

Journal of Geophysical Research: Solid Earth

Supporting Information for

**Late Miocene hinterland crustal shortening in the Longmen Shan thrust belt, the eastern margin of the Tibetan Plateau**

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Table S1 A compilation of thermochronological data in central Longmen Shan for plotting Figure 4.

**Introduction**

This file includes two supporting figures and one supporting table which are (1) relationship of eU versus ZHe and AHe ages, (2) plot of ZHe and AHe ages versus equivalent radius (Rs), (3) plots of inverse modeling results of the second model, and (4) a compilation of thermochronological data in central Longmen Shan for plotting Figure 7.

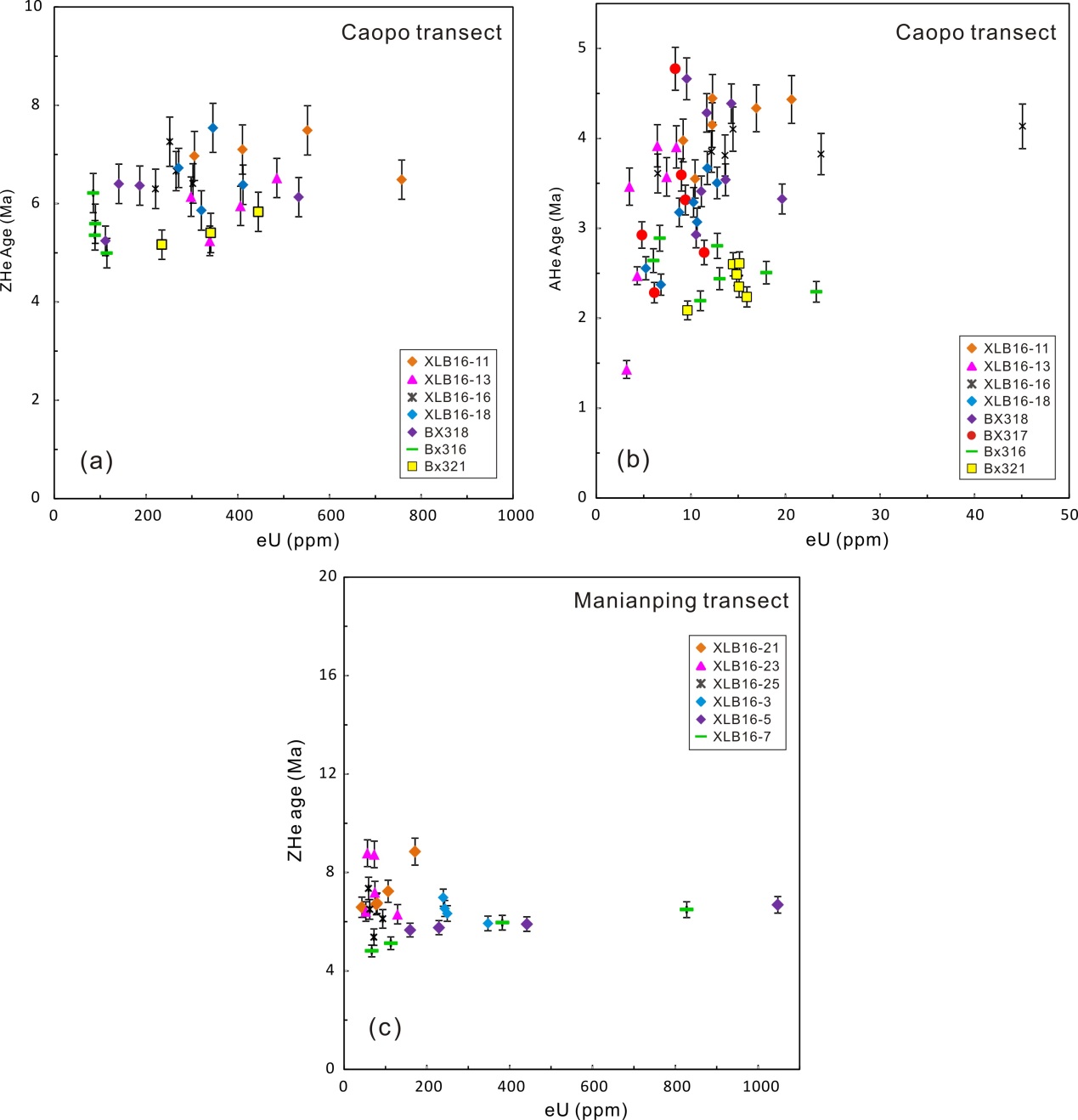


Figure S1. Relationship of eU versus ZHe and AHe ages of the Caopo and Manianping transects. These samples do not exhibit correlation, suggesting minor effects on the grains from radiation damage and not suffering slowly cooling.

