**Table S1**

U-Pb data for analyzed zircon from the volcanic ash beds of the Nanpanjiang Basin, South China.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Composition | Ratios | Age (Ma) |  |
| *Sample* | Pbc‡ | Pb\*‡  | Th | 206Pb§ | 208Pb# | 206Pb†† | err | 207Pb†† | err | 207Pb†† | err | 206Pb | err | 207Pb | 207Pb | corr. |
| Fractions† | (pg) | Pbc | U | 204Pb | 206Pb | 238U | (2σ%) | 235U | (2σ%) | 206Pb | (2σ%) | 238U | (2σ) | 235U | 206Pb | coef. |
|  |
| **Guandao section, Great Bank of Guizhou** |
| ***PGD Tuff-1: weighted mean 206Pb/238U date = 247.458 ± 0.053/0.12/0.29 Ma1. MSWD = 0.55*** |
| **z5**  | 0.9 | 39.8 | 0.33 | 2498 | 0.104 | 0.039141 | (.06) | 0.27663 | (.41) | 0.05128 | (.39) | **247.51** | **0.15** | 247.98 | 252.4 | 0.346 |
| **z3**  | 0.2 | 109.6 | 0.41 | 6702 | 0.129 | 0.039141 | (.05) | 0.27642 | (.18) | 0.05124 | (.15) | **247.51** | **0.12** | 247.82 | 250.8 | 0.559 |
| **z2**  | 0.3 | 89.5 | 0.42 | 5466 | 0.131 | 0.039139 | (.05) | 0.27622 | (.21) | 0.05121 | (.19) | **247.50** | **0.13** | 247.65 | 249.1 | 0.489 |
| **z7**  | 0.5 | 77.0 | 0.99 | 4078 | 0.313 | 0.039129 | (.05) | 0.27640 | (.26) | 0.05125 | (.24) | **247.43** | **0.13** | 247.80 | 251.3 | 0.418 |
| **z6**  | 0.2 | 90.1 | 0.42 | 5500 | 0.133 | 0.039126 | (.05) | 0.27594 | (.22) | 0.05117 | (.20) | **247.41** | **0.13** | 247.43 | 247.6 | 0.446 |
| **z4**  | 0.2 | 259.6 | 0.64 | 14918 | 0.202 | 0.039125 | (.05) | 0.27616 | (.12) | 0.05121 | (.09) | **247.41** | **0.12** | 247.60 | 249.5 | 0.696 |
| ***PGD-Tuff3: weighted mean 206Pb/238U date = 247.08 ± 0.11/0.17/0.31 Ma. MSWD = 0.39*** |
| z6  | 0.18 | 94.2 | 0.30 | 5931.8 | 0.094 | 0.043121 | (.07) | 0.31479 | (.33) | 0.05297 | (.29) | 272.15 | 0.18 | 277.89 | 326.5 | 0.576 |
| z3  | 0.14 | 73.2 | 0.26 | 4625.4 | 0.083 | 0.040966 | (.06) | 0.34236 | (.29) | 0.06064 | (.27) | 258.82 | 0.16 | 298.96 | 625.5 | 0.400 |
| **z4**  | 0.16 | 23.5 | 0.54 | 1402.9 | 0.170 | 0.039089 | (.11) | 0.27617 | (.98) | 0.05126 | (.94) | **247.19** | **0.26** | 247.6 | 252 | 0.410 |
| **z5**  | 0.13 | 30.7 | 0.67 | 1767.9 | 0.211 | 0.039077 | (.12) | 0.27499 | (.76) | 0.05106 | (.70) | **247.11** | **0.28** | 246.7 | 243 | 0.496 |
| **z1**  | 0.21 | 32.1 | 0.53 | 1914.7 | 0.169 | 0.039070 | (.07) | 0.27662 | (.63) | 0.05137 | (.61) | **247.06** | **0.18** | 248.0 | 257 | 0.252 |
| **z2**  | 0.14 | 55.5 | 0.59 | 3244.0 | 0.187 | 0.039062 | (.08) | 0.27531 | (.45) | 0.05114 | (.39) | **247.02** | **0.19** | 246.93 | 246.1 | 0.764 |
| ***GDGB Tuff-110: weighted mean 206Pb/238U date = 246.939 ± 0.090/0.13/0.29 Ma. MSWD = 0.37*** |
| z2a  | 0.8 | 43.3 | 0.18 | 2832 | 0.058 | 0.039166 | (.09) | 0.27684 | (.40) | 0.05129 | (.36) | 247.66 | 0.21 | 248.15 | 252.8 | 0.446 |
| z6a  | 1.1 | 21.6 | 0.43 | 1325 | 0.137 | 0.039060 | (.11) | 0.27591 | (.78) | 0.05125 | (.75) | 247.00 | 0.26 | 247.4 | 251 | 0.302 |
| z1a  | 0.7 | 26.2 | 0.54 | 1562 | 0.172 | 0.039056 | (.08) | 0.27617 | (.62) | 0.05131 | (.60) | 246.98 | 0.21 | 247.6 | 254 | 0.297 |
| z2  | 0.2 | 19.6 | 0.53 | 1176 | 0.167 | 0.039056 | (.11) | 0.27825 | (.92) | 0.05169 | (.89) | 246.98 | 0.26 | 249.3 | 271 | 0.367 |
| z3a  | 1.4 | 22.9 | 0.51 | 1377 | 0.160 | 0.039054 | (.09) | 0.27612 | (.71) | 0.05130 | (.69) | 246.96 | 0.23 | 247.6 | 253 | 0.293 |
| z4a  | 1.0 | 28.0 | 0.62 | 1636 | 0.195 | 0.039050 | (.09) | 0.27616 | (.61) | 0.05131 | (.59) | 246.94 | 0.22 | 247.6 | 254 | 0.326 |
