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Appendix-Data Supplement

DATABASE

Aeromagnetic surveys within and around Tarim Basin have been carried out by the China Aero Geophysical Survey and Remote Sensing Center for Natural Resources (AGRS) (Fig. DR1A), China Geological Survey, aiming to petroleum and mineral exploration. Total aeromagnetic data used in this study originated from the data set of the China Mainland Aeromagnetic Map (e.g. Xiong et al., 2013; Xiong et al., 2016a, 2016b), of which the details are presented in the READ-Me file. The high-resolution aeromagnetic data set with a 1 km × 1 km grid could be used for research purposes via the application in the China Geological Survey Geocloud Database (<http://geocloud.cgs.gov.cn/>), or digitized from the high-resolution aeromagnetic map of the China mainland (Xiong et al., 2013).

MAGNETIC DATA PROCESSING

The aeromagnetic data and EMGA2 has been merged by the Geosoft Oasis Montaj Software (<https://www.geosoft.com/products/oasis-montaj>). The total aeromagnetic anomaly has been processed first by differential reduction to pole (Fig. 2) (Arkani-Hamed, 1988, 2007), and then by the analytical signal (Fig. DR3) (e.g. Nabighian, 1984; Roest et al., 1992), which have been all integrated into the AGRS-Geoprobe Software. Such data-processing software could be approved to use by the AGRS, from <http://www.agrs.cn/cgzt/xxcp/448.htm>.

The final grid was filtered by differential reduction to pole (Fig. DR2) (Arkani-Hamed, 2007), which allowed us to locate the magnetic signal directly above the causative bodies and improve interpretations. Analytical signal transformation (Roest et al., 1992) further enhanced the expression of the linear magnetic anomalies (Figs. DR3, DR4). The method, equivalent to total magnetic gradient, was

used to delineate the magnetic signals and boundaries at very high resolutions (Ferris et al., 1998). This technique separates short-wavelength magnetic anomalies, such as mafic dikes, from the long-wavelength anomalies generally related to deep magnetic bodies, including crystalline basement.

MAGNETIC SUSCEPTIBILITIES

The magnetic susceptibilities of the rocks are all measured in field surveys and on the drill-cores (Fig. DR1B)) (Xiong et al., 2016c). More details are presented in the Table DR1.

Figure DR1. (A) New regional magnetic anomaly image with EMAG2 (Maus et al., 2009) and aeromagnetic datasets merged together along the black-gray line, overlain on hillshade DEM. (B) Statistics of magnetic susceptibility measurements of common rock types within and around Tarim Basin (Xiong et al, 2016c) (See data sources in Table DR1). P, Proterozoic; L, Late Paleozoic; ?, uncertainty of the period of the measured rock in the field.

Figure DR2. Differential reduction to pole map of the aeromagnetic anomalies; 20 nT contour interval. The warm red and cool blue colors depict magnetic highs and lows, respectively. Note the cross-cutting positive magnetic lineament, L1-L4. KP-Keping, BU-Bachu Uplift.

Figure DR3. Processed results of analytic signal of the aeromagnetic anomalies. (A)

horizontal-X, (B) horizontal-Y and (C) vertical-Z derivatives are calculated from the total field aeromagnetic anomaly of differential reduction to pole (Figure DR3). The maps of analytic signal with different color-value ranges, (D) 0–50 nT/km, (E) 5–50 nT/km, (F) 10–50 nT/km. The locations of the maxima and the shape of this signal can then be used to find magnetic body edges.

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Figure DR4. Correlation between the geophysical lineaments and geological observations, such as geological section, drill core and outcrops within and around the Tarim large igneous province. Data sources: Piqiang (e.g. Zhang et al., 2016); Bashisuogong (e.g. Ma et al., 2016); Xiaohaizi (e.g. Wei et al., 2014a, 2014b); Wajilitage (e.g. Shangguan et al., 2015; Zhang et al., 2016); Yingan (e.g. Wei et al., 2014a, 2014b); Kaipazileike (e.g. Zhang et al., 2010); Xiaohenan (e.g. Li et al., 2011; Zou et al., 2015; Wei et al., 2014); Qimugan (e.g. Li et al., 2013); Damushi (e.g. Li et al., 2008); Qipan (e.g. Yang et al., 2006); Gudongshan (e.g. Pan et al., 2011); H4 (e.g. Yu et al., 2011).

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Appendix-Schematic restoration of the plume head

Figure DR5. (A) Spatial distribution of the radial linear anomalies. (B) Original morphology and geometry of the imaged plume head, showing radial anomalies (L1-L6), and subdivision of Kepingtage fold-thrust belt (FTB) and Bachu Uplift domains. (C) Outline of plume features and (D) restored geometry, as discussed above. Red dashed lines along plume outline represent schematically restored boundaries with unfolding and strain reconstruction.

The geometry of the Tarim plume head and its radial dikes was restored to account for minor Cenozoic shortening in the Kepingtage FTB and Bachu Uplift

regions (Fig. DR5). The plume head and radial dike swarm were divided into two parts, as shown in Fig. DR5A and DR5B, with the northwest domain deformed in the Kepingtage FTB and the southeast domain deformed in Bachu Uplift region. Radial anomalies L5 and L6 are in the Kepingtage FTB domain, and L1-L4 are in the Bachu Uplift domain. The outlined of the imaged plume features were restored according to published estimates of Cenozoic shortening strain. We note that this is not a rigorous exercise, but provides insight into a plausible pre-Cenozoic geometry of the imaged plume structures.

Balanced and restored cross sections across the Kepingtage FTB suggest 20-30% shortening strain (Fig. DR5C) (e.g., Yin et al., 1998; Allen et al., 1999). The Kepingtage FTB is thin-skinned and the southern extent of thrusting appears does not deform the man center of the remnant plume head. The Kepingtage FTB domain in the northwest was stretched to account for this shortening. L5 and L6 anomalies appeared folded compared to L1-L4 anomalies, and they were subsequently unfolded schematically. The Bachu Uplift region has less Cenozoic shortening strain, estimated at ~10% (Fig. DR5C) (Allen et al., 1999; Laborde et al., 2019), and this region was stretched to account for this deformation. Figure DR5D schematically shows a plausible outline of the pre-Cenozoic Permian plume in the Tarim Basin.

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Appendix-Geochemical feature of magmatic rocks

Figure DR6. Plots showing compiled Nb/Yb for 300-268 Ma magmatic rocks within and around Tarim Basin versus (A) distance to mantle plume head (km) (See data sources in Table DR3), and (B) age (See data sources in Table DR2). Circled a., A general increase in Nb/Yb going younger in time; circled b., A general trend toward greater Nb/Yb with younging time. OIBs—oceanic island basalts (average values from Sun and McDonough, 1989).

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Appendix-Rheological profiles

The rheology and strength of the crust and upper mantle can be described by a rheological profile or yield strength envelope (e.g., Bürgmann and Dresen, 2008). A variety of factors influence lithospheric strength, and we highlight the following key factors that would have influenced the Tarim lithosphere during the plume impingement process: dehydration, chemical depletion, mafic intrusion/underplating, and mantle thickening (Fig. 3; Figure. DR7).

Figure DR7. Key factors that could have influenced the Tarim lithosphere during the plume impingement process: dehydration, chemical depletion, mafic intrusion/underplating.

We qualitatively present a rheological evolution following the interpreted geological history of the Tarim lithosphere during the Permian plume event. In a general sense (e.g., Hirth and Kohlstedt, 2003), the strength of the lower crust and

upper mantle is described by a power law relationship:

$$\dot{\epsilon} = A \sigma^n f_{H_2O} \exp\left(-\frac{E}{RT}\right)$$

where $\dot{\epsilon}$ is strain rate, A is a material constant, σ^n is stress with stress exponent n , f_{H_2O} is water fugacity, E is activation energy, R is the gas constant, and T is absolute temperature. The middle and lower crust are usually modeled with experimentally derived constraints for quartzite (wet or dry) and diabase rock types, respectively, whereas the upper mantle is approximated by olivine or dunite.

Crustal rheology and strength: mafic intrusion / underplating

According to geological observations and numerical experiments, crustal strength should increase by adding mafic material as the intrusive magmas cool (Carter and Tsenn, 1987; Ranalli and Murphy, 1987; Wilks and Carter, 1990; Anders et al., 1989; Liu and Furlong, 1994; Bürgmann and Dresen, 2008). In Fig. 3C, the red curves in the rheological profiles represent strength increase due to mafic rock addition to the lower crust via intrusions or underplating. There is time dependence on this strengthening, such that after initial mafic rock addition, the crust may be thermally weakened by the heat associated with the intrusion. However, after 10s of Myr, the sills should have cooled conductively and will represent strengthened crust due to the addition of stronger rock (e.g., diabase composition compared to more granite average crust) (e.g., Liu and Furlong, 1994). Given that Cenozoic Himalayan-Tibetan orogeny was 100s of Myr after the Permian plume event, any added mafic rocks would only strengthen the crust.

Upper mantle rheology and strength: dehydration and chemical depletion

For the upper lithospheric mantle, olivine or dunite compositions are used for strength quantification. Plume impingement drives elevated temperatures and high degrees of melting that would lead to chemical depletion (e.g., Fe relative to Mg components) and dehydration (i.e., reduced water content), which should all result in increased viscosity and strength (Chopra and Paterson, 1984; Hirth and Kohlstedt,

1996, 2003; Lee et al., 2001, 2011; Bürgmann and Dresen, 2008). The less dense mantle keel would form immediately during the plume evolution, and be thicker and stronger as shown in Fig. 3.

Upper mantle rheology and strength: Mantle thickening and thermal gradient of the lithosphere

The rheological profiles in Fig. 3 assume that the base of the lithosphere has a fixed temperature, T_{LAB} . This may be 1200-1300°C (e.g., Rudnick et al., 1998). As the mantle lithosphere thickens due to the aforementioned processes related to the Permian plume event, the lithospheric geothermal gradient decreases (Figure. DR7). Therefore, a natural consequence of thickening mantle lithosphere is lower lithospheric heatflux. The blue curves in Fig. 3 schematically connect the surface temperature T_s with T_{LAB} .

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Table DR1. Measured magnetic susceptibilities of four types of rocks within and around the Tarim Basin.

Rock type	Lithology	Period	Magnetic susceptibility / $k \times 10^{-5}$ SI		Mean	Region*
			Number	Range		
Sedimentary Rock	sandstone, mudstone	Cenozoic	276	0 - 10	4	field / well
	sandstone, mudstone	Cretaceous	317	0 - 24	15	field / well
	conglomerate, sandstone, mudstone	Jurassic	385	0 - 74	22	field / well
	conglomerate, fine-sandstone, mudstone	Triassic	506	2 - 4700	108	field / well
	sandstone, mudstone	Permian	472	0 - 360	94	field / well
	sandstone, carbonatite, mudstone	Carboniferous	397	0 - 41	12	field / well
	sand conglomerate, fin-conglomerate	Devonian	336	0 - 29	20	field / well
	sandstone, mudstone	Silurian	467	3 - 82	27	field / well
	mudstone, carbonatite	Ordovician	354	0 - 81	20	field / well
Metamorphic Rock	limestone, dolomite	Cambrian	392	0 - 38	6	field / well
	metamorphic rock (?)	Neoproterozoic	358	1 - 23	5	T1 Well
	metamorphic rock, sandstone	Pre- Neoproterozoic	426	9 - 47	27	T103 Well
	mixed granitic gneiss	Pre- Neoproterozoic	391	4 - 34	15	QM1 Well
	chino metamorphic rock	Pre- Neoproterozoic	496	30 - 411	126	YH2 Well
	metamorphic rock (?)	Pre- Neoproterozoic	527	20 - 68	46	C2 Well
	celadon killas	Pre- Neoproterozoic	663	4 - 45	28	YH6 Well
	granitic gneiss	Archean	306	N/A*	1390	field

Rock type	Lithology	Period	Magnetic susceptibility / $k \times 10^{-5}$ SI		Mean	Region*
			Number	Range		
Metamorphic Rock	iron-bearing quartzite	Early Proterozoic	257	1760 - 7176	4580	field
	schist (various type)	Early Proterozoic	624	0 - 80	24	field
	amphogneiss	Late Archean	324	10 - 135	51	Keluketage
	plagiocase amphibogneiss	Late Archean	297	0 - 1280	350	Keluketage
	granitic gneiss	Late Archean	361	18 - 5700	587	Keluketage
	phlogopite diopsidite	Late Archean	285	24 - 8900	3187	Keluketage
	pyrogenic carbonate	Late Archean	462	1000 - 15600	6839	Keluketage
	phlogopite	Late Archean	324	41 - 5400	1125	Keluketage
	diopsidite	Late Archean	357	53 - 1900	258	Keluketage
Intrusive Rock	graniton	Late Paleozoic	201	6000 - 12000	N/A*	field
	diabase	?	197	2630 - 10300	6018	field
	ultramafic rock	Late Paleozoic	189	140 - 16800	8480	field
	diorite	Proterozoic	482	30 - 90	71	field
	diorite	Late Paleozoic	497	14 - 4900	886	field
	granite	Late Paleozoic	775	0 - 95	9	field
Volcanic Rock	basalt	Permian	2165	93 - 11700	5300	field / well
	trachyte	Permian	2081	770 - 1900	1255	field / well
	rhyolite	Permian	3463	27 - 270	88	field / well

Rock type	Lithology	Period	Magnetic susceptibility / $k \times 10^{-5}$ SI		Mean	Region*
			Number	Range		
Volcanic Rock	andesite	Devonian	2576	1650 - 3480	2927	field / well
	volcanite (various type)	Late Cambrian-Early Ordovician	2657	1280 - 2530	2085	field / well

Notes:

- Region* — Location of measured rock of magnetic susceptibility;
- N/A* — No value, because of the loss of original data;
- ?* — Uncertainty of the period of the measured rock in the field;
- ? — Estimated lithology of the measured rock in the field;

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Table DR2. Compilation of radiometric crystallization ages of magmatic rocks within Tarim Basin