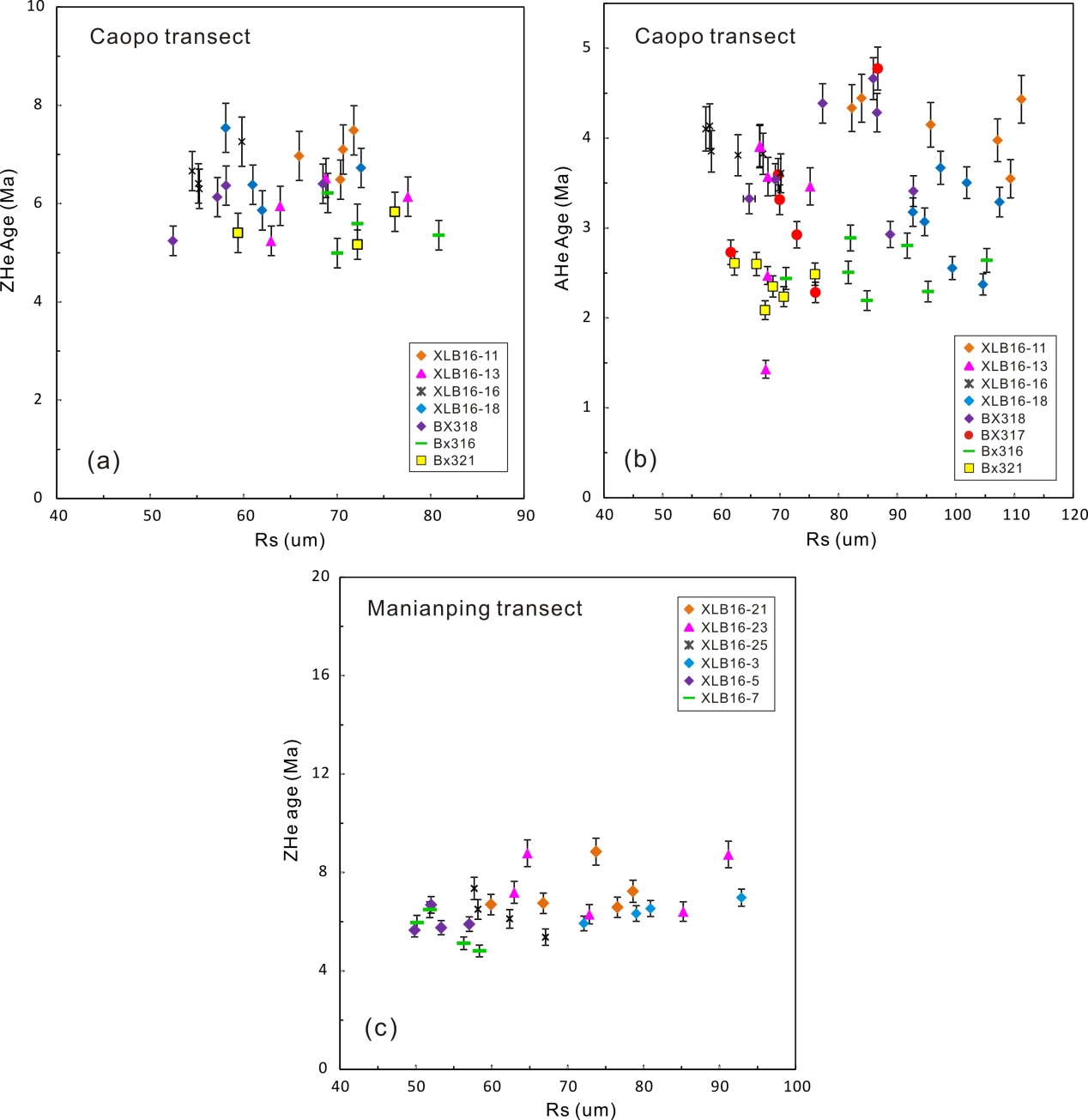


Figure S2. Plot of ZHe and AHe ages versus equivalent radius (Rs), which is the radius of a sphere with an equivalent surface area-to-volume ratio as a cylindrical crystal.

