

Meso-Cenozoic exhumation of the
Beishan, southern Central Asian
Orogenic Belt:
Insights from low-temperature
thermochronology

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MESO-CENOZOIC EXHUMATION OF THE BEISHAN, SOUTHERN CENTRAL ASIAN OROGENIC BELT: INSIGHTS FROM LOW-TEMPERATURE THERMOCHRONOLOGY

RUNNING TITLE

Meso-Cenozoic evolution of the Beishan

ABSTRACT

The Beishan Orogenic Collage (BOC) is located in the south of the Central Asian Orogenic Belt (CAOB) and formed during the final consumption of the Paleasian Ocean in the Late-Permian to Middle-Triassic. This study applies low temperature thermochronology to constrain the Meso-Cenozoic exhumation history of the BOC. Apatite fission track and U-Th-Sm/He data obtained for granitoid samples along a north-south transect through the BOC suggest evidence for three distinct phases of exhumation during (1) the Late Triassic - Early Jurassic (~225 – 180 Ma), (2) Early - mid Cretaceous (~130 – 95 Ma) and (3) Late Cretaceous - Early Palaeogene (~75 – 60 Ma). Samples from northern Beishan reveal a more profound early to middle Cretaceous signal and a weaker Late Triassic - Early Jurassic signal than those in southern Beishan. A potential explanation for this discrepancy is the presence of the Xingxingxia fault in the northern BOC which is interpreted to have undergone repeated reactivation throughout the Mesozoic, exposing deeper exhumed sections of the BOC. The fault may thus have acted as a control on exhumation in the region. This pattern is consistent with results from elsewhere in the CAOB such as in the Tianshan and the Altai, where regional widespread exhumation occurred since the Early Cretaceous while major fault zones record localised exhumation during the Late Cretaceous – Early Palaeogene. Additional late Cretaceous – early Palaeogene cooling ages found only in the south of the BOC suggest that exhumation at that time was more localised and didn't reach the northern margins of the study area.

Our results indicate that the Triassic - early Jurassic and early to middle Cretaceous exhumation events in Central Asia were more widespread than previously anticipated, extending to the northern margin of the Tarim Craton. This observation hence refines the existing tectonic history models for Central Asia.

KEYWORDS

Mesozoic, Cenozoic, exhumation, thermochronology, Beishan, CAOB, intracontinental, AFT.

TABLE OF CONTENTS

Meso-Cenozoic exhumation of the Beishan, southern Central Asian Orogenic Belt: Insights from Low-Temperature thermochronology	i
Running title	i
Abstract.....	i
Keywords.....	i
List of Figures and Tables	2
Introduction	4
Geological Setting	6
Methods	8
Apatite fission track and (U-Th-Sm)/He method	8
Laboratory Processing	9
Apatite fission track analysis.....	9
Apatite (U-Th-Sm)/He analysis.....	11
Modelling	12
Results	14
Sample Location.....	14
Xingxingxia fault zone	15
Liuyuan study area.....	21
Dunhuang study area	25
Discussion.....	28
Late Triassic – Early Jurassic exhumation	28
Cretaceous exhumation.....	31
Comparison with neighbouring regions	32
Comparison with exhumation in the Tianshan and sedimentation in the Junggar and Tarim basins	32
Comparison with the Altai-Sayan	33
Late Cenozoic exhumation in the CAO B	34
Conclusions	36
Acknowledgments	36
References	37
Appendix A: Data Table.....	1
Appendix B: Extended method.....	1

