$^{40}Ar/^{39}Ar$ Geochronology Results from the Harrisburg Junction, Hurricane, Little Creek Mountain, Santa Clara, Shivwits, Springdale West, St. George, The Divide, The Guardian Angels, Veyo, Virgin, Washington, and White Hills 7.5′ Quadrangles, St. George 30′ x 60′ Quadrangle, Washington County, Utah

by

Utah Geological Survey and U.S. Geological Survey

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OPEN-FILE REPORT 629
UTAH GEOLOGICAL SURVEY
a division of
Utah Department of Natural Resources
2014

INTRODUCTION

This open-file report makes available raw analytical data from laboratory procedures completed to determine the age of rock samples collected during geologic mapping of basaltic lava flows in the St. George 30′ x 60′ quadrangle and many 7.5′ quadrangles within the 30′ x 60′ quadrangle. Table 1 summarizes the results for each sample. Geologic maps completed during about fifteen years of field mapping in the area that depict the various lava flows are listed in the References section of this report. A brief discussion of procedures, comments, interpretations, and cautions for a few samples is provided below. This laboratory report was prepared by the U.S. Geological Survey (USGS) Geochronology Laboratory in Denver, Colorado. These ages were funded or partially funded by the Utah Geological Survey (UGS), USGS, and National Park Service, with most funding provided through the National Cooperative Geologic Mapping Program, STATEMAP component (various grants). These data are highly technical in nature and proper interpretation requires considerable training in the applicable geochronologic techniques.

The data and methods are available at http://geology.utah.gov/online/analytical_data.htm.

DATA AND DISCUSSION

Table 1 lists samples and names of basaltic flows from which the samples were collected, plateau and isochron ages obtained by the USGS lab, methods, location information in latitude and longitude, and USGS 7.5′ quadrangle where the sample was collected.

All of these isotopic ages are reported in Biek and others (2009, 2010). Geochemical analyses on most of these samples and on other samples collected from the same flows are contained in Biek and Ehler (2007). In addition, some age and geochemical analyses have been reported and discussed in 7.5′ quadrangle geologic map reports published by the UGS and listed in the References section below. However, it is important to note that some of this mapping was completed before these age analyses were completed and therefore some map units, names, and interpretations may have changed. The geologic map of the 30′ x 60′ quadrangle (Biek and others, 2009, 2010) is our latest major publication that synthesizes our mapping and interpretation of these units and this data.

The following notes are short comments made by the USGS lab during a phone discussion on March 31, 2005, with additional comments by UGS geologists. These comments have not been verified for accuracy or completeness.

General comment:
The USGS lab prefers to use the plateau age as the primary age, and the isochron as the supporting or confirming (or red flag) age to help interpret the plateau age. But the most reliable age is not always clear cut—all of the analyses are data that require interpretation. The isochron age is derived by synthesizing and plotting all the data on one line with a calculated standard deviation. It may look like tighter data on paper because of the much smaller error range, but that can be misleading. The USGS lab routinely calculates a larger standard deviation than other geochronology labs. It also tends to weigh the step-heating plateaus evenly; since plateaus include several steps, a couple of steps with high error bars may skew all results or make standard deviations a bit too broad. The lab also records raw data rather than synthesizing it as other labs often do. It follows this conservative approach to avoid obscuring problems that may exist in the data.

Comments on samples:
Sample VR41-08 (Gould Wash flow) 420 ± 210 ka pl; 420 ± 5 ka iso. The plateau age has a large error, probably due to excess argon. A separate UGS sample run by New Mexico Geochronology Laboratory yielded an age of 278 ± 0.0183 (Biek and others, 2009, 2010). The USGS suspects excess argon or another problem in the rock that would affect both results from both labs. A new sample should be analyzed.

VR42-03 (Grass Valley flow) 1.09 ± 0.09 ka pl; 0.96 ± 0.03 ka iso. This sample had excess argon and is probably younger.

VY8301-6 (Central West flow) 920 ± 70 ka pl; 930 ± 0.022 ka iso. A separate UGS sample run by the New Mexico Geochronology Laboratory yielded an age of 1.77 ± 0.09 Ma (Biek and others, 2009, 2010). The data appear good for both samples. All ages for this flow should be viewed with caution until this discrepancy is resolved.

VR40-02 (Santa Clara flow) 120 ± 60 ka pl; 89 ± 25 ka iso. This flow is so young that these ages can only be considered maximums; don't put much weight on these numbers. Separate ^{14}C dating of a charcoal wood fragment under the flow yielded an age of 32,600 ± 300 calendar years B.P. (27,270 ± 250 ^{14}C yr B.P.), and optically stimulated luminescence (OSL) dating of the soil around the charcoal yielded an age of about 40,000 calendar years B.P. (Willis and others, 2006; Willis and Hayden, in press). When these ages are considered together with setting, geomorphic relief, and weathering, this flow is probably around 33,000 years old.

VR41-02; VR41-03; ZP1501 (three samples of Crater Hill flow) 310 ± 70 ka pl, 298 ± 32 ka iso; 320 ± 130 ka pl, 294 ± 18 ka iso; 280 ± 80 ka pl, 228 ± 40 ka iso, respectively. The USGS lab felt confident about these ages but noted that it is a very young flow that is near the limits of reliable dating due to very little ^{39}Ar. A separate analysis of ZP1501 by the New Mexico Geochronology Lab yielded an age of 100 ± 0.08 ka (Biek and others, 2009, 2010). Separate OSL dating of sediments deposited in a lake impounded where the basalt flow dammed a canyon yielded ages of 125 to 115 ka (Hamilton and Rittenour, in preparation), supporting the younger age.

DISCLAIMER

This open-file release is intended as a data repository for information gathered in support of various UGS projects. The data are presented as received from the U.S. Geological Survey Geochronology Laboratory and do not necessarily conform to UGS technical, editorial, or policy standards; this should be considered by an individual or group planning to take action based on the contents of this report. The Utah Department of Natural Resources, Utah Geological Survey, makes no warranty, expressed or implied, regarding the suitability of this product for a particular use. The Utah Department of Natural Resources, Utah Geological Survey, shall not be liable under any circumstances for any direct, indirect, special, incidental, or consequential damages with respect to claims by users of this product. Comments and data do not necessarily represent the views or opinions of the U.S. Government or its employees.

REFERENCES

(includes all published 7.5′ quadrangle geologic maps covering sample locations, even if published before analyses were completed)

Biek, R.F., 2003a, Geologic map of the Harrisburg Junction quadrangle, Washington County, Utah: Utah Geological Survey Map 191, 42 p., 2 plates, scale 1:24,000.

Biek, R.F., 2003b, Geologic map of the Hurricane quadrangle, Washington County, Utah: Utah Geological Survey Map 187, 61 p., 2 plates, scale 1:24,000.

Biek, R.F., and Ehler, J.B., 2007, Whole-rock major- and trace-element geochemical data for basaltic rocks in the St. George 30′ x 60′ quadrangle and adjacent areas, Washington, Iron, and Kane Counties Utah: Utah Geological Survey Open-File Report 500, 1 plate, variously paginated, compact disk.

Biek, R.F., Rowley, P.D., Hayden, J.M., Hacker, D.B., Willis, G.C., Hintze, L.F., Anderson, R.E., and Brown, K.D., 2009, Geologic map of the St. George and east part of the Clover Mountains 30′ x 60′ quadrangles, Washington and Iron Counties, Utah: Utah Geological Survey Map 242, 2 plates, 101 p., scale 1:100,000.

Biek, R.F., Rowley, P.D., Hayden, J.M., Hacker, D.B., Willis, G.C., Hintze, L.F., Anderson, R.E., and Brown, K.D., 2010, Geologic map of the St. George and east part of the Clover Mountains 30′ x 60′

quadrangles, Washington and Iron Counties, Utah: Utah Geological Survey Map 242DM, 2 plates, 101 p., scale 1:100,000, GIS data.

Hamilton, W.L., and Rittenour, T.M., in preparation, Ancient lakes in Zion National Park, *in* MacLean, J., Huntoon, J.E., and Biek, R.F., editors, Geology of Utah's far south: Utah Geological Association Publication 43.

Hayden, J.M., 2004a, Geologic map of The Divide quadrangle, Washington County, Utah: Utah Geological Survey Map 197, 32 p., 2 plates, scale 1:24,000.

Hayden, J.M., 2004b, Geologic map of the Little Creek Mountain quadrangle, Washington County, Utah: Utah Geological Survey Map 204, 2 plates, scale 1:24,000.

Hayden, J.M., 2008, Geologic map of the Virgin quadrangle, Washington County, Utah: Utah Geological Survey Map 231, 2 plates, scale 1:24,000.

Hayden, J.M., 2011, Geologic map of the White Hills quadrangle, Washington County, Utah: Utah Geological Survey Map 250DM, 11 p., 2 plates, scale 1:24,000, GIS data.

Hayden, J.M., in preparation, Geologic map of the Veyo quadrangle, Washington County, Utah: Utah Geological Survey Map, 2 plates, scale 1:24,000, GIS data.

Hayden, J.M., and Willis, G.C., 2011, Geologic map of the St. George 7.5′ quadrangle, Washington County, Utah: Utah Geological Survey Map 251DM, 19 p., 2 plates, scale 1:24,000, GIS data.

Hintze, L.F., and Hammond, B.J., 1994, Geologic map of the Shivwits quadrangle, Washington County, Utah: Utah Geological Survey Map 153, 21 p., scale 1:24,000.

Willis, G.C., Biek, R.F., and Hayden, J.M., 2006, New age of the Santa Clara (Snow Canyon State Park) basalt flow: Utah Geological Survey, Survey Notes, v. 38, no. 3, p. 4–5.

Willis, G.C., Doelling, H.H., Solomon, B.J., and Sable, E.G., 2002, Interim geologic map of the Springdale West quadrangle, Washington County, Utah: Utah Geological Survey Open-File Report 394, 19 p., scale 1:24,000.

Willis, G.C., and Hayden, J.M., in press, Geologic map of the Santa Clara quadrangle, Washington County, Utah: Utah Geological Survey Map, 2 plates, scale 1:24,000, GIS data.

Willis, G.C. and Hayden, J.M., in preparation, Geologic map of the Washington quadrangle, Washington County, Utah: Utah Geological Survey Map, 2 plates, scale 1:24,000, GIS data.

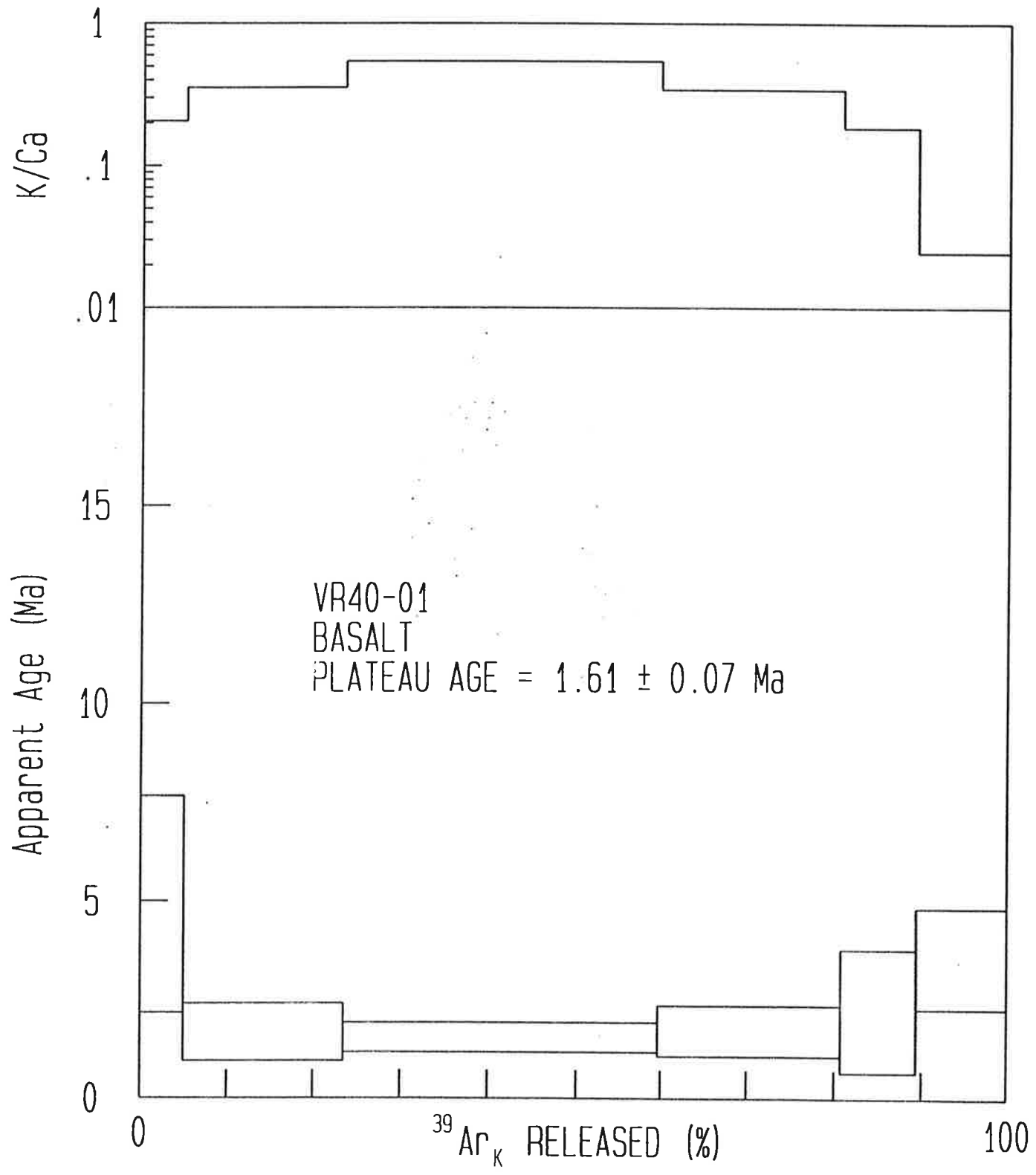
Willis, G.C., and Hylland, M.D., 2002, Interim geologic map of The Guardian Angels quadrangle, Washington County, Utah: Utah Geological Survey Open-File Report 395, 27 p., scale 1:24,000.

Table 1. $^{40}Ar/^{39}Ar$ Samples, Ages, Locations, and Flow Names, UGS-USGS Project, St. George 30' x 60' Quadrangle Area

Flow	UGS sample number	$^{40}Ar/^{39}Ar$ plateau age (Ma)	$^{40}Ar/^{39}Ar$ isochron age (Ma)	Mineral	Lab Used	7.5' Quadrangle	Longitude	Latitude
Gunlock - Dameron Valley north	VR40-01	1.61 ± 0.07	nd	Whole rock	USGS	Shivwits	-113.7744	37.2381
Santa Clara	VR40-02	0.120 ± 0.06*	0.089 ± 0.025?	Whole rock	USGS	White Hills	-113.6361	37.1167
Twin Peaks (West Black Ridge)	VR40-04	2.34 ± 0.02	nd	Whole rock	USGS	St. George	-113.5991	37.1129
Cedar Bench (Airport)	VR40-05	1.23 ± 0.01	nd	Whole rock	USGS	St. George	-113.5940	37.1047
Lava Ridge (Middleton Black Ridge)	VR40-06	1.41 ± 0.01	nd	Whole rock	USGS	St. George	-113.5510	37.1121
Washington	VR40-07	0.98 ± 0.02	nd	Whole rock	USGS	Harrisburg Junction	-113.4718	37.1378
Twin Peaks	VR40-10	2.43 ± 0.02	nd	Whole rock	USGS	Washington	-113.5664	37.2224
Cedar Bench	VR40-11	1.23 ± 0.01	nd	Whole rock	USGS	Washington	-113.5697	37.1592
Twin Peaks (T-Bone Hill)	VR40-12	2.37 ± 0.02	nd	Whole rock	USGS	Washington	-113.5687	37.1425
Lava Point	VR41-01c	1.06 ± 0.01	nd	Whole rock	USGS	Virgin	-113.1468	37.2113
Crater Hill	VR41-02	0.310 ± 0.070	0.298 ± 0.032	Whole rock	USGS	Springdale West	-113.0834	37.1746
Crater Hill	VR41-03	0.320 ± 0.130	0.294 ± 0.018?	Whole rock	USGS	Springdale West	-113.0848	37.1802
Ivans Knoll	VR41-06	1.06 + 0.16	0.937 + 0.006?	Whole rock	USGS	Hurricane	-113.2971	37.1284
Gould Wash	VR41-08	0.420 ± 0.210	0.420 ± 0.05	Whole rock	USGS	Little Creek Mountain	-113.2491	37.1258
Grass Valley	VR42-03	1.09 ± 0.09	0.966 ± 0.030	Whole rock	USGS	The Divide	-113.3244	37.0747
Cedar Bench (Snow Canyon Overlook)	VR42-08	1.16 ± 0.03	nd	Whole rock	USGS	Santa Clara	-113.6314	37.2195
Big Sand	VR42-09	1.13 ± 0.05	1.111 ± 0.007	Whole rock	USGS	Santa Clara	-113.6103	37.1631
Little Creek Peak	VR43-01	1.44 ± 0.04	nd	Whole rock	USGS	The Guardian Angels	-113.0727	37.3556
Baker Dam	VY8301-1	0.690 ± 0.140	0.686 ± 0.022	Whole rock	USGS	Veyo	-113.6933	37.3330
Baker Dam	VY8301-3	0.670 ± 0.040	nd	Whole rock	USGS	Veyo	-113.6701	37.3484
Gunlock - Dameron Valley north	VY8301-10	1.65 + 0.02	1.67 ± 0.04?	Whole rock	USGS	Veyo	-113.6664	37.3245
Aqueduct Hill	VY8301-4	2.05 ± 0.01	2.02 ± 0.01	Whole rock	USGS	Veyo	-113.6719	37.3504
Cinder cone NE of Veyo	VY8301-5	0.650 ± 0.08	0.614 ± 0.04	Whole rock	USGS	Veyo	-113.6765	37.3473
Central West	VY8301-6	0.920 ± 0.070	0.930 + 0.022?	Feldspar	USGS	Veyo	-113.6617	37.3721
Magotsu Creek	VY8301-7	1.00 ± 0.09	0.994 ± 0.023	Whole rock	USGS	Veyo	-113.6856	37.3671
Crater Hill	ZP1501	0.280 ± 0.080	0.228 ± 0.040?	Whole rock	USGS	Springdale West	-113.1057	37.2116

NOTES:
VR and ZP samples collected Mar 18-20, 1997
VY samples collected Aug 3, 2001
Age uncertainty = 2 standard deviations
? = preliminary number
Whole rock means groundmass concentrate
Isochron ages not available for some samples
Latitude and longitude based on NAD27
nd - no data

v 1/10/95 09:02:47 28 Aug 1998 #1 KD4 VR40-01



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(40/36in = 295.5)

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#1 KD4 VR40-01

J = 0.001139 ▪ 0.50% SAMPLE WT = 0.2520 g

TEMP C	Initial & radiogenic 40Ar	Potassium derived 39Ar	Chlorine derived 38Ar	Calcium derived 37Ar	Initial 36Ar	AGE* in Ma	**
650	4.364E-12	4.356E-13	1.179E-14	1.098E-12	1.124E-14	4.914 ▪	1.374
750	2.964E-12	1.625E-12	4.382E-15	2.385E-12	5.561E-15	1.669 ▪	.363
850	4.184E-12	3.181E-12	3.714E-15	3.056E-12	6.107E-15	1.537 ▪	.186
950	3.041E-12	1.853E-12	4.113E-15	2.819E-12	5.102E-15	1.699 ▪	.318
1050	2.342E-12	7.552E-13	8.072E-15	2.124E-12	5.175E-15	2.210 ▪	.778
1450	1.848E-11	9.381E-13	7.184E-14	1.976E-11	5.707E-14	3.536 ▪	.639
TOTAL GAS	3.537E-11	8.788E-12	1.039E-13	3.125E-11	9.025E-14	2.03	

84.4% of gas on plateau, steps 750 through 1050 PLATEAU AGE = 1.614 + .073

Note: all gas quantities are in moles. No blank correction.

* Ages calculated assuming initial 40Ar/36Ar = 295.5 ▪ 0

** 1-sigma precision estimates are for intra-sample reproducibility.

** 1-sigma precision estimates for plateaux are for intra-irradiation package reproducibility.

*** below detection limit

v 1/10/95 #1 KD4 VR40-01 08:59:51 28 Aug 1998

R A W D A T A

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar ä regression	TRAP CURRENT	MANIFOLD OPTION
44825	650	334302	33616	1207	31844	906	200	EALL
	■	810	71	19	76	78		
44826	750	227629	125322	1954	69116	487	200	EALL
	■	726	193	8	45	76		
44827	850	321754	245185	3513	88506	543	200	EALL
	■	725	184	7	91	77		
44828	950	233621	142894	2178	81586	459	200	EALL
	■	663	203	15	108	76		
44829	1050	179638	58290	1341	61450	451	200	EALL
	■	674	20	6	45	76		
44830	1450	1415447	73297	5768	571386	4896	200	EALL
	■	1368	56	18	421	78		

Raw counts and errors include blank corrections of:
40Ar = 3868 ■ 653
36Ar = 109.3 ■ 76.1

C O R R E C T I O N S

TEMP |C	39Ar Decay	37Ar Decay	-----K-derived---- 40Ar	38Ar	37Ar	---Ca-derived---- 39Ar	38Ar	36Ar	Cl-der 36Ar	Initial 38Ar
650	12	53917	189	447	0	57	3	22	0	161
750	46	117123	707	1667	0	123	6	48	0	80
850	90	150108	1383	3263	0	157	7	62	0	87
950	53	138492	806	1901	0	145	7	57	0	73
1050	21	104400	328	775	0	109	5	43	0	74
1450	27	971579	408	963	0	1018	48	399	1	817

All values in counts, corrected for mass discrimination

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	TEMP C	% TOT 39Ar	RAD YIELD	APP K/Ca	APP K/Cl	F	AGE (Ma)	intra-sample	precision intra-package
A	650	5.0	23.9	.21	89	2.395	4.914 ■	1.374	1.375
B	750	18.5	44.6	.35	897	.812	1.669 ■	.363	.363
C	850	36.2	56.9	.54	2072	.748	1.537 ■	.186	.186
D	950	21.1	50.4	.34	1090	.827	1.699 ■	.318	.318
E	1050	8.6	34.7	.18	226	1.076	2.210 ■	.778	.779
F	1450	10.7	8.7	.02	32	1.722	3.536 ■	.639	.646
Total gas				.4					

Precisions are 1 sigma, measured in Ma. Measured 40/36 atm = 287.9 ■.7
J = 0.001139 ■ 0.50% (intra-package) ■ 0.50% (inter-package)
Trap current factors- 40: 5.66 100: 0 200: 1
Manifold factors- ALL: 1 SPLIT 1: 3.3 SPLIT 2: 10.89 SPLIT 3: 35.937
EALL: 2 ESPLIT 1: 6.6 ESPLIT 2: 21.78
Sensitivity = 6.530E-18 % Reproducibility = .25 Detection limit = 40 counts
Data reduced assuming initial 40/36 = 295.50 ■ 0.00
Ca-factors: 3637=2.6E-04■1.7E-06 3837=3.2E-05■2.4E-07 3937=6.7E-04■3.7E-06
K-factors: 3739=0.0E+00■2.2E-03 3839=1.3E-02■2.4E-04 4039=5.7E-03■4.0E-03

v 1/10/95 #1 KD4 VR40-01 09:35:27 28 Aug 1998
Points AF deleted;
4 points regressed out of 6 includes 84.4 % of 39Ar
Mean X = .593E+00 Mean Y = .176E-02 Slope = -.177E-02 ä+Ç .184E-02
36/40 = .281E-02 ä+Ç .112E-02 39/40 = .159E+01 ä+Ç .104E+01
Fit parameters: SUMS = .02 MSWD = .01
40Ar/36Ar = 355.85 ä+Ç 141.83 F = .631 ä+Ç .414 AGE = 1.3 ä+Ç .85 Ma

Points AEF deleted;
3 points regressed out of 6 includes 75.8 % of 39Ar
Mean X = .632E+00 Mean Y = .169E-02 Slope = -.192E-02 ä+Ç .286E-02
36/40 = .291E-02 ä+Ç .183E-02 39/40 = .151E+01 ä+Ç .132E+01
Fit parameters: SUMS = .015 MSWD = .015
40Ar/36Ar = 343.76 ä+Ç 215.71 F = .661 ä+Ç .575 AGE = 1.36 ä+Ç 1.18 Ma

Point F deleted;
5 points regressed out of 6 includes 89.3 % of 39Ar
Mean X = .324E+00 Mean Y = .220E-02 Slope = -.167E-02 ä+Ç .639E-03
36/40 = .274E-02 ä+Ç .266E-03 39/40 = .165E+01 ä+Ç .516E+00
Fit parameters: SUMS = .023 MSWD = .008
40Ar/36Ar = 364.33 ä+Ç 35.33 F = .608 ä+Ç .191 AGE = 1.25 ä+Ç .39 Ma

Point F deleted;
5 points regressed out of 6 includes 89.3 % of 39Ar
Mean X = .324E+00 Mean Y = .220E-02 Slope = -.167E-02 ä+Ç .639E-03
36/40 = .274E-02 ä+Ç .266E-03 39/40 = .165E+01 ä+Ç .516E+00
Fit parameters: SUMS = .023 MSWD = .008
40Ar/36Ar = 364.33 ä+Ç 35.33 F = .608 ä+Ç .191 AGE = 1.25 ä+Ç .39 Ma

try EF

A	650C	WT X =	.17E+08	WT Y =	.19E+08	R =	.28E-01	Residual =	-.14E-01
B	750C	WT X =	.32E+06	WT Y =	.63E+07	R =	.15E-01	Residual =	.12E+00
C	850C	WT X =	.16E+06	WT Y =	.47E+07	R =	.49E-02	Residual =	-.36E-01
D	950C	WT X =	.11E+06	WT Y =	.32E+07	R =	.49E-02	Residual =	-.89E-01
E	1050C	WT X =	.94E+05	WT Y =	.21E+07	R =	.44E-02	Residual =	.45E-02
F	1450C	WT X =	.94E+05	WT Y =	.20E+07	R =	.64E-04	Residual =	.61E+00

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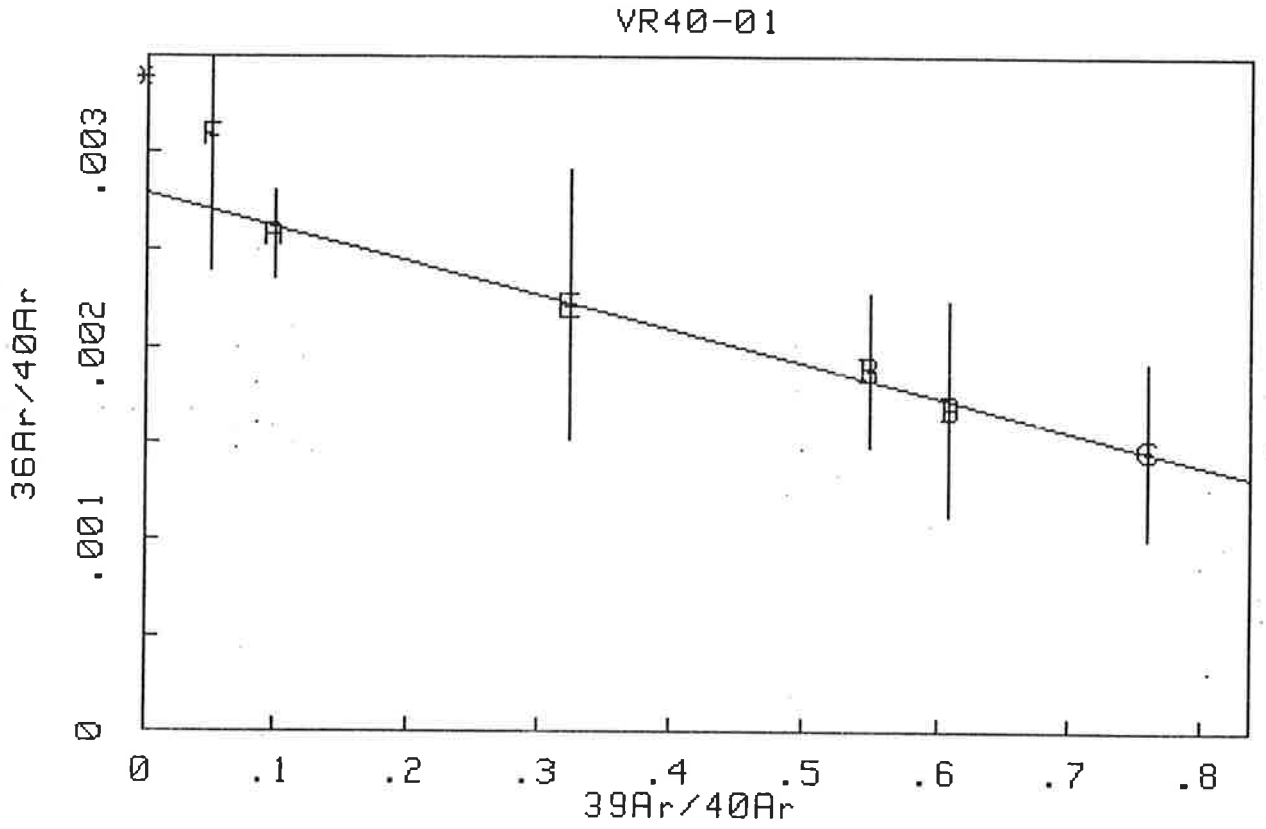
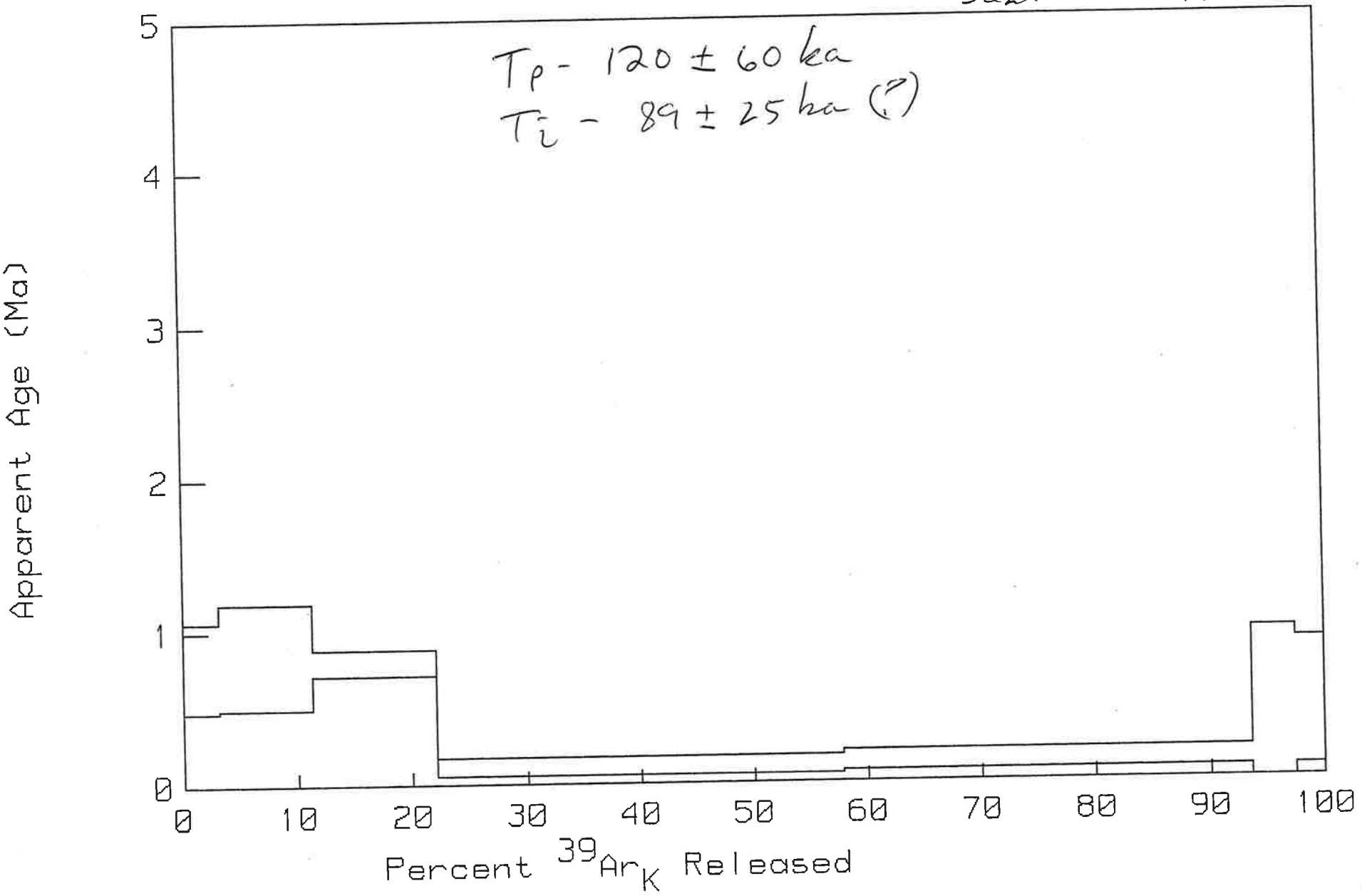


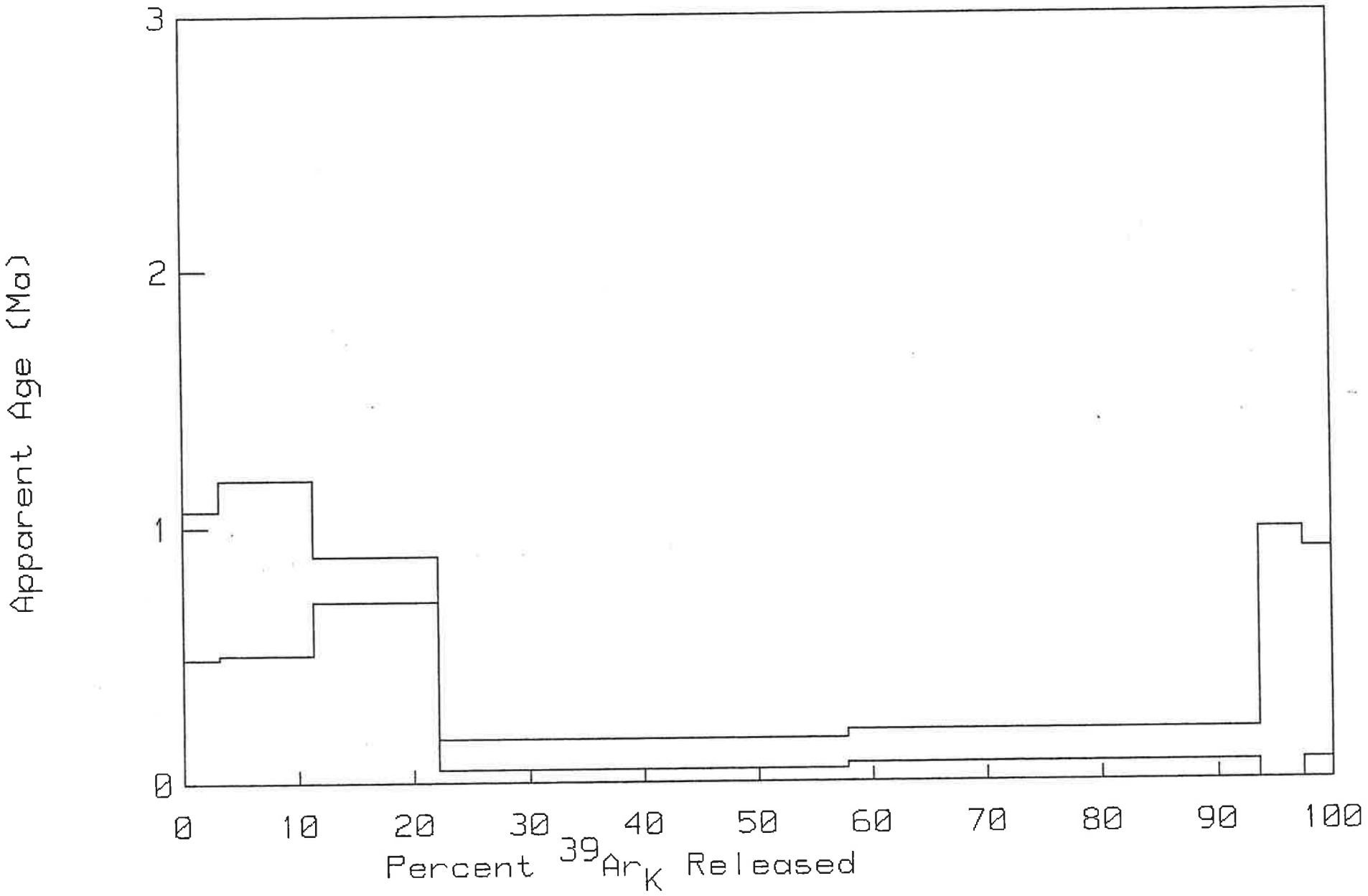
6 points regressed out of 6
Mean X = .309E+00 Mean Y = .225E-02 Slope = -.176E-02 ä+Ç .621E-03
36/40 = .279E-02 ä+Ç .252E-03 39/40 = .159E+01 ä+Ç .464E+00
Fit parameters: SUMS = .358 MSWD = .089
40Ar/36Ar = 357.8 ä+Ç 32.22 F = .628 ä+Ç .183 AGE = 1.29 ä+Ç .38 Ma

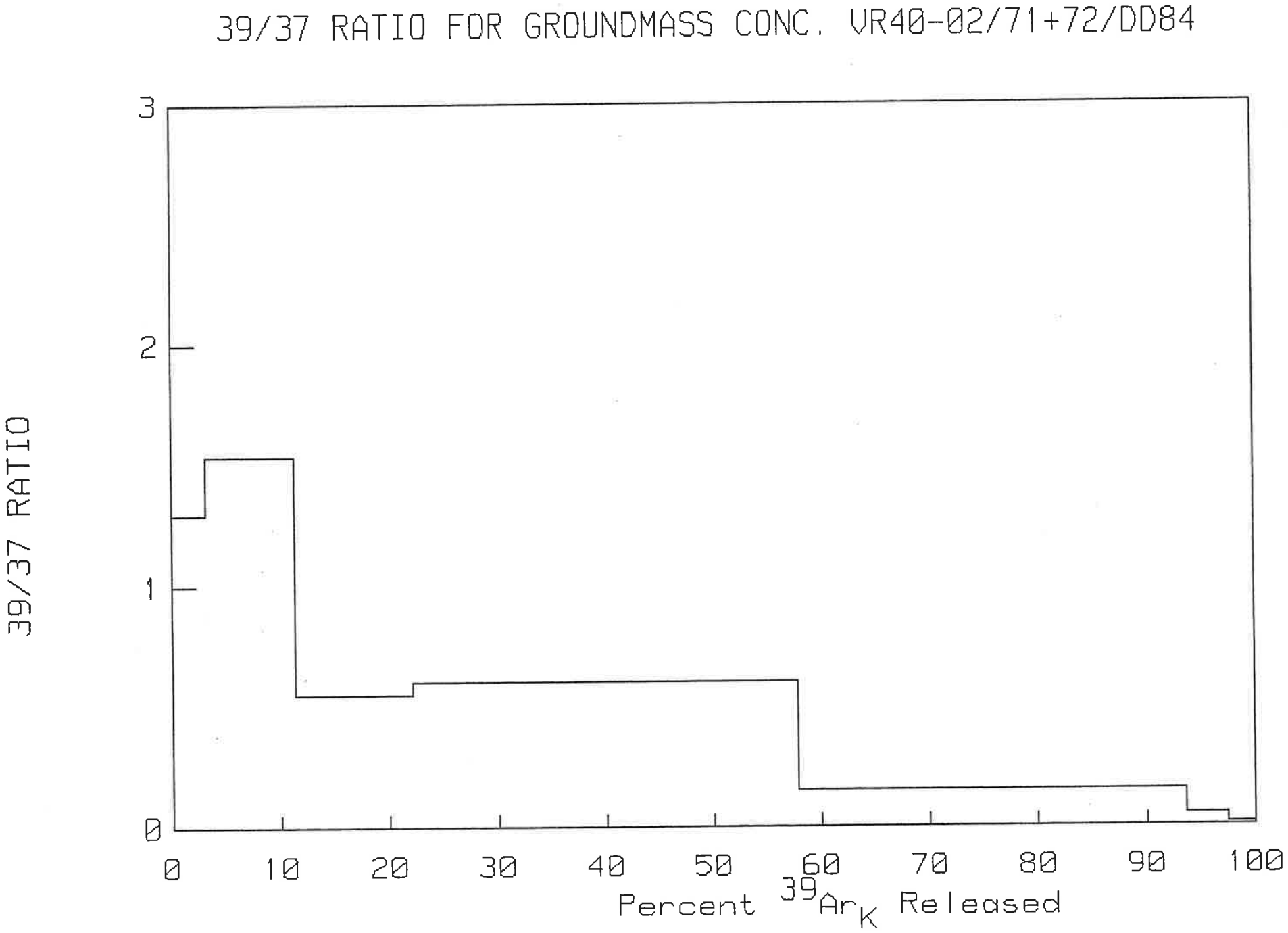
AGE SPECTRUM FOR GROUNDMASS CONC. VR40-02/71+72/DD84

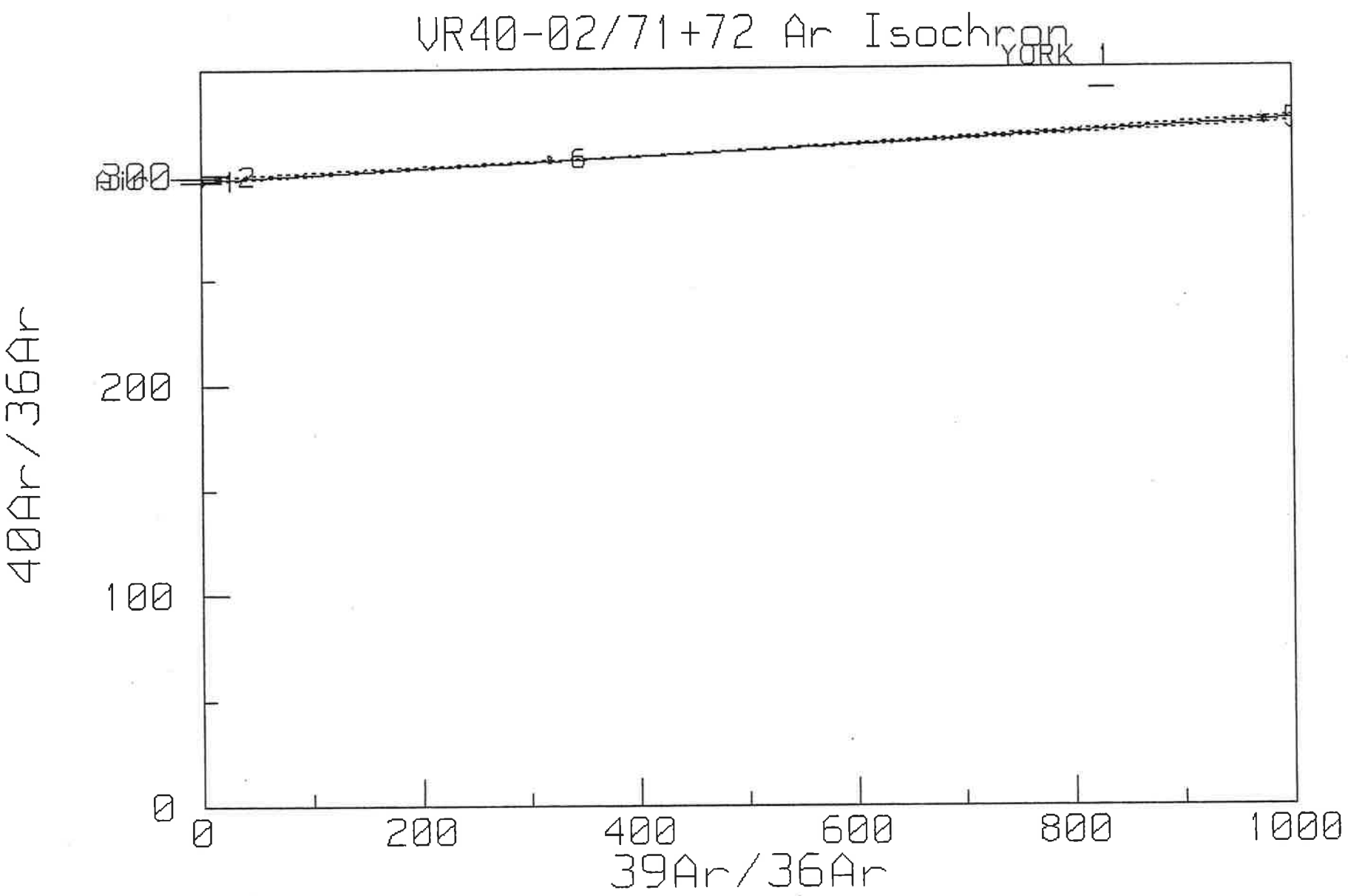
Santa Clara Flow



AGE SPECTRUM FOR GROUNDMASS CONC. VR40-02/71+72/DD84




39/37 RATIO FOR GROUNDMASS CONC. VR40-02/71+72/DD84
39/37 RATIO
3
2
1
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VR40-02/71+72 Ar Isochron
YORK 1
300
200
100
0
0
200
400
600
800
1000
40Ar/36Ar
39Ar/36Ar

VR40-02/71+72

York 1 Analysis

n= 4

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.027251	.0025866	297.6	1.2574

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.021E-01	4.85E-03	4.85E-03
Initial 40/36:	2.98E+02	6.29E-01	6.29E-01
Radiogenic 40/39:	2.73E-02	1.29E-03	1.29E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 4

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.02721	9.4961E-5	297.62	.048385

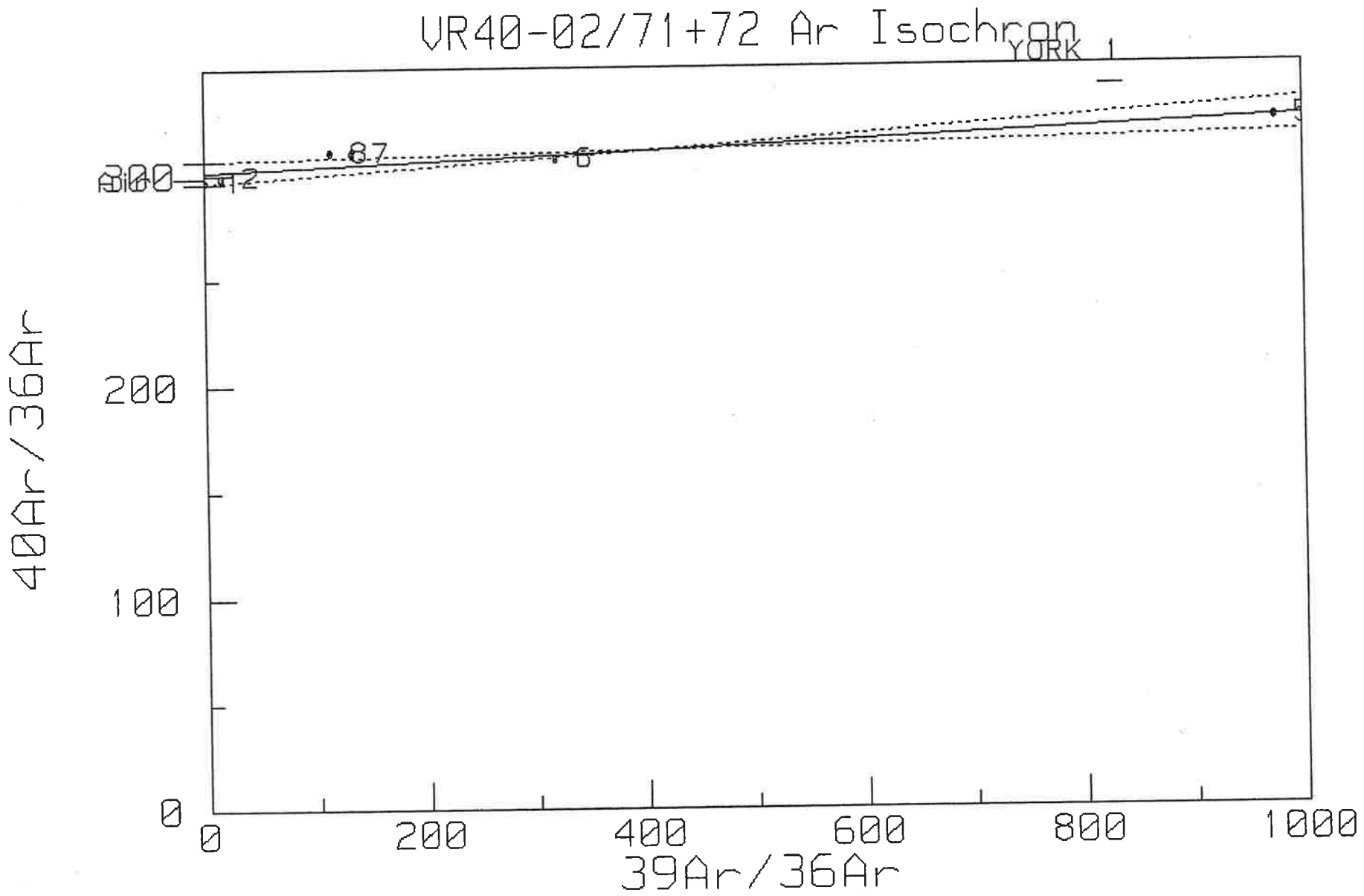
mswd= 26.1 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.020E-01	2.05E-04	2.05E-04
Initial 40/36:	2.98E+02	2.42E-02	2.42E-02
Radiogenic 40/39:	2.72E-02	4.75E-05	4.75E-05

All errors on this printout are: 2 SIGMA

#1, 2, 5, 6


VR40-02/71+72 Ar Isochron
YORK 1
87
6
300
200
100
0
0
200
400
600
800
1000
40Ar/36Ar
39Ar/36Ar

VR40-02/71+72
York 1 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.023805	.01319	301.5	5.3445

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	8.922E-02	2.47E-02	2.47E-02
Initial 40/36:	3.01E+02	2.67E+00	2.67E+00
Radiogenic 40/39:	2.38E-02	6.59E-03	6.59E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 6

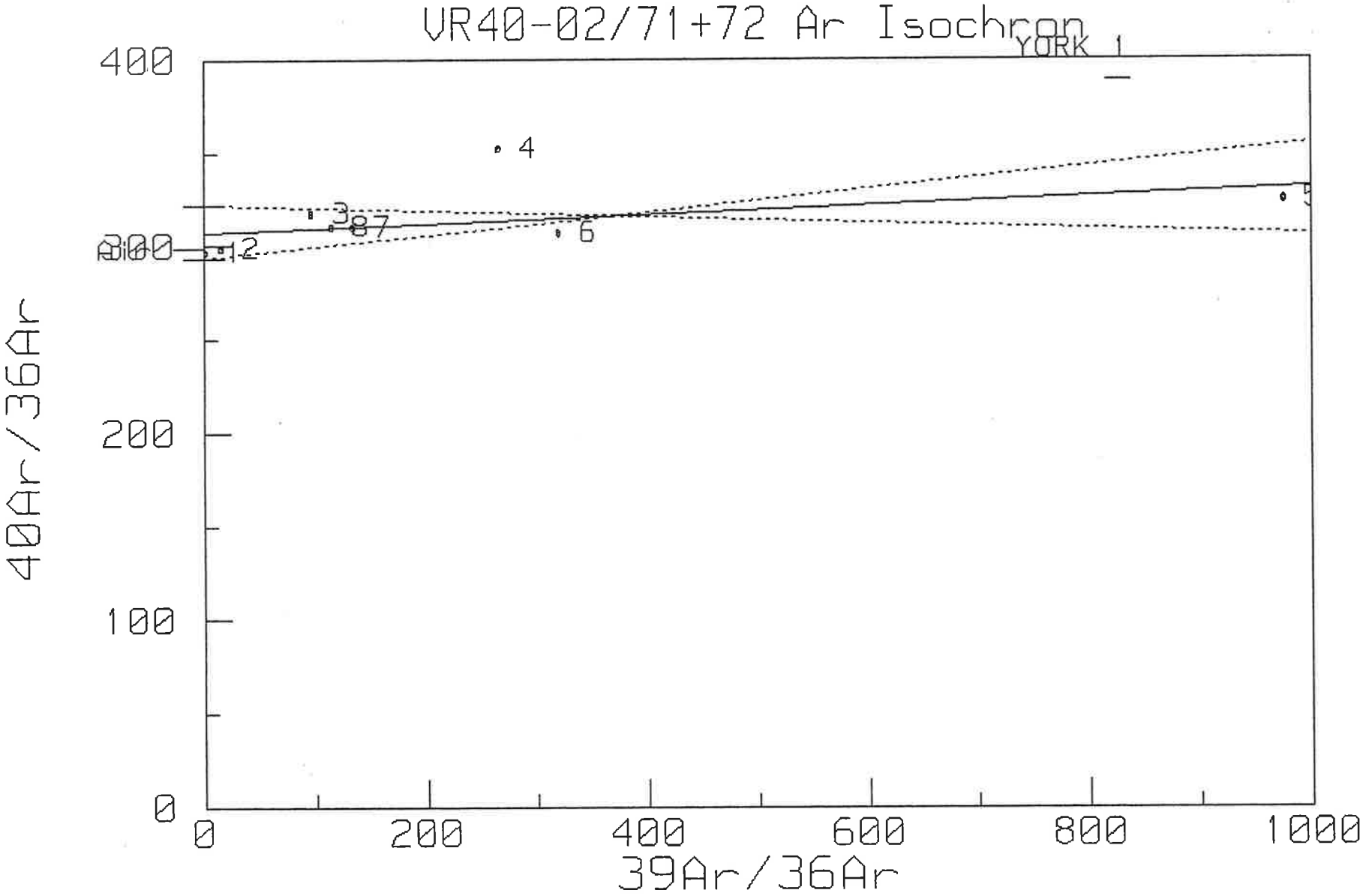
SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.023611	9.1175E-5	301.54	.038772
mswd= 137	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	8.849E-02	1.92E-04	1.92E-04
Initial 40/36:	3.02E+02	1.94E-02	1.94E-02
Radiogenic 40/39:	2.36E-02	4.56E-05	4.56E-05

All errors on this printout are: 2 SIGMA

#1, 2, 5, 6, 7, 8


VR40-02/71+72 Ar Isochron
YORK 1
400
200
100
0
0
200
400
600
800
1000
40Ar/36Ar
39Ar/36Ar
4
3
87
6
2

VR40-02/71+72
York 1 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.023281	.03902	307.63	14.39

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	8.725E-02	7.31E-02	7.31E-02
Initial 40/36:	3.08E+02	7.20E+00	7.20E+00
Radiogenic 40/39:	2.33E-02	1.95E-02	1.95E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.021162	8.7004E-5	308.11	.034264

mswd= 415 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	7.931E-02	1.81E-04	1.81E-04
Initial 40/36:	3.08E+02	1.71E-02	1.71E-02
Radiogenic 40/39:	2.12E-02	4.35E-05	4.35E-05

All errors on this printout are: 2 SIGMA

#1-8, All

Note: The data for this sample was horrendous! More or less funky, curved 'dirty gas' regressions persisted throughout. The 950° fraction was the most severely bothered with curved regressions (#4); Regressions in the 750° and 850° fractions weren't as awful, but were still seriously curved enough to be unable to reliably determine the results. The 1050° thru 1400° fractions weren't as bad, but still obviously differed a bit from being normal. Deviations were small for the 1150° fraction, though. This probably is actually within ± 0.07 Ma of the apparent age — 0.13 Ma

TEMP	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00017	.00003	.05059	1.76867	.00278	.01
750	.00101	.00018	.29768	.07840	.00025	1.30
850	.00041	.00007	.12166	.09173	.00027	1.54
950	.00020	.00003	.05788	.02361	.00025	.54
1050	.00018	.00003	.05252	.01540	.00003	.60
1150	.00054	.00010	.16063	.01768	.00004	.15
1250	.00014	.00003	.04231	.15076	.00013	.05
1400	.00010	.00002	.03073	.11075	.00016	.01

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.00019	.00008	2.319	.4	0.0	8.67 +/- 6.60
750	.00313	.01519	.206	1.0	3.1	.77 +/- .29
850	.00897	.03989	.225	6.8	8.2	.84 +/- .34
950	.01105	.05202	.212	15.9	10.7	.80 +/- .09
1050	.00505	.17362	.029	8.5	35.7	.11 +/- .06
1150	.00624	.17381	.036	3.7	35.8	.13 +/- .07
1250	.00210	.01918	.110	4.7	3.9	.41 +/- .56
1400	.00156	.01192	.131	4.8	2.5	.49 +/- .41
TOTAL GAS			.079			.30 +/- .15

PLATEAU AGE = .12 +/- .06 Ma
PLATEAU ON STEPS 5 TO 6 AND CONTAINS 71.5 PERCENT OF THE GAS
PLATEAU MIN = .11 AND PLATEAU MAX = .13

1250	.00001	.00025	.00020	.00010	.37562	.00001	.00027	.00000	.00046
1400	.00001	.00016	.00012	.00027	.98890	.00002	.00070	.00000	.00023

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00017	.00003	.05059	1.76867	.00278	.01
750	.00101	.00018	.29768	.07840	.00025	1.30
850	.00041	.00007	.12166	.09173	.00027	1.54
950	.00020	.00003	.05788	.02361	.00025	.54
1050	.00018	.00003	.05252	.01540	.00003	.60
1150	.00054	.00010	.16063	.01768	.00004	.15
1250	.00014	.00003	.04231	.15076	.00013	.05
1400	.00010	.00002	.03073	.11075	.00016	.01

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.00019	.00008	2.319	.4	0.0	8.67 +/- 6.60
750	.00313	.01519	.206	1.0	3.1	.77 +/- .29
850	.00897	.03989	.225	6.8	8.2	.84 +/- .34
950	.01105	.05202	.212	15.9	10.7	.80 +/- .09
1050	.00505	.17362	.029	8.5	35.7	.11 +/- .06
1150	.00624	.17381	.036	3.7	35.8	.13 +/- .07
1250	.00210	.01918	.110	4.7	3.9	.41 +/- .56
1400	.00156	.01192	.131	4.8	2.5	.49 +/- .41
TOTAL GAS			.079			.30 +/- .15

Your Personalized Argon Data Acquisition on Sample: VR40-02/71+72/DD84
Sample analysis started on 324 Reduced on 3-Feb-2005
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 398.8 mg
J-value and its error .0020775 .1 %

RAW DATA

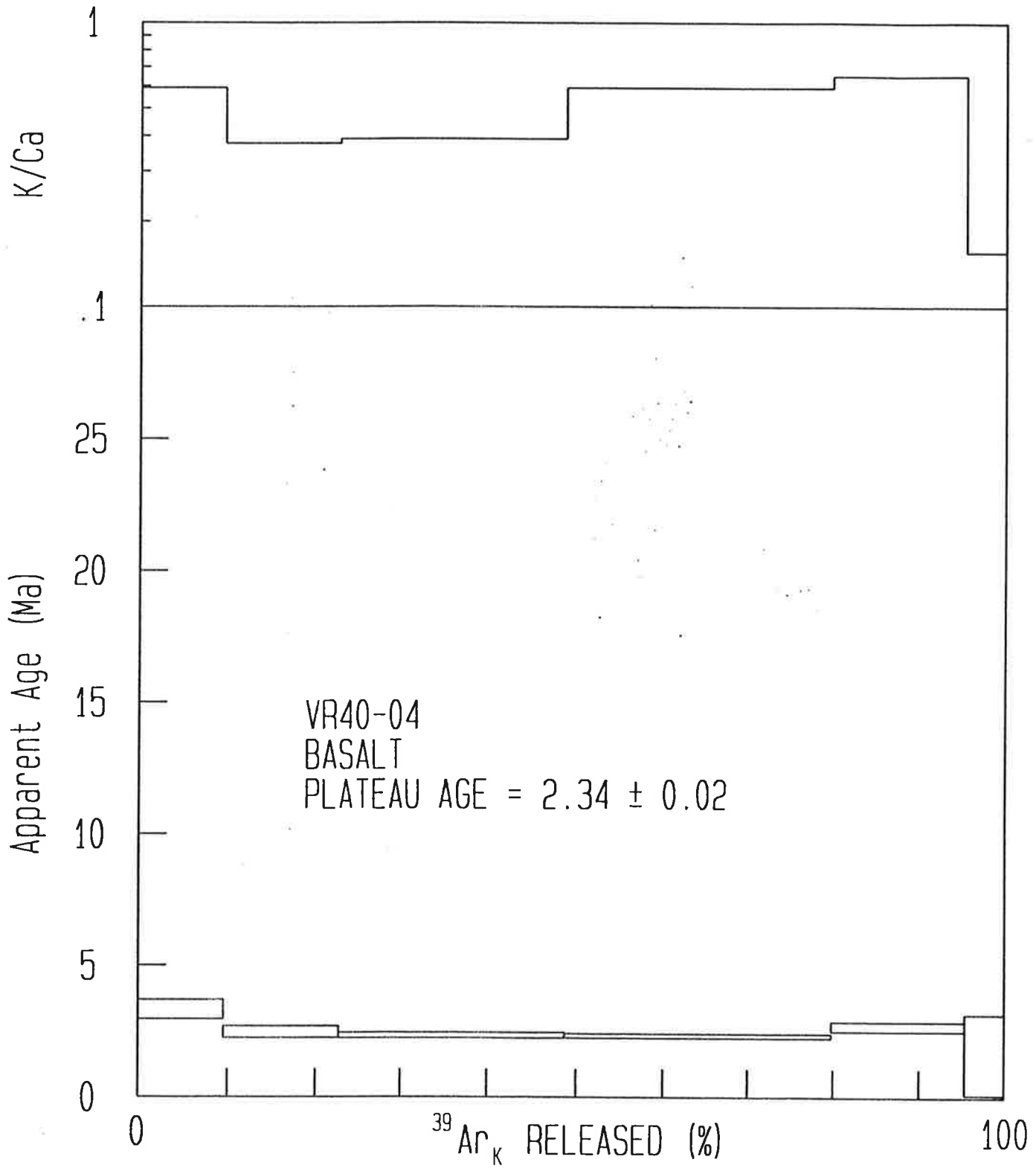
FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141599	650	.05078	.00009	.00004	.00002	.00017	200	1
+/-		.00001	.00001	.00000	.00001	.00000		
141600	750	.30097	.01512	.00148	.00004	.00100	200	1
+/-		.00095	.00024	.00001	.00002	.00001		
141601	850	.13104	.03971	.00310	.00009	.00042	200	1
+/-		.00076	.00009	.00001	.00000	.00001		
141602	950	.06947	.05183	.00370	.00032	.00022	200	1
+/-		.00470	.00096	.00001	.00007	.00001		
141603	1050	.05937	.17296	.01263	.00096	.00026	200	1
+/-		.00057	.00004	.00002	.00002	.00001		
141604	1150	.16868	.17376	.00733	.00385	.00085	200	1
+/-		.00005	.00007	.00002	.00000	.00001		
141605	1250	.04461	.01935	.00074	.00125	.00024	200	1
+/-		.00003	.00001	.00001	.00001	.00001		
141606	1400	.03241	.01255	.00042	.00328	.00037	200	1
+/-		.00023	.00004	.00000	.00001	.00001		

Raw values corrected for manifold options, trap current and mass discrimination

TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
650	.05078	.00009	.00004	.00002	.00017	.00695	0.00000
+/-	.00001	.00001	.00000	.00001	.00000		
750	.30097	.01516	.00149	.00004	.00101	.01167	.00003
+/-	.00095	.00024	.00001	.00002	.00001		
850	.13104	.03983	.00312	.00009	.00042	.02589	.00008
+/-	.00076	.00009	.00001	.00000	.00001		
950	.06947	.05198	.00372	.00032	.00022	.09540	.00011
+/-	.00470	.00096	.00001	.00007	.00001		
1050	.05937	.17346	.01270	.00097	.00026	.28864	.00037
+/-	.00057	.00004	.00002	.00002	.00001		
1150	.16868	.17426	.00737	.00388	.00086	1.15530	.00037
+/-	.00005	.00007	.00002	.00000	.00001		
1250	.04461	.01940	.00075	.00126	.00024	.37437	.00004
+/-	.00003	.00001	.00001	.00001	.00001		
1400	.03241	.01259	.00043	.00331	.00037	.98559	.00003
+/-	.00023	.00004	.00000	.00001	.00001		

TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
650	.00000	.00000	.00000	0.00000	.00698	.00000	.00000	.00000	.00001
750	.00001	.00020	.00016	0.00000	.01170	.00000	.00001	.00000	.00111
850	.00002	.00053	.00041	.00001	.02596	.00000	.00002	.00000	.00251
950	.00003	.00069	.00054	.00003	.09569	.00000	.00007	.00000	.00300
1050	.00009	.00230	.00181	.00008	.28952	.00001	.00020	.00001	.01037
1150	.00009	.00230	.00181	.00031	1.15909	.00002	.00082	.00000	.00495

v 1/10/95 14:49:15 27 Aug 1998 #38 KD4 VR40-04



v 1/10/95

(40/36in = 295.5)

v 1/10/95 14:39:46 27 Aug 1998

#38 KD4 VR40-04

J = 0.001141 ± 0.50% SAMPLE WT = 0.2532 g

TEMP C	Initial & radiogenic 40Ar	Potassium derived 39Ar	Chlorine derived 38Ar	Calcium derived 37Ar	Initial 36Ar	AGE* in Ma	**
650	1.045E-12	3.939E-13	2.834E-14	3.473E-13	1.380E-15	3.326 ±	.181
750	8.451E-13	5.403E-13	1.376E-14	7.479E-13	6.678E-16	2.466 ±	.111
850	1.560E-12	1.071E-12	5.998E-15	1.428E-12	1.164E-15	2.336 ±	.053
950	1.729E-12	1.277E-12	3.399E-15	1.126E-12	9.802E-16	2.317 ±	.043
1050	1.010E-12	6.441E-13	5.018E-15	5.153E-13	5.802E-16	2.678 ±	.089
1150	5.976E-13	1.873E-13	9.404E-15	6.237E-13	1.523E-15	1.620 ±	.758
TOTAL GAS	6.786E-12	4.113E-12	6.591E-14	4.788E-12	6.296E-15	2.46	

70.2% of gas on plateau, steps 750 through 950 PLATEAU AGE = 2.337 + .020

Note: all gas quantities are in moles. No blank correction.

* Ages calculated assuming initial 40Ar/36Ar = 295.5 ± 0

** 1-sigma precision estimates are for intra-sample reproducibility.

** 1-sigma precision estimates for plateaux are for intra-irradiation package reproducibility.

*** below detection limit

v 1/10/95 #38 KD4 VR40-04 14:39:39 27 Aug 1998

R A W D A T A

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar ä regression	TRAP CURRENT	MANIFOLD OPTION
44707	650	80169	30363	2588	11965	116	200	EALL
	■	541	27	14	24	9		
44708	750	64947	41661	1621	25753	68	200	EALL
	■	535	23	11	29	8		
44709	850	119920	82553	1565	49163	121	200	EALL
	■	551	24	3	98	7		
44710	950	132926	98471	1580	38719	100	200	EALL
	■	548	11	5	49	7		
44711	1050	77628	49647	1051	17718	56	200	EALL
	■	532	26	9	28	7		
44712	1150	45839	14462	904	21434	133	200	EALL
	■	536	11	11	3	18		

Raw counts and errors include blank corrections of:
40Ar = 11884 ■ 528
36Ar = 68.3 ■ 6.7

C O R R E C T I O N S

TEMP |C	39Ar Decay	37Ar Decay	-----K-derived---- 40Ar	38Ar	37Ar	----Ca-derived---- 39Ar	38Ar	36Ar	Cl-der 36Ar	Initial 38Ar
650	9	15153	171	404	0	18	1	7	0	20
750	13	32640	235	554	0	39	2	15	0	10
850	25	62363	466	1098	0	74	3	29	0	17
950	30	49156	556	1311	0	58	3	23	0	14
1050	15	22513	280	661	0	27	1	10	0	8
1150	4	27258	81	192	0	32	2	13	0	22

All values in counts, corrected for mass discrimination

v 1/10/95 #38 KD4 VR40-04 14:39:40 27 Aug 1998

	TEMP C	% TOT 39Ar	RAD YIELD	APP K/Ca	APP K/Cl	F	AGE (Ma)	intra-sample	precision intra-package
A	650	9.6	61.0	.59	34	1.617	3.326 ■	.181	.182
B	750	13.1	76.7	.38	95	1.199	2.466 ■	.111	.112
C	850	26.0	77.9	.39	432	1.136	2.336 ■	.053	.055
D	950	31.1	83.2	.59	910	1.127	2.317 ■	.043	.045
E	1050	15.7	83.0	.65	311	1.302	2.678 ■	.089	.090
F	1150	4.6	24.7	.16	48	.788	1.620 ■	.758	.759
Total gas				.5					

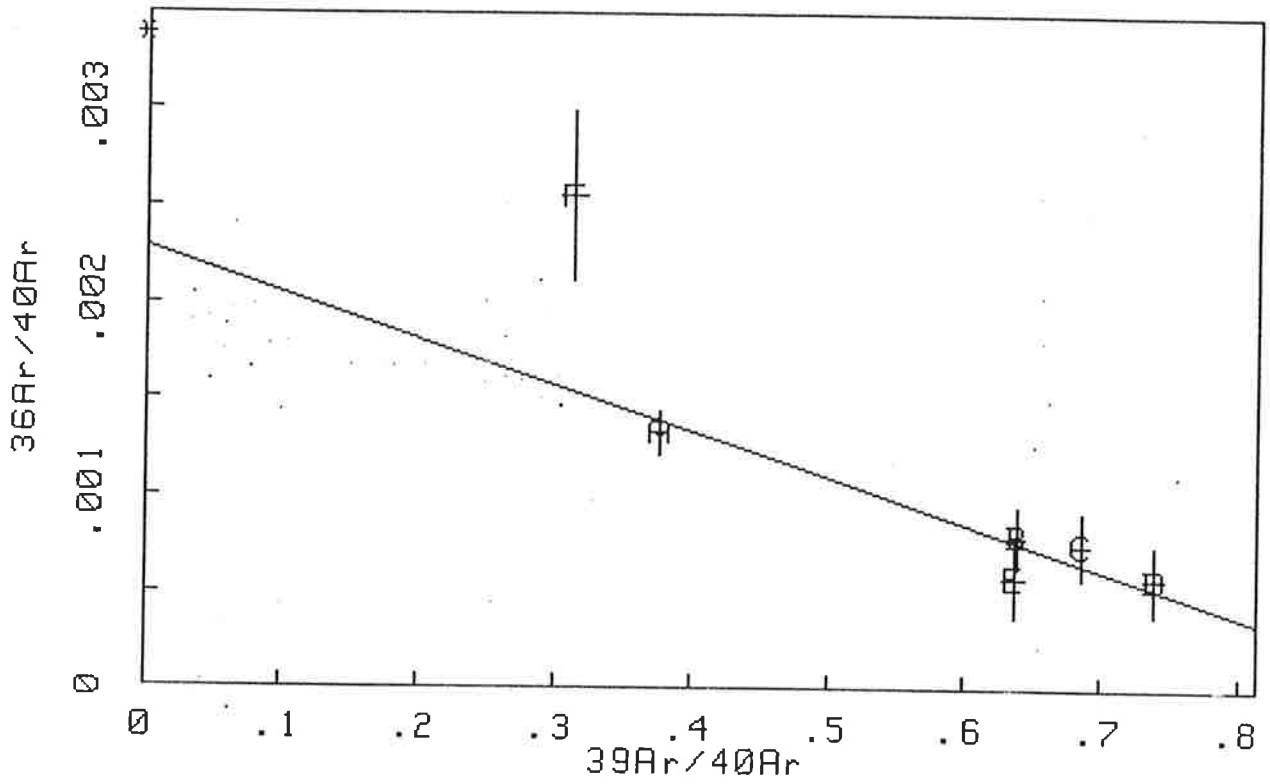
Precisions are 1 sigma, measured in Ma. Measured 40/36 atm = 287.9 ■.7
J = 0.001141 ■ 0.50% (intra-package) ■ 0.50% (inter-package)
Trap current factors- 40: 5.66 100: 0 200: 1
Manifold factors- ALL: 1 SPLIT 1: 3.3 SPLIT 2: 10.89 SPLIT 3: 35.937
EALL: 2 ESPLIT 1: 6.6 ESPLIT 2: 21.78
Sensitivity = 6.530E-18 % Reproducibility = .25 Detection limit = 40 counts
Data reduced assuming initial 40/36 = 295.50 ■ 0.00
Ca-factors: 3637=2.6E-04■1.7E-06 3837=3.2E-05■2.4E-07 3937=6.7E-04■3.7E-06
K-factors: 3739=0.0E+00■2.2E-03 3839=1.3E-02■2.4E-04 4039=5.7E-03■4.0E-03

v 1/10/95 #38 KD4 VR40-04 14:42:30 27 Aug 1998
Points EF deleted;
4 points regressed out of 6 includes 79.8 % of 39Ar
Mean X = .551E+00 Mean Y = .974E-03 Slope = -.200E-02 ä+Ç .470E-03
36/40 = .208E-02 ä+Ç .269E-03 39/40 = .104E+01 ä+Ç .120E+00
Fit parameters: SUMS = .097 MSWD = .048
40Ar/36Ar = 481.67 ä+Ç 62.52 F = .963 ä+Ç .112 AGE = 1.98 ä+Ç .23 Ma

Points AEF deleted;
3 points regressed out of 6 includes 70.2 % of 39Ar
Mean X = .685E+00 Mean Y = .709E-03 Slope = -.222E-02 ä+Ç .239E-02
36/40 = .223E-02 ä+Ç .164E-02 39/40 = .100E+01 ä+Ç .346E+00
Fit parameters: SUMS = .088 MSWD = .088
40Ar/36Ar = 448.5 ä+Ç 329.91 F = .996 ä+Ç .344 AGE = 2.05 ä+Ç .71 Ma

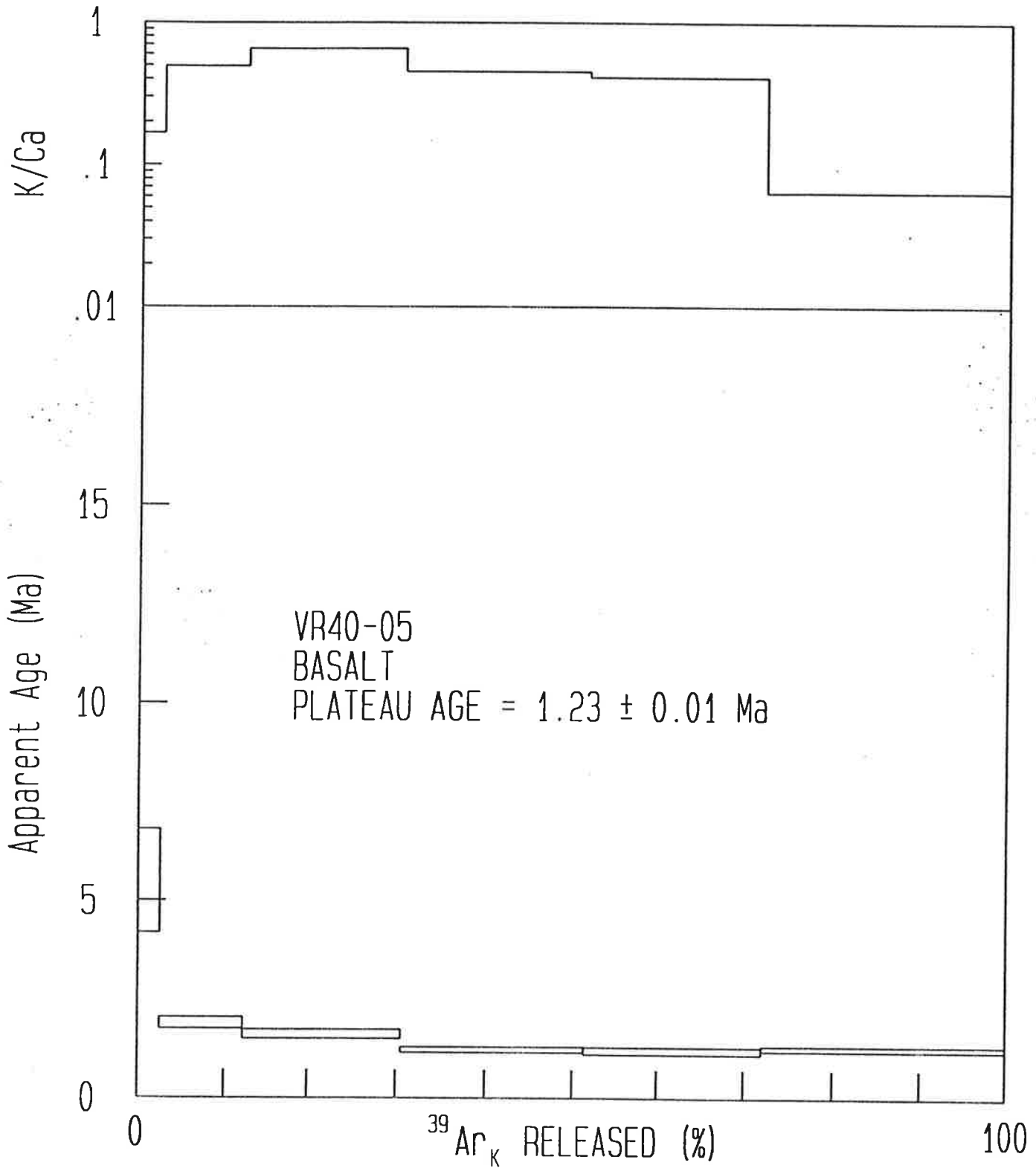
A	650C	WT X =	.15E+06	WT Y =	.82E+08	R =	.80E-01	Residual =	-.64E+00
B	750C	WT X =	.29E+05	WT Y =	.40E+08	R =	.37E-01	Residual =	-.12E+00
C	850C	WT X =	.22E+05	WT Y =	.35E+08	R =	.96E-02	Residual =	.24E+00
D	950C	WT X =	.19E+05	WT Y =	.32E+08	R =	.55E-02	Residual =	-.12E+00
E	1050C	WT X =	.14E+05	WT Y =	.25E+08	R =	.10E-01	Residual =	-.12E+01
F	1150C	WT X =	.12E+05	WT Y =	.52E+07	R =	.27E-01	Residual =	.23E+01

v 1/10/95, SAMPLE #38 KD4 VR40-04 14:42:05 27 Aug 1998



6 points regressed out of 6
Mean X = .556E+00 Mean Y = .965E-03 Slope = -.237E-02 ä+Ç .448E-03
36/40 = .228E-02 ä+Ç .258E-03 39/40 = .962E+00 ä+Ç .832E-01
Fit parameters: SUMS = 6.976 MSWD = 1.744
40Ar/36Ar = 437.85 ä+Ç 49.46 F = 1.039 ä+Ç .09 AGE = 2.14 ä+Ç .18 Ma

v 1/10/95 08:23:25 28 Aug 1998 #42 KD4 VR40-05



v 1/10/95

(40/36in = 295.5)

v 1/10/95 08:22:30 28 Aug 1998

#42 KD4 VR40-05

J = 0.001201 ■ 0.50% SAMPLE WT = 0.2504 g

TEMP C	Initial & radiogenic 40Ar	Potassium derived 39Ar	Chlorine derived 38Ar	Calcium derived 37Ar	Initial 36Ar	AGE* in Ma	**
650	4.579E-11	3.090E-13	6.903E-14	9.626E-13	1.523E-13	5.487 ■	.657
750	1.420E-11	1.182E-12	2.184E-14	1.246E-12	4.457E-14	1.894 ■	.072
850	1.723E-11	2.242E-12	2.403E-14	1.777E-12	5.268E-14	1.611 ■	.058
950	4.480E-12	2.537E-12	5.911E-15	2.913E-12	1.034E-14	1.217 ■	.034
1050	4.024E-12	2.524E-12	5.188E-15	3.171E-12	8.927E-15	1.189 ■	.044
1450	6.968E-12	3.418E-12	3.617E-14	2.755E-11	1.689E-14	1.252 ■	.030
TOTAL GAS	9.270E-11	1.221E-11	1.622E-13	3.762E-11	2.857E-13	1.47	

69.4% of gas on plateau, steps 950 through 1450 PLATEAU AGE = 1.226 + .012

Note: all gas quantities are in moles. No blank correction.