No.	Tectonic region	Geologic Unit	Sample No.	Sample lithology	Long.	Lati.	Dating Method	Age (Ma)	Error (Ma)	References
1	N Tarim	Felsic volcanics from drillhole	Shun-1	Dacite	84	39.25	LA-ICP-MS zircon U-Pb	286	4	(Li et al., 2007)
2	N Tarim	Felsic volcanics from drillhole	YM16-3	Rhyolite	81.92	41.06	40Ar/39Ar	266.9	1.7	(Liu et al., 2012)
3	N Tarim	Felsic volcanics from drillhole	MN1-1	Rhyolite	81.583	40.867	LA-ICP-MS zircon U-Pb	271.7	2.2	(Tian et al., 2010)
4	N Tarim	Felsic volcanics from drillhole	S99	Dacite	83.852	40.963	LA-ICP-MS zircon U-Pb	273.1	3.2	(Yu et al., 2011a)
5	N Tarim	Felsic volcanics from drillhole	S114	Dacite	84.317	40.759	LA-ICP-MS zircon U-Pb	276.6	2.7	(Yu et al., 2011a)
6	N Tarim	Felsic volcanics from drillhole	NK1-1	Rhyolitic intrusion	81.3	41.233	LA-ICP-MS zircon U-Pb	277.3	2.5	(Tian et al., 2010)
7	N Tarim	Felsic volcanics from drillhole	S79-3	Dacite	84.041	40.638	LA-ICP-MS zircon U-Pb	279.8	3	(Yu et al., 2011a)
8	N Tarim	Felsic volcanics from drillhole	S102-1	Dacite	83.755	40.741	LA-ICP-MS zircon U-Pb	281.8	3	(Yu et al., 2011a)
9	N Tarim	Felsic volcanics from drillhole	YM16-1	Rhyolitic intrusion	82.167	41.283	LA-ICP-MS zircon U-Pb	282.9	2.5	(Tian et al., 2010)
10	N Tarim	Felsic volcanics from drillhole	YM5-8	Rhyolite	81.867	41.117	LA-ICP-MS zircon U-Pb	286.6	3.3	(Tian et al., 2010)
11	N Tarim	Felsic volcanics from drillhole	HA2-5379	Trachydacite	83.346	41.334	Cameca zircon U-Pb	287.2	2	(Shangguan et al., 2016)
12	N Tarim	Felsic volcanics from drillhole	HA2	Rhyolite	83.06	41.29	Cameca zircon U-Pb	287.3	2	(Liu et al., 2014)
13	N Tarim	Felsic volcanics from drillhole	YM30-1	Rhyolite	81.8	41.35	LA-ICP-MS zircon U-Pb	290.9	4.1	(Tian et al., 2010)
14	N Tarim	Keping flood basalt (Kupukuziman Fm)	DWG07-1	Basalt	79.478	40.679	Whole-rock 40Ar/39Ar	274.8	2.4	(Zhang et al., 2010b)
15	N Tarim	Keping flood basalt (Kupukuziman Fm)	JA01	Basalt	79.772	40.76	SHRIMP zircon U-Pb	279	4.5	(Chen et al., 2010)
16	N Tarim	Keping flood basalt	LT24D	Tuff	79.84	40.825	LA-ICP-MS zircon U-Pb	281.1	3.4	(Han et al., 2019)
17	N Tarim	Keping flood basalt (Kupukuziman Fm)	LKC07-1	Basalt	79.866	40.827	Whole-rock 40Ar/39Ar	282.9	1.6	(Zhang et al., 2010b)
18	N Tarim	Keping flood basalt	YG-2	Basalt	79.685	40.685	Whole-rock 40Ar/39Ar	287.3	4	(Wei et al., 2014)
19	N Tarim	Keping flood basalt	YG-14	Basalt	79.685	40.688	Whole-rock 40Ar/39Ar	287.9	3.1	(Wei et al., 2014)
20	N Tarim	Keping flood basalt	Yg08	Basalt	79.527	40.654	SHRIMP zircon U-Pb	288.9	2	(Yu et al., 2011b)
21	N Tarim	Keping flood basalt	Yg01	Basalt	79.529	40.654	SHRIMP zircon U-Pb	289.5	2	(Yu et al., 2011b)

No.	Tectonic region	Geologic Unit	Sample No.	Sample lithology	Long.	Lati.	Dating Method	Age (Ma)	Error (Ma)	References
22	N Tarim	Keping flood basalt	KP-02	Basalt	79.43	40.69	LA-ICP-MS zircon U-Pb	291.9	2.2	(Zhang et al., 2012)
23	N Tarim	Keping flood basalt	KP-03	Basalt	79.429	40.69	LA-ICP-MS zircon U-Pb	291.9	4.5	(Zhang et al., 2012)
24	N Tarim	Keping flood basalt	KP-04	Basalt	79.428	40.69	LA-ICP-MS zircon U-Pb	293.9	4.6	(Zhang et al., 2012)
25	N Tarim	Keping flood basalt	JB09-09	Tuff	79.53	40.67	LA-ICP-MS zircon U-Pb	290.9	1.3	(Tian et al., 2018)
26	N Tarim	Basalt from drillhole	YT6-3	Basalt	81.983	41.383	40Ar/39Ar	267.4	3	(Liu et al., 2012)
27	N Tarim	Keping flood basalt (Kupukuziman Fm)	DWG07-4	Basalt	79.48	40.679	Whole-rock 40Ar/39Ar	271.9	3.7	(Zhang et al., 2010b)
28	N Tarim	Keping flood basalt	?	Basalt	79.51	40.67	40Ar/39Ar	278.5	1.4	(Chen et al., 1997)
29	N Tarim	Basalt from drillhole	YT6-1	Basalt	81.983	41.383	40Ar/39Ar	261.1	4.9	(Liu et al., 2012)
30	N Tarim	Gabbro in Kepingtage	04-B07	Gabbro	79.63	40.75	LA-ICP-MS zircon U-Pb	274	15	(Li et al., 2007)
31	N Tarim	Tuff in Kepingtage	04-B04	Tuff	79.63	40.75	LA-ICP-MS zircon U-Pb	291	10	(Li et al., 2007)
32	N Tarim	Keping flood basalt	04-B03	Basalt	79.63	40.75	LA-ICP-MS zircon U-Pb	275	13	(Li et al., 2007)
33	NW Tarim (Bachu)	Syenite in Bachu	T33	Quartz syenite	78.852	39.745	SHRIMP zircon U-Pb	273	3.7	(Chen et al., 2010)
34	NW Tarim (Bachu)	Syenite in Bachu	BC03	Quartz syenite	78.807	39.751	LA-ICP-MS zircon U-Pb	273.7	1.5	(Zhang et al., 2008)
35	NW Tarim (Bachu)	Syenite in Bachu	XH-13	Quartz syenite	78.8	39.767	SHRIMP zircon U-Pb	277	4	(Yang et al., 2006a)
36	NW Tarim (Bachu)	Syenite in Bachu	04-B32	Syenite	78.8	39.205	LA-ICP-MS zircon U-Pb	281	4	(Li et al., 2007)
37	NW Tarim (Bachu)	Syenite in Bachu	04-B30	Syenite	78.8	39.2	LA-ICP-MS zircon U-Pb	282	3	(Li et al., 2007)
38	NW Tarim (Bachu)	Syenite in Bachu	Sgt0503-1a	Quartz syenite	78.82	39.76	SHRIMP zircon U-Pb	284.3	2.8	(Li et al., 2011)
39	NW Tarim (Bachu)	Syenite in Bachu	04XJ-78	Syenite	78.85	39.785	SHRIMP zircon U-Pb	285.9	2.6	(Sun et al., 2008)
40	NW Tarim (Bachu)	Syenite in Bachu	WJL050710	Diorite	78.946	39.544	LA-ICP-MS zircon U-Pb	275.2	1.2	(Zou et al., 2015)
41	NW Tarim (Bachu)	Syenite in Bachu	Xhz-9	Syenite	78.8	39.77	Cameca zircon U-Pb	279.7	2	(Wei and Xu, 2011)
42	NW Tarim (Bachu)	Mafic intrusion in Bachu	04-B15	Diabase	78.75	39.35	LA-ICP-MS zircon U-Pb	272	6	(Li et al., 2007)
43	NW Tarim (Bachu)	Mafic intrusion in Bachu	WJL081907	Mafic dyke	78.937	39.535	SHRIMP zircon U-Pb	281.4	1.7	(Zou et al., 2015)

No.	Tectonic region	Geologic Unit	Sample No.	Sample lithology	Long.	Lati.	Dating Method	Age (Ma)	Error (Ma)	References
44	NW Tarim (Bachu)	Mafic intrusion in Bachu	DW27	Gabbro	78.935	39.535	LA-ICP-MS zircon U-Pb	282.4	1.4	(Zhang et al., 2016)
45	NW Tarim (Bachu)	Mafic intrusion in Bachu	D44	Metagabbro	78.932	39.55	LA-ICP-MS zircon U-Pb	283.3	0.9	(Zhang et al., 2016)
46	NW Tarim (Bachu)	Carbonatite in Bachu	Mn	Carbonatite	78.95	39.58	Cameca monazite Th-Pb	266	5.3	(Song et al., 2017)
47	NW Tarim (Bachu)	Clinopyroxenite in Bachu	DW24	Clinopyroxenite	78.934	39.533	Cameca zircon U-Pb	281.3	2.2	(Zhang et al., 2016)
48	NW Tarim (Bachu)	Clinopyroxenite in Bachu	W08	Olivine clinopyroxenite	78.934	39.533	Cameca zircon U-Pb	283	2.1	(Shangguan et al., 2016)
49	NW Tarim (Bachu)	Clinopyroxenite in Bachu	D53	Clinopyroxenite	78.934	39.534	LA-ICP-MS zircon U-Pb	284.2	2.8	(Zhang et al., 2016)
50	NW Tarim (Bachu)	Kimberlite in Bachu	DW31-4	Kimberlitic rock	78.935	39.566	Cameca perovskite U-Pb	299.8	4.3	(Zhang et al., 2013)
51	NW Tarim (Bachu)	Kimberlite in Bachu	DW21-4	Kimberlitic rock	78.926	39.57	Cameca baddeleyite U-P	300.5	4.4	(Zhang et al., 2013)
52	NW Tarim (Bachu)	Kimberlite in Bachu	DW21-1	Kimberlitic rock	78.924	39.57	Cameca baddeleyite U-P	300.8	4.7	(Zhang et al., 2013)
81	NW Tarim (Bachu)	Nephelinite in Wajilitage	CZG-1	Nephelinite	78.95	39.557	Cameca rutile U-Pb	268	30	(Cheng et al., 2015)
82	NW Tarim (Bachu)	Diabase in Tangwangcheng	TWC07-1	Diabase	78.81	40.02	Whole-rock 40Ar/39Ar	262.3	4.1	(Zhang et al., 2010b)
83	NW Tarim (Bachu)	Diabase in Xiaohaizi	XHZ07-7	Diabase	78.628	39.663	Whole-rock 40Ar/39Ar	285.4	8.5	(Zhang et al., 2010b)
53	NW Tarim (Piqiang)	Gabbro in Piqiang	2010HLJ028	Lecuogabbro	77.633	40.443	LA-ICP-MS zircon U-Pb	261.7	1.8	(Zhang and Zou, 2013)
54	NW Tarim (Piqiang)	Gabbro in Piqiang	2010HLJ026	Gabbro	77.632	40.445	LA-ICP-MS zircon U-Pb	262.3	2.1	(Zhang and Zou, 2013)
55	NW Tarim (Piqiang)	Gabbro in Piqiang	9-1K	Gabbro	77.64	40.45	Plagioclase 40Ar/39Ar	265.5	1.2	(Zhou et al., 2010)
56	NW Tarim (Piqiang)	Gabbro in Piqiang	PC-1	Gabbro	77.633	40.443	Cameca zircon U-Pb	273.3	2	(Zhang et al., 2016)
57	NW Tarim (Piqiang)	Gabbro in Piqiang	D56-7	Gabbro	77.634	40.442	Cameca zircon U-Pb	273.5	2.2	(Zhang et al., 2016)
58	NW Tarim (Piqiang)	Gabbro in Piqiang	D58	Gabbro	77.634	40.443	LA-ICP-MS zircon U-Pb	275.1	1.1	(Zhang et al., 2016)
59	NW Tarim (Piqiang)	Gabbro in Piqiang	NPC-13	Gabbro	77.609	40.437	Cameca zircon U-Pb	275.3	1.9	(Zhang et al., 2016)
60	NW Tarim (Piqiang)	Gabbro in Piqiang	08KT01	Gabbro	77.636	40.412	SHRIMP zircon U-Pb	276	4	(Zhang et al., 2010a)
61	NW Tarim (Piqiang)	Halajun granite pluton I	08KT02	Granite	77.4	40.455	SHRIMP zircon U-Pb	278	3	(Zhang et al., 2010a)

No.	Tectonic region	Geologic Unit	Sample No.	Sample lithology	Long.	Lati.	Dating Method	Age (Ma)	Error (Ma)	References
62	NW Tarim (Piqiang)	Halajun granite pluton I	HL16	Granite	77.36	40.49	LA-ICP-MS zircon U-Pb	273	2	(Su et al., 2019)
63	NW Tarim (Piqiang)	Halajun granite pluton I	?	Granite	77.326	40.478	LA-ICP-MS zircon U-Pb	275.4	2.8	(Luo et al., 2010)
64	NW Tarim (Piqiang)	Halajun granite pluton I	T08-1	Granite	77.325	40.479	LA-ICP-MS zircon U-Pb	275.1	6.2	(Liu et al., 2013)
65	NW Tarim (Piqiang)	Halajun granite pluton II	HL1	Granite	77.152	40.272	LA-ICP-MS zircon U-Pb	268	1	(Su et al., 2019)
66	NW Tarim (Piqiang)	Halajun granite pluton II	08KT03	Granite	77.133	40.267	SHRIMP zircon U-Pb	278	3	(Zhang et al., 2010a)
67	NW Tarim (Piqiang)	Halajun granite pluton II	T13-2	Granite	77.166	40.263	LA-ICP-MS zircon U-Pb	276.5	1.6	(Liu et al., 2013)
68	NW Tarim (Piqiang)	Halajun granite pluton II	YT-HH-7	Granite	77.147	40.283	LA-ICP-MS zircon U-Pb	272.7	1.1	(Huang et al., 2012)
69	NW Tarim (Piqiang)	Halajun granite pluton II	T14-1	Granite	77.136	40.242	LA-ICP-MS zircon U-Pb	277	2.1	(Liu et al., 2013)
70	NW Tarim (Piqiang)	Halajun granite pluton III	2010HLJ III-1	Monzonitic granite	77.178	40.354	LA-ICP-MS zircon U-Pb	268.6	1.5	(Zhang and Zou, 2013)
71	NW Tarim (Piqiang)	Halajun granite pluton IV	2010HLJ IV-3	Monzonitic granite	77.147	40.371	LA-ICP-MS zircon U-Pb	268.8	1.7	(Zhang and Zou, 2013)
72	NW Tarim (Piqiang)	Halajun granite pluton V	2010HLJ V-2	Monzonitic granite	77.214	40.357	LA-ICP-MS zircon U-Pb	271	2.2	(Zhang and Zou, 2013)
73	NW Tarim (Piqiang)	Halajun granite pluton V	T10-1	Granite	77.211	40.355	LA-ICP-MS zircon U-Pb	272.6	4.6	(Liu et al., 2013)
74	NW Tarim (Piqiang)	Kezile granite pluton	09KZ05	Biotite granite	77.07	40.41	LA-ICP-MS zircon U-Pb	272.4	1.1	(Zhang and Zou, 2013)
75	NW Tarim (Piqiang)	Kezile granite pluton	HL9	Granite	77.081	40.412	LA-ICP-MS zircon U-Pb	275	1	(Su et al., 2019)
76	NW Tarim (Piqiang)	Guerlale granite pluton	09GL07	Biotite granite	77.105	40.532	LA-ICP-MS zircon U-Pb	276.7	0.9	(Zhang and Zou, 2013)
77	NW Tarim (Piqiang)	Bashisuogong plutonic complex	BSSG-SZ	Quartz syenite	76.55	40.09	LA-ICP-MS zircon U-Pb	275.5	2	(Ma et al., 2016)
78	NW Tarim (Piqiang)	Bashisuogong plutonic complex	BSSG-HC	Gabbro	76.552	40.09	LA-ICP-MS zircon U-Pb	276.4	1.1	(Ma et al., 2016)
79	NW Tarim (Piqiang)	Bashisuogong plutonic complex	BSSG-HL	Diabase	76.554	40.09	LA-ICP-MS zircon U-Pb	277.2	0.9	(Ma et al., 2016)
80	NW Tarim (Piqiang)	Bashisuogong plutonic complex	BSSG-JH	Alkaline granite	76.556	40.09	LA-ICP-MS zircon U-Pb	278.6	1.9	(Ma et al., 2016)
84	SW Tarim	SW Tarim flood basalt	QMG1106	Sandstones#	76.583	38.02	LA-ICP-MS zircon U-Pb	284	4	(Li et al., 2013)
85	SW Tarim	SW Tarim flood basalt	QMG1112	Sandstones#	76.583	38.02	LA-ICP-MS zircon U-Pb	278	9	(Li et al., 2013)
86	SW Tarim	SW Tarim flood basalt	Txn25-21	Basalt	76.75	37.84	K-Ar	289.6	5.6	(Li et al., 2008)

