Sanidine, Single Crystal, Laser-fusion $^{40}Ar/^{39}Ar$ Geochronology Database for the Superstition Volcanic Field, Central Arizona

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December, 1998

Arizona Geological Survey Open-File Report 98-27
416 W. Congress, #100
Tucson, Arizona 85701

Jointly funded by the Arizona Geological Survey
and the U.S. Geological Survey STATEMAP Program.
Contracts #1434-94-A-1222, #1434-95-A-1352, #1434-HQ-96-AG-01474

This report is preliminary and has not been edited or reviewed for conformity with Arizona Geological Survey standards

INTRODUCTION

The Superstition volcanic field or Superstition - Superior volcanic field (Sheridan, 1978) of central Arizona has had a long, complex history of geological investigation. Starting along its eastern edge with studies of the Globe-Miami copper district (Ransome, 1903) work has continued for nearly one hundred years mainly in the rugged Superstition Mountains along the eastern fringe of the Phoenix metropolitan area (eg. Peterson, 1960, 1968, 1969; Peterson and others, 1983; Stuckless and Sheridan, 1971; Sheridan and others, 1970; Sheridan, 1987; and Sheridan and Prowell, 1986). Investigations initiated in 1994 by the Arizona Geological Survey concentrated on detailed (1:24,000) mapping of 7.5' quadrangles in the Superior area, Whitlow Canyon area, Goldfield Mountains, Santan Mountains, Superstition Mountains, and along the lower Salt River Canyon (Figure 1). Early on in the investigation, it was determined that the area's stratigraphic framework was considerably different from previous interpretations and that the volcanic field's geochronology was poorly resolved. The previous stratigraphic framework and nomenclature was exceptionally complex (Skotnicki and Ferguson, 1995; Trapp, 1996). Previous workers (principally Stuckless and Sheridan, 1971; Sheridan, 1987) had concluded that the field included at least three large ash-flow tuff cauldrons and that the duration of volcanism spanned over 10 million years from the latest Oligocene (27 Ma) to middle Miocene (15 Ma). Our mapping shows that the field is the source of only one major ash-flow tuff, the 18.58 Ma Apache Leap Tuff, and that this tuff was probably erupted from only one major cauldron (Superstition Cauldron). Sanidine, single-crystal $^{40}Ar/^{39}Ar$ geochronology shows that the lifespan of the field in the vicinity of the cauldron was less than 3 million years (20.5 to 17.9 Ma).

Geochronologic analyses using the highly precise and accurate sanidine, single crystal, laser-fusion $^{40}Ar/^{39}Ar$ technique were initiated in 1995 with 6 samples from a well-preserved series of silicic lavas in a previously unmapped area along the southern edge of the volcanic field (Ferguson and Skotnicki, 1995). This area, along Whitlow Canyon, was chosen because of its structural simplicity, essentially nonexistent hydrothermal alteration, and lack of prexisiting stratigraphic nomenclature. Subsequently, as mapping progressed to the north it became clear that the same general volcanic sequence was present throughout the field, and that there was only one regional, welded ash-flow tuff.

PHILOSOPHY OF SAMPLING

Samples were chosen to define the duration of volcanic sequences or to pinpoint the absolute age of units whose relative ages were already known based on cross-cutting and overlapping stratigraphic relationships established during mapping. Only in rare instances were samples selected to help determine relative age relationships.

During the course of mapping, samples were collected by Arizona Geological Survey geologists for several kinds of dating techniques ranging from whole rock K-Ar, sanidine, hornblende and biotite $^{40}Ar/^{39}Ar$, and U-Pb zircon. However, because fresh unaltered sanidine phenocrysts are abundant throughout the field and because the single-crystal sanidine technique has been proven superior both in terms of precision and accuracy, and simpler in terms of the mechanics of separation and analysis, it was decided that this technique would be used exclusively in this study.

SUMMARY OF STRATIGRAPHIC FRAMEWORK

The stratigraphy of the Superstition volcanic field can be divided into three broadly defined rock-stratigraphic units; pre-cauldron, syn-cauldron, and post-cauldron (Figure 2). The pre and post-cauldron rocks can be further divided into six petrographically distinct intermediate to felsic lava suites. Basalt lavas and sedimentary rocks are found throughout the volcanic pile, but they are only abundant at the top and bottom of the section.

Post-cauldron lavas occur in two chronologic and geographically distinct packages; lavas associated temporally and spatially with the Superstition Cauldron (18.5-18.0 Ma), and a younger (17-16 Ma) sequence of lavas that occur well to the south in the hangingwall of the Concentrator fault, a major west-side-down post-volcanic structure of the Ray - Superior area. The older post-cauldron lavas, referred to as Coffee Flat Mountain Formation occur close to or within the cauldron and consist mostly of crystal-rich rhyodacite or quartz latite (phenocrysts of quartz, sanidine, plagioclase, biotite, $\pm$ hornblende), but the unit also includes rare crystal-poor to aphyric rhyolites, and crystal-rich dacites (phenocrysts of plagioclase, and biotite). The younger post-cauldron lavas to the south consist mostly of crystal-poor, high-silica rhyolites (Peterson, 1966; Creasy and others, 1983).

The principal unit of the syn-cauldron sequence is the Apache Leap Tuff, a crystal-rich quartz latite ash-flow tuff with phenocrysts of plagioclase, quartz, sanidine, and biotite whose areal extent defines the limits of the volcanic field. The Apache Leap Tuff as defined by recent mapping and geochronology includes all exposures of tuff that were previously referred to as Superstition Tuff in the Superstition Mountains (eg. Stuckless and Sheridan, 1971; Skotnicki and Ferguson, 1995; Skotnicki and Ferguson, 1996; Gilbert and Ferguson, 1997; Ferguson and Gilbert, 1997), tuff of Comet Peak in the Florence Junction area (Ferguson and Skotnicki, 1995) and welded tuff in the Santan Mountains (Ferguson and Skotnicki, 1996).

Pre-cauldron lavas, collectively referred to as the Superstition Group, are divided into three formations. The formations appear to be both rock-stratigraphic units (defined by distinctive phenocryst assemblages) and time-stratigraphic units (bracketed into specific intervals of geologic time). There is little or no interfingering of the petrologic suites of lavas which define the formations. The formations are, from top to bottom: 1) Whitlow Canyon Formation (18.7 - 18.6 Ma) consisting of moderately crystal-poor (5-10%), quartz, sanidine, plagioclase, and biotite-bearing lavender-colored rhyodacite lava, 2) Tule Canyon Formation (19.0 - 18.7 Ma) consisting of crystal-poor (<5%), plagioclase, sanidine, biotite-bearing, rhyolite lava and nonwelded tuff, 3) Government Well Formation (> 19.0 and < 20.5 Ma) consisting of interbedded basaltic, andesitic, and dacite lava.

The Superstition Group overlies pre-Tertiary rocks throughout most of the volcanic field, but in some areas it overlies nonvolcaniclastic conglomerate of the Whitetail Formation (Ransome, 1903) which contains rare, thin tuffs. In the southern part of the field, where Apache Leap Tuff directly overlies the conglomerate, tuffs near the top of the unit have yielded dates of 18.7 and 19.0 Ma (Tule Canyon Formation age). To the northwest however, where Whitetail Formation is overlain by Government Well Formation, thin tuffs and two deeply eroded lava domes (rhyolite of Bulldog Canyon) within the upper part of the Whitetail Formation have yielded dates of 20.5 Ma, demonstrating the widely time-transgressive nature of the Whitetail Formation's upper contact.

The unit of Buzzards Roost, a sanidine, plagioclase, biotite-bearing rhyodacite lava overlies the Superstition Group, but its age relationship to Apache Leap Tuff is uncertain. Because the interval of time which spans the youngest pre-cauldron, and oldest post-cauldron lavas is so short (i.e. ages are within analytical error) and the age of the Buzzards Roost lava falls within this interval, a definitive assignment of pre- or post-cauldron can not be made for

this unit.

DESCRIPTION OF THE DATABASE

Dates are listed from youngest to oldest within each unit, and from the youngest to the oldest unit. There is some overlap between the oldest and youngest ages for adjacent units. The geochronologic data are provided in two tables. Table 1 provides a summary of all the dates and lists mean ages for each unit with analytical procedures described in a footnote. Table 2 lists the data for each individual crystal with analytical procedures described in a footnote. A series of probability distribution diagrams for each sample are also provided (Figure 3). Table 3 contains specific information about the location, petrology, quality and justification for collecting each sample, and also includes the map unit name in the most recently published geologic map of the sampled area.

ACKNOWLEDGMENTS

Geochronology samples were collected by Arizona Geological Survey geologists as part of STATEMAP funded mapping projects in 1995, 1996, and 1997. Samples were collected by Charles Ferguson, Steve Skotnicki, Wyatt Gilbert, Jon Spencer, and Steve Richard. Lisa Peters of New Mexico Tech's geochronology lab prepared the mineral separates. Steve Skotnicki drew Figure 2. The analyses were paid for by STATEMAP contracts #1434-94-A-1222, #1434-95-A-1352, and #1434-HQ-96-AG-01474.

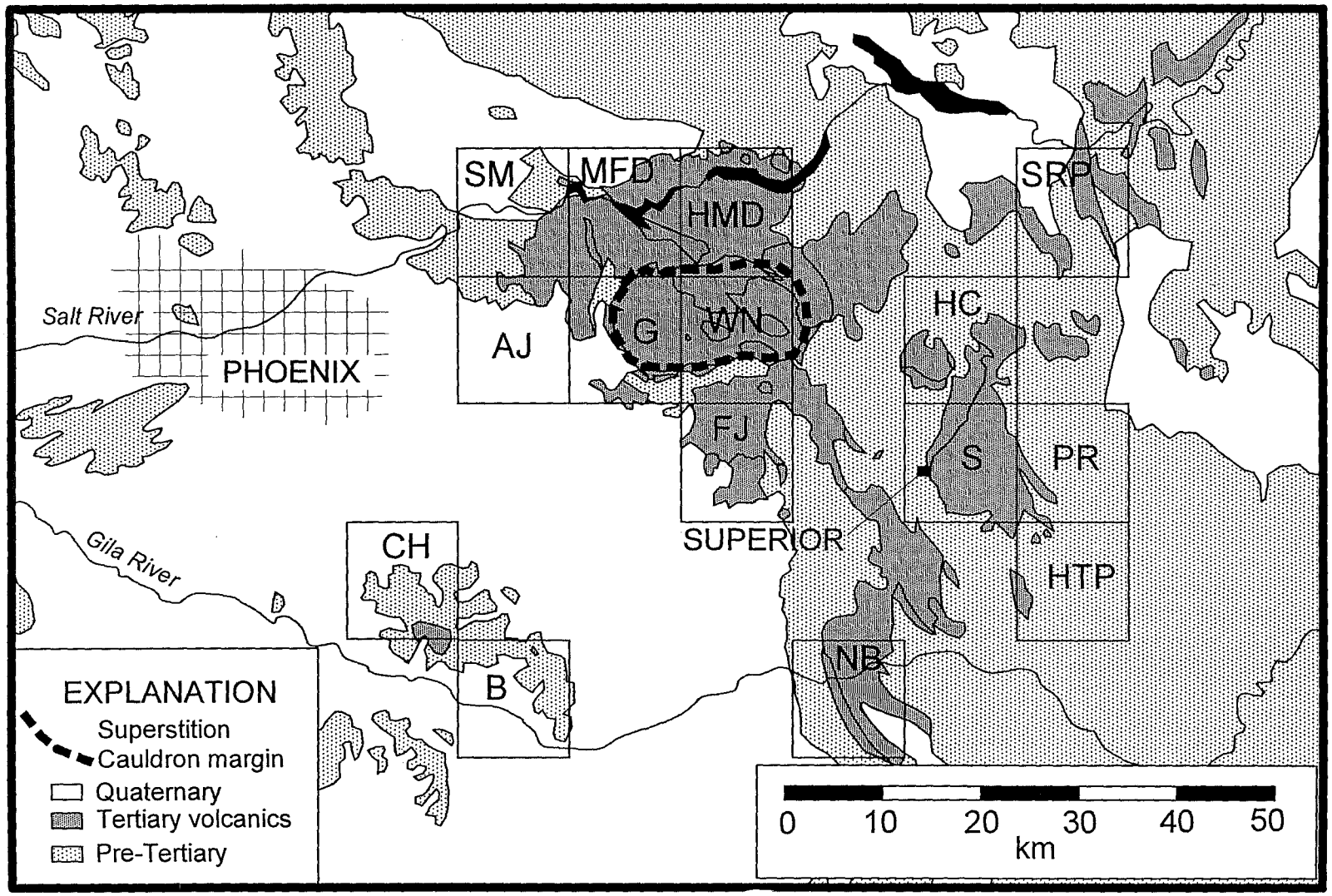

Figure 1 Simplified geology of the Superstition volcanic field showing the location of 7.5' quadrangles with geochronology sample locations. 7.5' USGS quadrangle names: **AJ**=Apache Junction, **B**=Blackwater, **CH**=Chandler Heights, **FJ**=Florence Junction, **G**=Goldfield, **HC**=Haunted Canyon, **HMD**=Horse Mesa Dam, **HTP**=Hot Tamale Peak(formerly Sonora), **MFD**=Mormon Flat Dam, **NB**=North Butte, **PR**=Pinal Ranch, **S**=Superior, **SM**=Stewart Mountain, **SRP**=Salt River Peak, **WN**=Weavers Needle.

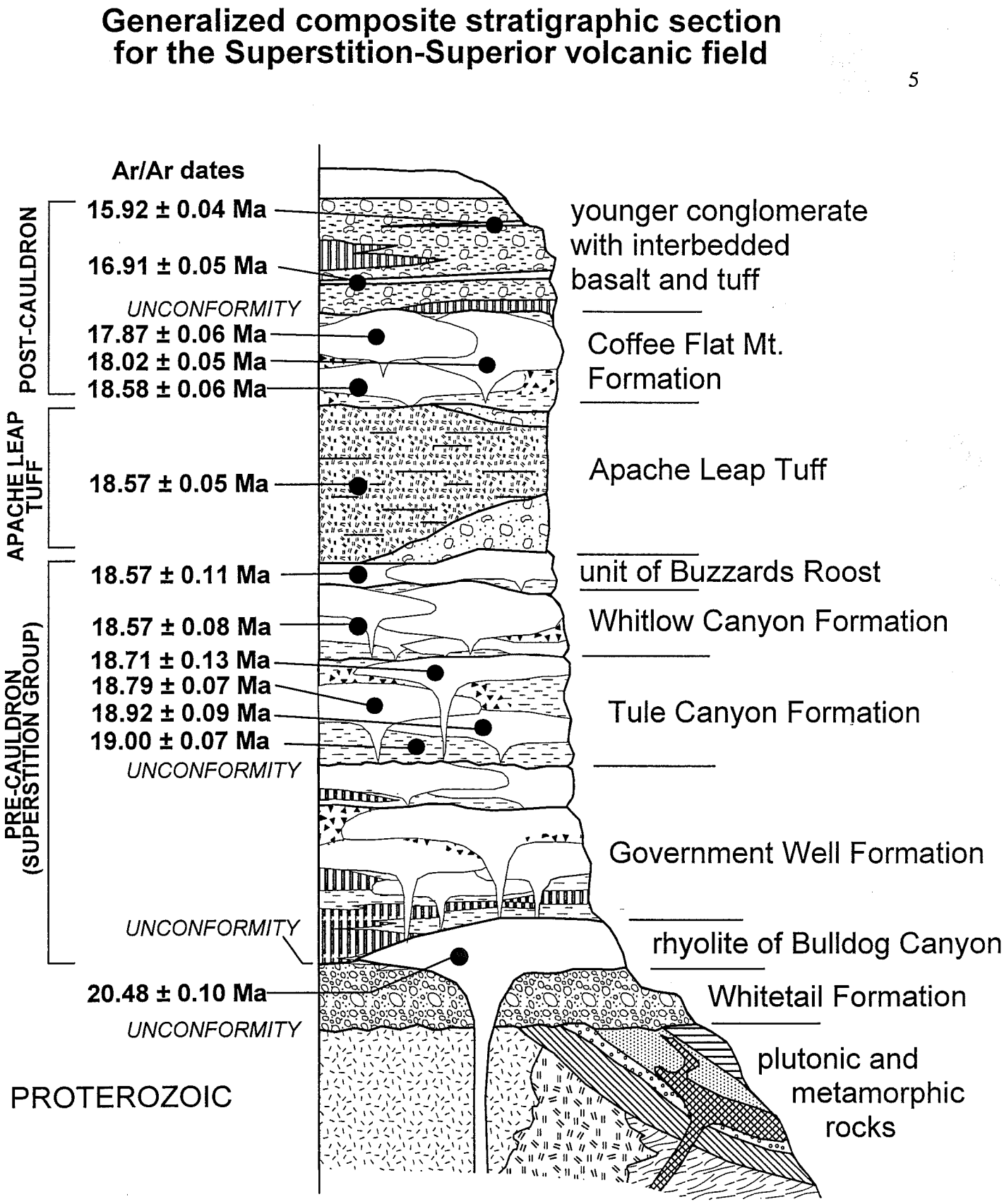

Figure 2 Generalized volcanic stratigraphy of the Superstition volcanic field in the vicinity of the Superstition Cauldron.

Table 1. Summary of $^{40}Ar/^{39}Ar$ single-crystal laser-fusion results from Superstition volcanic field rhyolitic tuffs and lavas.

Unit	Index	Sample	Quad	UTM Northing	UTM ea	L#	Irradiation	n	K/Ca	±2σ	Age	±2σ
Distal Post-cauldron units												
	1	J-4-11-96-2	S	3679175	490785	8121	NM-71	16	97.7	14.0	15.92	0.04
	2	J-1-17-96-1	NB	3664000	486295	8122	NM-71	14	80.6	17.3	16.18	0.05
	3	J-4-8-97-1	PR	3679525	504580	8123	NM-71	14	71.5	8.2	16.91	0.05
		mean						**3**			**16.27**	**0.56**
Coffee Flat Mountain Formation												
	4	FZ-11	MFD	3708085	463525	8126	NM-71	14	51.3	17.5	17.87	0.06
	5	FZ-80	WN	3705640	471320	9005	NM-87	12	52.2	14.8	18.01	0.10
	6	SS-1-12-95-2	WN	3695660	474875	6631	NM-50	14	66.7	16.4	18.02	0.05
	7	FS-297	WN	3693990	472105	5878	NM-41	15	52.1	23.0	18.08	0.08
	8	SS-4-8-92-1	WN	3699020	465640	9007	NM-87	19	40.1	11.1	18.15	0.06
	9	FZ-38	HMD	3709350	471485	8132	NM-71	15	38.9	5.4	18.24	0.08
	10	FS-298	WN	3694105	471635	5872	NM-41	10	42.4	4.9	18.30	0.07
	11	FZ-41	HMD	3709615	474685	8127	NM-71	15	44.3	10.9	18.42	0.06
	12	FZ-45	MFD	3709980	456695	8133	NM-71	18	54.2	16.2	18.47	0.05
	13	FZ-10	MFD	3711065	463930	8142	NM-71	14	55.9	21.0	18.53	0.13
	14	FS-163	WN	3696235	470505	6551	NM-49	12	50.9	15.1	18.58	0.06
		mean						**11**			**18.24**	**0.15**
Apache Leap Tuff												
	15	FZ-50	MFD	3709715	455420	8135	*NM-71*	*5*	*37.9*	*40.9*	*18.35*	*0.08*
	16	FY-85-9	G	3700650	462690	5877	NM-41	9	53.2	14.5	18.47	0.08
	17	FS-307	FJ	3684190	474385	5874	NM-41	10	47.0	17.2	18.50	0.07
	18	FX-187	FJ	3684235	466960	6624	NM-50	14	49.7	21.5	18.52	0.06
	19	FZ-7	MFD	3710370	464555	8128	NM-71	13	47.0	29.0	18.53	0.06
	20	FX-84	B	3663480	448635	6626	NM-50	9	36.5	28.2	18.55	0.07
	21	FS-162	WN	3698010	468120	6547	NM-49	15	50.4	20.9	18.56	0.07
	22	F8-148	MFD	3709170	461280	9006	NM-87	10	50.1	7.1	18.57	0.08
	23	FX-186	FJ	3684385	474285	6636	NM-50	4	26.7	58.7	18.57	0.09
	24	FY-81-47	G	3698145	461910	8999	NM-87	15	48.5	6.4	18.58	0.05
	25	FX-193	S	3685040	492800	6549 & 9010	NM-49 & 87	26	33.5	16.9	18.58	0.05
	26	FX-5	CH	3666315	438495	6639	NM-50	11	41.4	21.2	18.58	0.08
	27	FY-81-45	G	3698135	461735	8998	NM-87	15	46.1	6.5	18.59	0.05
	28	FZ-60	HMD	3718315	472605	8139	NM-71	16	55.5	20.7	18.60	0.06
	29	F8-102	MFD	3708125	455870	9003	NM-87	12	52.7	10.5	18.61	0.07
	30	F8-101	MFD	3708065	456135	9002	NM-87	15	36.6	17.6	18.61	0.07
	31	FZ-90	WN	3704550	472280	8137	NM-71	12	47.1	11.2	18.61	0.07
	32	FX-194	S	3685565	494785	6601 & 6627	NM-50	17	41.0	34.4	18.63	0.06
	33	FY-81-49	G	3698160	462025	9000	NM-87	12	49.2	8.5	18.64	0.06
	34	SS-12-10-97-1	SRP	3713185	500440	9004	NM-87	11	42.5	3.3	18.66	0.06
	35	FX-10	CH	3665530	438660	6635	*NM-50*	*8*	*59.1*	*18.1*	*18.92*	*0.09*
		mean						**19**			**18.58**	**0.03**
rhyodacite of Buzzards Roost												
	36	FX-183	FJ	3689990	474305	6539	NM-49	14	37.0	20.9	18.53	0.07
	37	FS-301	WN	3692995	472545	5868	NM-41	9	31.8	7.8	18.62	0.08
		mean						**2**			**18.57**	**0.11**
Whitlow Canyon Formation												
	38	FX-182	FJ	3689860	474185	6540	NM-49	13	32.1	6.7	18.53	0.07
	39	FS-300	WN	3693275	472100	5875	NM-41	9	17.5	4.4	18.54	0.10
	40	FX-185	FJ	3685025	474090	6541	NM-49	15	25.9	10.2	18.62	0.06
	41	F8-149	MFD	3709040	461700	9001	NM-87	13	30.3	4.0	18.75	0.08
	42	SS-4-12-96-4	G	3702570	461510	6666	NM-50	16	44.2	9.7	18.75	0.07
		mean						**5**			**18.64**	**0.10**

Table 1. Summary of $^{40}Ar/^{39}Ar$ single-crystal laser-fusion results from Superstition volcanic field rhyolitic tuffs and lavas.

Unit	Index	Sample	Quad	UTM Northing	UTM ea	L#	Irradiation	n	K/Ca	±2σ	Age	±2σ
Tule Canyon Formation												
	43	J-3-5-97-1	HC	3698150	497980	8124	NM-71	7	3.9	6.5	18.34	0.36
	44	FZ-13	MFD	3708870	463325	8134	NM-71	5	48.2	27.9	18.61	0.24
	45	FZ-44	MFD	3710095	456835	8138	NM-71	11	7.9	9.1	18.71	0.13
	46	J-2-3-97-2	HTP	3670610	501850	8125	NM-71	25	73.8	56.3	18.72	0.11
	47	FX-133	AJ	3706410	449255	6545	NM-49	14	11.3	12.2	18.79	0.07
	48	FX-181	AJ	3704540	444910	6550	NM-49	15	16.0	10.9	18.79	0.10
	49	FZ-32	MFD	3708235	457020	8129	NM-71	14	55.9	18.9	18.80	0.11
	50	FZ-12	MFD	3708465	463370	8141	NM-71	17	18.8	13.5	18.80	0.11
	51	FX-135	AJ	3706300	448780	6637	NM-50	15	9.3	6.3	18.81	0.13
	52	FX-179	AJ	3705765	447825	6552	NM-49	14	13.1	16.3	18.83	0.07
	53	FX-184	FJ	3688510	474260	6543	NM-49	14	48.1	15.2	18.84	0.07
	54	SS-2-27-96-1	AJ	3706295	450585	6630	NM-50	10	10.2	11.1	18.86	0.11
	55	FX-130	AJ	3706330	450060	6542	NM-49	13	55.4	27.0	18.88	0.07
	56	FX-180	SM	3706700	448640	6544	NM-49	9	46.8	48.7	18.89	0.08
	57	FZ-49	MFD	3711030	455225	8140	NM-71	5	19.7	7.1	18.89	0.13
	58	FZ-81	MFD	3714590	456900	8130	NM-71	9	36.4	22.6	18.91	0.20
	59	FZ-53	HMD	3714210	471495	8131	NM-71	12	55.3	8.1	18.92	0.07
	60	FZ-85	MFD	3714500	459775	8136	NM-71	15	3.7	1.0	18.92	0.09
	61	SMR-12-1-95-3	NB	3663620	480780	6665	NM-50	14	39.0	31.8	18.96	0.06
	62	FX-178	AJ	3705620	448025	6628	NM-50	14	54.9	41.2	19.00	0.07
		mean						**20**			**18.87**	**0.04**
Rhyolite of Bulldog Canyon												
	63	FX-176	AJ	3704985	449030	6546	NM-49	5	104.4	28.7	20.43	0.08
	64	FX-174	AJ	3704675	448555	6625	NM-50	12	106.9	81.4	20.52	0.08
	65	FX-137	AJ	3703710	444865	6629	NM-50	3	112.9	148.5	20.54	0.16
	66	FX-115	AJ	3703265	449285	6548	NM-49	25	89.9	69.9	20.61	0.07
		mean						**4**			**20.53**	**0.10**

Notes: Individual lines provide the following parameters for each sample: sample index number, sample field number, 7.5' quadrangle map: AJ=Apache Junction, B=Blackwater, CH=Chandler Heights, FJ=Florence Junction, G=Goldfield, HC=Haunted Canyon, HMD=Horse Mesa Dam, HTP=Hot Tamale Peak, MFD=Mormon Flat Dam, NB=North Butte, PR=Pinal Ranch, S=Superior, SM=Stewart Mountain, SRP=Salt River Peak, WN=Weavers Needle,
UTM grid zone 12 location, lab ID number, irradiation batch, lab ID number, n = number of single-crystal analyses, mean K/Ca value ± 2 σ, and weighted mean age ± 2σ. Summary lines for each unit provide n = number of samples , mean K/Ca ratio ± 2 σ, and weighted mean age ± 2σ. Weighted mean and error values calculated by inverse varience weighting (Samson and Alexander, 1987).
Data shown in italics are excluded from mean age calculations.

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

Notes: Header lines provide sample index number, sample field number, irradiation J parameter, irradiation batch, and lab ID number for each analyzed sample. Each data line repesents a laser-fusion analysis of a single sanidine crystal. Measured isotopic ratios are for corrected for blank, radioactive decay, and mass discrimination, but not corrected for interferring reactions.

$^{39}Ar_K$ denotes number of moles of ^{39}Ar produced from neutron irradiation of K. $\%^{40}Ar^*$ denotes percentage of

measured 40Ar that is radiogenically derived (non-atmospheric). K/Ca is the molar ratio calculated from 39ArK and 37ArCa. Age errors for individual analyses show analytical error only.

Data shown in italics are excluded from weighted mean age calculations.

Weighted mean lines show n = number of individual crystal analyses used in mean, mean K/Ca value ± 2 σ, and weighted mean age ± 2σ, calculated by inverse varience weighting (Samson and Alexander, 1987).

Mean age errors include errors in J and irradiation parameters.

Decay constant and isotopic abundances after Steiger and Jaeger (1977).

Sample preparation and irradiation: Sanidine separated by crushing, LST heavy liquid, Franz, HF, then irradiated in machined Al discs in the D-3 position, Nuclear Science Center, College Station, TX. Irradiation durations for each irradiation batch are: NM-50, 87 = 7 hrs, NM-49 = 7.6 hrs, NM-41, 71 = 14 hrs. Neutron flux monitored by interlaboratory standard Fish Canyon Tuff sanidine FC-1 with an assigned age of 27.84 Ma (Deino and Potts, 1990), relative to Mmhb-1 at 520.4 Ma (Samson and Alexander, 1987).

Instrumentation: Mass Analyzer Products 215-50 mass spectrometer on line with automated, all-metal extraction system at New Mexico Geochronology Research Laboratory, Socorro. Individual sanidine crystals were fused in vacuo by a 10W continuous CO_2 laser.

Reactive gasses removed for 1 to 2 minutes by SAES GP-50 getters operated at 20°C and ~450°C.

Analytical parameters: Electron multiplier sensitivity = 5 x 10^{-17} moles/pA; average system blanks = 300, 5, 1, 3, 3 x 10^{-18} moles at masses 40, 39, 38, 37, 36 respectively. J-factors determined to a precision of ± 0.2% by CO_2 laser-fusion of 4 to 6 single crystals from each of 4 to 6 radial positions around irradiation vessel. Correction factors for interfering nuclear reactions, determined using K-glass and CaF_2, $(^{40}Ar/^{39}Ar)_K$ = 0.00020±0.0003; $(^{36}Ar/^{37}Ar)_{Ca}$ = 0.00026±0.00002; and $(^{39}Ar/^{37}Ar)_{Ca}$ = 0.00070±0.0000

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Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
1) J-4-11-96-2, J=0.001576079±0.10%, NM-71, Lab#=8121								
12	5.704	0.0052	0.3603	17.9	98.2	98.1	15.85	0.07
05	5.649	0.0050	0.1465	30.2	102.5	99.2	15.87	0.06
13	5.665	0.0052	0.1900	34.9	98.1	99.0	15.88	0.06
07	5.730	0.0050	0.3965	37.6	102.4	98.0	15.89	0.06
18	5.760	0.0053	0.4955	23.1	95.6	97.5	15.89	0.07
17	5.649	0.0055	0.1047	35.2	93.3	99.5	15.90	0.05
02	6.398	0.0046	2.623	34.4	110.1	87.9	15.92	0.09
03	5.652	0.0051	0.0886	30.6	99.7	99.5	15.93	0.07
16	6.731	0.0055	3.739	39.5	92.6	83.6	15.93	0.09
14	5.728	0.0056	0.3402	38.2	90.7	98.2	15.93	0.06
09	5.677	0.0055	0.1662	45.4	93.3	99.1	15.93	0.06
01	5.687	0.0049	0.1635	46.5	103.2	99.2	15.96	0.06
15	5.653	0.0054	0.0469	15.7	94.3	99.8	15.96	0.09
10	5.663	0.0050	0.0672	40.6	101.7	99.7	15.97	0.06
04	5.677	0.0048	0.1070	41.9	106.8	99.4	15.98	0.06
11	5.685	0.0063	0.1238	29.9	81.1	99.4	15.99	0.06
08	*5.770*	*0.0062*	*0.2705*	*34.4*	*82.2*	*98.6*	*16.11*	*0.06*
06	*6.821*	*0.0054*	*3.508*	*38.1*	*95.3*	*84.8*	*16.37*	*0.10*
weighted mean			n=16	97.7	±14.0		15.92	0.04
2) J-1-17-96-1, J=0.001575215±0.10%, NM-71, Lab#=8122								
28	*5.686*	*0.0076*	*0.1305*	*6.14*	*67.4*	*99.3*	*15.98*	*0.13*
23	5.713	0.0060	0.0675	27.1	85.2	99.7	16.11	0.07
20	5.788	0.0063	0.3033	13.0	80.4	98.5	16.12	0.08
22	5.766	0.0065	0.1953	24.8	79.0	99.0	16.15	0.06
06	5.733	0.0056	0.0684	22.1	91.1	99.7	16.16	0.08
27	5.722	0.0067	0.0235	16.3	76.2	99.9	16.17	0.07
04	5.747	0.0060	0.1059	29.2	85.0	99.5	16.17	0.08
02	5.804	0.0074	0.2951	14.8	68.6	98.5	16.18	0.08
07	5.772	0.0057	0.1785	14.7	89.3	99.1	16.18	0.08
24	5.735	0.0054	0.0487	12.6	93.7	99.8	16.19	0.08
08	5.760	0.0061	0.1192	37.5	84.3	99.4	16.20	0.06
11	5.812	0.0071	0.2840	32.5	72.1	98.6	16.21	0.07
26	5.746	0.0062	0.0429	6.55	82.1	99.8	16.22	0.12
14	5.775	0.0065	0.0822	25.5	78.9	99.6	16.27	0.06
13	5.908	0.0081	0.5084	4.69	62.8	97.5	16.29	0.17
weighted mean			n=14	80.6	±17.3		16.18	0.05
3) J-4-8-97-1, J=0.001574373±0.10%, NM-71, Lab#=8123								
07	6.021	0.0077	0.2415	21.7	66.1	98.8	16.82	0.08
06	6.003	0.0074	0.1756	29.3	69.3	99.1	16.83	0.07
08	6.060	0.0077	0.3236	15.4	66.4	98.4	16.86	0.08
09	6.033	0.0076	0.2269	19.7	66.8	98.9	16.87	0.08
03	6.013	0.0072	0.1553	19.8	71.1	99.2	16.87	0.06
02	6.092	0.0077	0.4128	17.4	65.9	98.0	16.88	0.07

