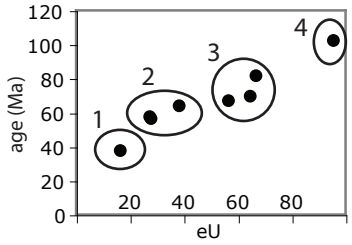
Supplemental File 1. Modeled (U-Th)/He Data (part 1 of 5)

Helium Modeling Data

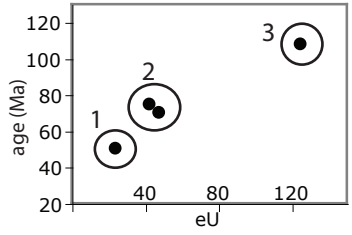
GROUP AVERAGES

Sample Name	Age (Ma)	eU (ppm)	FT	GROUP
BM1-3	38.4	16	0.65	1
BM1-1	57.2	27	0.60	2
BM1-2	58.4	27	0.66	2
BM1-6	64.6	38	0.55	2
BM1-4	67.5	56	0.57	3
BM1-8	70.4	64	0.53	3
BM1-7	82.4	66	0.52	3
BM1-5	103.0	95	0.65	4



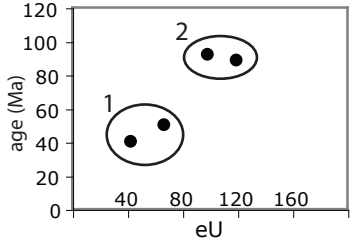
	Avg Age (Ma)	Avg eU (ppm)	Avg Ft
1	38.4	16	0.65
2	60.1	31	0.60
3	73.4	62	0.54
4	103.0	95	0.65

BM3-6	51.2	23	0.52	1
BM3-1	70.9	47	0.56	2
BM3-5	75.7	41	0.52	2
BM3-4	108.8	124	0.51	3



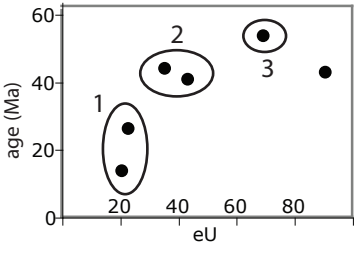
	Avg Age (Ma)	Avg eU (ppm)	Avg Ft
1	51.2	23	0.52
2	73.3	44	0.54
3	108.8	124	0.51

SBF6-3	41.2	42	0.61	1
SBF6-1	51.2	66	0.64	1
SBF6-5	89.6	118	0.53	2
SBF6-4	92.9	97	0.54	2



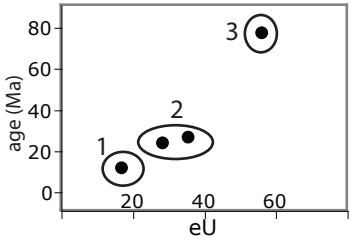
	Avg Age (Ma)	Avg eU (ppm)	Avg Ft
1	46.2	54	0.62
2	91.3	108	0.54

SBF7-4	14.0	20	0.62	1
SBF7-5	26.5	22	0.60	1
SBF7-2	41.0	43	0.54	2
SBF7-6	43.1	90	0.79	X
SBF7-7	44.2	35	0.57	2
SBF7-1	54.0	69	0.56	3



	Avg Age (Ma)	Avg eU (ppm)	Avg Ft
1	20.3	21	0.61
2	42.6	39	0.56
3	54.0	69	0.56

Wate1255-4	12.3	17	0.50	1
Wate1255-3	24.3	28	0.51	2
Wate1255-5	27.0	35	0.53	2
Wate1255-2	77.8	56	0.58	3

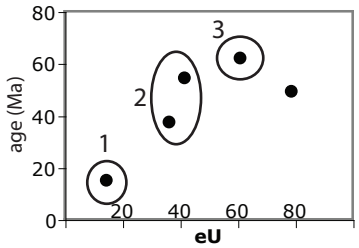


	Avg Age (Ma)	Avg eU (ppm)	Avg Ft
1	12.3	17	0.50
2	25.6	32	0.52
3	77.8	56	0.58

Supplemental File 1. Modeled (U-Th)/He Data (part 2 of 5)

Helium Modeling Data

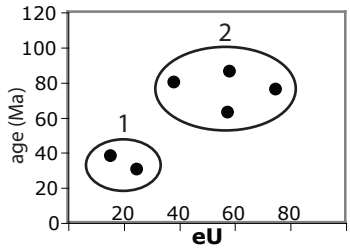
Sample Name	Age (Ma)	eU (ppm)	FT	GROUP
Wate1810-5	15.6	14	0.60	1
Wate1810-4	38.0	36	0.67	2
Wate1810-6	49.7	78	0.69	X
Wate1810-3	54.8	41	0.65	2
Wate1810-1	62.6	60	0.70	3



