**Tables:**

Table 1. Summary of new AHe, ZHe and ZFT data reported in this study.

| Sample No. | Latitude | Longitude | Elevation | AHe age1 | 1σ | ZHe age1 | 1σ | ZFT age | 1σ |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Caopo transect | | | |  |  |  |  |  |  |
| XLB16-11 | 31.4089 | 103.3620 | 4312 | 4.1 | 0.2 | 7.0 | 0.2 | 8.3 | 0.8 |
| XLB16-13 | 31.4049 | 103.3563 | 4056 | 3.0 | 0.4 | 5.9 | 0.5 | 9.0 | 0.6 |
| XLB16-16 | 31.4058 | 103.3435 | 3683 | 3.9 | 0.1 | 6.6 | 0.2 | 8.9 | 0.6 |
| XLB16-18 | 31.3989 | 103.3319 | 3126 | 3.0 | 0.2 | 6.5 | 0.5 |  |  |
| BX319 | 31.3935 | 103.3829 | 2905 |  |  |  |  | 6.7 | 0.6 |
| BX318 | 31.3801 | 103.3775 | 2700 | 3.6 | 0.3 | 5.9 | 0.5 | 6.2 | 1.0 |
| BX317 | 31.3713 | 103.3807 | 2500 | 2.8 | 0.3 |  |  | 6.1 | 0.7 |
| BX316 | 31.3498 | 103.3856 | 2107 | 2.5 | 0.1 | 5.4 | 0.4 |  |  |
| BX321 | 31.3180 | 103.3970 | 1728 | 2.4 | 0.1 | 5.4 | 0.2 |  |  |
| Manianping transect | |  |  |  |  |  |  |  |  |
| XLB16-21 | 31.4347 | 103.4082 | 4922 |  |  | 7.1 | 0.5 |  |  |
| XLB16-23 | 31.4244 | 103.4132 | 4300 |  |  | 7.2 | 0.7 |  |  |
| XLB16-25 | 31.4276 | 103.4243 | 3605 |  |  | 6.2 | 0.7 |  |  |
| XLB16-3 | 31.4027 | 103.4301 | 2960 |  |  | 6.4 | 0.3 |  |  |
| XLB16-5 | 31.4101 | 103.4464 | 2401 |  |  | 6.0 | 0.3 |  |  |
| XLB16-7 | 31.4040 | 103.4801 | 1827 |  |  | 5.4 | 0.6 |  |  |

1 Weighted means calculated using Isoplot V3.59 [Ludwig, 1991].

Table 2. ZFT results from Caopo transect of Xuelongbao massif, central Longmen Shan

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | No. of | Spontaneous\* | | Induced\* | | Dosimeter\* | | P(χ2) | U | Age  Dispersion | Age  (Ma) |
| No. | Grains | ρs (×106 m−2) | Ns | ρi (×106 m−2) | Ni | ρd (×106 m−2) | Nd | % | (ppm) | % | (± 1σ)† |
| XLB16-11 | 17 | 0.54 | 220 | 2.30 | 965 | 0.58 | 2406 | 15.7 | 142.9 | 18.7 | 8.3 ± 0.8 |
| XLB16-13 | 20 | 0.59 | 275 | 2.31 | 1121 | 0.58 | 2406 | 93.0 | 143.5 | 0 | 9.0 ± 0.6 |
| XLB16-16 | 20 | 1.08 | 282 | 4.39 | 1163 | 0.58 | 2406 | 74.7 | 272.8 | 0.2 | 8.9 ± 0.6 |
| BX319 | 14 | 0.99 | 233 | 5.23 | 1267 | 0.58 | 2406 | 14.1 | 325.2 | 16 | 6.7± 0.6 |
| BX318 | 4 | 0.58 | 44 | 3.52 | 262 | 0.58 | 2406 | 85.3 | 218.8 | 0 | 6.2± 1.0 |
| BX317 | 14 | 0.30 | 105 | 1.71 | 629 | 0.58 | 2406 | 74.9 | 106.6 | 0.5 | 6.1± 0.7 |

\* All samples were dated using the external detector method.