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
3 continued) J-4-8-97-1, J=0.001574373±0.10%, NM-71, Lab#=8123								
15	5.984	0.0069	0.0250	25.1	73.9	99.9	16.90	0.07
05	6.020	0.0066	0.1404	31.5	76.9	99.3	16.90	0.06
01	6.007	0.0067	0.0682	22.6	76.2	99.7	16.93	0.07
14	5.994	0.0068	0.0222	22.8	75.3	99.9	16.93	0.08
11	6.027	0.0068	0.1103	13.5	75.4	99.5	16.95	0.08
04	6.036	0.0070	0.1053	20.2	73.1	99.5	16.98	0.07
10	6.027	0.0073	0.0447	18.0	69.5	99.8	17.00	0.07
12	6.055	0.0068	0.0725	14.6	74.9	99.7	17.06	0.08
weighted mean			n=14	71.5	±8.2		16.91	0.05
4) FZ-11, J=0.001572906±0.10%, NM-71, Lab#=8126								
10	*6.430*	*0.0100*	*0.6986*	*6.16*	*51.2*	*96.8*	*17.58*	*0.17*
08	6.490	0.0144	0.6618	4.64	35.3	97.0	17.78	0.23
05	6.502	0.0100	0.6917	11.1	50.8	96.9	17.78	0.10
12	6.434	0.0117	0.4340	20.7	43.6	98.0	17.81	0.09
09	6.417	0.0092	0.3676	16.3	55.5	98.3	17.82	0.08
01	6.420	0.0090	0.3593	15.4	56.7	98.4	17.83	0.09
06	6.578	0.0126	0.8939	14.9	40.4	96.0	17.83	0.09
02	6.440	0.0088	0.4145	11.6	58.0	98.1	17.84	0.10
07	6.532	0.0086	0.7118	10.0	59.1	96.8	17.85	0.11
13	6.396	0.0083	0.2096	18.0	61.6	99.0	17.89	0.16
11	6.667	0.0102	1.112	18.6	49.8	95.1	17.90	0.08
14	6.561	0.0083	0.7482	12.5	61.4	96.6	17.90	0.11
15	6.437	0.0105	0.3104	13.7	48.6	98.6	17.92	0.09
04	6.477	0.0088	0.3951	17.3	58.1	98.2	17.96	0.09
03	6.562	0.0130	0.5531	12.9	39.3	97.5	18.07	0.10
weighted mean			n=14	51.3	±17.5		17.87	0.06
5) FZ-80, J=0.000807486 ±0.09%, NM-87, Lab#=9005								
14	12.43	0.0075	0.6918	0.973	67.7	98.4	17.72	0.59
13	12.99	0.0096	2.297	2.30	52.9	94.8	17.84	0.28
01	12.46	0.0123	0.3143	2.81	41.3	99.3	17.93	0.26
12	13.40	0.0127	3.468	3.64	40.1	92.4	17.95	0.19
15	12.72	0.0084	1.155	2.31	60.6	97.3	17.95	0.27
07	12.54	0.0112	0.5242	3.08	45.4	98.8	17.95	0.22
08	12.49	0.0073	0.3672	1.63	70.3	99.1	17.95	0.36
06	12.59	0.0080	0.6865	2.35	63.5	98.4	17.96	0.26
09	12.95	0.0299	1.761	1.01	17.1	96.0	18.02	0.56
02	12.86	0.0084	1.449	2.43	60.9	96.7	18.03	0.28
05	12.72	0.0100	0.7552	6.18	50.8	98.2	18.11	0.12
04	12.58	0.0092	0.2305	3.35	55.6	99.5	18.14	0.20
weighted mean			n=12	52.2	±14.8		18.01	0.10

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
6) SS-1-12-95-2, J=0.000778059±0.09%, NM-50, Lab#=6631								
14	13.07	0.0071	0.7690	3.62	71.7	98.3	17.94	0.10
01	13.18	0.0071	1.109	3.98	72.2	97.5	17.95	0.10
06	18.02	0.0099	17.44	4.63	51.5	71.4	17.98	0.17
12	13.78	0.0070	3.063	4.72	72.5	93.4	17.98	0.10
04	13.19	0.0071	1.084	6.27	72.2	97.6	17.98	0.09
08	13.32	0.0100	1.469	6.20	51.2	96.7	17.99	0.09
05	13.41	0.0069	1.757	6.60	74.5	96.1	18.01	0.09
02	13.21	0.0072	1.017	6.50	71.0	97.7	18.03	0.08
09	14.51	0.0073	5.385	5.17	70.0	89.0	18.04	0.11
03	13.48	0.0094	1.886	5.26	54.3	95.9	18.05	0.09
15	13.50	0.0073	1.944	7.55	70.1	95.7	18.06	0.09
13	13.33	0.0077	1.358	9.68	66.6	97.0	18.06	0.09
10	13.08	0.0072	0.5069	8.60	71.2	98.9	18.06	0.09
07	13.41	0.0079	1.421	6.46	64.3	96.9	18.14	0.09
weighted mean			n=14	66.7	±16.4		18.02	0.05
7) FS-297, J=0.00144923±0.14%, NM-41, Lab#=5878								
8	6.955	0.0080	0.2198	8.17	63.7	99.1	17.93	0.13
1	6.989	0.0076	0.3165	20.4	66.7	98.7	17.94	0.09
2	7.399	0.0109	1.690	8.48	46.7	93.3	17.95	0.12
33	6.978	0.0949	0.2894	3.88	5.4	98.9	17.95	0.12
9	*7.841*	*0.0096*	*3.120*	*8.59*	*52.9*	*88.2*	*18.00*	*0.14*
5	7.245	0.0091	1.074	6.39	55.8	95.6	18.02	0.12
28	6.972	0.0032	0.1466	4.37	161.4	99.4	18.03	0.11
36	7.050	0.0365	0.3835	2.98	14.0	98.4	18.05	0.14
34	7.640	0.0172	2.302	12.0	29.7	91.1	18.11	0.10
10	7.077	0.0081	0.3778	12.6	63.2	98.4	18.12	0.12
27	7.102	0.0155	0.4600	11.4	32.9	98.1	18.12	0.09
7	7.529	0.0109	1.857	11.3	47.0	92.7	18.16	0.15
37	7.073	0.0000	0.2805	2.13	-	98.8	18.18	0.17
29	*8.194*	*0.0174*	*4.054*	*20.8*	*29.3*	*85.4*	*18.20*	*0.12*
32	7.036	0.0016	0.1283	4.71	324.1	99.5	18.20	0.11
39	7.061	0.0270	0.2173	7.75	18.9	99.1	18.21	0.10
26	*8.253*	*0.0013*	*4.210*	*20.5*	*378.7*	*84.9*	*18.23*	*0.11*
3	*8.510*	*0.0189*	*5.021*	*20.4*	*26.9*	*82.6*	*18.28*	*0.12*
38	*9.325*	*0.0315*	*7.725*	*14.3*	*16.2*	*75.5*	*18.33*	*0.15*
30	7.112	0.0000	0.2221	4.74	-	99.1	18.33	0.12
25	*8.684*	*0.0193*	*5.452*	*19.1*	*26.4*	*81.5*	*18.40*	*0.13*
4	*8.697*	*0.0104*	*5.469*	*10.7*	*49.2*	*81.4*	*18.42*	*0.14*
6	*9.186*	*0.0104*	*7.073*	*19.1*	*49.2*	*77.3*	*18.46*	*0.17*
35	*12.75*	*0.0870*	*19.13*	*4.68*	*5.9*	*55.7*	*18.47*	*0.33*
31	*7.483*	*0.0603*	*0.5262*	*3.27*	*8.5*	*98.0*	*19.07*	*0.14*
weighted mean			n=15		52.1 ±23.0		18.08	0.08

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
8) SS-4-8-97-1, J=0.000807474 ±0.09%, NM-87, Lab#=9007								
09	12.89	0.0120	2.216	1.69	42.6	94.9	17.74	0.50
02	12.61	0.0141	0.8673	2.55	36.2	98.0	17.91	0.40
10	12.60	0.0130	0.5748	3.22	39.1	98.7	18.02	0.26
15	12.57	0.0145	0.4388	4.15	35.2	99.0	18.03	0.17
11	12.54	0.0131	0.3247	4.47	39.0	99.2	18.04	0.17
12	12.91	0.0151	1.578	2.87	33.7	96.4	18.04	0.24
18	12.53	0.0139	0.2528	4.21	36.7	99.4	18.05	0.17
19	12.54	0.0128	0.1561	3.25	40.0	99.6	18.10	0.20
17	12.57	0.0143	0.2848	2.69	35.6	99.3	18.11	0.25
04	12.91	0.0121	1.417	10.0	42.1	96.8	18.11	0.10
14	12.59	0.0074	0.2508	10.1	69.3	99.4	18.14	0.09
07	12.80	0.0130	0.9583	9.46	39.2	97.8	18.14	0.10
03	12.63	0.0121	0.3859	8.10	42.3	99.1	18.15	0.11
06	12.62	0.0076	0.2543	19.5	67.5	99.4	18.18	0.09
05	12.88	0.0113	1.126	4.16	45.1	97.4	18.19	0.18
13	12.87	0.0159	1.093	1.84	32.1	97.5	18.19	0.35
08	12.86	0.0182	1.001	10.3	28.1	97.7	18.21	0.09
16	12.65	0.0187	0.1505	2.95	27.2	99.7	18.27	0.24
01	12.83	0.0164	0.7499	11.8	31.1	98.3	18.28	0.11
weighted mean			n=19	40.1	±11.1		18.15	0.06
9) FZ-38, D13:71, J=0.001577429±0.10%, NM-71, Lab#=8132								
13	6.566	0.0148	0.8382	4.46	34.5	96.2	17.89	0.20
12	7.146	0.0129	2.625	5.97	39.7	89.2	18.04	0.19
16	6.700	0.0146	1.031	4.76	34.9	95.5	18.11	0.19
07	7.009	0.0141	2.059	8.79	36.3	91.3	18.13	0.13
15	6.618	0.0131	0.7221	7.44	39.0	96.8	18.14	0.15
06	6.807	0.0135	1.326	13.2	37.7	94.3	18.17	0.09
11	6.957	0.0129	1.816	8.66	39.7	92.3	18.18	0.13
09	6.969	0.0128	1.798	8.37	40.0	92.4	18.23	0.13
14	6.630	0.0138	0.6393	21.7	37.0	97.2	18.24	0.08
08	6.633	0.0120	0.6454	3.11	42.5	97.1	18.24	0.27
10	6.753	0.0123	1.007	16.0	41.5	95.6	18.28	0.11
02	6.706	0.0138	0.8083	16.2	37.0	96.4	18.31	0.09
03	6.624	0.0117	0.5004	3.11	43.4	97.8	18.34	0.29
04	6.600	0.0132	0.3816	8.03	38.6	98.3	18.37	0.15
05	6.623	0.0121	0.4404	13.6	42.1	98.0	18.39	0.09
01	*6.857*	*0.0099*	*0.5212*	*5.39*	*51.8*	*97.8*	*18.98*	*0.18*
weighted mean			n=15	38.9	±5.4		18.24	0.08

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$\%^{40}Ar^*$	Age (Ma)	±2σ (Ma)
10) FS-298,J=0.00144172±0.14%, NM-41, Lab#=5872								
09	7.098	0.0138	0.1578	8.09	36.9	99.4	18.25	0.10
10	7.102	0.0112	0.1684	6.30	45.4	99.3	18.25	0.11
06	7.208	0.0120	0.4936	6.18	42.5	98.0	18.28	0.10
07	7.142	0.0126	0.2626	10.3	40.3	98.9	18.28	0.10
05	7.086	0.0114	0.0422	4.71	44.8	99.8	18.31	0.12
02	7.239	0.0118	0.5546	6.44	43.3	97.7	18.31	0.12
04	7.131	0.0118	0.1550	3.46	43.3	99.4	18.34	0.12
01	7.108	0.0120	0.0695	7.41	42.6	99.7	18.34	0.10
08	7.191	0.0118	0.3179	3.76	43.4	98.7	18.37	0.13
03	7.111	0.0123	0.0442	2.97	41.3	99.8	18.37	0.14
weighted mean			n=10	42.4	±4.9		18.30	0.07
11) FZ-41, J=0.00157312±0.10%, NM-71, Lab#=8127								
02	6.856	0.0113	1.359	12.3	45.2	94.2	18.23	0.13
12	6.735	0.0106	0.8614	12.8	47.9	96.2	18.30	0.11
07	6.864	0.0119	1.261	21.7	42.8	94.6	18.33	0.21
04	6.787	0.0112	0.9413	14.1	45.7	95.9	18.38	0.14
09	6.784	0.0113	0.9303	13.2	45.0	96.0	18.38	0.17
05	6.783	0.0102	0.9123	11.6	50.2	96.0	18.39	0.12
11	6.839	0.0160	1.102	14.9	31.9	95.3	18.39	0.10
15	6.911	0.0133	1.339	16.1	38.3	94.3	18.40	0.09
08	6.852	0.0115	1.125	29.0	44.3	95.2	18.41	0.17
14	7.090	0.0142	1.923	19.7	36.0	92.0	18.42	0.10
10	6.700	0.0107	0.5785	16.3	47.5	97.5	18.44	0.09
03	6.617	0.0108	0.2491	18.1	47.4	98.9	18.48	0.09
06	6.599	0.0113	0.1730	17.3	45.0	99.2	18.49	0.08
13	6.703	0.0096	0.5028	16.8	53.2	97.8	18.51	0.09
01	6.813	0.0117	0.8715	12.5	43.8	96.2	18.51	0.23
weighted mean			n=15	44.3	±10.9		18.42	0.06
12) FZ-45, J=0.001577807±0.10%, NM-71, Lab#=8133								
05	6.553	0.0089	0.2387	7.63	57.2	98.9	18.36	0.12
18	6.594	0.0094	0.3721	10.5	54.4	98.3	18.36	0.11
11	6.598	0.0088	0.3233	14.0	57.9	98.6	18.42	0.08
17	6.560	0.0100	0.1932	19.4	50.8	99.1	18.42	0.07
08	6.591	0.0091	0.2624	14.1	56.2	98.8	18.45	0.08
01	6.529	0.0101	0.0495	14.3	50.5	99.8	18.45	0.08
02	6.593	0.0079	0.2619	10.1	64.8	98.8	18.45	0.09
07	6.597	0.0088	0.2630	10.7	58.1	98.8	18.46	0.10
15	6.627	0.0091	0.3639	19.3	56.1	98.4	18.46	0.09
13	6.559	0.0083	0.1253	20.2	61.4	99.4	18.47	0.07
06	6.547	0.0107	0.0825	27.4	47.7	99.6	18.47	0.07
09	6.663	0.0122	0.4585	19.4	41.8	98.0	18.49	0.07
16	6.629	0.0095	0.3424	17.0	53.7	98.5	18.49	0.09
03	6.582	0.0086	0.1673	9.83	59.1	99.3	18.50	0.10

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
12 continued) FZ-45, J=0.001577807±0.10%, NM-71, Lab#=8133								
14	6.589	0.0115	0.1815	14.8	44.5	99.2	18.51	0.08
10	6.605	0.0075	0.1532	13.4	68.4	99.3	18.58	0.09
04	6.603	0.0088	0.0985	11.1	58.1	99.6	18.62	0.10
12	6.646	0.0144	0.1706	7.51	35.5	99.3	18.68	0.12
weighted mean			n=18	54.2	±16.2		18.47	0.05
13) FZ-10, E7:71, J=0.001585534±0.10%, NM-71, Lab#=8142								
14	6.679	0.0153	1.154	4.13	33.5	94.9	18.04	0.26
10	6.816	0.0075	1.469	9.59	67.7	93.6	18.16	0.11
7	6.552	0.0090	0.5362	4.09	56.7	97.6	18.20	0.28
11	7.209	0.0070	2.719	3.11	73.2	88.9	18.23	0.38
2	6.781	0.0107	0.9518	10.7	47.8	95.9	18.50	0.10
13	8.129	0.0076	5.493	6.23	67.0	80.0	18.52	0.19
3	6.873	0.0110	1.234	4.30	46.3	94.7	18.52	0.25
12	6.597	0.0083	0.2988	13.9	61.8	98.7	18.52	0.09
6	6.734	0.0102	0.7133	9.24	50.1	96.9	18.57	0.15
15	6.917	0.0085	1.266	13.9	60.1	94.6	18.62	0.09
4	7.209	0.0095	2.144	5.03	53.5	91.2	18.71	0.24
8	6.717	0.0080	0.4201	4.98	63.6	98.2	18.76	0.24
9	6.502	0.0105	-0.3173	5.36	48.6	101.5	18.77	0.19
1	6.571	0.0096	-0.2362	7.69	52.9	101.1	18.90	0.14
5	*5.637*	*0.0087*	*-4.2510*	*1.56*	*58.4*	*122.3*	*19.61*	*0.61*
weighted mean			n=14	55.9	±21.0		18.53	0.13
14) FS-163, J=0.0008639091±0.09%, NM-49, Lab#=6551								
10	12.16	0.0091	0.8051	9.72	55.9	98.0	18.49	0.10
09	15.25	0.0106	11.17	5.63	48.1	78.4	18.54	0.16
08	12.48	0.0106	1.774	5.42	48.3	95.8	18.55	0.13
01	13.59	0.0087	5.495	7.87	58.3	88.1	18.55	0.13
03	15.00	0.0085	10.29	7.09	59.8	79.7	18.55	0.16
13	14.29	0.0084	7.871	14.1	60.8	83.7	18.56	0.13
07	12.95	0.0112	3.263	6.43	45.4	92.6	18.58	0.12
11	13.49	0.0086	5.077	7.91	59.5	88.9	18.59	0.12
05	13.22	0.0112	4.156	6.73	45.4	90.7	18.59	0.12
02	13.94	0.0108	6.563	8.84	47.3	86.1	18.61	0.14
04	13.30	0.0114	4.318	6.86	44.7	90.4	18.64	0.11
12	13.01	0.0135	3.209	13.5	37.8	92.7	18.70	0.10
weighted mean			n=12	50.9	±15.1		18.58	0.06
15) FZ-50, J=0.00157768±0.10%, NM-71, Lab#=8135								
15	*6.630*	*0.0144*	*1.488*	*0.673*	*35.4*	*93.4*	*17.54*	*1.02*
14	*6.680*	*0.0130*	*1.287*	*0.959*	*39.2*	*94.3*	*17.84*	*0.72*
13	6.540	0.0121	0.3036	6.85	42.2	98.6	18.27	0.14
03	6.643	0.0085	0.5774	12.9	59.7	97.4	18.33	0.09
02	6.588	0.0325	0.3272	9.68	15.7	98.6	18.39	0.11

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
15 continued) FZ-50, J=0.00157768±0.10%, NM-71, Lab#=8135								
12	6.514	0.0291	0.0741	5.88	17.5	99.7	18.39	0.17
09	6.823	0.0094	1.021	3.01	54.3	95.6	18.47	0.27
05	*6.700*	*0.0095*	*0.2234*	*1.45*	*53.8*	*99.0*	*18.78*	*0.50*
11	*6.685*	*0.0113*	*0.0935*	*1.70*	*45.1*	*99.6*	*18.85*	*0.44*
16	*6.467*	*0.0050*	*-0.8721*	*1.88*	*101.6*	*104.0*	*19.04*	*0.40*
10	*6.673*	*0.0123*	*-0.4641*	*1.09*	*41.4*	*102.1*	*19.28*	*0.64*
08	*6.740*	*0.0094*	*-0.2520*	*0.881*	*54.4*	*101.1*	*19.29*	*0.82*
17	*6.937*	*0.0038*	*-1.5086*	*0.994*	*135.9*	*106.4*	*20.89*	*0.79*
weighted mean			n=5	37.9	±40.9		18.35	0.08
16) FY-85-9, J=0.00144851±0.14%, NM-41, Lab#=5877								
06	7.052	0.0108	0.0383	6.24	47.2	99.8	18.31	0.13
03	7.147	0.0113	0.3045	5.62	45.0	98.8	18.35	0.11
09	7.129	0.0078	0.1584	4.00	65.8	99.3	18.41	0.11
08	7.218	0.0101	0.4044	7.80	50.4	98.4	18.46	0.11
05	7.150	0.0090	0.1157	9.03	56.5	99.5	18.50	0.10
02	7.136	0.0089	0.0553	8.90	57.2	99.8	18.51	0.09
04	7.171	0.0094	0.1675	6.41	54.5	99.3	18.52	0.11
10	7.210	0.0087	0.2517	8.31	58.5	99.0	18.55	0.11
01	7.217	0.0118	0.2478	7.35	43.4	99.0	18.57	0.10
07	*7.352*	*0.0087*	*0.6187*	*2.01*	*58.5*	*97.5*	*18.64*	*0.19*
weighted mean			n=9	53.2	±14.5		18.47	0.08
17) FS-307, J=0.00144476±0.14%, NM-41, Lab#=5874								
04	7.191	0.0129	0.3410	4.40	39.5	98.6	18.39	0.11
03	11.28	0.0091	14.10	4.10	56.1	63.1	18.45	0.25
02	7.209	0.0083	0.3208	10.9	61.5	98.7	18.45	0.10
06	7.186	0.0122	0.2141	4.62	41.8	99.1	18.47	0.11
07	7.137	0.0099	0.0320	4.82	51.4	99.9	18.49	0.11
10	9.912	0.0117	9.417	5.70	43.6	71.9	18.49	0.21
08	7.404	0.0108	0.8990	5.14	47.4	96.4	18.51	0.11
01	7.213	0.0096	0.2473	10.9	53.2	99.0	18.52	0.09
05	7.207	0.0119	0.1814	12.1	42.9	99.3	18.55	0.09
09	7.270	0.0156	0.3160	3.03	32.7	98.7	18.61	0.13
weighted mean			n=10	47.0	±17.2		18.50	0.07
18) FX-187, J=0.00077828±0.09%, NM-50, Lab#=6624								
09	17.58	0.0111	15.05	4.48	45.9	74.7	18.35	0.17
02	13.42	0.0119	0.8232	4.49	42.7	98.2	18.41	0.10
13	13.64	0.0170	1.534	4.74	30.0	96.7	18.42	0.10
06	13.30	0.0081	0.2480	3.91	63.2	99.5	18.48	0.10
15	13.39	0.0116	0.5065	9.14	44.0	98.9	18.49	0.08
14	13.36	0.0117	0.4041	5.23	43.5	99.1	18.49	0.09
12	13.35	0.0087	0.3447	2.44	58.4	99.2	18.51	0.10
03	13.34	0.0102	0.2834	5.89	50.2	99.4	18.52	0.09

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{38}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$\%^{40}Ar^*$	Age (Ma)	±2σ (Ma)
18 continued) FX-187, J=0.00077828±0.09%, NM-50, Lab#=6624								
04	13.52	0.0085	0.8685	2.95	60.1	98.1	18.52	0.10
07	13.76	0.0081	1.641	6.99	63.3	96.5	18.54	0.09
05	13.38	0.0150	0.3271	3.06	34.0	99.3	18.56	0.10
10	13.36	0.0105	0.1461	6.53	48.4	99.7	18.61	0.09
11	13.48	0.0081	0.5488	3.64	63.1	98.8	18.61	0.11
08	14.07	0.0106	2.434	7.57	48.1	94.9	18.66	0.10
01	*13.77*	*0.0123*	*0.8468*	*10.7*	*41.4*	*98.2*	*18.89*	*0.09*
weighted mean			n=14	49.7	±21.5		18.52	0.06
19) FZ-7, D9:71, J=0.001573939±0.10%, NM-71, Lab#=8128								
15	6.583	0.0089	0.1930	12.6	57.1	99.1	18.44	0.10
04	6.638	0.0102	0.3788	16.7	49.9	98.3	18.44	0.09
14	6.774	0.0146	0.8251	17.4	35.0	96.4	18.45	0.10
10	6.724	0.0130	0.6561	15.7	39.2	97.1	18.45	0.09
03	6.598	0.0093	0.1445	9.63	54.7	99.4	18.52	0.15
12	6.610	0.0107	0.1835	29.6	47.8	99.2	18.52	0.08
11	6.618	0.0076	0.1927	13.6	66.9	99.1	18.54	0.09
05	6.630	0.0118	0.2228	10.8	43.4	99.0	18.55	0.11
06	6.770	0.0366	0.6958	21.4	13.9	97.0	18.55	0.10
02	6.615	0.0089	0.1350	18.6	57.3	99.4	18.58	0.08
13	6.633	0.0087	0.1939	13.7	58.4	99.1	18.58	0.11
01	6.694	0.0088	0.3733	11.1	58.0	98.4	18.60	0.11
07	6.791	0.0170	0.6333	24.4	30.1	97.3	18.66	0.09
09	*6.746*	*0.0268*	*0.2659*	*5.69*	*19.1*	*98.9*	*18.84*	*0.21*
08	*6.787*	*0.0398*	*0.3406*	*5.92*	*12.8*	*98.6*	*18.89*	*0.18*
weighted mean			n=13	47.0	±29.0		18.53	0.06
20) FX-84, J=0.000778146±0.09%, NM-50, Lab#=6626								
07	13.58	0.0152	1.198	4.95	33.6	97.4	18.47	0.11
06	13.85	0.0092	2.123	3.55	55.4	95.5	18.47	0.11
04	13.56	0.0158	1.094	2.01	32.3	97.6	18.49	0.11
02	13.79	0.0117	1.743	4.18	43.6	96.3	18.54	0.10
05	13.53	0.0099	0.8647	8.36	51.6	98.1	18.55	0.09
10	14.40	0.0114	3.770	3.57	44.8	92.3	18.56	0.13
11	15.73	0.0255	8.180	5.52	20.0	84.6	18.59	0.13
08	13.67	0.0147	1.114	2.78	34.7	97.6	18.63	0.11
01	14.41	0.0415	3.426	2.96	12.3	93.0	18.71	0.11
weighted mean			n=9	36.5	±28.2		18.55	0.07
21) FS-162, J=0.0008639701±0.09%, NM-49, Lab#=6547								
03	12.06	0.0085	0.7309	5.90	60.0	98.2	18.37	0.09
01	12.01	0.0091	0.4547	7.52	56.0	98.9	18.42	0.08
02	11.98	0.0099	0.2237	6.53	51.5	99.5	18.48	0.09
04	12.58	0.0087	2.116	6.16	58.5	95.0	18.53	0.11
06	12.10	0.0100	0.4207	10.3	50.9	99.0	18.58	0.10

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$\%^{40}Ar^*$	Age (Ma)	±2σ (Ma)
21 continued) FS-162, J=0.0008639701±0.09%, NM-49, Lab#=6547								
15	12.15	0.0121	0.5617	6.68	42.0	98.6	18.58	0.12
16	12.14	0.0098	0.5081	5.30	52.3	98.8	18.60	0.11
12	13.48	0.0084	4.988	9.17	60.8	89.1	18.61	0.12
09	12.15	0.0102	0.4588	7.35	50.1	98.9	18.63	0.09
10	12.30	0.0095	0.9517	11.6	53.7	97.7	18.64	0.10
08	12.48	0.0161	1.564	7.52	31.7	96.3	18.64	0.11
13	12.14	0.0087	0.4177	5.86	58.8	99.0	18.64	0.11
11	12.39	0.0201	1.260	7.34	25.4	97.0	18.64	0.12
14	12.08	0.0113	0.1733	4.21	45.3	99.6	18.65	0.13
07	12.15	0.0087	0.4087	2.78	59.0	99.0	18.65	0.12
weighted mean			n=15	50.4	±20.9		18.56	0.07
22) F8-148, J=0.000807622 ±0.09%, NM-87, Lab#=9006								
06	14.35	0.0101	5.531	2.11	50.3	88.6	18.43	0.32
02	14.30	0.0097	5.261	8.31	52.7	89.1	18.48	0.14
05	17.49	0.0094	16.00	4.88	54.5	73.0	18.50	0.22
01	17.74	0.0096	16.84	8.69	53.2	72.0	18.51	0.16
14	14.90	0.0145	7.169	7.52	35.2	85.8	18.53	0.18
15	14.88	0.0130	6.986	3.49	39.4	86.1	18.58	0.34
13	13.51	0.0100	2.243	5.31	51.3	95.1	18.62	0.20
03	14.23	0.0098	4.628	6.93	52.2	90.4	18.65	0.14
12	14.35	0.0089	4.983	5.96	57.5	89.7	18.66	0.18
10	15.33	0.0094	8.138	4.25	54.4	84.3	18.73	0.22
weighted mean			n=10	50.1	±7.1		18.57	0.08
23) FX-186, J=0.000778392±0.09%, NM-50, Lab#=6636								
2	*22.91*	*0.0115*	*34.30*	*0.726*	*44.5*	*55.8*	*17.86*	*0.45*
27	*13.86*	*0.3397*	*2.595*	*0.448*	*1.5*	*94.7*	*18.33*	*0.32*
1	*13.63*	*0.4218*	*1.838*	*0.531*	*1.2*	*96.2*	*18.33*	*0.33*
13	13.72	0.4139	1.678	0.398	1.2	96.6	18.52	0.39
8	14.28	0.0100	3.367	2.96	50.8	93.0	18.56	0.11
9	15.19	0.3720	6.489	0.882	1.4	87.6	18.59	0.22
3	13.62	0.0096	1.062	1.19	53.4	97.7	18.60	0.17
7	*14.07*	*0.1983*	*1.009*	*0.837*	*2.6*	*98.0*	*19.27*	*0.19*
28	*14.87*	*0.3454*	*3.688*	*0.460*	*1.5*	*92.8*	*19.29*	*0.29*
4	*29.99*	*0.1991*	*54.75*	*1.18*	*2.6*	*46.1*	*19.31*	*0.48*
6	*19.71*	*0.0214*	*19.92*	*0.643*	*23.8*	*70.1*	*19.32*	*0.37*
15	*21.11*	*0.4278*	*24.55*	*0.443*	*1.2*	*65.8*	*19.41*	*0.52*
14	*14.38*	*0.0101*	*1.586*	*2.23*	*50.6*	*96.7*	*19.43*	*0.11*
25	*14.15*	*0.3258*	*0.7468*	*1.03*	*1.6*	*98.6*	*19.49*	*0.16*
weighted mean			n=4	26.7	±58.7		18.57	0.09
24) FY-81-47, J=0.000804606 ±0.09%, NM-87, Lab#=8999								
15	12.86	0.0110	0.2234	3.62	46.5	99.5	18.47	0.16
13	12.93	0.0090	0.4420	8.15	56.4	99.0	18.49	0.10

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
24 continued) FY-81-47, J=0.000804606 ±0.09%, NM-87, Lab#=8999								
01	12.86	0.0102	0.1207	17.5	50.2	99.7	18.52	0.07
05	12.88	0.0093	0.1795	5.41	54.9	99.6	18.53	0.12
03	13.21	0.0092	1.237	14.0	55.2	97.2	18.55	0.09
08	13.08	0.0093	0.7953	8.14	54.9	98.2	18.55	0.09
11	13.01	0.0126	0.4959	9.62	40.4	98.9	18.57	0.09
07	12.94	0.0143	0.2580	3.69	35.7	99.4	18.57	0.18
04	12.92	0.0125	0.1898	14.1	40.9	99.6	18.58	0.09
10	13.04	0.0106	0.5324	5.11	48.2	98.8	18.60	0.12
09	13.25	0.0097	1.206	12.2	52.3	97.3	18.62	0.09
12	13.10	0.0097	0.7042	7.09	52.6	98.4	18.62	0.10
14	12.95	0.0104	0.1528	9.90	49.1	99.7	18.63	0.09
06	13.12	0.0126	0.6928	6.35	40.4	98.4	18.66	0.11
02	13.69	0.0102	2.483	9.49	49.9	94.6	18.71	0.09
weighted mean			n=15	48.5	±6.4		18.58	0.05
25) FX-193, crystals 1-16: J=0.0008639401±0.09%, NM-49, Lab#=6549								
crystals 21-34: J=0.000805887 ±0.09%, NM-87, Lab#=9010								
26	13.87	0.0113	4.350	0.723	45.1	90.7	18.20	0.86
21	13.02	0.0123	1.081	1.44	41.4	97.6	18.37	0.43
25	13.14	0.0114	1.415	1.90	44.7	96.8	18.40	0.34
08	12.17	0.0164	0.7912	3.20	31.1	98.1	18.51	0.11
06	11.99	0.0156	0.1806	5.66	32.8	99.6	18.51	0.11
09	12.02	0.0646	0.2771	4.01	7.9	99.4	18.52	0.12
11	11.99	0.0139	0.1497	3.26	36.8	99.6	18.52	0.12
02	12.04	0.0123	0.2736	6.71	41.6	99.3	18.54	0.10
10	12.00	0.0168	0.1488	3.66	30.3	99.6	18.55	0.12
16	12.45	0.0253	1.660	5.95	20.2	96.1	18.55	0.11
01	12.23	0.0134	0.8575	6.54	38.0	97.9	18.58	0.11
04	12.05	0.0156	0.2099	3.17	32.7	99.5	18.59	0.12
05	12.00	0.0138	0.0494	1.72	36.9	99.9	18.59	0.15
33	13.58	0.0174	2.440	1.48	29.3	94.7	18.60	0.89
24	13.10	0.0150	0.7859	10.9	34.0	98.2	18.61	0.09
23	13.06	0.0107	0.6378	1.25	47.5	98.6	18.62	0.49
07	12.08	0.0136	0.2379	2.51	37.6	99.4	18.62	0.11
15	12.24	0.0151	0.7678	2.11	33.9	98.2	18.63	0.15
30	12.95	0.0114	0.2404	3.43	44.7	99.5	18.63	0.41
13	12.11	0.0140	0.3061	3.27	36.4	99.3	18.64	0.12
32	13.41	0.0143	1.779	1.74	35.6	96.1	18.64	0.71
34	13.76	0.0115	2.896	2.08	44.2	93.8	18.67	0.60
03	12.15	0.0134	0.3628	3.46	38.2	99.1	18.68	0.11
28	13.74	0.0205	2.777	1.79	24.9	94.0	18.68	0.40
22	13.33	0.0140	1.416	1.78	36.4	96.9	18.68	0.36
14	12.09	0.0148	0.1127	6.61	34.4	99.7	18.69	0.11
weighted mean			n=26	35.3	±16.9		18.58	0.05

