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Uplift and Exhumation of the Russell Fiord and Boundary blocks along the northern Fairweather Transform Fault, Alaska

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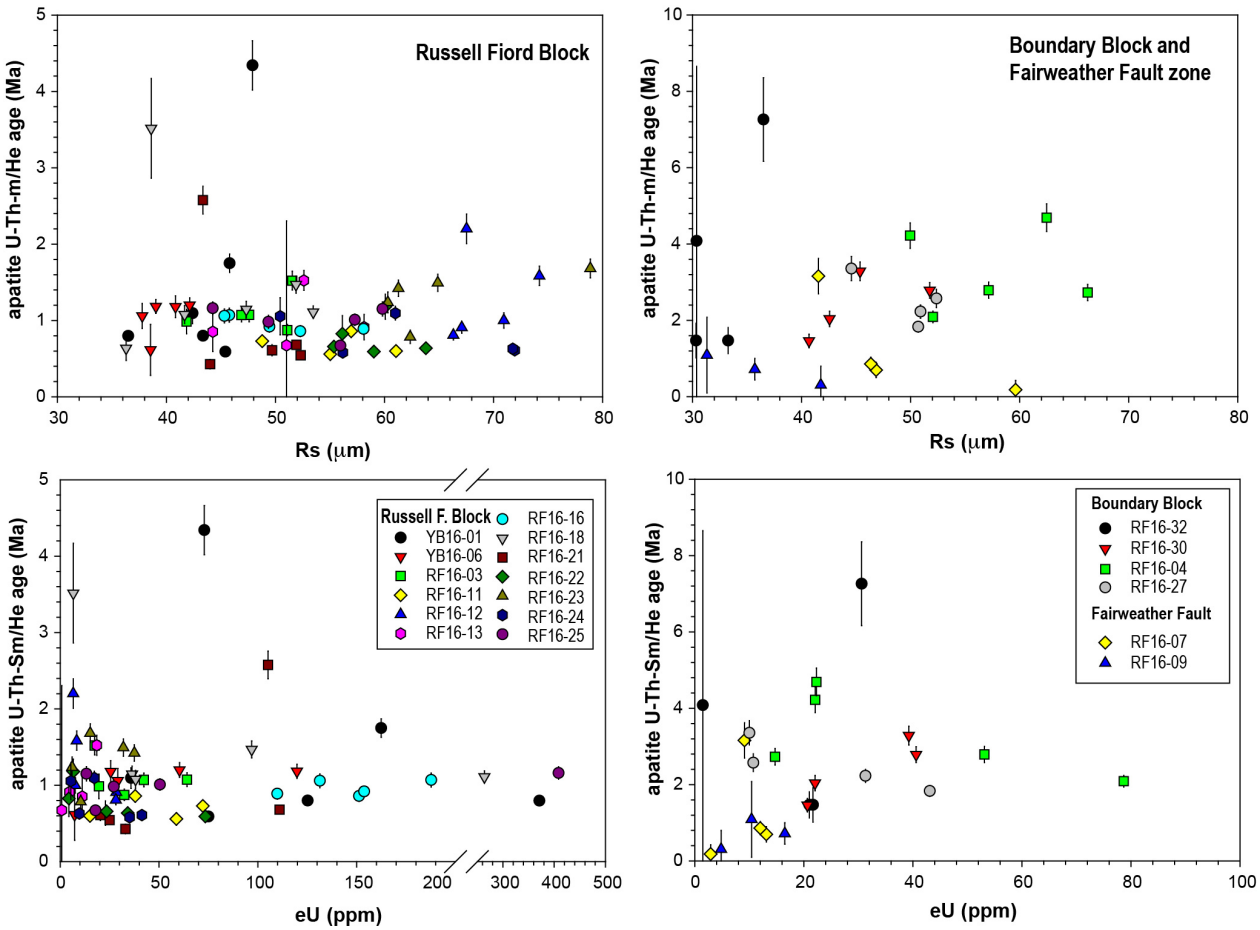

Figure S1. Apatite (U-Th-Sm)/He data plotted against the spherical radius (Rs) of the apatite grain (top) and plotted against the effective uranium concentration (eU) of the apatite grains (bottom). Samples from the Russell Fiord block (left) are plotted separately from samples collected on the Boundary block and Fairweather Fault zone (right).

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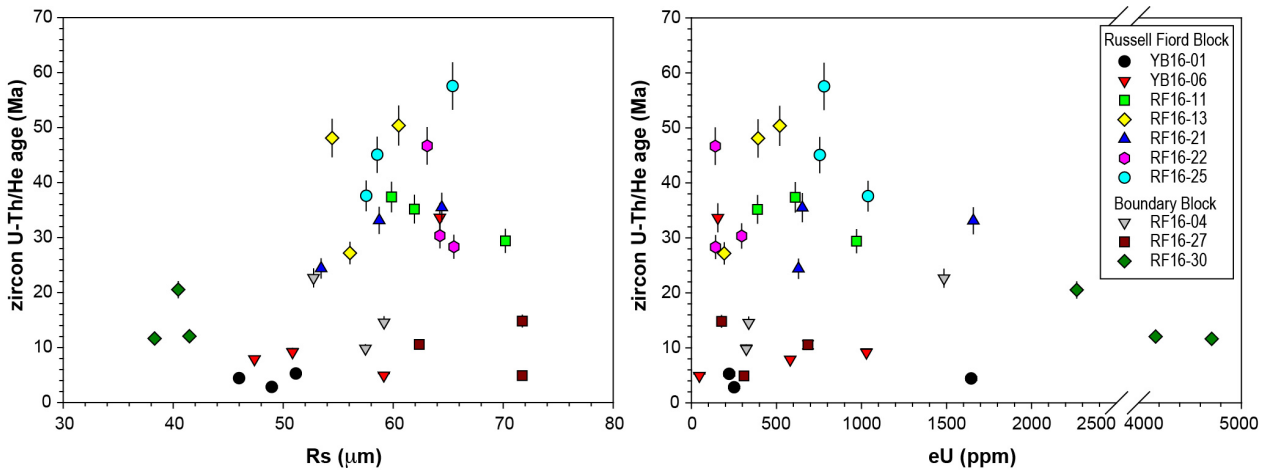

