Table A2. Zircon and Apatite Fission Track Analyses

Sample	Min.	# grains	Standard track density ($x10^6$ cm^{-2})	Fossil track density ($x10^6$ cm^{-2})	Induced track density ($x10^6$ cm^{-2})	Chi square prob. %	Central age (Ma) (95% CI)	Mean Length µm (# measured)	Dpar µm
From north to south:									
TK-1	A	13	1.42 (4099)	1.71 (547)	6.94 (2222)	82	62.4 (+9.8/-8.5)	13.29 ± 0.96 (101)	1.77
TK-2	Z	15	0.14 (3186)	8.29 (1104)	3.16 (420)	100	68.0 (+9.0/-8.0)		
	A	20	1.42 (4099)	2.99 (987)	10.60 (3508)	17	71.2 (+7.5/-6.8)	13.29 ± 0.96 (104)	2.31
TK-3	Z	10	0.14 (3204)	13.4 (769)	4.95 (285)	71	70.8 (+11.3/-9.8)		
	A	7	1.38 (3989)	0.54 (138)	1.88 (480)	94	71.0 (+15.6/-12.8)	13.63 ± 1.09 (10)	1.97
TK-4	Z	9	0.14 (3222)	9.93 (515)	3.84 (199)	79	68.4 (+13.0/-10.9)		
	A	14	1.38 (3989)	0.91 (204)	3.31 (742)	99	67.9 (+12.3/-10.4)	13.12 ± 1.05 (102)	2.32
TK-9	Z	7	0.15 (3258)	12.8 (303)	6.08 (144)	87	54.9 (+12.6/-10.3)		
	A	20	1.28 (3655)	0.34 (110)	3.83 (1227)	95	20.5 (+4.6/-3.8)	13.53 ± 1.60 (60)	2.05
TK-7	Z	20	0.15 (3240)	14.5 (2657)	6.9 (1260)	99	56.6 (+5.4/-4.9)		
	A	20	1.32 (3767)	1.44 (294)	17.8 (3640)	7	19.1 (+3.2/-2.8)	13.42 ± 1.46 (104)	2.52
TK-8	A	20	1.32 (3767)	0.05 (58)	0.97 (1232)	73	11.1 (+3.4/-2.6)	14.13 ± 1.70 (5)	2.43
TK-6	Z	17	0.15 (3258)	13.8 (1354)	8.0 (786)	78	46.2 (+5.2/-4.7)		
	A	20	1.35 (3876)	1.41 (297)	16.6 (3495)	51	20.0 (+2.9/-2.5)	13.06 ± 1.31 (101)	2.60
TK-5	Z	20	0.14 (3204)	14.2 (1634)	6.9 (797)	78	53.9 (+5.9/-5.3)		
	A	20	1.35 (3876)	1.31 (330)	16.9 (4281)	75	18.2 (+2.5/-2.2)	13.07 ± 1.22 (102)	2.65

Samples were collected by Sopurkh Khalsa and A. Blythe, and mineral separates obtained by Apatite to Zircon, Inc. All analyses were done by Blythe. Apatites were mounted in epoxy and zircons in Teflon; sample surfaces were ground and polished. Apatite were etched in 5.5M HNO_3 at 18°C for 22s, and zircons in an eutectic mixture of KOH-NaOH at 228°C for ~20 hours. An "external detector" (e.g., Naeser, 1979), consisting of low-U (<5 ppb) Brazil Ruby muscovite, was attached to each sample. Samples were irradiated in the Oregon State Triga nuclear reactor. Following irradiation, the muscovites were etched in 48% HF at 18°C for 30 min. Tracks were counted using a 100X dry lens and 1250X total magnification in crystals with well-etched, clearly visible tracks and sharp polishing scratches. A Kinitek stage and software written by Dumitru (1993) were used for analyses. Parentheses show number of tracks counted. Standard and induced track densities were determined on external detectors (geometry factor = 0.5), and fossil track densities were determined on internal mineral surfaces. The data were reduced with Binomfit (Brandon, 2002), and ages were calculated using zetas of 359 ± 10 (apatite) and 369 ± 10 (zircons) for dosimeter CN-

5 (e.g., Hurford and Green, 1983). The chi-square test was used to estimate the probability that individual grain ages for each sample belong to a single population with Poissonian distribution (Galbraith, 1981). All ages are central ages (Green, 1981) and errors are 95% confidence intervals (Brandon, 2002).

Apatite Fission Track Length Histograms:

