GSA Data Repository 2020088

Wolff, R., et al., 2020, Fast cooling of normal-fault footwalls: Rapid fault slip or thermal relaxation?: Geology, v. 48, https://doi.org/10.1130/G46940.1

Table DR1. Parameters of PECUBE model shown in Fig. 1B.

Temperature at top of model [°C]	0
Temperature at base of model [°C]	800
Radiogenic heat production [°C/Myr]	20
E-folding depth of heat production [km]	10
Thermal diffusivity [km^2/Myr]	20
Crustal density [kg/m^3]	2700
Mantle density [kg/m^3]	3200
Fault dip [°]	45

Table DR2. Coordinates of sampling locations.

Sample number	Elevation [m]	Latitude [°N]	Longitude [°E]	Sample lithology
Elevation profile: surface samples				
17A16	2606	46.9904	11.5541	Orthogneiss
17A17	2557	46.9878	11.5465	Calcschist
17A5	2315	46.9913	11.5418	Orthogneiss
17A3	2133	46.9944	11.5380	Orthogneiss
17A7	1860	46.9993	11.5292	Orthogneiss
17A2	1683	47.0022	11.5246	Orthogneiss
Elevation profile: drillcore samples				
BM060	1530	47.0019	11.5223	Orthogneiss
BM243	1368	47.0013	11.5232	Orthogneiss
BM425	1208	47.0010	11.5239	Orthogneiss
BM595	1058	47.0007	11.5247	Orthogneiss
BM696	968	47.0005	11.5253	Orthogneiss
BM797	879	47.0003	11.5259	Orthogneiss
BM995	704	46.9999	11.5268	Orthogneiss
Additional surface samples				
17A13	2721	46.9971	11.5813	Orthogneiss
17A11	1975	46.9715	11.5032	Calcschist
16A3	1683	46.9992	11.4963	Mylonitic schist
16A9	1441	46.9942	11.4967	Mylonitic schist
17A9	1342	46.9664	11.4690	Mylonitic schist

Table DR3. Results of apatite (U-Th)/He analysis.

