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| **Table S1. Summary of the main morphotectonic events across the NE Tibetan Plateau.** |
| Map ID | Studied region (Locality) | Age (Ma) | Activity/Event  | Method  | Data source |
| **65-54 Ma** |
| **Altyn Tagh Shan** |
| 1 | Nanyishan | 65-54 | fast exhumation and tectonic uplift  | ZFT and seismic profiles  | Wang Y et al., 2015 |
| 2 | Lapeiquan-Huatugou | 53.5-16.9 | N-S compression | seismic reflection data, structural and stratigraphic analyses | Wu L et al., 2019 |
| 3 | Huatugou | 56-39  | strike-slip faulting  | detrital ZPb | Cheng F et al., 2016 |
| **Hei Shan-kuantan Shan-Bei Shan** |
| 4 | Hei Shan | 53-40 | fast exhumation | *In situ* AFT | An et al., 2020 |
| **Qaidam basin** |
| 5 | Hero hill | 49-22 | surface uplift to 1462+148/-227 m | δ18Oc of mammalian fossils and carbonates | Li L et al., 2017 |
| 6 | Yingchaogou region | 54-47 | fast exhumation | *In situ* AFT | Jian X et al., 2018 |
| 7 | regional large scale | 65-50 | initiation of thrust system, crust contraction | structural geology | Yin A et al., 2008 |
| 8 | west of the basin | 53.5-43.8 | tectonic activity | seismic profiles | Cheng F et al., 2019 |
| 9 | Qaidam Beishan | 65-50 | fast exhumation  | *In situ* AFT, K-feldspar 40Ar/ 39Ar | Zhuang et al., 2018 |
| 10 | Dahonggou | 52-46 | tectonic uplift | magnetostratigraphy | Ji J et al., 2015 |
| 11 | Dahonggou | ~54 | provenance changed | sandstone petrology, detrital ZPb, heavy mineral of sediments | Bush et al., 2016 |
|  | Lulehe | 65-53  | fast exhumation | Detrital AFT | **this study** |
| **East Kunlun Shan** |
| 12 | Xidatan-Golmud  | 59-42 | tectonic activity | detrital ZFT  | Wang A et al., 2010 |
| 13 | Dongdatan-Xidatan-Golmud | 52.9  | fast exhumation | *In situ* AFT | Chen et al., 2011 |
| B1 | Wenquanhu-Deshuiwai | 65-47 | Fast exhumation related to crustal shorting | *In situ* AFT, ZHe, AHe, illite 40Ar/ 39Ar  | Staisch et al., 2020 |
| 14 | Xiangride | 56-45 | fast exhumation | AFT | Wang G et al., 2007 |
| 15 | Buqingshan-Xiangride | 50 | fast exhumation | *In situ* AFT | Tian et al, 2020 |
| **Center Qilian Shan (including Laji Shan-Jishi Shan)** |
| 16 | Shulenan Shan | ~55 | thrust faults | *In situ* AFT | Li B et al., 2020 |
| 17 | Daban Shan | 50-30 | fast exhumation | *In situ* AFT | Zhang J et al., 2015 |
| B2 | South Qilian city | ~65-60 | Reheating event | *In situ* AFT | Wu C et al., 2021 |
| B3 | Xining basin | 69-49 | tectonic transition | Magnetostratigraphy and detrital ZPb | He et al., 2021 |
| 18 | Xining basin | 55-52.5 | basin formation | magnetostratigraphy | Fang et al., 2019 |
| 19 | Xining-Lanzhou region | Paleocene | tectonic clockwise rotation  | paleomagnetism of sediments | Dupont-Nivet et al., 2004 |
| 20 | Lanzhou basin | 70-58 | fast exhumation | detrital AFT | Wang X et al., 2017 |
| **West Qinling Shan** |
| 21 | Guide basin | 70-53 | fast exhumation | *In situ* and detrital AFT | Wang X et al., 2016 |
| B4 | Linxia basin | 51  | basin formation | Magnetostratigraphy and detrital ZPb | Feng et al., 2022 |
| 22 | Ganjia-Dalijia Shan | 50-45 | fast exhumation | *In situ* AHe | Clark et al., 2010 |
| 23 | Taizi Shan | 50 ± 8 | reverse faulting | illite 40Ar/ 39Ar | Duvall et al., 2011 |
| 24 | Wudu basin | 70-58 | fast exhumation | detrital AFT | He et al., 2017a |
| 25 | Tianshui basin | 69-59 | fast exhumation | *In situ* and detrital AFT | Wang X et al., 2011 |
| 26 | Tianshui-Wudu | 60-50 | fast exhumation | *In situ* AFT | Enkelmann et al., 2006 |
| 27 | east of Tianshui-Wudu | 60-50 | fast exhumation | *In situ* AFT | Chen et al., 2015 |
| **Jiuquan basin** |
| B5 | Sunan | 61-43.1 | fast exhumation | detrital ZPb and AFT | Chen et al., 2022 |
|  | Jiuquan basin | 65-53 | fast exhumation | detrital AFT | **this study** |
| **43-39 Ma** |
| **Altyn Tagh Shan** |
| 28 | Tula | 49 | strike-slip faulting | detrital ZPb | Cheng F et al., 2015 |
| 29 | Mangnai | 49 | faulting | Magnetostratigraphy, heavy minerals | Yin A et al., 2002 |
| Lenghu section |
| Jianglisai |
| Xishuigou |
| 30 | Jinghong Shan | 47-44 | fast exhumation | *In situ* AFT | Sobel et al., 2001 |
| 31 | Altyn Tagh north margin | 40±10  | fast exhumation | *In situ* AFT and ZFT | Jolivet et al., 2001 |
| B16 | Jianglisai-Luojianglisai  | 40-35 | fast exhumation | *In situ* AFT and ZFT | Gao et al., 2022 |
| 32 | Dangjin pass | 40-25 | faulting reactive | *In situ* 40Ar/39Ar | Liu et al., 2007 |
| **Qaidam basin** |
| 11 | Dahonggou | ~46 | provenance changed | sandstone petrology, detrital ZPb, heavy mineral of sediments | Bush et al., 2016 |
| 33 | Kunbei -Yueya Shan | 43.8-22 | tectonic deformation | 2D seismic cross section | Wang Y et al., 2012 |
| 34 | large region of basin | 42.8-40.5 | crustal shorting and uplift | balanced cross-section restoration | Zhou et al., 2006 |
| 35 | east edge | 40 | fast exhumation | *In situ* AFT and ZFT | Jolivet et al., 2001 |
|  | Lulehe |  44-40 | fast exhumation | Detrital AFT | **this study** |
| **East Kunlun Shan** |
| 36 | Qimen Tagh | 40-30 | fast exhumation | *In situ* AFT, ZPb | Liu D et al., 2017 |
| 37 | Dazaohuo-Qimen Tagh | 40-35 | fast exhumation | *In situ* K-feldspar 40Ar/39Ar, AHe  | Wang F et al., 2017 |
| 38 | Nuomuhong | 40 | surface uplift and fast exhumation | *In situ* biotite and K-feldspars 40Ar/39Ar, AHe  | Wang F et al., 2016 |
| **Northern Qilian Shan**  |
| 39 | Subei basin | 43-42 | basin formation | sedimentology | Song, 2006 |
| 40 | Jiuquan basin | 40.2 | tectonic uplift  | magnetostratigraphy | Dai et al., 2005 |
| 41 | Muli basin | 40.2-35.3 | surface uplift to 2180-3502 m | δ18Oc and δ13Cc of lacustrine sediments | Qi et al., 2015 |
| **South Qilian Shan**  |
| 42 | Muli basin southwestern rim | 40 | fast exhumation | *In situ* AFT | Qi et al., 2016 |
| **Center Qilian Shan (Including Laji Shan-Jishi Shan)** |
| 20 | Lanzhou basin | 50-41 | fast exhumation | detrital AFT | Wang X et al., 2017 |
| B2 | Qilian city | ~40-30 | Reheating event | *In situ* AFT | Wu C et al., 2021 |
| **Haiyuan-Liupan Shan** |
| 43 | Sikouzi basin | 47.9 | basin formation | magnetostratigraphy | Han et al., 2008 |
|  |
| **West Qinling Shan** |
| 21 | Guide basin | 49-42 | fast exhumation | *In situ* and detrital AFT | Wang X et al., 2016 |
| 25 | Tianshui basin | 49-39 | fast exhumation | *In situ* and detrital AFT | Wang X et al., 2011 |
| ***Jiuquan basin*** |
|  | Jiuquan basin | 44-40 | fast exhumation | detrital AFT | **this study** |
| **34-29 Ma** |
| **Altyn Tagh Shan** |
| 43 | Yousha Shan | 31-15 | fast exhumation | *In situ* AFT | Wang E et al., 2006 |
| B15 | Subei | 36-31 | rapid exhumation | *In situ* AHe  | Ye et al., 2022 |
| **Qaidam basin** |
| 9 | Xitie Shan | 36-25 | fast exhumation  | *In situ* AHe | Zhuang et al., 2018 |
| 11 | Dahonggou | ~32 | provenance changed | sandstone petrology, detrital ZPb, heavy mineral of sediments | Bush et al., 2016 |
| B6 | Hongliugou | 33-10 | clockwise rotation | paleomagnetism | Li et al., 2020 |
| 44 | large region of basin | 36.6 | basin extention | volume balance and accumulation rates of sediments | Métivier et al., 1998 |
| 45 | Dahonggou | 30.8 | surface uplift to 3300 ±1400 m | fossil leaves | Song et al., 2020 |
|  | Lulehe |  34-28  | fast exhumation | Detrital AFT | **this study** |
| **East Kunlun Shan** |
| 46 | Kumukol basin | 35.5 | basin withdrew northward | seismic profiles and stratigraphy analysis of sediments | Mao et al., 2014 |
| 47 | Xidatan | 30-20 | fast exhumation | *In situ* ZHe, AHe, ZPb | Dai J et al., 2013 |
| 48 | Nachitai | 35-30 | crustal shorting | *In situ* biotite 40Ar/39Ar | Liu et al., 2005 |
| 49 | Kunlun pass-Nachitai | 37-24 | tectonic unroofing | *In situ* biotite, K-feldspar 40Ar/39Ar | Mock et al., 1999 |
| 50 | Kunlun fault West | 30-25 | faulting | *In situ* AHe, ZHe | Duvall et al., 2013 |
| 51 | Xianride-Nomuhung | ~35 | fast exhumation | *In situ* AHe | Clark et al., 2010 |
| **South Qilian Shan**  |
| 52 | Qaidam Shan | 40-30 | fast exhumation | *In situ* AFT | Cheng X et al., 2016 |
| 53 | Dachaidan | ~30 | denudation | *In situ* biotite and K-feldspar 40Ar/39Ar, AFT | Wang F et al., 2004 |
| B7 | Hongshan | ~30 | surface uplift | magnetostratigraphy, detrital ZPb | Wang W. et al., 2022 |
| **Northern Qilian Shan (including Longshou Shan)** |  |
| 54 | Tuolai Shan | 30-25 | faulting induced reheating | *In situ* AFT | Li B et al., 2020 |
| B2 | Longshou Shan | ~30 | fast exhumation | *In situ* AFT | Wu C et al., 2021 |
| **Center Qilian Shan (Including Laji Shan-Jishi Shan)** |
| B2 | South Menyuan | ~30 | fast exhumation | *In situ* AFT | Wu C et al., 2021 |
| 55 | Xining basin | ~36 | surface uplift to 2000-3000 m  | fossil pollen | Dupont-Nivet et al., 2008a |
| 56 | Lanzhou basin | 30-28 | surface uplift to 2000-3000 m | fossil pollen | Miao et al., 2013 |
| **West Qinling Shan** |
| 21 | Guide basin | 36-32 | fast exhumation | *In situ* and detrital AFT | Wang X et al., 2016 |
| 24 | Wudu basin | 37-36 | fast exhumation | detrital AFT | He et al., 2017 |
| 25 | Tianshui basin | 34-27 | fast exhumation | *In situ* and detrital AFT | Wang X et al., 2011 |
| 104 | Xunhua Basin | ~30 | provenance changed | magnetostratigraphy, detrital ZPb | Lease et al., 2012 |
| 57 | Linxia Basin | 29 | tectonic activity | magnetostratigraphy | Fang et al., 2016 |
| B3 | Xining basin | 33-30 | tectonic transition | Magnetostratigraphy and detrital ZPb | He et al., 2021 |
| **Jiuquan basin** |
| B5 | Sunan | 38.2-24.6 | fast exhumation | detrital ZPb and AFT | Chen et al., 2022 |
|  | Jiuquan basin | 34-28 | fast exhumation | detrital AFT | **this study** |
| **24-21 Ma** |
| **Altyn Tagh Shan** |
| 30 | Mangnai-ruoqiang | 25-19 | fast exhumation | *In situ* AFT | Sobel et al., 2001 |
| B8 | Heishiqiu | 27-17 | clockwise rotation | paleomagnetism | Li et al., 2021a |
| 58 | Janggalsay | ~22 | counterclockwise tectonic rotation | paleomagnetism of sediments | Lu et al., 2014 |
| 59 | Xorkol basin | 24-16 | tectonic extrusion | detrital ZPb | Yue et al., 2003 |
| 60 | Eboliang | 22 | enhanced tectonic activity | detrital ZPb | Cheng F et al., 2016 |
| 61 | Subei-Dangjin Pass | 20 | rapid exhumation | *In situ* AHe and ZHe | Shi et al., 2018 |
| **Hei Shan-kuantan Shan-Bei Shan** |
| 62 | Yumen basin | ~24-16 | tectonic uplift | detrital ZPb | Wang W et al., 2016b |
| **Qaidam basin** |
| 5 | Hero hill | 22-8.1 | surface uplift to 1469+153/-234 m | δ18Oc of mammalian fossils and carbonates | Li L et al., 2017 |
| 9 | Qaidam Beishan | 20.6-12.5 | fast exhumation  | *In situ* AFT, K-feldsapr 40Ar/39Ar | Zhuang et al., 2018 |
| 63 | Arlar | 22 | strike-slip faulting  | 3D seismic cross section | Cheng X et al., 2015 |
| 64 | Dahonggou | 20 | tectonic activity | magnetostratigraphy and detrital ZPb | Nie et al., 2019 |
| 18.5 | source switch |
| 65 | Dahonggou | ~25.5 | deformation  | magnetostratigraphy, detrital ZPb | Wang W. et al., 2017 |
|  | Lulehe | 24-21 | fast exhumation | Detrital AFT | **this study** |
| **East Kunlun Shan** |
| 50 | Kunlun fault Center | 20-15 | faulting | *In situ* AHe, ZHe | Duvall et al., 2013 |
| 66 | western domain  | 25-20 | N-S crust shorting and thicken | restoration balanced cross section | Wu C et al., 2020 |
| B1 | Xidatan | 23-20 | Fast exhumation related to strike-slip faulting | *In situ* AFT, ZHe, AHe | Staisch et al., 2020 |
| 67 | Qimen Tagh  | Neogene | left-lateral strike-slip faulting | seismic profiles and growth strata of basin succession | Cheng F et al., 2014 |
| B9 | Nuomuhong | ~25 | Faulting induced fast exhumation | *In situ* AHe | Li et al., 2020 |
| 68 | Central Kumkol basin | 22-15 | strike-slip faulting | paleomagnetism of sediments | Lu et al., 2016 |
| 69 | Qimen Tagh | 20 | fast exhumation | *In situ* AFT | Wu C et al., 2019 |
| Huashixia-Dulan  |
