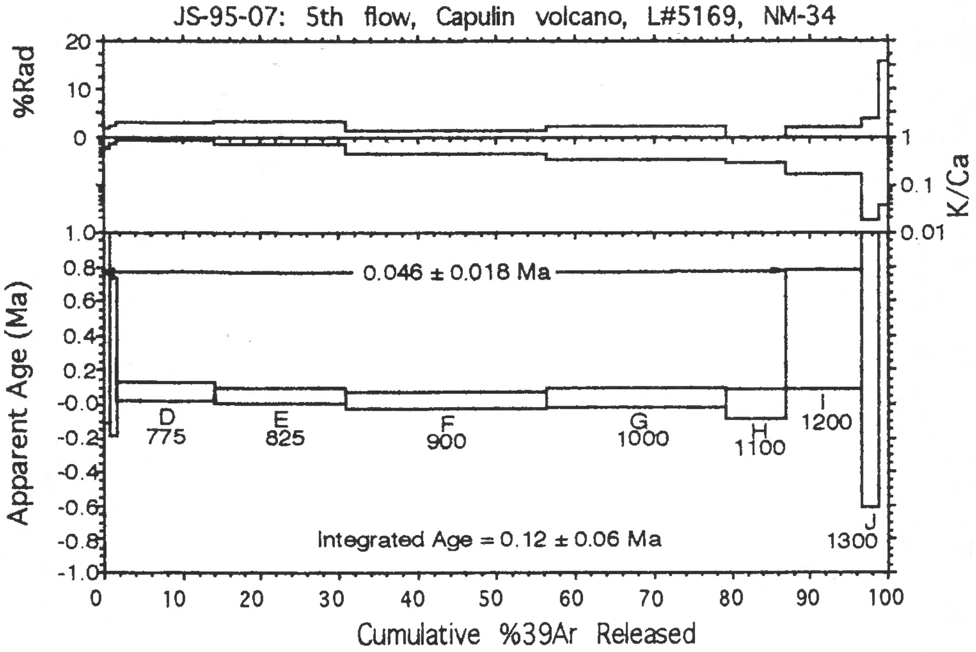

JS-95-3: Dale Mtn flow, L#2844, NM-30
Isochron age (Ma): 4.05±0.07
40Ar/36Ar Int: 303.0+1.1
MSWD: 14.9
Steps B-H
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
36Ar/40Ar
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
39Ar/40Ar


JS-95-05: Purvine Hills, L#2851, NM-30
%Rad
40
20
0
100
1
0.01
K/Ca
5
4
3
2
1
0
-1
Apparent Age (Ma)
0.91 ± 0.17 Ma
B
600
C
700
D
800
E
900
F
1000
G
1100
H
1200
Integrated Age = 1.8 ± 0.4 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

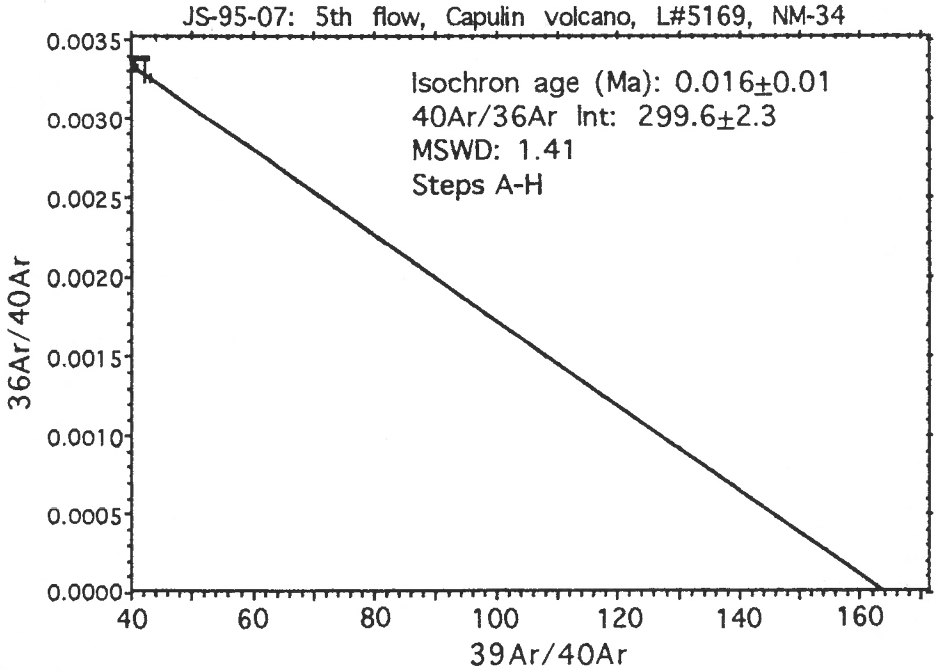

JS-95-5: Purvine Hills, L#2851, NM-30
Isochron age (Ma): 0.53±0.20
40Ar/36Ar Int: 298.7±1.9
MSWD: 0.91
Steps B-F
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
36Ar/40Ar
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
39Ar/40Ar


JS-95-06: Carr Mtn flow, L#2849, NM-30

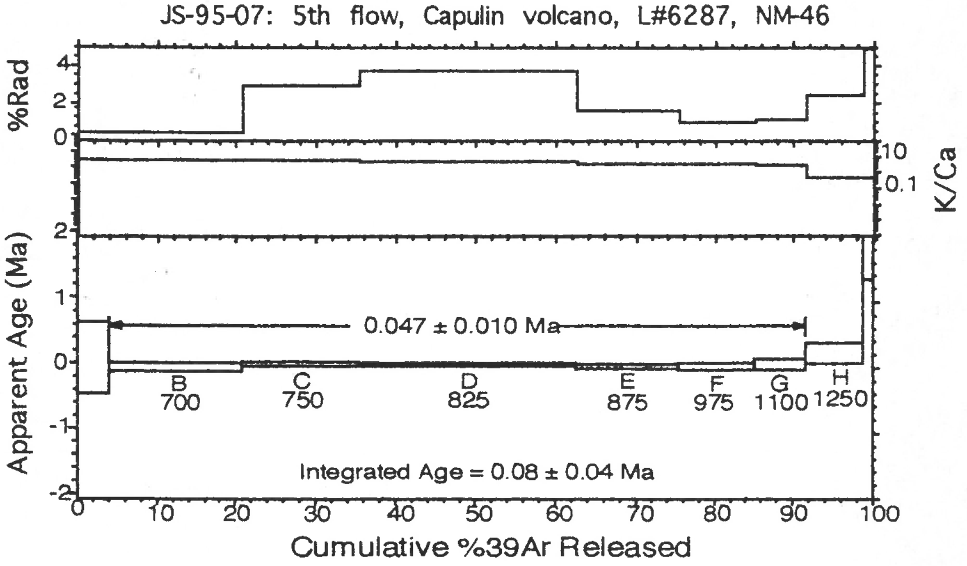

JS-95-6: Carr Mtn flow, L#2849, NM-30

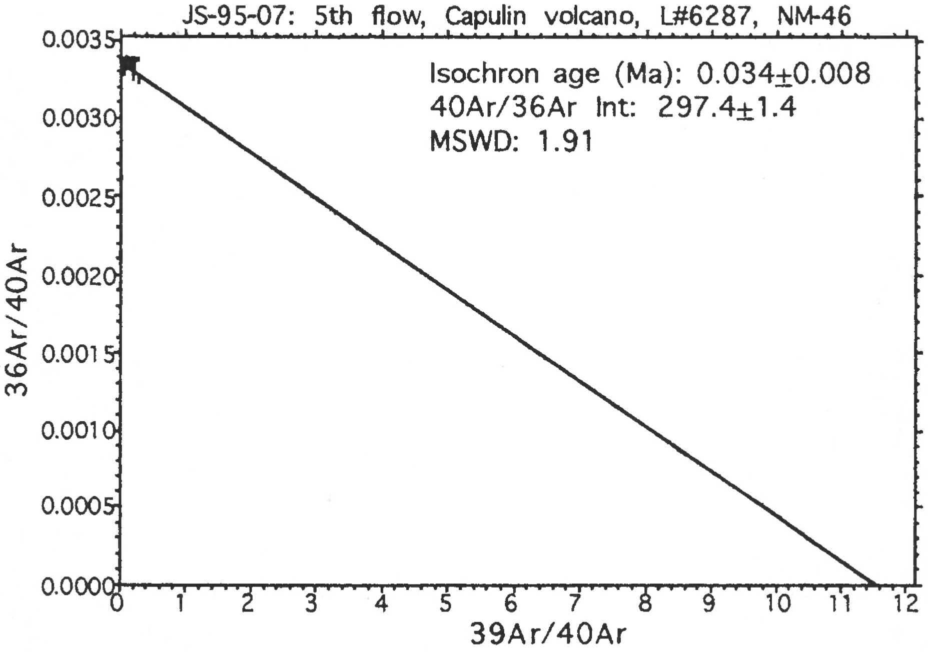


JS-95-07: 5th flow, Capulin volcano, L#5169, NM-34

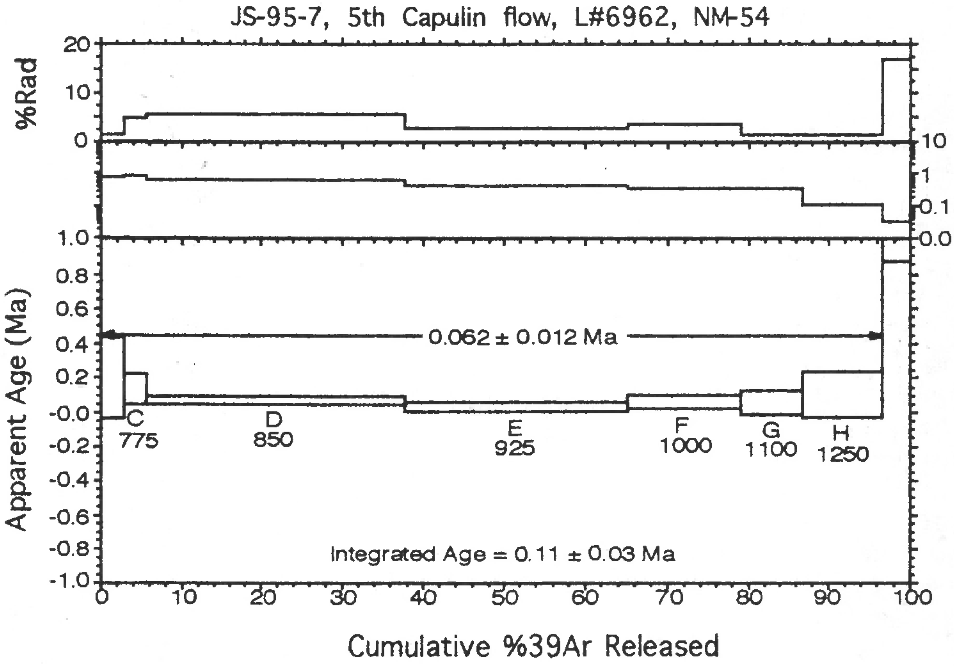


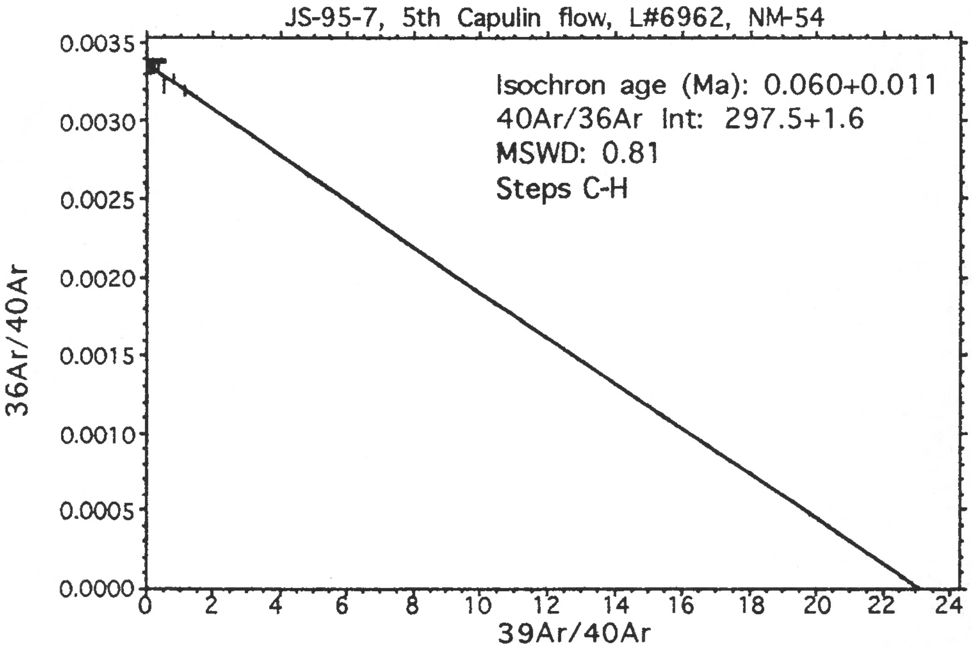
JS-95-07: 5th flow, Capulin volcano, L#5169, NM-34

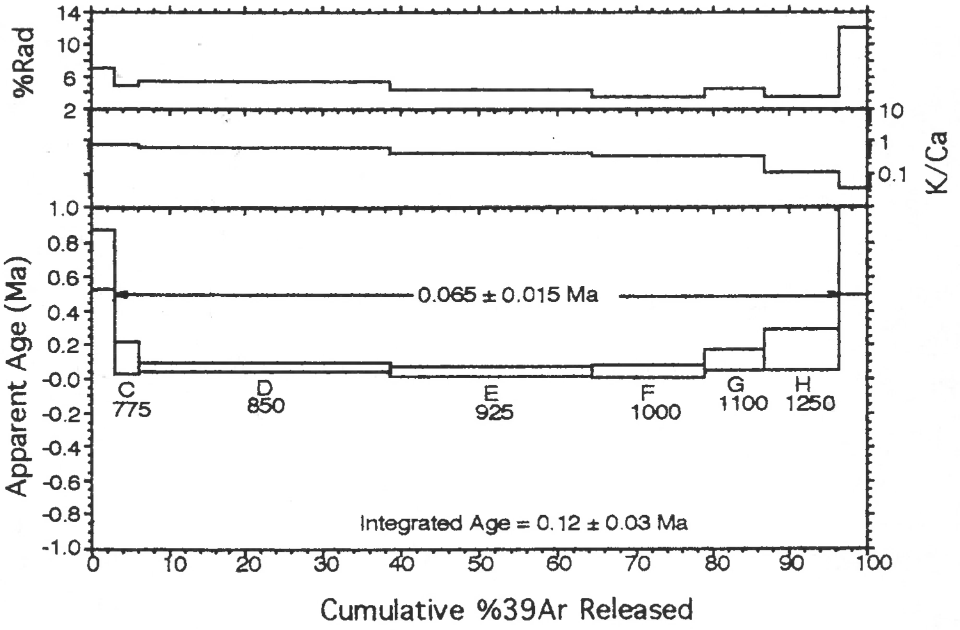

JS-95-07: 5th flow, Capulin volcano, L#6287, NM-46


JS-95-07: 5th flow, Capulin volcano, L#6287, NM-46

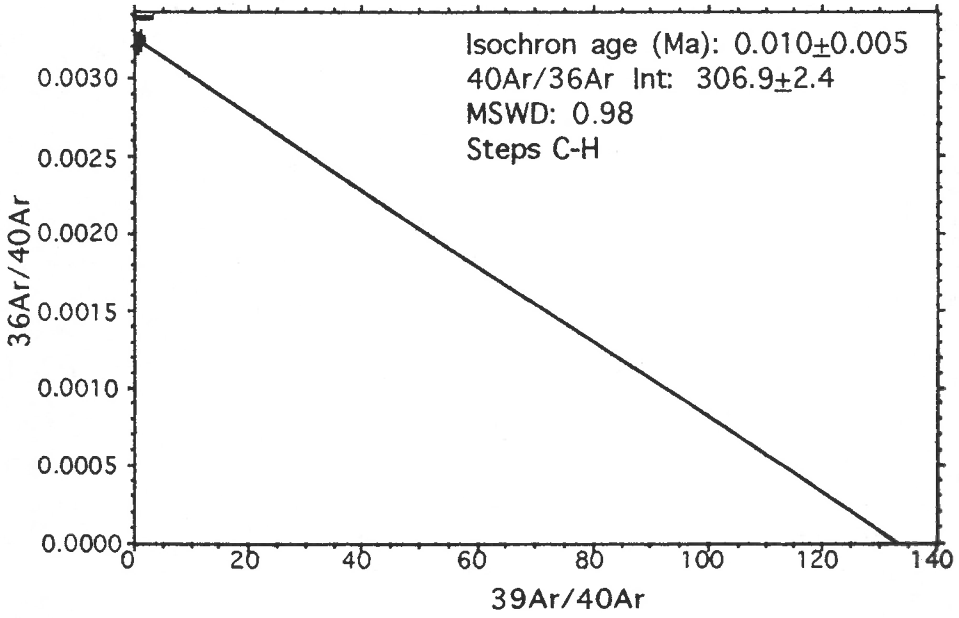
Isochron age (Ma): 0.034±0.008
40Ar/36Ar Int: 297.4±1.4
MSWD: 1.91


JS-95-7, 5th Capulin flow, L#6962, NM-54
%Rad
20
10
0
K/Ca
10
1
0.1
0.01
Apparent Age (Ma)
1.0
0.8
0.6
0.4
0.2
-0.0
-0.2
-0.4
-0.6
-0.8
-1.0
0.062 ± 0.012 Ma
C 775
D 850
E 925
F 1000
G 1100
H 1250
Integrated Age = 0.11 ± 0.03 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

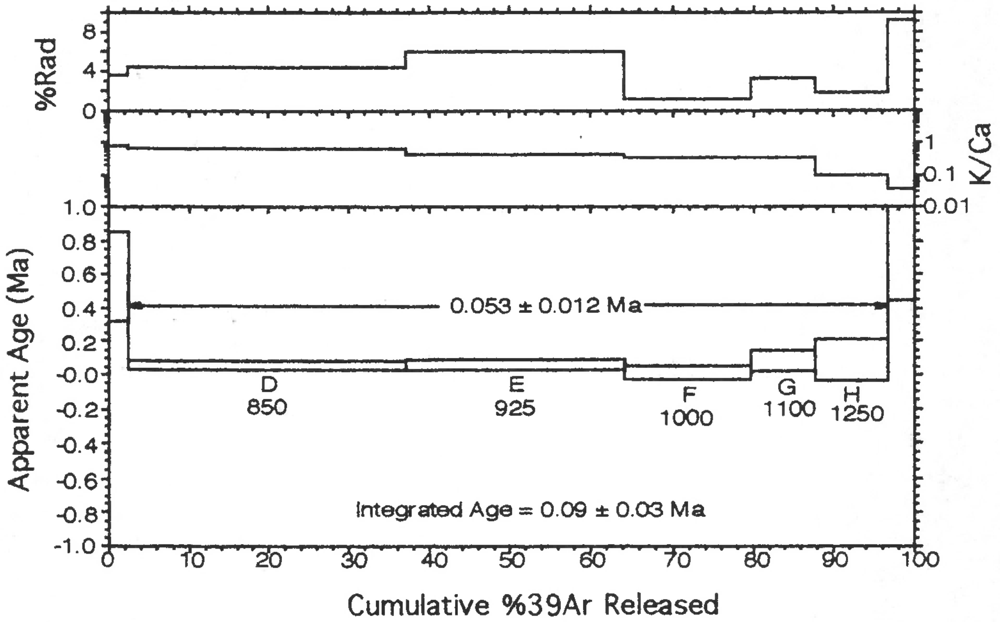

JS-95-7, 5th Capulin flow, L#6962, NM-54
Isochron age (Ma): 0.060+0.011
40Ar/36Ar Int: 297.5+1.6
MSWD: 0.81
Steps C-H
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0
2
4
6
8
10
12
14
16
18
20
22
24
39Ar/40Ar

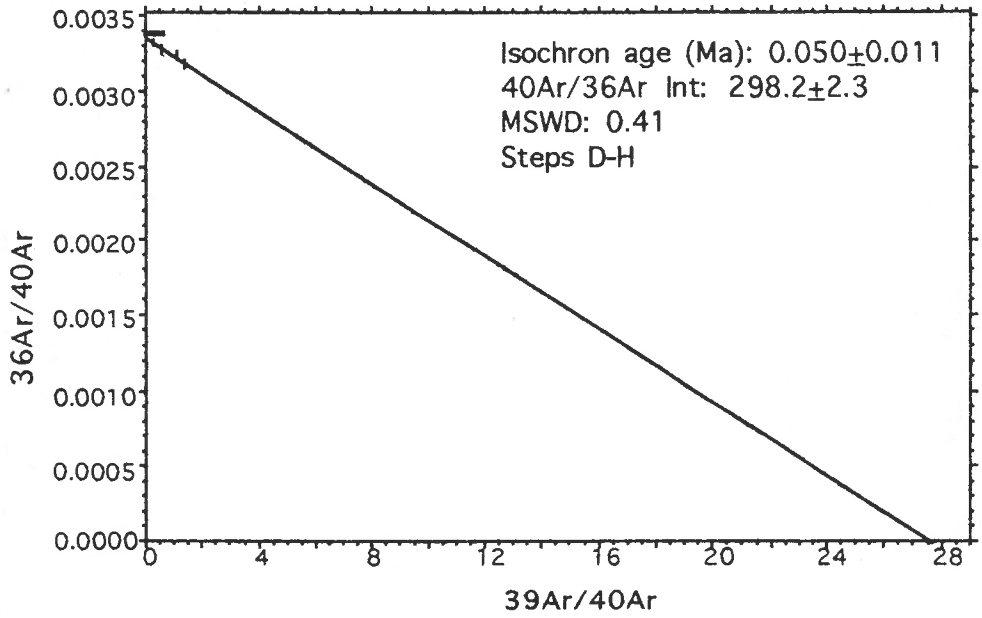


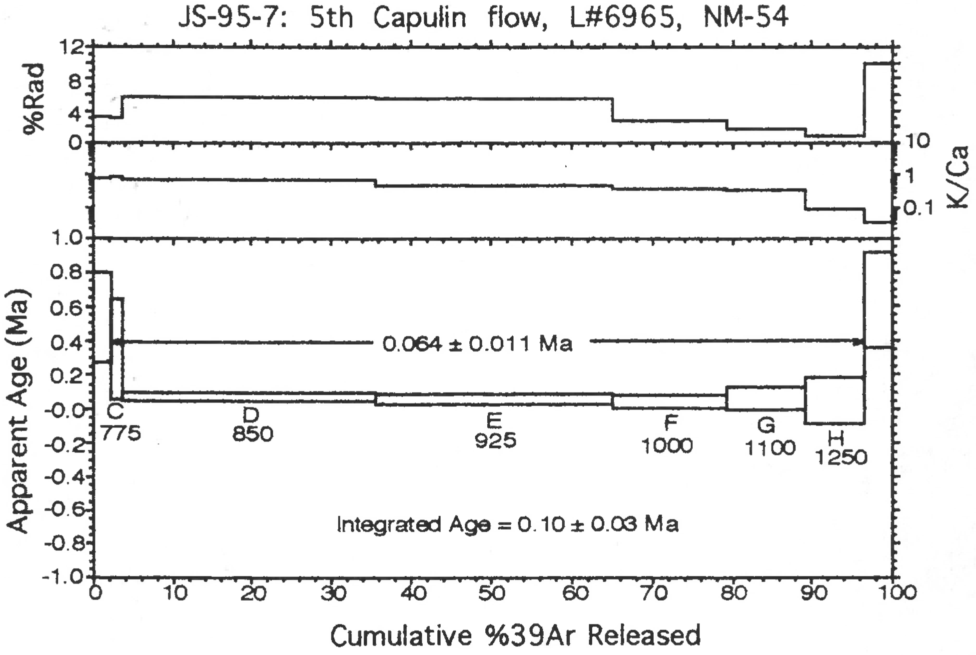
JS-95-7: 5th Capulin flow, L#6963, NM-54

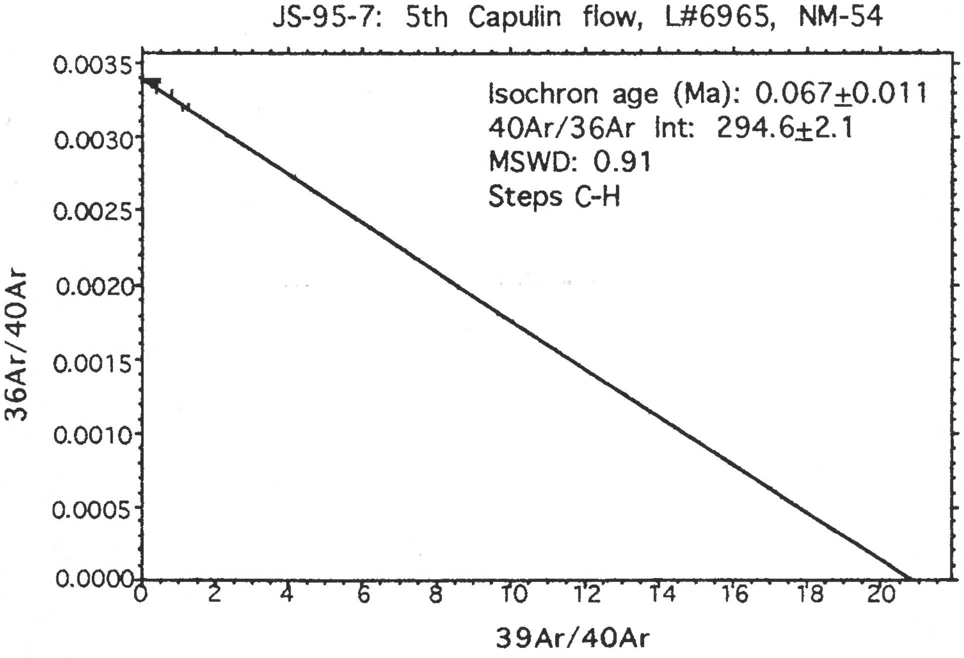


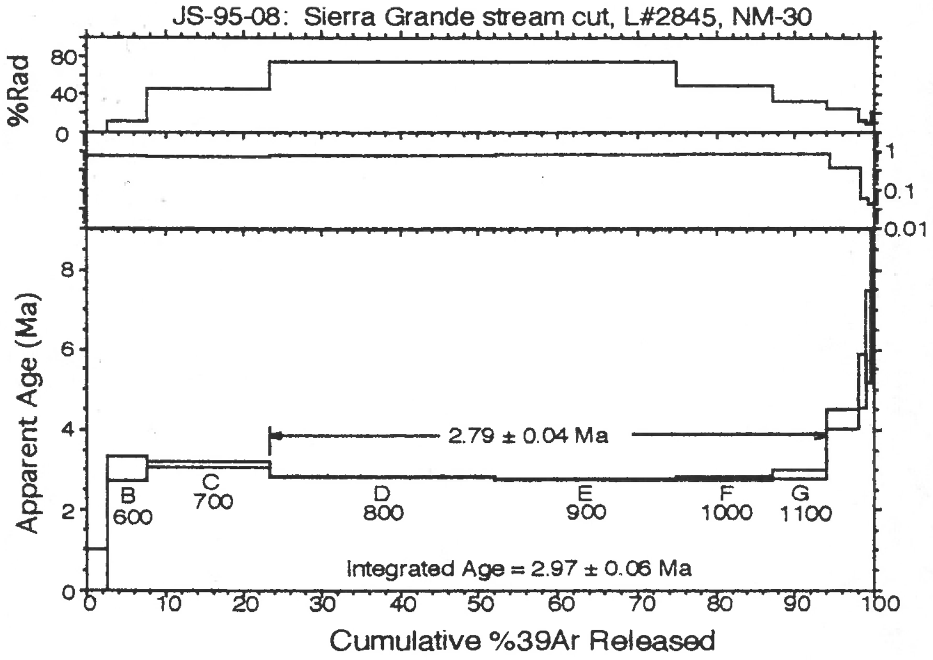
JS-95-7: 5th Capulin flow, L#6963, NM-54

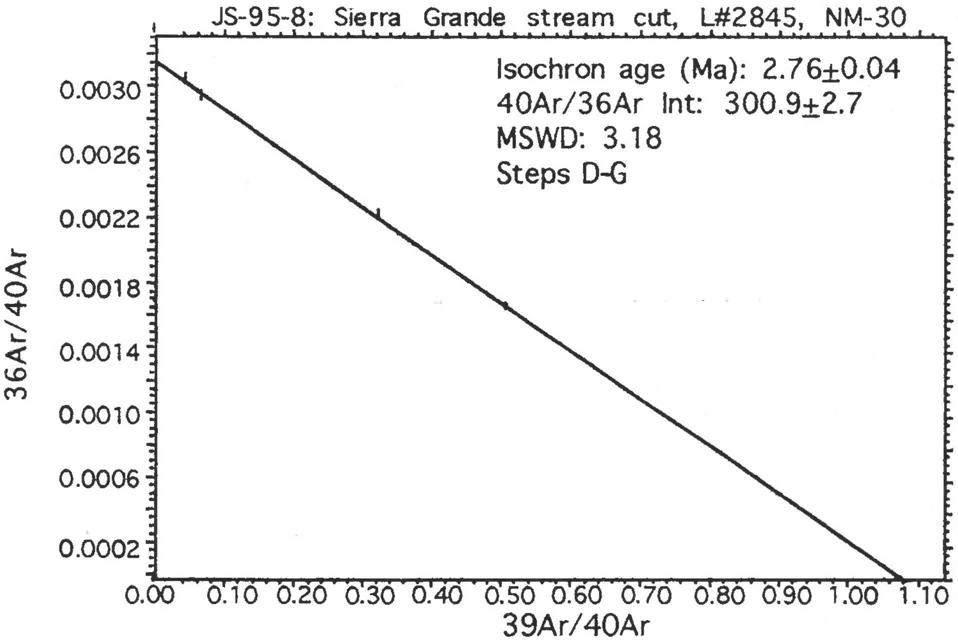

JS-95-7: 5th Capulin flow, L#6964, NM-54

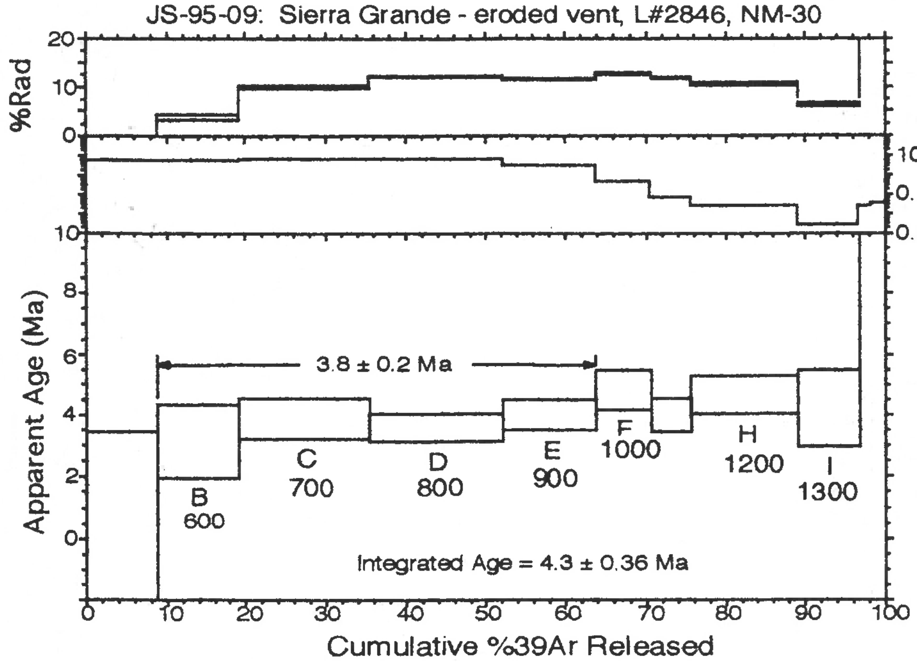

JS-95-7: 5th Capulin flow, L#6964, NM-54

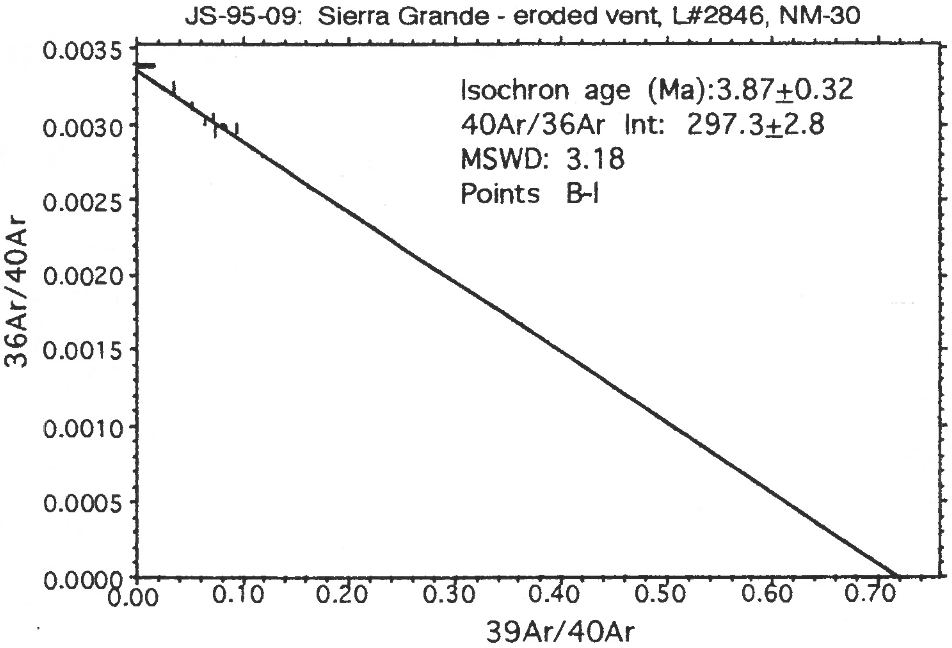

JS-95-7: 5th Capulin flow, L#6965, NM-54
%Rad
12
8
4
0
K/Ca
10
1
0.1
Apparent Age (Ma)
1.0
0.8
0.6
0.4
0.2
-0.0
-0.2
-0.4
-0.6
-0.8
-1.0
0.064 ± 0.011 Ma
C
775
D
850
E
925
F
1000
G
1100
H
1250
Integrated Age = 0.10 ± 0.03 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

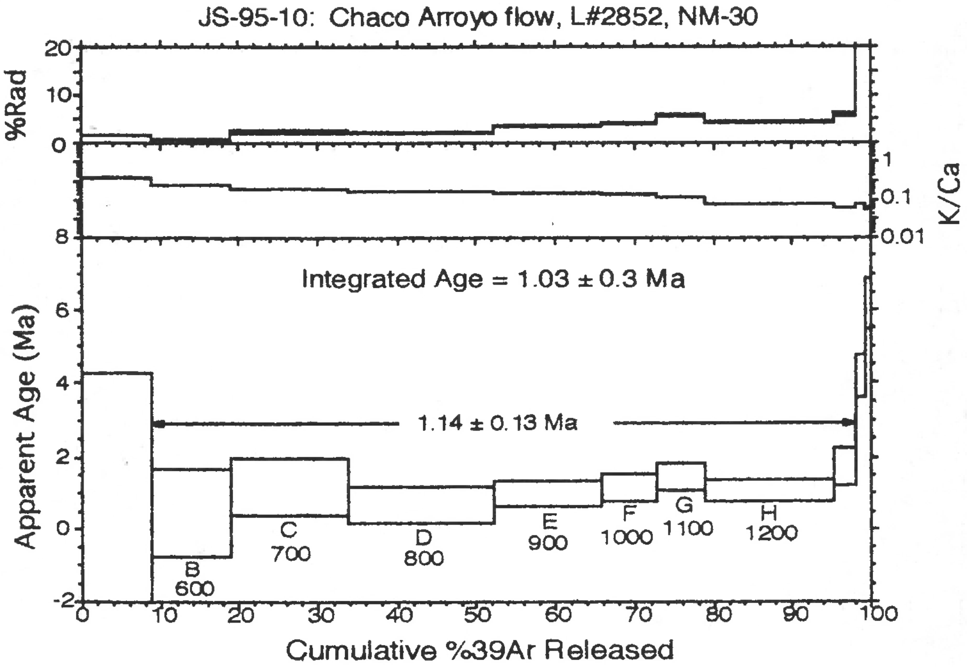

JS-95-7: 5th Capulin flow, L#6965, NM-54
Isochron age (Ma): 0.067±0.011
40Ar/36Ar Int: 294.6±2.1
MSWD: 0.91
Steps C-H
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0
2
4
6
8
10
12
14
16
18
20
39Ar/40Ar