GROUP AVERAGES

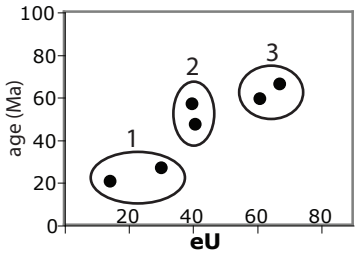
	Avg Age (Ma)	Avg eU (ppm)	Avg Ft
1	15.6	14	0.60
2	46.4	38	0.66
3	62.6	60	0.70

Sage1-2	31.1	24	0.61	1
Sage1-4	38.7	15	0.62	1
Sage1-1	63.4	57	0.64	2
Sage1-5	76.6	74	0.57	2
Sage1-6	80.6	38	0.56	2
Sage1-3	86.8	58	0.60	2



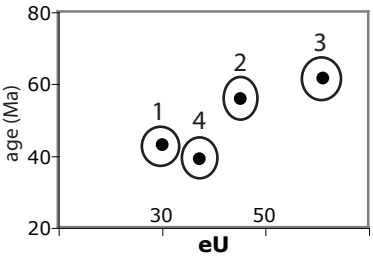
1	34.9	20	0.62
2	76.9	57	0.59

GCSK1-3	21.1	14	0.61	1
GCSK1-1	27.3	30	0.57	1
GCSK1-2	47.9	41	0.55	2
GCSK1-5	57.3	39	0.73	2
GCSK1-8	59.7	61	0.56	3
GCSK1-7	66.7	67	0.65	3



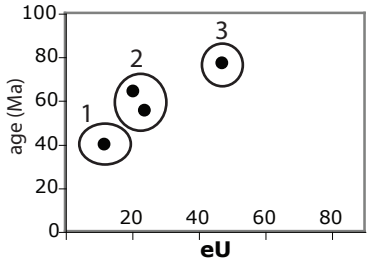
1	24.2	22	0.59
2	52.6	40	0.64
3	63.2	64	0.61

GCSK2-4	39.4	37	0.61	1
GCSK2-3	43.3	30	0.64	4
GCSK2-5	56.2	45	0.62	2
GCSK2-2	61.8	61	0.56	3



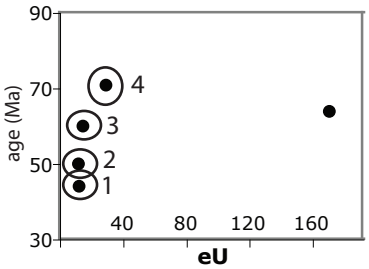
1	39.4	37	0.61
2	56.2	45	0.62
3	61.8	61	0.56
4	43.3	30	0.64

GCNK1-1	40.6	11	0.69	1
GCNK1-5	56.0	23	0.64	2
GCNK1-4	64.8	20	0.62	2
GCNK1-2	77.8	47	0.63	3



1	40.6	11	0.69
2	60.4	22	0.63
3	77.8	47	0.63

GCNK2-2	44.2	12	0.59	1
GCNK2-6	50.2	12	0.66	4
GCNK2-5	60.2	14	0.69	2
GCNK2-3	64.0	170	0.65	X
GCNK2-1	71.1	29	0.72	3

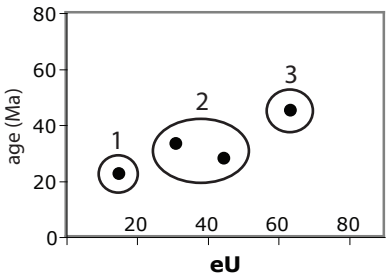


1	44.2	12	0.59
2	60.2	14	0.69
3	71.1	29	0.72
4	50.2	12	0.66

Supplemental File 1. Modeled (U-Th)/He Data (part 3 of 5)

Helium Modeling Data

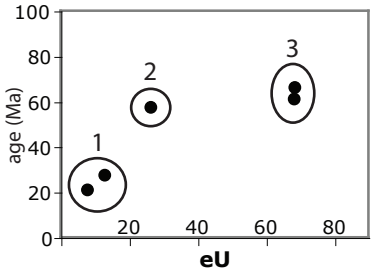
Sample Name	Age (Ma)	eU (ppm)	FT	GROUP
GCTR2-6	22.9	15	0.49	1
GCTR2-5	28.3	44	0.53	2
GCTR2-3	33.6	31	0.55	2
GCTR2-4	45.5	63	0.47	3