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$\%^{40}Ar^*$	Age (Ma)	±2σ (Ma)
26) FX-5, J=0.000778361±0.09%, NM-50, Lab#=6639								
10	13.40	0.0127	0.6451	1.19	40.2	98.6	18.45	0.17
01	13.35	0.0105	0.4394	1.31	48.5	99.0	18.47	0.14
13	13.38	0.0138	0.4716	3.45	37.0	99.0	18.50	0.11
09	13.52	0.0145	0.9166	3.36	35.2	98.0	18.52	0.12
05	14.46	0.0104	4.054	1.74	49.2	91.7	18.54	0.15
12	13.33	0.0166	0.1612	0.875	30.8	99.6	18.56	0.20
07	13.51	0.0087	0.6801	1.50	58.8	98.5	18.59	0.13
02	13.39	0.0115	0.2044	1.04	44.4	99.6	18.62	0.17
04	13.39	0.0112	0.0949	3.04	45.5	99.8	18.67	0.10
03	14.57	0.0265	3.879	2.66	19.3	92.1	18.75	0.13
08	13.45	0.0109	0.0665	0.960	46.7	99.9	18.77	0.19
weighted mean			n=11	41.4	±21.2		18.58	0.08
27) FY-81-45, J=0.000804458 ±0.09%, NM-87, Lab#=8998								
11	12.92	0.0124	0.5009	4.16	41.0	98.9	18.44	0.18
01	12.91	0.0105	0.3124	6.55	48.6	99.3	18.51	0.12
12	12.94	0.0118	0.4225	6.21	43.2	99.0	18.51	0.11
08	12.96	0.0109	0.4093	13.8	46.8	99.1	18.54	0.08
06	13.04	0.0147	0.6145	9.08	34.6	98.6	18.56	0.09
14	12.93	0.0108	0.2407	11.1	47.3	99.5	18.57	0.08
15	12.95	0.0119	0.2726	7.16	43.1	99.4	18.59	0.10
04	12.92	0.0100	0.1443	5.33	50.9	99.7	18.59	0.12
10	12.91	0.0096	0.0529	6.27	53.2	99.9	18.62	0.10
13	13.08	0.0119	0.6201	5.33	42.8	98.6	18.62	0.12
02	12.98	0.0083	0.2570	9.03	61.1	99.4	18.63	0.10
07	12.98	0.0100	0.2564	4.69	51.3	99.4	18.64	0.12
03	13.01	0.0131	0.2980	9.46	38.9	99.3	18.66	0.08
05	13.15	0.0108	0.7445	3.96	47.0	98.3	18.67	0.16
09	13.11	0.0120	0.5220	6.96	42.4	98.8	18.71	0.10
weighted mean			n=15	46.1	±6.5		18.59	0.05
28) FZ-60, J=0.001586137±0.10%, NM-71, Lab#=8139								
11	*7.443*	*0.0118*	*3.454*	*9.74*	*43.3*	*86.3*	*18.29*	*0.14*
12	*7.269*	*0.0082*	*2.858*	*5.82*	*62.3*	*88.4*	*18.29*	*0.23*
23	6.538	0.0085	0.1637	21.6	60.2	99.3	18.48	0.09
08	6.741	0.0089	0.8454	12.8	57.4	96.3	18.48	0.11
14	6.580	0.0083	0.2932	9.49	61.5	98.7	18.49	0.12
07	8.401	0.0085	6.436	17.0	60.3	77.4	18.50	0.13
24	6.578	0.0086	0.2184	7.65	59.4	99.0	18.54	0.13
25	6.543	0.0088	0.0959	25.4	58.0	99.6	18.55	0.08
29	6.564	0.0086	0.1557	14.4	59.5	99.3	18.56	0.09
26	6.524	0.0076	-0.0104	7.50	67.2	100.1	18.58	0.12
30	6.569	0.0100	0.1394	14.9	51.2	99.4	18.59	0.08
21	6.809	0.0087	0.9015	13.6	58.5	96.1	18.63	0.10
22	6.609	0.0086	0.2208	17.6	59.4	99.0	18.63	0.08

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
28 continued) FZ-60, J=0.001586137±0.10%, NM-71, Lab#=8139								
28	6.573	0.0102	0.0927	13.9	49.8	99.6	18.63	0.09
10	6.516	0.0093	-0.0996	26.0	54.6	100.5	18.64	0.08
27	6.588	0.0083	0.1183	14.4	61.5	99.5	18.66	0.09
20	6.583	0.0106	0.0716	14.5	48.0	99.7	18.68	0.09
02	6.619	0.0242	0.1306	11.9	21.1	99.4	18.74	0.12
weighted mean			n=16	55.5	±20.7		18.60	0.06
29) F8-102, J=0.000806725 ±0.09%, NM-87, Lab#=9003								
09	13.06	0.0099	1.079	4.52	51.3	97.6	18.44	0.16
02	13.08	0.0079	0.9554	4.59	64.7	97.8	18.53	0.15
13	12.91	0.0091	0.3541	3.76	56.1	99.2	18.55	0.18
01	13.27	0.0095	1.463	7.18	53.7	96.7	18.59	0.11
15	13.12	0.0091	0.9337	5.12	55.9	97.9	18.60	0.14
12	12.88	0.0103	0.1169	3.71	49.3	99.7	18.60	0.18
10	12.90	0.0088	0.0918	5.17	58.3	99.8	18.64	0.13
03	12.93	0.0106	0.1845	4.17	48.3	99.6	18.65	0.17
05	13.12	0.0095	0.8094	10.3	53.8	98.2	18.65	0.09
11	12.94	0.0105	0.1717	3.69	48.4	99.6	18.66	0.18
04	13.48	0.0076	1.896	3.79	67.1	95.8	18.71	0.18
08	13.14	0.0203	0.4409	2.69	25.2	99.0	18.83	0.24
weighted mean			n=12	52.7	±10.5		18.61	0.07
30) F8-101, J=0.000806193 ±0.09%, NM-87, Lab#=9002								
12	14.44	0.0090	5.842	1.99	56.5	88.0	18.40	0.33
03	13.13	0.0101	1.132	5.23	50.6	97.5	18.51	0.13
07	13.15	0.0089	1.151	3.02	57.3	97.4	18.53	0.22
04	13.85	0.0215	3.500	10.9	23.7	92.5	18.54	0.10
05	13.31	0.0151	1.681	9.44	33.9	96.3	18.55	0.10
09	13.15	0.0096	1.101	5.04	53.1	97.5	18.56	0.15
06	12.93	0.0088	0.3121	3.19	58.0	99.3	18.58	0.22
14	13.06	0.0160	0.6967	3.34	31.8	98.4	18.60	0.19
10	13.88	0.2298	3.516	1.27	2.2	92.6	18.60	0.47
11	15.63	0.0293	9.344	5.84	17.4	82.3	18.62	0.15
02	13.29	0.0111	1.405	7.14	45.8	96.9	18.63	0.11
08	13.03	0.0107	0.4211	8.04	47.6	99.0	18.68	0.10
13	13.76	0.0283	2.810	4.75	18.0	94.0	18.72	0.15
15	12.91	0.0158	-0.1639	1.95	32.3	100.4	18.75	0.31
01	15.78	0.0252	9.546	7.63	20.2	82.1	18.76	0.15
weighted mean			n=15	36.6	±17.6		18.61	0.07
31) FZ-90, J=0.001584951±0.10%, NM-71, Lab#=8137								
13	*11.00*	*0.0097*	*15.74*	*7.47*	*52.5*	*57.7*	*18.06*	*0.33*
12	*7.113*	*0.0097*	*2.326*	*4.71*	*52.7*	*90.3*	*18.28*	*0.25*
14	6.994	0.0120	1.688	10.1	42.6	92.9	18.48	0.14
15	6.988	0.0119	1.662	9.36	42.7	93.0	18.48	0.14

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
31 continued) FZ-90, J=0.001584951±0.10%, NM-71, Lab#=8137								
08	6.523	0.0095	0.0534	9.37	53.8	99.8	18.51	0.11
05	7.047	0.0107	1.782	12.8	47.7	92.5	18.55	0.11
04	6.847	0.0097	1.058	10.5	52.7	95.4	18.59	0.12
01	6.789	0.0117	0.8438	19.2	43.6	96.3	18.61	0.08
07	7.043	0.0092	1.685	17.3	55.3	92.9	18.62	0.13
09	7.196	0.0121	2.199	8.54	42.3	91.0	18.62	0.14
02	7.093	0.0139	1.800	8.82	36.7	92.5	18.67	0.15
03	6.903	0.0102	1.111	9.71	49.8	95.2	18.70	0.12
06	7.040	0.0101	1.512	13.8	50.5	93.7	18.76	0.11
10	6.869	0.0106	0.9320	7.42	48.2	96.0	18.76	0.16
11	*10.13*	*0.0130*	*11.74*	*7.87*	*39.2*	*65.8*	*18.95*	*0.27*
weighted mean			n=12	47.1	±11.2		18.61	0.07
32) FX-194, crystals 1-15: J=0.00077846±0.09%, NM-50, Lab#=6601								
crystals 21-27: J=0.000778087±0.09%, NM-50, Lab#=6627								
13	*13.51*	*0.0137*	*1.274*	*1.00*	*37.3*	*97.2*	*18.36*	*0.24*
11	13.49	0.0119	0.7965	1.87	43.0	98.3	18.52	0.14
21	14.48	0.0099	4.034	7.74	51.7	91.8	18.55	0.11
22	13.64	0.0104	1.187	3.12	49.0	97.4	18.57	0.10
27	13.34	0.0131	0.1244	1.34	39.0	99.7	18.59	0.13
06	13.58	0.0690	0.9344	4.23	7.4	98.0	18.60	0.12
26	13.59	0.0115	0.8818	6.11	44.2	98.1	18.61	0.09
04	13.83	0.0466	1.717	4.92	10.9	96.4	18.61	0.12
05	13.51	0.0086	0.5720	3.59	59.2	98.8	18.63	0.11
15	13.37	0.0109	0.0770	1.77	46.7	99.8	18.65	0.14
07	13.57	0.0105	0.7230	0.715	48.7	98.4	18.66	0.30
14	14.09	0.0162	2.449	2.08	31.5	94.9	18.68	0.15
03	13.63	0.0112	0.8440	1.75	45.4	98.2	18.70	0.15
01	13.62	0.0101	0.8031	1.72	50.3	98.3	18.70	0.15
02	13.56	0.0111	0.5549	2.80	46.0	98.8	18.71	0.13
08	15.49	0.0666	6.930	1.53	7.7	86.8	18.79	0.20
12	13.49	0.0101	0.1181	1.47	50.6	99.7	18.80	0.16
10	13.91	0.0077	1.531	0.609	66.4	96.8	18.80	0.39
09	13.53	0.0155	0.1394	1.29	32.9	99.7	18.85	0.20
weighted mean			n=18	40.6	±33.5		18.64	0.06
33) FY-81-49, J=0.000804927 ±0.09%,NM-87, Lab#=9000								
04	13.14	0.0118	1.093	2.85	43.2	97.5	18.52	0.20
06	13.12	0.0112	1.024	3.23	45.7	97.7	18.52	0.18
11	12.93	0.0074	0.3698	4.98	68.7	99.2	18.53	0.17
10	13.16	0.0101	1.018	8.20	50.7	97.7	18.58	0.12
14	12.99	0.0122	0.3481	5.96	41.8	99.2	18.62	0.14
08	13.13	0.0107	0.7872	9.22	47.7	98.2	18.64	0.11
09	13.22	0.0089	1.056	6.95	57.2	97.6	18.64	0.12
07	12.99	0.0095	0.2886	6.88	53.6	99.3	18.65	0.11

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
33 continued) FY-81-49, J=0.000804927 ±0.09%,NM-87, Lab#=9000								
01	12.96	0.0123	0.1809	6.54	41.3	99.6	18.65	0.10
03	13.02	0.0091	0.3510	5.21	56.3	99.2	18.66	0.12
15	13.13	0.0116	0.6868	3.64	44.1	98.5	18.68	0.19
05	13.17	0.0129	0.6514	8.00	39.6	98.5	18.74	0.10
weighted mean			n=12	49.2	±8.5		18.64	0.06
34) SS-12-10-97-1, B7:87, J=0.000807174, D=1.00154, NM-87, Lab#=9004								
06	13.30	0.0119	1.970	3.00	42.7	95.6	18.42	0.35
13	12.94	0.0117	0.3062	5.52	43.7	99.3	18.62	0.14
04	13.35	0.0144	1.680	8.92	35.5	96.3	18.62	0.11
02	13.10	0.0120	0.7814	8.99	42.4	98.2	18.64	0.11
09	13.21	0.0134	1.154	2.87	38.0	97.4	18.65	0.23
01	13.24	0.0115	1.248	9.74	44.3	97.2	18.65	0.09
10	13.03	0.0123	0.5136	16.8	41.5	98.8	18.66	0.09
03	13.14	0.0115	0.8057	5.72	44.4	98.2	18.69	0.13
11	12.97	0.0109	0.2464	5.57	46.7	99.4	18.69	0.13
15	13.46	0.0111	1.815	5.32	46.0	96.0	18.72	0.15
14	12.95	0.0119	0.0649	3.56	42.8	99.9	18.73	0.19
weighted mean			n=11	42.5	±3.3		18.66	0.06
35) FX-10, J=0.000778333±0.09%, NM-50, Lab#=6635								
12	*15.03*	*0.0091*	*5.893*	*2.14*	*56.3*	*88.4*	*18.56*	*0.16*
15	*14.19*	*0.1971*	*2.985*	*1.94*	*2.6*	*93.9*	*18.61*	*0.13*
08	13.82	0.0078	1.182	1.45	65.5	97.5	18.81	0.14
05	14.61	0.0085	3.833	3.64	59.8	92.3	18.83	0.13
01	13.78	0.0083	1.013	3.66	61.3	97.8	18.83	0.11
26	15.14	0.0079	5.530	2.47	65.0	89.2	18.86	0.13
07	15.97	0.0136	8.236	1.89	37.4	84.8	18.91	0.17
27	15.10	0.0084	5.162	3.07	60.7	89.9	18.96	0.13
25	13.71	0.0086	0.2982	1.77	59.1	99.4	19.02	0.11
10	13.72	0.0080	0.3036	3.40	63.9	99.3	19.03	0.11
weighted mean			n=8	59.1	±18.1		18.92	0.09
36) FX-183, J=0.0008640795±0.09%, NM-49, Lab#=6539								
11	13.16	0.0150	4.549	2.74	34.0	89.8	18.33	0.15
10	12.81	0.0435	3.126	4.10	11.7	92.8	18.44	0.11
07	13.04	0.0098	3.869	4.95	51.9	91.2	18.45	0.12
14	12.25	0.0120	1.191	8.05	42.4	97.1	18.46	0.09
03	12.43	0.0146	1.741	4.50	34.8	95.9	18.48	0.10
13	12.25	0.0128	1.093	2.96	40.0	97.4	18.50	0.11
15	12.45	0.0130	1.694	5.27	39.2	96.0	18.53	0.11
05	12.28	0.0135	0.9721	2.32	37.8	97.7	18.60	0.13
02	12.33	0.0163	1.143	3.46	31.4	97.3	18.60	0.10
09	12.36	0.0120	1.218	3.17	42.5	97.1	18.61	0.10
04	12.75	0.0152	2.547	2.03	33.6	94.1	18.61	0.15

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
36 continued) FX-183, J=0.0008640795±0.09%, NM-49, Lab#=6539								
01	12.81	0.0098	2.643	3.30	52.2	93.9	18.65	0.14
12	13.00	0.0119	3.283	2.22	42.8	92.5	18.66	0.14
08	13.24	0.0212	3.795	1.55	24.0	91.5	18.79	0.21
weighted mean			n=14	37.0	±20.9		18.53	0.07
37) FS-301, J=0.00144271±0.14%, NM-41, Lab#=5868								
10	7.188	0.0173	0.1050	7.32	29.6	99.6	18.54	0.10
09	7.280	0.0128	0.3709	5.19	39.8	98.5	18.57	0.12
08	7.926	0.0154	2.537	15.4	33.1	90.6	18.59	0.11
05	7.247	0.0171	0.2297	9.29	29.9	99.1	18.59	0.10
03	7.276	0.0171	0.3012	8.77	29.8	98.8	18.61	0.11
07	7.453	0.0152	0.8524	3.96	33.5	96.6	18.65	0.12
06	7.823	0.0148	2.074	7.95	34.5	92.2	18.67	0.11
02	7.499	0.0171	0.9457	7.58	29.9	96.3	18.70	0.11
04	7.247	0.0193	0.0688	6.41	26.5	99.7	18.71	0.10
weighted mean			n=9	31.8	±7.8		18.62	0.08
38) FX-182, J=0.0008640668±0.09%, NM-49, Lab#=6540								
09	19.16	0.0159	25.00	14.2	32.0	61.5	18.27	0.15
04	20.77	0.0214	30.31	9.63	23.9	56.9	18.32	0.21
05	16.90	0.0195	17.03	7.11	26.2	70.2	18.40	0.15
14	12.63	0.0155	2.534	4.66	32.9	94.1	18.43	0.13
16	12.37	0.0149	1.585	4.55	34.3	96.2	18.46	0.11
13	14.69	0.0149	9.418	8.22	34.1	81.1	18.47	0.14
15	13.75	0.0163	6.152	4.76	31.3	86.8	18.51	0.12
08	12.23	0.0149	0.8994	5.59	34.2	97.8	18.55	0.09
11	12.60	0.0154	2.176	10.2	33.0	94.9	18.55	0.08
01	12.66	0.0160	2.318	6.88	31.8	94.6	18.57	0.09
07	12.88	0.0151	3.002	8.70	33.8	93.1	18.60	0.10
12	13.79	0.0151	6.041	8.95	33.7	87.1	18.61	0.10
03	12.21	0.0144	0.7094	11.1	35.5	98.3	18.61	0.08
weighted mean			n=13	32.1	±6.7		18.53	0.07
39) FS-300, J=0.00144619±0.14%, NM-41, Lab#=5875								
05	8.337	0.0313	4.245	5.76	16.3	85.0	18.39	0.15
08	8.196	0.0277	3.761	5.82	18.4	86.5	18.40	0.15
07	8.297	0.0289	4.045	5.33	17.7	85.6	18.44	0.15
06	7.787	0.0326	2.244	6.28	15.6	91.5	18.50	0.13
01	8.556	0.0370	4.845	5.25	13.8	83.3	18.50	0.15
04	8.498	0.0309	4.554	10.6	16.5	84.2	18.57	0.13
09	7.632	0.0272	1.551	6.33	18.8	94.0	18.62	0.12
10	8.203	0.0239	3.466	5.96	21.4	87.5	18.64	0.14
03	8.551	0.0272	4.545	8.30	18.8	84.3	18.71	0.14
02	*9.167*	*0.0314*	*6.516*	*4.15*	*16.3*	*79.0*	*18.80*	*0.19*
weighted mean			n=9	17.5	±4.4		18.54	0.10

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
40) FX-185, J=0.0008640538±0.09%, NM-49, Lab#=6541								
02	*22.04*	*0.0193*	*35.38*	*7.32*	*26.5*	*52.6*	*17.98*	*0.25*
06	15.02	0.0204	10.65	3.68	25.0	79.0	18.41	0.16
07	12.10	0.0151	0.5551	11.6	33.8	98.7	18.51	0.08
10	14.25	0.0529	7.843	3.24	9.6	83.8	18.51	0.18
15	12.16	0.0196	0.7040	1.38	26.0	98.3	18.54	0.19
09	12.11	0.0176	0.4508	4.56	29.1	98.9	18.57	0.10
01	12.80	0.0182	2.758	13.8	28.0	93.6	18.58	0.08
03	13.01	0.0195	3.465	7.38	26.2	92.1	18.58	0.10
11	12.59	0.0198	2.006	4.47	25.8	95.3	18.61	0.12
04	12.12	0.0190	0.3413	8.18	26.9	99.2	18.63	0.08
05	12.47	0.0188	1.527	5.46	27.1	96.4	18.64	0.09
16	12.32	0.0221	0.9877	3.40	23.1	97.6	18.65	0.10
13	12.34	0.0209	0.9661	3.29	24.5	97.7	18.69	0.10
08	12.84	0.0181	2.655	3.37	28.2	93.9	18.70	0.11
14	12.56	0.0188	1.661	5.25	27.2	96.1	18.72	0.10
12	12.22	0.0188	0.3232	2.48	27.1	99.2	18.81	0.11
weighted mean			n=15	25.9	±10.2		18.62	0.06
41) F8-149, J=0.000805382 ±0.09%, NM-87, Lab#=9001								
07	12.95	0.0154	0.2036	2.30	33.1	99.5	18.64	0.30
06	13.14	0.0184	0.8037	2.18	27.8	98.2	18.65	0.36
08	13.47	0.0168	1.912	3.77	30.4	95.8	18.65	0.20
01	13.14	0.0210	0.8018	4.22	24.3	98.2	18.66	0.17
12	13.53	0.0144	2.019	1.42	35.5	95.6	18.70	0.42
14	13.10	0.0194	0.4090	2.71	26.3	99.1	18.76	0.23
05	13.04	0.0162	0.1894	8.38	31.5	99.6	18.77	0.10
03	13.36	0.0153	1.238	5.07	33.3	97.3	18.78	0.14
02	13.01	0.0159	0.0243	1.69	32.1	100.0	18.80	0.36
10	13.10	0.0211	0.2576	2.49	24.2	99.4	18.82	0.26
13	13.40	0.0140	1.257	1.17	36.3	97.2	18.84	0.49
11	13.89	0.0191	2.829	3.18	26.7	94.0	18.88	0.22
15	13.06	0.0161	-0.1096	1.62	31.8	100.3	18.92	0.36
weighted mean			n=13	30.3	±4.0		18.75	0.08
42) SS-4-12-96-4, J=0.00078937±0.09%, NM-50, Lab#=6666								
15	*15.98*	*0.0104*	*10.44*	*4.27*	*49.0*	*80.7*	*18.27*	*0.15*
12	14.43	0.0124	4.698	2.55	41.0	90.4	18.48	0.11
04	14.18	0.0110	3.589	3.84	46.5	92.5	18.59	0.11
11	20.04	0.0125	23.35	2.04	40.7	65.6	18.62	0.22
02	15.28	0.0116	7.114	3.88	44.1	86.2	18.66	0.13
07	13.39	0.0120	0.7014	3.34	42.4	98.5	18.68	0.10
03	13.39	0.0115	0.5950	1.88	44.5	98.7	18.72	0.12
10	13.70	0.0129	1.508	6.62	39.5	96.8	18.78	0.09
08	13.44	0.0112	0.6005	4.65	45.6	98.7	18.79	0.09
14	13.60	0.0119	1.123	4.94	43.0	97.6	18.80	0.10

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
42 continued) SS-4-12-96-4, J=0.00078937±0.09%, NM-50, Lab#=6666								
09	13.39	0.0087	0.3890	3.51	58.9	99.1	18.80	0.10
05	13.45	0.0118	0.5621	5.36	43.3	98.8	18.82	0.09
06	13.35	0.0107	0.2266	1.77	47.8	99.5	18.82	0.11
13	14.11	0.0123	2.719	4.42	41.4	94.3	18.86	0.10
16	13.45	0.0126	0.3952	1.86	40.6	99.1	18.89	0.11
01	*13.55*	*0.0118*	*0.2838*	*3.54*	*43.4*	*99.4*	*19.08*	*0.10*
weighted mean			n=14	44.2	±9.7		18.75	0.07
43) J-3-5-97-1, J=0.001573371±0.10%, NM-71, Lab#=8124								
02	5.870	0.5013	-1.5020	0.714	1.0	108.2	17.95	1.20
16	5.840	0.0504	-1.9397	0.290	10.1	109.9	18.12	2.05
27	6.603	0.3099	0.6730	1.63	1.6	97.3	18.16	0.45
28	6.561	0.1369	0.4529	2.34	3.7	98.1	18.18	0.30
01	5.931	0.3395	-2.2645	0.743	1.5	111.7	18.71	1.11
22	6.643	0.0840	-0.2294	0.980	6.1	101.1	18.97	0.74
25	6.532	0.1547	-0.8079	0.899	3.3	103.8	19.15	0.72
weighted mean			n=7	3.9	±6.5		18.34	0.36
44) FZ-13, J=0.001577894±0.10%, NM-71, Lab#=8134								
02	*6.780*	*0.0350*	*1.780*	*1.89*	*14.6*	*92.3*	*17.72*	*0.37*
04	7.054	0.0145	2.122	0.565	35.2	91.1	18.21	0.98
15	6.642	0.0073	0.6268	0.951	70.0	97.2	18.29	0.80
06	7.285	0.0103	2.407	3.64	49.4	90.2	18.62	0.23
11	6.528	0.0103	-0.2615	1.22	49.6	101.2	18.71	0.64
09	8.321	0.0139	5.677	1.24	36.6	79.8	18.82	0.58
08	*6.825*	*0.0033*	*-0.8002*	*1.19*	*155.9*	*103.5*	*19.99*	*0.59*
weighted mean			n=5	48.2	±27.9		18.61	0.24
45) FZ-44, J=0.001585655±0.10%, NM-71, Lab#=8138								
11	*6.565*	*0.0796*	*1.392*	*2.04*	*6.4*	*93.8*	*17.53*	*0.44*
12	*7.185*	*0.0567*	*2.995*	*2.05*	*9.0*	*87.7*	*17.94*	*0.43*
04	*7.004*	*0.0350*	*2.172*	*4.18*	*14.6*	*90.9*	*18.12*	*0.28*
10	*6.969*	*0.0967*	*1.982*	*2.23*	*5.3*	*91.7*	*18.19*	*0.44*
01	6.158	0.0252	-0.9361	2.87	20.2	104.5	18.32	0.30
13	7.044	0.1079	1.901	2.75	4.7	92.1	18.47	0.33
15	7.683	0.0554	3.950	3.27	9.2	84.9	18.56	0.32
03	7.085	0.1189	1.885	2.31	4.3	92.3	18.61	0.44
09	6.380	0.0851	-0.5512	3.54	6.0	102.7	18.64	0.26
02	6.799	0.0541	0.7262	10.1	9.4	96.9	18.75	0.12
05	7.278	0.0761	2.301	1.63	6.7	90.7	18.79	0.51
08	7.291	0.0605	2.236	4.95	8.4	91.0	18.88	0.23
14	8.690	0.0819	6.975	3.80	6.2	76.4	18.88	0.36
06	9.619	0.1416	10.12	4.81	3.6	69.0	18.89	0.31
07	7.695	0.0659	3.445	1.41	7.7	86.8	19.02	0.63
weighted mean			n=11	7.9	±9.1		18.71	0.13

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$\%^{40}Ar^*$	Age (Ma)	±2σ (Ma)
46) J-2-3-97-2, J=0.001572993±0.10%, NM-71, Lab#=8125								
29	6.869	0.0067	1.459	1.40	76.5	93.7	18.18	0.51
26	7.267	0.0083	2.544	3.14	61.8	89.7	18.39	0.27
31	6.679	0.0079	0.5526	2.20	64.3	97.6	18.40	0.32
40	6.809	0.0062	0.8795	1.42	82.0	96.2	18.49	0.41
22	6.721	0.0098	0.5482	2.11	51.9	97.6	18.52	0.28
30	6.738	0.0081	0.6023	3.37	63.0	97.4	18.52	0.24
25	6.733	0.0069	0.5596	2.79	74.1	97.5	18.54	0.25
28	6.787	0.0115	0.7387	1.53	44.4	96.8	18.55	0.44
36	6.713	0.0079	0.3770	3.62	64.6	98.3	18.64	0.19
27	6.668	0.0078	0.2216	2.69	65.5	99.0	18.64	0.25
24	6.864	0.0492	0.8769	2.26	10.4	96.3	18.66	0.33
37	6.809	0.0081	0.6546	2.82	63.1	97.2	18.68	0.26
23	6.699	0.0073	0.2783	3.98	70.3	98.8	18.68	0.19
39	6.711	0.0066	0.3059	1.85	77.9	98.7	18.69	0.30
15	7.147	0.0096	1.772	0.872	53.4	92.7	18.70	0.68
12	6.377	0.0042	-0.9281	0.661	121.7	104.3	18.78	0.85
20	6.770	0.0071	0.2895	5.78	71.4	98.7	18.87	0.13
03	6.938	0.0052	0.6997	1.28	98.0	97.0	19.00	0.44
08	6.697	0.0073	-0.1241	1.74	70.0	100.6	19.01	0.43
35	6.747	0.0081	0.0413	1.80	62.9	99.8	19.01	0.45
38	6.683	0.0067	-0.2020	2.51	76.6	100.9	19.03	0.29
32	6.801	0.0075	0.1124	2.52	68.1	99.5	19.11	0.25
09	6.738	0.0031	-0.1871	0.569	166.8	100.8	19.18	1.18
02	6.877	0.0056	0.2021	1.22	90.3	99.1	19.24	0.57
34	6.889	0.0053	0.1431	0.750	96.5	99.4	19.33	0.80
04	*6.601*	*0.0056*	*-1.2135*	*1.55*	*91.5*	*105.4*	*19.64*	*0.49*
10	*6.927*	*0.0075*	*-0.2783*	*0.572*	*67.8*	*101.2*	*19.78*	*1.23*
21	*7.842*	*0.0078*	*1.061*	*2.29*	*65.3*	*96.0*	*21.24*	*0.27*
weighted mean			n=25	73.8	±56.3		18.72	0.11
47) FX-133, J=0.0008639991±0.09%, NM-49, Lab#=6545								
13	13.87	0.0950	6.492	0.839	5.4	86.2	18.54	0.35
05	13.05	0.0659	3.409	2.00	7.7	92.3	18.69	0.15
16	14.20	0.0317	7.250	3.25	16.1	84.9	18.70	0.15
06	13.83	0.0931	6.010	1.69	5.5	87.2	18.70	0.19
11	14.77	0.0755	9.151	1.68	6.8	81.7	18.73	0.21
15	14.76	0.0447	9.059	0.948	11.4	81.9	18.74	0.33
14	12.63	0.0285	1.836	1.26	17.9	95.7	18.75	0.20
09	13.55	0.0356	4.911	2.65	14.4	89.3	18.76	0.13
07	13.01	0.0418	3.007	4.33	12.2	93.2	18.80	0.13
01	15.71	0.0965	12.13	1.05	5.3	77.2	18.81	0.31
10	13.94	0.0558	6.114	4.63	9.1	87.1	18.82	0.13
02	12.77	0.0254	2.118	2.73	20.1	95.1	18.83	0.13
04	12.59	0.1264	1.427	2.06	4.0	96.7	18.89	0.13

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
47 continued) FX-133, J=0.0008639991±0.09%, NM-49, Lab#=6545								
03	12.63	0.0224	1.449	1.80	22.8	96.6	18.92	0.15
weighted mean			n=14	11.3	±12.2		18.79	0.07
48) FX-181, J=0.0008639247±0.09%, NM-49, Lab#=6550								
03	*33.75*	*0.0478*	*74.37*	*6.91*	*10.7*	*34.9*	*18.26*	*0.54*
13	23.22	0.0288	38.17	3.66	17.7	51.4	18.51	0.37
14	18.31	0.0403	21.50	2.17	12.7	65.3	18.54	0.30
16	18.91	0.0479	23.36	4.64	10.7	63.5	18.63	0.24
12	23.16	0.0248	37.70	4.25	20.6	51.9	18.63	0.36
07	14.49	0.0251	8.303	1.33	20.3	83.1	18.67	0.25
05	18.36	0.0699	21.27	3.20	7.3	65.8	18.73	0.28
11	39.47	0.0220	92.69	5.10	23.2	30.6	18.73	0.68
06	21.21	0.0371	30.89	5.84	13.8	57.0	18.74	0.32
08	47.79	0.0396	120.8	3.83	12.9	25.3	18.76	0.92
15	12.93	0.0390	2.747	5.52	13.1	93.7	18.80	0.12
09	29.30	0.0236	58.12	4.78	21.7	41.4	18.80	0.48
02	14.85	0.0224	9.174	4.31	22.8	81.8	18.82	0.17
10	20.26	0.0419	27.45	3.86	12.2	60.0	18.84	0.29
04	15.84	0.0553	12.28	2.42	9.2	77.1	18.94	0.22
01	14.20	0.0227	6.589	3.73	22.4	86.3	19.00	0.17
weighted mean			n=15	16.0	±10.9		18.79	0.10
49) FZ-32, J=0.001574721±0.10%, NM-71, Lab#=8129								
13	*8.816*	*0.0096*	*8.182*	*4.67*	*53.3*	*72.6*	*18.09*	*0.28*
03	9.501	0.0089	10.14	5.81	57.5	68.5	18.39	0.29
05	6.872	0.0095	1.107	6.48	53.6	95.2	18.50	0.19
06	7.183	0.0092	2.033	6.73	55.6	91.6	18.60	0.19
12	6.673	0.0101	0.3023	5.28	50.3	98.7	18.61	0.19
08	8.959	0.0070	8.029	3.75	72.8	73.5	18.62	0.35
14	6.718	0.0107	0.4341	5.58	47.6	98.1	18.62	0.19
10	8.180	0.0155	5.310	11.6	32.8	80.8	18.69	0.16
07	7.339	0.0088	2.425	8.55	58.0	90.2	18.72	0.15
15	6.546	0.0107	-0.3925	1.12	47.8	101.8	18.83	0.65
02	7.099	0.0081	1.462	14.7	63.0	93.9	18.84	0.09
11	7.240	0.0087	1.907	19.8	58.4	92.2	18.87	0.10
01	7.666	0.0083	3.310	13.8	61.2	87.2	18.90	0.24
04	7.544	0.0080	2.779	15.0	63.5	89.1	19.00	0.13
09	6.707	0.0084	-0.1802	6.82	60.7	100.8	19.11	0.18
weighted mean			n=14	55.9	±18.9		18.80	0.11
50) FZ-12, J=0.001586064±0.10%, NM-71, Lab#=8141								
07	*7.480*	*0.0268*	*4.713*	*2.24*	*19.1*	*81.4*	*17.34*	*0.44*
08	*7.209*	*0.0203*	*3.517*	*0.860*	*25.2*	*85.6*	*17.57*	*1.06*
06	*8.830*	*0.0531*	*8.693*	*2.42*	*9.6*	*71.0*	*17.84*	*0.49*
16	8.449	0.0198	6.824	4.06	25.8	76.1	18.32	0.34