Sample Number	Aliq.	Mass of crystal [µg]	Sphere radius [µm]	He vol.[a] [ncc]	He 1σ [%]	He radiation density[b] [alpha/g]	^{238}U mass[c] [ng]	^{238}U 1σ [%]	^{238}U conc. [ppm]	^{232}Th mass[c] [ng]	^{232}Th 1σ [%]	^{232}Th conc. [ppm]	Th/U ratio	Sm mass[c] [ng]	Sm 1σ [%]	Sm conc. [ppm]	Ejection correct. (Ft)[d]	*Uncorr. He age [Ma]*	Ft-corr. He age [Ma]	2σ [Ma][e]	**Unweighted average age ± 2 s.e. [Ma]**
Elevation profile: surface samples																					
17A5	#1	6	71	**0.050**	2.7	$2.84*10^{14}$	**0.054**	2.1	9.5	**0.013**	3.0	2.3	0.24	**0.511**	4.2	91	**0.78**	*6.8*	**8.7**	0.8	
	#2	8	85	**0.077**	2.2	$2.92*10^{14}$	**0.064**	2.0	7.6	**0.089**	2.4	11	1.40	**0.601**	4.2	72	**0.81**	*7.2*	**8.8**	0.7	
	#3	6	99	**0.078**	2.1	$3.80*10^{14}$	**0.066**	2.0	11	**0.056**	2.5	8.9	0.85	**0.500**	4.2	79	**0.84**	*7.8*	**9.3**	0.7	**8.9 ± 0.3**
17A3	#1	14	111	**0.148**	1.7	$3.18*10^{14}$	**0.132**	1.9	9.5	**0.161**	2.4	12	1.22	**0.969**	4.2	69	**0.86**	*6.9*	**8.0**	0.5	
	#2	10	100	**0.165**	1.7	$5.06*10^{14}$	**0.127**	1.9	13	**0.150**	2.4	15	1.18	**0.674**	4.2	67	**0.84**	*8.1*	**9.7**	0.6	**8.8 ± 1.6**
17A7	#1	8	96	**0.208**	1.6	$8.17*10^{14}$	**0.171**	1.9	22	**0.260**	2.4	33	1.52	**1.241**	4.2	158	**0.83**	*7.1*	**8.5**	0.6	
	#2	10	74	**0.259**	1.4	$8.27*10^{14}$	**0.225**	1.8	22	**0.298**	2.4	29	1.33	**1.609**	4.2	156	**0.78**	*7.0*	**8.9**	0.7	
	#3	19	92	**0.462**	1.3	$7.60*10^{14}$	**0.363**	1.8	19	**0.438**	2.4	23	1.21	**2.181**	4.2	115	**0.83**	*7.9*	**9.5**	0.6	**9.0 ± 0.6**
17A2	#1	35	124	**0.591**	1.3	$4.99*10^{14}$	**0.525**	1.8	15	**0.505**	2.4	14	0.96	**2.775**	4.2	79	**0.87**	*7.3*	**8.4**	0.5	
	#2	21	127	**0.250**	1.5	$3.48*10^{14}$	**0.244**	1.8	12	**0.367**	2.4	18	1.51	**2.266**	4.2	109	**0.87**	*5.9*	**6.8**	0.4	
	#3	18	96	**0.715**	1.2	$1.24*10^{15}$	**0.531**	1.8	30	**0.603**	2.4	34	1.13	**3.198**	4.2	178	**0.83**	*8.4*	**10.2**	0.6	**8.4 ± 2.0**
Elevation profile: drillcore samples																					
BM243	#1	10	108	**0.260**	1.5	$7.44*10^{14}$	**0.211**	1.8	20	**0.301**	2.4	29	1.43	**1.413**	4.2	136	**0.87**	*7.3*	**8.5**	0.5	
	#2	11	75	**0.300**	1.4	$8.65*10^{14}$	**0.261**	1.8	23	**0.373**	2.4	33	1.43	**1.710**	4.2	151	**0.79**	*6.8*	**8.6**	0.6	
	#3	11	87	**0.264**	1.5	$7.76*10^{14}$	**0.246**	1.8	23	**0.333**	2.4	31	1.35	**1.633**	4.2	152	**0.82**	*6.5*	**7.9**	0.5	
	#4	9	75	**0.173**	1.7	$6.28*10^{14}$	**0.203**	1.8	22	**0.239**	2.4	26	1.18	**1.206**	4.2	133	**0.79**	*5.3*	**6.8**	0.5	**7.9 ± 0.8**
BM696	#1	4	74	**0.079**	2.0	$6.50*10^{14}$	**0.094**	1.9	23	**0.139**	2.5	34	1.48	**0.661**	4.2	164	**0.78**	*5.0*	**6.4**	0.5	
	#2	12	94	**0.273**	1.4	$6.95*10^{14}$	**0.278**	1.8	23	**0.395**	2.4	32	1.42	**1.751**	4.2	142	**0.82**	*5.9*	**7.1**	0.5	
	#3	13	106	**0.379**	1.3	$9.00*10^{14}$	**0.305**	1.8	24	**0.461**	2.4	36	1.51	**2.420**	4.2	189	**0.84**	*7.2*	**8.6**	0.5	**7.4 ± 1.3**
BM797	#1	4	70	**0.104**	1.9	$8.52*10^{14}$	**0.107**	1.9	26	**0.120**	2.5	29	1.12	**0.570**	4.2	140	**0.78**	*6.1*	**7.9**	0.7	
	#2	7	101	**0.157**	1.8	$6.59*10^{14}$	**0.181**	1.8	25	**0.264**	2.4	37	1.46	**1.228**	4.2	171	**0.86**	*5.1*	**6.0**	0.4	
	#3	15	98	**0.310**	1.4	$6.47*10^{14}$	**0.296**	1.8	20	**0.430**	2.4	29	1.45	**2.272**	4.2	154	**0.84**	*6.2*	**7.4**	0.5	**7.1 ± 1.2**
BM995	#1	6	88	**0.033**	3.7	$1.88*10^{14}$	**0.054**	2.0	9.8	**0.070**	2.4	13	1.31	**0.511**	8.8	93	**0.820**	*3.7*	**4.5**	0.4	
	#2	4	66	**0.029**	4.1	$2.69*10^{14}$	**0.046**	2.1	12	**0.054**	2.5	14	1.16	**0.258**	8.8	68	**0.754**	*4.0*	**5.3**	0.6	
	#3	8	93	**0.194**	2.3	$8.01*10^{14}$	**0.221**	1.8	29	**0.461**	2.4	60	2.09	**0.769**	8.8	99	**0.828**	*4.8*	**5.8**	0.4	**5.2 ± 0.7**