†Age data determined by AC using zeta (CN5) = 127 ± 5. All ages are central ages calculated from Galbraith and Laslett (1993).

Table 3. Single-grain zircon (U-Th)/He results from the Xuelongbao massif, central Longmen Shan

| Sample No. | 4He (ncc) | Mass (mg) | U (ppm) | Th (ppm) | Th/U | Rs 1 (μm) | FT 2 | Corr. Age (Ma) | Error (±1σ) | Weighted Mean 3  (Ma ± 1σ) | [eU] 4 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Caopo transect | |  |  |  |  |  |  |  |  |  |  |
| XLB16-11-1 | 3.251 | 0.0114 | 226.4 | 782.3 | 3.5 | 70.7 | 0.81 | 7.1 | 0.5 | 7.0 ± 0.2 | 410.2 |
| XLB16-11-2 | 5.920 | 0.0144 | 462.7 | 379.9 | 0.8 | 71.8 | 0.82 | 7.5 | 0.5 |  | 552.0 |
| XLB16-11-3 | 5.923 | 0.0123 | 549.2 | 886.5 | 1.6 | 70.4 | 0.81 | 6.5 | 0.4 |  | 757.5 |
| XLB16-11-4 | 2.256 | 0.0109 | 215.9 | 381.5 | 1.8 | 65.9 | 0.80 | 7.0 | 0.5 |  | 305.5 |
| XLB16-13-1 | 2.408 | 0.0130 | 270.8 | 116.5 | 0.4 | 77.6 | 0.83 | 6.1 | 0.4 | 5.9 ± 0.5 | 298.2 |
| XLB16-13-2 | 2.933 | 0.0094 | 407.0 | 332.7 | 0.8 | 68.8 | 0.81 | 6.5 | 0.4 |  | 485.2 |
| XLB16-13-3 | 2.123 | 0.0090 | 371.2 | 148.5 | 0.4 | 63.9 | 0.80 | 6.0 | 0.4 |  | 406.1 |
| XLB16-13-4 | 1.626 | 0.0094 | 310.0 | 123.7 | 0.4 | 63.0 | 0.80 | 5.2 | 0.3 |  | 339.0 |
| XLB16-16-1 | 1.314 | 0.0080 | 229.9 | 151.9 | 0.7 | 54.5 | 0.77 | 6.7 | 0.4 | 6.6 ± 0.2 | 265.6 |
| XLB16-16-2 | 1.193 | 0.0068 | 217.0 | 147.6 | 0.7 | 59.8 | 0.79 | 7.3 | 0.5 |  | 251.7 |
| XLB16-16-3 | 0.827 | 0.0063 | 191.4 | 125.3 | 0.7 | 55.3 | 0.77 | 6.3 | 0.4 |  | 220.8 |
| XLB16-16-4 | 1.148 | 0.0064 | 260.4 | 178.6 | 0.7 | 55.2 | 0.77 | 6.4 | 0.4 |  | 302.3 |
| XLB16-18-1 | 1.402 | 0.0077 | 283.9 | 156.0 | 0.5 | 62.0 | 0.79 | 5.9 | 0.4 | 6.5 ± 0.5 | 320.6 |
| XLB16-18-2 | 2.887 | 0.0158 | 240.7 | 129.2 | 0.5 | 72.6 | 0.82 | 6.7 | 0.4 |  | 271.1 |
| XLB16-18-3 | 2.244 | 0.0089 | 372.1 | 167.9 | 0.5 | 61.0 | 0.79 | 6.4 | 0.4 |  | 411.6 |
| XLB16-18-4 | 2.087 | 0.0084 | 312.7 | 141.2 | 0.5 | 58.1 | 0.78 | 7.5 | 0.5 |  | 345.9 |
| BX318-1 | 0.104 | 0.0054 | 165.1 | 90.5 | 0.5 | 58.1 | 0.78 | 6.4 | 0.4 | 5.9 ± 0.5 | 186.3 |
| BX318-2 | 0.103 | 0.0049 | 97.5 | 59.4 | 0.6 | 52.4 | 0.76 | 5.2 | 0.3 |  | 111.5 |
| BX318-3 | 0.099 | 0.0105 | 119.4 | 90.6 | 0.8 | 68.5 | 0.80 | 6.4 | 0.4 |  | 140.7 |
| BX318-4 | 0.150 | 0.0071 | 477.8 | 234.6 | 0.5 | 57.2 | 0.78 | 6.1 | 0.4 |  | 532.9 |
| BX316-1 | 0.702 | 0.0132 | 77.7 | 30.7 | 0.4 | 69.0 | 0.81 | 6.2 | 0.4 | 5.4 ± 0.4 | 84.9 |
| BX316-2 | 0.563 | 0.0111 | 81.7 | 32.4 | 0.4 | 72.2 | 0.82 | 5.6 | 0.4 |  | 89.3 |
| BX316-3 | 0.560 | 0.0097 | 106.0 | 36.7 | 0.3 | 70.0 | 0.81 | 5.0 | 0.3 |  | 114.6 |
| BX316-4 | 0.843 | 0.0172 | 79.5 | 38.9 | 0.5 | 80.9 | 0.84 | 5.4 | 0.3 |  | 88.6 |