| 70 | Dongdatan | 26±3 | thrust faulting | *In situ* chlorite 40Ar/39Ar and AFT | Wu Z et al., 2009 |
| 71 | Dulan-Ela Shan | 22-21 | tectonic uplift | *In situ* AFT, magnetostratigraphy  | Lu et al., 2012 |
| 72 | Buqingshan-Xiangride | 20-10 | fast exhumation | *In situ* AFT  | Yuan et al., 2006 |
| **Northern Qilian Shan**  |
| 41 | Muli basin | 22.7-18.2 | surface uplift to ~2848 m | δ18Oc and δ13Cc of lacustrine sediments | Qi et al., 2015 |
| 73 | Jiuxi basin north rim | 20-10 | fast exhumation | *In situ* AFT and vitrinite-reflectance | George et al., 2001 |
| 74 | WS of Wuwei | 24 | fast exhumation | *In situ* AFT | Pan et al., 2013 |
| **Center Qilian Shan (Including Laji Shan-Jishi Shan)** |
| 75 | Laji Shan | ~22 | fast exhumation  | *In situ* AHe, AFT | Lease et al., 2011 |
| B3 | Xining basin | 23-19 | tectonic transition | Magnetostratigraphy and detrital ZPb | He et al., 2021 |
| **West Qinling Shan** |
| 24 | Wudu basin | 23-19 | fast exhumation | detrital AFT | He et al., 2017 |
| 76 | Gonghe basin | 20 | basin formation | magnetostratigraphy and cosmogenic burial age | Craddock et al., 2011 |
| *B10* | *Lixian* | *23-22* | *volcano* | *Perovskite U-Pb* | *Liu et al., 2018* |
| **Haiyuan-Liupan Shan** |
| 77 | Nanhua Shan | 20-10 | fast exhumation | *In situ* AFT | Lin et al., 2011 |
| B11 | Tongxin basin | >21.7 | basin formation | magnetostratigraphy and cosmogenic burial age | Liang et al., 2021 |
| **Jiuquan basin** |
|  | Jiuquan basin | 24-21 | fast exhumation | detrital AFT | **this study** |
| **16-13 Ma** |
| **Altyn Tagh Shan** |
| 2 | Lapeiquan-Huatugou | 16.9-15.3 | initial strain localization | seismic reflection data, structural and stratigraphic analyses | Wu L et al., 2019 |
| 28 | Caishiling | 15 | faulting displacement | detrital ZPb | Cheng F et al., 2015 |
| B8 | Heishiqiu | 17-10 | counterclockwise rotation | paleomagnetism | Li et al., 2021a |
| B12 | Eboliang | 15-7 | tectonic rotation | paleomagnetism | Li et al., 2021b |
| 58 | Janggalsay | 17-15 | counterclockwise tectonic rotation | paleomagnetism of sediments | Lu et al., 2014 |
| 78 | Jianglisai | 17-14 | faulting | *In situ* AFT | Li M et al., 2015 |
| B16 | Jianglisai-Luojianglisai  | 17-15 | fast exhumation | *In situ* AFT and ZFT | Gao et al., 2022 |
| 79 | Akatengneng Shan  | 16.2-11.1 | counterclockwise rotations | paleomagnetism of sediments | Li et al., 2017 |
| 80 | Mangai-Youshashan  | ~14.5 | strike-slip faulting  | structure and sedimentary analysis  | Wang L et al., 2010 |
| **Qaidam basin** |
| 33 | Kunbei fault-Yueya Shan | 14.9-0 | tectonic deformation | 2D seismic cross section | Wang Y et al., 2012 |
| 65 | Dahonggou | ~12 | provenance changed | magnetostratigraphy, detrital ZPb | Wang W. et al., 2017 |
| 81 | Honggouzi | ~16 | tectonic uplift | sedimentolotical analysis, seismic reflection profiles | Zhang T et al., 2018 |
| 82 | Huatugou | 15-12 | surface uplift  | δ18O, δ13C of basin sediments | Li L et al., 2016 |
| 83 | Huatugou | 15 | tectonic deformation | magnetostratigraphy | Chang et al., 2015 |
| 84 | Huatugou-lenghu | ~15 | tectonic uplift | carbonate and chloride contents | Guo et al., 2018 |
| 85 | Xichagou Section | 15 | tectonic reorganization | gravel counting, paleocurrent of sediments | Wu L et al., 2012 |
| 86 | Dahonggou | 12 | tectonic activity | magnetostratigraphy | Lu and Xiong, 2009 |
| 87 | Huaitoutala | 14.7 | tectonic uplift | magnetostratigraphy | Fang et al., 2007 |
| 88 | Huaitoutala | 15-10 | surface uplift to 3300-4000 m | leaf wax hydrogen isotope | Zhuang et al., 2014 |
| 89 | ~12.4 | surface uplift to >700-1100 m | detrital ZPb, soil tetraethers  | Zhuang et al., 2019 |
|  | Lulehe | 16-15 | fast exhumation | Detrital AFT | **this study** |
| **East Kunlun Shan** |
| 13 | Dongdatan-Xidatan-Golmud | 16.3-10 | fast exhumation | *In situ* AFT | Chen et al., 2011 |
| 50 | Kunlun fault West | 12-8 | faulting | *In situ* AHe, ZHe | Duvall et al., 2013 |
| Dulan Chaka Highland | 17-12 | fast exhumation | *In situ* AHe, ZHe |
| 68 | Central Kumkol basin | ~15 | counterclockwise tectonic rotation | paleomagnetism of sediments | Lu et al., 2016 |
| 90 | Jingyu basin | 15 | left-lateral transtension, tectonic extention | *In situ* AFT, K-feldspar 40Ar/39Ar | Jolivet et al., 2003 |
| 91 | Naitou Shan | 14-10 | fast exhumation | *In situ* AFT | Wang Y et al., 2018 |
| **Jiuquan basin** |
| 92 | Jiuxi basin | ~17 | basin provenance changed | detrital ZPb | An et al., 2018 |
| 93 | Caogou | 13.5 | deformation from clockwise to counterclockwise rotation | paleomagnetism and AFT of sediments | Wang W et al., 2016a |
|  | Jiuquan basin | 16-15 | fast exhumation | detrital AFT | **this study** |
| **Northern Qilian Shan**  |
| 41 | Muli basin | 18.2-13.2 | surface uplift to ~3586 m | δ18Oc and δ13Cc of lacustrine sediments | Qi et al., 2015 |
| 94 | Yumen basin | ~16  | tectonic uplift | detrital ZPb | Wang W et al., 2016b |
| 100 | Tuolai Shan (west part) | 17-14 | fast exhumation  | *In situ* AFT | Zheng D et al., 2017 |
| 101 | Qilian country | 17-15 | fast exhumation  | *In situ* AFT | Yu et al., 2019b |
| 95 | Huangcheng-Shuangta  | 15 | thrust faulting  | *In situ* AHe | Wang W et al., 2020 |
| **Center Qilian Shan (Including Laji Shan-Jishi Shan)** |
| 75 | Jishi Shan | ~13 | fast exhumation  | *In situ* AHe, AFT | Lease et al., 2011 |
| 96 | Subei Basin | 14 | tectonic uplift  | detrital AFT  | Lin X et al., 2015 |
| 97 | Subei basin | 13.7 | tectonic uplift  | paleomagnetism of sediments | Sun J et al., 2005 |
| 98 | west Danghenan Shan  | 15 | fast exhumation  | *In situ* AHe and AFT | Yu et al., 2019a |
| 99 | Danghenan Shan | 12-9 | tectonic uplift  | biostratigraphy and magnetostratigraphy  | Wang et al., 2003 |
| 102 | Northeast Menyuan  | 15-10 | fast exhumation | *In situ* AFT, ZFT | Li B et al., 2019 |
| 103 | Xining basin | 17 | tectonic clockwise rotation  | paleomagnetism of sediments | Dupont-Nivet et al., 2008b |
| 104 | Xunhua Basin | 12-9 | provenance changed | magnetostratigraphy, detrital ZPb | Lease et al., 2012 |
| 105 | Xunhua-Linxia basins | 16-11 | surface uplift | magnetostratigraphic, and stable isotope records of sediments | Hough et al., 2011 |
| 106 | Linxia basin | 14.7-13.1 | provenance changed | detrital ZPb | Saylor et al., 2018 |
| **West Qinling Shan** |
| 21 | Guide basin | 16-13 | fast exhumation | *In situ* and detrital AFT | Wang X et al., 2016 |
| 22 | Ganjia-Dalijia Shan | 18 | fast exhumation | *In situ* AHe | Clark et al., 2010 |
| 25 | Tianshui basin | 14-13 | fast exhumation | *In situ* and detrital AFT | Wang X et al., 2011 |
| 107 | Guide basin | 17-11 | tectonic clockwise rotation  | paleomagnetism of sediments | Yan et al., 2006 |
| 108 | Zeku | Ne | surface uplift to 1200-1400 m | fossil pollen | Hui et al., 2018 |
| *B13* | *Lixian* | *16-14* | *volcano* | *K/Ar* | *Yu et al., 2011* |
| 109 | Tianshui basin | ~14 | tectonic uplift | detrital AFT and magnetostratigraphy | Wang X et al., 2012 |
| **Haiyuan-Liupan Shan** |
| B11 | Tongxin basin | 16.5 | thrust faulting | magnetostratigraphy | Liang et al., 2021 |
| **11-3 Ma** |
| **Altyn Tagh Shan** |
| 31 | middle Altyn Tagh | 7 | fast exhumation | *In situ* AFT and ZFT | Jolivet et al., 2001 |
| 32 | Dangjin pass | 10-8 | faulting reactive | *In situ* 40Ar/39Ar | Liu et al., 2007 |
| 78 | Jianglisai | 8-5 | faulting | *In situ* AFT | Li M et al., 2015 |
| 110 | Altun Shan | ~10 | fast exhumation | *In situ* AFT | Jolivet et al., 1999 |
| **Qaidam basin** |
| 5 | Hero hill | 8.1-2.5 | surface uplift to 2084+247/-354 m | δ18Oc of mammalian fossils and carbonates | Li L et al., 2017 |
| <2.5 | surface uplift to 2476+321/-445 m |
| 34 | large region of basin | 2.8 | crustal shorting and uplift | balanced cross-section restoration | Zhou et al., 2006 |
| 44 | large region of basin | 5.3 | tectonic extension | volume balance and accumulation rates of sediments | Métivier et al., 1998 |
| 81 | Honggouzi | ~10 | tectonic uplift | sedimentolotical analysis, seismic reflection profiles | Zhang T et al., 2018 |
| 87 | Huaitoutala | 8.1 | tectonic uplift | magnetostratigraphy | Fang et al., 2007 |
| 3.6 |
| 111 | northwest edge | 7 | fast exhumation | *In situ* AFT and ZFT | Jolivet et al., 2001 |
| **East Kunlun Shan** |
| 13 | Dongdatan-Xidatan-Golmud | 5.1 | fast exhumation | *In situ* AFT | Chen et al., 2011 |
| 50 | Kunlun fault East | 8-5 | faulting | *In situ* AHe, ZHe, AFT | Duvall et al., 2013 |
| 71 | Dulan-Ela Shan | 12-4.5 | tectonic uplift | *In situ* AFT, magnetostratigraphy  | Lu et al., 2012 |
| 90 | *Jingyu basin rim* | *10-8* | *volcano* | *In situ AFT, K-feldspar 40Ar/39Ar* | *Jolivet et al., 2003* |
| 112 | Kumkol basin | 7.5 | thrust faulting | paleomagnetism of growth strata | Lu et al., 2018 |
| **Northern Qilian Shan**  |
| 54 | Tuolai Shan | ~10 | fault reactivation  | *In situ* AFT | Li B et al., 2020 |
| 95 | Lenglong Ling | 5 | left-lateral faulting  | *In situ* AHe | Wang W et al., 2020 |
| 113 | Sunan basin | ~10 | fast exhumation  | *In situ* AHe | Zhuang et al., 2018 |
| B14 | Wuwei basin | 8.25 | surface uplift | magnetostratigraphy | Zhao et al., 2022 |
| 114 | nothwest edge  | 10-8 | faulting thrust induced fast exhumation  | *In situ* AFT | Zheng et al., 2017 |
| 115 | Jinfo Temple | ~10 | faulting | *In situ* AHe | Zheng et al., 2010 |
| 31 | middle edge | 7 | fast exhumation | In situ AFT and ZFT | Jolivet et al., 2001 |
| 116 | Yumu Shan | 9.8-9.6 | surface uplift | magnetostratigraphy | Fang et al., 2012 |
| **South Qilian Shan**  |
| 117 | Delingha | ~18-11  | fast exhumation  | *In situ* AFT | Pang et al., 2019 |
| B7 | Hongshan | ~10 | surface uplift | magnetostratigraphy, detrital ZPb | Wang W. et al., 2022 |
| 118 | Chaka basin | 11 | basin initiation and deformation | magnetostratigraphy | Zhang H et al., 2011 |
| 9 |
| 6.1 |
| **Center Qilian Shan (Including Laji Shan-Jishi Shan)** |
| 119 | Danghenan Shan  | 9-7 | fast exhumation  | *In situ* AHe | Zhuang et al., 2018 |
| **Qilian Shan** |
| 120 | Large region | 10-5 | deformation | structure geomorphic analysis | Meyer et al., 1998 |
| **West Qinling Shan** |
| 25 | Ganquan of Tianshui basin | 8 | fast exhumation | *In situ* and detrital AFT | Wang X et al., 2011 |
| 26 | Tianshui-Wudu | 9-4 | fast exhumation | *In situ* AFT | Enkelmann et al., 2006 |
| 57 | Linxia Basin | ~8 | tectonic clockwise rotation | magnetostratigraphy | Fang et al., 2016 |
| 109 | Tianshui basin | 9.2-7.4 | tectonic uplift | detrital AFT and magnetostratigraphy | Wang X et al., 2012 |
| 3.6-2.6 |
| 121 | Xining basin | 10.5-8 | surface uplift of 1000 m | biomarker from sediments | Chen et al., 2019 |
| 122 | 8-7 | tectionic uplift | magnetostratigraphy | Fang et al., 2019 |
| 123 | Gonghe basin | 10-6 | faults activity | structure analysis | Craddock et al., 2014 |
| **Haiyuan-Liupan Shan** |
| 124 | Ningxia basin | 10-6 | basin inversion | detrital ZPb, seismic-reflection sections | Wang W et al., 2013 |
| 125 | Madong Shan  | 8.2-7.3 | fast exhumation | *In situ* AFT | Zheng D et al., 2006 |
| **Jiuquan basin** |
| B5 | Yumu Shan | 10±4 | fast exhumation | detrital ZPb and AFT | Chen et al., 2022 |
| Notes: ZPb = zircon U-Pb, ZFT (AFT) = zircon (apatite) fission-track, ZHe (AHe) = zircon (apatite) (U-Th)/He, Ne = early-middle Miocene. Volcanic eruption is special marked by italic. The B-serie of Map ID means the data added recently. The basin nearby the structure boundary recorded event for either the *in situ* in several literatures, or for the source terrane in others. The distinguish here is honor the context of the original papers. Fast exhumation generally with a threshold value of more than 0.5 km/My. In order to facility the AFT data comparison, the bedrock AFT studies are highlighted by red color, while the of detrital AFT studies are marked by blue, which are illustrated in the Fig. 6. All the dataset is illustrated in Fig. 7B. |