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
50 continued) FZ-12, J=0.001586064±0.10%, NM-71, Lab#=8141								
29	7.463	0.0238	3.425	2.42	21.4	86.5	18.37	0.32
14	7.413	0.0205	3.126	3.07	24.9	87.6	18.48	0.35
01	8.249	0.0239	5.866	1.29	21.4	79.0	18.55	0.79
13	7.577	0.0181	3.547	5.39	28.2	86.2	18.59	0.25
05	7.829	0.0185	4.298	5.10	27.6	83.8	18.67	0.23
25	8.162	0.0225	5.363	8.51	22.7	80.6	18.73	0.18
26	7.015	0.0292	1.425	5.53	17.5	94.0	18.78	0.15
28	7.032	0.0216	1.455	3.17	23.6	93.9	18.80	0.23
10	7.705	0.0576	3.729	3.60	8.9	85.8	18.81	0.37
22	7.820	0.0323	4.103	3.80	15.8	84.5	18.82	0.25
24	6.996	0.0347	1.286	4.13	14.7	94.6	18.84	0.19
12	7.690	0.0701	3.598	4.53	7.3	86.2	18.88	0.28
27	7.816	0.0538	3.988	5.91	9.5	85.0	18.90	0.19
02	8.799	0.0245	7.251	6.88	20.8	75.7	18.95	0.24
21	7.518	0.0497	2.769	3.54	10.3	89.2	19.08	0.26
23	7.341	0.0263	2.150	4.37	19.4	91.4	19.09	0.19
20	*8.508*	*0.0298*	*5.817*	*10.8*	*17.1*	*79.8*	*19.33*	*0.15*
09	*8.802*	*0.1286*	*6.810*	*4.16*	*4.0*	*77.2*	*19.35*	*0.36*
weighted mean			n=17	18.8	±13.5		18.80	0.11
51) FX-135, J=0.000778405±0.09%, NM-50, Lab#=6637								
07	34.58	0.0948	72.42	0.505	5.4	38.1	18.43	0.73
15	21.86	0.0635	29.34	1.39	8.0	60.4	18.44	0.30
05	19.14	0.0725	19.89	1.50	7.0	69.3	18.54	0.25
11	25.50	0.0555	41.28	1.71	9.2	52.2	18.59	0.35
02	30.13	0.0755	56.92	0.445	6.8	44.2	18.61	0.67
08	27.95	0.0643	49.21	1.13	7.9	48.0	18.74	0.46
09	14.59	0.0419	3.959	0.914	12.2	92.0	18.76	0.21
14	32.46	0.0556	64.36	0.777	9.2	41.4	18.78	0.64
13	31.99	0.0602	62.77	1.08	8.5	42.0	18.79	0.52
03	20.25	0.0579	23.03	1.39	8.8	66.4	18.79	0.30
04	18.96	0.0670	18.49	1.22	7.6	71.2	18.87	0.30
01	64.36	0.0631	172.1	0.922	8.1	21.0	18.88	1.14
06	15.01	0.0425	4.858	2.66	12.0	90.5	18.97	0.13
10	15.16	0.0273	5.323	0.395	18.7	89.6	18.98	0.49
12	18.85	0.0496	17.77	0.927	10.3	72.2	19.00	0.33
weighted mean			n=15	9.3	±6.3		18.81	0.13
52) FX-179, J=0.0008638933±0.09%, NM-49, Lab#=6552								
4	13.54	0.1227	5.220	2.27	4.2	88.7	18.62	0.16
8	18.00	0.0388	20.22	10.1	13.1	66.8	18.65	0.20
11	16.89	0.0901	16.43	3.20	5.7	71.3	18.68	0.22
6	12.46	0.0258	1.161	8.09	19.8	97.3	18.79	0.10
9	12.90	0.1282	2.636	3.33	4.0	94.0	18.80	0.13
7	17.50	0.0244	18.15	9.74	20.9	69.4	18.82	0.20

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$\%^{40}Ar^*$	Age (Ma)	±2σ (Ma)
52 continued) FX-179, J=0.0008638933±0.09%, NM-49, Lab#=6552								
5	18.75	0.0261	22.38	8.38	19.6	64.7	18.82	0.21
10	14.51	0.1003	8.047	5.41	5.1	83.7	18.82	0.14
12	24.55	0.0846	42.03	2.88	6.0	49.4	18.83	0.42
14	12.37	0.0220	0.7037	8.29	23.2	98.3	18.86	0.11
1	16.56	0.0219	14.76	13.2	23.3	73.7	18.91	0.16
13	12.29	0.0221	0.3089	7.61	23.1	99.3	18.91	0.09
15	13.63	0.1154	4.718	1.93	4.4	89.8	18.99	0.19
2	22.88	0.0449	35.92	7.32	11.4	53.6	19.02	0.30
weighted mean			n=14	13.1	±16.3		18.83	0.07
53) FX-184, J=0.000864027±0.09%, NM-49, Lab#=6543								
16	12.29	0.0158	1.018	1.76	32.4	97.6	18.60	0.14
04	13.39	0.0107	4.719	1.57	47.6	89.6	18.61	0.19
06	12.34	0.0098	0.8058	1.94	52.1	98.1	18.77	0.15
03	14.15	0.0104	6.929	4.59	48.9	85.5	18.77	0.15
13	13.05	0.0091	3.138	4.88	56.1	92.9	18.80	0.10
12	12.54	0.0131	1.388	1.27	38.9	96.7	18.81	0.18
15	12.34	0.0117	0.6730	1.94	43.5	98.4	18.82	0.14
02	12.31	0.0095	0.4890	3.36	53.4	98.8	18.86	0.10
01	12.49	0.0100	1.091	4.81	51.1	97.4	18.87	0.10
14	14.26	0.0105	7.064	2.34	48.8	85.4	18.88	0.16
10	12.69	0.0091	1.689	4.76	56.0	96.1	18.90	0.10
07	13.10	0.0093	3.080	1.02	55.0	93.1	18.90	0.29
11	12.26	0.0095	0.1865	2.65	53.6	99.6	18.93	0.11
09	13.15	0.0141	2.986	2.08	36.3	93.3	19.03	0.14
weighted mean			n=14	48.1	±15.2		18.84	0.07
54) SS-2-27-96-1, J=0.000778026±0.09%, NM-50, Lab#=6630								
14	*58.94*	*0.0773*	*157.1*	*0.236*	*6.6*	*21.2*	*17.48*	*1.50*
12	*13.61*	*0.1188*	*2.948*	*0.156*	*4.3*	*93.7*	*17.81*	*0.81*
07	19.55	0.0829	21.08	0.711	6.2	68.2	18.61	0.34
10	18.07	0.0608	15.94	0.974	8.4	74.0	18.67	0.27
08	17.53	0.0315	13.90	0.951	16.2	76.6	18.75	0.23
01	31.50	0.0709	61.02	1.72	7.2	42.8	18.81	0.46
13	19.55	0.1103	20.59	0.834	4.6	68.9	18.82	0.31
02	15.43	0.0224	6.446	2.84	22.8	87.7	18.89	0.13
11	20.99	0.0549	25.25	1.13	9.3	64.5	18.90	0.32
15	22.42	0.0776	30.06	2.42	6.6	60.4	18.91	0.25
05	16.75	0.0397	10.69	1.40	12.8	81.2	18.99	0.19
06	22.85	0.0629	31.19	0.865	8.1	59.7	19.04	0.32
09	*18.37*	*0.1393*	*15.73*	*0.427*	*3.7*	*74.7*	*19.18*	*0.41*
04	*15.49*	*0.1218*	*5.828*	*0.785*	*4.2*	*88.9*	*19.23*	*0.24*
03	*33.32*	*0.1334*	*65.82*	*1.80*	*3.8*	*41.7*	*19.38*	*0.47*
weighted mean			n=10	10.2	±11.1		18.86	0.11

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
55) FX-130, J=0.0008640405±0.09%, NM-49, Lab#=6542								
11	*19.28*	*0.0129*	*25.10*	*7.12*	*39.5*	*61.5*	*18.40*	*0.21*
15	18.71	0.0091	22.67	5.70	56.3	64.2	18.62	0.21
05	17.09	0.0134	17.03	5.09	37.9	70.6	18.70	0.19
02	13.06	0.0232	3.182	3.49	22.0	92.8	18.80	0.13
14	12.31	0.0076	0.5756	2.58	66.9	98.6	18.82	0.11
10	12.95	0.0085	2.673	5.76	59.8	93.9	18.85	0.10
16	12.68	0.0093	1.729	3.22	54.8	96.0	18.87	0.11
08	12.26	0.0091	0.2977	3.98	56.0	99.3	18.87	0.12
06	13.21	0.0087	3.508	3.43	58.9	92.2	18.88	0.13
09	12.87	0.0088	2.305	6.98	58.2	94.7	18.90	0.09
13	17.35	0.0077	17.43	3.64	66.0	70.3	18.92	0.17
04	12.40	0.0075	0.5707	2.08	67.8	98.6	18.96	0.12
12	12.32	0.0072	0.2594	1.88	70.5	99.4	18.98	0.14
03	13.51	0.0112	4.112	1.92	45.4	91.0	19.07	0.17
weighted mean			n=13	55.4	±27.0		18.88	0.07
56) FX-180, J=0.0008640131±0.09%, NM-49, Lab#=6544								
04	*17.74*	*0.1903*	*20.82*	*0.962*	*2.7*	*65.4*	*18.00*	*0.36*
05	*13.41*	*0.0358*	*5.775*	*0.765*	*14.3*	*87.3*	*18.15*	*0.35*
06	12.26	0.0094	0.6179	2.13	54.2	98.5	18.73	0.13
10	12.19	0.0081	0.3623	4.08	62.7	99.1	18.74	0.10
03	12.29	0.0087	0.3671	2.50	58.8	99.1	18.88	0.11
01	12.48	0.0111	0.9866	10.5	46.0	97.7	18.90	0.09
08	12.57	0.0100	1.265	5.61	51.0	97.0	18.91	0.10
07	12.33	0.0968	0.4436	1.55	5.3	99.0	18.93	0.18
11	14.75	0.0579	8.547	1.93	8.8	82.9	18.96	0.19
09	12.28	0.0092	0.1627	3.10	55.2	99.6	18.97	0.10
14	12.33	0.0065	0.2235	3.47	79.0	99.5	19.02	0.11
12	*12.37*	*0.0075*	*-0.2442*	*0.736*	*67.7*	*100.6*	*19.28*	*0.29*
weighted mean			n=9	46.8	±48.7		18.89	0.08
57) FZ-49, J=0.001586321±0.10%, NM-71, Lab#=8140								
16	*13.77*	*0.0357*	*27.97*	*0.730*	*14.3*	*40.0*	*15.69*	*1.50*
05	*22.91*	*0.0222*	*57.61*	*1.33*	*23.0*	*25.7*	*16.76*	*1.30*
20	*7.489*	*0.0230*	*4.214*	*1.24*	*22.2*	*83.4*	*17.79*	*0.75*
32	*6.879*	*0.0654*	*2.024*	*1.17*	*7.8*	*91.4*	*17.90*	*0.58*
35	*7.376*	*0.0255*	*3.155*	*2.30*	*20.0*	*87.4*	*18.35*	*0.35*
36	*7.461*	*0.0213*	*3.252*	*2.32*	*23.9*	*87.1*	*18.51*	*0.34*
33	*7.041*	*0.0211*	*1.752*	*1.50*	*24.2*	*92.7*	*18.58*	*0.55*
30	*6.924*	*0.0235*	*1.284*	*2.76*	*21.7*	*94.5*	*18.64*	*0.29*
43	6.629	0.0209	0.1272	22.5	24.4	99.5	18.77	0.07
39	6.702	0.0350	0.3311	14.3	14.6	98.6	18.81	0.09
40	6.724	0.0250	0.3275	16.3	20.4	98.6	18.87	0.08
15	*6.880*	*0.0251*	*0.6687*	*1.28*	*20.3*	*97.2*	*19.03*	*0.62*
41	6.689	0.0248	0.0233	16.2	20.5	99.9	19.03	0.08

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$\%^{40}Ar^*$	Age (Ma)	±2σ (Ma)
57 continued) FZ-49, J=0.001586321±0.10%, NM-71, Lab#=8140								
34	*7.543*	*0.0179*	*2.903*	*1.15*	*28.5*	*88.6*	*19.04*	*0.66*
42	6.750	0.0273	0.1952	13.9	18.7	99.2	19.06	0.10
01	*10.52*	*0.0238*	*12.92*	*1.12*	*21.5*	*63.7*	*19.10*	*0.93*
11	*6.342*	*0.0291*	*-1.4321*	*1.62*	*17.5*	*106.7*	*19.26*	*0.53*
19	*8.191*	*0.0231*	*4.648*	*1.56*	*22.1*	*83.2*	*19.41*	*0.59*
37	*6.717*	*0.0244*	*-0.3712*	*1.66*	*20.9*	*101.7*	*19.44*	*0.50*
04	*7.111*	*0.0262*	*0.8662*	*0.951*	*19.5*	*96.4*	*19.52*	*0.81*
17	*6.429*	*0.0694*	*-2.1100*	*1.39*	*7.4*	*109.8*	*20.09*	*0.66*
06	*7.988*	*0.0281*	*2.208*	*0.554*	*18.1*	*91.9*	*20.88*	*1.43*
38	*6.800*	*0.0294*	*-2.1509*	*0.456*	*17.4*	*109.4*	*21.16*	*1.60*
weighted mean			n=5	19.7	±7.1		18.89	0.13
58) FZ-81, J=0.001575585±0.10%, NM-71, Lab#=8130								
02	6.874	0.0133	1.266	2.40	38.4	94.6	18.38	0.28
13	6.687	0.0120	0.3923	2.22	42.7	98.3	18.58	0.30
08	10.19	0.0228	12.03	5.90	22.4	65.1	18.76	0.31
06	6.924	0.0129	0.8464	6.96	39.6	96.4	18.87	0.15
07	7.852	0.0128	3.930	6.04	40.0	85.2	18.92	0.18
01	6.793	0.0099	0.2970	2.01	51.4	98.7	18.96	0.33
05	6.968	0.0174	0.8444	0.976	29.3	96.4	19.00	0.69
04	7.188	0.0110	1.375	2.74	46.5	94.4	19.18	0.26
11	6.920	0.0302	0.1802	2.75	16.9	99.3	19.42	0.25
12	*7.045*	*0.0194*	*0.0768*	*1.20*	*26.3*	*99.7*	*19.86*	*0.56*
14	*7.373*	*0.0127*	*1.142*	*0.714*	*40.1*	*95.4*	*19.89*	*0.90*
15	*7.278*	*0.2762*	*0.8276*	*0.756*	*1.8*	*96.9*	*19.95*	*0.82*
weighted mean			n=9	36.4	±22.6		18.91	0.20
59) FZ-53, J=0.001576427±0.10%, NM-71, Lab#=8131								
03	*6.847*	*0.0089*	*0.9337*	*11.9*	*57.6*	*96.0*	*18.59*	*0.10*
05	*6.744*	*0.0091*	*0.5694*	*7.14*	*56.2*	*97.5*	*18.61*	*0.16*
04	*6.733*	*0.0096*	*0.4419*	*6.24*	*52.9*	*98.1*	*18.68*	*0.17*
02	6.696	0.0092	0.1632	11.7	55.2	99.3	18.81	0.10
09	6.738	0.0090	0.2820	5.59	57.0	98.8	18.83	0.18
10	6.626	0.0093	-0.1214	4.37	54.7	100.5	18.85	0.17
06	6.717	0.0091	0.1702	9.05	56.3	99.3	18.86	0.11
15	6.747	0.0089	0.2371	9.85	57.6	99.0	18.89	0.10
07	6.730	0.0109	0.1626	14.6	46.7	99.3	18.90	0.08
14	6.765	0.0099	0.2757	9.68	51.6	98.8	18.91	0.12
12	6.718	0.0099	0.0896	11.7	51.5	99.6	18.93	0.09
08	6.737	0.0087	0.1444	6.06	59.0	99.4	18.94	0.19
11	6.772	0.0082	0.2442	3.77	62.6	98.9	18.96	0.19
01	6.750	0.0092	0.0671	12.2	55.5	99.7	19.04	0.09
13	6.726	0.0091	-0.0226	8.44	56.3	100.1	19.05	0.12
weighted mean			n=12	55.3	±8.1		18.92	0.07

Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
60) FZ-85, J=0.001584107±0.10%, NM-71, Lab#=8136								
13	*15.83*	*0.1463*	*33.87*	*1.52*	*3.5*	*36.8*	*16.58*	*1.04*
06	*10.74*	*0.1510*	*15.65*	*0.640*	*3.4*	*57.1*	*17.43*	*1.56*
11	7.258	0.1405	2.993	1.38	3.6	88.0	18.15	0.58
10	8.041	0.1278	5.258	1.20	4.0	80.8	18.47	0.76
01	6.676	0.1163	0.3616	3.39	4.4	98.5	18.70	0.32
20	7.029	0.1626	1.556	1.82	3.1	93.6	18.71	0.46
12	8.309	0.1510	5.780	0.688	3.4	79.6	18.80	1.27
23	6.953	0.1335	1.118	10.6	3.8	95.4	18.86	0.13
24	6.744	0.1340	0.4103	11.3	3.8	98.4	18.86	0.11
21	6.952	0.1953	1.084	4.29	2.6	95.6	18.90	0.20
26	6.787	0.1229	0.4877	8.92	4.2	98.0	18.91	0.14
08	7.823	0.1406	3.958	1.37	3.6	85.2	18.95	0.69
27	6.828	0.1349	0.5840	7.19	3.8	97.6	18.95	0.18
25	6.825	0.1268	0.5500	9.40	4.0	97.8	18.97	0.11
09	9.005	0.1226	7.821	1.08	4.2	74.4	19.06	0.82
28	6.755	0.1455	0.1932	9.78	3.5	99.3	19.07	0.13
22	7.032	0.1759	1.100	2.52	2.9	95.6	19.11	0.36
14	*7.990*	*0.1201*	*3.740*	*0.865*	*4.2*	*86.3*	*19.60*	*1.04*
weighted mean			n=15	3.7	±1.0		18.92	0.09
61) SMR-12-1-95-3, J=0.00078936±0.09%, NM-50, Lab#=6665								
06	13.44	0.0106	0.5664	4.48	48.3	98.8	18.80	0.10
15	13.48	0.0113	0.4502	7.27	45.0	99.0	18.91	0.09
09	13.42	0.0671	0.2542	3.02	7.6	99.5	18.92	0.09
13	13.49	0.0116	0.4027	2.28	44.0	99.1	18.94	0.10
14	13.56	0.1323	0.6791	1.29	3.9	98.6	18.94	0.13
05	13.46	0.0102	0.2966	1.47	50.0	99.4	18.94	0.12
08	13.43	0.0116	0.1771	3.43	44.1	99.6	18.95	0.10
12	13.60	0.0084	0.7339	6.70	60.6	98.4	18.95	0.09
11	13.46	0.0114	0.2503	6.27	44.8	99.5	18.96	0.09
04	13.56	0.0161	0.5895	3.16	31.7	98.7	18.97	0.10
07	13.44	0.0129	0.1284	4.06	39.7	99.7	18.98	0.10
01	13.44	0.0104	-0.0651	2.45	49.2	100.1	19.07	0.10
02	13.44	0.0112	-0.0863	0.868	45.7	100.2	19.08	0.16
10	13.71	0.0164	0.5323	1.26	31.2	98.9	19.19	0.13
weighted mean			n=14	39.0	±31.8		18.96	0.06
62) FX-178, J=0.000778028±0.09%, NM-50, Lab#=6628								
04	*13.80*	*0.0072*	*1.196*	*0.951*	*70.7*	*97.4*	*18.77*	*0.17*
16	14.28	0.0087	2.534	1.75	59.0	94.8	18.90	0.12
01	14.07	0.0083	1.782	8.54	61.5	96.3	18.92	0.10
10	13.64	0.0076	0.2815	0.689	67.0	99.4	18.92	0.23
13	13.75	0.0094	0.5981	1.47	54.3	98.7	18.95	0.12
07	13.66	0.0139	0.2176	2.95	36.6	99.5	18.98	0.10
02	13.68	0.0077	0.2152	2.49	66.4	99.5	19.01	0.11

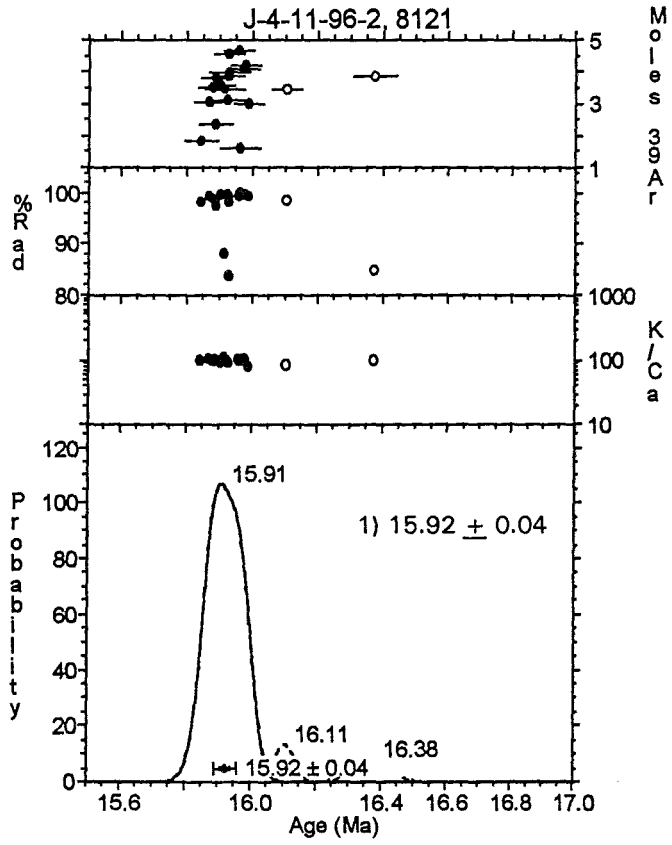
Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

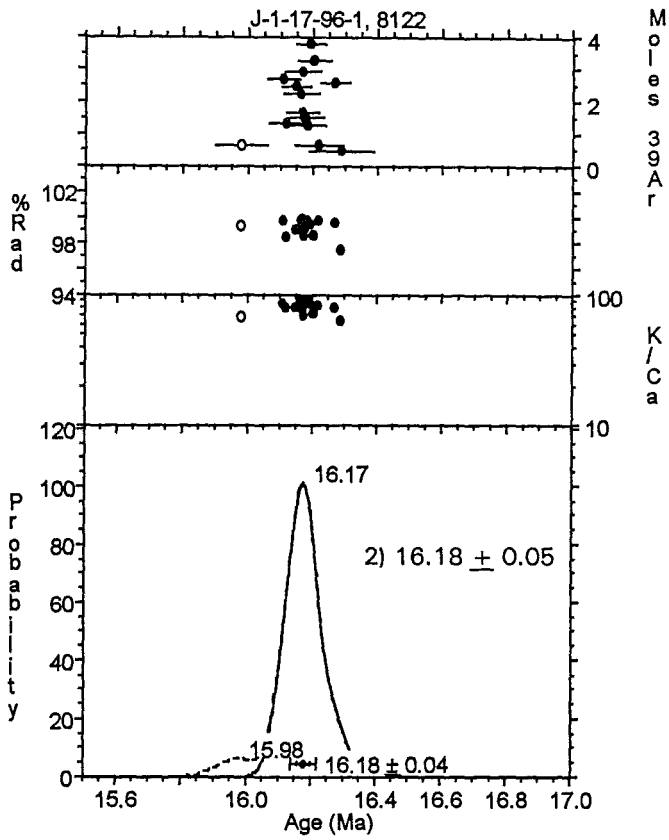
ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	%$^{40}Ar^*$	Age (Ma)	±2σ (Ma)
62 continued) FX-178, J=0.000778028±0.09%, NM-50, Lab#=6628								
14	13.89	0.0090	0.8945	1.84	56.4	98.1	19.02	0.12
09	14.57	0.0125	3.198	1.29	40.9	93.5	19.02	0.17
03	16.16	0.0092	8.574	1.78	55.5	84.3	19.03	0.16
15	13.82	0.0085	0.6684	1.37	59.7	98.6	19.03	0.14
05	13.76	0.1205	0.2239	0.590	4.2	99.6	19.14	0.25
06	13.62	0.0053	-0.3481	0.801	96.9	100.8	19.16	0.22
12	18.56	0.0118	16.36	2.03	43.4	74.0	19.16	0.22
08	13.72	0.0076	-0.0390	0.812	67.0	100.1	19.18	0.19
11	*14.01*	*0.0078*	*0.5601*	*0.932*	*65.5*	*98.8*	*19.32*	*0.17*
weighted mean			n=14	54.9	±41.2		19.00	0.07
63) FX-176, J=0.0008639847±0.09%, NM-49, Lab#=6546								
12	13.18	0.0053	0.1084	4.81	96.3	99.8	20.37	0.11
15	13.30	0.0054	0.5133	2.32	94.2	98.9	20.38	0.14
01	13.28	0.0050	0.3048	3.11	101.3	99.3	20.44	0.11
13	13.26	0.0051	0.1946	3.51	100.9	99.6	20.47	0.11
07	13.30	0.0039	0.2946	3.31	129.5	99.3	20.47	0.12
weighted mean			n=5	104.4	±28.7		20.43	0.08
64) FX-174, J=0.000778213±0.09%, NM-50, Lab#=6625								
02	*14.86*	*0.0057*	*1.537*	*0.926*	*89.7*	*96.9*	*20.11*	*0.19*
12	14.76	0.0056	0.5540	1.24	91.2	98.9	20.38	0.16
01	14.79	0.0051	0.6449	2.40	99.6	98.7	20.38	0.11
05	14.97	0.0051	1.124	3.08	99.9	97.8	20.44	0.11
13	14.66	0.0038	0.0267	2.09	133.1	99.9	20.45	0.11
04	15.03	0.1614	1.319	1.28	3.2	97.5	20.45	0.16
06	14.84	0.0045	0.5368	1.65	113.3	98.9	20.50	0.13
11	15.32	0.0054	2.087	4.70	95.2	96.0	20.53	0.12
07	15.14	0.0049	1.480	1.95	104.8	97.1	20.53	0.12
03	14.98	0.0050	0.8348	1.88	102.8	98.4	20.57	0.12
15	14.77	0.0037	-0.0160	1.63	136.8	100.0	20.62	0.13
09	14.77	0.0040	-0.1744	1.30	126.0	100.3	20.70	0.14
10	15.11	0.0029	0.7511	1.06	177.5	98.5	20.79	0.18
weighted mean			n=12	106.9	±81.4		20.52	0.08
65) FX-137, J=0.000778015±0.09%, NM-50, Lab#=6629								
03	14.73	0.0026	0.2881	1.44	192.6	99.4	20.44	0.14
02	14.77	0.0051	0.1390	0.922	100.3	99.7	20.56	0.17
01	14.79	0.0112	-0.0173	0.960	45.7	100.0	20.65	0.17
weighted mean			n=3	112.9	±148.5		20.54	0.16
66) FX-115, J=0.0008639552±0.09%, NM-49, Lab#=6548								
14	15.41	0.0075	7.606	7.20	67.7	85.4	20.41	0.13
15	21.00	0.0048	26.44	4.76	105.9	62.8	20.44	0.29
01	18.41	0.0040	17.61	23.9	127.0	71.7	20.47	0.19

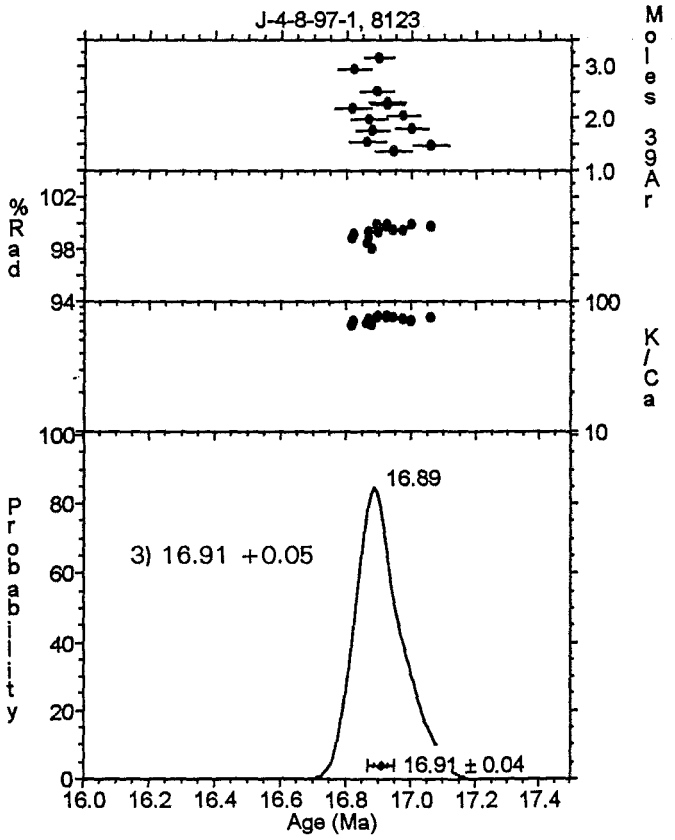
Table 2. $^{40}Ar/^{39}Ar$ analytical data from single-crystal laser-fusion of sanidine crystals.

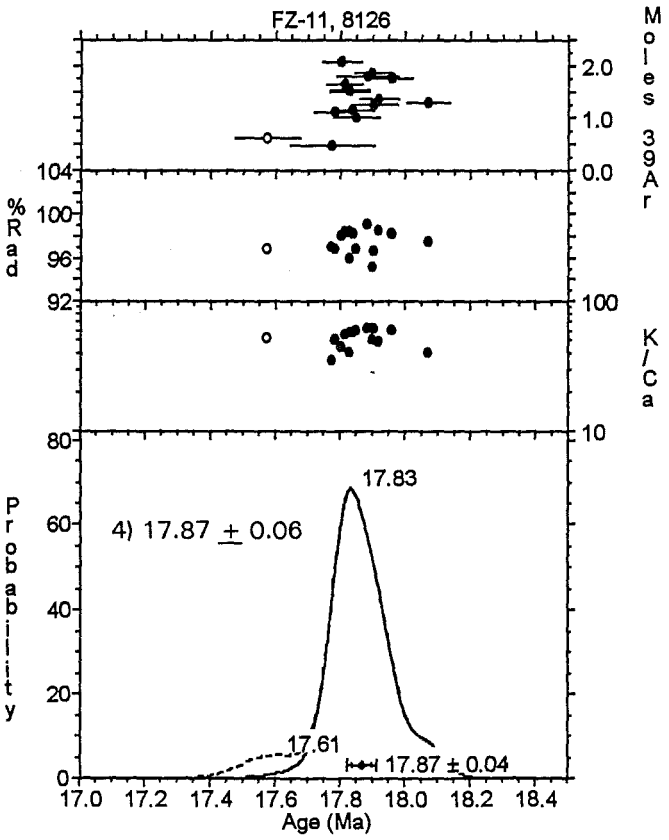
ID	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$ (x 10^{-3})	$^{39}Ar_K$ (x 10^{-15} mol)	K/Ca	$\%^{40}Ar^*$	Age (Ma)	±2σ (Ma)
66 continued) FX-115, J=0.0008639552±0.09%, NM-49, Lab#=6548								
09	23.13	0.0058	33.51	2.93	87.9	57.2	20.50	0.35
12	14.58	0.0063	4.586	4.95	81.0	90.7	20.50	0.15
16	20.96	0.0058	26.14	5.65	88.1	63.1	20.51	0.26
11	15.33	0.0057	7.066	2.88	89.9	86.4	20.52	0.19
27	16.83	0.0036	12.07	5.44	141.6	78.8	20.56	0.17
34	20.26	0.0044	23.68	6.55	114.9	65.5	20.56	0.22
13	15.34	0.0047	6.996	3.99	108.9	86.5	20.57	0.17
33	15.05	0.0052	6.012	2.74	97.9	88.2	20.58	0.15
10	14.89	0.0071	5.452	6.95	71.9	89.2	20.59	0.13
36	14.67	0.0048	4.687	2.01	106.1	90.6	20.60	0.14
37	15.04	0.0097	5.924	5.84	52.4	88.4	20.60	0.13
05	17.49	0.0040	14.19	12.0	126.9	76.0	20.61	0.18
26	16.27	0.0292	10.05	6.28	17.5	81.8	20.62	0.14
07	16.92	0.0056	12.21	4.06	91.7	78.7	20.63	0.21
25	14.23	0.0044	3.023	6.26	115.6	93.7	20.67	0.12
28	14.95	0.0055	5.411	2.41	92.1	89.3	20.69	0.14
06	19.06	0.1193	19.35	7.97	4.3	70.1	20.70	0.20
32	17.58	0.0050	14.28	3.68	101.4	76.0	20.71	0.19
08	16.42	0.0048	10.30	4.74	105.4	81.5	20.73	0.17
38	18.30	0.0266	16.66	3.12	19.2	73.1	20.74	0.19
39	17.26	0.0044	12.79	3.06	115.7	78.1	20.89	0.18
03	18.10	0.0044	15.47	2.71	116.1	74.7	20.96	0.23
weighted mean			n=25	89.9	±69.9		20.61	0.07

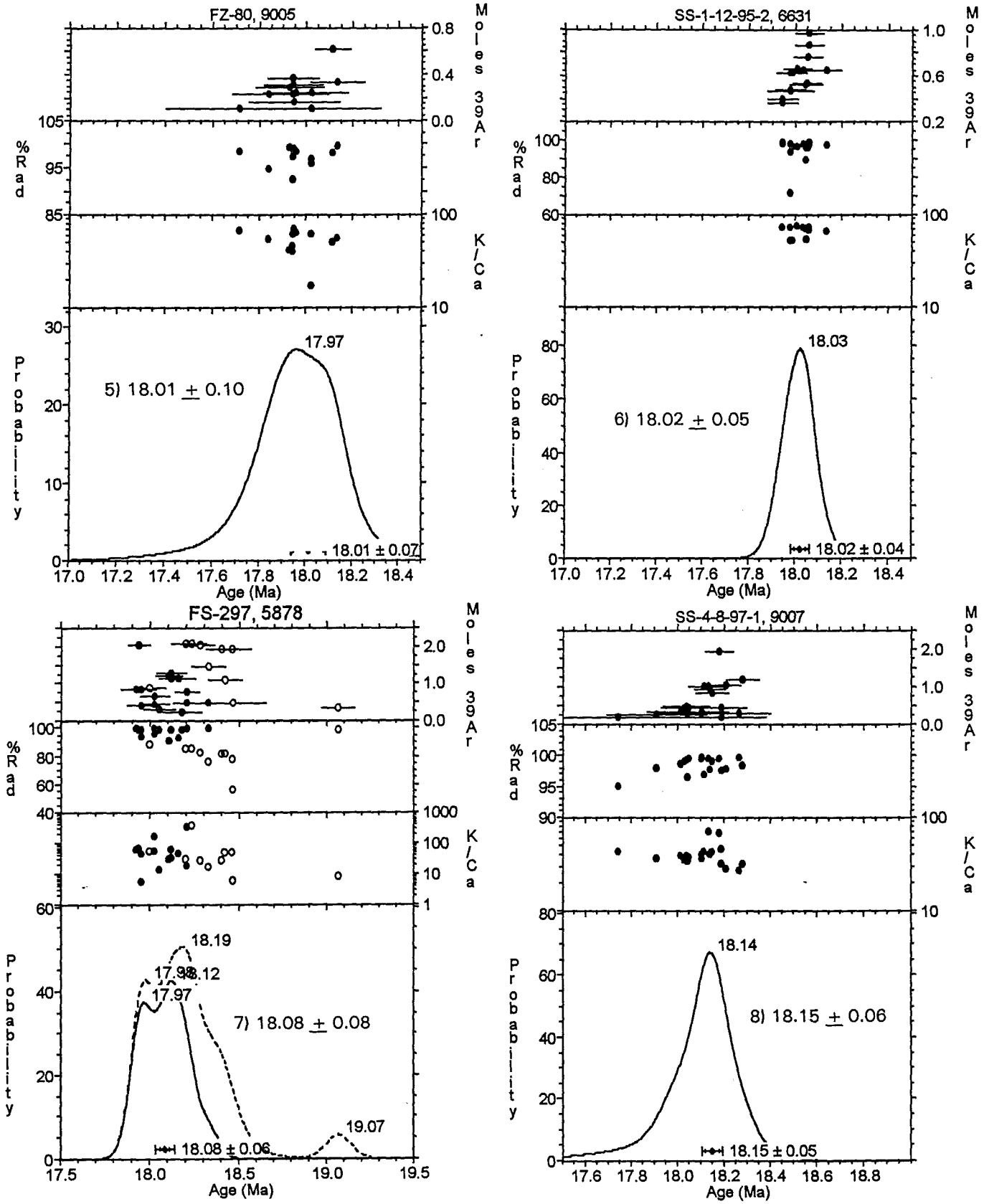
Figure 3 Age probability diagrams (pages 36-52) of single-crystal laser fusion $^{40}Ar/^{39}Ar$ results for individual samples. Lower panel shows cumulative age-probability spectrum (Deino and Potts, 1992), together with weighted-mean age and $\pm 2\sigma$ error (Samson and Alexander, 1987) after the sample's index number. Numbers above age-probablility are age modes in Ma. Upper panels display data from single-crystal analyses as dots, showing moles of measured ^{39}Ar X 10^{14}, percent radiogenic (non-atmospheric) ^{40}Ar, and K/Ca ratios calculated from K-derived ^{39}Ar and Ca-derived ^{37}Ar. Bars in upper panel show $\pm 1\sigma$ analytical error of single-crystal analyses.

