附表1 漾头剖面凝灰岩锆石LA-ICP-MS U-Pb同位素分析结果

Table 1 Analysis results of U-Pb isotope of the tuffs at Yangtous section

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 分析点 | U(10-6) | Th(10-6) | Th/U | Pbc | 207Pb/206Pb(1σ) | 207Pb/235U(1σ) | 206Pb/238U(1σ) | *t*207Pb/206Pb(1σ)(Ma) | *t*207Pb/235U(1σ)(Ma) | *t*206Pb/238U(1σ)(Ma) | 谐和度 |
| YT-7-01 |  404  |  435  | 1.08 | 0.0 | 0.064 6±0.002 0 | 1.084 3±0.034 5 | 0.121 5±0.001 3 | 761.1±65.6 | 745.7±16.8 | 739.3±7.6 | 99% |
| YT-7-02 |  1 073  |  469  | 0.44 | 0.0 | 0.057 7±0.002 0 | 0.730 5±0.022 1 | 0.090 9±0.001 3 | 520.4±77.8 | 556.8±13.0 | 560.6±7.5 | 99% |
| YT-7-03 |  660  |  225  | 0.34 | 0.0 | 0.059 7±0.002 1 | 0.729 3±0.023 3 | 0.089 4±0.001 0 | 590.8±105.5 | 556.1±13.7 | 551.8±5.7 | 99% |
| YT-7-04 |  416  |  220  | 0.53 | 0.0 | 0.065 9±0.002 2 | 1.146 7±0.037 6 | 0.126 7±0.001 5 | 1 200.0±70.4 | 775.7±17.8 | 769.1±8.6 | 99% |
| YT-7-05 |  1 362  |  411  | 0.30 | 75.4 | 0.060 3±0.001 6 | 0.742 9±0.019 2 | 0.089 3±0.000 9 | 613.0±89.8 | 564.1±11.2 | 551.6±5.4 | 97% |
| YT-7-06 |  639  |  469  | 0.73 | 230.4 | 0.063 9±0.001 6 | 1.175 3±0.031 5 | 0.132 9±0.001 6 | 738.9±53.7 | 789.1±14.7 | 804.6±8.9 | 98% |
| YT-7-07 |  1 008  |  298  | 0.30 | 93.9 | 0.059 9±0.002 0 | 0.735 5±0.020 1 | 0.090 0±0.003 2 | 611.1±74.1 | 559.8±11.7 | 555.4±18.8 | 99% |
| YT-7-08 |  980  |  436  | 0.45 | 297.0 | 0.063 5±0.001 7 | 0.868 9±0.023 5 | 0.098 9±0.001 1 | 724.1±27.8 | 635.0±12.8 | 607.8±6.4 | 95% |
| YT-7-09 |  925  |  494  | 0.53 | 130.7 | 0.064 9±0.004 2 | 0.777 7±0.027 5 | 0.090 2±0.001 1 | 772.2±137.0 | 584.2±15.7 | 556.9±6.6 | 95% |
| YT-7-10 |  607  |  340  | 0.56 | 203.0 | 0.102 8±0.007 4 | 1.552 3±0.136 7 | 0.101 4±0.001 5 | 1 675.9±129.5 | 951.4±54.4 | 622.8±8.9 | 58% |
| YT-7-11 |  1 090  |  302  | 0.28 | 126.0 | 0.059 9±0.001 6 | 0.740 0±0.018 8 | 0.089 3±0.000 8 | 598.2±57.4 | 562.4±11.0 | 551.3±5.0 | 98% |
| YT-7-12 |  412  |  287  | 0.70 | 500.1 | 0.128 0±0.008 1 | 2.002 4±0.149 6 | 0.103 7±0.002 2 | 2 072.2±111.1 | 1 116.3±50.6 | 635.9±12.6 | 45% |
| YT-7-13 |  870  |  381  | 0.44 | 85.4 | 0.064 8±0.001 8 | 0.813 5±0.021 5 | 0.090 9±0.000 9 | 768.5±59.3 | 604.4±12.1 | 560.7±5.1 | 92% |
