



*Supplement of*

## **An efficient approach for inverting rock exhumation from thermochronologic age–elevation relationship**

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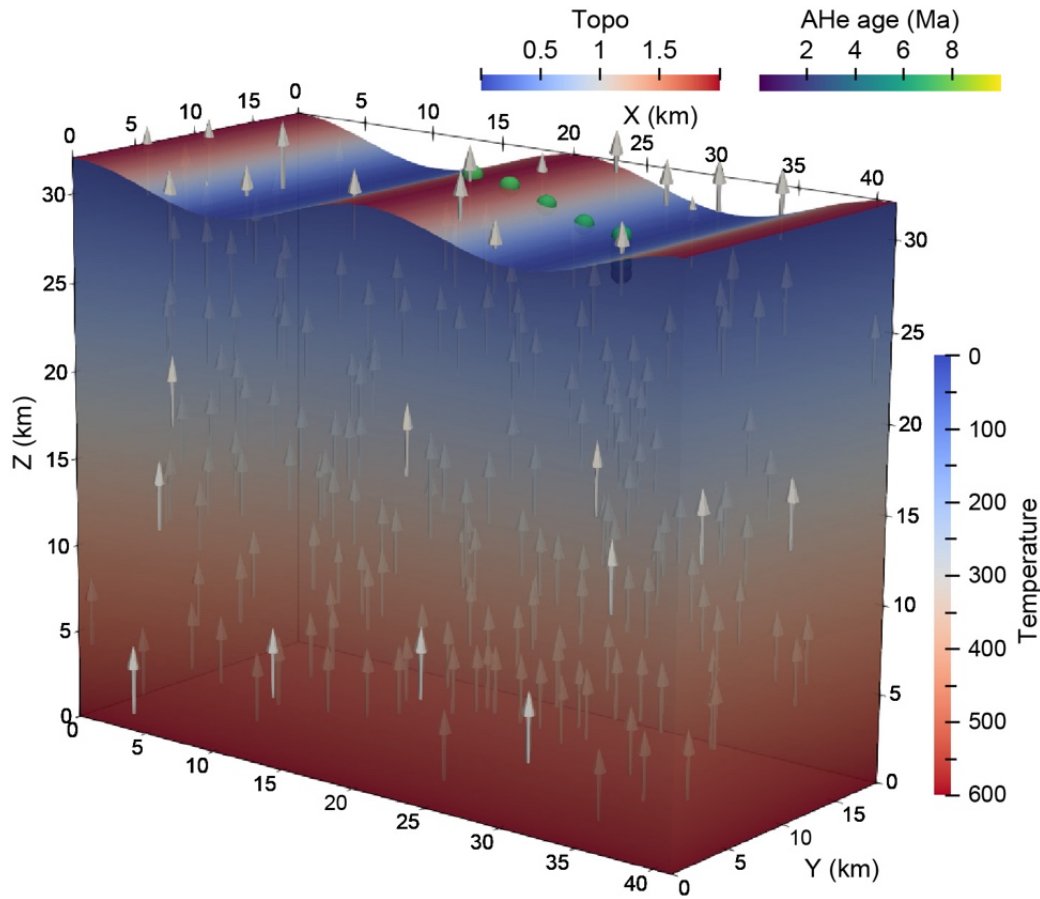


Figure S1. The *Pecube* model for synthesizing surface and borehole AFT and AHe age data. The model calculates evolving thermal field of a 30-km-thick crustal block using a combination of geothermal, rock exhumation (grey arrows), and a steady-state topographic parameters. Spheres mark the samples from which synthetic thermochronologic ages were calculated.

