

Supplementary Table S3: Thermal history model input table for simulations of the Karatau-Talas, Kazakhstan and Kyrgyzstan, based on framework established by Flowers et al. (2015)

1. Thermochronologic Data

Samples and data used in simulations

Simulation inputs			Data Source	All data
Sample Region	AFT	ZFT		
Greater Karatau				
A34	×		Supplementary Figure S1, S3, and Table S2	yes
Lesser Karatau				
KP15	×		Supplementary Figure S1, S3, and Table S2	yes
KP9	×	×	Supplementary Figure S1, S3, and Table S2	yes
KP4-3	×	×	Supplementary Figure S1, S3, and Table S2	yes
15187	×		Supplementary Figure S1, S3, and Table S2	yes
KP2-6	×	×	Supplementary Figure S1, S3, and Table S2	yes
Talas				
TN-11	×		Supplementary Figure S1, S3, and Table S2	yes
TN-12	×		Supplementary Figure S1, S3, and Table S2	yes

Data treatment, uncertainties, and other relevant constraints

ZFT Data

ZFT dates (Ma): Box constraints on the models (ZFT central age $\pm 1\sigma$) were from Supplementary File 2 , 4, and 5

Error (Ma) applied in modeling: error of 1σ was used from Supplementary file 4

AFT data

Dpar (μm): From Supplementary file 1

Lengths: Length data for all samples is available in Supplementary File 5

Initial mean track length: 16.3 μm

Track length reduction standard: 0.893

2. Additional geological information

Assumption	Explanation and data source
As all the samples were Neoproterozoic basement and there was no evidence for re-heating. Samples we assumed to have come from depth through the APAZ	

3. System- and model-specific parameters

He radiation damage model : Flowers et al. 2009

FT annealing model : Ketcham et al. 2007

FT c-axis projection : Used

Modeling code : QTQt 5.6.0 PC

Statistical fitting criteria : Default QTQt values

MCMC Parameters : Burn-in = 200,000, Post-burn-in = 200,000