# Supplemental file 1 analytical methods

Zircon grains were extracted using conventional heavy liquid and magnetic techniques, and were mounted in epoxy, then polished and coated with gold for cathodoluminescence (CL) imaging at Guangdong Provincial Key Laboratory of Mineral Resources and Geological Processes, Sun Yat-Sen University, Guangzhou, China.

Zircon U-Pb dating and trace element analyses were conducted using a Laser ICP-MS at the Guangzhou Institute of Geochemistry (GIG), Chinese Academy of Sciences (CAS). The zircon standards 91500 and GJ-1 were used to calibrate the U-Th-Pb ratios. The spot size for data collection was 30 µm. The errors for individual U-Pb analyses are presented with 1σ error and uncertainties in grouped ages are quoted at 95 % level (2σ). Off-line inspection and integration of background and analysis signals, and time-drift correction and quantitative calibration for trace element analyses and U–Pb dating were performed using ICPMSDataCal (Liu et al., 2008). Further detailed descriptions of the instrumentation and analytical procedure for the LA-ICP-MS zircon U-Pb and trace element technique are similar to those described by Yuanet al. (2004).

Whole rock samples for geochemistry were crushed to 200-mesh using an agate mill for elemental and Sr-Nd isotopic analyses. The major oxides were analyzed by a wavelength X-ray fluorescence spectrometry at GIG CAS. Trace element analyses were performed at the GIG CAS by a Perkin-Elmer Sciex ELAN 6000 ICP-MS. Detailed sample preparation and analytical procedure followed Li et al. (2002). Sr and Nd isotopic analyses were carried out at the GIG CAS on a Neptune Plus (Thermo Fisher Scientific, MA, USA) multi-collection mass spectrometry equipped with nine Faraday cup collectors and eight ion counters. Details analytical methods are presented by Yang et al. (2006). Normalizing factors used to correct the mass fractionation of Sr and Nd during the measurements were 86Sr/88Sr = 0.1194 and 146Nd/144Nd = 0.7219 (Yang et al., 2005; Yang et al., 2007b).

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# Supplemental file 2 table 1

LA-ICPMS zircon U-Pb dating results of the Dazhonghe volcanics

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Spots | Th/U | Isotopic ratios | | | | | | Ages (Ma) | | | |
| 207Pb/206Pb | ±σ | 207Pb/235U | ±σ | 206Pb/238U | ±σ | 207Pb/235U | ±σ | 206Pb/238U | ±σ |
| 15YN-41B1 | | | | | | | | | | | |
| 1 | 1 | 0.0581 | 0.0009 | 0.5368 | 0.0107 | 0.067 | 0.0013 | 436 | 7 | 418 | 8 |
| 2 | 0.3 | 0.0556 | 0.0009 | 0.5177 | 0.0093 | 0.0676 | 0.0011 | 424 | 6 | 421 | 7 |
| 3 | 0.4 | 0.0545 | 0.0009 | 0.5081 | 0.0101 | 0.0677 | 0.0013 | 417 | 7 | 422 | 8 |
| 4 | 0.4 | 0.0588 | 0.0009 | 0.5405 | 0.0096 | 0.0666 | 0.0011 | 439 | 6 | 416 | 7 |
| 5 | 0.5 | 0.0549 | 0.0009 | 0.508 | 0.0094 | 0.0672 | 0.0012 | 417 | 6 | 419 | 7 |
| 6 | 0.6 | 0.0548 | 0.0009 | 0.5088 | 0.0097 | 0.0674 | 0.0013 | 418 | 7 | 420 | 8 |
| 7 | 0.7 | 0.0552 | 0.0009 | 0.5086 | 0.009 | 0.0667 | 0.0011 | 418 | 6 | 416 | 7 |
| 8 | 0.8 | 0.0551 | 0.0008 | 0.5124 | 0.0092 | 0.0675 | 0.0012 | 420 | 6 | 421 | 7 |
| 9 | 0.4 | 0.0554 | 0.0009 | 0.5141 | 0.0099 | 0.0673 | 0.0012 | 421 | 7 | 420 | 8 |
| 10 | 0.7 | 0.0552 | 0.0009 | 0.5108 | 0.0102 | 0.067 | 0.0013 | 419 | 7 | 418 | 8 |
| 11 | 0.5 | 0.0543 | 0.0009 | 0.4998 | 0.009 | 0.0667 | 0.0012 | 412 | 6 | 417 | 7 |
| 12 | 0.6 | 0.0548 | 0.0008 | 0.5051 | 0.0087 | 0.0669 | 0.0011 | 415 | 6 | 418 | 7 |
| 13 | 0.5 | 0.0545 | 0.0009 | 0.5018 | 0.0093 | 0.0669 | 0.0012 | 413 | 6 | 417 | 7 |
| 14 | 0.5 | 0.0549 | 0.0009 | 0.505 | 0.0093 | 0.0668 | 0.0011 | 415 | 6 | 417 | 7 |
| 15 | 0.4 | 0.0551 | 0.0009 | 0.5069 | 0.009 | 0.0667 | 0.0011 | 416 | 6 | 416 | 7 |
| 16 | 0.7 | 0.0549 | 0.0009 | 0.5065 | 0.0086 | 0.067 | 0.0011 | 416 | 6 | 418 | 7 |
| 17 | 0.6 | 0.055 | 0.0009 | 0.5083 | 0.0101 | 0.0671 | 0.0013 | 417 | 7 | 418 | 8 |
| 18 | 1.2 | 0.2697 | 0.0041 | 23.5271 | 0.3979 | 0.6329 | 0.0107 | 3249 | 17 | 3161 | 42 |
| 15YN-41E1 | | | | | | | | | | | |
| 1 | 0.6 | 0.0556 | 0.0009 | 0.5169 | 0.0104 | 0.0675 | 0.0014 | 423 | 7 | 421 | 8 |
| 2 | 0.8 | 0.0552 | 0.0009 | 0.5079 | 0.0087 | 0.0668 | 0.0011 | 417 | 6 | 417 | 7 |
| 3 | 0.6 | 0.055 | 0.0009 | 0.5117 | 0.0087 | 0.0675 | 0.0011 | 420 | 6 | 421 | 7 |
| 4 | 0.7 | 0.055 | 0.0009 | 0.5088 | 0.009 | 0.0671 | 0.0012 | 418 | 6 | 419 | 7 |
| 5 | 0.8 | 0.0565 | 0.0009 | 0.5214 | 0.01 | 0.0668 | 0.0011 | 426 | 7 | 417 | 7 |
| 6 | 0.5 | 0.0549 | 0.0008 | 0.5079 | 0.0088 | 0.0671 | 0.0011 | 417 | 6 | 419 | 7 |
| 7 | 0.7 | 0.0553 | 0.0009 | 0.512 | 0.0089 | 0.0672 | 0.0011 | 420 | 6 | 419 | 7 |
| 8 | 0.5 | 0.0558 | 0.0009 | 0.5111 | 0.0091 | 0.0664 | 0.0011 | 419 | 6 | 415 | 7 |
| 9 | 0.7 | 0.0551 | 0.0008 | 0.5149 | 0.0092 | 0.0678 | 0.0012 | 422 | 6 | 423 | 7 |
| 10 | 0.5 | 0.0548 | 0.0009 | 0.5087 | 0.009 | 0.0673 | 0.0012 | 418 | 6 | 420 | 7 |
| 11 | 0.6 | 0.0549 | 0.0009 | 0.5102 | 0.0095 | 0.0674 | 0.0012 | 419 | 6 | 421 | 7 |
| 12 | 0.6 | 0.0562 | 0.0009 | 0.522 | 0.0101 | 0.0672 | 0.0012 | 426 | 7 | 419 | 7 |
| 13 | 0.9 | 0.0548 | 0.0009 | 0.5089 | 0.0093 | 0.0673 | 0.0012 | 418 | 6 | 420 | 7 |
| 14 | 0.5 | 0.0549 | 0.0009 | 0.5089 | 0.0088 | 0.0672 | 0.0011 | 418 | 6 | 419 | 7 |
| 15 | 0.5 | 0.055 | 0.0009 | 0.5072 | 0.0092 | 0.0669 | 0.0012 | 417 | 6 | 417 | 7 |
| 16 | 0.5 | 0.0549 | 0.0009 | 0.5093 | 0.0086 | 0.0672 | 0.0011 | 418 | 6 | 419 | 7 |

# Supplemental file 3 table 2

Major (wt. %) and trace elements (ppm) analytical results of the Dazhonghe volcanics