* Ages calculated assuming initial 40Ar/36Ar = 295.5 ■ 0

** 1-sigma precision estimates are for intra-sample reproducibility.

** 1-sigma precision estimates for plateaux are for intra-irradiation package reproducibility.

*** below detection limit

v 1/10/95 #42 KD4 VR40-05 08:22:26 28 Aug 1998

R A W D A T A

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP	MANIFOLD
						ä regression	CURRENT	OPTION
44763	650	3506303	23859	3469	31463	11990	200	EALL
	■	5526	46	14	56	16		
44764	750	1088123	91144	2279	40705	3529	200	EALL
	■	1273	25	4	24	10		
44765	850	1320604	172822	3434	58024	4177	200	EALL
	■	1263	50	27	47	15		
44766	950	344165	195602	2953	95068	873	200	EALL
	■	1206	56	11	186	10		
44767	1050	309226	194620	2904	103437	767	200	EALL
	■	1699	776	24	537	12		
44768	1450	535002	264731	6181	898033	1900	200	EALL
	■	1273	227	12	1055	12		

Raw counts and errors include blank corrections of:
40Ar = 6862 ■ 1146
36Ar = 59.7 ■ 9

C O R R E C T I O N S

TEMP	39Ar	37Ar	-----K-derived----			----Ca-derived----			Cl-der	Initial
|C	Decay	Decay	40Ar	38Ar	37Ar	39Ar	38Ar	36Ar	36Ar	38Ar
650	8	43693	134	317	0	50	2	19	0	2180
750	29	56578	514	1213	0	64	3	25	0	638
850	56	80727	975	2300	0	92	4	36	0	754
950	63	132386	1103	2603	0	150	7	59	0	148
1050	63	144173	1098	2590	0	163	8	64	0	128
1450	86	1252884	1486	3507	0	1420	67	557	0	242

All values in counts, corrected for mass discrimination

v 1/10/95 #42 KD4 VR40-05 08:22:27 28 Aug 1998

	TEMP C	% TOT 39Ar	RAD YIELD	APP K/Ca	APP K/Cl	F	AGE (Ma)	intra-sample	precision intra-package
A	650	2.5	1.7	.17	11	2.537	5.487 ■	.657	1.011
B	750	9.7	7.3	.49	131	.875	1.894 ■	.072	.094
C	850	18.4	9.7	.66	226	.744	1.611 ■	.058	.070
D	950	20.8	31.8	.45	1039	.562	1.217 ■	.034	.035
E	1050	20.7	34.4	.41	1177	.549	1.189 ■	.044	.045
F	1450	28.0	28.4	.06	229	.578	1.252 ■	.030	.032
Total gas				.4					

Precisions are 1 sigma, measured in Ma. Measured 40/36 atm = 287.9 ■.7
J = 0.001201 ■ 0.50% (intra-package) ■ 0.50% (inter-package)
Trap current factors- 40: 5.66 100: 0 200: 1
Manifold factors- ALL: 1 SPLIT 1: 3.3 SPLIT 2: 10.89 SPLIT 3: 35.937
EALL: 2 ESPLIT 1: 6.6 ESPLIT 2: 21.78
Sensitivity = 6.530E-18 % Reproducibility = .25 Detection limit = 40 counts
Data reduced assuming initial 40/36 = 295.50 ■ 0.00
Ca-factors: 3637=2.6E-04■1.7E-06 3837=3.2E-05■2.4E-07 3937=6.7E-04■3.7E-06
K-factors: 3739=0.0E+00■2.2E-03 3839=1.3E-02■2.4E-04 4039=5.7E-03■4.0E-03

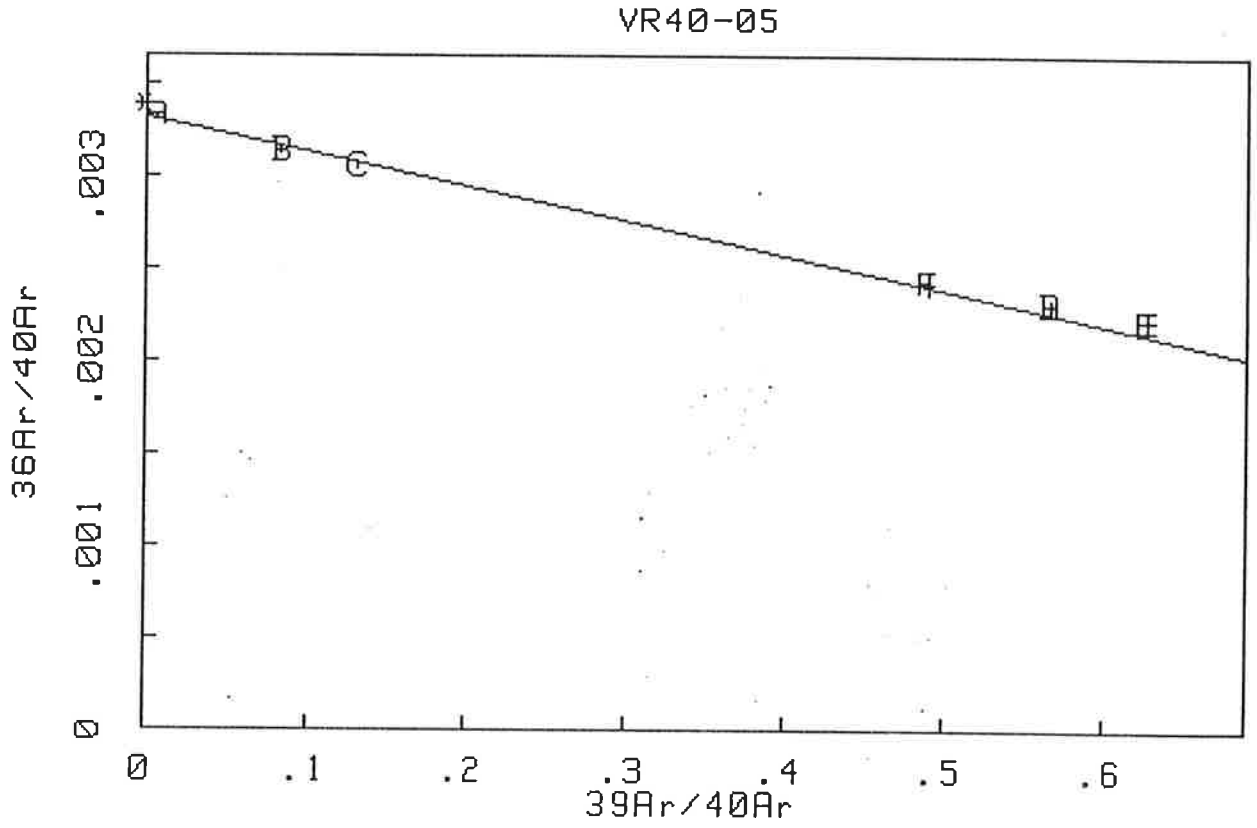
v 1/10/95 #42 KD4 VR40-05 08:24:58 28 Aug 1998
Points ABC deleted;
3 points regressed out of 6 includes 69.4 % of 39Ar
Mean X = .565E+00 Mean Y = .231E-02 Slope = -.151E-02 ä+Ç .575E-03
36/40 = .316E-02 ä+Ç .326E-03 39/40 = .210E+01 ä+Ç .584E+00
Fit parameters: SUMS = .002 MSWD = .002
40Ar/36Ar = 316.14 ä+Ç 32.56 F = .477 ä+Ç .133 AGE = 1.03 ä+Ç .29 Ma

Points AB deleted;
4 points regressed out of 6 includes 87.8 % of 39Ar
Mean X = .257E+00 Mean Y = .284E-02 Slope = -.171E-02 ä+Ç .698E-04
36/40 = .328E-02 ä+Ç .227E-04 39/40 = .192E+01 ä+Ç .681E-01
Fit parameters: SUMS = .128 MSWD = .064
40Ar/36Ar = 304.98 ä+Ç 2.11 F = .522 ä+Ç .019 AGE = 1.13 ä+Ç .04 Ma

Point A deleted;
5 points regressed out of 6 includes 97.5 % of 39Ar
Mean X = .155E+00 Mean Y = .301E-02 Slope = -.171E-02 ä+Ç .580E-04
36/40 = .328E-02 ä+Ç .127E-04 39/40 = .191E+01 ä+Ç .598E-01
Fit parameters: SUMS = .132 MSWD = .044
40Ar/36Ar = 304.88 ä+Ç 1.18 F = .523 ä+Ç .016 AGE = 1.13 ä+Ç .04 Ma

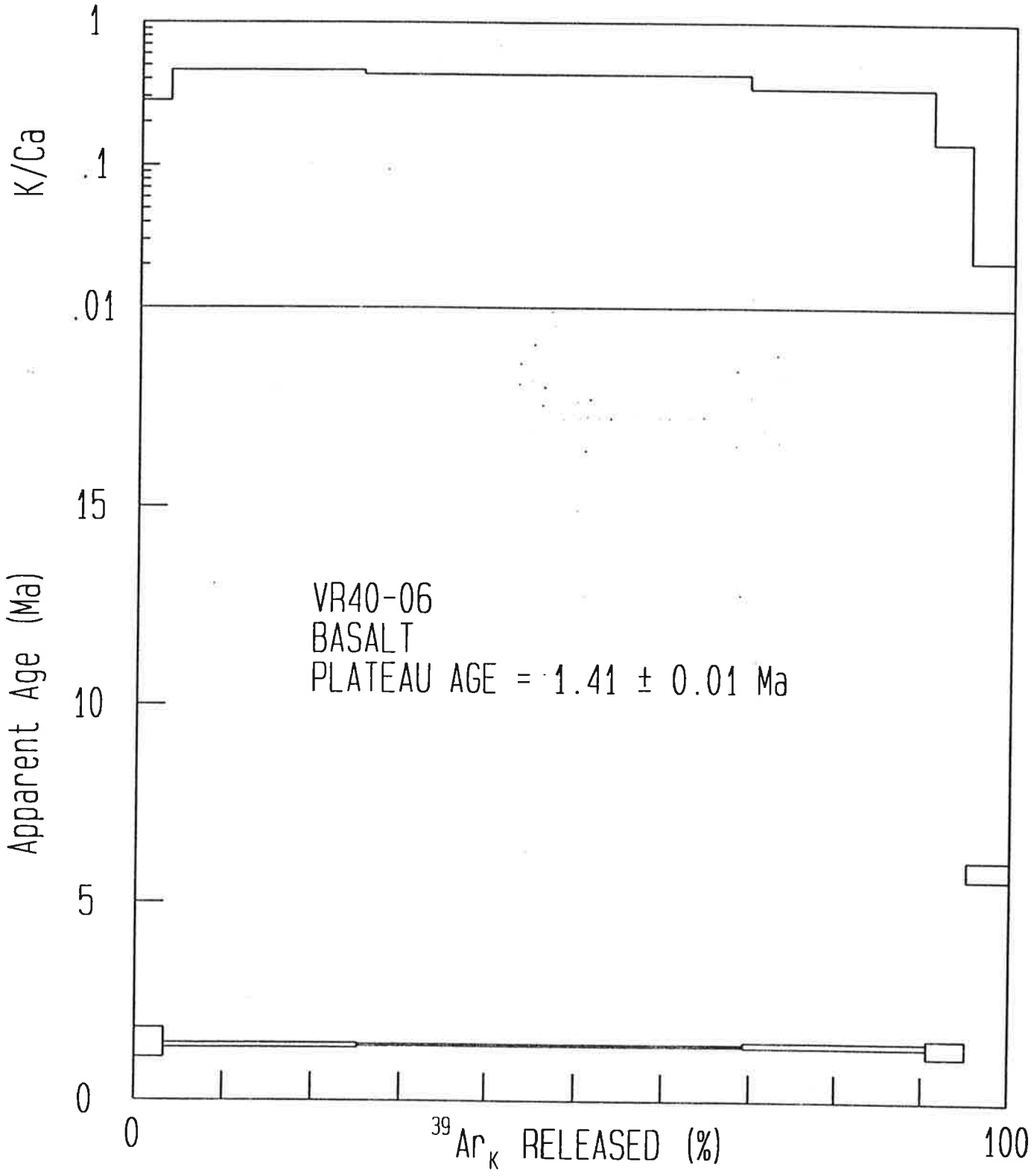
A	650C	WT X =	.88E+10	WT Y =	.21E+11	R =	.76E+00	Residual =	.84E+01
B	750C	WT X =	.10E+09	WT Y =	.75E+10	R =	.31E+00	Residual =	.31E-01
C	850C	WT X =	.40E+08	WT Y =	.37E+10	R =	.14E+00	Residual =	-.26E-01
D	950C	WT X =	.25E+06	WT Y =	.92E+09	R =	.24E+00	Residual =	-.46E-01
E	1050C	WT X =	.63E+05	WT Y =	.37E+09	R =	.20E+00	Residual =	.25E+00
F	1450C	WT X =	.58E+05	WT Y =	.31E+09	R =	.28E-01	Residual =	-.25E+00

v 1/10/95, SAMPLE #42 KD4 VR40-05 08:24:37 28 Aug 1998



6 points regressed out of 6
Mean X = .619E-01 Mean Y = .321E-02 Slope = -.186E-02 ä+Ç .463E-04
36/40 = .333E-02 ä+Ç .616E-05 39/40 = .179E+01 ã+Ç .431E-01
Fit parameters: SUMS = 16.698 MSWD = 4.174
40Ar/36Ar = 300.74 ä+Ç .56 F = .559 ä+Ç .013 AGE = 1.21 ä+Ç .03 Ma

v 1/10/95 09:44:33 28 Aug 1998 #50 KD4 VR40-06



v 1/10/95

(40/36in = 295.5)

v 1/10/95 09:43:29 28 Aug 1998
#50 KD4 VR40-06

J = 0.001204 ■ 0.50% SAMPLE WT = 0.2484 g

TEMP C	Initial & radiogenic 40Ar	Potassium derived 39Ar	Chlorine derived 38Ar	Calcium derived 37Ar	Initial 36Ar	AGE* in Ma	**
650	2.340E-12	4.012E-13	4.209E-15	7.393E-13	6.996E-15	1.472 ■	.185
750	2.600E-12	2.634E-12	1.193E-15	2.965E-12	3.036E-15	1.403 ■	.029
850	4.446E-12	5.294E-12	***	6.349E-12	3.405E-15	1.411 ■	.012
950	2.368E-12	2.559E-12	1.290E-15	3.834E-12	2.321E-15	1.428 ■	.034
1050	7.754E-13	5.254E-13	3.208E-15	1.881E-12	1.512E-15	1.358 ■	.112
1450	2.680E-12	6.024E-13	2.873E-14	1.474E-11	3.595E-15	5.822 ■	.123
TOTAL GAS	1.521E-11	1.202E-11	3.911E-14	3.050E-11	2.086E-14	1.63	

95.0% of gas on plateau, steps 650 through 1050 PLATEAU AGE = 1.411 + .009

Note: all gas quantities are in moles. No blank correction.
* Ages calculated assuming initial 40Ar/36Ar = 295.5 ■ 0
** 1-sigma precision estimates are for intra-sample reproducibility.
** 1-sigma precision estimates for plateaux are for intra-irradiation package reproducibility.
*** below detection limit

v 1/10/95 #50 KD4 VR40-06 09:43:25 28 Aug 1998

R A W D A T A

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar ä regression	TRAP CURRENT	MANIFOLD OPTION
44839	650	179310	30949	644	21066	565	200	EALL
	■	373	29	9	14	9		
44840	750	200202	203044	2793	84429	300	200	EALL
	■	309	44	6	186	9		
44841	850	342702	408127	5506	180710	399	200	EALL
	■	638	930	37	165	7		
44842	950	182452	197321	2735	109054	262	200	EALL
	■	367	132	20	62	11		
44843	1050	59597	40576	778	53470	158	200	EALL
	■	239	29	5	75	7		
44844	1450	205445	47169	2838	418775	589	200	EALL
	■	253	30	6	840	9		

Raw counts and errors include blank corrections of:
40Ar = 3618 ■ 230
36Ar = 33.7 ■ 6.8

C O R R E C T I O N S

TEMP C	39Ar Decay	37Ar Decay	-----K-derived---- 40Ar	38Ar	37Ar	----Ca-derived---- 39Ar	38Ar	36Ar	Cl-der 36Ar	Initial 38Ar
650	12	36657	175	412	0	38	2	15	0	100
750	76	147041	1145	2702	0	153	7	60	0	43
850	153	314988	2302	5431	0	327	15	128	0	49
950	74	190252	1113	2625	0	198	9	77	0	33
1050	15	93361	229	539	0	97	5	38	0	22
1450	18	731809	262	618	0	759	36	298	0	51

All values in counts, corrected for mass discrimination

v 1/10/95 #50 KD4 VR40-06 09:43:26 28 Aug 1998

	TEMP C	% TOT 39Ar	RAD YIELD	APP K/Ca	APP K/Cl	F	AGE (Ma)	intra-sample	precision intra-package
A	650	3.3	11.6	.28	231	.678	1.472 ■	.185	.187
B	750	21.9	65.5	.46	5344	.646	1.403 ■	.029	.030
C	850	44.1	77.4	.43	26477	.650	1.411 ■	.012	.014
D	950	21.3	71.0	.35	4800	.658	1.428 ■	.034	.035
E	1050	4.4	42.4	.15	396	.625	1.358 ■	.112	.113
F	1450	5.0	60.4	.02	51	2.685	5.822 ■	.123	.127
Total gas				.4					

Precisions are 1 sigma, measured in Ma. Measured 40/36 atm = 287.9 ■.7
J = 0.001204 ■ 0.50% (intra-package) ■ 0.50% (inter-package)
Trap current factors- 40: 5.66 100: 0 200: 1
Manifold factors- ALL: 1 SPLIT 1: 3.3 SPLIT 2: 10.89 SPLIT 3: 35.937
EALL: 2 ESPLIT 1: 6.6 ESPLIT 2: 21.78
Sensitivity = 6.530E-18 % Reproducibility = .25 Detection limit = 40 counts
Data reduced assuming initial 40/36 = 295.50 ■ 0.00
Ca-factors: 3637=2.6E-04■1.7E-06 3837=3.2E-05■2.4E-07 3937=6.7E-04■3.7E-06
K-factors: 3739=0.0E+00■2.2E-03 3839=1.3E-02■2.4E-04 4039=5.7E-03■4.0E-03

v 1/10/95 #50 KD4 VR40-06 09:47:31 28 Aug 1998
Points AEF deleted;
3 points regressed out of 6 includes 87.3 % of 39Ar
Mean X = .109E+01 Mean Y = .977E-03 Slope = -.225E-02 ä+Ç .551E-03
36/40 = .343E-02 ä+Ç .604E-03 39/40 = .153E+01 ä+Ç .108E+00
Fit parameters: SUMS = .117 MSWD = .117
40Ar/36Ar = 291.19 ä+Ç 51.22 F = .654 ä+Ç .046 AGE = 1.42 ä+Ç .1 Ma

Points EF deleted;
4 points regressed out of 6 includes 90.6 % of 39Ar
Mean X = .695E+00 Mean Y = .185E-02 Slope = -.218E-02 ä+Ç .706E-04
36/40 = .337E-02 ä+Ç .589E-04 39/40 = .154E+01 ä+Ç .312E-01
Fit parameters: SUMS = .13 MSWD = .065
40Ar/36Ar = 297.12 ä+Ç 5.2 F = .649 ä+Ç .013 AGE = 1.41 ä+Ç .03 Ma

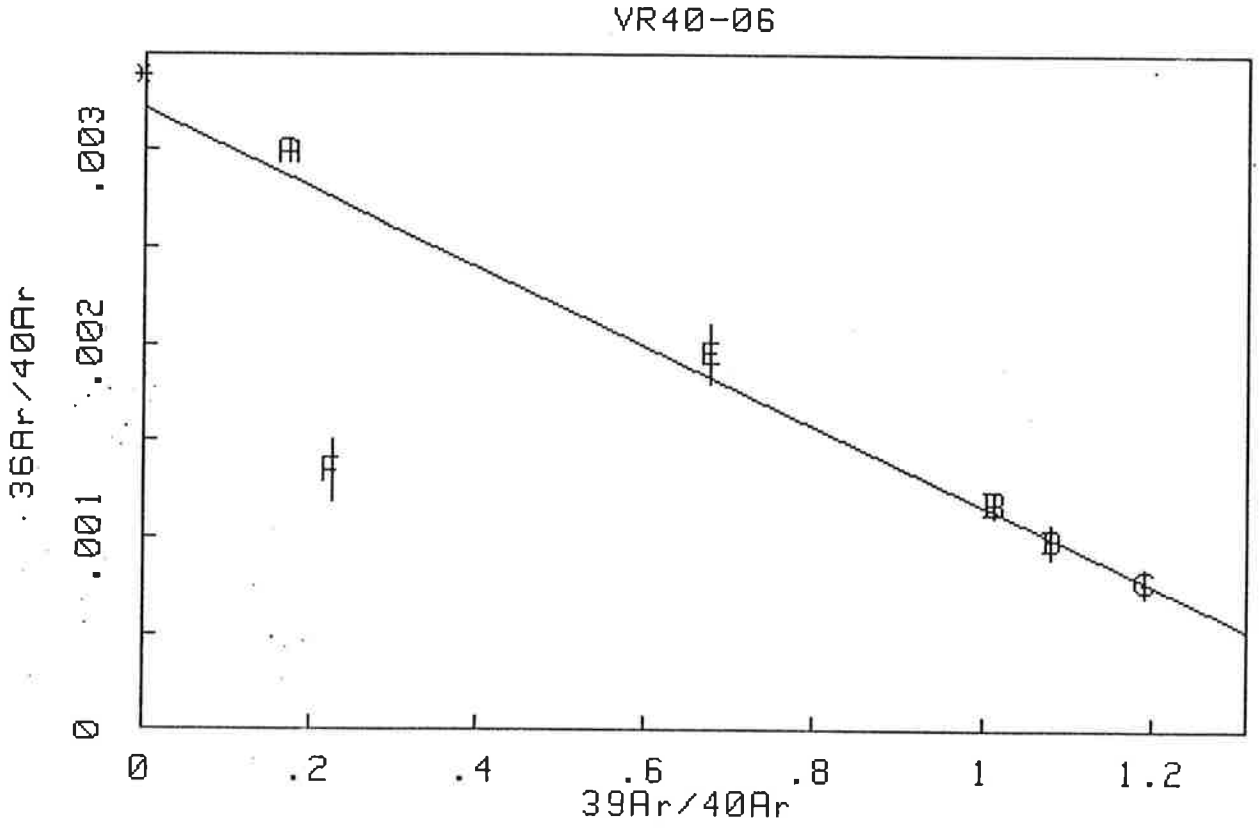
Point F deleted;
5 points regressed out of 6 includes 95 % of 39Ar
Mean X = .694E+00 Mean Y = .185E-02 Slope = -.218E-02 ä+Ç .706E-04
36/40 = .337E-02 ä+Ç .584E-04 39/40 = .154E+01 ä+Ç .311E-01
Fit parameters: SUMS = .304 MSWD = .101
40Ar/36Ar = 296.85 ä+Ç 5.15 F = .648 ä+Ç .013 AGE = 1.41 ä+Ç .03 Ma

Points AF deleted;
4 points regressed out of 6 includes 91.6 % of 39Ar
Mean X = .106E+01 Mean Y = .105E-02 Slope = -.231E-02 ä+Ç .310E-03
36/40 = .350E-02 ä+Ç .332E-03 39/40 = .152E+01 ä+Ç .638E-01
Fit parameters: SUMS = .135 MSWD = .068
40Ar/36Ar = 285.49 ä+Ç 27.03 F = .659 ä+Ç .028 AGE = 1.43 ä+Ç .06 Ma

Point A deleted;
5 points regressed out of 6 includes 96.7 % of 39Ar
Mean X = .101E+01 Mean Y = .107E-02 Slope = -.895E-03 ä+Ç .163E-03
36/40 = .197E-02 ä+Ç .169E-03 39/40 = .220E+01 ä+Ç .227E+00
Fit parameters: SUMS = 29.233 MSWD = 9.744
40Ar/36Ar = 507.3 ä+Ç 43.47 F = .454 ä+Ç .047 AGE = .99 ä+Ç .1 Ma

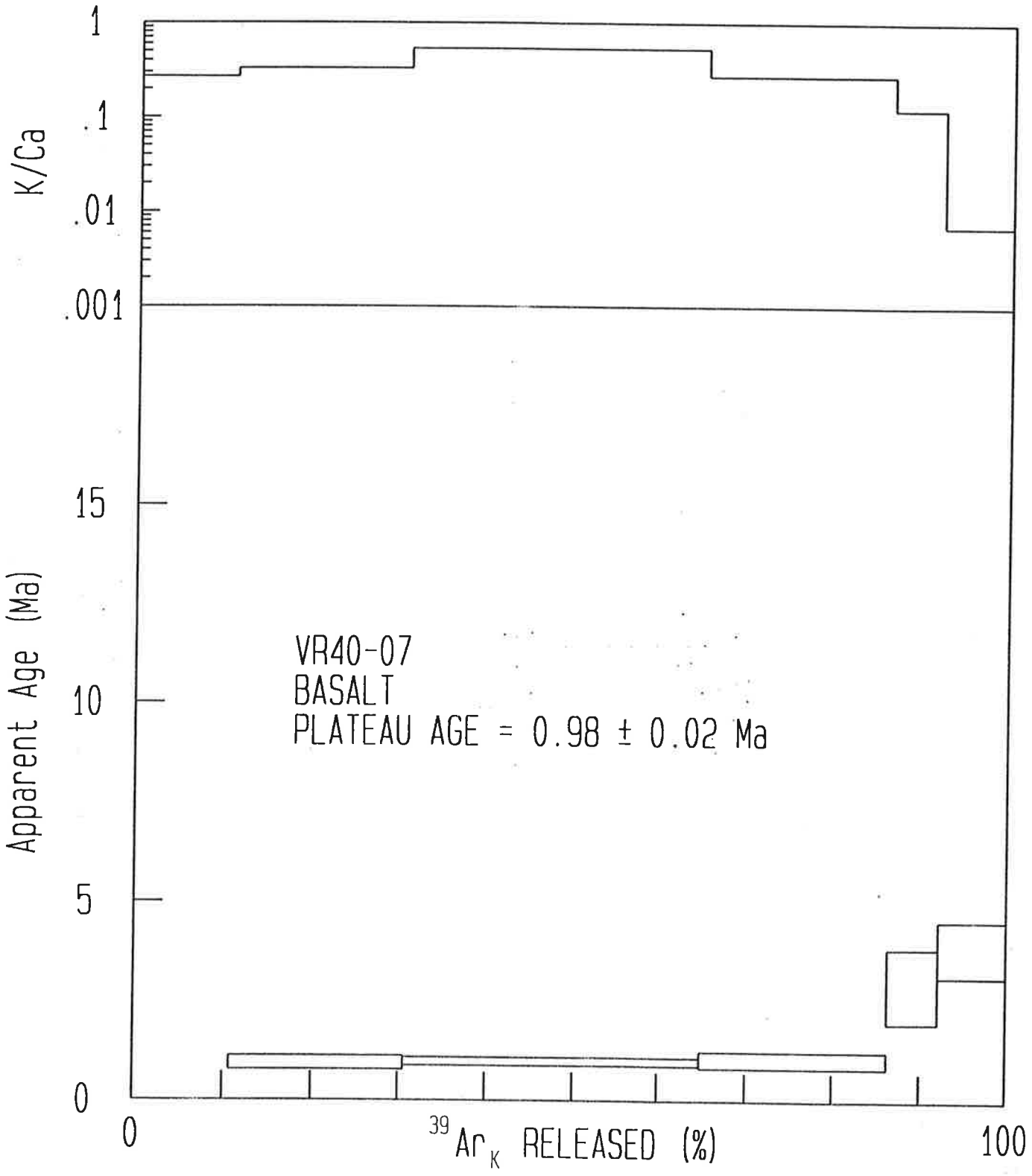
A	650C	WT X =	.79E+07	WT Y =	.41E+09	R =	.13E+00	Residual =	.24E+02
B	750C	WT X =	.39E+06	WT Y =	.22E+09	R =	.26E-01	Residual =	.15E+01
C	850C	WT X =	.13E+06	WT Y =	.20E+09	R =	.16E-01	Residual =	-.20E+01
D	950C	WT X =	.81E+05	WT Y =	.12E+09	R =	.13E-01	Residual =	-.27E+00
E	1050C	WT X =	.51E+05	WT Y =	.45E+08	R =	.32E-01	Residual =	.39E+01
F	1450C	WT X =	.50E+05	WT Y =	.41E+08	R =	.66E-03	Residual =	-.28E+01

v 1/10/95, SAMPLE #50 KD4 VR40-06 09:47:02 28 Aug 1998



6 points regressed out of 6
Mean X = .675E+00 Mean Y = .183E-02 Slope = -.205E-02 ä+Ç .691E-04
36/40 = .322E-02 ä+Ç .561E-04 39/40 = .157E+01 ä+Ç .342E-01
Fit parameters: SUMS = 89.984 MSWD = 22.496
40Ar/36Ar = 311.01 ä+Ç 5.43 F = .637 ä+Ç .014 AGE = 1.38 ä+Ç .03 Ma

v 1/10/95 08:31:15 28 Aug 1998 #58 KD4 VR40-07



v 1/10/95

(40/36in = 295.5)

v 1/10/95 08:30:12 28 Aug 1998

#58 KD4 VR40-07

J = 0.001265 ■ 0.50% SAMPLE WT = 0.2510 g

TEMP C	Initial & radiogenic 40Ar	Potassium derived 39Ar	Chlorine derived 38Ar	Calcium derived 37Ar	Initial 36Ar	AGE* in Ma	**
650	2.186E-12	7.927E-13	3.238E-14	1.523E-12	1.242E-14	-4.278 ■	.300
750	1.292E-12	1.463E-12	2.155E-14	2.310E-12	2.329E-15	.941 ■	.085
850	2.066E-12	2.519E-12	1.138E-14	2.462E-12	3.348E-15	.975 ■	.051
950	1.937E-12	1.587E-12	1.641E-14	3.000E-12	4.134E-15	1.029 ■	.103
1050	1.238E-12	4.355E-13	2.525E-14	1.856E-12	2.320E-15	2.895 ■	.467
1450	5.775E-12	5.773E-13	1.764E-13	4.276E-11	1.627E-14	3.819 ■	.349
TOTAL GAS	1.449E-11	7.374E-12	2.834E-13	5.392E-11	4.082E-14	.75	

75.5% of gas on plateau, steps 750 through 950 PLATEAU AGE = .976 + .021

Note: all gas quantities are in moles. No blank correction.
* Ages calculated assuming initial 40Ar/36Ar = 295.5 ■ 0
** 1-sigma precision estimates are for intra-sample reproducibility.
** 1-sigma precision estimates for plateaux are for intra-irradiation package reproducibility.
*** below detection limit

v 1/10/95

v 1/10/95 #58 KD4 VR40-07 08:30:09 28 Aug 1998

R A W D A T A

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar ä regression	TRAP CURRENT	MANIFOLD OPTION
44777	650	167736	61148	3159	48496	1008	200	EALL
	■	1016	9	34	107	27		
44778	750	99558	112856	3164	73540	231	200	EALL
	■	1011	15	31	138	14		
44779	850	159284	194192	3459	78325	314	200	EALL
	■	1040	117	25	96	15		
44780	950	149003	122381	2869	95402	387	200	EALL
	■	1003	109	33	57	19		
44781	1050	95004	33643	2382	58996	221	200	EALL
	■	1004	113	24	302	23		
44782	1450	442434	46689	14153	1358273	2167	200	EALL
	■	1248	407	14	1211	23		

Raw counts and errors include blank corrections of:
40Ar = 7745 ■ 1003
36Ar = 79 ■ 12.5

C O R R E C T I O N S

TEMP C	39Ar Decay	37Ar Decay	-----K-derived---- 40Ar	38Ar	37Ar	----Ca-derived---- 39Ar	38Ar	36Ar	Cl-der 36Ar	Initial 38Ar
650	20	70392	345	813	0	78	4	31	0	178
750	37	106841	636	1501	0	119	6	47	0	33
850	65	113895	1096	2585	0	127	6	50	0	48
950	41	138855	690	1628	0	155	7	61	0	59
1050	11	85945	189	447	0	96	5	38	0	33
1450	16	1980509	251	592	0	2204	104	864	1	233

All values in counts, corrected for mass discrimination

v 1/10/95 #58 KD4 VR40-07 08:30:10 28 Aug 1998

	TEMP C	% TOT 39Ar	RAD YIELD	APP K/Ca	APP K/Cl	F	AGE (Ma)	intra-sample	precision intra-package
A	650	10.7	-67.9	.27	59	-1.873	-4.278 ■	.300	.302
B	750	19.8	46.7	.33	164	.412	.941 ■	.085	.085
C	850	34.2	52.1	.53	535	.427	.975 ■	.051	.051
D	950	21.5	36.9	.27	234	.451	1.029 ■	.103	.103
E	1050	5.9	44.6	.12	42	1.270	2.895 ■	.467	.467
F	1450	7.8	16.7	.01	8	1.675	3.819 ■	.349	.354
Total gas				.3					

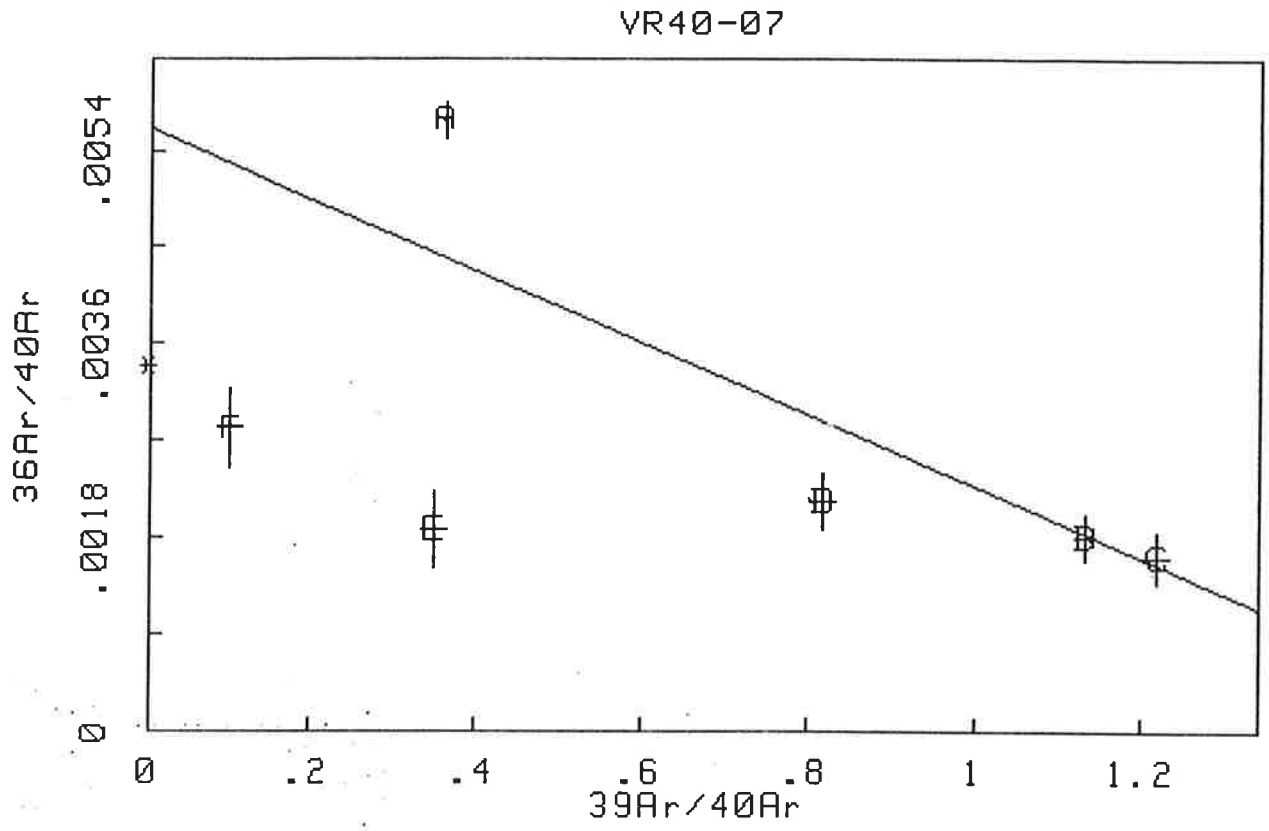
Precisions are 1 sigma, measured in Ma. Measured 40/36 atm = 287.9 ■.7
J = 0.001265 ■ 0.50% (intra-package) ■ 0.50% (inter-package)
Trap current factors- 40: 5.66 100: 0 200: 1
Manifold factors- ALL: 1 SPLIT 1: 3.3 SPLIT 2: 10.89 SPLIT 3: 35.937
EALL: 2 ESPLIT 1: 6.6 ESPLIT 2: 21.78
Sensitivity = 6.530E-18 % Reproducibility = .25 Detection limit = 40 counts
Data reduced assuming initial 40/36 = 295.50 ■ 0.00
Ca-factors: 3637=2.6E-04■1.7E-06 3837=3.2E-05■2.4E-07 3937=6.7E-04■3.7E-06
K-factors: 3739=0.0E+00■2.2E-03 3839=1.3E-02■2.4E-04 4039=5.7E-03■4.0E 03

v 1/10/95 #58 KD4 VR40-07 08:33:04 28 Aug 1998
Points AEF deleted;
3 points regressed out of 6 includes 75.5 % of 39Ar
Mean X = .108E+01 Mean Y = .183E-02 Slope = -.123E-02 ä+Ç .850E-03
36/40 = .315E-02 ä+Ç .928E-03 39/40 = .257E+01 ä+Ç .104E+01
Fit parameters: SUMS = .061 MSWD = .061
40Ar/36Ar = 317.36 ä+Ç 93.43 F = .389 ä+Ç .158 AGE = .89 ä+Ç .36 Ma

Points ADEF deleted;
2 points regressed out of 6 includes 54 % of 39Ar
Mean X = .117E+01 Mean Y = .172E-02 Slope = -.211E-02 ä+Ç .371E-02
36/40 = .419E-02 ä+Ç .436E-02 39/40 = .199E+01 ä+Ç .144E+01
40Ar/36Ar = 238.59 ä+Ç 248 F = .503 ä+Ç .364 AGE = 1.15 ä+Ç .83 Ma

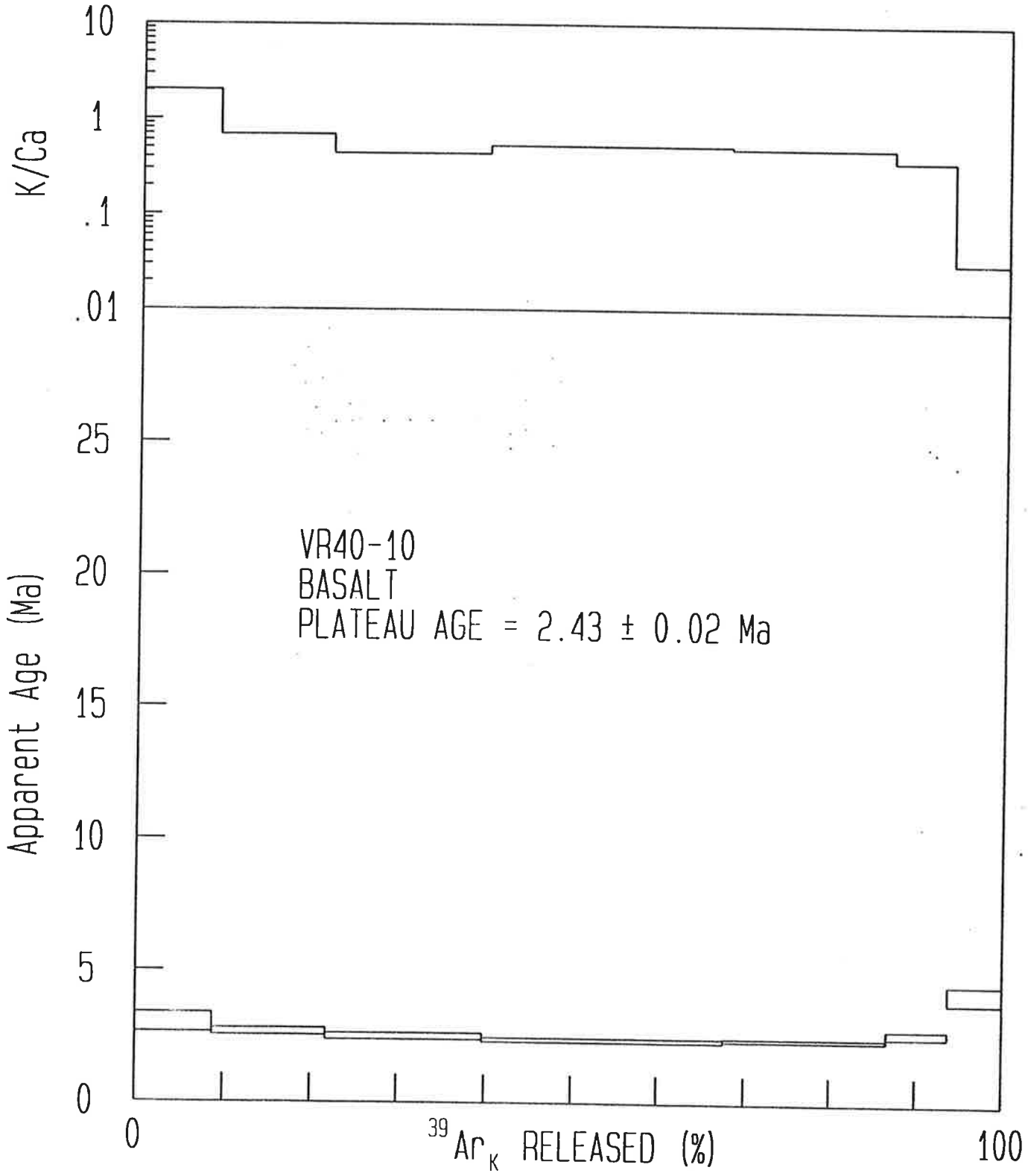
A	650C	WT X =	.21E+06	WT Y =	.37E+08	R =	.21E+00	Residual =	.14E+02
B	750C	WT X =	.72E+04	WT Y =	.22E+08	R =	.83E-01	Residual =	-.40E-14
C	850C	WT X =	.49E+04	WT Y =	.18E+08	R =	.25E-01	Residual =	.00E+00
D	950C	WT X =	.43E+04	WT Y =	.14E+08	R =	.20E-01	Residual =	-.12E+01
E	1050C	WT X =	.40E+04	WT Y =	.78E+07	R =	.13E 01	Residual =	-.44E+01
F	1450C	WT X =	.40E+04	WT Y =	.76E+07	R =	.39E-03	Residual =	-.32E+01

v 1/10/95, SAMPLE #58 KD4 VR40-07 08:32:41 28 Aug 1998



6 points regressed out of 6
Mean X = .700E+00 Mean Y = .327E-02 Slope = -.332E-02 ä+Ç .246E-03
36/40 = .559E-02 ä+Ç .198E-03 39/40 = .169E+01 ä+Ç .837E-01
Fit parameters: SUMS = 163.129 MSWD = 40.782
40Ar/36Ar = 178.83 ä+Ç 6.35 F = .593 ä+Ç .029 AGE = 1.35 ä+Ç .07 Ma

v 1/10/95 07:55:43 28 Aug 1998 #98 KD4 VR40-10



v 1/10/95

(40/36in = 295.5)

v 1/10/95 07:53:24 28 Aug 1998

#98 KD4 VR40-10

J = 0.001279 ■ 0.50% SAMPLE WT = 0.2512 g

TEMP C	Initial & radiogenic 40Ar	Potassium derived 39Ar	Chlorine derived 38Ar	Calcium derived 37Ar	Initial 36Ar	AGE* in Ma	**
550	1.717E-11	1.041E-12	8.512E-14	2.663E-13	5.347E-14	3.028 ■	.183
650	1.115E-11	1.552E-12	7.829E-14	1.174E-12	3.161E-14	2.682 ■	.065
750	7.528E-12	2.131E-12	2.524E-14	2.528E-12	1.763E-14	2.508 ■	.063
850	7.657E-12	3.322E-12	1.136E-14	3.248E-12	1.429E-14	2.383 ■	.038
950	5.595E-12	2.264E-12	9.311E-15	2.351E-12	1.086E-14	2.430 ■	.027
1050	6.917E-12	8.473E-13	1.418E-14	1.182E-12	2.007E-14	2.681 ■	.072
1450	1.095E-11	7.381E-13	3.437E-14	1.224E-11	3.252E-14	4.186 ■	.175
TOTAL GAS	6.696E-11	1.190E-11	2.579E-13	2.298E-11	1.805E-13	2.64	

64.9% of gas on plateau, steps 750 through 950 PLATEAU AGE = 2.425 + .016

Note: all gas quantities are in moles. No blank correction.
* Ages calculated assuming initial 40Ar/36Ar = 295.5 ■ 0
** 1-sigma precision estimates are for intra-sample reproducibility.
** 1-sigma precision estimates for plateaux are for intra-irradiation package reproducibility.
*** below detection limit

v 1/10/95 #98 KD4 VR40-10 07:53:21 28 Aug 1998

R A W D A T A

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar ä regression	TRAP CURRENT	MANIFOLD OPTION
44735	550	1314983	80249	6910	9001	4208	200	EALL
	■	1408	138	20	25	21		
44736	650	854078	119613	7230	39656	2509	200	EALL
	■	1431	70	22	46	11		
44737	750	577311	164306	3923	85370	1438	200	EALL
	■	1469	299	25	33	15		
44738	850	587724	256079	4134	109654	1191	200	EALL
	■	1321	86	6	130	14		
44739	950	429408	174580	2924	79323	902	200	EALL
	■	1017	51	9	28	6		
44740	1050	530017	65336	1692	39876	1602	200	EALL
	■	1015	13	7	69	6		
44741	1450	838771	57500	2992	412588	2810	200	EALL
	■	1324	74	10	723	14		

Raw counts and errors include blank corrections of:
40Ar = 6918 ■ 961
36Ar = 50 ■ 5.6

C O R R E C T I O N S

TEMP |C	39Ar Decay	37Ar Decay	-----K-derived---- 40Ar	38Ar	37Ar	----Ca-derived---- 39Ar	38Ar	36Ar	Cl-der 36Ar	Initial 38Ar
550	25	11793	453	1069	0	14	1	5	1	765
650	37	51995	675	1592	0	60	3	24	0	452
750	51	112002	927	2186	0	130	6	51	0	252
850	79	143953	1445	3408	0	167	8	66	0	205
950	54	104200	985	2323	0	121	6	48	0	155
1050	20	52416	368	869	0	61	3	24	0	287
1450	18	542677	321	757	0	630	30	247	0	465

All values in counts, corrected for mass discrimination

v 1/10/95 #98 KD4 VR40-10 07:53:22 28 Aug 1998

	TEMP C	% TOT 39Ar	RAD YIELD	APP K/Ca	APP K/Cl	F	AGE (Ma)	intra-sample	precision intra-package
A	550	8.8	8.0	2.03	30	1.313	3.028 ■	.183	.203
B	650	13.0	16.2	.69	48	1.163	2.682 ■	.065	.075
C	750	17.9	30.8	.44	204	1.088	2.508 ■	.063	.066
D	850	27.9	44.8	.53	708	1.033	2.383 ■	.038	.041
E	950	19.0	42.7	.50	589	1.054	2.430 ■	.027	.031
F	1050	7.1	14.2	.37	145	1.163	2.681 ■	.072	.084
G	1450	6.2	12.2	.03	52	1.816	4.186 ■	.175	.193
Total gas				.6					

Precisions are 1 sigma, measured in Ma. Measured 40/36 atm = 287.9 ■.7
J = 0.001279 ■ 0.50% (intra-package) ■ 0.50% (inter-package)
Trap current factors- 40: 5.66 100: 0 200: 1
Manifold factors- ALL: 1 SPLIT 1: 3.3 SPLIT 2: 10.89 SPLIT 3: 35.937
EALL: 2 ESPLIT 1: 6.6 ESPLIT 2: 21.78
Sensitivity = 6.530E-18 % Reproducibility = .25 Detection limit = 40 counts
Data reduced assuming initial 40/36 = 295.50 ■ 0.00
Ca-factors: 3637=2.6E-04■1.7E-06 3837=3.2E-05■2.4E-07 3937=6.7E-04■3.7E-06
K-factors: 3739=0.0E+00■2.2E-03 3839=1.3E-02■2.4E-04 4039=5.7E-03■4.0E-03

v 1/10/95 #98 KD4 VR40-10 07:58:42 28 Aug 1998
Points AG deleted;
5 points regressed out of 7 includes 85 % of 39Ar
Mean X = .231E+00 Mean Y = .253E-02 Slope = -.334E-02 ä+Ç .121E-03
36/40 = .330E-02 ä+Ç .315E-04 39/40 = .987E+00 ä+Ç .278E-01
Fit parameters: SUMS = .389 MSWD = .13
40Ar/36Ar = 302.93 ä+Ç 2.89 F = 1.013 ä+Ç .028 AGE = 2.34 ä+Ç .07 Ma

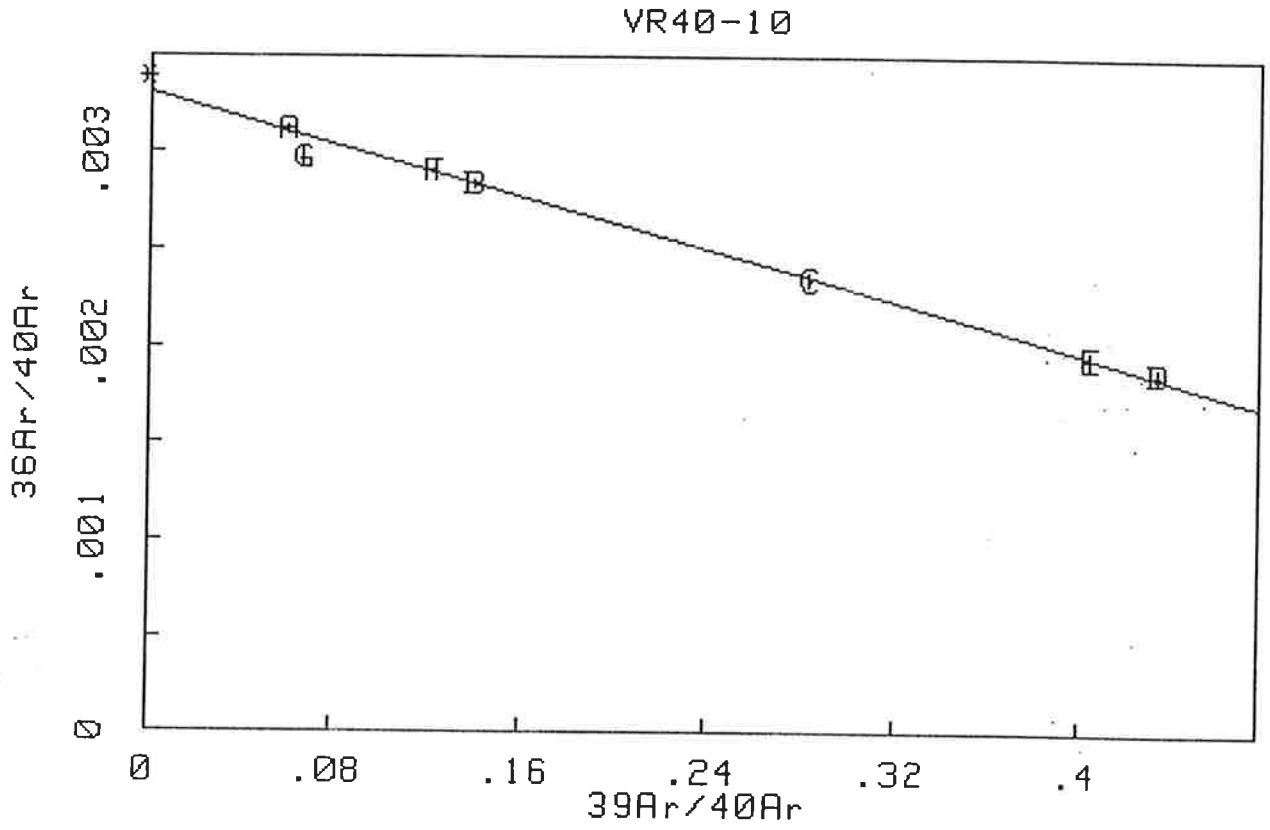
Point G deleted;
6 points regressed out of 7 includes 93.8 % of 39Ar
Mean X = .156E+00 Mean Y = .279E-02 Slope = -.339E-02 ä+Ç .881E-04
36/40 = .332E-02 ä+Ç .175E-04 39/40 = .979E+00 ä+Ç .216E-01
Fit parameters: SUMS = .68 MSWD = .17
40Ar/36Ar = 301.64 ä+Ç 1.59 F = 1.022 ä+Ç .023 AGE = 2.36 ä+Ç .05 Ma

Points FG deleted;
5 points regressed out of 7 includes 86.7 % of 39Ar
Mean X = .158E+00 Mean Y = .278E-02 Slope = -.339E-02 ä+Ç .883E-04
36/40 = .332E-02 ä+Ç .178E-04 39/40 = .979E+00 ä+Ç .216E-01
Fit parameters: SUMS = .678 MSWD = .226
40Ar/36Ar = 301.65 ä+Ç 1.62 F = 1.022 ä+Ç .023 AGE = 2.36 ä+Ç .05 Ma

Point A deleted;
6 points regressed out of 7 includes 91.2 % of 39Ar
Mean X = .217E+00 Mean Y = .257E-02 Slope = -.326E-02 ä+Ç .113E-03
36/40 = .327E-02 ä+Ç .281E-04 39/40 = .101E+01 ä+Ç .276E-01
Fit parameters: SUMS = 4.235 MSWD = 1.059
40Ar/36Ar = 305.48 ä+Ç 2.62 F = .995 ä+Ç .027 AGE = 2.29 ä+Ç .06 Ma

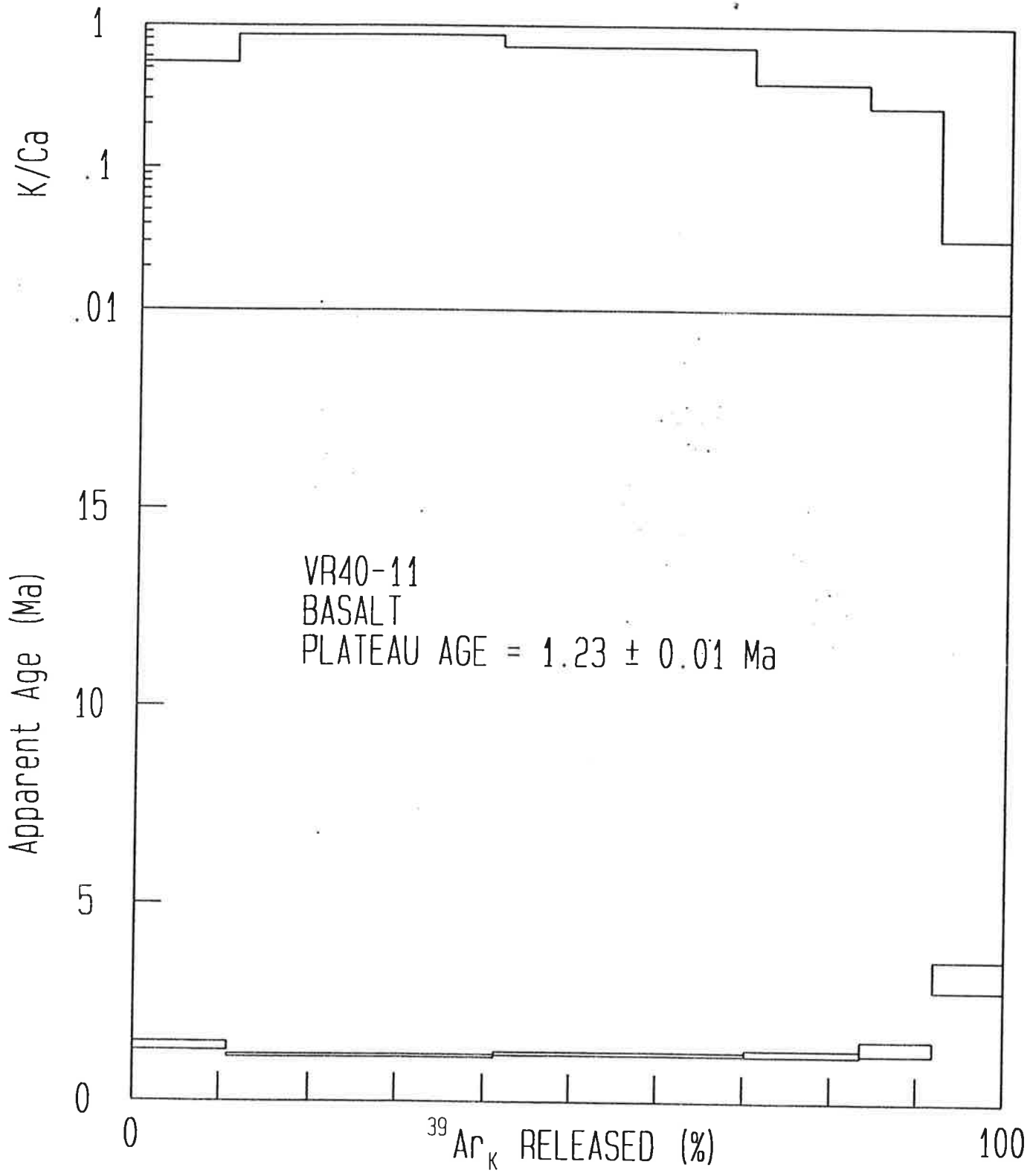
A	550C	WT X =	.24E+09	WT Y =	.38E+10	R =	.21E+00	Residual =	.24E+01
B	650C	WT X =	.17E+08	WT Y =	.23E+10	R =	.22E+00	Residual =	.76E+00
C	750C	WT X =	.17E+07	WT Y =	.94E+09	R =	.17E+00	Residual =	-.30E+00
D	850C	WT X =	.65E+06	WT Y =	.62E+09	R =	.82E-01	Residual =	.15E+00
E	950C	WT X =	.41E+06	WT Y =	.54E+09	R =	.65E-01	Residual =	-.35E+00
F	1050C	WT X =	.40E+06	WT Y =	.50E+09	R =	.18E-01	Residual =	.61E+00
G	1450C	WT X =	.40E+06	WT Y =	.44E+09	R =	.66E-02	Residual =	-.17E+01

v 1/10/95, SAMPLE #98 KD4 VR40-10 07:57:19 28 Aug 1998



7 points regressed out of 7
Mean X = .152E+00 Mean Y = .280E-02 Slope = -.336E-02 ä+Ç .870E-04
36/40 = .330E-02 ä+Ç .169E-04 39/40 = .985E+00 ä+Ç .218E-01
Fit parameters: SUMS = 6.16 MSWD = 1.232
40Ar/36Ar = 302.59 ä+Ç 1.55 F = 1.015 ä+Ç .023 AGE = 2.34 ä+Ç .05 Ma

v 1/10/95 08:14:02 28 Aug 1998 #106 KD4 VR40-11



v 1/10/95

(40/36in = 295.5)

v 1/10/95 08:06:21 28 Aug 1998

#106 KD4 VR40-11

J = 0.001279 ■ 0.50% SAMPLE WT = 0.2499 g

TEMP C	Initial & radiogenic 40Ar	Potassium derived 39Ar	Chlorine derived 38Ar	Calcium derived 37Ar	Initial 36Ar	AGE* in Ma	**
650	5.472E-12	1.724E-12	1.942E-14	1.631E-12	1.500E-14	1.392 ■	.052
750	5.025E-12	4.765E-12	8.345E-15	2.882E-12	8.925E-15	1.156 ■	.019
850	7.600E-12	4.561E-12	8.644E-15	3.344E-12	1.759E-14	1.214 ■	.021
950	4.527E-12	2.109E-12	8.768E-15	2.755E-12	1.147E-14	1.243 ■	.040
1050	6.254E-12	1.308E-12	1.518E-14	2.509E-12	1.851E-14	1.384 ■	.089
1450	4.028E-11	1.278E-12	8.914E-14	2.105E-11	1.303E-13	3.209 ■	.194
TOTAL GAS	6.915E-11	1.574E-11	1.495E-13	3.417E-11	2.018E-13	1.40	

50.7% of gas on plateau, steps 850 through 1050 PLATEAU AGE = 1.227 + .011

Note: all gas quantities are in moles. No blank correction.

* Ages calculated assuming initial 40Ar/36Ar = 295.5 ■ 0.

** 1-sigma precision estimates are for intra-sample reproducibility.

** 1-sigma precision estimates for plateaux are for intra-irradiation package reproducibility.

*** below detection limit

v 1/10/95 #106 KD4 VR40-11 08:06:17 28 Aug 1998

R A W D A T A

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
						á regression		
44751	650	419758	132929	3085	54360	1213	200	EALL
	■	936	283	6	123	10		
44752	750	386824	367277	5478	96009	761	200	EALL
	■	446	80	18	196	10		
44753	850	583878	351550	5164	111352	1452	200	EALL
	■	953	461	4	206	10		
44754	950	347520	162598	2712	91709	959	200	EALL
	■	419	402	9	118	10		
44755	1050	479408	100904	2275	83458	1507	200	EALL
	■	411	19	10	44	13		
44756	1450	3084567	99515	6405	699874	10676	200	EALL
	■	833	123	18	1360	29		

Raw counts and errors include blank corrections of:
40Ar = 5283 ■ 395
36Ar = 43.3 ■ 9

C O R R E C T I O N S

TEMP	C	39Ar Decay	37Ar Decay	-----K-derived---- 40Ar	38Ar	37Ar	----Ca-derived---- 39Ar	38Ar	36Ar	Cl-der 36Ar	Initial 38Ar
650	42	72963	750	1769	0	84	4	33	0	215
750	116	128971	2073	4889	0	148	7	58	0	128
850	111	149703	1984	4680	0	172	8	68	0	252
950	51	123397	917	2164	0	142	7	56	0	164
1050	32	112400	569	1342	0	129	6	51	0	265
1450	31	943462	556	1311	0	1085	51	425	1	1865

All values in counts, corrected for mass discrimination

v 1/10/95 #106 KD4 VR40-11 08:06:18 28 Aug 1998

	TEMP C	% TOT 39Ar	RAD YIELD	APP K/Ca	APP K/Cl	F	AGE (Ma)	intra-sample	precision intra-package
A	650	11.0	19.0	.55	215	.604	1.392 ■	.052	.055
B	750	30.3	47.5	.86	1382	.501	1.156 ■	.019	.020
C	850	29.0	31.6	.71	1277	.526	1.214 ■	.021	.023
D	950	13.4	25.1	.40	582	.539	1.243 ■	.040	.041
E	1050	8.3	12.5	.27	208	.600	1.384 ■	.089	.092
F	1450	8.1	4.4	.03	35	1.392	3.209 ■	.194	.260
Total gas				.6					

Precisions are 1 sigma, measured in Ma. Measured 40/36 atm = 287.9 ■.7
J = 0.001279 ■ 0.50% (intra-package) ■ 0.50% (inter-package)
Trap current factors- 40: 5.66 100: 0 200: 1
Manifold factors- ALL: 1 SPLIT 1: 3.3 SPLIT 2: 10.89 SPLIT 3: 35.937
EALL: 2 ESPLIT 1: 6.6 ESPLIT 2: 21.78
Sensitivity = 6.530E-18 % Reproducibility = .25 Detection limit = 40 counts
Data reduced assuming initial 40/36 = 295.50 ■ 0.00
Ca-factors: 3637=2.6E-04■1.7E-06 3837=3.2E-05■2.4E-07 3937=6.7E-04■3.7E-06
K-factors: 3739=0.0E+00■2.2E-03 3839=1.3E-02■2.4E-04 4039=5.7E-03■4.0E-03

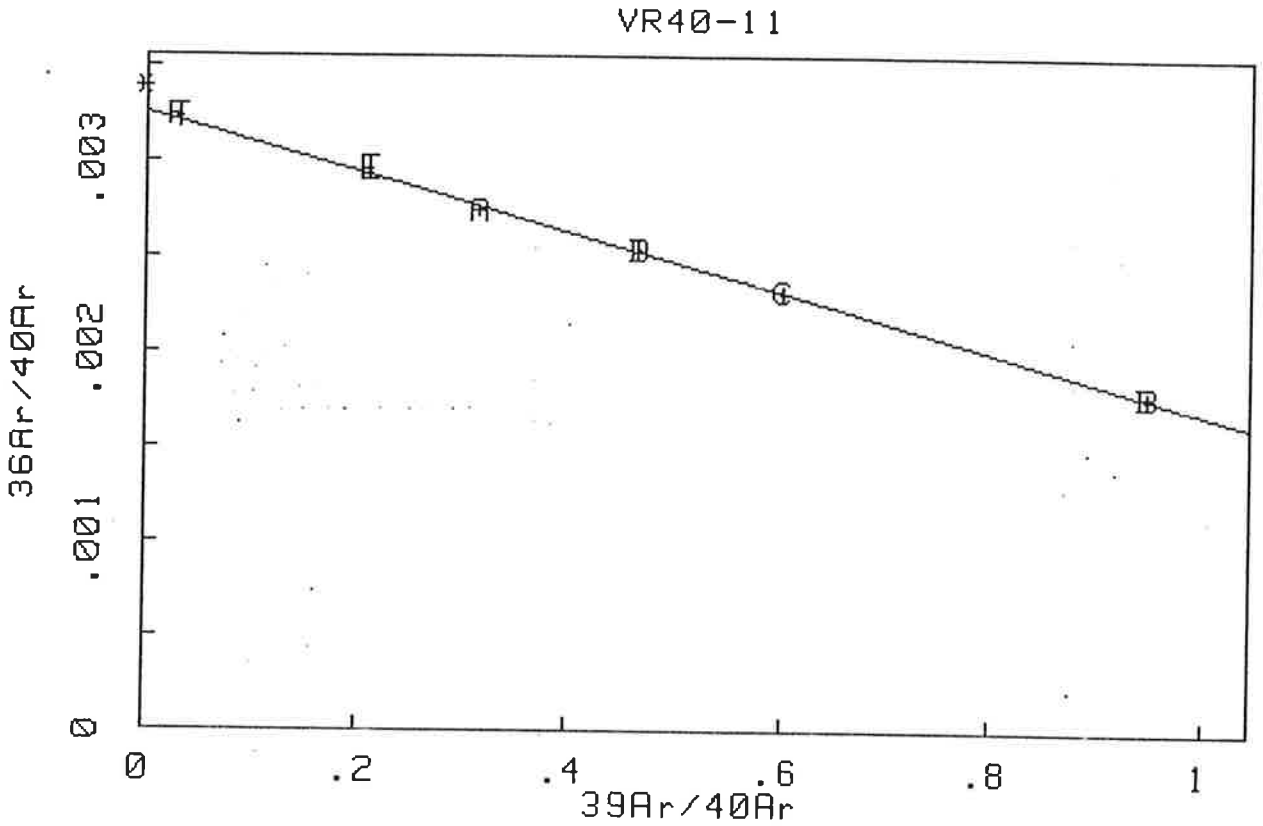
v 1/10/95 #106 KD4 VR40-11 08:16:22 28 Aug 1998
Points AF deleted;
4 points regressed out of 6 includes 80.9 % of 39Ar
Mean X = .641E+00 Mean Y = .226E-02 Slope = -.159E-02 ä+Ç .814E-04
36/40 = .328E-02 ä+Ç .564E-04 39/40 = .206E+01 ä+Ç .740E-01
Fit parameters: SUMS = .141 MSWD = .071
40Ar/36Ar = 304.9 ä+Ç 5.24 F = .485 ä+Ç .017 AGE = 1.12 ä+Ç .04 Ma

Point F deleted;
5 points regressed out of 6 includes 91.9 % of 39Ar
Mean X = .498E+00 Mean Y = .247E-02 Slope = -.154E-02 ä+Ç .629E-04
36/40 = .324E-02 ä+Ç .351E-04 39/40 = .210E+01 ä+Ç .660E-01
Fit parameters: SUMS = .97 MSWD = .323
40Ar/36Ar = 308.68 ä+Ç 3.35 F = .476 ä+Ç .015 AGE = 1.1 ä+Ç .03 Ma

Point A deleted;
5 points regressed out of 6 includes 89 % of 39Ar
Mean X = .563E+00 Mean Y = .238E-02 Slope = -.159E-02 ä+Ç .627E-04
36/40 = .328E-02 ä+Ç .405E-04 39/40 = .206E+01 ä+Ç .601E-01
Fit parameters: SUMS = .146 MSWD = .049
40Ar/36Ar = 304.65 ä+Ç 3.76 F = .486 ä+Ç .014 AGE = 1.12 ä+Ç .03 Ma

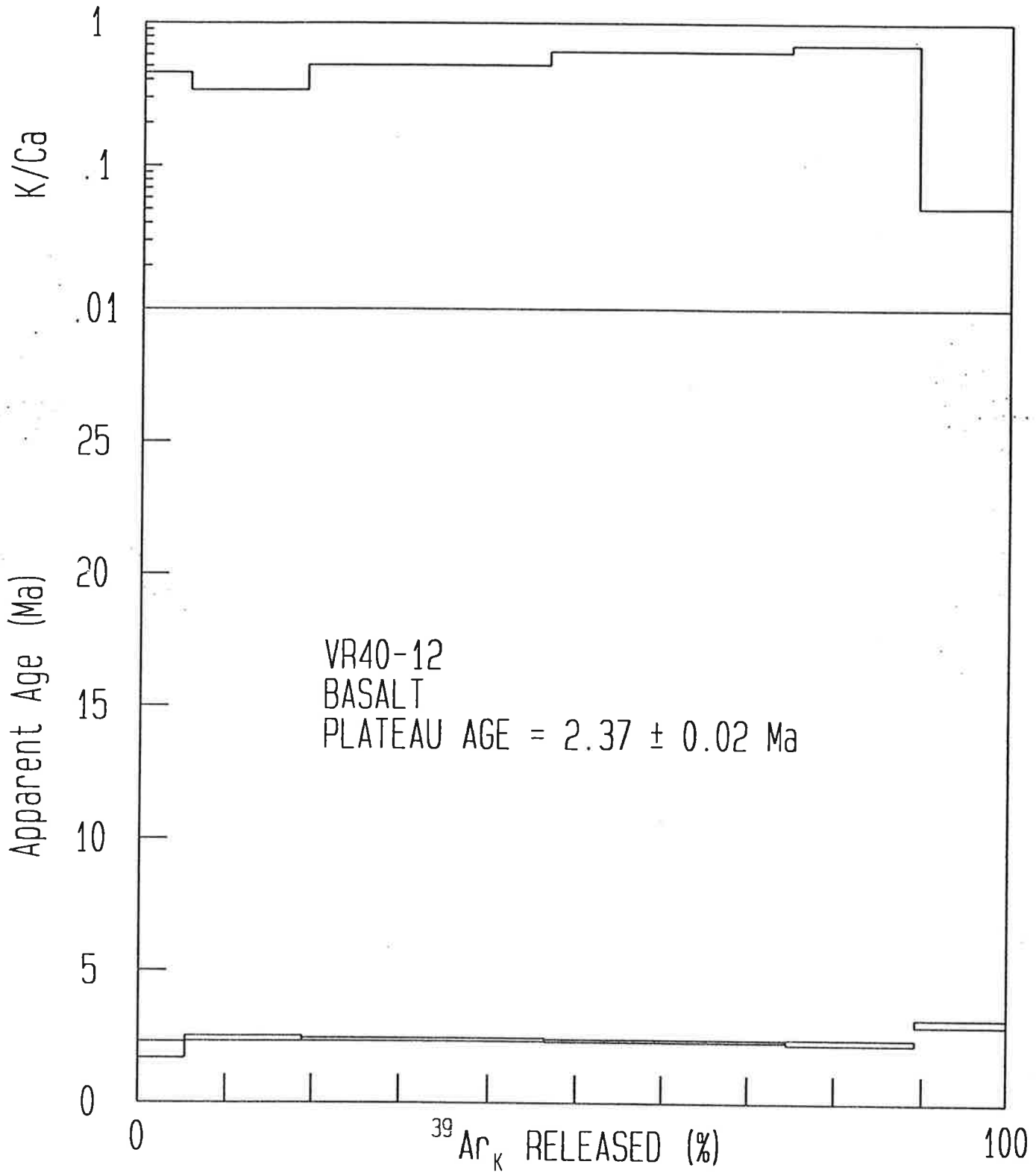
A	650C	WT X =	.20E+07	WT Y =	.18E+10	R =	.26E+00	Residual =	-.16E+01
B	750C	WT X =	.59E+06	WT Y =	.80E+09	R =	.49E-01	Residual =	.16E+00
C	850C	WT X =	.37E+06	WT Y =	.64E+09	R =	.57E-01	Residual =	-.27E+00
D	950C	WT X =	.33E+06	WT Y =	.44E+09	R =	.21E-01	Residual =	-.10E+00
E	1050C	WT X =	.33E+06	WT Y =	.33E+09	R =	.47E-02	Residual =	.19E+00
F	1450C	WT X =	.33E+06	WT Y =	.32E+09	R =	.77E-04	Residual =	.50E-01

v 1/10/95, SAMPLE #106 KD4 VR40-11 08:15:43 28 Aug 1998



6 points regressed out of 6
Mean X = .462E+00 Mean Y = .253E-02 Slope = -.156E-02 ä+Ç .561E-04
36/40 = .325E-02 ä+Ç .302E-04 39/40 = .208E+01 ä+Ç .590E-01
Fit parameters: SUMS = 1.429 MSWD = .357
40Ar/36Ar = 307.52 ä+Ç 2.85 F = .481 ä+Ç .014 AGE = 1.11 ä+Ç .03 Ma

v 1/10/95 07:43:35 28 Aug 1998 #114 KD4 VR40-12



v 1/10/95

(40/36in = 295.5)

v 1/10/95 07:41:34 28 Aug 1998

#114 KD4 VR40-12

J = 0.001279 ■ 0.50% SAMPLE WT = 0.2522 g

TEMP C	Initial & radiogenic 40Ar	Potassium derived 39Ar	Chlorine derived 38Ar	Calcium derived 37Ar	Initial 36Ar	AGE* in Ma	**
650	4.896E-12	5.771E-13	2.555E-14	6.662E-13	1.488E-14	1.995 ■	.157
750	3.638E-12	1.448E-12	1.194E-14	2.219E-12	7.164E-15	2.424 ■	.050
850	4.747E-12	2.964E-12	8.824E-15	3.041E-12	5.686E-15	2.386 ■	.029
950	4.318E-12	3.003E-12	1.164E-14	2.478E-12	4.254E-15	2.350 ■	.025
1050	3.136E-12	1.570E-12	2.066E-14	1.158E-12	5.275E-15	2.316 ■	.048
1450	4.765E-12	1.165E-12	3.359E-14	1.169E-11	1.089E-14	3.059 ■	.064
TOTAL GAS	2.550E-11	1.073E-11	1.122E-13	2.126E-11	4.815E-14	2.42	

83.8% of gas on plateau, steps 750 through 1050 PLATEAU AGE = 2.366 + .015

Note: all gas quantities are in moles. No blank correction.