**REFERENCES CITED**

An, K., Lin, X., Wu, L., Cheng, X., Chen, H., Ding, W., Zhang, F., Gong, J., Yang, R., Zhu, K., Li, C., Zhang, Y., & Gao, S. (2018). Reorganization of sediment dispersal in the Jiuxi Basin at ~17 Ma and its implications for uplift of the NE Tibetan Plateau. *Palaeogeography, Palaeoclimatology, Palaeoecology*, *511*, 558-576. <https://doi.org/10.1016/j.palaeo.2018.09.022>.

An, K., Lin, X., Wu, L., Yang, R., Chen, H., Cheng, X., Xia, Q., Zhang, F., Ding, W., Gao, S., Li, C., &Zhang, Y. (2020). An immediate response to the Indian-Eurasian collision along the northeastern Tibetan Plateau: evidence from apatite fission track analysis in the Kuantan Shan-Hei Shan. *Tectonophysics*, *774*(5), 228-278. <https://doi.org/10.1016/j.tecto.2019.228278>.

Bush, M. A., Saylor, J. E., Horton, B. K., & Nie, J. (2016). Growth of the Qaidam Basin during Cenozoic exhumation in the northern Tibetan Plateau: Inferences from depositional patterns and multiproxy detrital provenance signatures. *Lithosphere*, *8*(1), 58-82. <https://doi.org/10.1130/L449.1>.

Chang, H., Li, L., Qiang, X., Garzione, C. N., Pullen, A., & An, Z. (2015). Magnetostratigraphy of Cenozoic deposits in the western Qaidam Basin and its implication for the surface uplift of the northeastern margin of the Tibetan Plateau. *Earth and Planetary Science Letters*, *430*, 271-283. <https://doi.org/10.1016/j.epsl.2015.08.029>.

Chen, C., Bai, Y., Fang, X., Guo, H., Meng, Q., Zhang, W., Zhou, P., & Murodov, A. (2019). A late miocene terrestrial temperature history for the northeastern Tibetan plateau's period of tectonic expansion. *Geophysical Research Letters*, *46*(14), 8375-8386. <https://doi.org/10.1029/2019GL082805>.