Additional surface samples

17A13	#1	10	73	**0.251**	1.4	$7.41*10^{14}$	**0.198**	1.8	19	**0.326**	2.4	31	1.64	**4.060**	4.2	387	**0.78**	*6.7*	**8.7**	0.7	
	#2	3	52	**0.060**	2.5	$6.75*10^{14}$	**0.064**	2.0	19	**0.079**	2.4	24	1.23	**0.638**	4.2	193	**0.68**	*5.7*	**8.3**	0.9	**8.5 ± 0.3**
16A3	#1	6	113	**0.008**	6.7	$2.77*10^{13}$	**0.010**	7.4	1.8	**0.021**	2.7	3.6	2.01	**1.036**	4.2	178	**0.87**	*2.8*	**3.2**	0.5	
	#2	10	144	**0.013**	5.1	$2.17*10^{13}$	**0.010**	8.0	1.0	**0.012**	2.8	1.3	1.23	**1.385**	4.2	144	**0.90**	*4.5*	**5.0**	0.7	
	#3	5	76	**0.005**	7.4	$1.49*10^{13}$	**0.005**	18	1.0	**0.003**	10	0.5	0.53	**0.923**	4.2	169	**0.80**	*3.3*	**4.2**	0.9	**4.1 ± 1.0**
16A9	#1	2	58	**0.004**	8.3	$6.92*10^{13}$	**0.003**	20	2.0	**0.014**	2.7	8.7	4.29	**0.175**	4.2	111	**0.74**	*3.9*	**5.2**	1.3	
	#2	4	92	**0.014**	6.2	$9.99*10^{13}$	**0.008**	11	2.2	**0.034**	2.5	9.3	4.23	**0.336**	4.2	91	**0.85**	*5.9*	**7.0**	1.1	**6.1 ± 1.8**

[a] Amount of helium is given in nano-cubic-cm at standard temperature and pressure.
[b] Radiation density is calculated using the (U-Th)/He age of the aliquot.
[c] Amount of radioactive elements is given in nano-grams.
[d] Ejection correction (Ft): correction factor for alpha-ejection (according to Farley et al., 1996).
[e] Uncertainty of the single-grain age is given with 2 sigma error. The error includes both, the analytical uncertainty and the estimated uncertainty of the ejection correction.

Table DR4. Results of zircon (U-Th)/He analysis.