| YT-7-14 |  1 294  |  507  | 0.39 | 28.7 | 0.061 8±0.001 9 | 0.762 2±0.018 9 | 0.090 2±0.001 1 | 664.8±66.7 | 575.3±10.9 | 556.6±6.4 | 96% |
| YT-7-15 |  398  |  188  | 0.47 | 37.5 | 0.064 2±0.002 6 | 0.799 4±0.031 9 | 0.090 1±0.001 0 | 746.3±87.0 | 596.5±18.0 | 556.3±6.1 | 93% |
| YT-7-16 |  880  |  272  | 0.31 | 83.5 | 0.059 1±0.001 8 | 0.734 2±0.021 7 | 0.089 7±0.000 9 | 572.3±66.7 | 559.0±12.7 | 553.7±5.4 | 99% |
| YT-7-17 |  1 105  |  385  | 0.35 | 0.0 | 0.058 5±0.001 6 | 0.725 7±0.020 0 | 0.089 3±0.000 9 | 546.3±59.2 | 554.0±11.8 | 551.4±5.2 | 99% |
| YT-7-18 |  921  |  399  | 0.43 | 472.1 | 0.090 4±0.002 8 | 1.161 2±0.035 4 | 0.092 5±0.000 9 | 1 435.2±59.3 | 782.5±16.6 | 570.5±5.1 | 68% |
| YT-7-19 |  595  |  195  | 0.33 | 16.5 | 0.059 6±0.002 1 | 0.754 6±0.022 5 | 0.089 8±0.001 1 | 587.1±77.8 | 570.9±13.0 | 554.6±6.5 | 97% |
| YT-7-20 |  391  |  461  | 1.18 | 681.0 | 0.182 7±0.016 5 | 5.076 7±0.710 2 | 0.154 9±0.006 5 | 2 677.5±149.5 | 1 832.2±118.7 | 928.2±36.1 | 34% |
| YT-7-21 |  938  |  408  | 0.43 | 219.5 | 0.108 0±0.002 6 | 1.999 2±0.047 6 | 0.134 0±0.001 7 | 1 765.7±44.3 | 1 115.3±16.1 | 810.9±9.5 | 68% |
| YT-7-22 |  366  |  191  | 0.52 | 260.1 | 0.059 1±0.002 1 | 0.802 2±0.029 0 | 0.098 1±0.001 1 | 572.3±77.8 | 598.1±16.3 | 603.3±6.4 | 99% |
| YT-7-23 |  336  |  336  | 1.00 | 290.2 | 0.096 9±0.006 7 | 1.823 1±0.151 9 | 0.127 5±0.002 0 | 1 564.8±128.2 | 1 053.8±54.6 | 773.6±11.4 | 69% |
| YT-7-24 |  240  |  155  | 0.65 | 85.0 | 0.082 4±0.002 7 | 2.236 2±0.071 2 | 0.196 9±0.002 2 | 1 253.7±63.0 | 1 192.5±22.4 | 1 158.5±12.1 | 97% |
| YT-7-25 |  667  |  226  | 0.34 | 0.0 | 0.059 0±0.001 7 | 0.729 0±0.022 1 | 0.089 1±0.000 9 | 564.9±63.0 | 556.0±13.0 | 550.5±5.2 | 98% |
| YT-9-01 |  1 077  |  503  | 0.47 | 0.0 | 0.058 7±0.001 5 | 0.724 6±0.018 4 | 0.089 0±0.000 9 | 566.7±55.5 | 553.4±10.7 | 549.7±5.1 | 99% |
| YT-9-02 |  455  |  545  | 1.20 | 1.2 | 0.069 3±0.002 0 | 1.179 1±0.032 4 | 0.122 9±0.001 1 | 909.3±57.4 | 790.9±15.1 | 747.1±6.2 | 94% |
| YT-9-03 |  799  |  686  | 0.86 | 128.5 | 0.070 5±0.003 1 | 0.852 8±0.045 0 | 0.085 2±0.001 0 | 944.1±91.5 | 626.2±24.7 | 526.9±6.1 | 82% |