Chen, L., Wang, Y., He, P., Song, C., Meng, Q., Feng, W., Chen, W., & Wang, X. (2022). Mesozoic-Cenozoic multistage tectonic deformation of the Qilian Shan constrained by detrital apatite fission track and zircon U-Pb geochronology in the Yumu Shan area. *Tectonophysics*, *822*, 229151. <https://doi.org/10.1016/j.tecto.2021.229151>.

Chen, X., McRivette, M. W., Li, L., Yin, A., Jiang, R., Wan, J., & Li, H. (2011). Thermochronological evidence for multi-phase uplifting of the East Kunlun Mountains, northern Tibetan Plateau. *Geological Bulletin of China*, *30*(11), 1647-1660. <https://doi.org/10.1007/s12583-011-0162-0>.

Cheng, F., Jolivet, M., Fu, S., Zhang, Q., Guan, S., Yu, X., & Guo, Z. (2014). Northward growth of the Qimen Tagh Range: A new model accounting for the Late Neogene strike-slip deformation of the SW Qaidam Basin. *Tectonophysics*, *632*, 32-47. <https://doi.org/1016/j.tecto.2014.05.034>.

Cheng, F., Guo, Z., Jenkins, H., Fu, S., & Cheng, X. (2015). Initial rupture and displacement on the Altyn Tagh fault, northern Tibetan Plateau: Constraints based on residual Mesozoic to Cenozoic strata in the western Qaidam Basin. *Geosphere*, *11*(3), 921-942. <https://doi.org/10.1130/GES01070.1>.

Cheng, F., Jolivet, M., Fu, S., Zhang, C., Zhang, Q., & Guo, Z. (2016a). Large-scale displacement along the Altyn Tagh Fault (North Tibet) since its Eocene initiation: Insight from detrital zircon U-Pb geochronology and subsurface data. *Tectonophysics*, *677-678*, 261-279. <https://doi.org/10.1016/j.tecto.2016.04.023>

Cheng, F., Fu, S., Jolivet, M., Zhang, C., & Guo, Z. (2016b). Source to sink relation between the Eastern Kunlun Range and the Qaidam Basin, northern Tibetan Plateau during the Cenozoic. *Geological Society of America Bulletin*, *128*(1-2), 258-283. <https://doi.org/10.1130/B31260.1>.

Cheng, F., Garzione, C. N., Jolivet, M., Guo, Z., Zhang, D., Zhang, C., & Zhang, Q. (2019). Initial deformation of the northern Tibetan Plateau: insights from deposition of the lulehe formation in the Qaidam basin. *Tectonics*, *38*(1-2), 741-766. <https://doi.org/10.1029/2018TC005214>.

Cheng, X., Fu, S., Wang, H., Yu, X., Cheng, F., Liu, R., Du, W., & Guo, Z. (2015). Geometry and kinematics of the Arlar strike-slip fault, SW Qaidam basin, China: New insights from 3-D seismic data. *Journal of Asian Earth Sciences*, *98*, 198-208. <https://doi.org/10.1016/j.jseaes.2014.09.039>.

Cheng, X., Lin, X., Wu, L., Chen, H., Xiao, A., Gong, J., Zhang, F., & Yang, S. (2016). The exhumation history of north Qaidam thrust belt constrained by apatite fission track thermochronology: Implication for the evolution of the Tibetan Plateau. *Acta Geologica Sinica*, *90*(3), 870-883. <https://doi.org/10.1111/1755-6724.12730>.

Clark, M. K., Farley, K. A., Zheng, D., Wang, Z., & Duvall, A. R. (2010). Early Cenozoic faulting of the northern Tibetan Plateau margin from apatite (U–Th)/He ages. *Earth and Planetary Science Letters*, *296*(1-2), 78-88. <https://doi.org/10.1016/j.epsl.2010.04.051>.

Craddock, W. H., Kirby, E., & Zhang, H. (2011). Late Miocene-Pliocene range growth in the interior of the northeastern Tibetan Plateau. *Lithosphere*, *3*(6), 420-438. <https://doi.org/10.1130/L159.1>.

Craddock, W. H., Kirby, E., Zhang, H., Clark, M. K., Champagnac, J. D., & Yuan, D. (2014). Rates and style of Cenozoic deformation around the Gonghe Basin, northeastern Tibetan Plateau. *Geosphere*, *10*(6), 1255-1282. <https://doi.org/10.1130/GES01024.1>.

Dai, J., Wang, C., Hourigan, J., & Santosh, M. (2013). Multi-stage tectono-magmatic events of the Eastern Kunlun Range, northern Tibet: Insights from U-Pb geochronology and (U–Th)/He thermochronology. *Tectonophysics*, *599*, 97-106. <https://doi.org/10.1016/j.tecto.2013.04.005>.

Dai, S., Fang, X., Song, C., Gao, J., Gao, D., & Li, J. (2005). Early tectonic uplift of the northern Tibetan Plateau. *Chinese Science Bulletin*, *50*(15), 1642-1652. <https://doi.org/10.1360/03wd0255>.

Dettman, D. L., Fang, X., Garzione, C. N., & Li, J. (2003). Uplift-driven climate change at 12 Ma: a long δ18O record from the NE margin of the Tibetan plateau. *Earth and Planetary Science Letters*, *214*(1-2), 267-277. [https://doi.org/10.1016/s0012-821x(03)00383-2](https://doi.org/10.1016/s0012-821x%2803%2900383-2).

Dupont-Nivet, G., Horton, B. K., Butler, R. F., Wang, J., Zhou, J., & Waanders, G. L., 2004. Paleogene clockwise tectonic rotation of the Xining-Lanzhou region, northeastern Tibetan Plateau. *Journal of Geophysical Research: Solid Earth*, *109*, B04401. <https://doi.org/10.1029/2003JB002620>.

Dupont-Nivet, G., Hoorn, C., & Konert, M. (2008a). Tibetan uplift prior to the Eocene-Oligocene climate transition: Evidence from pollen analysis of the Xining Basin. *Geology*, *36*(12), 987-990. <https://doi.org/10.1130/0091-7613-37.6.506>.

Dupont-Nivet, G., Dai, S., Fang, X., Krijgsman, W., Erens, V., Reitsma, M., & Langereis, C. (2008b). Timing and distribution of tectonic rotations in the northeastern Tibetan Plateau. *Geological Society of America*, *Special Publications*, *444*, 73-87. [https://doi.org/10.1130/2008.2444(05)](https://doi.org/10.1130/2008.2444%2805%29).

Duvall, A. R., Clark, M. K., van der Pluijm, B. A., & Li, C. (2011). Direct dating of Eocene reverse faulting in northeastern Tibet using Ar-dating of fault clays and low-temperature thermochronometry. *Earth and Planetary Science Letters*, *304*(3-4), 520-526. <https://doi.org/10.1016/j.epsl.2011.02.028>.

Duvall, A. R., Clark, M. K., Kirby, E., Farley, K. A., Craddock, W. H., Li, C., & Yuan, D. (2013). Low-temperature thermochronometry along the Kunlun and Haiyuan faults, NE Tibetan Plateau: Evidence for kinematic change during late-stage orogenesis. *Tectonics*, *32*(5), 1190-1211. <https://doi.org/10.1002/tect.20072>.

Enkelmann, E., Ratschbacher, L., Jonckheere, R., Nestler, R., Fleischer, M., Gloaguen, R., Hacher, B., Zhang, Y., & Ma, Y. (2006). Cenozoic exhumation and deformation of northeastern Tibet and the Qinling: is Tibetan lower crustal flow diverging around the Sichuan basin?. *Geological Society of America Bulletin*, *118*(5-6), 651-671. <https://doi.org/10.1130/B25805>.

Fang, X., Zhang, W., Meng, Q., Gao, J., Wang, X., King, J., Song, C., Dai, S., & Miao, Y. (2007). High-resolution magnetostratigraphy of the Neogene Huaitoutala section in the eastern Qaidam Basin on the NE Tibetan Plateau, Qinghai Province, China and its implication on tectonic uplift of the NE Tibetan Plateau. *Earth and Planetary Science Letters*, *258*(1-2), 293-306. <https://doi.org/10.1016/j.epsl.2007.03.042>.

Fang, X., Liu, D., Song, C., Dai, S., & Meng, Q. (2012). Oligocene slow and Miocene-Quaternary rapid deformation and uplift of the Yumu Shan and North Qilian Shan: evidence from high-resolution magnetostratigraphy and tectonosedimentology. *Geological Society of London, Special Publications*, *373*(1), 149-171. <https://doi.org/10.1144/SP373.5>.

Fang, X., Wang, J., Zhang, W., Zan, J., Song, C., Yan, M., Appel, E., Wu, F., Yang, Y., & Lu, Y. (2016). Tectonosedimentary evolution model of an intracontinental flexural (foreland) basin for paleoclimatic research. *Global and Planetary Change*, *145*, 78-97. <https://doi.org/10.1016/j.gloplacha.2016.08.015>.

Fang, X., Fang, Y., Zan, J., Zhang, W., Song, C., Appel, E., Meng, Q., Miao, Y., Dai, S., Lu, Y., & Zhang, T. (2019). Cenozoic magnetostratigraphy of the Xining Basin, NE Tibetan Plateau, and its constraints on paleontological, sedimentological and tectonomorphological evolution. *Earth-Science Reviews*, *190*, 460-485. <https://doi.org/10.1016/j.earscirev.2019.01.021>.

Feng, Z., Zhang, W., Fang, X., Zan, J., Zhang, T., Song, C., & Yan, M. (2022). Eocene deformation of the NE Tibetan Plateau: Indications from magnetostratigraphic constraints on the oldest sedimentary sequence in the Linxia Basin. *Gondwana Research*, *101*, 77-93. <https://doi.org/10.1016/j.gr.2021.07.027>.

Gao, S., Cowgill, E., Wu, L., Lin, X., Cheng, X., Yang, R., Soares, C., Ketcham, R. A., An, K., Gong, J., Song, X., Tang, J., Chen, H., & Yang, S. (2022). From Left Slip to Transpression: Cenozoic Tectonic Evolution of the North Altyn Fault, NW Margin of the Tibetan Plateau. *Tectonics*, *41(3),* e2021TC006962. https://doi.org/10.1029/2021TC006962.

Garzione, C. N., Ikari, M. J., & Basu, A. R. (2005). Source of Oligocene to Pliocene sedimentary rocks in the Linxia basin in northeastern Tibet from Nd isotopes: Implications for tectonic forcing of climate. *Geological Society of America Bulletin*, *117*(9), 1156-1166. <https://doi.org/10.1130/B25743.1>.

George, A. D., Marshallsea, S. J., Wyrwoll, K. H., Chen, J., & Lu, Y. (2001). Miocene cooling in the northern Qilian Shan, northeastern margin of the Tibetan Plateau, revealed by apatite fission-track and vitrinite-reflectance analysis. *Geology*, *29*(10), 939-942. [https://doi.org/10.1130/0091-7613(2001)029<0939:MCITNQ>2.0.CO;2](https://doi.org/10.1130/0091-7613%282001%29029%3C0939%3AMCITNQ%3E2.0.CO;2).