GROUP AVERAGES

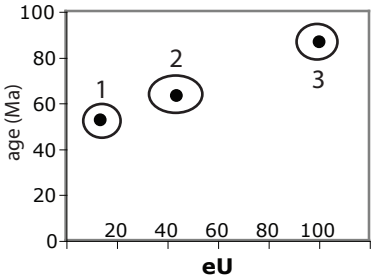
	Avg Age (Ma)	Avg eU (ppm)	Avg Ft
1	22.9	15	0.49
2	31.0	38	0.54
3	45.5	63	0.47

GCTR8-3	21.5	7	0.53	1
GCTR8-4	27.9	13	0.57	1
GCTR8-5	57.9	26	0.54	2
GCTR8-1	61.6	68	0.58	3
GCTR8-6	66.6	68	0.52	3



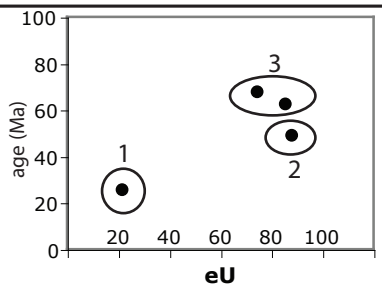
1	24.7	10	0.55
2	57.9	26	0.54
3	64.1	68	0.55

GCTR9-2	53.0	13	0.64	1
GCTR9-3	63.6	43	0.67	2
GCTR9-4	87.1	100	0.69	3



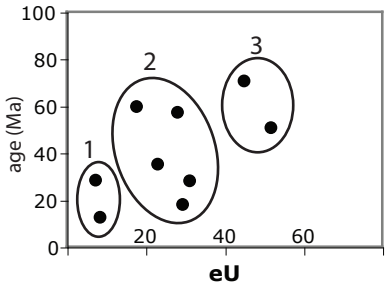
1	53.0	13	0.64
2	63.6	43	0.67
3	87.1	100	0.69

GC-SHC8-2	26.2	21	0.52	1
GC-SHC8-5	49.5	87	0.43	2
GC-SHC8-1	63.1	85	0.49	3
GC-SHC8-3	68.3	74	0.48	3



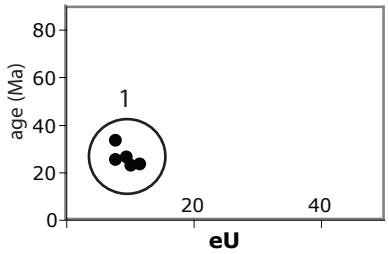
1	26.2	21	0.52
2	49.5	87	0.43
3	65.7	79	0.48

GC-SHC10-1	13.2	8	0.50	1
GC-SHC10-4	18.6	29	0.50	2
GC-SHC10-5	28.6	31	0.44	2
GC-SHC10-3	28.8	7	0.51	1
GC-SHC10-7	35.6	23	0.53	2
GC-SHC10-6	51.4	51	0.57	3
GC-SHC10-2	57.8	28	0.53	2
GC-SHC10-2	60.2	17	0.41	2
GC-SHC10-8	71.1	45	0.59	3



1	21.0	7	0.51
2	40.2	26	0.48
3	61.2	48	0.58

98GC20-1	25.6	8	0.74	1
98GC20-2	26.6	9	0.65	1
98GC20-3	33.6	8	0.64	1
98GC20-5	23.0	10	0.60	1
98GC20-6	23.8	11	0.53	1

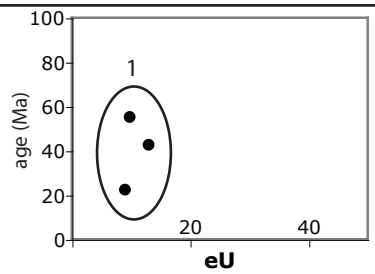


1	26.5	9	0.63

Supplemental File 1. Modeled (U-Th)/He Data (part 4 of 5)

Helium Modeling Data

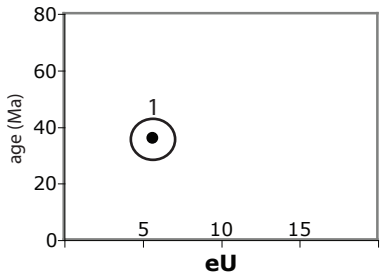
Sample Name	Age (Ma)	eU (ppm)	FT	GROUP
98GC11-3	43.2	13	0.65	1
98GC11-4	55.9	10	0.65	1
98GC11-6	22.9	9	0.62	1



GROUP AVERAGES

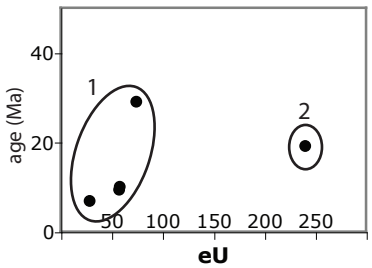
	Avg Age (Ma)	Avg eU (ppm)	Avg Ft
1	40.7	10	0.64