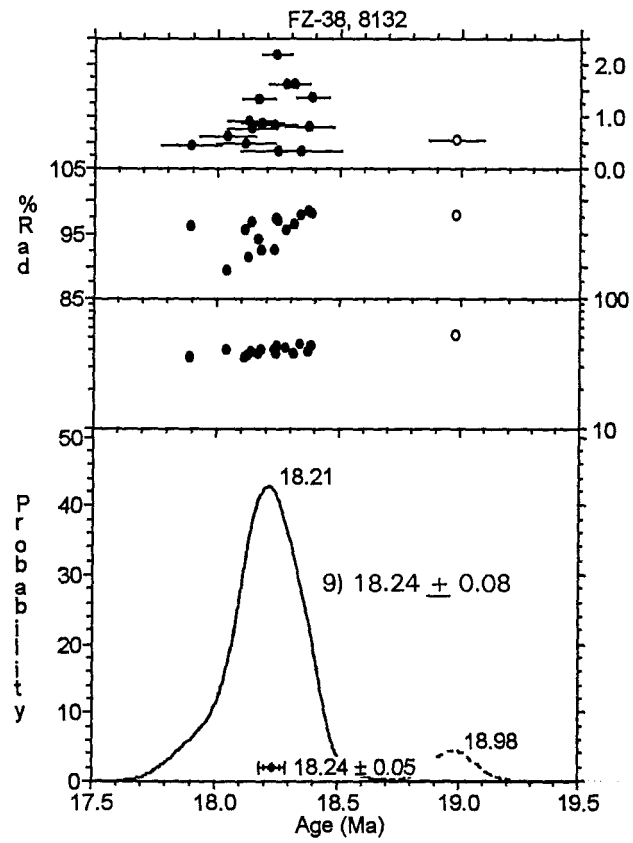

J-4-11-96-2, 8121
Moles 39Ar
% Rad
K/Ca
Probability
15.91
1) 15.92 ± 0.04
16.11
16.38
15.92 ± 0.04
Age (Ma)

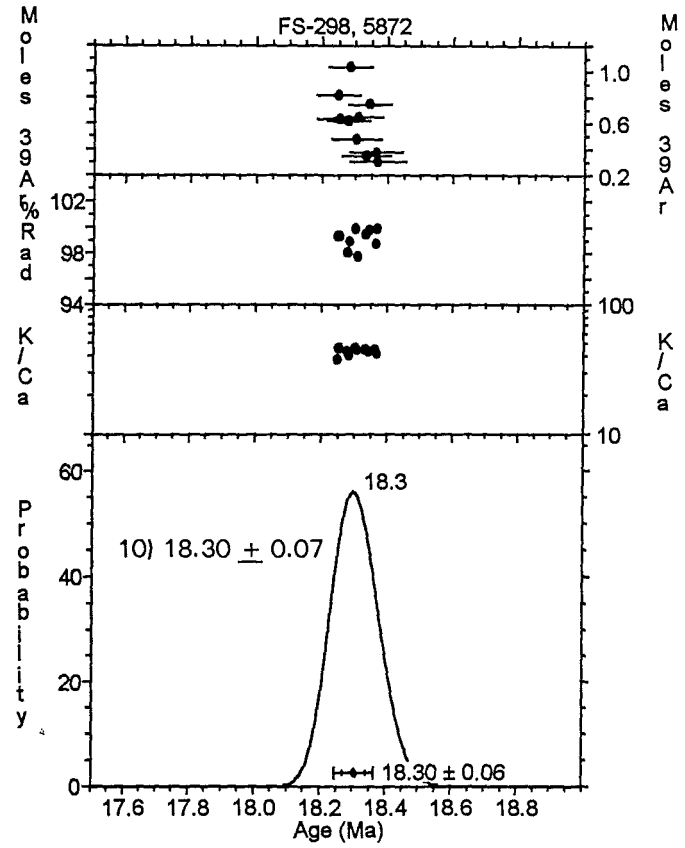

J-1-17-96-1, 8122
Moles 39Ar
% Rad
K/Ca
Probability
16.17
2) 16.18 ± 0.05
15.98
16.18 ± 0.04
Age (Ma)

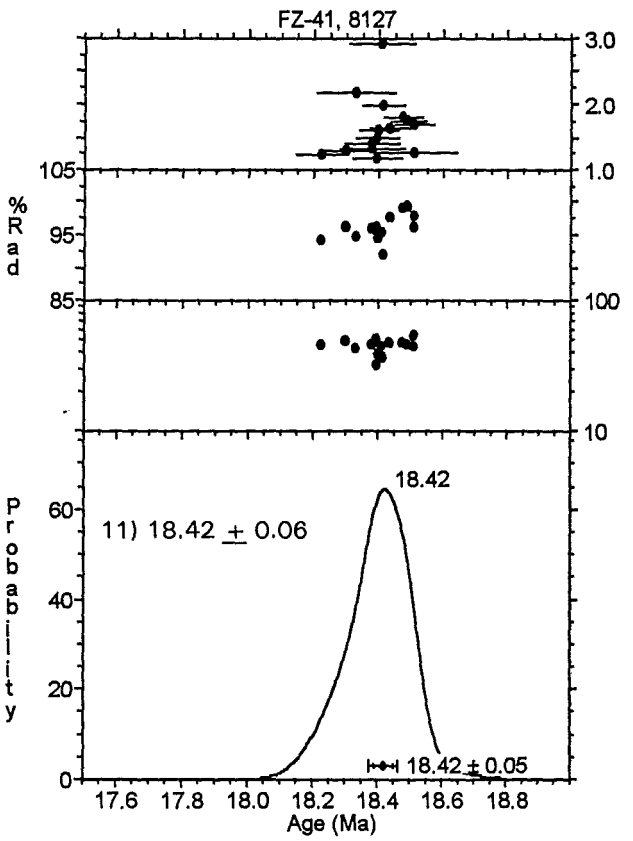

J-4-8-97-1, 8123
Moles 39Ar
% Rad
K/Ca
Probability
16.89
3) 16.91 +0.05
16.91 ± 0.04
Age (Ma)

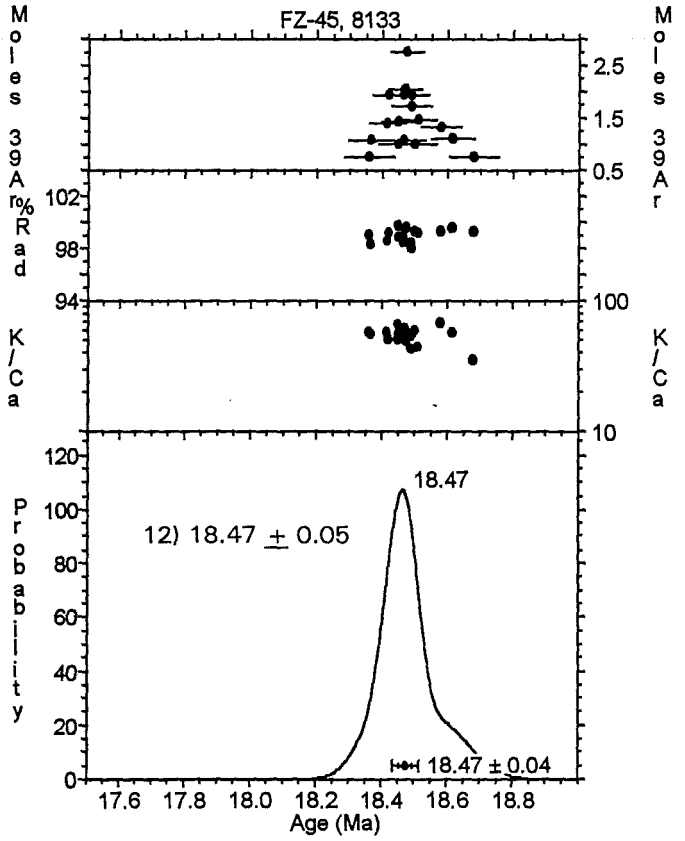

FZ-11, 8126
Moles 39Ar
% Rad
K/Ca
Probability
17.83
4) 17.87 ± 0.06
17.61
17.87 ± 0.04
Age (Ma)

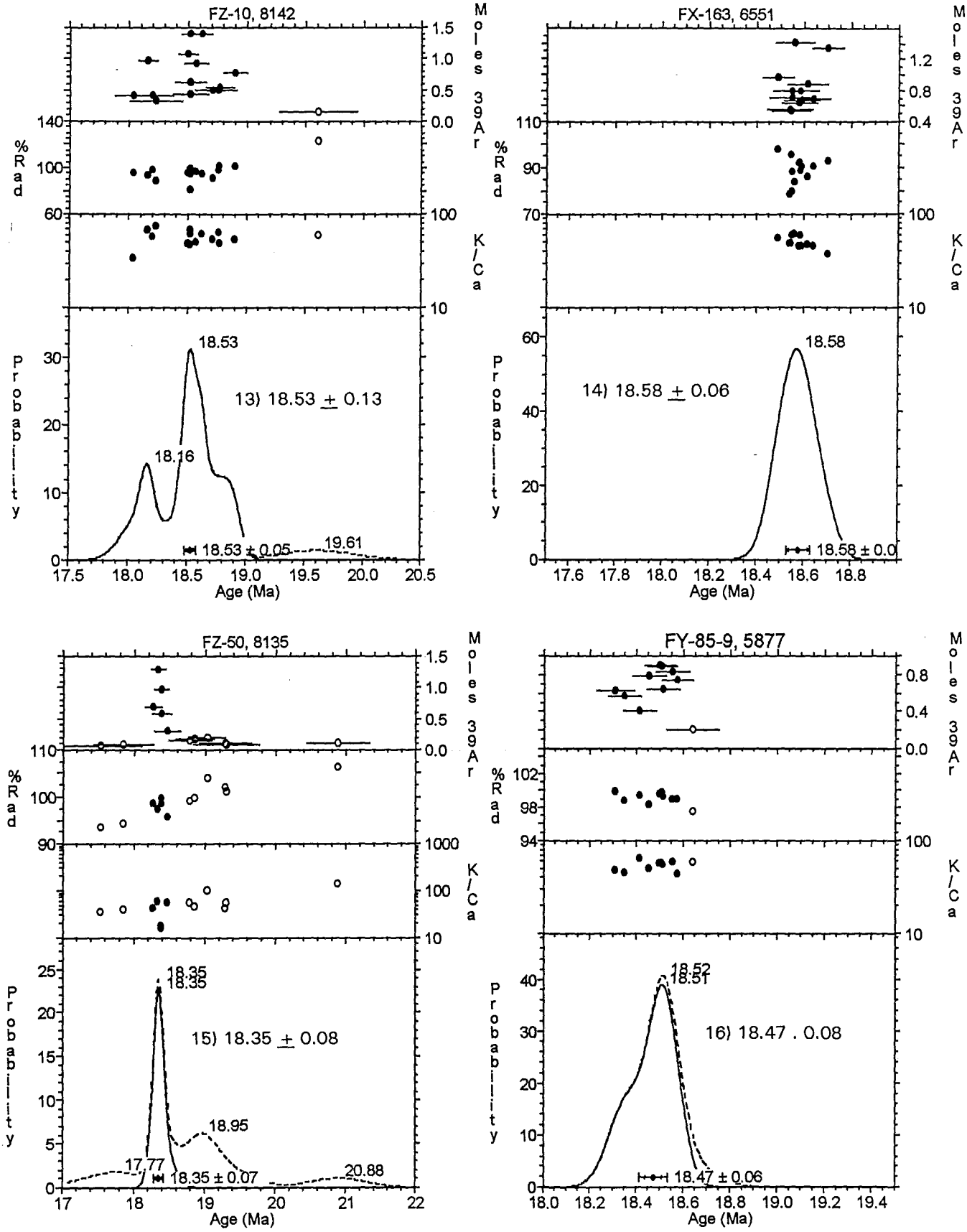

FZ-80, 9005
5) 18.01 ± 0.10
17.97
18.01 ± 0.07
SS-1-12-95-2, 6631
6) 18.02 ± 0.05
18.03
18.02 ± 0.04
FS-297, 5878
7) 18.08 ± 0.08
18.19
17.98
18.12
17.97
19.07
18.08 ± 0.06
SS-4-8-97-1, 9007
8) 18.15 ± 0.06
18.14
18.15 ± 0.05
Moles 39Ar
% Rad
K/Ca
Probability
Age (Ma)

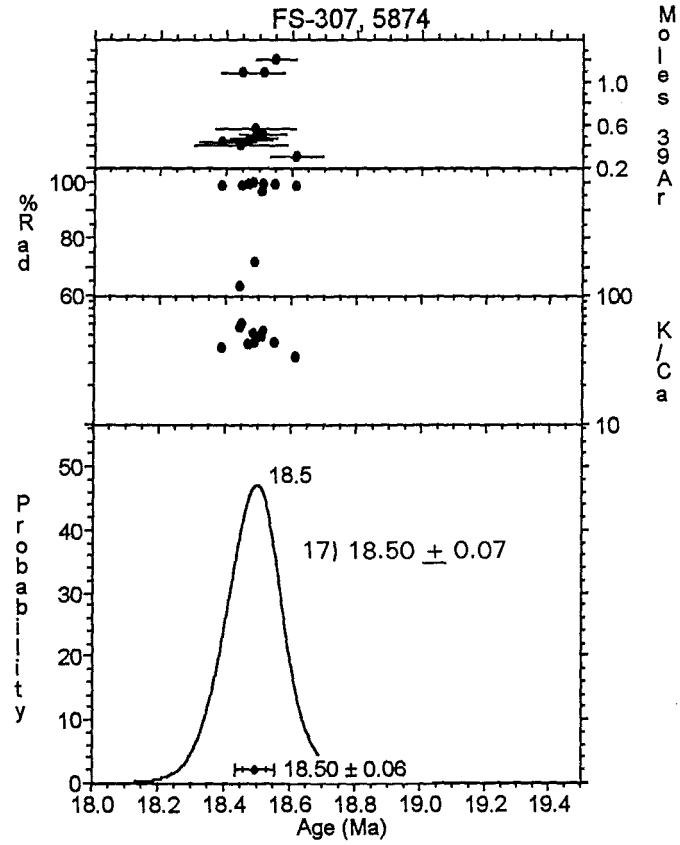

FZ-38, 8132
Moles 39Ar
% Rad
K/Ca
Probability
18.21
9) 18.24 ± 0.08
18.98
18.24 ± 0.05
Age (Ma)

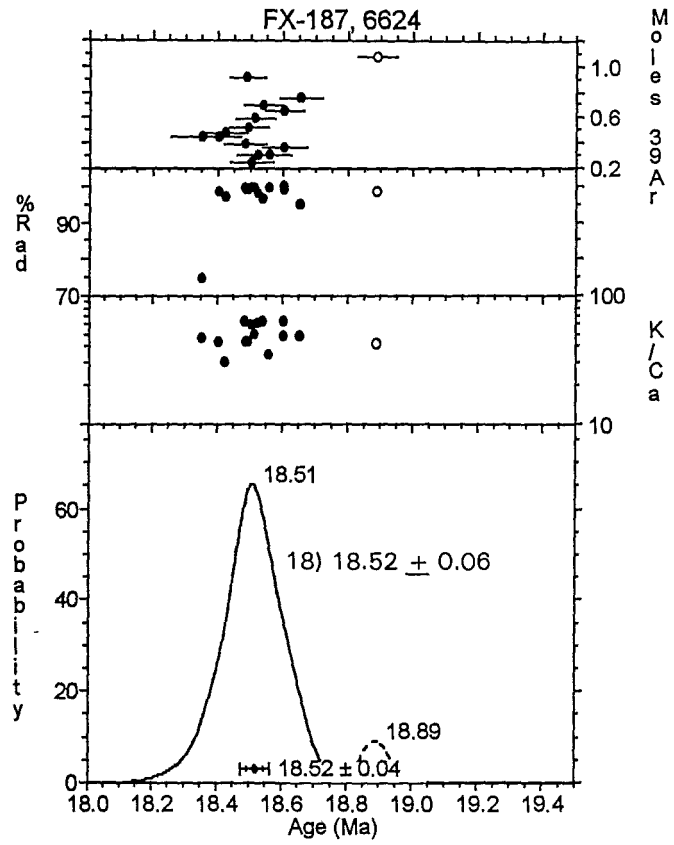

FS-298, 5872
Moles 39Ar
% Rad
K/Ca
Probability
18.3
10) 18.30 ± 0.07
18.30 ± 0.06
Age (Ma)

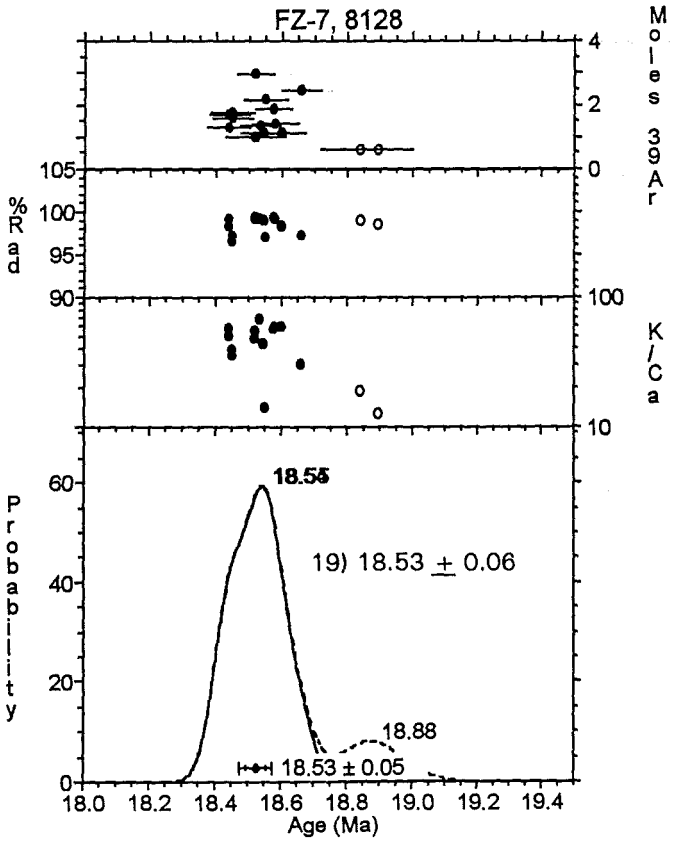

FZ-41, 8127
Moles 39Ar
% Rad
K/Ca
Probability
18.42
11) 18.42 ± 0.06
18.42 ± 0.05
Age (Ma)

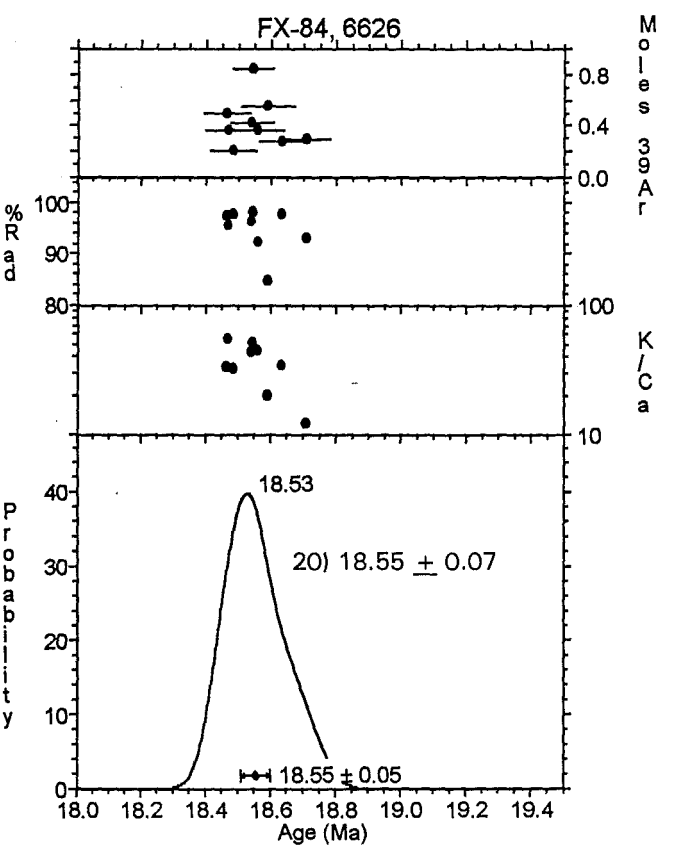

FZ-45, 8133
Moles 39Ar
% Rad
K/Ca
Probability
18.47
12) 18.47 ± 0.05
18.47 ± 0.04
Age (Ma)

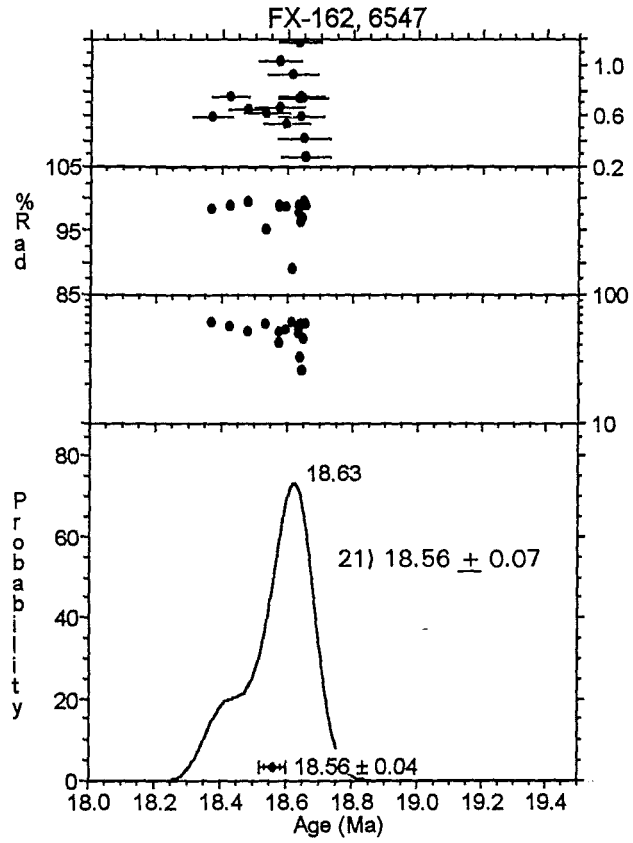

FZ-10, 8142
Moles 39Ar
% Rad
K/Ca
Probability
18.53
18.16
13) 18.53 ± 0.13
18.53 ± 0.05
19.61
Age (Ma)
FX-163, 6551
18.58
14) 18.58 ± 0.06
18.58 ± 0.0
FZ-50, 8135
18.35
18.35
15) 18.35 ± 0.08
18.95
17.77
18.35 ± 0.07
20.88
FY-85-9, 5877
18.52
18.51
16) 18.47 . 0.08
18.47 ± 0.06

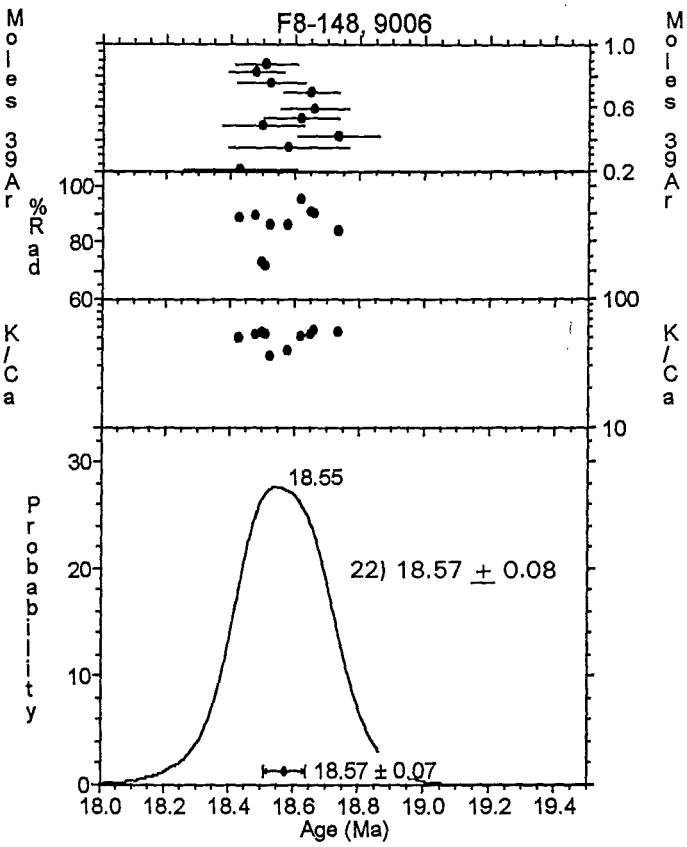

FS-307, 5874
Moles 39Ar
% Rad
K/Ca
Probability
18.5
17) 18.50 ± 0.07
18.50 ± 0.06
Age (Ma)

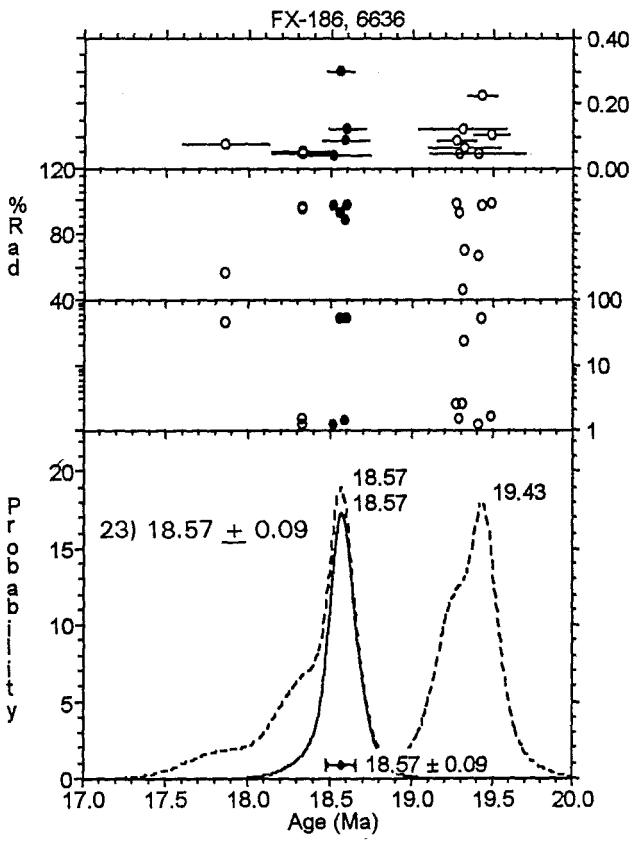

FX-187, 6624
Moles 39Ar
% Rad
K/Ca
Probability
18.51
18) 18.52 ± 0.06
18.89
18.52 ± 0.04
Age (Ma)

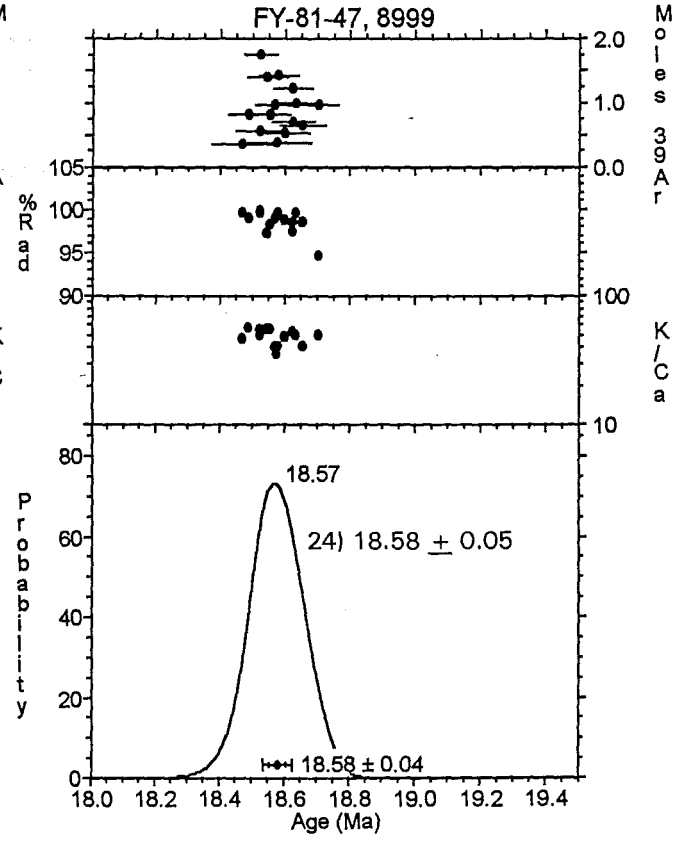

FZ-7, 8128
Moles 39Ar
% Rad
K/Ca
Probability
18.55
19) 18.53 ± 0.06
18.88
18.53 ± 0.05
Age (Ma)

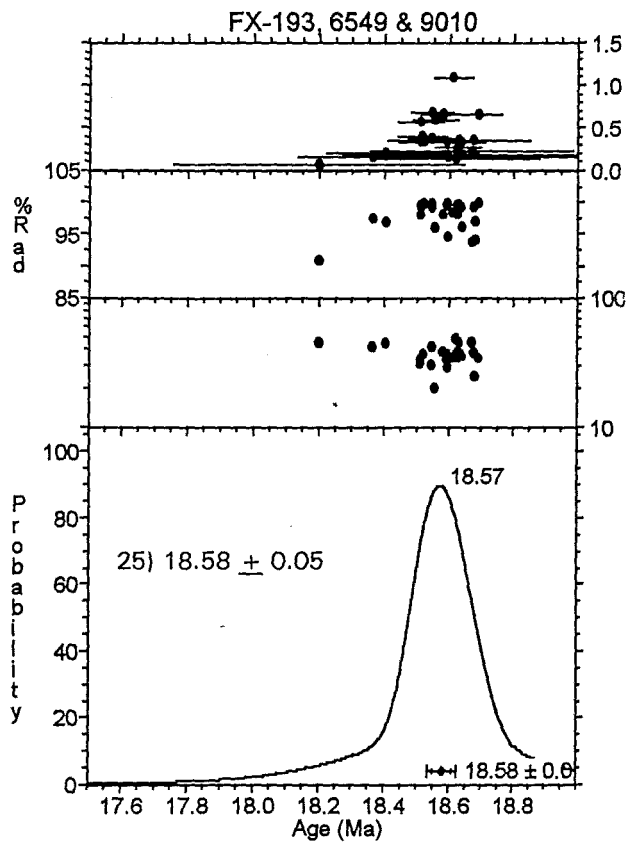

FX-84, 6626
Moles 39Ar
% Rad
K/Ca
Probability
18.53
20) 18.55 ± 0.07
18.55 ± 0.05
Age (Ma)