| BX321-1 | 0.426 | 0.0158 | 391.5 | 226.7 | 0.6 | 76.2 | 0.82 | 5.8 | 0.4 | 5.4 ± 0.2 | 444.8 |
| BX321-3 | 0.124 | 0.0071 | 301.7 | 167.5 | 0.6 | 59.4 | 0.78 | 5.4 | 0.4 |  | 341.1 |
| BX321-4 | 0.122 | 0.0130 | 198.6 | 152.9 | 0.8 | 72.2 | 0.81 | 5.2 | 0.3 |  | 234.5 |
| Manianping transect | |  |  |  |  |  |  |  |  |  |  |
| XLB16-21-1 | 0.390 | 0.0061 | 72.7 | 21.9 | 0.3 | 59.9 | 0.78 | 6.7 | 0.4 | 7.1 ± 0.5 | 77.9 |
| XLB16-21-2 | 1.180 | 0.0126 | 94.4 | 51.7 | 0.5 | 78.6 | 0.83 | 7.2 | 0.4 |  | 106.5 |
| XLB16-21-3 | 0.592 | 0.0090 | 74.0 | 25.0 | 0.3 | 66.8 | 0.81 | 6.7 | 0.4 |  | 79.8 |
| XLB16-21-4 | 2.839 | 0.0154 | 156.6 | 62.8 | 0.4 | 73.7 | 0.83 | 8.8 | 0.5 |  | 171.4 |
| XLB16-21-5 | 0.692 | 0.0200 | 39.6 | 14.8 | 0.4 | 76.6 | 0.82 | 6.6 | 0.4 |  | 43.1 |
| XLB16-23-1 | 0.635 | 0.0154 | 48.2 | 19.1 | 0.4 | 85.2 | 0.84 | 6.4 | 0.4 | 7.2 ± 0.7 | 52.7 |
| XLB16-23-2 | 1.621 | 0.0209 | 66.7 | 26.9 | 0.4 | 91.2 | 0.86 | 8.7 | 0.5 |  | 73.0 |
| XLB16-23-3 | 0.512 | 0.0078 | 69.0 | 23.5 | 0.3 | 63.0 | 0.80 | 7.2 | 0.4 |  | 74.5 |
| XLB16-23-4 | 0.511 | 0.0084 | 50.8 | 24.5 | 0.5 | 64.7 | 0.80 | 8.8 | 0.5 |  | 56.6 |
| XLB16-23-5 | 1.071 | 0.0108 | 121.8 | 32.1 | 0.3 | 72.8 | 0.83 | 6.3 | 0.4 |  | 129.3 |
| XLB16-25-1 | 0.367 | 0.0075 | 55.1 | 30.5 | 0.6 | 58.2 | 0.78 | 6.5 | 0.4 | 6.2 ± 0.7 | 62.2 |
| XLB16-25-2 | 0.401 | 0.0076 | 54.3 | 21.5 | 0.4 | 57.7 | 0.78 | 7.4 | 0.5 |  | 59.3 |
| XLB16-25-3 | 0.458 | 0.0066 | 86.9 | 28.1 | 0.3 | 62.4 | 0.79 | 6.1 | 0.4 |  | 93.5 |
| XLB16-25-4 | 0.465 | 0.0099 | 65.8 | 27.3 | 0.4 | 67.1 | 0.81 | 5.4 | 0.3 |  | 72.2 |
| XLB16-3-1 | 3.555 | 0.0203 | 227.2 | 53.2 | 0.2 | 92.9 | 0.86 | 7.0 | 0.3 | 6.4 ± 0.3 | 239.7 |
| XLB16-3-2 | 3.194 | 0.0154 | 324.6 | 98.2 | 0.3 | 72.1 | 0.83 | 5.9 | 0.3 |  | 347.6 |
| XLB16-3-3 | 3.046 | 0.0188 | 212.1 | 131.9 | 0.6 | 80.9 | 0.84 | 6.5 | 0.3 |  | 243.1 |
| XLB16-3-4 | 2.208 | 0.0138 | 229.2 | 85.7 | 0.4 | 79.0 | 0.84 | 6.3 | 0.3 |  | 249.4 |
| XLB16-5-1 | 0.788 | 0.0064 | 192.0 | 158.0 | 0.8 | 53.3 | 0.76 | 5.8 | 0.3 | 6.0 ± 0.3 | 229.2 |
| XLB16-5-2 | 0.410 | 0.0050 | 137.2 | 95.0 | 0.7 | 49.8 | 0.75 | 5.7 | 0.3 |  | 159.5 |
| XLB16-5-3 | 1.898 | 0.0077 | 393.1 | 205.8 | 0.5 | 57.0 | 0.78 | 5.9 | 0.3 |  | 441.5 |
| XLB16-5-4 | 3.652 | 0.0056 | 981.2 | 282.2 | 0.3 | 52.0 | 0.76 | 6.7 | 0.3 |  | 1047.5 |
| XLB16-7-1 | 1.141 | 0.0055 | 351.2 | 132.1 | 0.4 | 50.1 | 0.75 | 6.0 | 0.3 | 5.4 ± 0.6 | 382.3 |
| XLB16-7-2 | 2.524 | 0.0051 | 742.0 | 363.3 | 0.5 | 51.8 | 0.76 | 6.5 | 0.3 |  | 827.4 |
| XLB16-7-3 | 0.223 | 0.0073 | 56.3 | 44.8 | 0.8 | 58.4 | 0.78 | 4.8 | 0.2 |  | 66.9 |
| XLB16-7-4 | 0.368 | 0.0067 | 101.7 | 47.7 | 0.5 | 56.3 | 0.78 | 5.1 | 0.3 |  | 112.9 |

