|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Region | Sample No. | Lithology | Longintude | Lattitude | Trending | Sequence | Texture | Mineral assemblage | Alteration |
| Karamay | KM1503h | Dioritic porphyrite | 84°42′57″ | 45°40′24″ | WNW | Late 1 | Fine-grained ophitic texture/Porphyritic texture | Pl (50-55%1) + Hb (15-20%) + Bi (5-15%) + Q (<10%) + Cpx (<5%) + Mt (<5%) + Apatite (<5%) + Zircon (<5%) /Phynocrysts (15-35%) including Pl (15-30%) ± Hb (0-5%) and microcrystalline matrix (65-85%) composed of Hb + Bi + Q | Slightly chloritised |
| KM1510h | Dioritic porphyrite | 84°44′04″ | 45°39′39″ | WNW | Late 1 |
| Xierpu | XP1501h | Dioritic porphyrite | 84°34′14″ | 45°41′51″ | WNW | Late 1 | Porphyritic texture | Phynocrysts (20-40%) including Pl (10-25%) + Hb (10-25%) set in a fine grained (<0.02 mm) matrix (60-80%) composed of Pl + Hb | Weak Argillization |
| XP1505h | Dioritic porphyrite | 84°36′18″ | 45°42′35″ | WNW | Late 1 |
| XP1507h | Dioritic porphyrite | 84°36′20″ | 45°42′42″ | WNW | Late 1 |
| XP1510h | Dioritic porphyrite | 84°36′24″ | 45°42′42″ | WNW | Late 1 |
| Bieluagaxi | BLG1502h | Dolerite | 84°24′31″ | 46°01′52″ | ENE | Early | Opgitic texture/Fine-grained granular texture/Porphyritic texture | Di (35-45%) + Pl (50-55%) + Ti-Fe oxides (5-10%) + Hb (<5%) + Bi (<5%)/Pl (50-60%) + Hb (30-35%) + Bi (<5%) + Q (<5%) + Ap (<3%) + Ep (<3%)/Phynocrysts (20-40%) consist of Pl (15-25%) + Hb (5-15%) and microcrystalline matrix (60-80%) with needle-like Pl (45-55%) + Hb (15-25%) + Q (<5%) +Opx (5%) | Slight chloritisation and sericitisation |
| BLG1505h | Diorite | 84°24′19″ | 46°02′09″ | ENE | Early |
| BLG1507h | Dioritic porphyrite | 84°24′24″ | 46°09′17″ | ENE | Early |
| Liushugou | LSG1501h | Diorite | 84°17′40″ | 45°30′59″ | NE | Late 2 | Fine-medium grained granular texture/Porphyritic texture | Pl (45-55%) + Hb (25-35%) + Q (<5%) + Opx (<5%) + Mt (<3%) + Ap (<3%) + Ep (<3%)/Phynocrysts (15-25%) consist of Pl (15-20%) ± Hb (0-5%) and aphanitic matrix (75-85%) with Pl (55-65%) + Hb (30-45%) + Kf (<5%) | Slight chloritisation and sericitisation |
| LSG1502h | Diorite | 84°17′47″ | 45°30′46″ | NE | Late 2 |
| LSG1504h | Dioritic porphyrite | 84°22′08″ | 45°30′18″ | WNW | Late 1 |
| LSG1505h | Dioritic porphyrite | 84°21′58″ | 45°30′39″ | WNW | Late 1 |
| [1] All mineralogical percentages in the paper are in vol.% | | | | | | |  |  |  |