| Sample | 15YN-41A1 | 15YN-41A2 | 15YN-41B1 | 15YN-41B2 | 15YN-41C1 | 15YN-41C2 | 15YN-41D1 | 15YN-41D2 | 15YN-41E1 | 15YN-41E2 | 15YN-41F1 | 15YN-41F2 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ref. | This study | | | | | | | | | | | |
| SiO2 | 67.33 | 55.72 | 71.53 | 69.58 | 64.35 | 70.89 | 79.95 | 76.13 | 70.71 | 66.64 | 60.23 | 58.48 |
| TiO2 | 0.37 | 1.85 | 0.28 | 0.29 | 0.34 | 0.30 | 0.21 | 0.23 | 0.45 | 0.65 | 0.81 | 0.71 |
| Al2O3 | 12.95 | 14.12 | 13.51 | 11.70 | 15.96 | 11.46 | 10.36 | 12.22 | 13.91 | 15.71 | 16.80 | 15.99 |
| FeOT | 5.56 | 12.36 | 2.48 | 4.60 | 5.20 | 4.72 | 1.47 | 1.86 | 4.20 | 4.85 | 6.48 | 6.37 |
| MnO | 0.14 | 0.10 | 0.10 | 0.12 | 0.12 | 0.12 | 0.05 | 0.06 | 0.11 | 0.11 | 0.14 | 0.14 |
| MgO | 2.58 | 1.48 | 0.78 | 3.23 | 4.22 | 3.36 | 0.36 | 0.43 | 1.26 | 1.25 | 2.12 | 1.97 |
| CaO | 1.82 | 2.46 | 1.18 | 1.66 | 1.01 | 1.02 | 0.53 | 0.41 | 0.21 | 0.35 | 1.54 | 3.21 |
| Na2O | 5.07 | 8.31 | 6.16 | 3.95 | 4.35 | 3.99 | 3.78 | 4.22 | 5.75 | 6.50 | 4.54 | 4.52 |
| K2O | 0.18 | 0.09 | 0.75 | 0.32 | 0.29 | 0.28 | 1.40 | 1.96 | 1.15 | 0.94 | 3.13 | 2.65 |
| P2O5 | 0.05 | 0.44 | 0.04 | 0.02 | 0.03 | 0.02 | 0.04 | 0.04 | 0.08 | 0.12 | 0.13 | 0.11 |
| LOI | 3.03 | 1.76 | 2.62 | 3.99 | 3.17 | 2.90 | 1.50 | 1.87 | 1.62 | 2.43 | 3.14 | 4.79 |
| Total | 99.71 | 100.07 | 99.72 | 99.98 | 99.61 | 99.59 | 99.80 | 99.64 | 99.93 | 100.10 | 99.77 | 99.66 |
| V | 149 | 187 | 27.3 | 154 | 141 | 141 | 26.1 | 31.9 | 80.0 | 113 | 190 | 166.3 |
| Cr | 10.0 | 9.90 | 10.3 | 19.6 | 20.1 | 20.0 | 11.4 | 12.0 | 10.3 | 9.8 | 19.9 | 19.8 |
| Ga | 12.95 | 13.27 | 12.83 | 11.28 | 12.83 | 11.39 | 12.84 | 15.05 | 14.87 | 15.89 | 17.54 | 16.83 |
| Rb | 1.49 | 4.85 | 12.83 | 4.22 | 3.91 | 3.60 | 34.61 | 42.35 | 9.74 | 10.30 | 60.19 | 50.00 |
| Sr | 94 | 184 | 141 | 183 | 154 | 167 | 132 | 141 | 76 | 106 | 287 | 195 |
| Y | 17.34 | 15.15 | 19.30 | 13.24 | 16.14 | 14.59 | 28.49 | 35.98 | 26.35 | 26.68 | 20.43 | 19.01 |
| Zr | 43 | 37 | 102 | 37 | 48 | 42 | 109 | 120 | 99 | 85 | 62 | 57 |
| Nb | 1.30 | 1.09 | 2.53 | 1.08 | 1.30 | 1.20 | 3.11 | 3.39 | 2.97 | 2.84 | 2.39 | 2.08 |
| Cs | 0.15 | 0.50 | 0.69 | 0.99 | 0.98 | 0.91 | 1.03 | 1.40 | 0.38 | 0.51 | 3.82 | 4.53 |
| Ba | 31 | 145 | 137 | 56 | 61 | 59 | 313 | 589 | 266 | 205 | 632 | 455 |
| La | 4.5 | 4.3 | 9.2 | 5.2 | 5.2 | 4.6 | 10.9 | 12.1 | 7.3 | 10.0 | 8.6 | 8.2 |
| Ce | 10.1 | 9.3 | 19.0 | 10.4 | 11.4 | 10.1 | 25.4 | 29.8 | 18.7 | 20.1 | 17.7 | 16.7 |
| Pr | 1.29 | 1.18 | 2.28 | 1.29 | 1.36 | 1.31 | 2.96 | 3.60 | 2.45 | 2.69 | 2.38 | 2.17 |
| Nd | 5.78 | 5.25 | 9.40 | 5.59 | 5.92 | 5.60 | 12.24 | 14.25 | 11.18 | 11.87 | 10.56 | 9.70 |
| Sm | 1.72 | 1.57 | 2.30 | 1.54 | 1.62 | 1.54 | 3.06 | 3.44 | 3.06 | 3.15 | 2.82 | 2.50 |
| Eu | 0.49 | 0.49 | 0.66 | 0.51 | 0.55 | 0.52 | 0.64 | 0.77 | 0.85 | 1.11 | 1.06 | 1.15 |
| Gd | 2.16 | 2.04 | 2.61 | 1.84 | 2.06 | 1.99 | 3.24 | 4.12 | 3.63 | 3.73 | 3.19 | 2.97 |
| Tb | 0.38 | 0.35 | 0.42 | 0.32 | 0.40 | 0.35 | 0.63 | 0.76 | 0.64 | 0.62 | 0.52 | 0.49 |
| Dy | 2.71 | 2.37 | 2.77 | 2.14 | 2.62 | 2.30 | 4.26 | 5.42 | 4.21 | 4.12 | 3.38 | 3.12 |
| Ho | 0.62 | 0.55 | 0.64 | 0.46 | 0.58 | 0.53 | 0.95 | 1.24 | 0.96 | 0.89 | 0.74 | 0.68 |
| Er | 1.82 | 1.59 | 1.93 | 1.36 | 1.76 | 1.53 | 2.84 | 3.56 | 2.84 | 2.60 | 2.17 | 1.93 |
| Tm | 0.29 | 0.26 | 0.31 | 0.21 | 0.28 | 0.25 | 0.45 | 0.53 | 0.45 | 0.40 | 0.34 | 0.30 |
| Yb | 1.95 | 1.72 | 2.25 | 1.31 | 1.89 | 1.71 | 2.92 | 3.49 | 2.97 | 2.61 | 2.13 | 1.98 |
| Lu | 0.33 | 0.28 | 0.38 | 0.21 | 0.30 | 0.27 | 0.48 | 0.56 | 0.47 | 0.42 | 0.36 | 0.31 |
| Hf | 1.40 | 1.09 | 2.73 | 1.18 | 1.50 | 1.30 | 3.21 | 3.59 | 2.87 | 2.45 | 1.79 | 1.68 |
| Ta | 0.10 | 0.10 | 0.20 | 0.12 | 0.10 | 0.10 | 0.20 | 0.20 | 0.21 | 0.20 | 0.10 | 0.10 |
| Th | 1.04 | 0.87 | 2.07 | 0.94 | 1.17 | 1.06 | 2.92 | 3.27 | 2.45 | 2.17 | 1.65 | 1.52 |
| U | 0.48 | 0.43 | 0.82 | 0.44 | 0.54 | 0.48 | 1.09 | 1.25 | 0.90 | 0.79 | 0.59 | 0.52 |
| W | 2.38 | 1.09 | 12.30 | 8.26 | 2.45 | 1.41 | 0.87 | 1.06 | 1.07 | 1.08 | 2.30 | 2.86 |
| Sn | 2.32 | 1.06 | 11.96 | 8.03 | 2.38 | 1.37 | 0.84 | 1.03 | 1.04 | 1.05 | 2.24 | 2.78 |

Table 2 continued

| Sample | 15YN-41G1 | 15YN-41G2 | 15YN-41J1 | 15YN-41J2 | DZH01-1 | DZH01-2 | DZH01-3 | DZH01-4 | DZH01-5 | DZH01-6 | DZH01-7 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ref. | This study | | | | Mao et al., 2012 | | | | | | |
| SiO2 | 75.88 | 49.88 | 79.55 | 72.10 | 58.39 | 56.60 | 64.48 | 58.99 | 61.16 | 62.80 | 57.07 |
| TiO2 | 0.30 | 0.83 | 0.29 | 0.38 | 0.92 | 0.81 | 0.94 | 0.85 | 1.07 | 1.04 | 1.03 |
| Al2O3 | 11.61 | 14.34 | 9.55 | 14.44 | 15.45 | 14.58 | 12.73 | 14.58 | 13.58 | 13.05 | 16.63 |
| FeOT | 2.25 | 9.42 | 2.64 | 2.62 | 7.62 | 9.69 | 7.23 | 8.22 | 7.87 | 7.04 | 7.76 |
| MnO | 0.08 | 0.17 | 0.09 | 0.09 | 0.20 | 0.29 | 0.16 | 0.21 | 0.18 | 0.17 | 0.19 |
| MgO | 0.34 | 8.55 | 0.97 | 0.20 | 3.64 | 4.32 | 3.07 | 3.82 | 3.26 | 2.86 | 3.64 |
| CaO | 0.53 | 12.36 | 0.12 | 0.24 | 1.83 | 2.48 | 1.25 | 1.58 | 1.25 | 2.36 | 1.39 |
| Na2O | 5.84 | 1.91 | 4.13 | 6.82 | 3.53 | 3.61 | 3.20 | 3.66 | 3.64 | 3.95 | 4.32 |
| K2O | 0.69 | 0.09 | 0.71 | 0.96 | 3.52 | 2.02 | 3.16 | 2.84 | 2.87 | 2.46 | 3.59 |
| P2O5 | 0.07 | 0.05 | 0.04 | 0.09 | 0.22 | 0.23 | 0.23 | 0.23 | 0.32 | 0.35 | 0.26 |
| LOI | 1.81 | 1.28 | 1.44 | 1.20 | 4.23 | 4.69 | 3.12 | 4.51 | 3.45 | 3.58 | 3.62 |
| Total | 99.65 | 99.92 | 99.82 | 99.44 | 100.40 | 100.40 | 100.37 | 100.41 | 99.53 | 100.44 | 100.36 |
| V | 37.4 | 58.9 | 39.1 | 49.0 | 139 | 152 | 162 | 161 | 183 | 160 | 145 |
| Cr | 8.4 | 9.1 | 11.0 | 10.0 | 6.63 | 9.62 | 6.4 | 6.32 | 7.56 | 6.97 | 6.16 |
| Ga | 10.91 | 12.26 | 10.73 | 9.29 | 18.8 | 21.1 | 15.9 | 19.7 | 17.4 | 14.5 | 20.7 |
| Rb | 13.84 | 16.48 | 15.94 | 33.88 | 77.3 | 44.3 | 74.5 | 63 | 64.4 | 48.3 | 81.5 |
| Sr | 168 | 121 | 112 | 131 | 132 | 156 | 108 | 113 | 136 | 102 | 191 |
| Y | 21.72 | 29.33 | 19.95 | 13.49 | 40.9 | 41.4 | 31.7 | 35.3 | 38.9 | 36.9 | 54.5 |
| Zr | 96 | 116 | 113 | 65 | 176 | 139 | 133 | 148 | 141 | 124 | 228 |
| Nb | 2.43 | 2.94 | 3.71 | 2.40 | 5.72 | 4.97 | 4.38 | 5.17 | 4.61 | 4.02 | 7.6 |
| Cs | 0.67 | 0.98 | 0.48 | 2.28 | 6.37 | 2.93 | 3.95 | 4.02 | 3.9 | 2.14 | 6 |
| Ba | 95 | 150 | 147 | 112 | 337 | 198 | 375 | 252 | 276 | 312 | 313 |
| La | 8.0 | 6.5 | 6.9 | 6.8 | 21.4 | 34 | 13.7 | 21.7 | 17.1 | 18.2 | 20.9 |
| Ce | 20.8 | 18.6 | 20.2 | 15.1 | 50.5 | 56.1 | 33.7 | 46.4 | 40.8 | 41.3 | 55.7 |
| Pr | 2.90 | 2.33 | 1.98 | 1.28 | 6.55 | 6.75 | 4.35 | 5.57 | 5.24 | 5.31 | 7.64 |
| Nd | 12.63 | 10.60 | 8.42 | 5.40 | 28.5 | 28.7 | 19 | 23.8 | 23 | 23.4 | 33.9 |
| Sm | 3.22 | 3.11 | 2.04 | 1.34 | 6.76 | 6.18 | 4.51 | 5.43 | 5.75 | 5.67 | 8.08 |
| Eu | 0.74 | 0.78 | 0.47 | 0.36 | 1.69 | 1.85 | 1.32 | 1.3 | 1.47 | 1.43 | 1.73 |
| Gd | 3.51 | 3.92 | 2.24 | 1.39 | 6.72 | 6.39 | 4.74 | 5.36 | 5.9 | 5.7 | 7.96 |
| Tb | 0.59 | 0.67 | 0.43 | 0.26 | 1.08 | 1 | 0.77 | 0.85 | 0.97 | 0.93 | 1.28 |
| Dy | 3.55 | 4.65 | 2.95 | 1.76 | 6.66 | 6.19 | 4.76 | 5.25 | 5.97 | 5.78 | 8.1 |
| Ho | 0.81 | 1.10 | 0.75 | 0.42 | 1.3 | 1.23 | 0.94 | 1.03 | 1.17 | 1.13 | 1.62 |
| Er | 2.43 | 3.28 | 2.42 | 1.34 | 3.72 | 3.59 | 2.72 | 3.14 | 3.35 | 3.19 | 4.75 |
| Tm | 0.40 | 0.54 | 0.41 | 0.22 | 0.58 | 0.53 | 0.41 | 0.47 | 0.52 | 0.47 | 0.73 |
| Yb | 2.78 | 3.67 | 2.87 | 1.49 | 3.79 | 3.29 | 2.69 | 3.24 | 3.18 | 2.98 | 4.62 |
| Lu | 0.44 | 0.62 | 0.49 | 0.24 | 0.59 | 0.51 | 0.41 | 0.49 | 0.47 | 0.45 | 0.69 |
| Hf | 2.83 | 3.63 | 3.21 | 1.80 | 4.83 | 3.74 | 3.42 | 3.96 | 3.56 | 3.22 | 5.89 |
| Ta | 0.10 | 0.20 | 0.20 | 0.10 | 0.37 | 0.35 | 0.27 | 0.33 | 0.28 | 0.24 | 0.46 |
| Th | 1.99 | 2.29 | 2.49 | 1.83 | 5.73 | 5.75 | 4.64 | 5.31 | 4.7 | 4.05 | 7.63 |
| U | 0.80 | 0.88 | 0.77 | 0.57 | 2.18 | 1.58 | 1.16 | 1.74 | 1.32 | 1.27 | 2.24 |
| W | 2.19 | 4.36 | 1.11 | 1.46 |  |  |  |  |  |  |  |
| Sn | 2.13 | 4.24 | 1.08 | 1.42 |  |  |  |  |  |  |  |