Guo, P., Liu, C., Huang, L., Yu, M., Wang, P., & Zhang, G. (2018). Palaeohydrological evolution of the late Cenozoic saline lake in the Qaidam Basin, NE Tibetan Plateau: Tectonic vs. climatic control. *Global and Planetary Change*, *165*, 44-61. <https://doi.org/10.1016/j.gloplacha.2018.03.012>.

Guo, Z., Lu, J, & Zhang, Z. (2009). Cenozoic exhumation and thrusting in the northern Qilian Shan, northeastern margin of the Tibetan Plateau: Constraints from sedimentological and apatite fission-track data. *Acta Geologica Sinica*, *83*(3), 562-579. <https://doi.org/10.1111/j.1755-6724.2009.00045.x>.

Han, P., Liu, C., Gao, F., Fang, J., & Wang, J. (2008). A paleomagnetic study of the Cenozoic Sikouzi Formation in Guyuan, Ningxia. *Journal of Stratigraphy*, *32*, 315-320. (In Chinese with English abstract).

He, C., Zhang, Y., Li, S., Wang, K., & Ji, J. (2021). Magnetostratigraphic study of a Late Cretaceous–Paleogene succession in the eastern Xining basin, NE Tibet: Constraint on the timing of major tectonic events in response to the India-Eurasia collision. *Geological Society of America Bulletin*, *133*(11-12), 2457-2484. <https://doi.org/10.1130/B35874.1>.

He, P., Wang, X., Song, C., Wang, Q., Deng, L., & Zhong, S. (2017). Cenozoic evolution of the Western Qinling Mt. Range based on thermochronologic and sedimentary records from the Wudu Basin, NE Tibetan Plateau. *Journal of Asian Earth Sciences*. *138*, 484-494. <http://dx.doi.org/10.1016/j.jseaes.2017.02.033>.

Hoke, G. D., Liu, Z., Hren, M. T., Wissink, G. K., & Garzione, C. N. (2014). Stable isotopes reveal high southeast Tibetan Plateau margin since the Paleogene. *Earth and Planetary Science Letters*, *394*, 270-278. <https://doi.org/10.1130/G34331.1>.

Horton, B. K., Dupont-Nivet, G., Zhou, J., Waanders, G. L., Butler, R. F., & Wang, J. (2004). Mesozoic-Cenozoic evolution of the Xining-Minhe and Dangchang basins, northeastern Tibetan Plateau: Magnetostratigraphic and biostratigraphic results. *Journal of Geophysical Research: Solid Earth*, *109*, B04402. <https://doi.org/10.1029/2003JB002913>.

Hough, B. G., Garzione, C. N., Wang, Z., Lease, R. O., Burbank, D. W., & Yuan, D. (2011). Stable isotope evidence for topographic growth and basin segmentation: Implications for the evolution of the NE Tibetan Plateau. *Geological Society of America Bulletin*, *123*(1-2), 168-185. <https://doi.org/10.1130/B30090.1>.

Huntington, K. W., Saylor, J., Quade, J., & Hudson, A. M. (2015). High late Miocene-Pliocene elevation of the Zhada Basin, southwestern Tibetan Plateau, from carbonate clumped isotope thermometry. *Geological Society of America Bulletin*, *127*(1-2), 181-199. <https://doi.org/10.1130/B31000.1>.

Hui, Z., Li, X., Ma, Z., Xiao, L., Zhang, J., & Chang, J. (2018). Miocene pollen assemblages from the Zeku Basin, northeastern Tibetan Plateau, and their palaeoecological and palaeoaltimetric implications. *Palaeogeography, Palaeoclimatology, Palaeoecology*, *511*, 419-432. <https://doi.org/10.1016/j.palaeo.2018.09.009>.

Ji, J., Zhang, K., Clift, P. D., Zhuang, G., Song, B., Ke, X., & Xu, Y. (2017). High-resolution magnetostratigraphic study of the Paleogene-Neogene strata in the Northern Qaidam Basin: Implications for the growth of the Northeastern Tibetan Plateau. *Gondwana Research*, *46*, 141-155. <https://doi.org/10.1016/j.gr.2017.02.015>.

Jian, X., Guan, P., Zhang, W., Liang, H., Feng, F., & Fu, L. (2018). Late Cretaceous to early Eocene deformation in the northern Tibetan Plateau: Detrital apatite fission track evidence from northern Qaidam basin. *Gondwana Research*, *60*, 94-104. <https://doi.org/10.1016/j.gr.2018.04.007>.

Jolivet, M., Roger, F., Arnaud, N., Brune, M., Tapponnier, P., & Seward, D. (1999). Exhumation history of the Altun Shan with evidence for the timing of the subduction of the Tarim block beneath the Altyn Tagh system, North Tibet. *Earth and Planetary Sciences*, *329*, 749-755. [https://doi.org/10.1016/S1251-8050(00)88495-5](https://doi.org/10.1016/S1251-8050%2800%2988495-5).

Jolivet, M., Brunel, M., Seward, D., Xu, Z., Yang, J., Roger, F., Tapponnier, P., Malavieille, J., Arnaud, N., & Wu, C. (2001). Mesozoic and Cenozoic tectonics of the northern edge of the Tibetan plateau: fission-track constraints. *Tectonophysics*, *343*(1-2), 111-134. [https://doi.org/10.1016/S0040-1951(01)00196-2](https://doi.org/10.1016/S0040-1951%2801%2900196-2).

Jolivet, M., Brunel, M., Seward, D., Xu, Z., Yang, J., Malavieille, J., Roger, F., Leyreloup, A., Arnaud, N., & Wu, C. (2003). Neogene extension and volcanism in the Kunlun Fault Zone, northern Tibet: New constraints on the age of the Kunlun Fault. *Tectonics*, *22*(5). <https://doi.org/10.1029/2002TC001428>.

Lease, R. O., Burbank, D. W., Clark, M. K., Farley, K. A., Zheng, D., & Zhang, H. (2011). Middle Miocene reorganization of deformation along the northeastern Tibetan Plateau. *Geology*, *39*(4), 359-362. <https://doi.org/10.1130/G31356.1>.

Lease, R. O., Burbank, D. W., Hough, B., Wang, Z., & Yuan, D. (2012). Pulsed Miocene range growth in northeastern Tibet: Insights from Xunhua Basin magnetostratigraphy and provenance. *Geological Society of America Bulletin*, *124*(5-6), 657-677. <https://doi.org/10.1130/B30524.1>.

Li, B., Chen, X., Zuza, A. V., Hu, D., Ding, W., Huang, P., & Xu, S. (2019). Cenozoic cooling history of the North Qilian Shan, northern Tibetan Plateau, and the initiation of the Haiyuan fault: Constraints from apatite- and zircon-fission track thermochronology. *Tectonophysics*, *751*, 101-124. <https://doi.org/10.1016/j.tecto.2018.12.005>.

Li, B., Zuza, A. V., Chen, X., Hu, D., Shao, Z., Qi, B., Wang, Z., Levy, D. A., & Xiong, X. (2020). Cenozoic multi-phase deformation in the Qilian Shan and out-of-sequence development of the northern Tibetan Plateau. *Tectonophysics*, *782-783*, 228423. <https://doi.org/10.1016/j.tecto.2020.228423>.

Li, B. S., Yan, M., Zhang, W., Fang, X., Meng, Q., Zan, J., Chen, Y., Zhang, D., Yang, Y., & Guan, C. (2017). New paleomagnetic constraints on middle Miocene strike-slip faulting along the middle Altyn Tagh Fault. *Journal of Geophysical Research: Solid Earth*, *122*(6), 4106-4122. <https://doi.org/10.1002/2017JB014058>.

Li, B. S., Yan, M., Zhang, W., Parés, J. M., Fang, X., Yang, Y., Zhang, D., Guan, C., & Bao, J. (2020). Magnetic fabric constraints on the Cenozoic compressional strain changes in the northern Qaidam marginal thrust belt and their tectonic implications. *Tectonics*, *39*(6), e2019TC005989. <https://doi.org/10.1029/2019TC005989>.

Li, B. S., Yan, M., Zhang, W., & Fang, X. (2021a). Bidirectional growth of the Altyn Tagh Fault since the Early Oligocene. *Tectonophysics*, *815*, 228991. <https://doi.org/10.1016/j.tecto.2021.228991>.

Li, B. S., Yan, M., Zhang, W., Fang, X., Yang, Y., Zhang, D., Guan, C., & Bao, J. (2021b). Two-stage strike-slip faulting of the Altyn Tagh Fault revealed by magnetic fabrics in the Qaidam Basin. *Tectonophysics*, *821*, 229142. <https://doi.org/10.1016/j.tecto.2021.229142>.

Li, C., Zheng, D., Zhou, R., Yu, J., Wang, Y., Pang, J., Wang, Y., Hao, Y., & Li, Y. (2021). Late oligocene tectonic uplift of the East Kunlun Shan: Expansion of the northeastern Tibetan Plateau. *Geophysical Research Letters*, *48*(3), e2020GL091281. <https://doi.org/10.1029/2020GL091281>.

Li, L., Guo, Z., Guan, S., Zhou, S., Wang, M., Fang, Y., & Zhang, C. (2015). Heavy mineral assemblage characteristics and the Cenozoic paleogeographic evolution in southwestern Qaidam Basin. *Science China Earth Sciences*, *58*(6), 859-875. <https://doi.org/10.1007/s11430-014-5050-x>.

Li, L., Garzione, C. N., Pullen, A., & Chang, H. (2016). Early-middle Miocene topographic growth of the northern Tibetan Plateau: Stable isotope and sedimentation evidence from the southwestern Qaidam basin. *Palaeogeography, Palaeoclimatology, Palaeoecology*, *461*, 201-213. <https://doi.org/10.1016/j.palaeo.2016.08.025>.

Li, L., Wu, C., Fan, C., Li, J., & Zhang, C. (2017). Carbon and oxygen isotopic constraints on paleoclimate and paleoelevation of the southwestern Qaidam basin, northern Tibetan Plateau. *Geoscience Frontiers*, *8*(5), 1175-1186. <https://doi.org/10.1016/j.gsf.2016.12.001>.

Li, J., Fang, X., Song, C., Pan, B., Ma, Y., & Yan, M. (2014). Late Miocene-Quaternary rapid stepwise uplift of the NE Tibetan Plateau and its effects on climatic and environmental changes. *Quaternary Research*, *81*(3), 400-423. <https://doi.org/10.1016/j.yqres.2014.01.002>.

Li, M., Tang, L., & Yuan, W. (2015). Middle Miocene-Pliocene activities of the North Altyn fault system: evidence from apatite fission track data. *Arabian Journal of Geosciences*, *8*(11), 9043-9054. <https://doi.org/10.1007/s12517-015-1873-9>.

Li, S., Currie, B. S., Rowley, D. B., & Ingalls, M. (2015). Cenozoic paleoaltimetry of the SE margin of the Tibetan Plateau: Constraints on the tectonic evolution of the region. *Earth and Planetary Science Letters*, *432*, 415-424. <https://doi.org/10.1016/j.epsl.2015.09.044>.