No.	Tectonic region	Geologic Unit	Sample No.	Sample lithology	Long.	Lati.	Dating Method	Age (Ma)	Error (Ma)	References
87	SW Tarim	SW Tarim flood basalt	Txn25-21	Basalt	76.75	37.84	40Ar/39Ar	290.1	3.5	(Yang et al., 2006b)
88	SW Tarim	SW Tarim flood basalt	?	Basalt	76.6976	37.5215	K-Ar	292.4	0.5	(Liu and Li, 1991)
89	SW Tarim	SW Tarim flood basalt	Y8-y-4	Basalt	76.6976	37.5215	LA-ICP-MS zircon U-Pb	298.3	2.8	(Shao et al., 2015)
90	SW Tarim	SW Tarim flood basalt	GD07-9	Basalt	76.6976	37.5215	K-Ar	277.35	3.83	(Pan et al., 2011)
91	SW Tarim	SW Tarim flood basalt	GD07-17	Basalt	76.6976	37.5215	K-Ar	291.5	3.91	(Pan et al., 2011)

Notes:

- ? — No sample number, because of the loss of original data;
- # — Sedimentary strata overlain or underlain the basalt;

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Table DR3. Compilation of elements data for aged magmatic rocks within the Tarim Basin

NO.	Region	Geologic unit	Age/Ma	Ref. for ages	Long.	lati.	Distance/km	Sample name	Sample lithology	Ref. for elements	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃ ¹	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	LOI	Rb	Sr	Th	U	Nb	Ta	Zr	Hf	Pb	La	Ce	Yb	Lu	Nb/Yb	Nb/La	Ce/Pb	Nb*
1	1	Volcanic rocks	282.9	(Tian et al., 2010)	82.17	41.28	344	YM16-2	Rhyolite	(Liu et al., 2014)	78.6	0.22	10.2	2.48	0.01	0.16	0.07	0.68	5.73	0.01	1.32	514	22.2	37.3	5.6	154	10.5	1199	31.5	21.9	276	387	8.2	1.2	18.7805	0.5580	17.6712	0.5144
2	1	Volcanic rocks	287	Estimated**	81.33	40.78	257	SL1-6	Rhyolite	(Tian et al., 2010)	70.9	0.22	13.4	2.62	0.02	0.18	2.22	1.92	4.78	0.01	3.5	143	41	15.7	3.1	86.2	5.01	496	13.6	8.82	77.8	188	5.05	0.71	17.0693	1.1080	21.3152	0.8359
3	1	Volcanic rocks	282.9	(Tian et al., 2010)	82.17	41.28	344	YM16-1	Rhyolite	(Tian et al., 2010)	77.29	0.21	10.58	3.79	0.02	0.04	0.44	2.49	3.96	0	0.92	159	15.7	31.1	4.94	129	7.93	891	24.6	18	101	173	6.45	0.83	20.0000	1.2772	9.6111	0.7801
4	1	Volcanic rocks	282.9	(Tian et al., 2010)	82.17	41.28	344	YM16-2	Rhyolite	(Tian et al., 2010)	79.37	0.22	10.28	2.29	0.17	0.13	0.17	0.43	4.7	0	2.02	169	20.3	34.6	5.19	116	7.99	962	25.5	15.8	114	212	6.52	0.86	17.7914	1.0175	13.4177	0.6260
5	1	Volcanic rocks	282.9	(Tian et al., 2010)	82.17	41.28	344	YM16-1	Volcanic rock	(Liu et al., 2012)	76.96	0.19	10.37	3.26	0.01	0.07	0.34	2.11	5.44	0.01	0.64	351	26.8	45.6	13	163	12.6	1402	38.1		172	310	8.8	1.23	18.5227	0.9477		0.6238
6	1	Volcanic rocks	282.9	(Tian et al., 2010)	82.17	41.28	344	YM16-2	Volcanic rock	(Liu et al., 2012)	76.76	0.19	10.59	3.46	0.01	0.04	0.41	2.73	4.65	0.01	0.86	271	40.7	39.2	16.1	158	12.1	1392	37.2		160	296	8.29	1.19	19.0591	0.9875		0.6762
7	1	Volcanic rocks	282.9	(Tian et al., 2010)	82.17	41.28	344	YM16-3	Volcanic rock	(Liu et al., 2012)	76.42	0.21	10.65	3.83	0.01	0.08	0.09	2.56	4.87	0.01	0.72	285	27.7	46.3	9.6	174	13.3	1444	39.2		176	331	9.56	1.38	18.2008	0.9886		0.6533
8	1	Volcanic rocks	282.9	(Tian et al., 2010)	82.17	41.28	344	YM16-4	Volcanic rock	(Liu et al., 2012)	73.37	0.21	10.46	6.67	0.02	0.21	0.11	2.01	4.96	0.01	1.46	292	36.1	42.9	5.75	215	12.2	1379	37.8		148	272	9.03	1.31	23.8095	1.4527		0.9145
9	1	Volcanic rocks	282.9	(Tian et al., 2010)	82.17	41.28	344	YM16-5	Volcanic rock	(Liu et al., 2012)	76.67	0.21	10.81	2.65	0.01	0.12	0.09	2.71	4.99	0.01	1.12	278	33.6	49.6	8.69	155	13.4	1417	38.7		185	335	10	1.46	15.5000	0.8378		0.5484
10	1	Volcanic rocks	282.9	(Tian et al., 2010)	82.17	41.28	344	YM16-6	Volcanic rock	(Liu et al., 2012)	75.3	0.21	10.4	4.78	0.05	0.29	0.13	2.4	4.54	0.01	1.32	242	35.5	50.8	8.97	151	13.6	1484	40.1		188	328	10.5	1.56	14.3810	0.8032		0.5237
11	1	Volcanic rocks	287.2	(Shangguan et al., 2016)	83.35	41.33	437	HA1	Rhyolite	(Liu et al., 2014)	71.79	0.47	10.46	2.46	0.04	0.11	1.15	3.46	5.23	0.13	0.58	158	144	16.2	2.9	41.8	2.9	458	11.3	21.9	91.3	183	3	0.5	13.9333	0.4578	8.3562	0.3684
12	1	Volcanic rocks	277.3	(Tian et al., 2010)	81.30	41.23	279	NK1-3	Rhyolite	(Liu et al., 2014)	76.72	0.36	11.92	0.94		0.13	0.38	1.89	5.97	0.08	1.12	184	73.9	20.7	3	26.4	1.8	433	10.2	23.8	78	157	4.9	0.7	5.3878	0.3385	6.5966	0.2227
13	1	Volcanic rocks	287.2	(Shangguan et al., 2016)	83.35	41.33	437	HA2-1	Dacite	(Liu et al., 2014)	66.34	0.63	14.96	4.88	0.1	0.41	2.25	3.83	4.97	0.19	0.92	135	154	14.2	2.9	45.4	2.7	633	14.7	22.8	83.3	168	5.6	0.9	8.1071	0.5450	7.3684	0.4474
14	1	Volcanic rocks	287.2	(Shangguan et al., 2016)	83.35	41.33	437	HA2-2	Dacite	(Liu et al., 2014)	65.78	0.6	14.67	5.33	0.12	0.37	2.46	3.51	5.02	0.18	1.45	140	212	14	3	45.2	2.7	591	14.1	23.9	80.6	162	5.4	0.8	8.3704	0.5608	6.7782	0.4560
15	1	Volcanic rocks	287.2	(Shangguan et al., 2016)	83.86	40.87	463	YX1	Dacite	(Liu et al., 2014)	68.15	0.63	14.04	4.5	0.08	0.42	2.17	3.07	5.12	0.19	1.13	213	139	23.1	5.5	29.2	2.1	467	11.6	35.4	84	168	5.2	0.8	5.6154	0.3476	4.7458	0.2247
16	1	Volcanic rocks	287.2	(Shangguan et al., 2016)	83.86	40.87	463	YX2	Dacite	(Liu et al., 2014)	67.09	0.7	13.91	5.43	0.09	0.56	2.19	2.91	4.89	0.21	1.52	199	136	21.6	5.4	30.5	2.1	518	12.4	32.4	78.1	158	5.1	0.8	5.9804	0.3905	4.8765	0.2517
17	1	Volcanic rocks	287.2	(Shangguan et al., 2016)	81.48	40.85	271	SX1	Dacite	(Liu et al., 2014)	63.77	0.91	16.59	5.55	0.04	0.41	0.94	4.7	4.96	0.27	1.35	95.5	232	9.7	1.5	53.5	3.6	451	10.1	13.5	70.4	143	2.6	0.4	20.5769	0.7599	10.5926	0.6939
18	1	Volcanic rocks	287	Estimated*	81.58	40.87	280	MN1	Rhyolite	(Liu et al., 2014)	74.62	0.21	12.55	1.66	0.01	0.22	0.74	0.63	8.03	0.01	0.8	162	33.8	11.1	2.4	70.7	5.1	647	15.1	8.2	143	255	5.6	0.8	12.6250	0.4944	31.0976	0.6014
19	1	Volcanic rocks	271.7	(Tian et al., 2010)	81.58	40.87	280	MN1-1	Rhyolite	(Tian et al., 2010)	75.52	0.43	12.4	0.68	0.02	0.01	0.6	1.99	6.98	0.03	1.12	366	34	11	2.6	81.2	5.2	665	17	6.49	90.1	164	4.98	0.7	16.3052	0.9012	25.2696	0.8742
20	1	Volcanic rocks	271.7	(Tian et al., 2010)	81.58	40.87	280	MN1-2	Rhyolite	(Tian et al., 2010)	76.61	0.36	12.17	0.5	0.02	0.01	0.45	1.84	6.7	0.04	1.09	367	29.4	12.6	3.11	81.4	5.3	584	15	6.14	99.4	188	5.02	0.73	16.2151	0.8189	30.6189	0.7796
21	1	Volcanic rocks	277.3	(Tian et al., 2010)	81.30	41.23	279	NK1-2	Rhyolite	(Tian et al., 2010)	70.48	0.39	15.46	1.98	0.01	0.07	0.49	2.39	5.8	0.06	2.57	328	111	14.8	2.09	24.9	1.66	492	12.8	18.6	51.9	97.7	5.22	0.86	4.7701	0.4798	5.2527	0.3045
22	1	Volcanic rocks	290.9	(Tian et al., 2010)	81.80	41.35	321	YM30-1	Rhyolite	(Tian et al., 2010)	75.26	0.63	10.59	3.45	0.03	1.05	1.96	3.48	1.24	0.09	1.97	57.2	698	10.9	2.21	26.7	1.58	263	6.96	14	45.5	86.7	2.87	0.44	9.3031	0.5868	6.1929	0.4063
23	1	Volcanic rocks	290.9	(Tian et al., 2010)	81.80	41.35	321	YM30-2	Rhyolite	(Tian et al., 2010)	74.23	0.69	10.67	3.78	0.04	1.14	2.08	3.47	1.48	0.11	2.05	61.2	691	16.2	3.12	29.4	1.91	314	8.74	10.3	50.4	103	3.74	0.56	7.8610	0.5833	10.0000	0.3487
24	1	Volcanic rocks	286.6	(Tian et al., 2010)	81.87	41.12	313	YM5-8	Dacite	(Tian et al., 2010)	64.98	0.69	14.22	6	0.2	0.57	0.59	4.1	4.1	0.09	4.27	70	25.4	11.9	2.27	85.2	5.37	500	11.6	9.05	73.5	149	3.24	0.47	26.2963	1.1592	16.4641	0.9764
25	1	Volcanic rocks	287	Estimated*	81.33	41.30	285	YT8-1	Rhyolite	(Tian et al., 2010)	74.39	0.36	13.42	1.28	0.01	0.12	0.77	2.44	4.73	0.06	2.17	124	72.2	15.8	2.74	20.9	1.3	320	8.94	18.5	38.1	64.6	2.31	0.33	9.0476	0.5486	3.4919	0.2887
26	1	Volcanic rocks	287	Estimated*	81.33	41.30	285	YT8-2	Rhyolite	(Tian et al., 2010)	75.19	0.35	13.07	1.55	0.02	0.14	0.68	2.34	4.73	0.06	1.64	124	64.7	15.2	2.63	20.6	1.3	298	8.48	16.6	33	57.6	3.15	0.44	6.5397	0.6242	3.4699	0.3117
27	1	Volcanic rocks	276.6	(Yu et al., 2011a)	84.32	40.76	498	S114	Dacite	(Yu et al., 2011a)	67.19	0.66	13.66	6.3	0.06	0.8	2.12	3.38	4.87	0.2	0.88	146	125	17.6	4.76	32.8	1.98	482	11.7	68.6	50.1	102	4.21	0.64	7.7910	0.6547	1.4869	0.3744
28	1	Volcanic rocks	273.1	(Yu et al., 2011a)	83.85	40.96	464	S99	Dacite	(Yu et al., 2011a)	66.42	0.5	14.71	6.11	0.06	1.26	1.54	3.64	4.43	0.16	1.44	93.4	95.3	13.4	3.64	42.2	2.53	537	13.4	30.5	42.4		5	0.75	8.4400	0.9953	3.0393	0.6000
29	1	Volcanic rocks	279.8	(Yu et al., 2011a)	84.04	40.64	472	S79-3	Dacite	(Yu et al., 2011a)	68.21	0.6	13.62	5.62	0.05	1.18	1.64	3.3	4.63	0.18	1.02	151	129	17.8	4.39	32.1	2	431	10.8	69.7	59.7	115	3.99	0.58	8.0451	0.5377	1.6499	0.3337
30	1	Volcanic rocks	281.8	(Yu et al., 2011a)	83.76	40.74	451	S102-1	Dacite	(Yu et al., 2011a)	67.37	0.61	13.56	7.02	0.1	1.09	1.72	3.17	3.99	0.19	1.52	102	96.9	16.7	3.97	31.7	2.02	460	11.5	100	47.5	99.5	4.67	0.69	6.7880	0.6674	0.9950	0.3815
31	1	Volcanic rocks	287	Estimated*	81.98	41.45	340	DH12-1	Dolerite	(Tian et al., 2010)	40.61	2.74	12.71	13.1	0.14	11.26	6.05	2.4	1.56	0.39	8.74	38	392	3.83	0.95	39.4	2.29	183	4.66	2.94	29.3	59.9	1.78	0.26	22.1348	1.3447	20.3741	1.2606
32	1	Volcanic rocks	287	Estimated*	81.98	41.45	340	DH12-2	Dolerite	(Tian et al., 2010)	41.42	2.37	11.19	14.5	0.08	8.16	9.46	2.39	2.11	0.39	7.65	31.5	502	3.12	1.06	36.7	2.05	165	4.34	3.43	29.9	62.2	1.58	0.24	23.2278	1.2274	18.1341	1.2878
33	1	Volcanic rocks	287	Estimated*	81.33	40.78	257	SL1-2	Basalt	(Tian et al., 2010)	50.09	1.94	14.29	10.71	0.11	3.56	8.71	2.31	1.29	0.34	6.4	18.6	420	3.51	0.8	37.9	2.11	233	5.83	5.21	30.1	65.2	2.24	0.31	16.9196	1.2591	12.5144	1.2497
34	1	Volcanic rocks	287	Estimated*																																		