Sample Number	Aliq.	Mass of crystal [μg]	Sphere radius [μm]	He vol.[a] [ncc]	He 1σ [%]	He radiation density[b] [alpha/g]	^{238}U mass[c] [ng]	^{238}U 1σ [%]	^{238}U conc. [ppm]	^{232}Th mass[c] [ng]	^{232}Th 1σ [%]	^{232}Th conc. [ppm]	Th/U ratio	Sm mass[c] [ng]	Sm 1σ [%]	Sm conc. [ppm]	Ejection correct. (Ft)[d]	*Uncorr. He age [Ma]*	Ft-corr. He age [Ma]	2σ [Ma][e]	**Unweighted average age ± 2 s.e. [Ma]**
Elevation profile: surface samples																					
17A17	#1	2	43	**0.541**	1.2	$1.02*10^{16}$	**0.737**	1.8	369.6	**0.090**	2.5	45.2	0.12	**0.004**	5.1	2.2	0.72	*5.9*	**8.2**	0.8	
	#2	2	59	**0.916**	1.1	$1.25*10^{16}$	**0.791**	1.8	318.4	**0.171**	2.4	68.8	0.22	**0.020**	5.1	7.9	0.79	*9.1*	**11.5**	0.9	**9.9 ± 2.3**
17A5	#1	4	48	**5.371**	1.0	$4.60*10^{16}$	**5.189**	1.8	1237.6	**0.655**	2.4	156.3	0.13	**0.011**	5.1	2.6	0.75	*8.3*	**11.1**	0.9	
	#2	8	58	**5.598**	1.0	$2.40*10^{16}$	**6.194**	1.8	778.6	**0.557**	2.4	70.0	0.09	**0.029**	5.1	3.6	0.79	*7.3*	**9.3**	0.7	
	#3	9	65	**3.794**	1.0	$1.47*10^{16}$	**4.338**	1.8	505.0	**0.488**	2.4	56.8	0.11	**0.026**	5.1	3.0	0.81	*7.1*	**8.7**	0.6	**9.7 ± 1.4**
17A3	#1	2	41	**3.116**	1.0	$5.63*10^{16}$	**3.321**	1.8	1568.2	**1.788**	2.4	844.2	0.54	**0.026**	5.1	12.4	0.70	*6.9*	**9.8**	0.9	
	#2	3	50	**5.450**	1.0	$5.84*10^{16}$	**5.906**	1.8	1772.7	**2.248**	2.4	674.8	0.38	**0.028**	5.1	8.5	0.75	*7.0*	**9.3**	0.8	
	#3	5	49	**4.882**	2.5	$3.85*10^{16}$	**5.899**	1.8	1298.3	**1.005**	2.4	221.2	0.17	**0.032**	5.1	7.1	0.75	*6.6*	**8.8**	0.8	
	#4	4	49	**5.835**	2.5	$5.32*10^{16}$	**5.089**	1.8	1292.9	**2.996**	2.4	761.2	0.59	**0.045**	5.1	11.3	0.75	*8.3*	**11.1**	1.1	**9.7 ± 1.0**
17A7	#1	6	59	**6.076**	1.0	$3.48*10^{16}$	**5.939**	1.8	998.8	**0.811**	2.4	136.3	0.14	**0.014**	5.1	2.4	0.79	*8.2*	**10.4**	0.8	
	#2	5	54	**5.403**	1.0	$3.74*10^{16}$	**5.491**	1.8	1092.2	**2.000**	2.4	397.9	0.36	**0.027**	5.1	5.4	0.77	*7.5*	**9.7**	0.8	
	#3	19	80	**13.98**	0.9	$2.31*10^{16}$	**13.57**	1.8	704.0	**2.749**	2.4	142.6	0.20	**0.062**	5.1	3.2	0.84	*8.1*	**9.6**	0.6	**9.9 ± 0.5**