1 Radius of a sphere with the equivalent surface area-to-volume ratio as cylindrical crystals (Meesters & Dunai, 2002).

2 FT is the a-ejection correction after Farley et al. [1996].

3 Weighted means at 95% confidence level calculated using Isoplot V3.59 [Ludwig, 1991].

4 Effective Uranium content, [eU] =U+ 0.235Th ppm [Flowers et al., 2007].

Table 4. Single-grain apatite (U-Th)/He results from Caopo transect of Xuelongbao massif, central Longmen Shan

| Sample No. | 4He (ncc) | Mass (mg) | U (ppm) | Th (ppm) | Sm  (ppm) | Th/U | Rs 1 (μm) | FT 2 | Corr. Age (Ma) | Error (±1σ) | Weighted Mean 3  (Ma ± 1σ) | [eU] 4 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| XLB16-11-1 | 0.117 | 0.0300 | 8.7 | 7.4 | 94.5 | 0.8 | 70.7 | 0.81 | 3.5 | 0.2 | 4.1 ± 0.2 | 10.4 |
| XLB16-11-2 | 0.105 | 0.0145 | 14.7 | 9.4 | 30.4 | 0.6 | 71.8 | 0.82 | 4.3 | 0.3 |  | 16.9 |
| XLB16-11-3 | 0.331 | 0.0346 | 17.3 | 14.1 | 9.4 | 0.8 | 70.4 | 0.81 | 4.4 | 0.3 |  | 20.6 |
| XLB16-11-4 | 0.105 | 0.0202 | 9.7 | 11.0 | 40.6 | 1.1 | 65.9 | 0.80 | 4.1 | 0.2 |  | 12.2 |
| XLB16-11-5 | 0.103 | 0.0270 | 7.9 | 5.3 | 30.6 | 0.7 | 77.6 | 0.83 | 4.0 | 0.2 |  | 9.2 |
| XLB16-11-6 | 0.072 | 0.0133 | 10.5 | 7.4 | 30.6 | 0.7 | 68.8 | 0.81 | 4.4 | 0.3 |  | 12.3 |
| XLB16-13-1 | 0.019 | 0.0074 | 6.5 | 4.1 | 39.0 | 0.6 | 63.9 | 0.80 | 3.6 | 0.2 | 3.0 ± 0.4 | 7.4 |
| XLB16-13-2 | 0.003 | 0.0070 | 2.3 | 3.8 | 9.1 | 1.7 | 63.0 | 0.80 | 1.4 | 0.1 |  | 3.2 |
| XLB16-13-3 | 0.008 | 0.0074 | 3.8 | 2.4 | 26.8 | 0.6 | 54.5 | 0.77 | 2.5 | 0.1 |  | 4.3 |
| XLB16-13-4 | 0.011 | 0.0091 | 3.1 | 1.7 | 20.4 | 0.6 | 59.8 | 0.79 | 3.5 | 0.2 |  | 3.5 |
| XLB16-13-5 | 0.016 | 0.0068 | 5.6 | 3.5 | 9.0 | 0.6 | 55.3 | 0.77 | 3.9 | 0.2 |  | 6.5 |
| XLB16-13-6 | 0.020 | 0.0065 | 6.8 | 6.9 | 15.7 | 1.0 | 55.2 | 0.77 | 3.9 | 0.2 |  | 8.5 |