NO.	Region	Geologic unit	Age/Ma	Ref. for ages	Long.	lati.	Distance/km	Sample name	Sample lithology	Ref. for elements	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃ ¹	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	LOI	Rb	Sr	Th	U	Nb	Ta	Zr	Hf	Pb	La	Ce	Yb	Lu	Nb/Yb	Nb/La	Ce/Pb	Nb*
65	1	Kupukuziman Formation	291.9	(Zhang et al., 2012a)	79.72	40.73	141	08KT12	Basalt	(Zhang et al., 2010a)	44.38	3.99	14.17	17.05	0.19	7.91	5.81	3.16	1.36	0.95	0.62	24.3	355	3.36	0.77	25.7	1.75	283	7		34.7	79.5	3.61	0.58	7.1191	0.7406		0.8067
66	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.72	40.73	141	08KT13	Basalt	(Zhang et al., 2010a)	49.32	3.41	11.22	17.14	0.18	6.12	3.67	3.87	0.97	0.62	3.15	17.8	191	5.27	1.37	24.5	1.7	243	6.18		32	73.6	3.08	0.51	7.9545	0.7656		0.6394
67	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.72	40.73	141	08KT14	Basalt	(Zhang et al., 2010a)	51.24	3.25	10.59	17.44	0.16	5.26	3.35	4.22	1.04	0.56	2.6	16.5	164	5.12	1.56	23.5	1.67	224	5.85		31.9	69.2	2.87	0.47	8.1882	0.7367		0.6232
68	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.72	40.73	141	08KT15	Basalt	(Zhang et al., 2010a)	50.37	3.55	11.91	18.15	0.13	4	3.72	4.39	0.71	0.62	2.17	12.9	183	5.15	1.45	25	1.72	249	6.14		29.9	69.2	3.05	0.49	8.1967	0.8361		0.6828
69	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ1-02	Basalt	(Zhou et al., 2009)	44.44	3.57	14.9	15.85	0.18	6.29	7.89	3.06	1.26	0.87	1.69	29.9	522	3.16	0.84	28.6	1.41	291	6.33	5.46	36.1	70	2.9	0.48	9.8621	0.7922	12.8205	0.9075
70	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ1-05	Basalt	(Zhou et al., 2009)	43.82	3.93	14.29	16.37	0.19	5.43	7.99	3.22	1.49	0.97	2.22	33.2	443	3.69	0.94	36.5	1.72	321	7.67	6.65	41.2	82	3.65	0.61	10.0000	0.8859	12.3308	1.0033
71	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ2-01	Basalt	(Zhou et al., 2009)	44.32	3.89	14.74	16.36	0.19	5.42	8.08	2.94	1.51	0.98	1.47	22.7	493	3.41	0.99	31.4	1.48	285	6.82	8.82	38.6	75	3.45	0.53	9.1014	0.8135	8.5034	0.9276
72	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ2-06	Basalt	(Zhou et al., 2009)	44.11	3.8	14.73	16.14	0.19	5.61	7.88	2.66	1.8	0.97	1.68	23.7	848	3.38	0.87	29.3	1.53	266	6.7	6.63	37.9	71	3.64	0.6	8.0495	0.7731	10.7089	0.8774
73	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ3-3	Basalt	(Zhou et al., 2009)	45.12	3.8	15.03	14.96	0.2	5.83	8.53	2.72	1.22	0.96	1.34	28.5	480	2.95	0.85	29.3	1.5	296	6.51	5.56	37.8	69	3.47	0.55	8.4438	0.7751	12.4101	0.9404
74	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ3-8	Basalt	(Zhou et al., 2009)	44.8	3.74	15.03	15.14	0.2	6.39	8.34	2.87	1.19	0.94	1.37	25.9	529	2.97	0.76	30.2	1.51	284	6.49	6.7	35.2	67	3.57	0.56	8.4594	0.8580	10.0000	1.0010
75	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ3-10	Basalt	(Zhou et al., 2009)	45.03	3.46	15.72	14.26	0.19	6.99	7.96	2.59	1.04	0.87	1.94	22.8	428	3.18	0.71	27	1.54	307	6.38	6.14	35.9	65	3.41	0.54	7.9179	0.7521	10.5863	0.8564
76	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ4-2	Basalt	(Zhou et al., 2009)	43.55	4.13	15.6	15.92	0.15	3.62	9.52	3.3	1.22	0.99	2.01	22.9	462	3.07	0.69	29	1.41	270	6.16	4.98	35.1	65	3.45	0.53	8.4058	0.8262	13.0522	0.9468
77	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ5-2	Basalt	(Zhou et al., 2009)	43.26	3.69	15.19	13.23	0.25	2.66	8.04	5.06	1.28	0.94	5.91	20.2	1112	2.88	0.62	27.4	1.47	280	6.52	4.75	35.1	64	3.2	0.5	8.5625	0.7806	13.4737	0.9236
78	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ6-2	Basalt	(Zhou et al., 2009)	46.71	3.89	17.14	12.75	0.13	3.46	8.98	3.21	1.26	0.99	1.28	24.9	447	2.99	0.73	30.5	1.52	277	6.84	5.31	35.7	70	3.46	0.54	8.8150	0.8543	13.1827	1.0005
79	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ7-2	Basalt	(Zhou et al., 2009)	44.81	3.92	15.8	14.73	0.13	2.05	7.7	4.89	1.39	1.05	3.88	17.4	1190	3.7	0.93	31.7	1.56	299	6.85	7.82	42.1	80	3.84	0.58	8.2552	0.7530	10.2302	0.8608
80	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ7-4	Basalt	(Zhou et al., 2009)	41.42	3.35	14.61	12.34	0.26	2.17	11.01	4.42	2.11	0.85	7.28	32.1	702	3.04	0.55	25.5	1.37	259	6.17	5.49	34.5	60	3.13	0.48	8.1470	0.7391	10.9290	0.8439
81	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ8-2	Basalt	(Zhou et al., 2009)	47.6	3.73	14.39	13.4	0.2	5.82	8.45	2.88	1.37	0.91	0.86	26.6	326	4.88	0.99	31	2.08	296	7.87	6.92	47.4	99	3.63	0.57	8.5399	0.6540	14.3064	0.6908
82	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQ8-8	Basalt	(Zhou et al., 2009)	44.76	3.68	15.23	14.92	0.19	6.63	7.93	2.6	1.13	0.92	1.91	18.1	322	3.31	0.82	30.7	1.82	276	6.42	4.66	40.5	81	3.21	0.52	9.5639	0.7580	17.3820	0.8987
83	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQY1-2	Basalt	(Zhou et al., 2009)	44.59	4.15	13.96	15.93	0.21	6.08	7.72	2.63	1.37	1.21	1.77	29.5	334	3.84	0.86	38.7	2.36	357	8.69	6.24	49.7	101	3.75	0.58	10.3200	0.7787	16.1859	0.9494
84	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQY2-2	Basalt	(Zhou et al., 2009)	45.56	3.94	14.36	15.46	0.21	6.26	7.96	2.77	1.32	1.08	1.46	26.9	378	3.99	0.92	39	2.17	337	8.14	5.62	46.8	100	3.4	0.56	11.4706	0.8333	17.7936	0.9673
85	1	Volcanic rocks	290	Estimated*	79.72	40.78	145	AQY4-4	Basalt	(Zhou et al., 2009)	47.31	3.82	14.34	13.21	0.24	5.81	9.49	3.1	0.89	0.87	0.85	11.2	422	4.14	0.99	28.5	1.74	280	6.93	5.73	45.4	89	3.72	0.56	7.6613	0.6278	15.5323	0.7046
86	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.69	40.69	135	YG-1	Basalt	(Wei et al., 2014)	46.27	4.14	13.16	16.78	0.21	4.21	7.86	3.28	1.46	1.3	0.86	19	341	4.25	0.98	31.8	1.76	356	7.63	6.97	43.5	98.3	3.86	0.57	8.2383	0.7310	14.1033	0.7927
87	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.69	40.69	135	YG-2	Basalt	(Wei et al., 2014)	46.57	4.21	13.19	17.11	0.21	4.57	7.79	3.1	1.47	1.28	0.02	13.9	359	4.16	0.97	31.3	1.76	349	7.53	6.9	43.1	97.2	3.8	0.57	8.2368	0.7262	14.0870	0.7922
88	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.69	40.69	135	YG-3	Basalt	(Wei et al., 2014)	44.93	4.14	13.52	16.84	0.2	5.27	7.47	3.08	1.48	1.15	1.42	23.7	307	3.47	0.86	30.4	1.73	325	6.99	5.72	39.2	89	3.69	0.55	8.2385	0.7755	15.5594	0.8834
89	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.69	40.69	135	YG-5	Basalt	(Wei et al., 2014)	46.68	4.02	13.59	16.46	0.19	4.81	7.79	3.32	1.58	1.1		30.4	361	3.9	0.94	30.7	1.71	371	7.61	6.56	40.8	92.2	3.83	0.57	8.0157	0.7525	14.0549	0.8248
90	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.69	40.69	135	YG-6	Basalt	(Wei et al., 2014)	46.16	4.16	13.1	17.36	0.22	4.85	7.8	2.74	1.48	1.3	0.86	21.1	360	4.24	0.99	31.7	1.74	354	7.7	7.06	43.5	98.3	3.9	0.58	8.1282	0.7287	13.9235	0.7911
91	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.69	40.69	135	YG-7	Basalt	(Wei et al., 2014)	45.41	3.93	14.52	16.09	0.18	4.98	8.13	2.63	1.3	0.96	1.4	21.8	353	2.96	0.7	26.5	1.5	284	6.21	5.37	33.8	76.3	3.39	0.5	7.8171	0.7840	14.2086	0.8979
92	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.69	40.69	135	YG-10	Basalt	(Wei et al., 2014)	47.87	3.83	13.6	15.62	0.19	4.67	8.53	2.51	1.55	0.82	0.35	29	331	3.68	0.89	23.9	1.28	283	6.34	6.48	34.3	76.2	3.52	0.52	6.7898	0.6968	11.7593	0.7210
93	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.69	40.69	135	YG-11	Basalt	(Wei et al., 2014)	47.18	3.81	13.56	15.34	0.18	5.12	8.39	2.46	1.47	0.82	1.2	28.2	315	3.52	0.87	24.7	1.4	278	6.26	6.21	33.4	74.4	3.5	0.52	7.0571	0.7395	11.9807	0.7721
94	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.69	40.69	135	YG-12	Basalt	(Wei et al., 2014)	46.74	3.73	13.63	15.57	0.19	5.39	8.4	2.48	1.4	0.77	1.22	26.8	307	3.36	0.84	23.7	1.31	269	6.1	5.69	31.7	70.6	3.39	0.5	6.9912	0.7476	12.4077	0.7783
95	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.69	40.69	135	YG-13	Basalt	(Wei et al., 2014)	46.8	3.71	13.7	15.28	0.18	5.59	8.4	2.4	1.39	0.78	1.31	26	319	3.26	0.81	20.9	0.98	261	5.91	5.53	31	69.4	3.34	0.5	6.2575	0.6742	12.5497	0.7046
96	1	Kaipazileike Formation	287.9	(Wei et al., 2014)	79.69	40.69	135	YG-14	Basalt	(Wei et al., 2014)	46.44	3.72	13.84	15.38	0.16	5.48	8.39	2.65	1.35	0.77	1.35	24	309	3.2	0.82	23.5	1.36	262	5.93	5.77	31.4	70.3	3.39	0.5	6.9322	0.7484	12.1837	0.7946
97	1	Kaipazileike Formation	287.9	(Wei et al., 2014)	79.69	40.69	135	YG-15	Basalt	(Wei et al., 2014)	46.14	3.73	13.58	15.79	0.2	5.76	8.4	2.59	1.36	0.8	1.69	27.2	309	3.34	0.86	23.9	1.32	274	6.16	5.52	32.3	72.2	3.5	0.52	6.8286	0.7399	13.0797	0.7799
98	1	Kaipazileike Formation	287.9	(Wei et al., 2014)	79.69	40.69	1																															