Figure S2. Zircon (U-Th)/He data plotted against the spherical radius (Rs) of the zircon grain (left) and plotted against the effective uranium concentration (eU) of the zircon grain (right).

Table S1: Parameters used for HeFTy modeling

Sample ID	Grain IDs	Grain age Error	Acceptable fit solutions	Good Fit solutions	Constraint 1	Constraint 2
RF16-11	Zr 1/2/3 Ap1/2/3/4	all 25%	3479	1463	22–50 Ma 70–220 °C	0.3–3 Ma 50–120 °C
RF16-13	Zr 1/2/3 Ap 1/2/3/5	30% Ap 3 all others 25%	4285	256	22–70 Ma 80–220 °C	0.3–3 Ma 50–120 °C
RF16-21	Zr 1/2/3/ Ap 2/3/1/5	all 25%	2500	1220	18–46 Ma 80–220°C	0.3–3 Ma 50–120 °C
RF16-22	Zr 1/2/3/ Ap 1/2/4/5	all 25%	2170	357	22–60 Ma 80–200 °C	0.3–2.5 Ma 50–120 °C
RF16-25	Zr 1/2/3 Ap 5/4/1/3	all 25%	4060	1316	27–65 Ma 80–220 °C	0.3 - 3 Ma 50–120 °C
YA53	Zr 1/2/3 Ap 1/2/4/5	all 15%	460	66	14–54 Ma 80–220 °C	0.5–2 Ma 50–120 °C
YA47	Ap 1/3/4/5 Zr 1/2	all 35%	3942	43	4–35 Ma 80–220 °C	0.5–2.5 Ma 50–120 °C
YA52	Zr 1/2 Ap 1/2/3	all 20%	5384	806	1–6 Ma 80–220 °C	0.2–2 Ma 50–120 °C
YB16-01	Zr 1/2/3 Ap 1/4/5/6	all 25%	937	23	2–20 Ma 80–200 °C	0.1–3 Ma 50–120 °C
YB16-06	Z r2/3/4 Ap 2/4/5/1	all 20%	1784	18	3–28 Ma 80–220 °C	0.1–3 Ma 50–120 °C
RF16-04	Zr 1/2/3 Ap 5/2/3/1	25% Ap 20% Zr	976	5	6–32 Ma 80–220 °C	1 - 6 Ma 50–120 °C
RF16-27	Zr 1/2/3 Ap 1/2/3/5	35% Zr 1/2/3, others 25%	6907	46	3–26 Ma 80–220 °C	0.5–4 Ma 50–120 °C
RF16-30	Zr 1-3 Ap 2/5/3/1	30% Zr1/2/3, others 25%	4424	79	0.5–5 Ma 50–120 °C	8.5–27 Ma 80–220 °C
YA54	Zr 1/2/3 Ap 1/2/3/4	all Zr 25% all Ap 30%	4979	294	3–22 Ma 80–220 °C	0.5–3 Ma 50–120 °C
YAKB58 /RF16-09	Z 1/2/3 Ap 2/4/5	all Zr 20% all Ap 30%	113	0	1.2–4 Ma 80–220 °C	0.2–0.6 Ma 50–120 °C
RF16-07	Ap 5/6/7	all 35%	580	0		2–0.1 Ma 50–100 °C
RF16-09	Ap 2/4/ 5	all 30 %	535	0		0.1–2 Ma 50–100 °C

Note: For each sample the model precision was set to "Best", 50,000 simulations were conducted, the diffusion model of Flowers et al. (2009) and Guenthner et al. (2013) were used for apatite and zircon, respectively.

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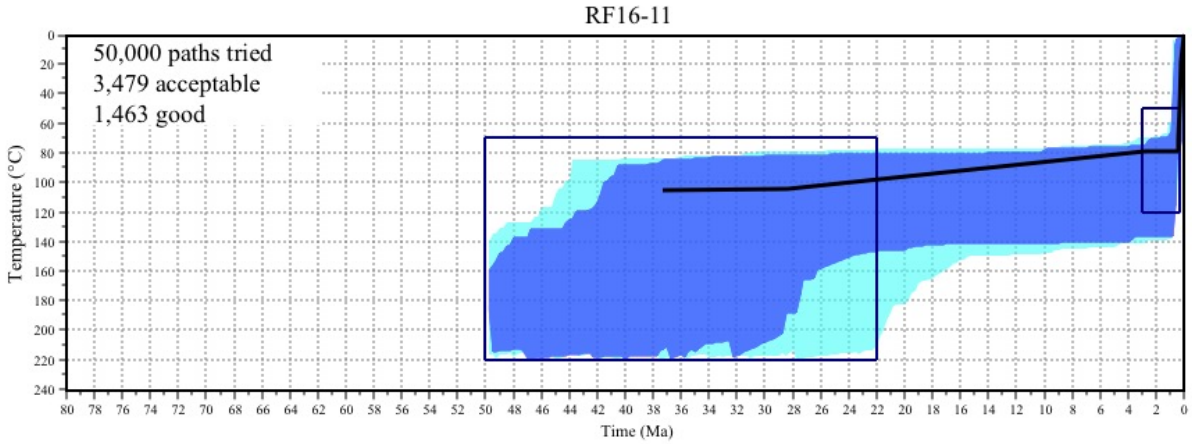