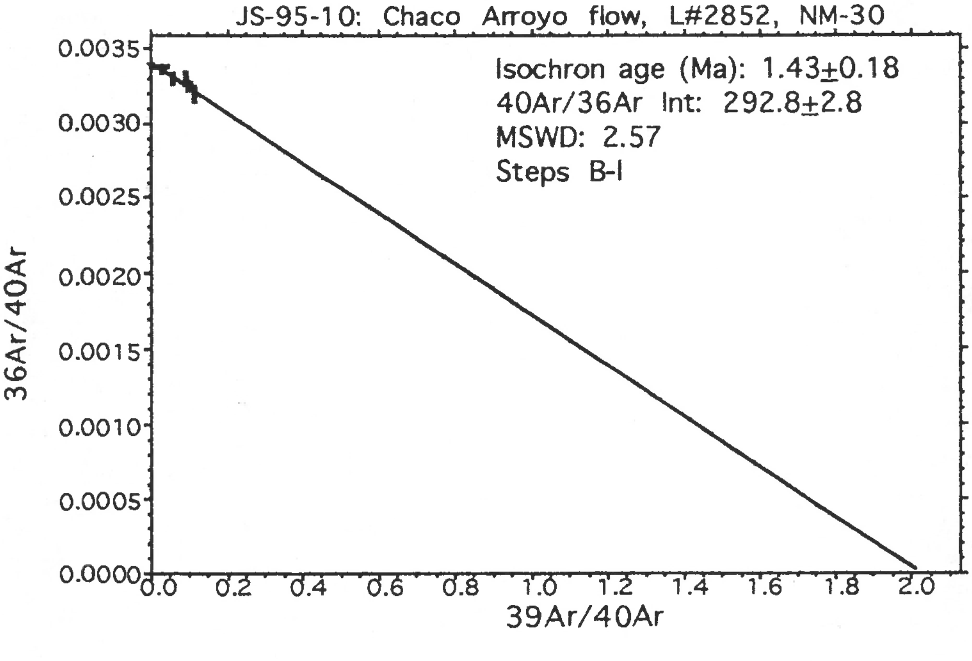

JS-95-08: Sierra Grande stream cut, L#2845, NM-30
%Rad
80
40
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
8
6
4
2
0
2.79 ± 0.04 Ma
B
600
C
700
D
800
E
900
F
1000
G
1100
Integrated Age = 2.97 ± 0.06 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

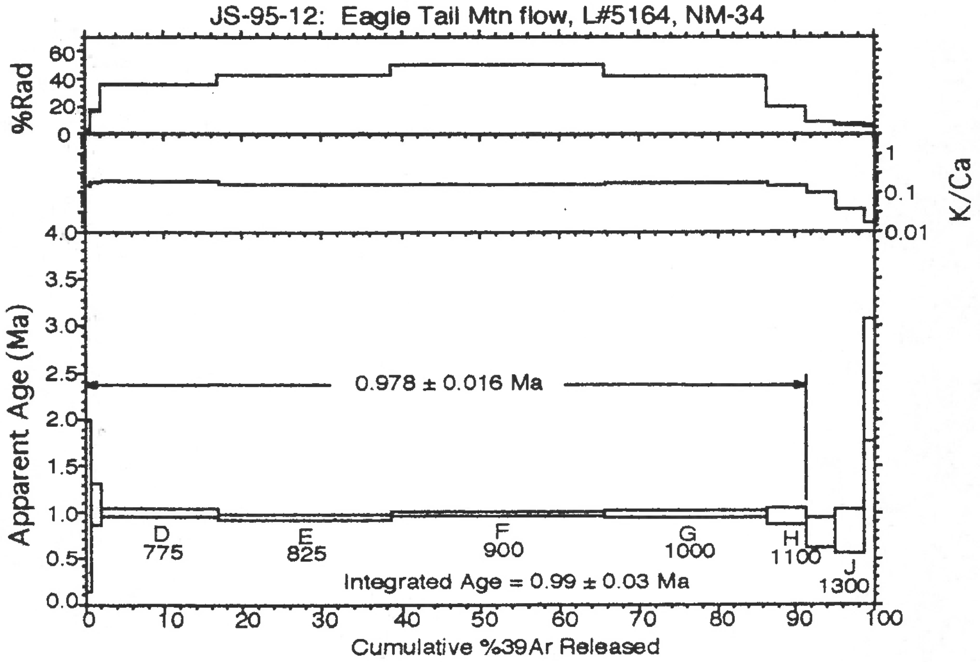

JS-95-8: Sierra Grande stream cut, L#2845, NM-30
Isochron age (Ma): 2.76±0.04
40Ar/36Ar Int: 300.9±2.7
MSWD: 3.18
Steps D-G
36Ar/40Ar
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
1.10
39Ar/40Ar

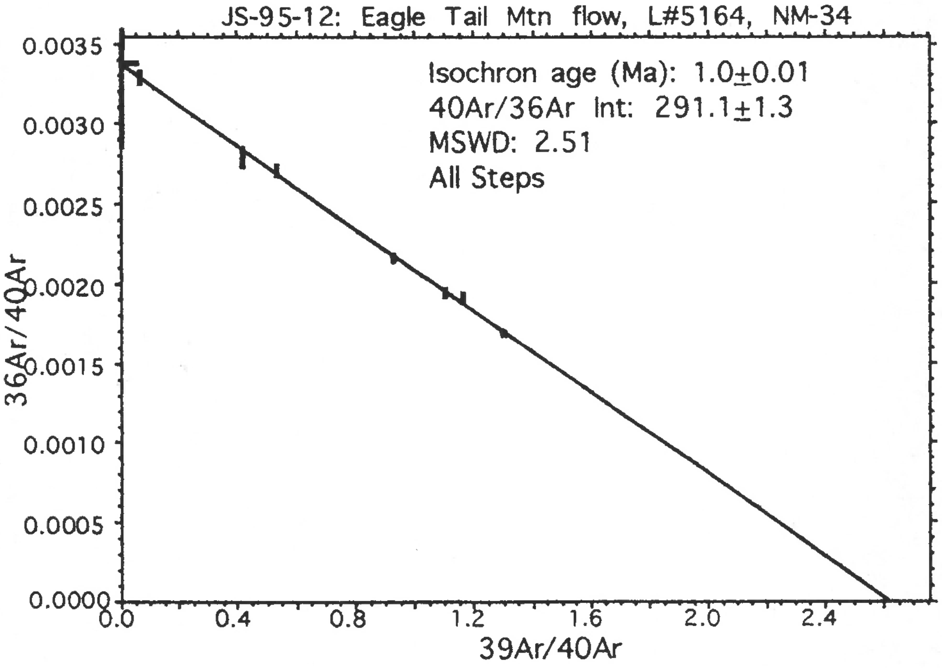

JS-95-09: Sierra Grande - eroded vent, L#2846, NM-30
%Rad
20
10
0
K/Ca
10
0.1
0.001
Apparent Age (Ma)
8
6
4
2
0
3.8 ± 0.2 Ma
B
600
C
700
D
800
E
900
F
1000
H
1200
I
1300
Integrated Age = 4.3 ± 0.36 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released


JS-95-09: Sierra Grande - eroded vent, L#2846, NM-30
Isochron age (Ma):3.87±0.32
40Ar/36Ar Int: 297.3±2.8
MSWD: 3.18
Points B-I
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
39Ar/40Ar

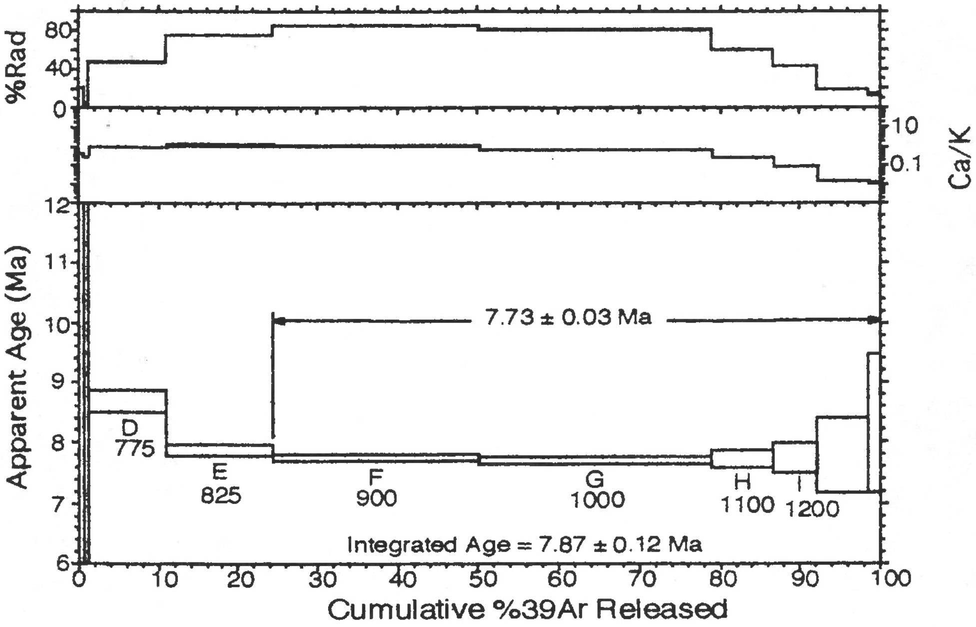

JS-95-10: Chaco Arroyo flow, L#2852, NM-30
%Rad
20
10
0
K/Ca
1
0.1
0.01
Integrated Age = 1.03 ± 0.3 Ma
Apparent Age (Ma)
8
6
4
2
0
-2
1.14 ± 0.13 Ma
B
600
C
700
D
800
E
900
F
1000
G
1100
H
1200
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released


JS-95-10: Chaco Arroyo flow, L#2852, NM-30
Isochron age (Ma): 1.43±0.18
40Ar/36Ar Int: 292.8±2.8
MSWD: 2.57
Steps B-I
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
39Ar/40Ar

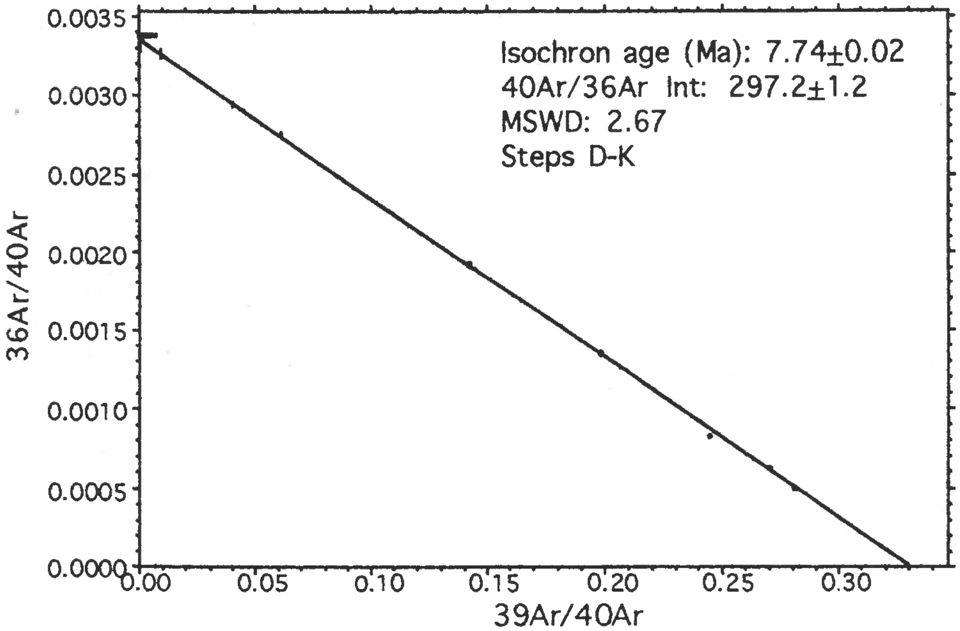

JS-95-12: Eagle Tail Mtn flow, L#5164, NM-34
%Rad
60
40
20
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.978 ± 0.016 Ma
D
775
E
825
F
900
G
1000
H
1100
J
1300
Integrated Age = 0.99 ± 0.03 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

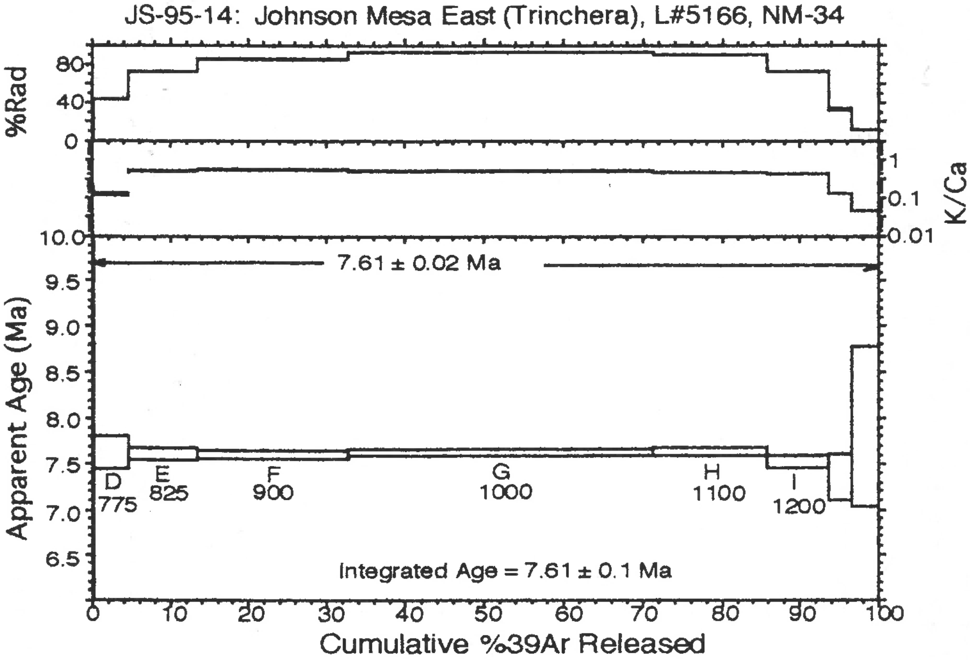

JS-95-12: Eagle Tail Mtn flow, L#5164, NM-34
Isochron age (Ma): 1.0±0.01
40Ar/36Ar Int: 291.1±1.3
MSWD: 2.51
All Steps
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.0
0.4
0.8
1.2
1.6
2.0
2.4
39Ar/40Ar

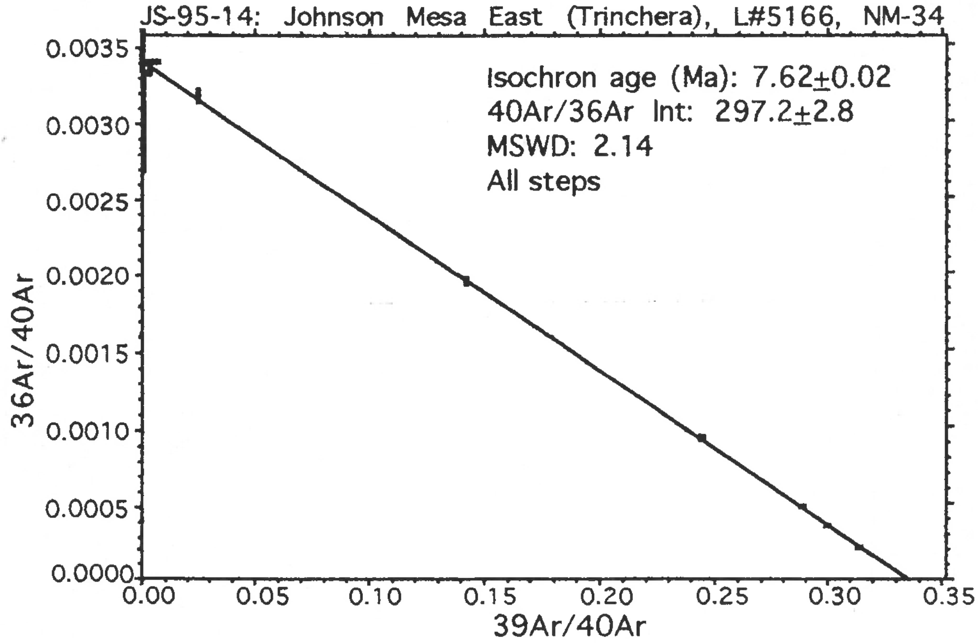
JS-95-13: Johnson Mesa West (Yankee), L#5165, NM-34

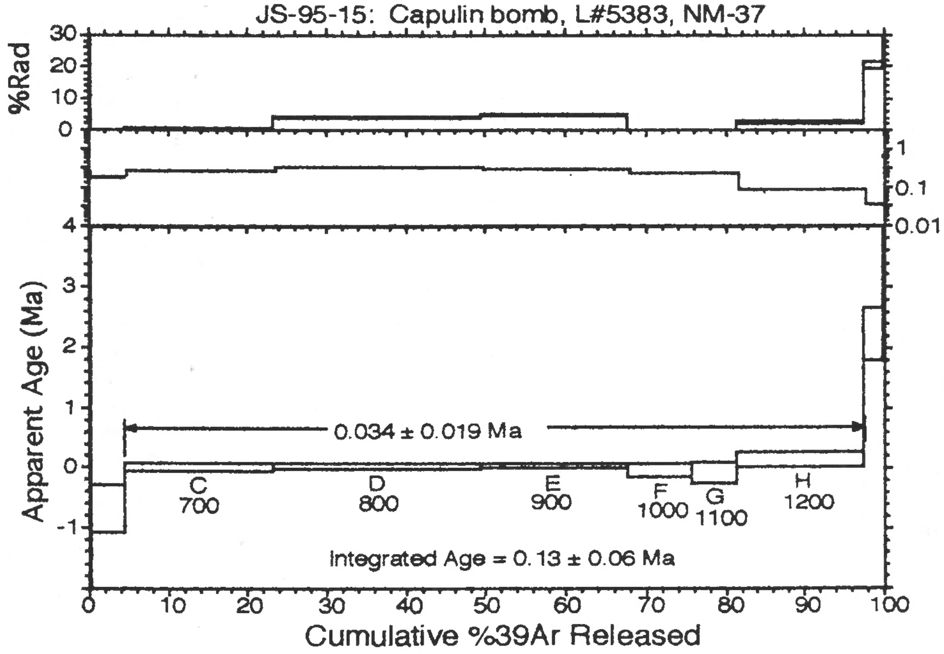


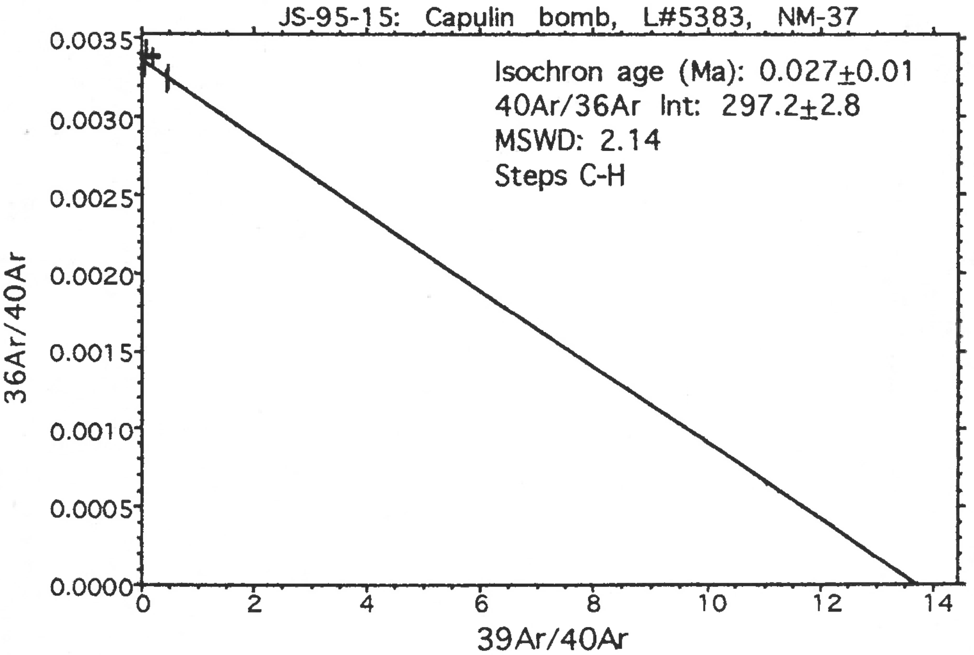
JS-95-13: Johnson Mesa West (Yankee), L#5165, NM-34

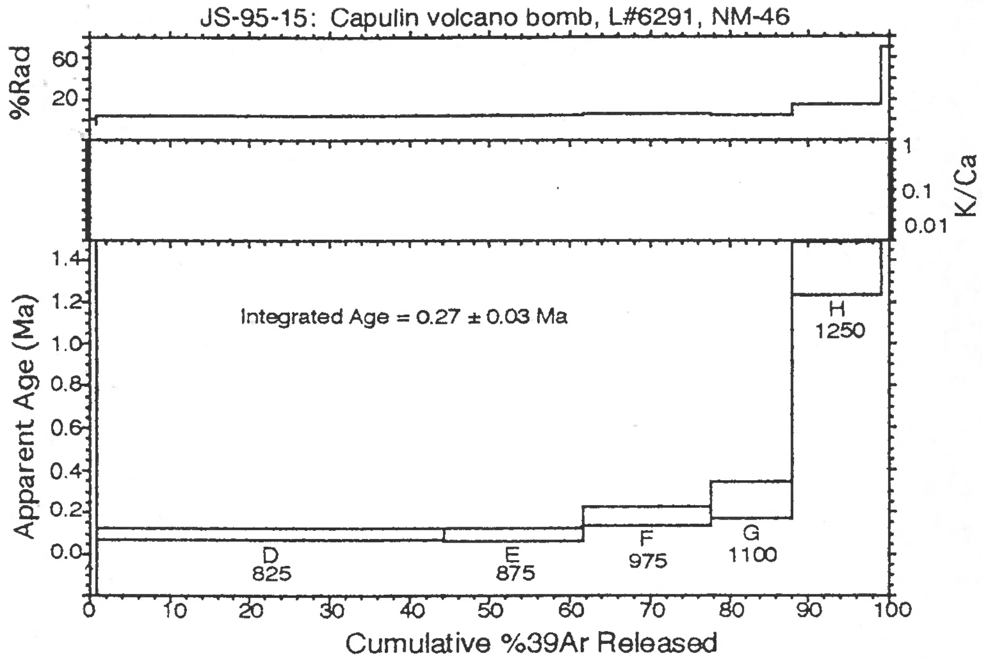


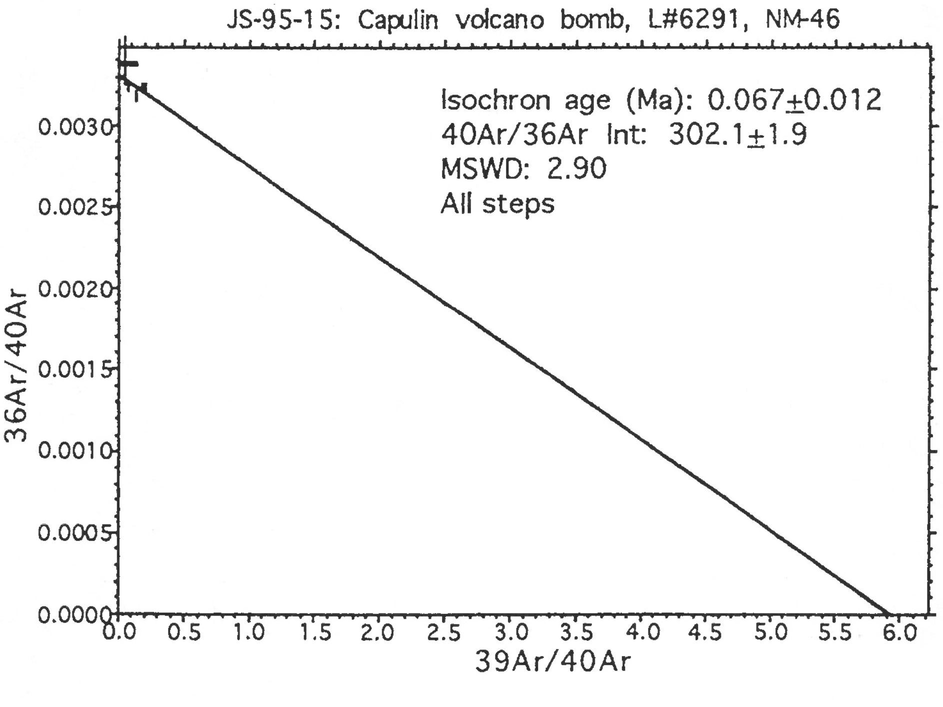

JS-95-14: Johnson Mesa East (Trinchera), L#5166, NM-34
%Rad
80
40
0
K/Ca
1
0.1
0.01
7.61 ± 0.02 Ma
Apparent Age (Ma)
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
D
775
E
825
F
900
G
1000
H
1100
I
1200
Integrated Age = 7.61 ± 0.1 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

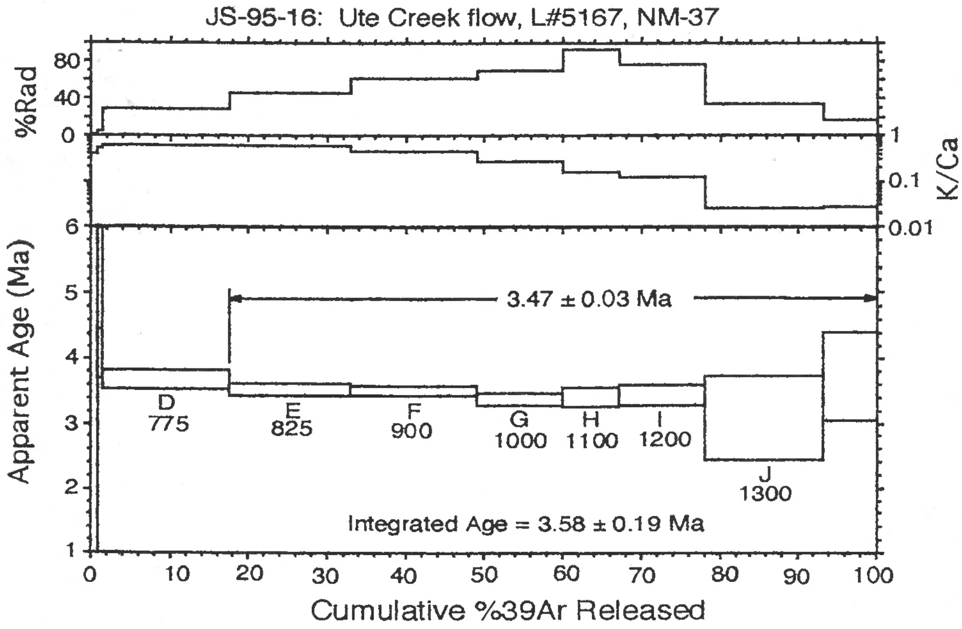

JS-95-14: Johnson Mesa East (Trinchera), L#5166, NM-34
Isochron age (Ma): 7.62±0.02
40Ar/36Ar Int: 297.2±2.8
MSWD: 2.14
All steps
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
39Ar/40Ar

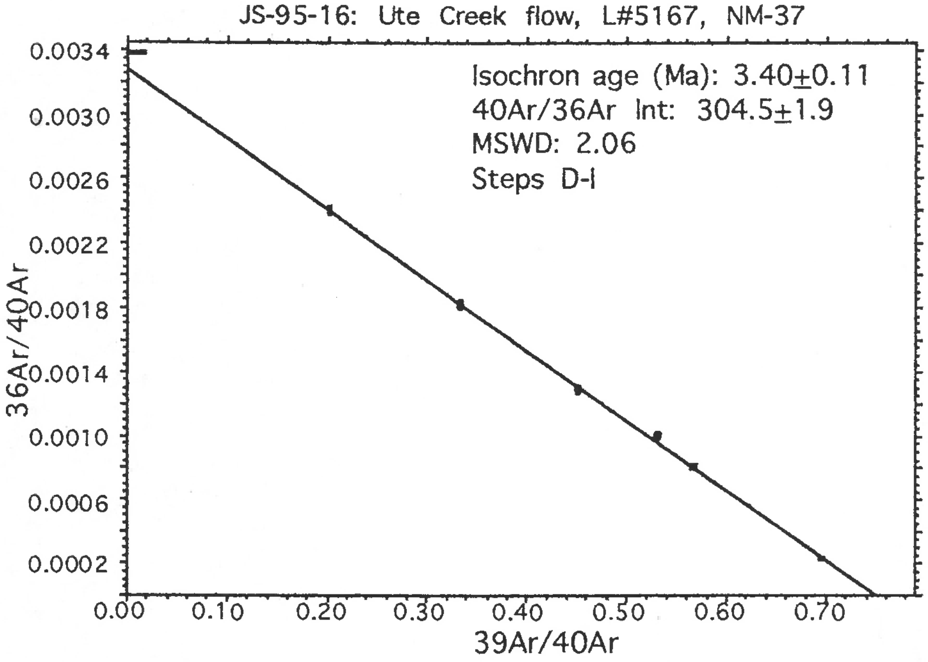

JS-95-15: Capulin bomb, L#5383, NM-37
%Rad
30
20
10
0
K/Ca
1
0.1
0.01
4
Apparent Age (Ma)
3
2
1
0
-1
0.034 ± 0.019 Ma
C
700
D
800
E
900
F
1000
G
1100
H
1200
Integrated Age = 0.13 ± 0.06 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

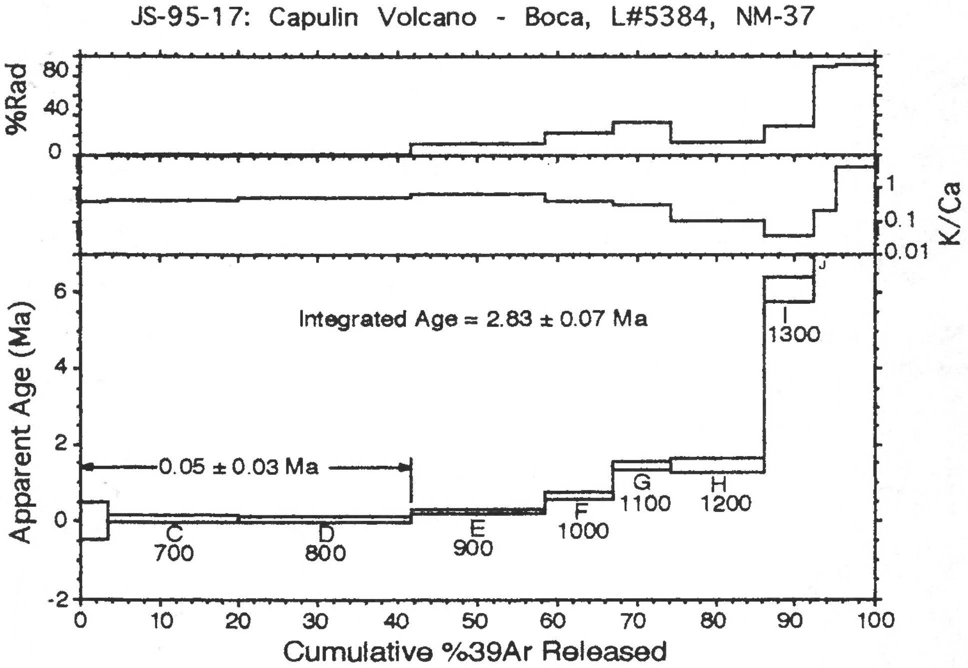

JS-95-15: Capulin bomb, L#5383, NM-37
Isochron age (Ma): 0.027±0.01
40Ar/36Ar Int: 297.2±2.8
MSWD: 2.14
Steps C-H
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0
2
4
6
8
10
12
14
39Ar/40Ar

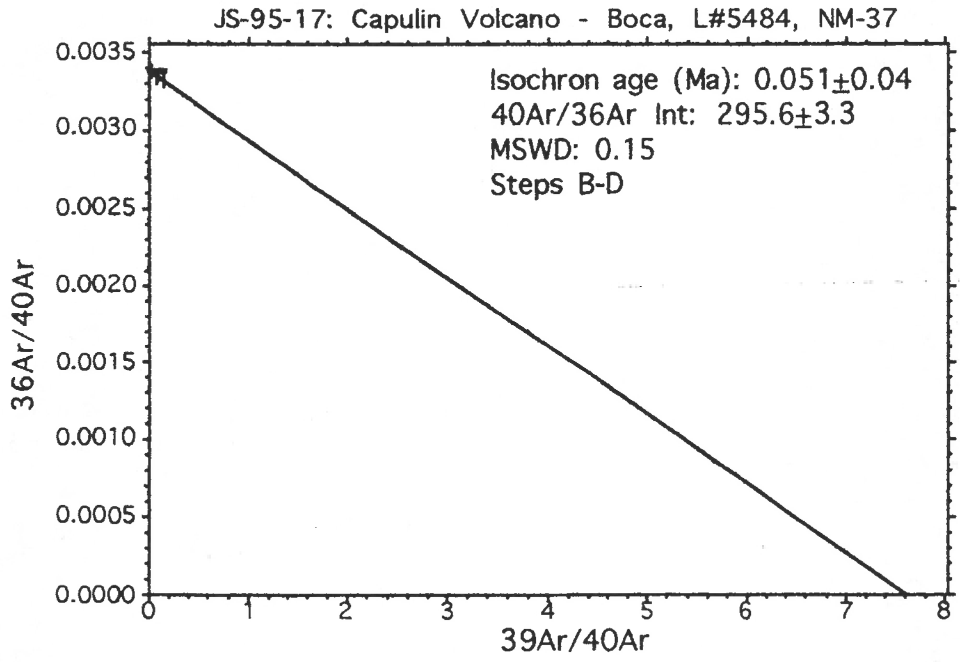

JS-95-15: Capulin volcano bomb, L#6291, NM-46
%Rad
60
20
K/Ca
1
0.1
0.01
Apparent Age (Ma)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Integrated Age = 0.27 ± 0.03 Ma
D
825
E
875
F
975
G
1100
H
1250
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

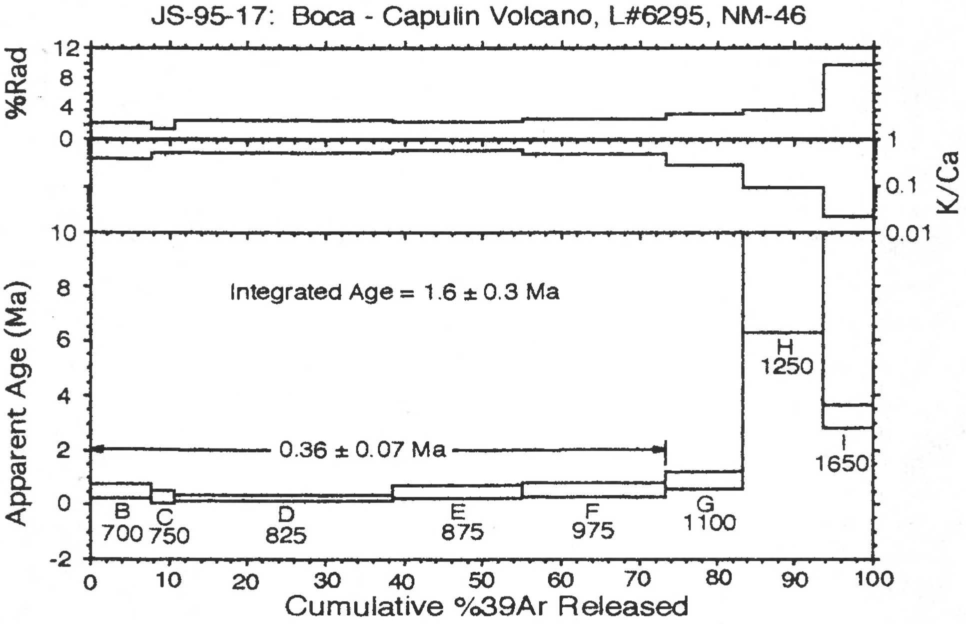

JS-95-15: Capulin volcano bomb, L#6291, NM-46
Isochron age (Ma): 0.067±0.012
40Ar/36Ar Int: 302.1±1.9
MSWD: 2.90
All steps
36Ar/40Ar
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
39Ar/40Ar


JS-95-16: Ute Creek flow, L#5167, NM-37
%Rad
80
40
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
6
5
4
3
2
1
3.47 ± 0.03 Ma
D
775
E
825
F
900
G
1000
H
1100
I
1200
J
1300
Integrated Age = 3.58 ± 0.19 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

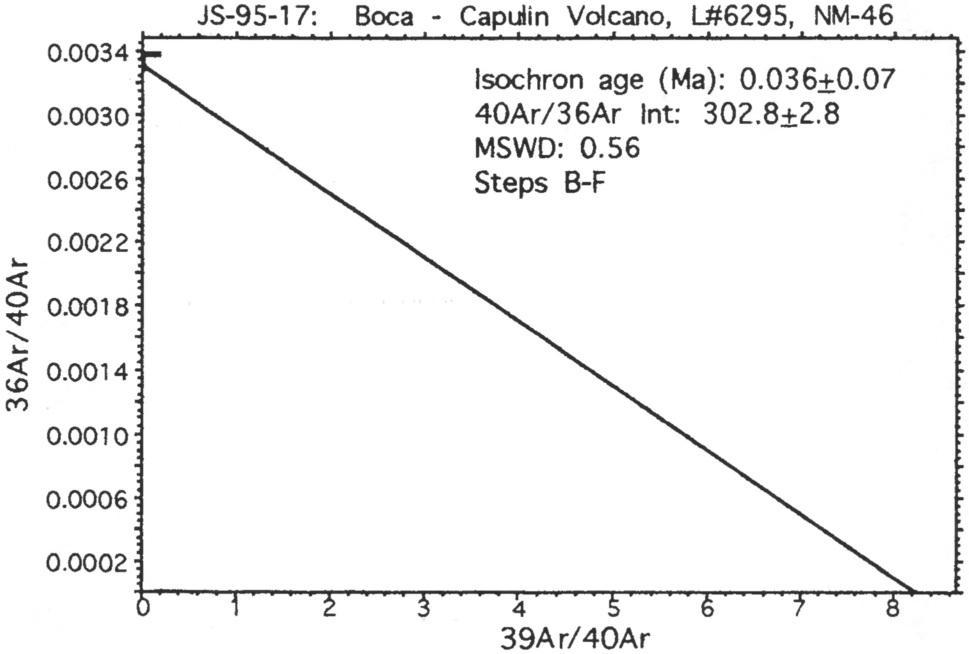

JS-95-16: Ute Creek flow, L#5167, NM-37
Isochron age (Ma): 3.40±0.11
40Ar/36Ar Int: 304.5±1.9
MSWD: 2.06
Steps D-I
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
39Ar/40Ar


JS-95-17: Capulin Volcano - Boca, L#5384, NM-37
%Rad
80
40
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
6
4
2
0
-2
Integrated Age = 2.83 ± 0.07 Ma
0.05 ± 0.03 Ma
C
700
D
800
E
900
F
1000
G
1100
H
1200
I
1300
J
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