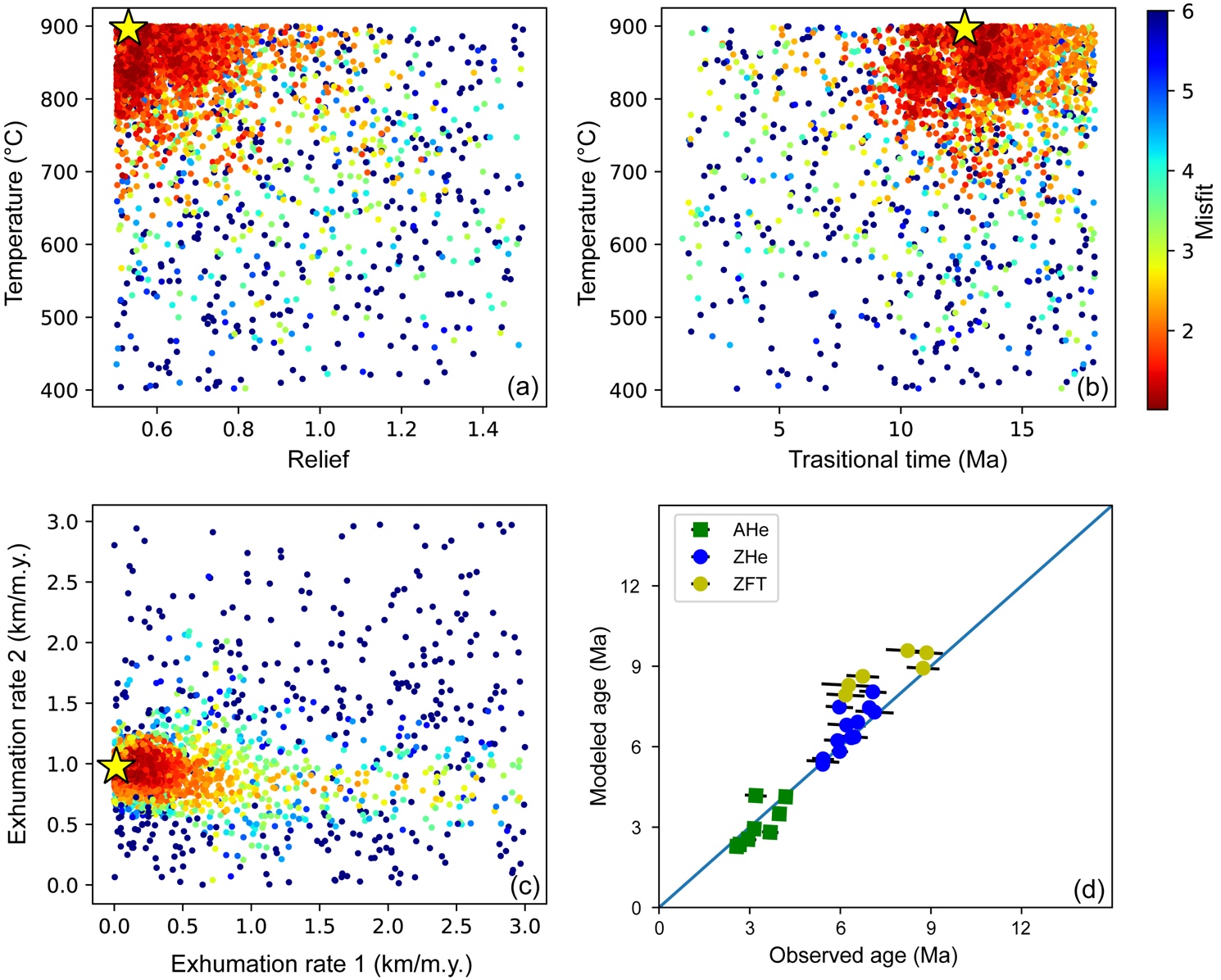


Figure S3. 2D scatter diagrams showing (a-c) results of the NA inversion and (d) comparison between observations and predictions by the best-fit model. Except for the basal temperature (400-900 oC), other setups are the same as the model shown in figure 5.