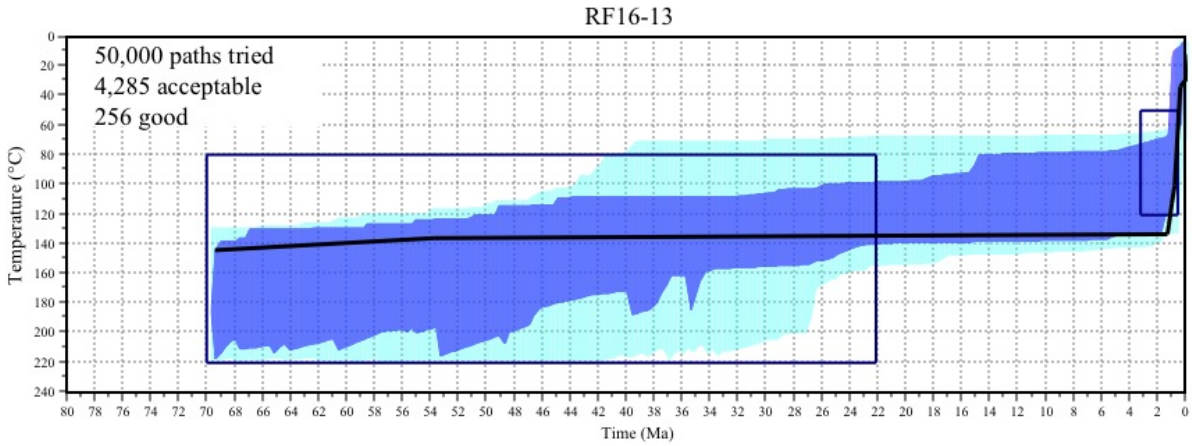

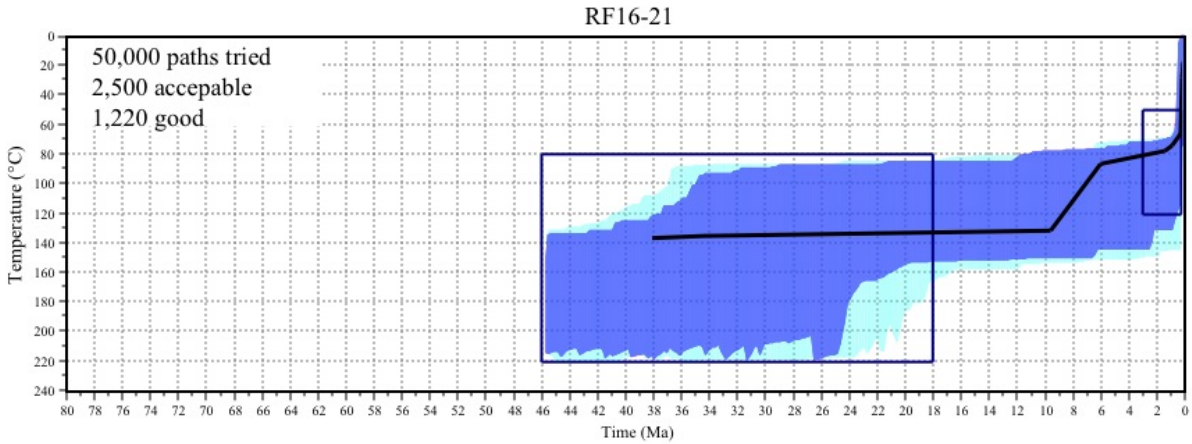

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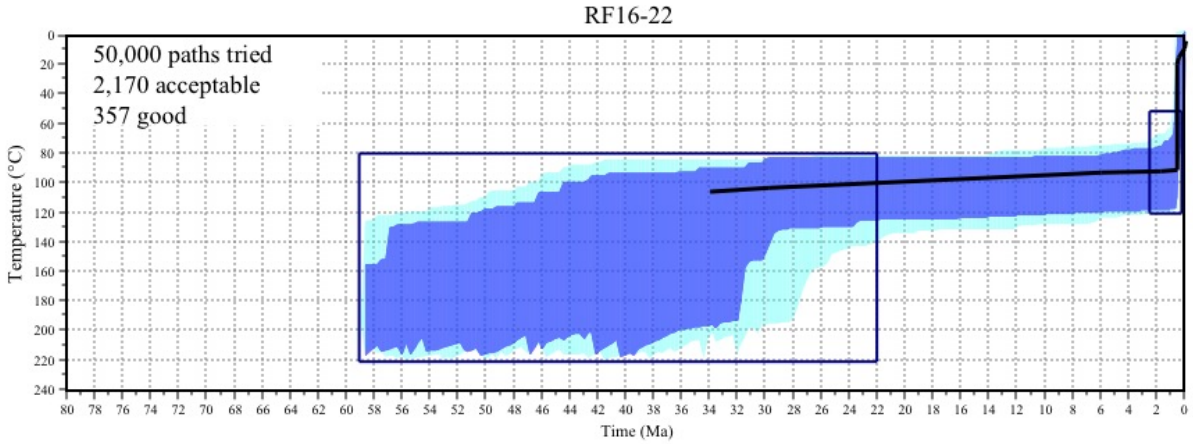