NO.	Region	Geologic unit	Age/Ma	Ref. for ages	Long.	lati.	Distance/km	Sample name	Sample lithology	Ref. for elements	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃ ¹	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	LOI	Rb	Sr	Th	U	Nb	Ta	Zr	Hf	Pb	La	Ce	Yb	Lu	Nb/Yb	Nb/La	Ce/Pb	Nb*
130	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.43	40.69	121	K-02	Picritic basalt	(Zhang et al., 2012a)	43.65	4.15	14	15.69	0.26	3.04	8	3.48	1.45	1.75	5.07	19.2	438	6.3	1.2	19.4	0.83	442	9.6	9.1	64.2	139	5.31	0.87	3.6535	0.3022	15.2747	0.3269
131	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.43	40.69	121	K-03	Basalt	(Zhang et al., 2012a)	45.89	4.26	12.64	20.4	0.26	3.73	7.58	2.87	1.93	1.89	0.74	39.9	334	6.52	1.38	38.1	2.39	442	11	10.2	59.8	128	5.31	0.8	7.1751	0.6371	12.5490	0.6540
132	1	Kaipazileike Formation	287.3	(Wei et al., 2014)	79.43	40.69	121	K-05	Basalt	(Zhang et al., 2012a)	50.41	2.32	13.6	14.13	0.17	4.74	7.33	3.02	0.82	0.28	3.15	19.2	405	2.8	0.6	17	1.03	188	4.4	4.1	21.7	46.1	2.19	0.34	7.7626	0.7834	11.2439	0.7392
133	1	Kupukuziman Formation	291.9	(Zhang et al., 2012a)	79.48	40.68	123	DWG07-1	Basaltic rock	(Zhang et al., 2010b)	47.97	3.69	13.21	17.96	0.25	4.12	7.99	3.16	1.62	0.7	0.5	31.8	359	6.55	1.65	28.5	1.94	284	7.64	9.25	39.9	79.5	3.84	0.57	7.4219	0.7143	8.5946	0.5975
134	1	Kupukuziman Formation	291.9	(Zhang et al., 2012a)	79.48	40.68	123	DWG07-2	Basaltic rock	(Zhang et al., 2010b)	48.39	3.51	13.22	17.98	0.25	4.13	7.97	3.02	1.29	0.68	0.46	17.9	591	6.77	1.75	28.2	1.93	282	7.54	8.46	40.1	79.2	3.85	0.58	7.3247	0.7032	9.3617	0.5801
135	1	Kupukuziman Formation	291.9	(Zhang et al., 2012a)	79.48	40.68	123	DWG07-3	Basaltic rock	(Zhang et al., 2010b)	47.81	3.65	13.21	18.47	0.26	4.14	7.65	2.93	1.31	0.71	0.62	16.6	472	6.26	1.44	28.1	1.92	277	7.53	9.44	39	77	3.95	0.57	7.1139	0.7205	8.1568	0.6095
136	1	Kupukuziman Formation	291.9	(Zhang et al., 2012a)	79.48	40.68	123	DWG07-4	Basaltic rock	(Zhang et al., 2010b)	47.85	2.93	13.66	17.34	0.2	5.61	8.57	2.59	0.87	0.32	0.92	18.8	354	2.47	0.6	19.8	1.36	201	6.01	4.2	22.3	48.8	2.88	0.41	6.8750	0.8879	11.6190	0.9042
137	1	Kupukuziman Formation	291.9	(Zhang et al., 2012a)	79.87	40.83	157	LKC07-1	Basaltic rock	(Zhang et al., 2010b)	46.55	3.52	12.98	18.65	0.26	3.82	8.28	3.04	1.45	0.7	1.42	22.9	317	6.52	1.54	28.6	1.96	282	7.76	9.55	40	79.9	4.01	0.59	7.1322	0.7150	8.3665	0.6002
138	1	Kupukuziman Formation	291.9	(Zhang et al., 2012a)	79.87	40.83	157	LKC07-2	Basaltic rock	(Zhang et al., 2010b)	47.52	3.79	13.39	18.62	0.27	4.18	8.07	3.06	1.28	0.71	0.66	20.7	353	6.3	1.44	27.7	1.91	279	7.32	9.1	38.9	78.7	3.66	0.56	7.5683	0.7121	8.6484	0.5997
139	1	Kupukuziman Formation	291.9	(Zhang et al., 2012a)	79.87	40.83	157	LKC07-3	Basaltic rock	(Zhang et al., 2010b)	50.67	2.79	13.05	14.96	0.21	3.25	7.64	3.48	1.19	0.57	2.42	20.8	499	7.62	1.75	24.4	1.61	247	6.9	17.5	38.6	76.7	3.45	0.52	7.0725	0.6321	4.3829	0.4822
140	1	Volcanic rocks	281.1	(Han et al., 2019)	79.84	40.83	155	LT24A	Basalt	(Han et al., 2019)	50.48	2.93	13.39	14.58	0.22	3.41	7.69	3.42	0.85	0.74	1.37	26.1	502	7.46	1.7	23.6	1.67	258	7.12	10.8	37.9	84.2	3.5	0.54	6.7429	0.6227	7.7963	0.4757
141	1	Volcanic rocks	281.1	(Han et al., 2019)	79.85	40.82	155	LT25B	Basalt	(Han et al., 2019)	47.68	3.54	13.53	16.92	0.23	3.49	7.98	2.92	1.66	0.72	0.91	26.7	330	5.71	1.31	24.2	1.85	260	6.96	7.31	34.2	76.8	3.68	0.59	6.5761	0.7076	10.5062	0.5869
142	1	Bashisuogong plutonic c	276.4	(Ma et al., 2016)	76.55	40.09	178	BSSG2-1	Gabbro	(Ma et al., 2016)	47.54	2.69	16.75	13.95	0.16	3.69	8.12	4.33	0.91	1.4	0.15	13.5	970	2.01	0.5	12	0.83	113	3.06	5.92	31.9	71	1.96	0.31	6.1224	0.3762	11.9932	0.5079
143	1	Bashisuogong plutonic c	276.4	(Ma et al., 2016)	76.55	40.09	178	BSSG2-2	Gabbro	(Ma et al., 2016)	52.87	0.81	15.22	6.57	0.12	4.95	13.76	3.24	0.85	0.39	0.97	18.5	658	2.11	0.47	6.69	0.52	110	3.32	7.09	19.2	41.6	1.62	0.28	4.1296	0.3484	5.8674	0.3562
144	1	Bashisuogong plutonic c	276.4	(Ma et al., 2016)	76.55	40.09	178	BSSG2-3	Gabbro	(Ma et al., 2016)	52.89	1.88	15.61	11.58	0.21	2.3	5.82	4.83	2.33	0.93	0.33	39.6	598	3.41	1.21	20.9	1.32	206	5.41	11.5	50	106	3.31	0.53	6.3142	0.4180	9.2174	0.5425
145	1	Bashisuogong plutonic c	276.4	(Ma et al., 2016)	76.55	40.09	178	BSSG2-4	Gabbro	(Ma et al., 2016)	51.77	2.01	16.27	12.43	0.22	2.73	6.66	4.89	1.71	1.01	0.27	23.1	709	2.16	0.64	14.6	0.9	144	3.93	8.81	42.1	89.4	2.77	0.41	5.2708	0.3468	10.1476	0.5189
146	1	Bashisuogong plutonic c	276.4	(Ma et al., 2016)	76.55	40.09	178	BSSG2-5	Gabbro	(Ma et al., 2016)	51.94	1.9	15.92	12.44	0.22	2.71	6.58	4.82	1.87	1.02	0.07	28.3	697	2.95	0.83	18.4	1.11	179	4.69	9.31	47.2	101	3.01	0.5	6.1130	0.3898	10.8485	0.5285
147	1	Bashisuogong plutonic c	276.4	(Ma et al., 2016)	76.55	40.09	178	BSSG2-6	Gabbro	(Ma et al., 2016)	46.16	2.9	15.31	16.8	0.2	5.28	6.75	4.08	1.2	0.51	0.81	19.8	492	2.19	0.64	22.9	1.5	218	5.82	3.58	26.8	57.8	2.43	0.37	9.4239	0.8545	16.1453	1.0131
148	1	Bashisuogong plutonic c	276.4	(Ma et al., 2016)	76.55	40.09	178	BSSG-HC	Gabbro	(Ma et al., 2016)	48.82	2.67	16.05	14.33	0.26	3.51	5.92	5.09	1.49	1.05	0.94	24.6	625	4.33	1.21	43.6	2.72	391	8.98	7.51	55	119	4.28	0.62	10.1869	0.7927	15.8455	0.9575
149	1	Bashisuogong plutonic c	277.2	(Ma et al., 2016)	76.55	40.09	178	BSSG-6	Diabase dyke	(Ma et al., 2016)	50.35	2.65	14.17	14.07	0.22	3.14	6.66	4.44	2.2	0.87	0.15	66	508	7.03	1.96	37.3	2.33	261	6.57	11.3	48.6	101	3.65	0.52	10.2192	0.7675	8.9381	0.6839
150	1	Bashisuogong plutonic c	277.2	(Ma et al., 2016)	76.55	40.09	178	BSSG-7	Diabase dyke	(Ma et al., 2016)	46.37	1.54	15.23	12.92	0.19	7.5	10.98	2.69	0.86	0.17	1.01	58.4	336	1.03	0.31	9.06	0.58	77	2.16	11.1	10.1	22.1	1.7	0.23	5.3294	0.8970	1.9910	0.9520
151	1	Bashisuogong plutonic c	277.2	(Ma et al., 2016)	76.55	40.09	178	BSSG-14	Diabase dyke	(Ma et al., 2016)	49.92	2.76	14.51	13.01	0.18	4.18	7.95	4.22	1.74	0.43	0.31	55	521	8.03	1.72	46.3	2.95	289	7.18	10.9	40.8	82.2	3.13	0.46	14.7923	1.1348	7.5413	0.8669
152	1	Bashisuogong plutonic c	277.2	(Ma et al., 2016)	76.55	40.09	178	BSSG-HL	Diabase dyke	(Ma et al., 2016)	44.53	3.82	14.35	14.02	0.16	7.02	10.15	2.83	1.53	0.25	1.01	9.37	747	1.18	0.32	12.4	0.87	79.8	2.09	3.88	26.5	61	2.13	0.29	5.8216	0.4679	15.7216	0.7515
153	1	Bashisuogong plutonic c	278.6	(Ma et al., 2016)	76.56	40.09	178	BSSG-1	Alkali granite	(Ma et al., 2016)	72.71	0.3	12.23	4.06	0.09	0.06	0.52	3.6	5.93	0.01	0.49	327	8.99	23.8	3.59	100	4.98	873	24.1	28.4	123	213	10.5	1.67	9.5238	0.8130	7.5000	0.6264
154	1	Bashisuogong plutonic c	278.6	(Ma et al., 2016)	76.56	40.09	178	BSSG-2	Alkali granite	(Ma et al., 2016)	74.6	0.11	11.57	2.84	0.05	0.07	0.39	4.01	4.83	0.01	0.39	450	7.2	28.4	10.5	157	9.49	1441	38.6	60.5	95.2	157	9.26	1.33	16.9546	1.6492	2.5950	1.0233
155	1	Bashisuogong plutonic c	278.6	(Ma et al., 2016)	76.56	40.09	178	BSSG-5	Alkali granite	(Ma et al., 2016)	76.12	0.09	12.04	0.99	0.01	0.07	0.57	3.86	5.04	0.01	0.37	211	11.1	28.6	6.59	107	8.04	859	23.6	12.8	145	222	3.87	0.54	27.6486	0.7379	17.3438	0.5631
156	1	Bashisuogong plutonic c	278.6	(Ma et al., 2016)	76.56	40.09	178	BSSG-9	Alkali granite	(Ma et al., 2016)	71.31	0.28	13.52	3.89	0.05	0.16	0.67	4.82	4.97	0.03	0.1	135	27	17.1	3.06	72.3	4.31	717	17.2	11.2	106	169	4.89	0.77	14.7853	0.6821	15.0893	0.5756
157	1	Bashisuogong plutonic c	278.6	(Ma et al., 2016)	76.56	40.09	178	BSSG-JH	Alkali granite	(Ma et al., 2016)	69.3	0.34	13.68	3.85	0.07	0.22	1.49	4.24	5.62	0.08	0.37	162	35.3	48.3	10.6	63.5	5.19	1175	30.6	15.2	166	254	12.5	1.72	5.0800	0.3825	16.7105	0.2404
158	1	Bashisuogong plutonic c	275.5	(Ma et al., 2016)	76.55	40.09	178	BSSG-SZ	Quartz syenite	(Ma et al., 2016)	60.92	0.71	14.61	8.99	0.22	0.26	2.7	5.09	5.34	0.13	0.07	111	25.7	6.09	1.78	49.3	2.51	321	4.79	23.2	35.5	64.1	4.41	0.79	11.1791	1.3887	2.7629	1.1364
159	1	Bashisuogong plutonic c	275.5	(Ma et al., 2016)	76.55	40.09	178	BSSG-4	Quartz syenite	(Ma et al., 2016)	62.54	0.81	15.58	6.71	0.14	0.29	1.89	4.99	6.06	0.07	0.08	136	89.3	6.92	1.94	42.8	1.95	426	7.11	27.3	37.2	63.6	3.07	0.47	13.9414	1.1505	2.3297	0.9041
160	1	Bashisuogong plutonic c	275.5	(Ma et al., 2016)	76.55	40.09	178	BSSG-10	Quartz syenite	(Ma et al., 2016)	60.07	0.81	15.73	8.29	0.21	0.48	2.53	5.4	5.32	0.2	0.14	87.3	79.9	3.56	1.28	36	2.27	278	6.1	16.4	28.4	59.3	3.06	0.51	11.7647	1.2676	3.6159	1.2134
161	1	Bashisuogong plutonic c	275.5	(Ma et al., 2016)	76.55	40.09	178	BSSG-12	Quartz syenite	(Ma et al., 2016)	64.42	0.57	15.29	6.71	0.14	0.37	2.17	5.06	4.76	0.16	0.11	86.9	61.5	10.4	1.87	40.5	3.25	266	8.35	13.5	37.8	71	5.43	0.77	7.4586	1.0714	5.2593	0.6923
162	1	Bashisuogong plutonic c	275.5	(Ma et al., 2016)	76.55	40.																																