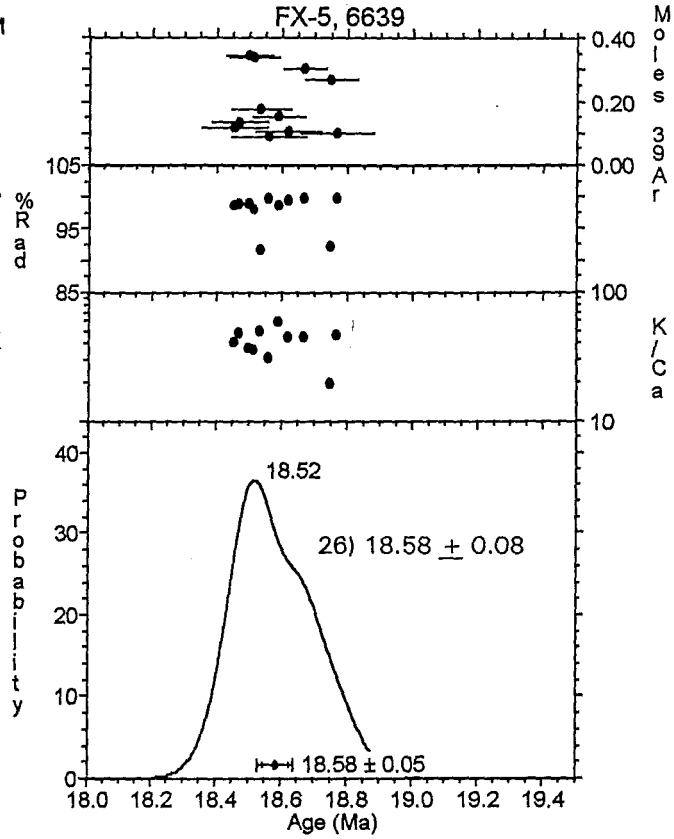

FX-162, 6547
Moles 39Ar
% Rad
K/Ca
Probability
18.63
21) 18.56 ± 0.07
18.56 ± 0.04
Age (Ma)

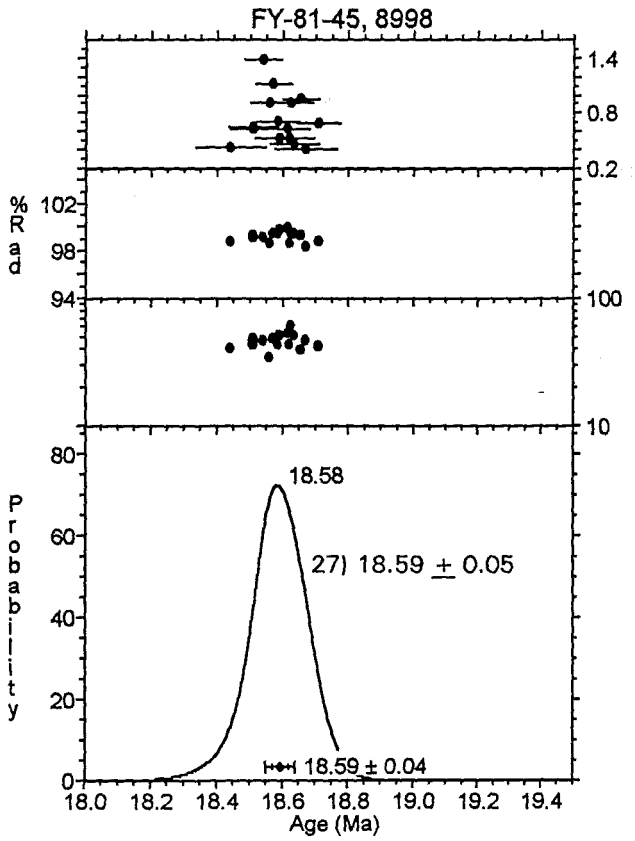

F8-148, 9006
Moles 39Ar
% Rad
K/Ca
Probability
18.55
22) 18.57 ± 0.08
18.57 ± 0.07
Age (Ma)

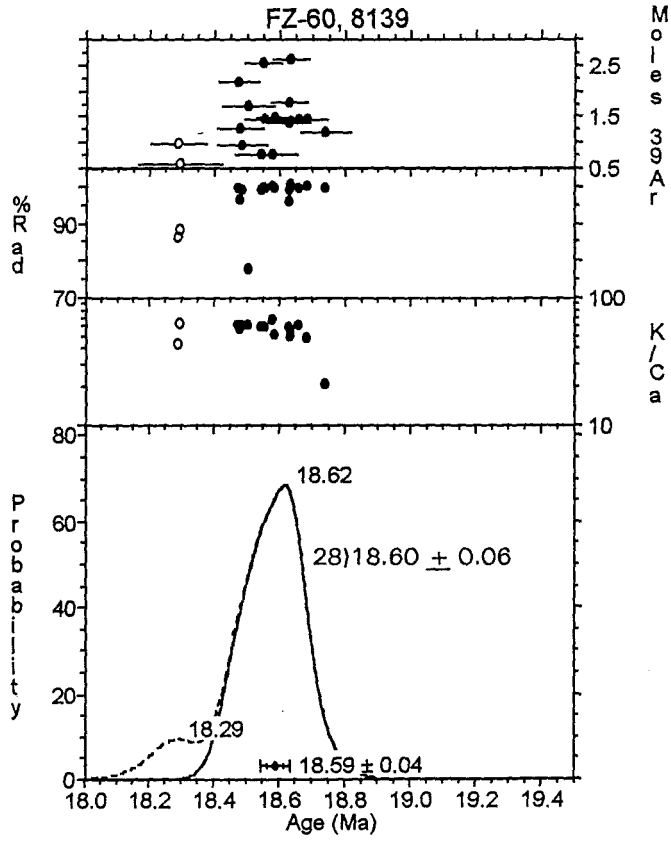

FX-186, 6636
Moles 39Ar
% Rad
K/Ca
Probability
18.57
18.57
19.43
23) 18.57 ± 0.09
18.57 ± 0.09
Age (Ma)

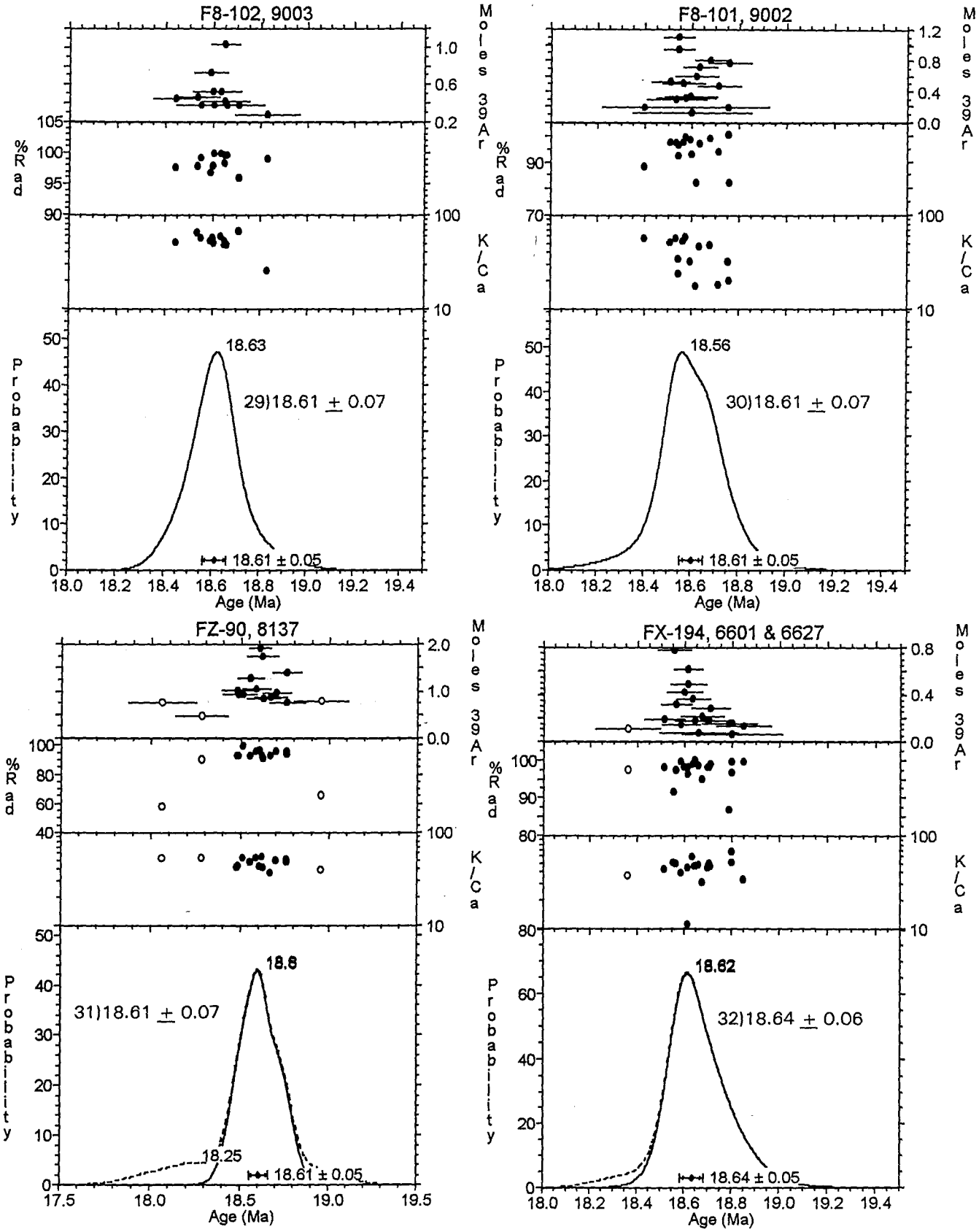

FY-81-47, 8999
Moles 39Ar
% Rad
K/Ca
Probability
18.57
24) 18.58 ± 0.05
18.58 ± 0.04
Age (Ma)

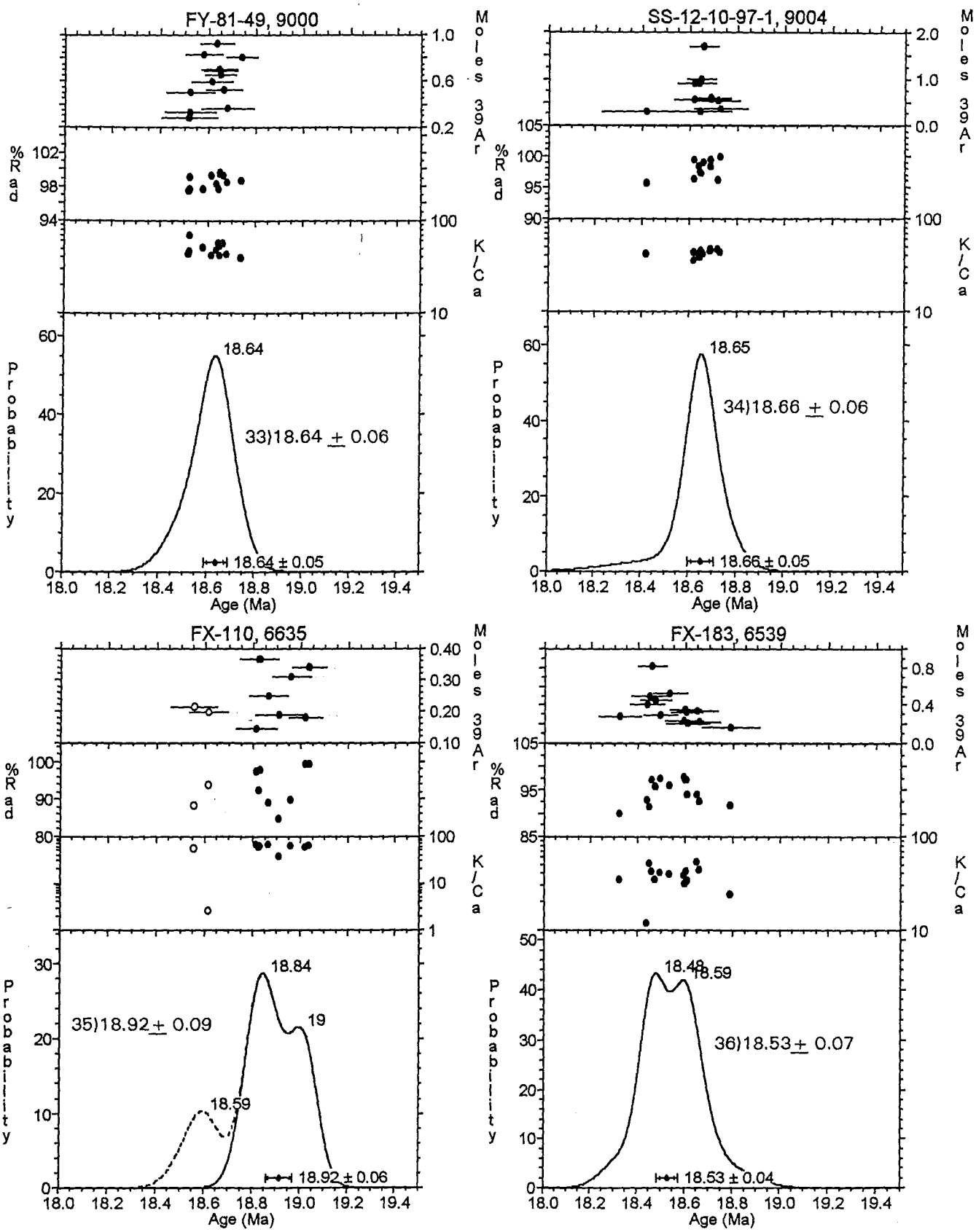

FX-193, 6549 & 9010
Moles 39Ar
% Rad
K/Ca
Probability
18.57
25) 18.58 ± 0.05
18.58 ± 0.05
Age (Ma)

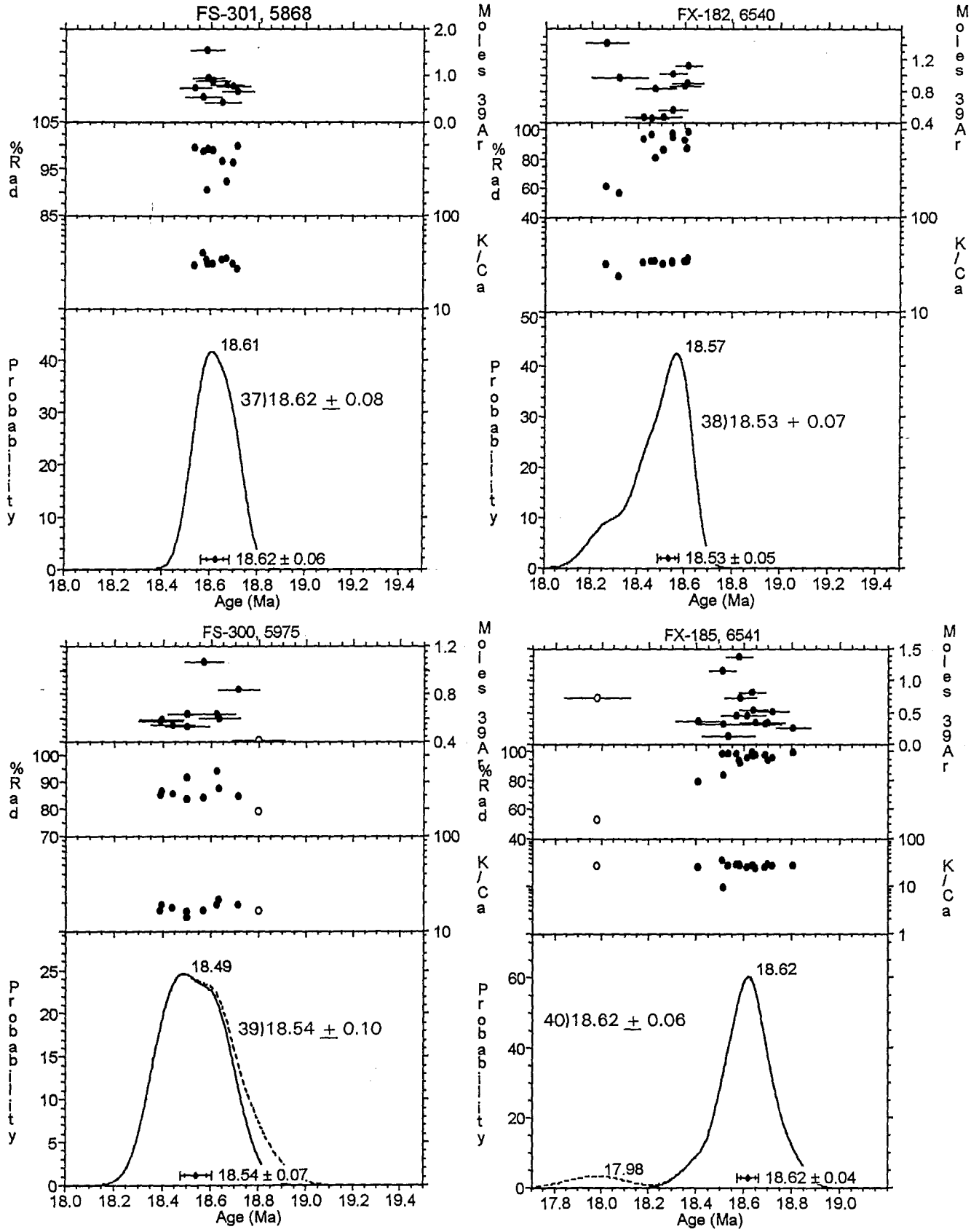

FX-5, 6639
Moles 39Ar
% Rad
K/Ca
Probability
18.52
26) 18.58 ± 0.08
18.58 ± 0.05
Age (Ma)

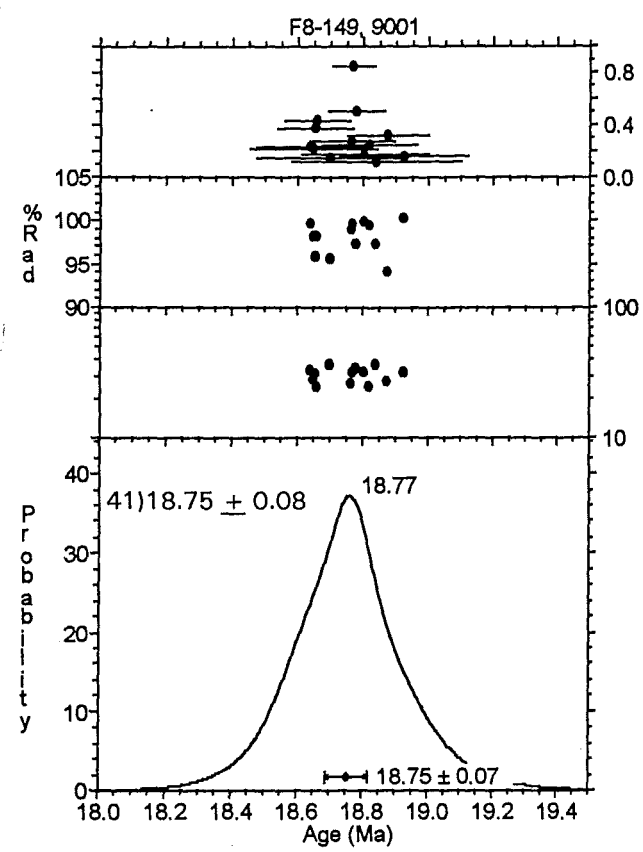

FY-81-45, 8998
Moles 39Ar
% Rad
K/Ca
Probability
18.58
27) 18.59 ± 0.05
18.59 ± 0.04
Age (Ma)

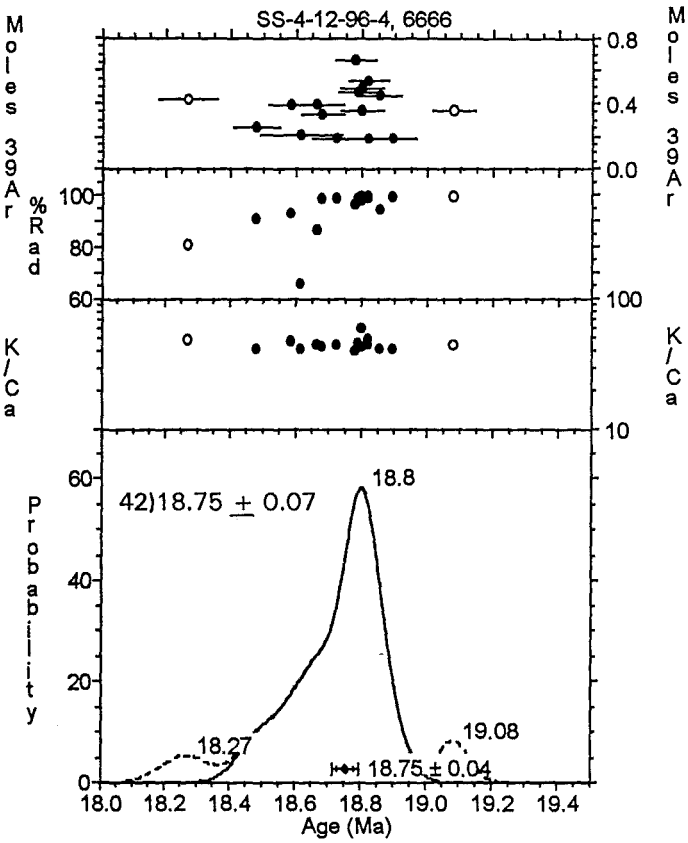

FZ-60, 8139
Moles 39Ar
% Rad
K/Ca
Probability
18.62
28)18.60 ± 0.06
18.29
18.59 ± 0.04
Age (Ma)

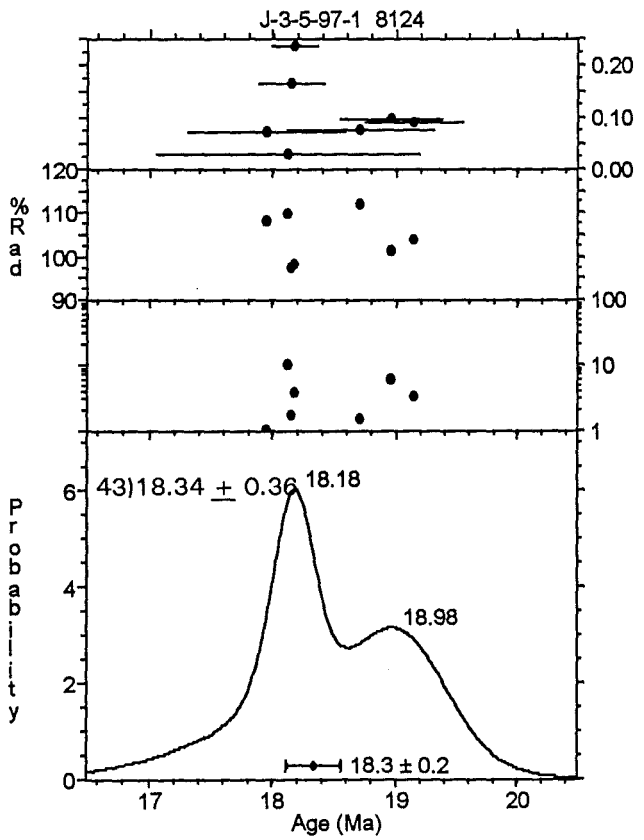

F8-102, 9003
Moles 39Ar
% Rad
K/Ca
Probability
18.63
29)18.61 ± 0.07
18.61 ± 0.05
Age (Ma)
F8-101, 9002
18.56
30)18.61 ± 0.07
18.61 ± 0.05
FZ-90, 8137
18.6
31)18.61 ± 0.07
18.25
18.61 ± 0.05
FX-194, 6601 & 6627
18.62
32)18.64 ± 0.06
18.64 ± 0.05

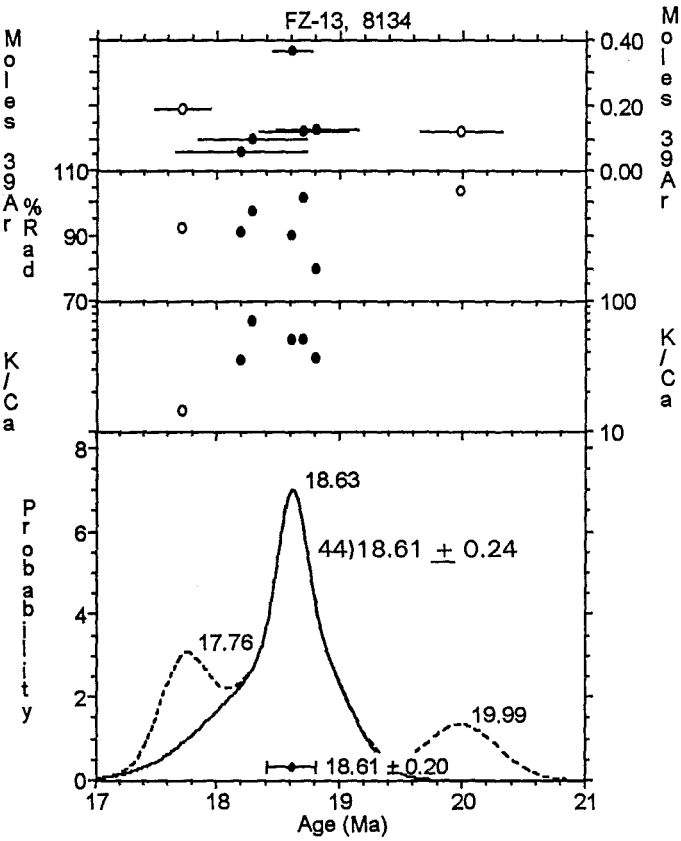

FY-81-49, 9000
SS-12-10-97-1, 9004
FX-110, 6635
FX-183, 6539
Moles 39Ar
% Rad
K/Ca
Probability
Age (Ma)
18.64
33)18.64 ± 0.06
18.64 ± 0.05
18.65
34)18.66 ± 0.06
18.66 ± 0.05
18.84
19
18.59
35)18.92 ± 0.09
18.92 ± 0.06
18.48
18.59
36)18.53 ± 0.07
18.53 ± 0.04

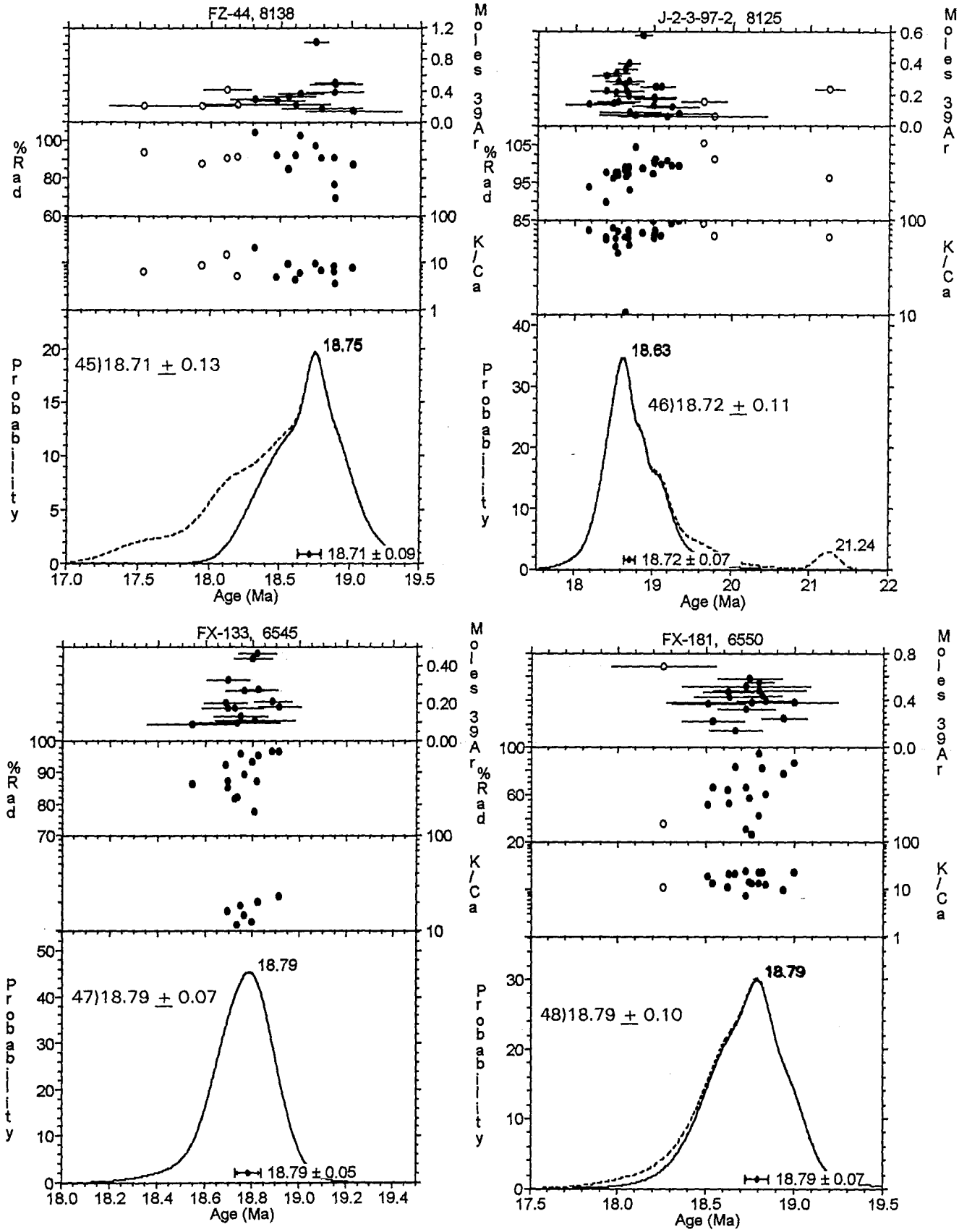

FS-301, 5868
Moles 39Ar
% Rad
K/Ca
Probability
18.61
37)18.62 ± 0.08
18.62 ± 0.06
Age (Ma)
FX-182, 6540
18.57
38)18.53 + 0.07
18.53 ± 0.05
FS-300, 5975
18.49
39)18.54 ± 0.10
18.54 ± 0.07
FX-185, 6541
18.62
40)18.62 ± 0.06
17.98
18.62 ± 0.04

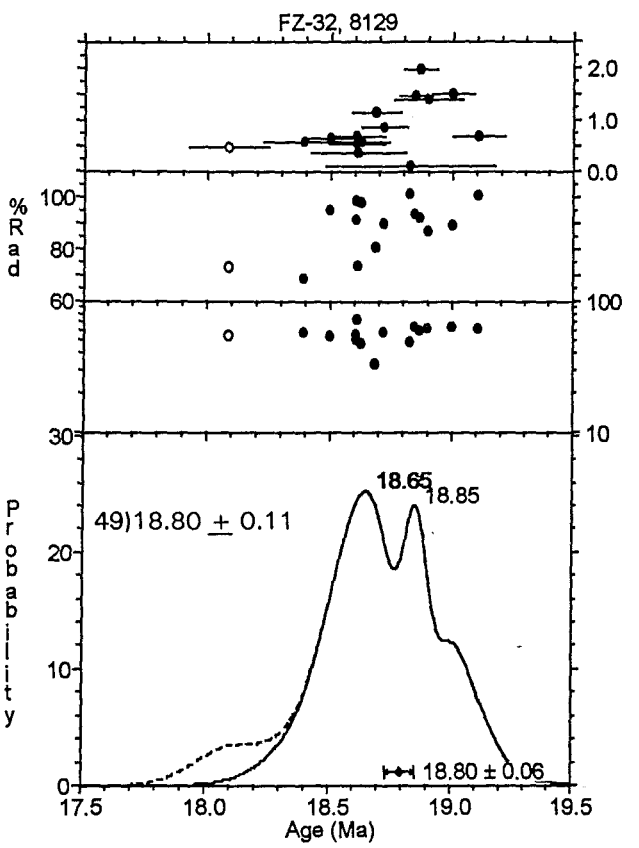

F8-149, 9001
Moles 39Ar
% Rad
K/Ca
Probability
41)18.75 ± 0.08
18.77
18.75 ± 0.07
Age (Ma)

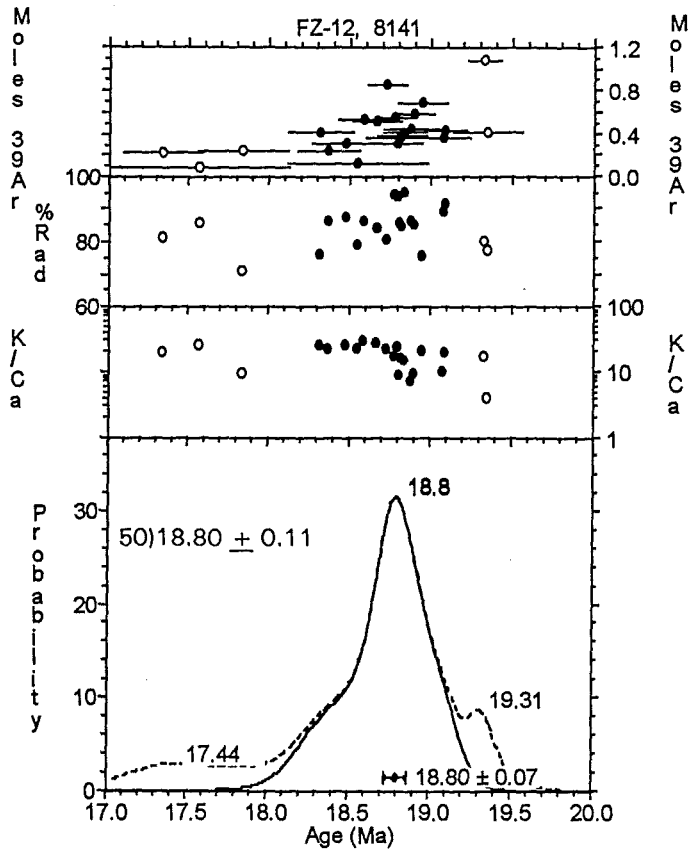

SS-4-12-96-4, 6666
Moles 39Ar
% Rad
K/Ca
Probability
42)18.75 ± 0.07
18.8
18.27
19.08
18.75 ± 0.04
Age (Ma)