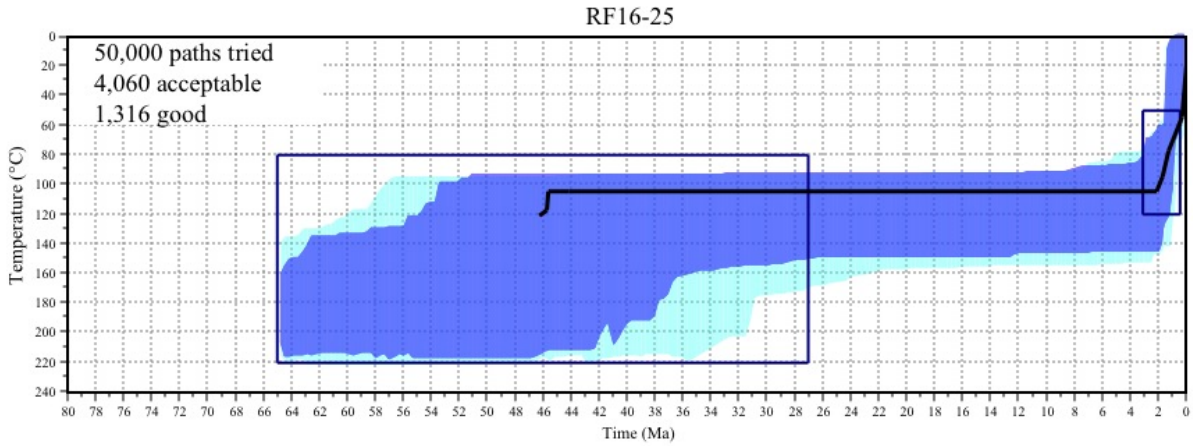

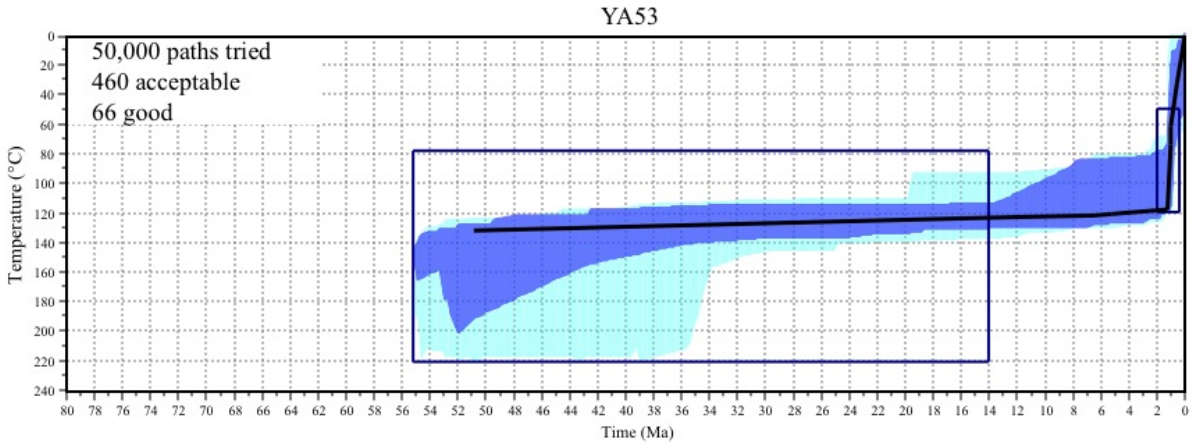

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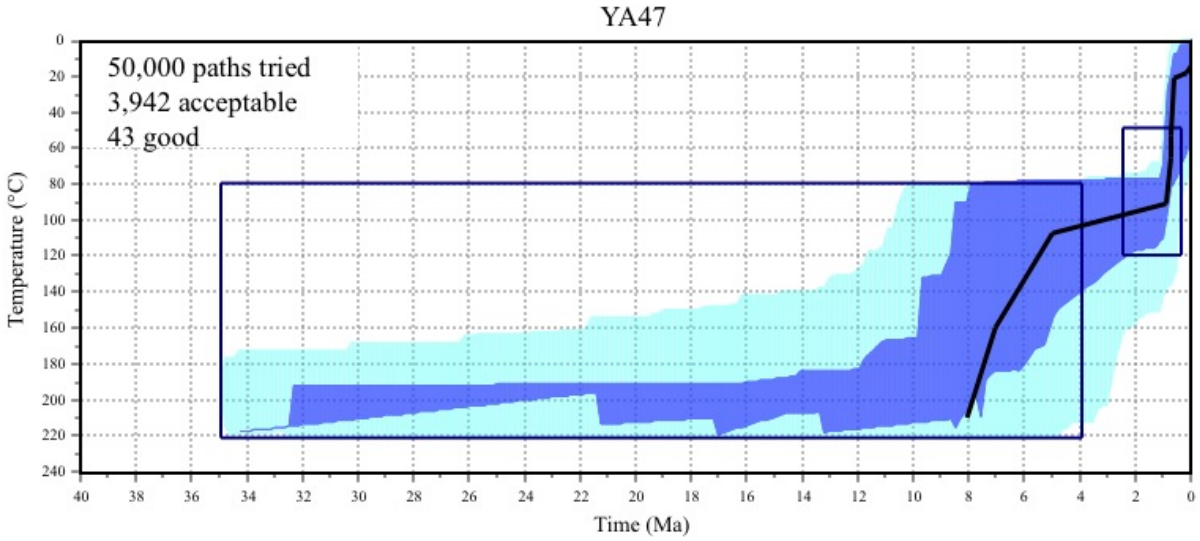

