Thermochronological Data (c.f. Table 1 and 2 in main text)																		
	Sample																	
	BN-18	BN-1	BN-2	BN-3	BN-17	BN-4	BN-5	BN-10	BN-11	BN-12	BN-7	BN-8	BN-9	BN-6	BN-13	BN-14	BN-15	BN-16
AFT Data	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
# Single Grains	6	26	22	22	20	20	20	20	20	20	22	15	20	15	20	8	8	3
# HCT Lengths	8	49	100	106	98	104	105	249	102	151	134	22	151	19	120	33	55	8
Dpar	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Apatite (U-Th)/He (#)	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	no	yes	no	no
# Single Grains	4	-	2	22	6	3	6	3	6	6	13	-	2	-	-	2	-	-
Additional Geological Information (c.f. SI-Table 2)																		
Constraint #1																Joint Model		
Time (Ma)	72.5±2.5	900±100	900±100	900±100	900±100	900±100	900±100	900±100	900±100	900±100	900±100	900±100	900±100	900±100	900±100	900±100		
Temperature (°C)	20±10	100±100	100±100	100±100	100±100	100±100	100±100	100±100	100±100	100±100	100±100	100±100	100±100	100±100	100±100	100±100		
Constraint #2																		
Time (Ma)	29±1	72.5±2.5	6±1	6±1	6±1	6±1	6±1	6±1	6±1	6±1	455±35	455±35	455±35	455±35	6±1	550±50		
Temperature (°C)	20±10	20±10	20±10	20±10	20±10	20±10	20±10	20±10	20±10	20±10	20±10	20±10	20±10	20±10	20±10	20±10		
Constraint #3																		
Time (Ma)		6±1									120±20	120±20	120±20	120±20		45±1		
Temperature (°C)		20±10									20±10	20±10	20±10	20±10		20±10		
Constraint #4																		
Time (Ma)											59±1	59±1	59±1	59±1				
Temperature (°C)											20±10	20±10	20±10	20±10				
System-and model-specific parameters																		
Modelling software	QTQt (Version 5.6.0) (Gallagher, 2012)																	
FT annealing model																		
FT annealing model	Ketcham et al. (2007) multi-kinetic annealing model																	
C-axis projection	Yes																	
Compositional parameter	Yes (Dpar)																	
Etchant	5.5 M (Donelick et al., 2005)																	
He Kinetic Model																		
Radiation Damage	Gautheron et al. (2009)																	
Fragmentation	Modification on Beucher et al. (2013) adopted by QTQt and described in software documentation.																	
Alpha-ejection	Uncorrected apatite (U-Th)/He ages used as input, alpha-ejection correct for at each time-step (e.g. Meesters and Dunai, 2002).																	
Resampling	Observed He age resampled with MCMC using a normal distribution, centred on the observed value, with a standard deviation equal to the input error.*																	
General prior range																		
Time (Ma)	314±285	125±120	132±87	153±108	109±64	106±100	213±206	380±320	386±380	229±223	385±325	220±160	390±330	130±70	168±162	401±356		
Temperature (°C)									70±70									
# Iterations[§]																		
Burn in									50,000+									
Post-Burn in									200,000+									
Model used for denudation estimates	Expected	Expected	Expected	Expected	Posterior	Expected	Posterior	Expected	Expected	Expected	Expected	Expected	Expected	Expected				

*****Instead of trying to fit the observed age exactly, this process samples the normal distribution, allowing for the uncertainty in the observation. In practice this can be thought of as a way of allowing for uncertainty in the predictive model.

[§]The total number of iterations exceeds the values stated for both the Burn-in and Post-Burn in as several iterations were run to optimise the MCMC parameters before a longer run was performed to fully explore the model space.