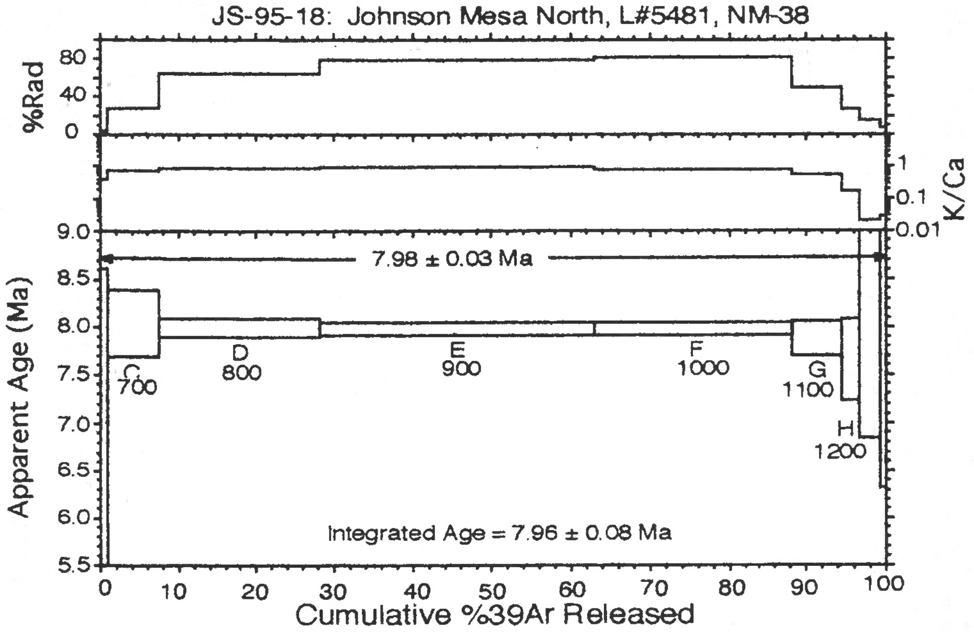

JS-95-17: Capulin Volcano - Boca, L#5484, NM-37
Isochron age (Ma): 0.051±0.04
40Ar/36Ar Int: 295.6±3.3
MSWD: 0.15
Steps B-D
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0
1
2
3
4
5
6
7
8
39Ar/40Ar

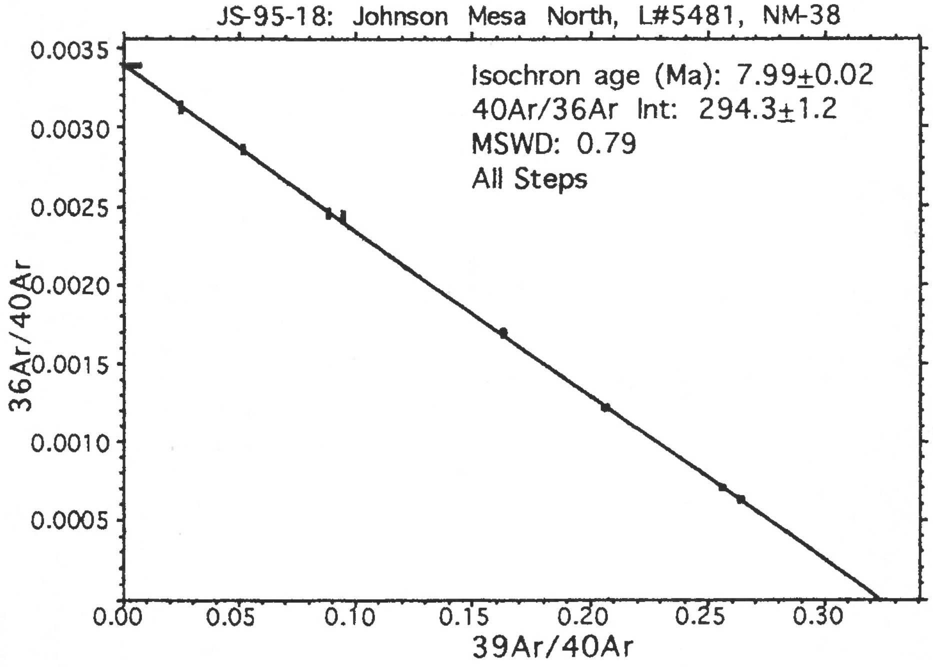


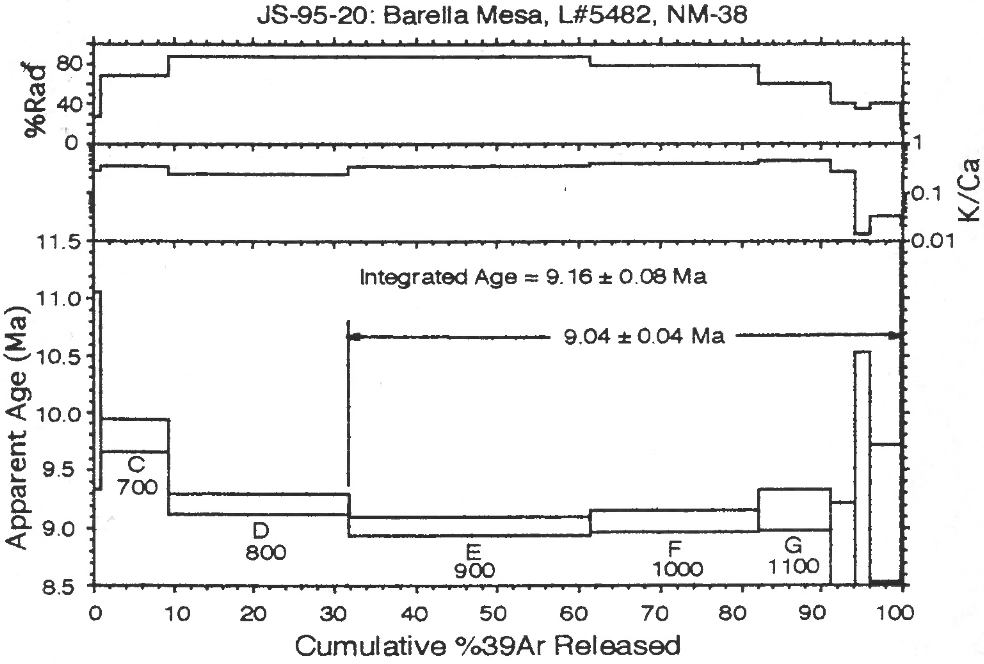
JS-95-17: Boca - Capulin Volcano, L#6295, NM-46

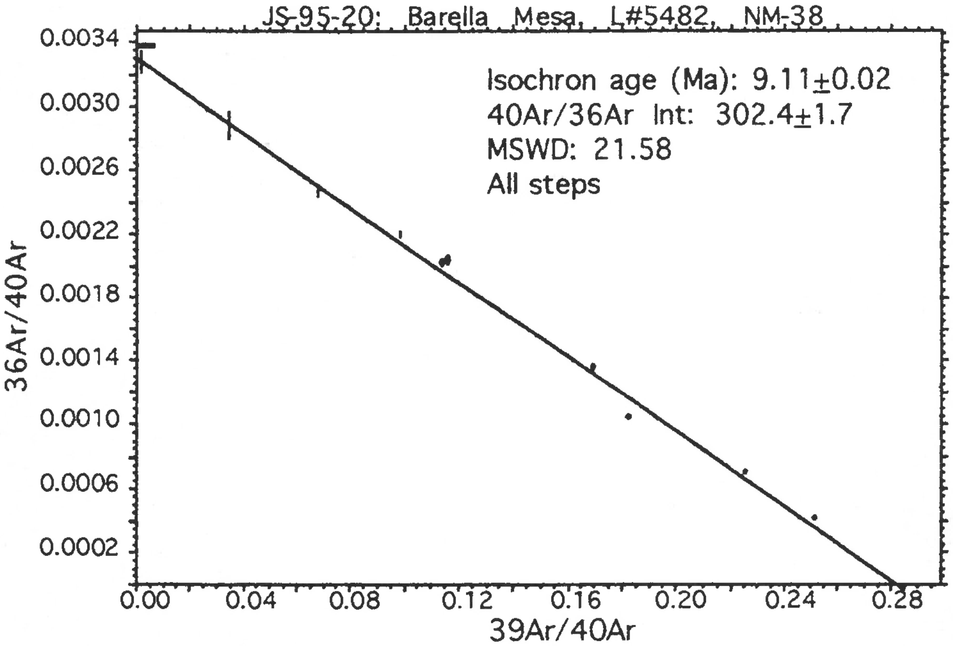


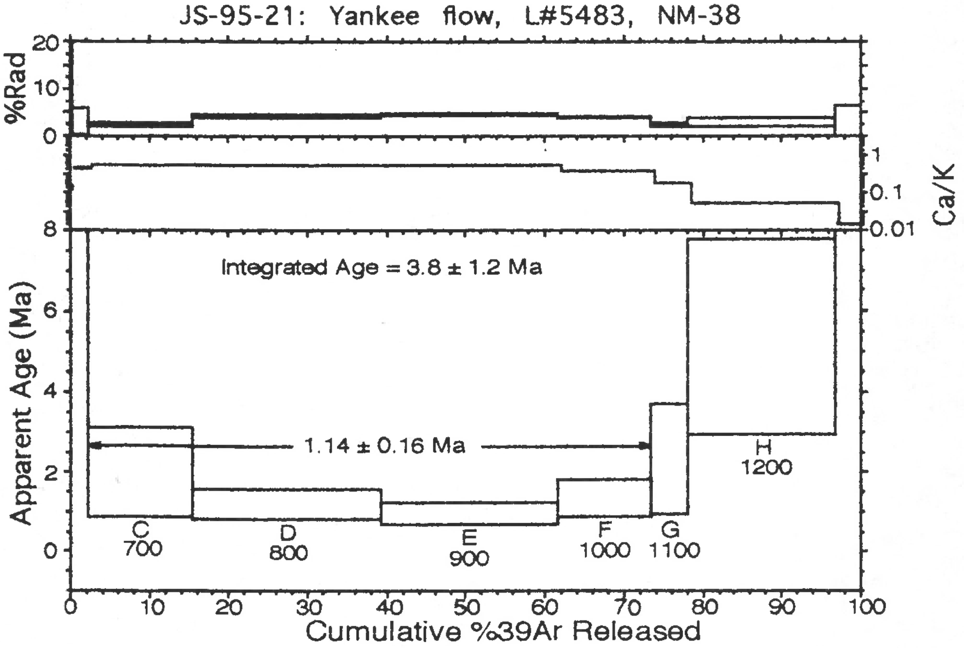
JS-95-17: Boca - Capulin Volcano, L#6295, NM-46

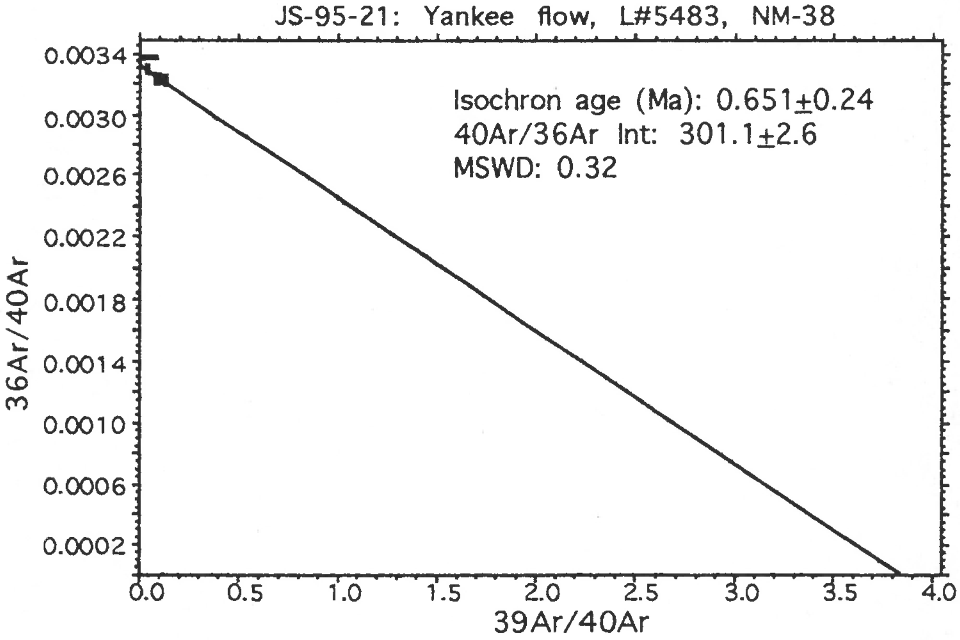

JS-95-18: Johnson Mesa North, L#5481, NM-38
%Rad
80
40
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
7.98 ± 0.03 Ma
C
700
D
800
E
900
F
1000
G
1100
H
1200
Integrated Age = 7.96 ± 0.08 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

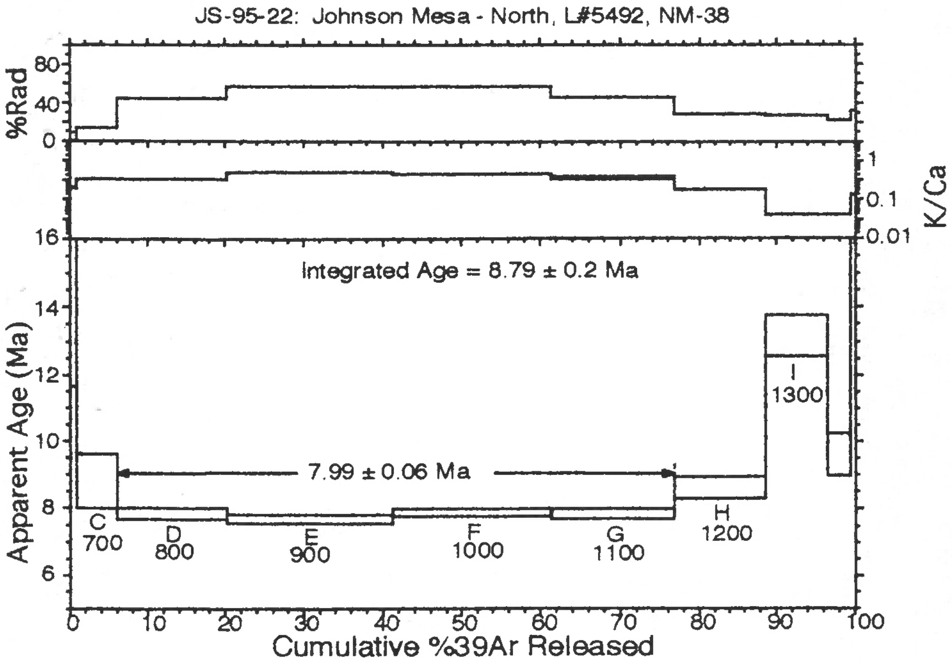

JS-95-18: Johnson Mesa North, L#5481, NM-38
Isochron age (Ma): 7.99±0.02
40Ar/36Ar Int: 294.3±1.2
MSWD: 0.79
All Steps
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.00
0.05
0.10
0.15
0.20
0.25
0.30
39Ar/40Ar

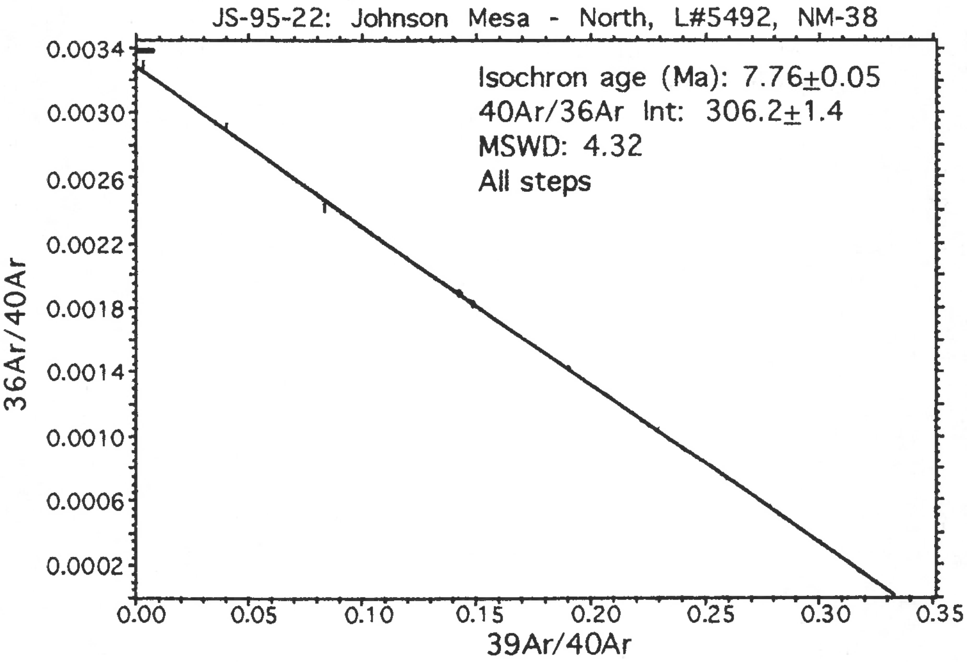

JS-95-20: Barella Mesa, L#5482, NM-38
%Rad
80
40
0
1
0.1
0.01
K/Ca
11.5
11.0
10.5
10.0
9.5
9.0
8.5
Apparent Age (Ma)
Integrated Age = 9.16 ± 0.08 Ma
9.04 ± 0.04 Ma
C
700
D
800
E
900
F
1000
G
1100
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

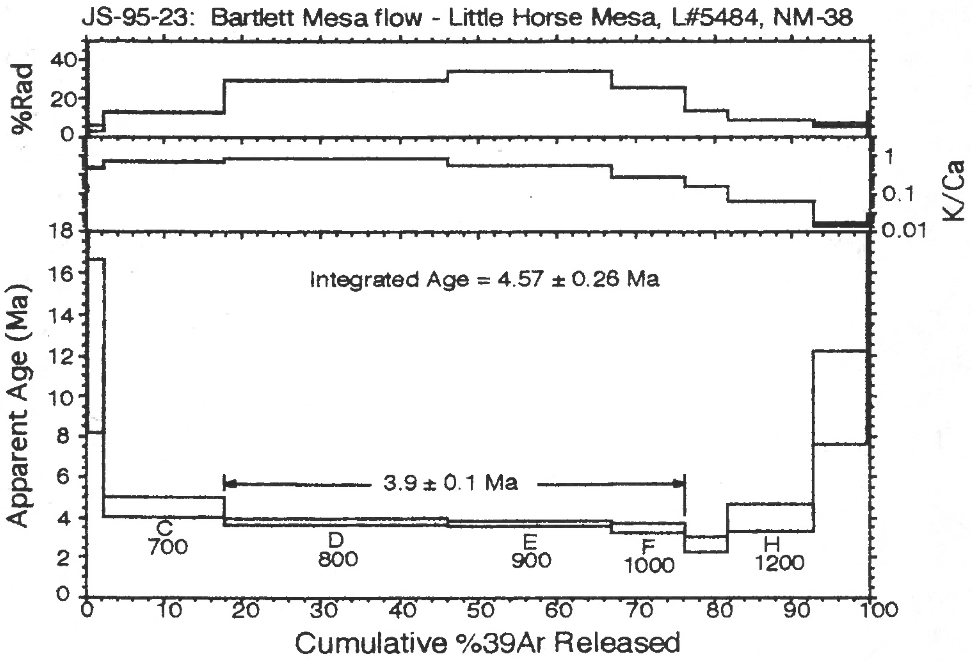

JS-95-20: Barella Mesa, L#5482, NM-38
Isochron age (Ma): 9.11±0.02
40Ar/36Ar Int: 302.4±1.7
MSWD: 21.58
All steps
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
36Ar/40Ar
0.00
0.04
0.08
0.12
0.16
0.20
0.24
0.28
39Ar/40Ar

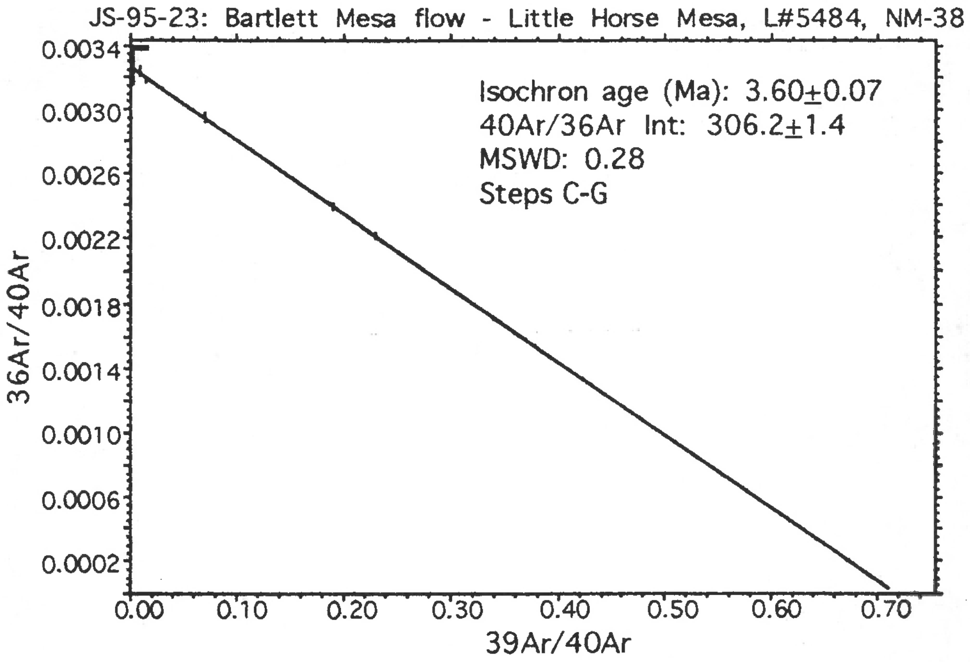

JS-95-21: Yankee flow, L#5483, NM-38
%Rad
20
10
0
Ca/K
1
0.1
0.01
8
6
4
2
0
Apparent Age (Ma)
Integrated Age = 3.8 ± 1.2 Ma
1.14 ± 0.16 Ma
C
700
D
800
E
900
F
1000
G
1100
H
1200
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

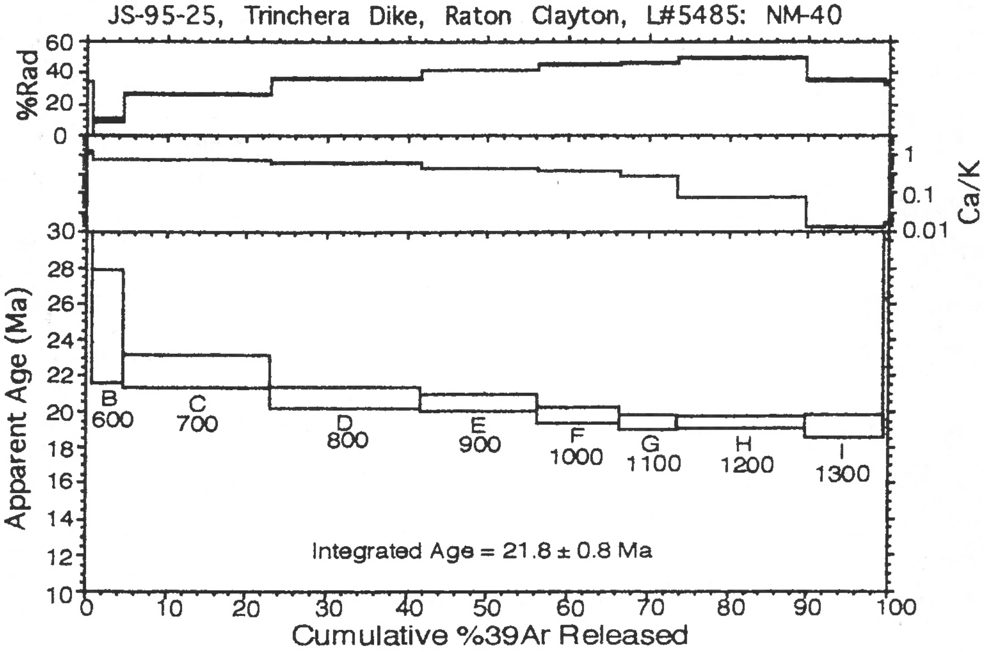

JS-95-21: Yankee flow, L#5483, NM-38
Isochron age (Ma): 0.651±0.24
40Ar/36Ar Int: 301.1±2.6
MSWD: 0.32
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
39Ar/40Ar

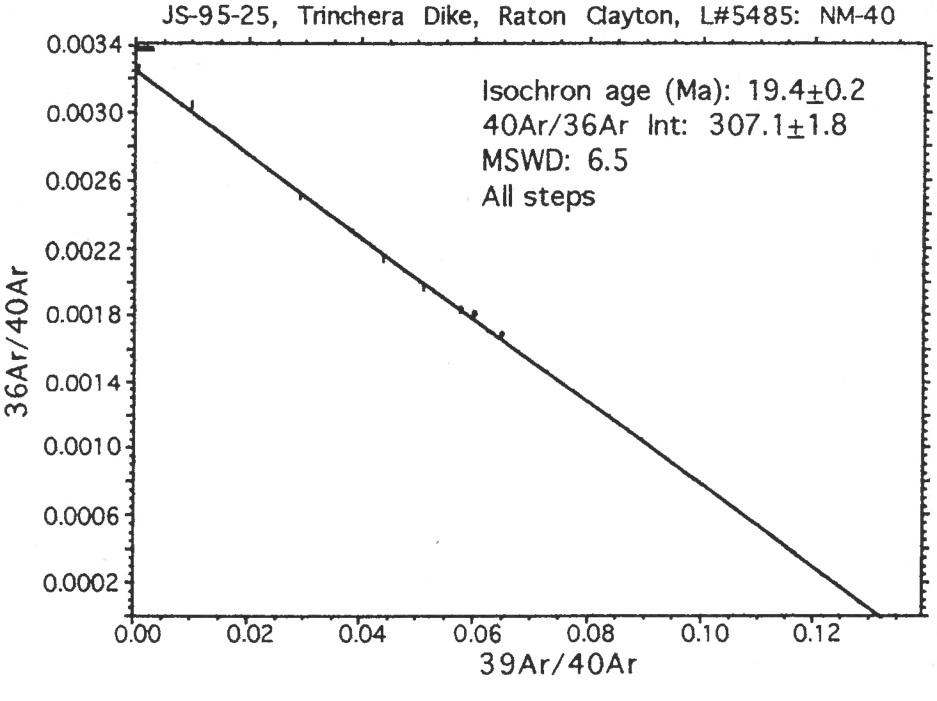

JS-95-22: Johnson Mesa - North, L#5492, NM-38
%Rad
80
40
0
K/Ca
1
0.1
0.01
16
14
12
10
8
6
Apparent Age (Ma)
Integrated Age = 8.79 ± 0.2 Ma
7.99 ± 0.06 Ma
C
700
D
800
E
900
F
1000
G
1100
H
1200
I
1300
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

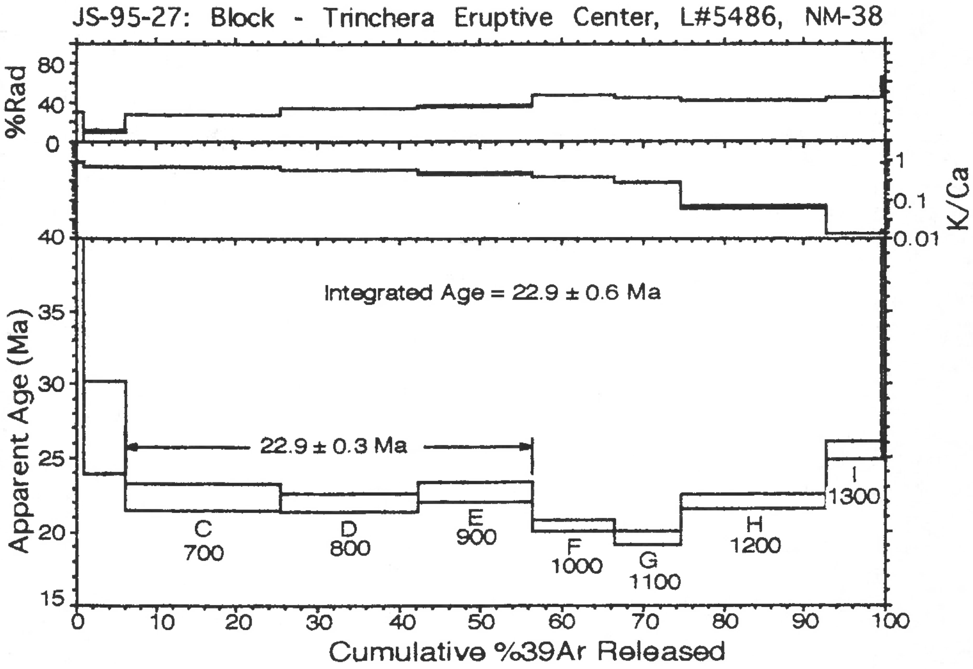

JS-95-22: Johnson Mesa - North, L#5492, NM-38
Isochron age (Ma): 7.76±0.05
40Ar/36Ar Int: 306.2±1.4
MSWD: 4.32
All steps
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
36Ar/40Ar
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
39Ar/40Ar

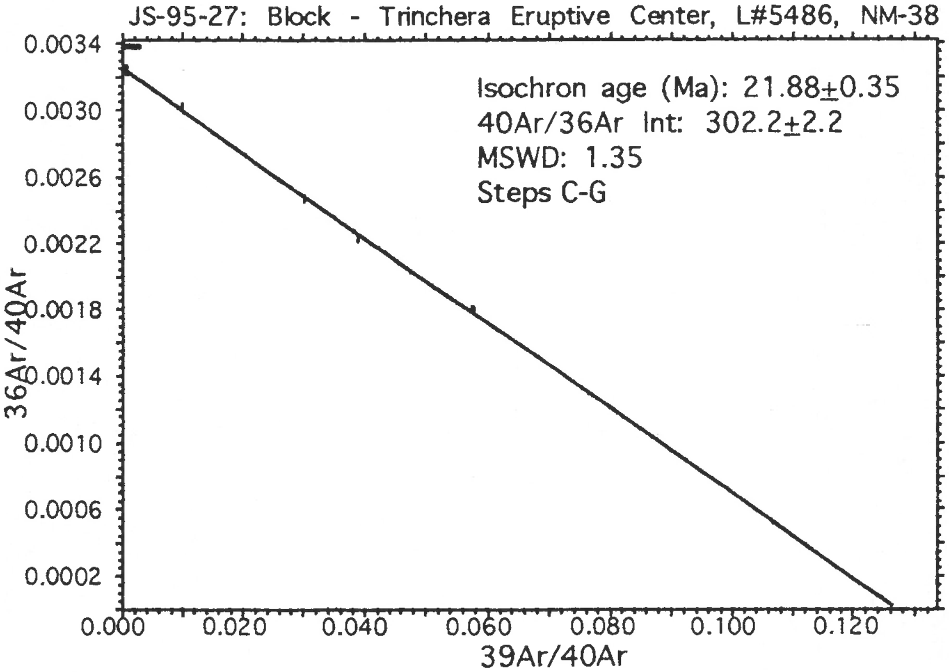

JS-95-23: Bartlett Mesa flow - Little Horse Mesa, L#5484, NM-38
%Rad
0
20
40
K/Ca
1
0.1
0.01
Apparent Age (Ma)
0
2
4
6
8
10
12
14
16
18
Integrated Age = 4.57 ± 0.26 Ma
3.9 ± 0.1 Ma
C
700
D
800
E
900
F
1000
H
1200
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

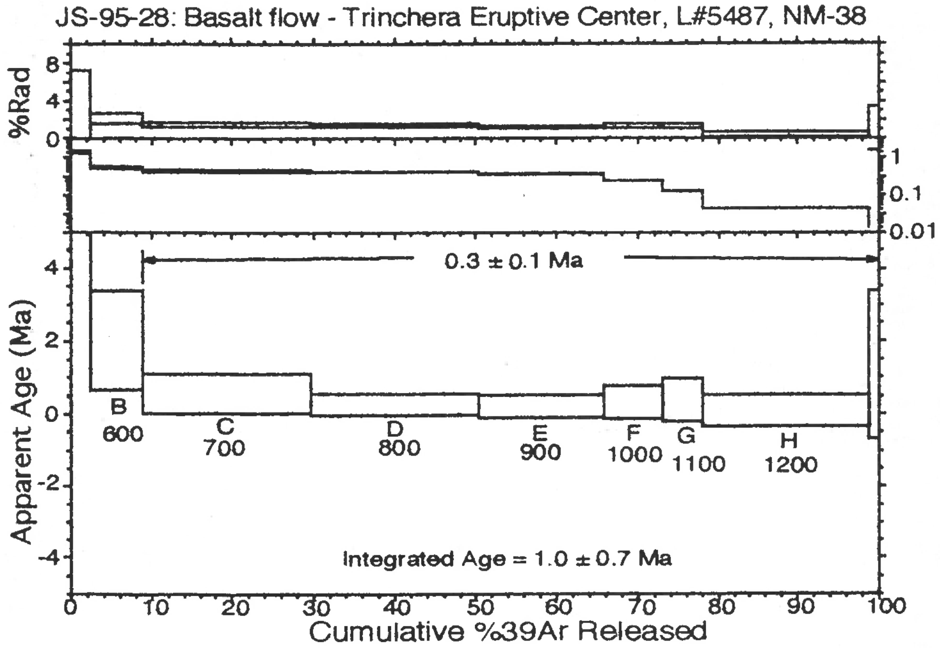

JS-95-23: Bartlett Mesa flow - Little Horse Mesa, L#5484, NM-38
Isochron age (Ma): 3.60±0.07
40Ar/36Ar Int: 306.2±1.4
MSWD: 0.28
Steps C-G
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
39Ar/40Ar

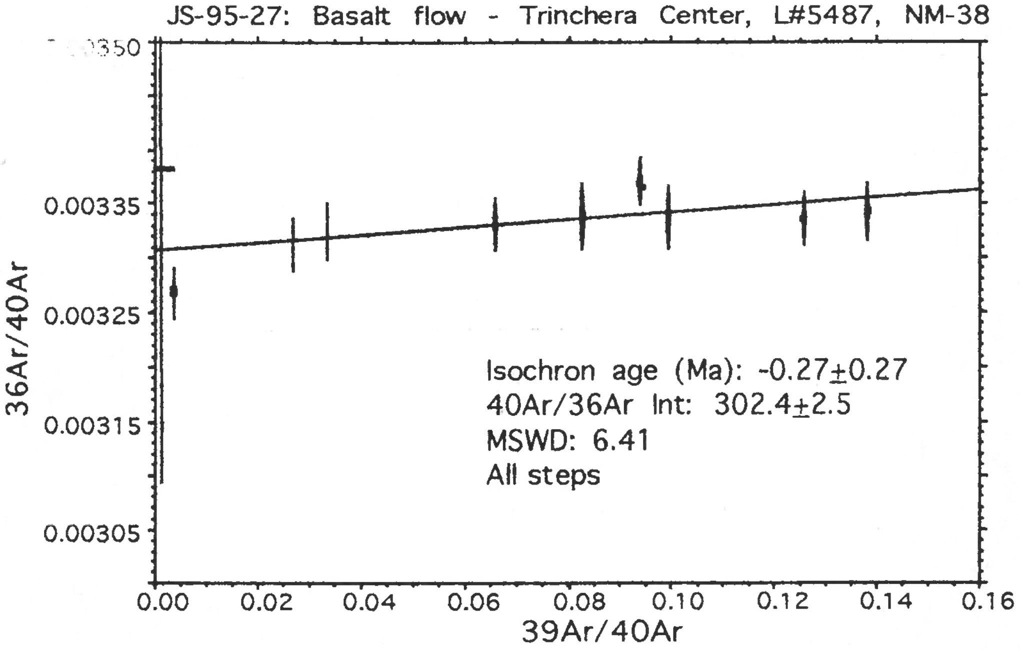

JS-95-25, Trinchera Dike, Raton Clayton, L#5485: NM-40
%Rad
0
20
40
60
Ca/K
1
0.1
0.01
Apparent Age (Ma)
10
12
14
16
18
20
22
24
26
28
30
B 600
C 700
D 800
E 900
F 1000
G 1100
H 1200
I 1300
Integrated Age = 21.8 ± 0.8 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

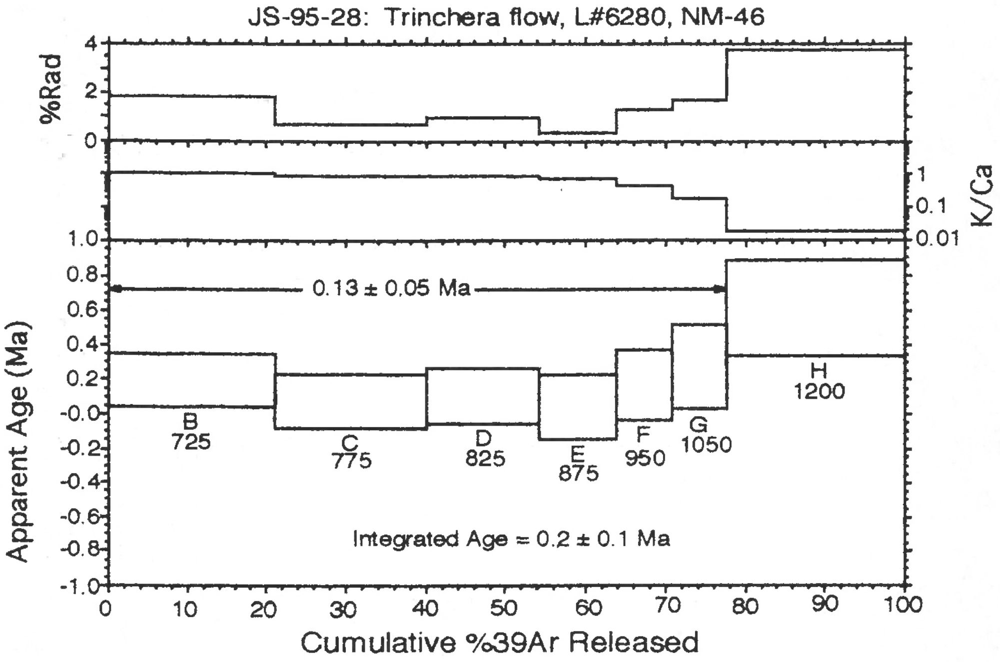

JS-95-25, Trinchera Dike, Raton Clayton, L#5485: NM-40
Isochron age (Ma): 19.4±0.2
40Ar/36Ar Int: 307.1±1.8
MSWD: 6.5
All steps
36Ar/40Ar
0.0002
0.0006
0.0010
0.0014
0.0018
0.0022
0.0026
0.0030
0.0034
0.00
0.02
0.04
0.06
0.08
0.10
0.12
39Ar/40Ar