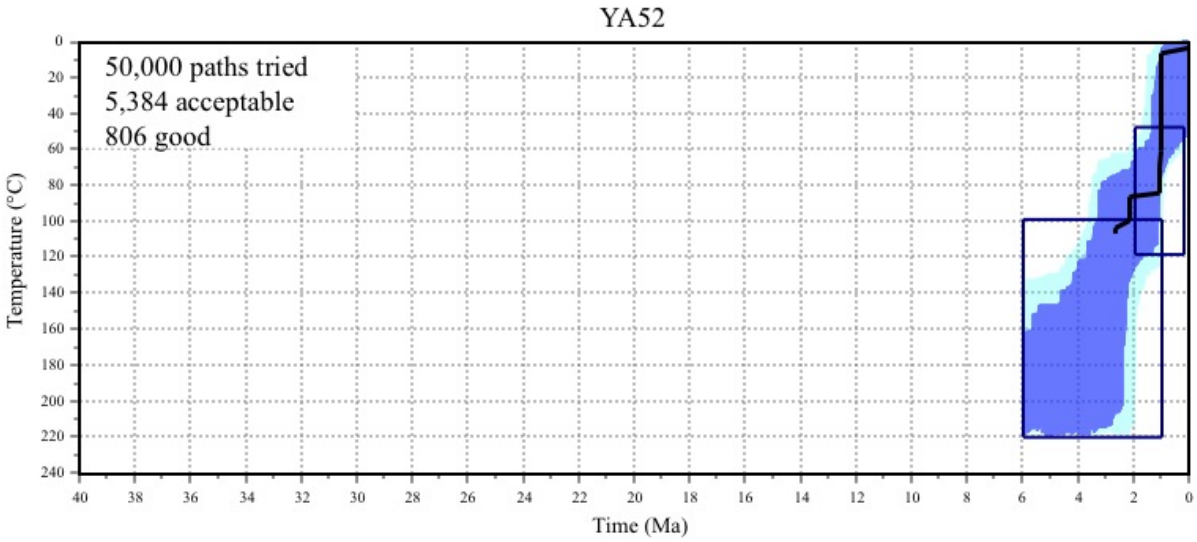

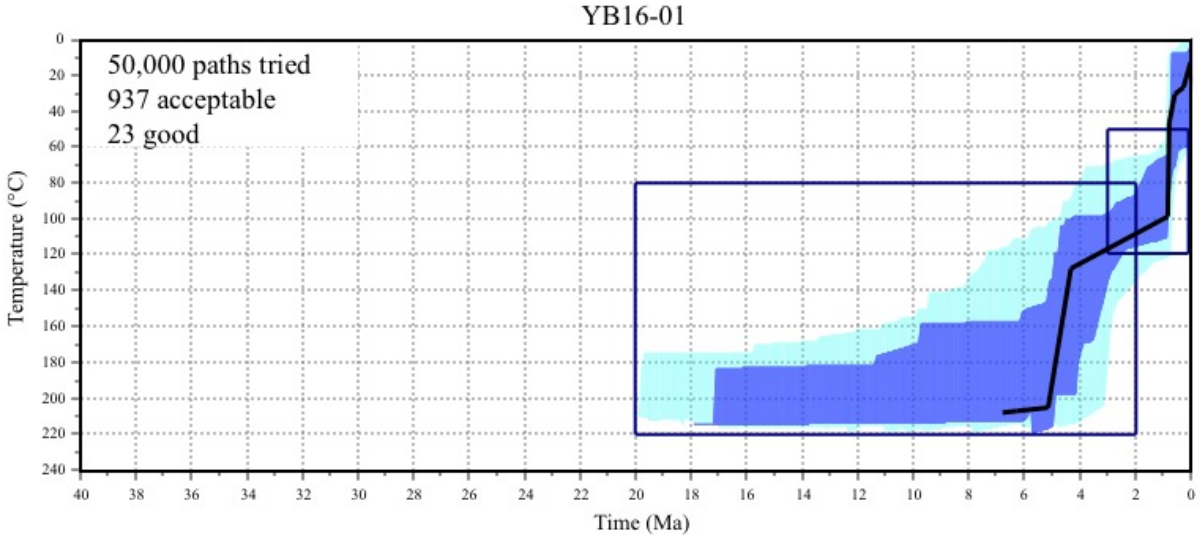

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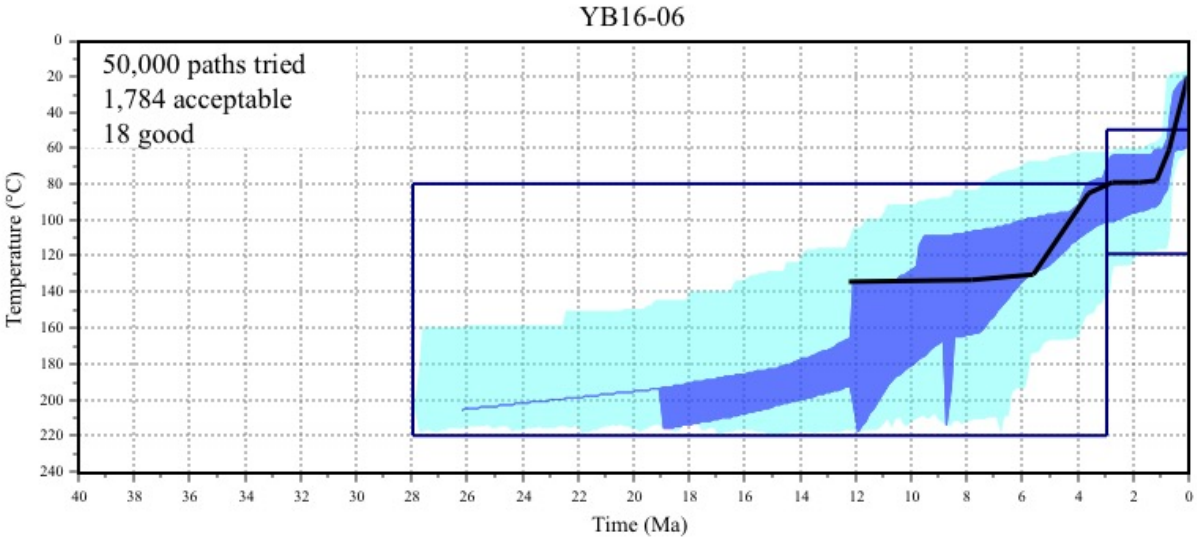