| XLB16-16-1 | 0.059 | 0.0069 | 20.3 | 14.8 | 37.7 | 0.7 | 62.0 | 0.79 | 3.8 | 0.2 | 3.9 ± 0.1 | 23.8 |
| XLB16-16-2 | 0.030 | 0.0063 | 11.2 | 10.1 | 12.5 | 0.9 | 72.6 | 0.82 | 3.8 | 0.2 |  | 13.6 |
| XLB16-16-3 | 0.023 | 0.0043 | 12.9 | 6.4 | 40.5 | 0.5 | 61.0 | 0.79 | 4.1 | 0.2 |  | 14.5 |
| XLB16-16-4 | 0.017 | 0.0076 | 5.5 | 4.4 | 41.0 | 0.8 | 58.1 | 0.78 | 3.6 | 0.2 |  | 6.5 |
| XLB16-16-5 | 0.074 | 0.0044 | 35.7 | 39.9 | 9.5 | 1.1 | 69.0 | 0.81 | 4.1 | 0.2 |  | 45.1 |
| XLB16-16-6 | 0.024 | 0.0055 | 10.2 | 8.5 | 120.5 | 0.8 | 109.3 | 0.86 | 3.9 | 0.2 |  | 12.2 |
| XLB16-18-1 | 0.042 | 0.0248 | 6.2 | 2.7 | 7.9 | 0.4 | 82.3 | 0.82 | 2.4 | 0.1 | 3.0 ± 0.2 | 6.8 |
| XLB16-18-2 | 0.101 | 0.0285 | 8.8 | 6.4 | 45.5 | 0.7 | 111.2 | 0.86 | 3.3 | 0.2 |  | 10.3 |
| XLB16-18-3 | 0.055 | 0.0194 | 7.1 | 7.3 | 41.0 | 1.0 | 95.7 | 0.84 | 3.2 | 0.2 |  | 8.8 |
| XLB16-18-4 | 0.089 | 0.0201 | 10.1 | 6.8 | 50.6 | 0.7 | 107.1 | 0.86 | 3.7 | 0.2 |  | 11.7 |
| XLB16-18-5 | 0.030 | 0.0213 | 5.0 | 1.1 | 19.4 | 0.2 | 83.9 | 0.82 | 2.6 | 0.1 |  | 5.2 |
| XLB16-18-6 | 0.065 | 0.0195 | 9.8 | 3.8 | 29.1 | 0.4 | 67.9 | 0.78 | 3.1 | 0.2 |  | 10.7 |
| XLB16-18-7 | 0.116 | 0.0249 | 10.6 | 9.2 | 37.8 | 0.9 | 67.6 | 0.77 | 3.5 | 0.2 |  | 12.8 |
| BX318-1 | 0.072 | 0.0185 | 9.7 | 5.8 | 30.0 | 0.6 | 97.4 | 0.85 | 3.4 | 0.2 | 3.6 ± 0.3 | 11.1 |
| BX318-2 | 0.080 | 0.0179 | 8.3 | 5.3 | 28.7 | 0.6 | 99.4 | 0.85 | 4.7 | 0.2 |  | 9.6 |
| BX318-3 | 0.068 | 0.0110 | 12.5 | 7.5 | 35.4 | 0.6 | 94.7 | 0.84 | 4.4 | 0.2 |  | 14.3 |
| BX318-4 | 0.036 | 0.0078 | 11.6 | 8.6 | 25.3 | 0.7 | 101.8 | 0.86 | 3.5 | 0.2 |  | 13.7 |
| BX318-5 | 0.048 | 0.0152 | 9.1 | 6.2 | 21.9 | 0.7 | 71.0 | 0.79 | 2.9 | 0.1 |  | 10.5 |
| BX318-6 | 0.079 | 0.0157 | 9.7 | 8.6 | 45.1 | 0.9 | 81.7 | 0.82 | 4.3 | 0.2 |  | 11.7 |