17A2	#1	11	64	**10.76**	1.0	$3.31*10^{16}$	**10.96**	1.8	1012.6	**1.030**	2.5	95.1	0.09	**0.018**	5.1	1.7	0.81	*8.0*	**9.9**	0.7	
	#2	8	64	**4.941**	1.0	$2.00*10^{16}$	**6.021**	1.8	729.6	**1.521**	2.4	184.3	0.25	**0.072**	5.1	8.8	0.81	*6.4*	**8.0**	0.6	
	#3	9	71	**20.34**	1.0	$7.14*10^{16}$	**19.31**	1.8	2072.4	**14.05**	2.4	1507.6	0.73	**0.109**	5.1	11.6	0.82	*7.4*	**9.1**	0.6	**9.0 ± 1.1**
Elevation profile: drillcore samples																					
BM243	#1	3	52	**6.578**	1.0	$8.00*10^{16}$	**6.497**	1.8	2250.1	**2.142**	2.4	741.8	0.33	**0.016**	5.1	5.6	0.77	*7.8*	**10.2**	0.8	
	#2	1	44	**0.731**	2.2	$2.43*10^{16}$	**1.081**	1.8	966.9	**0.124**	2.4	111.2	0.12	**0.004**	5.5	3.3	0.72	*5.5*	**7.5**	0.8	**8.9 ± 1.9**
BM425	#1	1	42	**1.450**	2.1	$3.89*10^{16}$	**1.694**	1.8	1203.7	**0.608**	2.4	432.0	0.36	**0.023**	5.5	16.3	0.71	*6.5*	**9.2**	0.9	
	#2	2	47	**1.372**	2.2	$2.16*10^{16}$	**1.728**	1.8	746.9	**0.580**	2.4	250.4	0.34	**0.079**	5.5	34.1	0.74	*6.1*	**8.2**	0.8	
	#3	1	42	**0.930**	2.2	$3.40*10^{16}$	**1.143**	1.8	1106.1	**0.377**	2.4	364.7	0.33	**0.011**	5.5	10.6	0.71	*6.3*	**8.8**	0.9	**8.7 ± 0.5**
BM595	#1	9	91	**15.85**	2.1	$5.44*10^{16}$	**16.79**	1.8	1846.6	**6.263**	2.4	688.6	0.37	**0.059**	5.5	6.5	0.86	*7.2*	**8.3**	0.6	
	#2	10	93	**18.46**	2.1	$5.54*10^{16}$	**18.11**	1.8	1748.1	**4.232**	2.4	408.6	0.23	**0.029**	5.5	2.8	0.87	*8.0*	**9.2**	0.6	
	#3	5	79	**7.995**	2.1	$5.15*10^{16}$	**8.500**	1.8	1710.9	**3.159**	2.4	635.9	0.37	**0.034**	5.5	6.9	0.84	*7.2*	**8.5**	0.6	**8.7 ± 0.6**
BM797	#1	2	48	**4.046**	1.1	$7.73*10^{16}$	**4.762**	1.8	2528.1	**0.784**	2.4	416.1	0.16	**0.005**	5.1	2.7	0.75	*6.8*	**9.1**	0.8	
	#2	1	42	**0.379**	2.1	$1.31*10^{16}$	**0.611**	1.8	560.7	**0.150**	2.4	137.9	0.25	**0.004**	5.5	4.1	0.71	*4.9*	**6.8**	0.7	
	#3	2	49	**3.161**	2.0	$4.81*10^{16}$	**3.719**	1.8	1574.2	**1.621**	2.4	686.1	0.44	**0.016**	5.5	6.6	0.75	*6.4*	**8.5**	0.8	**8.1 ± 1.4**