* Ages calculated assuming initial 40Ar/36Ar = 295.5 ■ 0

** 1-sigma precision estimates are for intra-sample reproducibility.

** 1-sigma precision estimates for plateaux are for intra-irradiation package reproducibility.

*** below detection limit

v 1/10/95 #114 KD4 VR40-12 07:41:19 28 Aug 1998

R A W D A T A

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar ä regression	TRAP CURRENT	MANIFOLD OPTION
44722	650	375153	44498	2368	22658	1183	200	EALL
	■	825	27	8	15	10		
44723	750	279216	111637	2332	75450	609	200	EALL
	■	545	99	3	131	8		
44724	850	364773	228495	3690	103336	510	200	EALL
	■	659	83	28	45	10		
44725	950	331923	231476	3969	84146	386	200	EALL
	■	728	120	17	178	8		
44726	1050	240809	121052	3161	39322	439	200	EALL
	■	541	103	4	33	9		
44727	1450	365330	90347	3687	396786	1099	200	EALL
	■	585	56	6	360	8		

Raw counts and errors include blank corrections of:
40Ar = 11884 ■ 528
36Ar = 68.3 ■ 6.7

C O R R E C T I O N S

TEMP |C	39Ar Decay	37Ar Decay	-----K-derived---- 40Ar	38Ar	37Ar	----Ca-derived---- 39Ar	38Ar	36Ar	Cl-der 36Ar	Initial 38Ar
650	14	29356	251	592	0	34	2	13	0	213
750	34	97836	630	1485	0	114	5	45	0	103
850	70	134107	1289	3041	0	157	7	61	0	81
950	71	109293	1306	3081	0	128	6	50	0	61
1050	37	51116	683	1611	0	60	3	23	0	76
1450	28	516228	507	1195	0	603	28	236	0	156

All values in counts, corrected for mass discrimination

v 1/10/95 #114 KD4 VR40-12 07:41:20 28 Aug 1998

	TEMP C	% TOT 39Ar	RAD YIELD	APP K/Ca	APP K/Cl	F	AGE (Ma)	intra-sample	precision intra-package
A	650	5.4	10.2	.45	55	.865	1.995 ■	.157	.163
B	750	13.5	41.8	.34	293	1.051	2.424 ■	.050	.053
C	850	27.6	64.6	.51	813	1.035	2.386 ■	.029	.032
D	950	28.0	70.9	.63	624	1.019	2.350 ■	.025	.028
E	1050	14.6	50.3	.71	184	1.004	2.316 ■	.048	.050
F	1450	10.9	32.4	.05	84	1.327	3.059 ■	.064	.069
Total gas				.5					

Precisions are 1 sigma, measured in Ma. Measured 40/36 atm = 287.9 ■.7
J = 0.001279 ■ 0.50% (intra-package) ■ 0.50% (inter-package)
Trap current factors- 40: 5.66 100: 0 200: 1
Manifold factors- ALL: 1 SPLIT 1: 3.3 SPLIT 2: 10.89 SPLIT 3: 35.937
EALL: 2 ESPLIT 1: 6.6 ESPLIT 2: 21.78
Sensitivity = 6.530E-18 % Reproducibility = .25 Detection limit = 40 counts
Data reduced assuming initial 40/36 = 295.50 ■ 0.00
Ca-factors: 3637=2.6E-04■1.7E-06 3837=3.2E-05■2.4E-07 3937=6.7E-04■3.7E-06
K-factors: 3739=0.0E+00■2.2E-03 3839=1.3E-02■2.4E-04 4039=5.7E-03■4.0E-03

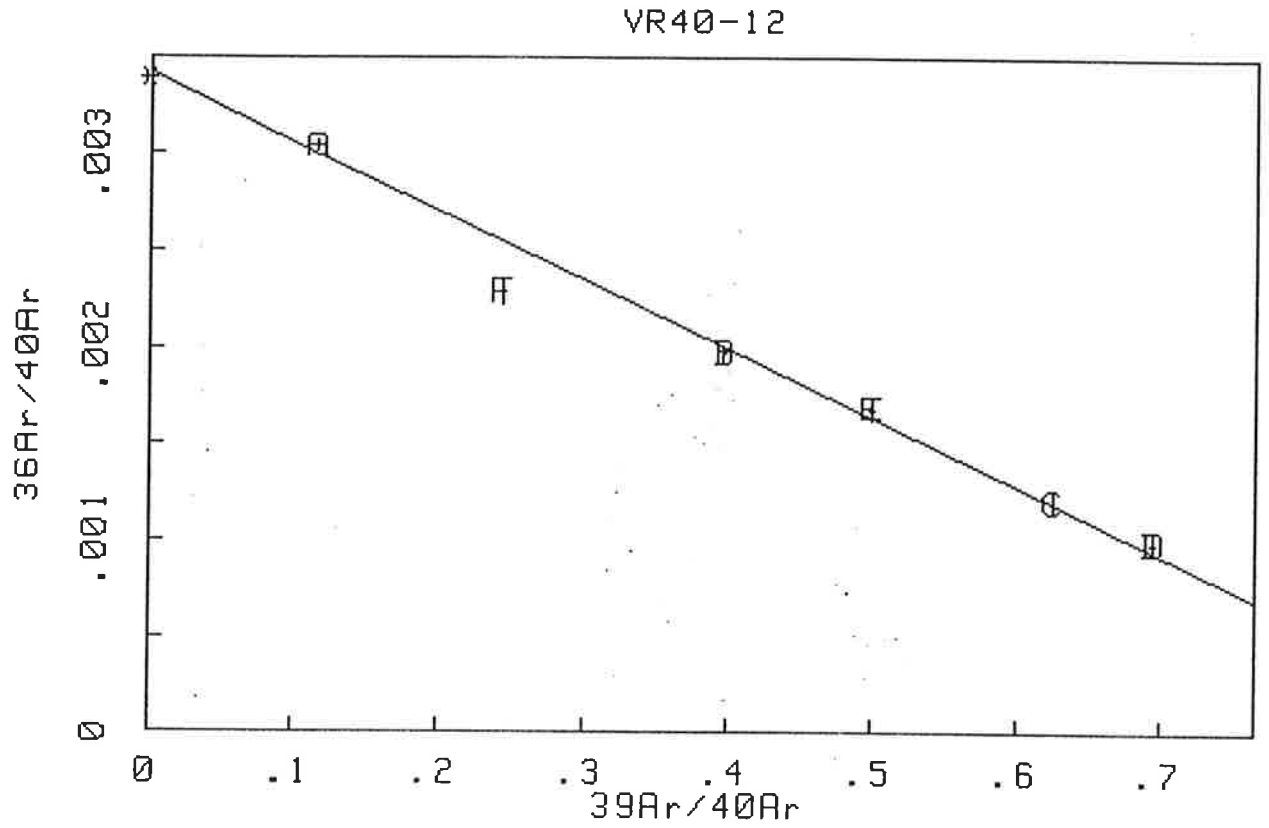
v 1/10/95 #114 KD4 VR40-12 07:45:43 28 Aug 1998
Points AF deleted;
4 points regressed out of 6 includes 83.8 % of 39Ar
Mean X = .534E+00 Mean Y = .152E-02 Slope = -.336E-02 ±.203E-03
36/40 = .331E-02 ±.111E-03 39/40 = .987E+00 ±.283E-01
Fit parameters: SUMS = .831 MSWD = .415
40Ar/36Ar = 301.68 ±10.11 F = 1.013 ±.029 AGE = 2.34 ±.07 Ma

Point F deleted;
5 points regressed out of 6 includes 89.1 % of 39Ar
Mean X = .346E+00 Mean Y = .221E-02 Slope = -.360E-02 ±.809E-04
36/40 = .345E-02 ±.335E-04 39/40 = .959E+00 ±.147E-01
Fit parameters: SUMS = 2.535 MSWD = .845
40Ar/36Ar = 289.59 ±2.81 F = 1.043 ±.016 AGE = 2.41 ±.04 Ma

Point A deleted;
5 points regressed out of 6 includes 94.6 % of 39Ar
Mean X = .501E+00 Mean Y = .161E-02 Slope = -.308E-02 ±.157E-03
36/40 = .315E-02 ±.822E-04 39/40 = .102E+01 ±.278E-01
Fit parameters: SUMS = 5.76 MSWD = 1.92
40Ar/36Ar = 317.52 ±8.28 F = .977 ±.027 AGE = 2.25 ±.06 Ma

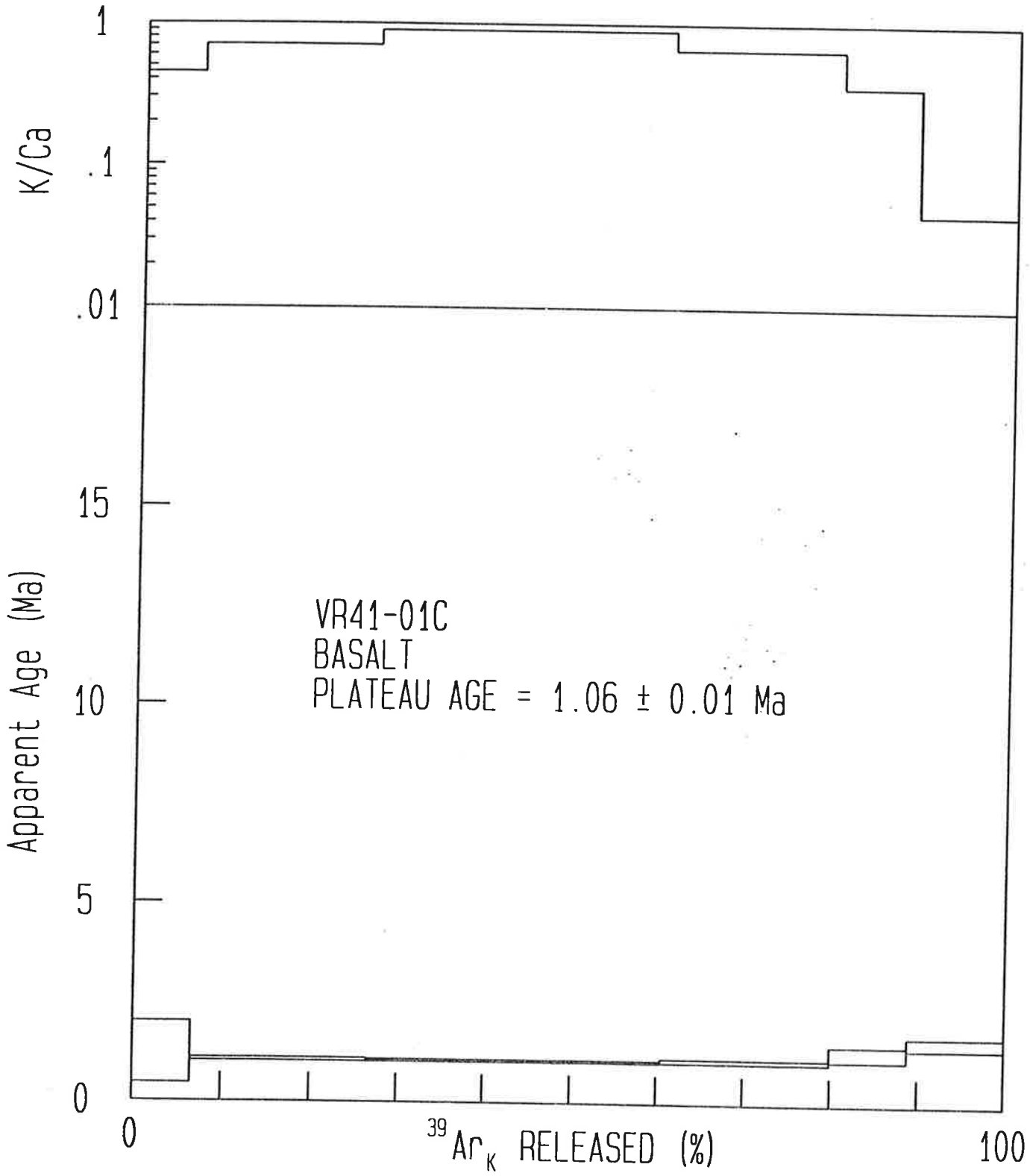
A	650C	WT X =	.15E+08	WT Y =	.14E+10	R =	.25E+00	Residual =	.93E+01
B	750C	WT X =	.15E+07	WT Y =	.64E+09	R =	.92E-01	Residual =	.11E+01
C	850C	WT X =	.51E+06	WT Y =	.44E+09	R =	.37E-01	Residual =	-.64E+00
D	950C	WT X =	.23E+06	WT Y =	.35E+09	R =	.30E-01	Residual =	-.44E+00
E	1050C	WT X =	.18E+06	WT Y =	.25E+09	R =	.28E-01	Residual =	.11E+01
F	1450C	WT X =	.17E+06	WT Y =	.22E+09	R =	.88E-02	Residual =	-.16E+01

v 1/10/95, SAMPLE #114 KD4 VR40-12 07:44:47 28 Aug 1998



6 points regressed out of 6
Mean X = .340E+00 Mean Y = .221E-02 Slope = -.357E-02 ä+Ç .803E-04
36/40 = .342E-02 ä+Ç .325E-04 39/40 = .960E+00 ä+Ç .148E-01
Fit parameters: SUMS = 18.671 MSWD = 4.668
40Ar/36Ar = 292.28 ä+Ç 2.78 F = 1.042 ä+Ç .016 AGE = 2.4 ä+Ç .04 Ma

v 1/10/95 08:45:26 28 Aug 1998 #118 KD4 VR41-01C



v 1/10/95

(40/36in = 295.5)

v 1/10/95 08:44:30 28 Aug 1998

#118 KD4 VR41-01C

J = 0.001274 ■ 0.50% SAMPLE WT = 0.2544 g

TEMP C	Initial & radiogenic 40Ar	Potassium derived 39Ar	Chlorine derived 38Ar	Calcium derived 37Ar	Initial 36Ar	AGE* in Ma	**
650	2.022E-12	7.475E-13	1.545E-14	8.663E-13	5.487E-15	1.230 ■	.386
750	1.740E-12	2.265E-12	9.100E-15	1.671E-12	2.344E-15	1.062 ■	.020
850	2.762E-12	3.859E-12	5.837E-15	2.238E-12	3.395E-15	1.047 ■	.014
950	1.833E-12	2.213E-12	4.754E-15	1.753E-12	2.687E-15	1.078 ■	.027
1050	1.344E-12	1.008E-12	8.923E-15	1.448E-12	2.627E-15	1.292 ■	.094
1450	4.170E-12	1.279E-12	4.601E-14	1.440E-11	1.118E-14	1.554 ■	.075
TOTAL GAS	1.387E-11	1.137E-11	9.008E-14	2.238E-11	2.772E-14	1.15	

79.9% of gas on plateau, steps 650 through 950 PLATEAU AGE = 1.056 + .007

Note: all gas quantities are in moles. No blank correction.
* Ages calculated assuming initial 40Ar/36Ar = 295.5 ■ 0
** 1-sigma precision estimates are for intra-sample reproducibility.
** 1-sigma precision estimates for plateaux are for intra-irradiation package reproducibility.
*** below detection limit

v 1/10/95 #118 KD4 VR41-01C 08:44:27 28 Aug 1998

R A W D A T A

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar ä regression	TRAP CURRENT	MANIFOLD OPTION
44803	650	155115	57633	1898	26013	449	200	EALL
	■	1373	376	37	364	33		
44804	750	134217	174588	3030	50143	219	200	EALL
	■	1130	63	31	37	3		
44805	850	213138	297404	4420	67128	313	200	EALL
	■	1107	59	19	90	5		
44806	950	141309	170595	2635	52559	248	200	EALL
	■	1110	241	13	118	6		
44807	1050	103315	77761	1706	43377	237	200	EALL
	■	1101	90	17	60	10		
44808	1450	319831	99251	4771	431282	1178	200	EALL
	■	1201	121	21	238	10		

Raw counts and errors include blank corrections of:
40Ar = 5731 ■ 1101
36Ar = 61.3 ■ 1.3

C O R R E C T I O N S

TEMP |C	39Ar Decay	37Ar Decay	-----K-derived---- 40Ar	38Ar	37Ar	----Ca-derived---- 39Ar	38Ar	36Ar	Cl-der 36Ar	Initial 38Ar
650	20	41623	325	767	0	45	2	18	0	79
750	62	80303	985	2324	0	86	4	34	0	34
850	105	107598	1678	3959	0	115	5	45	0	49
950	60	84319	963	2271	0	90	4	35	0	38
1050	28	69649	439	1035	0	75	4	29	0	38
1450	35	693104	556	1312	0	742	35	291	0	160

All values in counts, corrected for mass discrimination

v 1/10/95 #118 KD4 VR41-01C 08:44:28 28 Aug 1998

	TEMP C	% TOT 39Ar	RAD YIELD	APP K/Ca	APP K/Cl	F	AGE (Ma)	intra-sample	precision intra-package
A	650	6.6	19.8	.45	117	.535	1.230 ■	.386	.387
B	750	19.9	60.2	.70	602	.462	1.062 ■	.020	.020
C	850	33.9	63.7	.90	1600	.456	1.047 ■	.014	.015
D	950	19.5	56.7	.66	1127	.469	1.078 ■	.027	.028
E	1050	8.9	42.2	.36	274	.563	1.292 ■	.094	.094
F	1450	11.2	20.7	.05	67	.676	1.554 ■	.075	.077
Total gas				.6					

Precisions are 1 sigma, measured in Ma. Measured 40/36 atm = 287.9 ■.7
J = 0.001274 ■ 0.50% (intra-package) ■ 0.50% (inter-package)
Trap current factors- 40: 5.66 100: 0 200: 1
Manifold factors- ALL: 1 SPLIT 1: 3.3 SPLIT 2: 10.89 SPLIT 3: 35.937
EALL: 2 ESPLIT 1: 6.6 ESPLIT 2: 21.78
Sensitivity = 6.530E-18 % Reproducibility = .25 Detection limit = 40 counts
Data reduced assuming initial 40/36 = 295.50 ■ 0.00
Ca-factors: 3637=2.6E-04■1.7E-06 3837=3.2E-05■2.4E-07 3937=6.7E-04■3.7E-06
K-factors: 3739=0.0E+00■2.2E-03 3839=1.3E-02■2.4E-04 4039=5.7E-03■4.0E-03

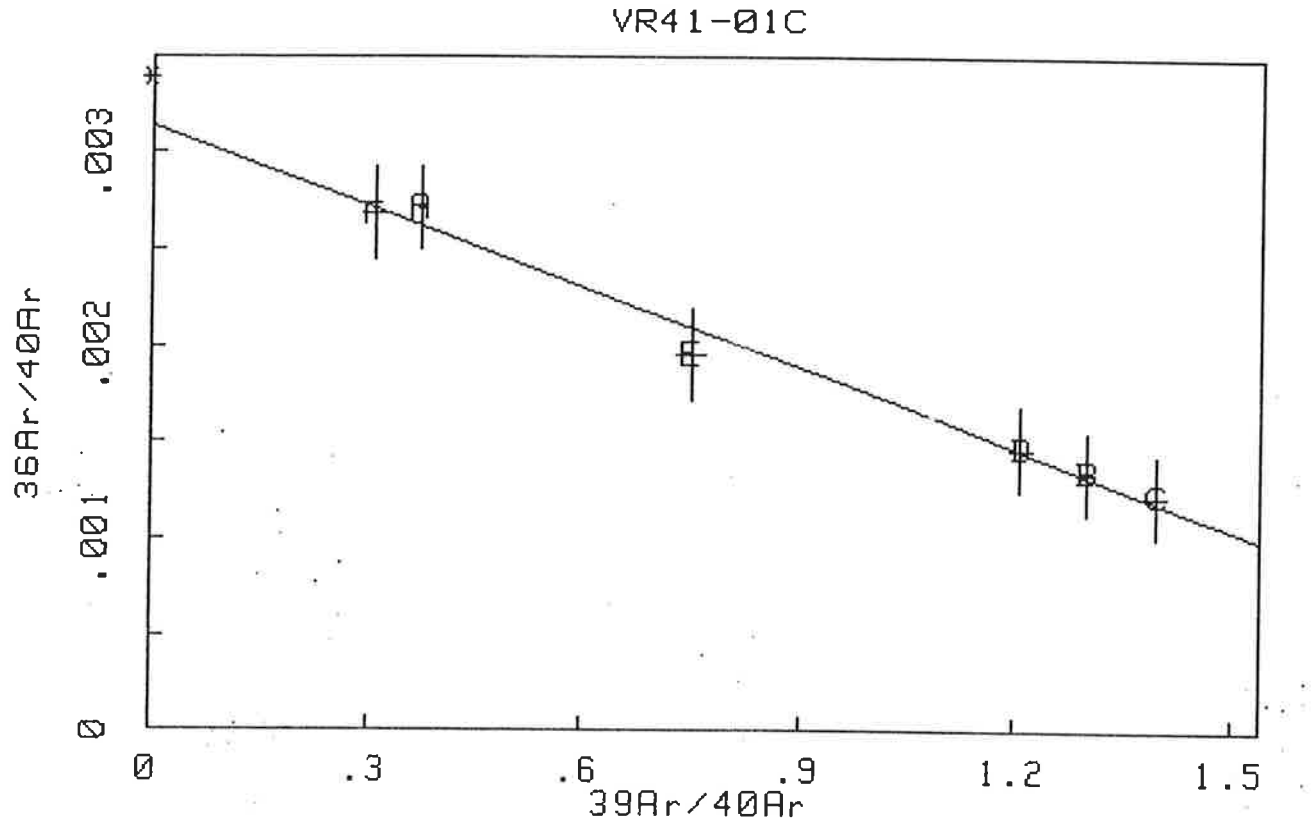
v 1/10/95 #118 KD4 VR41-01C 08:47:02 28 Aug 1998
Points AEF deleted;
3 points regressed out of 6 includes 73.3 % of 39Ar
Mean X = .130E+01 Mean Y = .135E-02 Slope = -.125E-02 ä+Ç .161E-02
36/40 = .297E-02 ä+Ç .210E-02 39/40 = .238E+01 ä+Ç .140E+01
Fit parameters: SUMS = 0 MSWD = 0
40Ar/36Ar = 336.44 ä+Ç 237.88 F = .42 ä+Ç .246 AGE = .96 ä+Ç .56 Ma

Points EF deleted;
4 points regressed out of 6 includes 79.9 % of 39Ar
Mean X = .106E+01 Mean Y = .170E-02 Slope = -.146E-02 ä+Ç .258E-03
36/40 = .325E-02 ä+Ç .294E-03 39/40 = .223E+01 ä+Ç .219E+00
Fit parameters: SUMS = .018 MSWD = .009
40Ar/36Ar = 307.68 ä+Ç 27.88 F = .449 ä+Ç .044 AGE = 1.03 ä+Ç .1 Ma

Point F deleted;
5 points regressed out of 6 includes 88.8 % of 39Ar
Mean X = .101E+01 Mean Y = .174E-02 Slope = -.141E-02 ä+Ç .247E-03
36/40 = .316E-02 ä+Ç .268E-03 39/40 = .225E+01 ä+Ç .229E+00
Fit parameters: SUMS = .54 MSWD = .18
40Ar/36Ar = 316.2 ä+Ç 26.81 F = .444 ä+Ç .045 AGE = 1.02 ä+Ç .1 Ma

A	650C	WT X =	.93E+05	WT Y =	.23E+08	R =	.11E+00	Residual =	.34E+00
B	750C	WT X =	.75E+04	WT Y =	.22E+08	R =	.51E-01	Residual =	.68E-01
C	850C	WT X =	.54E+04	WT Y =	.22E+08	R =	.16E-01	Residual =	.14E+00
D	950C	WT X =	.36E+04	WT Y =	.21E+08	R =	.30E-01	Residual =	.39E-02
E	1050C	WT X =	.29E+04	WT Y =	.18E+08	R =	.38E-01	Residual =	-.63E+00
F	1450C	WT X =	.29E+04	WT Y =	.17E+08	R =	.26E-02	Residual =	-.20E+00

v 1/10/95, SAMPLE #118 KD4 VR41-01C 08:46:38 28 Aug 1998



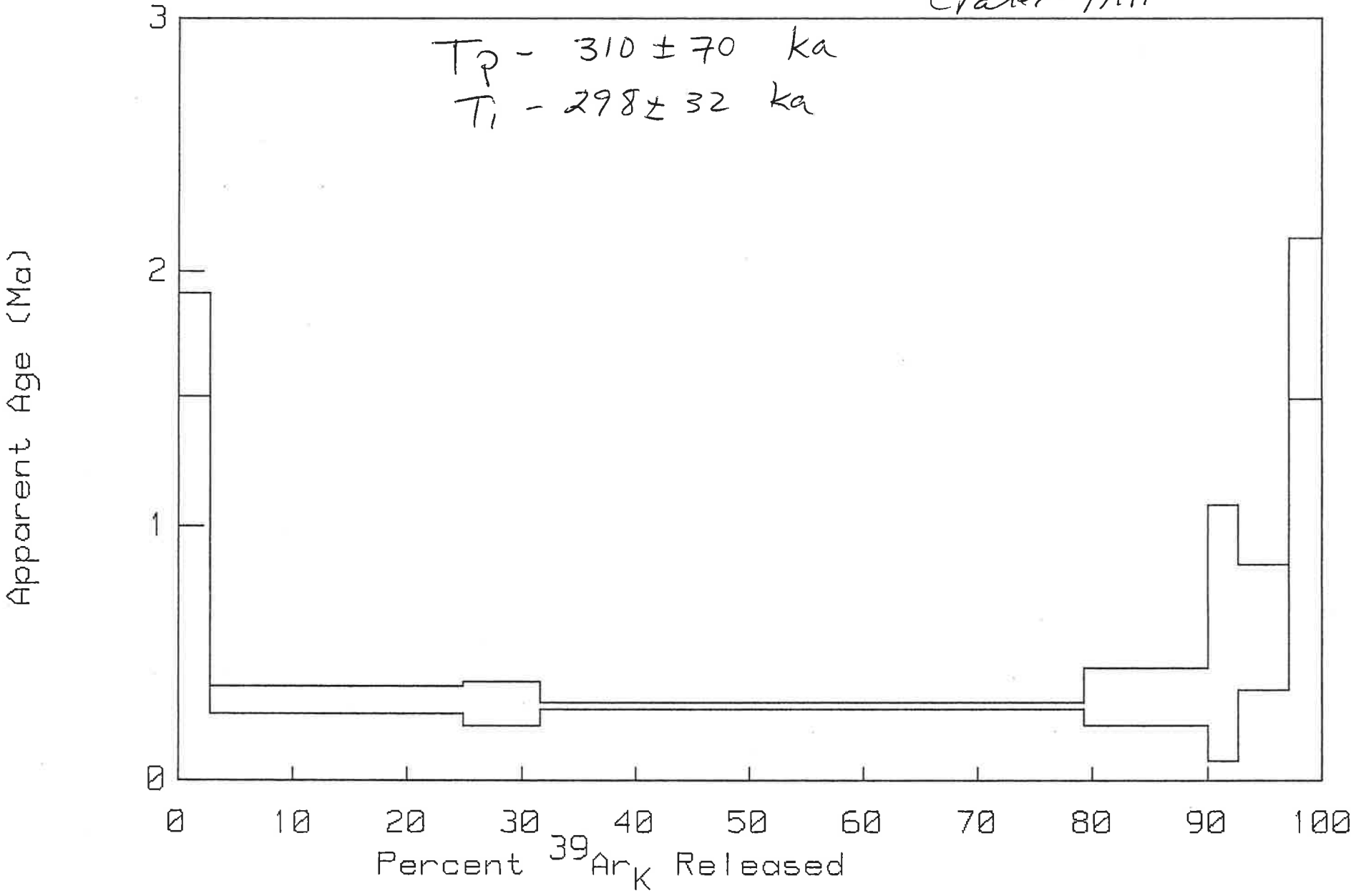
6 points regressed out of 6
Mean X = .912E+00 Mean Y = .187E-02 Slope = -.138E-02 ä+Ç .206E-03
36/40 = .314E-02 ä+Ç .208E-03 39/40 = .227E+01 ä+Ç .212E+00
Fit parameters: SUMS = .565 MSWD = .141
40Ar/36Ar = 318.89 ä+Ç 21.18 F = .441 ä+Ç .041 AGE = 1.01 ä+Ç .09 Ma

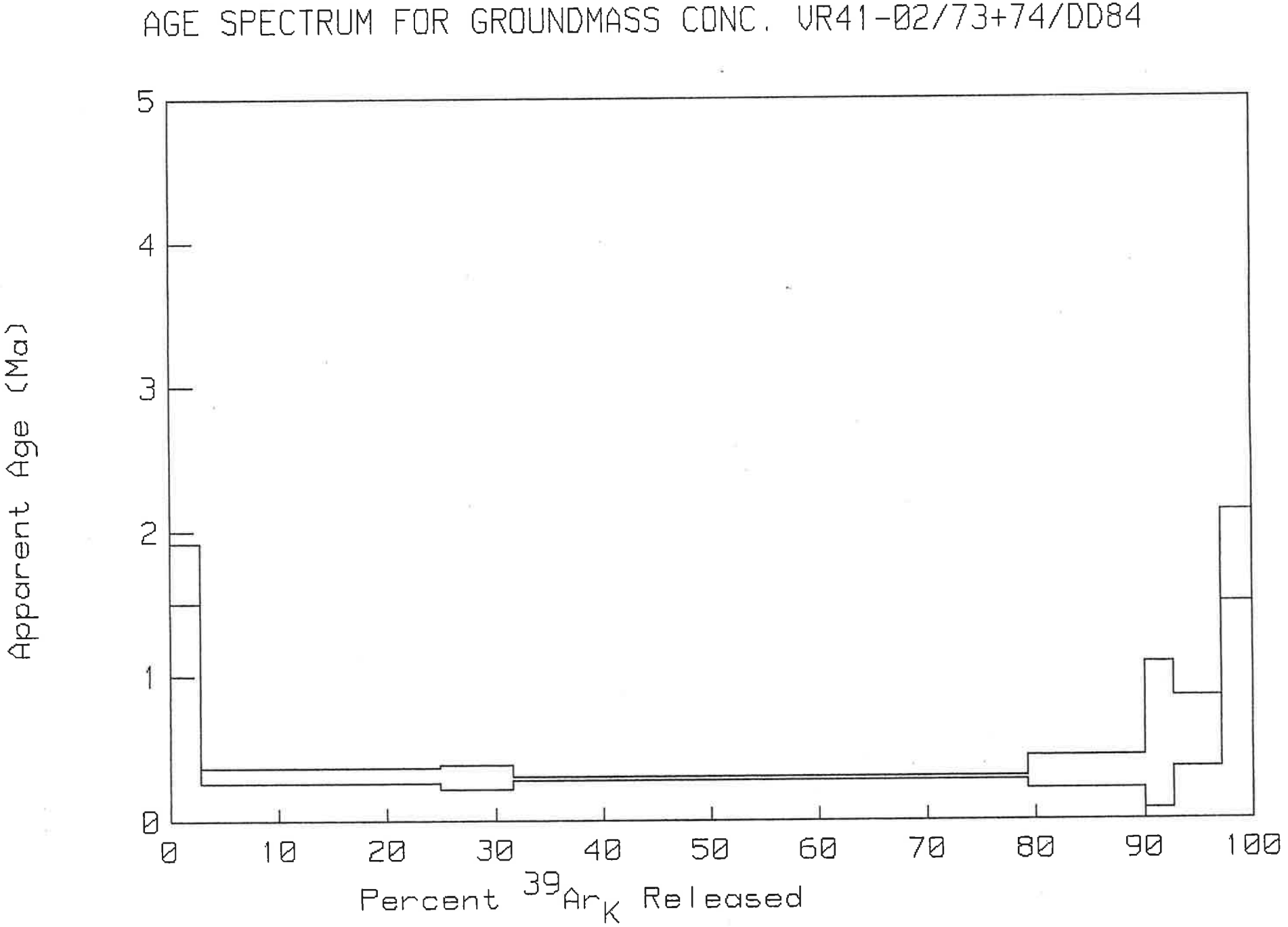
AGE SPECTRUM FOR GROUNDMASS CONC. VR41-02/73+74/DD84

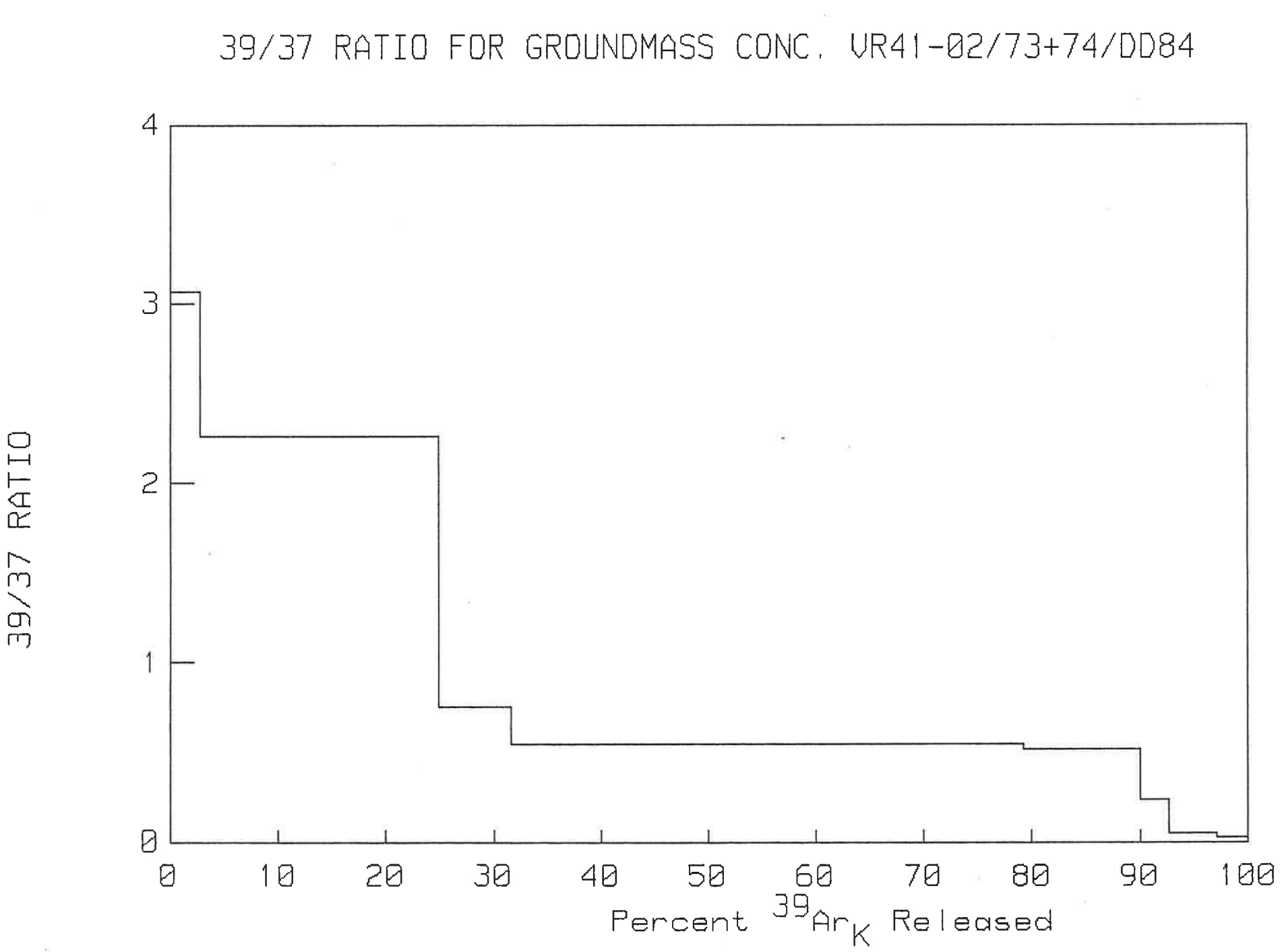
Crater Hill

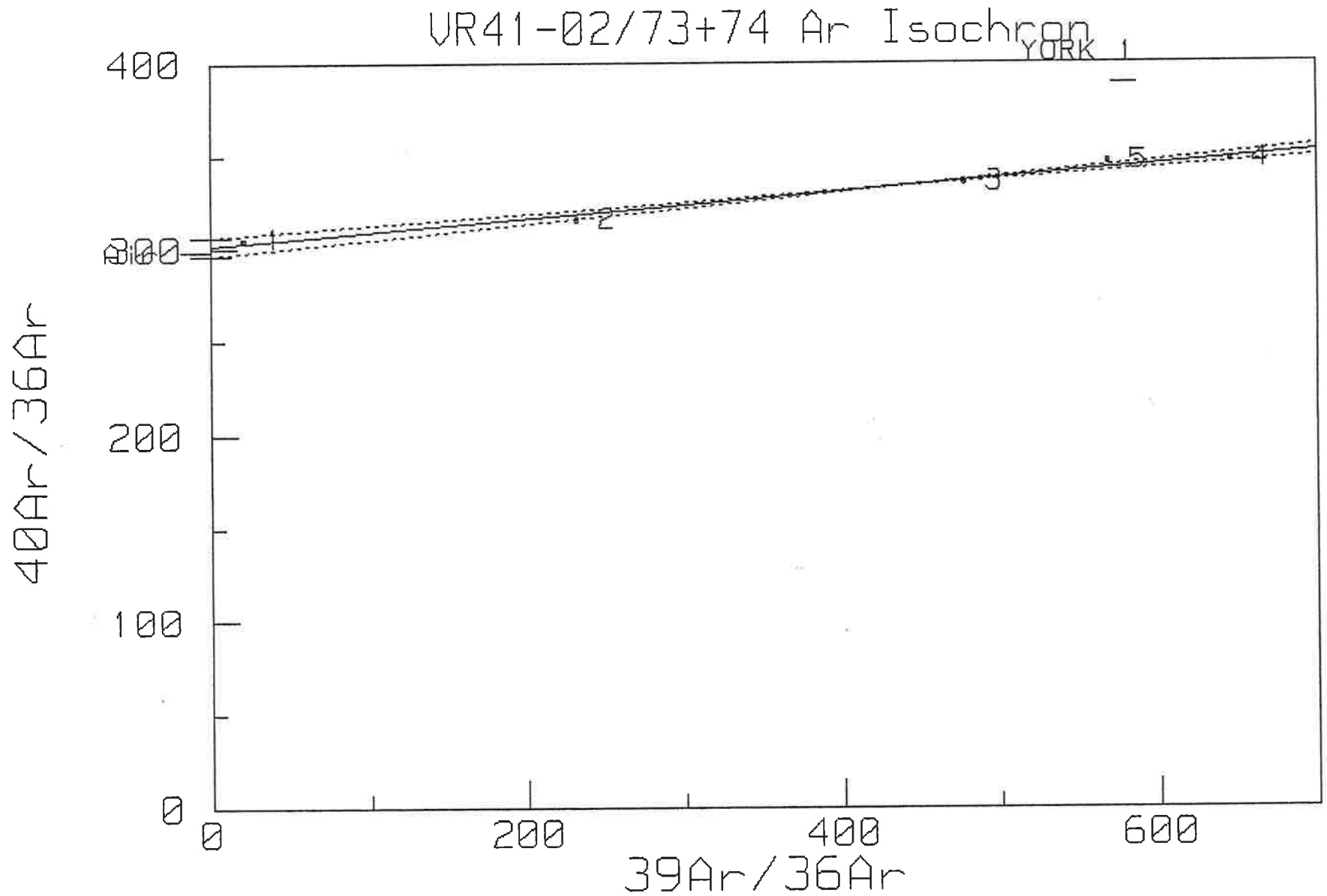
T_P - 310 ± 70 ka

T_i - 298 ± 32 ka




AGE SPECTRUM FOR GROUNDMASS CONC. VR41-02/73+74/DD84
Apparent Age (Ma)
0
1
2
3
4
5
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


39/37 RATIO FOR GROUNDMASS CONC. VR41-02/73+74/DD84
39/37 RATIO
4
3
2
1
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VR41-02/73+74 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
39Ar/36Ar
1
2
3
4
5

VR41-02/73+74

York 1 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.071639	.011414	301.81	4.9382

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.648E-01	2.11E-02	2.11E-02
Initial 40/36:	3.02E+02	2.47E+00	2.47E+00
Radiogenic 40/39:	7.16E-02	5.71E-03	5.71E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 5

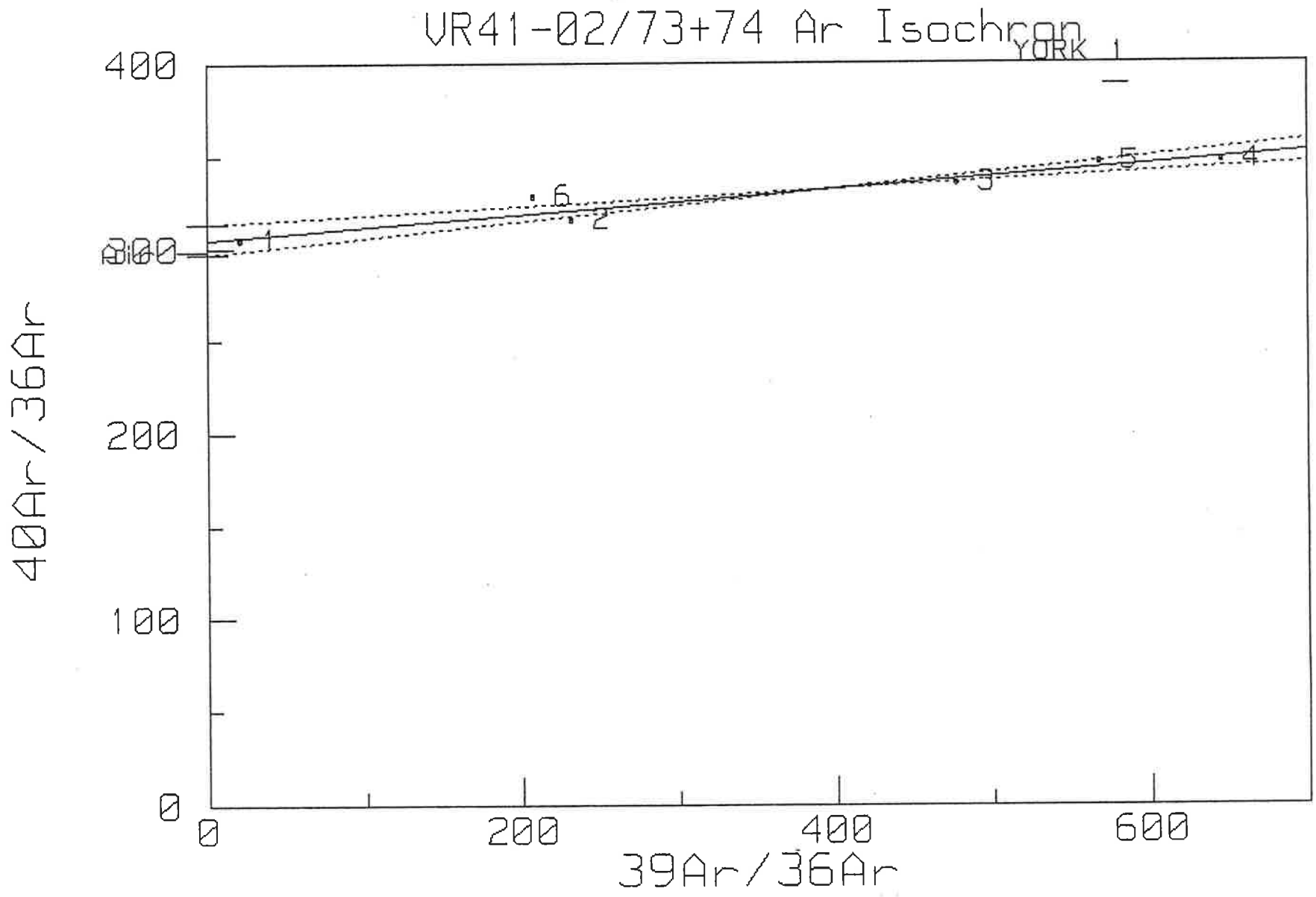
SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.071825	.00015009	301.74	.067169
mswd= 79.1	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.655E-01	3.84E-04	3.84E-04
Initial 40/36:	3.02E+02	3.36E-02	3.36E-02
Radiogenic 40/39:	7.18E-02	7.50E-05	7.50E-05

All errors on this printout are: 2 SIGMA

#1-5


VR41-02/73+74 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
39Ar/36Ar
1
2
3
4
5
6

VR41-02/73+74

York 1 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.066678	.020607	305.38	8.3218

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.465E-01	3.81E-02	3.81E-02
Initial 40/36:	3.05E+02	4.16E+00	4.16E+00
Radiogenic 40/39:	6.67E-02	1.03E-02	1.03E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.066176	.0001424	305.55	.059633

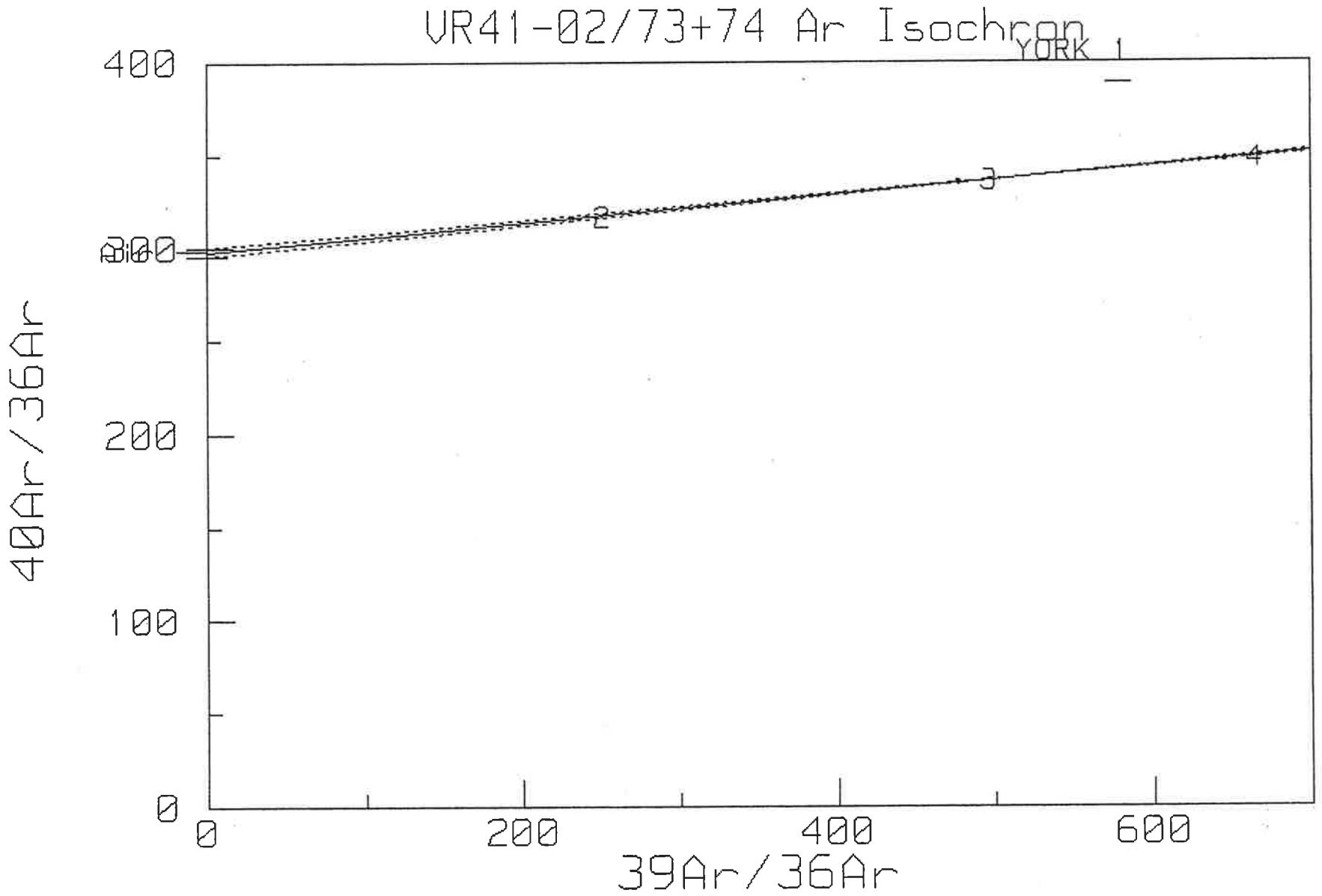
mswd= 143 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.446E-01	3.59E-04	3.59E-04
Initial 40/36:	3.06E+02	2.98E-02	2.98E-02
Radiogenic 40/39:	6.62E-02	7.12E-05	7.12E-05

All errors on this printout are: 2 SIGMA

#1-6


VR41-02/73+74 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
39Ar/36Ar
1
2
3
4

VR41-02/73+74

York 1 Analysis

n= 3

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.076164	.0043068	298.04	2.0209

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.815E-01	7.96E-03	7.96E-03
Initial 40/36:	2.98E+02	1.01E+00	1.01E+00
Radiogenic 40/39:	7.62E-02	2.15E-03	2.15E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 3

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.076049	.00025696	298.09	.12349

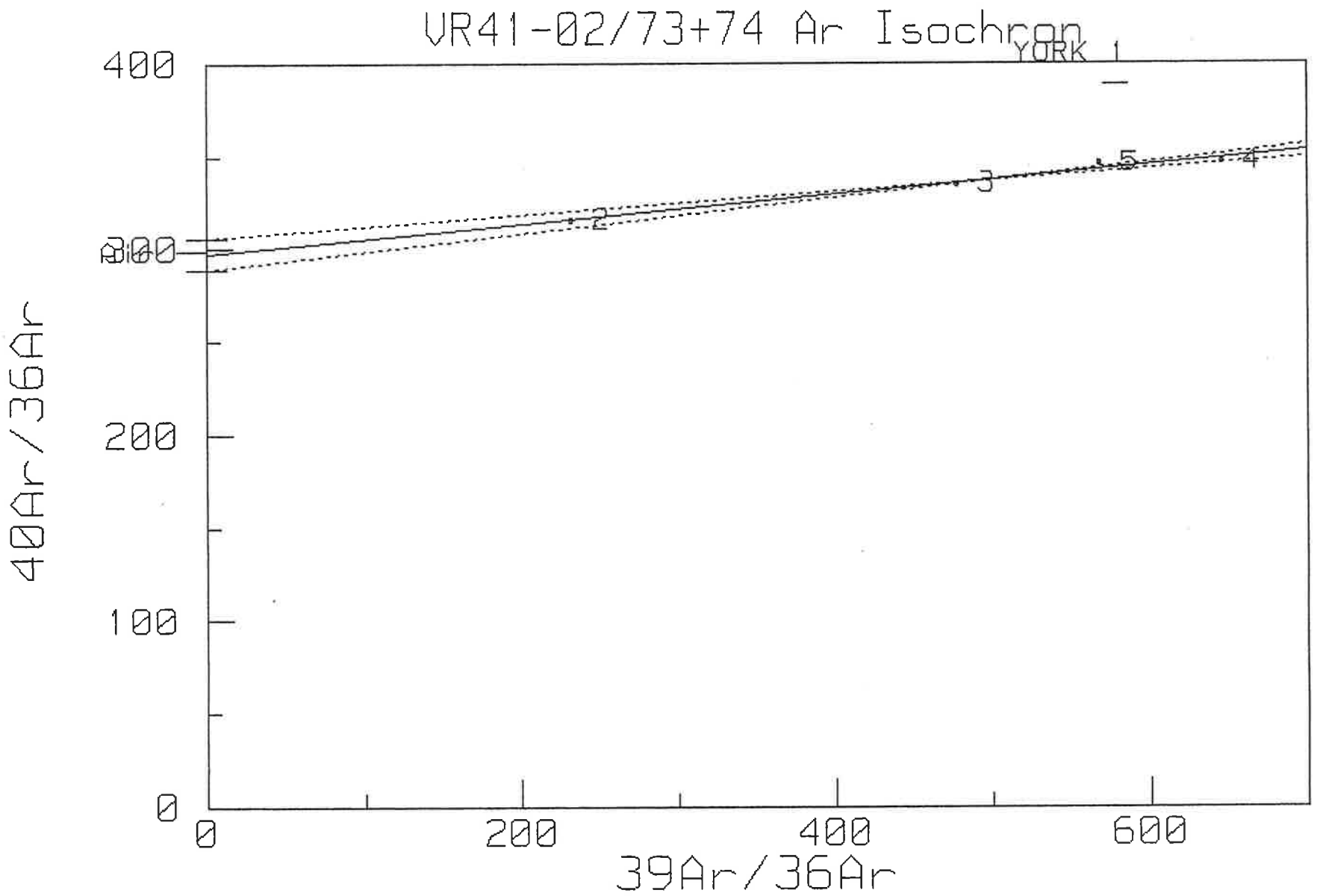
mswd= 17.1 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.811E-01	5.52E-04	5.52E-04
Initial 40/36:	2.98E+02	6.17E-02	6.17E-02
Radiogenic 40/39:	7.60E-02	1.28E-04	1.28E-04

All errors on this printout are: 2 SIGMA

#2-4


VR41-02/73+74 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
39Ar/36Ar
1
2
3
4
5

VR41-02/73+74

York 1 Analysis

n= 4

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.080676	.017349	297.07	8.5692

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.982E-01	3.21E-02	3.21E-02
Initial 40/36:	2.97E+02	4.28E+00	4.28E+00
Radiogenic 40/39:	8.07E-02	8.67E-03	8.67E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 4

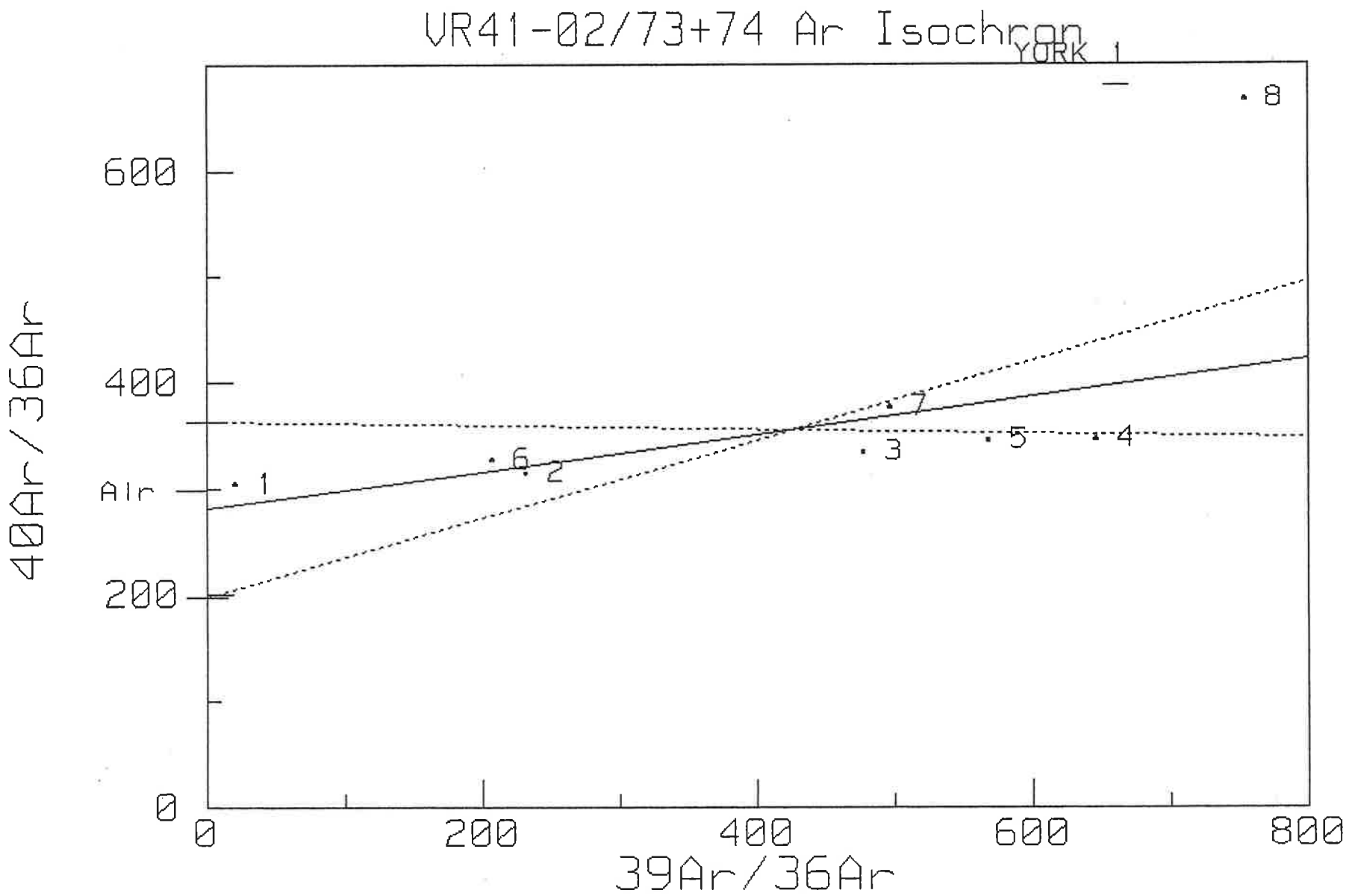
SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.080098	.00024122	297.34	.12153
mswd= 75.5	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.961E-01	5.35E-04	5.35E-04
Initial 40/36:	2.97E+02	6.08E-02	6.08E-02
Radiogenic 40/39:	8.01E-02	1.21E-04	1.21E-04

All errors on this printout are: 2 SIGMA

#2-5


VR41-02/73+74 Ar Isochron
YORK 1
8
600
400
Air
200
0
1
6
2
7
3
5
4
0
200
400
600
800
40Ar/36Ar
39Ar/36Ar

VR41-02/73+74

York 1 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.17605	.19458	280.6	82.999

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	6.506E-01	3.60E-01	3.60E-01
Initial 40/36:	2.81E+02	4.15E+01	4.15E+01
Radiogenic 40/39:	1.76E-01	9.73E-02	9.73E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.084841	.00012357	313.43	.056387

mswd= 1620 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	3.136E-01	3.88E-04	3.88E-04
Initial 40/36:	3.13E+02	2.82E-02	2.82E-02
Radiogenic 40/39:	8.48E-02	6.18E-05	6.18E-05

All errors on this printout are: 2 SIGMA

#1-8, All

1250	.00002	.00050	.00040	.00020	.73590	.00002	.00052	.00000	.00038
1400	.00001	.00033	.00026	.00021	.79534	.00002	.00056	.00000	.00026

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00118	.00021	.34855	.05544	.00056	3.06
750	.00082	.00014	.24227	.01456	.00010	2.27
850	.00012	.00002	.03629	.02355	.00010	.76
950	.00063	.00011	.18762	.00351	.00010	.54
1050	.00016	.00003	.04810	.03032	.00011	.52
1150	.00011	.00002	.03316	.13625	.00019	.24
1250	.00008	.00001	.02259	.06640	.00020	.05
1400	.00003	.00001	.00982	.08583	.00059	.03

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.01117	.02412	.463	3.1	2.8	1.71 +/- .20
750	.01639	.19010	.086	6.3	22.0	.32 +/- .05
850	.00484	.05869	.082	11.6	6.8	.30 +/- .09
950	.03262	.41059	.079	14.5	47.6	.29 +/- .01
1050	.00825	.09260	.089	14.4	10.7	.33 +/- .11
1150	.00364	.02325	.156	9.8	2.7	.58 +/- .50
1250	.00619	.03799	.163	21.2	4.4	.60 +/- .25
1400	.01231	.02509	.491	55.0	2.9	1.81 +/- .32
TOTAL GAS			.111			.41 +/- .07

PLATEAU AGE = .31 +/- .07 Ma
PLATEAU ON STEPS 2 TO 5 AND CONTAINS 87.2 PERCENT OF THE GAS
PLATEAU MIN = .29 AND PLATEAU MAX = .33

PLATEAU AGE = .30 +/- .05 Ma
PLATEAU ON STEPS 2 TO 4 AND CONTAINS 76.5 PERCENT OF THE GAS
PLATEAU MIN = .29 AND PLATEAU MAX = .32

Your Personalized Argon Data Acquisition on Sample: VR41-02/73+74/DD84
Sample analysis started on 250 Reduced on 30-Sep-2004
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 398.9 mg
J-value and its error .002049 .1 %

RAW DATA

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141060	650	.35997	.02402	.00280	.00011	.00117	200	1
+/-		.00108	.00027	.00001	.00001	.00001		
141061	750	.26063	.18932	.02377	.00119	.00084	200	1
+/-		.00006	.00005	.00002	.00000	.00001		
141062	850	.04174	.05849	.00430	.00110	.00014	200	1
+/-		0.00000	.00011	.00001	.00001	.00000		
141063	950	.22452	.40930	.00733	.01071	.00083	200	1
+/-		.00017	.00035	.00001	.00001	.00000		
141064	1050	.05732	.09232	.00170	.00255	.00021	200	1
+/-		0.00000	.00005	.00000	.00002	.00001		
141065	1150	.03703	.02322	.00054	.00138	.00014	200	1
+/-		.00001	0.00000	.00002	.00001	.00001		
141066	1250	.02917	.03834	.00091	.01043	.00027	200	1
+/-		.00001	.00005	.00000	.00000	.00001		
141067	1400	.02239	.02554	.00061	.01126	.00025	200	1
+/-		.00001	.00003	.00000	.00001	.00001		

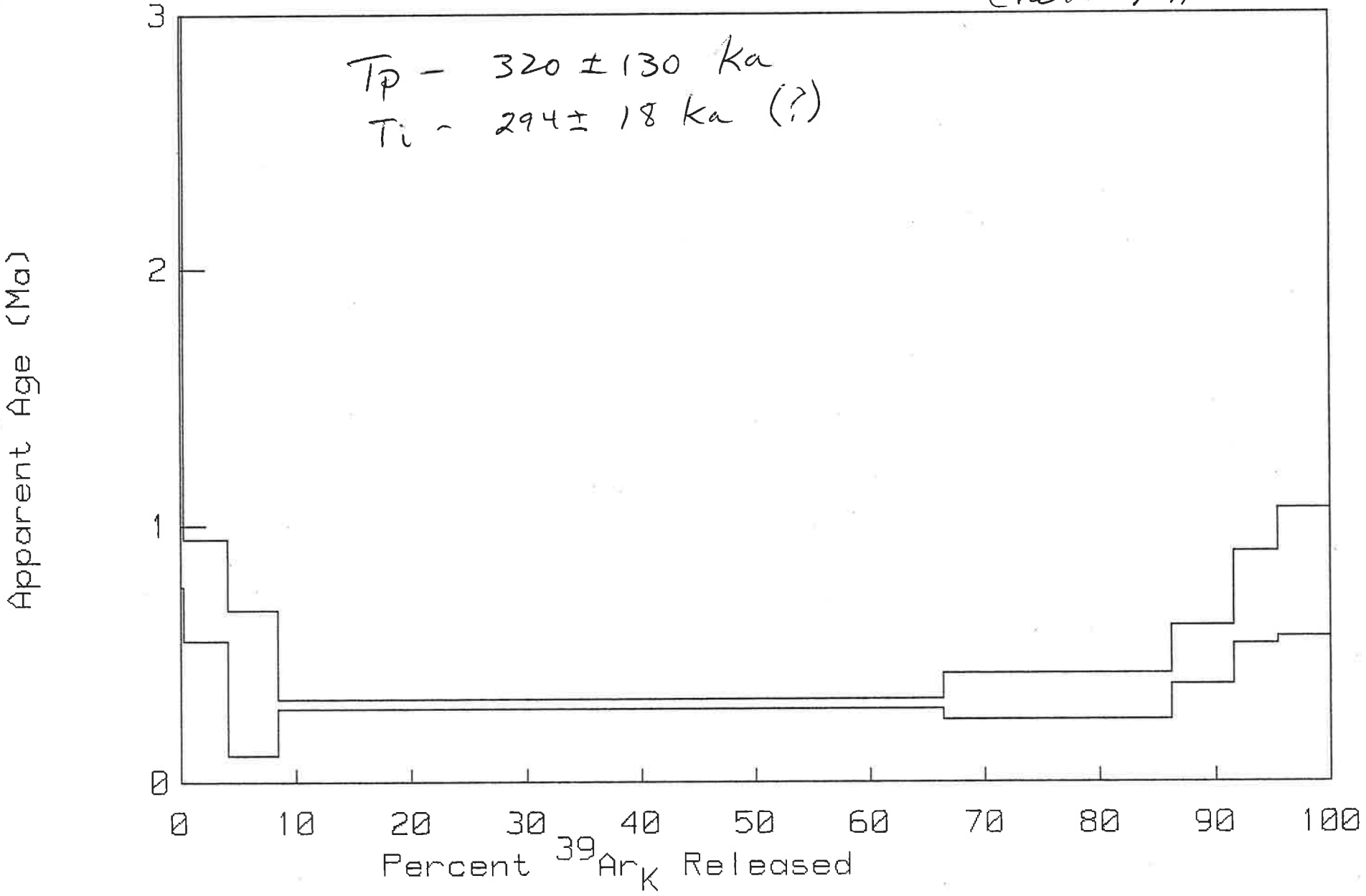
Raw values corrected for manifold options, trap current and mass discrimination

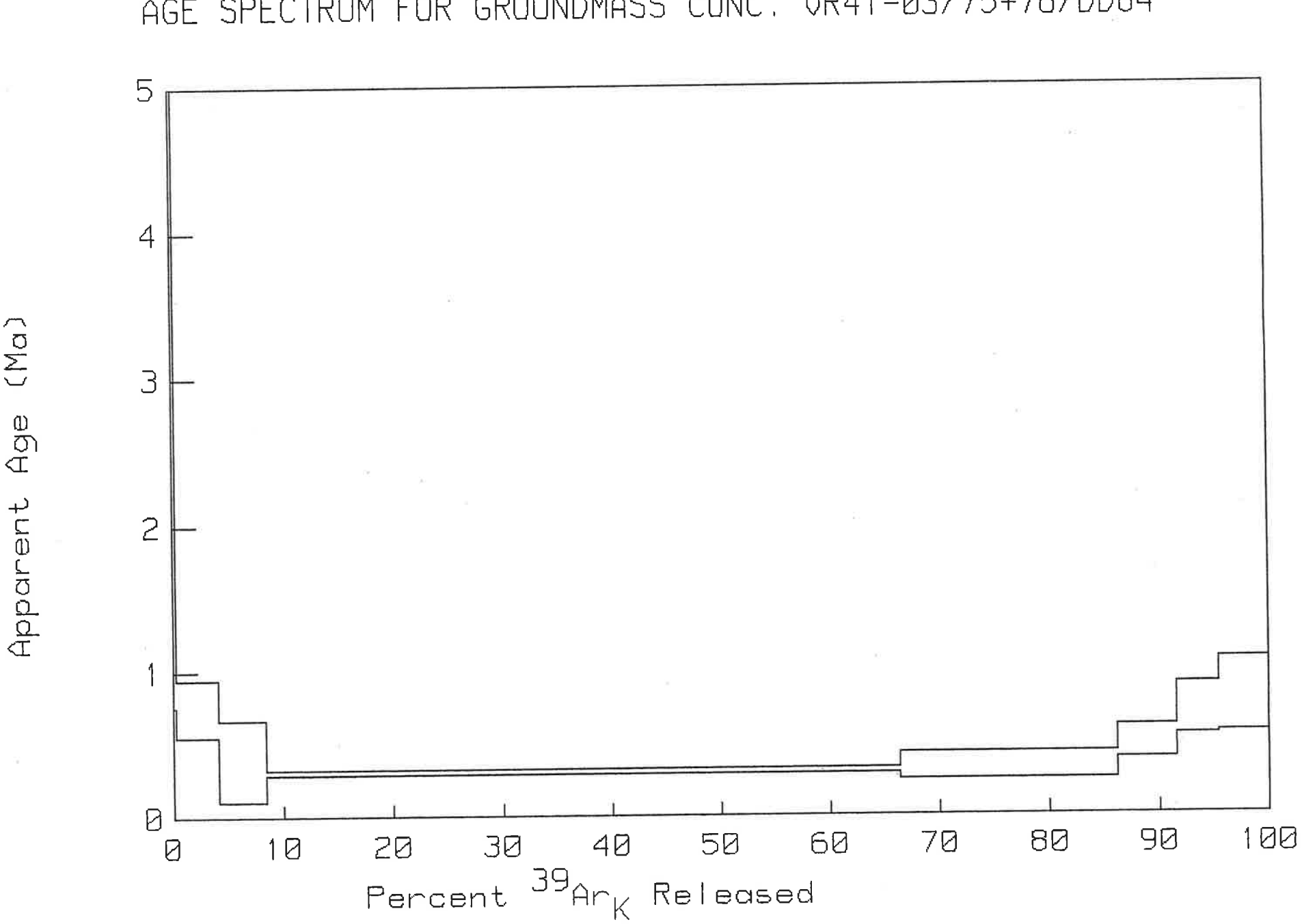
TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
650	.35997	.02409	.00282	.00011	.00118	.00778	.00004
+/-	.00108	.00027	.00001	.00001	.00001		
750	.26063	.18986	.02390	.00120	.00085	.08277	.00030
+/-	.00006	.00005	.00002	.00000	.00001		
850	.04174	.05865	.00433	.00111	.00015	.07626	.00009
+/-	0.00000	.00011	.00001	.00001	.00000		
950	.22452	.41048	.00737	.01080	.00084	.74368	.00065
+/-	.00017	.00035	.00001	.00001	.00001		
1050	.05732	.09258	.00171	.00257	.00021	.17702	.00015
+/-	0.00000	.00005	.00000	.00002	.00001		
1150	.03703	.02328	.00054	.00139	.00014	.09587	.00004
+/-	.00001	.00000	.00002	.00001	.00001		
1250	.02917	.03845	.00092	.01052	.00028	.72540	.00006
+/-	.00001	.00005	.00000	.00000	.00001		
1400	.02239	.02561	.00061	.01136	.00025	.78399	.00004
+/-	.00001	.00003	.00000	.00001	.00001		

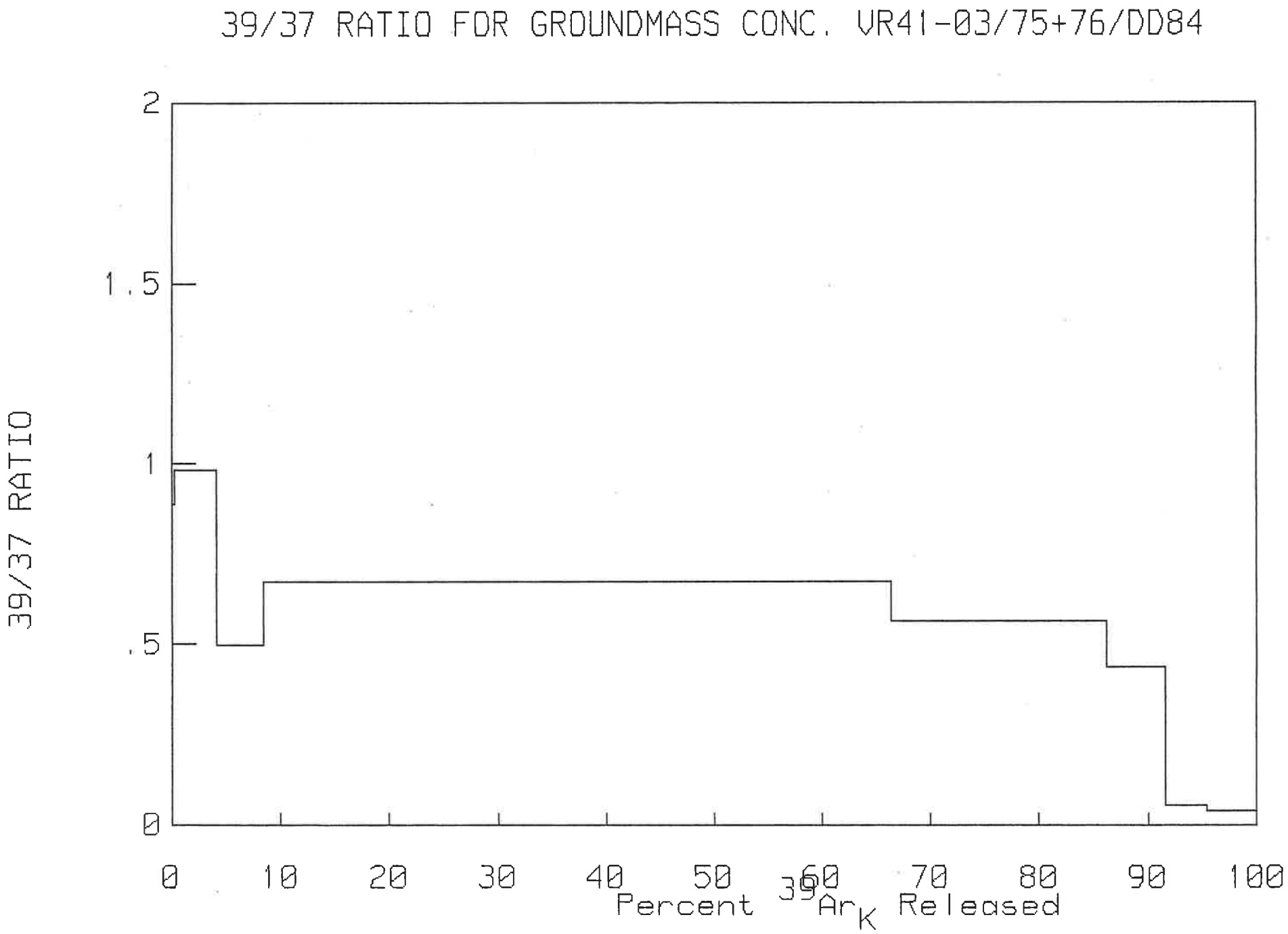
TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
650	.00001	.00032	.00025	0.00000	.00788	.00000	.00001	.00000	.00229
750	.00010	.00251	.00198	.00002	.08388	.00000	.00006	.00001	.02125
850	.00003	.00078	.00061	.00002	.07734	.00000	.00005	.00000	.00353
950	.00021	.00543	.00427	.00020	.75427	.00002	.00053	.00000	.00181
1050	.00005	.00122	.00096	.00005	.17954	.00000	.00013	.00000	.00045
1150	.00001	.00031	.00024	.00003	.09725	.00000	.00007	.00000	.00021