| BX318-7 | 0.044 | 0.0072 | 16.9 | 11.8 | 50.4 | 0.7 | 91.7 | 0.84 | 3.3 | 0.2 |  | 19.6 |
| BX317-1 | 0.012 | 0.0088 | 4.0 | 3.7 | 9.7 | 0.9 | 70.1 | 0.78 | 2.9 | 0.1 | 2.8 ± 0.3 | 4.8 |
| BX317-2 | 0.016 | 0.0057 | 9.3 | 9.1 | 11.4 | 1.0 | 58.0 | 0.74 | 2.7 | 0.1 |  | 11.4 |
| BX317-3 | 0.014 | 0.0103 | 4.8 | 5.8 | 9.6 | 1.2 | 58.3 | 0.74 | 2.3 | 0.1 |  | 6.1 |
| BX317-4 | 0.063 | 0.0157 | 6.9 | 6.1 | 15.9 | 0.9 | 104.6 | 0.86 | 4.8 | 0.2 |  | 8.3 |
| BX317-5 | 0.026 | 0.0087 | 7.7 | 7.4 | 19.9 | 1.0 | 107.4 | 0.86 | 3.3 | 0.2 |  | 9.4 |
| BX317-6 | 0.024 | 0.0079 | 7.3 | 7.3 | 17.3 | 1.0 | 92.7 | 0.84 | 3.6 | 0.2 |  | 9.0 |
| BX316-1 | 0.024 | 0.0078 | 11.0 | 8.5 | 24.8 | 0.8 | 67.9 | 0.78 | 2.4 | 0.1 | 2.5 ± 0.1 | 13.0 |
| BX316-2 | 0.060 | 0.0134 | 16.0 | 8.3 | 45.1 | 0.5 | 75.2 | 0.80 | 2.5 | 0.1 |  | 18.0 |
| BX316-3 | 0.071 | 0.0193 | 11.0 | 7.5 | 44.8 | 0.7 | 66.6 | 0.77 | 2.8 | 0.1 |  | 12.8 |
| BX316-4 | 0.024 | 0.0126 | 5.2 | 6.3 | 3.2 | 1.2 | 66.5 | 0.77 | 2.9 | 0.1 |  | 6.7 |
| BX316-5 | 0.041 | 0.0246 | 5.0 | 4.6 | 6.8 | 0.9 | 67.1 | 0.77 | 2.6 | 0.1 |  | 6.0 |
| BX316-6 | 0.033 | 0.0135 | 9.0 | 8.6 | 20.9 | 1.0 | 62.8 | 0.76 | 2.2 | 0.1 |  | 11.0 |
| BX316-7 | 0.109 | 0.0199 | 20.8 | 10.4 | 32.5 | 0.5 | 57.4 | 0.74 | 2.3 | 0.1 |  | 23.3 |
| BX221-1 | 0.014 | 0.0073 | 8.0 | 6.8 | 14.0 | 0.8 | 82.0 | 0.82 | 2.1 | 0.1 | 2.4 ± 0.1 | 9.6 |
| BX221-2 | 0.025 | 0.0071 | 12.1 | 9.9 | 18.7 | 0.8 | 105.3 | 0.86 | 2.6 | 0.1 |  | 14.5 |
| BX221-3 | 0.036 | 0.0100 | 12.1 | 11.8 | 21.8 | 1.0 | 84.8 | 0.83 | 2.5 | 0.1 |  | 14.9 |
| BX221-4 | 0.020 | 0.0054 | 12.5 | 11.3 | 22.1 | 0.9 | 95.2 | 0.85 | 2.6 | 0.1 |  | 15.1 |
| BX221-6 | 0.024 | 0.0072 | 12.7 | 10.4 | 21.4 | 0.8 | 72.9 | 0.77 | 2.3 | 0.1 |  | 15.1 |
| BX221-7 | 0.028 | 0.0083 | 13.9 | 8.7 | 9.4 | 0.6 | 61.6 | 0.73 | 2.2 | 0.1 |  | 15.9 |