BM995	#1	6	69	**11.43**	1.8	$5.82*10^{16}$	**19.52**	1.8	3032.9	**3.586**	2.4	557.3	0.18	**0.095**	5.5	14.7	0.82	*4.6*	**5.7**	0.4	
	#2	8	74	**16.38**	1.9	$6.65*10^{16}$	**20.46**	1.8	2569.2	**2.425**	2.4	304.6	0.12	**0.231**	5.5	29.0	0.83	*6.5*	**7.8**	0.6	
	#3	5	75	**10.02**	1.9	$6.21*10^{16}$	**13.98**	1.8	2682.4	**4.177**	2.4	801.6	0.30	**0.328**	5.5	62.9	0.83	*5.5*	**6.7**	0.5	**6.7 ± 1.2**
Additional surface samples																					
17A13	#1	4	64	**3.578**	1.0	$3.01*10^{16}$	**3.665**	1.8	923.0	**1.335**	2.4	336.3	0.36	**0.024**	5.1	6.0	0.81	*7.4*	**9.2**	0.6	
	#2	12	86	**8.587**	0.9	$2.21*10^{16}$	**8.557**	1.8	697.8	**1.345**	2.4	109.7	0.16	**0.020**	5.1	1.7	0.85	*8.0*	**9.4**	0.5	
	#3	4	54	**5.939**	1.0	$5.74*10^{16}$	**6.342**	1.8	1759.5	**1.695**	2.4	470.4	0.27	**0.008**	5.1	2.2	0.77	*7.3*	**9.5**	0.7	**9.4 ± 0.2**
17A11	#1	3	48	**1.087**	1.1	$1.17*10^{16}$	**1.480**	1.8	440.3	**0.122**	2.4	36.3	0.08	**0.017**	5.1	5.0	0.75	*6.0*	**8.0**	0.7	
	#2	2	42	**1.221**	1.1	$2.14*10^{16}$	**1.626**	1.8	754.0	**0.446**	2.4	206.9	0.27	**0.007**	5.1	3.3	0.71	*5.8*	**8.2**	0.8	
	#3	3	55	**1.446**	1.0	$1.47*10^{16}$	**1.840**	1.8	540.8	**0.754**	2.4	221.5	0.41	**0.013**	5.1	3.8	0.78	*5.9*	**7.6**	0.6	**7.9 ± 0.3**
16A3	#1	4	57	**0.879**	2.6	$7.24*10^{15}$	**1.034**	1.8	248.5	**0.413**	2.4	99.3	0.40	**0.020**	5.1	4.8	0.78	*6.4*	**8.2**	0.7	
	#2	7	54	**2.355**	2.6	$1.11*10^{16}$	**2.656**	1.8	358.7	**0.811**	2.4	109.5	0.31	**0.019**	5.1	2.6	0.77	*6.9*	**8.9**	0.8	
	#3	5	52	**1.885**	2.6	$1.28*10^{16}$	**2.110**	1.8	407.3	**0.791**	2.4	152.7	0.37	**0.033**	5.1	6.3	0.76	*6.8*	**8.9**	0.8	
	#4	10	57	**2.722**	2.5	$9.54*10^{15}$	**3.513**	1.8	359.5	**0.550**	2.4	56.3	0.16	**0.031**	5.1	3.2	0.79	*6.2*	**7.9**	0.7	**8.5 ± 0.5**
17A9	#1	5	61	**2.077**	1.1	$1.48*10^{16}$	**2.360**	1.8	497.6	**0.615**	2.4	129.6	0.26	**0.024**	5.1	5.2	0.80	*6.9*	**8.6**	0.6	
	#2	2	40	**0.578**	1.2	$1.19*10^{16}$	**0.837**	1.8	445.6	**0.276**	2.4	146.9	0.33	**0.010**	5.1	5.5	0.70	*5.3*	**7.6**	0.8	
	#3	3	40	**0.505**	2.6	$6.53*10^{15}$	**0.720**	1.8	243.0	**0.248**	2.4	83.5	0.34	**0.007**	5.1	2.5	0.70	*5.4*	**7.7**	0.8	**8.0 ± 0.7**