Table S1 A compilation of thermochronological data in central Longmen Shan for plotting Figure 7.

| Sample No. | Longitude | Latitude | Elevation | Age (Ma) | Error (1σ) | Age type | References |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0935-5 | 103.7997 | 31.0750 | 431 | 40.3 | 3.0 | AFT | Arne et al. (1997) |
| 1035-1 | 103.8000 | 31.1042 | 765 | 94.3 | 9.1 | AFT | Arne et al. (1997) |
| FT1 | 103.1308 | 31.7183 | 3950 | 6.6 | 1.0 | AFT | Arne et al. (1997) |
| FT2 | 103.1308 | 31.7183 | 3500 | 7.3 | 1.4 | AFT | Arne et al. (1997) |
| FT4 | 103.1308 | 31.7183 | 2750 | 3.9 | 0.6 | AFT | Arne et al. (1997) |
| FT-5 | 103.1109 | 31.6636 | 2400 | 3.8 | 1.3 | AFT | Arne et al. (1997) |
| FT-7 | 103.3993 | 31.0684 | 950 | 6.5 | 1.2 | AFT | Arne et al. (1997) |
| CW-6a | 103.3993 | 31.0684 | 1150 | 4.8 | 1.5 | AFT | Arne et al. (1997) |
| CW-3 | 103.7824 | 31.1177 | 800 | 173 | 8.5 | AFT | Arne et al. (1997) |
| FT93-152 | 103.4459 | 30.9351 | 800 | 39 | 5.0 | AFT | Arne et al. (1997) |
| HKT15 | 103.1700 | 31.0200 | 2081 | 4.9 | 0.5 | AFT | Arne et al. (1997) |
| FT93-154 | 103.8396 | 30.9896 | 900 | 168 | 10.0 | AFT | Arne et al. (1997) |
| FT1 | 103.1308 | 31.7183 | 3950 | 68 | 4.0 | ZFT | Arne et al. (1997) |
| FT4 | 103.1308 | 31.7183 | 2750 | 49 | 7.0 | ZFT | Arne et al. (1997) |
| FT-5 | 103.1109 | 31.6636 | 2400 | 38 | 2.0 | ZFT | Arne et al. (1997) |
| FT-7 | 103.3993 | 31.0684 | 950 | 110 | 7.0 | ZFT | Arne et al. (1997) |
| Mar-93 | 103.3902 | 31.0738 | 900 | 4.6 | 0.2 | AHe | Kirby et al. (2002) |
| Apr-93 | 103.3941 | 31.1549 | 900 | 11 | 0.5 | ZHe | Kirby et al. (2002) |
| LM223 | 103.6049 | 31.3886 | 2474 | 14.6 | 0.6 | ZHe | Godard et al. (2009) |
| LM225 | 103.5886 | 31.3797 | 3185 | 15 | 0.9 | ZHe | Godard et al. (2009) |
| LM226 | 103.5911 | 31.3779 | 3060 | 22.3 | 1.3 | ZHe | Godard et al. (2009) |
| LM227 | 103.5953 | 31.3812 | 2806 | 26.3 | 1.5 | ZHe | Godard et al. (2009) |
| LM228 | 103.5968 | 31.4154 | 2232 | 9 | 0.6 | ZHe | Godard et al. (2009) |
| LM229 | 103.5758 | 31.4249 | 1731 | 21.6 | 1.3 | ZHe | Godard et al. (2009) |
| LM2196 | 103.5981 | 31.4018 | 2190 | 7.8 | 0.3 | ZHe | Godard et al. (2009) |
| LM256 | 103.4917 | 31.4436 | 2330 | 12.2 | 0.7 | ZHe | Godard et al. (2009) |
| W1425 | 103.5264 | 31.4149 | 1439 | 9 | 0.6 | ZHe | Godard et al. (2009) |
| W1848 | 103.4989 | 31.4389 | 1860 | 7.2 | 0.4 | ZHe | Godard et al. (2009) |
| W2093 | 103.5040 | 31.4373 | 1956 | 8.55 | 0.5 | ZHe | Godard et al. (2009) |
| W2130 | 103.5022 | 31.4387 | 2130 | 11.1 | 0.5 | ZHe | Godard et al. (2009) |