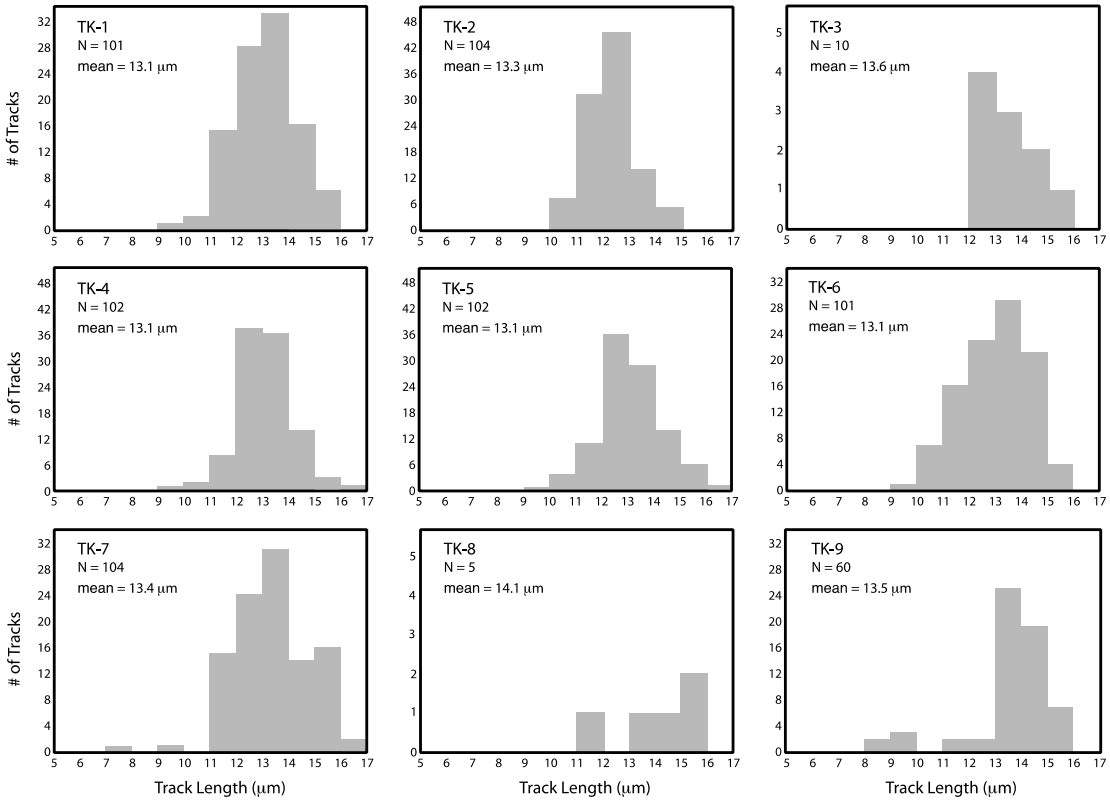

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Table A3: Apatite (U-Th)/He data.

Sample	# of grains	Radius (μm)[a]	Mass (μg)	U (ppm)	Th (ppm)	^{4}He (nmol/g)	F_T[b]	Corrected Age (Ma)	Average Age (Ma)	Std Dev (Ma)
TKA-1									48.51	0.59
	2	51.27	4.57	55.99	6.21	10.74	0.71	48.21		
	1	46.00	1.77	159.68	63.06	32.55	0.71	48.12		
	1	33.25	1.35	149.00	71.42	28.55	0.64	49.19		
TKA-2									59.60	1.77
	2	45.01	3.12	73.79	13.35	16.69	0.68	58.94		
	1	31.75	0.97	68.05	20.65	14.38	0.59	61.61		
	1	38.25	1.30	107.84	17.52	22.46	0.64	58.26		
TKA-3									32.76	--
	1	44.00	2.55	7.18	3.11	1.02	0.71	32.76		
TKA-4									33.77	0.24
	2	41.10	3.17	38.71	49.57	6.03	0.66	33.51		
	1	34.75	1.28	28.29	34.71	4.13	0.61	33.99		
	1	32.75	1.04	77.72	50.97	10.16	0.62	33.82		
TKA-5									8.96	1.27
	2	48.82	7.09	136.99	203.30	5.40	0.71	7.57		
	1	44.00	2.30	156.10	289.37	7.61	0.68	9.27		
	1	39.00	1.48	166.42	388.02	8.87	0.63	10.05		
TKA-6									9.96	0.05
	2	36.76	2.63	215.26	354.07	10.01	0.62	10.00		
	1	38.25	1.18	227.59	47.81	33.84	0.63	**41.48***		
	1	31.25	1.12	153.60	226.61	6.51	0.59	9.93		
TKA-7									12.85	1.68
	2	35.73	2.07	161.48	256.28	8.19	0.60	11.39		
	1	39.75	1.73	130.16	224.95	9.42	0.65	14.69		
	1	37.00	1.22	99.25	173.09	5.81	0.62	12.46		
TKA-8									12.57	4.26
	2	64.87	9.39	7.09	15.41	0.71	0.76	15.89		
	1	33.75	0.94	18.14	23.70	0.92	0.59	12.09		
	1	38.00	1.48	10.27	26.14	0.88	0.63	15.57		
	1	40.50	1.67	25.62	22.03	0.73	0.65	6.73		
TKA-9									21.44	2.36
	2	39.35	3.33	60.87	143.18	6.43	0.67	18.77		
	1	45.75	1.68	77.77	155.42	8.55	0.69	20.15		
	1	46.25	2.26	56.12	145.76	8.13	0.71	23.33		
	1	31.50	0.79	53.43	126.18	6.20	0.59	23.52		

[a] Radius is the half-width perpendicular to the c-axis for single grains and mass-weighted average (MWAR) for multiple-grain aliquots (Reiners and Farley, 2001). *Single grain age in bold was not used in calculation of average.

[b] F_T is the correction factor for α-ejection (Farley, 2002).

References:

Farley, K.A., 2002, (U-Th)/He dating: techniques, calibrations, and applications. Mineralogical Society of America, Reviews in Mineralogy and Geochemistry 47, p. 819-844.

Reiners, P.W., and Farley, K.A., 2001, Influence of crystal size on apatite (U-Th)/He thermochronology: an example from the Bighorn Mountains, Wyoming. Earth Planetary Science Letters 188, p. 413-420.

Table A4. HeFTy Inverse Model Paramaters.

Intitial track length: 15.3 μm (based on Durango measurements by AEB)
Annealing model: Ketcham et al., 2005; Farley, 2000 (Durango)
Search method: Monte Carlo
Merit value for "good" fit: 0.5
Merit value for "acceptable" fit: 0.05

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