[a] Amount of helium is given in nano-cubic-cm at standard temperature and pressure.
[b] Radiation density is calculated using the (U-Th)/He age of the aliquot.
[c] Amount of radioactive elements is given in nano-grams.
[d] Ejection correction (Ft): correction factor for alpha-ejection (according to Farley et al., 1996).
[e] Uncertainty of the single-grain age is given with 2 sigma error. The error includes both, the analytical uncertainty and the estimated uncertainty of the ejection correction.

Table DR5. Results of apatite fission track analysis.

Sample number	Sample lithology	No. of crystals	Spontaneous		Induced		Dosimeter[a]		$P(\chi^2)$ [%]	**Central age[b] ± 1σ [Ma]**	MTL[c] [μm]	No. of measured TL	Dpar [μm]	U [ppm]
			ρ	*N*	*ρ*	*N*	*ρ*	*N*						
Elevation profile: surface samples														
17A16	Orthogneiss	20	0.10	31	2.03	652	1.31	3928	100	**10.8 ± 2.0**	12.8 ± 0.2	41	1.8	19
17A5	Orthogneiss	20	0.13	40	3.13	976	1.30	3898	100	**9.3 ± 1.5**	13.3 ± 0.3	15	1.7	30
17A3	Orthogneiss	20	0.09	30	2.26	717	1.27	3803	100	**9.2 ± 1.7**	13.3 ± 0.3	23	1.6	21
17A7	Orthogneiss	20	0.13	44	3.26	1117	1.32	3948	100	**9.0 ± 1.4**	13.1 ± 0.3	19	1.6	30
17A2	Orthogneiss	20	0.08	27	2.12	681	1.29	3877	100	**8.9 ± 1.8**	13.3 ± 0.2	30	1.7	21
Elevation profile: drillcore samples														
BM060	Orthogneiss	16	0.11	108	2.76	2845	1.21	3200	94	**7.7 ± 1.0**	–	–	1.5	27
BM243	Orthogneiss	16	0.10	114	3.12	3668	1.20	3200	100	**6.3 ± 0.8**	–	–	2.2	30
BM595	Orthogneiss	12	0.10	56	3.21	1631	1.28	3200	97	**7.4 ± 1.2**	–	–	1.4	28
BM696	Orthogneiss	11	0.11	62	3.18	1797	1.25	3200	93	**7.3 ± 1.1**	–	–	1.5	29
BM797	Orthogneiss	14	0.06	69	2.04	2375	1.26	3200	98	**6.2 ± 0.9**	–	–	1.5	18
Additional surface samples														
17A13	Orthogneiss	20	0.12	32	2.89	789	1.26	3786	100	**8.9 ± 1.6**	13.0 ± 0.2	35	1.6	27
17A11	Calcschist	11	0.07	11	2.09	339	1.29	3887	100	**7.3 ± 2.2**	13.2 ± 0.3	15	1.8	20

ρ: track densities are as measured (x 10^6 tr/cm^2).
N: number of tracks counted.
χ^2 P[%]: probability obtaining Chi-square value for n degree of freedom (n = number of crystals - 1).
ζ values for surface and drillcore samples are 348.2 ± 6.5 yr/cm^2 and 346 ± 24 yr/cm^2, respectively.
[a] using dosimeter glass CN5.
[b] central age calculated according to Galbraith & Laslett (1993).
[c] MTL: mean track length (TL).

Table DR6. Parameters of PECUBE model for Brenner fault.

Model dimensions x, y, z [km]	46, 6, 70
Temperature at base of model [°C]	800
Temperature at top of model [°C]	5
Radiogenic heat production [°C/Myr]	30
E-folding depth of heat production [km]	20
Thermal diffusivity [km^2/Myr]	20
Crustal density [kg/m^3]	2700
Mantle density [kg/m^3]	3200
Fault dip [°]	35