LIST OF FIGURES AND TABLES

- Figure 1: Map of the Central Asian Orogenic Belt with indication of the Beishan study area (blue) and showing the location of other low-T thermochronological studies in the region (black). 5
- Figure 2: Simplified map of the Beishan area showing the distribution of sedimentary and basement rocks. Figures 3, 7 and 11 are marked. Modified after Xiao *et al.* (2010), CTAJ (2007) 13
- Figure 3: Map of the Xingxingxia fault zone and surroundings. AFT central ages and pooled AHe ages are from this study and are shown by star symbols. $^{40}\text{Ar}/^{39}\text{Ar}$ biotite and U-Pb zircon ages are from Wang *et al.* 2010. Modified after Wang *et al.* 2010 15
- Figure 4: Radial plots of calculated AFT cooling ages for each sample location within the Xingxingxia fault zone (A-F). Central values were calculated and where the data shows a high degree of age dispersion (>20%), age-peak discrimination was performed using the automatic mixture model of the RadialPlotter software (Vermeesch 2009). The percentage of the data contained in each peak as well as age dispersion within each peak is shown in brackets with the age of each peak. The Cl/F ratio is indicated by a red/yellow colour scale. The X-axis shows decreasing uncertainty from left to right. The curved Y-axis on the right of the plot shows increasing age in Ma and the Y-axis to the left of the plot displays standard deviations from the central age. Frequency plots depict length distribution of apatite fission tracks in samples from the area. n is the number of measured confined tracks, l_m is the average track length and σ is the standard deviation of the track lengths distribution. 18
- Figure 5: Radial plots of calculated AFT cooling ages combining all samples from the Xingxingxia fault zone. The data show a high degree of dispersion (~27%) and therefore age-peak discrimination was performed using the automatic mixture model of the RadialPlotter software (Vermeesch 2009). Resultant age-peaks are shown in black. AHe ages are shown in pink and clearly mimic the youngest two AFT age-peaks. The Cl/F ratio is indicated by a red/yellow colour scale. As shown, apatites with the highest Cl/F ratios (red symbols) record the youngest AFT age peak of ~100 Ma. 19
- Figure 6: Thermal history models for samples in the vicinity of Xingxingxia generated using HeFTy software (Ketcham 2005). Modelling strategy uses box-constraints for AFT ages (this study) and any other published data to generate paths of varying probability for the thermal history. The purple envelope encompasses 'Good' (>0.5) probability pathways and the green envelope 'Acceptable' (>0.05) pathways. The blue line represents the weighted mean path of the model. The Partial Annealing Zone (PAZ) is highlighted in red. $^{40}\text{Ar}/^{39}\text{Ar}$ ages (Bt-245±5 Ma, Kfs-210±20 Ma) for BH01 from Wang *et al.* 2010. 20
- Figure 7: Map of Liuyuan town and surroundings. AFT central ages and pooled AHe ages are from this study and are shown by star symbols. U-Pb zircon ages from Li *et al.* 2012. Modified after Xiao *et al.* 2010, Li *et al.* 2012, The Second Geological Team of the Gansu Bureau of Geology and Mineral Deposits 1967. 21
- Figure 8: Radial plots of calculated AFT cooling ages for each sample location in the vicinity of Liuyuan (A-F). Central values were calculated and where the data shows a high degree of age dispersion (>20%) age-peak discrimination was performed using the automatic mixture model of the RadialPlotter software (Vermeesch 2009). The percentage of the data contained in each peak as well as age dispersion within each peak is shown in brackets with the age of each peak. Frequency plots depict length distribution of apatite fission tracks in samples from the area. n is the number of measured confined tracks, l_m is the average track length and σ is the standard deviation of the track lengths distribution. 23
- Figure 9: Radial plot of calculated AFT cooling ages combining all samples from the vicinity of Liuyuan. The data shows a high degree of dispersion (~25%) and therefore age-peak discrimination was performed using the automatic mixture model of the RadialPlotter software (Vermeesch 2009). Resultant age-peaks are shown in black. AHe ages are shown in pink and the older age mimics the younger of the two AFT age-peaks. Cl/F ratio is indicated by red/yellow colour scale. 24
- Figure 10: Thermal history models for samples in the vicinity of Liuyuan (BH04, BH08, BH09) and Dunhuang (BH07) generated using HeFTy software (Ketcham 2005). Modelling strategy uses box-constraints for AFT and AHe ages to generate paths of varying probability for the thermal history of the rock mass. The purple envelope encompasses 'Good' (>0.5) probability pathways and the green envelope 'Acceptable' (>0.05) pathways. The blue line represents the weighted mean path of the model. The Partial Annealing Zone (PAZ) is highlighted in red. 25
- Figure 11: Map of sample area to the east of Dunhuang. AFT central ages and pooled AHe ages are from this study and are shown by star symbols. Modified after The Second Geological Team of the Gansu Bureau of Geology and Mineral Deposits 1967. 26

Figure 12: Radial plot of calculated AFT cooling ages combining all samples from the vicinity of Dunhuang (A) and individual plots for each sampling location (B-D). Central values were calculated and where the data shows a high degree of age dispersion (>20%) age-peak discrimination was performed using the automatic mixture model of the RadialPlotter software (Vermeesch 2009). The percentage of the data contained in each peak as well as age dispersion within each peak is shown in brackets with the age of each peak. Frequency plot depicts length distribution of apatite fission tracks in sample from the area. n is the number of measured confined tracks, l_m is the average track length and σ is the standard deviation of the track lengths distribution. AHe ages are shown in pink on the Dunhuang pooled plot and the older age mimics the younger of the two AFT age-peaks. 27

Figure 13: Comparison of the results obtained in this study (for the Beishan) with the thermochronological record of the Kyrgyz Tianshan and Siberian Altai-Sayan (modified after Glorie and De Grave., in preparation). The Beishan results are shown by blue boxes (solid = age peaks, dashed = spread in individual age data). The timing of the main tectonic events that affected the Tianshan and the Altai-Sayan are indicated as well. The upper panels for both figures show topography estimates (grey) based on the AFT data and simplified sequence stratigraphy (red and green) with h. = hiatus; c. = (alluvial) conglomerate: for the Tian Shan, the sequence stratigraphy constraints are based on data from the Tarim (Dumitru et al., 2001), Chu (Bullen et al., 2001) and Issyk-kul (Cobbold et al., 1994) basins; for the Altai-Sayan based on data from the Kuznestk (Davies et al., 2010), West-Siberian (Vyssotski et al., 2006) and Chyua basins (Buslov et al., 1999). 30

Table 1: Analytical details for the LA-ICP-MS as used for AFT dating 11

Table 2: Sample location and lithology details. 14

Table 3: AFT dating results. ρ_s is the density of spontaneous tracks (in 10^5 tracks/cm²). N_s is the number of counted spontaneous tracks. n is the number of counted grains. ²³⁸U is in pmm. CaO is in wt%. The AFT age (t) is given in Ma and was calculated using the Hasebe et al., (2004) equation. 16

Table 4: AHe dating results. Concentrations for U, Th and Sm are given in ppm. ⁴He concentration is in nmol/μg. Ft is the α -ejection correction factor. Number of aliquots for each age given in brackets. Single aliquot ages in italics. AFT central ages listed for comparison. 17