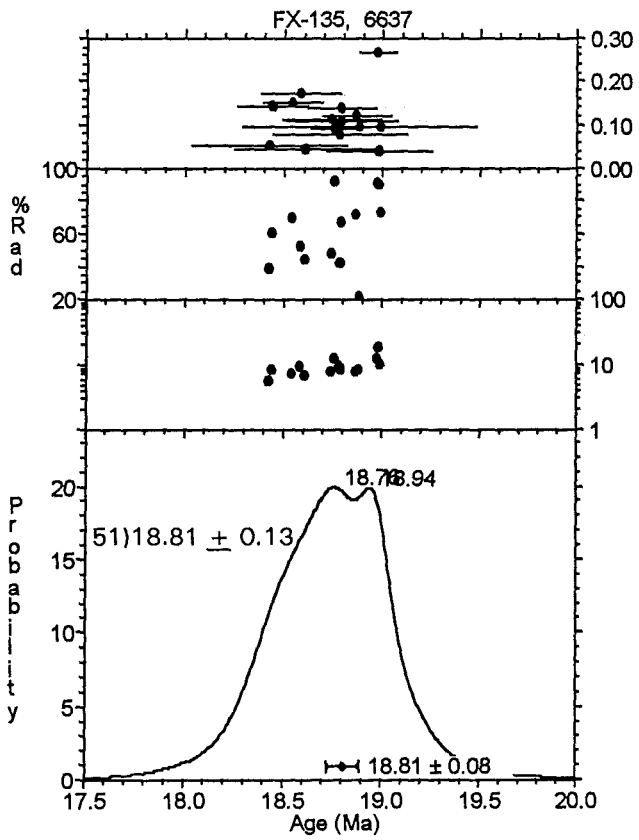

J-3-5-97-1 8124
Moles 39Ar
% Rad
K/Ca
Probability
43)18.34 ± 0.36
18.18
18.98
18.3 ± 0.2
Age (Ma)

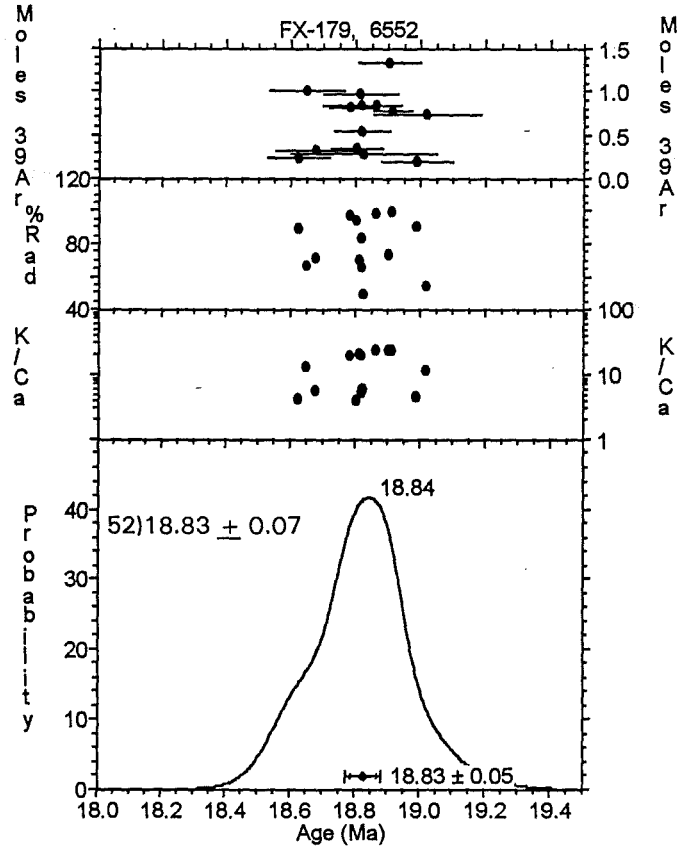

FZ-13, 8134
Moles 39Ar
% Rad
K/Ca
Probability
18.63
44)18.61 ± 0.24
17.76
19.99
18.61 ± 0.20
Age (Ma)

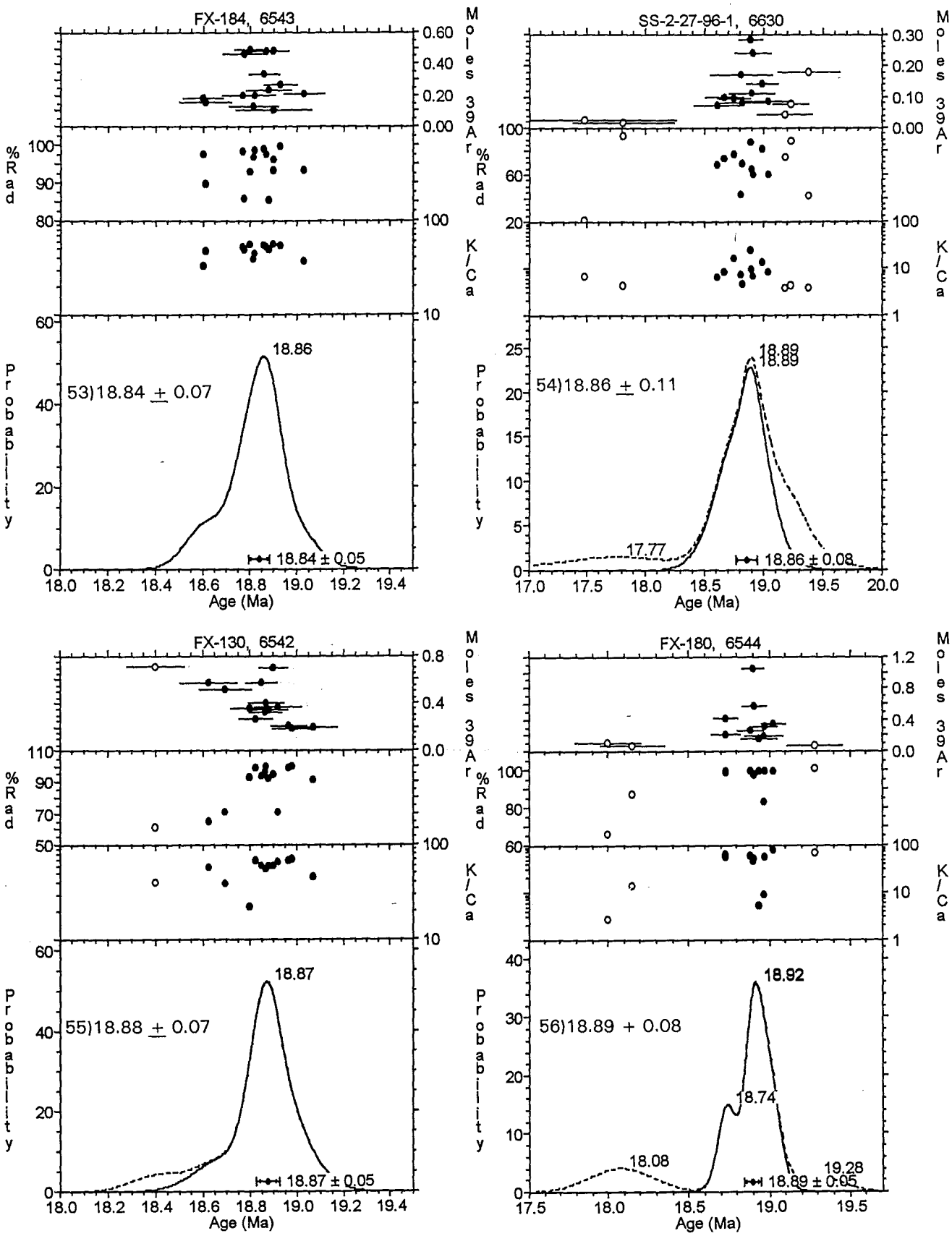

FZ-44, 8138
Moles 39Ar
% Rad
K/Ca
Probability
45)18.71 ± 0.13
18.75
18.71 ± 0.09
Age (Ma)
J-2-3-97-2, 8125
18.63
46)18.72 ± 0.11
18.72 ± 0.07
21.24
FX-133, 6545
47)18.79 ± 0.07
18.79
18.79 ± 0.05
FX-181, 6550
48)18.79 ± 0.10
18.79
18.79 ± 0.07

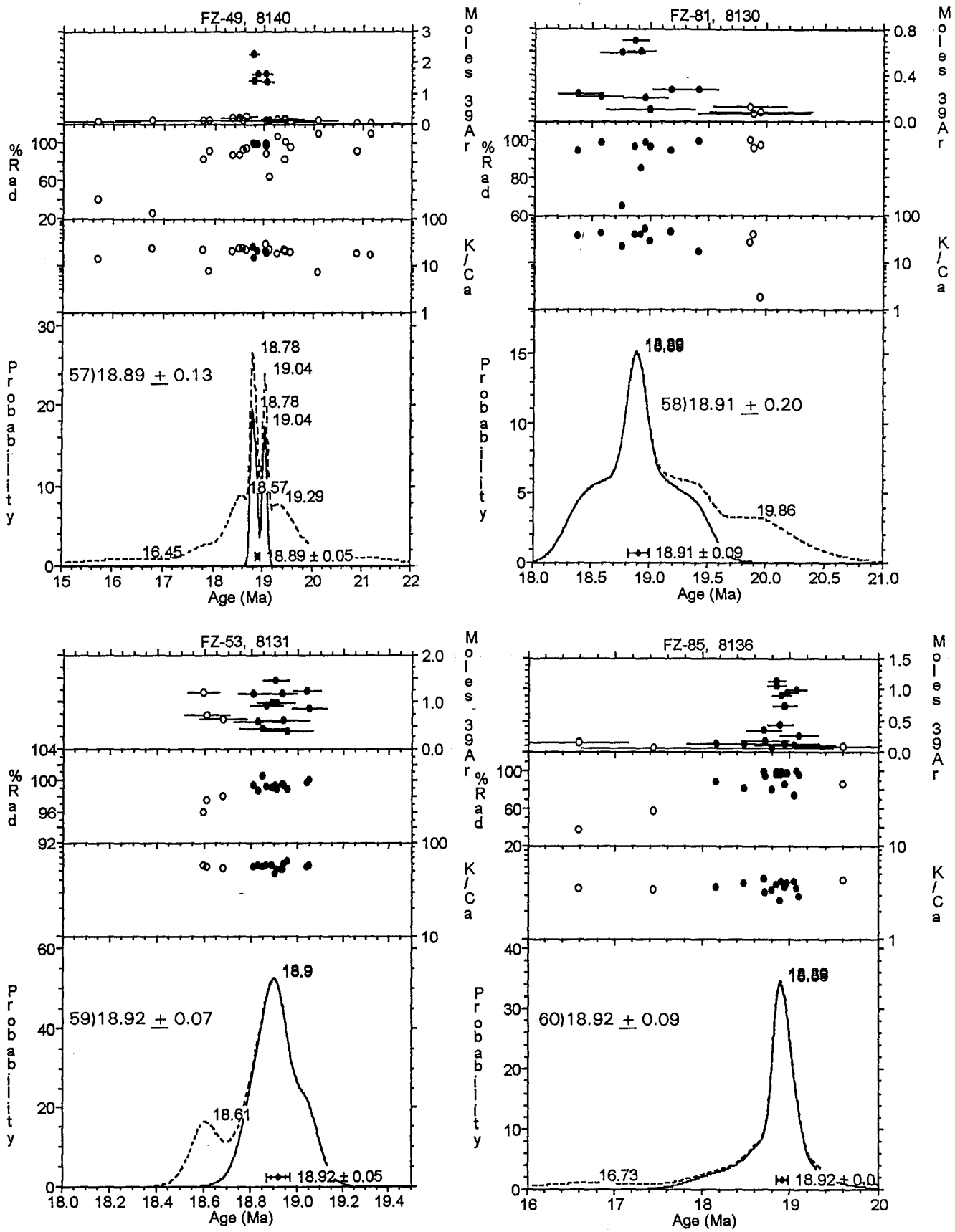

FZ-32, 8129
Moles 39Ar
% Rad
K/Ca
Probability
49)18.80 ± 0.11
18.65
18.85
18.80 ± 0.06
Age (Ma)

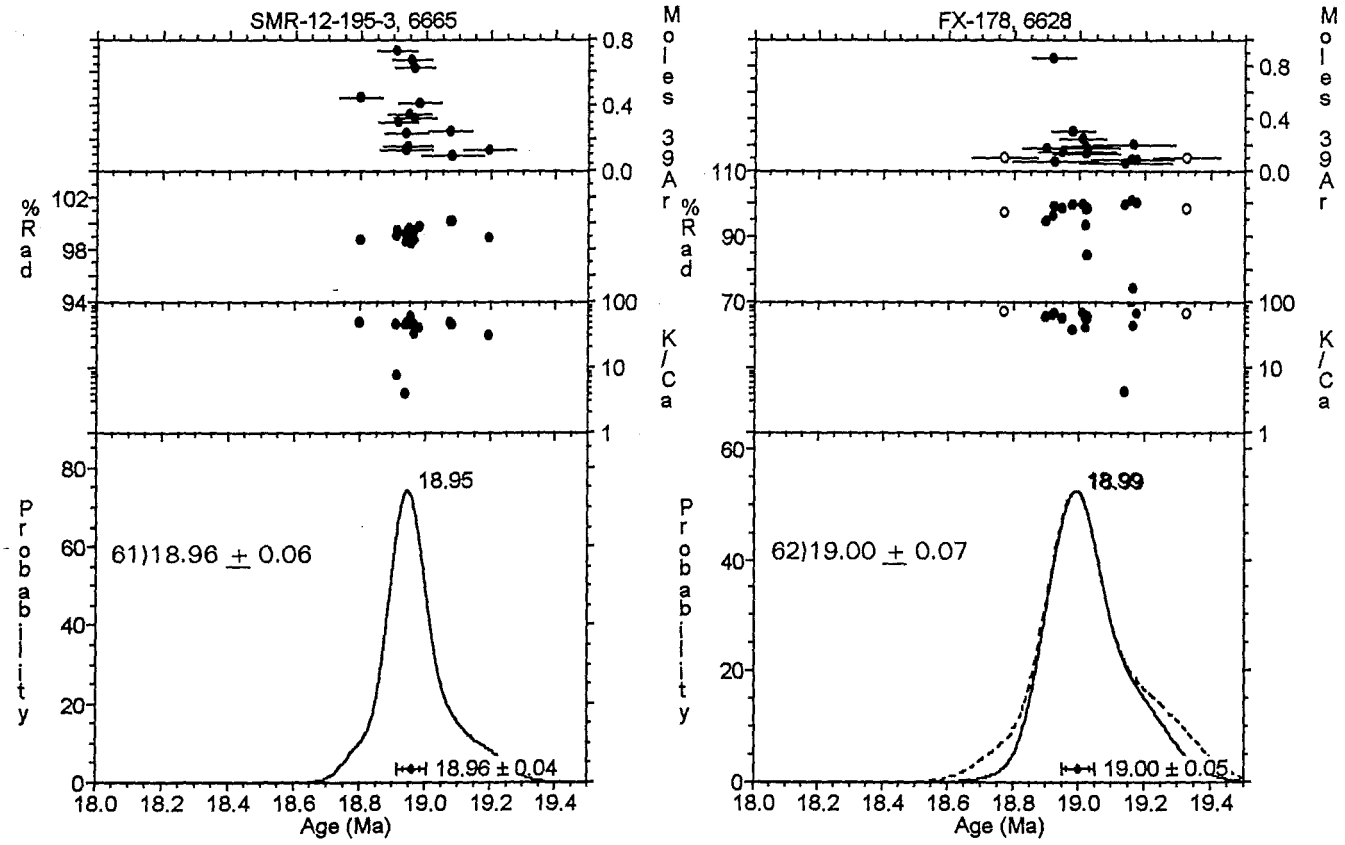

FZ-12, 8141
Moles 39Ar
% Rad
K/Ca
Probability
50)18.80 ± 0.11
18.8
19.31
17.44
18.80 ± 0.07
Age (Ma)

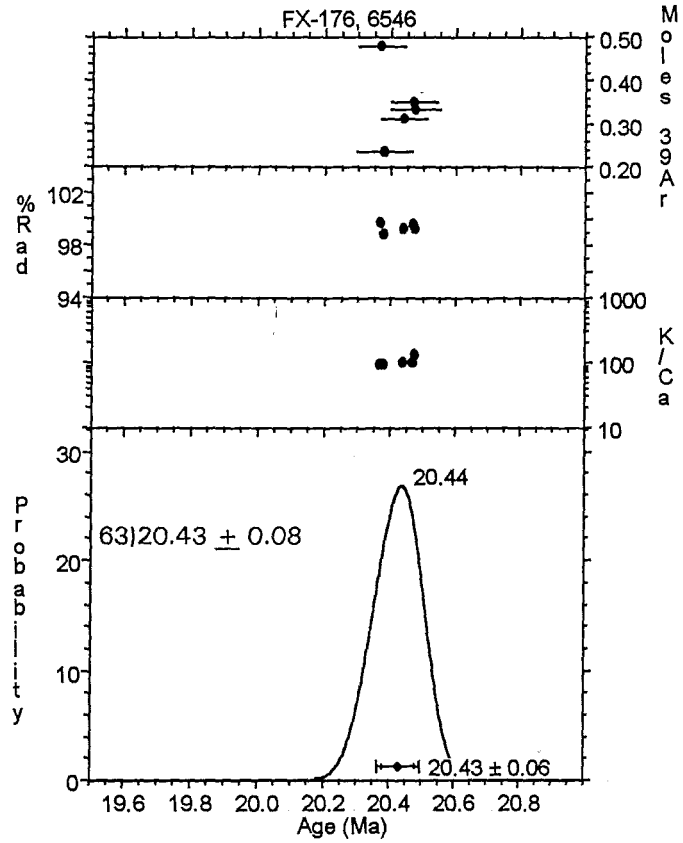

FX-135, 6637
Moles 39Ar
% Rad
K/Ca
Probability
51)18.81 ± 0.13
18.78
18.94
18.81 ± 0.08
Age (Ma)

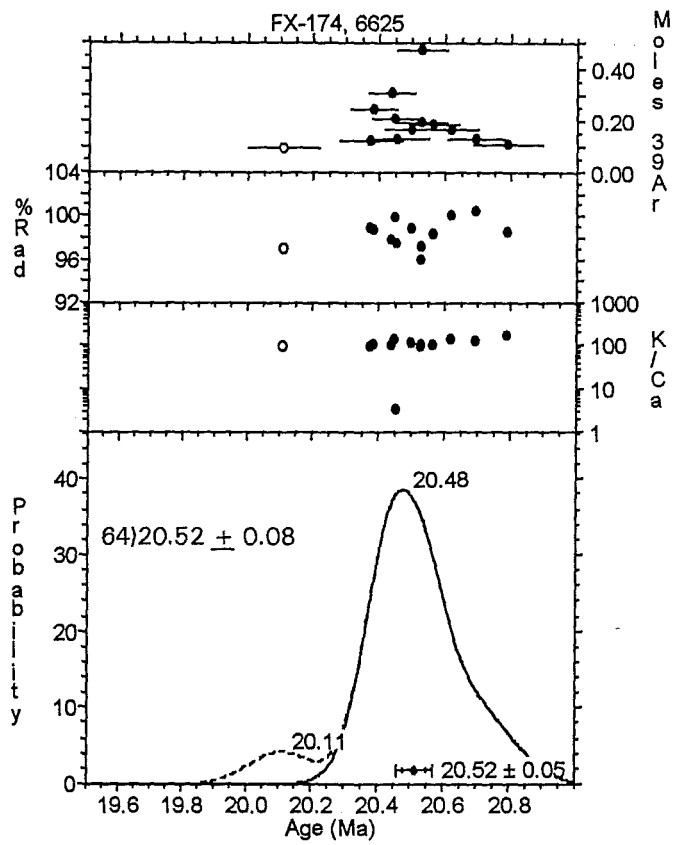

FX-179, 6552
Moles 39Ar
% Rad
K/Ca
Probability
52)18.83 ± 0.07
18.84
18.83 ± 0.05
Age (Ma)

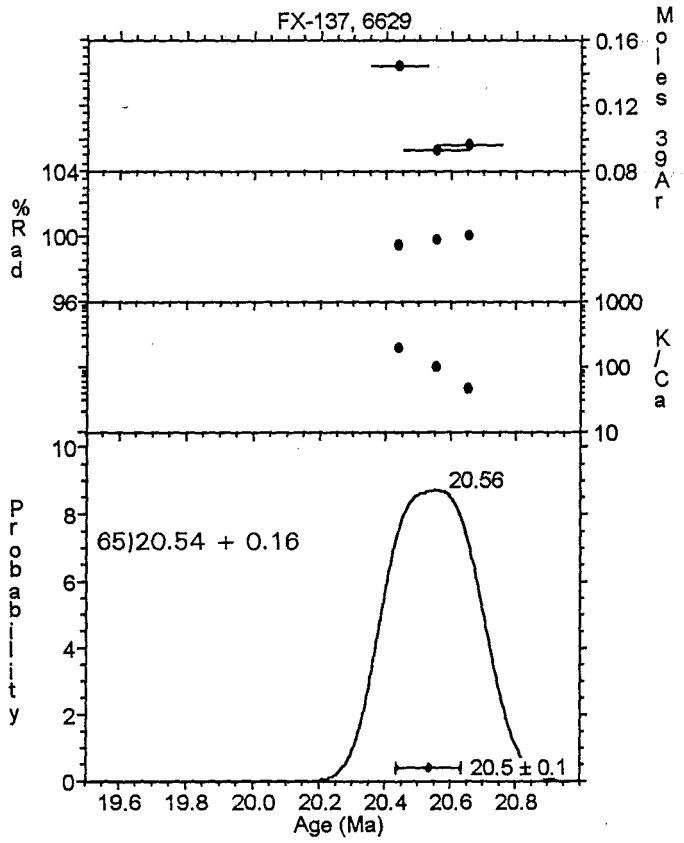

FX-184, 6543
53)18.84 ± 0.07
18.86
18.84 ± 0.05
SS-2-27-96-1, 6630
54)18.86 ± 0.11
18.89
18.89
17.77
18.86 ± 0.08
FX-130, 6542
55)18.88 ± 0.07
18.87
18.87 ± 0.05
FX-180, 6544
56)18.89 + 0.08
18.92
18.74
18.08
19.28
18.89 ± 0.05
Moles 39Ar
% Rad
K/Ca
Probability
Age (Ma)


FZ-49, 8140
57)18.89 ± 0.13
18.78
19.04
18.78
19.04
18.57
19.29
16.45
18.89 ± 0.05
Age (Ma)
FZ-81, 8130
58)18.91 ± 0.20
19.86
18.91 ± 0.09
Age (Ma)
FZ-53, 8131
59)18.92 ± 0.07
18.9
18.61
18.92 ± 0.05
Age (Ma)
FZ-85, 8136
60)18.92 ± 0.09
16.73
18.92 ± 0.0
Age (Ma)
Moles 39Ar
% Rad
K/Ca
Probability


SMR-12-195-3, 6665
Moles 39Ar
% Rad
K/Ca
Probability
61)18.96 ± 0.06
18.95
18.96 ± 0.04
Age (Ma)
FX-178, 6628
62)19.00 ± 0.07
18.99
19.00 ± 0.05
Age (Ma)


FX-176, 6546
Moles 39Ar
% Rad
K/Ca
Probability
63)20.43 ± 0.08
20.44
20.43 ± 0.06
Age (Ma)


FX-174, 6625
Moles 39Ar
% Rad
K/Ca
Probability
64)20.52 ± 0.08
20.48
20.11
20.52 ± 0.05
Age (Ma)


FX-137, 6629
Moles 39Ar
% Rad
K/Ca
Probability
65)20.54 + 0.16
20.56
20.5 ± 0.1
Age (Ma)

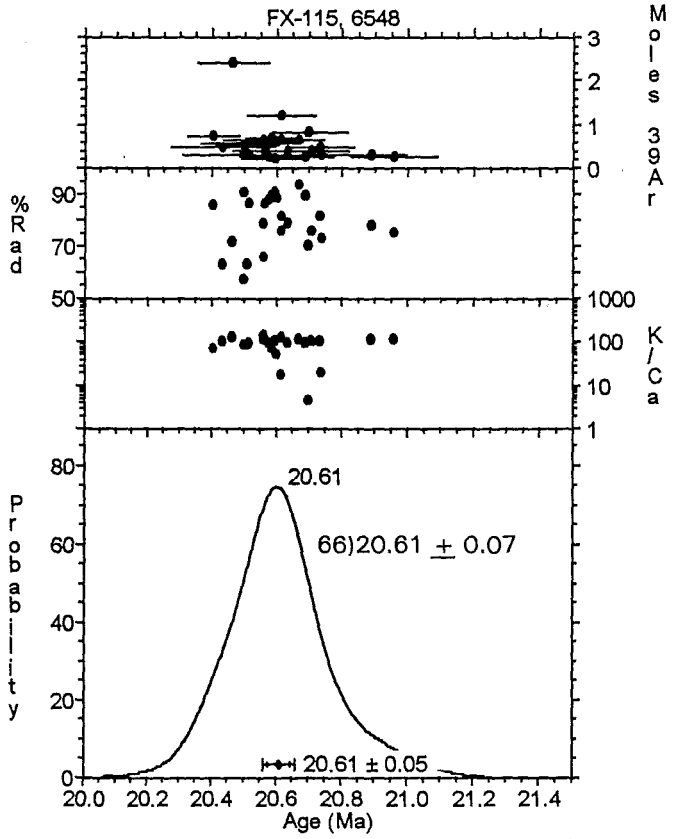

FX-115, 6548
Moles 39Ar
% Rad
K/Ca
Probability
66)20.61 ± 0.07
20.61
20.61 ± 0.05
Age (Ma)

TABLE 3 Sample descriptions and locations. Samples are grouped in stratigraphic units from youngest to oldest. The table headings are from left to right; index number and field sample number, age, UTM Grid Zone 12 coordinates rounded to the nearest 5 meters, and 7.5' quadrangle name. A written description is provided with a physical description of the sample locality, petrology of the sample, Township and Range location if the area has been surveyed, and a description of why the sample was collected. Reference of the most recent geologic map showing the sampled unit is also given. Arizona Geological Survey maps that are referenced will also show the location of the sample, but pre-existing USGS maps will not. Samples with the **SS** prefix were collected by Steve Skotnicki, **J** prefix samples were collected by Jon Spencer, and **SMR** prefix samples were collected by Steve Richard. The **F** prefix denotes samples collected by Charles Ferguson with the second letter indicating which notebook contains the original field note; **FS** and **FY** samples were collected in 1994-95, **FX** samples were collected in 1995-96, **FZ** samples were collected in 1996-97, and **F8** samples were collected in 1997-98.

YOUNGER POST-CAULDRON UNITS

Sample	Age	UTM Northing	UTM Easting	Quadrangle
1) J-4-11-96-2	15.92 ± 0.04 Ma	3679175	490785	Superior

Nonwelded lithic tuff interbedded with gently east-dipping conglomerate in hangingwall of Concentrator fault south of Superior. Sample collected from highway road cut 1/4 mile north of the southern edge of the Superior 7.5' quadrangle, elevation: 2910', SE/4 sec. 15, T2S, R12E. Unit was mapped as part of QTg by Peterson (1969). This sample is located within map unit Tc of Richard and Spencer (1998).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
2) J-1-17-96-1	16.18 ± 0.05 Ma	3664000	486295	North Butte

Hypabyssal rhyolitic intrusion north of Cochran, just north of Gila River in the NW/4 sec. 5, T4S, R12E. Sample is from near the south end of major ridge at an elevation of about 1950'. This unit which intrudes Apache Leap Tuff nearby was mapped as Tf by Richard and Spencer (1997), and it records a period of shallow level felsic intrusive activity that occurred at the end of the period of widespread felsic volcanism in this region. This sample is also located within map unit Tri of Richard and Spencer (1998).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
3) J-4-8-97-1	16.91 ± 0.05 Ma	3679525	504580	Pinal Ranch

Bedded, nonwelded fine to coarse lapilli tuff interbedded with east-dipping (25°), post-Apache Leap Tuff conglomerate. Sample collected near the base of a south-facing slope in a west-flowing side canyon about 100 meters upstream from its confluence with Mineral Creek near Hagan Ranch, elevation: 2960', E/2 of sec. 18, T2S, R14E. The tuff occurs within a tuffaceous sandstone unit mapped as QTgt by Peterson (1961). This sample is located within map unit Tt of Richard and Spencer (1998).

COFFEE FLAT MOUNTAIN FORMATION

Sample	Age	UTM Northing	UTM Easting	Quadrangle
4) FZ-11	17.87 ± 0.06 Ma	3708085	463525	Mormon Flat Dam

Crystal-rich, brown vitric matrix rhyodacite lava from the northwest-facing cliff (elevation: 3100') of the Geronimo Head massif. Lava was mapped as Tq by Ferguson and Gilbert (1997) and represents the northern edge of a major lava dome complex that was emplaced along the northern margin of the Superstition Cauldron.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
5) FZ-80	18.01 ± 0.10 Ma	3705640	471320	Weavers Needle

Black, vitric matrix, crystal-rich rhyodacite lava from about 3750' elevation on a smooth slope between 3908' and 4242' peaks about 1 km west of Tortilla Well. Lava represents upper part of post-cauldron lava dome sequence (Coffee Flat Mountain Formation). Unit was mapped as Trd by Peterson and others (1983).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
6) SS-1-12-95-2	18.02 ± 0.05 Ma	3695660	474875	Weavers Needle

Crystal-rich rhyodacite lava from the base of a flow and the base of cliff north of a saddle definingm the 3574' peak at the south end of Coffee Flat Mountain, east-central edge of sec. 25, T1N, R10E, elevation: 3500'. Mapped as Tfu by Ferguson and Skotnicki (1995), this flow represents an upper flow unit of the Coffee Flat Mountain Formation where it overlaps the southeastern margin of the Superstition Cauldron.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
7) FS-297	18.08 ± 0.08 Ma	3693990	472105	Weavers Needle

Upper of two moderately crystal-rich rhyodacite lavas of the Coffee Flat Mountain Formation that occur just south of the Superstition Cauldron margin and in the immediate hangingwall of the Elephant Butte fault. Sample was taken from the 2880' elevation in major gulch in the W/2 of sec. 35, T1N, R10E. Unit was mapped as Tfu by Ferguson and Skotnicki (1995) and was sampled because the lava overlaps some important faults in the area which cut the underlying Whitlow Canyon Formation.

COFFEE FLAT MOUNTAIN FORMATION CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
8) SS-4-8-97-1	18.15 ± 0.06 Ma	3699020	465640	Weavers Needle

Crystal-rich rhyodacite lava of the Coffee Flat Mountain Formation from the base of a flow along the southern side of the southern pinnacle of Weavers Needle. Sample collected an elevation of about 4240', NW/4 sec. 18, T1N, R10E. The flow at Weavers Needle is essentially flat-lying and it overlies a monolithic breccia composed of Apache Leap Tuff. Both lava and breccia overlie flat-lying intracauldron Apache Leap Tuff. Unit was mapped as Tr by Peterson and others (1983).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
9) FZ-38	18.24 ± 0.08 Ma	3709350	471485	Horse Mesa Dam

Moderately crystal-poor (5-10% phenocrysts), dark green, vitric matrix rhyolite lava of Coffee Flat Mountain Formation from a road cut along the Apache Trail (Arizona highway 88) at the eastern end of the bridge across Fish Creek, 2235' BM elevation. This lava was sampled because it overlaps a gently south-dipping angular unconformity cut into gently north-dipping Government Well Formation dacite lavas. The lava was mapped as Trf (post-cauldron rhyolite lava) by Gilbert and Ferguson (1997) and differentiated from the crystal-poor rhyolite lavas which overlie the Government Well Formation lavas farther north for two reasons. First, the lavas are considerably more crystal-rich than typical pre-cauldron crystal-poor rhyolites of the Tule Canyon Formation, and also because the south-dipping contact was considered as a possible buried topographic margin for the Superstition Cauldron. The post-cauldron age of this lava and another lava in the same massif farther east (FZ-41) indicated that the south-dipping contact is part of the cauldron margin.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
10) FS-298	18.30 ± 0.07 Ma	3694105	471635	Weavers Needle

Lower of two moderately crystal-rich rhyodacite lavas of the Coffee Flat Mountain Formation that occur just south of the Superstition Cauldron margin and in the immediate hangingwall of the Elephant Butte fault. Sample was taken from a west-facing slope at an elevation of about 3200', and below a saddle between 3521' and 3403' peaks in the NE/4 of sec. 34, T1N, R10E. Unit was mapped as Tful by Ferguson and Skotnicki (1995) and was sampled because the lava overlaps some important faults in the area which cut the underlying Whitlow Canyon Formation.

COFFEE FLAT MOUNTAIN FORMATION CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
11) FZ-41	18.42 ± 0.06 Ma	3709615	474685	Horse Mesa Dam

Moderately crystal-poor (5-10% phenocrysts), light green, vitric matrix rhyolite lava of the Coffee Flat Mountain Formation from about 400 meters WSW of 4191' peak along major ridge overlooking Lewis and Pranty Creek, and about 1.1 km north of Black Cross Butte, elevation: 3990'. This lava was sampled because it overlaps a gently south-dipping angular unconformity cut into gently north-dipping Government Well Formation dacite lavas. The lava was mapped as Trf (post-cauldron rhyolite lava) by Gilbert and Ferguson (1997) and differentiated from the crystal-poor rhyolite lavas which overlie the Government Well Formation lavas farther north for two reasons. First, the lavas are considerably more crystal-rich than typical pre-cauldron crystal-poor rhyolites of the Tule Canyon Formation, and also because the south-dipping contact was considered as a possible buried topographic margin for the Superstition Cauldron. The post-cauldron age of this lava and another lava in the same massif farther west (FZ-38) indicated that the south-dipping contact is part of the cauldron margin.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
12) FZ-45	18.47 ± 0.05 Ma	3709980	456695	Mormon Flat Dam

Crystal-rich, nonwelded, massive ash-flow tuff less than 5 meters thick interbedded with the uppermost part of the volcaniclastic sedimentary rocks of Willow Springs basin. The tuff, mapped as Trx by Ferguson and Gilbert (1997) is essentially flat-lying and occurs < 50 meters below the contact with a basalt lava flow which caps the sequence. The sample was collected at an elevation of about 2750' on the southeast side of the mesa. The sedimentary sequence (Tcv unit of Ferguson and Gilbert, 1997) overlies the Apache Leap Tuff farther west, but structural complications in the middle of the basin (possible growth faults) make it possible that some parts of the basin sequence underlie the Apache Leap Tuff (see also description of sample FZ-32). The tuff is probably related to some post-cauldron lava of the Coffee Flat Formation.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
13) FZ-10	18.53 ± 0.13 Ma	3711065	463930	Mormon Flat Dam

Nonwelded, moderately crystal-poor tuff bed less than 3 meters thick within post-Apache Leap Tuff volcaniclastic conglomerate sequence near Mesquite Flat, elevation: 2300'. Mapped as Tt within the Tcv unit of Ferguson and Gilbert (1997), this tuff was sampled to give an age for the lower part of the conglomerate sequence. The tuff was probably derived from one of the nearby post-cauldron lava domes of the Coffee Flat Mountain Formation.