| SC062 | 103.8981 | 31.3510 | 1726 | 9.1 | 0.4 | ZHe | Godard et al. (2009) |
| SC064 | 103.8575 | 31.3580 | 2061 | 19.8 | 0.8 | ZHe | Godard et al. (2009) |
| SC065 | 103.8542 | 31.3568 | 1927 | 13 | 0.5 | ZHe | Godard et al. (2009) |
| SC067 | 103.8878 | 31.3529 | 1807 | 12.4 | 0.5 | ZHe | Godard et al. (2009) |
| SC074 | 103.5370 | 31.2010 | 1755 | 20.6 | 0.9 | ZHe | Godard et al. (2009) |
| SC077 | 103.5325 | 31.2014 | 1526 | 7.5 | 0.3 | ZHe | Godard et al. (2009) |
| SC079 | 103.5227 | 31.2045 | 1350 | 4.04 | 0.3 | ZHe | Godard et al. (2009) |
| SC081 | 103.4955 | 31.2067 | 1056 | 9.9 | 0.4 | ZHe | Godard et al. (2009) |
| LM195 | 103.7541 | 31.3268 | 1495 | 11.6 | 0.5 | ZHe | Godard et al. (2009) |
| LM231 | 103.5169 | 31.3907 | 1295 | 10.1 | 0.4 | ZHe | Godard et al. (2009) |
| LM234 | 103.4870 | 31.2415 | 1130 | 17 | 0.7 | ZHe | Godard et al. (2009) |
| LM235 | 103.4768 | 31.1089 | 930 | 18.6 | 0.8 | ZHe | Godard et al. (2009) |
| SC083 | 103.3310 | 31.0709 | 930 | 12.5 | 0.5 | ZHe | Godard et al. (2009) |
| SC084 | 103.3577 | 31.0558 | 1452 | 6.3 | 0.3 | ZHe | Godard et al. (2009) |
| SC085 | 103.4672 | 31.0697 | 1712 | 60.7 | 2.5 | ZHe | Godard et al. (2009) |
| LM198 | 103.8496 | 31.1308 | 939 | 193.9 | 7.8 | ZHe | Godard et al. (2009) |
| LM208 | 104.0323 | 31.3489 | 811 | 228.7 | 9.2 | ZHe | Godard et al. (2009) |
| LM213 | 103.5757 | 31.0264 | 794 | 466.1 | 18.7 | ZHe | Godard et al. (2009) |
| W1425 | 103.5264 | 31.4149 | 1439 | 2.7 | 0.1 | AHe | Godard et al. (2009) |
| W1848 | 103.4989 | 31.4389 | 1860 | 2.1 | 0.1 | AHe | Godard et al. (2009) |
| W1848 | 103.4989 | 31.4389 | 1860 | 2.5 | 0.1 | AHe | Godard et al. (2009) |
| W2093 | 103.5040 | 31.4373 | 1956 | 2.3 | 0.1 | AHe | Godard et al. (2009) |
| W2093 | 103.5040 | 31.4373 | 1956 | 2.3 | 0.1 | AHe | Godard et al. (2009) |
| SC062 | 103.8981 | 31.3510 | 1726 | 4.8 | 0.2 | AHe | Godard et al. (2009) |
| SC065 | 103.8542 | 31.3568 | 1927 | 4.6 | 0.2 | AHe | Godard et al. (2009) |
| LM01 | 103.7200 | 31.0800 | 799 | 153.5 | 6.5 | AFT | Wilson and Fowler (2011) |
| LM03 | 103.4900 | 31.1400 | 987 | 7.7 | 2.3 | AFT | Wilson and Fowler (2011) |
| LM04 | 103.4900 | 31.2000 | 995 | 8.9 | 1.3 | AFT | Wilson and Fowler (2011) |
| LM07 | 103.4500 | 31.0700 | 1014 | 4.9 | 0.3 | AFT | Wilson and Fowler (2011) |
| LMW-01 | 103.6361 | 31.3833 | 4174 | 22.6 | 0.4 | AHe | Wang et al. (2012) |
| LMW-02 | 103.6403 | 31.3880 | 4009 | 0.8 | 0.6 | AHe | Wang et al. (2012) |
| LMW-06 | 103.6525 | 31.4156 | 3212 | 20.9 | 1.1 | AHe | Wang et al. (2012) |
| LMW-07 | 103.6622 | 31.4310 | 1908 | 10.9 | 0.3 | AHe | Wang et al. (2012) |