NO.	Region	Geologic unit	Age/Ma	Ref. for ages	Long.	lati.	Distance/km	Sample name	Sample lithology	Ref. for elements	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃ ¹	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	LOI	Rb	Sr	Th	U	Nb	Ta	Zr	Hf	Pb	La	Ce	Yb	Lu	Nb/Yb	Nb/La	Ce/Pb	Nb*
195	1	Guerlale pluton	276.7	(Zhang & Zou, 2013)	77.11	40.53	151	09GL17	Granite	(Zhang & Zou, 2013)	74.11	0.19	12.73	1.97	0.05	0.32	0.68	3.2	5.49	0.03	1.05	383	53.5	51.3	6.34	48.9	6.11	242	8.01	40.7	77.6	138	6.1	0.93	8.0164	0.6302	3.3907	0.2627
196	1	Guerlale pluton	276.7	(Zhang & Zou, 2013)	77.11	40.53	151	09GL18	Granite	(Zhang & Zou, 2013)	73.81	0.19	12.6	2.14	0.02	0.27	0.94	3.4	5.17	0.03	1.24	379	39.5	54.4	6.16	49.4	5.98	249	8.04	20.5	79.5	140	5.89	0.95	8.3871	0.6214	6.8293	0.2546
204	1	Halajun granite pluton-II	278	(Zhang et al., 2010a)	77.13	40.27	136	08KT03-1	K-feldspar granite	(Zhang et al., 2010a)	77.67	0.04	12.07	0.42	0.01	0.05	0.53	3.73	4.85	0.01	0.42	447	6.23	41.1	5.9	82.4	6.99	234	13.1		56	115	8.82	1.4	9.3424	1.4714		0.5821
205	1	Halajun granite pluton-II	278	(Zhang et al., 2010a)	77.13	40.27	136	08KT03-2	K-feldspar granite	(Zhang et al., 2010a)	77.88	0.04	12.09	0.26	0.01	0.05	0.59	3.79	4.72		0.38	441	8.59	41.7	9.32	115	9.17	164	9.51		64.7	137	8.93	1.38	12.8779	1.7774		0.7504
206	1	Halajun granite pluton-II	278	(Zhang et al., 2010a)	77.13	40.27	136	08KT03-3	K-feldspar granite	(Zhang et al., 2010a)	77.81	0.05	12.04	0.4	0.01	0.08	0.52	3.6	4.88		0.43	412	7.31	40.1	7.32	97.5	7.81	176	9		61.7	130	7.78	1.19	12.5321	1.5802		0.6643
207	1	Halajun granite pluton-II	278	(Zhang et al., 2010a)	77.13	40.27	136	08KT03-4	K-feldspar granite	(Zhang et al., 2010a)	76.76	0.06	12.17	1.15	0.01	0.07	0.57	3.76	4.83		0.43	456	7.34	53.9	7.62	143	8.34	202	11.1		65.5	141	11.9	1.83	12.0168	2.1832		0.8157
208	1	Halajun granite pluton-II	278	(Zhang et al., 2010a)	77.13	40.27	136	08KT03-5	K-feldspar granite	(Zhang et al., 2010a)	77.99	0.05	12.18	0.49	0.01	0.08	0.47	3.5	4.59		0.46	416	7.49	41.8	9.94	116	9.74	206	11.3		53.1	113	8.04	1.28	14.4279	2.1846		0.8345
209	1	Halajun granite pluton-II	278	(Zhang et al., 2010a)	77.13	40.27	136	08KT03-6	K-feldspar granite	(Zhang et al., 2010a)	77.24	0.05	12.01	0.77	0.02	0.05	0.52	3.7	4.86		0.58	456	5.15	44	7.79	105	8.76	210	12		64.9	140	9.88	1.5	10.6275	1.6179		0.6659
210	1	Halajun granite pluton-II	278	(Zhang et al., 2010a)	77.13	40.27	136	08KT03-7	K-feldspar granite	(Zhang et al., 2010a)	78.22	0.03	12	0.21	0.01	0.07	0.49	3.61	4.7	0.01	0.48	443	7.84	45	9.34	108	8.85	178	10.3		49.6	104	7.94	1.26	13.6020	2.1774		0.7748
211	1	Halajun granite pluton-II	278	(Zhang et al., 2010a)	77.13	40.27	136	08KT03-8	K-feldspar granite	(Zhang et al., 2010a)	77.02	0.04	12.42	0.7	0.01	0.07	0.53	3.58	5		0.45	470	6.29	42.9	5.97	92.1	7.67	172	9.16		59	127	8.85	1.38	10.4068	1.5610		0.6204
212	1	Halajun granite pluton-II	278	(Zhang et al., 2010a)	77.12	40.26	136	HLJ2-1A	Granite	(Cao et al., 2013)	77.15	0.05	12.12	0.74	0.01	0.03	0.59	3.72	4.61		0.42	338	2.78	23.5	6.57	37.7	3.46	156	9.77		29.2	59.9	6.89	0.96	5.4717	1.2911		0.4878
213	1	Halajun granite pluton-II	278	(Zhang et al., 2010a)	77.12	40.26	136	HLJ2-2A	Granite	(Cao et al., 2013)	76.29	0.08	12.31	1.12	0.01	0.03	0.69	3.95	4.5	0.01	0.47	358	4.61	66.8	7.96	118	8.65	202	12.9		85.7	174	11.4	1.64	10.3509	1.3769		0.5286
214	1	Halajun granite pluton-II	278	(Zhang et al., 2010a)	77.12	40.26	136	HLJ2-1B	Granite	(Cao et al., 2013)	76.23	0.05	12.03	1.41	0.01	0.04	0.59	3.72	4.58		0.78	415	8.57	44.1	9.1	113	7.65	181	9.8		42.9	96.4	9.75	1.39	11.5897	2.6340		0.8805
215	1	Halajun granite pluton-II	278	(Zhang et al., 2010a)	77.12	40.26	136	HLJ2-2B	Granite	(Cao et al., 2013)	76.29	0.08	12.37	0.99	0.01	0.04	0.68	3.97	4.55	0.01	0.42	345	4.65	69.8	8	106	7.87	210	13.2		86.3	170	11.4	1.62	9.2982	1.2283		0.4629
216	1	Halajun granite pluton-II	268	(Su et al., 2019)	77.15	40.27	134	HL-1	Granite	(Su et al., 2019)	73	0.27	13.49	2.83	0.05	0.16	1.06	3.78	5.36	0.03	0.21	192	88	16.8	2.95	72.4	4.12	330	9.65	18.2	63.5	129	6.06	0.87	11.9472	1.1402	7.0879	0.7513
217	1	Halajun granite pluton-II	268	(Su et al., 2019)	77.15	40.27	134	HL-3	Granite	(Su et al., 2019)	72.34	0.18	14.01	1.93	0.03	0.12	0.91	3.85	5.88	0.03	0.26	185	94.8	16	2.98	44.4	3.07	247	7.23	18.2	66.7	125	4.4	0.59	10.0909	0.6657	6.8681	0.4606
218	1	Halajun granite pluton-II	268	(Su et al., 2019)	77.15	40.27	134	HL-5	Granite	(Su et al., 2019)	70.95	0.47	12.84	3.81	0.07	0.57	1.69	3.31	4.82	0.1	1.57	203	93.6	34.2	2.97	40.6	3.38	327	9.37	28.1	64.4	115	4.36	0.62	9.3119	0.6304	4.0925	0.2932
219	1	Halajun granite pluton-II	268	(Su et al., 2019)	77.15	40.27	134	HL-6	Granite	(Su et al., 2019)	75.26	0.15	12.29	1.84	0.03	0.08	0.65	3.28	5.58	0.02	0.43	257	47.2	16.6	4.11	52.7	3.64	246	8.51	21.2	62	129	6.07	0.84	8.6820	0.8500	6.0849	0.5567
220	1	Halajun granite pluton-II	268	(Su et al., 2019)	77.15	40.27	134	HL-7	Granite	(Su et al., 2019)	73.35	0.24	13.51	1.88	0.03	0.26	0.98	3.71	5.34	0.04	0.67	238	80.3	31.3	4.25	29.8	3.59	195	6.07	26.7	42	73.8	3.26	0.42	9.1411	0.7095	2.7640	0.2786
221	1	Halajun granite pluton-II	268	(Su et al., 2019)	77.15	40.27	134	HL-8	Granite	(Su et al., 2019)	71.91	0.36	13.34	3.06	0.07	0.43	1.45	3.52	4.99	0.08	0.69	246	103	28.2	4.7	32.6	3.18	275	8.3	45.8	57.1	103	3.76	0.53	8.6702	0.5709	2.2489	0.2753
222	1	Halajun granite pluton-II	268	(Su et al., 2019)	77.15	40.27	134	HL-21	Granite	(Su et al., 2019)	80.46	0.1	10.35	1.07	0.01	0.04	0.49	2.85	4.51	0.01	0.37	228	20.8	35.3	6.46	74.5	4.45	243	8.95	22.1	76.2	144	7.58	1.02	9.8285	0.9777	6.5158	0.4868
223	1	Halajun granite pluton-III	268.6	(Zhang & Zou, 2013)	77.18	40.35	136	2010HLJIII-1	Granite	(Zhang & Zou, 2013)	62.25	0.44	15.71	5.72	0.12	1.01	2.41	4.71	5.28	0.1	2.07	258	118	28.7	5.67	92.2	6.53	640	13.6	19.4	130	231	5.15	1.81	17.9029	0.7092	11.9072	0.5116
224	1	Halajun granite pluton-III	268.6	(Zhang & Zou, 2013)	77.18	40.35	136	2010HLJIII-2	Granite	(Zhang & Zou, 2013)	62.69	0.45	15.67	5.95	0.07	0.84	1.63	3.68	6.94	0.11	1.79	306	130	33.9		87.4	5.78	629	12.6	328	126	225	4.81	0.76	18.1705	0.6937	0.6860	0.4532
225	1	Halajun granite pluton-III	268.6	(Zhang & Zou, 2013)	77.18	40.35	136	2010HLJIII-3	Granite	(Zhang & Zou, 2013)	60.29	0.68	15.37	7.52	0.14	1.2	2.6	3.75	6.18	0.13	1.91	305	124	45.6		114	6.96	611	12.1	30	118	216	5.32	0.82	21.4286	0.9661	7.2000	0.5267
226	1	Halajun granite pluton-III	268.6	(Zhang & Zou, 2013)	77.18	40.35	136	2010HLJIII-4	Granite	(Zhang & Zou, 2013)	61.22	0.08	17.68	3.68	0.03	0.53	1.34	3.78	9.45	0.03	2	412	145	26.2		40.8	4.99	841	18.3	120	101	177	4.78	0.78	8.5356	0.4040	1.4750	0.2688
227	1	Halajun granite pluton-III	268.6	(Zhang & Zou, 2013)	77.18	40.35	136	2010HLJIII-5	Granite	(Zhang & Zou, 2013)	62.37	0.46	15.82	5.35	0.09	0.92	2.35	3.6	7.07	0.11	1.68	329	146	33.1		85	6.04	651	13.4	26.4	106	196	4.93	0.79	17.2414	0.8019	7.4242	0.4864
228	1	Halajun granite pluton-IV	268.8	(Zhang & Zou, 2013)	77.15	40.37	139	2010HLJIV-1	Granite	(Zhang & Zou, 2013)	73.8	0.19	12.7	1.85	0.09	0.24	0.87	3.29	5.41	0.03	1.4	385	62.7	49	4.84	42.9	5.59	241	7.5	13.1	21	39	5.28	0.83	8.1250	2.0429	2.9771	0.4533
229	1	Halajun granite pluton-IV	268.8	(Zhang & Zou, 2013)	77.15	40.37	139	2010HLJIV-2	Granite	(Zhang & Zou, 2013)	73.75	0.19	12.75	1.91	0.02	0.24	0.85	3.34	5.39	0.03	1.35	366	42.7	31.8	5.12	40	4.84	217	7.24	12.1	26.1	44.6	4.49	0.7	8.9087	1.5326	3.6860	0.4706
230	1	Halajun granite pluton-IV	268.8	(Zhang & Zou, 2013)	77.15	40.37	139	2010HLJIV-3	Granite	(Zhang & Zou, 2013)	73.76	0.2	12.77	1.59	0.01	0.28	0.94	3.15	5.33	0.03	1.72	370	44.8	47.2	4.76	51.6	7.46	257	8.75	11.6	34.3	62.7	5.95	0.92	8.6723	1.5044	5.4052	0.4346
231	1	Halajun granite pluton-IV	268.8	(Zhang & Zou, 2013)	77.15	40.37	139	2010HLJIV-4	Granite	(Zhang & Zou, 2013)	73.66	0.2	12.7	2.52	0.01	0.35	0.52	3.08	5.48	0.03	1.24	370	45.4	47.8	4.98	44.7	5.88	246	7.94	18.8	31.1	55.7	5.35	0.85	8.3551	1.4373	2.9628	0.3929
232	1	Halajun granite pluton-V	271	(Zhang & Zou, 2013)	77.21	40.36	134	09HLV-1	Granite	(Zhang & Zou, 2013)	76.38	0.08	12.35	0.63	0.01	0.1	0.76	3.05	5.17	0.02	0.87	444	15.6	47.1	15.9	148	10.8	234	11.5	14.7	97.6	186	13.7	1.98	10.8029	1.5164	12.6531	0.7398
233	1	Halajun granite pluton-V	271	(Zhang & Zou, 2013)	77.21	40.36	134	09HLV-2	Granite	(Zhang & Zou, 2013)	75.72	0.09	12.3	1.75	0.02	0.06	0.66	3.53	4.65	0.02	0.64	465	8.87	50.9	5.33	152	11.1	237	11.7	9.55	142	273	14.5	2.07	10.4828	1.0704	28.5864	0.6060
234	1	Halajun granite pluton-V	271	(Zhang & Zou, 2013)	77.21	40.36	134	09HLV-3	Granite	(Zhang & Zou, 2013)	76.56	0.07	12.1	1.27	0.02	0.05	0.6	3.5	4.5																			

