

Table S8. Summary of performed simulations.

UNIFORM UPLIFT												
Time step: 130-15 Ma		Time step: 15-0 Ma					Surface volumetric radiogenic heat production (uW/m3)	e-folding factor (km)				
Topography	Uniform uplift rate (mm/yr)	Topography	Uniform uplift rate (mm/yr)	Basal temperature (°C)	Surface temperature (°C)	Thermal conductivity (W/mK)						
present day	0.15	present day	0.2:0.1:1.5	700	10	2.5	1	10				
GEOMETRY AND LOCATION OF THE PARABOLIC UPLIFT FIELD - Background exhumation												
Time step: 130-15 Ma		Time step: 15-0 Ma					Surface volumetric radiogenic heat production (uW/m3)	e-folding factor (km)	width of parabola (km)	location of the peak parabolic uplift (km)		
Topography	Uniform uplift rate (mm/yr)	Topography	Parabolic uplift rate (mm/yr)	Basal temperature (°C)	Surface temperature (°C)	Thermal conductivity (W/mK)						
present day	0.15	present day	0.6	700	10	2.5	1	10	40:20:160	55:5:80		
SENSITIVITY TEST - effect of basal temperature and exhumation rate - background exhumation												
Time step: 130-15 Ma		Time step: 15-0 Ma					Surface volumetric radiogenic heat production (uW/m3)	e-folding factor (km)	width of parabola (km)	location of the peak parabolic uplift (km)		
Topography	Uniform uplift rate (mm/yr)	Topography	Parabolic uplift rate (mm/yr)	Basal temperature (°C)	Surface temperature (°C)	Thermal conductivity (W/mK)						
present day	0.15	present day	0.4:0.1:1	400:100:1000	10	2.5	1	10	100	60		
DURATION OF THE PARABOLIC UPLIFT - background exhumaiton												
Time step: 130-15 Ma		Time step: 15:2:3 Ma-0 Ma					Surface volumetric radiogenic heat production (uW/m3)	e-folding factor (km)	width of parabola (km)	location of the peak parabolic uplift (km)		
Topography	Uniform uplift rate (mm/yr)	Topography	Parabolic uplift rate (mm/yr)	Basal temperature (°C)	Surface temperature (°C)	Thermal conductivity (W/mK)						
present day	0.15	present day	0.3:0.2:1.3	700	10	2.5	1	10	100	60		
UNIFORM UPLIFT DURING LAST 7 Ma - background exhumaiton												
Time step: 130-15 Ma		Time step: 15- 7:2:1 Ma		Time step: 7:2:1 - 0 Ma					Surface volumetric radiogenic heat production (uW/m3)	e-folding factor (km)	width of parabola (km)	location of the peak parabolic uplift (km)
Topography	Uniform uplift rate (mm/yr)	Topography	Parabolic uplift rate (mm/yr)	Topography	Uniform uplift rate (mm/yr)	Basal temperature (°C)	Surface temperature (°C)	Thermal conductivity (W/mK)				

present day	0.15	present day	0.3:0.2:1.3	present day	0.5:0.5:2	700	10	2.5	1	10	100	60
GEOMETRY OF THE PARABOLIC UPLIFT FIELD - Leones valley												
Time step: 130-15 Ma		Time step: 15-0 Ma										
Topography	Uniform uplift rate (mm/yr)	Topography	Parabolic uplift rate (mm/yr)	Basal temperature (°C)	Surface temperature (°C)	Thermal conductivity (W/mK)	Surface volumetric radiogenic heat production (uW/m3)	e-folding factor (km)	width of parabola (km)	location of the peak parabolic uplift (km)		
present day	0.15	present day	1.1	700	10	2.5	1	10	20:05:50	75		
DURATION AND MAGNITUDE OF THE PARABOLIC UPLIFT - Leones valley												
Time step: 130-15:2:3 Ma		Time step: 15:2:3 Ma-9:2:1		Time step: 9:2:1 - 0 Ma								
Topography	Uniform uplift rate (mm/yr)	Topography	Parabolic uplift rate (mm/yr)	Topography	Uniform uplift rate (mm/yr)	Basal temperature (°C)	Surface temperature (°C)	Thermal conductivity (W/mK)	Surface volumetric radiogenic heat production (uW/m3)	e-folding factor (km)	width of parabola (km)	location of the peak parabolic uplift (km)
present day	0.15	present day	1.2:0.2:2.2	present day	0.1	700	10	2.5	1	10	40	75