The analytical errors for major elements are generally <2%. The analytical precision for trace elements is generally better than 5% for elements with concentrations >200 ppm, and 5–10% when <200 ppm (Li et al., 2002).

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# Supplemental file 4 table 3

Major (wt. %) and trace elements (ppm) data of the Dawazi volcanics

| Sample | 15YN-37A1 | 15YN-37A2 | 15YN-39A | 15YN-39B | 2701 | 3201 | 3203 | D-35 | D-36 | D-42 | D-46 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ref. | This study | | | | Lehmann et al., 2013 | | | | | | |
| SiO2 | 74.63 | 76.20 | 71.06 | 72.26 | 67.08 | 72.93 | 74.24 | 75.18 | 45.57 | 67.40 | 88.16 |
| TiO2 | 0.45 | 0.45 | 0.31 | 0.32 | 0.81 | 0.21 | 0.32 | 0.19 | 0.83 | 0.34 | 0.04 |
| Al2O3 | 9.45 | 9.09 | 12.83 | 12.47 | 14.59 | 12.62 | 12.52 | 12.59 | 16.06 | 12.74 | 6.88 |
| FeOT | 4.18 | 5.20 | 3.11 | 3.66 | 4.77 | 2.13 | 2.21 | 2.16 | 11.47 | 1.78 | 0.22 |
| MnO | 0.04 | 0.02 | 0.12 | 0.10 | 0.05 | 0.10 | 0.04 | 0.07 | 0.24 | 0.04 | 0.01 |
| MgO | 1.95 | 2.21 | 3.80 | 3.84 | 1.06 | 0.84 | 0.55 | 0.36 | 5.58 | 9.35 | 0.07 |
| CaO | 2.10 | 0.30 | 0.76 | 0.23 | 0.81 | 2.16 | 1.50 | 0.47 | 5.84 | 0.20 | 0.06 |
| Na2O | 1.91 | 1.08 | 3.62 | 2.02 | 5.38 | 3.58 | 4.90 | 5.51 | 4.47 | 1.93 | 3.37 |
| K2O | 0.84 | 0.70 | 0.80 | 1.51 | 1.24 | 1.73 | 0.97 | 1.06 | 0.13 | 0.17 | 0.12 |
| P2O5 | 0.02 | 0.01 | 0.05 | 0.05 | 0.06 | 0.04 | 0.07 | 0.04 | 0.10 | 0.07 | 0.02 |
| LOI | 3.91 | 3.70 | 2.93 | 2.96 | 3.42 | 3.21 | 2.18 | 1.85 | 8.26 | 5.63 | 1.01 |
| Total | 99.94 | 99.55 | 99.73 | 99.84 | 99.72 | 99.75 | 99.76 | 99.70 | 99.60 | 99.76 | 99.85 |
| V | 49.1 | 43.0 | 47.2 | 45.1 | 117 | 33 | 12 | 5 | 357 | 21 | 2 |
| Cr | 10.0 | 10.0 | 11.3 | 8.5 | 10 | 3 | 3 | 3 | 11 | 3 | 3 |
| Ga | 9.62 | 9.89 | 12.20 | 12.66 | 16.3 | 11.3 | 13.1 | 11 | 19.5 | 16 | 4.2 |
| Rb | 22.06 | 20.49 | 11.89 | 21.39 | 13.8 | 13.1 | 6.3 | 16 | 0.7 | 2.3 | 2.8 |
| Sr | 141 | 71 | 58 | 24 | 298 | 60 | 97.1 | 94 | 145 | 58.8 | 40.7 |
| Y | 16.84 | 18.49 | 28.20 | 27.96 | 10.7 | 9.22 | 23.1 | 22 | 8.49 | 32.5 | 36.4 |
| Zr | 62 | 67 | 78 | 77 | 115 | 67 | 52 | 117 | 24 | 53 | 49 |
| Nb | 1.70 | 1.80 | 2.15 | 2.06 | 6.7 | 2.3 | 2.3 | 2 | 1.2 | 2.7 | 3 |
| Cs | 0.61 | 1.04 | 0.56 | 1.44 | 4.39 | 2.59 | 1.08 | 1 | 0.29 | 0.94 | 0.29 |
| Ba | 74 | 82 | 211 | 366 | 168 | 271 | 220 | 237 | 57 | 59 | 56 |
| La | 9.9 | 9.1 | 9.9 | 6.6 | 12.2 | 9.5 | 13.3 | 10.5 | 2.9 | 11.1 | 10.5 |
| Ce | 21.1 | 19.5 | 20.9 | 13.2 | 29.7 | 22.2 | 30.8 | 20 | 7.17 | 12.4 | 23.2 |
| Pr | 2.76 | 2.61 | 2.46 | 1.63 | 3.13 | 2.35 | 3.91 |  | 1.01 | 3.45 | 3.12 |
| Nd | 12.23 | 11.19 | 10.36 | 7.06 | 12.9 | 8.47 | 17.8 | 6 | 4.79 | 16.2 | 12.6 |
| Sm | 3.22 | 2.70 | 2.69 | 1.99 | 3.22 | 2.03 | 4.72 | 2.7 | 1.47 | 4.84 | 3.43 |
| Eu | 1.17 | 0.82 | 0.63 | 0.53 | 0.88 | 0.62 | 1.31 | 0.8 | 0.53 | 1.38 | 0.24 |
| Gd | 3.31 | 2.83 | 3.17 | 2.57 | 3.06 | 2.17 | 4.92 |  | 1.69 | 5.74 | 4.12 |
| Tb | 0.51 | 0.47 | 0.57 | 0.53 | 0.46 | 0.33 | 0.71 | 0.5 | 0.29 | 0.97 | 0.76 |
| Dy | 3.09 | 3.16 | 4.03 | 3.86 | 2.73 | 1.92 | 4.07 |  | 1.83 | 6.32 | 5.68 |
| Ho | 0.65 | 0.68 | 0.93 | 0.89 | 0.55 | 0.41 | 0.89 |  | 0.39 | 1.32 | 1.35 |
| Er | 1.85 | 1.91 | 2.78 | 2.72 | 1.75 | 1.25 | 2.91 |  | 1.27 | 4.13 | 4.44 |
| Tm | 0.28 | 0.29 | 0.44 | 0.43 | 0.25 | 0.19 | 0.47 |  | 0.17 | 0.63 | 0.69 |
| Yb | 1.82 | 1.88 | 2.85 | 2.96 | 1.87 | 1.43 | 3.66 | 4.2 | 1.3 | 4.25 | 4.95 |
| Lu | 0.29 | 0.31 | 0.44 | 0.48 | 0.3 | 0.2 | 0.57 | 0.63 | 0.19 | 0.64 | 0.77 |
| Hf | 1.90 | 2.00 | 2.26 | 2.26 | 3.4 | 2.1 | 2.3 | 3 | 1.1 | 3.1 | 1.6 |
| Ta | 0.10 | 0.10 | 0.10 | 0.10 | 0.5 | 0.1 | 0.1 | 0.5 | 0.1 | 0.2 | 0.1 |
| Th | 1.82 | 1.83 | 2.56 | 2.56 | 2.4 | 3 | 2 | 3.7 | 0.7 | 2.4 | 3.9 |
| U | 0.61 | 0.72 | 1.17 | 1.09 | 0.5 | 3.1 | 4.8 | 1.1 | 0.5 | 2.6 | 1.5 |
| W | 1.05 | 1.38 | 1.11 | 1.12 |  |  |  |  |  |  |  |
| Sn | 1.02 | 1.34 | 1.08 | 1.09 |  |  |  |  |  |  |  |