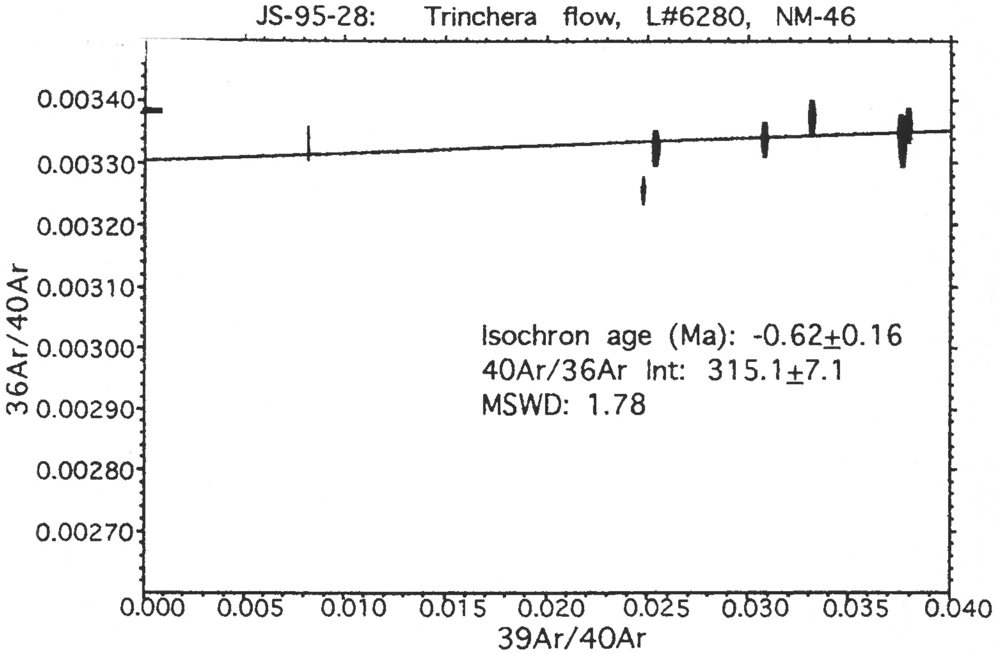

JS-95-27: Block - Trinchera Eruptive Center, L#5486, NM-38
%Rad
80
40
0
1
0.1
0.01
K/Ca
40
35
30
25
20
15
Apparent Age (Ma)
Integrated Age = 22.9 ± 0.6 Ma
22.9 ± 0.3 Ma
C
700
D
800
E
900
F
1000
G
1100
H
1200
I
1300
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

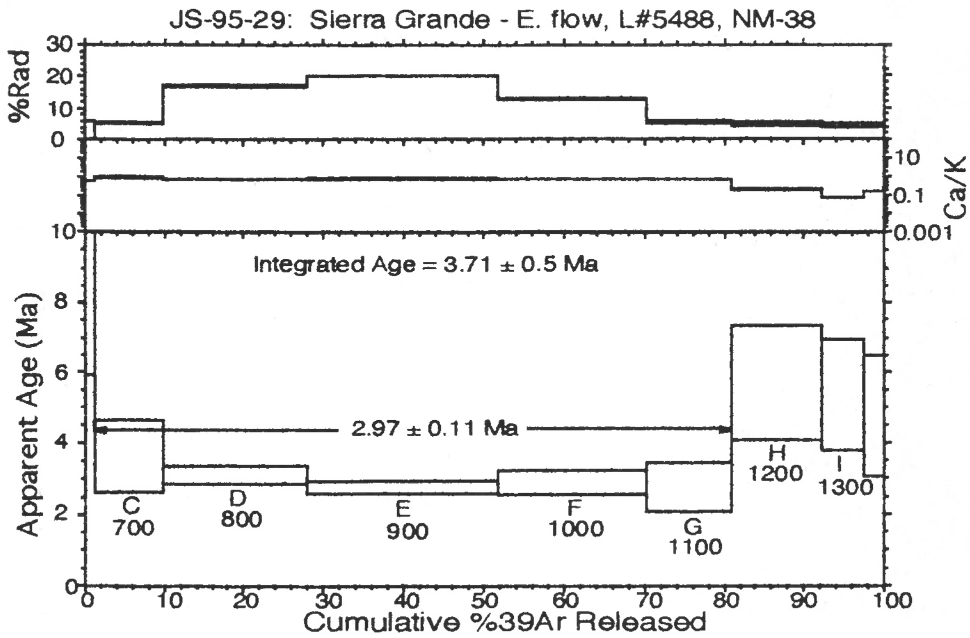

JS-95-27: Block - Trinchera Eruptive Center, L#5486, NM-38
Isochron age (Ma): 21.88±0.35
40Ar/36Ar Int: 302.2±2.2
MSWD: 1.35
Steps C-G
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
36Ar/40Ar
0.000
0.020
0.040
0.060
0.080
0.100
0.120
39Ar/40Ar

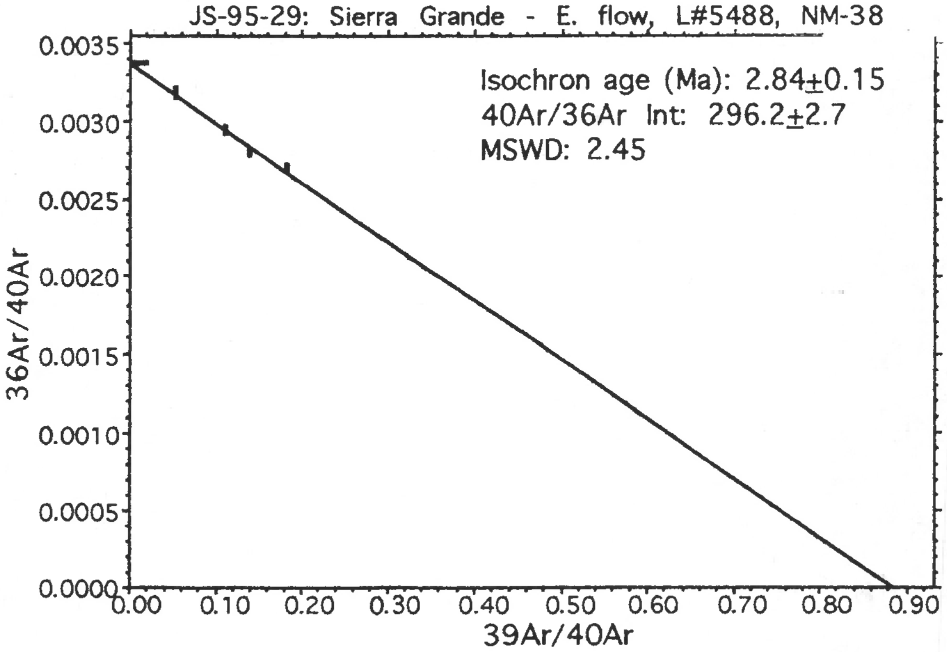

JS-95-28: Basalt flow - Trinchera Eruptive Center, L#5487, NM-38
%Rad
8
4
0
K/Ca
1
0.1
0.01
0.3 ± 0.1 Ma
Apparent Age (Ma)
4
2
0
-2
-4
B
600
C
700
D
800
E
900
F
1000
G
1100
H
1200
Integrated Age = 1.0 ± 0.7 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

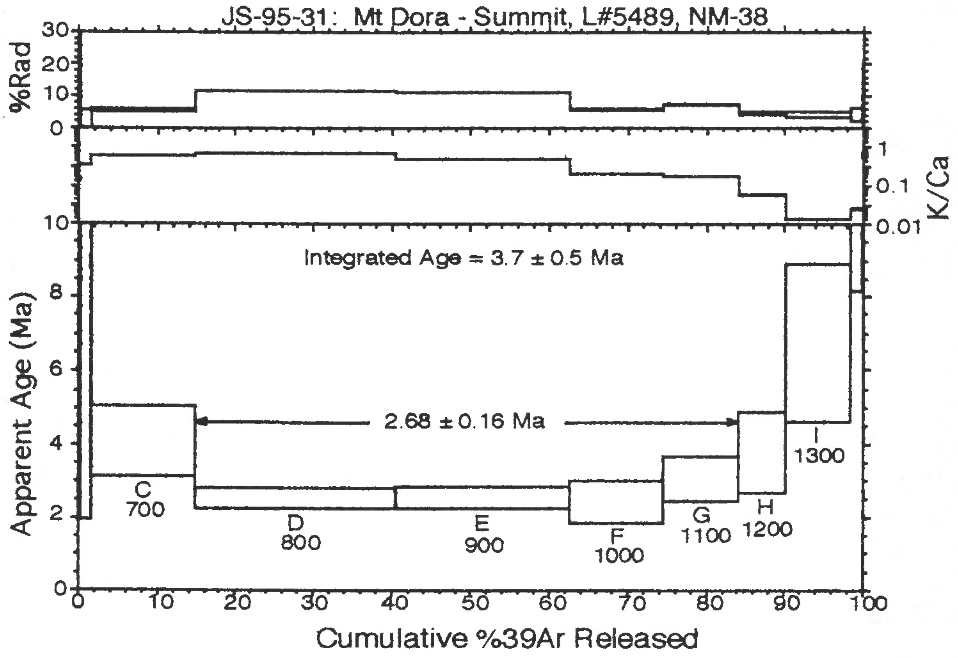

JS-95-27: Basalt flow - Trinchera Center, L#5487, NM-38
36Ar/40Ar
0.00335
0.00325
0.00315
0.00305
Isochron age (Ma): -0.27±0.27
40Ar/36Ar Int: 302.4±2.5
MSWD: 6.41
All steps
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
39Ar/40Ar

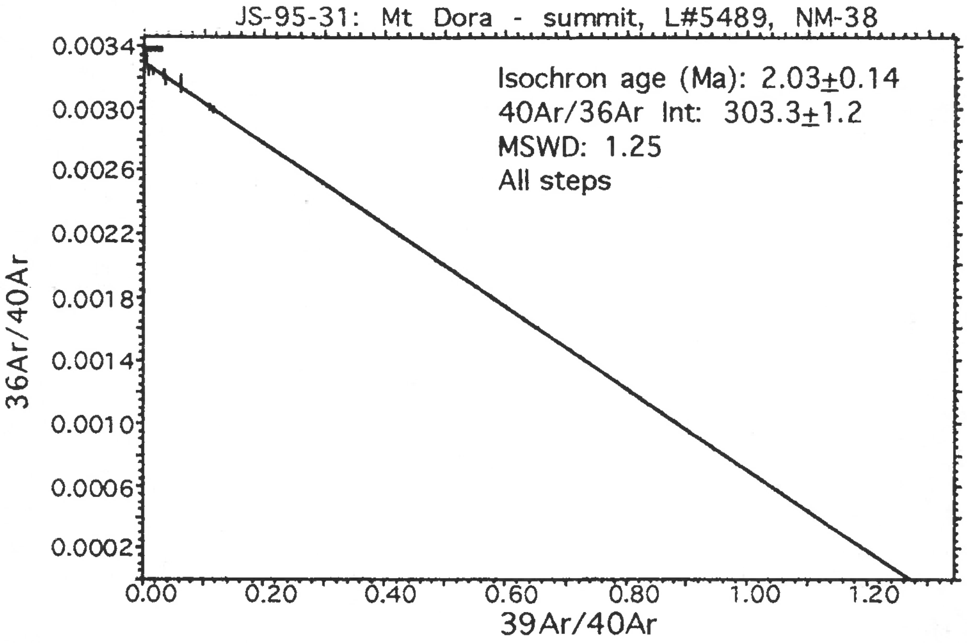

JS-95-28: Trinchera flow, L#6280, NM-46
%Rad
4
2
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
1.0
0.8
0.6
0.4
0.2
-0.0
-0.2
-0.4
-0.6
-0.8
-1.0
0.13 ± 0.05 Ma
B
725
C
775
D
825
E
875
F
950
G
1050
H
1200
Integrated Age = 0.2 ± 0.1 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

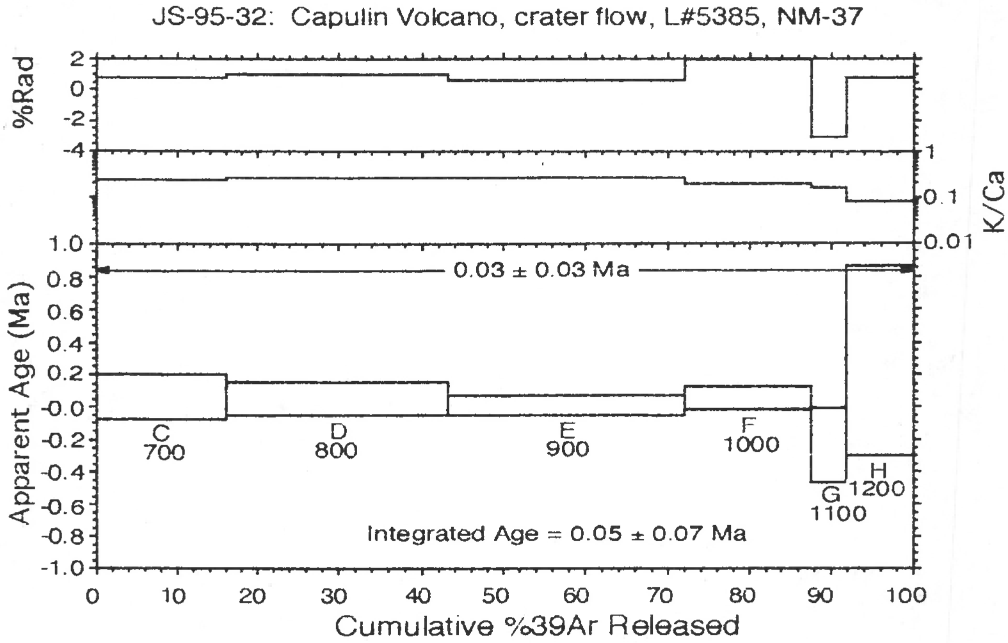

JS-95-28: Trinchera flow, L#6280, NM-46
36Ar/40Ar
0.00340
0.00330
0.00320
0.00310
0.00300
0.00290
0.00280
0.00270
Isochron age (Ma): -0.62±0.16
40Ar/36Ar Int: 315.1±7.1
MSWD: 1.78
0.000
0.005
0.010
0.015
0.020
0.025
0.030
0.035
0.040
39Ar/40Ar

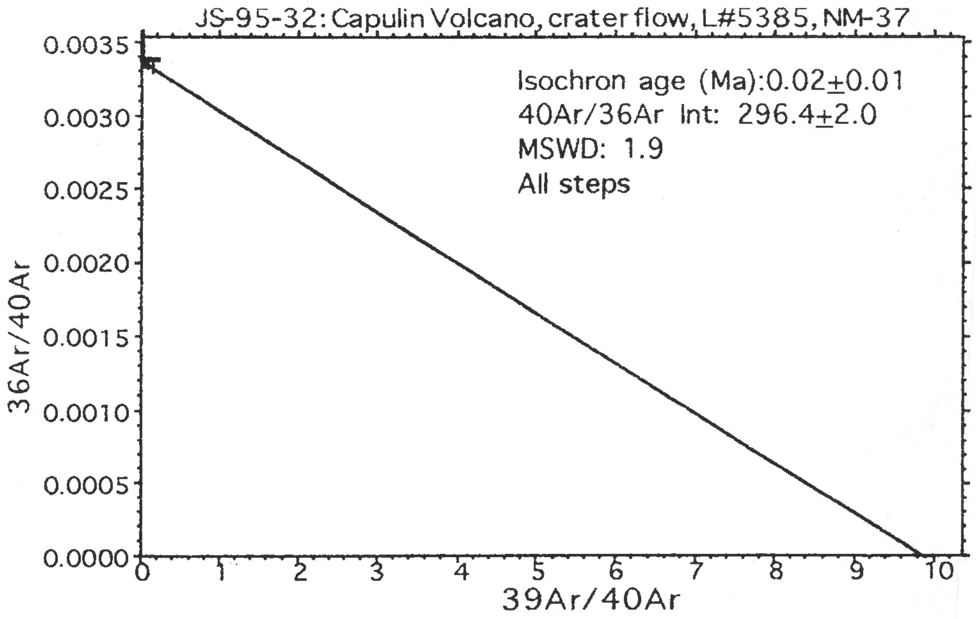

JS-95-29: Sierra Grande - E. flow, L#5488, NM-38
%Rad
30
20
10
0
Ca/K
10
0.1
0.001
Integrated Age = 3.71 ± 0.5 Ma
2.97 ± 0.11 Ma
Apparent Age (Ma)
10
8
6
4
2
0
C 700
D 800
E 900
F 1000
G 1100
H 1200
I 1300
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

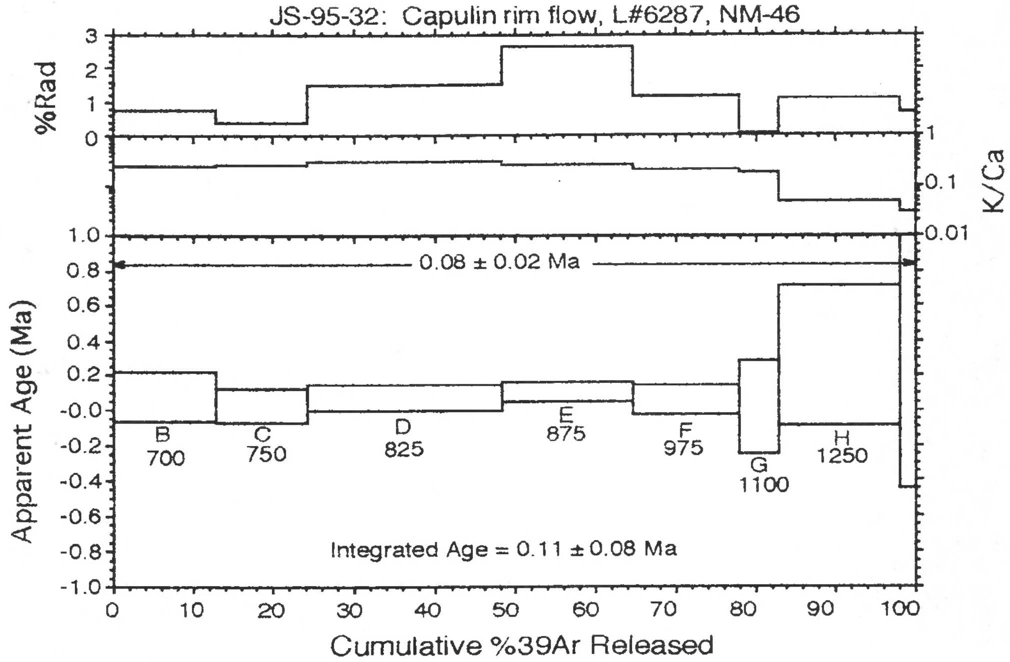

JS-95-29: Sierra Grande - E. flow, L#5488, NM-38
Isochron age (Ma): 2.84±0.15
40Ar/36Ar Int: 296.2±2.7
MSWD: 2.45
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
39Ar/40Ar

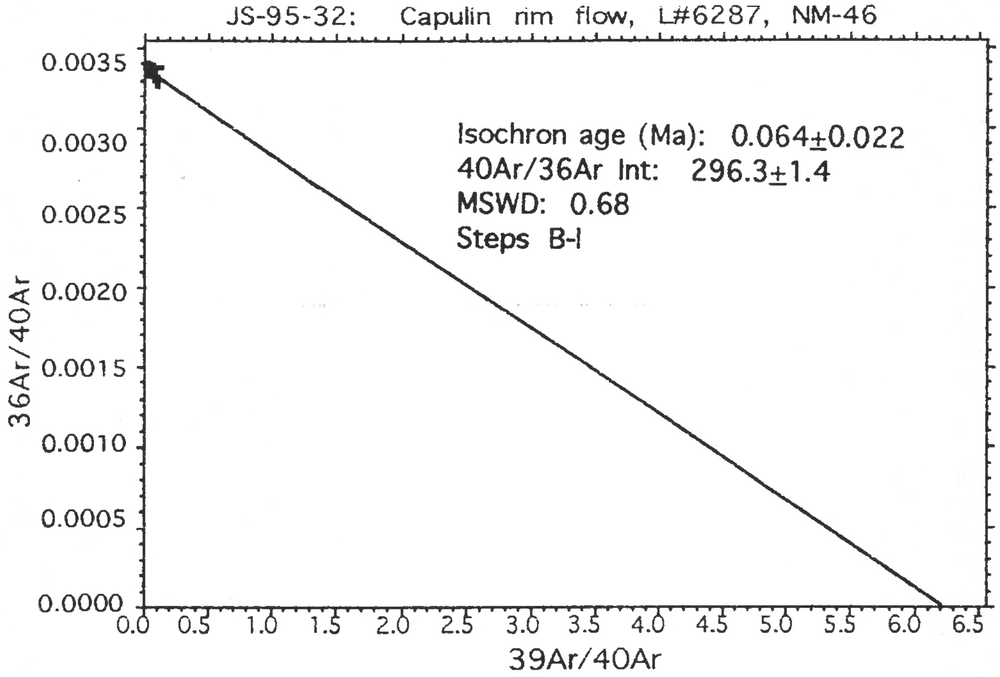

JS-95-31: Mt Dora - Summit, L#5489, NM-38
%Rad
30
20
10
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
10
8
6
4
2
0
Integrated Age = 3.7 ± 0.5 Ma
2.68 ± 0.16 Ma
C
700
D
800
E
900
F
1000
G
1100
H
1200
I
1300
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

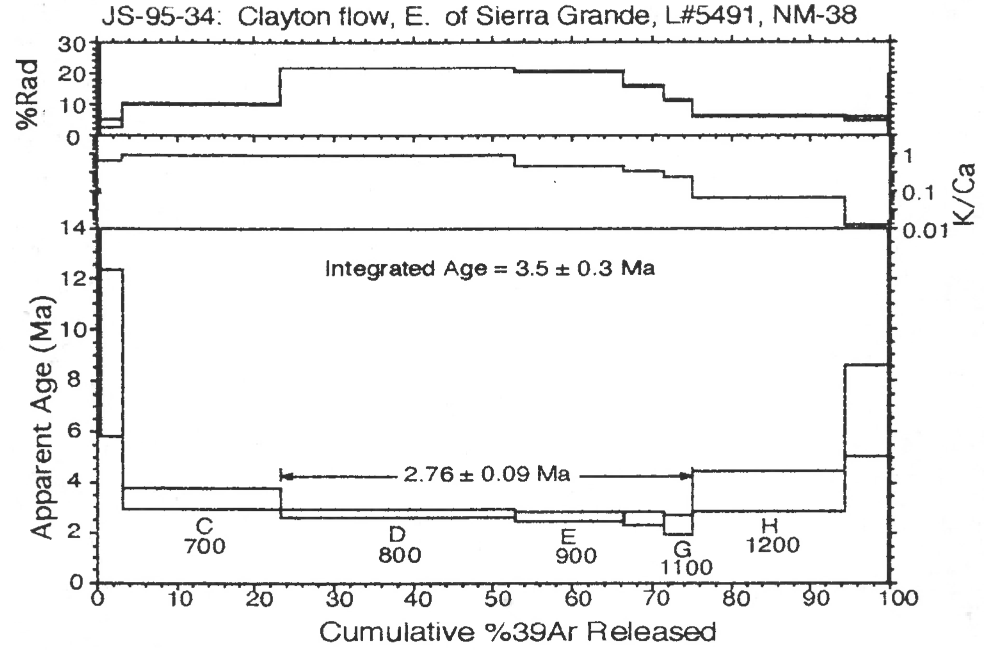

JS-95-31: Mt Dora - summit, L#5489, NM-38
Isochron age (Ma): 2.03±0.14
40Ar/36Ar Int: 303.3±1.2
MSWD: 1.25
All steps
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.20
0.40
0.60
0.80
1.00
1.20
39Ar/40Ar

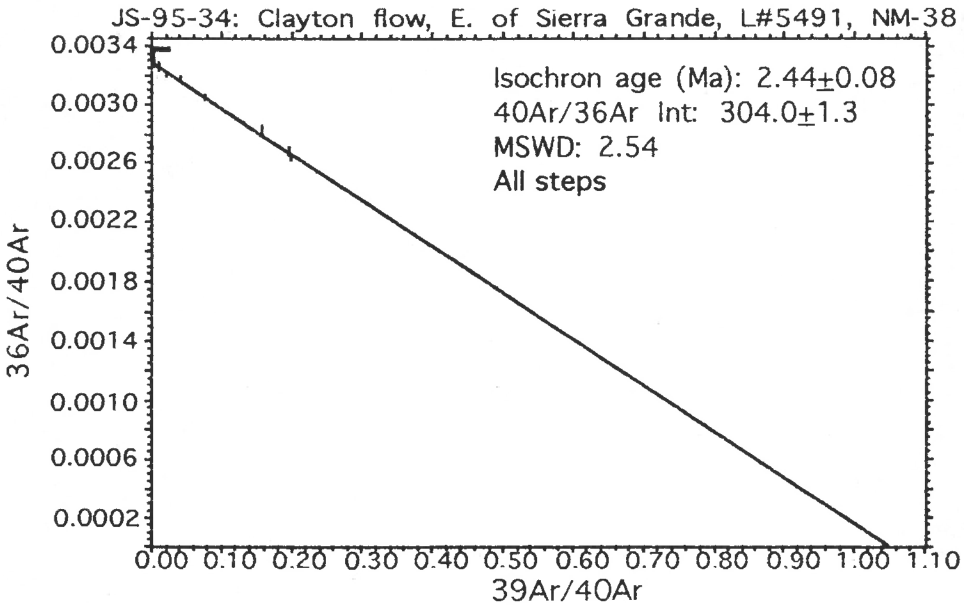

JS-95-32: Capulin Volcano, crater flow, L#5385, NM-37
%Rad
2
0
-2
-4
K/Ca
1
0.1
0.01
Apparent Age (Ma)
1.0
0.8
0.6
0.4
0.2
-0.0
-0.2
-0.4
-0.6
-0.8
-1.0
0.03 ± 0.03 Ma
C 700
D 800
E 900
F 1000
G 1100
H 1200
Integrated Age = 0.05 ± 0.07 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

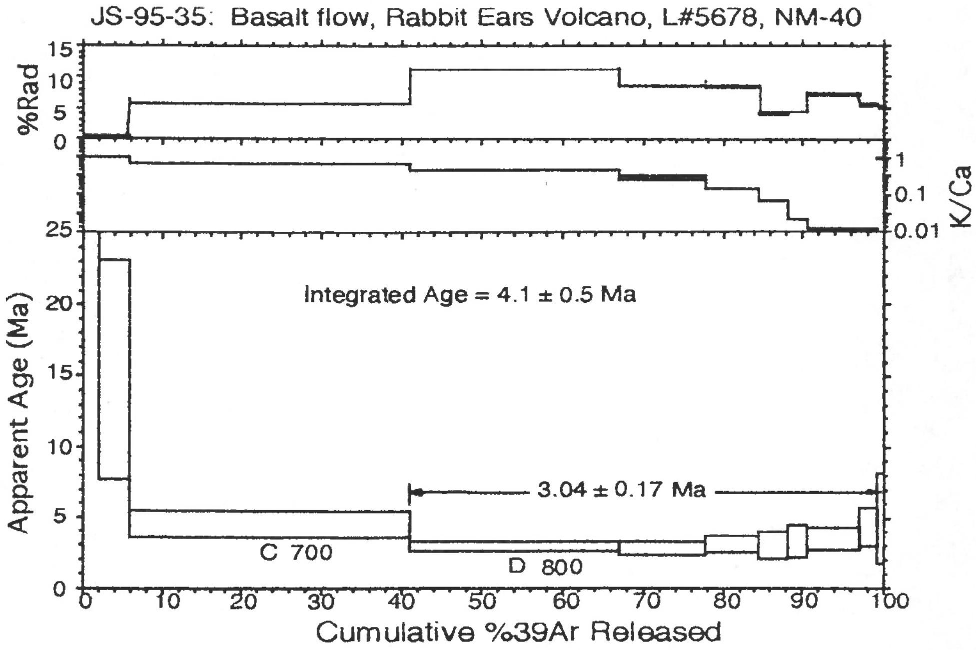

JS-95-32: Capulin Volcano, crater flow, L#5385, NM-37
Isochron age (Ma):0.02±0.01
40Ar/36Ar Int: 296.4±2.0
MSWD: 1.9
All steps
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0
1
2
3
4
5
6
7
8
9
10
39Ar/40Ar

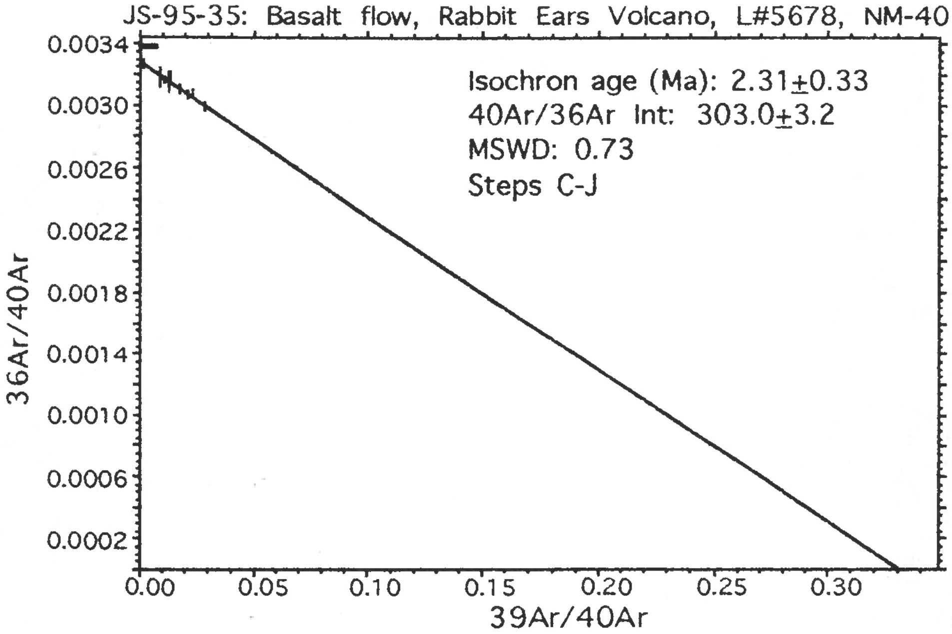

JS-95-32: Capulin rim flow, L#6287, NM-46
%Rad
3
2
1
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
1.0
0.8
0.6
0.4
0.2
-0.0
-0.2
-0.4
-0.6
-0.8
-1.0
0.08 ± 0.02 Ma
B
700
C
750
D
825
E
875
F
975
G
1100
H
1250
Integrated Age = 0.11 ± 0.08 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released


JS-95-32: Capulin rim flow, L#6287, NM-46
Isochron age (Ma): 0.064±0.022
40Ar/36Ar Int: 296.3±1.4
MSWD: 0.68
Steps B-I
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
39Ar/40Ar

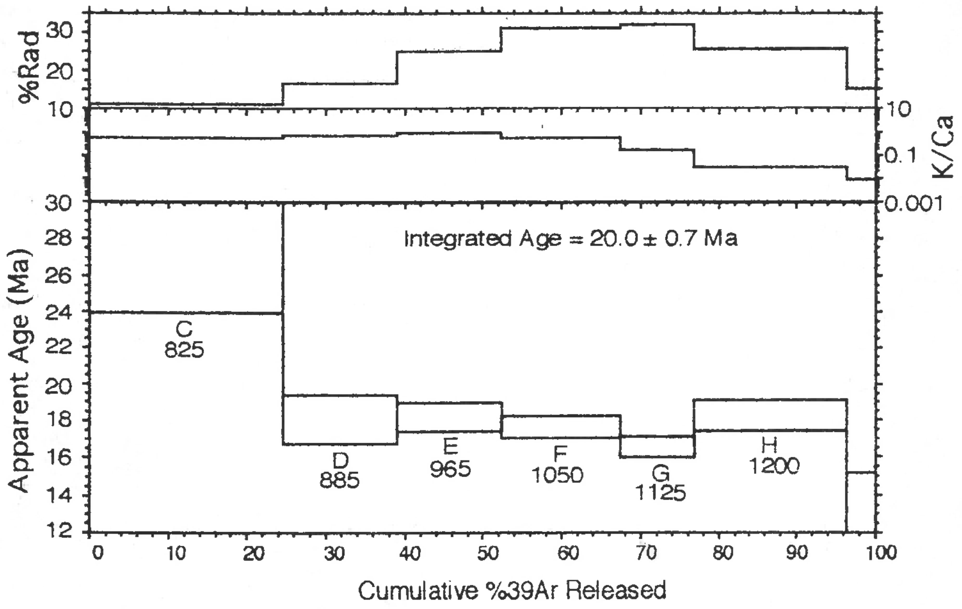

JS-95-34: Clayton flow, E. of Sierra Grande, L#5491, NM-38
%Rad
30
20
10
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
14
12
10
8
6
4
2
0
Integrated Age = 3.5 ± 0.3 Ma
2.76 ± 0.09 Ma
C
700
D
800
E
900
G
1100
H
1200
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released


JS-95-34: Clayton flow, E. of Sierra Grande, L#5491, NM-38
Isochron age (Ma): 2.44±0.08
40Ar/36Ar Int: 304.0±1.3
MSWD: 2.54
All steps
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
1.10
39Ar/40Ar

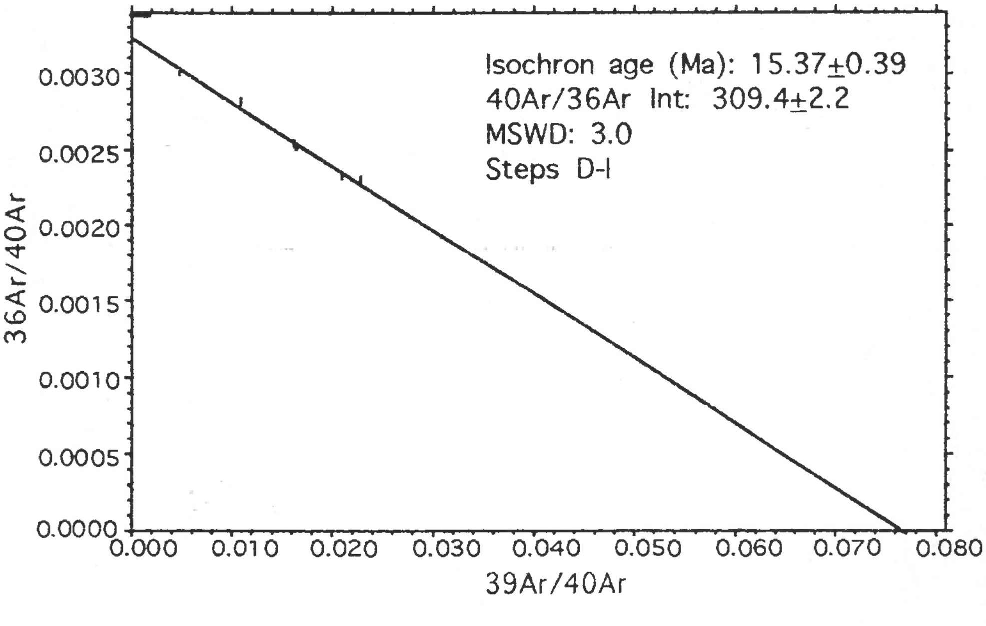

JS-95-35: Basalt flow, Rabbit Ears Volcano, L#5678, NM-40
%Rad
15
10
5
0
K/Ca
1
0.1
0.01
25
20
15
10
5
0
Apparent Age (Ma)
Integrated Age = 4.1 ± 0.5 Ma
3.04 ± 0.17 Ma
C 700
D 800
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