| YT-9-04 |  693  |  508  | 0.73 | 0.0 | 0.057 7±0.001 7 | 0.708 8±0.020 3 | 0.088 9±0.000 9 | 516.7±67.6 | 544.0±12.1 | 548.9±5.4 | 99% |
| YT-9-05 |  1 242  |  590  | 0.48 | 0.0 | 0.058 3±0.001 5 | 0.720 6±0.019 0 | 0.089 1±0.000 9 | 538.9±55.5 | 551.0±11.2 | 550.5±5.6 | 99% |
| YT-9-06 |  433  |  172  | 0.40 | 0.0 | 0.057 5±0.002 1 | 0.795 9±0.027 8 | 0.100 4±0.001 1 | 522.3±77.8 | 594.5±15.7 | 616.5±6.6 | 96% |
| YT-9-07 |  2 867  |  815  | 0.28 | 19.6 | 0.058 7±0.001 2 | 0.626 4±0.014 0 | 0.077 1±0.000 9 | 553.7±44.4 | 493.8±8.6 | 478.7±5.4 | 96% |
| YT-9-08 |  1 035  |  463  | 0.45 | 133.1 | 0.073 9±0.002 6 | 1.021 0±0.038 8 | 0.098 7±0.001 0 | 1 038.9±70.1 | 714.4±19.5 | 607.0±5.6 | 83% |
| YT-9-09 |  807  |  722  | 0.89 | 96.1 | 0.058 5±0.001 7 | 0.714 6±0.019 8 | 0.089 2±0.001 3 | 550.0±64.8 | 547.5±11.7 | 550.7±7.5 | 99% |
| YT-9-10 |  888  |  480  | 0.54 | 12.4 | 0.059 5±0.001 8 | 0.735 4±0.022 0 | 0.089 2±0.000 9 | 583.4±65.6 | 559.7±12.9 | 551.0±5.2 | 98% |
| YT-9-11 |  1 065  |  339  | 0.32 | 10.6 | 0.055 2±0.002 0 | 0.641 8±0.018 9 | 0.080 6±0.001 3 | 420.4±79.6 | 503.4±11.7 | 499.9±7.6 | 99% |
| YT-9-12 |  939  |  662  | 0.71 | 2.4 | 0.058 8±0.001 7 | 0.727 8±0.021 4 | 0.089 3±0.000 9 | 561.1±69.4 | 555.3±12.6 | 551.7±5.2 | 99% |
| YT-9-13 |  417  |  354  | 0.85 | 1.4 | 0.074 2±0.005 8 | 1.260 2±0.072 4 | 0.129 2±0.002 8 | 1 047.8±157.4 | 828.0±32.5 | 783.4±15.9 | 94% |
| YT-9-14 |  252  |  312  | 1.24 | 0.0 | 0.062 1±0.003 3 | 1.203 0±0.110 1 | 0.126 1±0.002 5 | 679.6±114.8 | 802.2±50.8 | 765.4±14.2 | 95% |
| YT-9-15 |  807  |  893  | 1.11 | 9.6 | 0.092 5±0.030 9 | 1.086 0±0.368 8 | 0.084 1±0.000 8 | 1 476.9±674.2 | 746.5±179.5 | 520.5±4.8 | 64% |
| YT-9-16 |  973  |  267  | 0.27 | 0.0 | 0.066 1±0.001 5 | 1.208 4±0.027 8 | 0.131 7±0.001 1 | 810.8±46.3 | 804.5±12.8 | 797.8±6.4 | 99% |
| YT-9-17 |  1 184  |  790  | 0.67 | 0.0 | 0.058 2±0.001 9 | 0.716 1±0.02 10 | 0.088 6±0.001 0 | 600.0±70.4 | 548.4±12.4 | 547.2±5.8 | 99% |
| YT-9-18 |  2 231  |  1 282  | 0.57 | 0.0 | 0.062 1±0.001 5 | 0.633 7±0.014 7 | 0.073 8±0.000 7 | 675.9±47.2 | 498.4±9.2 | 458.9±4.0 | 91% |
| YT-9-19 |  1 251  |  927  | 0.74 | 25.6 | 0.060 6±0.001 5 | 0.751 5±0.018 9 | 0.089 8±0.001 1 | 633.4±51.8 | 569.1±10.9 | 554.2±6.5 | 97% |