NO.	Region	Geologic unit	Age/Ma	Ref. for ages	Long.	lati.	Distance/km	Sample name	Sample lithology	Ref. for elements	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃ ¹	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	LOI	Rb	Sr	Th	U	Nb	Ta	Zr	Hf	Pb	La	Ce	Yb	Lu	Nb/Yb	Nb/La	Ce/Pb	Nb*
267	1	Halajun granite pluton-I	273	(Su et al., 2019)	77.36	40.49	131	HL-16	Granite	(Su et al., 2019)	76.21	0.13	12.42	1.15	0.01	0.05	0.58	3.6	5.19	0.01	0.45	343	19.6	37.9	6.79	60.9	5.77	186	7.91	27	93.6	185	6.42	0.89	9.4860	0.6506	6.8519	0.3465
268	1	Halajun granite pluton-I	273	(Su et al., 2019)	77.36	40.49	131	HL-18	Granite	(Su et al., 2019)	76.17	0.07	12.05	1.29	0.02	0.03	0.62	3.64	5.02	0.01	0.66	330	8.81	32.7	7.95	73.3	5.95	125	6.81	12.2	47.8	96.5	8.59	1.17	8.5332	1.5335	7.9098	0.6284
269	1	Halajun granite pluton-I	273	(Su et al., 2019)	77.36	40.49	131	HL-19	Granite	(Su et al., 2019)	75.94	0.08	12.16	1.44	0.01	0.03	0.61	3.97	4.7	0.01	0.58	464	8.5	41.5	33.9	130	9.22	209	11.6	17.4	71.3	142	11.4	1.5	11.4035	1.8233	8.1609	0.8100
270	1	Halajun granite pluton-I	278	(Zhang et al., 2010a)	77.39	40.49	129	08KT02-1	K-feldspar granite	(Zhang et al., 2010a)	71.86	0.19	14.6	1.91	0.03	0.15	1.2	4.33	5.3	0.02	0.15	170	88.7	17.6	2.83	44.7	3.04	367	10.6		48.1	104	4.86	0.74	9.1975	0.9293		0.5207
271	1	Halajun granite pluton-I	278	(Zhang et al., 2010a)	77.39	40.49	129	08KT02-2	K-feldspar granite	(Zhang et al., 2010a)	71.7	0.17	14.7	1.74	0.03	0.14	1.14	4.15	5.72	0.02	0.21	190	97.8	20.6	2.35	44.2	3.17	183	5.61		86.2	176	4.59	0.71	9.6296	0.5128		0.3555
272	1	Halajun granite pluton-I	278	(Zhang et al., 2010a)	77.39	40.49	129	08KT02-3	K-feldspar granite	(Zhang et al., 2010a)	73.22	0.16	14.44	1.47	0.03	0.15	1	3.73	5.35	0.02	0.21	183	93.5	20.3	2.44	40.7	2.93	243	7.22		96.2	194	4.13	0.65	9.8547	0.4231		0.3121
273	1	Halajun granite pluton-I	278	(Zhang et al., 2010a)	77.39	40.49	129	08KT02-4	K-feldspar granite	(Zhang et al., 2010a)	74.24	0.19	13.36	1.76	0.03	0.15	0.96	3.64	5.19	0.03	0.24	177	87.6	26.6	3.98	52.6	4.07	314	9.81		108	211	5.54	0.87	9.4946	0.4870		0.3326
274	1	Halajun granite pluton-I	278	(Zhang et al., 2010a)	77.39	40.49	129	08KT02-5	K-feldspar granite	(Zhang et al., 2010a)	72.89	0.17	13.16	1.62	0.03	0.15	0.89	3.44	5.25	0.02	2.2	197	77.9	17.1	3.46	50.2	3.81	266	8.1		42.6	102	4.78	0.75	10.5021	1.1784		0.6304
275	1	Halajun granite pluton-I	278	(Zhang et al., 2010a)	77.39	40.49	129	08KT02-6	K-feldspar granite	(Zhang et al., 2010a)	72.7	0.17	13.94	1.75	0.03	0.15	1.01	3.86	5.83	0.02	0.29	207	80.4	12.8	5.64	59.1	4.51	172	5.5		52.4	108	5.81	0.99	10.1721	1.1279		0.7734
276	1	Halajun granite pluton-I	278	(Zhang et al., 2010a)	77.39	40.49	129	08KT02-7	K-feldspar granite	(Zhang et al., 2010a)	75.23	0.28	12.02	2.73	0.05	0.18	1.15	3.4	4.56	0.04	0.2	151	75.9	27.4	3.8	69.3	4.71	367	11.9		78.4	174	7.5	1.17	9.2400	0.8839		0.5068
277	1	Halajun granite pluton-I	278	(Zhang et al., 2010a)	77.36	40.48	130	HU11-1A	Granite	(Cao et al., 2013)	72.44	0.23	13.82	2.33	0.04	0.15	1.01	3.67	5.45	0.03	0.29	196	89	24.8	5.34	68.4	6.06	286	10.2		101	193	7.57	1.08	9.0357	0.6772		0.4632
278	1	Halajun granite pluton-I	278	(Zhang et al., 2010a)	77.36	40.48	130	HU11-2A	Granite	(Cao et al., 2013)	72.57	0.2	13.83	2.11	0.04	0.13	0.96	3.65	5.72	0.02	0.22	182	97.1	16.6	2.66	49	3.24	249	7.77		52.1	105	5.09	0.72	9.6267	0.9405		0.5647
279	1	Halajun granite pluton-I	278	(Zhang et al., 2010a)	77.36	40.48	130	HU11-1B	Granite	(Cao et al., 2013)	72.39	0.22	13.87	2.23	0.04	0.16	1.01	3.69	5.47	0.02	0.3	201	89.1	22.5	3.69	55.6	5.48	373	12.9		102	195	6.75	0.99	8.2370	0.5451		0.3934
280	1	Halajun granite pluton-I	278	(Zhang et al., 2010a)	77.36	40.48	130	HU11-2B	Granite	(Cao et al., 2013)	72.62	0.2	14	2.02	0.04	0.15	0.95	3.62	5.64	0.02	0.16	176	93.8	15.2	2.49	44.9	2.96	290	9.18		49.7	101	4.9	0.7	9.1633	0.9034		0.5537
281	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-1	Gabbro	(Zhang et al., 2010a)	43.63	2.22	17.38	15.39	0.12	6.28	11.65	2.23	0.26	0.02	0.33	2.79	491	0.26	0.06	2.7	0.21	22	0.76		2.62	6.08	0.41	0.07	6.5854	1.0305		1.1087
282	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-2	Gabbro	(Zhang et al., 2010a)	50.75	0.62	24.33	5.52	0.05	2.73	11.19	3.52	0.35	0.02	0.33	3.07	653	0.22	0.06	1.88	0.12	11.2	0.33		2.91	6.07	0.18	0.03	10.4444	0.6460		0.7963
283	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-3	Gabbro	(Zhang et al., 2010a)	47.72	2.65	15.91	14.89	0.17	4.9	10.02	2.91	0.42	0.31	0.31	5.62	527	0.75	0.33	24.8	1.52	56.3	1.57		16.5	4.0	1.81	0.29	13.7017	1.5030		2.3893
284	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-5	Gabbro	(Zhang et al., 2010a)	40.63	3.17	12.27	21.62	0.18	9.63	10.8	1.62	0.25	0.03	0.55	3.22	310	0.47	0.09	3.92	0.3	35.2	1.22		3.81	9.37	0.69	0.1	5.6812	1.0289		0.9928
285	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-6	Gabbro	(Zhang et al., 2010a)	51.89	2.33	14.06	14.06	0.16	4.13	7.21	3.01	1.83	0.25	0.71	44.6	369	5.47	1.12	24.5	1.75	215	5.7		26.5	57.8	2.32	0.37	10.5603	0.9245		0.6897
286	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-8	Olv.-bearing gabbro	(Zhang et al., 2010a)	39.08	2.77	7.77	25.04	0.24	14.02	10.41	1.01	0.11	0.01	0.73	1.43	235	0.13	0.07	1.45	0.13	18.5	0.69		1.65	4.55	0.6	0.1	2.4167	0.8788		1.0611
287	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-9	Gabbro	(Zhang et al., 2010a)	44.97	3.37	14.71	16.18	0.16	5.6	11.83	2.36	0.4	0.06	0.04	4.29	415	0.49	0.1	7.35	0.52	51.2	1.53		5.71	14	1.17	0.17	6.2821	1.2872		1.4893
288	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-10	Gabbro	(Zhang et al., 2010a)	48.43	2.53	16.23	14.1	0.16	4.71	9.75	2.9	0.61	0.28	0.1	12.1	502	1.5	0.33	21.9	1.48	57.9	1.64		15.5	36.5	1.78	0.27	12.3034	1.4129		1.5393
289	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-11	Gabbro	(Zhang et al., 2010a)	44.55	5.57	11.74	19.81	0.22	5.27	9.66	2.57	0.67	0.12	0.49	14.2	384	2.15	0.42	43.1	2.9	168	4.4		13.4	33.1	2.3	0.37	18.7391	3.2164		2.7215
290	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-12	Gabbro	(Zhang et al., 2010a)	44.58	3.82	16.1	16.28	0.14	4.23	10.74	2.94	0.57	0.1	0.08	7.59	491	0.86	0.19	9.71	0.62	62.4	1.96		7.67	18.3	1.12	0.18	8.6696	1.2660		1.2814
291	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-13	Gabbro	(Zhang et al., 2010a)	47.33	2.75	15.43	15.68	0.18	4.89	9.69	2.87	0.55	0.4	0.15	9.72	506	1.21	0.3	23.3	1.5	46.9	1.45		18.1	43.2	1.91	0.29	12.1990	1.2873		1.6874
292	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-14	Diabase/dolerite	(Zhang et al., 2010a)	51.56	2.28	14.13	13.87	0.14	4.24	7.06	3.4	1.6	0.28	1.09	42	322	5.51	1.17	26.5	1.87	221	5.74		27.1	60.8	2.39	0.37	11.0879	0.9779		0.7350
293	1	Piqiang plutonic complex	276	(Zhang et al., 2010a)	77.62	40.45	110	08KT01-15	Diabase/dolerite	(Zhang et al., 2010a)	52.18	2.85	13.91	14.29	0.19	3.5	6.91	3.17	1.91	0.37	0.39	50.6	391	6.45	1.49	32.8	2.37	259	6.58		32.4	72.4	2.87	0.45	11.4286	1.0123		0.7690
294	1	Piqiang plutonic complex	275	Estimated*	77.61	40.47	113	PQ1117	Dioritic dike	(Cao et al., 2013)	52.79	1.83	17.44	8.47	0.14	4.1	7.96	3.3	1.48	0.32	1.56	56.8	559	4.05	1.88	22.1	2.32	59.2	1.92		17.2	34.2	1.34	0.21	16.4925	1.2849		0.8974
295	1	Piqiang plutonic complex	275	Estimated*	77.61	40.47	113	PQ1212	Dioritic dike	(Cao et al., 2013)	53.5	2.5	14.02	13.7	0.18	2.94	6.41	3.02	2.19	0.52	0.44	67.2	366	7.52	1.57	36.5	2.62	323	8.46		42.2	88.9	3.37	0.5	10.8309	0.8649		0.6944
296	1	Piqiang plutonic complex	275	Estimated*	77.61	40.47	113	PQ1205	Dioritic dike	(Cao et al., 2013)	54.92	1.68	15.26	13.16	0.19	1.65	5.41	3.83	2.37	0.42	0.52	31.5	398	6.08	1.64	45.9	1.75	658	16.3		46.7	98	4	0.6	11.4750	0.9829		0.9232
297	1	Piqiang plutonic complex	275	Estimated*	77.61	40.47	113	PQ1114	Dioritic dike	(Cao et al., 2013)	56.19	1.99	19.26	5.69	0.09	2.12	6.86	4.27	1.46	0.32	1.12	41.7	662	4.17	2.05	24.2	2.85	97.3	2.94		16.1	34.8	1.62	0.24	14.9383	1.5031		1.0010
298	1	Piqiang plutonic complex	275	Estimated*	77.61	40.47	113	PQ1112	Dioritic dike	(Cao et al., 2013)	57.03	2.31	19.24	2.67	0.04	1.45	7.09	5.01	2.79	0.16	1.59	48.3	755	7.33	6.82	38.8	4.05	89.4	2.95		32.7	59.5	2.27	0.34	17.0925	1.1865		0.8494
299	1	Piqiang plutonic complex	275	Estimated*	77.61	40.47	113	PQ1113	Dioritic dike	(Cao et al., 2013)	59.42	1.3	19.04	2.26	0.03	1.56	6.45	5.13	2.59	0.17	1.42	61.6	940	7.56	6.05	31.9	3.31	85.8	2.92		32.7	63.1	2.93	0.42	10.8874	0.9755		0.6876
300	1	Piqiang plutonic complex	275	Estimated*	77.61																																	

NO.	Region	Geologic unit	Age/Ma	Ref. for ages	Long.	lati.	Distance/km	Sample name	Sample lithology	Ref. for elements	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃ ¹	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	LOI	Rb	Sr	Th	U	Nb	Ta	Zr	Hf	Pb	La	Ce	Yb	Lu	Nb/Yb	Nb/La	Ce/Pb	Nb*
332	2	Wajilitag intrusion	280	Estimated*	78.94	39.57	39	WJL050605-1	Syenite porphyry	(Zou et al., 2015)	55.39	0.75	19.73	4.75	0.26	0.61	1.92	5.95	5.73	0.19	4.45	83.3	1918	38.1	7.72	315	13	1533	28.4	127	135	253	4.64	0.67	67.8879	2.3333	1.9921	1.4886
333	2	Wajilitag intrusion	280	Estimated*	78.94	39.57	39	WJL050605-2	Syenite porphyry	(Zou et al., 2015)	54.61	0.74	19.36	5.04	0.25	0.6	2.44	6.74	4.74	0.18	5.09	66.7	1228	38.4	13.2	309	13.1	1591	28.7	175	148	261	3.92	0.57	78.8265	2.0878	1.4914	1.3892
334	2	Wajilitag intrusion	280	Estimated*	78.94	39.57	39	WJL050605-3	Syenite porphyry	(Zou et al., 2015)	55.05	0.77	19.54	4.32	0.2	0.65	2.08	7.17	4.38	0.19	5.51	55.5	906	43.9	4.33	377	13.7	1576	27.8	29.2	156	277	6.27	0.94	60.1276	2.4167	9.4863	1.5440
335	2	Wajilitag intrusion	280	Estimated*	78.94	39.57	39	WJL050605-4	Syenite porphyry	(Zou et al., 2015)	54.74	0.73	19.4	5.88	0.19	0.49	1.9	6.32	5.44	0.19	4.44	78.2	1167	45.5	8.71	307	12.6	1176	21.9	44.2	151	259	4.29	0.62	71.5618	2.0331	5.8597	1.2553
336	2	Wajilitag intrusion	281.4	(Zou et al., 2015)	78.94	39.54	41	WJL070603	Alkali mafic rock(syenite?)	(Zou et al., 2015)	56.71	0.41	20.48	3.22	0.19	0.34	1.65	10.5	3.83	0.05	2.15	106	1425	46.5	13.2	272	5.65	1431	21.5	36	183	278	3.85	0.59	70.6494	1.4863	7.7222	0.9993
337	2	Wajilitag intrusion	281.4	(Zou et al., 2015)	78.94	39.54	41	WJL081907	Alkali mafic rock(syenite?)	(Zou et al., 2015)	57.05	0.45	20.59	3.26	0.18	0.6	1.66	10.18	3.81	0.06	1.68	97.9	1922	47.8	10.4	280	6.29	1431	21.9	26	176	282	3.97	0.61	70.5290	1.5909	10.8462	1.0346
338	2	Mazha syenite intrusion	285.9	(Sun et al., 2008a)	78.85	39.79	21	04XJ-75	Syenite	(Sun et al., 2008a)	67.29	0.4	16.79	3.69	0.04	0.08	0.54	5.15	5.8	0.06	0.85	78.2	49	12.5	2.24	55.8	3.52	332	7.38	7.64	86.3	170	2.25	0.34	24.8000	0.6466	22.2513	0.5758
339	2	Syenite intrusion	277	(Yang et al., 2006)	78.80	39.77	18	Xhzn4-4	Quartz syenite porphyry	(Yang et al., 2006)	67.08	0.3	14.77	3.95	0.12	0.38	1.13	5.79	4.4	0.01	1.26	109	283	27.9		163	10.4	1007	24.8		147	298	5.9	0.8	27.6271	1.1088		0.8626
340	2	Syenite intrusion	277	(Yang et al., 2006)	78.80	39.77	18	Xhzn4-5	Quartz syenite porphyry	(Yang et al., 2006)	67.49	0.31	14.83	4.18	0.13	0.44	1.11	5.92	4.69	0.01	1.16	108	56.9	26.8		158	9.9	1001	24.1		144	300	5.8	0.8	27.2414	1.0972		0.8620
341	2	Syenite intrusion	277	(Yang et al., 2006)	78.80	39.77	18	Xhzn4-6	Quartz syenite porphyry	(Yang et al., 2006)	67.71	0.3	14.93	4.17	0.16	0.4	1.13	5.58	4.5		1.15	107	53.1	26.4		161	10.4	987	23.7		131	272	5.6	0.8	28.7500	1.2290		0.9279
342	2	Syenite intrusion	277	(Yang et al., 2006)	78.80	39.77	18	Xhzn4-7	Quartz syenite porphyry	(Yang et al., 2006)	66.52	0.3	14.92	5.17	0.14	0.32	0.72	5.63	4.79	0.01	0.85	108	40	24		155	8.9	1000	22.3		133	277	5.1	0.7	30.3922	1.1654		0.9298
343	2	Syenite intrusion	277	(Yang et al., 2006)	78.80	39.77	18	Xhzn4-8	Quartz syenite porphyry	(Yang et al., 2006)	67.54	0.3	15	4.26	0.15	0.46	0.56	5.77	4.63		1	94.9	38.6	24.5		148	8.8	920	21.3		124	260	5	0.7	29.6000	1.1935		0.9101
344	2	Syenite intrusion	273.7	(Zhang et al., 2008)	78.81	39.75	19	05BH-2	Quartz syenite	(Zhang et al., 2008)	68.7	0.08	17.1	2.05	0.01	0.01	0.28	6.08	5.71	0.01	0.39	92.9	16.8	10	1.94	55.9	3.57	340	8.26		43.1	85	2.14	0.31	26.1215	1.2970		0.9126
345	2	Syenite intrusion	273.7	(Zhang et al., 2008)	78.81	39.75	19	05BH-3	Quartz syenite	(Zhang et al., 2008)	68.48	0.11	17.11	2.05	0.1	0.01	0.08	6.3	5.66	0.02	0.33	94	24.6	15.9	3.97	84.6	5.24	564	14.9		71.6	139	3.01	0.41	28.1063	1.1816		0.8498
346	2	Syenite intrusion	273.7	(Zhang et al., 2008)	78.81	39.75	19	05BH-5	Quartz syenite	(Zhang et al., 2008)	67.87	0.34	14.49	5.13	0.17	0.16	0.77	5.41	4.79	0.03	0.46	144	78.8	31.2	12.4	210	15.3	1349	34.6		178	335	6.7	0.99	31.3433	1.1798		0.9551
347	2	Volcanic rocks	285	(Zhang et al., 2010b)	78.81	40.02	30	TWC07-1	Diabase	(Zhang et al., 2010b)	44.58	2.43	15.54	15.93	0.2	8.64	7.95	2.65	1.01	0.5	1.14	18.5	377	2.36	0.59	15.7	1.07	165	4.25	5.15	21.9	45.6	2.38	0.37	6.5966	0.7169	8.8544	0.7402
348	2	Volcanic rocks	285.4	(Zhang et al., 2010b)	78.63	39.66	15	XHZ07-5	Basaltic rock	(Zhang et al., 2010b)	46.29	3.25	12.62	14.88	0.15	6.01	7.59	3.93	2.93	0.78	1.84	95.2	981	21.2	4.9	88.5	6.34	608	14.6	9.63	76.5	164	2.01	0.27	44.0299	1.1569	17.0301	0.7448
349	2	Volcanic rocks	285.4	(Zhang et al., 2010b)	78.63	39.66	15	XHZ07-7	Basaltic rock	(Zhang et al., 2010b)	48.05	3.52	14.16	13.39	0.21	4.11	8.72	3.12	1.68	0.76	2.56	59	736	8.6	2.11	65.9	4.48	413	10.8	20.9	64	136	2.69	0.37	24.4981	1.0297	6.5072	0.9520
350	2	Volcanic rocks	287.3	(Wei et al., 2014)	79.70	39.71	95	Xhn12-6	Basalt	(Yu et al., 2017)	45	4.06	12.03	20.4	0.22	3.03	6.54	2.16	4.48	1.31	0.76	76.8	284	5.1	1	33.1	2	433	9.4		43.6	106	4.2	0.7	7.8810	0.7592		0.7523
351	2	Volcanic rocks	287.3	(Wei et al., 2014)	79.70	39.71	95	Xhn14-1	Basalt	(Yu et al., 2017)	41.29	5.11	16.81	19.48	0.47	4.71	4.63	3.01	0.52	1.97	2	4.5	369	5.1	1.5	37.5	2.1	443	9.6		54.3	123	4.5	0.7	8.3333	0.6906		0.7637
352	2	Volcanic rocks	287.3	(Wei et al., 2014)	79.70	39.71	95	Xhn14-3	Basalt	(Yu et al., 2017)	43.66	4.06	16.54	12.44	0.27	2.53	12.07	2.24	0.89	1.63	6.91	14.8	381	5.1	1.3	36.7	2.1	431	9.3		54.9	119	3.7	0.6	9.9189	0.6685		0.7433
353	2	Volcanic rocks	287.3	(Wei et al., 2014)	79.70	39.71	95	Xhn13-3	Basalt	(Yu et al., 2017)	49.96	3.99	12.86	11.94	0.33	1.96	8.98	2.53	1.32	1.58	4.53	25.5	334	5.1	1.4	36.4	2.1	436	9.5		53.1	118	4.2	0.7	8.6667	0.6855		0.7497
354	2	Volcanic rocks	287.3	(Wei et al., 2014)	79.70	39.71	95	XHN01	Basalt	(Yu et al., 2017)	46.6	4.22	13.41	12.75	0.21	3.3	8.54	2.48	0.96	1.62	5.77	16	437	5.1	1.6	37.8	1.8	493	9.5		55.2	123	4.1	0.6	9.2195	0.6848		0.7635
355	2	Volcanic rocks	287.3	(Wei et al., 2014)	79.70	39.71	95	XHN03	Basalt	(Yu et al., 2017)	46.67	4.16	12.64	17.58	0.24	4.55	7.47	2.77	1.75	1.34	0.36	24.4	341	4.9	1.1	33.5	1.8	404	8.2		46.8	105	4.1	0.6	8.1707	0.7158		0.7498
356	2	Volcanic rocks	287.3	(Wei et al., 2014)	79.70	39.71	95	Xhn15-1	Basalt	(Yu et al., 2017)	45.99	4.32	12.88	17.24	0.2	4.09	7.81	2.7	1.86	1.32	1.09	37.1	325	4.8	1.1	31.4	1.9	373	8		44.5	100	3.9	0.6	8.0513	0.7056		0.7282
357	2	Volcanic rocks	287.3	(Wei et al., 2014)	79.70	39.71	95	Xhn16-2	Basalt	(Yu et al., 2017)	45.18	4.08	13.72	16.78	0.22	4.88	8.81	2.57	1.12	1.26	1.41	20.3	506	4.3	1	30.3	1.9	348	7.6		42.8	97.9	4	0.6	7.5750	0.7079		0.7570
358	2	Volcanic rocks	287.3	(Wei et al., 2014)	79.70	39.71	95	XHN04	Basalt	(Yu et al., 2017)	45.16	3.92	14.08	16.83	0.21	5.47	8.32	2.78	1.35	0.91	0.5	24.1	354	3	0.8	28.7	1.6	292	6.2		32.2	71.9	3.3	0.5	8.6970	0.8913		0.9897
359	2	Volcanic rocks	287.3	(Wei et al., 2014)	79.70	39.71	95	XHN05	Basalt	(Yu et al., 2017)	44.49	4.09	14.24	15	0.25	4.9	8.94	2.72	1.46	1	2.56	26.4	361	3.7	0.8	28.6	1.6	303	6.5		39.8	84.2	3.6	0.6	7.9444	0.7186		0.7988
360	2	Volcanic rocks	287.3	(Wei et al., 2014)	79.70	39.71	95	XHN06	Basalt	(Yu et al., 2017)	46.16	3.72	13.71	15.71	0.2	5.91	8.38	2.72	1.45	0.73	0.84	27.8	498	3.3	0.8	25.5	1.5	270	6		29.6	66.2	3.3	0.5	7.7273	0.8615		0.8745
361	2	Hypabyssal rock	281.4	(Zou et al., 2015)	78.95	39.57	39	08KT13-1	Diabase/dolerite	(Zhang et al., 2010a)	44.6	4.05	14.04	17.21	0.2	5.74	8.06	2.88	1.61	0.97	0.15	34	388	3.15	0.72	25.8	1.66	281	6.53		33.5	76.8	3.32	0.54	7.7711	0.7701		0.8512
362	2	Hypabyssal rock	281.4	(Zou et al., 2015)	78.95	39.57	39	08KT16-1	Diabase/dolerite	(Zhang et al., 2010a)	47.2	3.59	14.95	13.9	0.18	4.92	7.68	3.52	2.01	0.71	0.82	36.9	700	6.97	1.72	57.1	2.47	366	8.32		54.8	117	1.94	0.29	29.4330	1.0420		0.9902
363	2	Hypabyssal rock	281.4	(Zou et al., 2015)	78.95	39.57	39	08KT16-2	Diabase/dolerite	(Zhang et al., 2010a)	43.79	3.87	13.65	15.7	0.19	4.64	9.11	2.51	1.42	0.45	4.31	33.1	593	4.12	1.03	47.3	3.06	264	6.37		36	81.4	2.11	0.31	22.4171	1.3139		1.3163
364	2	Hypabyssal rock	281.4	(Zou et al., 2015)	78.95	39.57	39	08KT16-3	Diabase/dolerite	(Zhang et al., 2010a)	47.68	3.41	14.26	13.9	0.17	4.15	8.06	3	1.91	0.48	2.56	37.3	646	4.94	1.09	40.2	2.63	274	6.65		39.1	86.7	2.25	0.35	17.8667	1.0281		0.9803
365	2	Hypabyssal rock	281.4	(Zou et al., 2015)	78.95	39.57	39	08KT17-1	Diabase/dolerite	(Zhang et al., 2010a)	44.79	4.02	13.21	16.7	0.17	5.54	9.22	2.																				