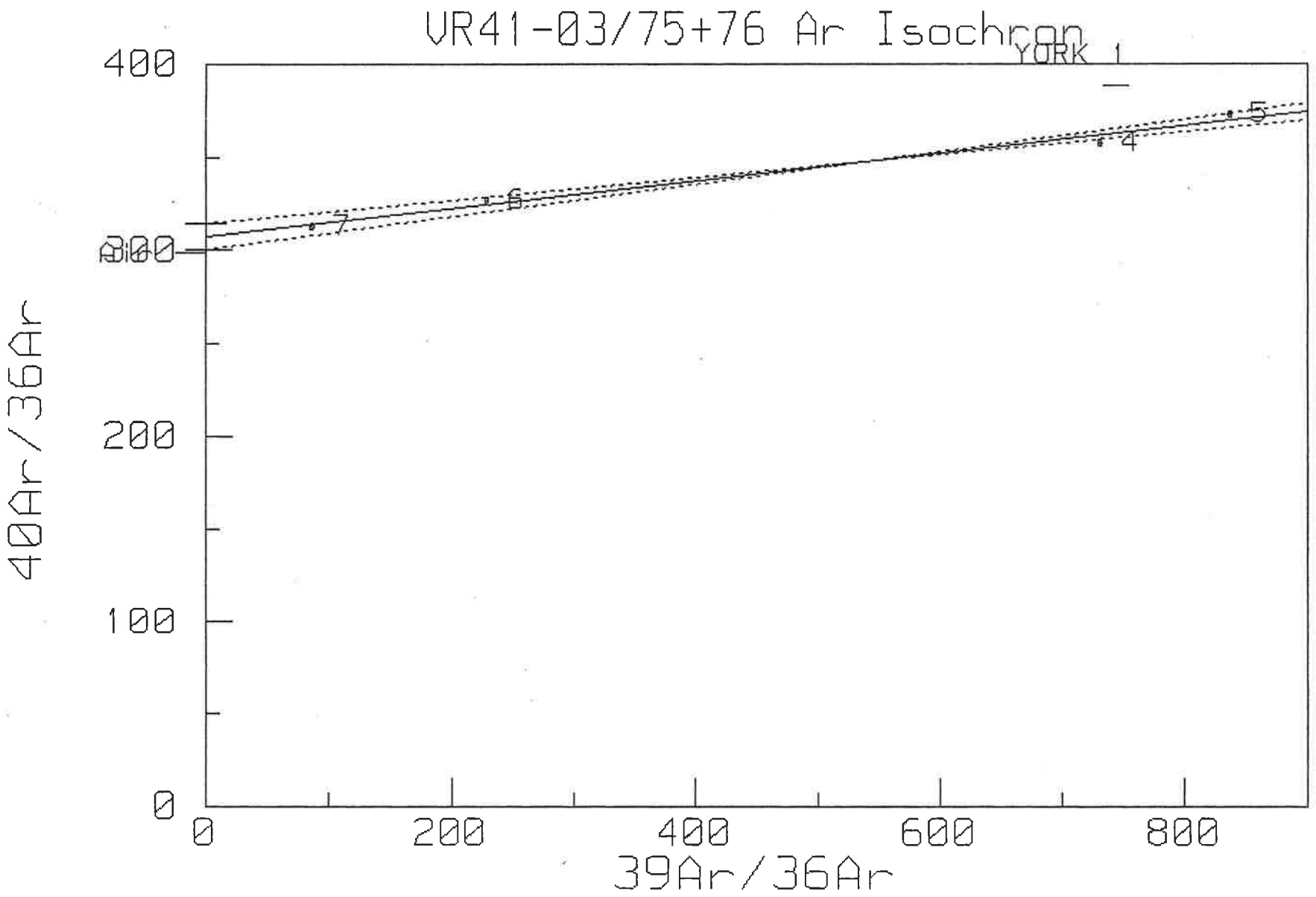
AGE SPECTRUM FOR GROUNDMASS CONC. VR41-03/75+76/DD84

Crater Hill




AGE SPECTRUM FOR GROUNDMASS CONC. VR41-03/75+76/DD84
Apparent Age (Ma)
0
1
2
3
4
5
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


39/37 RATIO FOR GROUNDMASS CONC. VR41-03/75+76/DD84
2
1.5
1
.5
0
39/37 RATIO
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VR41-03/75+76 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
800
39Ar/36Ar
4
5
6
7

VR41-03/75+76

York 1 Analysis

n= 4

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.074209	.012806	307.51	6.7635

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.673E-01	2.31E-02	2.31E-02
Initial 40/36:	3.08E+02	3.38E+00	3.38E+00
Radiogenic 40/39:	7.42E-02	6.40E-03	6.40E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 4

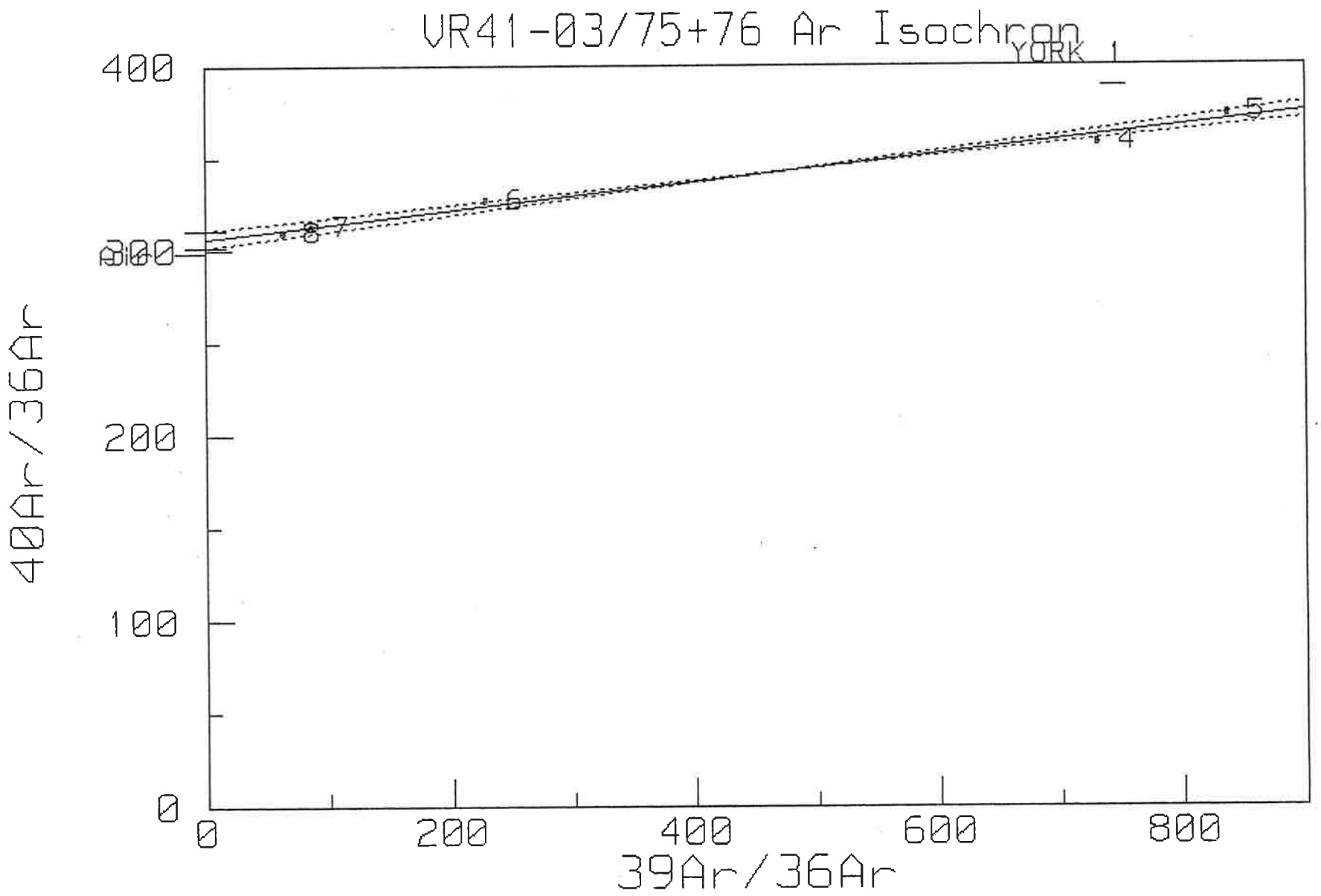
SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.074063	.00012465	307.57	.069779
mswd= 109	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.667E-01	3.49E-04	3.49E-04
Initial 40/36:	3.08E+02	3.49E-02	3.49E-02
Radiogenic 40/39:	7.41E-02	6.23E-05	6.23E-05

All errors on this printout are: 2 SIGMA

#4-7


VR41-03/75+76 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
800
39Ar/36Ar
1
2
3
4
5
6
7
8

VR41-03/75+76

York 1 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.075842	.0097919	306.36	4.5355

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.732E-01	1.76E-02	1.76E-02
Initial 40/36:	3.06E+02	2.27E+00	2.27E+00
Radiogenic 40/39:	7.58E-02	4.90E-03	4.90E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.075649	.00010801	306.43	.053908

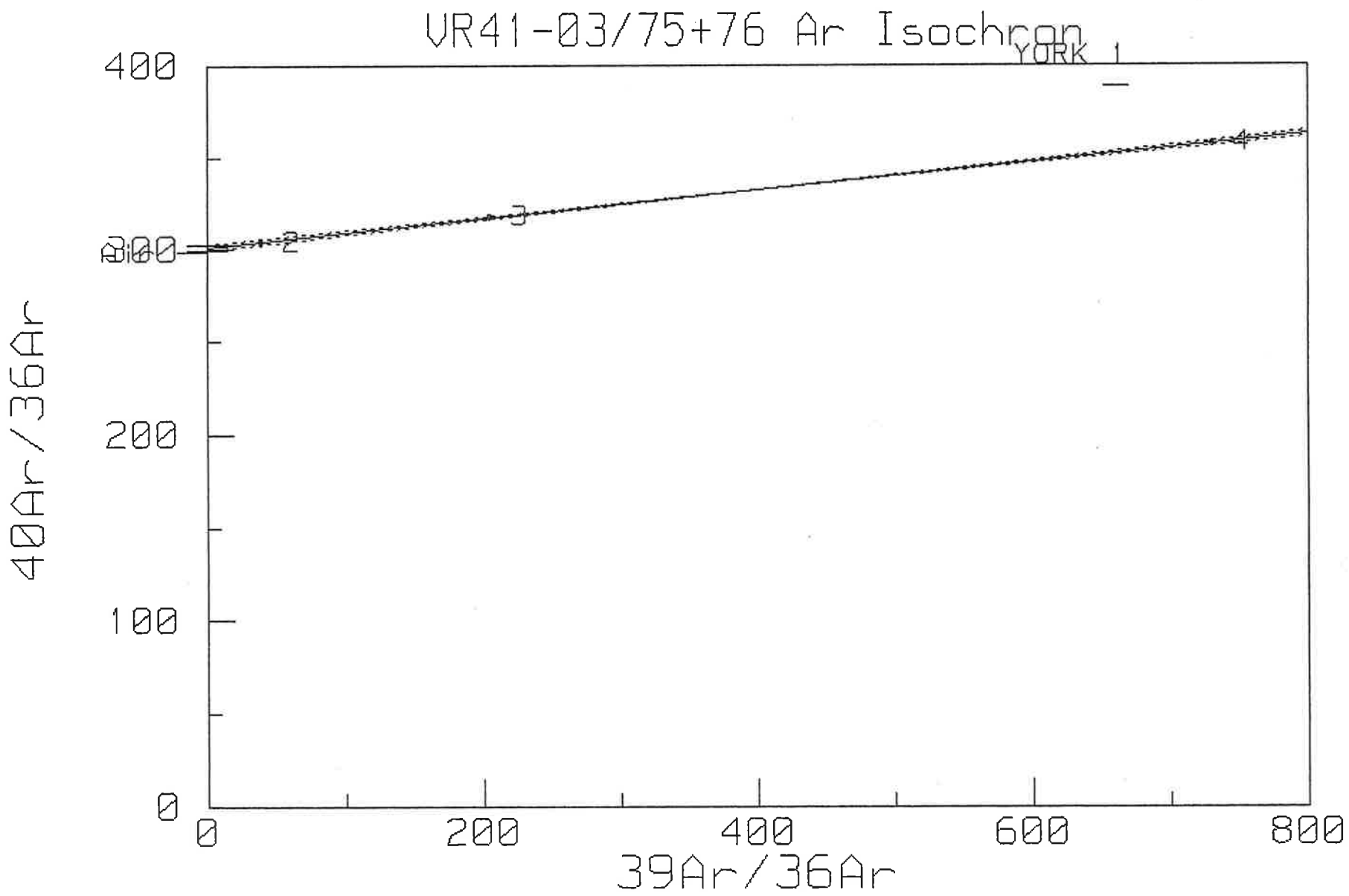
mswd= 93.8 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.725E-01	3.35E-04	3.35E-04
Initial 40/36:	3.06E+02	2.70E-02	2.70E-02
Radiogenic 40/39:	7.56E-02	5.40E-05	5.40E-05

All errors on this printout are: 2 SIGMA

#4-8


VR41-03/75+76 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
800
39Ar/36Ar

VR41-03/75+76

York 1 Analysis

n= 3

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.077599	.0034789	301.02	1.3858

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.795E-01	6.27E-03	6.27E-03
Initial 40/36:	3.01E+02	6.93E-01	6.93E-01
Radiogenic 40/39:	7.76E-02	1.74E-03	1.74E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 3

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.077493	.00015209	301.05	.065431

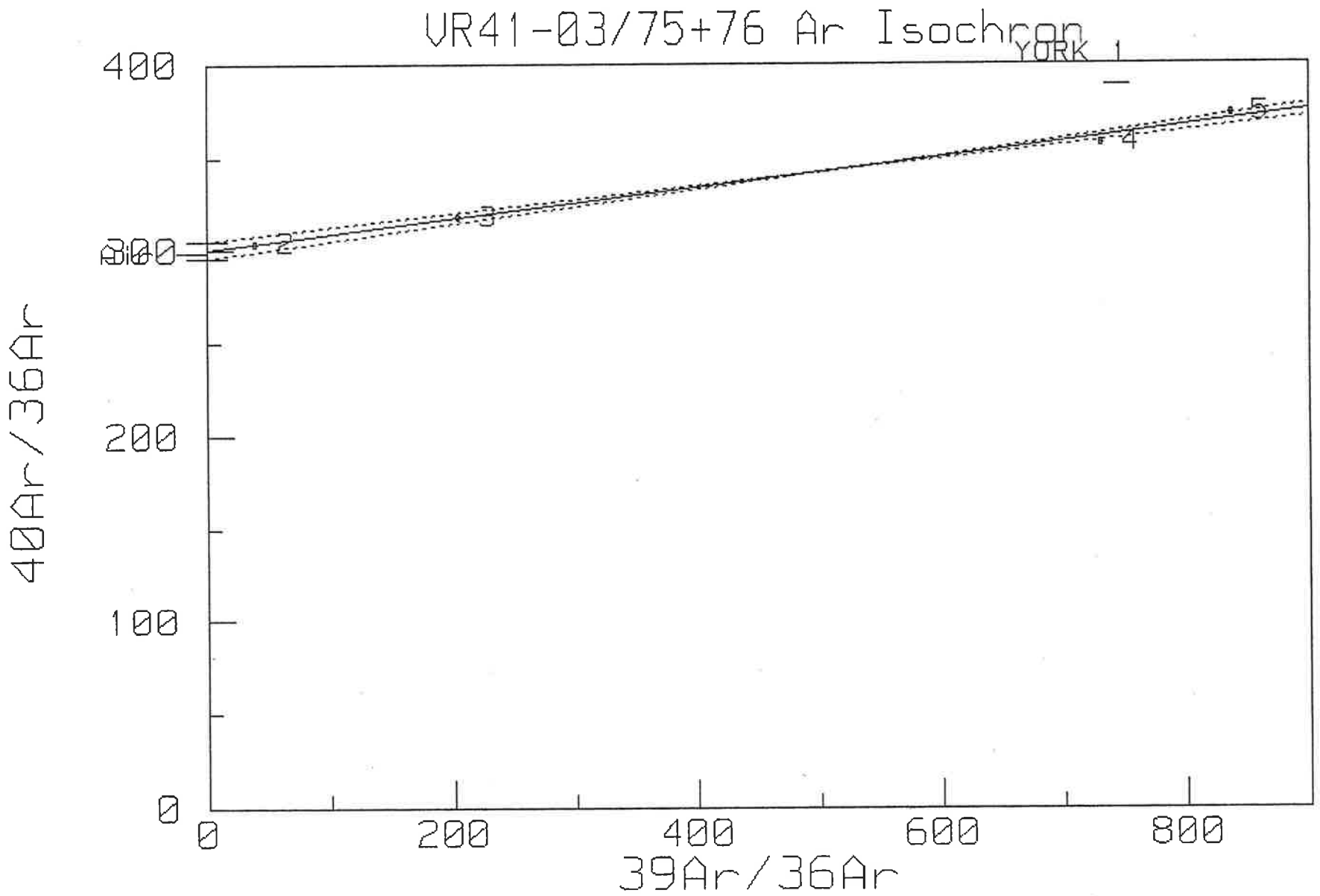
mswd= 21.6 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.791E-01	3.91E-04	3.91E-04
Initial 40/36:	3.01E+02	3.27E-02	3.27E-02
Radiogenic 40/39:	7.75E-02	7.60E-05	7.60E-05

All errors on this printout are: 2 SIGMA

#2-4


VR41-03/75+76 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
800
39Ar/36Ar

VR41-03/75+76

York 1 Analysis

n= 4

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.083103	.0090433	300.24	4.6551

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.993E-01	1.63E-02	1.63E-02
Initial 40/36:	3.00E+02	2.33E+00	2.33E+00
Radiogenic 40/39:	8.31E-02	4.52E-03	4.52E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 4

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.08317	.00011664	300.21	.064359

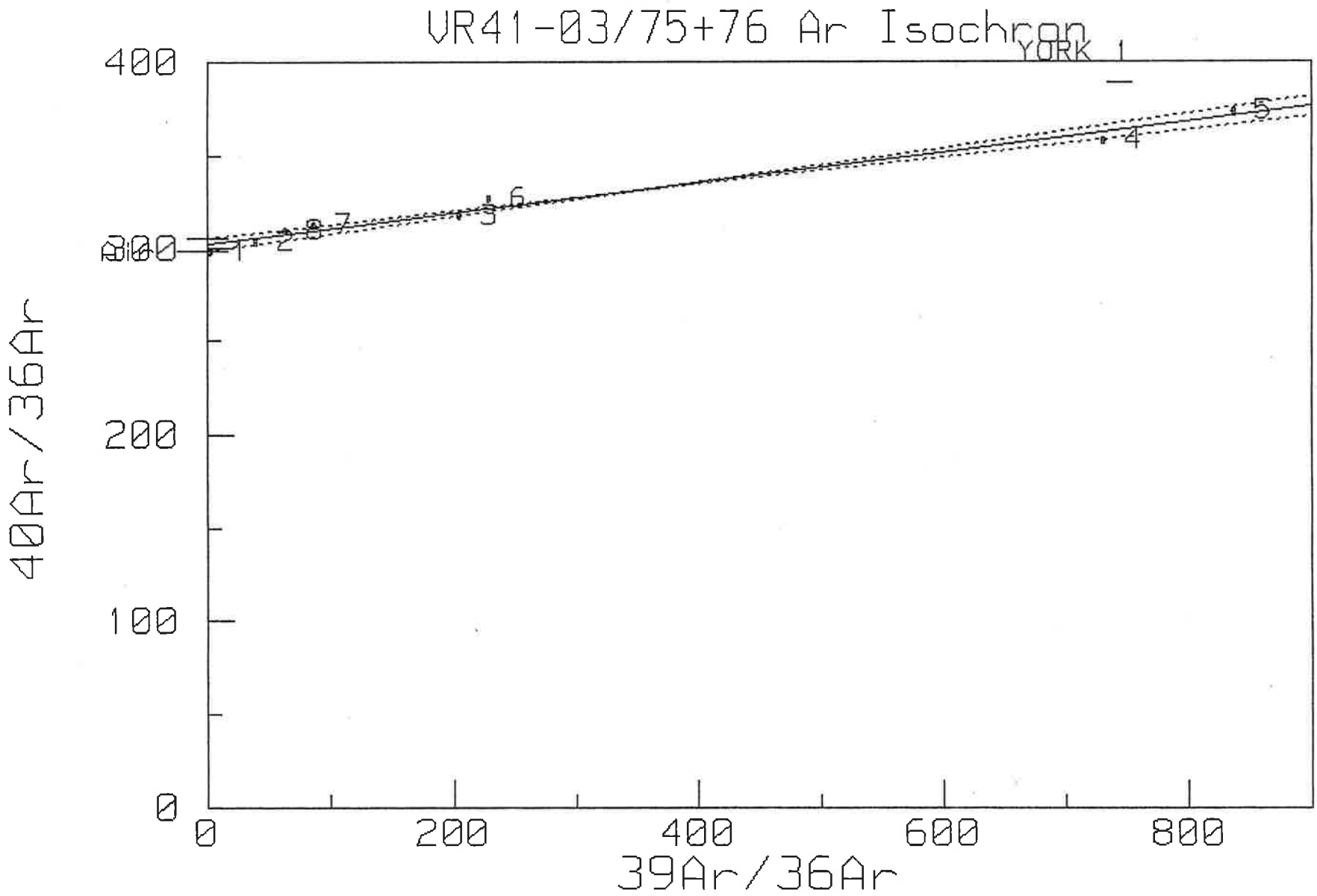
mswd= 86.4 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.995E-01	3.66E-04	3.66E-04
Initial 40/36:	3.00E+02	3.22E-02	3.22E-02
Radiogenic 40/39:	8.32E-02	5.83E-05	5.83E-05

All errors on this printout are: 2 SIGMA

#2-5


VR41-03/75+76 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
800
39Ar/36Ar

VR41-03/75+76

York 1 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.081572	.010221	302.45	3.6878

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.938E-01	1.84E-02	1.84E-02
Initial 40/36:	3.02E+02	1.84E+00	1.84E+00
Radiogenic 40/39:	8.16E-02	5.11E-03	5.11E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.081094	9.0854E-5	302.57	.036314

mswd= 106 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.921E-01	3.35E-04	3.35E-04
Initial 40/36:	3.03E+02	1.82E-02	1.82E-02
Radiogenic 40/39:	8.11E-02	4.54E-05	4.54E-05

All errors on this printout are: 2 SIGMA

#1-5, All

1250	.00002	.00041	.00032	.00016	.58716	.00001	.00041	.00000	.00105
1400	.00002	.00049	.00039	.00026	.95046	.00002	.00067	.00000	.00133

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00107	.00019	.31740	1.11718	.00159	.89
750	.00079	.00014	.23468	.05453	.00025	.99
850	.00018	.00003	.05184	.07842	.00013	.50
950	.00065	.00011	.19111	.00461	.00010	.67
1050	.00019	.00003	.05683	.02535	.00011	.56
1150	.00020	.00003	.05791	.03151	.00016	.44
1250	.00036	.00006	.10577	.04963	.00024	.05
1400	.00060	.00011	.17600	.06890	.00027	.04

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.00286	.00216	1.327	.9	.3	4.77 +/- 4.01
750	.00641	.03078	.208	2.7	3.8	.75 +/- .20
850	.00386	.03590	.108	6.9	4.4	.39 +/- .28
950	.04010	.47323	.085	17.0	58.0	.31 +/- .02
1050	.01490	.16117	.092	20.3	19.7	.33 +/- .09
1150	.00613	.04486	.137	9.5	5.5	.49 +/- .11
1250	.00613	.03083	.199	5.5	3.8	.72 +/- .18
1400	.00840	.03732	.225	4.5	4.6	.81 +/- .25
TOTAL GAS			.109			.39 +/- .07

PLATEAU AGE = .32 +/- .13 Ma
PLATEAU ON STEPS 3 TO 5 AND CONTAINS 82.1 PERCENT OF THE GAS
PLATEAU MIN = .31 AND PLATEAU MAX = .39

PLATEAU AGE = .31 +/- .05 Ma
PLATEAU ON STEPS 4 TO 5 AND CONTAINS 77.7 PERCENT OF THE GAS
PLATEAU MIN = .31 AND PLATEAU MAX = .33

©
Your Personalized Argon Data Acquisition on Sample: VR41-03/75+76/DD84
Sample analysis started on 251 Reduced on 4-Oct-2004
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 403.8 mg
J-value and its error .0019965 .1 %

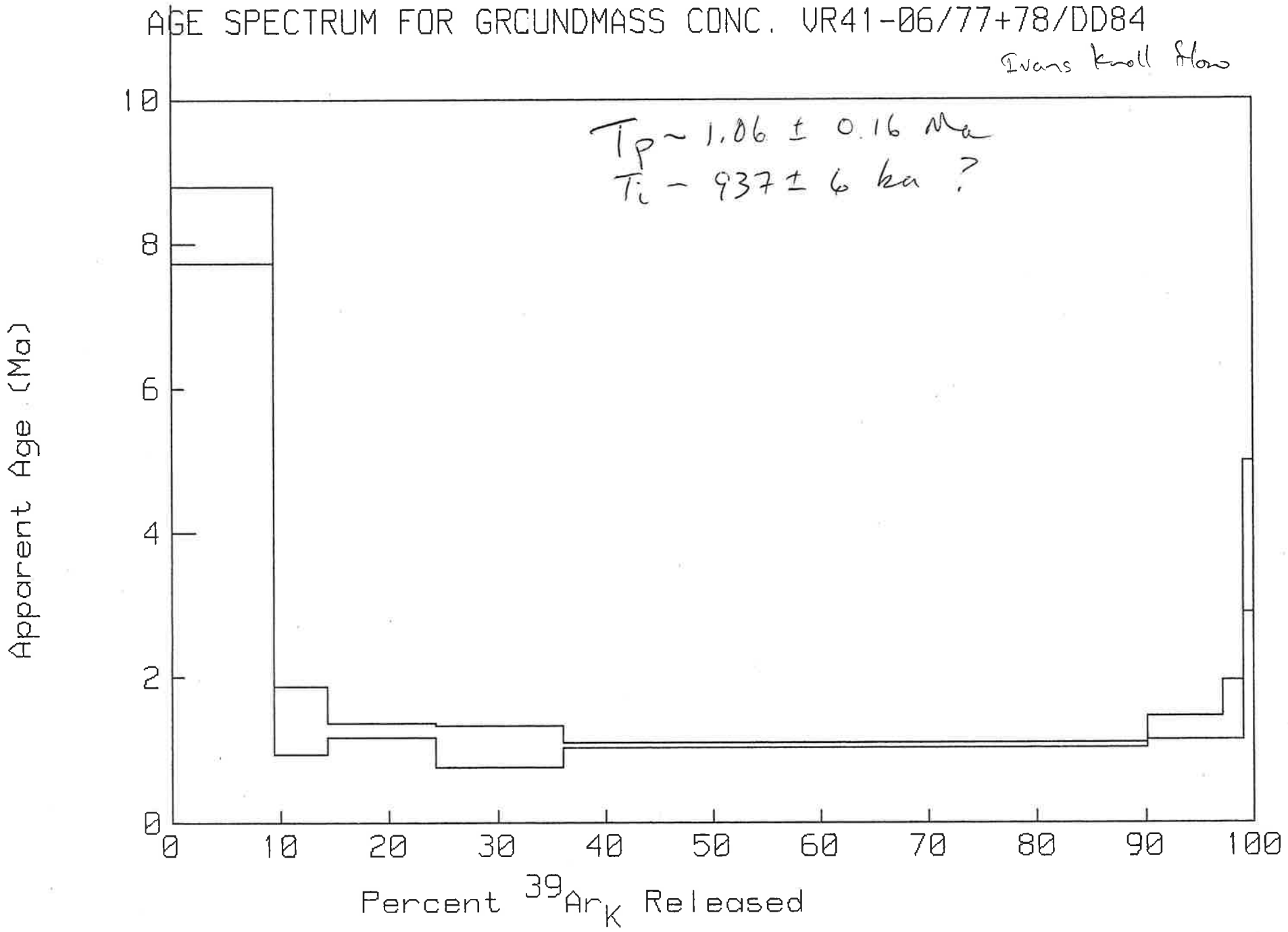
RAW DATA

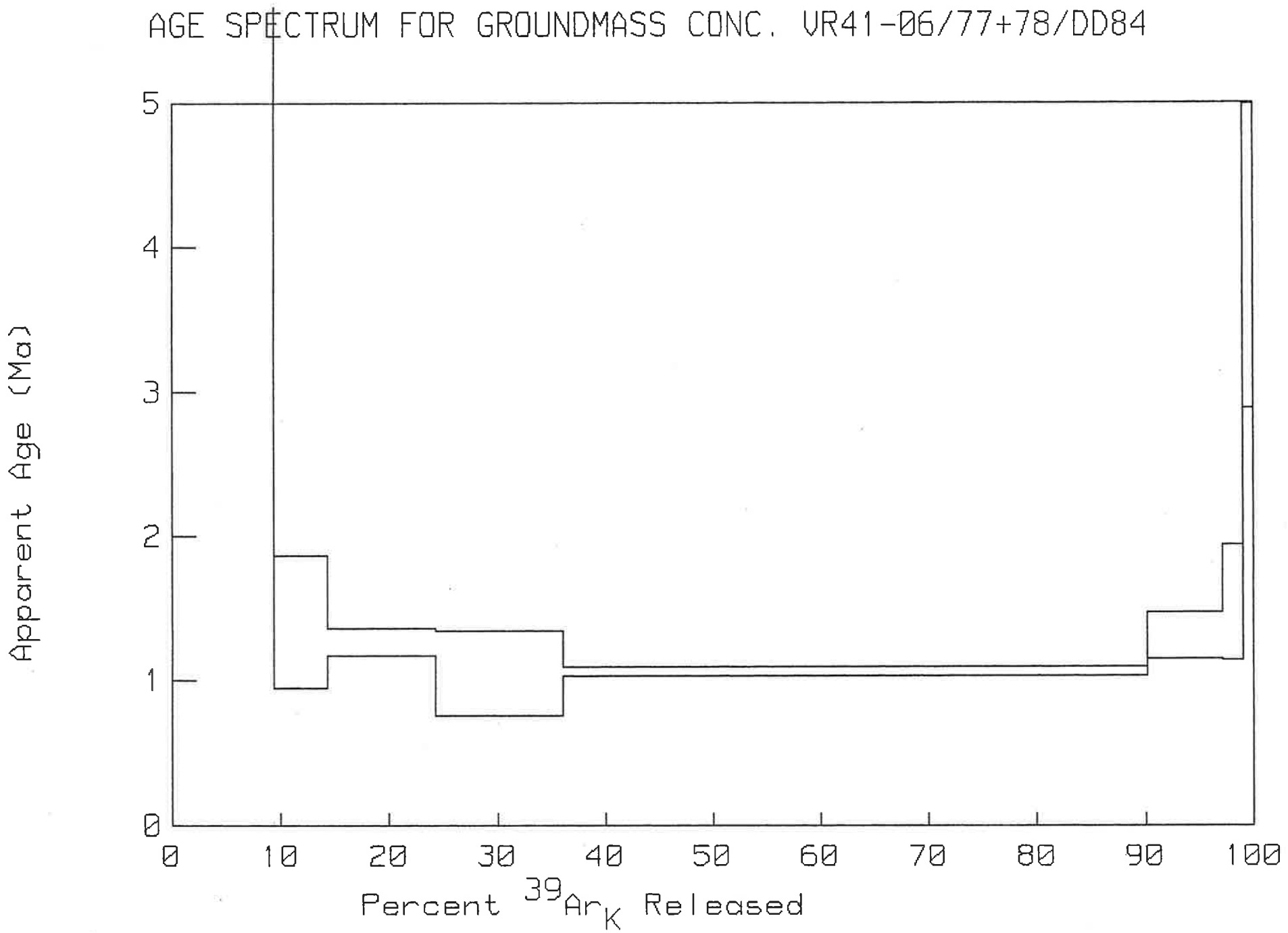
FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141068	650	.32029	.00215	.00047	.00003	.00106	200	1
+/-		.00029	.00001	.00003	.00000	.00001		
141069	750	.24140	.03067	.00249	.00043	.00079	200	1
+/-		.00025	.00001	.00001	.00001	.00001		
141070	850	.05608	.03579	.00152	.00100	.00019	200	1
+/-		.00002	0.00000	.00001	.00000	.00001		
141071	950	.23614	.47162	.00808	.00979	.00083	200	1
+/-		.00023	.00040	.00002	.00002	.00001		
141072	1050	.07340	.16066	.00314	.00399	.00027	200	1
+/-		.00003	.00009	.00001	.00001	.00001		
141073	1150	.06451	.04473	.00171	.00142	.00022	200	1
+/-		.00005	.00003	.00000	.00001	.00000		
141074	1250	.11221	.03110	.00153	.00815	.00051	200	1
+/-		.00008	.00002	.00000	.00000	.00000		
141075	1400	.18479	.03782	.00193	.01318	.00084	200	1
+/-		.00012	.00001	.00001	.00001	.00001		

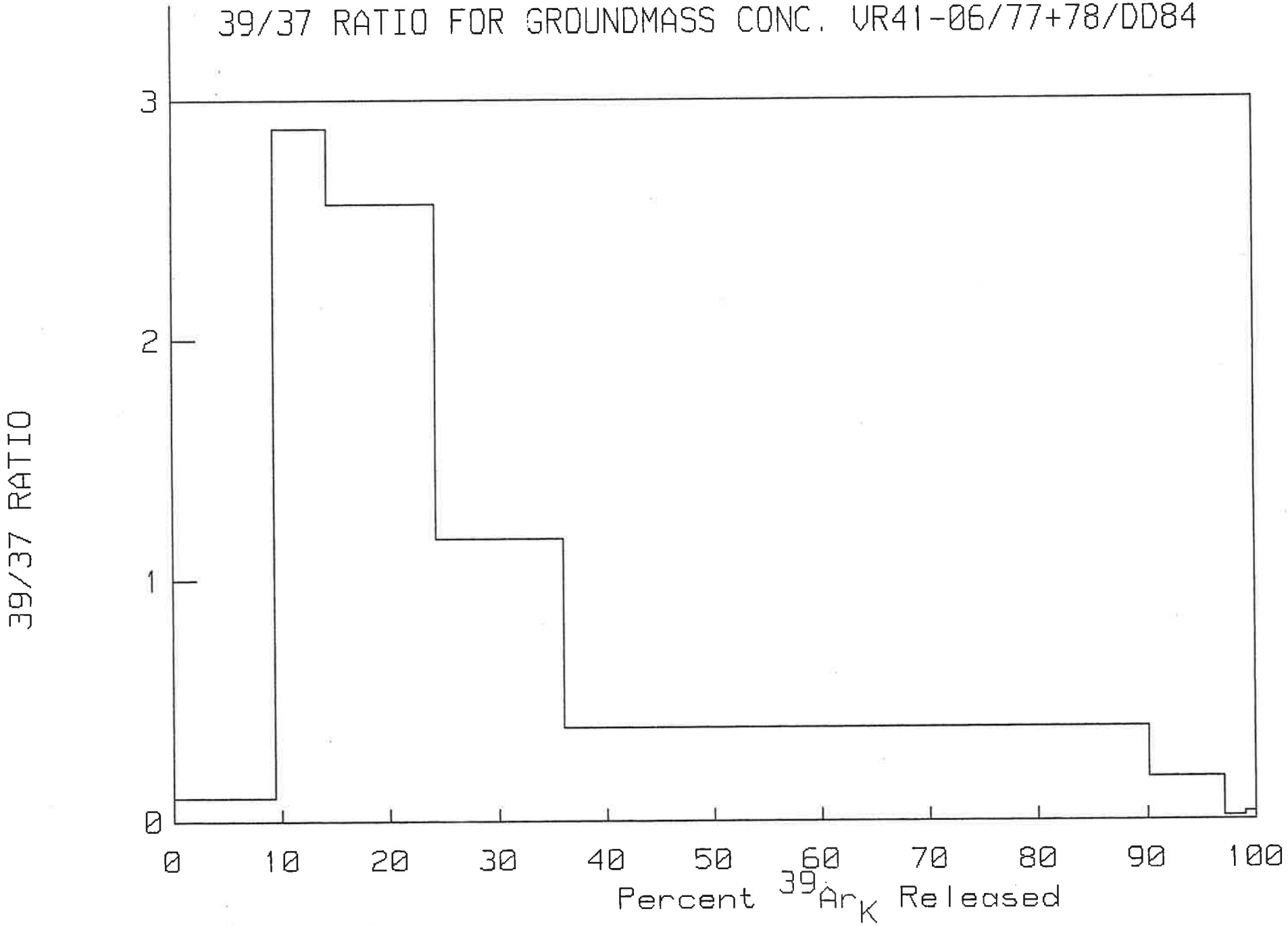
Raw values corrected for manifold options, trap current and mass discrimination

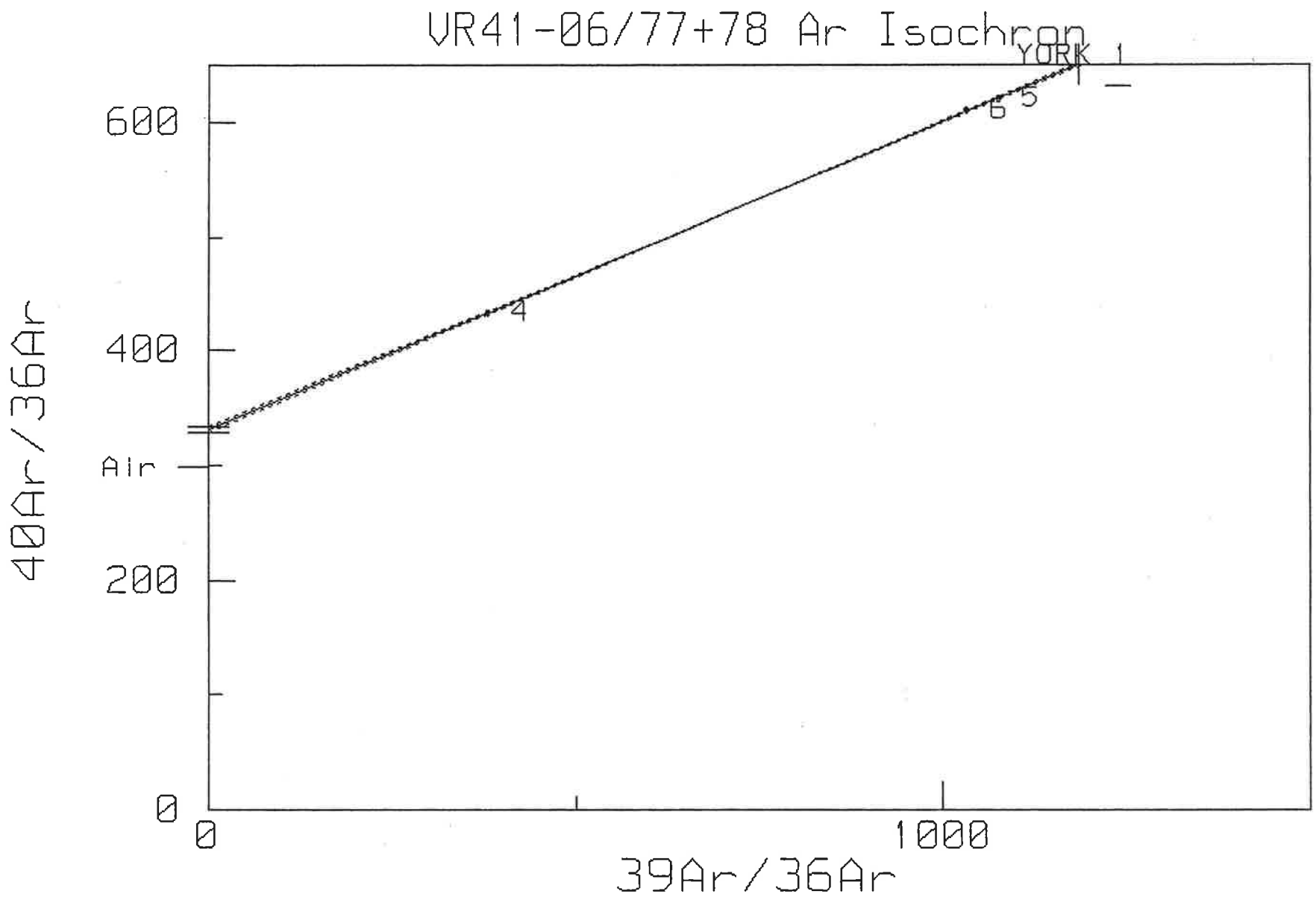
TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
650	.32029	.00216	.00048	.00003	.00107	.00239	0.00000
+/-	.00029	.00001	.00003	.00000	.00001		
750	.24140	.03075	.00250	.00044	.00080	.03081	.00005
+/-	.00025	.00001	.00001	.00001	.00001		
850	.05608	.03589	.00153	.00101	.00020	.07097	.00006
+/-	.00002	.00000	.00001	.00000	.00001		
950	.23614	.47298	.00812	.00987	.00084	.69422	.00075
+/-	.00023	.00040	.00002	.00002	.00001		
1050	.07340	.16112	.00316	.00402	.00027	.28305	.00026
+/-	.00003	.00009	.00001	.00001	.00001		
1150	.06451	.04486	.00172	.00144	.00022	.10109	.00007
+/-	.00005	.00003	.00000	.00001	.00000		
1250	.11221	.03119	.00154	.00822	.00052	.57896	.00005
+/-	.00008	.00002	.00000	.00000	.00000		
1400	.18479	.03793	.00195	.01329	.00085	.93719	.00006
+/-	.00012	.00001	.00001	.00001	.00001		

TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
650	.00000	.00003	.00002	0.00000	.00243	.00000	.00000	.00000	.00026
750	.00002	.00041	.00032	.00001	.03123	.00000	.00002	.00000	.00196
850	.00002	.00047	.00037	.00002	.07196	.00000	.00005	.00000	.00102
950	.00024	.00626	.00492	.00019	.70385	.00001	.00050	.00000	.00174
1050	.00008	.00213	.00168	.00008	.28700	.00001	.00020	.00000	.00099
1150	.00002	.00059	.00047	.00003	.10250	.00000	.00007	.00000	.00109


AGE SPECTRUM FOR GROUNDMASS CONC. VR41-06/77+78/DD84
Ivans knoll flow
T_p ~ 1.06 ± 0.16 Ma
T_i ~ 937 ± 6 ka ?
Apparent Age (Ma)
0
2
4
6
8
10
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


AGE SPECTRUM FOR GROUNDMASS CONC. VR41-06/77+78/DD84
Apparent Age (Ma)
0
1
2
3
4
5
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


39/37 RATIO FOR GROUNDMASS CONC. VR41-06/77+78/DD84
39/37 RATIO
3
2
1
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VR41-06/77+78 Ar Isochron
YORK
1
2
3
4
5
6
600
400
Air
200
0
40Ar/36Ar
0
1000
39Ar/36Ar

VR41-06/77+78

York 1 Analysis

n= 3

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.26859	.0034959	331.59	2.6904

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.374E-01	6.17E-03	6.17E-03
Initial 40/36:	3.32E+02	1.35E+00	1.35E+00
Radiogenic 40/39:	2.69E-01	1.75E-03	1.75E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 3

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.26853	.00020183	331.64	.16963

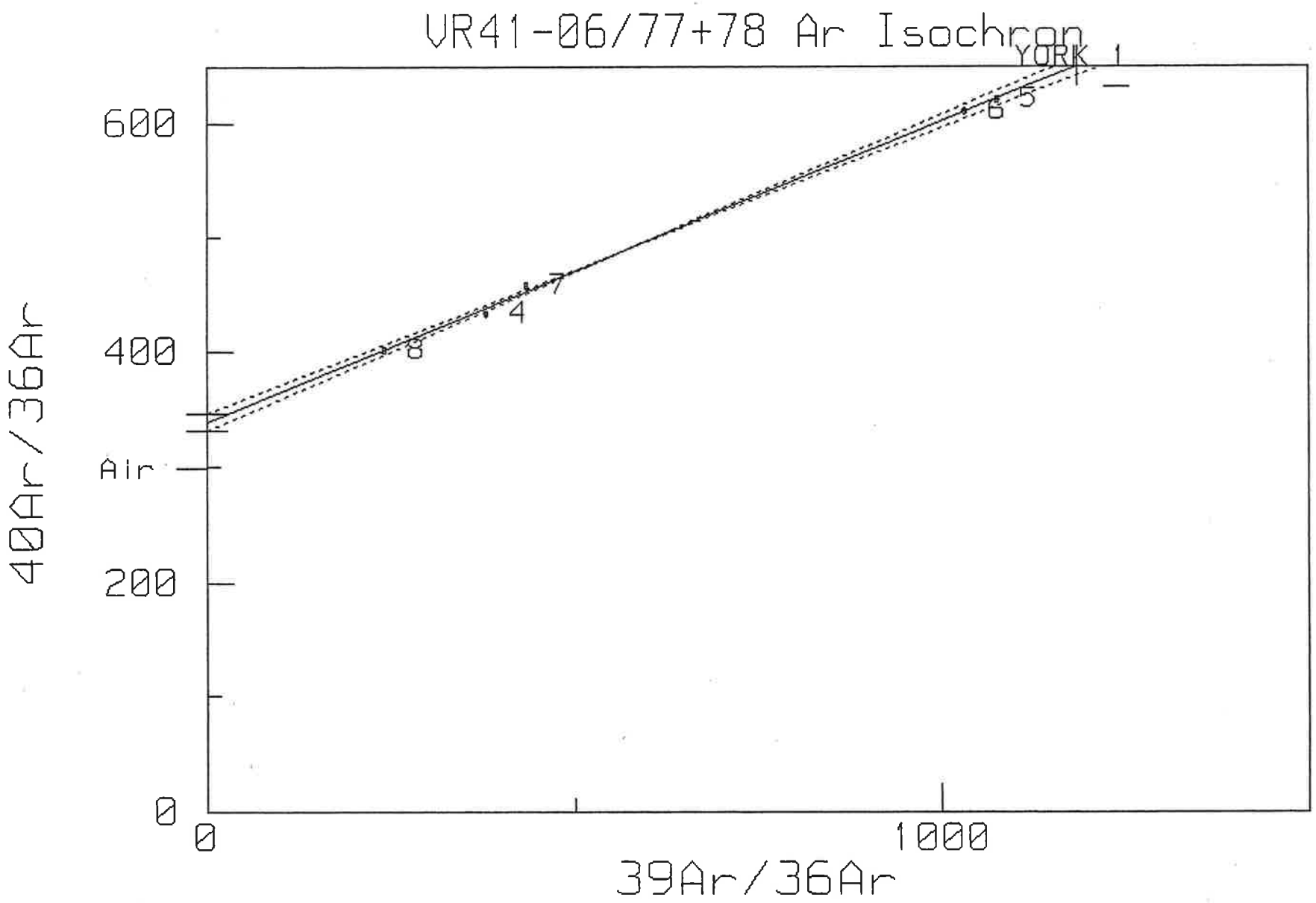
mswd= 25.7 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.371E-01	1.00E-03	1.00E-03
Initial 40/36:	3.32E+02	8.48E-02	8.48E-02
Radiogenic 40/39:	2.69E-01	1.01E-04	1.01E-04

All errors on this printout are: 2 SIGMA

#4-6


VR41-06/77+78 Ar Isochron
YORK 1
600
400
Air
200
0
40Ar/36Ar
0
1000
39Ar/36Ar

VR41-06/77+78

York 1 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.26243	.013425	338.55	7.8327

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.159E-01	2.34E-02	2.34E-02
Initial 40/36:	3.39E+02	3.92E+00	3.92E+00
Radiogenic 40/39:	2.62E-01	6.71E-03	6.71E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.26194	.00014956	338.82	.098408

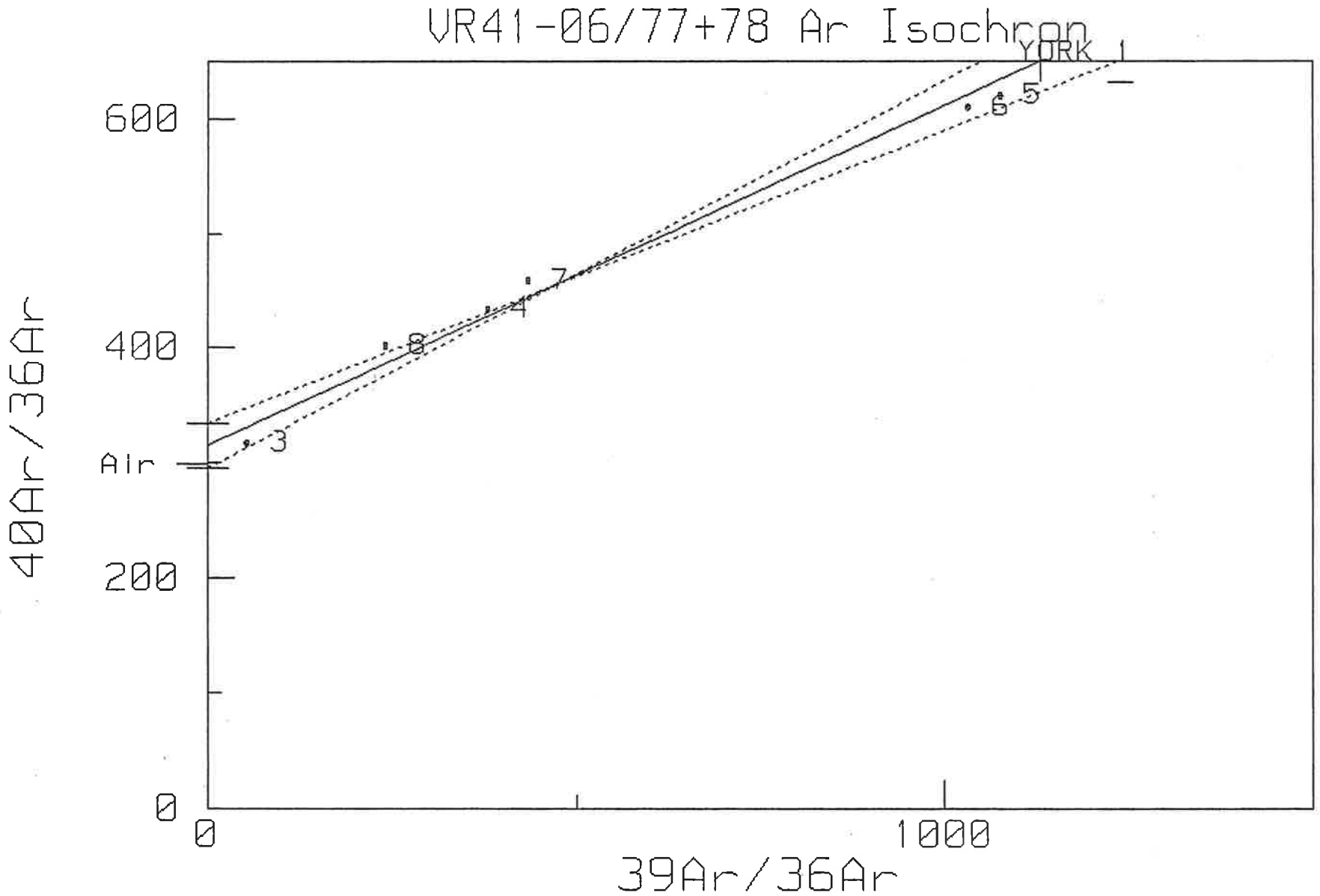
mswd= 95.5 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.142E-01	9.50E-04	9.50E-04
Initial 40/36:	3.39E+02	4.92E-02	4.92E-02
Radiogenic 40/39:	2.62E-01	7.48E-05	7.48E-05

All errors on this printout are: 2 SIGMA

#4-8


VR41-06/77+78 Ar Isochron
YORK
600
400
Air
200
0
40Ar/36Ar
0
1000
39Ar/36Ar
1
2
3
4
5
6
7
8

VR41-06/77+78

York 1 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.29651	.040876	314.79	19.298

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.035E+00	7.13E-02	7.13E-02
Initial 40/36:	3.15E+02	9.65E+00	9.65E+00
Radiogenic 40/39:	2.97E-01	2.04E-02	2.04E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.28436	.00019116	320.18	.099465

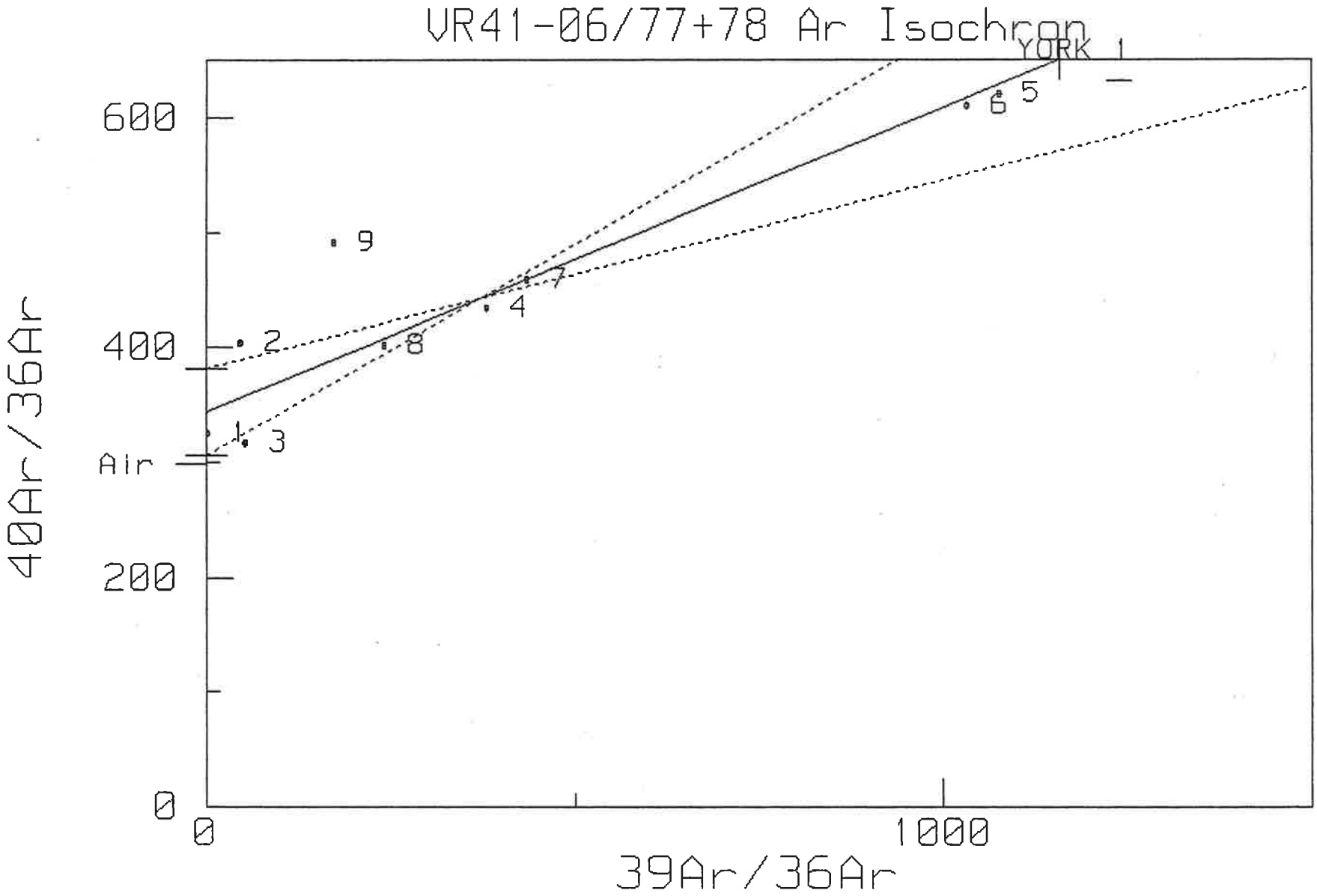
mswd= 347 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.924E-01	1.05E-03	1.05E-03
Initial 40/36:	3.20E+02	4.97E-02	4.97E-02
Radiogenic 40/39:	2.84E-01	9.56E-05	9.56E-05

All errors on this printout are: 2 SIGMA

#3-8


VR41-06/77+78 Ar Isochron
YORK 1
600
400
200
0
Air
40Ar/36Ar
0
1000
39Ar/36Ar
1
2
3
4
5
6
7
8
9

VR41-06/77+78
York 1 Analysis

n= 9

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.26459	.10144	343.67	37.968

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.234E-01	1.77E-01	1.77E-01
Initial 40/36:	3.44E+02	1.90E+01	1.90E+01
Radiogenic 40/39:	2.65E-01	5.07E-02	5.07E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 9

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.25606	.00010092	345.86	.04624

mswd= 900 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	8.937E-01	9.11E-04	9.11E-04
Initial 40/36:	3.46E+02	2.31E-02	2.31E-02
Radiogenic 40/39:	2.56E-01	5.05E-05	5.05E-05

All errors on this printout are: 2 SIGMA

#1-9, All

Note: 75c° fraction (#2) had relatively severe curvature in regressions due to "dirty" gas. This fraction absolutely unreliable.

Regressions in other fractions looked normal, although detector baseline was noisy.

850	.00002	.00051	.00040	0.00000	.01343	.00000	.00001	.00000	.00311
950	.00004	.00106	.00083	.00001	.03114	.00000	.00002	.00000	.00609
1050	.00005	.00123	.00097	.00002	.07974	.00000	.00006	.00000	.00645
1150	.00022	.00569	.00448	.00030	1.09844	.00002	.00078	.00000	.00710
1250	.00003	.00073	.00057	.00008	.30879	.00001	.00022	.00000	.00017
1350	.00001	.00021	.00016	.00024	.89518	.00002	.00063	.00000	.00008
1500	.00000	.00010	.00008	.00006	.23717	.00000	.00017	.00000	.00005

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00014	.00002	.04036	6.99191	.03374	27.40
750	.00164	.00029	.48332	.15285	.00285	.10
850	.00074	.00013	.21829	.13203	.00048	2.88
950	.00021	.00004	.06227	.02711	.00044	2.57
1050	.00009	.00002	.02558	.08272	.00036	1.17
1150	.00042	.00007	.12293	.00871	.00036	.39
1250	.00013	.00002	.03759	.04700	.00045	.18
1350	.00007	.00001	.01946	.11452	.00053	.02
1500	.00004	.00001	.01244	.30239	.00136	.03

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.00400	.00014	28.113	9.0	0.0	95.56 +/- 23.15
750	.17742	.07481	2.371	26.8	9.4	8.26 +/- .53
850	.01559	.03870	.403	6.7	4.9	1.41 +/- .46
950	.02905	.08001	.363	31.5	10.1	1.27 +/- .09
1050	.02807	.09336	.301	51.4	11.7	1.05 +/- .29
1150	.13072	.43036	.304	50.6	54.1	1.06 +/- .03
1250	.02066	.05527	.374	35.1	6.9	1.30 +/- .16
1350	.00699	.01585	.441	26.3	2.0	1.54 +/- .40
1500	.00821	.00727	1.130	39.6	.9	3.94 +/- 1.05
TOTAL GAS			.529			1.84 +/- .17

PLATEAU AGE = 1.06 +/- .16 Ma
PLATEAU ON STEPS 5 TO 6 AND CONTAINS 65.8 PERCENT OF THE GAS
PLATEAU MIN = 1.05 AND PLATEAU MAX = 1.06

Your Personalized Argon Data Acquisition on Sample: VR41-06/77+78/DD84
Sample analysis started on 323 Reduced on 2-Feb-2005
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 403.9 mg
J-value and its error .001935 .1 %

RAW DATA

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141590	650	.04437	.00014	.00005	.00001	.00014	200	1
+/-		.00001	.00001	.00000	.00001	.00000		
141591	750	.66152	.07498	.00261	.00258	.00182	200	1
+/-		.01764	.00202	.00006	.00006	.00002		
141592	850	.23428	.03852	.00373	.00005	.00074	200	1
+/-		.00012	0.00000	.00001	.00000	.00002		
141593	950	.09215	.07964	.00714	.00010	.00022	200	1
+/-		.00001	.00006	.00002	.00001	.00001		
141594	1050	.05463	.09295	.00766	.00027	.00011	200	1
+/-		.00001	.00002	.00000	.00002	.00002		
141595	1150	.25813	.42899	.01281	.00368	.00071	200	1
+/-		.00020	.00032	.00002	.00001	.00001		
141596	1250	.05882	.05521	.00092	.00103	.00021	200	1
+/-		0.00000	.00006	.00001	.00003	.00001		
141597	1350	.02661	.01640	.00032	.00299	.00030	200	1
+/-		.00001	0.00000	.00000	.00000	.00001		
141598	1500	.02073	.00740	.00015	.00079	.00010	200	1
+/-		.00004	.00001	.00001	.00001	.00001		

Raw values corrected for manifold options, trap current and mass discrimination

TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
650	.04437	.00014	.00005	.00001	.00014	0.00000	0.00000
+/-	.00001	.00001	.00000	.00001	.00000		
750	.66152	.07520	.00263	.00260	.00184	.76328	.00016
+/-	.01764	.00203	.00006	.00006	.00002		
850	.23428	.03863	.00375	.00005	.00074	.01340	.00008
+/-	.00012	.00000	.00001	.00000	.00002		
950	.09215	.07987	.00718	.00011	.00022	.03108	.00017
+/-	.00001	.00006	.00002	.00001	.00001		
1050	.05463	.09322	.00770	.00027	.00011	.07952	.00020
+/-	.00001	.00002	.00000	.00002	.00002		
1150	.25813	.43022	.01288	.00371	.00072	1.09495	.00091
+/-	.00020	.00033	.00002	.00001	.00001		
1250	.05882	.05537	.00093	.00104	.00021	.30777	.00012
+/-	0.00000	.00006	.00001	.00003	.00001		
1350	.02661	.01644	.00032	.00302	.00031	.89217	.00003
+/-	.00001	.00000	.00000	.00000	.00001		
1500	.02073	.00742	.00016	.00080	.00011	.23638	.00002
+/-	.00004	.00001	.00001	.00001	.00001		

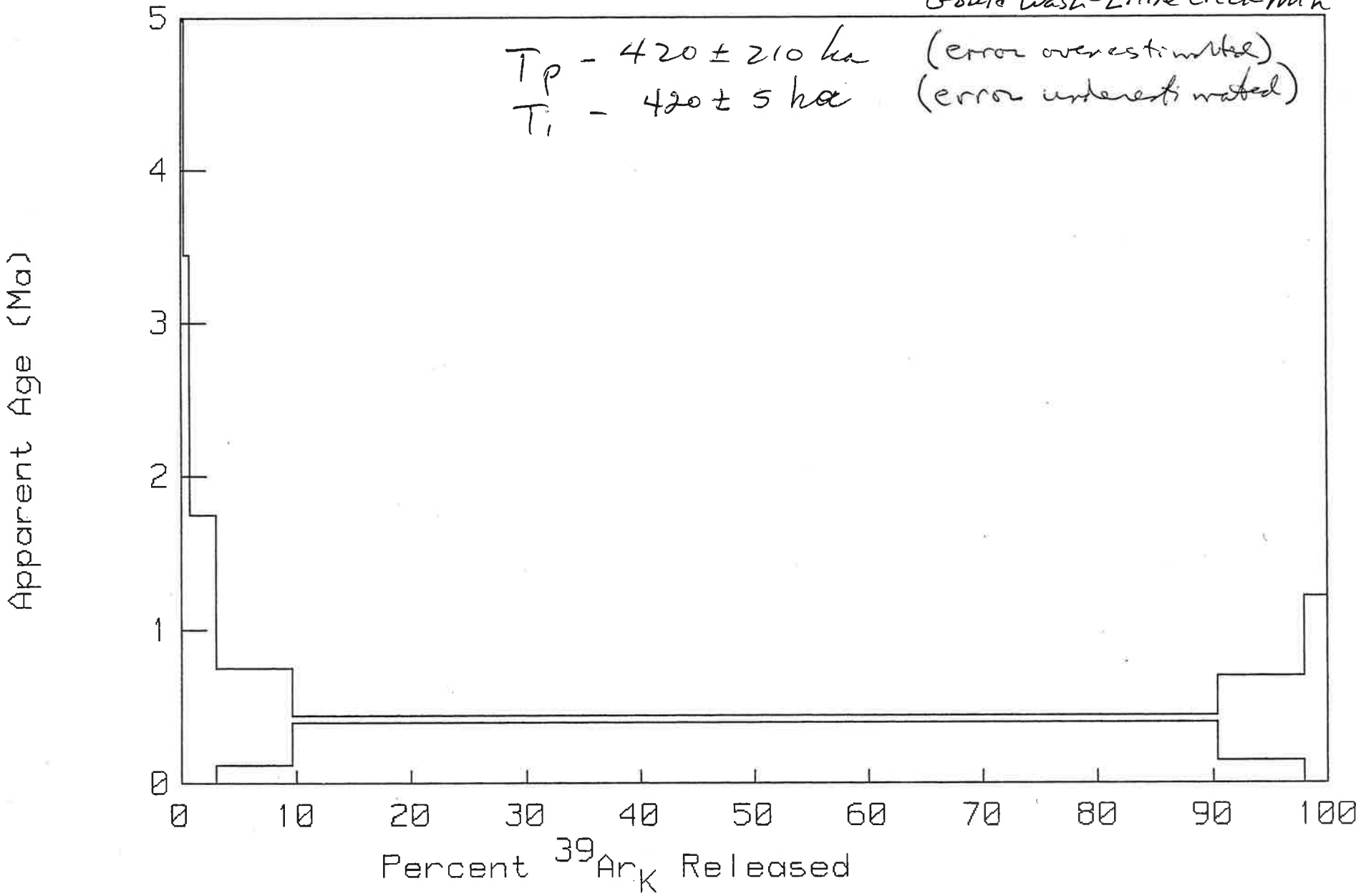
TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
650	.00000	.00000	.00000	0.00000	.00001	.00000	.00000	.00000	.00003
750	.00004	.00099	.00078	.00021	.76585	.00002	.00054	.00000	.00133

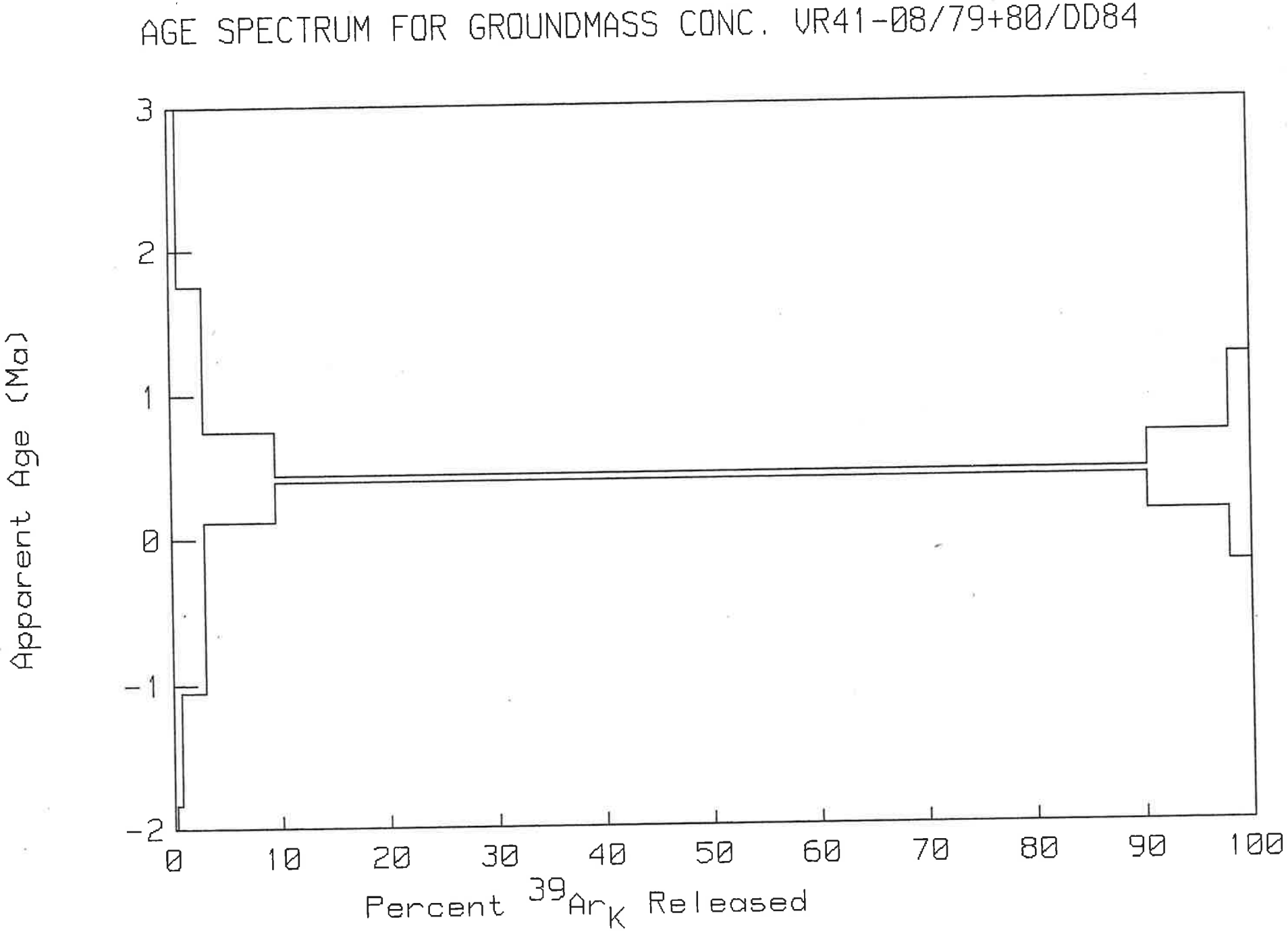
AGE SPECTRUM FOR GROUNDMASS CONC. VR41-08/79+80/DD84

Gould Wash-Little Creek Mtn

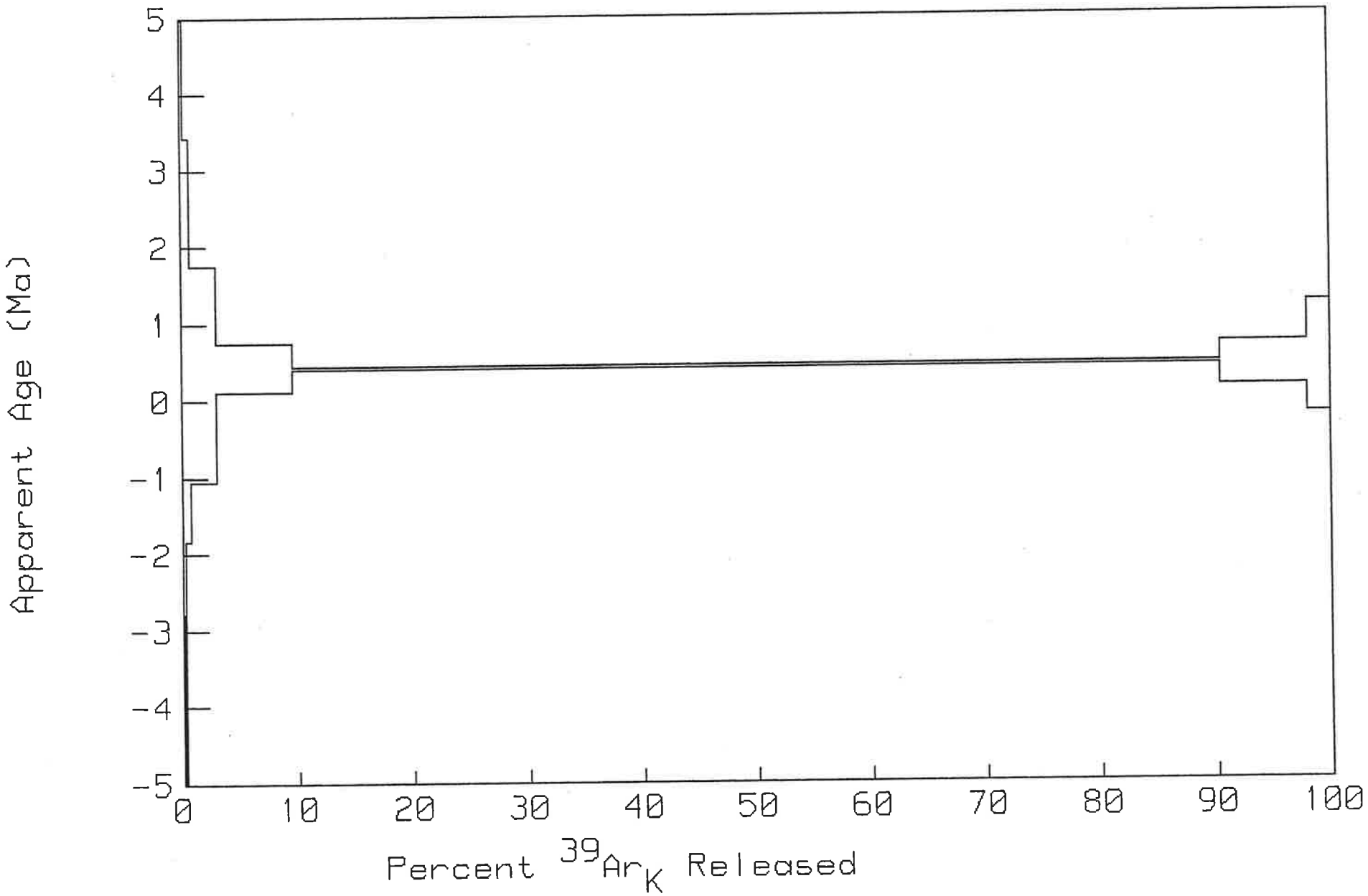
T_p - 420 ± 210 ka (error overestimated)

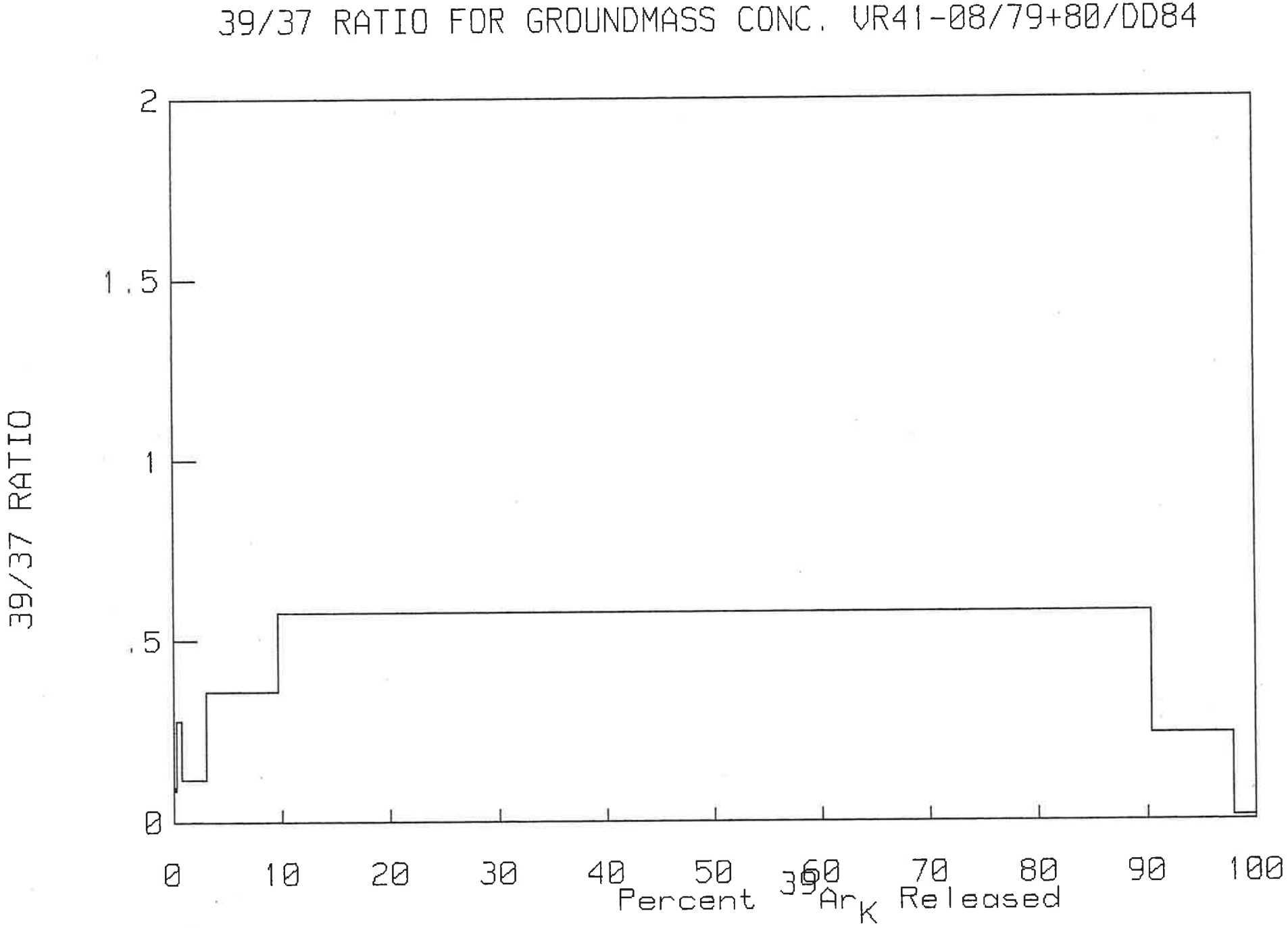
T_i - 420 ± 5 ka (error underestimated)