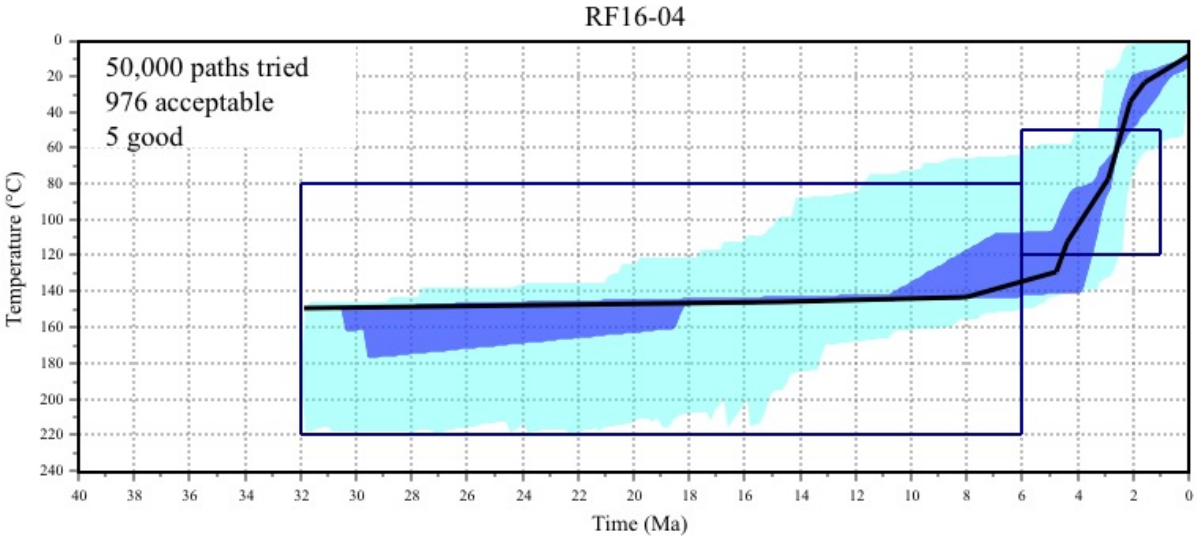

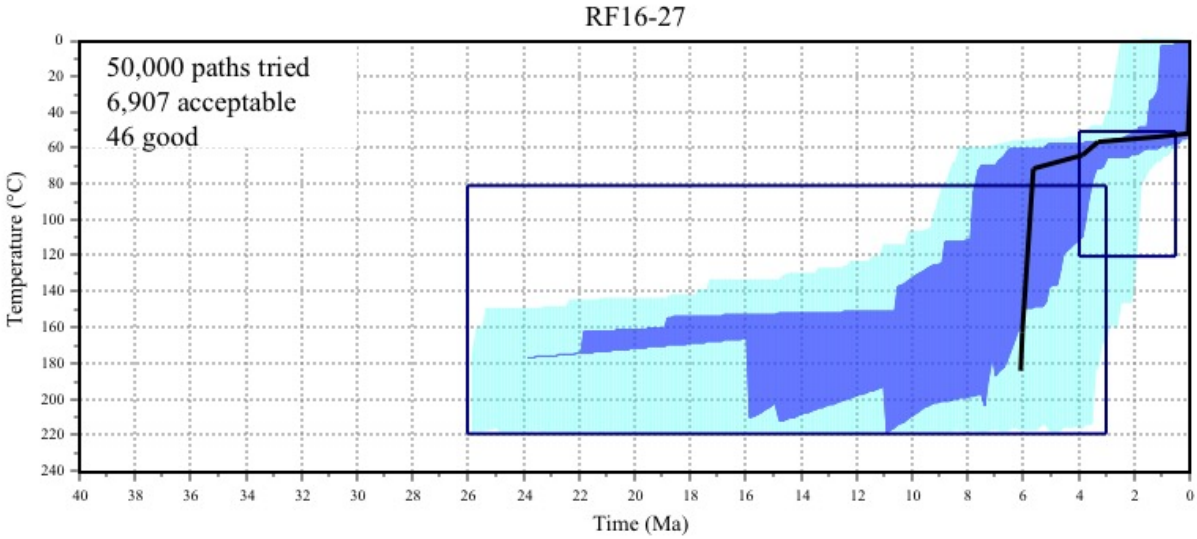

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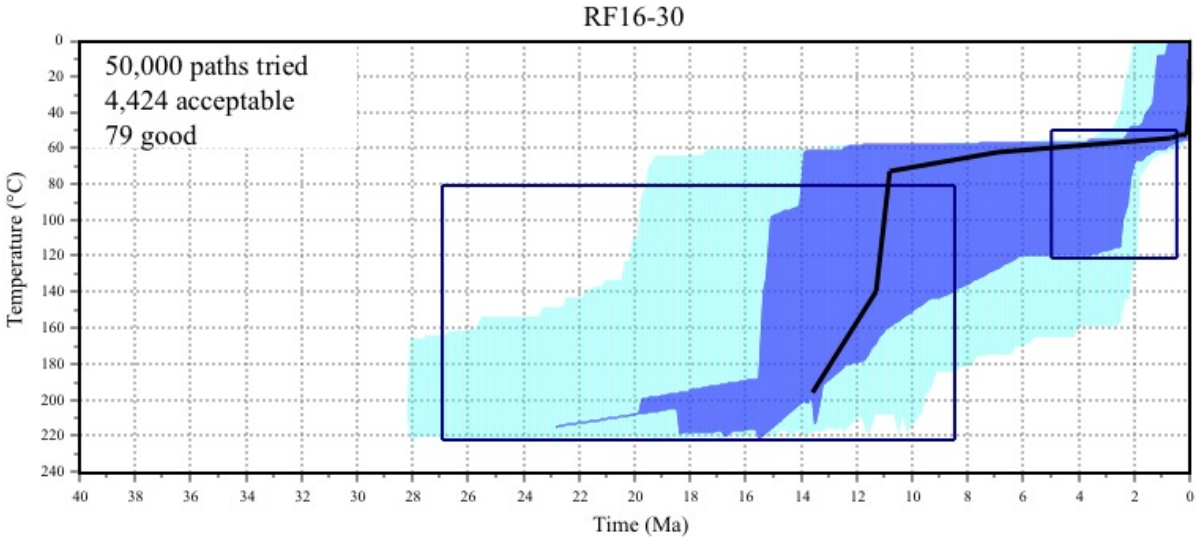