Liang, H., Zhang, K., Fu, J., Wang, W., Zhang, P., & Ma, Z. (2021). Sedimentary basin evolution and its implications for outward expansion of the northeastern Tibetan Plateau: Insights from the Tongxin Basin, China. *Palaeogeography, Palaeoclimatology, Palaeoecology*, *575*, 110460. <https://doi.org/10.1016/j.palaeo.2021.110460>.

Lin, X., Chen, H., Wyrwoll, K. H., Batt, G. E., Liao, L., & Xiao, J. (2011). The uplift history of the Haiyuan-Liupan Shan region northeast of the present Tibetan Plateau: Integrated constraint from stratigraphy and thermochronology. *The Journal of Geology*, *119*(4), 372-393. <https://doi.org/10.1086/660190>.

Lin, X., Zheng, D., Sun, J., Windley, B. F., Tian, Z., Gong, Z., & Jia, Y. (2015). Detrital apatite fission track evidence for provenance change in the Subei Basin and implications for the tectonic uplift of the Danghe Nan Shan (NW China) since the mid-Miocene. *Journal of Asian Earth Sciences*, *111*, 302-311. <https://doi.org/10.1016/j.jseaes.2015.07.007>.

Lin, X., Wyrwoll, K. H., Chen, H., & Cheng, X. (2016). On the timing and forcing mechanism of a mid-Miocene arid climate transition at the NE margins of the Tibetan Plateau: stratigraphic and sedimentologic evidence from the Sikouzi Section. *Internation Journal of Earth Science*, *105*(3), 1039-1049. <https://doi.org/10.1007/s00531-015-1213-z>.

Lin, X., Tian, Y., Donelick, R. A., Liu-Zeng, J., Cleber, S. J., Li, C., Wu, Q., & Li, Z. (2019). Mesozoic and Cenozoic tectonics of the northeastern edge of the Tibetan plateau: Evidence from modern river detrital apatite fission-track age constraints. *Journal of Asian Earth Sciences*, *170*, 84-95. <https://doi.org/10.1016/j.jseaes.2018.10.028>.

Liu, D., Zhao, Z., Niu, Y., Zhu, D., & Li, X. (2018). Perovskite U-Pb and Sr-Nd isotopic perspectives on melilitite magmatism and outward growth of the Tibetan Plateau. *Geology*, *46*(12), 1027-1030. <https://doi.org/10.1130/G45329.1>.

Liu, D. L., Li, H., Sun, Z., Pan, J., Wang, M., Wang, H., & Chevalier, M. L. (2017). AFT dating constrains the Cenozoic uplift of the Qimen Tagh Mountains, Northeast Tibetan Plateau, comparison with LA-ICPMS Zircon U–Pb ages. *Gondwana Research*, *41*, 438-450. <https://doi.org/10.1016/j.gr.2015.10.008>.

Liu, Y., Genser, J., Neubauer, F., Jin, W., Ge, X., Handler, R., & Takasu, A. (2005). 40Ar/39Ar mineral ages from basement rocks in the Eastern Kunlun Mountains, NW China, and their tectonic implications. *Tectonophysics*, *398*(3-4), 199-224. <https://doi.org/10.1016/j.tecto.2005.02.007>.

Liu, Y., Neubauer, F., Genser, J., Ge, X., Takasu, A., Yuan, S., Chang, L., & Li, W. (2007). Geochronology of the initiation and displacement of the Altyn strike-slip Fault, western China. *Journal of Asian Earth Sciences*, *29*(2-3), 243-252. <https://doi.org/10.1016/j.jseaes.2006.03.002>.

Lu, H., & Xiong, S. (2009). Magnetostratigraphy of the Dahonggou section, northern Qaidam Basin and its bearing on Cenozoic tectonic evolution of the Qilian Shan and Altyn Tagh Fault. *Earth and Planetary Science Letters*, *288*(3-4), 539-550. <https://doi.org/10.1016/j.epsl.2009.10.016>.

Lu, H., Wang, E., Shi, X., & Meng, K. (2012). Cenozoic tectonic evolution of the Elashan range and its surroundings, northern Tibetan Plateau as constrained by paleomagnetism and apatite fission track analyses. *Tectonophysics*, *580*, 150-161. <https://doi.org/10.1016/j.tecto.2012.09.013>.

Lu, H., Wang, E., & Meng, K. (2014). Paleomagnetism and anisotropy of magnetic susceptibility of the Tertiary Janggalsay section (southeast Tarim basin): Implications for Miocene tectonic evolution of the Altyn Tagh Range. *Tectonophysics*, *618*, 67-78. <https://doi.org/10.1016/j.tecto.2014.01.031>.

Lu, H., Fu, B., Shi, P., Ma, Y., & Li, H. (2016). Constraints on the uplift mechanism of northern Tibet. *Earth and Planetary Science Letters*, *453*, 108-118. <https://doi.org/10.1016/j.epsl.2016.08.010>.

Lu, H., Fu, B., Shi, P., Xue, G., & Li, H. (2018). Late-Miocene thrust fault-related folding in the northern Tibetan Plateau: Insight from paleomagnetic and structural analyses of the Kumkol basin. *Journal of Asian Earth Sciences*, *156*, 246-255. <https://doi.org/10.1016/j.jseaes.2018.01.026>.

Mao, L., Xiao, A., Wu, L., Li, B., Wang, L., Lou, Q., Dong, Y., & Qin, S. (2014). Cenozoic tectonic and sedimentary evolution of southern Qaidam Basin, NE Tibetan Plateau and its implication for the rejuvenation of Eastern Kunlun Mountains. *Science China Earth Sciences*, *57*(11), 2726-2739. <https://doi.org/10.1007/s11430-014-4951-z>.

Métivier, F., Gaudemer, Y., Tapponnier, P., & Meyer, B. (1998). Northeastward growth of the Tibet plateau deduced from balanced reconstruction of two depositional areas: The Qaidam and Hexi Corridor basins, China. *Tectonics*, *17*(6), 823-842. <https://doi.org/10.1029/98TC02764>.

Meyer, B., Tapponnier, P., Bourjot, L., Metivier, F., Gaudemer, Y., Peltzer, G., Shunmin, G., & Zhitai, C. (1998). Crustal thickening in Gansu-Qinghai, lithospheric mantle subduction, and oblique, strike-slip controlled growth of the Tibet plateau. *Geophysical Journal International*, *135*(1), 1-47. <https://doi.org/10.1046/j.1365-246X.1998.00567.x>.

Miao, Y., Wu, F., Herrmann, M., Yan, X., & Meng, Q. (2013). Late early Oligocene East Asian summer monsoon in the NE Tibetan Plateau: Evidence from a palynological record from the Lanzhou Basin, China. *Journal of Asian Earth Sciences*, *75*, 46-57. <https://doi.org/10.1016/j.jseaes.2013.07.003>.

Mock, C., Arnaud, N. O., & Cantagrel, J. M. (1999). An early unroofing in northeastern Tibet? Constraints from 40Ar/39Ar thermochronology on granitoids from the eastern Kunlun range (Qianghai, NW China). *Earth and Planetary Science Letters*, *171*(1), 107-122. [https://doi.org/10.1016/S0012-821X(99)00133-8](https://doi.org/10.1016/S0012-821X%2899%2900133-8).

Naylor, M., Sinclair, H. D., Bernet, M., van der Beek, P., & Kirstein, L. A. (2015). Bias in detrital fission track grain-age populations: Implications for reconstructing changing erosion rates. *Earth and Planetary Science Letters*, *422*, 94-104. <https://doi.org/10.1016/j.epsl.2015.04.020>.

Nie, J., Ren, X., Saylor, J. E., Su, Q., Horton, B. K., Bush, M. A., Chen, W., & Pfaff, K. (2020). Magnetic polarity stratigraphy, provenance, and paleoclimate analysis of Cenozoic strata in the Qaidam Basin, NE Tibetan Plateau. *Geological Society of America Bulletin*, *132*(1-2), 310-320. <https://doi.org/10.1130/B35175.1>.

Pan, B., Li, Q., Hu, F., Geng, H., Liu, Z., Jiang, S., & Yuan, W. (2013). Cretaceous and Cenozoic cooling history of the eastern Qilian Shan, north-eastern margin of the Tibetan Plateau: evidence from apatite fission-track analysis. *Terra Nova*, *25*(6), 431-438. <https://doi.org/10.1111/ter.12052>.

Pang, J., Yu, J., Zheng, D., Wang, W., Ma, Y., Wang, Y., Li, C., Li, Y., & Wang, Y. (2019). Neogene expansion of the Qilian Shan, north Tibet: Implications for the dynamic evolution of the Tibetan Plateau. *Tectonics*, *38*, 1018-1032. <https://doi.org/10.1029/2018TC005258>.

Qi, B., Hu, D., Yang, X., Zhang, X., & Zhao, X. (2015). Paleoelevation of the Qilian Mountain inferred from carbon and oxygen isotopes of Cenozoic strata. *Acta Geoscientica Sinica*, *36*(3), 322-331. <https://doi.org/10.3975/cagsb.2015.03.07>. (In Chinese with English abstract).

Qi, B., Hu, D., Yang, X., Zhang, Y., Tan, C., Zhang, P., & Feng, C. (2016). Apatite fission track evidence for the Cretaceous-Cenozoic cooling history of the Qilian Shan (NW China) and for stepwise northeastward growth of the northeastern Tibetan Plateau since early Eocene. *Journal of Asian Earth Sciences*, *124*, 28-41. <https://doi.org/10.1016/j.jseaes.2016.04.009>.

Robinson, D. M., Dupont-Nivet, G., Gehrels, G. E., & Zhang, Y. (2003). The Tula uplift, northwestern China: Evidence for regional tectonism of the northern Tibetan Plateau during late Mesozoic-early Cenozoic time. *Geological Society of America Bulletin*, *115*(1), 35-47. [https://doi.org/10.1130/0016-7606(2003)115<0035:TTUNCE>2.0.CO;2](https://doi.org/10.1130/0016-7606%282003%29115%3C0035%3ATTUNCE%3E2.0.CO;2).

Saylor, J. E., Jordan, J. C., Sundell, K. E., Wang, X., Wang, S., & Deng, T. (2017). Topographic growth of the Jishi Shan and its impact on basin and hydrology evolution, NE Tibetan Plateau. *Basin Research*, *30*(3), 544-563. <https://doi.org/10.1111/bre.12264>.

Shi, W., Wang, F., Yang, L., Wu, L., & Zhang, W. (2018). Diachronous growth of the Altyn Tagh Mountains: Constraints on propagation of the northern Tibetan margin from (U-Th)/He dating. *Journal of Geophysical Research: Solid Earth*, *123*(7), 6000-6018. <https://doi.org/10.1029/2017JB014844>.

Sobel, E. R., Arnaud, N., Jolivet, M., Ritts, B. D., & Brunel, M. (2001). Jurassic to Cenozoic exhumation history of the Altyn Tagh range, northwest China, constrained by 40Ar/39Ar and apatite fission track thermochronology. In: Hendrix, M. S., Davis, G. A. (Eds), Paleozoic and Mesozoic Tectonic Evolution of Central and Eastern Asia: From Continental Assembly to Intracontinental Deformation: Boulder, Colorado. *Geological Society of America Memoirs*, *194*, 247-267. <https://doi.org/10.1130/0-8137-1194-0.247>.