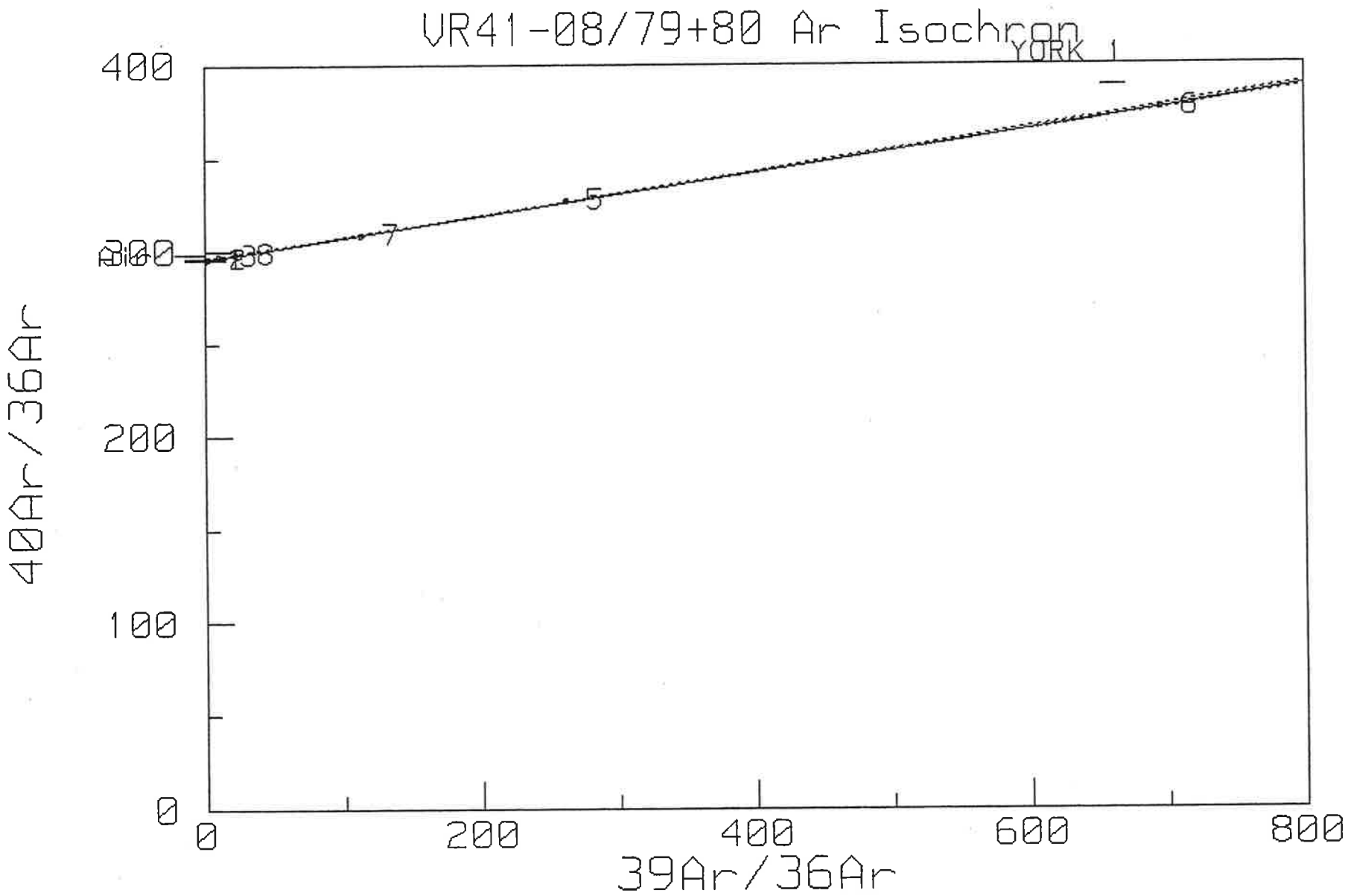



AGE SPECTRUM FOR GROUNDMASS CONC. VR41-08/79+80/DD84
Apparent Age (Ma)
3
2
1
0
-1
-2
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released

AGE SPECTRUM FOR GROUNDMASS CONC. VR41-08/79+80/DD84




39/37 RATIO FOR GROUNDMASS CONC. VR41-08/79+80/DD84
39/37 RATIO
2
1.5
1
.5
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VR41-08/79+80 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
800
39Ar/36Ar
5
6
7
8

VR41-08/79+80

York 1 Analysis

n= 7

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.11586	.0018081	295.97	.42894

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	4.185E-01	3.29E-03	3.29E-03
Initial 40/36:	2.96E+02	2.14E-01	2.14E-01
Radiogenic 40/39:	1.16E-01	9.04E-04	9.04E-04

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 7

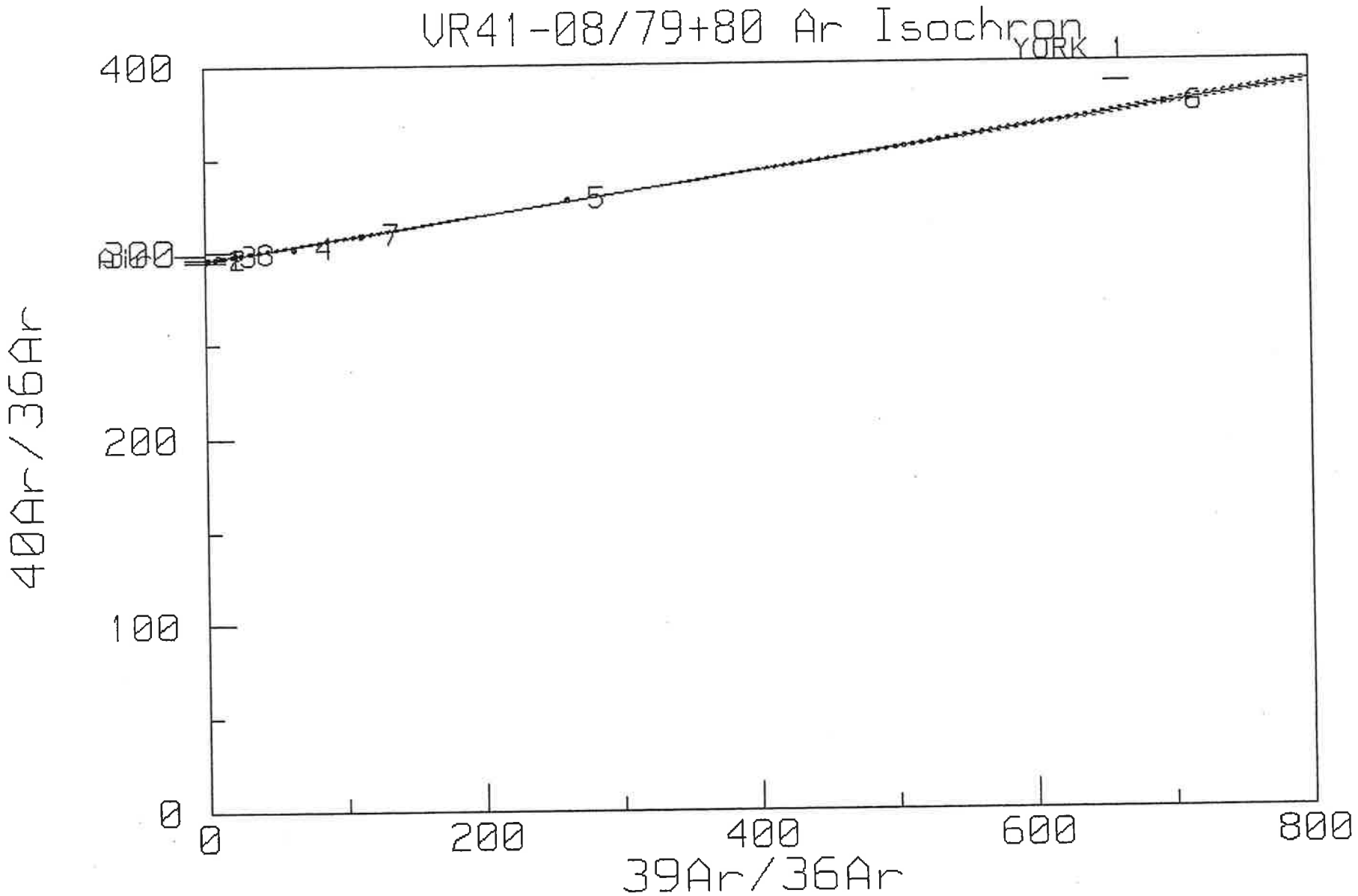
SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.11578	.00012471	295.99	.033993
mswd= 13.1	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	4.182E-01	4.75E-04	4.75E-04
Initial 40/36:	2.96E+02	1.70E-02	1.70E-02
Radiogenic 40/39:	1.16E-01	6.24E-05	6.24E-05

All errors on this printout are: 2 SIGMA

#1, 2, 3, 5, 6, 7, 8


VR41-08/79+80 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
800
39Ar/36Ar

VR41-08/79+80

York 1 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.11616	.0029199	295.72	.6487

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	4.196E-01	5.29E-03	5.29E-03
Initial 40/36:	2.96E+02	3.24E-01	3.24E-01
Radiogenic 40/39:	1.16E-01	1.46E-03	1.46E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.11613	.00012319	295.72	.031557
mswd= 21	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	4.195E-01	4.75E-04	4.75E-04
Initial 40/36:	2.96E+02	1.58E-02	1.58E-02
Radiogenic 40/39:	1.16E-01	6.16E-05	6.16E-05

All errors on this printout are: 2 SIGMA

#1-8, All

1250	.00003	.00075	.00059	.00006	.23604	.00000	.00017	.00000	.00150
1400	.00001	.00020	.00016	.00039	1.44936	.00003	.00102	.00000	.00116

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00104	.00018	.30654	1.07481	.00037	.10
750	.00034	.00006	.10086	3.80031	.00031	.09
850	.00040	.00007	.11787	.73090	.00027	.28
950	.00026	.00005	.07700	.38792	.00012	.12
1050	.00019	.00003	.05667	.08806	.00014	.36
1150	.00087	.00015	.25783	.00618	.00014	.58
1250	.00050	.00009	.14881	.07651	.00014	.24
1400	.00070	.00012	.20609	.19847	.00017	.01

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.00029	.00096	.306	.1	.1	1.11 +/- 3.88
750	.00017	.00065	.259	.2	.1	.93 +/- 13.72
850	.00086	.00387	.222	.7	.5	.80 +/- 2.64
950	.00162	.01675	.097	2.1	2.2	.35 +/- 1.40
1050	.00605	.05040	.120	9.6	6.7	.43 +/- .32
1150	.07054	.60820	.116	21.1	80.8	.42 +/- .02
1250	.00657	.05697	.115	4.2	7.6	.42 +/- .28
1400	.00210	.01525	.138	1.0	2.0	.50 +/- .72
TOTAL GAS			.117			.42 +/- .12

PLATEAU AGE = .42 +/- .21 Ma
PLATEAU ON STEPS 5 TO 7 AND CONTAINS 95.0 PERCENT OF THE GAS
PLATEAU MIN = .42 AND PLATEAU MAX = .43

Your Personalized Argon Data Acquisition on Sample: VR41-08/79+80/DD84
Sample analysis started on 324 Reduced on 3-Feb-2005
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 405.6 mg
J-value and its error .0020025 .1 %

RAW DATA

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141608	650	.30684	.00096	.00027	.00003	.00103	200	1
+/-		.00001	.00002	.00001	.00001	.00001		
141609	750	.10103	.00065	.00014	.00002	.00034	200	1
+/-		.00006	0.00000	.00001	.00001	.00001		
141610	850	.11877	.00386	.00027	.00005	.00040	200	1
+/-		.00003	.00002	.00001	.00001	.00001		
141611	950	.07879	.01676	.00051	.00047	.00030	200	1
+/-		.00736	.00155	.00008	.00009	.00001		
141612	1050	.06324	.05025	.00089	.00046	.00023	200	1
+/-		.00004	.00002	.00001	.00000	.00001		
141613	1150	.33469	.60592	.01007	.00349	.00115	200	1
+/-		.00022	.00045	.00002	.00001	.00001		
141614	1250	.15597	.05685	.00233	.00078	.00056	200	1
+/-		.00007	.00003	.00000	.00000	.00001		
141615	1400	.20835	.01619	.00150	.00478	.00108	200	1
+/-		.00030	.00007	.00000	.00000	.00001		

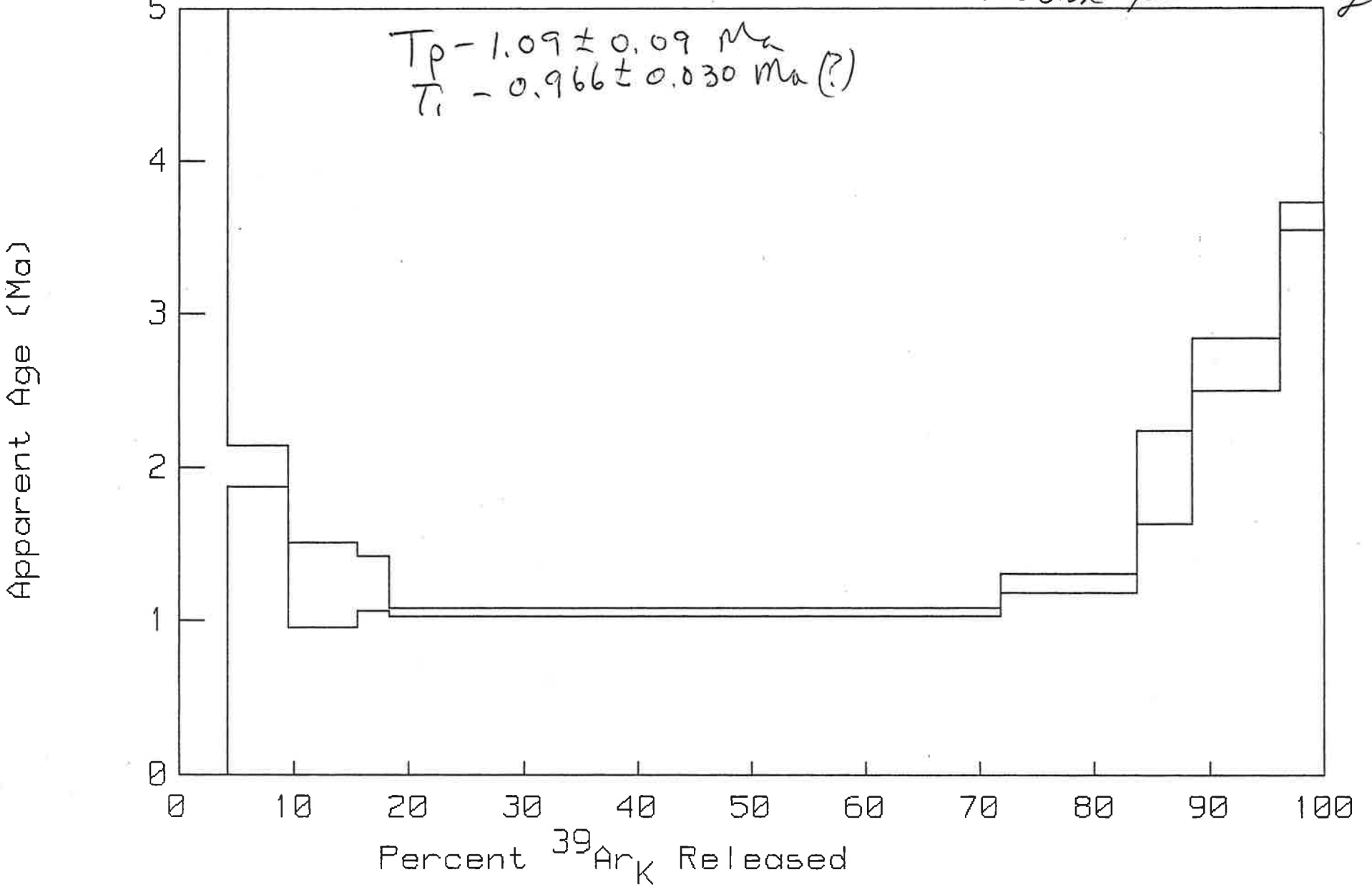
Raw values corrected for manifold options, trap current and mass discrimination

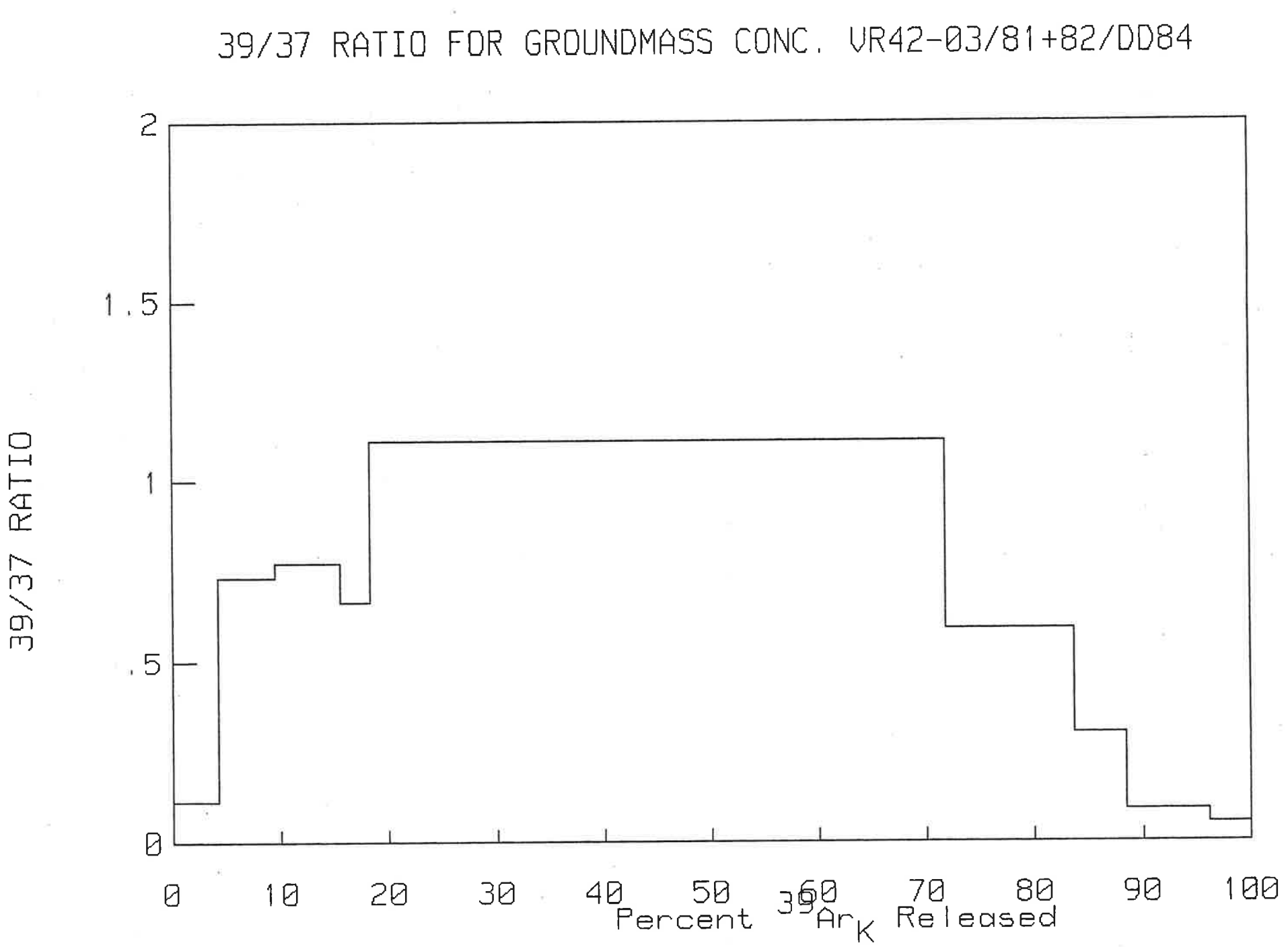
TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
650	.30684	.00096	.00027	.00003	.00104	.00992	0.00000
+/-	.00001	.00002	.00001	.00001	.00001		
750	.10103	.00065	.00014	.00002	.00034	.00743	0.00000
+/-	.00006	.00000	.00001	.00001	.00001		
850	.11877	.00388	.00027	.00005	.00040	.01380	.00001
+/-	.00003	.00002	.00001	.00001	.00001		
950	.07879	.01681	.00052	.00047	.00030	.14122	.00004
+/-	.00736	.00156	.00008	.00009	.00001		
1050	.06324	.05039	.00089	.00046	.00023	.13883	.00011
+/-	.00004	.00002	.00001	.00000	.00001		
1150	.33469	.60766	.01013	.00352	.00116	1.05321	.00129
+/-	.00022	.00045	.00002	.00001	.00001		
1250	.15597	.05702	.00235	.00079	.00057	.23528	.00012
+/-	.00007	.00003	.00000	.00000	.00001		
1400	.20835	.01623	.00151	.00483	.00109	1.44454	.00003
+/-	.00030	.00007	.00000	.00000	.00001		

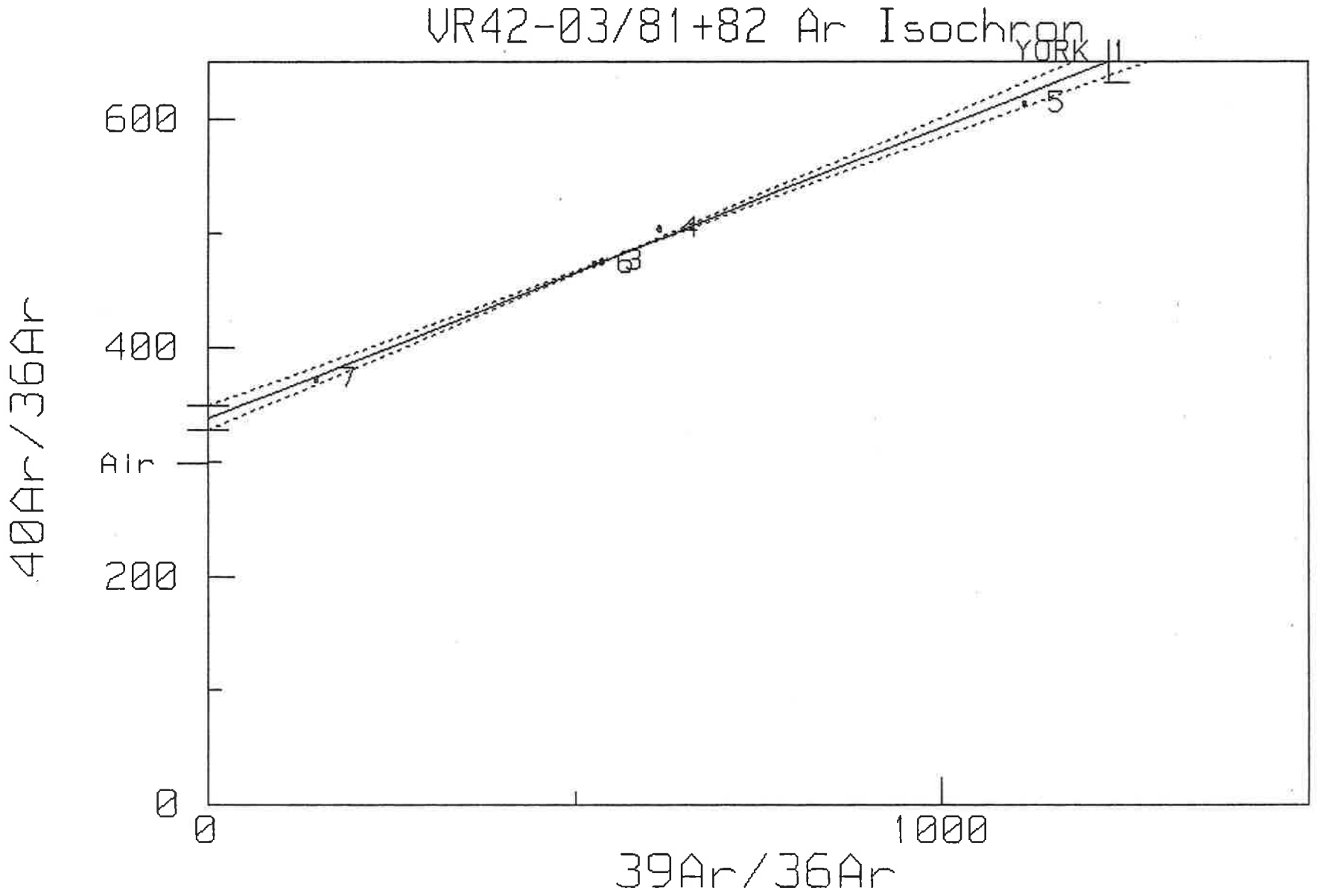
TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
650	.00000	.00001	.00001	0.00000	.00995	.00000	.00001	.00000	.00008
750	.00000	.00001	.00001	0.00000	.00746	.00000	.00001	.00000	.00007
850	.00000	.00005	.00004	0.00000	.01384	.00000	.00001	.00000	.00015
950	.00001	.00022	.00017	.00004	.14169	.00000	.00010	.00000	.00025
1050	.00003	.00067	.00052	.00004	.13927	.00000	.00010	.00000	.00019
1150	.00030	.00804	.00633	.00029	1.05643	.00002	.00075	.00000	.00192

AGE SPECTRUM FOR GROUNDMASS CONC. VR42-03/81+82/DD84

The Divide quad - Grass Valley




39/37 RATIO FOR GROUNDMASS CONC. VR42-03/81+82/DD84
39/37 RATIO
2
1.5
1
.5
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VR42-03/81+82 Ar Isochron
YORK
600
400
Air
200
0
0
1000
40Ar/36Ar
39Ar/36Ar
7
6
4
5

VR42-03/81+82

York 1 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.25409	.018989	337.81	10.568

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.408E-01	3.52E-02	3.52E-02
Initial 40/36:	3.38E+02	5.28E+00	5.28E+00
Radiogenic 40/39:	2.54E-01	9.49E-03	9.49E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 5

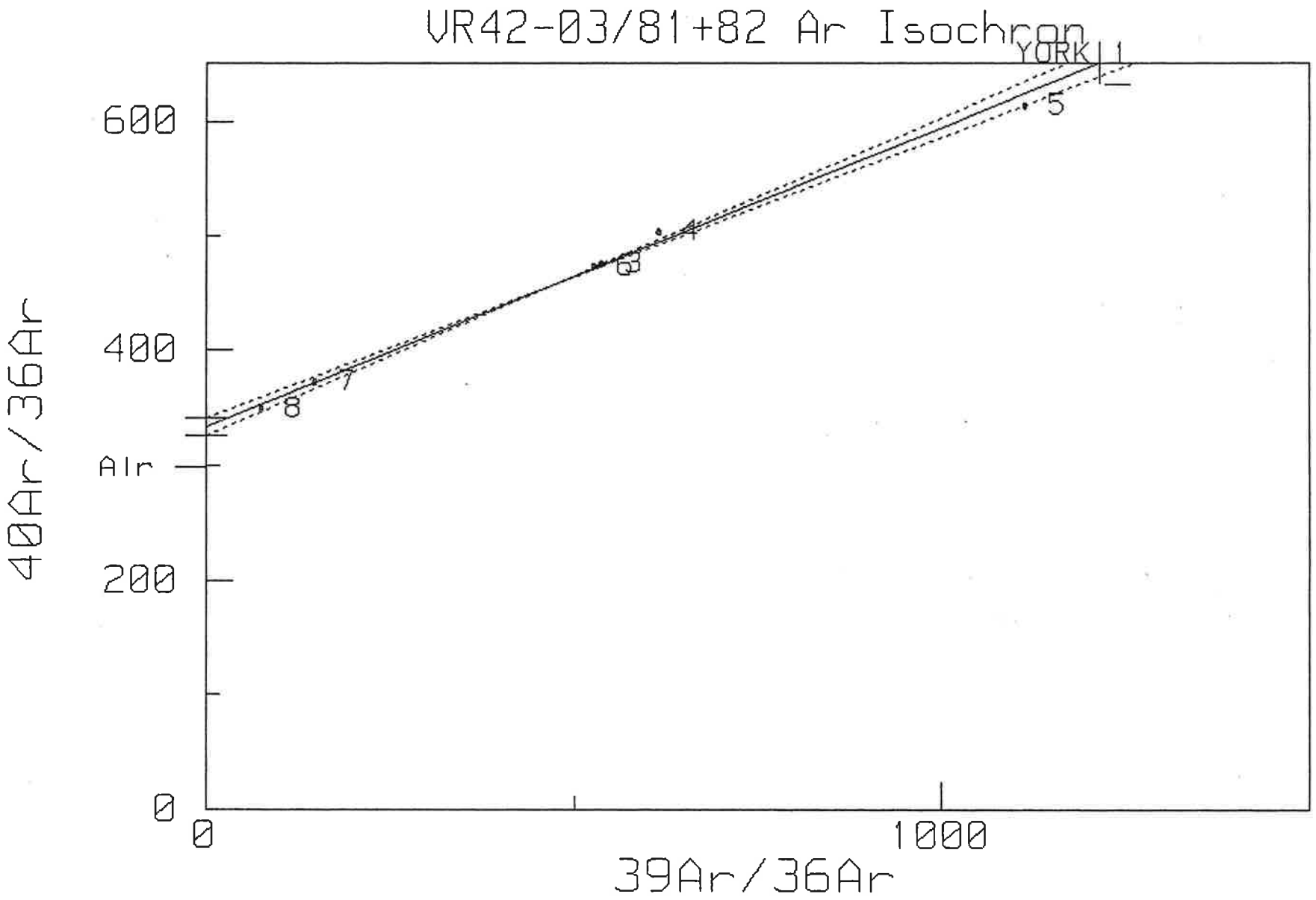
SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.24895	.00015785	340.59	.097608
mswd= 145	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.218E-01	9.67E-04	9.67E-04
Initial 40/36:	3.41E+02	4.88E-02	4.88E-02
Radiogenic 40/39:	2.49E-01	7.89E-05	7.89E-05

All errors on this printout are: 2 SIGMA

3-7


VR42-03/81+82 Ar Isochron
YORK
1
5
4
3
7
8
600
400
Air
200
0
0
1000
40Ar/36Ar
39Ar/36Ar

VR42-03/81+82

York 1 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.26075	.016002	333.29	7.5768

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.655E-01	2.96E-02	2.96E-02
Initial 40/36:	3.33E+02	3.79E+00	3.79E+00
Radiogenic 40/39:	2.61E-01	8.00E-03	8.00E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 6

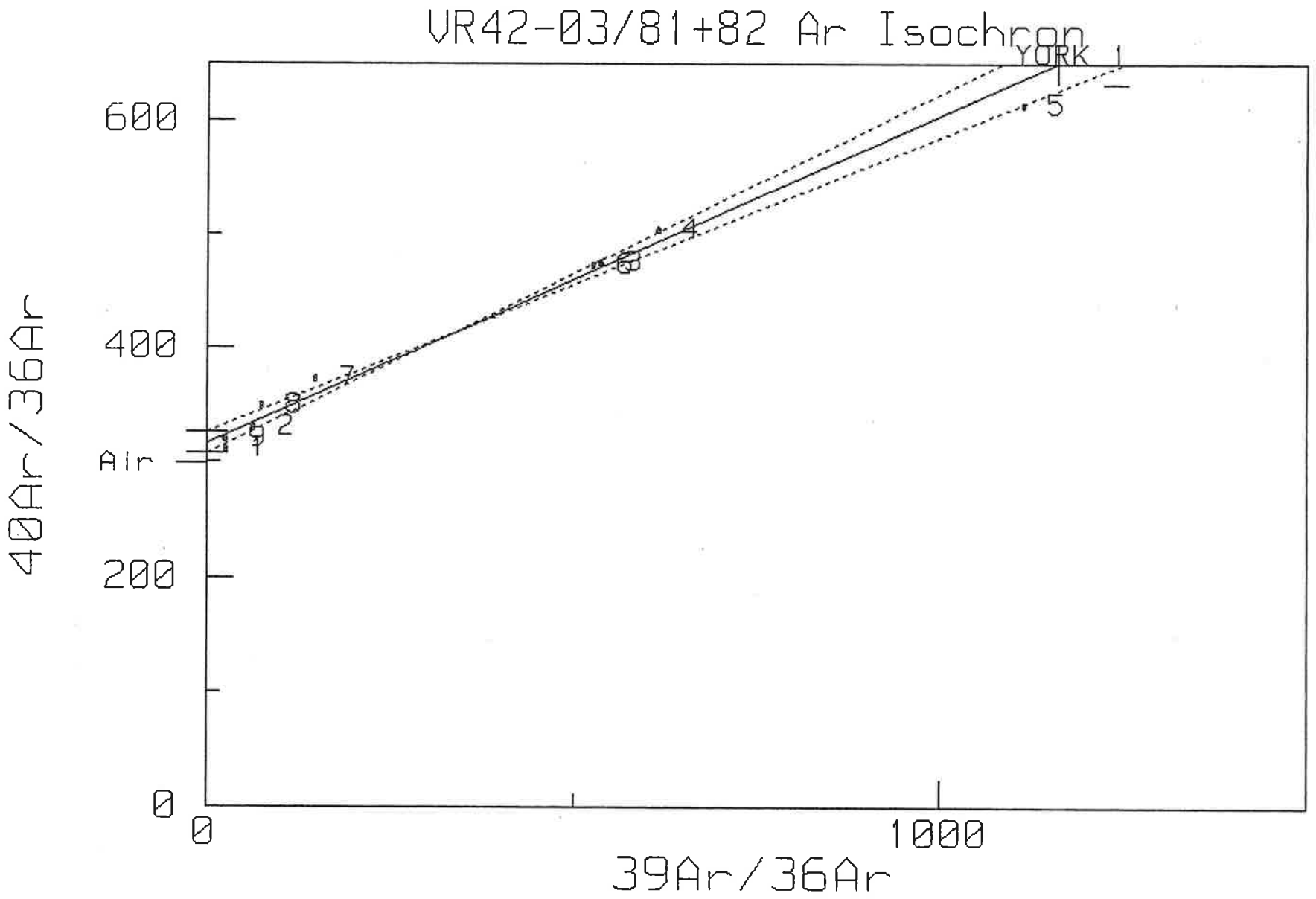
SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.25535	.00014107	335.69	.075706
mswd= 154	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.455E-01	9.81E-04	9.81E-04
Initial 40/36:	3.36E+02	3.79E-02	3.79E-02
Radiogenic 40/39:	2.55E-01	7.05E-05	7.05E-05

All errors on this printout are: 2 SIGMA

#3-8


VR42-03/81+82 Ar Isochron
YORK
600
400
Air
200
0
40Ar/36Ar
0
1000
39Ar/36Ar

VR42-03/81+82
York 1 Analysis

n= 9

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.28729	.02879	316.48	9.5805

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.064E+00	5.33E-02	5.33E-02
Initial 40/36:	3.16E+02	4.79E+00	4.79E+00
Radiogenic 40/39:	2.87E-01	1.44E-02	1.44E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 9

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.27716	.0001313	319.27	.049225
mswd= 294	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.026E+00	1.05E-03	1.05E-03
Initial 40/36:	3.19E+02	2.46E-02	2.46E-02
Radiogenic 40/39:	2.77E-01	6.56E-05	6.56E-05

All errors on this printout are: 2 SIGMA

#[redacted] 1-9, All

750° fraction (#1) had serious 'dirty' gas regressions and is unreliable.

There was a significant amount of much higher F-value sample blank from preceding DD85 samples. Blank corrections were estimated for 1250° and 1400° fractions (#8, 9). It appears the 1400° fraction was probably a bit overcorrected, from the isochrons', the 1250° fraction might be slightly overcorrected as well.

TEMP C	K-DERIVED 37Ar	K-DERIVED 38Ar	K-DERIVED 40Ar	Ca-DERIVED 36Ar	Ca-DERIVED 37Ar	Ca-DERIVED 38Ar	Ca-DERIVED 39Ar	Cl-DERIVED 36Ar	Cl-DERIVED 38Ar
750	.00002	.00055	.00043	.00010	.37556	.00001	.00027	.00000	.00054
800	.00003	.00069	.00054	.00002	.07107	.00000	.00005	.00000	.00109
850	.00003	.00079	.00062	.00002	.07752	.00000	.00005	.00000	.00036
900	.00001	.00036	.00029	.00001	.04117	.00000	.00003	.00000	.00011
950	.00027	.00701	.00552	.00013	.47785	.00001	.00034	.00000	.00009
1050	.00006	.00157	.00123	.00005	.20017	.00000	.00014	.00000	.00023
1150	.00002	.00062	.00049	.00004	.15635	.00000	.00011	.00000	.00034
1250	.00004	.00102	.00080	.00024	.87814	.00002	.00062	.00000	.00110
1400	.00002	.00050	.00039	.00020	.75134	.00002	.00053	.00000	.00062

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
750	.00165	.00029	.48782	.80232	.00074	.11
800	.00083	.00015	.24530	.03649	.00065	.74
850	.00011	.00002	.03298	.07565	.00040	.77
900	.00004	.00001	.01317	.04826	.00040	.67
950	.00048	.00008	.14046	.00816	.00034	1.11
1050	.00023	.00004	.06661	.01737	.00040	.59
1150	.00032	.00006	.09419	.08105	.00063	.30
1250	.00103	.00018	.30532	.04628	.00087	.09
1400	.00151	.00027	.44604	.02424	.00118	.05

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
750	.02560	.04146	.618	5.0	4.2	2.29 +/- 2.97
800	.02844	.05231	.544	10.4	5.3	2.01 +/- .14
850	.01993	.05993	.333	37.2	6.0	1.23 +/- .28
900	.00924	.02746	.337	40.7	2.8	1.25 +/- .18
950	.15083	.53047	.284	50.8	53.5	1.05 +/- .03
1050	.03985	.11864	.336	37.0	12.0	1.24 +/- .06
1150	.02454	.04696	.523	20.6	4.7	1.93 +/- .30
1250	.05541	.07679	.722	15.3	7.7	2.67 +/- .17
1400	.03693	.03759	.982	7.6	3.8	3.63 +/- .09
TOTAL GAS			.394			1.46 +/- .16

PLATEAU AGE = 1.09 +/- .09 Ma
PLATEAU ON STEPS 4 TO 6 AND CONTAINS 68.2 PERCENT OF THE GAS
PLATEAU MIN = 1.05 AND PLATEAU MAX = 1.25

FILE 150186 Sample
TEMP 21.8 MINERAL
TIME 1.665 JUILIAN DAY 412MANIFOLD OPTION 1 TRAP CURRENT 150
FILE 150186 Sample
TEMP 21.8 MINERAL
TIME 1.665 JUILIAN DAY 412MANIFOLD OPTION 1 TRAP CURRENT 150
☺
Your Personalized Argon Data Acquisition on Sample: VR42-03/81+82/DD84
Sample analysis started on 320 Reduced on 15-Feb-2005
Irradiated on 36   2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 399.5 mg
J-value and its error .002053   .1 %

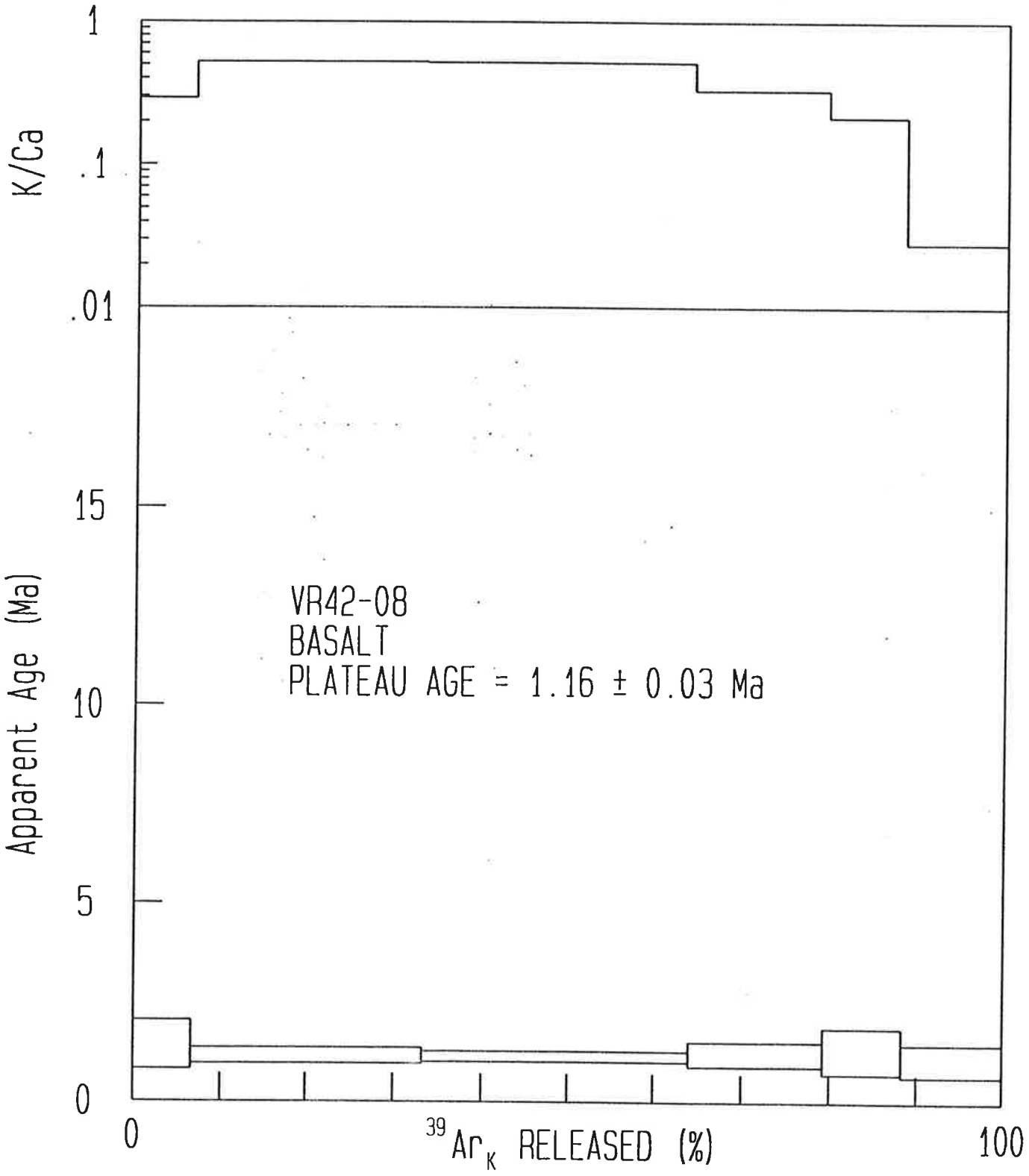
RAW DATA

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141525	750	.51386	.04152	.00138	.00135	.00173	200	1
+/-		.03027	.00188	.00005	.00030	.00000		
141526	800	.27429	.05210	.00192	.00025	.00084	200	1
+/-		.00019	.00005	.00004	.00001	.00001		
141527	850	.05353	.05969	.00116	.00028	.00013	200	1
+/-		.00002	.00004	.00001	.00001	.00001		
141528	900	.02270	.02735	.00048	.00015	.00006	200	1
+/-		.00033	.00005	.00002	.00003	.00001		
141529	950	.29681	.52818	.00716	.00171	.00060	200	1
+/-		.00002	.00028	.00001	.00001	.00001		
141530	1050	.10770	.11819	.00184	.00072	.00028	200	1
+/-		.00001	.00006	.00001	.00000	.00001		
141531	1150	.11922	.04684	.00101	.00056	.00036	200	1
+/-		.00008	.00001	.00001	.00001	.00001		
141532	1250	.36154	.07702	.00230	.00314	.00126	200	1
+/-		.00013	.00001	.00002	.00001	.00001		
141533	1400	.48336	.03793	.00139	.00268	.00169	200	1
+/-		.00027	.00002	.00000	.00000	.00000		

Raw values corrected for manifold options, trap current and mass discrimination

TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
750	.51386	.04163	.00139	.00136	.00175	.37422	.00009
+/-	.03027	.00188	.00005	.00030	.00000		
800	.27429	.05225	.00193	.00026	.00085	.07084	.00011
+/-	.00019	.00005	.00004	.00001	.00001		
850	.05353	.05986	.00117	.00028	.00013	.07727	.00012
+/-	.00002	.00004	.00001	.00001	.00001		
900	.02270	.02743	.00048	.00015	.00006	.04103	.00006
+/-	.00033	.00005	.00002	.00003	.00001		
950	.29681	.52970	.00720	.00173	.00060	.47639	.00111
+/-	.00002	.00028	.00001	.00001	.00001		
1050	.10770	.11853	.00185	.00072	.00028	.19950	.00025
+/-	.00001	.00006	.00001	.00000	.00001		
1150	.11922	.04697	.00102	.00056	.00036	.15581	.00010
+/-	.00008	.00001	.00001	.00001	.00001		
1250	.36154	.07725	.00232	.00317	.00127	.87501	.00016
+/-	.00013	.00001	.00002	.00001	.00001		
1400	.48336	.03804	.00140	.00271	.00171	.74865	.00008
+/-	.00027	.00002	.00000	.00000	.00000		

v 1/10/95 10:09:18 28 Aug 1998 #242 KD4 VR42-08



v 1/10/95

(40/36in = 295.5)

v 1/10/95 10:08:22 28 Aug 1998

#242 KD4 VR42-08

J = 0.001263 ■ 0.50% SAMPLE WT = 0.2505 g

TEMP C	Initial & radiogenic 40Ar	Potassium derived 39Ar	Chlorine derived 38Ar	Calcium derived 37Ar	Initial 36Ar	AGE* in Ma	**
650	1.831E-12	4.826E-13	7.602E-15	8.633E-13	5.168E-15	1.434 ■	.307
750	2.105E-12	1.965E-12	2.069E-15	1.954E-12	3.738E-15	1.160 ■	.100
850	2.490E-12	2.265E-12	1.760E-15	2.274E-12	4.580E-15	1.143 ■	.065
950	1.845E-12	1.119E-12	2.426E-15	1.759E-12	4.240E-15	1.205 ■	.156
1050	1.588E-12	6.567E-13	4.180E-15	1.587E-12	4.115E-15	1.291 ■	.289
1450	3.404E-12	8.720E-13	2.682E-14	1.615E-11	1.014E-14	1.060 ■	.202
TOTAL GAS	1.326E-11	7.359E-12	4.485E-14	2.459E-11	3.198E-14	1.18	

100.0% of gas on plateau, steps 650 through 1450 PLATEAU AGE = 1.160 + .025

Note: all gas quantities are in moles. No blank correction.
* Ages calculated assuming initial 40Ar/36Ar = 295.5 ■ 0
** 1-sigma precision estimates are for intra-sample reproducibility.
** 1-sigma precision estimates for plateaux are for intra-irradiation package reproducibility.
*** below detection limit

v 1/10/95

v 1/10/95 #242 KD4 VR42-08 10:08:19 28 Aug 1998

R A W D A T A

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar ä regression	TRAP CURRENT	MANIFOLD OPTION
44872	650	140405	37222	1018	22656	424	200	EALL
	■	556	89	10	45	17		
44873	750	162067	151452	2153	51249	334	200	EALL
	■	628	280	5	75	23		
44874	850	191632	174563	2429	59605	407	200	EALL
	■	513	164	24	36	17		
44875	950	141741	86260	1294	46095	370	200	EALL
	■	508	95	12	78	20		
44876	1050	121895	50670	951	41559	356	200	EALL
	■	496	58	15	53	22		
44877	1450	260990	68014	2879	422778	1133	200	EALL
	■	639	92	22	523	20		

Raw counts and errors include blank corrections of:
40Ar = 2762 ■ 495
36Ar = 28.3 ■ 9.3

C O R R E C T I O N S

TEMP |C	39Ar Decay	37Ar Decay	-----K-derived---- 40Ar	38Ar	37Ar	----Ca-derived---- 39Ar	38Ar	36Ar	Cl-der 36Ar	Initial 38Ar
650	15	44747	210	495	0	44	2	17	0	74
750	61	101302	854	2016	0	101	5	39	0	54
850	71	117916	985	2323	0	117	6	46	0	66
950	35	91263	486	1148	0	91	4	36	0	61
1050	21	82348	286	674	0	82	4	32	0	59
1450	28	838403	379	895	0	832	39	327	0	145

All values in counts, corrected for mass discrimination

v 1/10/95 #242 KD4 VR42-08 10:08:20 28 Aug 1998

	TEMP C	% TOT 39Ar	RAD YIELD	APP K/Ca	APP K/Cl	F	AGE (Ma)	intra-sample	precision intra-package
A	650	6.6	16.6	.29	154	.630	1.434 ▪	.307	.307
B	750	26.7	47.5	.52	2299	.509	1.160 ▪	.100	.100
C	850	30.8	45.6	.52	3113	.502	1.143 ▪	.065	.065
D	950	15.2	32.1	.33	1116	.529	1.205 ▪	.156	.156
E	1050	8.9	23.4	.22	380	.567	1.291 ▪	.289	.290
F	1450	11.8	11.9	.03	79	.465	1.060 ▪	.202	.204
Total gas				.4					

Precisions are 1 sigma, measured in Ma. Measured 40/36 atm = 287.9 ▪.7
J = 0.001263 ▪ 0.50% (intra-package) ▪ 0.50% (inter-package)
Trap current factors- 40: 5.66 100: 0 200: 1
Manifold factors- ALL: 1 SPLIT 1: 3.3 SPLIT 2: 10.89 SPLIT 3: 35.937
EALL: 2 ESPLIT 1: 6.6 ESPLIT 2: 21.78
Sensitivity = 6.530E-18 % Reproducibility = .25 Detection limit = 40 counts
Data reduced assuming initial 40/36 = 295.50 ▪ 0.00
Ca-factors: 3637=2.6E-04▪1.7E-06 3837=3.2E-05▪2.4E-07 3937=6.7E-04▪3.7E-06
K-factors: 3739=0.0E+00▪2.2E-03 3839=1.3E-02▪2.4E-04 4039=5.7E-03▪4.0E-03

v 1/10/95 #242 KD4 VR42-08 10:25:53 28 Aug 1998
Points AEF deleted;
3 points regressed out of 6 includes 72.7 % of 39Ar
Mean X = .849E+00 Mean Y = .192E-02 Slope = -.157E-02 ä+Ç .888E-03
36/40 = .325E-02 ä+Ç .763E-03 39/40 = .207E+01 ä+Ç .696E+00
Fit parameters: SUMS = .01 MSWD = .01
40Ar/36Ar = 307.49 ä+Ç 72.17 F = .483 ä+Ç .162 AGE = 1.1 ä+Ç .37 Ma

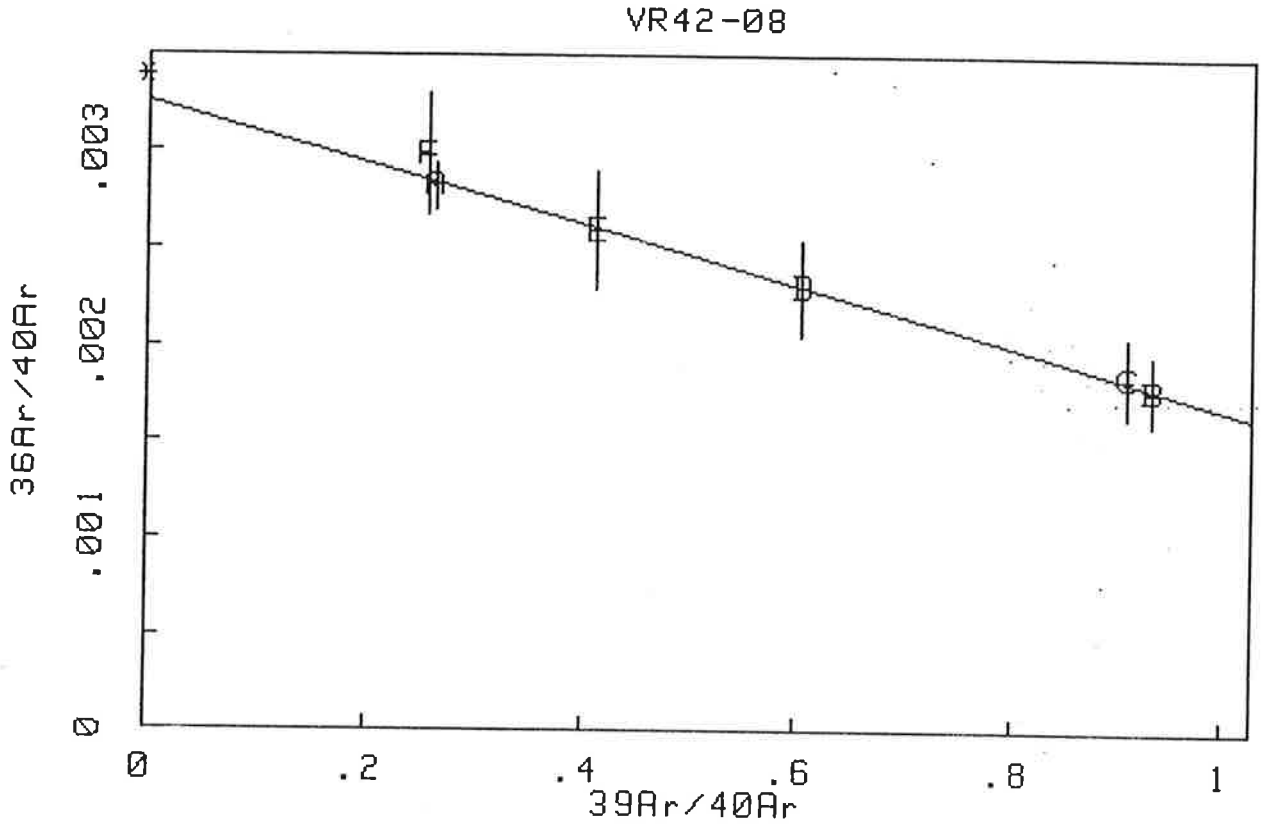
Points EF deleted;
4 points regressed out of 6 includes 79.2 % of 39Ar
Mean X = .559E+00 Mean Y = .237E-02 . Slope = -.155E-02 ä+Ç .275E-03
36/40 = .323E-02 ä+Ç .175E-03 39/40 = .209E+01 ä+Ç .278E+00
Fit parameters: SUMS = .01 MSWD = .005
40Ar/36Ar = 309.54 ä+Ç 16.8 F = .478 ä+Ç .064 AGE = 1.09 ä+Ç .14 Ma

Point F deleted;
5 points regressed out of 6 includes 88.2 % of 39Ar
Mean X = .548E+00 Mean Y = .238E-02 Slope = -.155E-02 ä+Ç .273E-03
36/40 = .323E-02 ä+Ç .170E-03 39/40 = .209E+01 ä+Ç .277E+00
Fit parameters: SUMS = .01 MSWD = .003
40Ar/36Ar = 309.55 ä+Ç 16.32 F = .478 ä+Ç .063 AGE = 1.09 ä+Ç .14 Ma

Points AF deleted;
4 points regressed out of 6 includes 81.6 % of 39Ar
Mean X = .791E+00 Mean Y = .201E-02 Slope = -.155E-02 ä+Ç .573E-03
36/40 = .324E-02 ä+Ç .467E-03 39/40 = .208E+01 ä+Ç .482E+00
Fit parameters: SUMS = .01 MSWD = .005
40Ar/36Ar = 308.85 ä+Ç 44.51 F = .48 ä+Ç .111 AGE = 1.09 ä+Ç .25 Ma

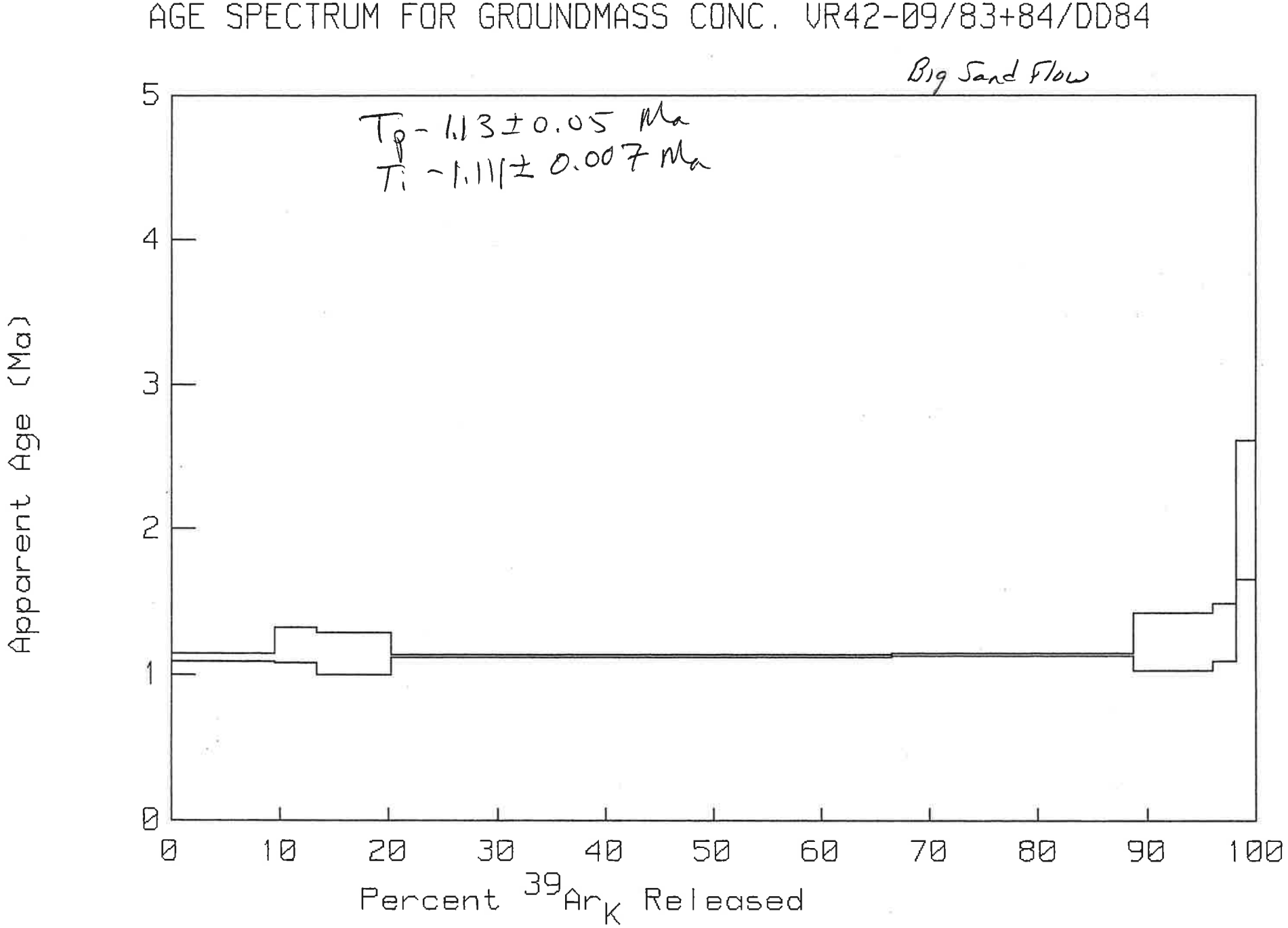
A	650C	WT X =	.91E+06	WT Y =	.69E+08	R =	.93E-01	Residual =	-.48E-01
B	750C	WT X =	.70E+05	WT Y =	.30E+08	R =	.36E-01	Residual =	-.66E-01
C	850C	WT X =	.49E+05	WT Y =	.24E+08	R =	.13E-01	Residual =	.73E-01
D	950C	WT X =	.40E+05	WT Y =	.16E+08	R =	.15E-01	Residual =	.12E-01
E	1050C	WT X =	.36E+05	WT Y =	.11E+08	R =	.11E-01	Residual =	-.14E-01
F	1450C	WT X =	.35E+05	WT Y =	.10E+08	R =	.27E-02	Residual =	.45E+00

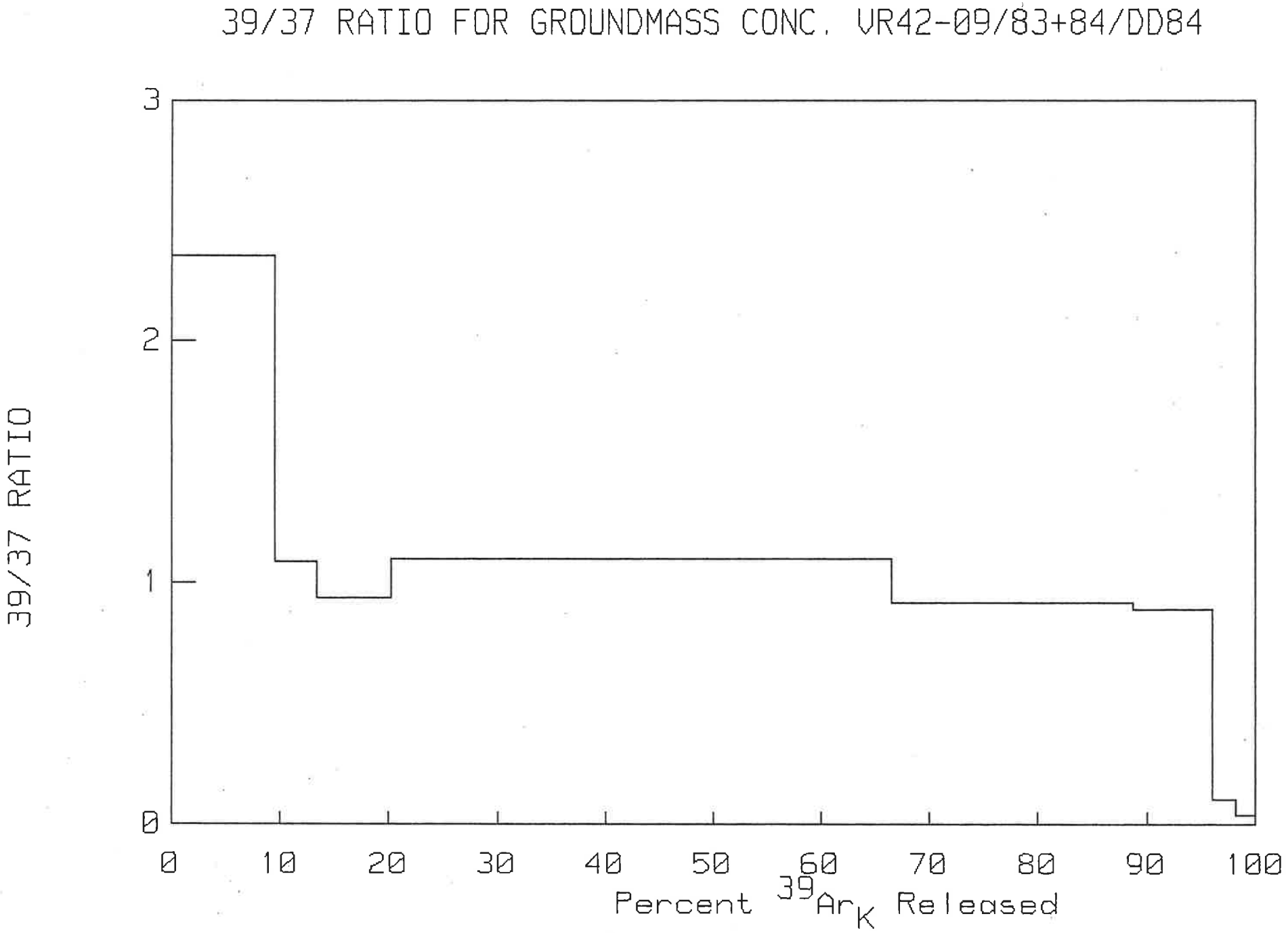
v 1/10/95, SAMPLE #242 KD4 VR42-08 10:10:27 28 Aug 1998

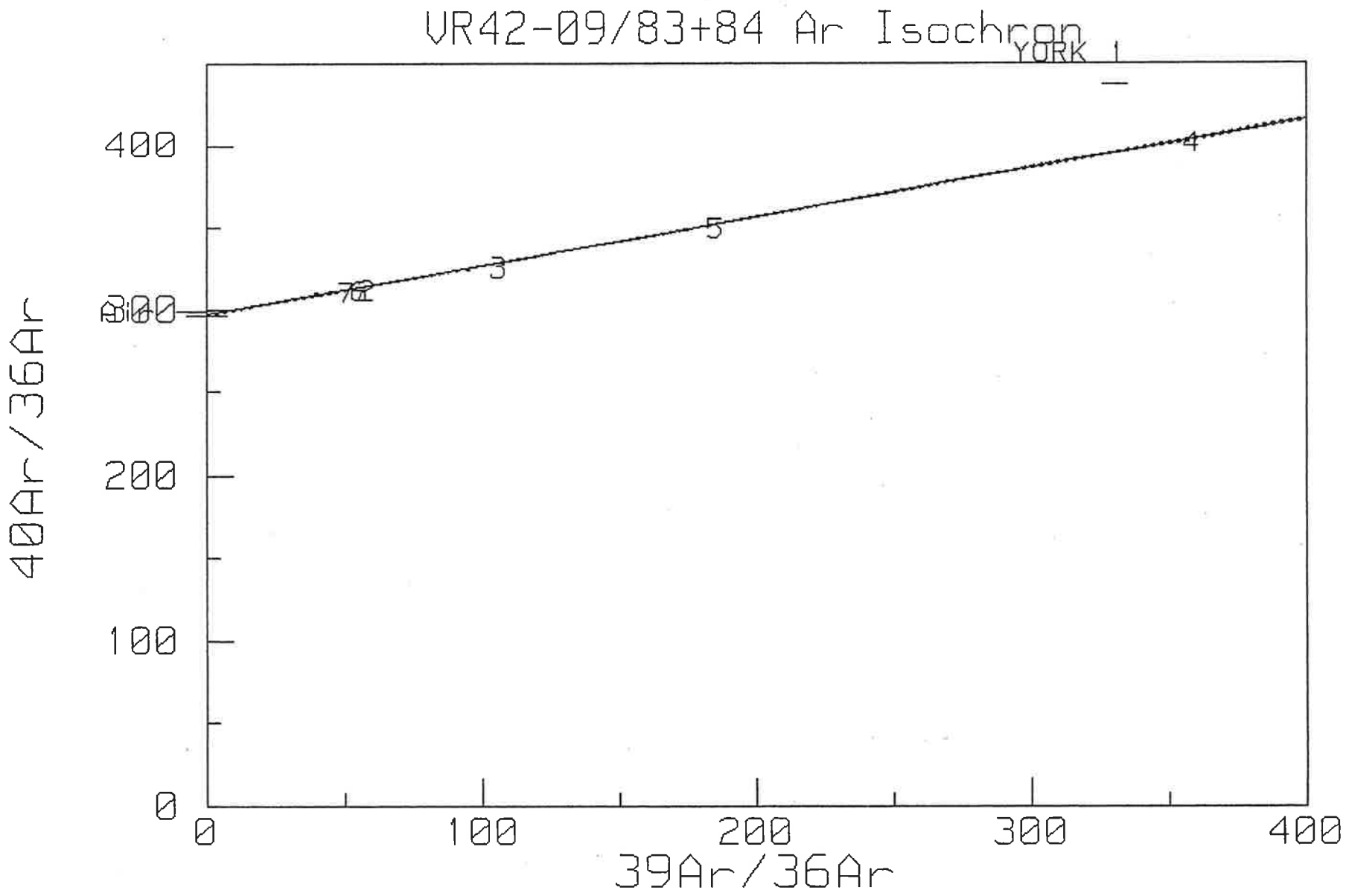


6 points regressed out of 6
Mean X = .530E+00 Mean Y = .242E-02 Slope = -.157E-02 ä+Ç .265E-03
36/40 = .325E-02 ä+Ç .161E-03 39/40 = .207E+01 ä+Ç .264E+00
Fit parameters: SUMS = .202 MSWD = .051
40Ar/36Ar = 307.23 ä+Ç 15.2 F = .484 ä+Ç .062 AGE = 1.1 ä+Ç .14 Ma

AEF
EF
F
AF


AGE SPECTRUM FOR GROUNDMASS CONC. VR42-09/83+84/DD84
Big Sand Flow
T_p - 1.13 ± 0.05 Ma
T_i - 1.111 ± 0.007 Ma
Apparent Age (Ma)
0
1
2
3
4
5
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


39/37 RATIO FOR GROUNDMASS CONC. VR42-09/83+84/DD84
39/37 RATIO
3
2
1
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VR42-09/83+84 Ar Isochron
YORK
1
2
3
4
5
400
300
200
100
0
0
100
200
300
400
40Ar/36Ar
39Ar/36Ar

VR42-09/83+84

York 1 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.29761	.0035498	296.87	.50321

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.111E+00	6.71E-03	6.71E-03
Initial 40/36:	2.97E+02	2.52E-01	2.52E-01
Radiogenic 40/39:	2.98E-01	1.77E-03	1.77E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.29786	.00029723	296.85	.047424

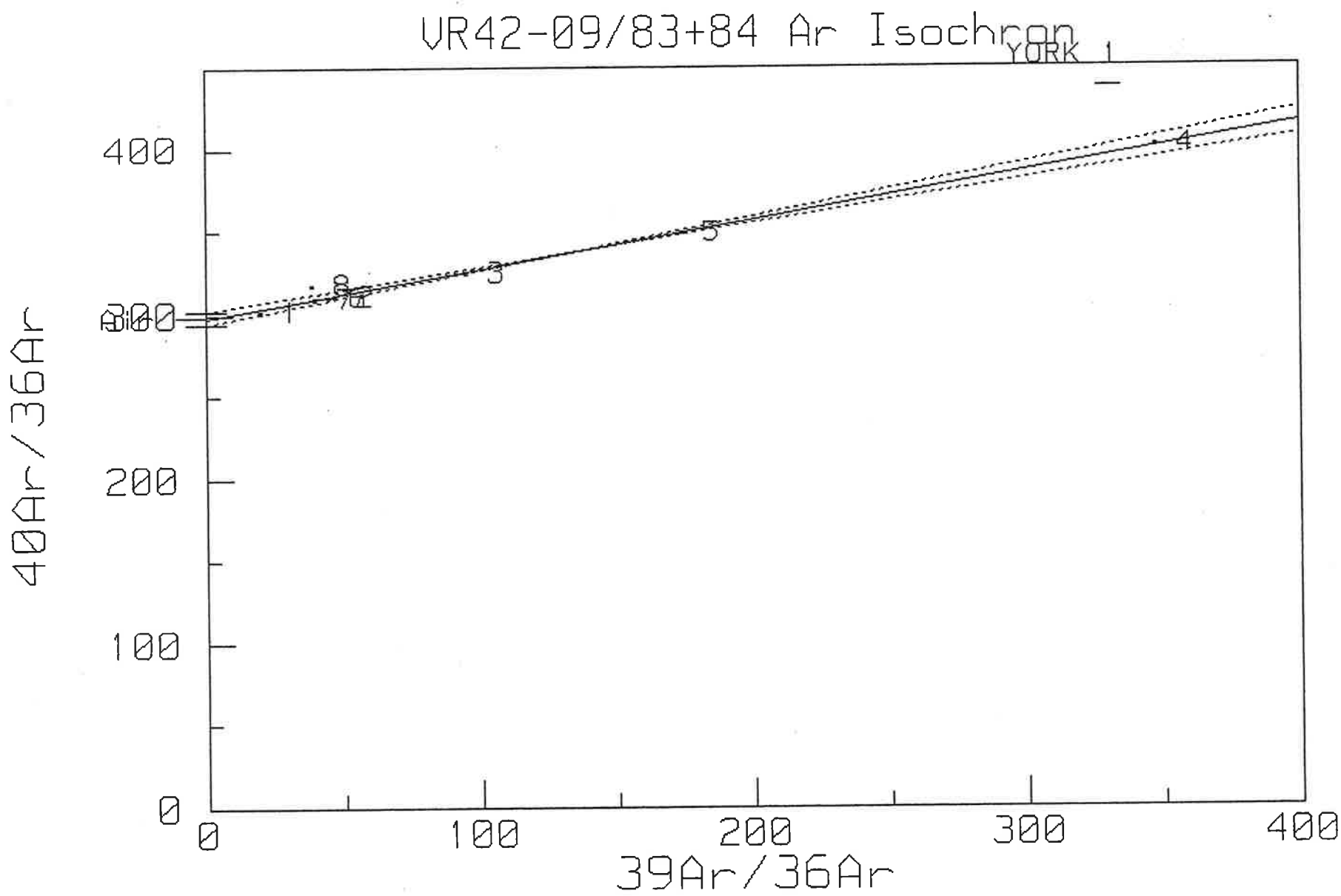
mswd= 10.7 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.112E+00	1.24E-03	1.24E-03
Initial 40/36:	2.97E+02	2.37E-02	2.37E-02
Radiogenic 40/39:	2.98E-01	1.49E-04	1.49E-04

All errors on this printout are: 2 SIGMA

#2-7


VR42-09/83+84 Ar Isochron
YORK 1
400
200
100
0
40Ar/36Ar
0
100
200
300
400
39Ar/36Ar

VR42-09/83+84

York 1 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.29227	.029552	298.34	3.5945

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.096E+00	5.54E-02	5.54E-02
Initial 40/36:	2.98E+02	1.80E+00	1.80E+00
Radiogenic 40/39:	2.92E-01	1.48E-02	1.48E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.29264	.00027249	298.3	.037756
mswd= 94	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.097E+00	1.21E-03	1.21E-03
Initial 40/36:	2.98E+02	1.89E-02	1.89E-02
Radiogenic 40/39:	2.93E-01	1.36E-04	1.36E-04

All errors on this printout are: 2 SIGMA

#1-8, All

1250	.00002	.00040	.00032	.00008	.29139	.00001	.00021	.00000	.00045
1400	.00001	.00034	.00027	.00018	.66137	.00001	.00047	.00000	.00047

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00686	.00121	2.02776	.00651	.00036	2.36
750	.00121	.00021	.35629	.03242	.00039	1.09
850	.00103	.00018	.30306	.03867	.00037	.94
950	.00191	.00034	.56332	.00255	.00036	1.10
1050	.00183	.00032	.54061	.00184	.00037	.91
1150	.00235	.00041	.69330	.05358	.00039	.88
1250	.00076	.00013	.22600	.05346	.00041	.10
1400	.00067	.00012	.19651	.12942	.00068	.04

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.04051	.13546	.299	2.0	9.4	1.12 +/- .02
750	.01822	.05658	.322	4.9	3.9	1.20 +/- .12
850	.02986	.09753	.306	8.9	6.8	1.14 +/- .14
950	.20011	.66372	.302	26.0	46.3	1.13 +/- .01
1050	.09727	.31950	.304	15.2	22.3	1.14 +/- .01
1150	.03449	.10493	.329	4.7	7.3	1.23 +/- .20
1250	.01050	.03038	.346	4.4	2.1	1.29 +/- .20
1400	.01469	.02574	.571	6.9	1.8	2.13 +/- .48
TOTAL GAS			.311			1.16 +/- .05

PLATEAU AGE = 1.13 +/- .05 Ma
PLATEAU ON STEPS 3 TO 5 AND CONTAINS 75.4 PERCENT OF THE GAS
PLATEAU MIN = 1.13 AND PLATEAU MAX = 1.14

Your Personalized Argon Data Acquisition on Sample: VR42-09/83+84/DD84
Sample analysis started on 321 Reduced on 12-Feb-2005
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 402.2 mg
J-value and its error .0020695 .1 %

RAW DATA

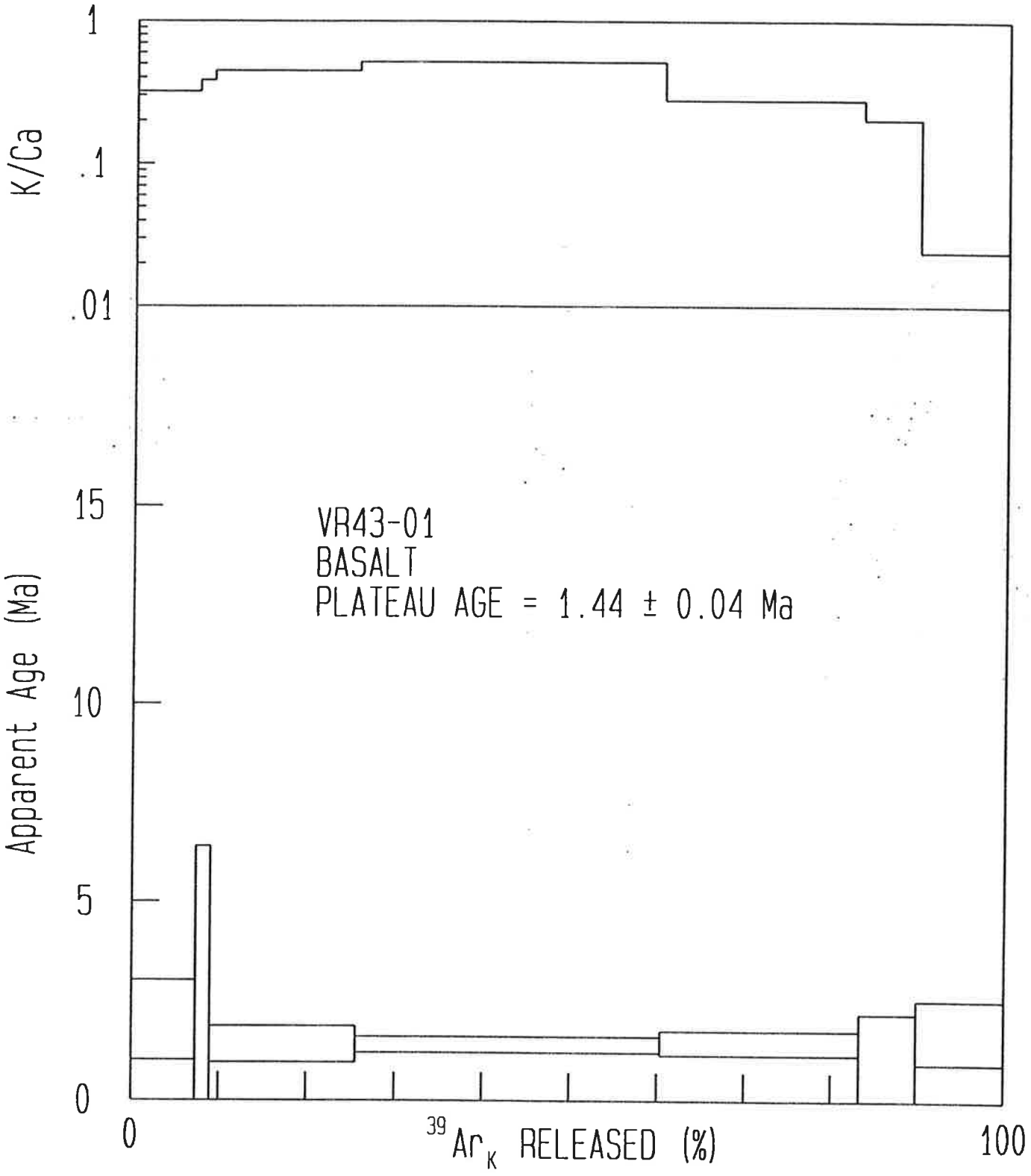
FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141544	650	2.06968	.13483	.01140	.00020	.00680	200	1
+/-		.00229	.00046	.00000	.00002	.00001		
141545	750	.37510	.05634	.00338	.00018	.00121	200	1
+/-		.00048	.00010	.00000	.00000	.00001		
141546	850	.33393	.09712	.00324	.00037	.00104	200	1
+/-		.00078	.00020	.00001	.00001	.00001		
141547	950	.77034	.66086	.01086	.00213	.00205	200	1
+/-		.00082	.00107	.00002	.00001	.00001		
141548	1050	.64120	.31816	.00614	.00123	.00190	200	1
+/-		.00064	.00033	.00001	.00001	.00000		
141549	1150	.72888	.10450	.00327	.00042	.00235	200	1
+/-		.00038	.00006	.00003	.00001	.00002		
141550	1250	.23682	.03044	.00098	.00102	.00083	200	1
+/-		.00010	0.00000	.00000	.00001	.00001		
141551	1400	.21147	.02607	.00094	.00232	.00083	200	1
+/-		.00020	.00002	.00001	.00000	.00001		

Raw values corrected for manifold options, trap current and mass discrimination

TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
650	2.06968	.13522	.01147	.00020	.00688	.05733	.00028
+/-	.00229	.00046	.00000	.00002	.00001		
750	.37510	.05650	.00340	.00019	.00122	.05197	.00012
+/-	.00048	.00010	.00000	.00000	.00001		
850	.33393	.09740	.00326	.00037	.00105	.10397	.00020
+/-	.00078	.00020	.00001	.00001	.00001		
950	.77034	.66276	.01092	.00215	.00207	.60210	.00139
+/-	.00082	.00107	.00002	.00001	.00001		
1050	.64120	.31908	.00618	.00124	.00192	.34888	.00067
+/-	.00064	.00033	.00001	.00001	.00000		
1150	.72888	.10480	.00328	.00042	.00238	.11830	.00022
+/-	.00038	.00006	.00003	.00001	.00002		
1250	.23682	.03053	.00099	.00103	.00084	.29038	.00006
+/-	.00010	.00000	.00000	.00001	.00001		
1400	.21147	.02615	.00094	.00234	.00084	.65904	.00005
+/-	.00020	.00002	.00001	.00000	.00001		

TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
650	.00007	.00179	.00141	.00002	.05747	.00000	.00004	.00000	.00846
750	.00003	.00075	.00059	.00001	.05213	.00000	.00004	.00000	.00243
850	.00005	.00129	.00101	.00003	.10430	.00000	.00007	.00000	.00179
950	.00033	.00877	.00690	.00016	.60391	.00001	.00043	.00000	.00180
1050	.00016	.00422	.00332	.00009	.34996	.00001	.00025	.00000	.00162
1150	.00005	.00139	.00109	.00003	.11866	.00000	.00008	.00000	.00148

v 1/10/95 09:55:58 28 Aug 1998 #254 KD4 VR43-01



v 1/10/95

(40/36in = 295.5)

v 1/10/95 09:54:46 28 Aug 1998

#254 KD4 VR43-01

J = 0.001263 ■ 0.50% SAMPLE WT = 0.2534 g

TEMP C	Initial & radiogenic 40Ar	Potassium derived 39Ar	Chlorine derived 38Ar	Calcium derived 37Ar	Initial 36Ar	AGE* in Ma	**
550	4.149E-12	5.788E-13	3.437E-14	9.416E-13	1.230E-14	2.020 ■	.501
650	1.535E-13	1.315E-13	3.154E-15	1.783E-13	***	2.158 ■	2.122
750	1.292E-12	1.310E-12	1.664E-14	1.528E-12	1.619E-15	1.414 ■	.227
850	2.343E-12	2.753E-12	6.005E-15	2.778E-12	2.177E-15	1.407 ■	.098
950	1.678E-12	1.812E-12	2.303E-15	3.373E-12	1.780E-15	1.448 ■	.149
1050	7.115E-13	5.321E-13	3.875E-15	1.351E-12	1.590E-15	1.034 ■	.574
1450	1.762E-12	7.901E-13	3.846E-14	1.704E-11	3.933E-15	1.728 ■	.396
TOTAL GAS	1.209E-11	7.907E-12	1.048E-13	2.719E-11	2.350E-14	1.48	

100.0% of gas on plateau, steps 550 through 1450 PLATEAU AGE = 1.437 + .038

Note: all gas quantities are in moles. No blank correction.