| YT-9-20 |  990  |  707  | 0.71 | 30.3 | 0.060 3±0.001 5 | 0.751 4±0.020 5 | 0.089 8±0.001 0 | 613.0±83.3 | 569.1±11.9 | 554.6±5.8 | 97% |
| YT-9-21 |  1 303  |  587  | 0.45 | 0.0 | 0.060 3±0.001 3 | 0.741 1±0.016 5 | 0.088 6±0.000 7 | 613.0±48.1 | 563.1±9.6 | 547.3±4.4 | 97% |
| YT-9-22 |  2 764  |  152  | 0.05 | 31.9 | 0.059 4±0.001 3 | 0.644 2±0.015 1 | 0.078 3±0.001 1 | 588.9±13.9 | 504.9±9.4 | 486.0±6.6 | 96% |
| YT-9-23 |  392  |  293  | 0.75 | 27.2 | 0.062 4±0.002 4 | 0.773 1±0.028 5 | 0.089 8±0.001 0 | 687.1±79.6 | 581.5±16.3 | 554.5±6.0 | 95% |

附表2 漾头剖面凝灰岩锆石微量元素(10-6)分析结果

Table 2 Analysis results of zircon trace elements (10-6) from tuffs at Yangtou section

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 测试点 | La | Ce | Pr | Nd | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu | Y | Hf | Nb | Ta | Th | U | Nb/Hf | Hf/Th | Th/Nb | Yb/Sm | Th/U |
| YT-7-02 | 0.02 | 11.13 | 0.62 | 13.33 | 31.93 | 0.82 | 150.36 | 52.16 |  670.58 |  233.91 | 1 068.32 |  203.00 | 2 008.56 |  327.93 | 7 459.06 | 33 062.71 |  4.99 | 2.57 | 470.02 | 1 072.87 | 0.000 15 | 70.34 | 94.25 | 62.90 | 0.44 |
| YT-7-03 | 0.00 | 7.08 | 0.42 | 6.61 | 14.13 | 0.44 | 85.35 | 29.26 |  388.19 |  136.01 |  655.72 |  128.29 | 1 313.63 |  224.84 | 4 522.07 | 32 103.13 |  3.31 | 1.80 | 227.95 |  659.82 | 0.000 10 | 140.83 | 68.80 | 92.95 | 0.35 |
| YT-7-05 | 0.75 | 10.58 | 0.29 | 5.25 | 13.28 | 0.15 | 83.36 | 32.16 |  437.77 |  166.07 |  792.51 |  163.87 | 1 711.39 |  286.21 | 5 466.56 | 36 384.40 |  5.58 | 3.03 | 416.92 | 1 361.52 | 0.000 15 | 87.27 | 74.69 | 128.91 | 0.31 |
| YT-7-07 | 0.00 | 8.26 | 0.10 | 2.29 | 8.08 | 0.34 | 53.49 | 20.00 |  285.14 |  106.58 |  520.84 |  108.13 | 1 125.66 |  187.73 | 3 508.85 | 36 951.50 |  4.38 | 2.31 | 298.16 | 1 008.26 | 0.000 12 | 123.93 | 68.10 | 139.23 | 0.30 |
| YT-7-09 | 0.24 | 12.17 | 1.44 | 24.31 | 48.07 | 2.66 | 237.44 | 72.47 |  888.83 |  298.69 | 1 282.83 |  243.95 | 2 356.83 |  382.98 | 9 383.67 | 30 287.53 |  6.50 | 2.59 | 502.13 |  924.75 | 0.000 21 | 60.32 | 77.30 | 49.03 | 0.54 |