Song, C. H. (2006). *Tectonic uplift and Cenozoic sedimentary evolution in the northern margin of the Tibetan Plateau*. (PhD thesis). Lanzhou Univerisity.

Song, B., Spicer, R. A., Zhang, K., Ji, J., Farnsworth, A., Hughes, A. C., Yang, Y., Hang, F., Xu, Y., Spicer, T., Shen, T., Lunt, D. J., & Shi, G. (2020). Qaidam Basin leaf fossils show northeastern Tibet was high, wet and cool in the early Oligocene. *Earth and Planetary Science Letters*, *537*, 116175. <https://doi.org/10.1016/j.epsl.2020.116175>.

Staisch, L. M., Niemi, N. A., Clark, M. K., & Chang, H. (2020). The Cenozoic evolution of crustal shortening and left‐lateral shear in the central East Kunlun Shan: Implications for the uplift history of the Tibetan Plateau. *Tectonics*, 39, e2020TC006065. https://doi.org/10.1029/2020TC006065

Sun, J., Zhu, R., & An, Z. (2005). Tectonic uplift in the northern Tibetan Plateau since 13.7 Ma ago inferred from molasse deposits along the Altyn Tagh Fault. *Earth and Planetary Science Letters*, *235*(3-4), 641-653. <https://doi.org/10.1016/j.epsl.2005.04.034>.

Sun, Z., Yang, Z., Pei, J., Ge, X., Wang, X., Yang, T., Li, W., & Yuan, S. (2005). Magnetostratigraphy of Paleogene sediments from northern Qaidam Basin, China: Implications for tectonic uplift and block rotation in northern Tibetan Plateau. *Earth and Planetary Science Letters*, *237*(3-4), 635-646. <https://doi.org/10.1016/j.epsl.2005.07.007>.

Tian, P., Yuan, W., Yang, X., Feng, Z., Chen, X., & Yuan, E. (2020). Multi-stage tectonic events of the eastern Kunlun Mountains, northern Tibetan Plateau constrained by fission track thermochronology. *Journal of Asian Earth sciences*, *198*, 104428. <https://doi.org/10.1016/j.jseaes.2020.104428>.

Wang, A., Wang, G., Zhang, K., & John, G. I. (2010). An Early Cenozoic tectonic event in eastern Kunlun Orogen, evidence from detrital fission track geochronology. *Earth Science-Journal of China University of Geosciences*, *35*(5), 737-746. <https://doi.org/10.1017/S0004972710001772>.

Wang, E., Xu, F., Zhou, J., Wan, J., & Burchfiel, B. C. (2006). Eastward migration of the Qaidam basin and its implications for Cenozoic evolution of the Altyn Tagh fault and associated river systems. *Geological Society of America Bulletin*, *118*(3-4), 349-365. <https://doi.org/10.1130/B25778.1>.

Wang, F., Feng, H., Shi, W., Zhang, W., Wu, L., Yang, L., Wang, Y., Zhang, Z., & Zhu, R. (2016). Relief history and denudation evolution of the northern Tibet margin: Constraints from 40Ar/39Ar and (U-Th)/He dating and implications for far-field effect of rising plateau. *Tectonophysics*, *675*, 196-208. <https://doi.org/10.1016/j.tecto.2016.03.001>.

Wang, F., Shi, W., Zhang, W., Wu, L., Yang, L., Wang, Y., & Zhu, R. (2017). Differential growth of the northern Tibetan margin: evidence for oblique stepwise rise of the Tibetan Plateau. *Scientific Reports*, *7*(1), 41164. <https://doi.org/10.1038/srep41164>.

Wang, G., Xiang, S., Wang, A., Garver, J. I., Wintsch, R. P., & Zhang, K. (2007). Thermochronological constraint to the processes of the east Kunlun and adjacent areas in Mesozoic-early Cenozoic. *Earth Science-Journal of China University of Geosciences*, *32*(5), 605-614. <https://doi.org/10.1631/jzus.2007.A1858>.

Wang, L., Xiao, A., Gong, Q., Liu, D., Wu, L., Zhou, S., Shen, Z., Lou, Q., & Sun, X. (2010). The unconformity in Miocene sequence of western Qaidam Basin and its tectonic significance. *Science China Earth Sciences*, *53*(8), 1126-1133. <https://doi.org/10.1007/s11430-010-4006-z>.

Wang, W., Kirby, E., Zhang, P., Zheng, D., Zhang, G., Zhang, H., Zheng, W., & Chai, C. (2013). Tertiary basin evolution along the northeastern margin of the Tibetan Plateau: Evidence for basin formation during Oligocene transtension. *Geological Society of America Bulletin*, *125*(3-4), 377-400. <https://doi.org/10.1130/B30611.1>.

Wang, W., Zhang, P., Pang, J., Garzione, C., Zhang, H., Liu, C., Zheng, D., Zheng, W., & Yu, J. (2016a). The Cenozoic growth of the Qilian Shan in the northeastern Tibetan Plateau: A sedimentary archive from the Jiuxi Basin. *Journal of Geophysical Research: Solid Earth*, *121*(4), 2235-2257. <https://doi.org/10.1002/2015JB012689>.

Wang, W., Zhang, P., Yu, J., Wang, Y., Zheng, D., Zheng, W., Zhang, H., & Pang, J. (2016b). Constraints on mountain building in the northeastern Tibet: Detrital zircon records from synorogenic deposits in the Yumen Basin. *Scientific Reports*, *6*(1), 1-8. <https://doi.org/10.1038/srep27604>.

Wang, W., Zheng, W., Zhang, P., Li, Q., Kirby, E., Yuan, D., Zheng, D., Liu, C., Wang, Z., Zhang, H., & Pang, J. (2017). Expansion of the Tibetan Plateau during the Neogene. *Nature communications*, *8*, 15887. <https://doi.org/10.1038/ncomms15887>.

Wang, W., Zheng, D., Li, C., Wang, Y., Zhang, Z., Pang, J., Wang, Y., Yu, J., Wang, Y., Zheng, W., & Zhang, H. (2020). Cenozoic exhumation of the Qilian Shan in the northeastern Tibetan Plateau: evidence from low-temperature thermochronology. *Tectonics*, *39*(4), e2019TC005705. <https://doi.org/10.1029/2019TC005705>.

Wang, W., Zhang, P., Garzione, C. N., Liu, C, Zhang, Z., Pang, J., Wang, Y., Zheng D., Zheng, W., & Zhang H. (2022). Pulsed rise and growth of the Tibetan Plateau to its northern margin since ca. 30 Ma. *Proceedings of the National Academy of Sciences*, *119*(8), e2120364119. <https://doi.org/10.1073/pnas.2120364119>.

Wang, X., Li, J., Song, C., Zattin, M., Zhao, Z., Zhang, J., Zhang, Y., & He, K. (2011a). Late Cenozoic orogenic history of western Qinling inferred from sedimentation of Tianshui basin, northeastern margin of Tibetan plateau. *International Journal of Earth sciences*, *101*(5), 1345-1356. <https://doi.org/10.1007/s00531-011-0724-5>.

Wang, X., Zattin, M., Li, J., Song, C., Peng, T., Liu, S., & Liu, B. (2011b). Eocene to Pliocene exhumation history of the Tianshui-Huicheng region determined by apatite fission track thermochronology: implications for evolution of the northeastern Tibetan plateau margin. *Journal of Asian Earth sciences*, *42*(1-2), 97-110. <https://doi.org/10.1016/j.jseaes.2011.04.012>.

Wang, X., Song, C., Zattin, M., He, P., Song, A., Li, J., & Wang, Q. (2016). Cenozoic pulsed deformation history of northeastern Tibetan Plateau reconstructed from fission-track thermochronology. *Tectonophysics*, *672-673*, 212-227. <https://doi.org/10.1016/j.tecto.2016.02.006>.

Wang, X., Deng, L., Zattin, M., Ji, M., & Li, J. (2017). Palaeogene growth of the northeastern Tibetan Plateau: detrital fission track and sedimentary analysis of the Lanzhou basin, NW China. *Journal of Asian Earth Sciences*, *147*, 322-331. <https://doi.org/10.1016/j.jseaes.2017.07.020>.

Wang, X. M., Wang, B., Qiu, Z., Xie, G., Xie, J., Downs, W., Qiu, Z., & Deng, T. (2003). Danghe area (western Gansu, China) biostratigraphy and implications for depositional history and tectonics of northern Tibetan Plateau. *Earth and Planetary Science Letters*, *208*(3-4), 253-269. [https://doi.org/10.1016/S0012-821X(03)00047-5](https://doi.org/10.1016/S0012-821X%2803%2900047-5).

Wang, Y., Deng, T., & Biasatti, D. (2006). Ancient diets indicate significant uplift of southern Tibet after ca. 7 Ma. *Geology*, *34*(4), 309-312. <https://doi.org/10.1130/G22254.1>.

Wang, Y. D., Zheng, J., Zhang, W., Li, S., Liu, X., Yang, X., & Liu, Y. (2012). Cenozoic uplift of the Tibetan Plateau: Evidence from the tectonic-sedimentary evolution of the western Qaidam Basin. *Geoscience Frontiers*, *3*(2), 175-187. <https://doi.org/10.1016/j.gsf.2011.11.005>.

Wang, Y. D., Zheng, J., Zheng, Y., Liu, X., & Sun, G. (2015). Paleocene-Early Eocene uplift of the Altyn Tagh Mountain: Evidence from detrital zircon fission track analysis and seismic sections in the northwestern Qaidam basin. *Journal of Geophysical Research: Solid Earth*, *120*(12), 8534-8550. <https://doi.org/10.1002/2015JB011922>.

Wang, Y. D., Zheng, J., & Zheng, Y. (2018). Mesozoic-Cenozoic exhumation history of the Qimen Tagh Range, northeastern margins of the Tibetan Plateau: Evidence from apatite fission track analysis. *Gondwana Research*, *58*, 16-26. <https://doi.org/10.1016/j.gr.2018.01.014>.

Wu, C., Zuza, A. V., Zhou, Z., Yin, A., McRivette, M. V., Chen, X., Ding, L., & Geng, J. (2019). Mesozoic-Cenozoic evolution of the Eastern Kunlun Range, central Tibet, and implications for basin evolution during the Indo-Asian collision. *Lithosphere*, *11*(4), 524-550. [https://doi.org/10.1016/S0040-1951(03)00053-2](https://doi.org/10.1016/S0040-1951%2803%2900053-2).

Wu, C., Liu, C., Fan, S., Zuza, A. V., Ding, L., Liu, W., Ye, B., Yang, S., & Zhou, Z. (2020). Structural analysis and tectonic evolution of the western domain of the Eastern Kunlun Range, northwest Tibet. *Geological Society of America Bulletin*, *132*(5-6), 1291-1315. <https://doi.org/10.1130/B35388.1>.