| z4  | 0.3 | 29.5 | 0.49 | 1778 | 0.154 | 0.039033 | (.08) | 0.27775 | (.57) | 0.05163 | (.55) | 246.84 | 0.18 | 248.9 | 268 | 0.393 |
| **z5**  | 0.3 | 52.1 | 0.64 | 3010 | 0.202 | 0.038991 | (.06) | 0.27551 | (.37) | 0.05127 | (.34) | **246.57** | **0.15** | 247.09 | 252.0 | 0.419 |
| **z5a**  | 0.8 | 49.6 | 0.56 | 2924 | 0.177 | 0.038963 | (.07) | 0.27490 | (.35) | 0.05119 | (.33) | **246.40** | **0.17** | 246.61 | 248.5 | 0.380 |
|  |
| **Taiping section, Pingguo Platform** |
| ***TP Tuff-3: weighted mean 206Pb/238U date = 252.002 ± 0.072/0.13/0.30 Ma. MSWD = 0.84*** |
| z4  | 0.14 | 114.1 | 0.80 | 6302.3 | 0.254 | 0.039896 | (.05) | 0.28213 | (.21) | 0.05131 | (.19) | 252.19 | 0.13 | 252.34 | 253.8 | 0.455 |
| z6  | 0.17 | 115.4 | 0.61 | 6691.9 | 0.192 | 0.039893 | (.05) | 0.28287 | (.18) | 0.05145 | (.16) | 252.17 | 0.13 | 252.93 | 260.0 | 0.485 |
| **z3**  | 0.39 | 62.9 | 0.76 | 3521.2 | 0.241 | 0.039886 | (.07) | 0.28244 | (.36) | 0.05138 | (.34) | **252.13** | **0.18** | 252.59 | 256.9 | 0.442 |
| **z7**  | 0.32 | 58.1 | 0.69 | 3311.6 | 0.218 | 0.039866 | (.06) | 0.28254 | (.31) | 0.05142 | (.29) | **252.00** | **0.15** | 252.67 | 258.8 | 0.378 |
| **z1**  | 0.22 | 92.1 | 0.62 | 5332.6 | 0.195 | 0.039863 | (.05) | 0.28225 | (.22) | 0.05138 | (.20) | **251.98** | **0.13** | 252.44 | 256.7 | 0.473 |
| **z2**  | 0.20 | 99.3 | 0.84 | 5437.7 | 0.267 | 0.039858 | (.05) | 0.28213 | (.22) | 0.05136 | (.20) | **251.95** | **0.13** | 252.34 | 256.0 | 0.429 |
| ***TP Tuff-4: weighted mean 206Pb/238U date = 251.835 ± 0.065/0.13/0.30 Ma. MSWD = 1.0*** |
| **z2**  | 0.27 | 106.0 | 0.69 | 6027.5 | 0.218 | 0.039850 | (.06) | 0.28172 | (.22) | 0.05130 | (.19) | **251.90** | **0.14** | 252.02 | 253.2 | 0.560 |
| **z7**  | 0.16 | 208.9 | 0.68 | 11870 | 0.216 | 0.039847 | (.05) | 0.28168 | (.15) | 0.05129 | (.11) | **251.88** | **0.12** | 251.99 | 253.0 | 0.690 |
| **z1**  | 0.16 | 112.0 | 0.70 | 6345.2 | 0.223 | 0.039834 | (.05) | 0.28178 | (.19) | 0.05133 | (.17) | **251.80** | **0.13** | 252.07 | 254.5 | 0.527 |
| **z3**  | 0.19 | 168.6 | 0.69 | 9574.8 | 0.218 | 0.039827 | (.05) | 0.28142 | (.15) | 0.05127 | (.13) | **251.76** | **0.13** | 251.78 | 252.0 | 0.600 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

*Notes:* Corr. coef. = correlation coefficient. Age calculations are based on the decay constants of Jaffey et al. (1971).

† All analyses are single zircon grains and pre-treated by the thermal annealing and acid leaching (CA-TIMS) technique. Data used in age calculations are in bold.

‡ Pbc is total common Pb in analysis. Pb\* is radiogenic Pb concentration.

§ Measured ratio corrected for spike and fractionation only.

# Radiogenic Pb ratio.

†† Corrected for fractionation, spike, blank, and initial Th/U disequilibrium in magma. Mass fractionation correction of 0.25%/amu ± 0.04%/amu (atomic mass unit) was applied to single-collector Daly analyses. All common Pb is assumed to be blank. Total procedural blank was less than 0.1pg for U. Blank isotopic composition: 206Pb/204Pb = 18.42 ± 0.35, 207Pb/204Pb =15.36 ± 0.23, 208Pb/204Pb = 37.46 ± 0.74.

1 Weighted mean date uncertainties are reported in the form of ± X/Y/Z: X = internal (analytical) uncertainty in the absence of all external or systematic errors; Y = incorporates the U-Pb tracer calibration error; Z = includes X and Y as well as the decay constant errors.