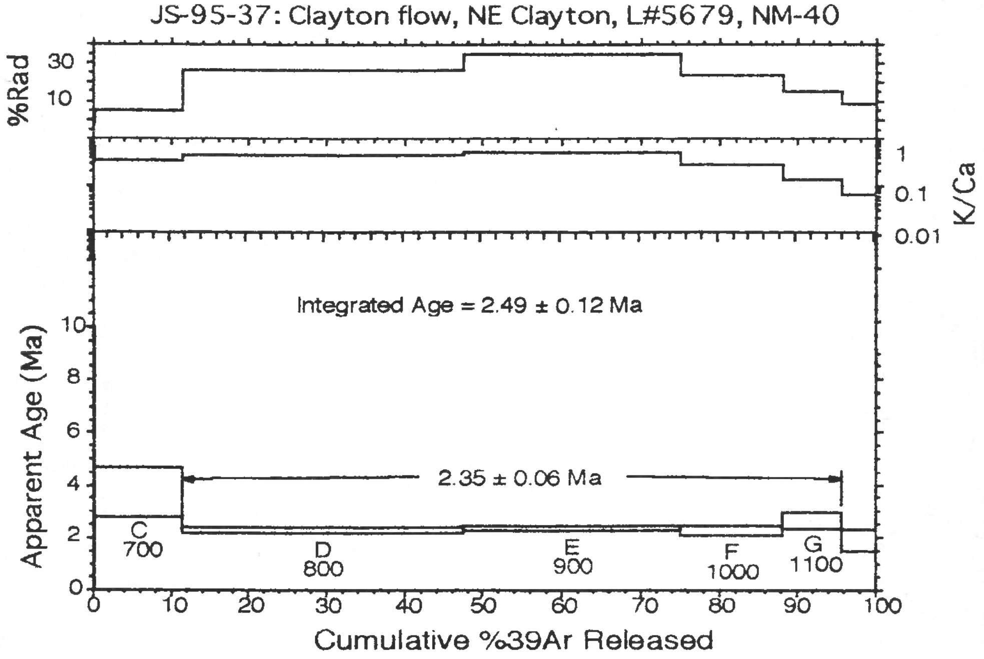

JS-95-35: Basalt flow, Rabbit Ears Volcano, L#5678, NM-40
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
36Ar/40Ar
Isochron age (Ma): 2.31±0.33
40Ar/36Ar Int: 303.0±3.2
MSWD: 0.73
Steps C-J
0.00
0.05
0.10
0.15
0.20
0.25
0.30
39Ar/40Ar

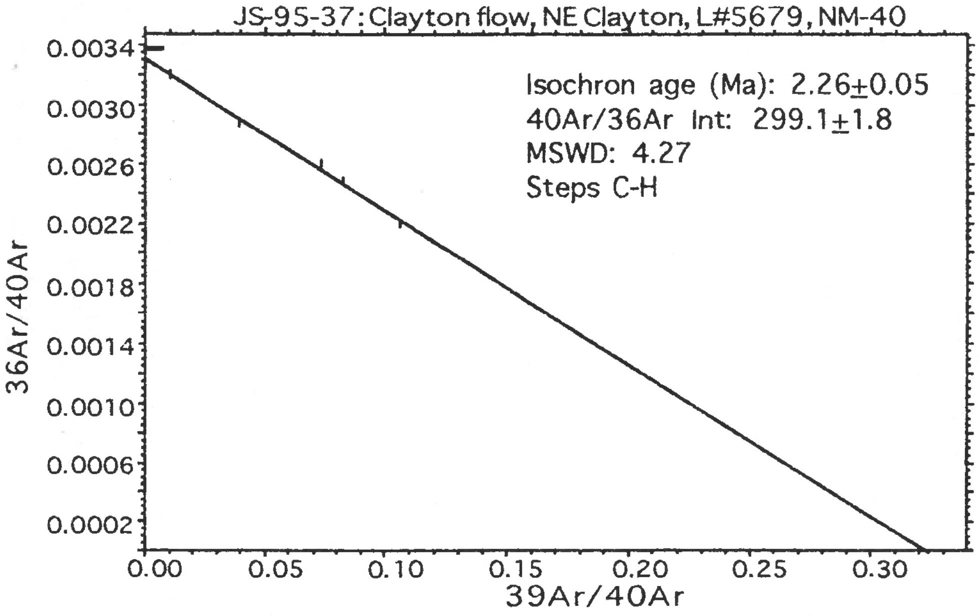
JS-95-36: Raton dike, L#5963, NM-43

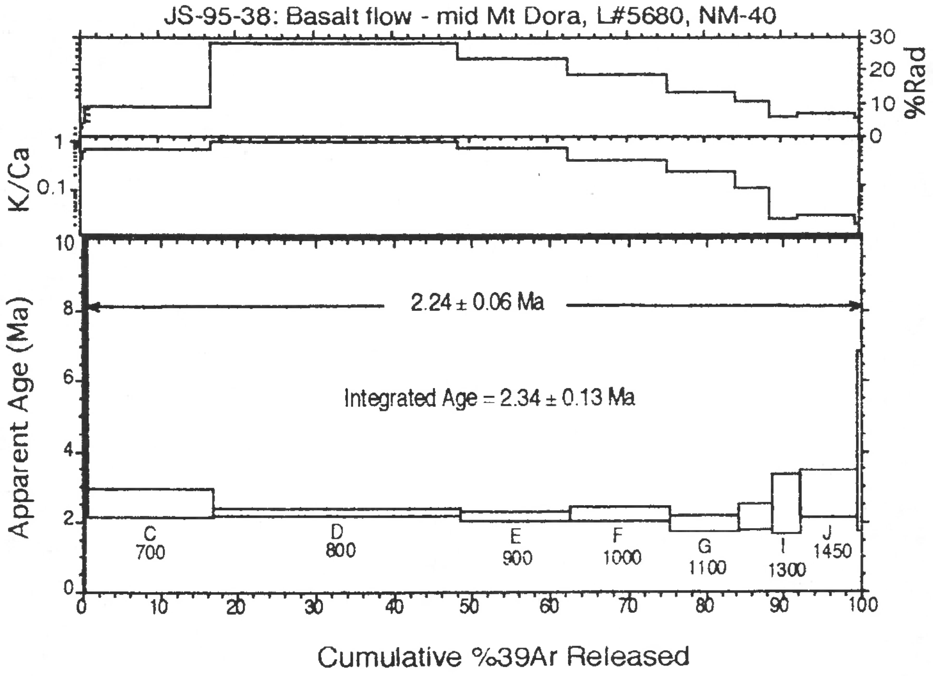


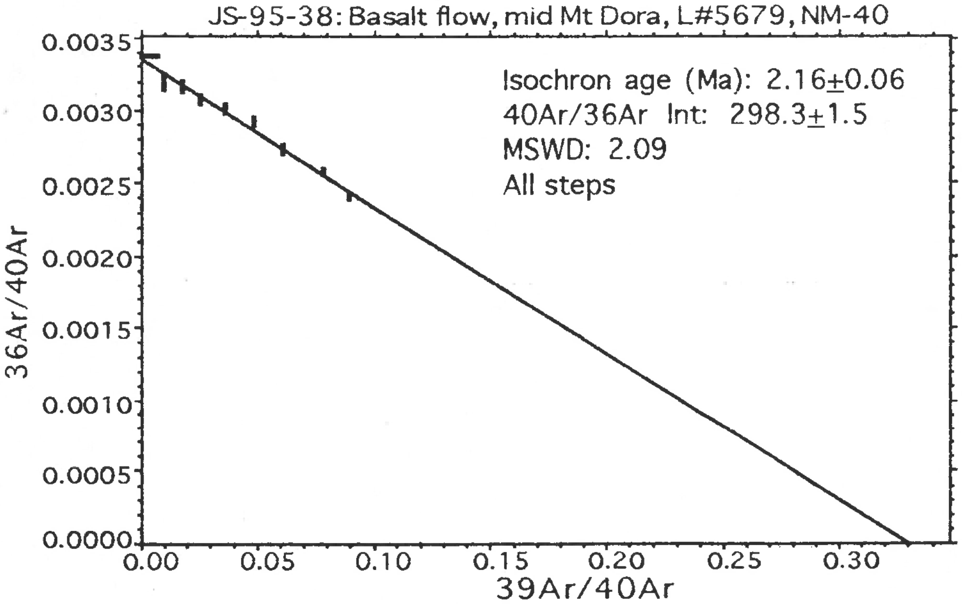
JS-95-36: Raton dike, L#5963, NM-43

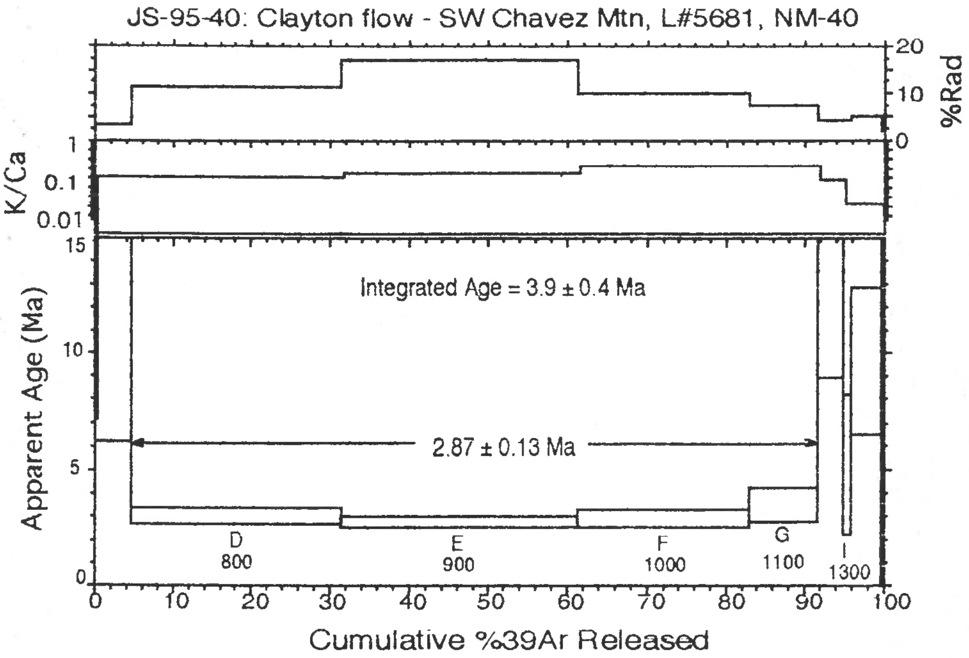


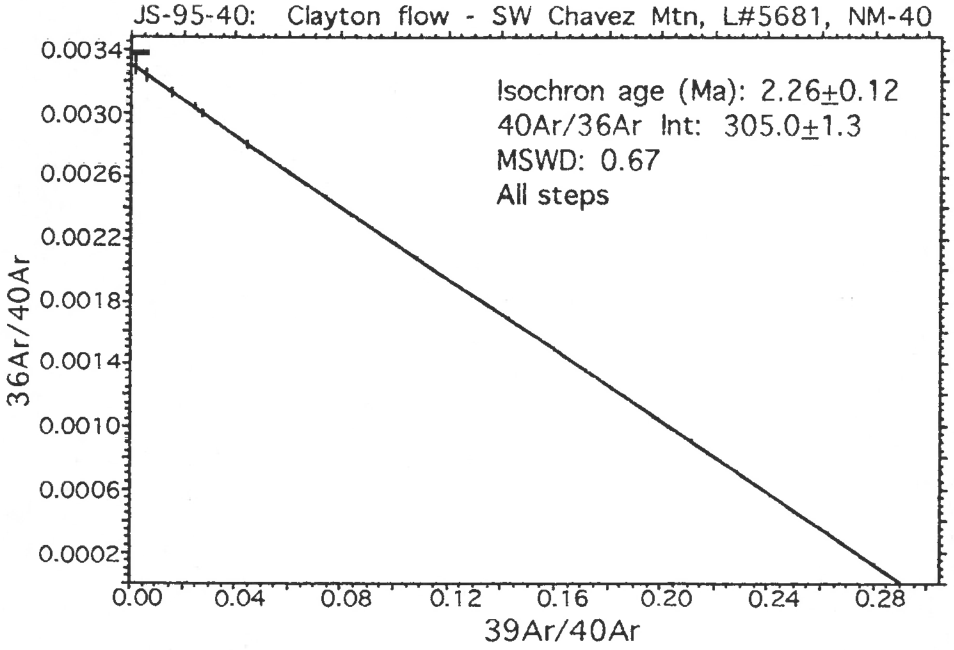

JS-95-37: Clayton flow, NE Clayton, L#5679, NM-40
%Rad
30
10
1
0.1
0.01
K/Ca
Integrated Age = 2.49 ± 0.12 Ma
2.35 ± 0.06 Ma
Apparent Age (Ma)
0
2
4
6
8
10
C
700
D
800
E
900
F
1000
G
1100
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

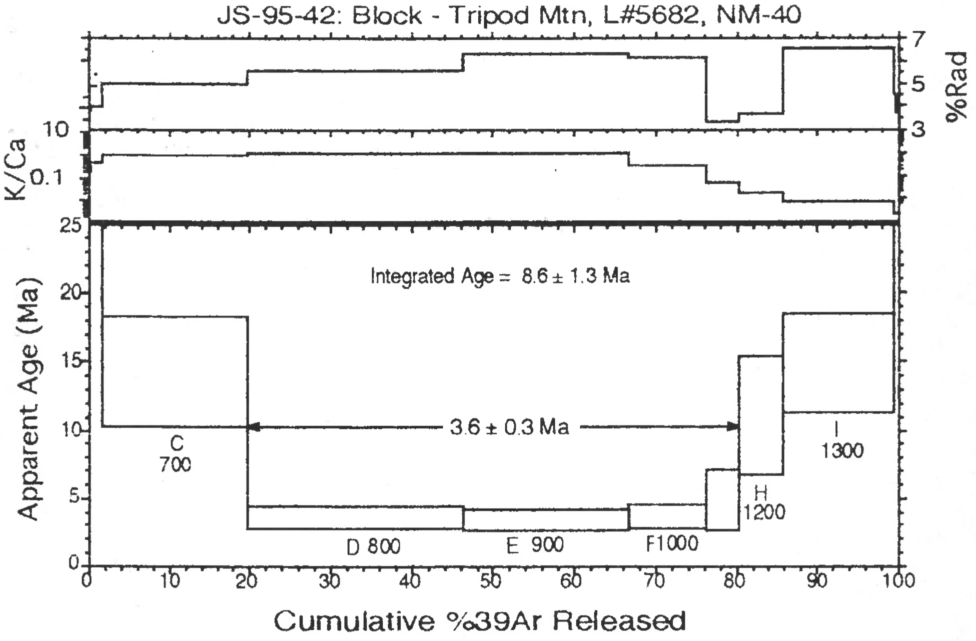

JS-95-37: Clayton flow, NE Clayton, L#5679, NM-40
Isochron age (Ma): 2.26±0.05
40Ar/36Ar Int: 299.1±1.8
MSWD: 4.27
Steps C-H
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.05
0.10
0.15
0.20
0.25
0.30
39Ar/40Ar

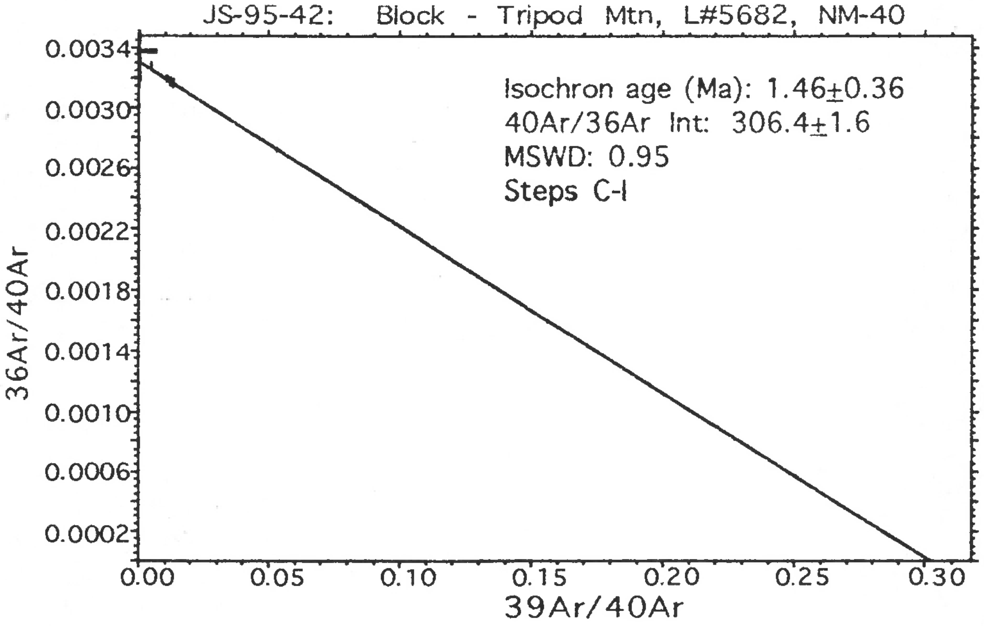

JS-95-38: Basalt flow - mid Mt Dora, L#5680, NM-40

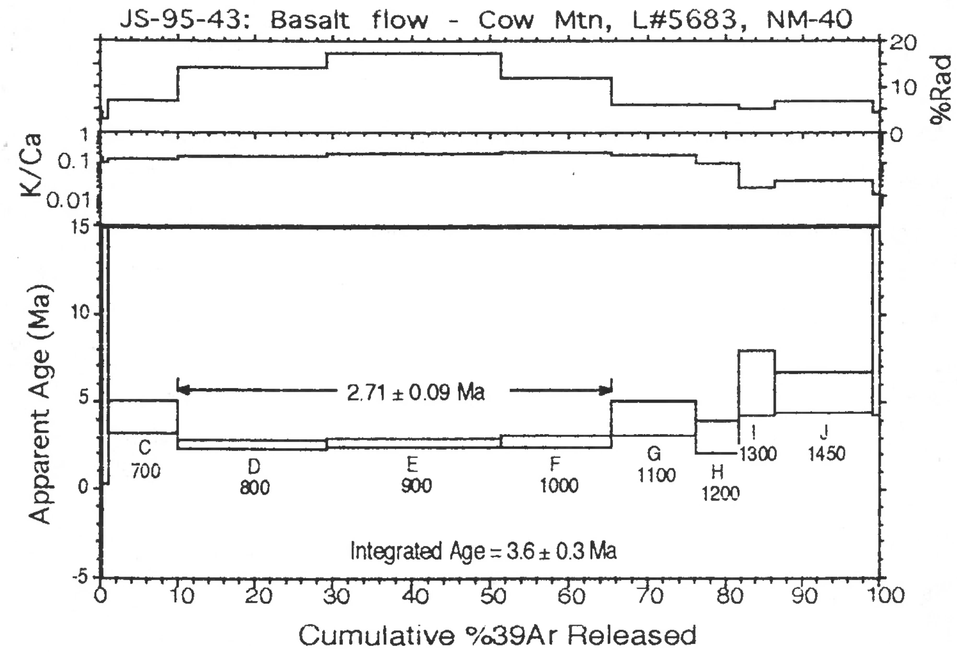

JS-95-38: Basalt flow, mid Mt Dora, L#5679, NM-40

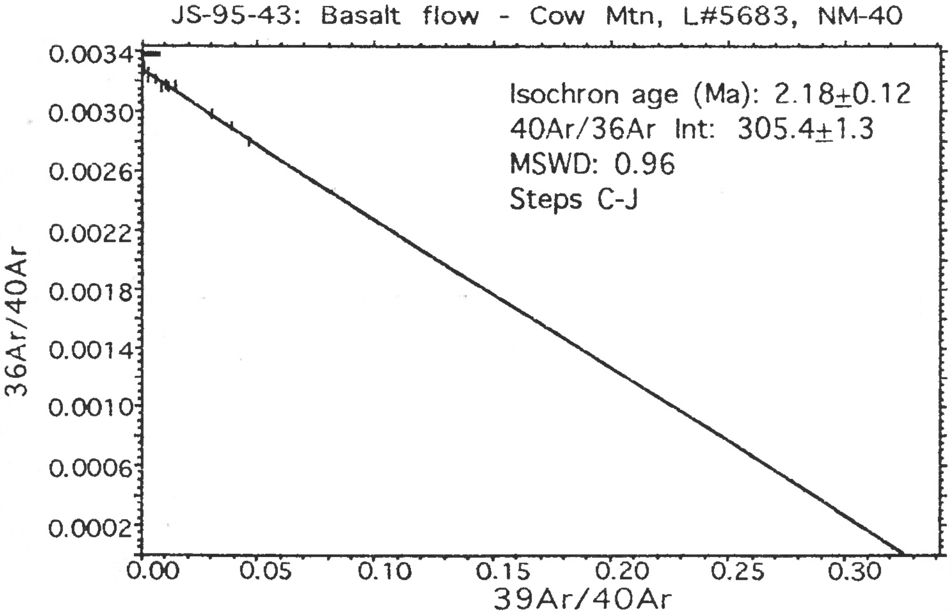

JS-95-40: Clayton flow - SW Chavez Mtn, L#5681, NM-40
%Rad
20
10
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
15
10
5
0
Integrated Age = 3.9 ± 0.4 Ma
2.87 ± 0.13 Ma
D
800
E
900
F
1000
G
1100
I
1300
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

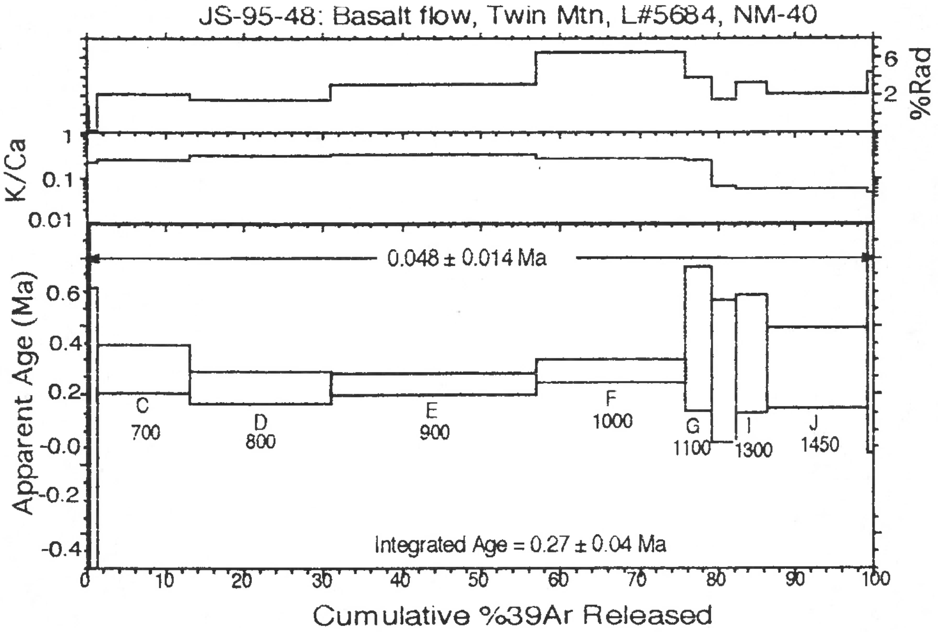

JS-95-40: Clayton flow - SW Chavez Mtn, L#5681, NM-40
Isochron age (Ma): 2.26±0.12
40Ar/36Ar Int: 305.0±1.3
MSWD: 0.67
All steps
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.04
0.08
0.12
0.16
0.20
0.24
0.28
39Ar/40Ar

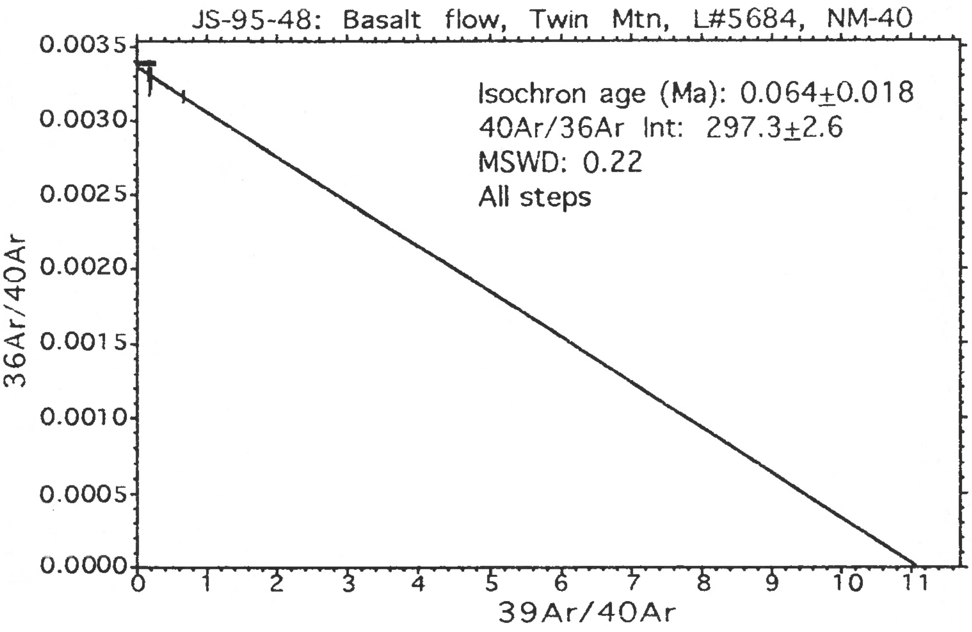

JS-95-42: Block - Tripod Mtn, L#5682, NM-40
%Rad
7
5
3
K/Ca
10
0.1
Apparent Age (Ma)
25
20
15
10
5
0
Integrated Age = 8.6 ± 1.3 Ma
3.6 ± 0.3 Ma
C
700
D 800
E 900
F1000
H
1200
I
1300
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

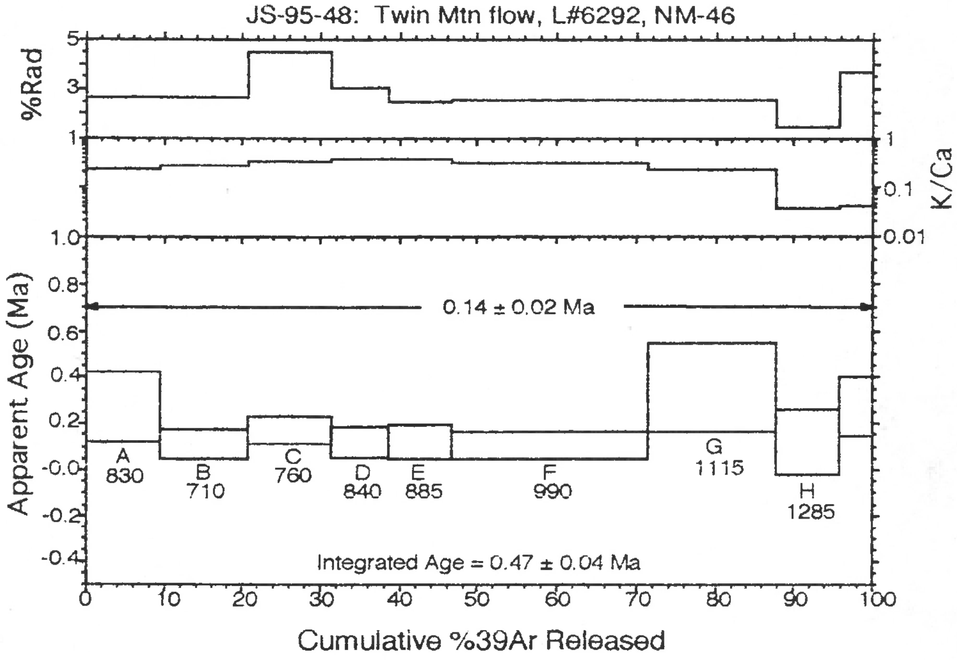

JS-95-42: Block - Tripod Mtn, L#5682, NM-40
Isochron age (Ma): 1.46±0.36
40Ar/36Ar Int: 306.4±1.6
MSWD: 0.95
Steps C-I
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.05
0.10
0.15
0.20
0.25
0.30
39Ar/40Ar

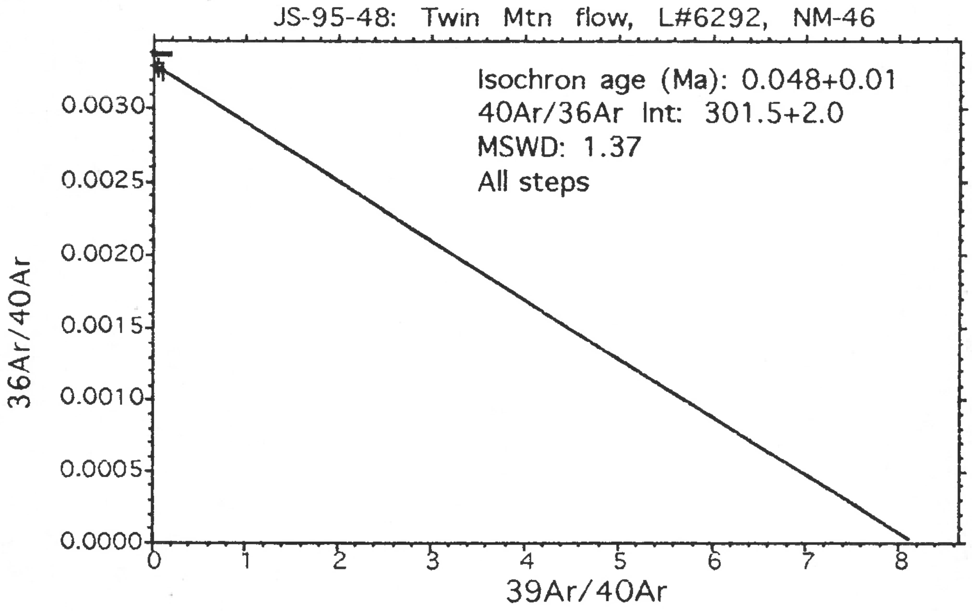

JS-95-43: Basalt flow - Cow Mtn, L#5683, NM-40
%Rad
20
10
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
15
10
5
0
-5
2.71 ± 0.09 Ma
C
700
D
800
E
900
F
1000
G
1100
H
1200
I
1300
J
1450
Integrated Age = 3.6 ± 0.3 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

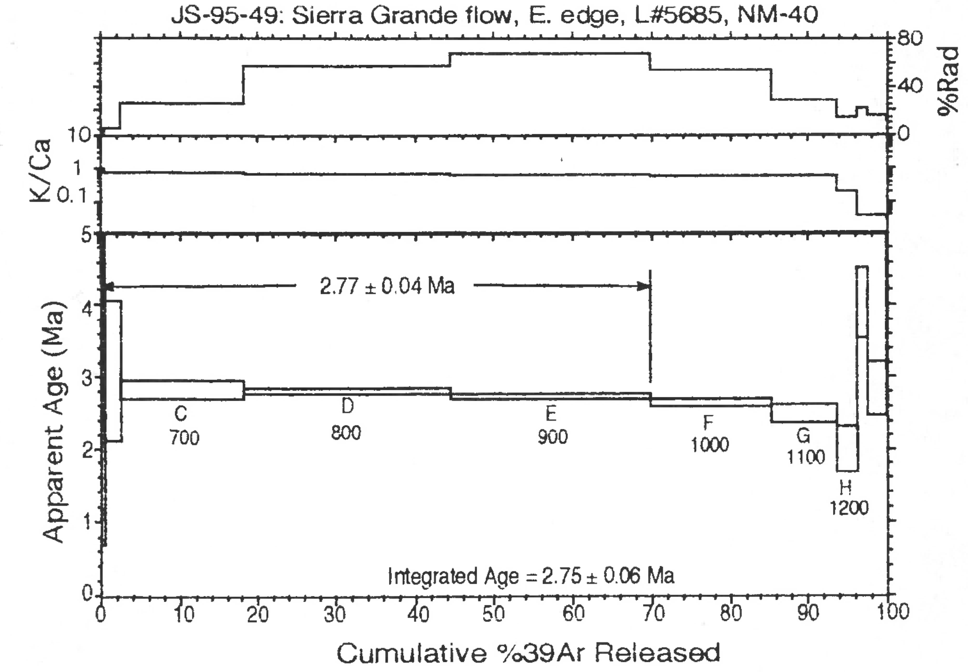

JS-95-43: Basalt flow - Cow Mtn, L#5683, NM-40
Isochron age (Ma): 2.18±0.12
40Ar/36Ar Int: 305.4±1.3
MSWD: 0.96
Steps C-J
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.05
0.10
0.15
0.20
0.25
0.30
39Ar/40Ar

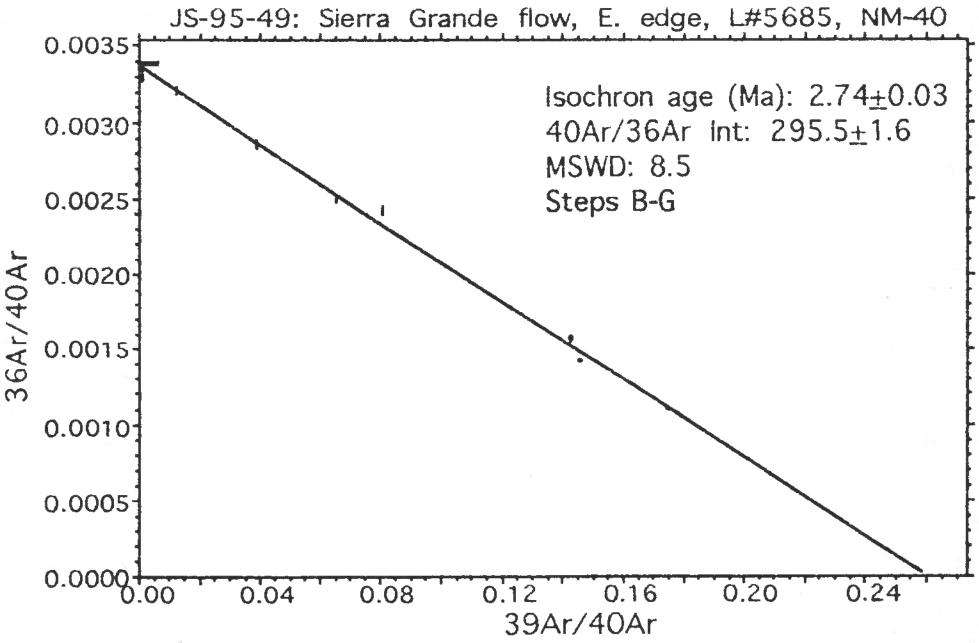

JS-95-48: Basalt flow, Twin Mtn, L#5684, NM-40
6
2
%Rad
K/Ca
1
0.1
0.01
0.048 ± 0.014 Ma
Apparent Age (Ma)
0.6
0.4
0.2
-0.0
-0.2
-0.4
C
700
D
800
E
900
F
1000
G
1100
I
1300
J
1450
Integrated Age = 0.27 ± 0.04 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

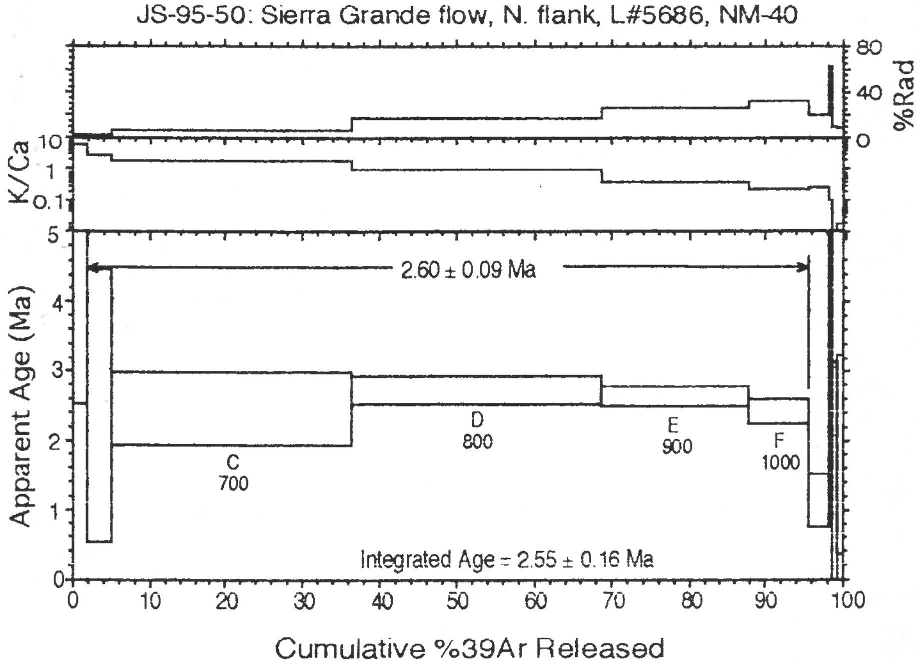

JS-95-48: Basalt flow, Twin Mtn, L#5684, NM-40
Isochron age (Ma): 0.064±0.018
40Ar/36Ar Int: 297.3±2.6
MSWD: 0.22
All steps
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0
1
2
3
4
5
6
7
8
9
10
11
39Ar/40Ar

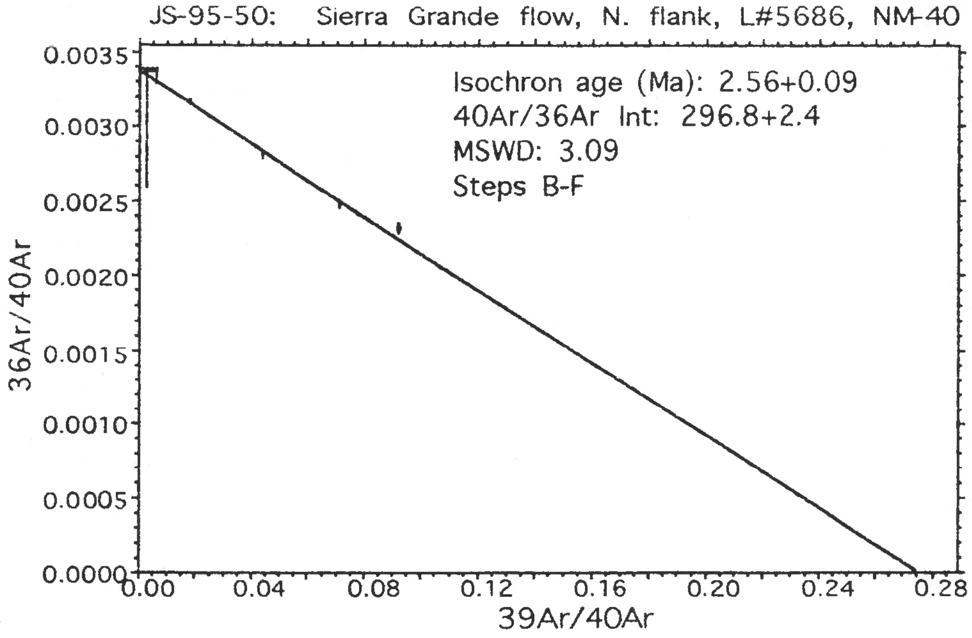

JS-95-48: Twin Mtn flow, L#6292, NM-46
%Rad
5
3
1
1
K/Ca
0.1
0.01
1.0
0.8
0.6
0.4
0.2
-0.0
-0.2
-0.4
Apparent Age (Ma)
0.14 ± 0.02 Ma
A
830
B
710
C
760
D
840
E
885
F
990
G
1115
H
1285
Integrated Age = 0.47 ± 0.04 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