Wu, C., Zuza, A. V., Li, J., Haproff, P. J., Yin, A., Chen, X., Ding, L., & Li, B. (2021). Late Mesozoic-Cenozoic cooling history of the northeastern Tibetan Plateau and its foreland derived from low-temperature thermochronology. *Geological Society of America Bulletin*, *133*(11-12), 2393-2417. <https://doi.org/10.1130/B35879.1>.

Wu, J., Guo, L., Xiong, S., Wang, S., Tang, Z., Yang, X., Gu, N., Li, C., & Cui, J. (2019). New magnetic constraints on early-middle Miocene uplift of the Liupan Shan, northeastern margin of the Tibetan Plateau. *Geochemistry, Geophysics, Geosystems*, *20*(3), 1340-1357. <https://doi.org/10.1029/2018gc007944>.

Wu, L., Xiao, A., Yang, S., Wang, L., Mao, L., Wang, L., Dong, Y., & Xu, B. (2012). Two-stage evolution of the Altyn Tagh Fault during the Cenozoic: new insight from provenance analysis of a geological section in NW Qaidam Basin. NW China. *Terra Nova*, *24*(5), 387-395. <https://doi.org/10.1111/j.1365-3121.2012.01077.x>.

Wu, L., Lin, X., Cowgill, E., Xiao, A., Cheng, X., Chen, H., Zhao, H., Shen, Y., & Yang, S. (2019). Middle Miocene reorganization of the Altyn Tagh fault system, northern Tibetan Plateau. *Geological Society of America Bulletin*, *131*(7-8), 1157-1178. <https://doi.org/10.1130/B31875.1>.

Wu, Z., Ye, P., Patrick, B. J., Hu, D., Zhao, W., & Wu, Z. (2009). Late Oligocene-Early Miocene thrusting in southern East Kunlun Mountains, northern Tibetan plateau. *Journal of Earth Science*, *20*(2), 381-390. <https://doi.org/10.1007/s12583-009-0031-2>.

Xia, G., Wu, C., Li, G., Li, G., Yi, H., & Wagreich, M. (2020). Cenozoic growth of the Eastern Kunlun Range (northern Tibetan Plateau): evidence from sedimentary records in the southwest Qaidam Basin. *International Geology Review*, *63*(6), 769-786. <https://doi.org/10.1080/00206814.2020.1731717>.

Yan, M., Vander, Voo, R., Fang, X., Parés, J. M., & Rea, D. K. (2006). Paleomagnetic evidence for a mid-Miocene clockwise rotation of about 25° of the Guide Basin area in NE Tibet. *Earth and Planetary Science Letters*, *241*(1-2), 234-247. <https://doi.org/10.1016/j.epsl.2005.10.013>.

Yang, R., Fang, X., Meng, Q., Zan, J., Zhang, W., Deng, T., Yang, Y., Ruan, X., Yang, L., & Li, B. (2017). Paleomagnetic constraints on the Middle Miocene-Early Pliocene stratigraphy in the Xining Basin, NE Tibetan Plateau, and the geologic implications. *Geochemistry, Geophysics, Geosystems*, *18*(11), 3741-3757. <https://doi.org/10.1002/2017GC006945>.

Ye, Y., Wu, L., Cowgill, E., Tian, Y., Lin, X., Xiao, A., & Chen, H., 2022. Long-lagged (∼19 Myr) response of accelerated river incision to rock uplift on the northern margin of the Tibetan Plateau. *Earth and Planetary Science Letters,* 591, 117608. https://doi.org/10.1016/j.epsl.2022.117608.

Yin, A., Rumelhart, P. E., Butler, R., Cowgill, E., Harrison, T. M., Foster, D. A., Ingersoll, R. V., Zhang, Q., Zhou, X., Wang, X., Hanson, A., & Raza, A. (2002). Tectonic history of the Altyn Tagh fault system in northern Tibet inferred from Cenozoic sedimentation. *Geological Society of America Bulletin*, *114*(10), 1257-1295. [https://doi.org/10.1130/0016-7606(2002)1142.0.CO;2](https://doi.org/10.1130/0016-7606%282002%291142.0.CO;2).

Yin, A., Dang, Y., Wang, L., Jiang, W., Zhou, S., Chen, X., Gehrals, G. E., & McRivette, M. W. (2008a). Cenozoic tectonic evolution of the Qaidam Basin and its surrounding regions (part 1): the southern Qilian Shan-Nan Shan thrust belt and northern Qaidam basin. *Geological Society of America Bulletin*, *120*(7-8), 813-846. <https://doi.org/10.1130/B26180.1>.

Yin, A., Dang, Y., Zhang, M., Chen, X., & McRivette, M. W. (2008b). Cenozoic tectonic evolution of the Qaidam basin and its surrounding regions (Part 3): Structural geology, sedimentation, and regional tectonic reconstruction. *Geological Society of America Bulletin*, *120*(7-8), 847-876. <https://doi.org/10.1130/B26232.1>.

Yu, J., Zheng, D., Pang, J., Wang, Y., Fox, M., & Vermeesch, P. (2019a). Miocene range growth along the Altyn Tagh fault: Insights from apatite fission track and (U-Th)/He thermochronometry in the western Danghenan Shan, China. *Journal of Geophysical Research: Solid Earth*, *124*, 9433-9453. <https://doi.org/10.1029/2019JB017570>.

Yu, J., Pang, J., Wang, Y., Zheng, D., Liu, C., Wang, W., Li, Y., Li, C., & Xiao, L. (2019b). Mid-Miocene uplift of the northern Qilian Shan as a result of the northward growth of the northern Tibetan Plateau. *Geosphere*, *15*(2), 1-10. <https://doi.org/10.1130/GES01520.1>.

Yu, X., Mo, X., Zhao, Z., He, W., & Li, Y. (2011). Cenozoic bimodal volcanic rocks of the West Qinling: Implication for the genesis and nature of the rifting of north-south tectonic belt. *Acta Petrologica Sinica*, *27*(7), 2195-2202. <https://doi.org/10.1016/j.sedgeo.2011.06.007>. (In Chinese with English abstract).

Yuan, W., Dong, J., Wang, S., & Carter, A. (2006). Apatite fission track evidence for Neogene uplift in the eastern Kunlun Mountains, northern Qinghai-Tibet Plateau, China. *Journal of Asian Earth Sciences*, *27*(6), 847-856. <https://doi.org/10.1016/j.jseaes.2005.09.002>.

Yue, Y., Ritts, B. D., Graham, S. A., Wooden, J. L., Gehrels, G. E., & Zhang, Z. (2004). Slowing extrusion tectonics: lowered estimate of post-Early Miocene slip rate for the Altyn Tagh fault. *Earth and Planetary Science Letters*, *217*(1-2), 111-122. [https://doi.org/10.1016/S0012-821X(03)00544-2](https://doi.org/10.1016/S0012-821X%2803%2900544-2).

Zhang, J., Wang, Y., Zhang, B., & Zhao, H. (2015). Evolution of the NE Qinghai-Tibetan Plateau, constrained by the apatite fission track ages of the mountain ranges around the Xining Basin in NW China. *Journal of Asian Earth Sciences*, *97*, 10-23. <https://doi.org/10.1016/j.jseaes.2014.10.002>.

Zhang, H., Craddock, W. H., Lease, R. O., Wang, W., Yuan, D., Zhang, P., Molnar, P., Zheng, D., & Zheng, W. (2011). Magnetostratigraphy of the Neogene Chaka basin and its implications for mountain building processes in the north-eastern Tibetan Plateau. *Basin Research*, *24*(1), 31-50. <https://doi.org/10.1111/j.1365-2117.2011.00512.x>.

Zhang, T., Fang, X., Wang, Y., Song, C., Zhang, W., Yan, M., Han, W., & Zhang, D. (2018a). Late Cenozoic tectonic activity of the Altyn Tagh range: Constraints from sedimentary records from the western Qaidam Basin, NE Tibetan Plateau. *Tectonophysics*, *737*, 40-56. <https://doi.org/10.1016/j.tecto.2018.04.021>.

Zhang, T., Han, W., Fang, X., Miao, Y., Zhang, W., Song, C., Wang, Y., Khatri, D. B., & Zhang, Z. (2018b). Tectonic control of a change in sedimentary environment at ~10 Ma in the northeastern Tibetan Plateau. *Geophysical Research Letters*, *45*(14), 6843-6852. <https://doi.org/10.1029/2018GL078460>.

Zhang W. (2006). *Cenozoic uplift of the Tibetan Plateau: Evidence from high resolution magnetostratigraphy of the Qaidam basin*. (PhD thesis). Lanzhou University.

Zhao, Z., Shi, W., Yang, Y., Cai, M., Liu, C., Liu, X., Wang, T., Zhao, Y., & Yang, Q. (2022). Late Cenozoic magnetostratigraphy and paleoenvironmental change in the northeastern Tibetan Plateau: Evidence from a drill core in the Wuwei Basin, NW China. *Journal of Asian Earth Sciences*, *224*, 105023. <https://doi.org/10.1016/j.jseaes.2021.105023>.

Zheng, D., Zhang, P., Wan, J., Yuan, D., Yin, G., Zhang, G., Wang, Z., Min, W., & Chen, J. (2006). Rapid exhumation at ~ 8 Ma on the Liupan Shan thrust fault from apatite fission-track thermochronology: Implications for growth of the northeastern Tibetan Plateau margin. *Earth and Planetary Science Letters*, *248*(1-2), 198-208. <https://doi.org/10.1016/j.epsl.2006.05.023>.

Zheng, D., Clark, M. K., Zhang, P., Zheng, W., & Farley, K. A. (2010). Erosion, fault initiation and topographic growth of the North Qilian Shan (northern Tibetan Plateau). *Geosphere*, *6*(6), 937-941. <https://doi.org/10.1130/GES00523.1>.

Zheng D., Wang W., Wan J, Yuan, D., Liu, C., Zheng, W., Zhang, H., Pang, J., & Zhang, P. (2017). Progressive northward growth of the northern Qilian Shan-Hexi Corridor (northeastern Tibet) during the Cenozoic. *Lithoshere*, *9*(3), 408-416. <https://doi.org/10.1130/L587.1>.

Zhou, J., Xu, F., Wang, T., Cao, A., & Yin, C. (2006). Cenozoic deformation history of the Qaidam Basin, NW China: Results from cross-section restoration and implications for Qinghai-Tibet Plateau tectonics. *Earth and Planetary Science Letters*, *243*(1-2), 195-210. <https://doi.org/10.1016/j.epsl.2005.11.033>.

Zhuang, G., Brandon, M. T., Pagani, M., & Krishnan, S. (2014). Leaf wax stable isotopes from Northern Tibetan Plateau: Implications for uplift and climate since 15 Ma. *Earth and Planetary Science Letters*, *390*, 186-198. <https://doi.org/10.1016/j.epsl.2014.01.003>.

Zhuang, G., Zhang, Y. G., Hourigan, J. K., Ritts, B. D., Hren, M., Hou, M., Wu, M., & Kim, B. (2019). Microbial and Geochronologic Constraints on the Neogene Paleotopography of Northern Tibetan Plateau. *Geophysical Research Letters*, *46*(3), 1312-1319. <https://doi.org/10.1029/2018GL081505>.