Table 3 continued

| Sample | DP-9 | DP-70 | DP-71 | DP-30 | DO-35 | DP-21 | DP-81 | NO.1 | DP6-7 | DP5-3 | DP2-4 | DP2-3 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ref. | Li et al., 2012 | | | | | | | | Zhong et al., 2000 | | | |
| SiO2 | 80.83 | 83.31 | 85.06 | 86.01 | 87.37 | 73.33 | 88.86 | 78.38 | 72.37 | 72.07 | 73.90 | 76.39 |
| TiO2 | 0.20 | 0.23 | 0.20 | 0.19 | 0.19 | 0.28 | 0.14 | 0.10 | 0.17 | 0.16 | 0.28 | 0.14 |
| Al2O3 | 7.59 | 8.56 | 6.94 | 6.05 | 4.86 | 11.22 | 5.59 | 9.12 | 12.77 | 13.05 | 13.01 | 10.85 |
| FeOT | 4.54 | 2.15 | 2.08 | 2.52 | 3.12 | 5.30 | 1.10 | 4.33 | 3.40 | 3.14 | 3.89 | 3.29 |
| MnO | 0.04 | 0.02 | 0.02 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | 0.08 | 0.10 | 0.13 | 0.13 |
| MgO | 0.60 | 0.36 | 0.27 | 0.35 | 0.39 | 1.26 | 0.30 | 0.64 | 1.40 | 1.20 | 2.30 | 1.60 |
| CaO | 0.09 | 0.08 | 0.45 | 0.17 | 0.12 | 0.08 | 0.09 | 0.11 | 1.11 | 0.70 | 1.30 | 0.70 |
| Na2O | 0.07 | 0.07 | 0.06 | 0.05 | 0.05 | 0.08 | 0.08 | 2.56 | 3.30 | 3.31 | 3.48 | 3.71 |
| K2O | 1.92 | 2.42 | 1.87 | 1.65 | 1.23 | 2.90 | 1.54 | 0.77 | 1.03 | 2.29 | 0.37 | 0.51 |
| P2O5 | 0.03 | 0.01 | 0.00 | 0.01 | 0.04 | 0.03 | 0.01 | 0.00 | 0.10 | 0.12 | 0.11 | 0.10 |
| LOI | 3.69 | 2.40 | 2.11 | 2.19 | 2.43 | 5.02 | 1.39 | 3.49 | 0.09 | 0.20 | 0.05 | 0.09 |
| Total | 99.60 | 99.61 | 99.06 | 99.23 | 99.84 | 99.53 | 99.13 | 99.53 | 95.82 | 96.34 | 98.82 | 97.51 |
| V | 16.30 | 22.9 | 18.1 | 16.2 | 16.9 | 21.4 | 17.4 | 16.3 | 20.9 | 22.6 | 26.9 | 10.7 |
| Cr | 11.30 | 7.7 | 1.9 | 3.8 | 16.3 | 0.2 | 10.4 | 22.8 | 12.7 | 13 | 13.3 | 20.2 |
| Ga |  |  |  |  |  |  |  |  |  |  |  |  |
| Rb | 23.50 | 22 | 21.2 | 22 | 16.8 | 32.6 | 22 | 11 | 15 | 31.6 | 4.76 | 7.31 |
| Sr | 9.10 | 10.1 | 11.9 | 10.1 | 8.7 | 14.9 | 12.2 | 40.7 | 85.9 | 52.2 | 104 | 64.2 |
| Y | 7.30 | 4.4 | 8.6 | 4.4 | 6.6 | 12.3 | 7.3 | 16.6 | 23.7 | 21.5 | 14 | 18 |
| Zr | 52.10 | 40.4 | 47.3 | 40.4 | 40.8 | 90.6 | 50.9 | 77.9 | 80.6 | 90.9 | 54.4 | 60.1 |
| Nb | 6.30 | 5.6 | 5.6 | 5.6 | 5.5 | 8.9 | 5.9 | 7.3 | 2.06 | 2.28 | 1.97 | 1.98 |
| Cs | 1.92 | 0.75 | 0.5 | 0.75 | 0.66 | 1.06 | 0.55 | 0.2 |  |  |  |  |
| Ba | 427.00 | 315 | 609 | 315 | 233 | 911 | 514 | 176 | 252 | 476 | 108 | 611 |
| La | 3.1 | 3.2 | 2.5 | 1.8 | 2.8 | 4.3 | 2.8 | 2.2 | 12.4 | 6.18 | 4.1 | 2.06 |
| Ce | 6.4 | 6.7 | 2.6 | 3.4 | 5.7 | 8.4 | 3.8 | 4.7 | 18.6 | 18.6 | 8.7 | 4.84 |
| Pr | 0.98 | 1 | 0.51 | 0.5 | 0.92 | 1.24 | 0.76 | 0.65 | 2.95 | 1.84 | 1.19 | 0.67 |
| Nd | 4.7 | 4.7 | 2.9 | 2.4 | 4.1 | 6.5 | 3.6 | 2.8 | 13.5 | 8.71 | 5.9 | 3.72 |
| Sm | 1.14 | 1.22 | 0.76 | 0.56 | 0.99 | 1.68 | 0.88 | 0.76 | 3.79 | 2.54 | 1.61 | 1.25 |
| Eu | 0.7 | 0.7 | 1.7 | 0.5 | 0.4 | 1.4 | 1 | 0.4 | 0.95 | 0.64 | 0.43 | 0.35 |
| Gd | 0.6 | 0.6 | 0.3 | 0.3 | 0.6 | 0.8 | 0.5 | 0.4 | 3.34 | 2.54 | 1.53 | 1.46 |
| Tb | 0.13 | 0.14 | 0.07 | 0.06 | 0.12 | 0.17 | 0.1 | 0.1 | 0.68 | 0.59 | 0.34 | 0.37 |
| Dy | 1.2 | 1.6 | 1.3 |  |  | 1.9 | 1.1 | 2.2 | 4.2 | 3.57 | 2.27 | 3.26 |
| Ho | 0.26 | 0.35 | 0.28 | 0.14 | 0.21 | 0.44 | 0.24 | 0.53 | 1.16 | 1.07 | 0.68 | 0.85 |
| Er | 0.5 | 0.6 | 0.4 | 0.3 | 0.5 | 0.8 | 0.4 | 0.7 | 2.81 | 2.64 | 1.87 | 2.46 |
| Tm | 0.18 | 0.22 | 0.15 | 0.09 | 0.12 | 0.24 | 0.15 | 0.38 | 0.5 | 0.5 | 0.32 | 0.45 |
| Yb | 1.07 | 1.33 | 1.03 | 0.58 | 0.81 | 1.57 | 1.03 | 1.98 | 3.35 | 3.21 | 2.29 | 2.96 |
| Lu | 1.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.3 | 0.46 | 0.45 | 0.27 | 0.4 |
| Hf | 0.59 | 1.15 | 2.22 | 1.15 | 2.03 | 3.2 | 1.81 | 3.77 | 2.15 | 2.71 | 1.76 | 1.82 |
| Ta | 0.16 | 0.27 | 0.46 | 0.27 | 0.45 | 0.58 | 0.42 | 0.59 |  |  |  |  |
| Th | 0.80 | 5 | 6.9 | 5 | 5.4 | 3.8 | 6.8 | 9.3 | 2.59 | 2.7 | 1.54 | 1.72 |
| U | 0.50 | 2.1 | 2.8 | 2.1 | 2.2 | 1.6 | 2.7 | 3.7 |  |  |  |  |
| W |  |  |  |  |  |  |  |  |  |  |  |  |
| Sn |  |  |  |  |  |  |  |  |  |  |  |  |