01GC103-2	36.4	6	0.54	1



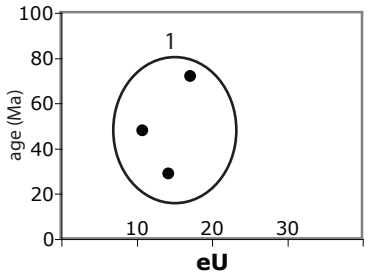
1	34.6	6	0.54

01GC92-1	29.2	73	0.68	1
01GC92-2	9.6	57	0.58	1
01GC92-3	7.2	27	0.53	1
01GC92-4	19.4	239	0.49	2
01GC92-5	10.3	57	0.52	1



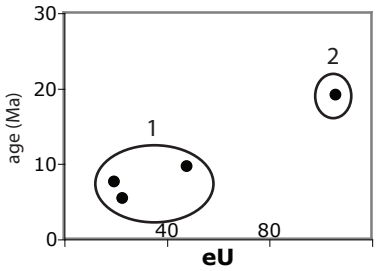
1	14.1	53	0.58
2	19.4	239	0.49

01GC86-1	29.2	14	0.75	1
01GC86-2	72.3	17	0.70	1
01GC86-3	48.4	11	0.71	1



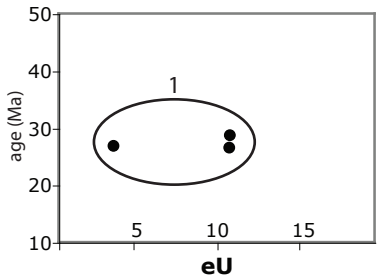
1	50.0	14	0.72

01GC90-1	5.6	22	0.77	1
01GC90-3	7.8	19	0.76	1
01GC90-4	19.2	106	0.69	2
01GC90-5	9.8	48	0.59	1



1	7.7	30	0.70
2	19.2	106	0.69

01GC128-3	28.9	11	0.79	1
01GC128-5	26.7	11	0.79	1
01GC128-6	27.1	3	0.67	1



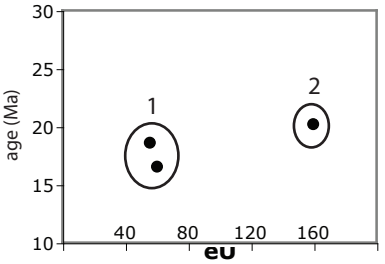
1	27.6	8	0.75

Supplemental File 1. Modeled (U-Th)/He Data (part 5 of 5)

Helium Modeling Data

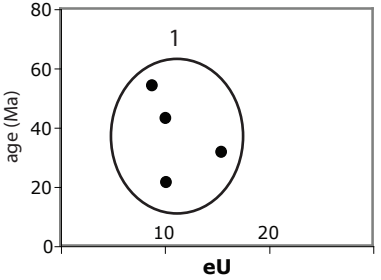
GROUP AVERAGES

Sample Name	Age (Ma)	eU (ppm)	FT	GROUP
GC93-1	16.6	60	0.61	1
GC93-2	20.3	159	0.59	2
GC93-3	18.7	55	0.59	1



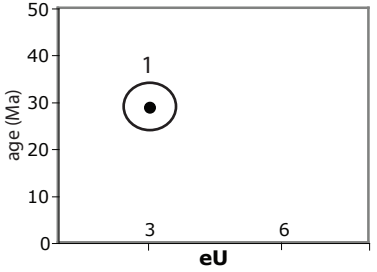
	Avg Age (Ma)	Avg eU (ppm)	Avg Ft
1	17.7	57	0.60
2	20.3	159	0.59

98GC16-1	31.9	15	0.52	1
98GC16-2	21.7	10	0.55	1
98GC16-3	43.5	10	0.61	1
98GC16-4	54.6	9	0.52	1



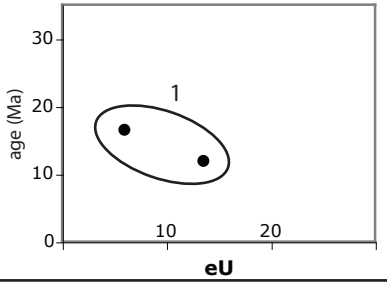
1	37.9	11	0.55

02GC122-1	29.0	3	0.66	1



1	29.0	3	0.66

98GC34-1	16.7	6	0.56	1
98GC34-2	12.1	13	0.50	1



1	14.4	10	0.53