| LMW-08 | 103.6526 | 31.4430 | 1670 | 8.5 | 0.6 | AHe | Wang et al. (2012) |
| LME-09 | 103.6479 | 31.2907 | 2900 | 7.1 | 1.1 | AHe | Wang et al. (2012) |
| LME-11 | 103.6526 | 31.2874 | 2500 | 2.9 | 0.2 | AHe | Wang et al. (2012) |
| LME-13 | 103.6536 | 31.2853 | 2100 | 4.9 | 0.7 | AHe | Wang et al. (2012) |
| LME-14 | 103.6568 | 31.2848 | 2000 | 10.1 | 0.6 | AHe | Wang et al. (2012) |
| LME-15 | 103.6595 | 31.2830 | 1800 | 7.7 | 1.9 | AHe | Wang et al. (2012) |
| LME-16 | 103.6518 | 31.2676 | 1550 | 2.1 | 0.2 | AHe | Wang et al. (2012) |
| LME-17 | 103.6465 | 31.2289 | 1430 | 2.5 | 0.1 | AHe | Wang et al. (2012) |
| LME-18 | 103.6443 | 31.2165 | 1390 | 2.9 | 0.4 | AHe | Wang et al. (2012) |
| LME-19 | 103.6592 | 31.1740 | 1280 | 4.7 | 0.4 | AHe | Wang et al. (2012) |
| LME-20 | 103.6692 | 31.1607 | 1160 | 4.1 | 0.3 | AHe | Wang et al. (2012) |
| LMW-01 | 103.6361 | 31.3833 | 4174 | 56.5 | 19.8 | AFT | Wang et al. (2012) |
| LMW-02 | 103.6403 | 31.3880 | 4009 | 27.6 | 8.1 | AFT | Wang et al. (2012) |
| LMW-06 | 103.6525 | 31.4156 | 3212 | 17.8 | 10.6 | AFT | Wang et al. (2012) |
| LMW-07 | 103.6622 | 31.4310 | 1908 | 27.2 | 8.7 | AFT | Wang et al. (2012) |
| LMW-08 | 103.6526 | 31.4430 | 1670 | 19.9 | 4.2 | AFT | Wang et al. (2012) |
| LME-09 | 103.6479 | 31.2907 | 2900 | 27 | 4.1 | AFT | Wang et al. (2012) |
| LME-11 | 103.6526 | 31.2874 | 2500 | 19.8 | 3.0 | AFT | Wang et al. (2012) |
| LME-13 | 103.6536 | 31.2853 | 2100 | 23.5 | 2.8 | AFT | Wang et al. (2012) |
| LME-14 | 103.6568 | 31.2848 | 2000 | 18.4 | 3.1 | AFT | Wang et al. (2012) |
| LME-15 | 103.6595 | 31.2830 | 1800 | 17.3 | 2.7 | AFT | Wang et al. (2012) |
| LME-16 | 103.6518 | 31.2676 | 1550 | 21.3 | 5.7 | AFT | Wang et al. (2012) |
| LME-17 | 103.6465 | 31.2289 | 1430 | 23 | 2.8 | AFT | Wang et al. (2012) |
| LME-19 | 103.6592 | 31.1740 | 1280 | 15.1 | 2.7 | AFT | Wang et al. (2012) |
| LME-20 | 103.6692 | 31.1607 | 1160 | 15 | 2.2 | AFT | Wang et al. (2012) |
| LMW-01 | 103.6361 | 31.3833 | 4174 | 51.5 | 1.7 | ZHe | Wang et al. (2012) |
| LMW-03 | 103.6446 | 31.3979 | 3802 | 51.7 | 1.0 | ZHe | Wang et al. (2012) |
| LMW-05 | 103.6528 | 31.4129 | 3385 | 44.7 | 3.1 | ZHe | Wang et al. (2012) |
| LMW-07 | 103.6622 | 31.4310 | 1908 | 25.5 | 2.7 | ZHe | Wang et al. (2012) |
| LME-09 | 103.6479 | 31.2907 | 2900 | 37.4 | 2.5 | ZHe | Wang et al. (2012) |
| LME-11 | 103.6526 | 31.2874 | 2500 | 33.5 | 0.9 | ZHe | Wang et al. (2012) |
| LME-13 | 103.6536 | 31.2853 | 2100 | 33.9 | 1.8 | ZHe | Wang et al. (2012) |
| LME-15 | 103.6595 | 31.2830 | 1800 | 31.7 | 2.4 | ZHe | Wang et al. (2012) |