* Ages calculated assuming initial 40Ar/36Ar = 295.5 ■ 0

** 1-sigma precision estimates are for intra-sample reproducibility.

** 1-sigma precision estimates for plateaux are for intra-irradiation package reproducibility.

*** below detection limit

v 1/10/95

v 1/10/95 #254 KD4 VR43-01 09:54:43 28 Aug 1998

R A W D A T A

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
						ä regression		
44854	550	317932	44635	3091	25257	987	200	EALL
	■	533	86	25	25	34		
44855	650	11807	10141	380	4781	11	200	EALL
	■	199	29	13	10	33		
44856	750	99481	100977	2632	40945	159	200	EALL
	■	717	8	33	52	35		
44857	850	180627	212210	3302	74406	229	200	EALL
	■	240	88	19	105	32		
44858	950	129257	139748	2044	90272	210	200	EALL
	■	237	116	14	42	32		
44859	1050	54713	41064	834	36135	153	200	EALL
	■	215	34	18	84	36		
44860	1450	135232	61747	3789	455649	663	200	EALL
	■	299	19	29	282	37		

Raw counts and errors include blank corrections of:
40Ar = 3799 ■ 196
36Ar = 31 ■ 31

C O R R E C T I O N S

TEMP |C	39Ar Decay	37Ar Decay	-----K-derived---- 40Ar	38Ar	37Ar	----Ca-derived---- 39Ar	38Ar	36Ar	Cl-der 36Ar	Initial 38Ar
550	18	48258	252	594	0	49	2	19	0	176
650	4	9143	57	135	0	9	0	4	0	1
750	40	78362	570	1344	0	79	4	31	0	23
850	84	142515	1197	2825	0	143	7	56	0	31
950	55	173050	788	1859	0	174	8	68	0	25
1050	16	69325	231	546	0	70	3	27	0	23
1450	25	874887	344	811	0	878	41	344	0	56

All values in counts, corrected for mass discrimination

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	TEMP C	% TOT 39Ar	RAD YIELD	APP K/Ca	APP K/Cl	F	AGE (Ma)	intra-sample	precision intra-package
A	550	7.3	12.4	.32	41	.887	2.020 ■	.501	.503
B	650	1.7	81.2	.38	101	.948	2.158 ■	2.122	2.122
C	750	16.6	63.0	.45	190	.621	1.414 ■	.227	.227
D	850	34.8	72.6	.52	1109	.618	1.407 ■	.098	.099
E	950	22.9	68.6	.28	1904	.636	1.448 ■	.149	.149
F	1050	6.7	34.0	.20	332	.454	1.034 ■	.574	.574
G	1450	10.0	34.0	.02	50	.759	1.728 ■	.396	.396
Total gas				.4					

Precisions are 1 sigma, measured in Ma. Measured 40/36 atm = 287.9 ■.7
J = 0.001263 ■ 0.50% (intra-package) ■ 0.50% (inter-package)
Trap current factors- 40: 5.66 100: 0 200: 1
Manifold factors- ALL: 1 SPLIT 1: 3.3 SPLIT 2: 10.89 SPLIT 3: 35.937
EALL: 2 ESPLIT 1: 6.6 ESPLIT 2: 21.78
Sensitivity = 6.530E-18 % Reproducibility = .25 Detection limit = 40 counts
Data reduced assuming initial 40/36 = 295.50 ■ 0.00
Ca-factors: 3637=2.6E-04■1.7E-06 3837=3.2E-05■2.4E-07 3937=6.7E-04■3.7E-06
K-factors: 3739=0.0E+00■2.2E-03 3839=1.3E-02■2.4E-04 4039=5.7E-03■4.0E-03

v 1/10/95 #254 KD4 VR43-01 09:59:47 28 Aug 1998
Point Y deleted;
7 points regressed out of 7
Mean X = .146E+00 Mean Y = .295E-02 Slope = -.210E-02 ä+Ç .143E-02
36/40 = .326E-02 ä+Ç .233E-03 39/40 = .155E+01 ä+Ç .960E+00
Fit parameters: SUMS = .136 MSWD = .027
40Ar/36Ar = 306.94 ä+Ç 21.94 F = .644 ä+Ç .398 AGE = 1.47 ä+Ç .91 Ma

Points ABFG deleted;
3 points regressed out of 7 includes 74.3 % of 39Ar
Mean X = .109E+01 Mean Y = .108E-02 Slope = -.197E-02 ä+Ç .239E-01
36/40 = .323E-02 ä+Ç .261E-01 39/40 = .164E+01 ä+Ç .667E+01
Fit parameters: SUMS = 0 MSWD = 0
40Ar/36Ar = 309.36 ä+Ç 2494.67 F = .611 ä+Ç 2.49 AGE = 1.39 ä+Ç 5.67 Ma

Points ABG deleted;
4 points regressed out of 7 includes 81 % of 39Ar
Mean X = .101E+01 Mean Y = .136E-02 Slope = -.319E-02 ä+Ç .879E-02
36/40 = .457E-02 ä+Ç .897E-02 39/40 = .143E+01 ä+Ç .125E+01
Fit parameters: SUMS = .003 MSWD = .002
40Ar/36Ar = 218.87 ä+Ç 429.49 F = .698 ä+Ç .61 AGE = 1.59 ä+Ç 1.39 Ma

Points FG deleted;
5 points regressed out of 7 includes 83.3 % of 39Ar
Mean X = .145E+00 Mean Y = .295E-02 Slope = -.219E-02 ä+Ç .152E-02
36/40 = .327E-02 ä+Ç .243E-03 39/40 = .149E+01 ä+Ç .941E+00
Fit parameters: SUMS = .094 MSWD = .031
40Ar/36Ar = 305.8 ä+Ç 22.76 F = .669 ä+Ç .421 AGE = 1.52 ä+Ç .96 Ma

Points AB deleted;
5 points regressed out of 7 includes 91 % of 39Ar
Mean X = .901E+00 Mean Y = .152E-02 Slope = -.204E-02 ä+Ç .474E-02
36/40 = .336E-02 ä+Ç .444E-02 39/40 = .165E+01 ä+Ç .186E+01
Fit parameters: SUMS = .027 MSWD = .009
40Ar/36Ar = 297.71 ä+Ç 393.81 F = .606 ä+Ç .684 AGE = 1.38 ä+Ç 1.56 Ma

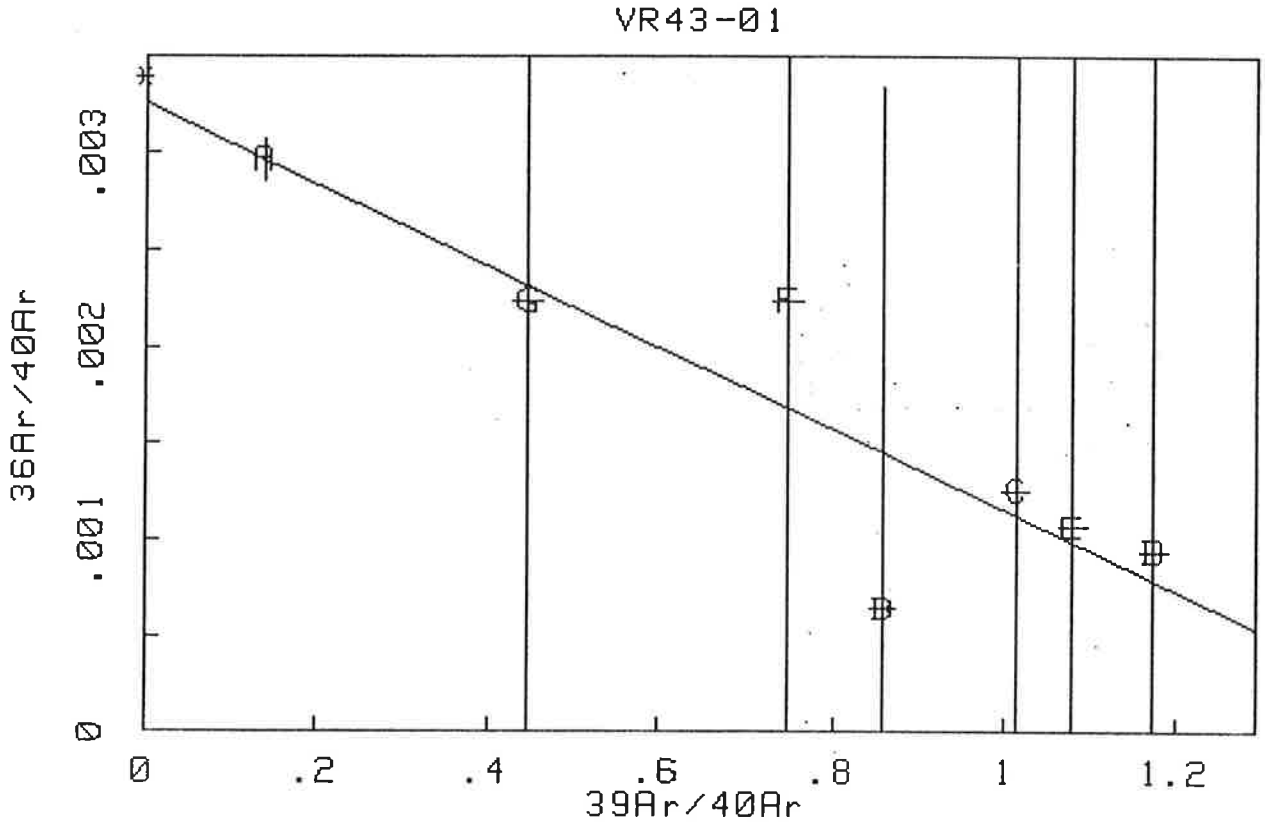
Points AG deleted;
5 points regressed out of 7 includes 82.7 % of 39Ar
Mean X = .977E+00 Mean Y = .121E-02 Slope = -.191E-02 ä+Ç .806E-02
36/40 = .308E-02 ä+Ç .796E-02 39/40 = .161E+01 ä+Ç .291E+01
Fit parameters: SUMS = .135 MSWD = .045
40Ar/36Ar = 325.01 ä+Ç 841.22 F = .622 ä+Ç 1.125 AGE = 1.42 ä+Ç 2.56 Ma

A	550C	WT X =	.18E+08	WT Y =	.93E+08	R =	.48E-01	Residual =	.15E+01
B	650C	WT X =	.48E+04	WT Y =	.14E+06	R =	.39E-02	Residual =	-.30E+00
C	750C	WT X =	.38E+04	WT Y =	.13E+06	R =	.15E-02	Residual =	.42E-01
D	850C	WT X =	.37E+04	WT Y =	.13E+06	R =	.43E-04	Residual =	.36E-01
E	950C	WT X =	.37E+04	WT Y =	.13E+06	R =	.86E-04	Residual =	.18E-01
F	1050C	WT X =	.36E+04	WT Y =	.13E+06	R =	.55E-03	Residual =	.21E+00
G	1450C	WT X =	.36E+04	WT Y =	.12E+06	R =	.10E-03	Residual =	.47E-02

v 1/10/95 #254 KD4 VR43-01 09:58:18 28 Aug 1998
Points ABCFG deleted;
2 points regressed out of 7 includes 57.7 % of 39Ar
Mean X = .113E+01 Mean Y = .995E-03 Slope = -.139E-02 ä+Ç .408E-01
36/40 = .257E-02 ä+Ç .461E-01 39/40 = .184E+01 ä+Ç .210E+02
40Ar/36Ar = 389.77 ä+Ç 6996.76 F = .543 ä+Ç 6.181 AGE = 1.24 ä+Ç 14.07 Ma

A	550C	WT X =	.18E+08	WT Y =	.93E+08	R =	.48E-01	Residual =	.57E+01
B	650C	WT X =	.48E+04	WT Y =	.14E+06	R =	.39E-02	Residual =	-.27E+00
C	750C	WT X =	.38E+04	WT Y =	.13E+06	R =	.15E-02	Residual =	.37E-01
D	850C	WT X =	.37E+04	WT Y =	.13E+06	R =	.43E-04	Residual =	.16E-15
E	950C	WT X =	.37E+04	WT Y =	13E+06	R =	.86E-04	Residual =	.00E+00
F	1050C	WT X =	.36E+04	WT Y =	.13E+06	R =	.55E-03	Residual =	.25E+00
G	1450C	WT X =	.36E+04	WT Y =	.12E+06	R =	.10E-03	Residual =	.10E+00

v 1/10/95, SAMPLE #254 KD4 VR43-01 09:57:31 28 Aug 1998



7 points regressed out of 7
Mean X = .146E+00 Mean Y = .295E-02 Slope = -.210E-02 ä+Ç .143E-02
36/40 = .326E-02 ä+Ç .233E-03 39/40 = .155E+01 ä+Ç .960E+00
Fit parameters: SUMS = .136 MSWD = .027
40Ar/36Ar = 306.94 ä+Ç 21.94 F = .644 ä+Ç .398 AGE = 1.47 ä+Ç .91 Ma

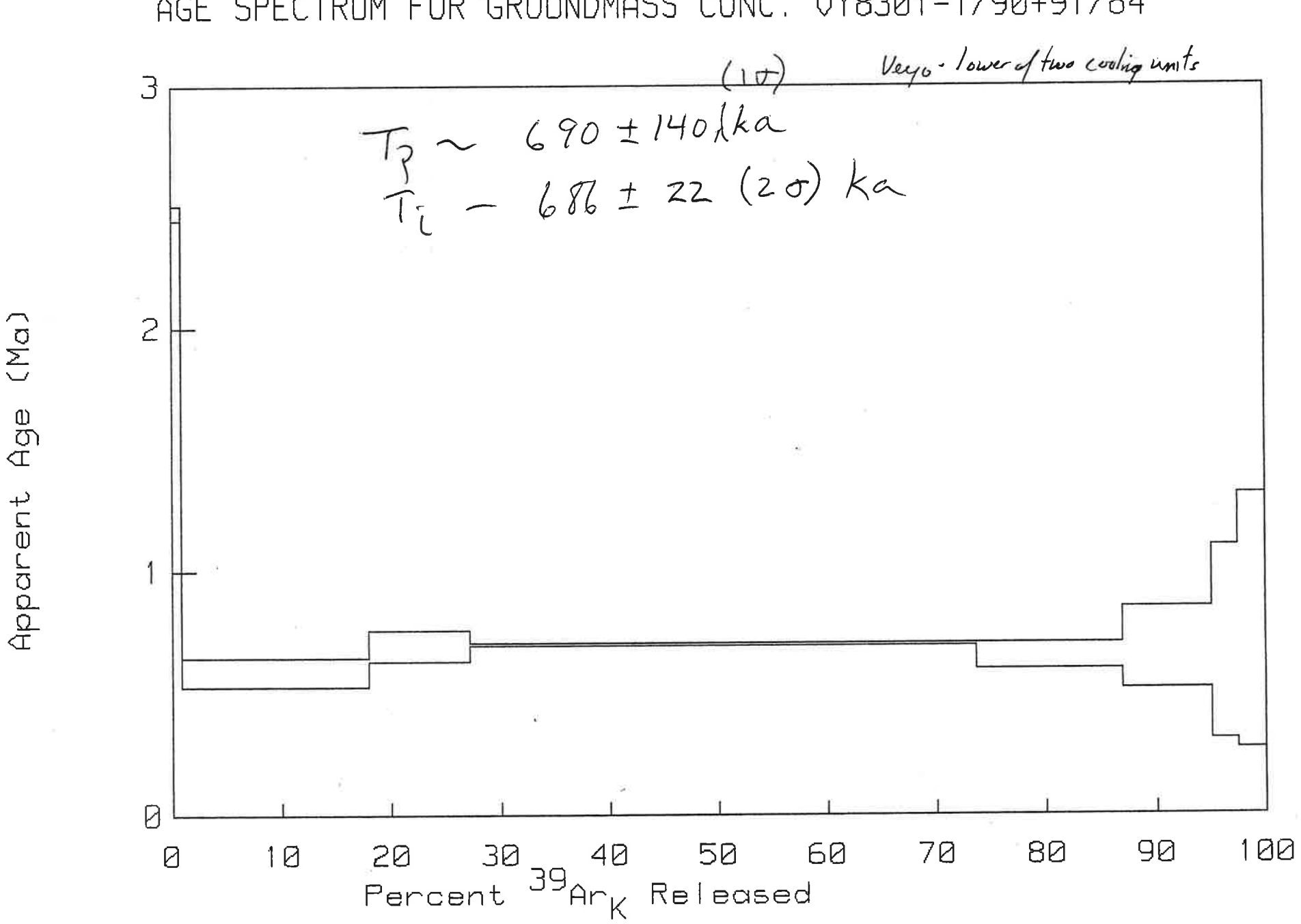
ABFG

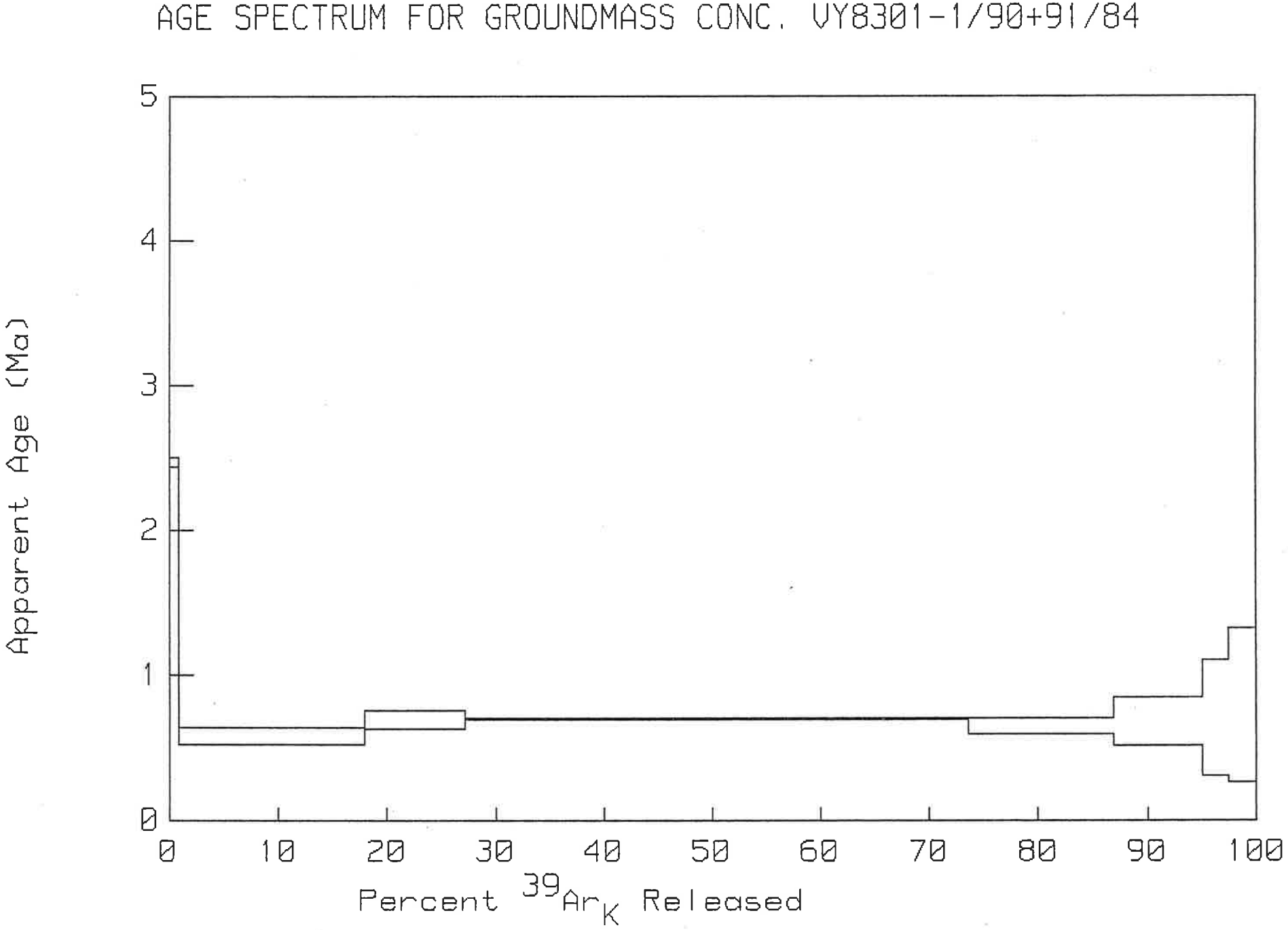
ABG

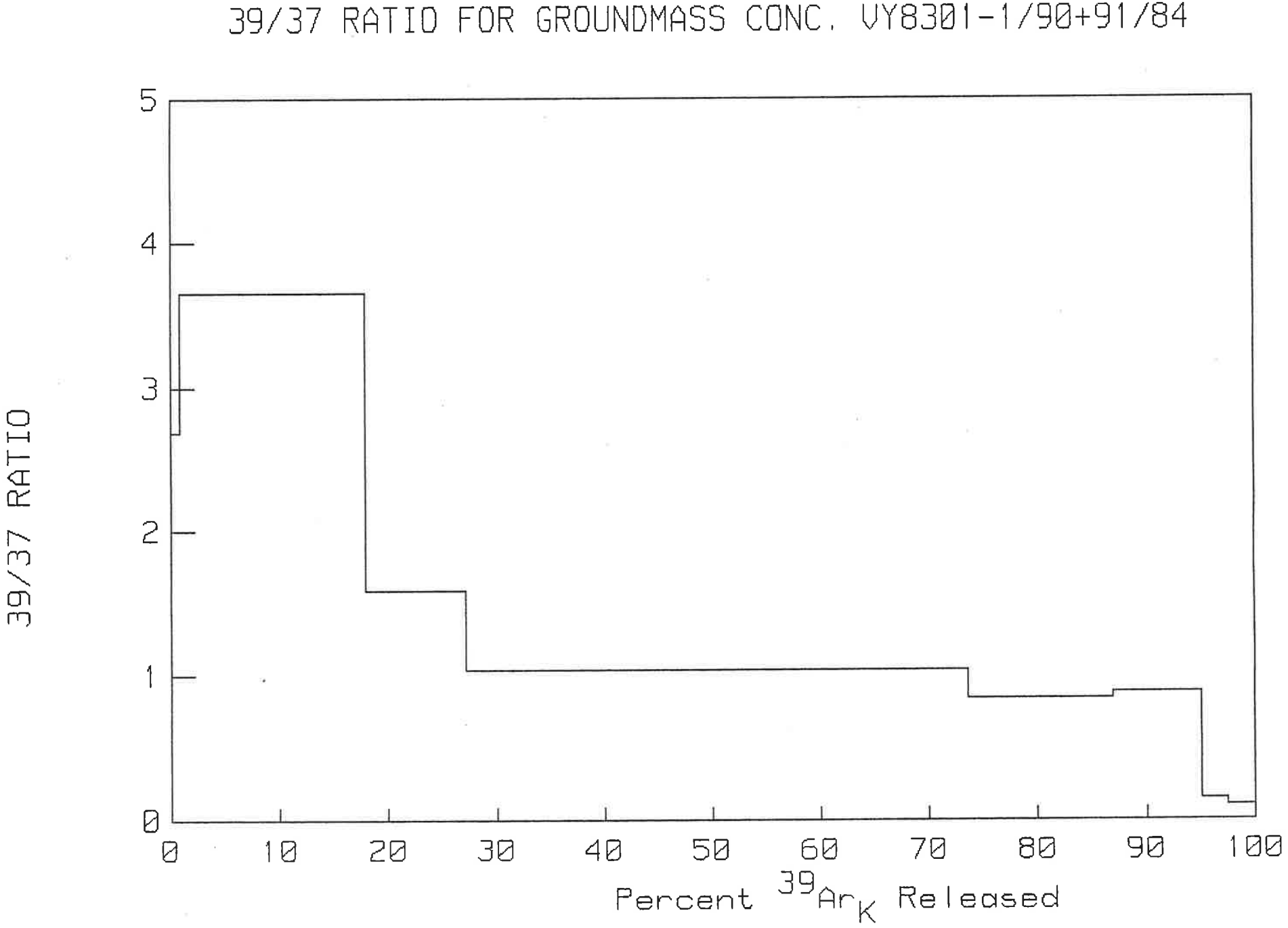
AFG

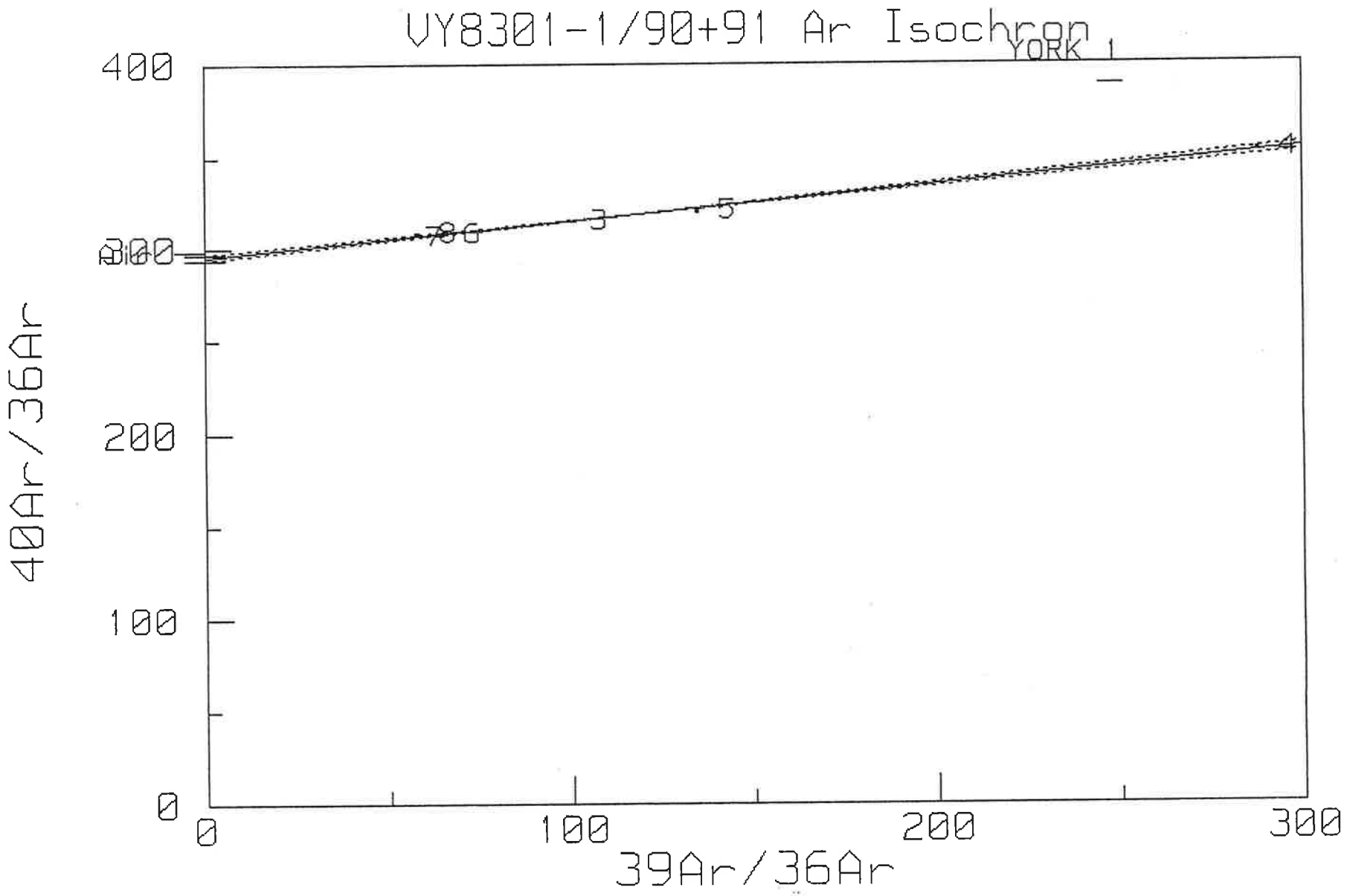
AB

AG


AGE SPECTRUM FOR GROUNDMASS CONC. VY8301-1/90+91/84
(1σ)
Veyo - lower of two cooling units
$T_p \sim 690 \pm 140$ ka
$T_i - 686 \pm 22$ (2σ) ka
Apparent Age (Ma)
3
2
1
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


AGE SPECTRUM FOR GROUNDMASS CONC. VY8301-1/90+91/84
Apparent Age (Ma)
0
1
2
3
4
5
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


39/37 RATIO FOR GROUNDMASS CONC. VY8301-1/90+91/84
39/37 RATIO
0
1
2
3
4
5
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VY8301-1/90+91 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
100
200
300
39Ar/36Ar
1
2
3
4
5
6
7

VY8301-1/90+91

York 1 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.19594	.012809	295.77	1.6947

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	6.858E-01	2.24E-02	2.24E-02
Initial 40/36:	2.96E+02	8.47E-01	8.47E-01
Radiogenic 40/39:	1.96E-01	6.40E-03	6.40E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.19653	.00038254	295.7	.053678

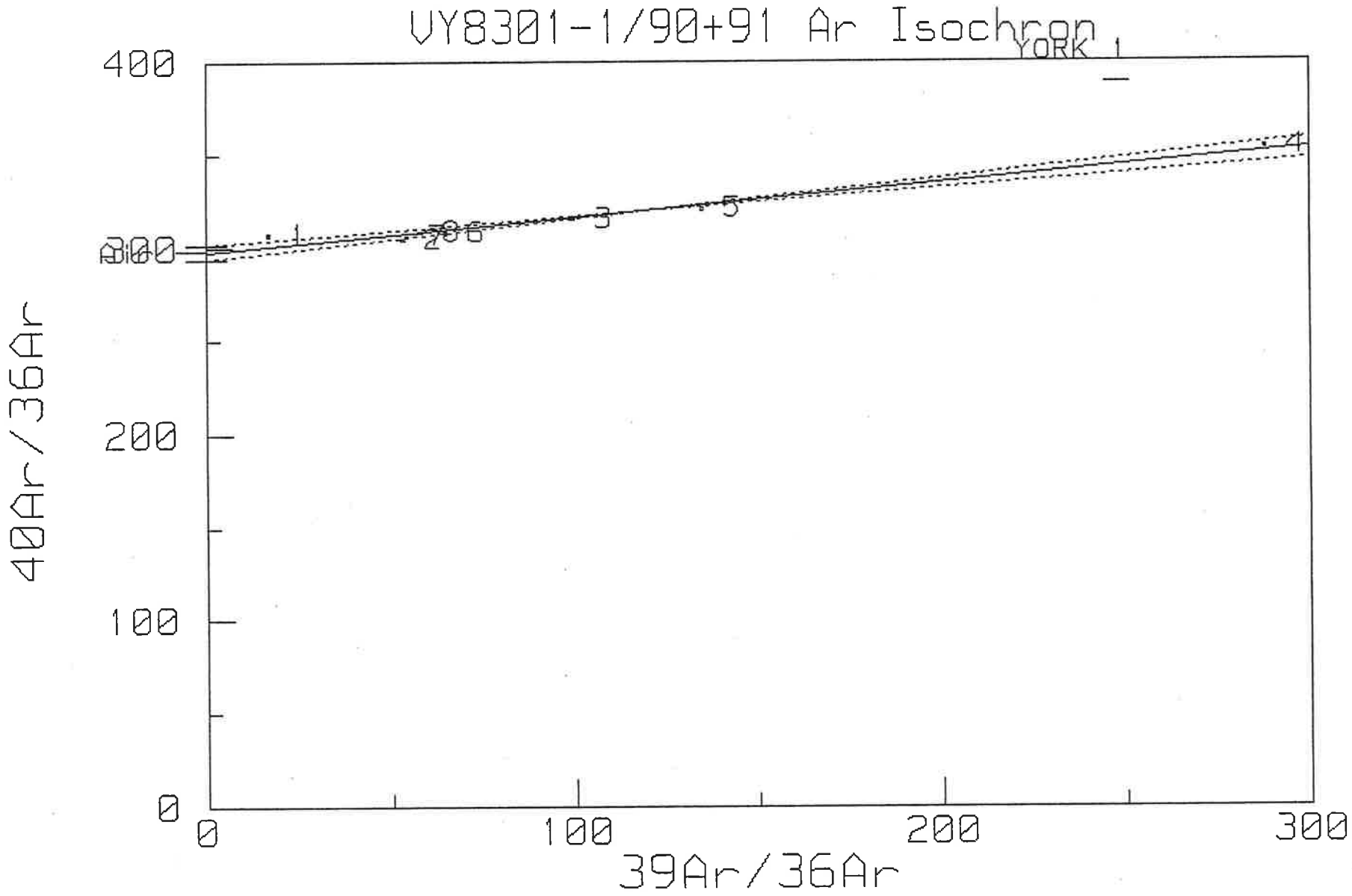
mswd= 31.8 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	6.879E-01	9.60E-04	9.60E-04
Initial 40/36:	2.96E+02	2.68E-02	2.68E-02
Radiogenic 40/39:	1.97E-01	1.91E-04	1.91E-04

All errors on this printout are: 2 SIGMA

#28


VY8301-1/90+91 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
100
200
300
39Ar/36Ar
1
2
3
4
5
6

VY8301/90+91/84
York 1 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.18278	.032599	297.79	3.7593

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	6.398E-01	5.70E-02	5.70E-02
Initial 40/36:	2.98E+02	1.88E+00	1.88E+00
Radiogenic 40/39:	1.83E-01	1.63E-02	1.63E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.18494	.00034716	297.59	.042382
mswd= 88	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	6.473E-01	8.88E-04	8.88E-04
Initial 40/36:	2.98E+02	2.12E-02	2.12E-02
Radiogenic 40/39:	1.85E-01	1.74E-04	1.74E-04

All errors on this printout are: 2 SIGMA

#1-8, All

.250	.00002	.00045	.00035	.00006	.23647	.00000	.00017	.00000	.00044
.400	.00002	.00049	.00038	.00010	.36513	.00001	.00026	.00000	.00052

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00077	.00014	.22876	.00884	.00085	2.69
750	.00462	.00081	1.36388	.01679	.00020	3.64
850	.00133	.00023	.39299	.01851	.00024	1.58
950	.00232	.00041	.68504	.00164	.00024	1.04
1050	.00142	.00025	.42012	.01516	.00022	.84
1150	.00182	.00032	.53730	.04838	.00023	.89
1250	.00062	.00011	.18404	.11388	.00024	.14
1400	.00063	.00011	.18709	.15005	.00027	.10

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.00917	.01298	.707	3.9	.9	2.47 +/- .03
750	.04113	.24611	.167	2.9	17.1	.58 +/- .06
850	.02620	.13262	.198	6.2	9.2	.69 +/- .06
950	.13316	.66876	.199	16.1	46.4	.70 +/- .01
1050	.03552	.19198	.185	7.8	13.3	.65 +/- .05
1150	.02301	.11819	.195	4.1	8.2	.68 +/- .17
1250	.00679	.03388	.200	3.6	2.4	.70 +/- .40
1400	.00830	.03685	.225	4.2	2.6	.79 +/- .53
TOTAL GAS			.197			.69 +/- .06

PLATEAU AGE = .69 +/- .14 Ma
PLATEAU ON STEPS 3 TO 7 AND CONTAINS 79.5 PERCENT OF THE GAS
PLATEAU MIN = .65 AND PLATEAU MAX = .70

1250	.00002	.00045	.00035	.00006	.23647	.00000	.00017	.00000	.00044
1400	.00002	.00049	.00038	.00010	.36513	.00001	.00026	.00000	.00052

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00077	.00014	.22876	.00884	.00085	2.69
750	.00462	.00081	1.36388	.01679	.00020	3.64
850	.00133	.00023	.39299	.01851	.00024	1.58
950	.00232	.00041	.68504	.00164	.00024	1.04
1050	.00142	.00025	.42012	.01516	.00022	.84
1150	.00182	.00032	.53730	.04838	.00023	.89
1250	.00062	.00011	.18404	.11388	.00024	.14
1400	.00063	.00011	.18709	.15005	.00027	.10

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.00917	.01298	.707	3.9	.9	2.47 +/- .03
750	.04113	.24611	.167	2.9	17.1	.58 +/- .06
850	.02620	.13262	.198	6.2	9.2	.69 +/- .06
950	.13316	.66876	.199	16.1	46.4	.70 +/- .01
1050	.03552	.19198	.185	7.8	13.3	.65 +/- .05
1150	.02301	.11819	.195	4.1	8.2	.68 +/- .17
1250	.00679	.03388	.200	3.6	2.4	.70 +/- .40
1400	.00830	.03685	.225	4.2	2.6	.79 +/- .53
TOTAL GAS			.197			.69 +/- .06

Your Personalized Argon Data Acquisition on Sample: VY8301-1/90+91/84
Sample analysis started on 245 Reduced on 27-Sep-2004
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 408.1 mg
J-value and its error .0019405 .1 %

RAW DATA

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141043	650	.23807	.01292	.00093	.00008	.00077	200	1
+/-		.00100	.00029	.00000	.00002	.00000		
141044	750	1.40757	.24507	.01625	.00106	.00459	200	1
+/-		.00129	.00019	.00000	.00001	.00002		
141045	850	.42056	.13209	.00552	.00131	.00134	200	1
+/-		.00037	.00010	.00000	.00001	.00001		
141046	950	.82515	.66627	.01187	.01005	.00246	200	1
+/-		.00078	.00048	.00001	.00001	.00001		
141047	1050	.45764	.19129	.00415	.00357	.00147	200	1
+/-		.00048	.00016	.00001	.00002	.00001		
141048	1150	.56153	.11776	.00331	.00208	.00183	200	1
+/-		.00051	.00007	.00000	.00001	.00002		
141049	1250	.19118	.03389	.00100	.00368	.00068	200	1
+/-		.00009	0.00000	.00002	.00000	.00001		
141050	1400	.19577	.03695	.00112	.00569	.00072	200	1
+/-		.00014	.00003	.00001	.00001	.00002		

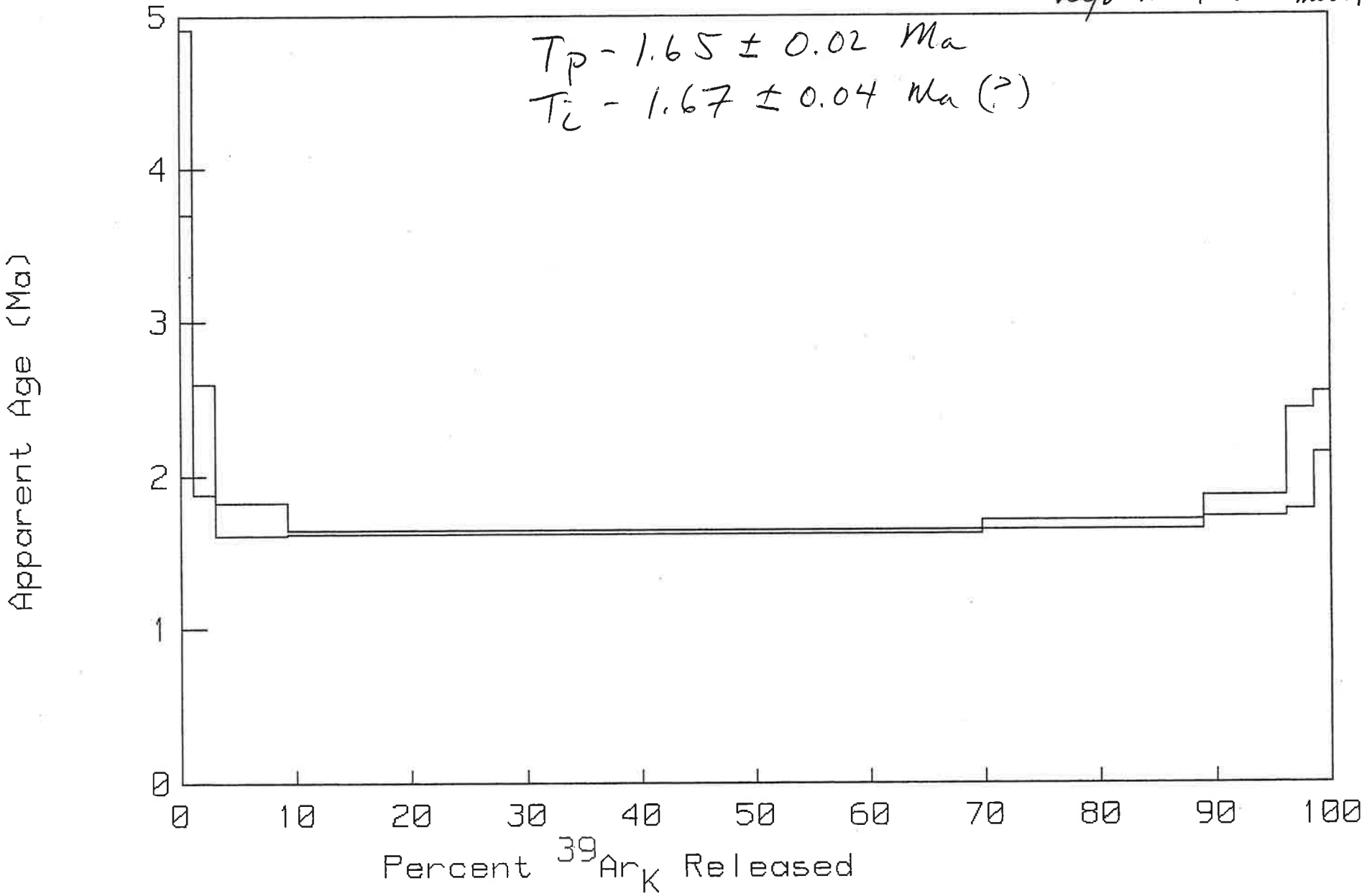
Raw values corrected for manifold options, trap current and mass discrimination

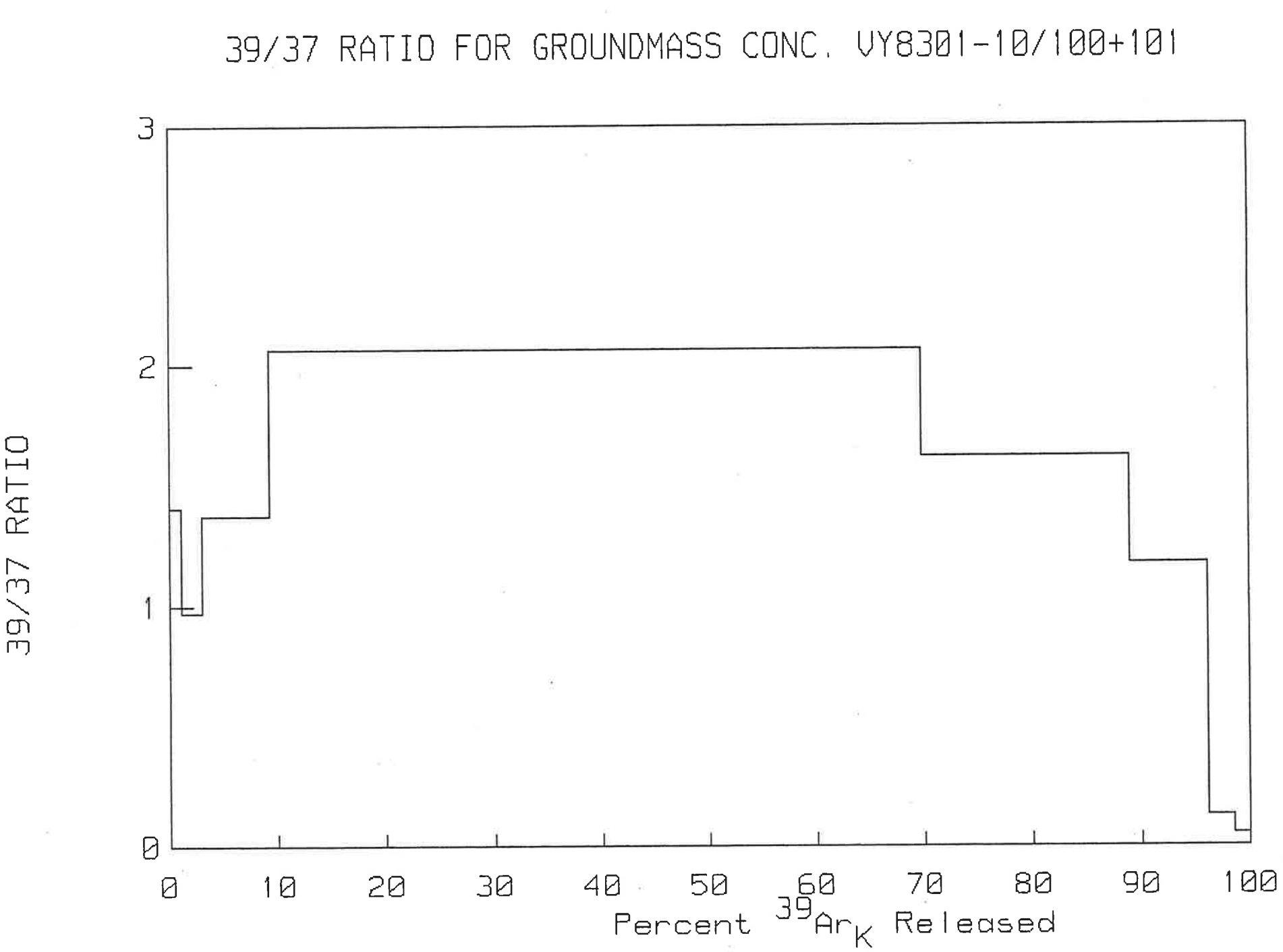
TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
650	.23807	.01296	.00094	.00008	.00078	.00476	.00002
+/-	.00100	.00029	.00000	.00002	.00000		
750	1.40757	.24578	.01634	.00107	.00464	.06658	.00038
+/-	.00129	.00019	.00000	.00001	.00002		
850	.42056	.13247	.00555	.00132	.00135	.08242	.00020
+/-	.00037	.00011	.00000	.00001	.00001		
950	.82515	.66818	.01194	.01013	.00249	.63349	.00103
+/-	.00078	.00048	.00001	.00001	.00001		
1050	.45764	.19184	.00417	.00360	.00148	.22538	.00030
+/-	.00048	.00016	.00001	.00002	.00001		
1150	.56153	.11810	.00333	.00210	.00185	.13149	.00018
+/-	.00051	.00007	.00000	.00001	.00002		
1250	.19118	.03399	.00100	.00372	.00069	.23277	.00005
+/-	.00009	.00000	.00002	.00000	.00001		
1400	.19577	.03705	.00113	.00574	.00073	.35941	.00006
+/-	.00014	.00003	.00002	.00001	.00002		

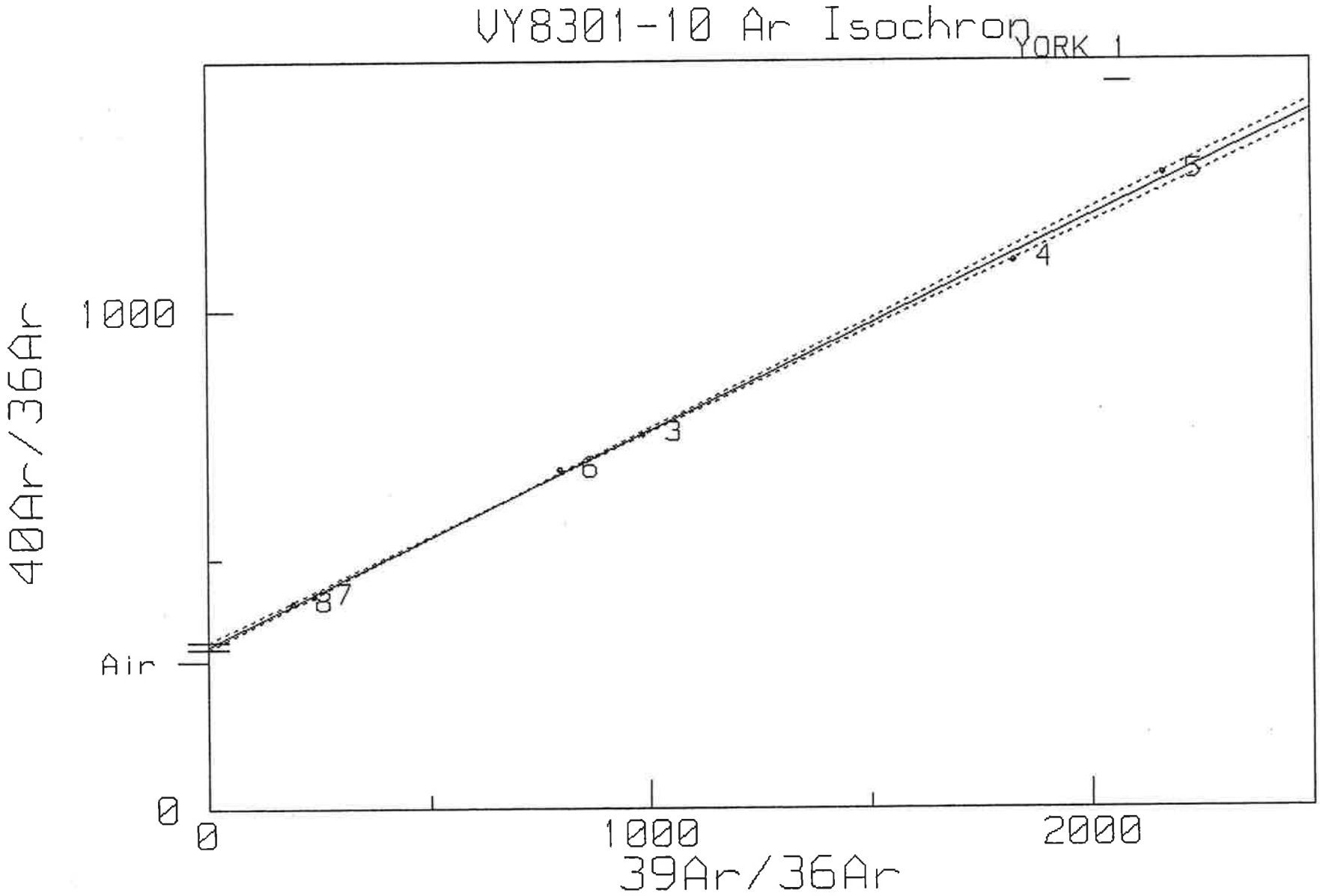
TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
650	.00001	.00017	.00013	0.00000	.00483	.00000	.00000	.00000	.00063
750	.00012	.00325	.00256	.00002	.06752	.00000	.00005	.00000	.01227
850	.00007	.00175	.00138	.00002	.08367	.00000	.00006	.00000	.00356
950	.00033	.00884	.00696	.00017	.64329	.00001	.00045	.00000	.00267
1050	.00010	.00254	.00200	.00006	.22889	.00000	.00016	.00000	.00138
1150	.00006	.00156	.00123	.00004	.13353	.00000	.00009	.00000	.00144

AGE SPECTRUM FOR GROUNDMASS CONC. VY8301-10/100+101

Vego - north end Cameron Valley




39/37 RATIO FOR GROUNDMASS CONC. VY8301-10/100+101
39/37 RATIO
3
2
1
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VY8301-10 Ar Isochron
YORK 1
40Ar/36Ar
1000
Air
0
0
1000
2000
39Ar/36Ar
7
6
3
4
5

VY8301-10

York 1 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.42751	.010913	330.93	7.3181

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.600E+00	2.05E-02	2.05E-02
Initial 40/36:	3.31E+02	3.66E+00	3.66E+00
Radiogenic 40/39:	4.28E-01	5.46E-03	5.46E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.42671	.00016402	331.42	.13196

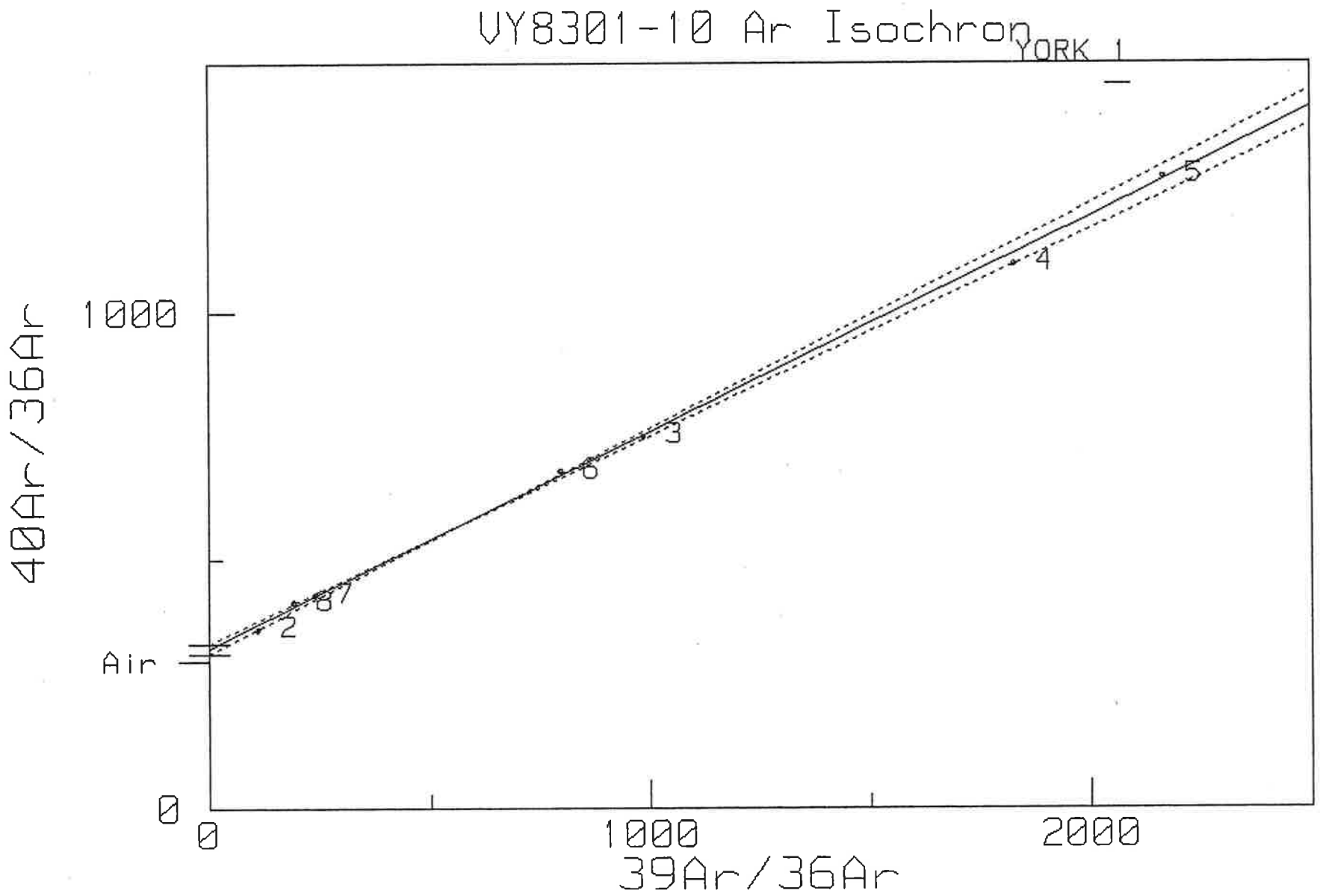
mswd= 179 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.597E+00	1.63E-03	1.63E-03
Initial 40/36:	3.31E+02	6.60E-02	6.60E-02
Radiogenic 40/39:	4.27E-01	8.20E-05	8.20E-05

All errors on this printout are: 2 SIGMA

3-8


VY8301-10 Ar Isochron
YORK 1
40Ar/36Ar
1000
Air
0
0
1000
2000
39Ar/36Ar
2
8
7
3
4
5

York 1 Analysis

n= 7

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.43474	.01754	322.88	9.609

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.627E+00	3.28E-02	3.28E-02
Initial 40/36:	3.23E+02	4.80E+00	4.80E+00
Radiogenic 40/39:	4.35E-01	8.77E-03	8.77E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 7

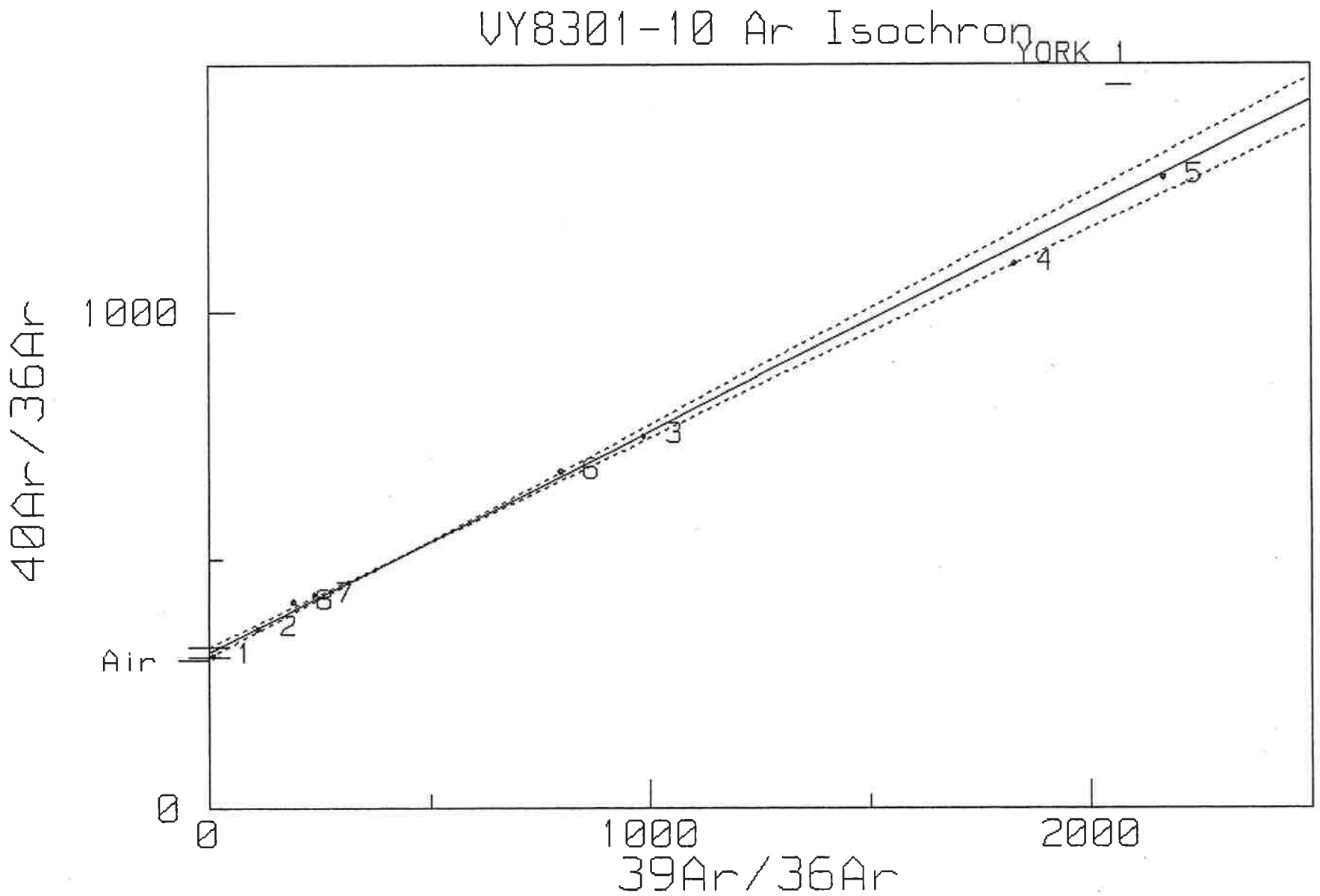
SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.43123	-.00020168	324.98	.13107
mswd= 221	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.614E+00	1.66E-03	1.66E-03
Initial 40/36:	3.25E+02	6.55E-02	6.55E-02
Radiogenic 40/39:	4.31E-01	1.01E-04	1.01E-04

All errors on this printout are: 2 SIGMA

#28


VY8301-10 Ar Isochron
YORK 1
40Ar/36Ar
1000
Air
0
0
1000
2000
39Ar/36Ar
1
2
8
7
6
3
4
5

VY8301-10

York 1 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.44504	.023711	313.86	10.629

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.665E+00	4.44E-02	4.44E-02
Initial 40/36:	3.14E+02	5.31E+00	5.31E+00
Radiogenic 40/39:	4.45E-01	1.19E-02	1.19E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.43666	-3.7095E-5	317.94	.038089
mswd= 285	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.634E+00	1.63E-03	1.63E-03
Initial 40/36:	3.18E+02	1.90E-02	1.90E-02
Radiogenic 40/39:	4.37E-01	1.85E-05	1.85E-05

All errors on this printout are: 2 SIGMA

1-8, All

1250	.00002	.00059	.00046	.00009	.35114	.00001	.00025	.00000	.00060
1400	.00001	.00034	.00027	.00015	.55566	.00001	.00039	.00000	.00035

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00216	.00038	.63776	.16099	.00138	1.41
750	.00031	.00005	.09162	.09589	.00072	.97
900	.00012	.00002	.03475	.02811	.00055	1.37
950	.00061	.00011	.18004	.00400	.00052	2.07
1050	.00016	.00003	.04835	.00898	.00054	1.62
1150	.00017	.00003	.04924	.01758	.00058	1.18
1250	.00019	.00003	.05534	.08702	.00067	.13
1400	.00014	.00002	.04008	.05284	.00075	.05

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.02427	.02108	1.151	3.7	1.1	4.30 +/- .60
750	.02048	.03423	.598	18.2	1.9	2.24 +/- .36
900	.05342	.11619	.460	59.8	6.3	1.72 +/- .11
950	.48756	1.11576	.437	71.8	60.4	1.63 +/- .02
1050	.15953	.35528	.449	75.4	19.2	1.68 +/- .03
1150	.06391	.13306	.480	55.8	7.2	1.80 +/- .07
1250	.02502	.04457	.561	31.0	2.4	2.10 +/- .33
1400	.01613	.02587	.623	28.6	1.4	2.33 +/- .20
TOTAL GAS			.461			1.72 +/- .04

PLATEAU AGE = 1.65 +/- .02 Ma
PLATEAU ON STEPS 4 TO 5 AND CONTAINS 79.7 PERCENT OF THE GAS
PLATEAU MIN = 1.63 AND PLATEAU MAX = 1.68

Your Personalized Argon Data Acquisition on Sample: VY8301-10/100+101
Sample analysis started on 321 Reduced on 30-Jan-2005
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 403.1 mg
J-value and its error .002075 .1 %

RAW DATA

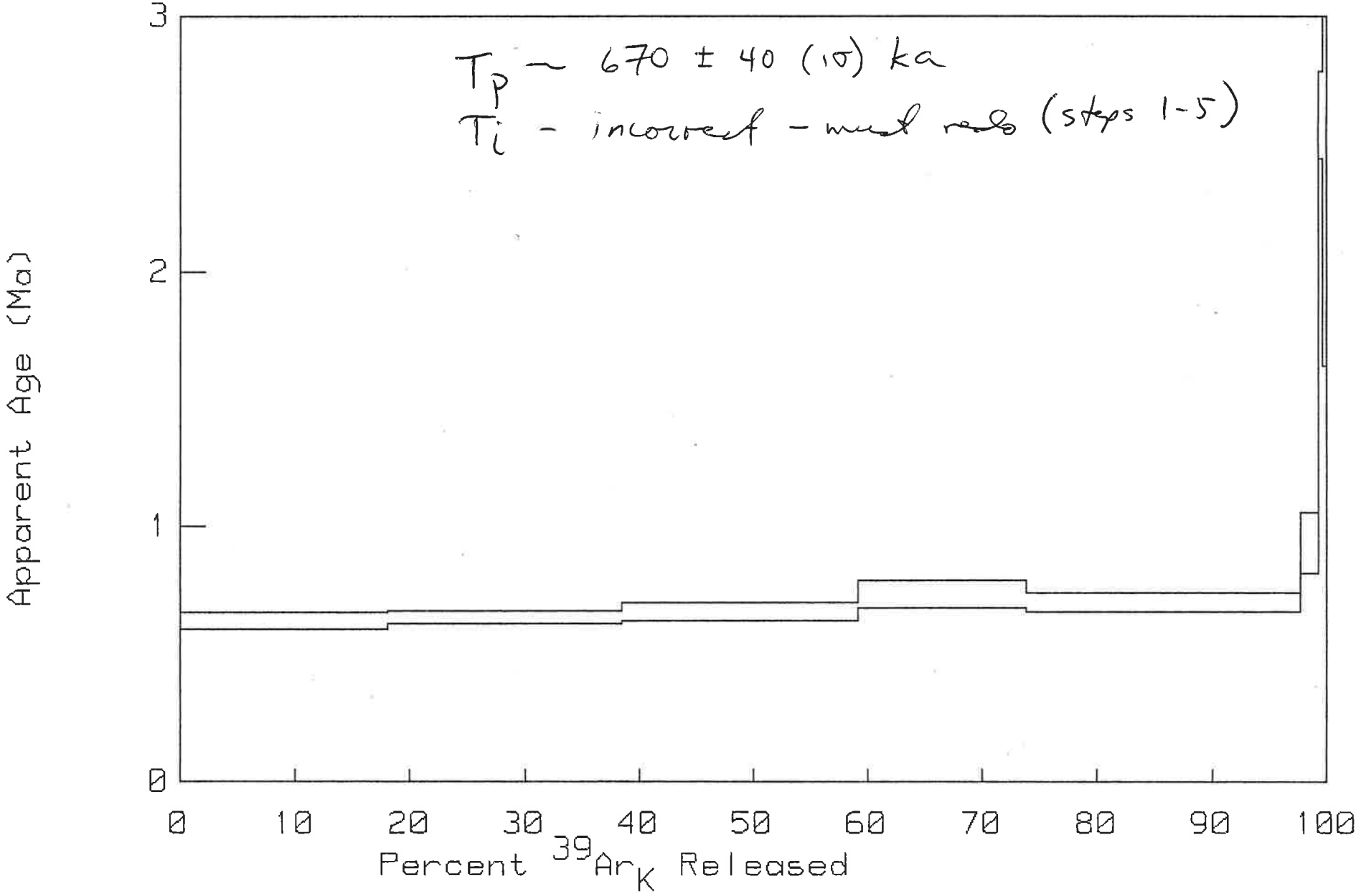
FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141535	650	.66224	.02099	.00165	.00005	.00214	200	1
+/-		.00042	.00003	.00000	.00000	.00001		
141536	750	.11245	.03408	.00098	.00012	.00032	200	1
+/-		.00005	0.00000	.00001	.00001	.00001		
141537	900	.08938	.11568	.00188	.00030	.00014	200	1
+/-		.00007	.00010	.00000	.00003	.00001		
141538	950	.67920	1.11062	.01585	.00192	.00075	200	1
+/-		.00074	.00087	.00001	.00001	.00001		
141539	1050	.21157	.35368	.00577	.00078	.00022	200	1
+/-		.00007	.00031	.00004	.00001	.00001		
141540	1150	.11453	.13248	.00331	.00040	.00020	200	1
+/-		.00007	.00007	.00001	.00002	.00001		
141541	1250	.08082	.04460	.00122	.00124	.00028	200	1
+/-		0.00000	.00004	.00002	.00001	.00001		
141542	1400	.05648	.02613	.00072	.00196	.00028	200	1
+/-		.00004	.00003	.00001	.00001	.00000		

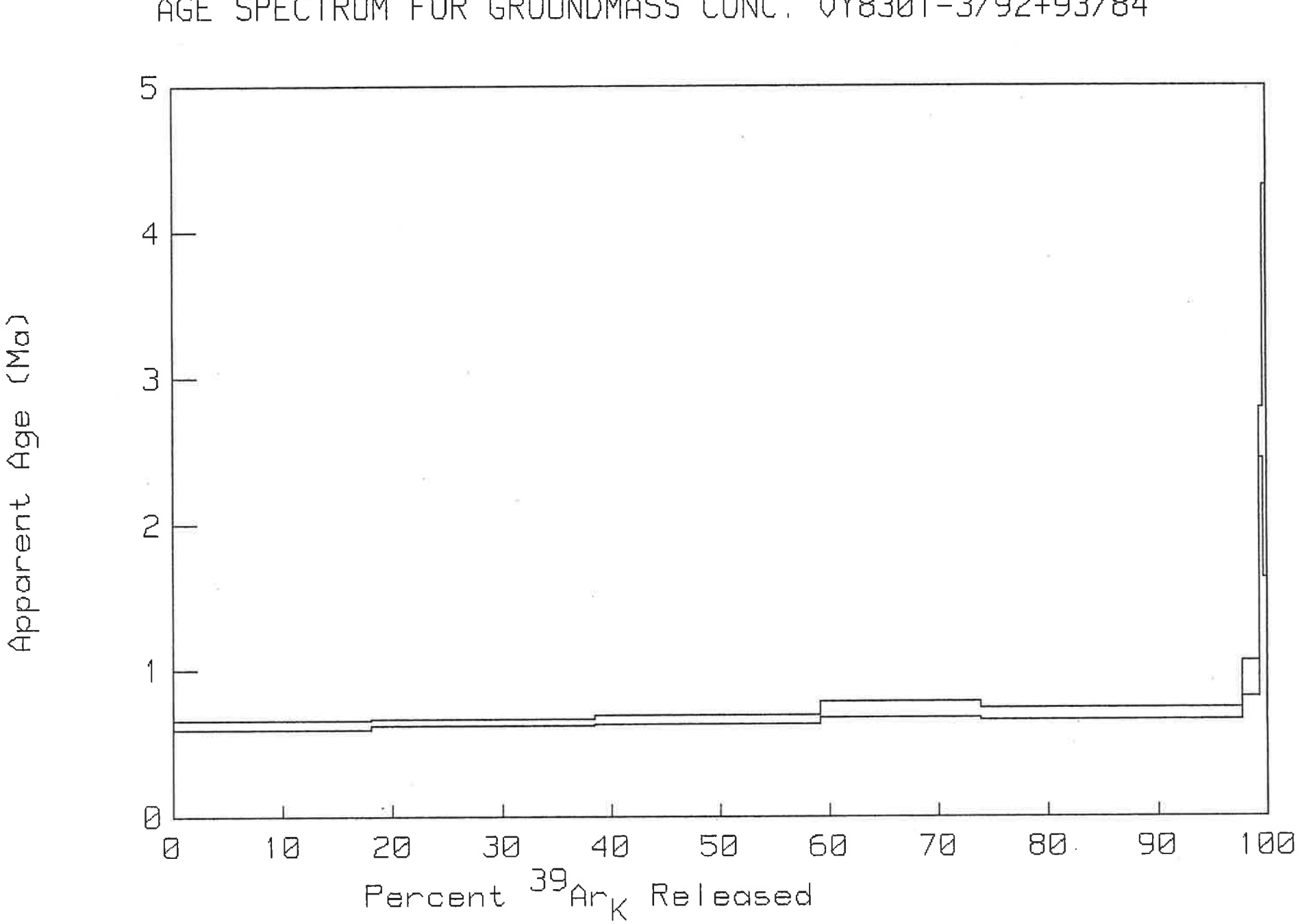
Raw values corrected for manifold options, trap current and mass discrimination