Table 3 continued

| Sample | DP-1 | DP-10 | DP-51 | DP-73 | DP-29 | NO.2 | DP5-7' | DP6-3 | DP6-6 | DP6-5' | DP6-5 | DP4-4 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ref. | Zhong et al., 2000 | | | | | | | | | | | |
| SiO2 | 69.06 | 67.36 | 70.12 | 71.04 | 72.92 | 74.03 | 67.25 | 61.95 | 49.33 | 44.28 | 51.92 | 51.65 |
| TiO2 | 0.36 | 0.53 | 0.41 | 0.41 | 0.35 | 0.21 | 0.13 | 0.25 | 0.70 | 0.72 | 0.42 | 0.67 |
| Al2O3 | 12.71 | 15.92 | 13.02 | 13.59 | 12.80 | 12.22 | 10.36 | 15.42 | 19.76 | 20.00 | 16.87 | 17.35 |
| FeOT | 4.17 | 4.62 | 3.89 | 3.97 | 3.94 | 2.69 | 9.12 | 5.69 | 10.45 | 15.41 | 5.73 | 10.59 |
| MnO | 0.15 | 0.11 | 0.16 | 0.20 | 0.14 | 0.05 | 0.23 | 0.09 | 0.12 | 0.21 | 0.15 | 0.13 |
| MgO | 4.37 | 2.44 | 2.81 | 3.28 | 1.97 | 3.95 | 5.20 | 7.70 | 7.00 | 7.20 | 5.00 | 5.50 |
| CaO | 1.27 | 0.34 | 1.09 | 0.39 | 0.32 | 0.21 | 0.50 | 1.00 | 1.70 | 2.80 | 9.10 | 2.00 |
| Na2O | 3.81 | 3.14 | 4.70 | 2.08 | 3.83 | 2.24 | 0.08 | 1.79 | 4.52 | 3.15 | 1.94 | 0.71 |
| K2O | 0.49 | 2.29 | 0.39 | 2.19 | 1.13 | 1.15 | 0.33 | 0.87 | 0.09 | 0.16 | 0.84 | 2.42 |
| P2O5 | 0.08 | 0.14 | 0.09 | 0.10 | 0.07 | 0.03 | 0.13 | 0.18 | 0.03 | 0.12 | 0.12 | 0.15 |
| LOI | 3.62 | 2.96 | 2.53 | 2.87 | 2.38 | 3.09 |  | 0.10 | 0.17 |  |  | 0.21 |
| Total | 100.09 | 99.85 | 99.21 | 100.12 | 99.85 | 99.87 | 93.33 | 95.04 | 93.87 | 94.05 | 92.09 | 91.38 |
| V | 26.50 | 40.4 | 28.5 | 36.2 | 29.2 | 19.2 | 46.2 | 26.8 | 119 | 325 | 173 | 174 |
| Cr | 4.00 | 16.4 | 8.1 | 8.4 | 7.4 | 8.2 | 7.53 | 12.7 | 46.3 | 45.1 | 17.3 | 40.4 |
| Ga |  |  |  |  |  |  |  |  |  |  |  |  |
| Rb | 8.30 | 34.2 | 6 | 29.8 | 16.4 | 16.2 | 4.71 | 14.8 | 1.43 | 2.65 | 16.5 | 50.4 |
| Sr | 48.80 | 85 | 117 | 51.5 | 76.3 | 32.1 | 4.58 | 46.5 | 151 | 106 | 122 | 30.1 |
| Y | 29.70 | 26 | 13.6 | 19.4 | 14.8 | 22.7 | 11.1 | 26.6 | 13.8 | 13.8 | 24.6 | 11.4 |
| Zr | 79.30 | 80.8 | 79.4 | 84.4 | 77.7 | 87.6 | 42.8 | 72.8 | 30.2 | 36.7 | 40.8 | 31.9 |
| Nb | 7.20 | 8 | 6.6 | 6.8 | 6.5 | 8.3 | 1.34 | 2.52 | 1.8 | 1.93 | 1.49 | 0.93 |
| Cs | 1.00 | 7.32 | 0.4 | 3.76 | 1.19 | 3.91 |  |  |  |  |  |  |
| Ba | 139.00 | 516 | 332 | 694 | 328 | 170 | 189 | 205 | 90 | 122 | 188 | 645 |
| La | 13 | 9.1 | 3.5 | 4 | 9.4 | 11 | 5.79 | 12.9 | 6.46 | 6.07 | 27.3 | 6.93 |
| Ce | 26.9 | 21.6 | 9.7 | 8 | 21.9 | 22.3 | 8.47 | 26.3 | 14.2 | 12 | 60.2 | 13.6 |
| Pr | 3.25 | 2.32 | 0.91 | 0.9 | 2.09 | 3.03 | 1.48 | 3.41 | 1.82 | 1.57 | 7.57 | 1.85 |
| Nd | 13.7 | 11.4 | 4 | 4.3 | 9 | 13.1 | 6.77 | 15.8 | 8.59 | 7.74 | 29.8 | 9.6 |
| Sm | 3.26 | 2.83 | 1.04 | 1.13 | 1.99 | 3.18 | 1.57 | 4.13 | 2.18 | 2.17 | 8.01 | 2.39 |
| Eu | 0.5 | 1.2 | 0.8 | 1.7 | 0.8 | 0.5 | 0.38 | 0.89 | 0.79 | 1.09 | 2.88 | 0.69 |
| Gd | 2 | 1.6 | 0.5 | 0.6 | 1.4 | 2 | 1.55 | 4 | 2.18 | 2.24 | 6.33 | 2.09 |
| Tb | 0.4 | 0.34 | 0.12 | 0.13 | 0.26 | 0.39 | 0.3 | 0.75 | 0.44 | 0.42 | 1.13 | 0.42 |
| Dy | 4.3 | 4 | 1.8 | 2.4 | 2.4 | 3.6 | 1.93 | 4.33 | 2.65 | 2.29 | 5.55 | 2.29 |
| Ho | 0.98 | 0.91 | 0.42 | 0.62 | 0.5 | 0.83 | 0.55 | 1.23 | 0.76 | 0.66 | 1.29 | 0.66 |
| Er | 1.7 | 1.5 | 0.6 | 0.8 | 1 | 1.6 | 1.28 | 2.98 | 1.58 | 1.54 | 2.63 | 1.54 |
| Tm | 0.58 | 0.52 | 0.26 | 0.41 | 0.3 | 0.47 | 0.22 | 0.51 | 0.22 | 0.27 | 0.41 | 0.27 |
| Yb | 3.24 | 3.01 | 1.51 | 2.16 | 1.74 | 2.81 | 1.5 | 3.35 | 1.56 | 1.71 | 2.53 | 1.71 |
| Lu | 0.5 | 0.4 | 0.2 | 0.3 | 0.3 | 0.4 | 0.23 | 0.41 | 0.16 | 0.19 | 0.34 | 0.19 |
| Hf | 4.00 | 4.79 | 3.07 | 4.16 | 4.06 | 5.7 | 1.39 | 2.1 | 1.05 | 1.04 | 1.23 | 0.79 |
| Ta | 0.37 |  |  |  |  |  |  |  |  | 0.25 | 0.46 | 0.68 |
| Th | 3.20 | 3.3 | 8.1 | 8.5 | 4.7 | 12.5 | 1.2 | 2.58 | 1.08 | 1.04 | 1.2 | 0.92 |
| U | 1.10 | 13 | 3 | 3.4 | 1.9 | 4.7 |  |  |  |  |  |  |
| W |  |  |  |  |  |  |  |  |  |  |  |  |
| Sn |  |  |  |  |  |  |  |  |  |  |  |  |

The analytical errors for major elements are generally <2%. The analytical precision for trace elements is generally better than 5% for elements with concentrations >200 ppm, and 5–10% when <200 ppm (Li et al., 2002).

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# Supplemental file 5 table 4

Sr-Nd isotopic compositions for the Dazhonghe and Dawazi volcanics (t=420 Ma)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | Ref. | Rb | Sr | Rb/Sr | 87Rb/86Sr | 87Sr/86Sr | 2s | (87Sr/86Sr)i | Sm | Nd | 147Sm/144Nd | 143Nd/144Nd | 2s | TDM(Ga) | (143Nd/144Nd)i | εNd(t) |
| 15YN-37B1 | This study | 1.49 | 94.5 | 0.02 | 0.04578 | 0.70701 | 13 | 0.70674 |  |  |  |  |  |  |  |  |
| 15YN-41B1 | 12.8 | 141 | 0.09 | 0.26246 | 0.7075 | 11 | 0.70593 | 2.3 | 9.40 | 0.15 | 0.51279 | 10 | 0.85 | 0.51238 | 5.5 |
| 15YN-41E1 | 9.74 | 75.6 | 0.13 | 0.37297 | 0.70806 | 10 | 0.70583 | 3.06 | 11.2 | 0.17 | 0.5128 | 9 | 1.1 | 0.51235 | 4.9 |
| 15YN-41G1 | 16.5 | 121 | 0.14 | 0.39361 | 0.70813 | 11 | 0.70578 | 3.11 | 10.6 | 0.18 | 0.51279 | 6 | 1.52 | 0.5123 | 4 |
| DP5-7 | Zhong et al., 2000 | 0.41 | 6.75 | 0.06 | 0.17995 | 0.7091 | 19 | 0.70803 | 1.65 | 5.89 | 0.17 | 0.51268 | 15 | 1.63 | 0.51221 | 2.3 |
| DP5-7' | 4.84 | 4.61 | 1.05 | 3.0237 | 0.72981 | 25 | 0.71172 | 1.42 | 6.85 | 0.12 | 0.51252 | 14 | 1.04 | 0.51218 | 1.7 |
| DP6-3 | 15.1 | 48.5 | 0.31 | 0.91301 | 0.7145 | 18 | 0.70904 | 4.29 | 16.2 | 0.16 | 0.51265 | 19 | 1.38 | 0.51221 | 2.2 |
| DP6-5' | 2.74 | 111 | 0.02 | 0.07375 | 0.70841 | 16 | 0.70796 | 2.87 | 8.66 | 0.2 | 0.51279 | 17 | 4.14 | 0.51224 | 2.7 |
| DP6-6 | 1.51 | 166 | 0.01 | 0.02675 | 0.70801 | 27 | 0.70785 | 2.26 | 8.69 | 0.15 | 0.51263 | 12 | 1.29 | 0.51221 | 2.2 |
| D36 |  |  |  |  |  |  |  | 1.34 | 4.64 | 0.17 | 0.51285 |  | 1.16 | 0.51237 | 5.4 |
| D8 |  |  |  |  |  |  |  | 1.17 | 3.82 | 0.19 | 0.51255 |  | 3.26 | 0.51204 | -1.1 |
| 3203 | Lehmann et al., 2013 |  |  |  |  |  |  |  | 4.72 | 18.3 | 0.16 | 0.51273 |  | 1.11 | 0.5123 | 4 |
| D46 |  |  |  |  |  |  |  | 3.29 | 12.1 | 0.16 | 0.51278 |  | 1.14 | 0.51233 | 4.5 |
| D42 |  |  |  |  |  |  |  | 4.11 | 14.3 | 0.17 | 0.51278 |  | 1.46 | 0.5123 | 3.9 |
| 2701 |  |  |  |  |  |  |  | 4.12 | 19.4 | 0.13 | 0.51257 |  | 1.03 | 0.51222 | 2.4 |
| 3201 |  |  |  |  |  |  |  | 2.07 | 9.57 | 0.13 | 0.51271 |  | 0.8 | 0.51235 | 5 |

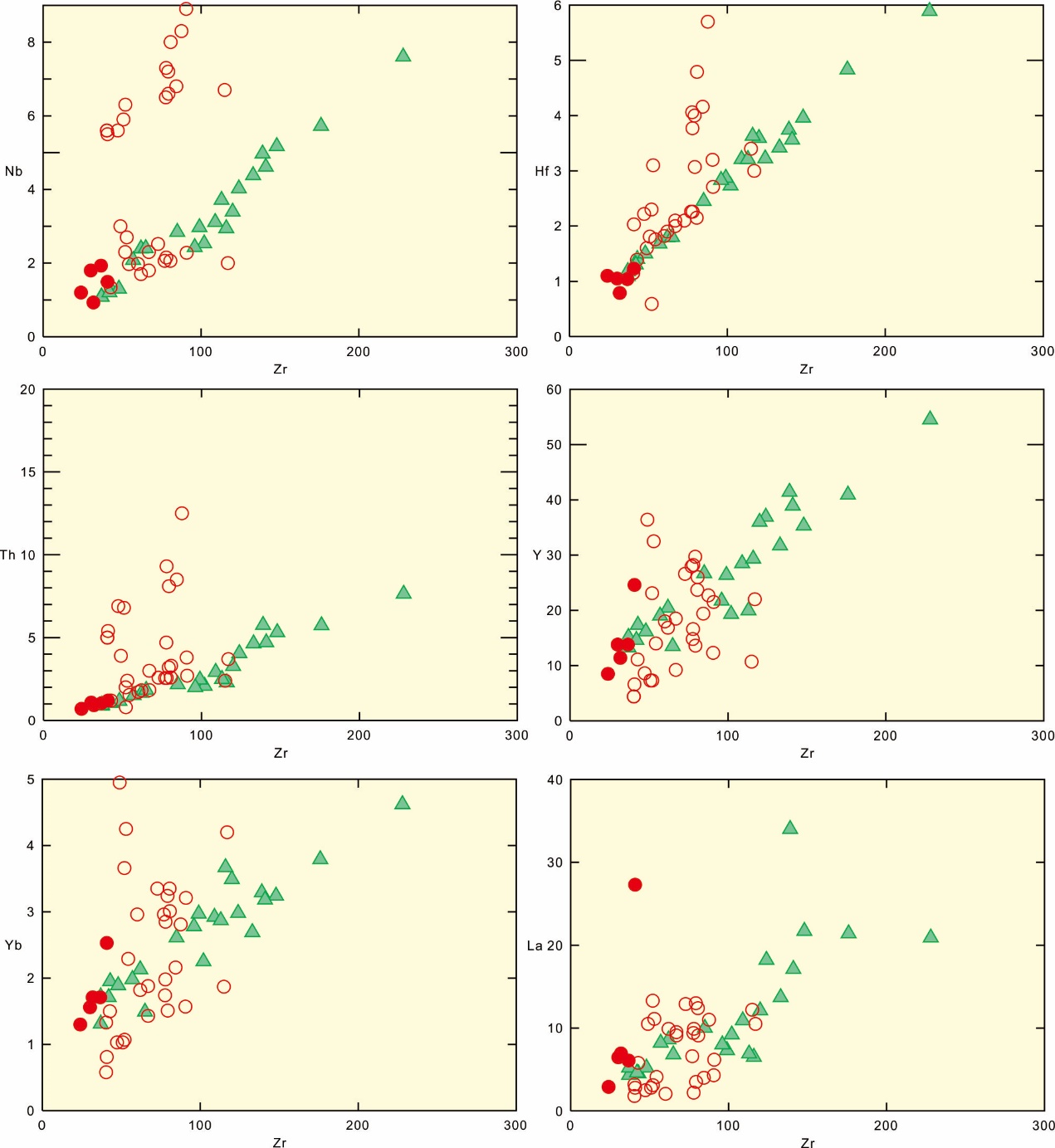
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# Supplemental file 6