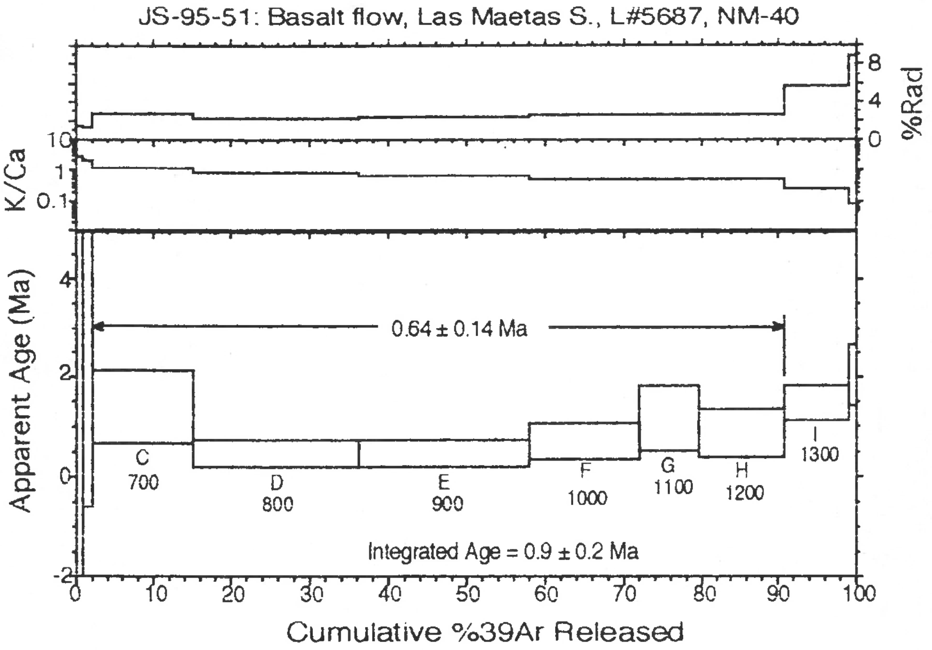

JS-95-48: Twin Mtn flow, L#6292, NM-46
Isochron age (Ma): 0.048+0.01
40Ar/36Ar Int: 301.5+2.0
MSWD: 1.37
All steps
36Ar/40Ar
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0
1
2
3
4
5
6
7
8
39Ar/40Ar

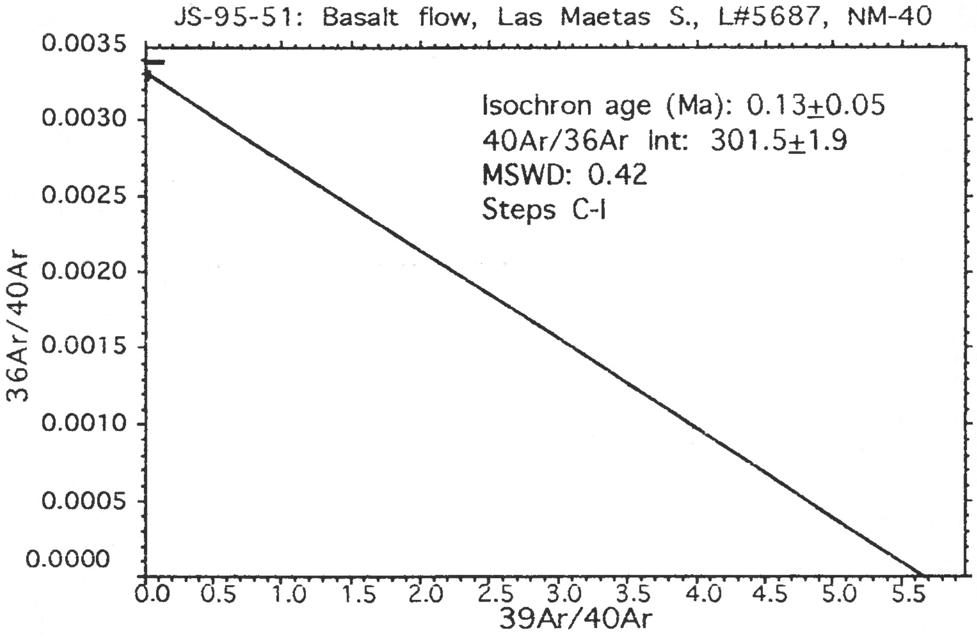

JS-95-49: Sierra Grande flow, E. edge, L#5685, NM-40
80
40
0
%Rad
10
1
0.1
K/Ca
5
4
3
2
1
0
Apparent Age (Ma)
2.77 ± 0.04 Ma
C
700
D
800
E
900
F
1000
G
1100
H
1200
Integrated Age = 2.75 ± 0.06 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released


JS-95-49: Sierra Grande flow, E. edge, L#5685, NM-40
Isochron age (Ma): 2.74±0.03
40Ar/36Ar int: 295.5±1.6
MSWD: 8.5
Steps B-G
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
36Ar/40Ar
0.00
0.04
0.08
0.12
0.16
0.20
0.24
39Ar/40Ar

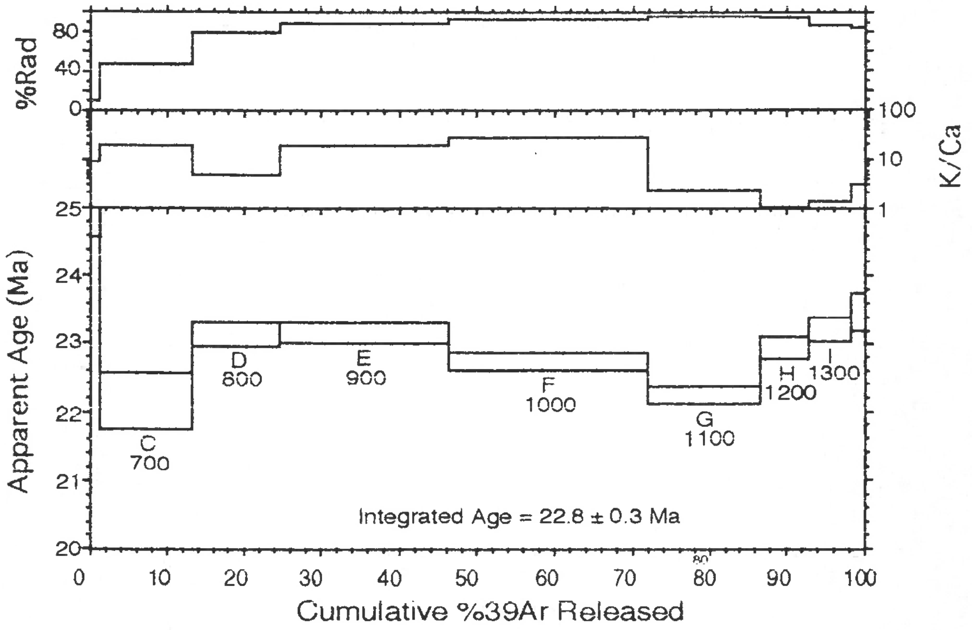

JS-95-50: Sierra Grande flow, N. flank, L#5686, NM-40
%Rad
80
40
0
K/Ca
10
1
0.1
Apparent Age (Ma)
0
1
2
3
4
5
2.60 ± 0.09 Ma
C
700
D
800
E
900
F
1000
Integrated Age = 2.55 ± 0.16 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released


JS-95-50: Sierra Grande flow, N. flank, L#5686, NM-40
Isochron age (Ma): 2.56+0.09
40Ar/36Ar Int: 296.8+2.4
MSWD: 3.09
Steps B-F
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
39Ar/40Ar
0.00
0.04
0.08
0.12
0.16
0.20
0.24
0.28

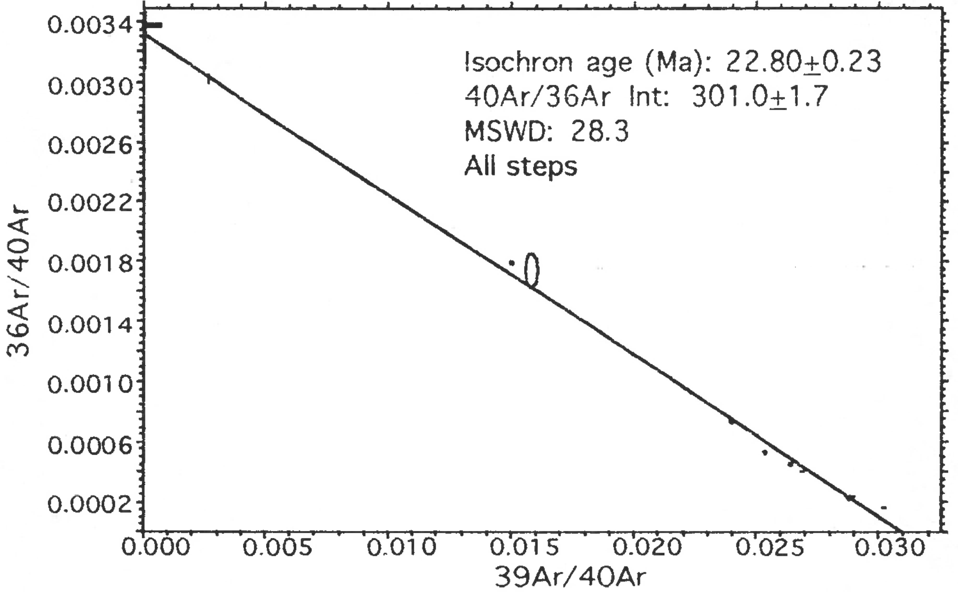

JS-95-51: Basalt flow, Las Maetas S., L#5687, NM-40
%Rad
0
4
8
K/Ca
10
1
0.1
Apparent Age (Ma)
-2
0
2
4
0.64 ± 0.14 Ma
C
700
D
800
E
900
F
1000
G
1100
H
1200
I
1300
Integrated Age = 0.9 ± 0.2 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

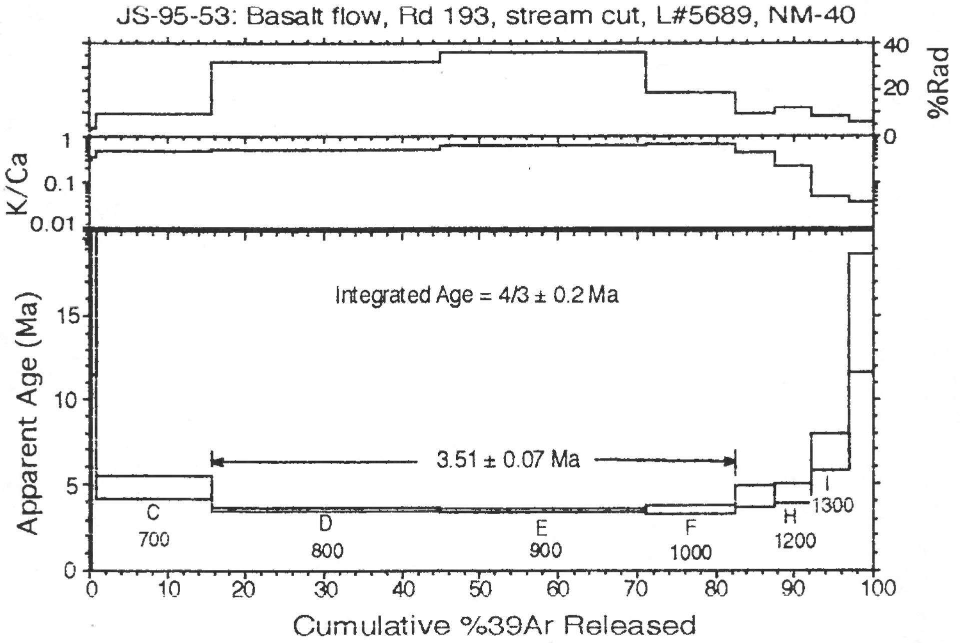

JS-95-51: Basalt flow, Las Maetas S., L#5687, NM-40
Isochron age (Ma): 0.13±0.05
40Ar/36Ar Int: 301.5±1.9
MSWD: 0.42
Steps C-I
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
39Ar/40Ar

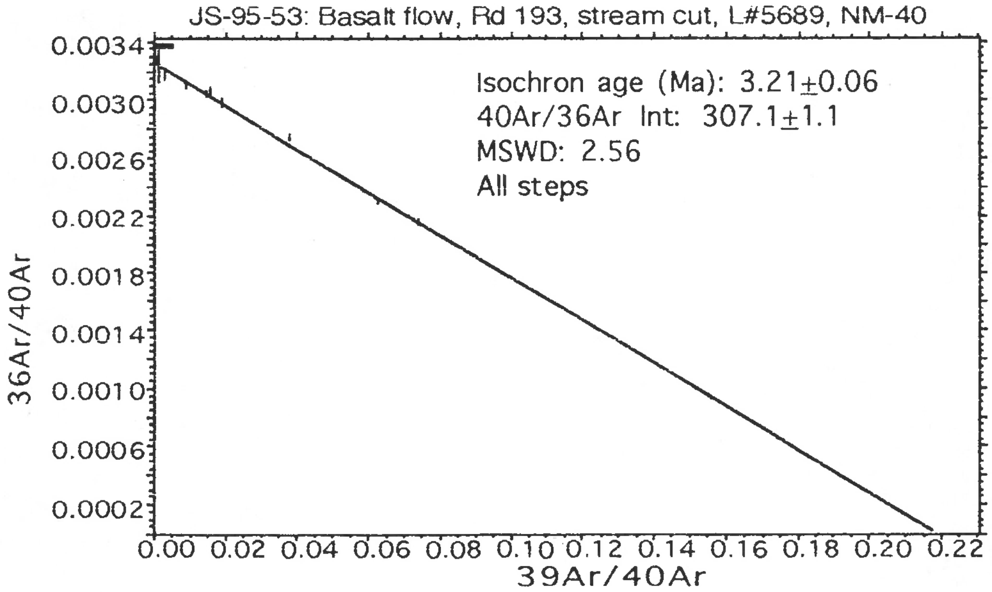
JS-95-52: Phonolite Intrusive, Chico Hills, L#5688, NM-40

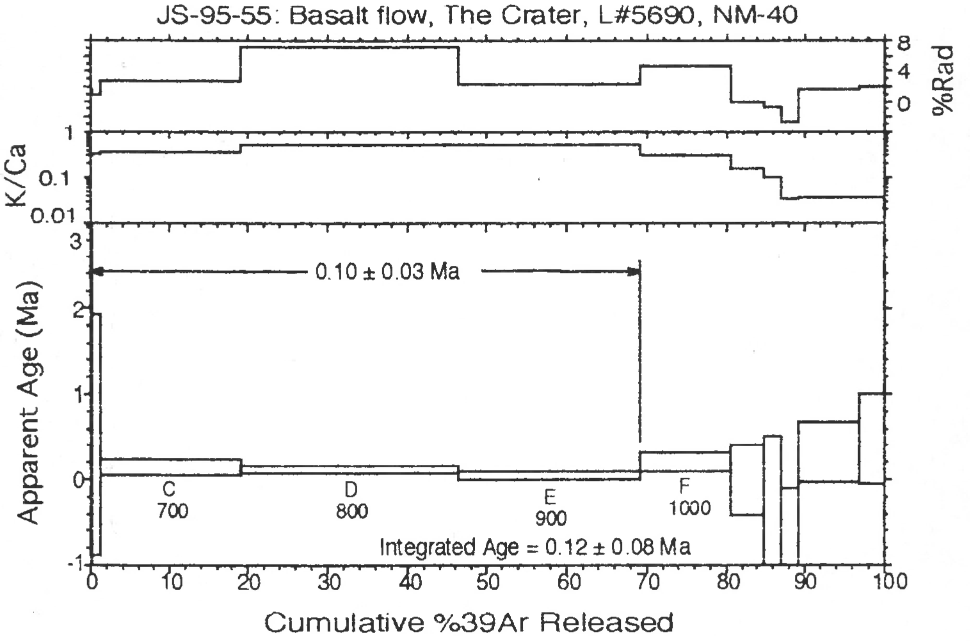


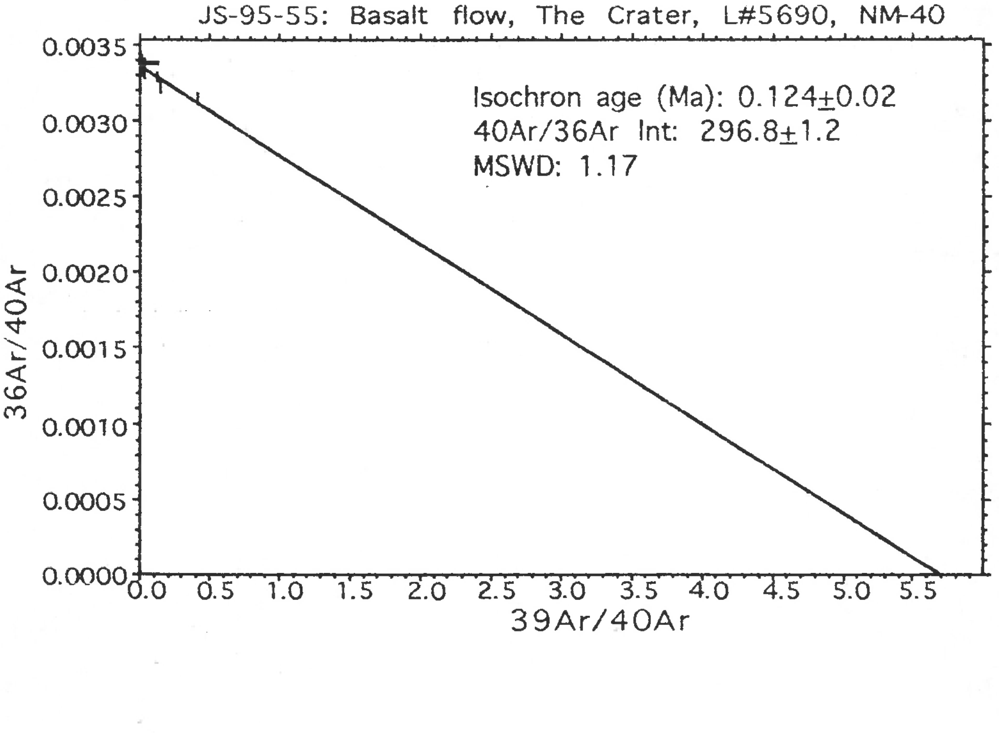
JS-95-52: Phonolite Intrusion - Chico Hills, L#5688, NM-40

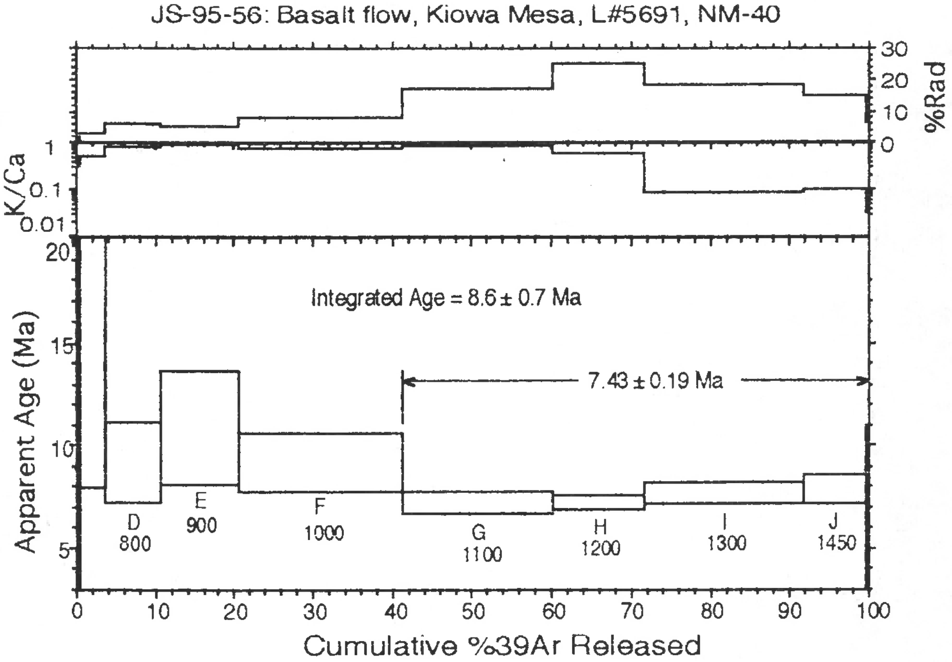


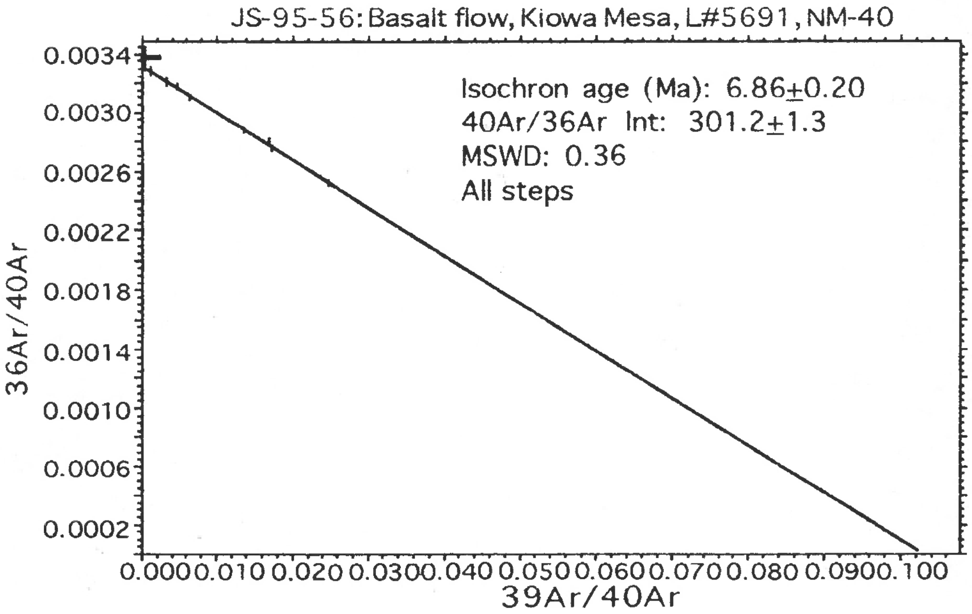

JS-95-53: Basalt flow, Rd 193, stream cut, L#5689, NM-40
40
20
0
%Rad
1
0.1
0.01
K/Ca
Integrated Age = 4/3 ± 0.2 Ma
3.51 ± 0.07 Ma
C
700
D
800
E
900
F
1000
H
1200
I
1300
0
5
10
15
Apparent Age (Ma)
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

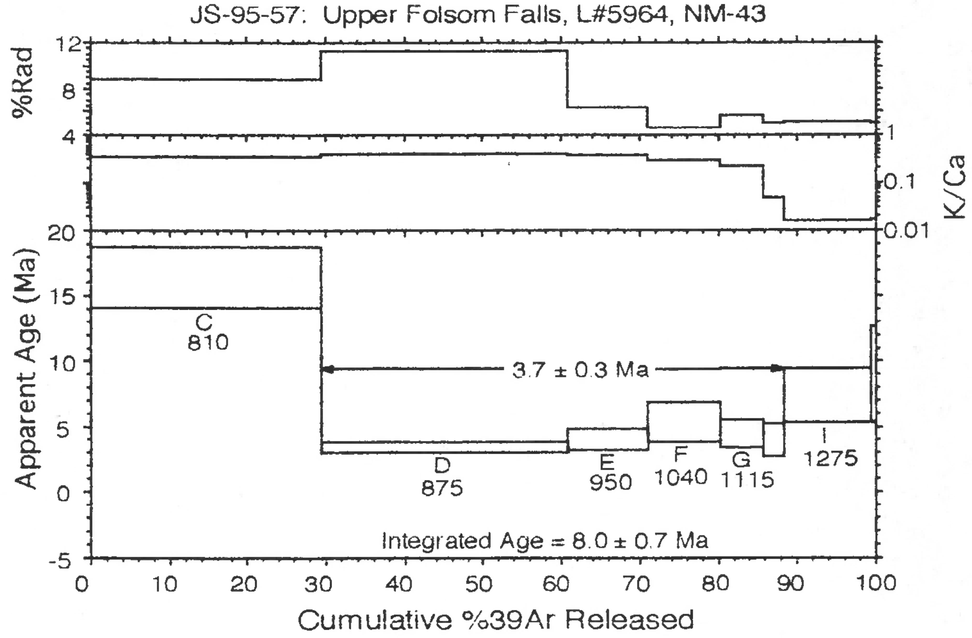

JS-95-53: Basalt flow, Rd 193, stream cut, L#5689, NM-40
Isochron age (Ma): 3.21±0.06
40Ar/36Ar Int: 307.1±1.1
MSWD: 2.56
All steps
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
36Ar/40Ar
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
0.18
0.20
0.22
39Ar/40Ar

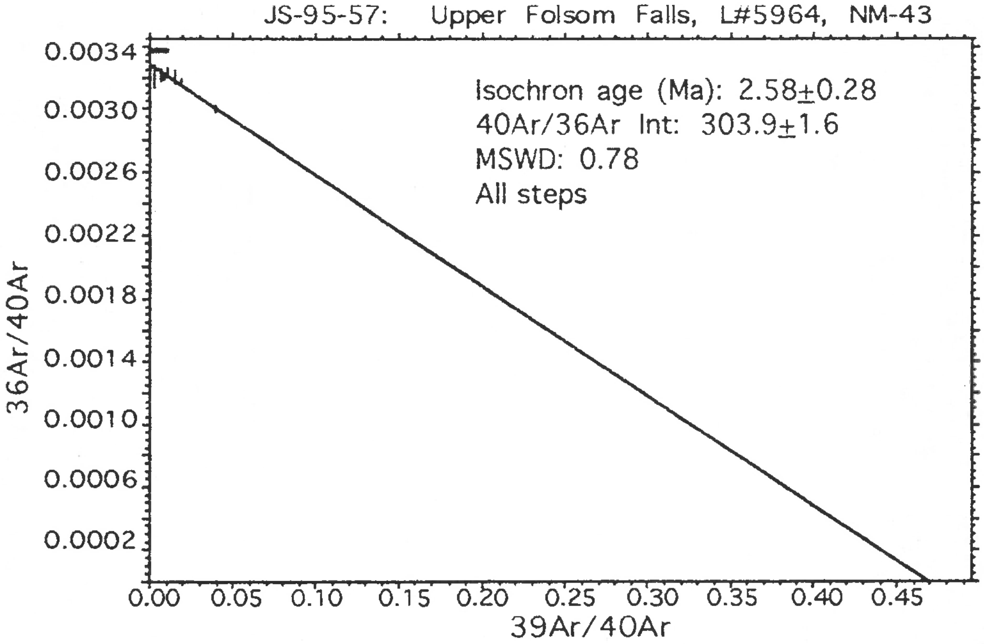

JS-95-55: Basalt flow, The Crater, L#5690, NM-40
%Rad
8
4
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
3
2
1
0
-1
0.10 ± 0.03 Ma
C
700
D
800
E
900
F
1000
Integrated Age = 0.12 ± 0.08 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

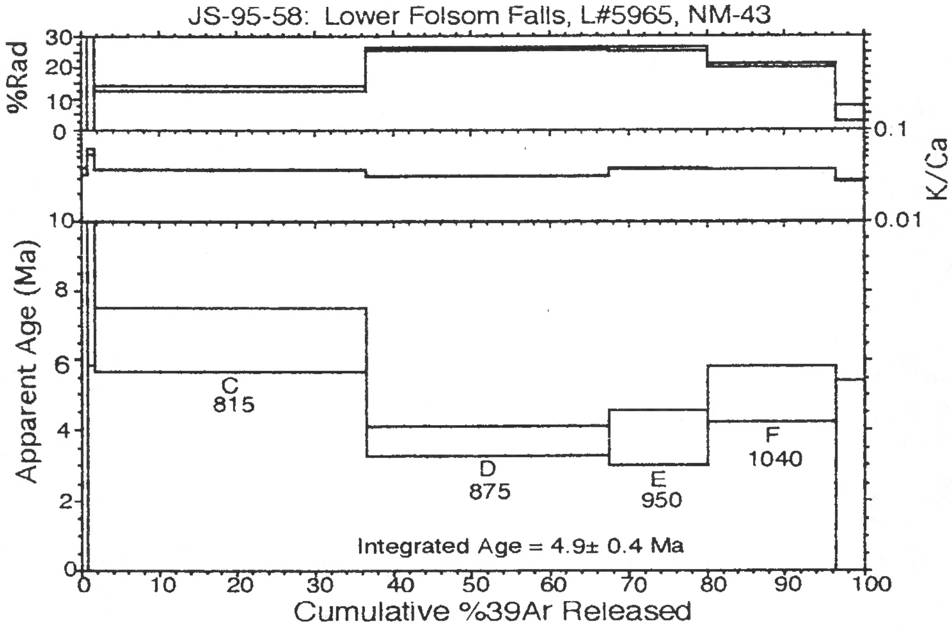

JS-95-55: Basalt flow, The Crater, L#5690, NM-40
Isochron age (Ma): 0.124±0.02
40Ar/36Ar Int: 296.8±1.2
MSWD: 1.17
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
39Ar/40Ar

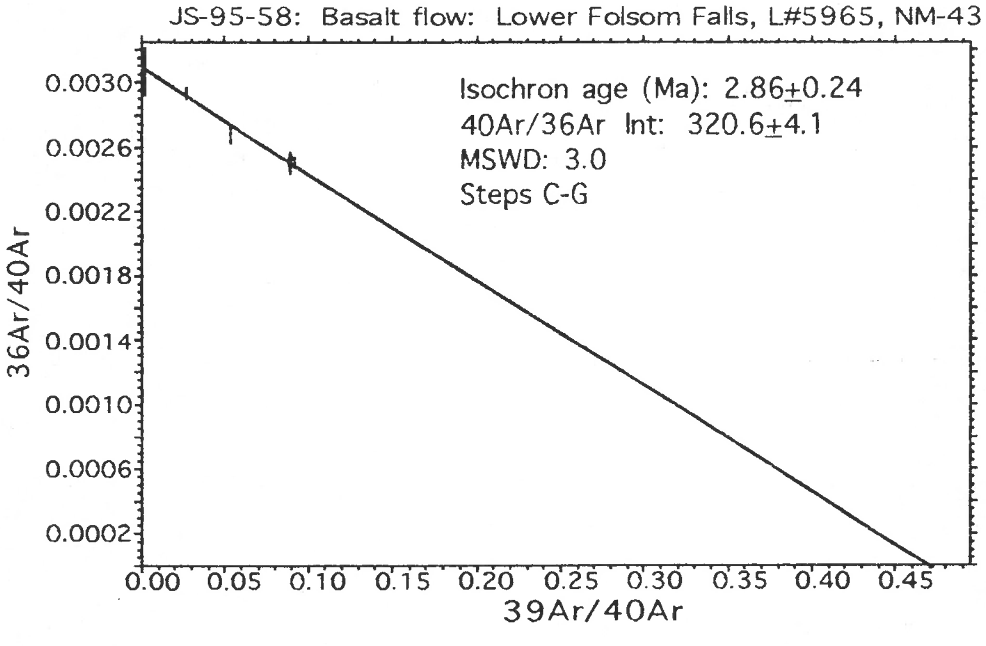

JS-95-56: Basalt flow, Kiowa Mesa, L#5691, NM-40
%Rad
30
20
10
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
20
15
10
5
Integrated Age = 8.6 ± 0.7 Ma
7.43 ± 0.19 Ma
D 800
E 900
F 1000
G 1100
H 1200
I 1300
J 1450
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

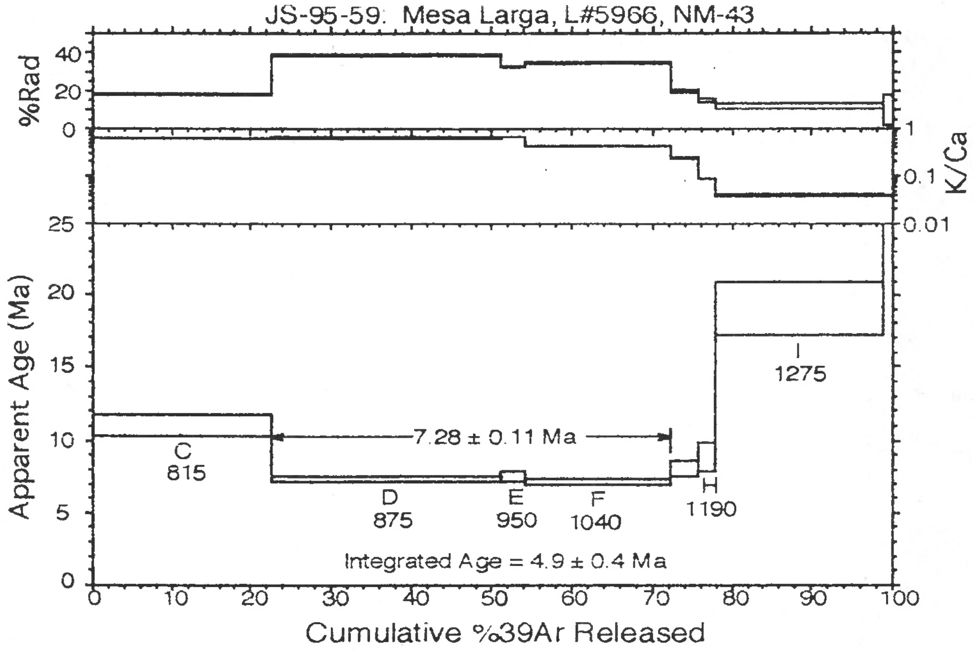

JS-95-56: Basalt flow, Kiowa Mesa, L#5691, NM-40
Isochron age (Ma): 6.86±0.20
40Ar/36Ar Int: 301.2±1.3
MSWD: 0.36
All steps
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
39Ar/40Ar
0.000
0.010
0.020
0.030
0.040
0.050
0.060
0.070
0.080
0.090
0.100

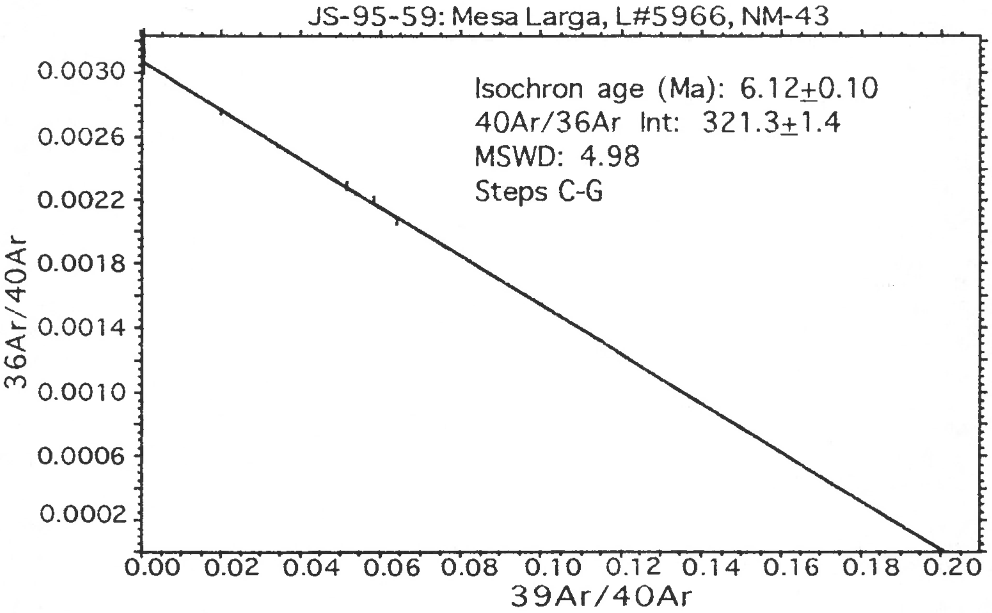

JS-95-57: Upper Folsom Falls, L#5964, NM-43

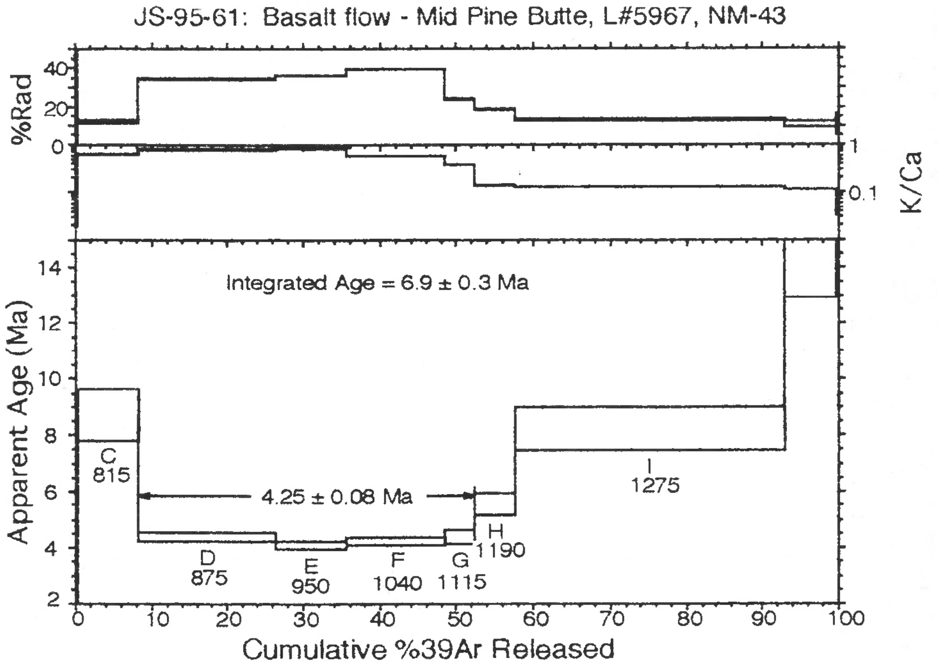

JS-95-57: Upper Folsom Falls, L#5964, NM-43

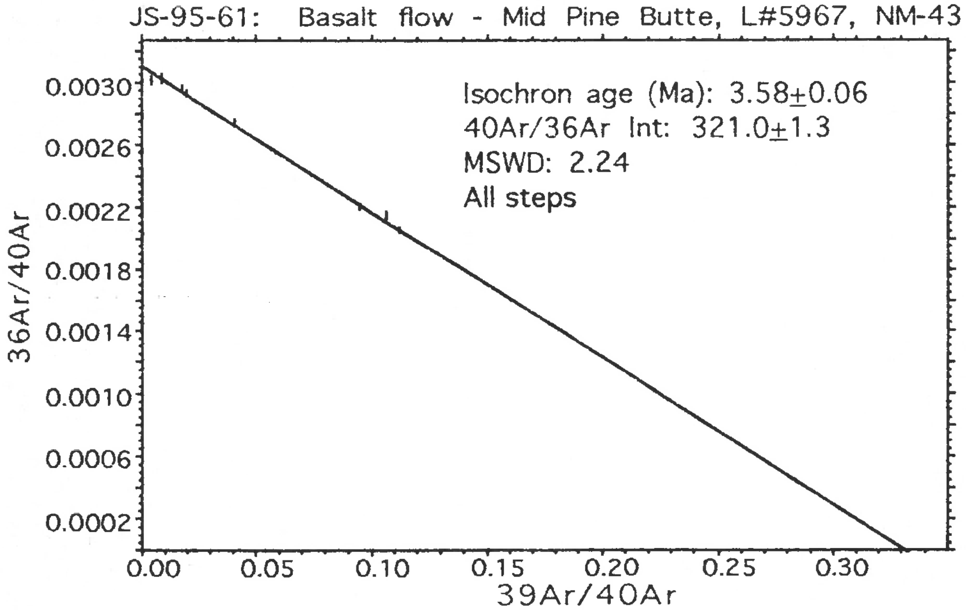

JS-95-58: Lower Folsom Falls, L#5965, NM-43
%Rad
30
20
10
0
K/Ca
0.1
0.01
Apparent Age (Ma)
10
8
6
4
2
0
C
815
D
875
E
950
F
1040
Integrated Age = 4.9± 0.4 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