| YT-7-11 | 0.45 | 9.45 | 1.12 | 7.49 | 9.71 | 2.46 | 53.37 | 21.27 |  308.22 |  118.65 |  598.24 |  130.33 | 1 463.90 |  260.69 | 3 840.58 | 37 015.58 |  4.21 | 2.13 | 302.10 | 1 089.92 | 0.000 11 | 122.53 | 71.72 | 150.83 | 0.28 |
| YT-7-13 | 0.13 | 9.84 | 0.91 | 16.52 | 29.49 | 1.06 | 148.75 | 49.35 |  611.17 |  211.34 |  924.19 |  177.92 | 1 755.44 |  287.77 | 6 648.71 | 32 288.95 |  3.48 | 2.23 | 377.77 |  870.38 | 0.000 11 | 85.47 | 108.49 | 59.53 | 0.43 |
| YT-7-14 | 0.17 | 11.54 | 0.52 | 7.86 | 16.71 | 0.36 | 102.89 | 37.28 |  493.07 |  179.23 |  827.37 |  165.61 | 1 650.90 |  270.88 | 5 778.97 | 34 885.29 |  4.38 | 2.50 | 497.02 | 1 293.83 | 0.000 13 | 70.19 | 113.44 | 98.82 | 0.38 |
| YT-7-15 | 0.04 | 6.96 | 0.73 | 15.25 | 28.42 | 1.73 | 139.22 | 41.95 |  497.30 |  165.52 |  721.80 |  134.62 | 1 336.61 |  220.21 | 5 268.51 | 29 074.44 |  2.34 | 1.35 | 191.11 |  398.05 | 0.000 08 | 152.14 | 81.77 | 47.03 | 0.48 |
| YT-7-16 | 0.01 | 6.95 | 0.10 | 4.01 | 9.18 | 0.16 | 57.12 | 23.78 |  328.97 |  122.96 |  605.24 |  125.81 | 1 311.75 |  220.35 | 4 070.10 | 36 221.34 |  4.51 | 2.20 | 265.34 |  879.69 | 0.000 12 | 136.51 | 58.84 | 142.91 | 0.30 |
| YT-7-17 | 0.03 | 9.70 | 0.35 | 6.49 | 15.54 | 0.27 | 98.31 | 36.03 |  479.14 |  171.45 |  817.95 |  161.52 | 1 655.38 |  274.74 | 5 593.59 | 34 582.92 |  4.67 | 2.43 | 387.67 | 1 104.59 | 0.000 13 | 89.21 | 83.10 | 106.54 | 0.35 |
| YT-7-19 | 0.07 | 7.71 | 0.17 | 4.36 | 10.46 | 0.29 | 58.70 | 21.46 |  288.51 |  102.73 |  484.23 |  98.38 | 1 010.12 |  169.56 | 3 342.11 | 33 806.11 |  4.56 | 2.12 | 196.01 |  594.64 | 0.000 13 | 172.47 | 42.97 | 96.56 | 0.33 |
| YT-7-25 | 0.07 | 7.59 | 0.45 | 6.46 | 13.76 | 0.69 | 80.02 | 25.92 |  342.55 |  123.75 |  563.33 |  109.69 | 1 109.66 |  188.57 | 3 960.08 | 31 455.43 |  3.38 | 1.90 | 231.61 |  667.38 | 0.000 11 | 135.81 | 68.58 | 80.66 | 0.35 |
| YT-9-01 | 0.01 | 10.02 | 0.22 | 5.30 | 17.88 | 0.33 | 109.91 | 42.51 |  539.15 |  221.87 |  982.08 |  210.96 | 1 880.56 |  366.45 | 5 866.25 | 35 337.29 |  5.85 | 3.31 | 502.61 | 1 077.15 | 0.000 17 | 70.31 | 85.93 | 105.18 | 0.47 |
| YT-9-04 | 0.09 | 8.60 | 1.32 | 22.52 | 47.41 | 0.96 | 247.11 | 82.67 |  932.70 |  350.91 | 1 456.65 |  295.01 | 2 520.71 |  485.73 | 9 188.47 | 30 409.41 |  3.02 | 1.66 | 507.68 |  693.18 | 0.000 10 | 59.90 | 168.30 | 53.16 | 0.73 |