*Selected trace elements (ppm) versus Zr (ppm) diagrams for checking element mobility during post-eruption alteration. Symbols are the same as in figure 5a.*



# Supplemental file 7

*Nb/La versus MgO (wt. %) and SiO2 (wt. %) diagrams. Symbols are the same as in figure 5a.*



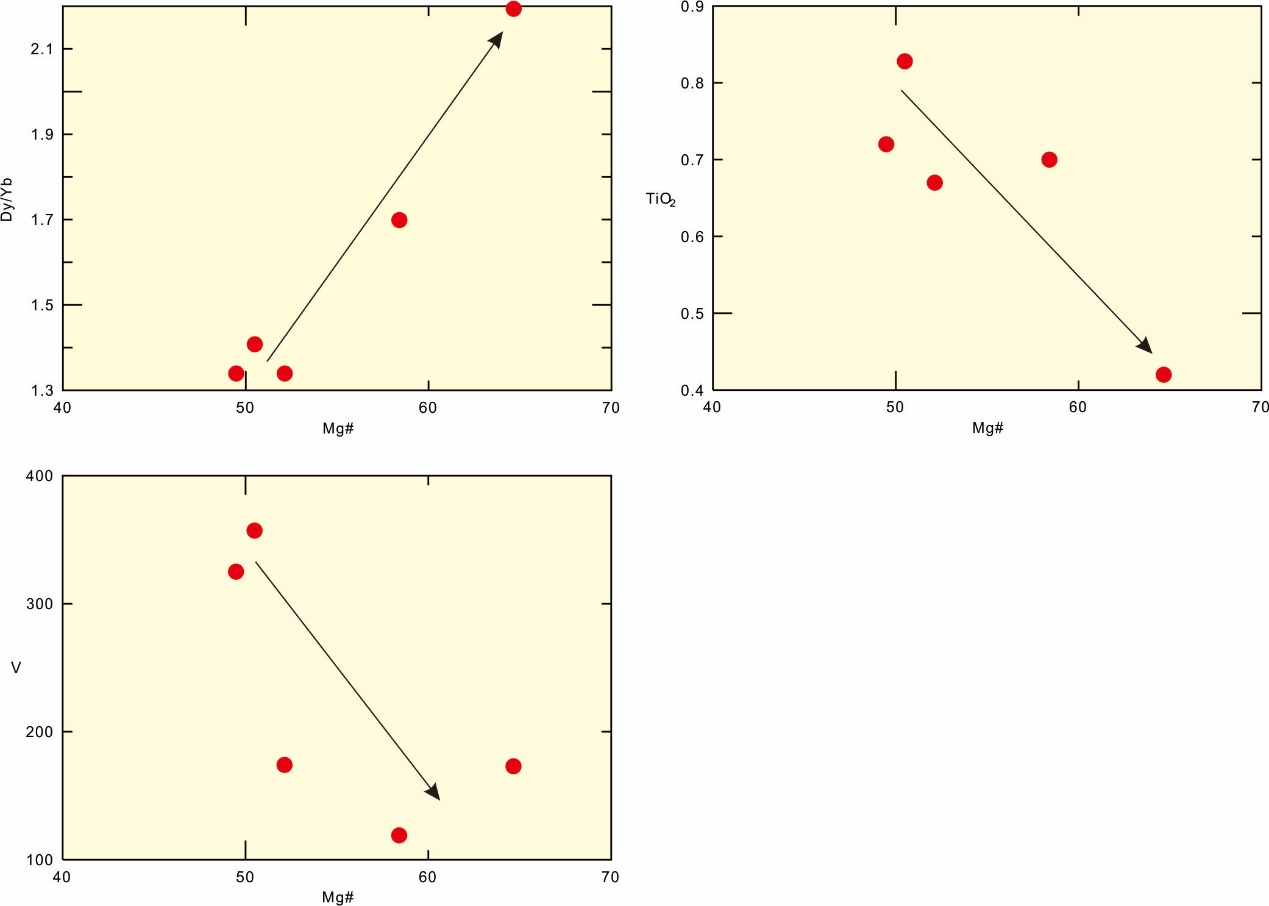
# Supplemental file 8

Harker diagrams for the Dawazi and Dazhonghe volcanics. Symbols are the same as in figure 5.



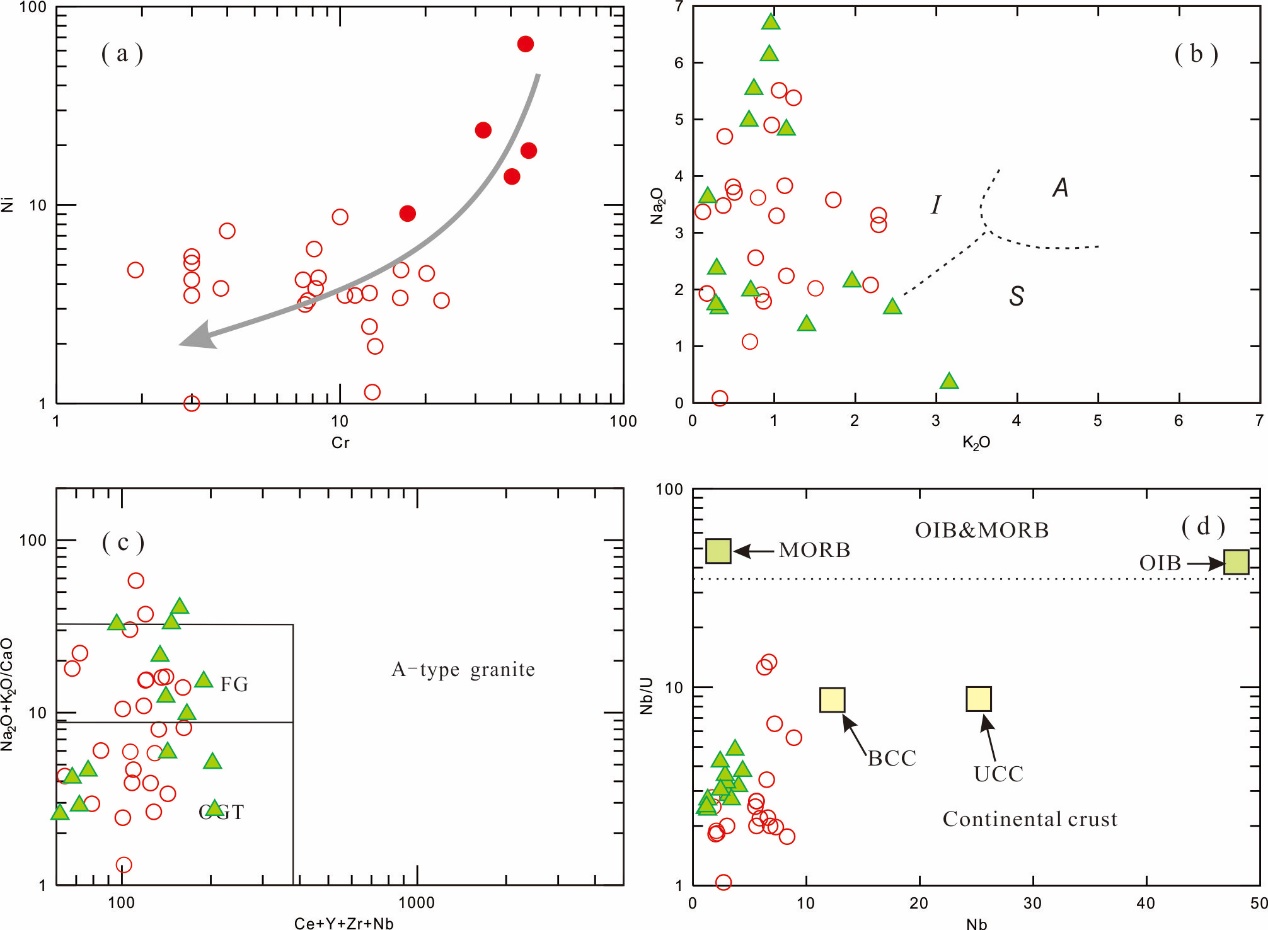
# Supplemental file 9

*Selected major (wt. %) and trace elements (ppm) versus Mg# diagrams. Symbols are the same as in figure 5a.*



# Supplemental file 10

(a) Cr versus Ni plot. (b) K2O versus Na2O plot. (c) (K2O+Na2O)/CaO versus (Zr + Nb + Ce + Y) diagram (after Whalen et al., 1987). (d) Nb/U versus Nb plot. FG represents fractionated felsic granite; OGT represents unfractionated M-, I-, and S-type granite. Data for MORB and OIB are taken from Sun and McDonough (1989). Data for Upper Continental Crust (UCC) and Bulk Continental Crust (BCC) are from Taylor and McLennan (1985) and Rudnick (1995), respectively. Symbols are the same as in Fig. 5.