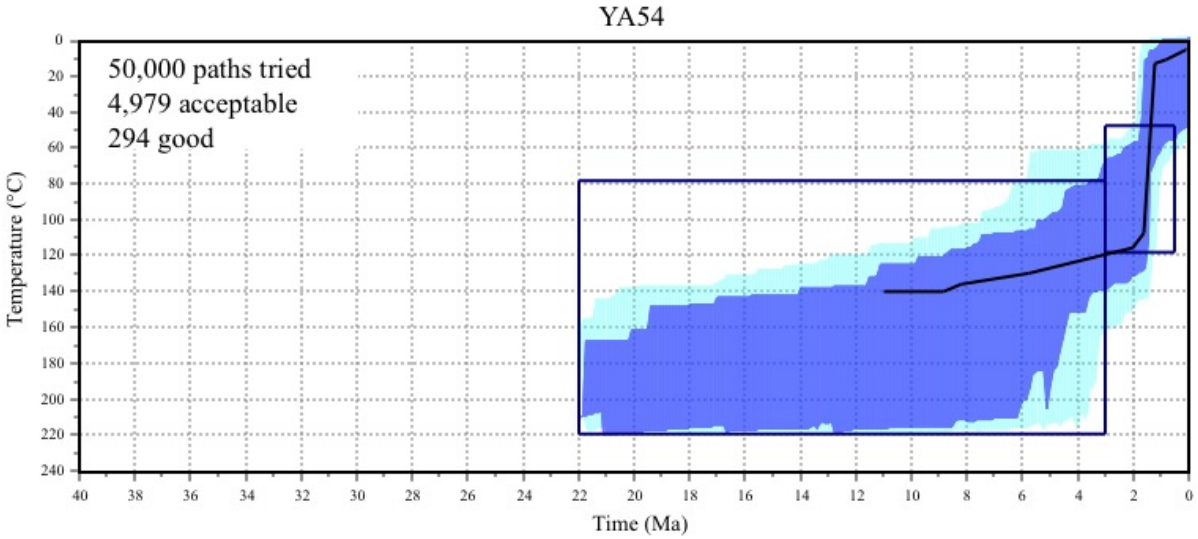

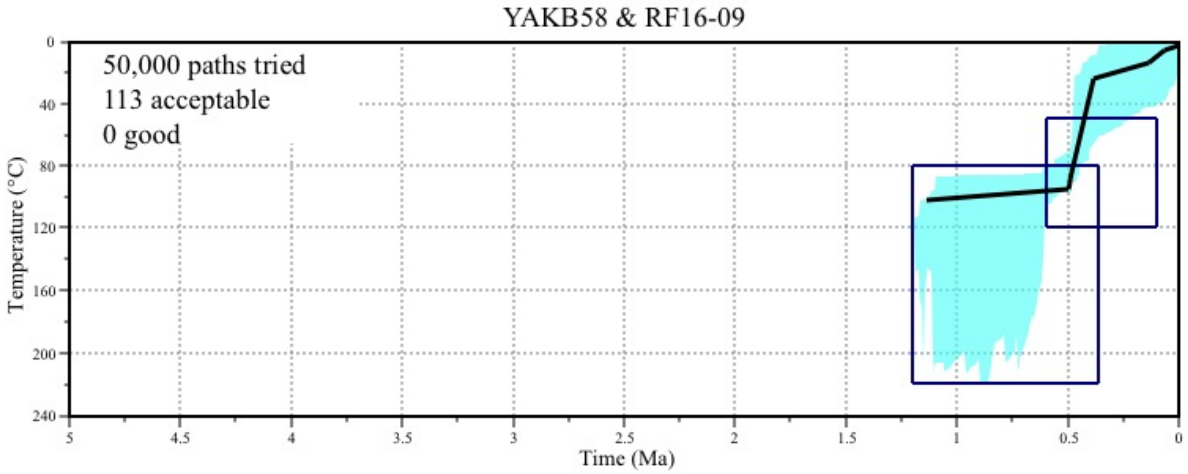

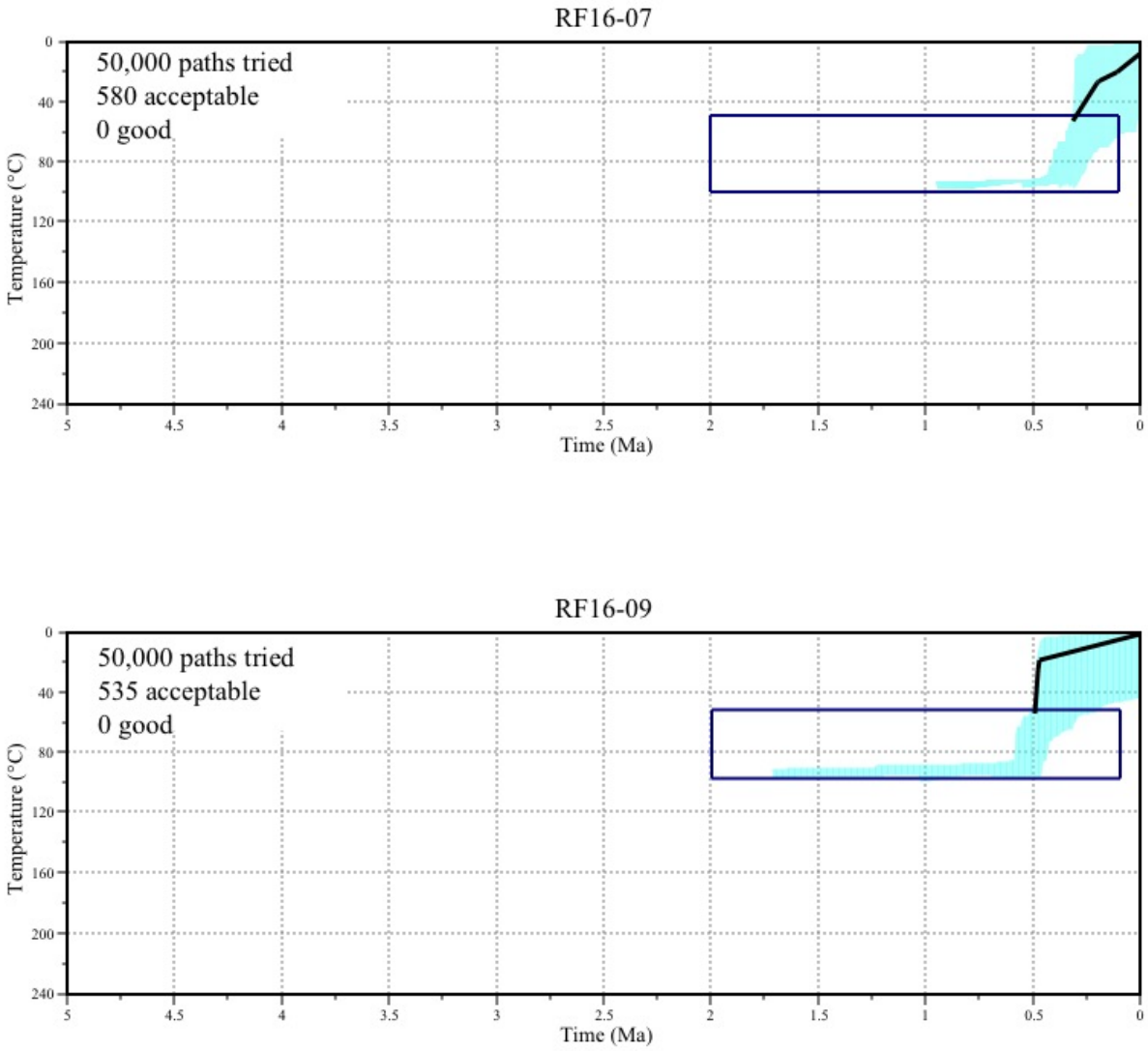

Figure S3. Time-temperature model results for individual samples. Each model has one end constraint set at 0–10°C at 0 Ma. Other individual constraints are depicted by the blue rectangles and listed in Table S1. Shaded light blue region indicates the envelope of acceptable solutions and dark blue the envelope of good fit solutions. The solid black lines are the best fit model for each model run consisting of 50,000 paths tried. Models generated with HeFTy (Ketcham, 2009).

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