**Table S1 The GPS and descriptions for studied dykes in Central west Junggar**

**Table S2 Plots of FeOt, MgO, TiO2, P2O5, Na2O, K2O, Nb, Sr, Rb, Ba, La, and Th versus LOI for the high-Mg dioritic dykes in the west Junggar**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Sample No. | KM1503h | KM1510h | XP1505h | XP1510h | XP1501h | XP1507h | BLG1502h | BLG1505h | BLG1507h | LSG1501h | LSG1502h | LSG1504h | LSG1505h |
| Group | Group 1 | Group 1 | Group 1 | Group 1 | Group 1 | Group 1 | Group 2 | Group 2 | Group 2 | Group 1 | Group 1 | Group 1 | Group 1 |
| Sample Name | Dioritic Porphyrite | Dioritic Porphyrite | Dioritic Porphyrite | Dioritic Porphyrite | Dioritic Porphyrite | Dioritic Porphyrite | Diorite | Diorite | Dioritic Porphyrite | Diorite | Diorite | Dioritic Porphyrite | Dioritic Porphyrite |
| SiO2 | 60.94 | 59.35 | 57.53 | 57.16 | 59.27 | 58.62 | 52.97 | 52.30 | 54.59 | 53.93 | 55.70 | 55.18 | 55.20 |
| TiO2 | 0.56 | 0.76 | 0.70 | 0.75 | 0.78 | 0.77 | 1.38 | 1.09 | 0.61 | 0.92 | 0.90 | 0.80 | 0.82 |
| Al2O3 | 17.19 | 16.36 | 17.09 | 16.94 | 16.41 | 17.42 | 15.29 | 15.78 | 14.81 | 16.54 | 16.18 | 15.94 | 16.43 |
| Fe2O3 | 1.36 | 2.18 | 1.49 | 1.37 | 2.03 | 1.28 | 3.30 | 0.95 | 0.97 | 2.73 | 1.69 | 1.49 | 1.42 |
| FeO | 3.07 | 3.67 | 4.90 | 4.47 | 3.83 | 4.63 | 4.75 | 6.27 | 5.87 | 4.43 | 4.57 | 4.37 | 5.27 |
| MnO | 0.07 | 0.10 | 0.11 | 0.09 | 0.09 | 0.07 | 0.14 | 0.12 | 0.15 | 0.13 | 0.10 | 0.09 | 0.11 |
| MgO | 2.56 | 4.28 | 4.54 | 4.11 | 4.08 | 3.29 | 5.63 | 7.91 | 8.41 | 5.20 | 6.12 | 5.62 | 5.28 |
| CaO | 5.29 | 5.95 | 6.46 | 6.56 | 5.60 | 6.35 | 6.02 | 6.73 | 7.10 | 8.06 | 5.02 | 5.60 | 6.26 |
| Na2O | 3.72 | 3.21 | 3.19 | 3.67 | 3.50 | 3.72 | 3.98 | 3.43 | 2.67 | 3.42 | 4.45 | 4.16 | 3.91 |
| K2O | 1.55 | 1.35 | 1.19 | 1.11 | 1.57 | 0.74 | 1.74 | 1.46 | 1.02 | 1.60 | 0.62 | 0.86 | 1.20 |
| P2O5 | 0.11 | 0.15 | 0.14 | 0.15 | 0.15 | 0.19 | 0.46 | 0.22 | 0.12 | 0.17 | 0.18 | 0.17 | 0.16 |
| H2O+ | 2.13 | 2.08 | 2.14 | 2.36 | 1.92 | 1.92 | 2.67 | 2.70 | 2.50 | 2.37 | 2.86 | 3.05 | 2.52 |
| CO2 | 1.13 | 0.18 | 0.27 | 0.92 | 0.47 | 0.82 | 0.98 | 0.72 | 0.57 | 0.04 | 0.98 | 2.06 | 1.03 |
| LOI | 2.99 | 2.00 | 1.88 | 2.88 | 2.02 | 2.18 | 3.56 | 2.81 | 3.00 | 2.13 | 3.72 | 5.37 | 3.10 |
| Total | 99.69 | 99.61 | 99.75 | 99.67 | 99.71 | 99.82 | 99.31 | 99.68 | 99.38 | 99.54 | 99.36 | 99.39 | 99.60 |
| FeOT | 4.30 | 5.63 | 6.24 | 5.70 | 5.66 | 5.79 | 7.72 | 7.13 | 6.74 | 6.88 | 6.09 | 5.71 | 6.55 |
| Rb | 34.0 | 28.1 | 39.3 | 32.0 | 37.1 | 18.0 | 32.2 | 31.5 | 26.3 | 40.0 | 13.6 | 18.2 | 19.5 |
| Sr | 606 | 641 | 643 | 697 | 564 | 671 | 618 | 463 | 294 | 681 | 748 | 647 | 715 |
| Nb | 2.19 | 2.59 | 1.44 | 1.66 | 3.12 | 2.48 | 15.5 | 6.39 | 3.77 | 2.50 | 1.23 | 1.11 | 1.53 |
| Ba | 642 | 431 | 382 | 376 | 477 | 421 | 503 | 358 | 395 | 438 | 1163 | 465 | 446 |
| La | 10.6 | 9.87 | 6.40 | 5.89 | 11.1 | 7.34 | 33.7 | 11.3 | 9.40 | 8.86 | 5.56 | 5.49 | 6.60 |
| Th | 3.31 | 2.40 | 1.15 | 0.94 | 2.73 | 1.14 | 7.37 | 2.16 | 2.67 | 1.83 | 0.63 | 0.77 | 0.97 |