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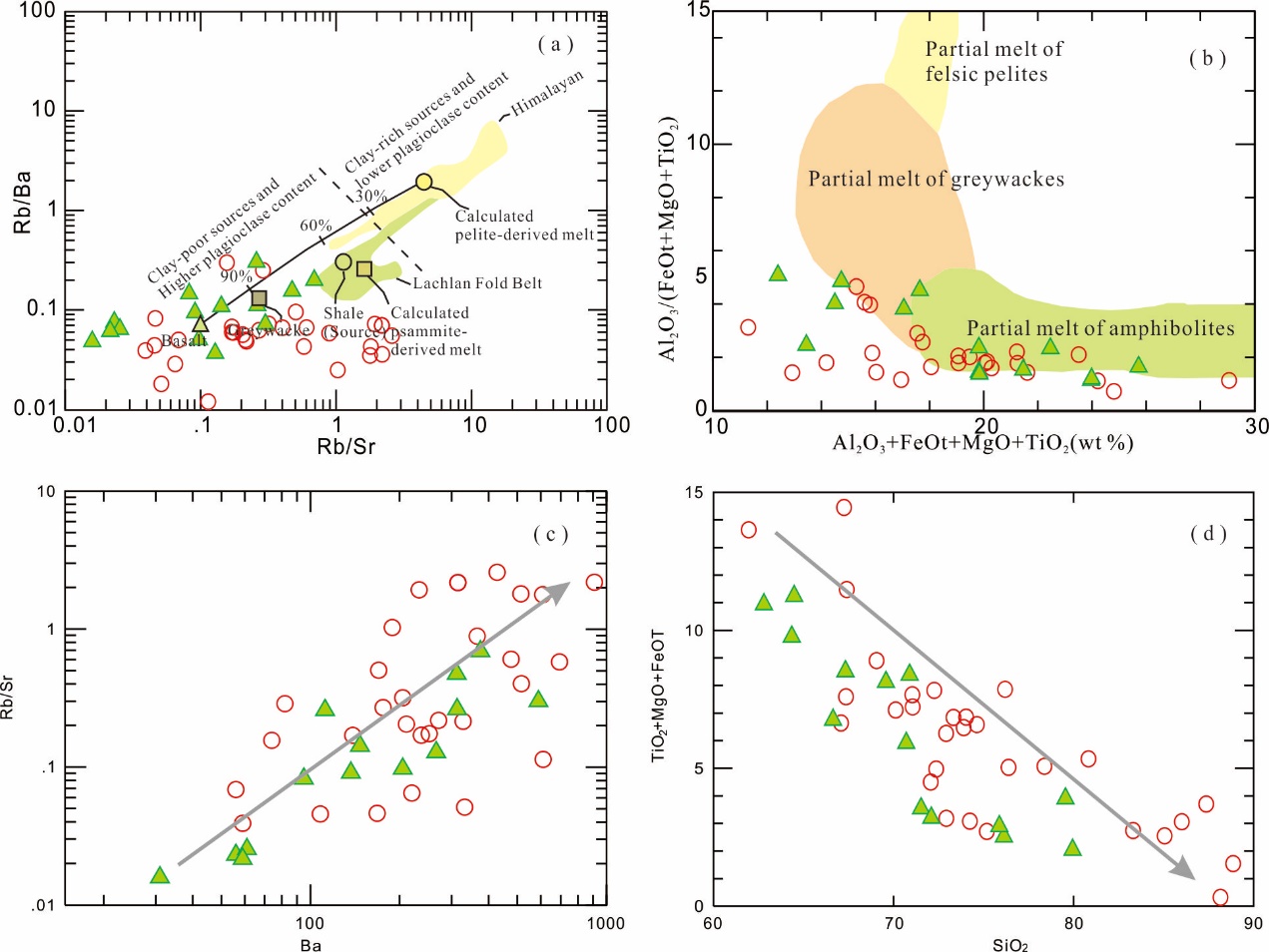
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# Supplemental file 11

(a) Rb/Ba versus Rb/Sr plot. (b) Al2O3/(FeOT+MgO+TiO2) versus Al2O3+ FeOT+ MgO + TiO2 plot. (c) Rb/Sr versus Ba plot. (d) TiO2+MgO+FeOT versus SiO2 plot. Fields in (a–b) are from Patiňo-Douce and Harris (1998), Sylvester (1998) and Patiňo-Douce (1999). Symbols are the same as in figure 5.



**References**

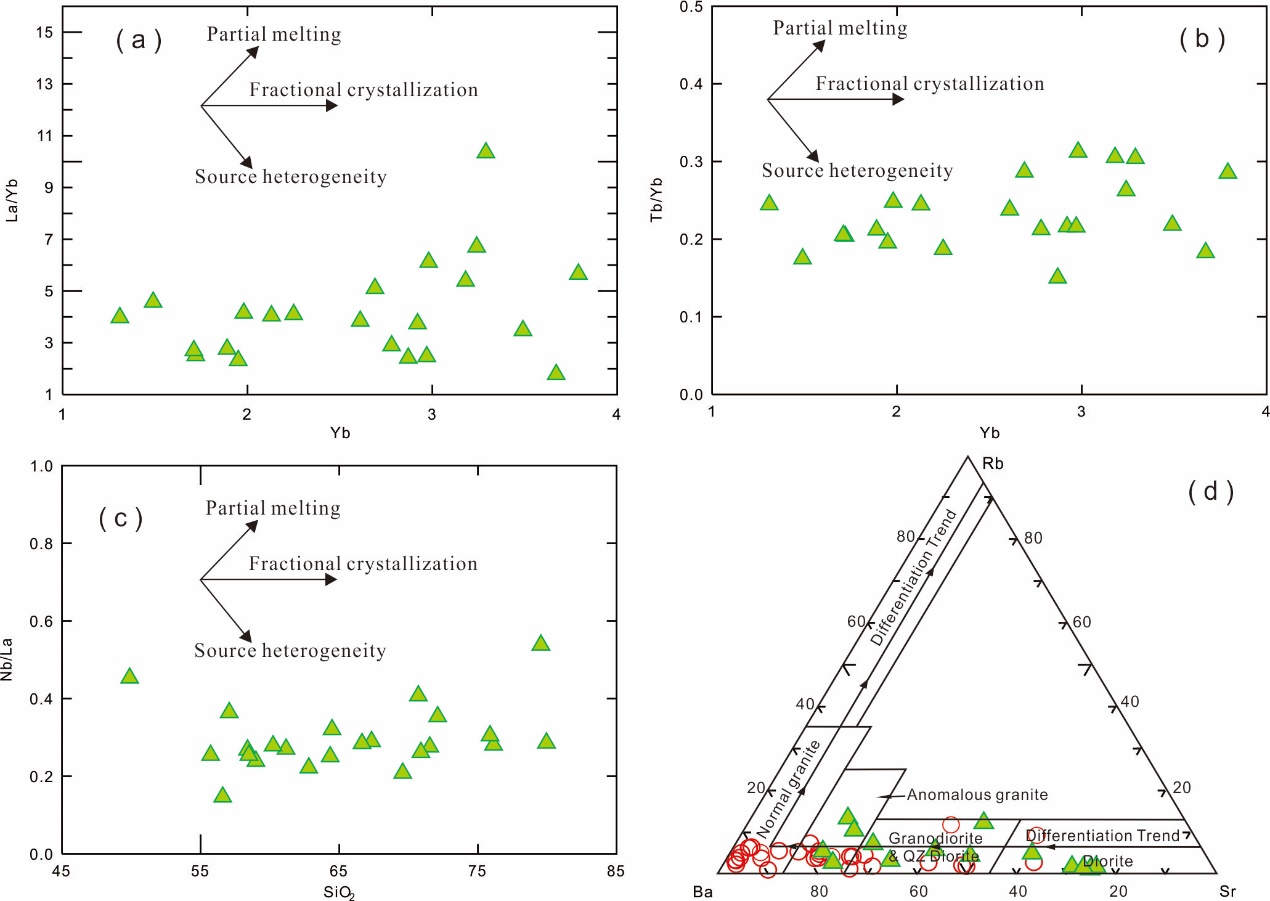
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# Supplemental file 12

(a) La/Yb versus Yb plot. (b) Th/Yb versus Yb plot. (c) Nb/La versus SiO2 plot. (d) Rb-Ba-Sr plot (EL Bouseily and El Sokkary, 1975). Symbols are the same as in figure 5.