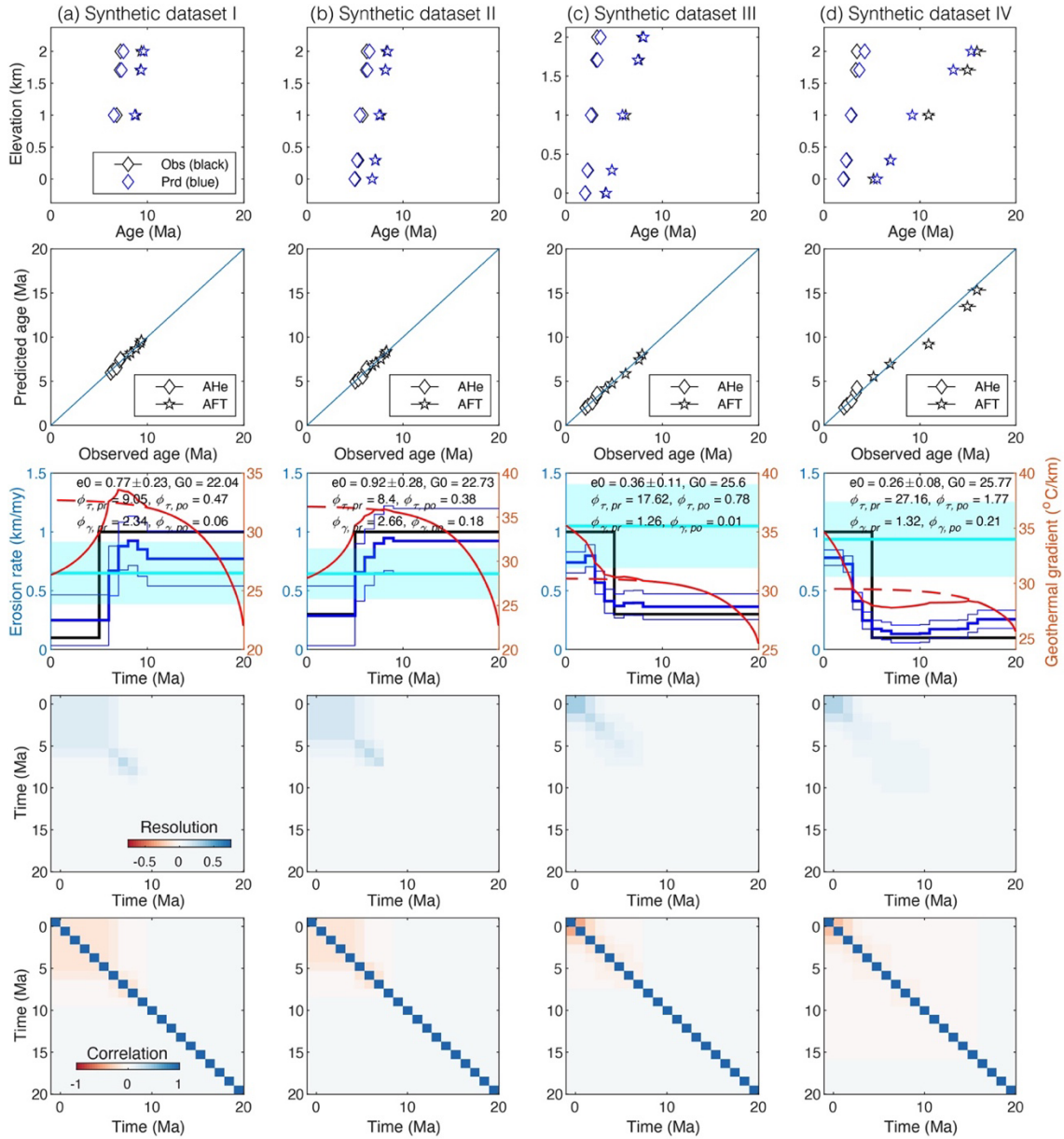


Figure S2. The best-fit model for the synthetic dataset I (a), II (b), III (c) and IV (d) using surface samples. First row: Comparison between the observed (in black) and predicted (in blue) AER. Second row: plots of observed and modeled ages. Third row: Histories of exhumation and geothermal gradients. The black line marks the “true” exhumation history used for simulating the age dataset, whereas the blue thick and thin lines are the mean and one standard deviation of the inverted exhumation. The red dash and solid lines are the history of the geothermal gradients, predicted by the *a priori* and *a posteriori* models, respectively, whereas the cyan line and polygon denotes the modern geothermal gradient. Fourth and bottom row: Plots of the resolution and correlation matrix.

Tables S1. Synthetic age dataset generated by *Pecube* models and used in the Figures 9 and S2.

Elevation	Age (Ma), model-a	Age (Ma), model-b	Age (Ma), model-c	Age (Ma), model-d	Age type
2000.00	9.38	8.27	7.90	15.94	AFT
1707.11	9.28	8.14	7.57	14.94	AFT
1000.00	8.82	7.68	6.18	10.90	AFT
292.89	8.25	7.14	4.76	6.89	AFT
0.00	7.91	6.79	4.09	5.16	AFT
-500.00	7.28	6.15	3.34	3.78	AFT
-1000.00	6.64	5.48	2.69	2.97	AFT
-1500.00	5.98	4.82	2.09	2.30	AFT
-2000.00	5.28	4.12	1.54	1.69	AFT
2000.00	7.22	6.21	3.23	3.43	AHe
1707.11	7.14	6.13	3.13	3.32	AHe
1000.00	6.82	5.78	2.73	2.87	AHe
292.89	6.44	5.34	2.28	2.38	AHe
0.00	6.20	5.03	2.02	2.09	AHe
-500.00	5.57	4.11	1.49	1.56	AHe
-1000.00	4.62	2.93	0.99	1.04	AHe
-1500.00	3.19	1.76	0.53	0.57	AHe
-2000.00	1.59	0.83	0.21	0.23	AHe