COFFEE FLAT MOUNTAIN FORMATION CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
14) FS-163	18.58 ± 0.06 Ma	3696235	470505	Weavers Needle

Crystal-rich hypabyssal intrusion similar petrographically to both the Coffee Flat Mountain Formation lavas and the Apache Leap Tuff. The sample was collected from the stream bottom of Miners Canyon at an elevation of 2640', NW/4 sec. 27, T1N, R10E. Unit was mapped as Tfl by Ferguson and Skotnicki (1995) and was sampled because it intrudes the southern margin of the Superstition Cauldron.

APACHE LEAP TUFF

Sample	Age	UTM Northing	UTM Easting	Quadrangle
15) FZ-50	18.35 ± 0.08 Ma	3709715	455420	Mormon Flat Dam

White, poorly welded, crystal-rich ash-flow tuff from stream cut just below jeep trail crossing, elevation: 1940'. Sample is from the upper part of the Apache Leap Tuff outflow sheet (mapped as Ts by Ferguson and Gilbert, 1997) that dips about 50° to the east. The anomalous young age of 18.35 Ma prompted resampling of the unit from the same outcrop belt (samples F8-101, 102). These later samples yielded ages of 18.61 Ma.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
16) FY-85-9	18.47 ± 0.08 Ma	3700650	462690	Goldfield

Densely welded, crystal-rich tuff from the top of the Hieroglyphic member (Tsh unit of Skotnicki and Ferguson, 1995) collected from the cliffs east of West Boulder Canyon at an elevation of about 3090' in the NW/4 of sec. 11, T1N, R9E. The tuff, recognized as the lowest member of intracauldron Apache Leap Tuff, was sampled in order to date the intracauldron tuff and determine if any hiatus exists between this unit and the younger intracauldron members. Samples of the uppermost member (FY-81-45,47, and 49) dated at about 18.55 Ma indicate that the intracauldron Apache Leap Tuff is all essentially the same age.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
17) FS-307	18.50 ± 0.07 Ma	3684190	474385	Florence Junction

Densely welded, crystal-rich ash-flow tuff from south side of the Whitlow Ranch Flood Control Basin Dam, elevation: 2220', SE/4 sec. 36, T1S, R10E. Mapped as tuff of Comet Peak (Tcp) by Ferguson and Skotnicki (1995), the tuff in this area is essentially flat-lying and lies in an abandoned strand of the Elephant Butte fault.

APACHE LEAP TUFF CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
18) FX-187	18.52 ± 0.06 Ma	3684235	466960	Florence Junction

Densely welded, crystal-rich ash-flow tuff from the west end of long skinny hill on section line between sections 31 and 32, T1S, R10E, elevation 2160'. Foliations in the hill are erratic which seems typical of this expanse of the Apache Leap Tuff outflow sheet. The tuff is interpreted to be essentially flat-lying and to bury irregular paleotopography. Mapped as tuff of Comet Peak (Tcp) by Ferguson and Skotnicki (1995).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
19) FZ-7	18.53 ± 0.06 Ma	3710370	464555	Mormon Flat Dam

Poorly welded, crystal-rich ash-flow tuff in footwall of major, northwest-striking fault that runs through Mesquite Flat. Sample collected in gully directly west of the "Flat" at an elevation of about 2100'. Tuff overlies Whitlow Canyon Formation lava to the south and is overlain by volcaniclastic conglomerate and a basalt flow to the west. Unit mapped as Ts by Ferguson and Gilbert (1997) and referred to as Canyon Lake Tuff by Prowell (1984).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
20) FX-84	18.55 ± 0.07 Ma	3663480	448635	Blackwater

Moderately welded, pinkish gray, crystalline matrix, crystal-rich ash-flow tuff from near the crest of "Commode Butte", the informal name for a small butte (1856') in northeast corner of the Gila River Indian Reservation, center of sec. 5, T4S, R8E. Mapped as Ttw and interpreted as flat-lying outflow sheet of Apache Leap Tuff (Ferguson and Skotnicki, 1996). The tuff overlies a structurally complex (steeply tilted and locally folded) Mid-Tertiary conglomerate.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
21) FS-162	18.56 ± 0.07 Ma	3698010	468120	Weavers Needle

Densely welded, crystal-rich ash-flow tuff from the 3150' level of Bluff Spring Canyon, SE/4 sec. 17, T1N, R10E. The tuff is from a steeply (50°) northeast-tilted sequence of intracauldron Apache Leap Tuff, just within the southern edge of Peterson and others (1983) La Barge Canyon Cauldron, a feature they interpreted to lie within the Superstition Cauldron. This margin is reinterpreted as the southwestern bounding fault of graben which transects the Superstition Cauldron (Ferguson and others, 1998).

APACHE LEAP TUFF CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
22) F8-148	18.57 ± 0.08 Ma	3709170	461280	Mormon Flat Dam

Red, densely welded, vitric matrix, crystal-rich ash-flow tuff from the base of the Apache Leap Tuff outflow sheet. Sampled in bottom of LaBarge Canyon at an elevation of about 1690' approximately 700 meters (stream course length) upstream from Canyon Lake. Vitrophyre represents basal portion of tuff that was mapped as Canyon Lake Tuff by Stuckless and Sheridan (1971) which they dated at about 15.2 Ma by fission track zircon and sphene, and corresponds to the Ts map unit of Ferguson and Gilbert (1997).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
23) FX-186	18.57 ± 0.09 Ma	3684385	474285	Florence Junction

Young set of bimodal crystal population in a densely welded, crystal-rich ash-flow tuff from the northwest side of the Whitlow Ranch Flood Control Basin Dam, elevation: 2080', SE/4 sec. 36, T1S, R10E. Tuff was mapped as tuff of Comet Peak (Tcp) by Ferguson and Skotnicki (1995), and is currently interpreted as outflow sheet of the Apache Leap Tuff. The young set of sanidine crystals from this sample are interpreted to represent the true age of the tuff. The old set (19.4 Ma) are probably xenocrystic or from lithic fragments contained within the tuff.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
24) FY-81-47	18.58 ± 0.05 Ma	3698145	461910	Goldfield

Densely welded, crystal-rich tuff from the upper Flatirons member (Tsfu of Skotnicki and Ferguson, 1996), the highest preserved unit of intracauldron Apache Leap Tuff. The sample was collected from the 4700' level on the west slope of the 4869' peak in the SE/4 of sec. 15, T1N, R9E. This map unit is laterally correlative with the upper part of Stuckless and Sheridan's (1971) Siphon Draw member of the Superstion Tuff, dated at 22.6 ± 1.0 Ma by biotite K-Ar (Damon, 1969) and at about 24 Ma by zircon fission track (Stuckless and Sheridan, 1971).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
25) FX-193	18.58 ± 0.05 Ma	3685040	492800	Superior

Densely welded, brown, vitric matrix, crystal-rich ash-flow tuff from the top of the lower (brown vitrophyre) unit of Peterson's (1968) type section of the Apache Leap Tuff. The sample was collected from a road cut along US 60 on north side of highway on the uphill end of the tunnel east of Superior, elevation: 3500', NE/4 sec. 36, T1S, R12E. Mapped as Tal by Peterson (1969). Age determined from combination of 1996 analysis of 15 crystals and 1998 analysis of 11 crystals.

APACHE LEAP TUFF CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
26) FX-5	18.58 ± 0.08 Ma	3666315	438495	Chandler Heights

Dark reddish brown, densely welded, vitric matrix, crystal-rich ash-flow tuff from head of southeast-flowing gulch in south-central sec. 29, T3S, R7E, 2,100' elevation. Sampled because of its vitric matrix. Mapped as Ttw and interpreted as flat-lying outflow sheet of Apache Leap Tuff (Ferguson and Skotnicki, 1996). This unit also yielded a K-Ar phlogopite age of 26.00 ± 0.54 (recalculated in Reynolds et al., 1986 from Balla, 1972).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
27) FY-81-45	18.59 ± 0.05 Ma	3698135	461735	Goldfield

Densely welded, crystal-rich tuff from the upper Flatirons member (Tsfu of Skotnicki and Ferguson, 1996), the highest preserved unit of intracauldron Apache Leap Tuff. The sample was collected from the 4500' level on the west slope of the 4869' peak in the SE/4 of sec. 15, T1N, R9E. This map unit is laterally correlative with the upper part of Stuckless and Sheridan's (1971) Siphon Draw member of the Superstion Tuff, dated at 22.6 ± 1.0 Ma by biotite K-Ar (Damon, 1969) and at about 24 Ma by zircon fission track (Stuckless and Sheridan, 1971).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
28) FZ-60	18.60 ± 0.06 Ma	3718315	472605	Horse Mesa Dam

Poorly to moderately welded, crystal-rich ash-flow tuff from northeast side of peak (3360' elevation) west of Goat Mountain and north of Salt River. The sample is from the upper flow-unit of a prominent, flat-lying outflow sheet of ignimbrite which overlies all volcanic units in the area. Unit was mapped as Tsu by Gilbert and Ferguson (1997), and is considered part of the outflow sheet of Apache Leap Tuff.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
29) F8-102	18.61 ± 0.07 Ma	3708125	455870	Mormon Flat Dam

Massive, poorly to nonwelded, crystal-rich ash-flow tuff from upper portion of the outflow sheet of Apache Leap Tuff in Willow Springs basin (mapped as Ts by Ferguson and Gilbert, 1997). The tuff is overlain by volcaniclastic conglomerate and overlies crystal-poor rhyolite lavas of the Tule Canyon Formation. This tuff was sampled along with F8-101 because previous attempts to date this sequence had yielded an anomalous young age of 18.35 Ma (sample FZ-50). The sample comes from a brush-covered outcrop along the northwest cutbank of the main canyon just downstream of the confluence with a major south-flowing gulch, elevation: 1920'.

APACHE LEAP TUFF CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
30) F8-101	18.61 ± 0.07 Ma	3708065	456135	Mormon Flat Dam

Medium-bedded, nonwelded, crystal-rich ash-flow tuff from the uppermost portion of the outflow sheet of Apache Leap Tuff in Willow Springs basin (mapped as Ts by Ferguson and Gilbert, 1997). The tuff is overlain by volcaniclastic conglomerate and overlies crystal-poor rhyolite lavas of the Tule Canyon Formation. This tuff was sampled along with F8-102 because previous attempts to date this sequence had yielded an anomalous young age of 18.35 Ma (sample FZ-50). The sample comes from an active stream-cut in the main canyon bottom in a sharp meander bend about 300 meters below the confluence with the major south-flowing gulch mentioned in the description of sample F8-102, elevation: 1920'.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
31) FZ-90	18.61 ± 0.07 Ma	3704550	472280	Weavers Needle

Densely welded, crystal-rich ash-flow tuff from the upper part of intracauldron Apache Leap Tuff near its northeastern cauldron margin. The foliation in this area dips steeply (40-50°) to the northeast. Sample is from a stream-cut about 400 meters downstream of Indian Spring no. 1 along Peters Trail, elevation: about 3220'. The sample was collected near the type area of Stuckless and Sheridan's (1971) Dogie Spring member of the Superstition Tuff which they dated at 18.4 ± 0.06 Ma (biotite K-Ar). Unit was mapped as Taf by Peterson and others (1983).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
32) FX-194	18.63 ± 0.06 Ma	3685565	494785	Superior

Poorly welded, white, crystal-rich ash-flow tuff from upper (white) unit of the type section of Peterson's (1968) Apache Leap Tuff. Sample collected from road cut on south side of US 60 just west of the Oak Flat turnoff, SE/4 sec 29, T1S, R13E, elevation: 3880'. Mapped as Tal by Peterson (1969). Age determined from the old set of a bimodal population of sanidine crystals (the young set yielded and age of 18.57 Ma).

APACHE LEAP TUFF CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
33) FY-81-49	18.64 ± 0.06 Ma	3698160	462025	Goldfield

Densely welded, crystal-rich ash-flow tuff from the upper Flatirons member (Tsfu of Skotnicki and Ferguson, 1996), the highest preserved unit of intracauldron Apache Leap Tuff. The sample was collected from the highest preserved part of this member at the crest of a 4869' peak in the SE/4 of sec. 15, T1N, R9E. This map unit is laterally correlative with the upper part of Stuckless and Sheridan's (1971) Siphon Draw member of the Superstion Tuff, dated at 22.6 ± 1.0 Ma by biotite K-Ar (Damon, 1969) and at about 24 Ma by zircon fission track (Stuckless and Sheridan, 1971).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
34) SS-12-10-97-1	18.66 ± 0.06 Ma	3713185	500440	Salt River Peak

Densely welded, vitric matrix, crystal-rich ash-flow tuff from near the base of the Apache Leap Tuff along Pinto Creek. Sample collected from west side of canyon at an elevation of about 2600' near constriction between 3309' and 3050' peaks, along the west-central edge of the quadrangle.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
35) FX-10	18.92 ± 0.09 Ma	3665530	438660	Chandler Heights

Densely welded, reddish brown, crystalline matrix, crystal-rich ash-flow tuff from the base of a cliff in the N/2 of sec. 32, T3S, R7E, about 1850' elevation. Mapped as Ttw and interpreted as flat-lying outflow sheet of Apache Leap Tuff (Ferguson and Skotnicki, 1996). Anomalous "old" date is attributed to presence of lithic fragments or xenocrystic sanidine in the sample.

RHYODACITE OF BUZZARDS ROOST

Sample	Age	UTM Northing	UTM Easting	Quadrangle
36) FX-183	18.53 ± 0.07 Ma	3689990	474305	Florence Junction

Dark green vitric matrix, crystal-rich rhyodacite lava mapped as dacite of Buzzards Roost (Tdu) by Ferguson and Skotnicki (1995). The sample was collected on south-facing slope in N/2 of sec. 13, T1S,R10E, at an elevation of about 2500'. The lava overlies the Whitlow Canyon rhyodacite but its age relationship with the Apache Leap Tuff is unknown.

RHYODACITE OF BUZZARDS ROOST CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
37) FS-301	18.62 ± 0.08 Ma	3692995	472545	Weavers Needle

Light-gray, devitrified matrix, crystal-rich lava from the saddle of a major east-west trending ridge in the north-central edge of sec. 2, T1S, R10E, elevation: 2840'. Sample is typical of the Buzzards Roost lava containing abundant plagioclase and sanidine with biotite, but no quartz. Mapped as Tdu by Ferguson and Skotnicki (1995), this lava's age relationship with Apache Leap Tuff is not known.

WHITLOW CANYON FORMATION

Sample	Age	UTM Northing	UTM Easting	Quadrangle
38) FX-182	18.53 ± 0.07 Ma	3689860	474185	Florence Junction

Lavender, crystalline matrix rhyodacite lava of the Whitlow Canyon Formation from stream cut in major tributary to Whitlow Canyon in N/2 of sec. 13, T1S, R10E, elevation: 2360'. Mapped as Trd by Ferguson and Skotnicki (1995).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
39) FS-300	18.54 ± 0.10 Ma	3693275	472100	Weavers Needle

Lavender, crystalline matrix, moderately crystal-poor lava from the crest of a rounded hill top in SW/4 of sec. 35, T1N, R10E, elevation: 3040'. Sample is typical of the Whitlow Canyon Formation (Trd of Ferguson and Skotnicki, 1995). This lava is overlain by Buzzards Roost lava nearby, and farther south this type of lava is overlain by the outflow sheet of Apache Leap Tuff.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
40) FX-185	18.62 ± 0.06 Ma	3685025	474090	Florence Junction

Lavender crystalline matrix Whitlow Canyon Formation rhyodacite lava from the south end of hill just west of dirt road leading to dam spillway, N/2 sec. 36, T1S, R10E, elevation: 2230'. Mapped as Trd by Ferguson and Skotnicki (1995), this represents the southernmost occurence of this type of lava. The lava intrudes Pinal Schist and is overlain by essentially flat-lying Apache Leap Tuff in the immediate footwall of the Elephant Butte fault.

WHITLOW CANYON FORMATION CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
41) F8-149	18.75 ± 0.08 Ma	3709040	461700	Mormon Flat Dam

Lavender crystalline matrix, moderately crystal-poor (5-10% phenocrysts) rhyodacite lava. Sample was collected on south-facing slope above confluence of LaBarge Canyon and major west-flowing gulch about 400 meters upstream from sample F8-148, elevation: 1800'. Lava was correlated with the Whitlow Canyon Formation lavas because of its distinctive mineralogy (quartz, plagioclase, sanidine, biotite) and its stratigraphic position below Apache Leap Tuff and above crystal-poor rhyolites of the Tule Canyon Formation. Mapped as Tw by Ferguson and Gilbert (1997).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
42) SS-4-12-96-4	18.75 ± 0.07 Ma	3702570	461510	Goldfield

Nonwelded, bedded felsic tuff that occurs at the base of a volcaniclastic sequence (Tft of Skotnicki and Ferguson, 1995) within the Superstition Cauldron. The sample was collected along the west slope near the crest of the high point (3097') of Black Mesa in the N/2 of sec. 3, T1N, R9E at an elevation of approximately 2980'. The tuff which dips northeast at about 30° overlies a thin, widespread monolithic breccia unit composed of Whitlow Canyon Formation type rhyodacite lava. The breccia, mapped as Trd by Skotnicki and Ferguson (1995), directly overlies intracauldron Apache Leap Tuff throughout the northeastern part of its cauldron, and it is interpreted as an avalanche deposit derived from a cauldron wall volcanic edifice (Ferguson and Gilbert, 1997). The tuff was sampled in order to help date the post-cauldron volcaniclastic sequence, but its date of 18.76 Ma which is clearly older than the 18.57 Ma Apache Leap Tuff it overlies indicates that the unit's sanidine crystals are from an older, pre-cauldron source. Since the underlying breccia unit is composed of lava clasts that appear to be derived from the pre-cauldron Whitlow Canyon Formation lava, it seems likely that this is also the source of the sanidine crystals in sample S-4-12-96-4. Although the breccia unit has not been dated directly, the nearest exposure of Whitlow Canyon Formation lava is along the northern cauldron margin where it has been dated dated at 18.75 Ma (sample F8-149).

TULE CANYON FORMATION

Sample	Age	UTM Northing	UTM Easting	Quadrangle
43) J-3-5-97-1	18.34 ± 0.36 Ma	3698150	497980	Haunted Canyon

"Older volcanics" or map unit Tev of Peterson (1960) which underlie Apache Leap Tuff just east of his Haunted Canyon Cauldron. Sample is from an elevation of about 3560' at a road cut on the south flank of JK Mountain about 500 meters up canyon from Coon Spring. Alteration of volcanics probably responsible for excess scatter and wide range of analytical error. Note that even though volcanics underlie the Apache Leap Tuff, the age is at least 0.2 Ma to young.

TULE CANYON FORMATION CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
44) FZ-13	18.61 ± 0.24 Ma	3708870	463325	Mormon Flat Dam

Crystal-poor rhyolite lava with red silicified matrix and abundant quartz viens, mapped as Trp by Ferguson and Gilbert (1997). Sampled along north side of major canyon southwest of Tortilla Flat at about 2300'. Lava represents the younger of two pre-cauldron rhyolite lavas (Tule Canyon Formation) sampled in the area (the other is FZ-12). The lava occurs in a structurally complicated region with dips up to 50° to the northeast.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
45) FZ-44	18.71 ± 0.13 Ma	3710095	456835	Mormon Flat Dam

Crystal-poor (1-3% phenocrysts), green, vitric matrix rhyolite lava from knob about 300 meters east of 2881' peak, elevation: 2660'. The unit was mapped as Trpy because it occurs at the top of the Tule Canyon Formation in a sequence of lavas that dip moderately (15-25°) to the northeast compared to the 25-45° dips of the underlying rhyolite lavas. Before this rock was dated it was considered a possibility that this unit, along with a lava sampled as FZ-32 was younger than Apache Leap Tuff.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
46) J-2-3-97-2	18.72 ± 0.11 Ma	3670610	501850	Hot Tamale Peak

Nonwelded tuff interbedded with nonvolcaniclastic (Whitetail) conglomerate in the east wall of the Ray mine pit, NW/4 of sec. 13, T3s, R13E. A 32 Ma biotite K-Ar date reported in Cornwall and others (1971) was obtained from a nearby tuff (now beneath mine dump). Sample was collected about 30 meters below the base of the Apache Leap Tuff at an elevation of about 2560'. The entire Whitetail Conglomerate is only about 60 meters thick in this area.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
47) FX-133	18.79 ± 0.07 Ma	3706410	449255	Apache Junction

Black vitric matrix rhyolite lava with about 5% phenocrysts from north side of 3269' peak, elevation: 3000'. Mapped as Tr2, it is correlated with the Tule Canyon Formation (Skotnicki and Ferguson, 1996). Middle of three overlapping lava flows in area, dipping about 15° to the northeast.

TULE CANYON FORMATION CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
48) FX-181	18.79 ± 0.10 Ma	3704540	444910	Apache Junction

Nonwelded, bedded, crystal-poor rhyolite tuff from the westernmost exposures of the Tule Canyon Formation in Goldfield Mountains in the SW/4 of sec. 25, T2N, R7E. The tuff is essentially flat-lying and overlies a tilted sequence of conglomerate with thin, nonwelded tuffs (Sample FX-137) and crystalline basement. The tuff was collected at the base of a cliff at about 2650' and is overlain by a crystal-rich, hornblende dacite lava (Dacite of Pass Mountain) that is is undatable (no sanidine). The crystal-poor tuff was mapped as Tt (Skotnicki and Ferguson, 1996) and it contains abundant sanidine indicating that it is not associated with the overlying crystal-rich dacite lava. The sample was collected to confirm the correlation with Tule Canyon Formation and to constrain the younger age limit for tilting of the underlying conglomerate sequence. A tuff (FX-137) in the underlying conglomerate yielded and age of 20.5 Ma..

Sample	Age	UTM Northing	UTM Easting	Quadrangle
49) FZ-32	18.80 ± 0.11 Ma	3708235	457020	Mormon Flat Dam

Crystal-poor (1-2% phenocrysts), light green vitric matrix rhyolite lava from craggy outcrop on west slope of mountain about 2 km west of Apache Gap, elevation: 2300'. The lava was mapped as Trpy by Ferguson and Gilbert (1997) because it was considered likely that the flow was younger than the Apache Leap Tuff. This age assingment was made because the lava lies in the hangingwall of the major fault which bounds the eastern edge of the Willow Springs basin. At the western edge of the basin, the outflow sheet of Apache Leap Tuff which overlies crystal-poor rhyolite lava of the Tule Canyon Formation, is overlain by volcaniclastic sandstone and conglomerate, and it appeared that this lava (FZ-32) was within this sequence of sedimentary rocks. The geochronology of the lava sampled as FZ-32 requires that it must lie within a sliver of the master fault, which juxtaposes the rhyolite lava and the post-Apache Leap sedimentary rocks of the basin with lavas of the older Government Well Formation. This fault sliver had been mapped, but its significance was not realized until after dating of this lava.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
50) FZ-12	18.80 ± 0.11 Ma	3708465	463370	Mormon Flat Dam

Moderatley crystal-poor (5-10% phenocrysts), green, vitric matrix rhyolite lava from south side of major canyon southwest of Tortilla Flat at about 2400'. Mapped as Trx by Ferguson and Gilbert (1997). Lava represents the older of two pre-cauldron rhyolite lavas (Tule Canyon Formation) sampled in the area (the other is FZ-13). The lava occurs in a structurally complicated region with dips up to 50° to the northeast.

TULE CANYON FORMATION CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
51) FX-135	18.81 ± 0.13 Ma	3706300	448780	Apache Junction

Light green (incipient hydrated glass with abundant clay-coated fractures) vitric matrix rhyolite lava with about 5% phenocrysts from west slope of major 3269' peak, elevation: about 2600'. Mapped as Tr1 (Skotnicki and Ferguson, 1996). Lowermost of three overlapping lava flows in the area. The sample was collected from the base of a small cliff and the base of the lava flow which conformably overlies bedded, nonwelded crystal-poor tuff (samples FX-130, FX-180) which dip about 20° to the northeast and which overlie steeply northeast-dipping (30-50°) Government Well Formation dacite lava.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
52) FX-179	18.83 ± 0.07 Ma	3705765	447825	Apache Junction

Nonwelded, bedded, crystal-poor rhyolite tuff from Tule Canyon Formation (Tt unit of Skotnicki and Ferguson, 1996) to the west of Bulldog Canyon fault. The tuff occurs in the upper part of a fanning dip sequence of rhyolite tuffs which overlie steeply northeast dipping (30-50°) lavas of the Government Well Formation. This tuff dips 19° to the northeast. Sample was taken along north slope of 2635' elevation peak at an elevation of about 2325'. Sample was taken, along with FZ-178 (19.00 Ma), to document the time-span of the fanning dip sequence.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
53) FX-184	18.84 ± 0.07 Ma	3688510	474260	Florence Junction

Massive nonwelded crystal-poor rhyolite tuff from flats north of Elephant Butte, north-central edge of sec. 24, T1S, R10E, elevation: 2350'. Sample was collected because this thin, apparently flat-lying sequence of tuff directly overlies basement in the immediate footwall of the Elephant Butte fault. Age relationship to the nearby lamproite lava of Elephant Butte or any other Tertiary unit is unkown, but its crystal-poor petrology and general appearance is similar to the Tule Canyon Formation nonwelded tuffs of the area.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
54) SS-2-27-96-1	18.86 ± 0.11 Ma	3706295	450585	Apache Junction

Black vitrophyre rhyolite lava with about 5% phenocrysts from southwest side of 3134' peak, elevation: 3050'. Mapped as Tr3, rhyolite lava of the Tule Canyon Formation (Skotnicki and Ferguson, 1996) that is the uppermost of three overlapping lava flows in the area, dipping about 20-25° to the northeast.

TULE CANYON FORMATION CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
55) FX-130	18.88 ± 0.07 Ma	3706330	450060	Apache Junction

Nonwelded, bedded, crystal-poor rhyolite tuff from base of Tule Canyon Formation (Tt unit of Skotnicki and Ferguson, 1996) collected in a side canyon at the western base of the 3134' peak, elevation: about 2350'. Tuff dips about 20° to the northeast and directly overlies steeply northeast-dipping (30-50°) Government Well Formation dacites along an angular unconformity.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
56) FX-180	18.89 ± 0.08 Ma	3706700	448640	Stewart Mountain

Nonwelded, bedded, crystal-poor rhyolite tuff from base of Tule Canyon Formation (Tt unit of Skotnicki and Ferguson, 1996) in side canyon along northwestern slope of the 3269'peak, elevation: about 2250'. Tuffs dip about 15-20° to the northeast and directly overlie steeply northeast-dipping (35-55°) Government Well dacites along an angular unconformity.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
57) FZ-49	18.89 ± 0.13 Ma	3711030	455225	Mormon Flat Dam

Crystal-poor (2-5% phenocrysts) rhyolite lava from major gulch about 250 meters downstream from Bagley Tank, elevation: 2030'. Lava represents middle to upper part of the Tule Canyon Formation in this area and the sequence dips northeast at about 40°. Mapped as Trp by Ferguson and Gilbert (1997).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
58) FZ-81	18.91 ± 0.20 Ma	3714590	456900	Mormon Flat Dam

Moderately crystal-rich (10% phenocrysts) rhyolite lava from essentially flat-lying sequence of Tule Canyon Formation lavas north of Salt River about 600 meters north of the confluence with Cottonwood Creek. Sample was collected in black, vitric matrix zone of the lava on the south slope of 2074' hill at an elevation of about 2000'. Mapped as Trx by Ferguson and Gilbert (1997), this lava directly overlies the dacite lavas of the Government Well Formation.

TULE CANYON FORMATION CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
59) FZ-53	18.92 ± 0.07 Ma	3714210	471495	Horse Mesa Dam

Nonwelded, bedded, crystal-poor rhyolite tuff from the base of the crystal-poor rhyolite sequence (Tt of Gilbert and Ferguson, 1997). The sample comes from a south-facing canyon wall at about 3430' elevation, about 500 meters due south of the 4112' peak in the middle of Horse Mesa. It was collected to constrain the age of the base of this unit in this area. The tuff directly overlies crystal-rich dacitic tuffs and dacite lavas of the Government Well Formation.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
60) FZ-85	18.92 ± 0.09 Ma	3714500	459775	Mormon Flat Dam

Crystal-poor (<2% phenocrysts) rhyolite lava with black, vitric matrix from flat-lying sequence collected on a prominent point about 700 meters south of the 2857' peak of the El Recortado, elevation: 2640'. This lava represents the lower part of the Tule Canyon Formation north of Salt River.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
61) SMR-12-1-95-3	18.96 ± 0.06 Ma	3663620	480780	North Butte

Nonwelded, crystal-poor felsic tuff interbedded with conglomerate which directly overlies crystalline basement. Mapped as tuff of North Butte by Richard and Spencer (1997), this tuff dips east about 20° and is overlain by rhyolite lavas that are probably equivalent in age to the approximately 17 Ma hypabyssal intrusion sampled (J-1-17-96-1) to the east of here. Sample collected from small peak 200 meters SW of 2160' peak in N/2 of sec. 3, T4S, R11E, elevtion: 2000'.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
62) FX-178	19.00 ± 0.07 Ma	3705620	448025	Apache Junction

Nonwelded, bedded, crystal-poor rhyolite tuff from Tule Canyon Formation (Tt unit of Skotnicki and Ferguson, 1996) to the west of Bulldog Canyon fault. The tuff occurs at the base of a fanning dip sequence of rhyolite tuffs which overlie steeply northeast dipping (30-50°) lavas of the Government Well Formation. This tuff dips 32° to the northeast. Sample was collected along east slope of 2635' peak at an elevation of about 2150'. Sample was taken to date the base of the Tule Canyon Formation and, along with sample FX-179 (18.83 Ma), to document the time-span of the fanning dip sequence.

RHYOLITE OF BULLDOG CANYON

Sample	Age	UTM Northing	UTM Easting	Quadrangle
63) FX-176	20.43 ± 0.08 Ma	3704985	449030	Apache Junction

Crystalline matrix, crystal-poor rhyolite lava from core of the Bulldog Canyon rhyolite lava dome (Trb of Skotnicki and Ferguson, 1996). The sample was collected from an active stream channel outcrop in Bulldog Canyon at an elevation of about 2050'. The dome is overlain by basal lavas of the Government Well Formation and is probably the source of nonwelded tuffs and tuff breccias that are preserved in the basal congomerate unit of the Goldfield Moutains (Tst unit of Skotnicki and Ferguson, 1996). Correlative, approximately 20.5 Ma dates of two of these tuff units, one from phenocrysts in a distal tuff and the other from a clast in a proximal tuff, confirm this correlation and prove that this lava is the oldest volcanic rock in the area instead of the youngest as had previously been interpreted (Fodor, 1969).

Sample	Age	UTM Northing	UTM Easting	Quadrangle
64) FX-174	20.52 ± 0.08 Ma	3704675	448555	Apache Junction

Clast of crystal-poor, rhyolite lava within lithic-rich, nonwelded tuff that occurs in volcaniclastic sequence which directly overlies crystalline basement in the hangingwall of a major, west-side-down fault in Bulldog Canyon. The volcaniclastic sequence, mapped as Tst by Skotnicki and Ferguson (1996) dips 35° to the northeast and is overlain by lavas of the Government Well Formation. The clast was sampled to provide a solid connection between this tuff and the nearby Bulldog Canyon lava dome which lies in the footwall of the aforementioned fault. The dome was previously interpreted to be the youngest volcanic rock in the area (Fodor, 1969). Sample was collected in narrow gully directly west of 2315' peak at an elevation of about 2090'.

Sample	Age	UTM Northing	UTM Easting	Quadrangle
65) FX-137	20.54 ± 0.16 Ma	3703710	444865	Apache Junction

Thin (< 1 meter-thick) nonwelded, crystal-poor, rhyolite tuff interbedded with conglomerate in a moderately (25-35°) north-dipping sequence which underlies the volcanic rocks at Pass Mountain. Mapped as Tst (Skotnicki and Ferguson, 1996), the sequence of conglomerate is nonvolcaniclastic in its lower part. The tuff was collected at the south end of Pass Mountain at an elevation of about 2500', in the W/2 of sec. 36, T2N, R7E. The sample was taken to constrain the older limit for tilting of the conglomerate sequence which is capped by the flat-lying, approximately 19 Ma tuff of sample FX-181. Its age of 20.5 Ma strongly suggests that this tuff was derived from one of the Bulldog Canyon lava domes located about 4 km to the east.

RHYOLITE OF BULLDOG CANYON CONTINUED

Sample	Age	UTM Northing	UTM Easting	Quadrangle
66) FX-115	20.61 ± 0.07 Ma	37032655	449285	Apache Junction

Light green, vitric matrix, crystal-poor rhyolite lava from the interior of an isolated dome in the southern Goldfield Mountains. Lava dome intrudes and appears to be related to a sequence of conglomerate interbedded with nonwelded rhyolite tuff along its southern contact. The lava was correlated with another lava dome to the north in Bulldog Canyon which is overlain by the basal lavas of the Government Well Formation. Unit was mapped as rhyolite of Bulldog Canyon (Trb of Skotnicki and Ferguson, 1996). The sample was collected from about 100 meters south of a 2441' peak, at an elevation of about 2325'.

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