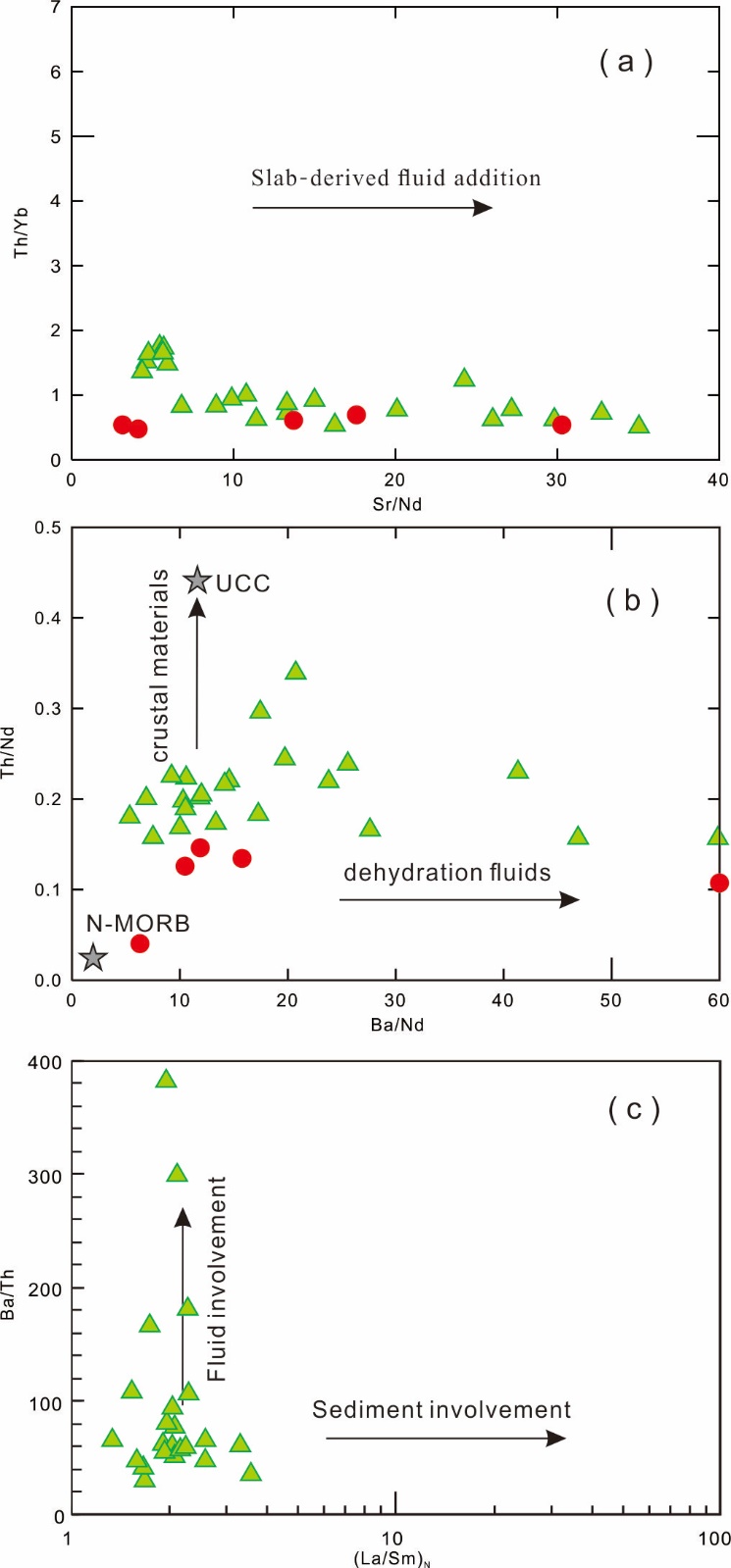


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# Supplemental file 13

(a) Th/Yb versus Sr/Nd plot. (b) Th/Nd versus Ba/Nd plot. (c) Ba/Th versus (La/Sm)N plot. Data for MORB are taken from Sun and McDonough (1989). Data for Upper Continental Crust (UCC) are from Taylor and McLennan (1985). Symbols are the same as in figure 5.



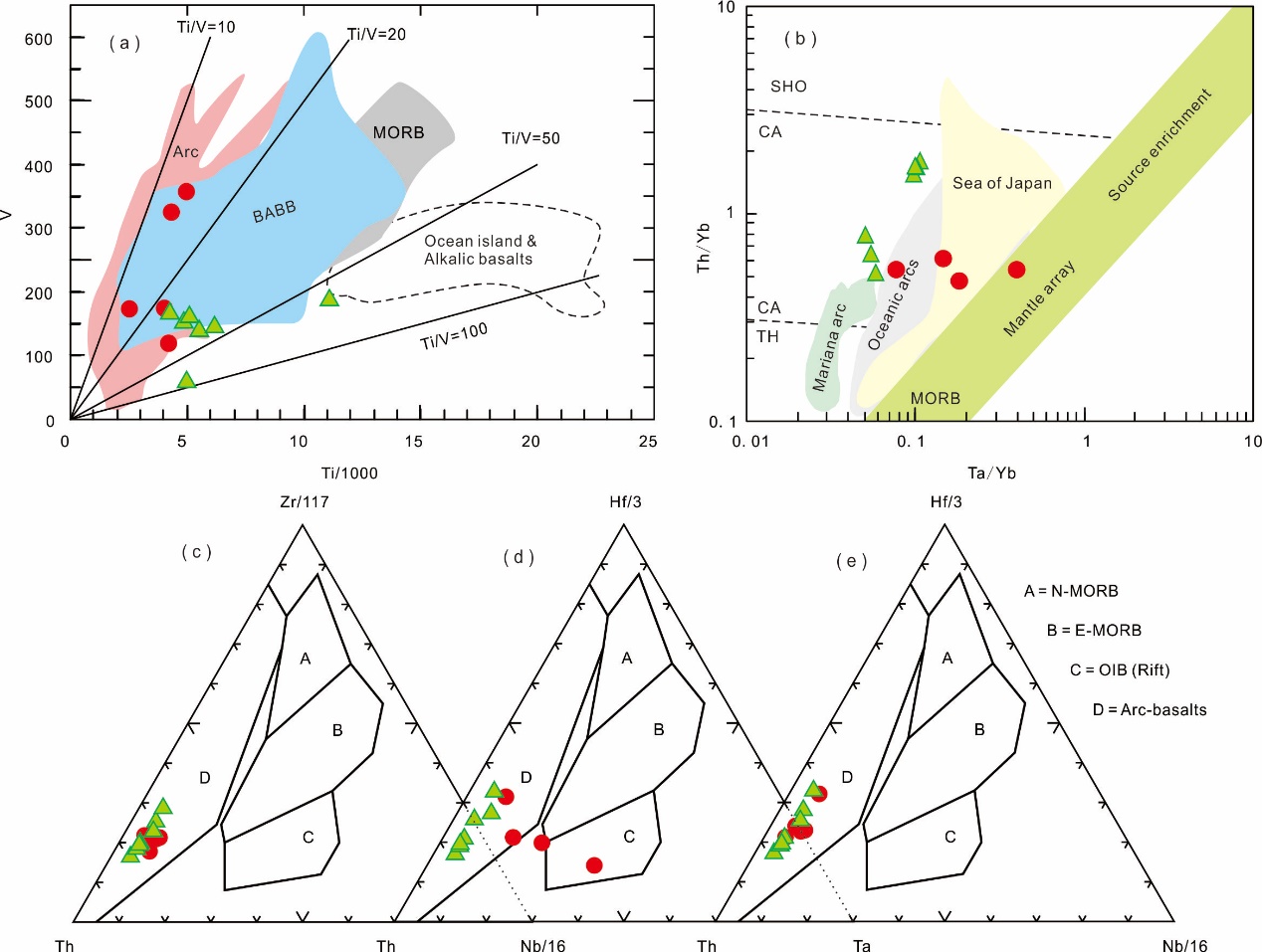
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# Supplemental file 14

Tectonic discrimination diagrams for the Dawazi and Dazhonghe basaltic rocks involving (a) Ti/1000 versus V plot (after Shervais, 1982), (b) Ta/Yb versus Th/Yb diagram (Pearce and Cann, 1973) and (c-e) Th–Zr/117–Nb/16, Th–Hf/3–Ta and Th–Hf/3–Nb/16 diagrams (Wood, 1980). Symbols are the same as in figure 5.



**References**

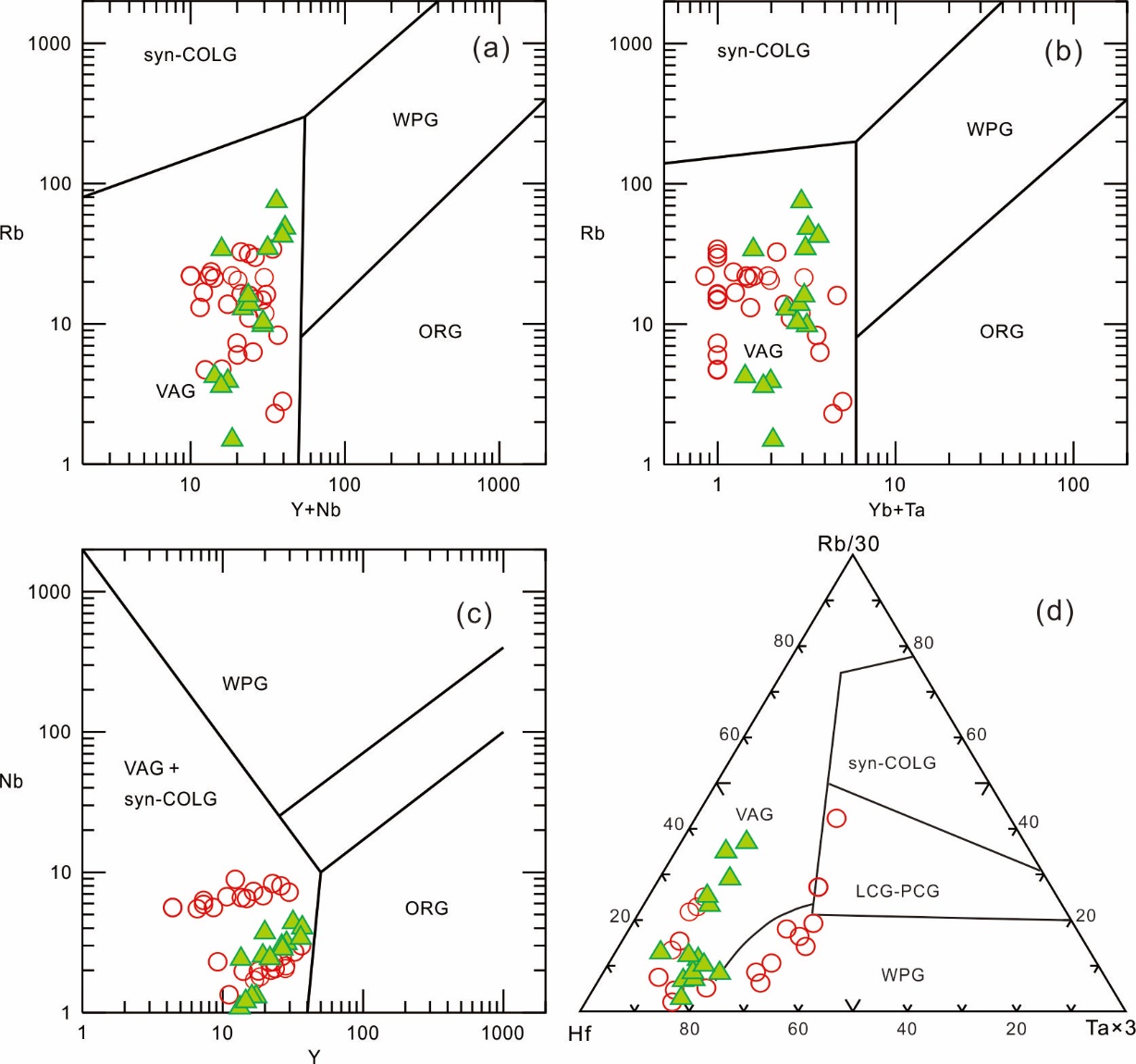
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# Supplemental file 15

Tectonic discrimination diagrams for the Dawazi and Dazhonghe silicic rocks involving (a) Rb-(Y+Nb) , Rb-(Yb+Ta), Nb-Y and Hf–Rb/30–Ta×3 diagrams (after Pearce, 1996; Pearce et al., 1984). Symbols are the same as in figure 5.



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