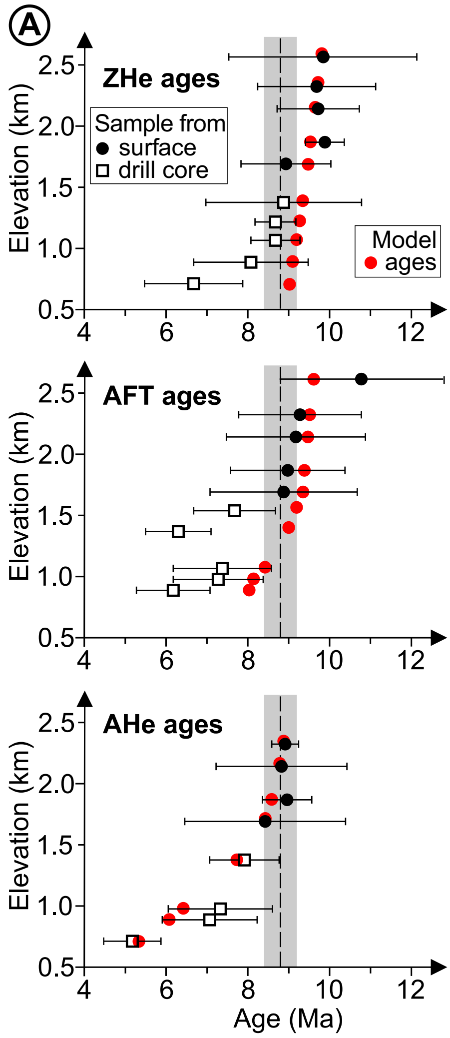

Figure DR1: Results of a PECUBE model, in which the initially flat model topography develops gradually to the present-day topography after faulting (i.e. from 8.8 to 0 Ma). Compared to the model with the static present-day topography (Fig. 3A) the predicted AHe ages differ by less than 0.2 Ma (the AFT and ZHe ages remain unchanged).

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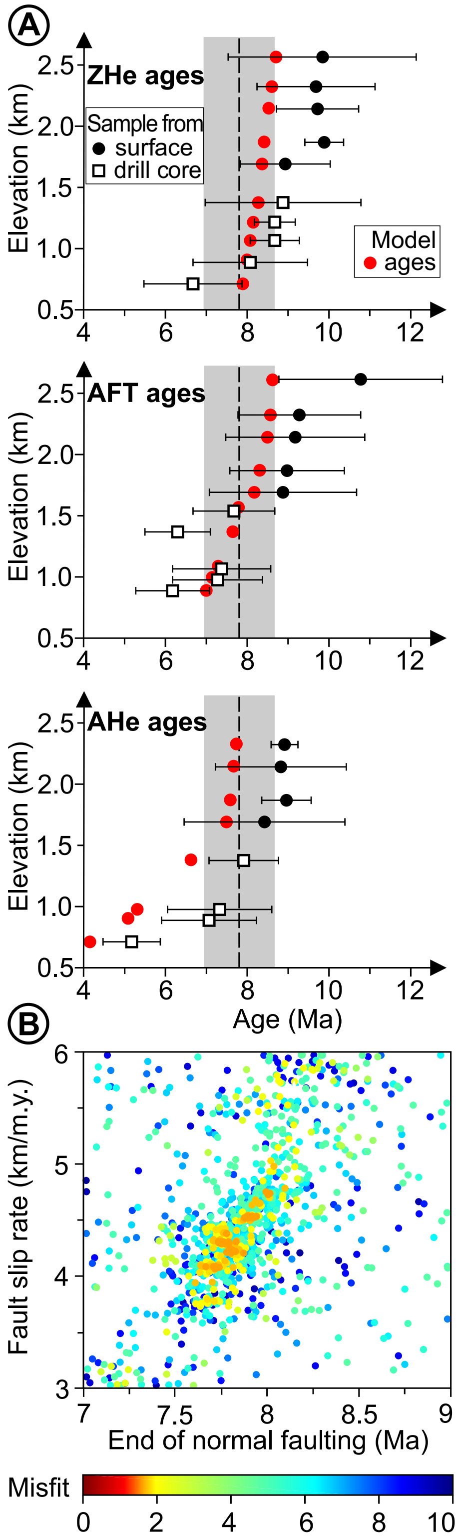

Figure DR2: Results of an additional inversion (based on 8580 model runs) using only the ZHe and AFT ages. This inversion suggests an end of faulting at 7.8±0.9 Ma, a slip rate of 4.1±0.9 km/Myr, and a total amount of extension of 37±10 km.

Wolff et al. Fig. DR2