1 Radius of a sphere with the equivalent surface area-to-volume ratio as cylindrical crystals (Meesters & Dunai, 2002).

2 FT is the a-ejection correction after Farley et al. [1996].

3 Weighted means at 95% confidence level calculated using Isoplot V3.59 [Ludwig, 1991]. Evidently younger or older age outliers are highlighted in grey shading and are excluded from calculation of the weighted mean age.

4 Effective Uranium content, [eU] =U+ 0.235Th ppm [Flowers et al., 2007].

Table 5. Parameters used in *Pecube* modeling

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter Name | Parameter Range | Units | Reference |
| Thermal conductivity | 2.5 | W/m/K | Whipp et al. [2007] |
| Crustal density | 2700 | kg/m3 |  |
| Thermal diffusivity | 25 | km2/Μy |  |
| Mean annual surface temperature | 25 | °C |  |
| Atmospheric lapse rate | 6 | °C/km | Naito et al. [2006] |
| Model time step | Optimal | years |  |
| Horizontal node spacing | 0.9 | km |  |
| Vertical node spacing | 0.9 | km |  |
| Model starting time | 20 | Ma |  |
| Transitional time | 1-18 | Ma |  |
| Relief factor at the transitional time | 0.5-1.5 | - |  |
| Basal temperature (model shown in figure 6) | 400-700 | °C |  |
| Basal temperature (model shown in figure S3) | 400-900 | °C |  |
| Exhumation rate before and after the transitional time | 0-3 | km/m.y. |  |