Fig. S1 Major oxides vs. LOI diagrams of dykes in West Junngar

**Table S3 The geochronological information of the granitoids in the Western Junggar**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **lithology** | **Age（Ma）** | **1σ** | **Method** | **Data source** |
| Karamay | K-feldspar granite | 276 | 5 | SHRIMP | Han et al., 2006 |
| Karamay | alkali-feldspar granite | 296 | 4 | TIMS | Su et al., 2006 |
| Karamay | granite | 316.7 | 3.6 | LA-ICP-MS | Gao et al., 2006 |
| Karamay | granite | 318 | 5 | SHRIMP | Han et al., 2006 |
| Karamay | monzogranite | 319 | 1 | LA-ICP-MS | Feng et al., 2012b |
| Karamay | granite | 300 | 2.6 | LA-ICP-MS | Li et al., 2015 |
| Karamay | dioritic dyke | 298 |  | LA-ICP-MS | Li et al., 2015 |
| East Karamay (Karamay) | granodiorite | 316 | 3 | LA-ICP-MS | Tang et al., 2012 |
| East Karamay (Karamay) | diorite | 314 | 3 | LA-ICP-MS | Tang et al., 2012 |
| East Karamay (Karamay) | alkali-feldspar granite | 304 | 3 | LA-ICP-MS | Tang et al., 2012 |
| Karamay | dioritic porphyry dyke | 303.1 | 1.2 | LA-ICP-MS | Feng et al., 2012b |
| Karamay (C1 strata) | dioritic dyke | 321 | 1 | Ar-Ar | Yin et al., 2010 |
| Karamay | dilorite dyke | 316.8 | 5.3 | LA-ICP-MS | unpublished data |
| Karamay | dioritic porphyry dyke | 311.3 | 2.1 | LA-ICP-MS | this study |
| North Karamay | dioritic dyke | 308 | 7 | SHRIMP | Han et al., 2006 |
| West Karamay (Xiaerpu) | granite | 311 | 3 | LA-ICP-MS | Tang et al., 2012b |
| west Karamay (Xiaerpu) | dioritic dyke | 305 | 2 | Ar-Ar | Yin et al., 2013 |
| Xiaerpu | monzogranite | 299 | 6 | LA-ICP-MS | Kang et al., 2009 |
| Xiaerpu | granodiorite | 297.6 | 2.5 | LA-ICP-MS | Li et al., 2013 |
| Xiaerpu | diabase dyke | 298.9 | 5 | LA-ICP-MS | Li et al., 2013 |
| West Karamay (Xiaerpu) | dioritic dyke | 309 | 3 | LA-ICP-MS | Tang et al., 2012 |
| Xiaerpu | dilorite dyke | 310.2 | 4.1 | LA-ICP-MS | unpublished data |
| Xiaerpu | dioritic porphyry dyke | 309.7 | 2.4 | LA-ICP-MS | this study |
| Hongshan | dioritic dyke | 284 | 3 | Ar-Ar | Yin et al., 2013 |
| Hongshan | alkali-feldspar granite | 301 | 4 | TIMS | Su t al., 2006 |
| Hongshan | K-feldspar granite | 317.8 | 2.2 | LA-ICP-MS | Gao et al., 2014 |
| Hongshan | K-feldspar granite | 315.7 | 2.4 | SIMS | Gao et al., 2014 |
| Hongshan | K-feldspar granite | 316 | 0.59 | CA-TIMS | Gao et al., 2014 |
| Hongshan | alkali-feldspar granite | 315.7 | 2.4 | SIMS | Jiang et al., 2015 |
| Hongshan | alkali-feldspar granite | 317.8 | 3.8 | LA-ICP-MS | Jiang et al., 2015 |
| Hongshan | granite | 297 | 12 | Rb-Sr | Chen and Jahn, 2004 |
| Hongshan | granite | 304 | 1 | LA-ICP-MS | Feng et al., 2012a |
| Hongshan | ring dioritic dyke | 302-304 | 1 | LA-ICP-MS | Feng et al., 2012a |
| Hongshan | non-ring dioritic dyke | 302 | 1 | LA-ICP-MS | Feng et al., 2012a |
| Hongshan | dioritic dyke | 295 | 2 | LA-ICP-MS | Ma et al., 2020 |
| Bieluagaxi | granodiorite | 319 | 3.2 | LA-ICP-MS | Gao et al., 2014 |
| Bieluagaxi | diorite | 299.3 | 2 | Ar-Ar | Yin et al., 2015 |
| Bieluagaxi | dioritic dyke | 296.7 | 2.1 | Ar-Ar | Yin et al., 2015 |
| Bieluagaxi | dioritic dyke | 291.9 | 3 | Ar-Ar | Yin et al., 2012 |
| Bieluagaxi | dioritic dyke | 318.5 | 3.3 | LA-ICP-MS | unpublished data |
| Bieluagaxi | dioritic dyke | 324.3 | 3.6 | LA-ICP-MS | this study |
| Bieluagaxi | dioritic dyke | 315 | 4.5 | LA-ICP-MS | Duan et al., 2019 |
| Bieluagaxi | dioritic porphyry dyke | 318.6 | 3.9 | LA-ICP-MS | Duan et al., 2019 |
| Bieluagaxi | dioritic dyke | 308.6 | 5.5 | LA-ICP-MS | He et al., 2015 |
| Baogutu area (Wudehe) | dioritic porphyry | 311-315 | 4 | LA-ICP-MS | Tang et al., 2010 |
| Baogutu area (Kuogeshaye) | dioritic porphyry dyke | 314 | 4 | LA-ICP-MS | Tang et al., 2010 |
| Baogutu area (Kuogeshaye) | dioritic porphyry | 310 | 3 | LA-ICP-MS | Tang et al., 2010 |
| Baogutu area (C1 starta) | dioritic dyke | 321 | 1 | Ar-Ar | Yin et al., 2010 |
| Liushugou (C1 starta) | dioritic dyke | 313.9 | 3.2 | LA-ICP-MS | this study |

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