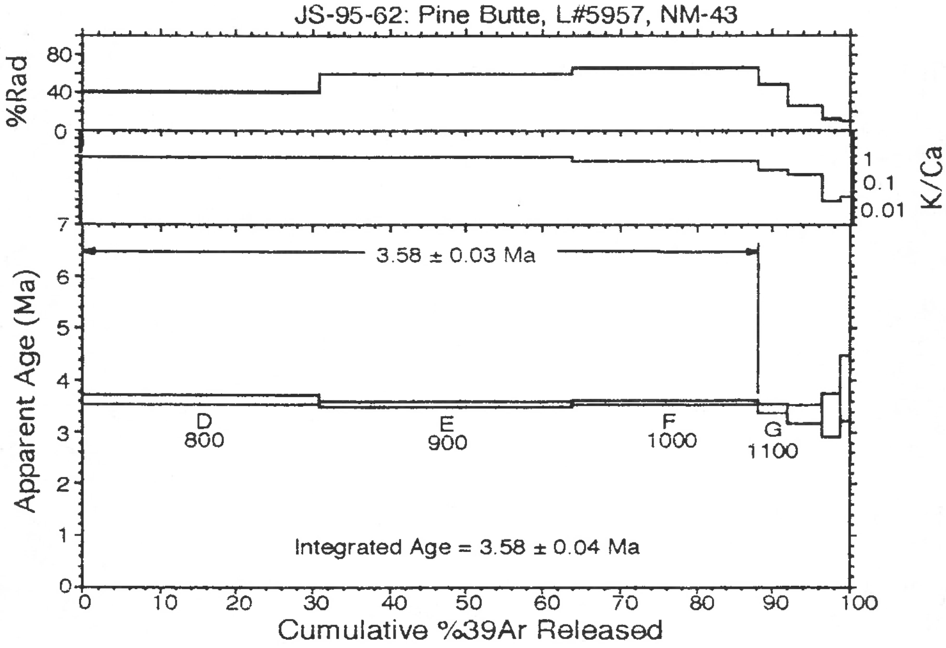

JS-95-58: Basalt flow: Lower Folsom Falls, L#5965, NM-43
Isochron age (Ma): 2.86±0.24
40Ar/36Ar Int: 320.6±4.1
MSWD: 3.0
Steps C-G
36Ar/40Ar
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
39Ar/40Ar

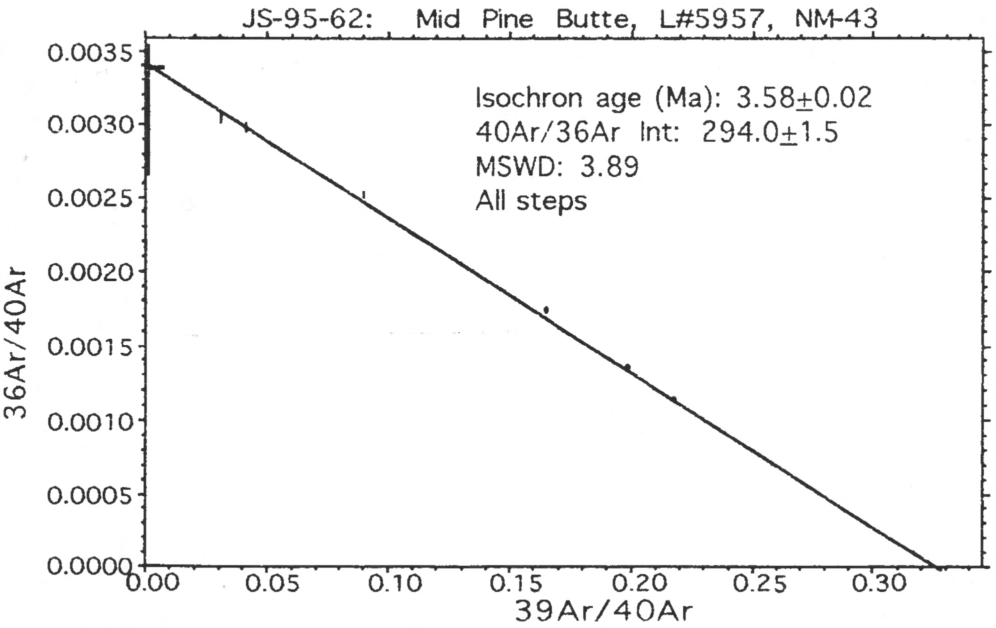

JS-95-59: Mesa Larga, L#5966, NM-43
%Rad
40
20
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
25
20
15
10
5
0
C
815
D
875
E
950
F
1040
H
1190
I
1275
7.28 ± 0.11 Ma
Integrated Age = 4.9 ± 0.4 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

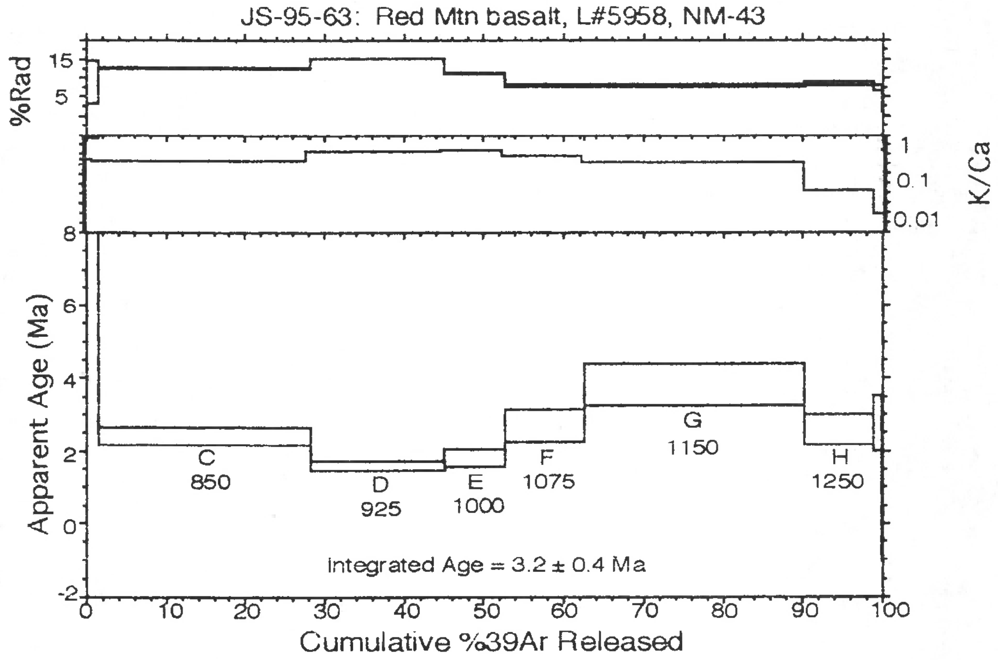

JS-95-59: Mesa Larga, L#5966, NM-43
Isochron age (Ma): 6.12±0.10
40Ar/36Ar Int: 321.3±1.4
MSWD: 4.98
Steps C-G
36Ar/40Ar
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
0.18
0.20
39Ar/40Ar

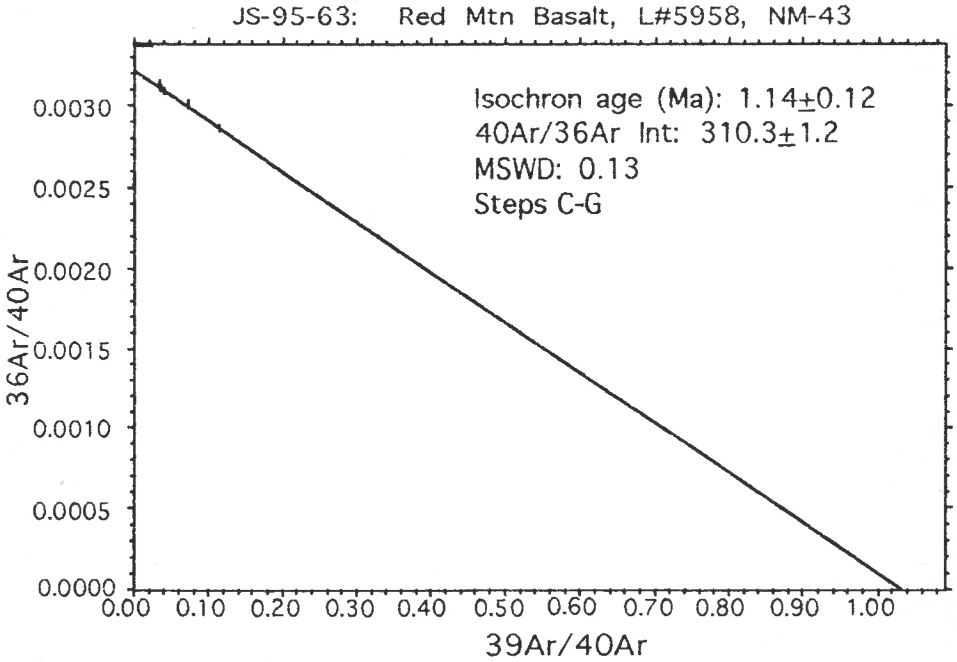

JS-95-61: Basalt flow - Mid Pine Butte, L#5967, NM-43
%Rad
40
20
0
K/Ca
1
0.1
Apparent Age (Ma)
14
12
10
8
6
4
2
Integrated Age = 6.9 ± 0.3 Ma
4.25 ± 0.08 Ma
C
815
D
875
E
950
F
1040
G
1115
H
1190
I
1275
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

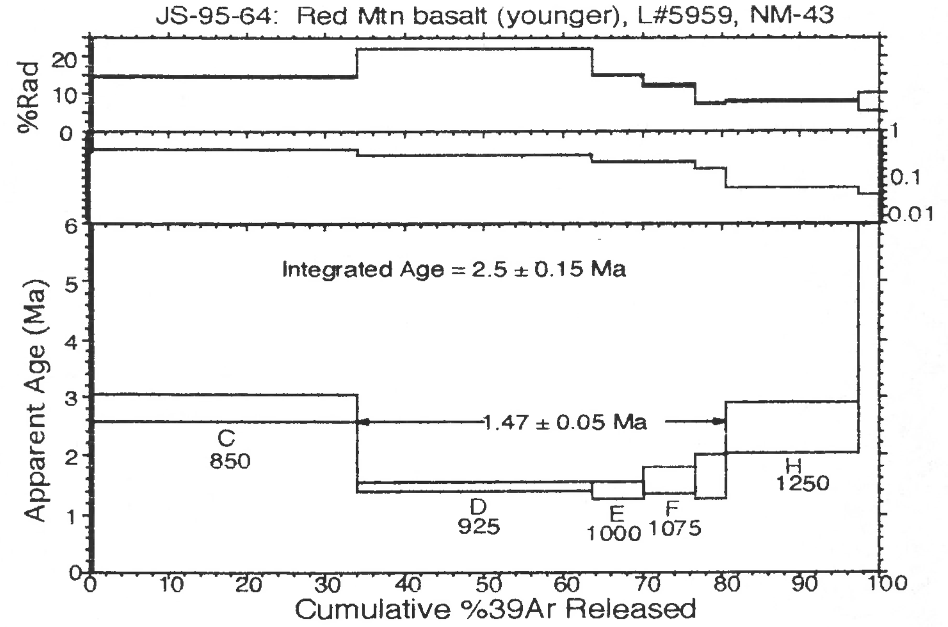

JS-95-61: Basalt flow - Mid Pine Butte, L#5967, NM-43
Isochron age (Ma): 3.58±0.06
40Ar/36Ar Int: 321.0±1.3
MSWD: 2.24
All steps
36Ar/40Ar
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.05
0.10
0.15
0.20
0.25
0.30
39Ar/40Ar


JS-95-62: Pine Butte, L#5957, NM-43
%Rad
80
40
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
7
6
5
4
3
2
1
0
3.58 ± 0.03 Ma
D
800
E
900
F
1000
G
1100
Integrated Age = 3.58 ± 0.04 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

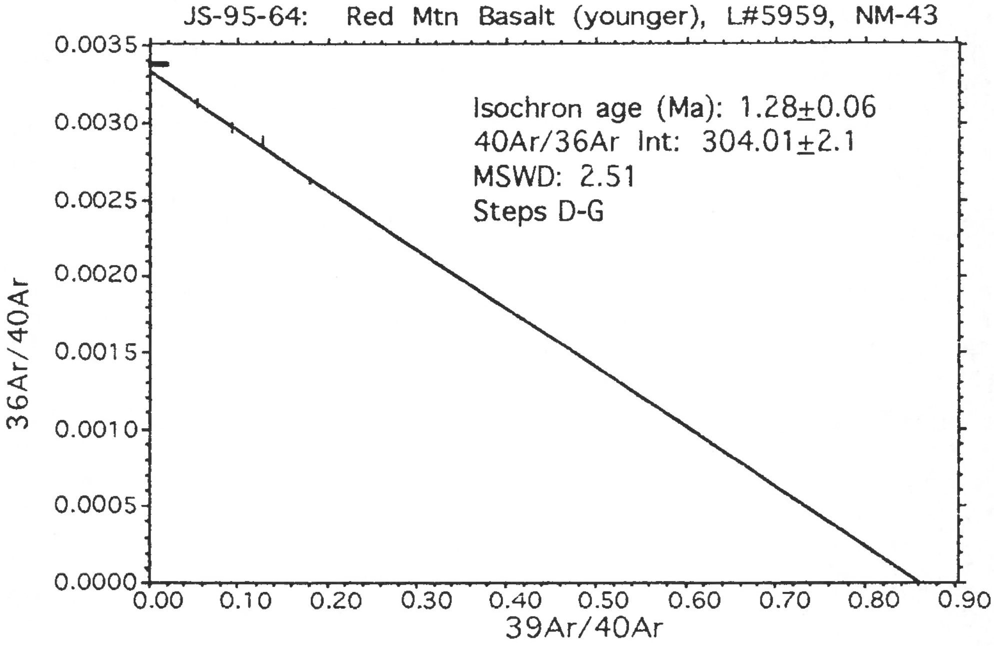

JS-95-62: Mid Pine Butte, L#5957, NM-43
Isochron age (Ma): 3.58±0.02
40Ar/36Ar Int: 294.0±1.5
MSWD: 3.89
All steps
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
39Ar/40Ar
0.00
0.05
0.10
0.15
0.20
0.25
0.30


JS-95-63: Red Mtn basalt, L#5958, NM-43
%Rad
15
5
K/Ca
1
0.1
0.01
Apparent Age (Ma)
8
6
4
2
0
-2
C
850
D
925
E
1000
F
1075
G
1150
H
1250
Integrated Age = 3.2 ± 0.4 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

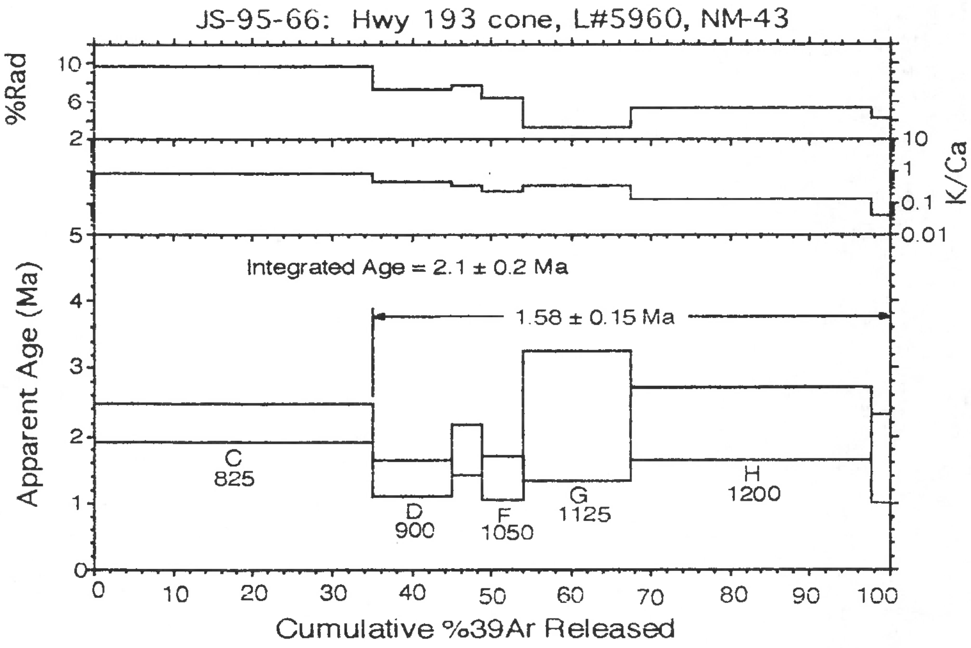

JS-95-63: Red Mtn Basalt, L#5958, NM-43
Isochron age (Ma): 1.14±0.12
40Ar/36Ar Int: 310.3±1.2
MSWD: 0.13
Steps C-G
36Ar/40Ar
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
39Ar/40Ar

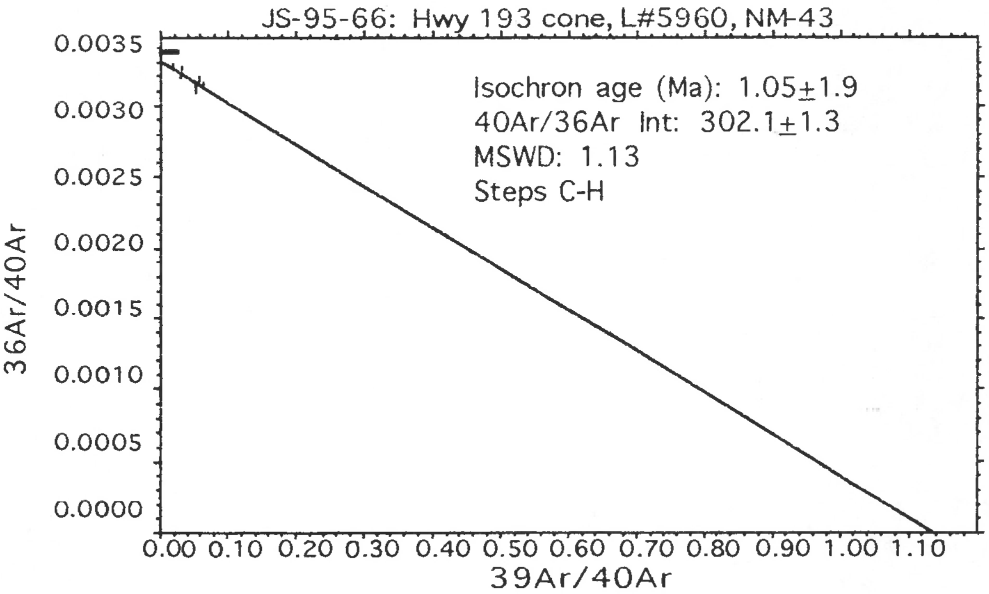


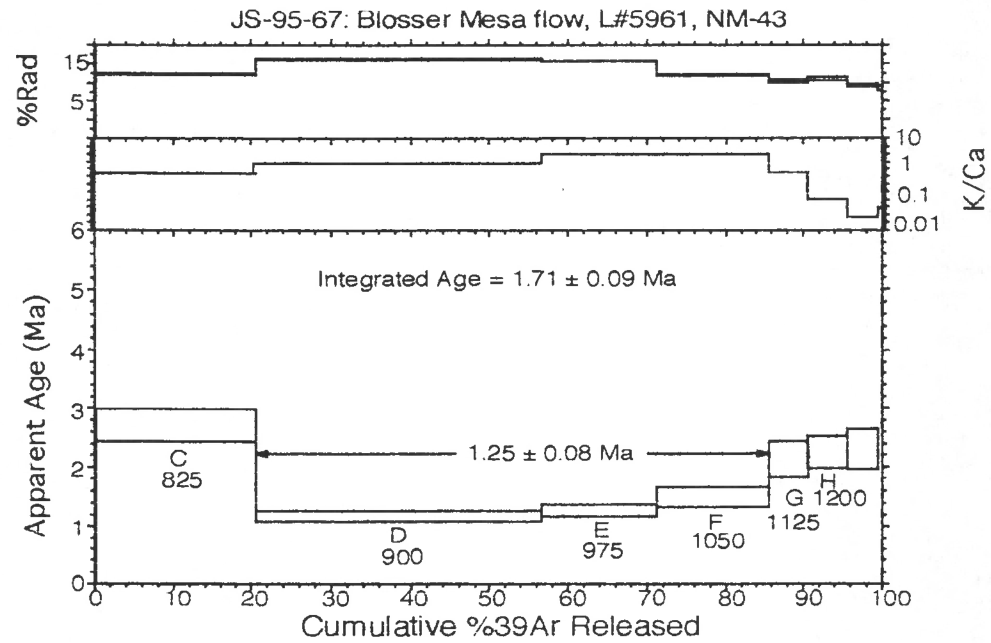
JS-95-64: Red Mtn basalt (younger), L#5959, NM-43

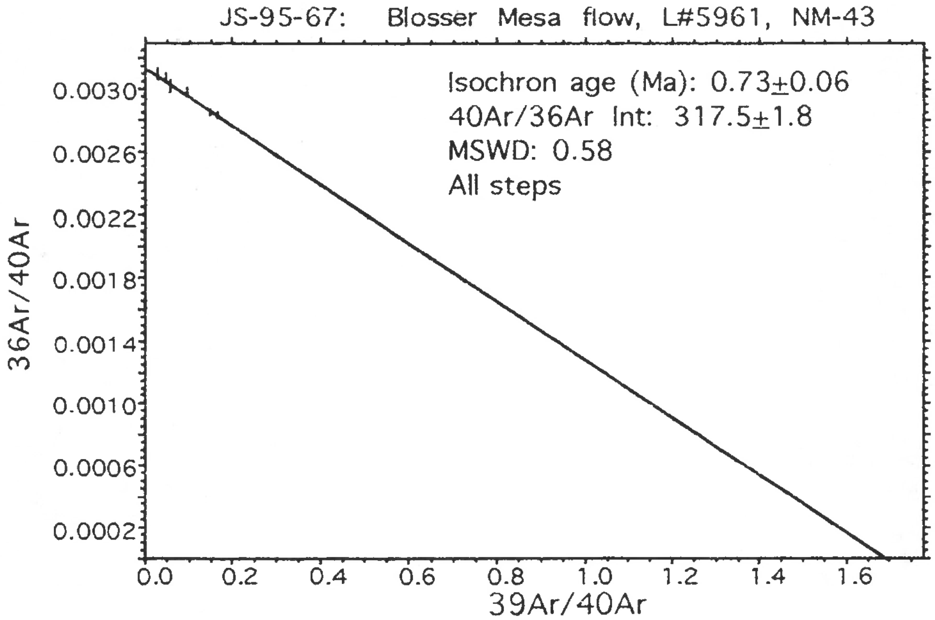


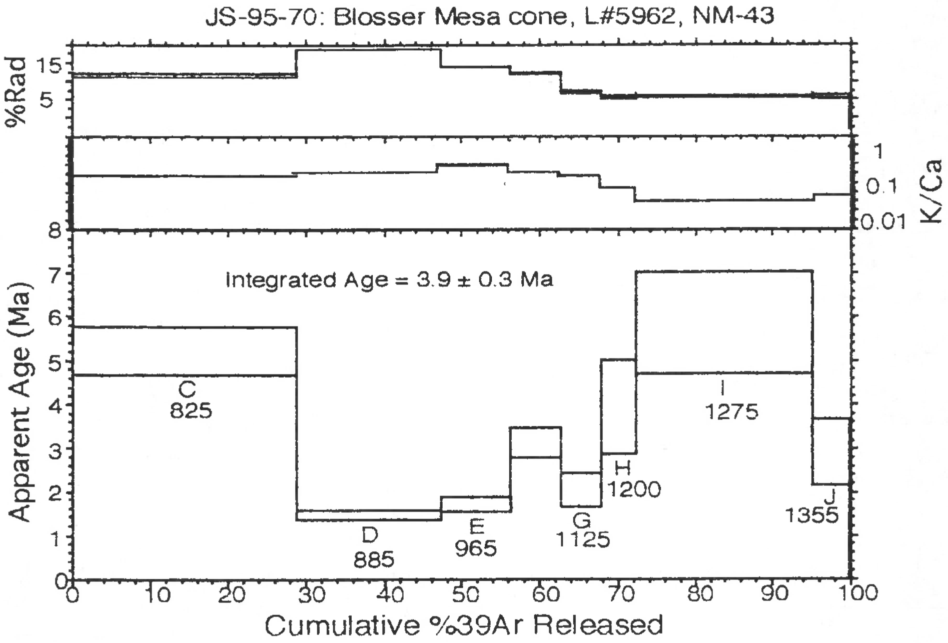
JS-95-64: Red Mtn Basalt (younger), L#5959, NM-43

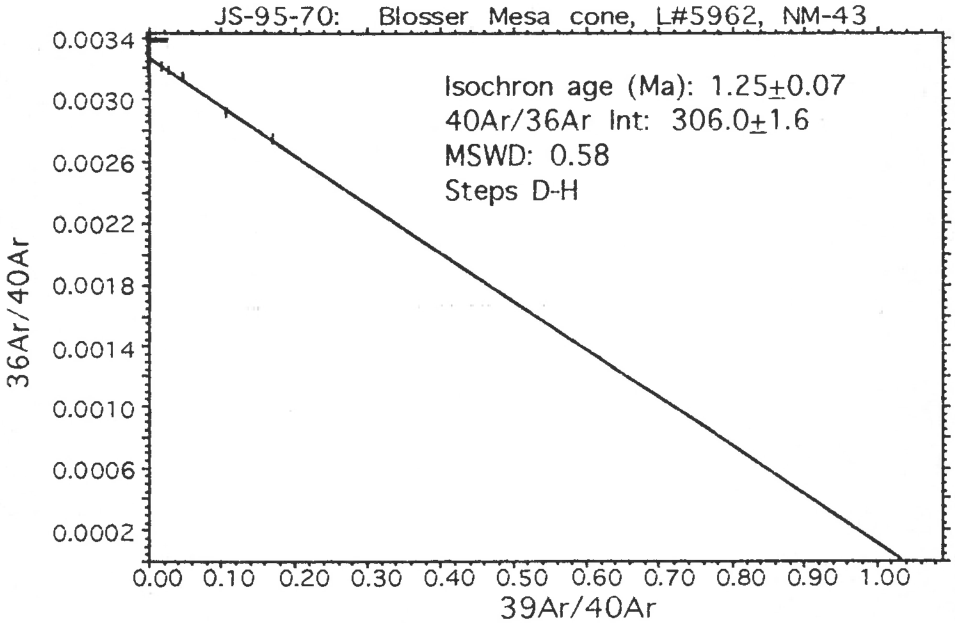

JS-95-66: Hwy 193 cone, L#5960, NM-43
%Rad
10
6
2
10
1
0.1
0.01
K/Ca
5
4
3
2
1
0
Apparent Age (Ma)
Integrated Age = 2.1 ± 0.2 Ma
1.58 ± 0.15 Ma
C
825
D
900
F
1050
G
1125
H
1200
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

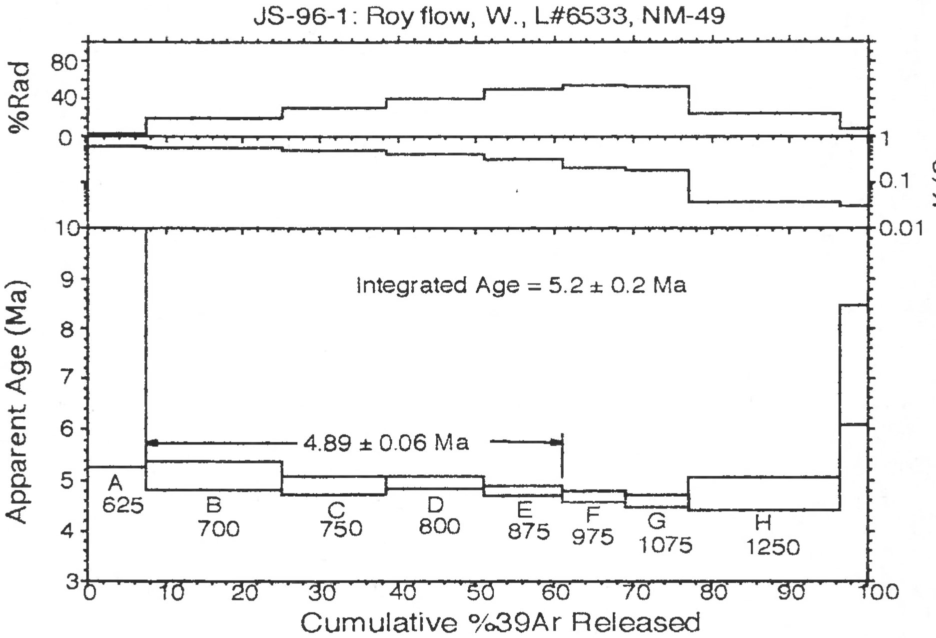

JS-95-66: Hwy 193 cone, L#5960, NM-43
Isochron age (Ma): 1.05±1.9
40Ar/36Ar Int: 302.1±1.3
MSWD: 1.13
Steps C-H
36Ar/40Ar
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
1.10
39Ar/40Ar

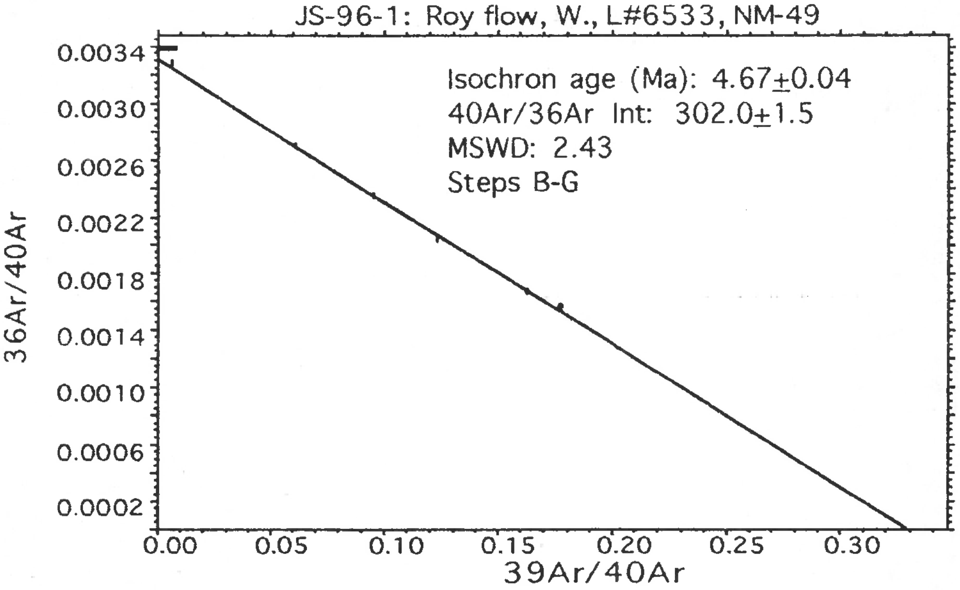

JS-95-67: Blosser Mesa flow, L#5961, NM-43
%Rad
15
5
10
1
0.1
0.01
K/Ca
6
5
4
3
2
1
0
Apparent Age (Ma)
Integrated Age = 1.71 ± 0.09 Ma
1.25 ± 0.08 Ma
C
825
D
900
E
975
F
1050
G
1125
H
1200
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released


JS-95-67: Blosser Mesa flow, L#5961, NM-43
Isochron age (Ma): 0.73±0.06
40Ar/36Ar Int: 317.5±1.8
MSWD: 0.58
All steps
36Ar/40Ar
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
39Ar/40Ar

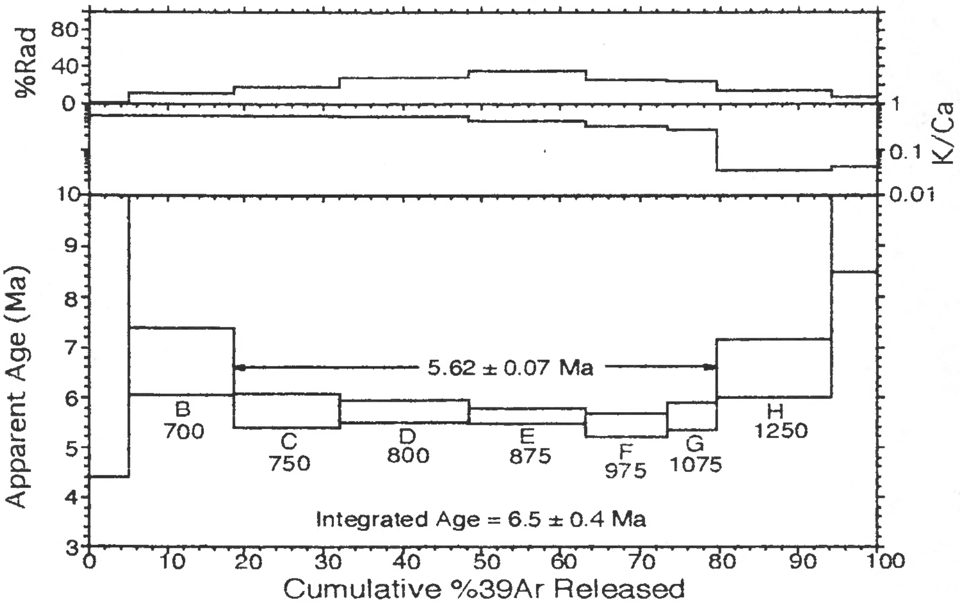

JS-95-70: Blosser Mesa cone, L#5962, NM-43
%Rad
15
5
1
0.1
0.01
K/Ca
8
7
6
5
4
3
2
1
0
Apparent Age (Ma)
Integrated Age = 3.9 ± 0.3 Ma
C
825
D
885
E
965
G
1125
H
1200
I
1275
J
1355
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released


JS-95-70: Blosser Mesa cone, L#5962, NM-43
Isochron age (Ma): 1.25±0.07
40Ar/36Ar Int: 306.0±1.6
MSWD: 0.58
Steps D-H
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
36Ar/40Ar
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
39Ar/40Ar

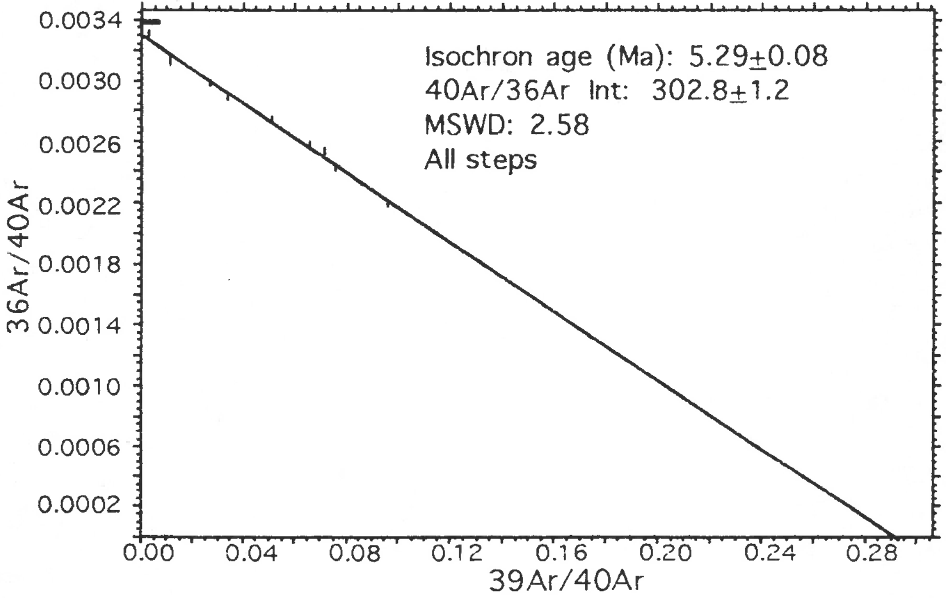

JS-96-1: Roy flow, W., L#6533, NM-49
%Rad
80
40
0
K/Ca
1
0.1
0.01
10
9
8
7
6
5
4
3
Apparent Age (Ma)
Integrated Age = 5.2 ± 0.2 Ma
4.89 ± 0.06 Ma
A
625
B
700
C
750
D
800
E
875
F
975
G
1075
H
1250
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