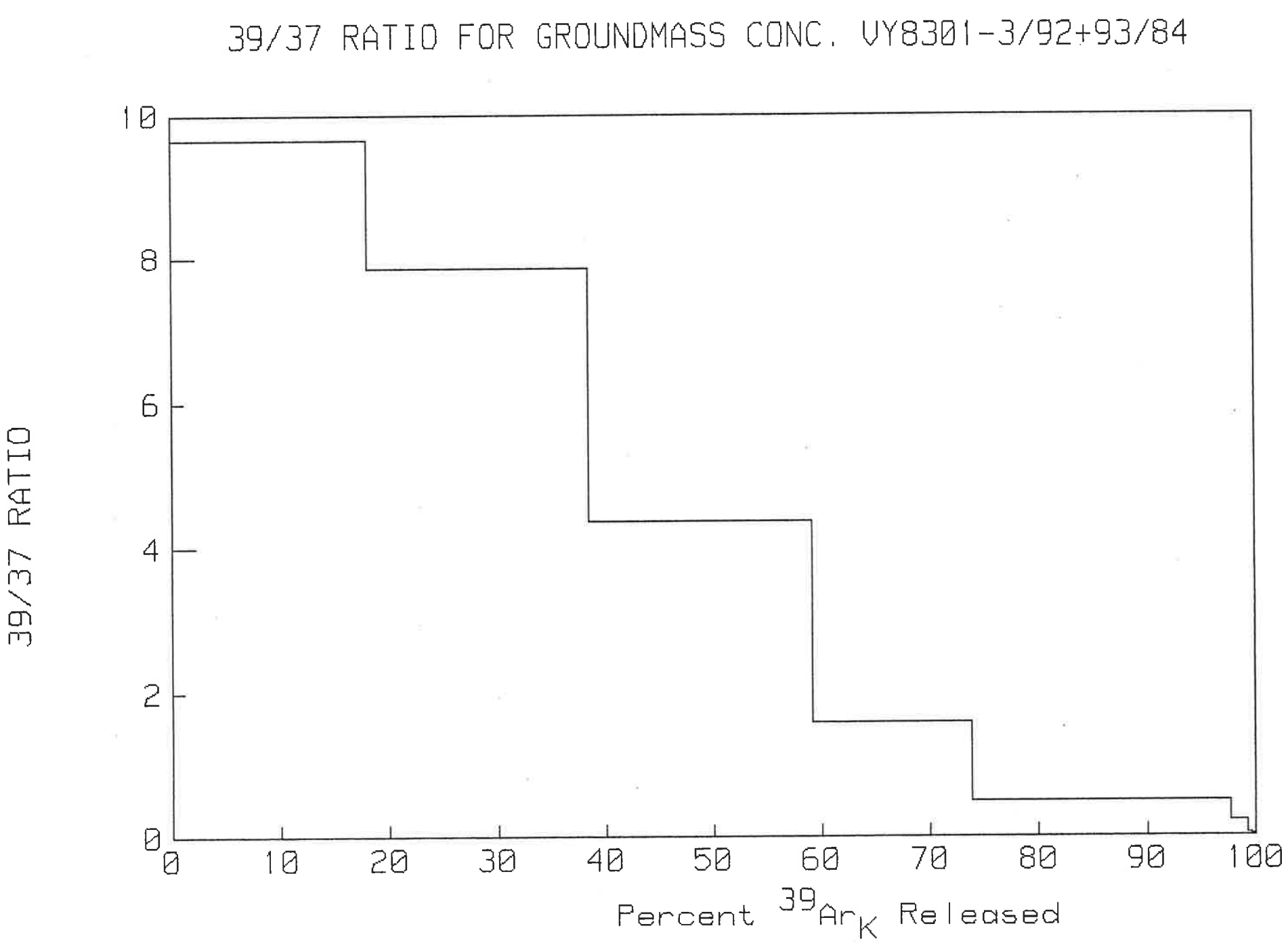
TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
650	.66224	.02105	.00166	.00005	.00216	.01495	.00004
+/-	.00042	.00003	.00000	.00000	.00001		
750	.11245	.03418	.00098	.00013	.00032	.03505	.00007
+/-	.00005	.00000	.00001	.00001	.00001		
900	.08938	.11601	.00189	.00030	.00014	.08435	.00024
+/-	.00007	.00010	.00000	.00003	.00001		
950	.67920	1.11381	.01594	.00193	.00076	.53844	.00233
+/-	.00074	.00087	.00001	.00001	.00001		
1050	.21157	.35469	.00580	.00079	.00022	.21934	.00074
+/-	.00007	.00032	.00004	.00001	.00001		
1150	.11453	.13286	.00333	.00040	.00020	.11290	.00028
+/-	.00007	.00007	.00001	.00002	.00001		
1250	.08082	.04473	.00123	.00125	.00028	.34990	.00009
+/-	0.00000	.00004	.00002	.00001	.00001		
1400	.05648	.02621	.00072	.00198	.00029	.55369	.00005
+/-	.00004	.00003	.00001	.00001	.00000		

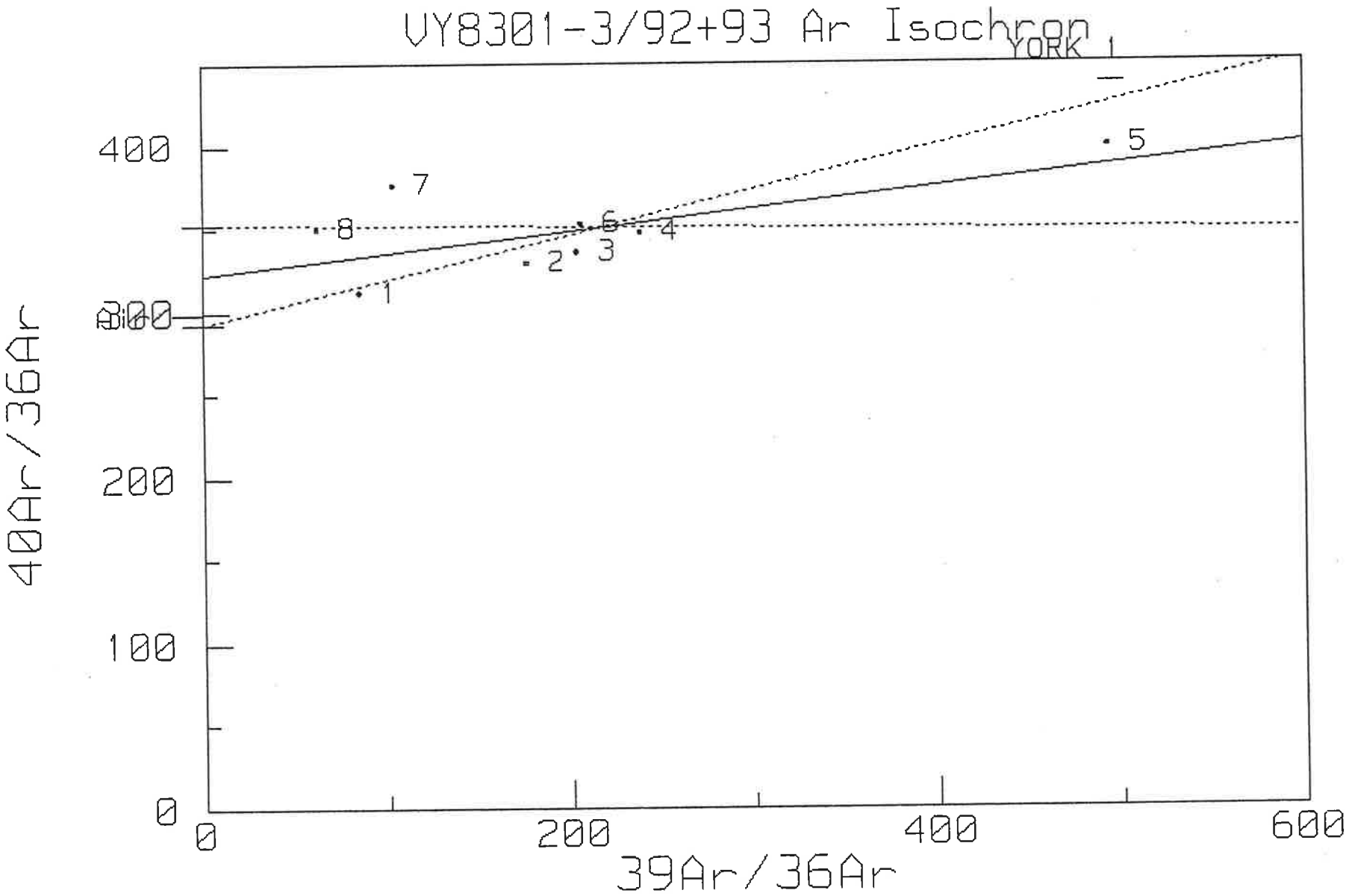
TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
650	.00001	.00028	.00022	0.00000	.01500	.00000	.00001	.00000	.00100
750	.00002	.00045	.00036	.00001	.03516	.00000	.00002	.00000	.00048
900	.00006	.00154	.00121	.00002	.08460	.00000	.00006	.00000	.00034
950	.00056	.01475	.01160	.00015	.53981	.00001	.00038	.00000	.00107
1050	.00018	.00470	.00369	.00006	.21995	.00000	.00016	.00000	.00107
1150	.00007	.00176	.00138	.00003	.11324	.00000	.00008	.00000	.00154

AGE SPECTRUM FOR GROUNDMASS CONC. VY8301-3/92+93/84




AGE SPECTRUM FOR GROUNDMASS CONC. VY8301-3/92+93/84
Apparent Age (Ma)
0
1
2
3
4
5
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


39/37 RATIO FOR GROUNDMASS CONC. VY8301-3/92+93/84
39/37 RATIO
10
8
6
4
2
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VY8301-3/92+93 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
39Ar/36Ar
1
2
3
4
5
6
7
8

VY8301-3/92+93

York 1 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.12999	.13664	322.63	29.8

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	4.353E-01	2.29E-01	2.29E-01
Initial 40/36:	3.23E+02	1.49E+01	1.49E+01
Radiogenic 40/39:	1.30E-01	6.83E-02	6.83E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.12766	.00025988	323	.058137

mswd= 538 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	4.275E-01	6.10E-04	6.10E-04
Initial 40/36:	3.23E+02	2.91E-02	2.91E-02
Radiogenic 40/39:	1.28E-01	1.30E-04	1.30E-04

All errors on this printout are: 2 SIGMA

#1-8, All

1250	.00000	.00008	.00007	.00004	.16593	.00000	.00012	.00000	.00007
1400	.00000	.00006	.00005	.00009	.34427	.00001	.00024	.00000	.00007

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00326	.00058	.96361	.01032	.00022	9.67
750	.00179	.00032	.52772	.00673	.00023	7.85
850	.00156	.00027	.45964	.01008	.00024	4.35
950	.00094	.00017	.27887	.01575	.00026	1.58
1050	.00074	.00013	.21939	.01141	.00025	.49
1150	.00012	.00002	.03406	.03626	.00033	.22
1250	.00006	.00001	.01808	.05051	.00094	.04
1400	.00008	.00001	.02351	.40217	.00107	.01

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)	
650	.05177	.27645	.187	5.1	18.0	.63 +/-	.03
750	.06030	.31512	.191	10.2	20.5	.64 +/-	.02
850	.06276	.31731	.198	11.9	20.7	.66 +/-	.03
950	.04917	.22525	.218	14.9	14.7	.73 +/-	.05
1050	.07652	.36698	.209	25.5	23.9	.70 +/-	.04
1150	.00663	.02379	.279	16.2	1.5	.93 +/-	.12
1250	.00495	.00634	.781	21.4	.4	2.61 +/-	.17
1400	.00436	.00491	.888	15.6	.3	2.97 +/-	1.34
TOTAL GAS			.206			.69 +/-	.04

PLATEAU AGE = .67 +/- .04 Ma
PLATEAU ON STEPS 1 TO 5 AND CONTAINS 97.7 PERCENT OF THE GAS
PLATEAU MIN = .63 AND PLATEAU MAX = .73

PLATEAU AGE = .69 +/- .04 Ma
PLATEAU ON STEPS 3 TO 5 AND CONTAINS 59.2 PERCENT OF THE GAS
PLATEAU MIN = .66 AND PLATEAU MAX = .73

Your Personalized Argon Data Acquisition on Sample: VY8301-3/92+93/84
Sample analysis started on 246 Reduced on 29-Sep-2004
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 401.8 mg
J-value and its error .0018565 .1 %

RAW DATA

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141052	650	1.01825	.27525	.01196	.00044	.00323	200	1
+/-		.00058	.00015	.00001	.00000	.00001		
141053	750	.59130	.31376	.01321	.00062	.00178	200	1
+/-		.00051	.00033	.00000	.00000	.00001		
141054	850	.52570	.31596	.01309	.00112	.00156	200	1
+/-		.00054	.00023	.00001	.00001	.00001		
141055	950	.33038	.22436	.00807	.00218	.00097	200	1
+/-		.00030	.00017	.00001	.00000	.00001		
141056	1050	.29972	.36589	.00705	.01141	.00093	200	1
+/-		.00026	.00034	.00001	.00001	.00001		
141057	1150	.04094	.02376	.00053	.00165	.00014	200	1
+/-		.00001	.00001	.00000	.00002	.00000		
141058	1250	.02309	.00642	.00017	.00254	.00010	200	1
+/-		0.00000	.00002	.00001	.00001	.00000		
141059	1400	.02792	.00513	.00016	.00527	.00017	200	1
+/-		0.00000	.00003	.00001	.00002	.00001		

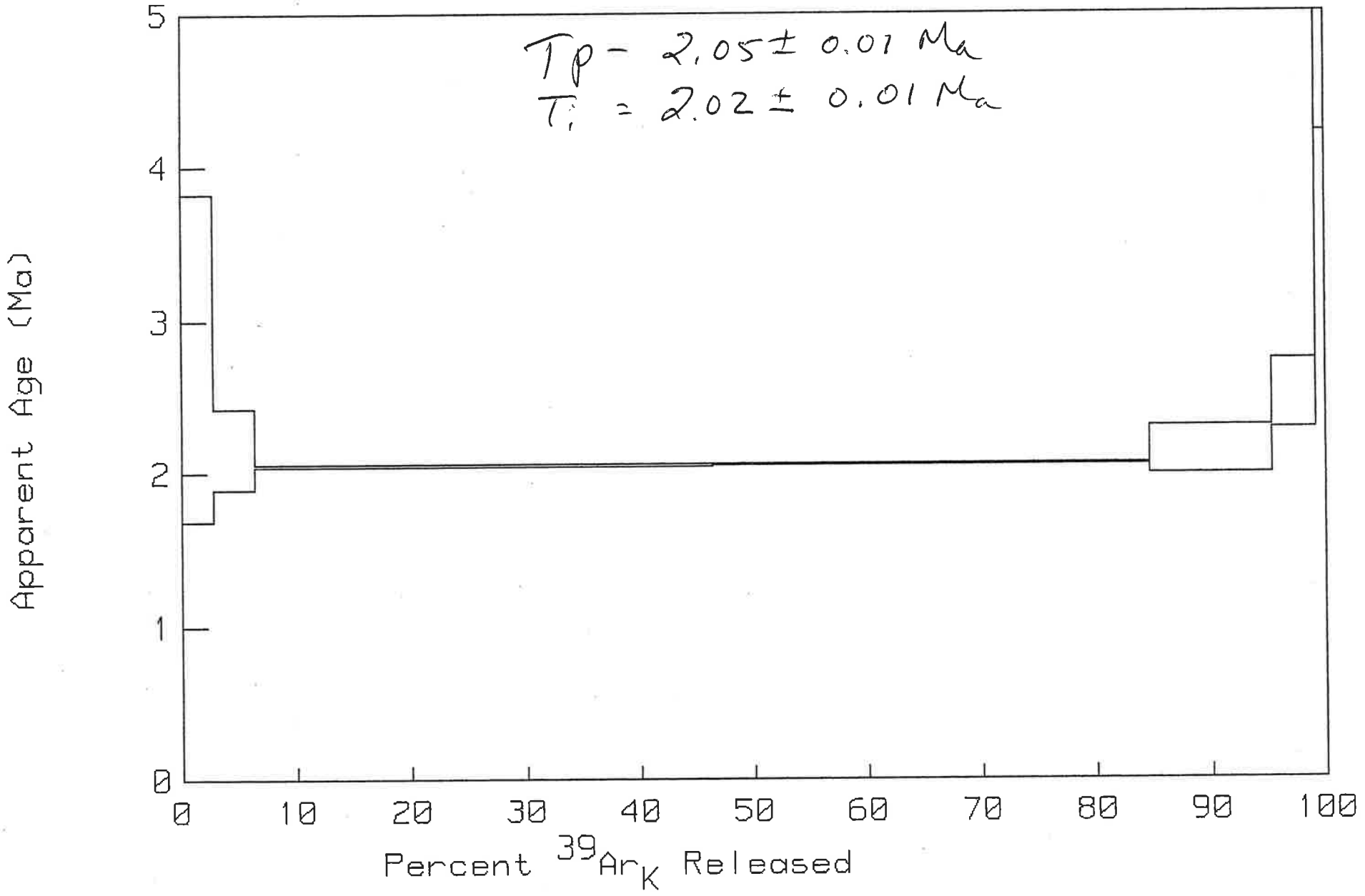
Raw values corrected for manifold options, trap current and mass discrimination

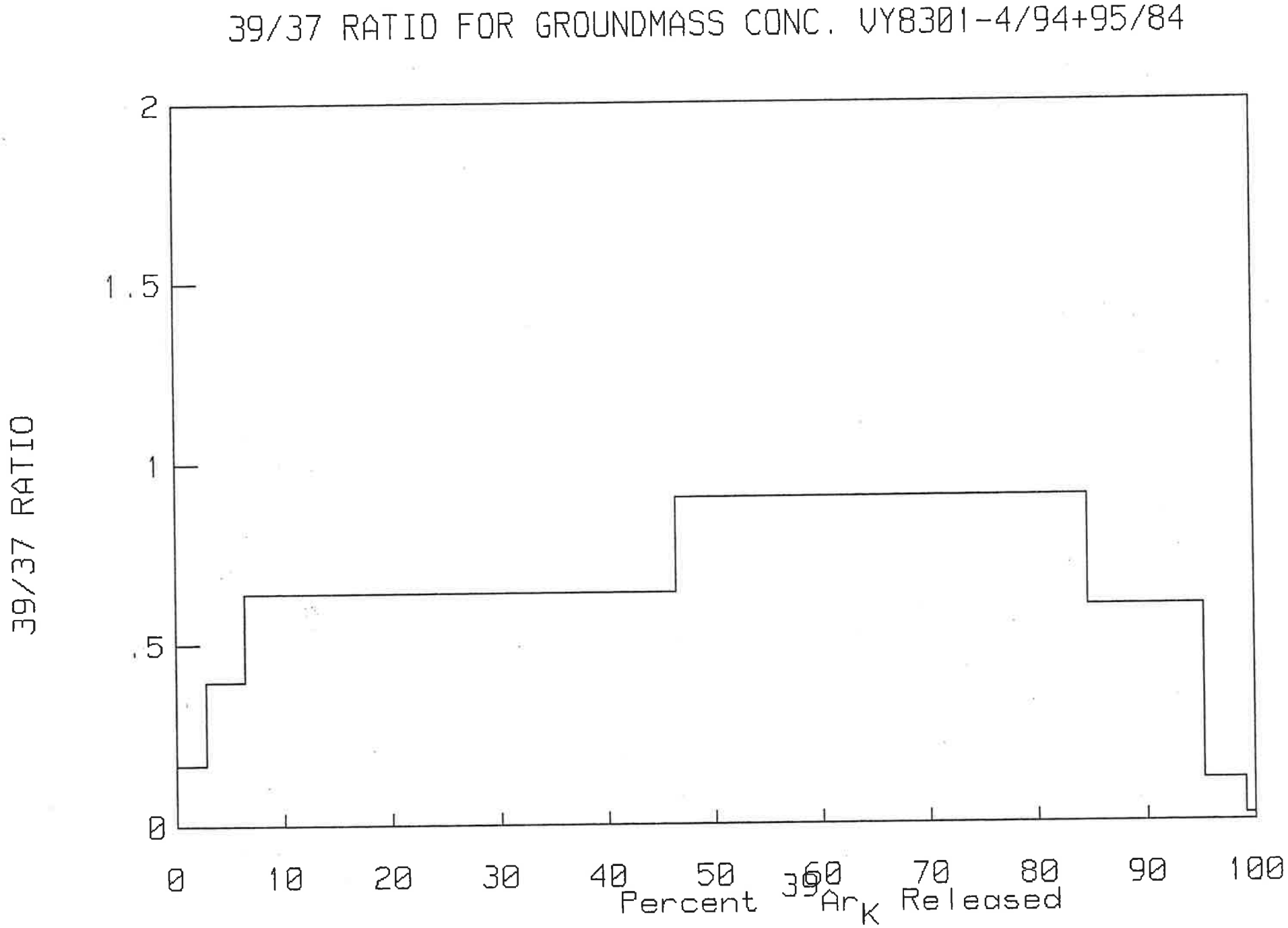
TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
650	1.01825	.27604	.01203	.00045	.00327	.02830	.00043
+/-	.00058	.00015	.00001	.00000	.00001		
750	.59130	.31466	.01329	.00062	.00180	.03966	.00049
+/-	.00051	.00033	.00000	.00000	.00001		
850	.52570	.31687	.01317	.00113	.00158	.07191	.00049
+/-	.00054	.00023	.00001	.00001	.00001		
950	.33038	.22501	.00812	.00220	.00098	.14010	.00035
+/-	.00030	.00017	.00001	.00000	.00001		
1050	.29972	.36694	.00709	.01151	.00094	.73297	.00057
+/-	.00026	.00034	.00001	.00001	.00001		
1150	.04094	.02383	.00053	.00167	.00014	.10616	.00004
+/-	.00001	.00001	.00000	.00002	.00000		
1250	.02309	.00644	.00017	.00256	.00011	.16337	.00001
+/-	0.00000	.00002	.00001	.00001	.00000		
1400	.02792	.00515	.00016	.00531	.00017	.33896	.00001
+/-	0.00000	.00003	.00001	.00002	.00001		

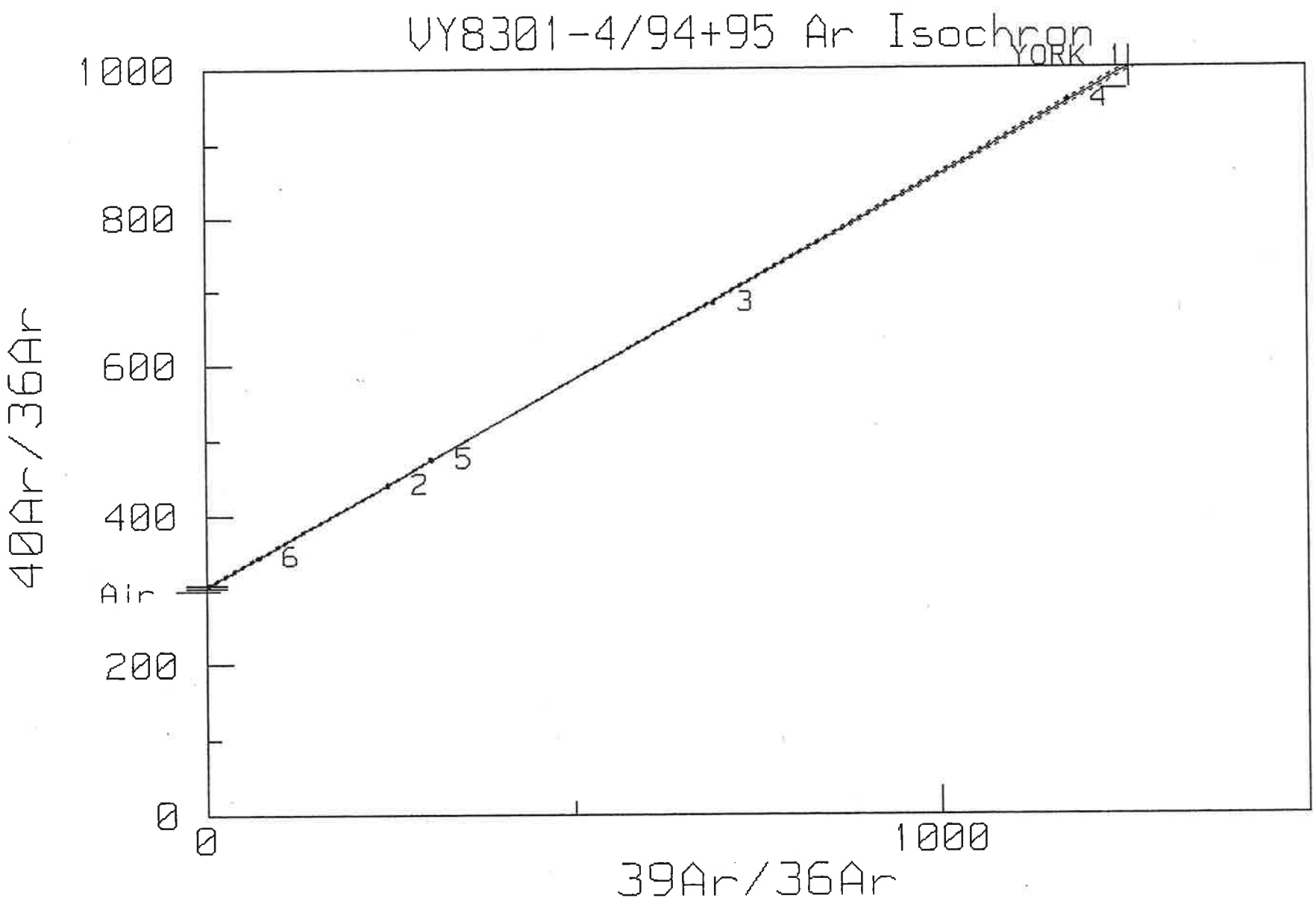
TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
650	.00014	.00365	.00288	.00001	.02860	.00000	.00002	.00000	.00780
750	.00016	.00417	.00328	.00001	.04013	.00000	.00003	.00000	.00880
850	.00016	.00419	.00330	.00002	.07288	.00000	.00005	.00000	.00870
950	.00011	.00298	.00234	.00004	.14219	.00000	.00010	.00000	.00497
1050	.00018	.00485	.00382	.00020	.74430	.00002	.00053	.00000	.00210
1150	.00001	.00031	.00025	.00003	.10781	.00000	.00008	.00000	.00020

AGE SPECTRUM FOR GROUNDMASS CONC. UY8301-4/94+95/84

Aqueduct Hill




39/37 RATIO FOR GROUNDMASS CONC. VY8301-4/94+95/84
39/37 RATIO
2
1.5
1
.5
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VY8301-4/94+95 Ar Isochron
YORK II
1000
800
600
400
Air
200
0
0
1000
40Ar/36Ar
39Ar/36Ar
1
2
3
4
5
6

VY8301-4/94+95

York 1 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.55144	.0051235	305.06	1.8428

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.018E+00	9.59E-03	9.59E-03
Initial 40/36:	3.05E+02	9.21E-01	9.21E-01
Radiogenic 40/39:	5.51E-01	2.56E-03	2.56E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 5

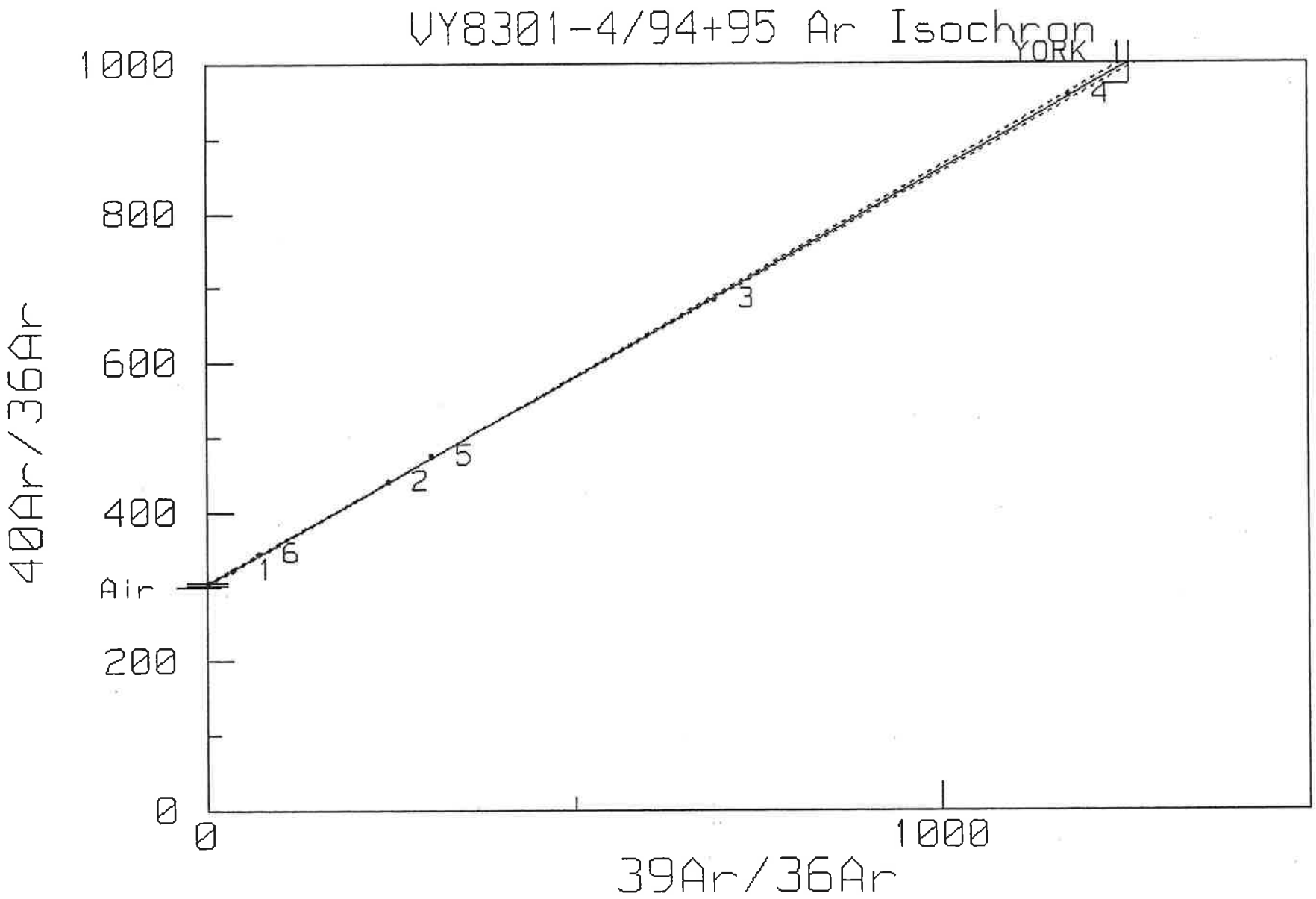
SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.55198	.0002002	304.81	.088361
mswd= 47.5	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.020E+00	2.05E-03	2.05E-03
Initial 40/36:	3.05E+02	4.42E-02	4.42E-02
Radiogenic 40/39:	5.52E-01	1.00E-04	1.00E-04

All errors on this printout are: 2 SIGMA

#2-6


VY8301-4/94+95 Ar Isochron
YORK
1000
800
600
400
Air
200
0
0
1000
40Ar/36Ar
39Ar/36Ar
1
2
3
4
5
6

VY8301-4/94+95
York 1 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.55374	.0060718	303.8	1.7882

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.027E+00	1.13E-02	1.13E-02
Initial 40/36:	3.04E+02	8.94E-01	8.94E-01
Radiogenic 40/39:	5.54E-01	3.04E-03	3.04E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 6

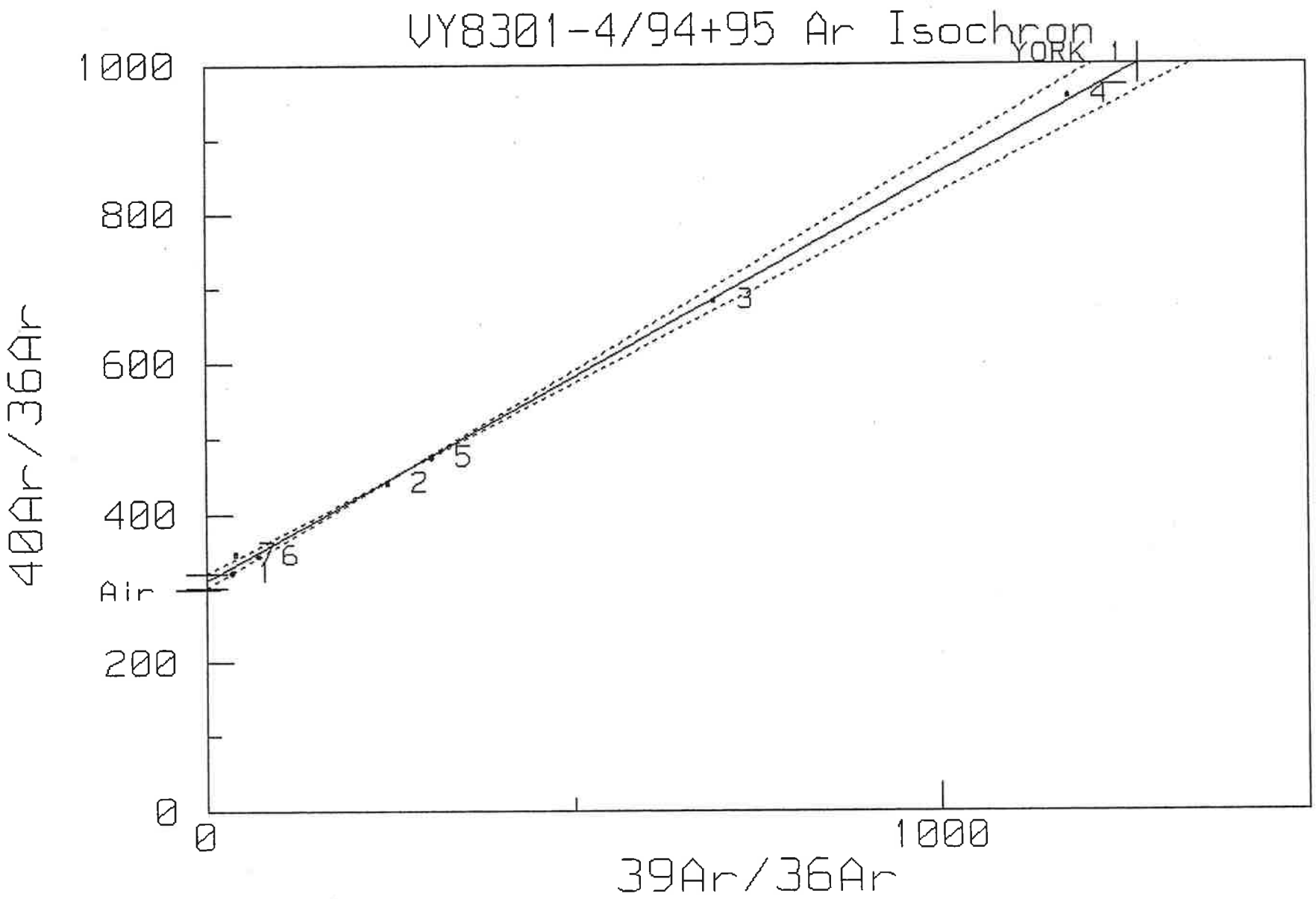
SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.55318	.00022858	303.94	.081021
mswd= 47.7	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.025E+00	2.07E-03	2.07E-03
Initial 40/36:	3.04E+02	4.05E-02	4.05E-02
Radiogenic 40/39:	5.53E-01	1.14E-04	1.14E-04

All errors on this printout are: 2 SIGMA

1-6


VY8301-4/94+95 Ar Isochron
YORK 1
1000
800
600
400
Air
200
0
0
1000
40Ar/36Ar
39Ar/36Ar
1
2
3
4
5
6

VY8301-4/94+95

York 1 Analysis

n= 7

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.54229	.035683	310.21	9.3281

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.985E+00	6.53E-02	6.53E-02
Initial 40/36:	3.10E+02	4.66E+00	4.66E+00
Radiogenic 40/39:	5.42E-01	1.78E-02	1.78E-02

• All errors on this printout are 2 SIGMA

York 2 Analysis

n= 7

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.54595	.00014123	309.17	.050569

mswd= 205 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.998E+00	2.01E-03	2.01E-03
Initial 40/36:	3.09E+02	2.53E-02	2.53E-02
Radiogenic 40/39:	5.46E-01	7.06E-05	7.06E-05

All errors on this printout are: 2 SIGMA

#1-7, All

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	ERROR IN F (1 sigma)	Error in F (1 sigma)	39/37 Ratio
750	.00084	.00015	.24779	.29099	.00090	.16
850	.00016	.00003	.04734	.07232	.00071	.40
950	.00062	.00011	.18314	.00251	.00067	.64
1050	.00035	.00006	.10316	.00168	.00067	.90
1150	.00038	.00007	.11130	.04194	.00070	.60
1250	.00058	.00010	.17170	.06358	.00082	.12
1400	.00023	.00004	.06900	.14588	.00156	.02

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
750	.02196	.02919	.752	8.1	2.7	2.75 +/- 1.06
850	.02325	.03946	.589	32.7	3.7	2.16 +/- .26
950	.24050	.42976	.560	56.2	40.0	2.05 +/- .01
1050	.23065	.41138	.561	68.2	38.3	2.05 +/- .01
1150	.06738	.11526	.585	37.5	10.7	2.14 +/- .15
1250	.02786	.04064	.686	13.9	3.8	2.51 +/- .23
1400	.01196	.00922	1.298	14.8	.9	4.75 +/- .53
TOTAL GAS			.580			2.12 +/- .06

PLATEAU AGE = 2.05 +/- .01 Ma
PLATEAU ON STEPS 3 TO 4 AND CONTAINS 78.3 PERCENT OF THE GAS
PLATEAU MIN = 2.05 AND PLATEAU MAX = 2.05

Your Personalized Argon Data Acquisition on Sample: VY8301-4/94+95/84
Sample analysis started on 322 Reduced on 7-Feb-2005
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 409.1 mg
J-value and its error .00203 .1 %

RAW DATA

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141564	750	.27005	.02917	.00131	.00061	.00088	200	1
+/-		.00796	.00180	.00004	.00006	.00000		
141565	850	.07100	.03934	.00084	.00034	.00019	200	1
+/-		.00036	.00003	.00001	.00001	.00001		
141566	950	.42811	.42810	.00694	.00231	.00079	200	1
+/-		.00038	.00026	.00001	.00000	.00000		
141567	1050	.33809	.40966	.00705	.00157	.00047	200	1
+/-		.00005	.00031	.00000	.00001	.00000		
141568	1150	.17988	.11482	.00357	.00067	.00042	200	1
+/-		.00001	.00008	.00000	.00002	.00001		
141569	1250	.19998	.04068	.00259	.00122	.00067	200	1
+/-		.00007	.00001	.00000	.00000	.00001		
141570	1400	.08106	.00951	.00080	.00166	.00036	200	1
+/-		.00004	0.00000	.00001	.00000	.00000		

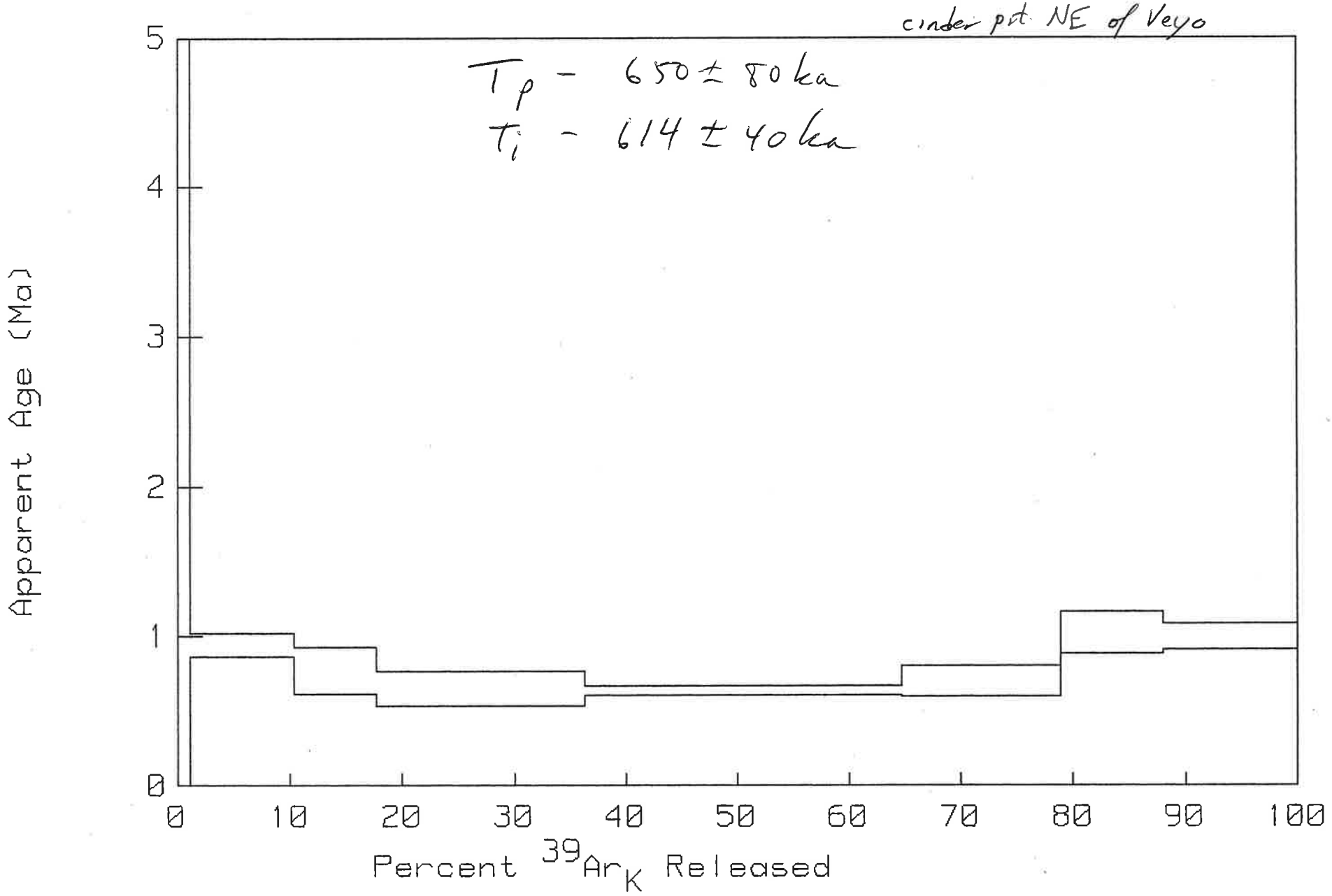
Raw values corrected for manifold options, trap current and mass discrimination

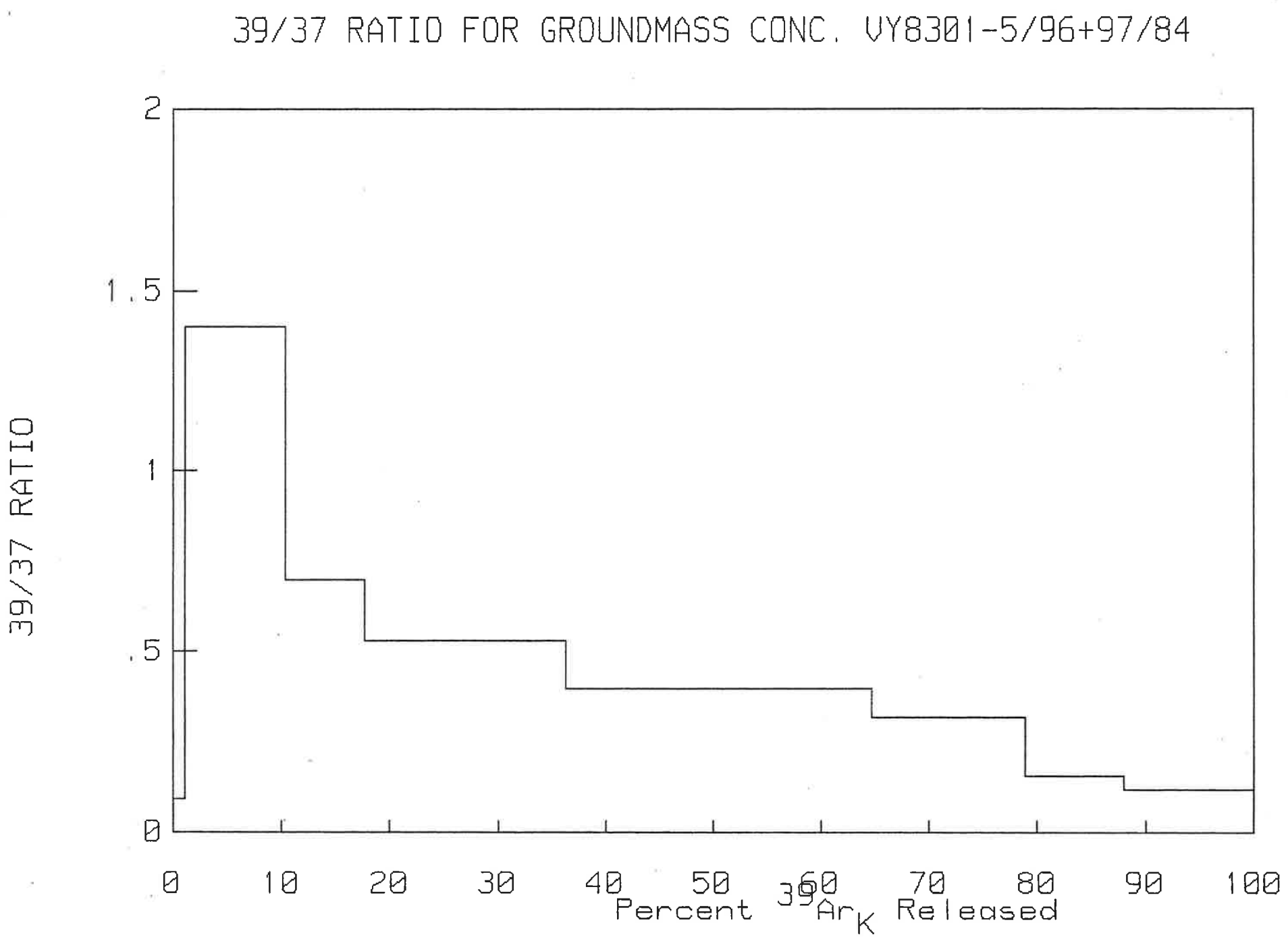
TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
750	.27005	.02926	.00131	.00062	.00089	.17679	.00006
+/-	.00796	.00180	.00004	.00006	.00000		
850	.07100	.03945	.00085	.00035	.00019	.09896	.00008
+/-	.00036	.00003	.00001	.00001	.00001		
950	.42811	.42933	.00698	.00233	.00080	.66689	.00090
+/-	.00038	.00026	.00001	.00000	.00000		
1050	.33809	.41084	.00709	.00158	.00047	.45322	.00086
+/-	.00005	.00031	.00000	.00001	.00000		
1150	.17988	.11516	.00359	.00067	.00043	.19245	.00024
+/-	.00001	.00008	.00000	.00002	.00001		
1250	.19998	.04080	.00261	.00123	.00068	.35168	.00009
+/-	.00007	.00001	.00000	.00000	.00001		
1400	.08106	.00954	.00080	.00167	.00036	.48072	.00002
+/-	.00004	.00000	.00001	.00000	.00000		

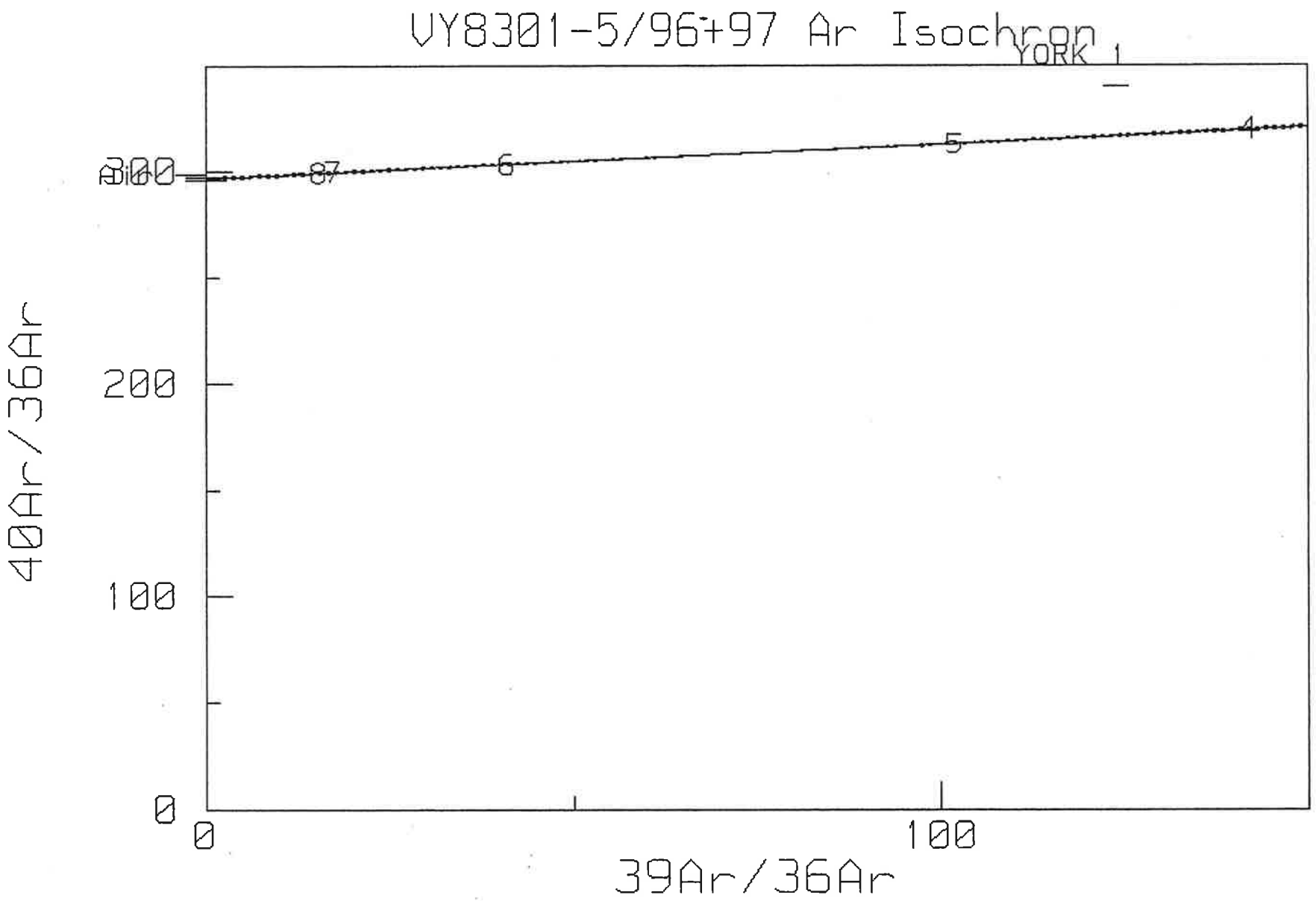
TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
750	.00001	.00039	.00030	.00005	.17740	.00000	.00013	.00000	.00078
850	.00002	.00052	.00041	.00003	.09929	.00000	.00007	.00000	.00029
950	.00021	.00568	.00447	.00018	.66900	.00001	.00047	.00000	.00117
1050	.00021	.00544	.00428	.00012	.45459	.00001	.00032	.00000	.00158
1150	.00006	.00152	.00120	.00005	.19307	.00000	.00014	.00000	.00199
1250	.00002	.00054	.00042	.00010	.35289	.00001	.00025	.00000	.00196
1400	.00000	.00012	.00010	.00013	.48239	.00001	.00034	.00000	.00063

	Calculated	Empirical

AGE SPECTRUM FOR GROUNDMASS CONC. VY8301-5/96+97/84




39/37 RATIO FOR GROUNDMASS CONC. VY8301-5/96+97/84
39/37 RATIO
2
1.5
1
.5
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VY8301-5/96+97 Ar Isochron
YORK 1
300
200
100
0
40Ar/36Ar
0
100
39Ar/36Ar
87
6
5
4

VY8301-5/96+97

York 1 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.1621	.007039	296.62	.5279

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	6.077E-01	1.32E-02	1.32E-02
Initial 40/36:	2.97E+02	2.64E-01	2.64E-01
Radiogenic 40/39:	1.62E-01	3.52E-03	3.52E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.16225	.00066634	296.61	.051395

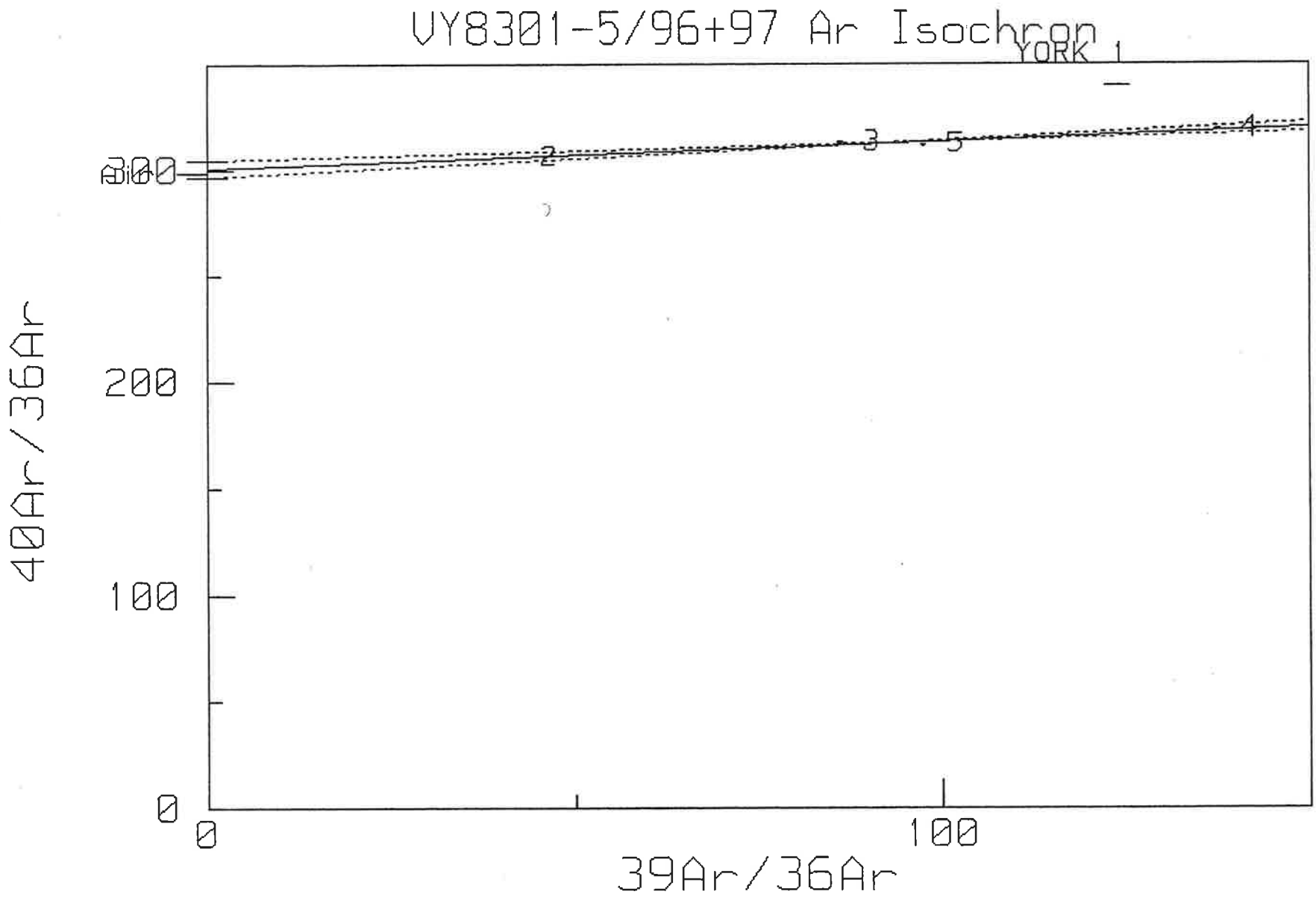
mswd= 10.6 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	6.083E-01	1.39E-03	1.39E-03
Initial 40/36:	2.97E+02	2.57E-02	2.57E-02
Radiogenic 40/39:	1.62E-01	3.33E-04	3.33E-04

All errors on this printout are: 2 SIGMA

4-8


VY8301-5/96+97 Ar Isochron
YORK 1
300
200
100
0
40Ar/36Ar
0
100
39Ar/36Ar
1
2
3
4
5

VY8301-5/96+97

York 1 Analysis

n= 4

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.13432	.042057	300.46	4.0402

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	5.036E-01	7.88E-02	7.88E-02
Initial 40/36:	3.00E+02	2.02E+00	2.02E+00
Radiogenic 40/39:	1.34E-01	2.10E-02	2.10E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 4

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.13417	.0011109	300.47	.10763

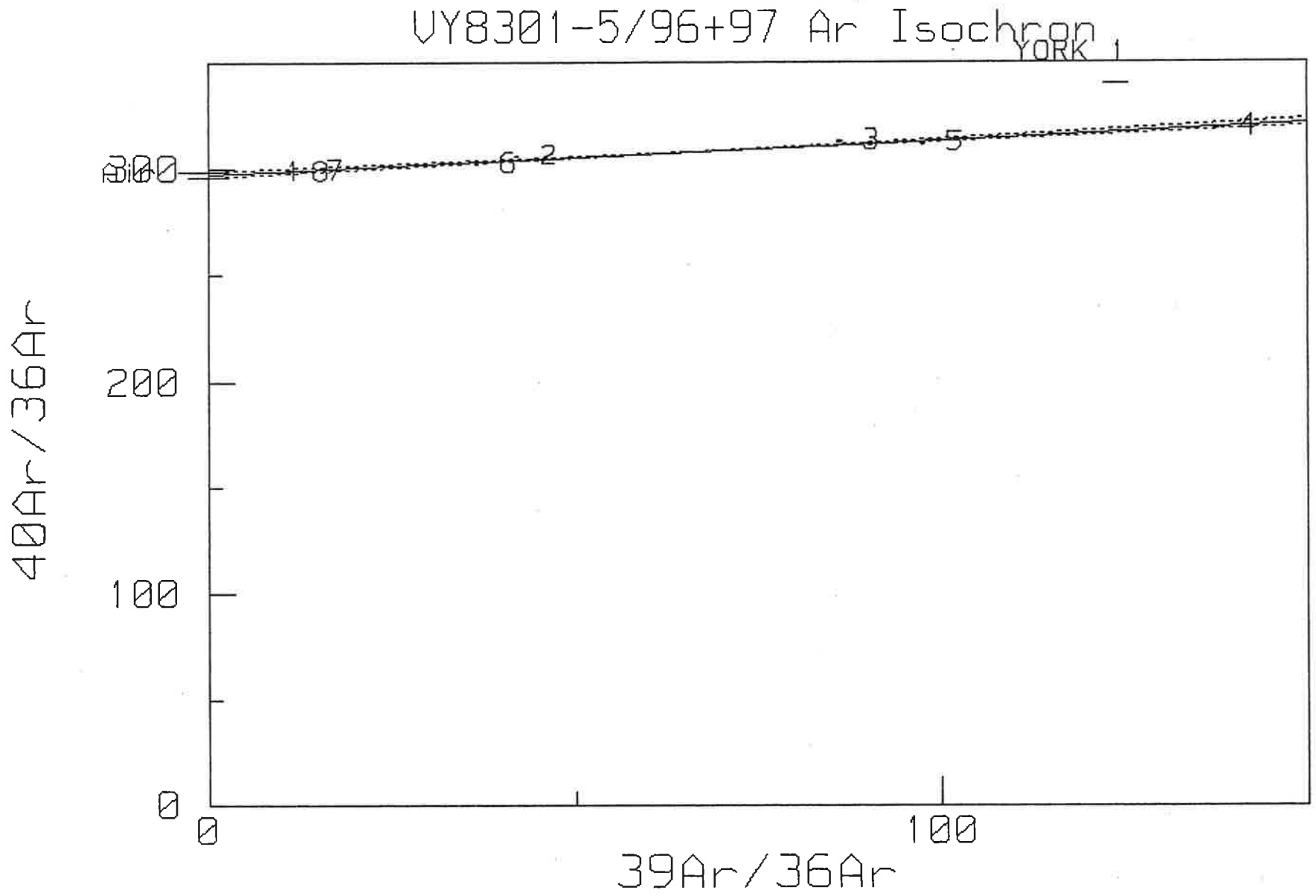
mswd= 38 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	5.030E-01	2.14E-03	2.14E-03
Initial 40/36:	3.00E+02	5.38E-02	5.38E-02
Radiogenic 40/39:	1.34E-01	5.55E-04	5.55E-04

All errors on this printout are: 2 SIGMA

#2-5


VY8301-5/96+97 Ar Isochron
YORK 1
300
200
100
0
0
100
40Ar/36Ar
39Ar/36Ar
1
7
6
2
3
5
4

VY8301-5/96+97
York 1 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.16365	.021097	297.3	1.435

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	6.136E-01	3.95E-02	3.95E-02
Initial 40/36:	2.97E+02	7.17E-01	7.17E-01
Radiogenic 40/39:	1.64E-01	1.05E-02	1.05E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.16317	.00058696	297.33	.041055

mswd= 35.6 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	6.117E-01	1.26E-03	1.26E-03
Initial 40/36:	2.97E+02	2.05E-02	2.05E-02
Radiogenic 40/39:	1.63E-01	2.93E-04	2.93E-04

All errors on this printout are: 2 SIGMA

#1-8, All

Moderately dirty gas in 650° fraction; relative deviations are huge for mass 39 and 37 compared to small amounts present. Other fractions O.K.

1200	.00004	.00095	.00075	.00012	.46245	.00001	.00033	.00000	.00187
1400	.00005	.00123	.00097	.00021	.79230	.00002	.00056	.00000	.00320

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00116	.00020	.34237	1.01030	.00052	.09
750	.00171	.00030	.50516	.02045	.00030	1.40
850	.00066	.00012	.19553	.04178	.00025	.70
950	.00105	.00019	.30989	.03159	.00021	.53
1050	.00226	.00040	.66699	.00808	.00020	.39
1150	.00301	.00053	.88967	.02792	.00022	.32
1200	.00561	.00099	1.65773	.03693	.00033	.16
1400	.00850	.00150	2.51289	.02380	.00032	.12

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.00362	.00839	.431	1.0	1.1	1.62 +/- 3.79
750	.01810	.07204	.251	3.5	9.3	.94 +/- .08
850	.01177	.05716	.206	5.7	7.3	.77 +/- .16
950	.02494	.14461	.172	7.4	18.6	.65 +/- .12
1050	.03726	.22070	.169	5.3	28.4	.63 +/- .03
1150	.02046	.11015	.186	2.2	14.2	.70 +/- .10
1200	.01963	.07193	.273	1.2	9.2	1.02 +/- .14
1400	.02470	.09293	.266	1.0	11.9	1.00 +/- .09
TOTAL GAS			.206			.77 +/- .11

Tp - 650 ka ± 80k.

)
Your Personalized Argon Data Acquisition on Sample: VY8301-5/96+97/84
Sample analysis started on 321 Reduced on 11-Feb-2005
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 401.6 mg
J-value and its error .0020785 .1 %

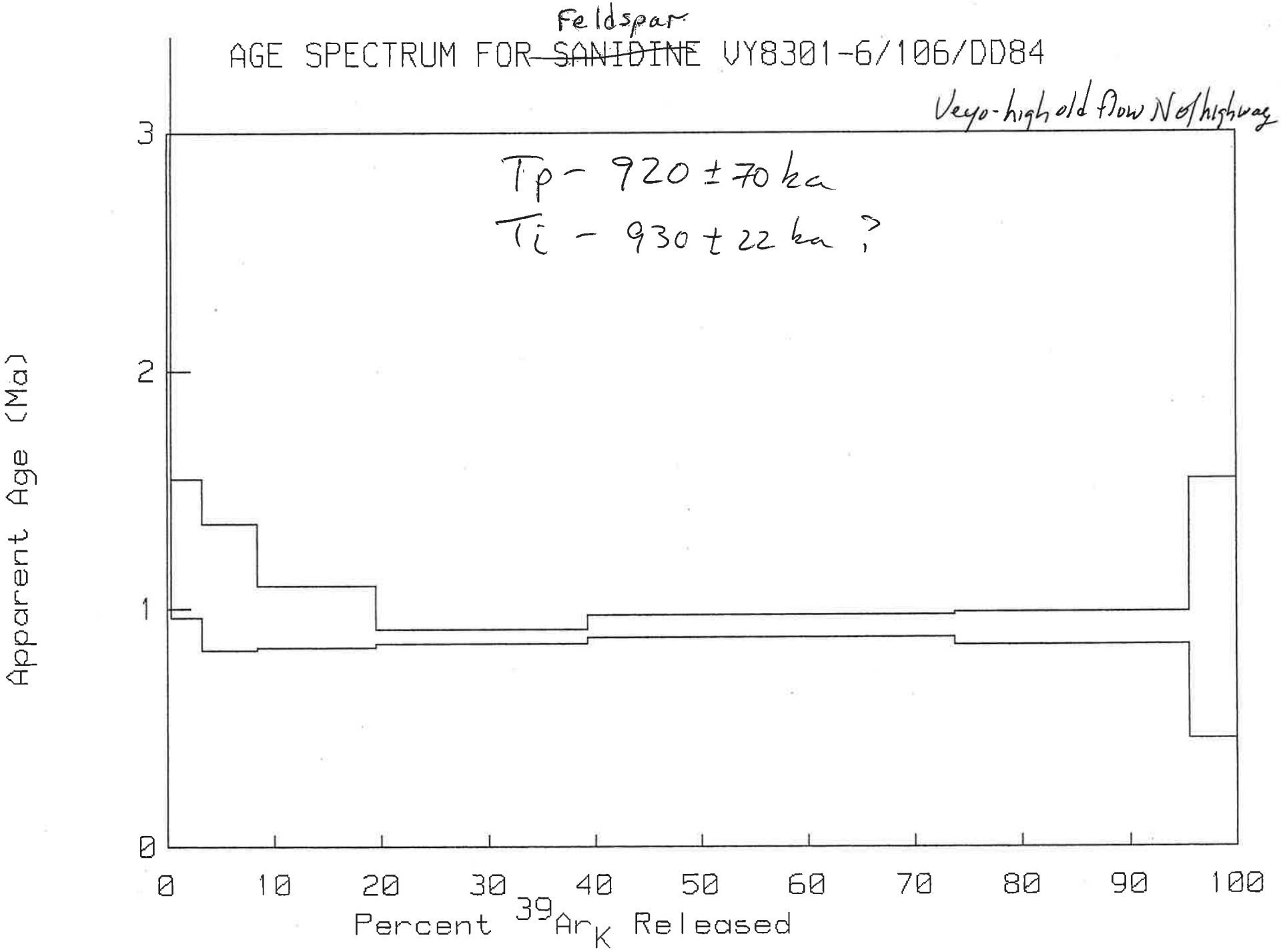
RAW DATA

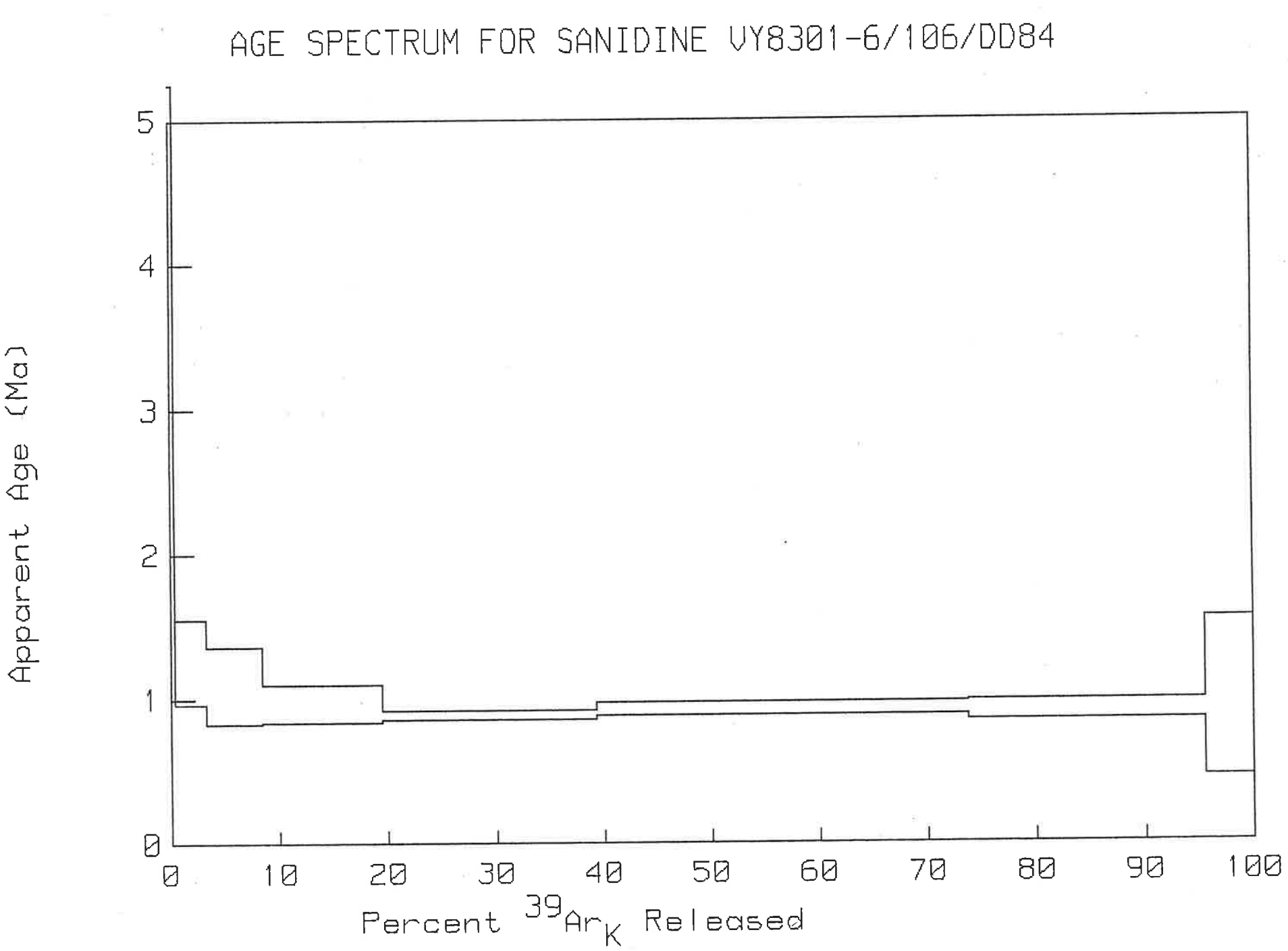
FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141554	650	.34608	.00841	.00069	.00031	.00117	200	1
+/-		.00490	.00109	.00001	.00002	.00001		
141555	750	.52401	.07172	.00353	.00018	.00171	200	1
+/-		.00037	.00004	.00001	.00000	.00001		
141556	850	.20789	.05694	.00182	.00029	.00068	200	1
+/-		.00012	.00001	.00001	.00000	.00001		
141557	950	.33634	.14408	.00286	.00095	.00111	200	1
+/-		.00020	.00010	.00001	.00001	.00001		
141558	1050	.70654	.22000	.00485	.00195	.00238	200	1
+/-		.00064	.00016	.00002	.00000	.00001		
141559	1150	.91127	.10985	.00338	.00121	.00307	200	1
+/-		.00074	.00009	.00001	.00000	.00001		
141560	1200	1.67811	.07190	.00380	.00161	.00567	200	1
+/-		.00143	.00003	.00001	.00000	.00001		
141561	1400	2.53856	.09303	.00591	.00276	.00862	200	1
+/-		.00210	.00003	.00000	.00001	.00001		

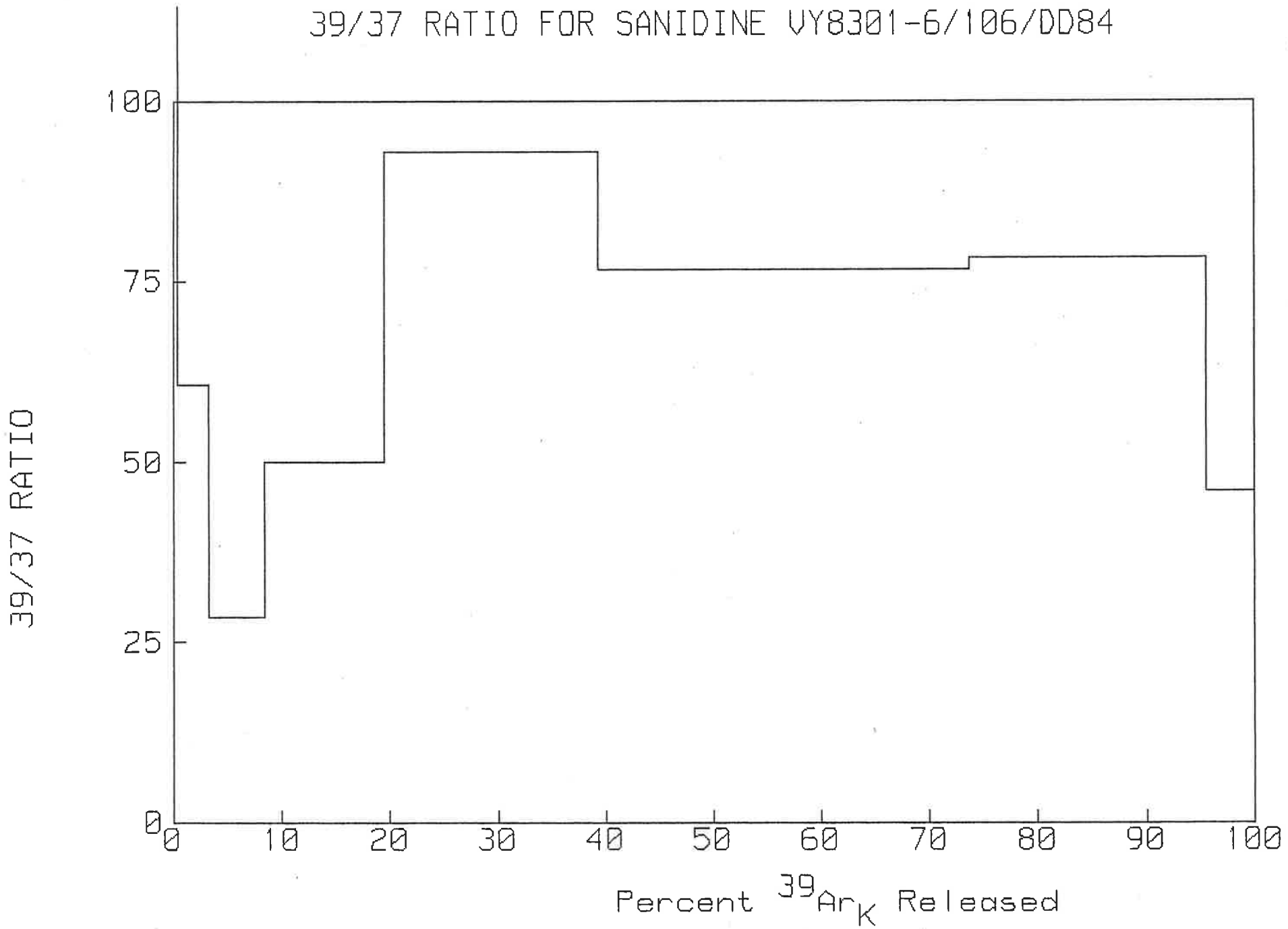
Raw values corrected for manifold options, trap current and mass discrimination