| YT-9-05 | 1.53 | 15.02 | 1.09 | 10.81 | 22.10 | 1.10 | 151.54 | 57.12 |  716.68 |  291.59 | 1 262.71 |  268.11 | 2 321.88 |  441.50 | 7 510.20 | 34 700.19 |  6.10 | 2.99 | 589.69 | 1 242.33 | 0.000 18 | 58.85 | 96.75 | 105.08 | 0.47 |
| YT-9-09 | 8.38 | 37.73 | 5.43 | 46.65 | 87.33 | 51.60 | 399.01 | 106.86 | 1 030.76 |  318.51 | 1 117.15 |  216.57 | 1 793.38 |  325.60 | 8 627.83 | 28 312.80 |  7.35 | 2.76 | 722.35 |  806.95 | 0.000 26 | 39.20 | 98.23 | 20.54 | 0.90 |
| YT-9-10 | 0.10 | 12.02 | 0.28 | 5.97 | 14.39 | 0.32 | 97.12 | 38.69 |  474.58 |  195.48 |  829.28 |  181.31 | 1 584.92 |  306.75 | 5 062.70 | 35 555.00 |  5.56 | 3.01 | 479.96 |  887.81 | 0.000 16 | 74.08 | 86.28 | 110.17 | 0.54 |
| YT-9-12 | 8.84 | 36.95 | 3.65 | 23.78 | 21.49 | 0.89 | 111.04 | 39.64 |  473.43 |  189.66 |  797.06 |  166.08 | 1 464.74 |  281.07 | 4 831.49 | 32 243.72 |  7.05 | 3.08 | 661.58 |  939.10 | 0.000 22 | 48.74 | 93.91 | 68.17 | 0.70 |
| YT-9-17 | 1.09 | 19.81 | 1.45 | 22.99 | 43.22 | 3.07 | 240.90 | 81.56 |  914.53 |  344.26 | 1 407.66 |  289.88 | 2 486.12 |  465.16 | 8 637.88 | 29 136.90 |  7.83 | 2.86 | 790.03 | 1 184.36 | 0.000 27 | 36.88 | 100.84 | 57.52 | 0.67 |
| YT-9-19 | 0.39 | 22.93 | 0.78 | 11.84 | 24.60 | 1.91 | 137.11 | 47.63 |  581.14 |  229.18 |  959.85 |  207.04 | 1 815.75 |  345.52 | 6 015.12 | 33 275.66 |  8.55 | 3.71 | 927.01 | 1 251.40 | 0.000 26 | 35.90 | 108.39 | 73.80 | 0.74 |
| YT-9-20 | 15.97 | 58.16 | 7.43 | 46.07 | 40.55 | 1.04 | 192.05 | 64.56 |  755.73 |  293.59 | 1 216.00 |  252.43 | 2 207.98 |  417.16 | 7 559.16 | 32 633.37 |  4.66 | 2.24 | 707.12 |  990.50 | 0.000 14 | 46.15 | 151.63 | 54.46 | 0.71 |
| YT-9-21 | 0.16 | 10.33 | 0.28 | 7.66 | 19.07 | 3.56 | 112.27 | 40.17 |  514.53 |  207.65 |  931.58 |  201.33 | 1 833.15 |  356.34 | 5 519.37 | 29 974.96 |  9.18 | 3.97 | 586.59 | 1 303.42 | 0.000 31 | 51.10 | 63.90 | 96.14 | 0.45 |
| YT-9-23 | 10.43 | 37.00 | 4.77 | 31.56 | 24.74 | 1.04 | 110.68 | 38.61 |  423.23 |  160.52 |  650.41 |  136.86 | 1 202.52 |  229.23 | 4 087.79 | 31 627.58 |  2.26 | 1.09 | 292.88 |  391.69 | 0.000 07 | 107.99 | 129.57 | 48.61 | 0.75 |