| LME-16 | 103.6518 | 31.2676 | 1550 | 23.9 | 1.6 | ZHe | Wang et al. (2012) |
| LME-17 | 103.6465 | 31.2289 | 1430 | 22.5 | 1.6 | ZHe | Wang et al. (2012) |
| LME-18 | 103.6443 | 31.2165 | 1390 | 24.7 | 0.9 | ZHe | Wang et al. (2012) |
| LME-20 | 103.6692 | 31.1607 | 1160 | 108.7 | 7.1 | ZHe | Wang et al. (2012) |
| LMW-01 | 103.6361 | 31.3833 | 4174 | 242.4 | 19.7 | ZFT | Wang et al. (2012) |
| LMW-05 | 103.6528 | 31.4129 | 3385 | 297.1 | 15.6 | ZFT | Wang et al. (2012) |
| LMW-07 | 103.6622 | 31.4310 | 1908 | 174.6 | 10.8 | ZFT | Wang et al. (2012) |
| LME-11 | 103.6526 | 31.2874 | 2500 | 263.1 | 17.6 | ZFT | Wang et al. (2012) |
| LME-17 | 103.6465 | 31.2289 | 1430 | 194.8 | 13.2 | ZFT | Wang et al. (2012) |
| LME-18 | 103.6443 | 31.2165 | 1390 | 197 | 23.4 | ZFT | Wang et al. (2012) |
| LME-20 | 103.6692 | 31.1607 | 1160 | 369.6 | 21.4 | ZFT | Wang et al. (2012) |
| Lm01 | 103.3863 | 31.3488 | 2026 | 9.3 | 0.4 | ZFT | Tan et al. (2017) |
| Lm02 | 103.3852 | 31.3418 | 1911 | 11.4 | 0.4 | ZFT | Tan et al. (2017) |
| Lm03 | 103.3968 | 31.3288 | 1752 | 8.4 | 0.3 | ZFT | Tan et al. (2017) |
| Lm04 | 103.4130 | 31.3122 | 1569 | 10.1 | 0.4 | ZFT | Tan et al. (2017) |
| Lm05 | 103.2451 | 31.5248 | 1658 | 12.5 | 0.5 | ZFT | Tan et al. (2017) |
| Lm06 | 103.4971 | 31.3660 | 1188 | 11.8 | 0.5 | ZFT | Tan et al. (2017) |
| Lm07 | 103.3782 | 31.3635 | 2346 | 10.1 | 0.4 | ZFT | Tan et al. (2017) |
| Lm08 | 103.3742 | 31.3560 | 2260 | 11.7 | 0.4 | ZFT | Tan et al. (2017) |
| Lm09 | 103.3825 | 31.3521 | 2147 | 10.3 | 0.5 | ZFT | Tan et al. (2017) |
| Lm10 | 103.3362 | 31.3626 | 2545 | 10.1 | 0.4 | ZFT | Tan et al. (2017) |
| Lm11 | 103.3555 | 31.3610 | 2500 | 10.5 | 0.5 | ZFT | Tan et al. (2017) |
| Lm19 | 103.7301 | 31.6004 | 1882 | 13.4 | 0.5 | ZFT | Tan et al. (2017) |
| Lm20 | 103.1280 | 31.6840 | 2258 | 42.9 | 1.1 | ZFT | Tan et al. (2017) |
| WCH-8 | 103.7500 | 31.1170 | 822 | 58.7 | 1.7 | ZFT | Tan et al. (2017) |
| LK-4 | 104.1540 | 31.4700 | 659 | 89.2 | 5.0 | ZFT | Tan et al. (2017) |
| JH-5 | 104.0220 | 31.4100 | 1090 | 86.2 | 4.0 | ZFT | Tan et al. (2017) |
| WCH-6 | 103.4800 | 31.0520 | 884 | 171.2 | 5.1 | ZFT | Tan et al. (2017) |
| JH-1 | 104.0580 | 31.3100 | 672 | 240.6 | 28.0 | ZFT | Tan et al. (2017) |
| JH-2 | 104.0320 | 31.2870 | 725 | 144.8 | 9.8 | ZFT | Tan et al. (2017) |
| C93-244 | 103.6697 | 31.5484 | 1650 | 131 | 0.3 | 40Ar/39Ar | Arne et al. (1997) |
| C93-246B | 103.5755 | 31.4962 | 1500 | 119.4 | 0.6 | 40Ar/39Ar | Arne et al. (1997) |
| BM-29 | 103.5408 | 31.3319 | 3240 | 160 | 0.4 | 40Ar/39Ar | Yan et al. (2008) |

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