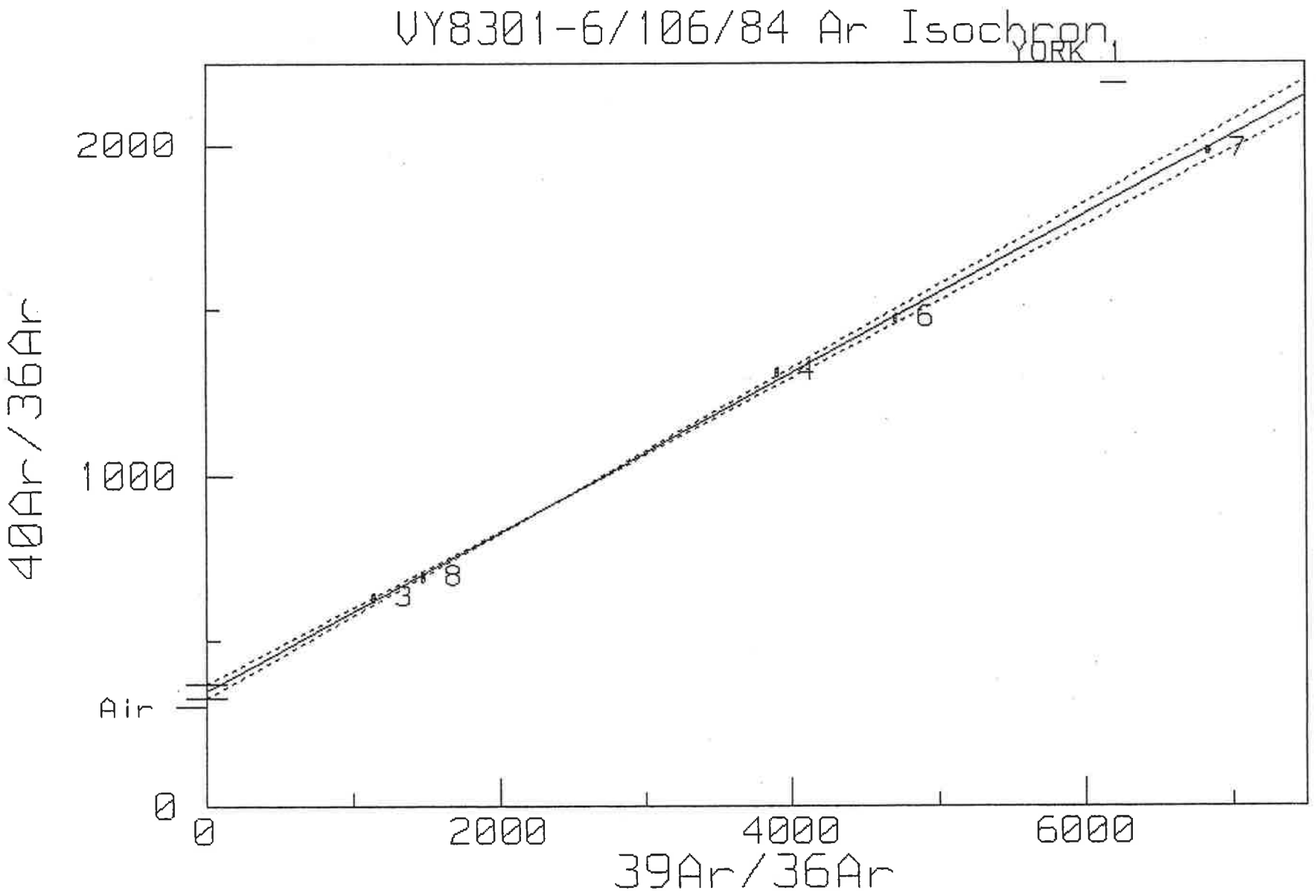
TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
650	.34608	.00844	.00070	.00032	.00118	.08938	.00002
+/-	.00490	.00109	.00001	.00002	.00001		
750	.52401	.07192	.00355	.00018	.00172	.05126	.00015
+/-	.00037	.00004	.00002	.00000	.00001		
850	.20789	.05710	.00183	.00029	.00068	.08164	.00012
+/-	.00012	.00001	.00001	.00000	.00001		
950	.33634	.14450	.00287	.00096	.00112	.27241	.00030
+/-	.00020	.00010	.00001	.00001	.00001		
1050	.70654	.22063	.00488	.00197	.00241	.55720	.00046
+/-	.00064	.00016	.00002	.00000	.00001		
1150	.91127	.11017	.00340	.00122	.00311	.34538	.00023
+/-	.00074	.00010	.00001	.00000	.00001		
1200	1.67811	.07210	.00382	.00162	.00574	.46087	.00015
+/-	.00143	.00003	.00001	.00000	.00001		
1400	2.53856	.09330	.00595	.00278	.00872	.78956	.00020
+/-	.00210	.00003	.00000	.00001	.00001		

TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
650	.00000	.00011	.00009	.00002	.08969	.00000	.00006	.00000	.00038
750	.00004	.00095	.00075	.00001	.05141	.00000	.00004	.00000	.00229
850	.00003	.00076	.00059	.00002	.08190	.00000	.00006	.00000	.00095
950	.00007	.00191	.00150	.00007	.27330	.00001	.00019	.00000	.00077
1050	.00011	.00292	.00230	.00015	.55906	.00001	.00039	.00000	.00155
1150	.00006	.00146	.00115	.00009	.34654	.00001	.00024	.00000	.00140


Feldspar
AGE SPECTRUM FOR ~~SANIDINE~~ VY8301-6/106/DD84
Veyo-high old flow N of highway
Tp - 920 ± 70 ka
Ti - 930 ± 22 ka ?
Apparent Age (Ma)
3
2
1
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


AGE SPECTRUM FOR SANIDINE VY8301-6/106/DD84
Apparent Age (Ma)
0
1
2
3
4
5
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


39/37 RATIO FOR SANIDINE VY8301-6/106/DD84
100
75
50
25
0
39/37 RATIO
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


VY8301-6/106/84 Ar Isochron
YORK 1
2000
1000
Air
0
40Ar/36Ar
0
2000
4000
6000
39Ar/36Ar
3
8
4
6
7

VY8301-6/106/84

York 1 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.23965	.0092888	349.26	21.942

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	8.950E-01	1.74E-02	1.74E-02
Initial 40/36:	3.49E+02	1.10E+01	1.10E+01
Radiogenic 40/39:	2.40E-01	4.64E-03	4.64E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 5

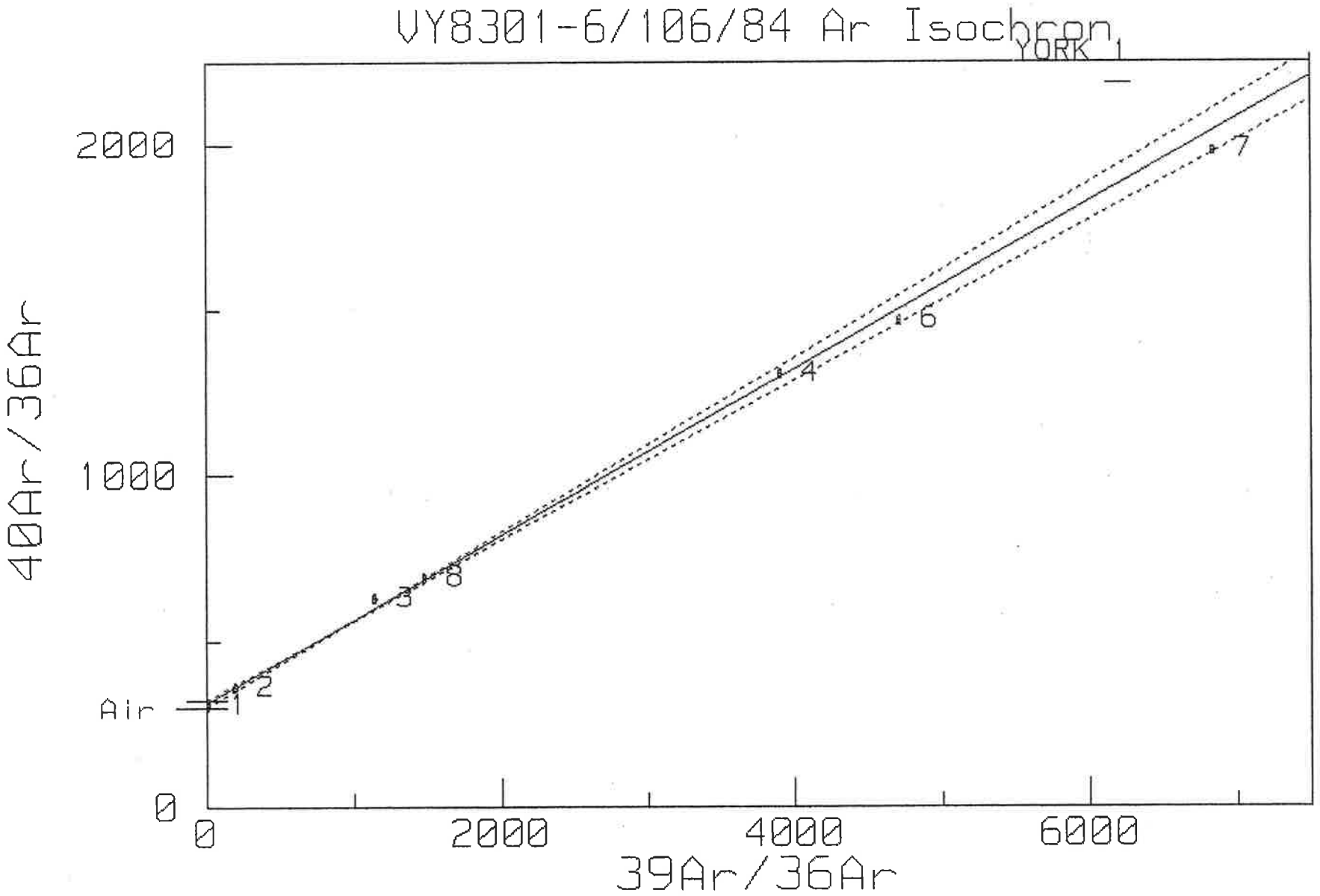
SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.23944	2.6932E-5	349.61	.088387
mswd= 249	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	8.942E-01	8.95E-04	8.95E-04
Initial 40/36:	3.50E+02	4.42E-02	4.42E-02
Radiogenic 40/39:	2.39E-01	1.35E-05	1.35E-05

All errors on this printout are: 2 SIGMA

#3, 4, 6, 7, 8


VY8301-6/106/84 Ar Isochron
YORK 1
2000
1000
Air
0
40Ar/36Ar
0
2000
4000
6000
39Ar/36Ar
1
2
3
8
4
6
7

VY8301-6/106/84

York 1 Analysis

n= 7

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.25301	.011381	310.7	11.952

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.448E-01	2.13E-02	2.13E-02
Initial 40/36:	3.11E+02	5.98E+00	5.98E+00
Radiogenic 40/39:	2.53E-01	5.69E-03	5.69E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 7

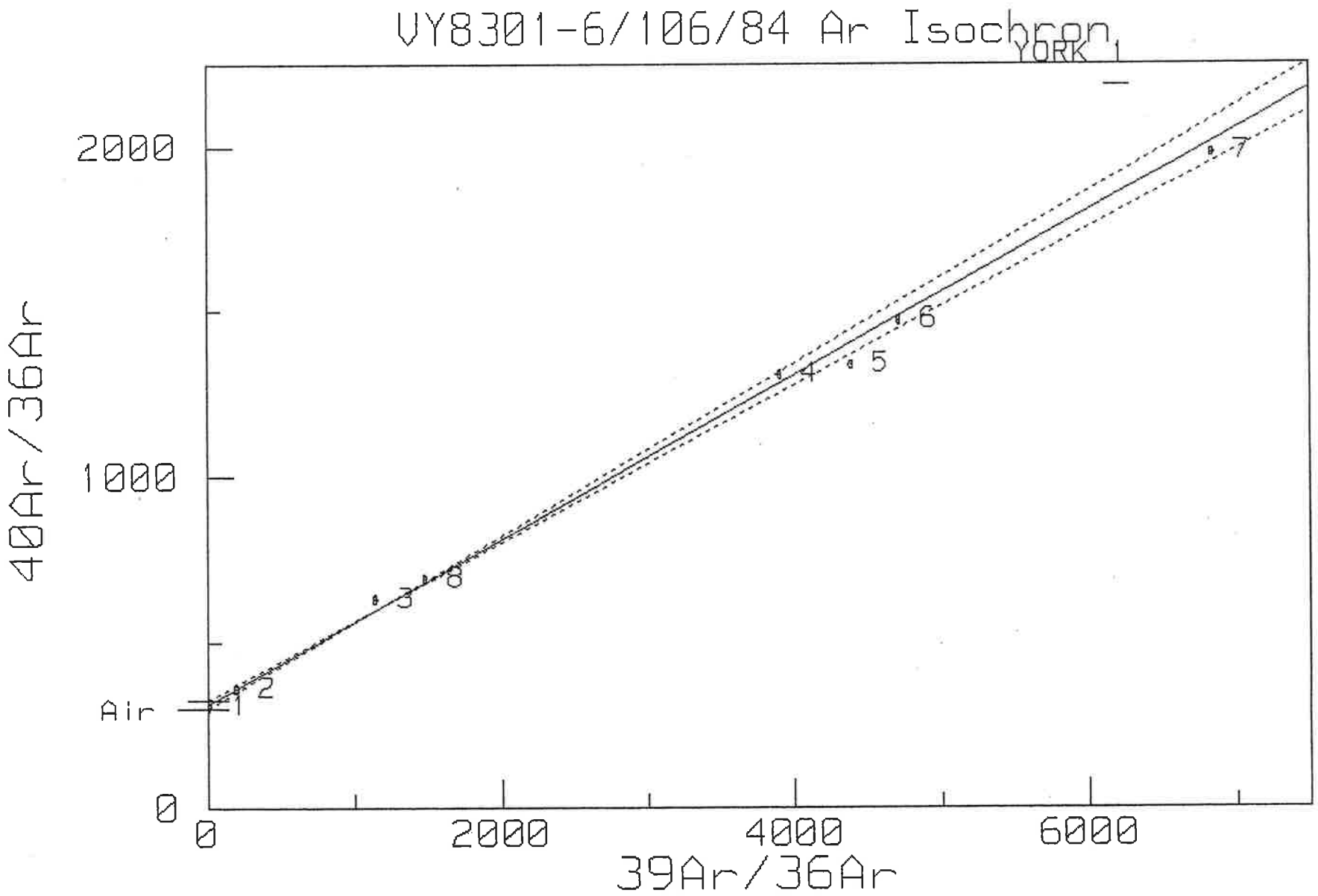
SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.24765	-2.7033E-6	318.46	.039775
mswd= 386	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.248E-01	9.25E-04	9.25E-04
Initial 40/36:	3.18E+02	1.99E-02	1.99E-02
Radiogenic 40/39:	2.48E-01	1.35E-06	1.35E-06

All errors on this printout are: 2 SIGMA

#1, 2, 3, 4, 6, 7 8


VY8301-6/106/84 Ar Isochron
YORK 1
2000
1000
Air
0
40Ar/36Ar
0
2000
4000
6000
39Ar/36Ar
1
2
3
8
4
5
6
7

VY8301-6/106/84

York 1 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.24887	.011537	311.56	13.533

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.294E-01	2.16E-02	2.16E-02
Initial 40/36:	3.12E+02	6.77E+00	6.77E+00
Radiogenic 40/39:	2.49E-01	5.77E-03	5.77E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.24356	-2.0779E-6	319.74	.038593
mswd= 478	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.095E-01	9.09E-04	9.09E-04
Initial 40/36:	3.20E+02	1.93E-02	1.93E-02
Radiogenic 40/39:	2.44E-01	1.04E-06	1.04E-06

All errors on this printout are: 2 SIGMA

~~#~~ 1-8, All

1350	.00009	.00242	.00190	0.00000	.00234	.00000	.00000	.00000	0.00000
1450	.00002	.00049	.00038	0.00000	.00080	.00000	.00000	.00000	0.00000

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
800	.00080	.00014	.23780	1.04685	.00294	3956.27
900	.00013	.00002	.03697	.07834	.00040	60.56
1000	.00004	.00001	.01114	.07070	.00035	28.51
1100	.00002	0.00000	.00704	.03524	.00031	50.15
1200	.00004	.00001	.01115	.00829	.00028	92.94
1300	.00006	.00001	.01803	.01243	.00030	76.55
1350	.00003	0.00000	.00789	.01775	.00029	78.15
1450	.00002	0.00000	.00737	.14586	.00032	45.98

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
800	.00813	.00331	2.454	3.3	.4	9.14 +/- 3.89
900	.00805	.02400	.336	17.8	2.9	1.25 +/- .29
1000	.01255	.04288	.293	52.0	5.1	1.09 +/- .26
1100	.02408	.09302	.259	75.1	11.1	.97 +/- .13
1200	.03925	.16563	.237	75.3	19.8	.89 +/- .03
1300	.07159	.28793	.249	77.3	34.4	.93 +/- .05
1350	.04496	.18305	.246	82.1	21.9	.92 +/- .07
1450	.00985	.03681	.268	56.0	4.4	1.00 +/- .54
TOTAL GAS			.261			.98 +/- .10

PLATEAU AGE = .92 +/- .07 Ma
PLATEAU ON STEPS 4 TO 7 AND CONTAINS 87.2 PERCENT OF THE GAS
PLATEAU MIN = .89 AND PLATEAU MAX = .97

PLATEAU AGE = .91 +/- .05 Ma
PLATEAU ON STEPS 5 TO 7 AND CONTAINS 76.1 PERCENT OF THE GAS
PLATEAU MIN = .89 AND PLATEAU MAX = .93

Your Personalized Argon Data Acquisition on Sample: VY8301-6/106/DD84
Sample analysis started on 263 Reduced on 6-Oct-2004
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type SANIDINE
Sample Weight 42.8 mg
J-value and its error .0020705 .1 %

RAW DATA

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141113	800	.24597	.00330	.00033	0.00000	.00080	200	1
+/-		.00006	0.00000	.00001	.00003	.00001		
141114	900	.04527	.02389	.00035	0.00000	.00012	200	1
+/-		.00004	.00001	.00001	.00000	.00001		
141115	1000	.02414	.04269	.00058	.00002	.00004	200	1
+/-		.00002	.00004	.00001	.00001	.00001		
141116	1100	.03209	.09260	.00124	.00002	.00002	200	1
+/-		.00002	.00010	.00001	.00000	.00001		
141117	1200	.05213	.16488	.00216	.00002	.00004	200	1
+/-		.00007	.00013	.00001	.00001	.00000		
141118	1300	.09262	.28663	.00376	.00004	.00006	200	1
+/-		.00002	.00012	.00001	.00002	.00001		
141119	1350	.05476	.18222	.00238	.00003	.00003	200	1
+/-		.00005	.00016	.00000	.00001	.00001		
141120	1450	.01761	.03665	.00049	.00001	.00002	200	1
+/-		.00001	.00001	.00001	.00000	.00002		

Raw values corrected for manifold options, trap current and mass discrimination

TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
800	.24597	.00331	.00034	0.00000	.00080	0.00000	.00001
+/-	.00006	.00000	.00001	.00003	.00001		
900	.04527	.02396	.00035	0.00000	.00013	.00040	.00004
+/-	.00004	.00001	.00001	.00000	.00001		
1000	.02414	.04281	.00058	.00002	.00004	.00151	.00007
+/-	.00002	.00004	.00001	.00001	.00001		
1100	.03209	.09286	.00125	.00002	.00002	.00188	.00016
+/-	.00002	.00010	.00001	.00000	.00001		
1200	.05213	.16536	.00217	.00002	.00004	.00184	.00028
+/-	.00007	.00013	.00001	.00001	.00000		
1300	.09262	.28745	.00378	.00004	.00006	.00386	.00048
+/-	.00002	.00012	.00001	.00002	.00001		
1350	.05476	.18275	.00239	.00003	.00003	.00241	.00031
+/-	.00005	.00016	.00000	.00001	.00001		
1450	.01761	.03675	.00050	.00001	.00003	.00081	.00006
+/-	.00001	.00001	.00001	.00000	.00002		

TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
800	.00000	.00004	.00003	0.00000	0.00000	.00000	.00000	.00000	.00015
900	.00001	.00032	.00025	0.00000	.00040	.00000	.00000	.00000	.00002
1000	.00002	.00057	.00045	0.00000	.00150	.00000	.00000	.00000	.00001
1100	.00005	.00123	.00097	0.00000	.00185	.00000	.00000	.00000	.00001
1200	.00008	.00219	.00172	0.00000	.00178	.00000	.00000	.00000	0.00000
1300	.00014	.00381	.00299	0.00000	.00376	.00000	.00000	.00000	0.00000

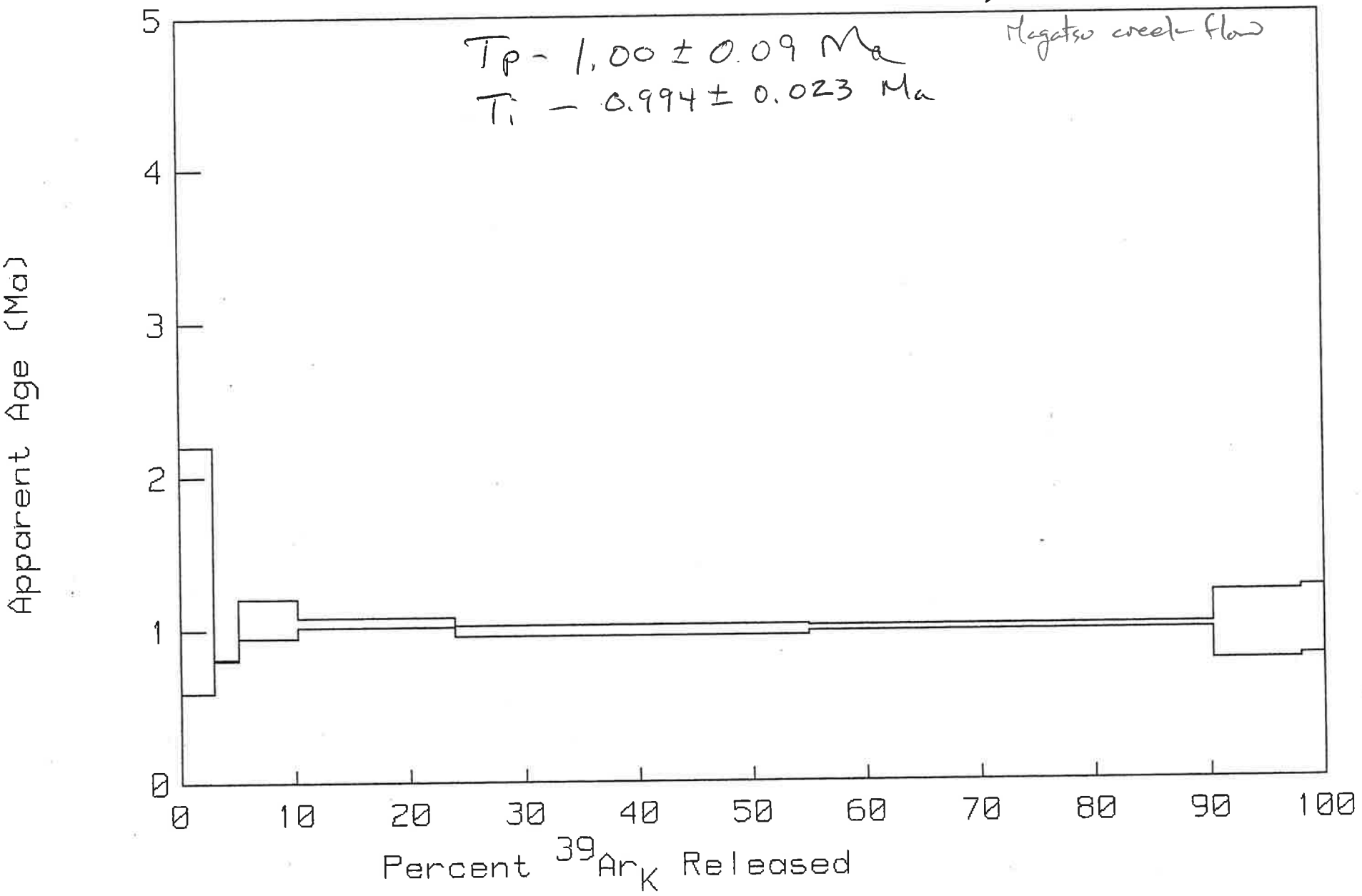
AGE SPECTRUM FOR GROUNDMASS CONC. VY8301-7/98+99/84

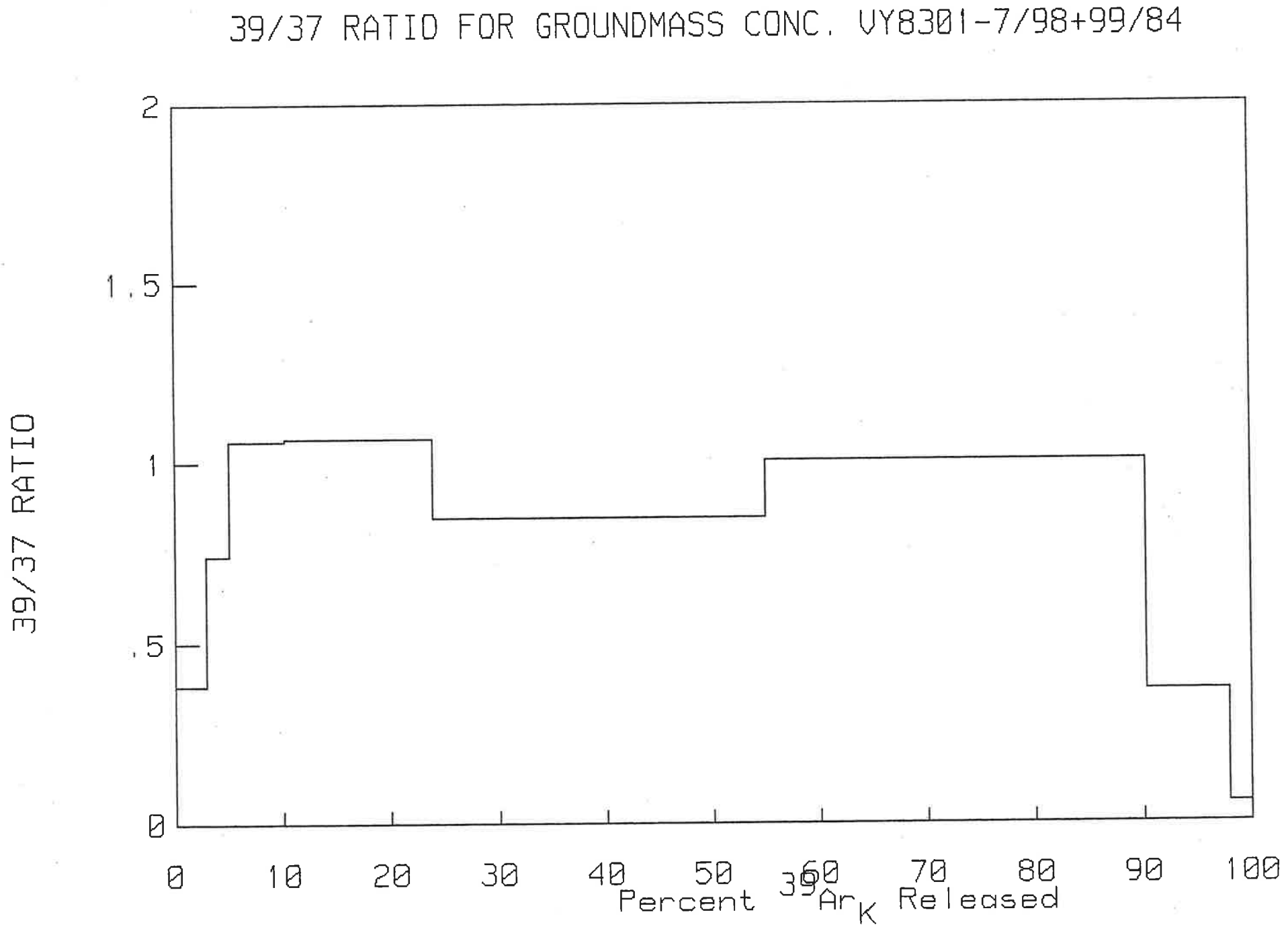
Veyo - bench below road

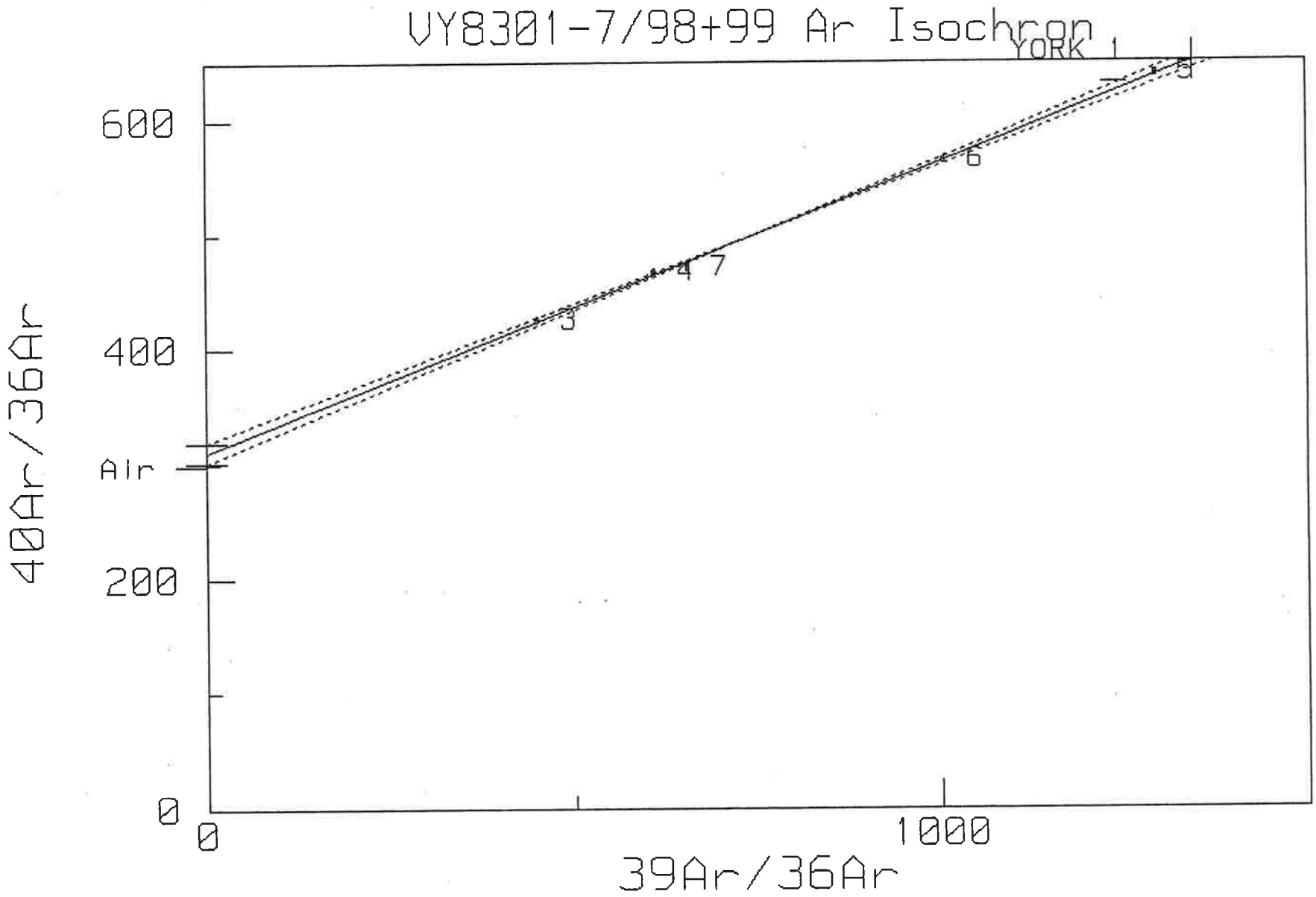
Magatsu creek - flow

T_p - 1.00 ± 0.09 Ma

T_i - 0.994 ± 0.023 Ma




39/37 RATIO FOR GROUNDMASS CONC. VY8301-7/98+99/84
39/37 RATIO
2
1.5
1
.5
0
0
10
20
30
40
50
60
70
80
90
100
Percent 39Ar K Released


VY8301-7/98+99 Ar Isochron
YORK 1
600
400
Air
200
0
0
1000
40Ar/36Ar
39Ar/36Ar
1
2
3
4
5
6
7

VY8301-7/98+99

York 1 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.2527	.012193	309.85	9.2185

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.492E-01	2.29E-02	2.29E-02
Initial 40/36:	3.10E+02	4.61E+00	4.61E+00
Radiogenic 40/39:	2.53E-01	6.10E-03	6.10E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.25341	.00014846	309.28	.12124

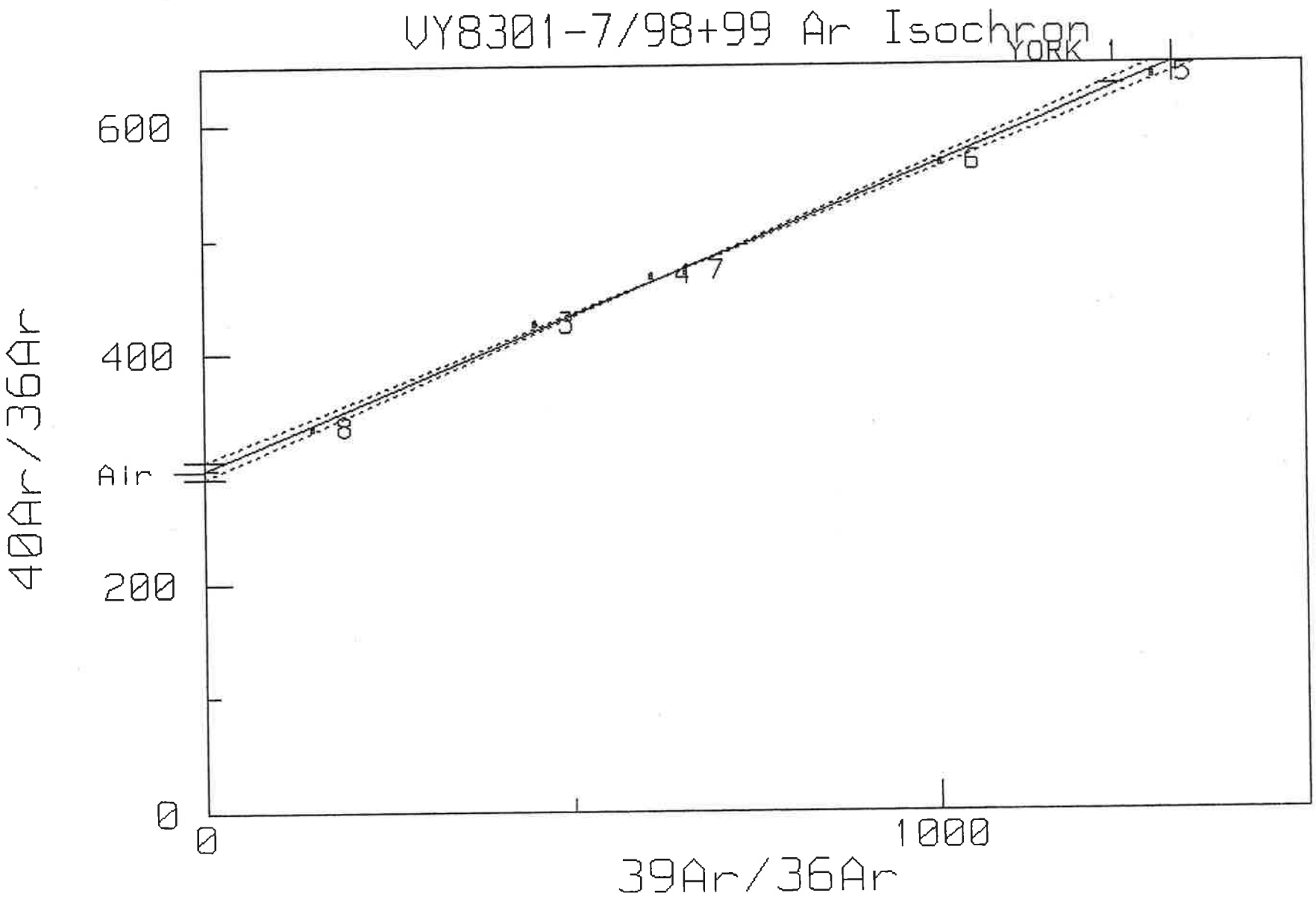
mswd= 83.5 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.518E-01	9.92E-04	9.92E-04
Initial 40/36:	3.09E+02	6.06E-02	6.06E-02
Radiogenic 40/39:	2.53E-01	7.42E-05	7.42E-05

All errors on this printout are: 2 SIGMA

#3-7


VY8301-7/98+99 Ar Isochron
YORK 1
600
400
Air
200
0
40Ar/36Ar
0
1000
39Ar/36Ar
8
3
4
7
6
5

VY8301-7/98+99
York 1 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.26455	.012029	299.97	7.4951

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.936E-01	2.26E-02	2.26E-02
Initial 40/36:	3.00E+02	3.75E+00	3.75E+00
Radiogenic 40/39:	2.65E-01	6.01E-03	6.01E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 6

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.26146	.00013577	301.9	.094498

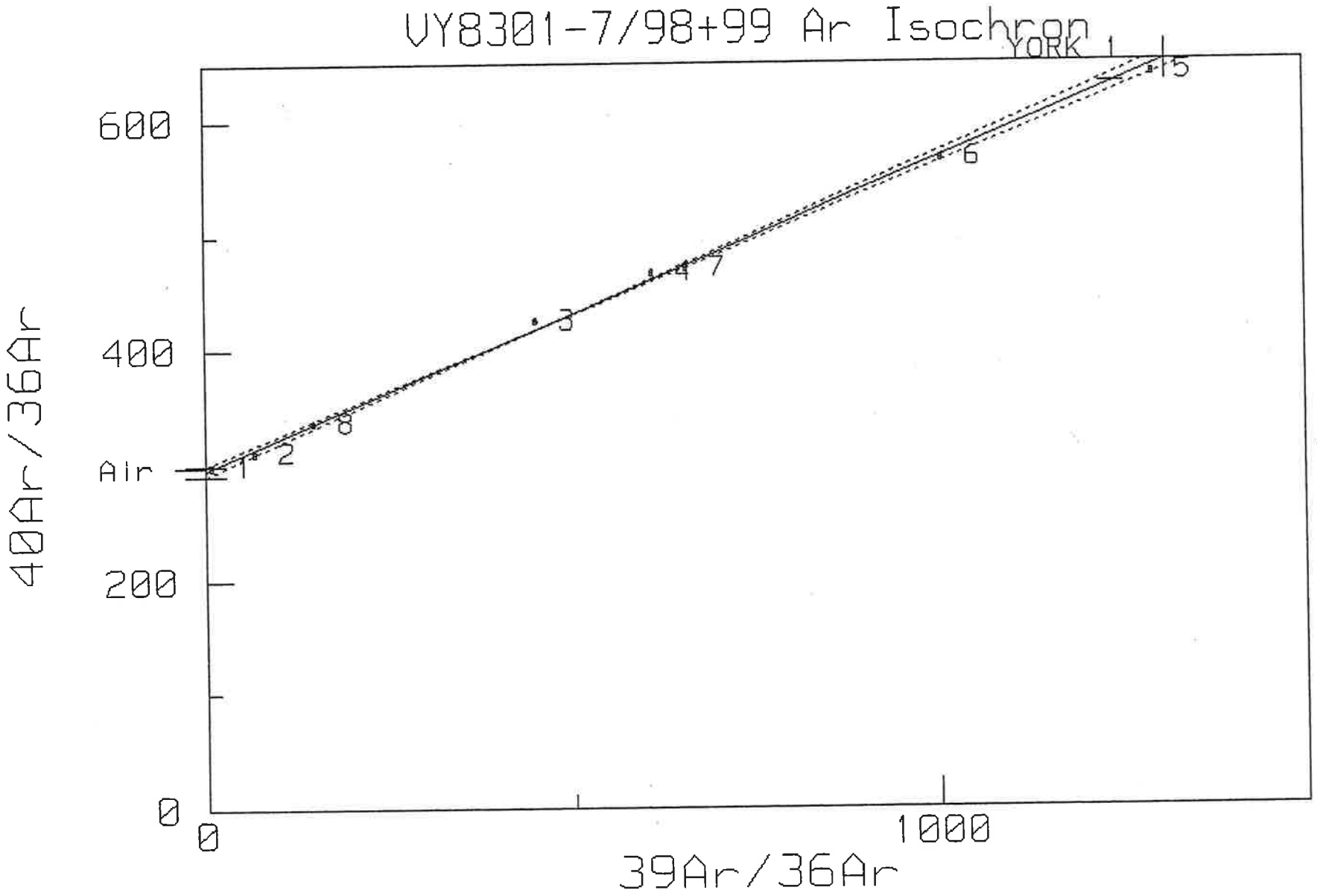
mswd= 117 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	9.820E-01	1.01E-03	1.01E-03
Initial 40/36:	3.02E+02	4.72E-02	4.72E-02
Radiogenic 40/39:	2.61E-01	6.79E-05	6.79E-05

All errors on this printout are: 2 SIGMA

#3-8


VY8301-7/98+99 Ar Isochron
YORK 1
600
400
Air
200
0
0
1000
40Ar/36Ar
39Ar/36Ar
1
2
8
3
4
7
6
5

VY8301-7/98+99
York 1 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.26984	.0092641	295.84	4.2822

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.013E+00	1.74E-02	1.74E-02
Initial 40/36:	2.96E+02	2.14E+00	2.14E+00
Radiogenic 40/39:	2.70E-01	4.63E-03	4.63E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 8

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.2668	.00014629	297.17	.074696

mswd= 126 Error Correlation= 0

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	1.002E+00	1.04E-03	1.04E-03
Initial 40/36:	2.97E+02	3.73E-02	3.73E-02
Radiogenic 40/39:	2.67E-01	7.31E-05	7.31E-05

All errors on this printout are: 2 SIGMA

#1-8, All

Note: Gas was moderately 'dirty' in the 650° and 750° fractions - these are less than normally reliable. Other regressions were normal.

1250	.00005	.00126	.00099	.00007	.25822	.00001	.00018	.00000	.00337
1400	.00001	.00034	.00027	.00013	.48214	.00001	.00034	.00000	.00094

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	Calculated ERROR IN F (1 sigma)	Empirical Error in F (1 sigma)	39/37 Ratio
650	.00435	.00077	1.28644	.21427	.00044	.38
750	.00040	.00007	.11711	.00148	.00026	.74
850	.00014	.00003	.04258	.03448	.00034	1.06
950	.00028	.00005	.08262	.00898	.00034	1.07
1050	.00030	.00005	.08777	.00904	.00032	.85
1150	.00044	.00008	.12909	.00503	.00032	1.00
1250	.00014	.00003	.04279	.06003	.00032	.37
1400	.00017	.00003	.05133	.06057	.00033	.05

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.01328	.03586	.370	1.0	2.9	1.39 +/- .80
750	.00566	.02644	.214	4.6	2.1	.80 +/- .01
850	.01864	.06496	.287	30.1	5.2	1.08 +/- .13
950	.04782	.17092	.280	36.2	13.7	1.05 +/- .03
1050	.10187	.38557	.264	52.6	31.0	.99 +/- .03
1150	.11750	.44064	.267	46.8	35.4	1.00 +/- .02
1250	.02535	.09524	.266	36.7	7.6	1.00 +/- .23
1400	.00700	.02559	.273	11.9	2.1	1.03 +/- .23
TOTAL GAS			.271			1.02 +/- .07

PLATEAU AGE = 1.00 +/- .09 Ma
PLATEAU ON STEPS 5 TO 7 AND CONTAINS 74.0 PERCENT OF THE GAS
PLATEAU MIN = .99 AND PLATEAU MAX = 1.00

©

Your Personalized Argon Data Acquisition on Sample: VY8301-7/98+99/84
Sample analysis started on 322 Reduced on 4-Feb-2005
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 403.7 mg
J-value and its error .0020825 .1 %

RAW DATA

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141572	650	1.30010	.03575	.00221	.00032	.00433	200	1
+/-		.00526	.00099	.00002	.00002	.00001		
141573	750	.12304	.02634	.00074	.00012	.00040	200	1
+/-		.00221	.00037	.00002	.00002	.00001		
141574	850	.06189	.06468	.00131	.00021	.00016	200	1
+/-		.00001	.00002	.00000	.00000	.00001		
141575	950	.13222	.17018	.00338	.00055	.00032	200	1
+/-		.00007	.00009	.00001	.00001	.00000		
141576	1050	.19365	.38398	.01042	.00156	.00042	200	1
+/-		.00011	.00011	.00003	.00001	.00001		
141577	1150	.25117	.43876	.01749	.00150	.00056	200	1
+/-		.00011	.00033	.00001	.00000	.00001		
141578	1250	.06914	.09495	.00463	.00088	.00021	200	1
+/-		.00003	.00006	.00000	.00001	.00002		
141579	1400	.05859	.02580	.00131	.00165	.00030	200	1
+/-		0.00000	.00001	.00000	.00001	.00000		

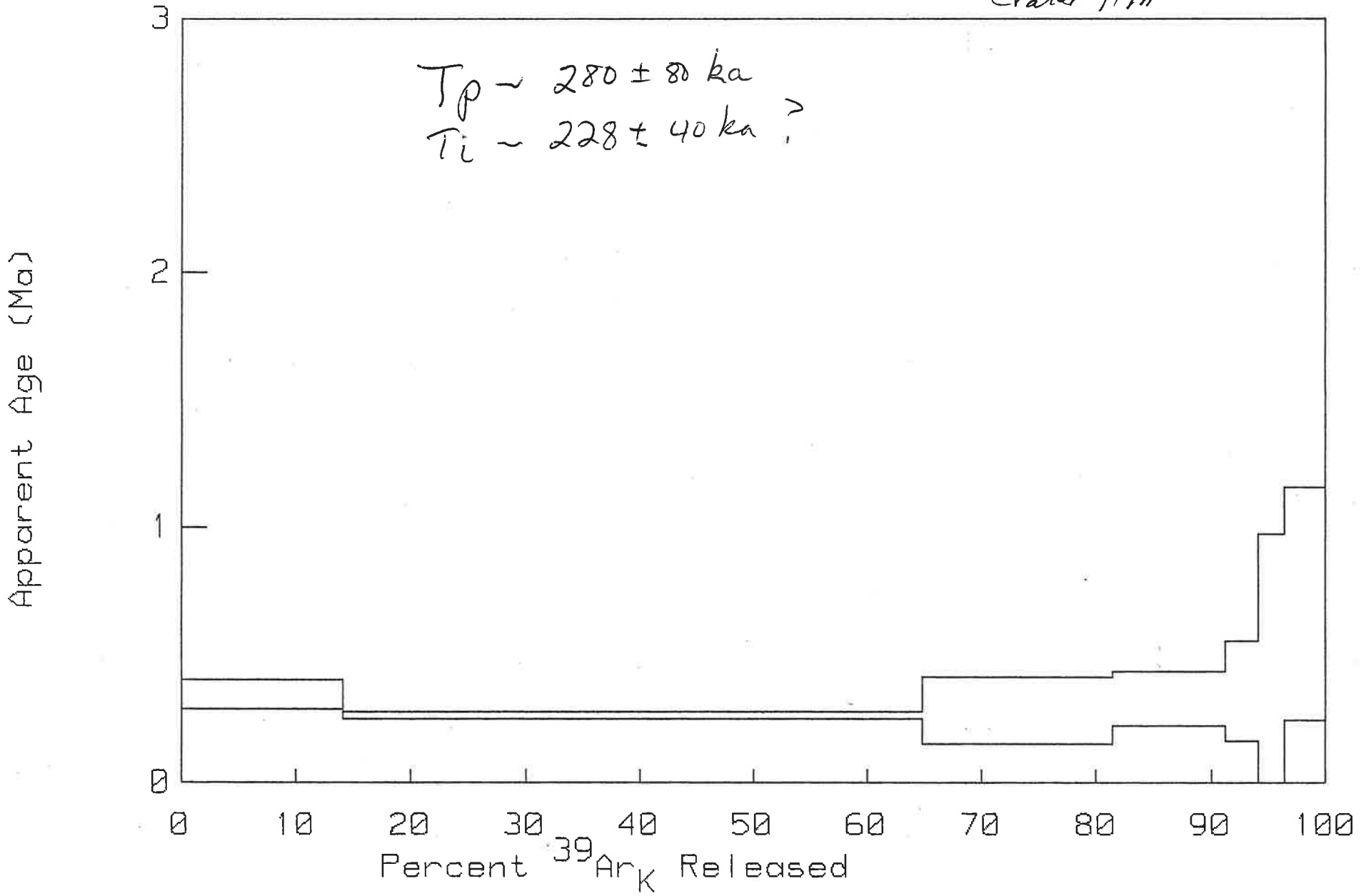
Raw values corrected for manifold options, trap current and mass discrimination

TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
650	1.30010	.03585	.00222	.00033	.00438	.09396	.00008
+/-	.00526	.00099	.00002	.00002	.00001		
750	.12304	.02641	.00075	.00012	.00041	.03547	.00006
+/-	.00221	.00037	.00002	.00002	.00001		
850	.06189	.06487	.00132	.00021	.00016	.06121	.00014
+/-	.00001	.00002	.00000	.00000	.00001		
950	.13222	.17067	.00340	.00055	.00032	.15955	.00036
+/-	.00007	.00009	.00001	.00001	.00000		
1050	.19365	.38509	.01048	.00157	.00042	.45427	.00081
+/-	.00011	.00011	.00003	.00001	.00001		
1150	.25117	.44002	.01759	.00151	.00056	.43716	.00093
+/-	.00011	.00033	.00001	.00000	.00001		
1250	.06914	.09522	.00466	.00089	.00022	.25738	.00020
+/-	.00003	.00006	.00000	.00001	.00002		
1400	.05859	.02587	.00132	.00166	.00030	.48049	.00005
+/-	0.00000	.00001	.00000	.00001	.00000		

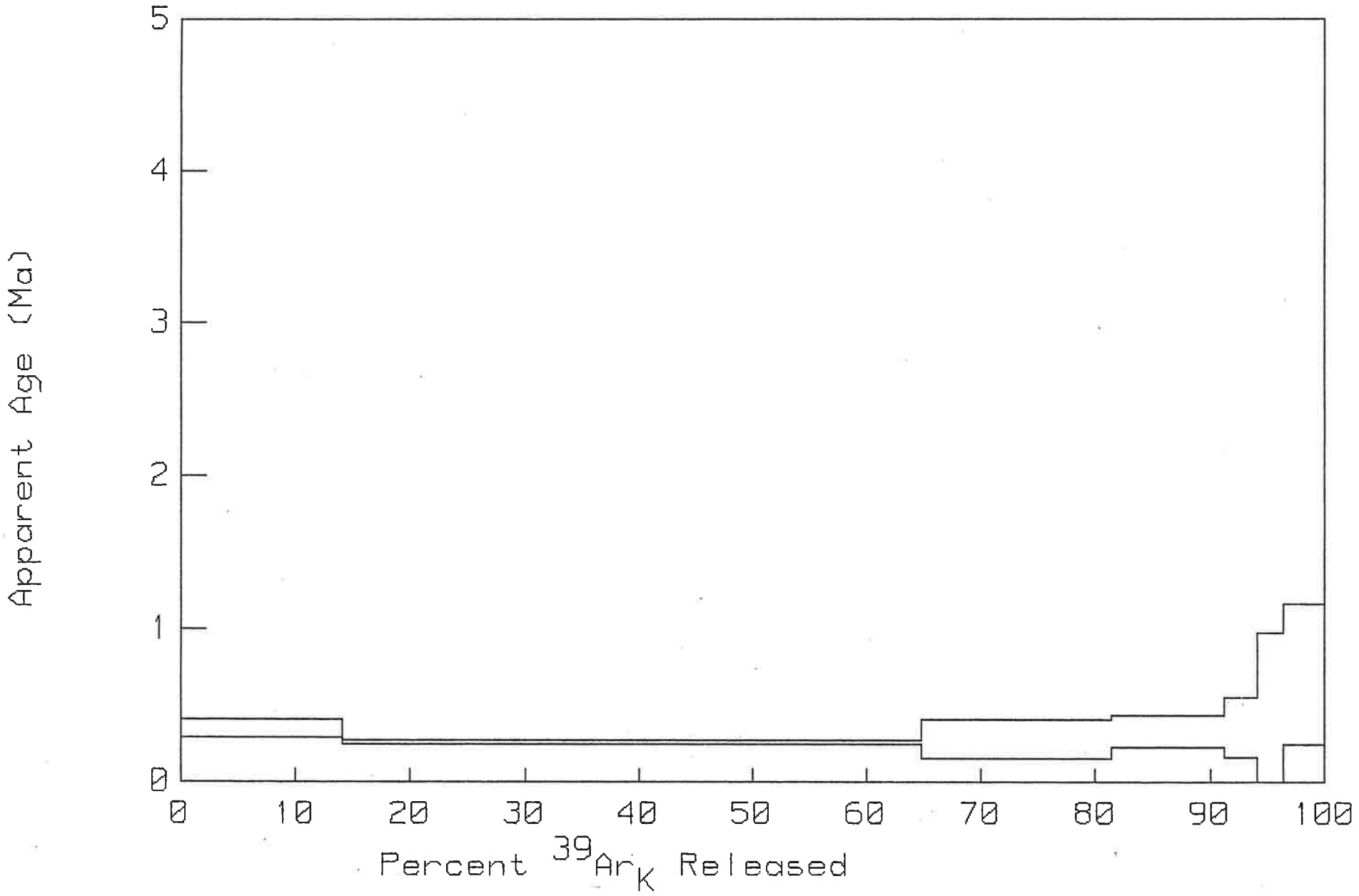
TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
650	.00002	.00047	.00037	.00003	.09427	.00000	.00007	.00000	.00098
750	.00001	.00035	.00028	.00001	.03558	.00000	.00003	.00000	.00033
850	.00003	.00086	.00068	.00002	.06139	.00000	.00004	.00000	.00043
950	.00009	.00226	.00178	.00004	.16002	.00000	.00011	.00000	.00109
1050	.00019	.00510	.00401	.00012	.45565	.00001	.00032	.00000	.00532
1150	.00022	.00583	.00458	.00012	.43845	.00001	.00031	.00001	.01168

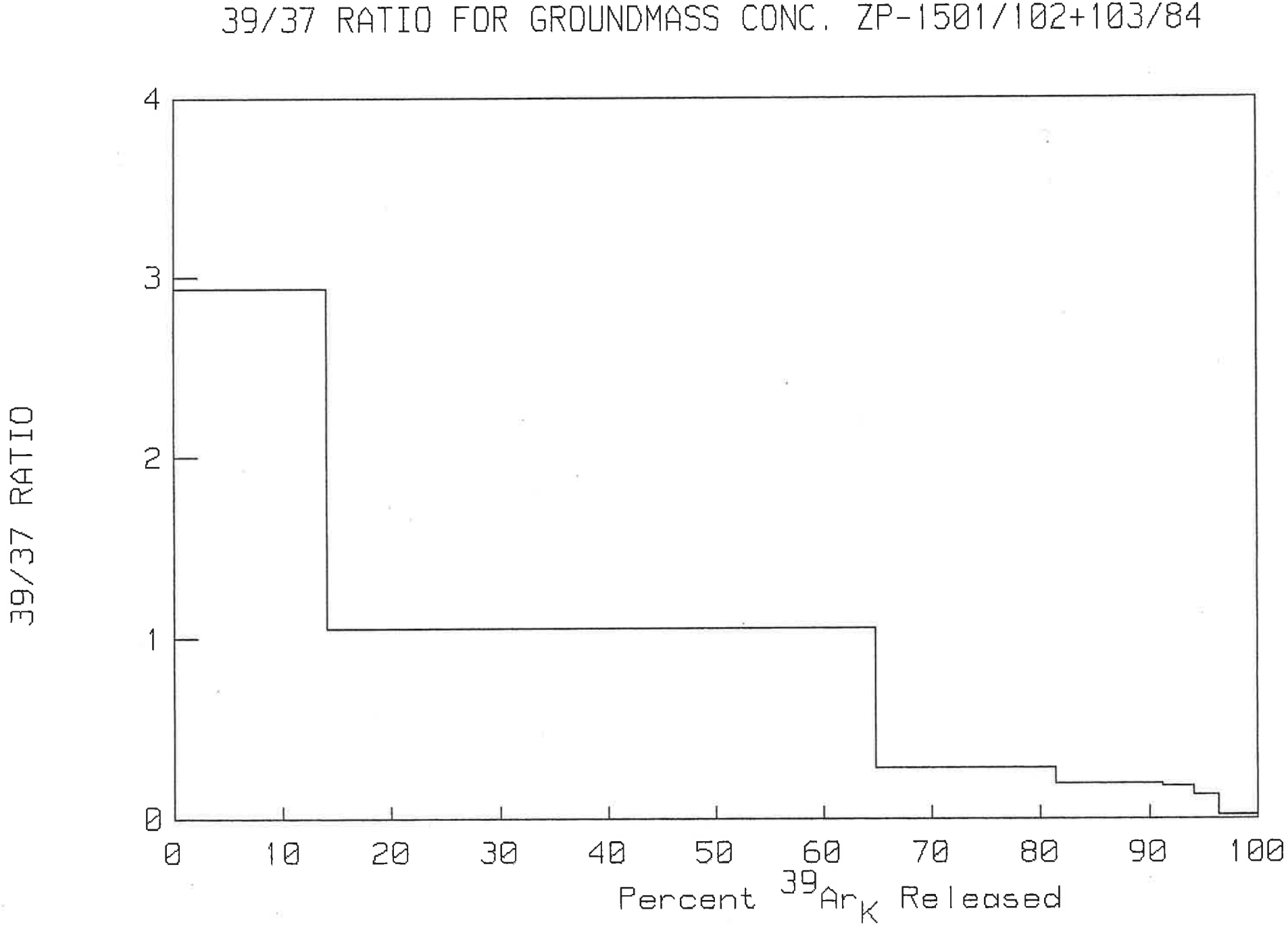
AGE SPECTRUM FOR GROUNDMASS CONC. ZP-1501/102+103/84

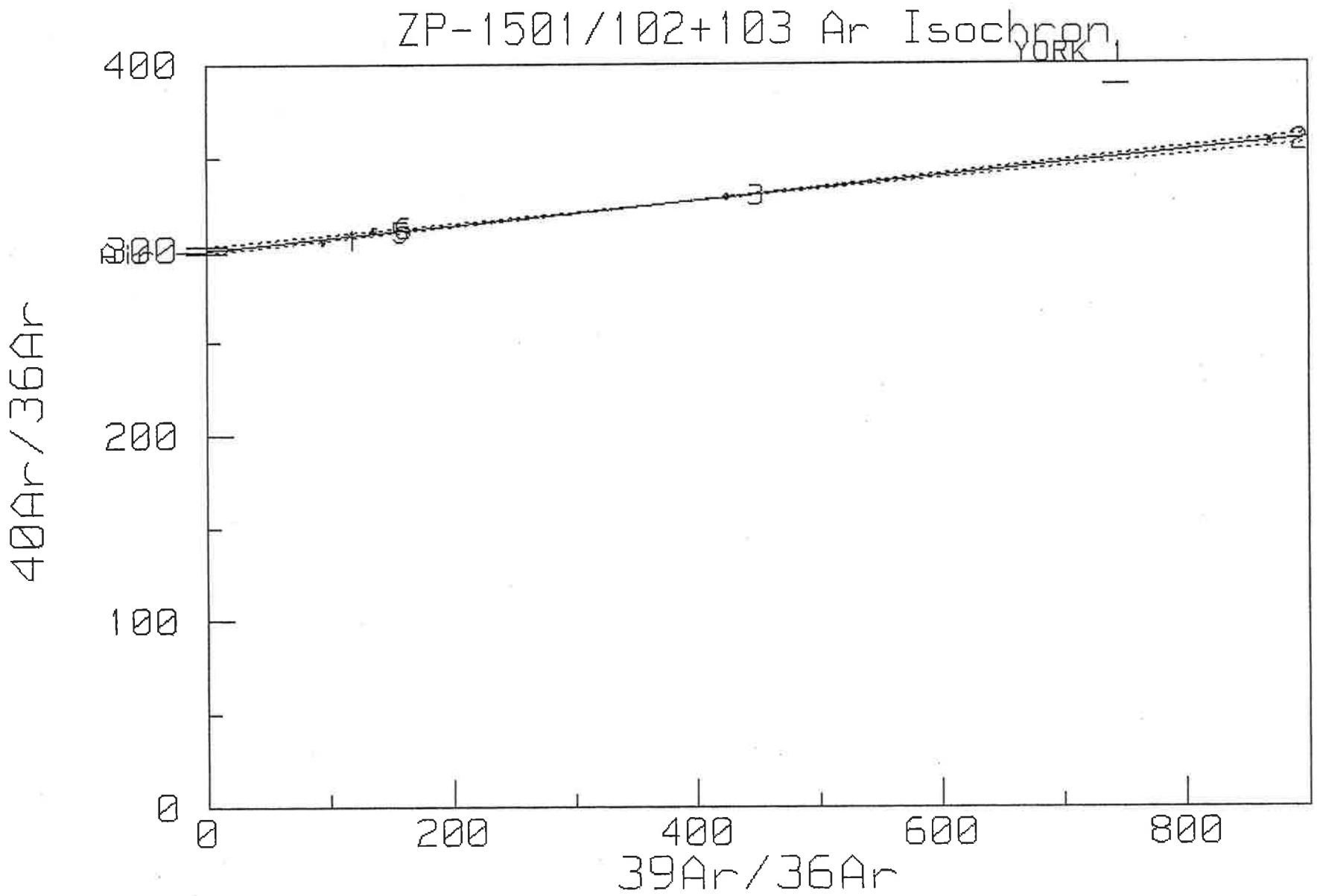
Crater Hill



AGE SPECTRUM FOR GROUNDMASS CONC. ZP-1501/102+103/84




39/37 RATIO FOR GROUNDMASS CONC. ZP-1501/102+103/84
39/37 RATIO
4
3
2
1
0
0
10
20
30
40
50
60
70
80
90
100
Percent $^{39}Ar_K$ Released


ZP-1501/102+103 Ar Isochron
YORK 1
400
300
200
100
0
40Ar/36Ar
0
200
400
600
800
39Ar/36Ar

ZP-1501/102+103

York 1 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.064818	.0072838	301.59	3.1961

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.376E-01	1.33E-02	1.33E-02
Initial 40/36:	3.02E+02	1.60E+00	1.60E+00
Radiogenic 40/39:	6.48E-02	3.64E-03	3.64E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.064544	.00012801	301.69	.059567
mswd= 54.3	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.366E-01	3.33E-04	3.33E-04
Initial 40/36:	3.02E+02	2.98E-02	2.98E-02
Radiogenic 40/39:	6.45E-02	6.40E-05	6.40E-05

All errors on this printout are: 2 SIGMA

#2-6

ZP-1501/102+103
York 1 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.066312	.0051066	299.84	2.0627

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.430E-01	9.36E-03	9.36E-03
Initial 40/36:	3.00E+02	1.03E+00	1.03E+00
Radiogenic 40/39:	6.63E-02	2.55E-03	2.55E-03

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 5

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.066225	.00011752	299.87	.051213

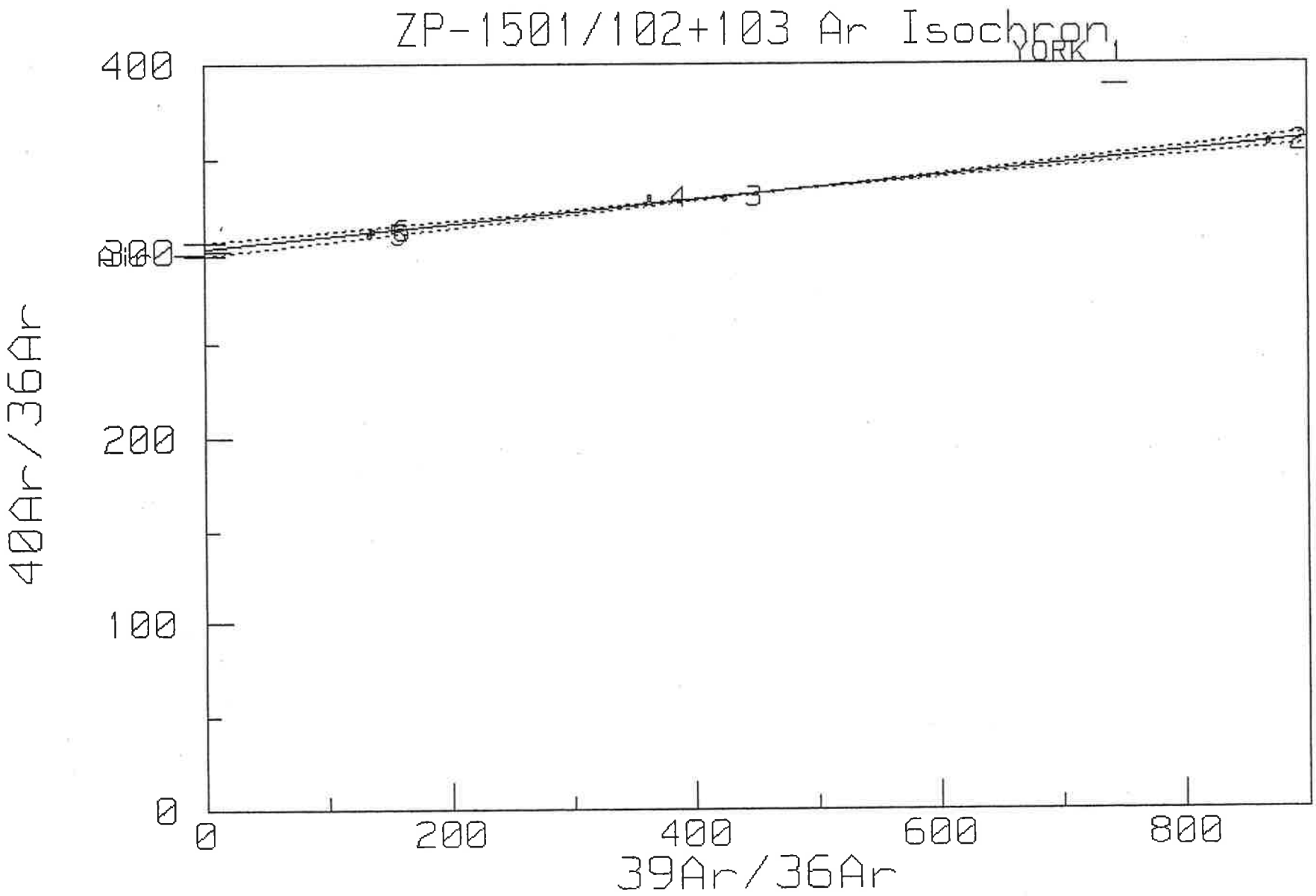
mswd= 39.9 Error Correlation= 0

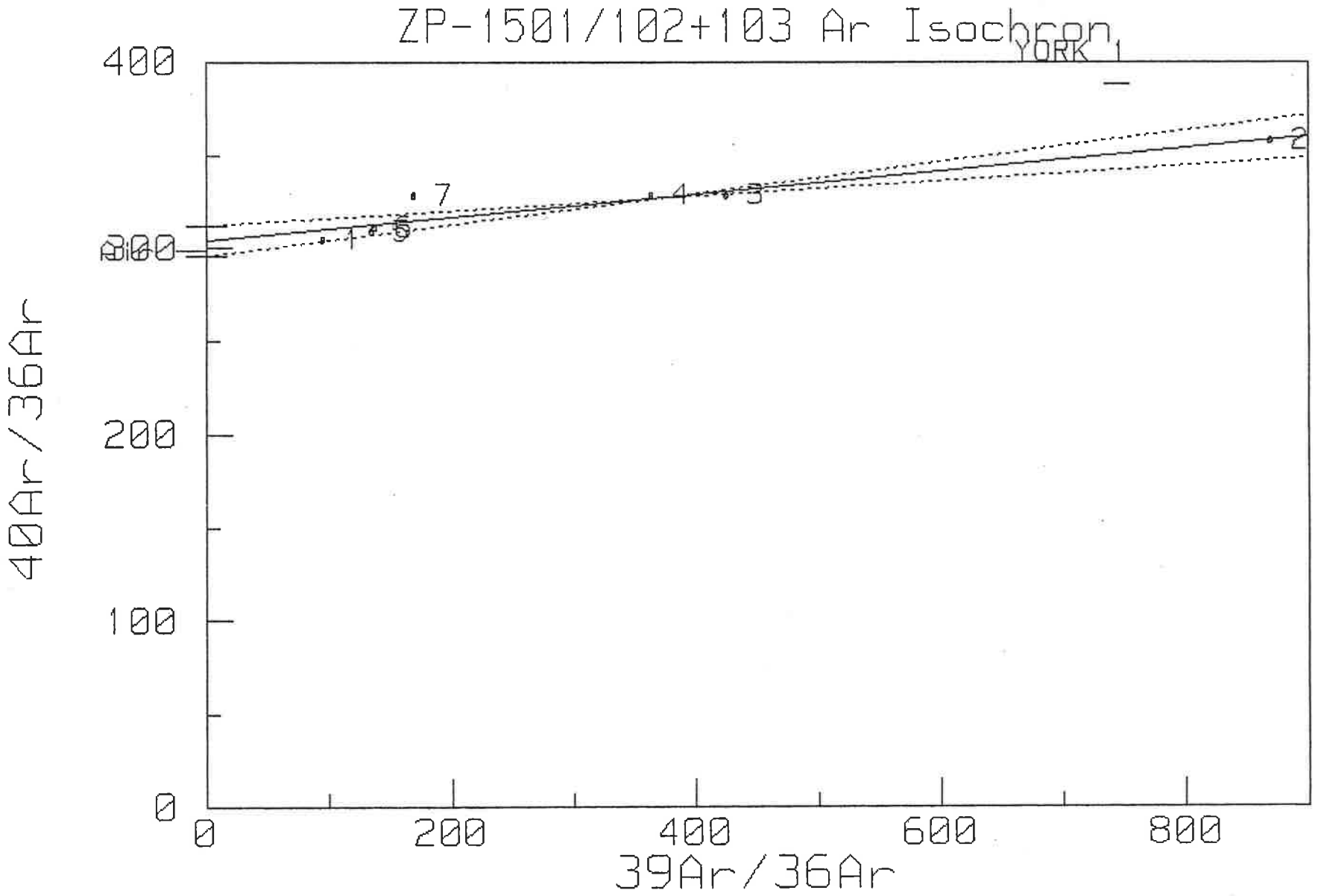
Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.427E-01	3.24E-04	3.24E-04
Initial 40/36:	3.00E+02	2.56E-02	2.56E-02
Radiogenic 40/39:	6.62E-02	5.88E-05	5.88E-05

All errors on this printout are: 2 SIGMA

#1,2,3,5,6


ZP-1501/102+103 Ar Isochron
YORK
400
300
200
100
0
40Ar/36Ar
0
200
400
600
800
39Ar/36Ar


ZP-1501/102+103 Ar Isochron
YORK 1
400
200
100
0
40Ar/36Ar
0
200
400
600
800
39Ar/36Ar
7
4
3
2

ZP-1501/102+103

York 1 Analysis

n= 7

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.062174	.02165	303.95	8.1126

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.279E-01	3.97E-02	3.97E-02
Initial 40/36:	3.04E+02	4.06E+00	4.06E+00
Radiogenic 40/39:	6.22E-02	1.08E-02	1.08E-02

All errors on this printout are 2 SIGMA

York 2 Analysis

n= 7

SLOPE	SLOPE ERR	Y INTER.	Y INTER. ERR.
.061616	.0001144	304.11	.045772
mswd= 174	Error Correlation= 0		

Isochron Regression Results

	Value	+2s unc	-2s unc
Age (Ma):	2.258E-01	3.08E-04	3.08E-04
Initial 40/36:	3.04E+02	2.29E-02	2.29E-02
Radiogenic 40/39:	6.16E-02	5.72E-05	5.72E-05

All errors on this printout are: 2 SIGMA

#1-7, All

TEMP C	ATMOSPHERIC Ar 36	ATMOSPHERIC Ar 38	ATMOSPHERIC Ar 40	ERROR IN F (1 sigma)	Error in F (1 sigma)	39/37 Ratio
650	.00121	.00021	.35855	.01568	.00011	2.93
750	.00047	.00008	.14020	.00379	.00009	1.05
850	.00032	.00006	.09430	.03493	.00009	.28
950	.00022	.00004	.06493	.02858	.00011	.19
1050	.00018	.00003	.05311	.05359	.00012	.18
1150	.00014	.00002	.03995	.15323	.00013	.13
1350	.00017	.00003	.05083	.12474	.00023	.02

TEMP C	Radiogenic AR40	K-derived AR39	F VALUE	RAD YIELD	%Ar39 TOTAL	APPARENT AGE & ERROR (Ma at 1 sigma)
650	.01081	.11522	.094	2.9	14.1	.34 +/- .06
750	.02929	.41295	.071	16.9	50.6	.26 +/- .01
850	.01044	.13575	.077	9.8	16.6	.28 +/- .13
950	.00716	.07995	.090	9.8	9.8	.33 +/- .10
1050	.00236	.02417	.098	4.2	3.0	.36 +/- .20
1150	.00207	.01849	.112	4.9	2.3	.41 +/- .56
1350	.00558	.02913	.192	9.8	3.6	.70 +/- .46
TOTAL GAS			.083			.30 +/- .07

PLATEAU AGE = .28 +/- .08 Ma
PLATEAU ON STEPS 1 TO 4 AND CONTAINS 91.2 PERCENT OF THE GAS
PLATEAU MIN = .26 AND PLATEAU MAX = .34

PLATEAU AGE = .27 +/- .07 Ma
PLATEAU ON STEPS 2 TO 3 AND CONTAINS 67.3 PERCENT OF THE GAS
PLATEAU MIN = .26 AND PLATEAU MAX = .28

Your Personalized Argon Data Acquisition on Sample: ZP-1501/102+103/84
Sample analysis started on 252 Reduced on 6-Oct-2004
Irradiated on 36 2004
Ar 40/36 MEASURED ATMOSPHERE 298.9
Mineral type GROUNDMASS CONC.
Sample Weight 402.9 mg
J-value and its error .0020317 .1 %

RAW DATA

FILE	TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	TRAP CURRENT	MANIFOLD OPTION
141076	650	.37056	.11473	.00769	.00054	.00121	200	1
+/-		.00064	.00007	.00001	.00002	.00001		
141077	750	.17378	.41139	.02353	.00534	.00058	200	1
+/-		.00008	.00031	.00001	.00000	.00000		
141078	850	.10615	.13549	.00442	.00661	.00045	200	1
+/-		0.00000	.00009	.00001	.00001	.00001		
141079	950	.07292	.07988	.00345	.00559	.00033	200	1
+/-		0.00000	.00004	.00002	.00000	.00001		
141080	1050	.05572	.02415	.00201	.00182	.00021	200	1
+/-		0.00000	0.00000	.00000	.00000	.00000		
141081	1150	.04221	.01851	.00108	.00198	.00017	200	1
+/-		.00002	.00001	.00001	.00002	.00001		
141082	1350	.05671	.02983	.00157	.01617	.00049	200	1
+/-		.00001	.00002	.00000	.00005	.00001		

Raw values corrected for manifold options, trap current and mass discrimination

TEMP	40Ar	39Ar	38Ar	37Ar	36Ar	AR 37 DECAY	AR 39 DECAY
650	.37056	.11506	.00773	.00054	.00123	.03882	.00018
+/-	.00064	.00007	.00001	.00002	.00001		
750	.17378	.41257	.02367	.00539	.00059	.38665	.00066
+/-	.00008	.00031	.00001	.00000	.00001		
850	.10615	.13588	.00445	.00666	.00045	.47834	.00022
+/-	0.00000	.00010	.00001	.00001	.00001		
950	.07292	.08011	.00347	.00564	.00033	.40507	.00013
+/-	0.00000	.00004	.00002	.00000	.00001		
1050	.05572	.02422	.00202	.00184	.00022	.13227	.00004
+/-	0.00000	.00000	.00000	.00000	.00000		
1150	.04221	.01857	.00108	.00199	.00017	.14345	.00003
+/-	.00002	.00001	.00001	.00002	.00001		
1350	.05671	.02992	.00158	.01631	.00049	1.17391	.00005
+/-	.00001	.00002	.00000	.00005	.00001		

TEMP	----K-DERIVED------			-------Ca-DERIVED----------				---Cl-DERIVED---	
C	37Ar	38Ar	40Ar	36Ar	37Ar	38Ar	39Ar	36Ar	38Ar
650	.00006	.00152	.00120	.00001	.03931	.00000	.00003	.00000	.00599
750	.00021	.00546	.00429	.00011	.39183	.00001	.00028	.00001	.01812
850	.00007	.00179	.00141	.00013	.48493	.00001	.00034	.00000	.00259
950	.00004	.00106	.00083	.00011	.41066	.00001	.00029	.00000	.00237
1050	.00001	.00032	.00025	.00004	.13410	.00000	.00009	.00000	.00167
1150	.00001	.00024	.00019	.00004	.14544	.00000	.00010	.00000	.00081
1350	.00001	.00039	.00030	.00032	1.19020	.00002	.00084	.00000	.00114

Calculated Empirical