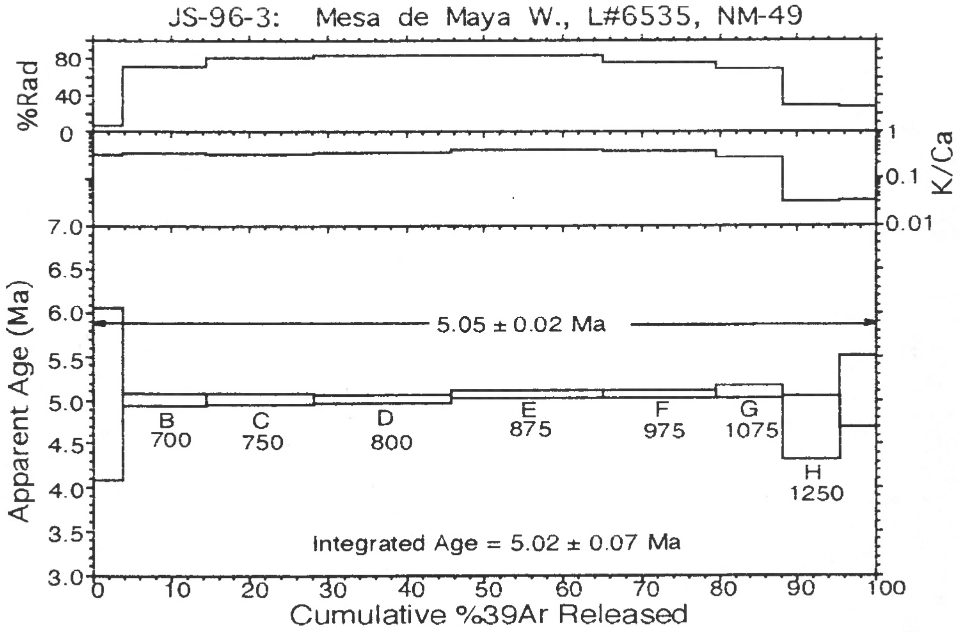

JS-96-1: Roy flow, W., L#6533, NM-49
Isochron age (Ma): 4.67±0.04
40Ar/36Ar Int: 302.0±1.5
MSWD: 2.43
Steps B-G
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.05
0.10
0.15
0.20
0.25
0.30
39Ar/40Ar

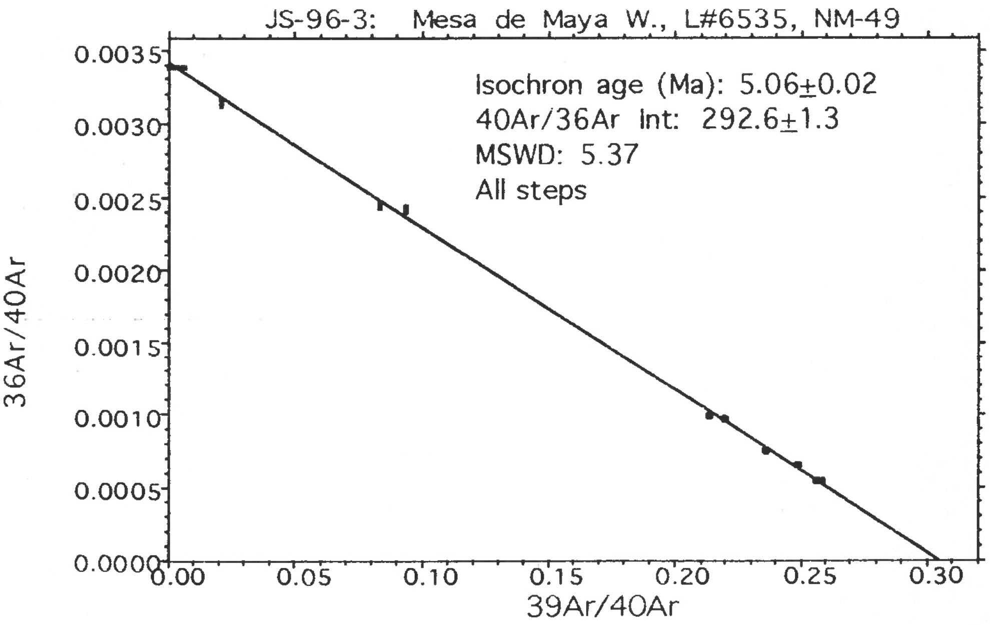
JS-96-2: Roy flow, NE, L#6534, NM-49

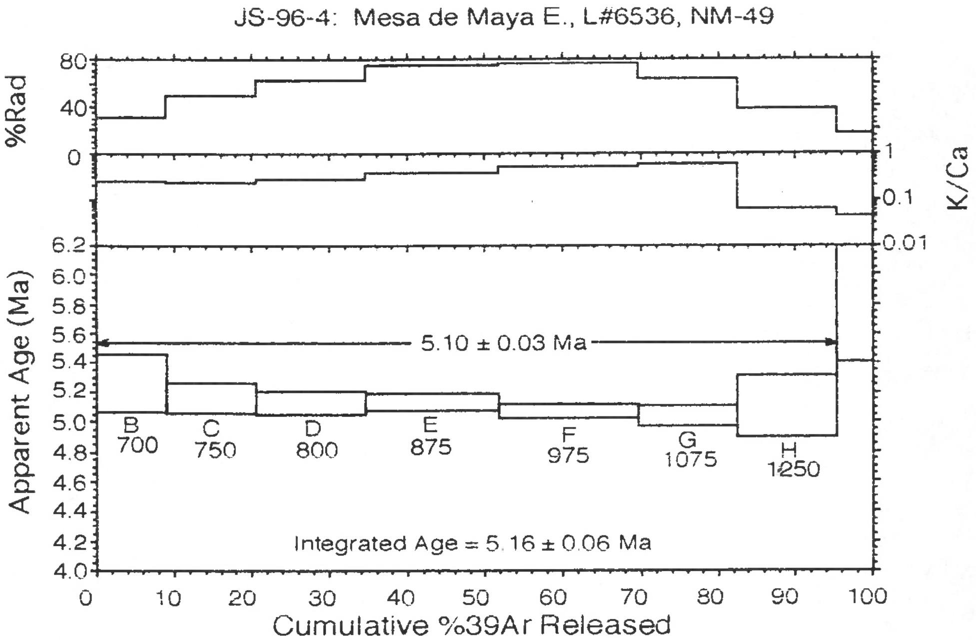


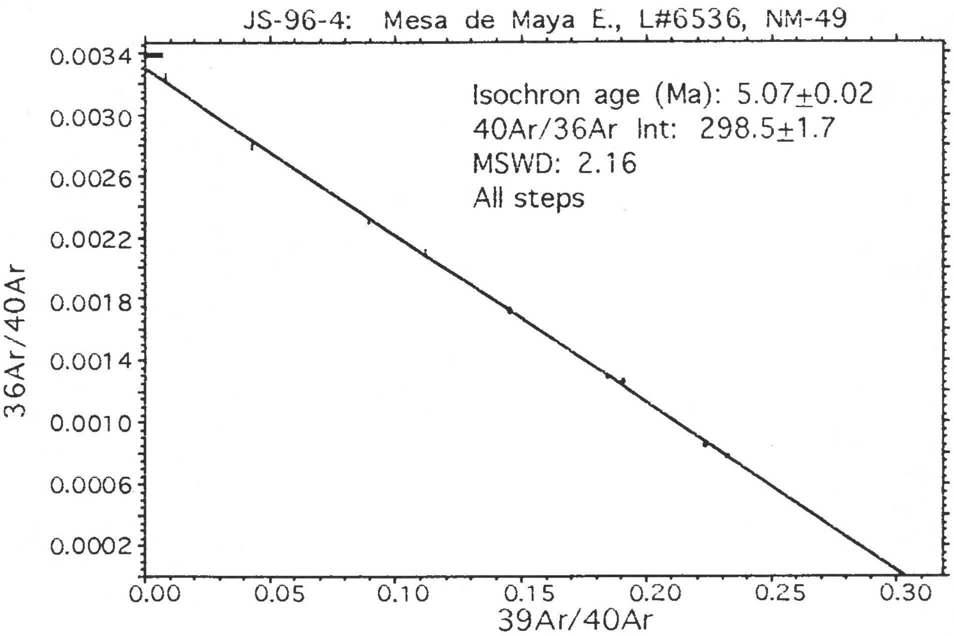
JS-96-2: Roy flow NE, L#6534, NM-49

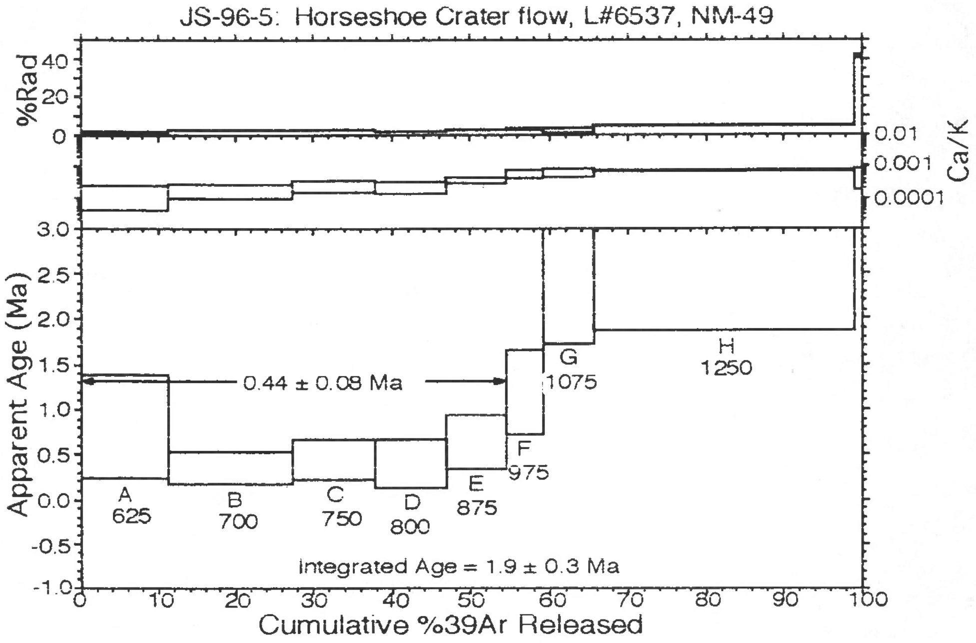


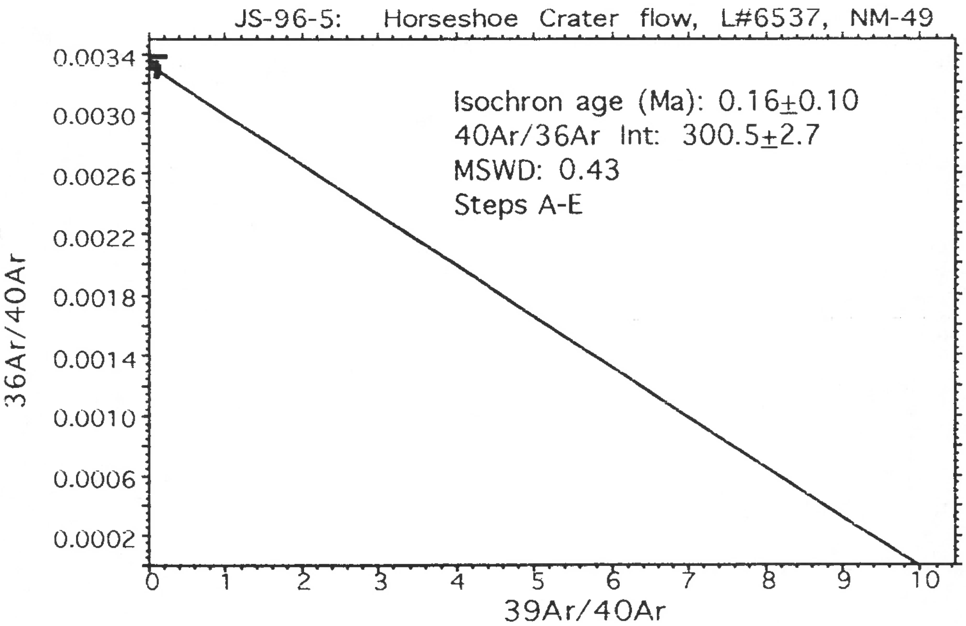

JS-96-3: Mesa de Maya W., L#6535, NM-49
%Rad
80
40
0
1
0.1
0.01
K/Ca
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
Apparent Age (Ma)
5.05 ± 0.02 Ma
B
700
C
750
D
800
E
875
F
975
G
1075
H
1250
Integrated Age = 5.02 ± 0.07 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

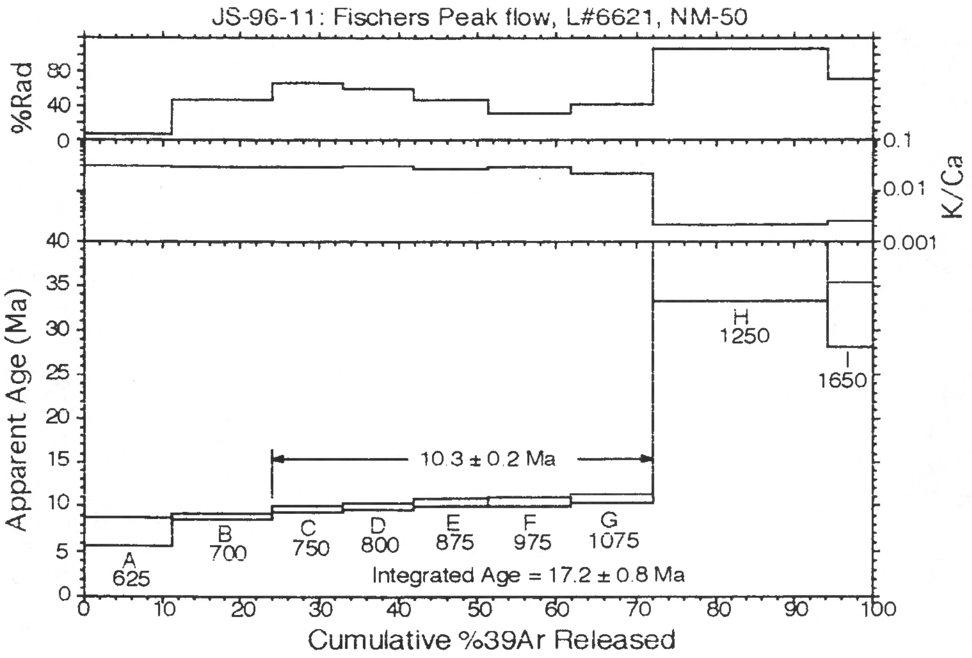

JS-96-3: Mesa de Maya W., L#6535, NM-49
Isochron age (Ma): 5.06±0.02
40Ar/36Ar Int: 292.6±1.3
MSWD: 5.37
All steps
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
36Ar/40Ar
0.00
0.05
0.10
0.15
0.20
0.25
0.30
39Ar/40Ar

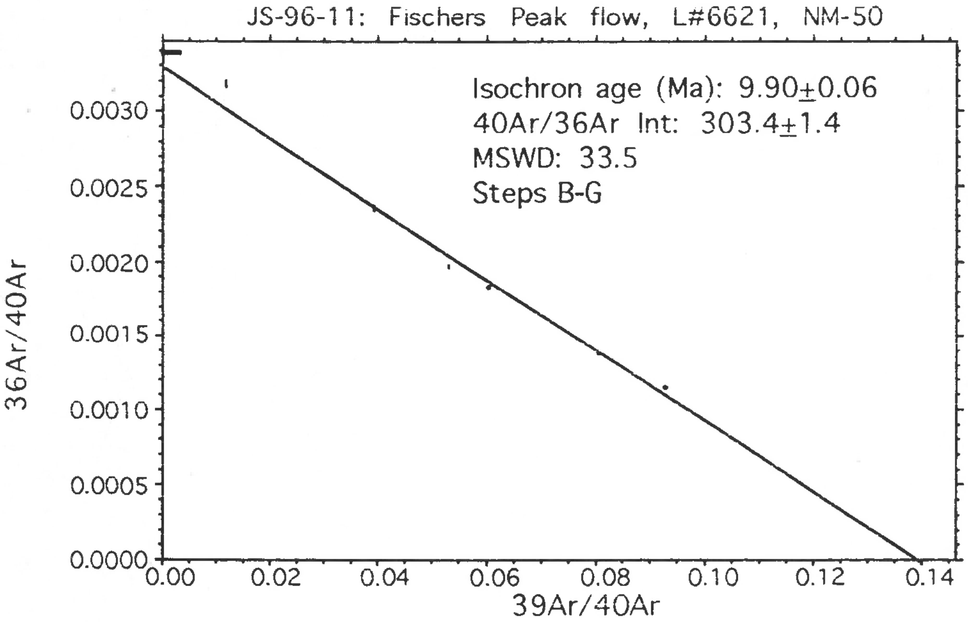

JS-96-4: Mesa de Maya E., L#6536, NM-49
%Rad
80
40
0
K/Ca
1
0.1
0.01
Apparent Age (Ma)
6.2
6.0
5.8
5.6
5.4
5.2
5.0
4.8
4.6
4.4
4.2
4.0
5.10 ± 0.03 Ma
B 700
C 750
D 800
E 875
F 975
G 1075
H 1250
Integrated Age = 5.16 ± 0.06 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

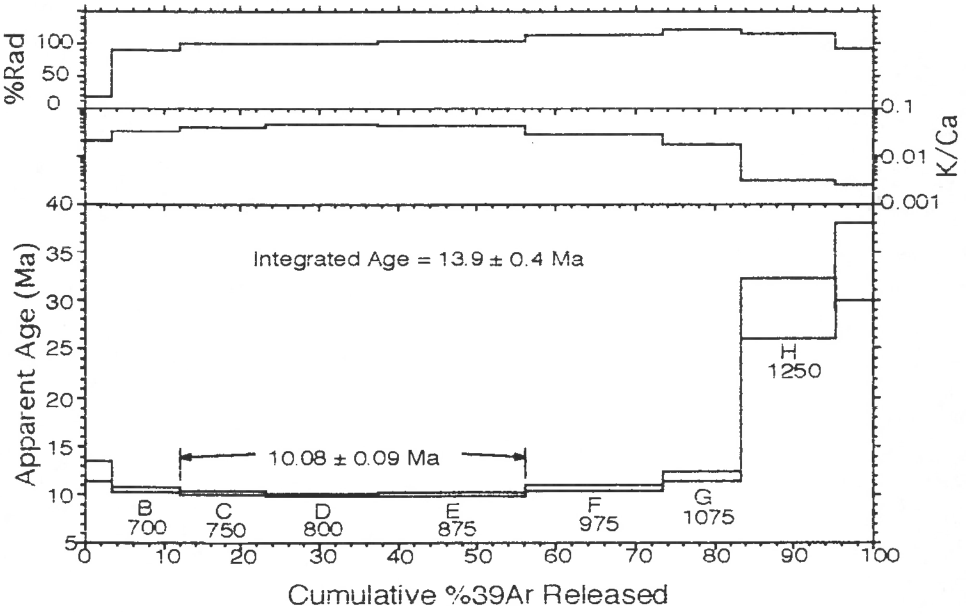

JS-96-4: Mesa de Maya E., L#6536, NM-49
Isochron age (Ma): 5.07±0.02
40Ar/36Ar Int: 298.5±1.7
MSWD: 2.16
All steps
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0.00
0.05
0.10
0.15
0.20
0.25
0.30
39Ar/40Ar


JS-96-5: Horseshoe Crater flow, L#6537, NM-49
%Rad
40
20
0
Ca/K
0.01
0.001
0.0001
Apparent Age (Ma)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0.44 ± 0.08 Ma
A
625
B
700
C
750
D
800
E
875
F
975
G
1075
H
1250
Integrated Age = 1.9 ± 0.3 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

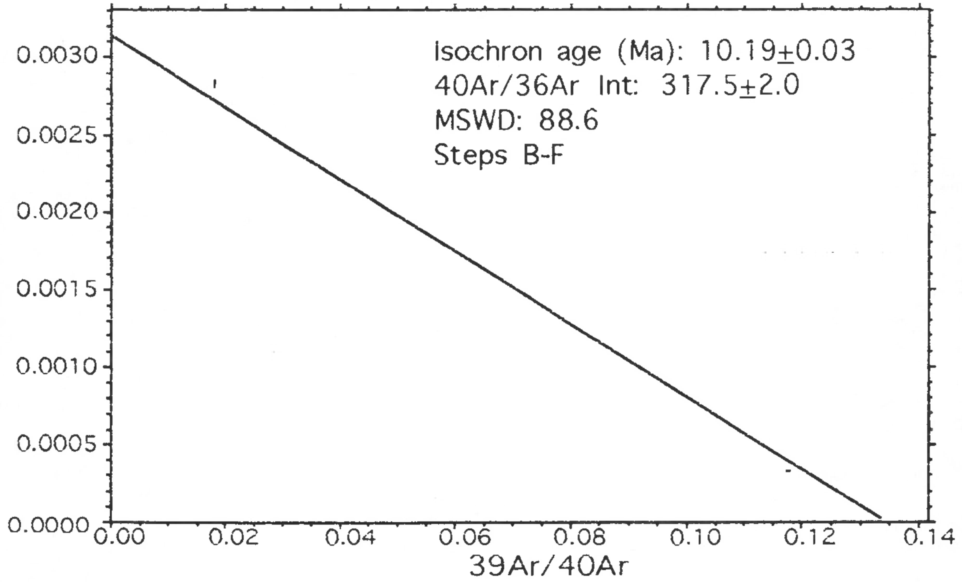

JS-96-5: Horseshoe Crater flow, L#6537, NM-49
Isochron age (Ma): 0.16±0.10
40Ar/36Ar Int: 300.5±2.7
MSWD: 0.43
Steps A-E
36Ar/40Ar
0.0034
0.0030
0.0026
0.0022
0.0018
0.0014
0.0010
0.0006
0.0002
0
1
2
3
4
5
6
7
8
9
10
39Ar/40Ar


JS-96-11: Fischers Peak flow, L#6621, NM-50
%Rad
0
40
80
K/Ca
0.1
0.01
0.001
Apparent Age (Ma)
0
5
10
15
20
25
30
35
40
A
625
B
700
C
750
D
800
E
875
F
975
G
1075
H
1250
I
1650
10.3 ± 0.2 Ma
Integrated Age = 17.2 ± 0.8 Ma
0
10
20
30
40
50
60
70
80
90
100
Cumulative %39Ar Released

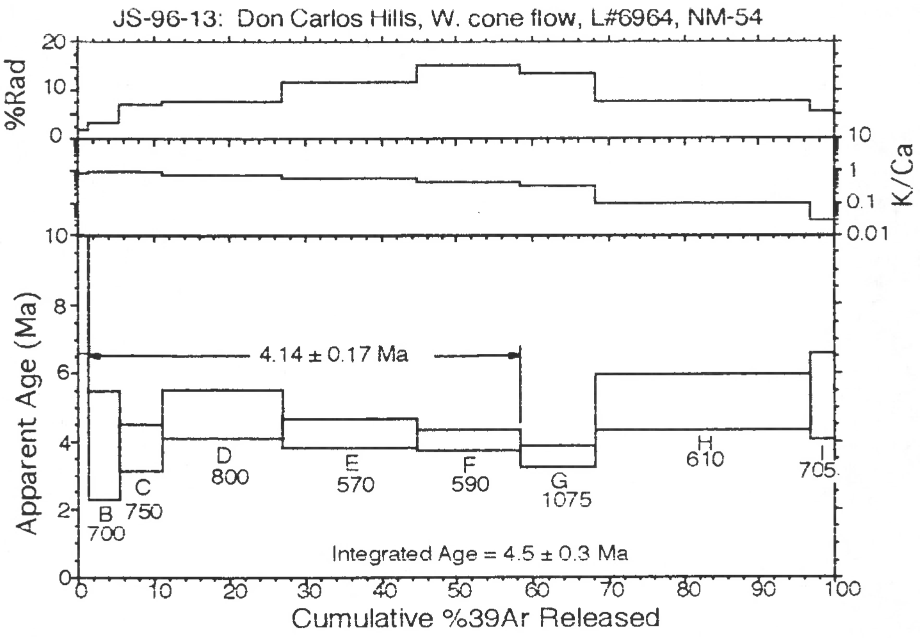

JS-96-11: Fischers Peak flow, L#6621, NM-50
Isochron age (Ma): 9.90±0.06
40Ar/36Ar Int: 303.4±1.4
MSWD: 33.5
Steps B-G
36Ar/40Ar
0.0000
0.0005
0.0010
0.0015
0.0020
0.0025
0.0030
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
39Ar/40Ar



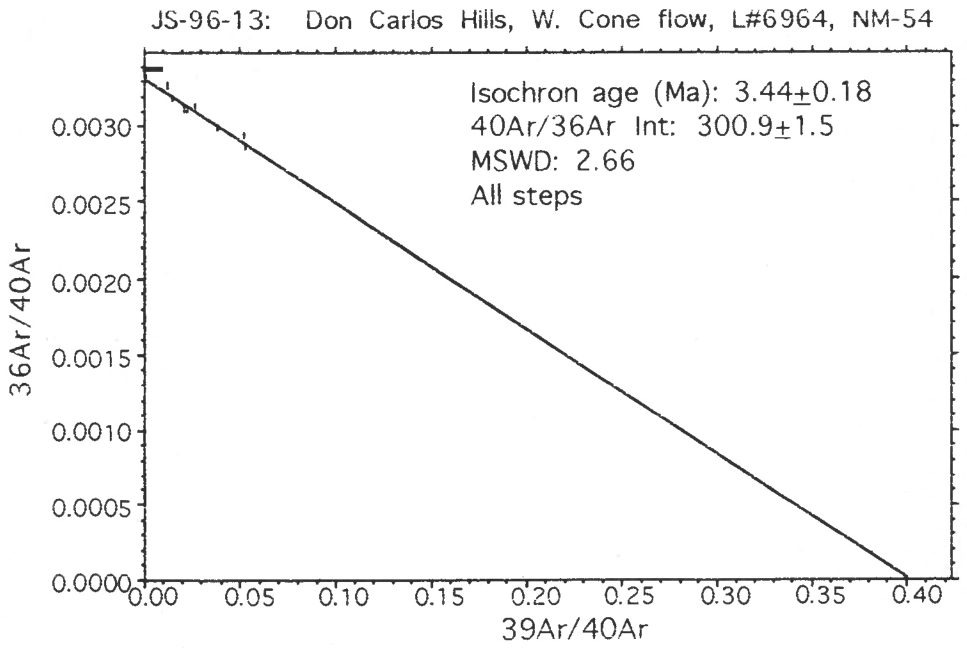
JS-96-12: Fischers Peak flow, L#6622, NM-50



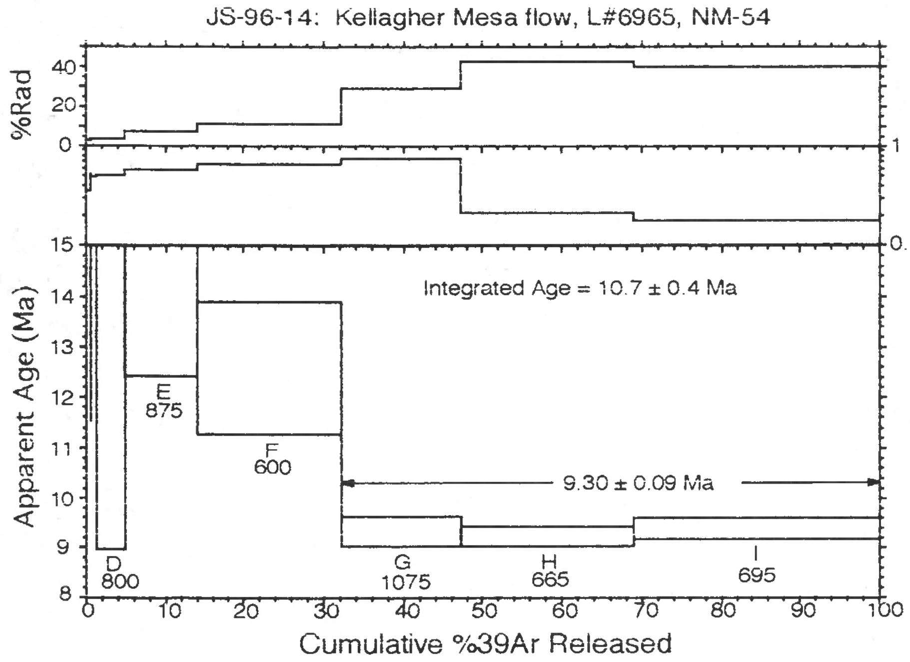
JS-96-12: Fischers Peak flow, L#6622, NM-50

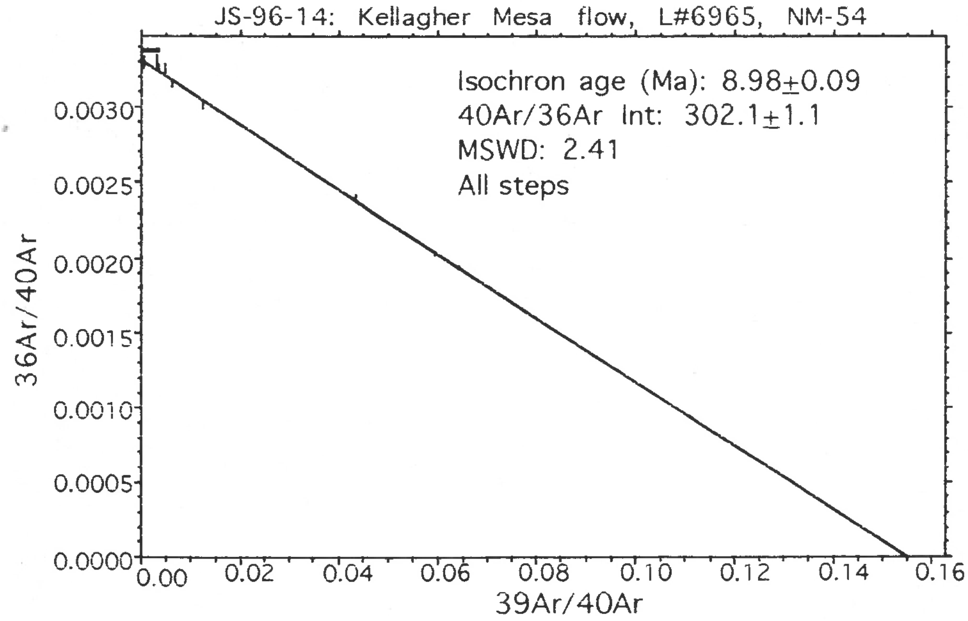


JS-96-13: Don Carlos Hills, W. cone flow, L#6964, NM-54



JS-96-13: Don Carlos Hills, W. Cone flow, L#6964, NM-54


JS-96-14: Kellagher Mesa flow, L#6965, NM-54


JS-96-14: Kellagher Mesa flow, L#6965, NM-54

Appendix C
Sample locations

Names, identifications numbers, respective locations, and elevations for all of the Raton-Clayton volcanic field ^{40}Ar/^{39}Ar samples in this study. The source for all of the sample locations was obtained from U.S.G.S. 7.5 minute series topographic maps.

Sample Name	Sample #	Latitude	Longitude	Elevation (m)
3rd Capulin volcano flow	JS-94-4	36° 44'32"	104°57'38"	2067
Clayton flow, NE of Clayton	JS-94-5	36°28'24"	103°11'46"	1542
Bartlett Mesa flow, N. Raton	JS-95-1	36° 56'34"	104°24'55"	2475
Dale Mtn flow	JS-95-3	36° 55'28"	104°11'13"	2542
Purvine Hills flow	JS-95-5	36° 48'52"	103°51'05"	2048
Carr Mtn flow	JS-95-6	36° 49'07"	103°48'52"	2036
5th Capulin volcano flow	JS-95-7	36° 47'31"	103°58'32"	2200
Sierra Grande, E. stream cut	JS-95-8	36° 41'11"	104°48'19"	1981
Sierra Grande, eroded vent	JS-95-9	36° 42'22"	104°48'29"	2018
Chaco Arroyo flow	JS-95-10	36° 45'20"	104°04'43"	2094
EagleTail Mtn flow	JS-95-12	36° 40'01"	104°23'13"	1981
W. Johnson Mesa flow	JS-95-13	36° 56'18"	104°16'13"	2438
E. Johnson Mesa flow	JS-95-14	36° 54'29"	104°04'13"	2304
Capulin volcano bomb	JS-95-15	36° 46'32"	103°57'46"	2146
Ute Creek flow	JS-95-16	36° 18'17"	103°55'35"	1768
Capulin volcano - Boca	JS-95-17	36° 46'56"	103°59'11"	2237
E. Johnson Mesa flow	JS-95-18	36° 54'31"	104°04'04"	2289
Barela Mesa flow	JS-95-20	36° 58'36"	104°17'36"	2560
Yankee volcano flow	JS-95-21	36° 56'18"	104°18'58"	2256
N. Johnson Mesa flow	JS-95-22	36° 57'26"	104°13'16"	2389
Little Horse Mesa flow	JS-95-23	36° 58'56"	104°24'07"	2524
Trinchera dike	JS-95-25	37° 00'08"	104°03'09"	1859
Block, Trinchera center	JS-95-27	36° 59'24"	104°04'30"	1999
Flow, Trinchera center	JS-95-28	36° 58'46"	104°04'35"	1896
Sierra Grande, E. flow	JS-95-29	36° 48'44"	104°48'52"	2060
Mt Dora summit	JS-95-31	36° 32'26"	103°27'32"	1896
Capulin volcano, crater	JS-95-32	36° 48'54"	103°58'04"	2463

Sample Name	Sample #	Latitude	Longitude	Elevation (m)
Clayton flow, NE	JS-95-34	36°29'48"	103°13'05"	2091
Rabbit Ears flow	JS-95-35	36°32'34"	103°16'45"	1646
Raton dike	JS-95-36	36° 53'44"	104°26'58"	2060
Clayton flow, E.	JS-95-37	36° 32'34"	103°07'34"	1505
Mt Dora flow	JS-95-38	36° 31'40"	103°28'08"	1774
Clayton flow, SW Chavez Mtn	JS-95-40	36°35'43"	103°44'15"	1847
Block, Tripod Mtn	JS-95-42	36°35'30"	103°39'24"	1878
Cow Mtn flow	JS-95-43	36°36'54"	103°46'40"	1963
Twin Mtn flow	JS-95-48	36° 48'04"	103°53'05"	2079
Sierra Grande, E. edge	JS-95-49	36° 42'26"	104° 47'43"	1966
Sierra Grande, N. edge	JS-95-50	36° 49'07"	103°51'33"	2036
Las Mesetas flow	JS-95-51	36° 27'00"	104°04'05"	1951
Chico Hills intrusive	JS-95-52	36° 29'11"	104°04'03"	2079
Rd 193 flow, S.	JS-95-53	36° 31'44"	104°03'52"	2024
"The Crater" flow	JS-95-55	36° 33'51"	104°10'30"	2365
Kiowa Mesa flow	JS-95-56	36° 38'38"	104°37'09"	2182
Upper Folsom Falls flow	JS-95-57	36° 52'17"	103°52'48"	1902
Lower Folsom Falls	JS-95-58	36° 54'04"	103°51'31"	1853
Mesa Larga flow	JS-95-59	36° 41'38"	104°09'04"	2280
Flow beneath Pine Buttes	JS-95-61	36° 36'16"	104°09'50"	2295
Pine Butte center	JS-95-62	36° 36'04"	104°09'45"	2371
Red Mtn flow, older	JS-95-63	36° 40'35"	104°18'30"	2060
Red Mnt flow, younger	JS-95-64	36° 40'33"	104°18'49"	2072
Hwy 193 cone	JS-95-66	36° 36'38"	104°06'55"	2182
Blosser Mesa flow	JS-95-67	36° 42'16"	104°12'45"	2164
Blosser Mesa cone	JS-95-70	36° 42'20"	104°14'15"	2198
Roy flow, W.	JS-96-1	36° 03'31"	103°57'41"	1713
Roy flow, NE	JS-96-2	36°14'40"	103°55'45"	1774
Mesa de Maya flow, W.	JS-96-3	37°11'25"	103°36'11"	
Mesa de Maya flow, E.	JS-96-4	37°09'37"	103°29'14"	
Horseshoe Crater flow	JS-96-5	36° 40'52"	104°00'32"	2118
Mt. Clayton flow	JS-96-6	36° 31'59"	103°37'22"	1878

Appendix C continued

Sample Name	Sample #	Latitude	Longitude	Elevation (m)
Don Carlos Hills flow, E.	JS-96-7	36° 24'04"	103°48'23"	1911
Fischers Peak flow, lower	JS-96-11	37° 00'32"	104°24'15"	2646
Fischers Peak flow, upper	JS-96-12	37° 00'34"	104°24'13"	2676
Don Carlos Hills cone	JS-96-13	36° 23'23"	103°52'19"	2036
Kelleher Mesa flow	JS-96-14	36° 56'42"	104°03'43"	2225