NO.	Region	Geologic unit	Age/Ma	Ref. for ages	Long.	lati.	Distance/km	Sample name	Sample lithology	Ref. for elements	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃ ¹	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	LOI	Rb	Sr	Th	U	Nb	Ta	Zr	Hf	Pb	La	Ce	Yb	Lu	Nb/Yb	Nb/La	Ce/Pb	Nb*
397	2	Mafic dike	281.4	(Zou et al., 2015)	78.79	39.82	16	BC-4	Mafic dike	(Wei et al., 2014)	44.09	3.94	13.23	16.62	0.16	5.18	9.6	2.29	0.95	0.38	3.12	18.1	494	3.18	0.88	37.3	2.25	218	5.35	3.81	28.2	62.2	1.84	0.25	20.2717	1.3227	16.3255	1.3350
398	2	Mafic dike	281.4	(Zou et al., 2015)	78.79	39.82	16	BC-5	Mafic dike	(Wei et al., 2014)	44.9	4.58	14.08	15.36	0.19	4.88	7.69	3.42	1.26	0.54	2.62	21.9	581	4.79	1.3	57.3	3.42	299	6.89	3.8	43.5	95.1	2.16	0.29	26.5278	1.3172	25.0263	1.3454
399	2	Mafic dike	281.4	(Zou et al., 2015)	78.79	39.82	16	BC-6	Mafic dike	(Wei et al., 2014)	45.74	3.96	3	15.99	0.17	5.14	9.46	1.91	0.99	0.41	2.84	21.6	504	3.54	0.94	36.9	2.22	233	5.68	3.55	30.5	67.5	2.05	0.28	18.0000	1.2098	19.0141	1.2036
400	2	Mafic dike	281.4	(Zou et al., 2015)	78.79	39.82	16	BC-9	Mafic dike	(Wei et al., 2014)	49.3	3.4	12.95	13.15	0.16	3.84	8.24	2.38	1.88	0.53	2.43	44.8	699	6.3	1.36	45.5	3.03	318	8.2	6.08	47.3	99.2	2.29	0.33	19.8690	0.9619	16.3158	0.8933
401	2	Mafic dike	281.4	(Zou et al., 2015)	78.79	39.82	16	BC-12	Mafic dike	(Wei et al., 2014)	49.48	3.15	14.28	11.68	0.15	3.54	7.25	3.71	2.37	0.55	1.78	50.1	760	4.57	1.2	46	2.72	298	7.03	4.23	44.4	96.5	2.61	0.37	17.6245	1.0360	22.8132	1.0945
407	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1101	Gabbro	(Cao et al., 2014)	46.04	4.15	15.1	12.41	0.16	5.63	10.12	3.18	1.58	0.89	0.27	34.6	1131	5.25	1.27	46.9	3.33	286	6.89		60.4	127	2	0.28	23.4500	0.7765		0.8926
408	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1102	Gabbro	(Cao et al., 2014)	44.37	4.94	12.49	16.32	0.19	6.03	10.69	2.46	1.32	0.76		32	874	5.17	1.29	54.7	3.71	258	6.69		46.3	99.2	2.16	0.31	25.3241	1.1814		1.1983
409	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1103	Gabbro	(Cao et al., 2014)	43.27	5.39	10.43	16.28	0.19	7.93	11.28	2.06	1.72	0.61	0.38	51.3	583	5.57	1.37	67.6	4.81	359	9.71		46.4	103	2.57	0.37	26.3035	1.4569		1.4251
410	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1104	Gabbro	(Cao et al., 2014)	43.87	4.65	11.69	16.11	0.2	7.16	11.18	2.35	1.38	0.62	0.32	33.9	744	4.32	1.25	44	2.99	267	7.2		39.3	87.5	1.95	0.27	22.5641	1.1196		1.1445
411	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1105	Gabbro	(Cao et al., 2014)	50.01	2.94	18.1	9.68	0.13	3.47	8.58	3.96	1.65	0.44	0.57	34.3	1276	6.19	1.51	50.6	3.25	331	8.07		53.5	107	1.82	0.27	27.8022	0.9458		0.9424
412	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1106	Gabbro	(Cao et al., 2014)	46.02	3.84	14.59	14.05	0.16	5.34	10.2	3	1.41	0.85	0.05	30.8	1101	4.54	1.13	49.9	3.35	262	6.7		69.5	140	2.35	0.33	21.2340	0.7180		0.9521
413	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1107	Gabbro	(Cao et al., 2014)	49.53	2.92	18.62	10.27	0.15	3.23	7.55	4.41	1.57	0.51	0.77	39.9	1226	5.9	1.44	49.7	3.35	262	6.51		53.6	106	1.55	0.23	32.0645	0.9272		0.9472
414	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1108	Gabbro	(Cao et al., 2014)	47.94	3.89	13.57	14.52	0.19	4.82	7.83	3.25	2.35	0.71	0.45	51.1	972	5.29	1.3	61.2	4.18	305	7.77		59.8	129	2.31	0.34	26.4935	1.0234		1.1662
415	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1109	Gabbro	(Cao et al., 2014)	45.87	4.15	12.91	15.81	0.19	5.15	9.24	2.76	2	0.82	0.64	48.1	875	7.71	1.68	57.5	3.99	321	8.69		66.8	143	2.57	0.37	22.3735	0.8608		0.8587
416	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1110	Gabbro	(Cao et al., 2014)	51.23	2.38	18.91	8.96	0.12	2.98	6.9	4.37	2.21	0.54	0.93	42.7	1124	8.05	1.76	45	3.05	300	7.71		52.1	106	1.82	0.26	24.7253	0.8637		0.7447
417	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1111	Gabbro	(Cao et al., 2014)	50.58	2.55	18.69	9.46	0.13	3.07	7.18	4.28	2.15	0.63	0.8	41.8	1161	5.94	1.38	46.2	2.97	318	7.86		53	105	1.8	0.26	25.6667	0.8717		0.8825
418	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1112	Gabbro	(Cao et al., 2014)	50.01	2.98	18.03	9.92	0.14	3.29	8.06	4.33	1.54	0.65	0.57	32	1350	5.65	1.34	47.5	3.13	257	6.18		48.6	99.2	1.66	0.24	28.6145	0.9774		0.9715
419	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1114A	Gabbro	(Cao et al., 2014)	50.55	2.38	19.04	8.96	0.12	2.94	7.34	4.29	2.16	0.54	1.22	44	1130	7.19	1.36	41.7	2.82	233	5.47		49.3	99	1.55	0.22	26.9032	0.8458		0.7507
420	2	Mafic intrusion	283	(Zhang et al., 2016)	78.94	39.54	41	BC1114B	Gabbro	(Cao et al., 2014)	45.76	4.25	12.72	16.17	0.21	5.24	8.56	2.8	2.01	0.91	0.9	48.5	868	5.77	1.27	57.2	3.71	298	7.67		70.7	150	2.71	0.38	21.1070	0.8091		0.9598
421	2	Mafic dike	281	(Zou et al., 2015)	78.80	39.77	18	XHZ-8	Diabase	(Wei & Xu, 2013)	46.55	3.56	14.47	14.17	0.24	4.42	6.64	3.5	3.33	1.02	1.61	12.2	840	8.44	2.2	66	3.87	396	9.9		114	220	2.09	0.27	31.5789	0.5789		0.7211
422	2	Mafic dike	281	(Zou et al., 2015)	78.80	39.77	18	XHZ-10	Diabase	(Wei & Xu, 2013)	60.35	1.45	15.27	7.68	0.15	3.4	2.09	2.54	3.56	0.21	3.02	74.6	366	9.85	1.73	18.4	1.31	232	6.26		43.4	88.9	2.38	0.36	7.7311	0.4240		0.3016
423	2	Mafic dike	281	(Zou et al., 2015)	78.80	39.77	18	XHZ-13	Diabase	(Wei & Xu, 2013)	45.68	3.8	13.45	14.74	0.16	4.76	8.67	2.18	1.41	0.52	4.2	22.9	615	4.69	1.13	44.1	3.01	270	7.27		39.2	84.7	2.2	0.31	20.0455	1.1250		1.1023
424	2	Mafic dike	281	(Zou et al., 2015)	78.80	39.77	18	XHZ-14	Diabase	(Wei & Xu, 2013)	50.3	3.13	16.08	12.08	0.16	3.5	8.97	3.34	1.4	0.46	0.19	34.8	673	4.67	1.14	42.9	2.81	279	7.13		40.5	88.1	2.28	0.33	18.8158	1.0593		1.0572
425	2	Ultramafic dike	283	Estimated*	78.93	39.72	30	XHZ62	Ultramafic dike	(Zhou et al., 2009)	42.99	1.59	6.63	14.57	0.16	18.73	9.93	0.82	0.17	0.16	4.13	8.5	180	1.3	0.34	14.6	0.94	110	2.77	1.29	12.2	29	0.99	0.13	14.7475	1.1967	22.4806	1.2425
426	2	Ultramafic dike	283	Estimated*	78.93	39.72	30	XHZ63	Ultramafic dike	(Zhou et al., 2009)	42.89	1.63	6.56	14.67	0.15	18.77	10.04	0.74	0.16	0.16	4.07	9.4	208	1.34	0.34	14.2	0.89	107	2.59	1.22	12.7	29	1.05	0.13	13.5238	1.1181	23.7705	1.1666
427	2	Ultramafic dike	283	Estimated*	78.93	39.72	30	XHZ64	Ultramafic dike	(Zhou et al., 2009)	43.02	1.57	6.3	14.97	0.15	19.55	9.92	0.71	0.17	0.15	3.44	9.7	180	1.24	0.31	13.1	0.84	96	2.52	1.22	11.7	27	0.95	0.13	13.7895	1.1197	22.1311	1.1656
428	2	Ultramafic dike	283	Estimated*	78.93	39.72	30	XHZ65	Ultramafic dike	(Zhou et al., 2009)	43.21	1.6	6.64	14.32	0.16	18.17	10.32	0.71	0.16	0.16	4.17	8	182	1.4	0.38	14.9	0.95	111	2.81	1.24	12.5	29	1.01	0.14	14.7525	1.1920	23.3871	1.2072
429	2	Intrusive Complex	273.7	(Zhang et al., 2008)	78.81	39.75	19	05BH-12	Gabbro	(Zhang et al., 2008)	51.27	2.37	13.98	15.48	0.4	2.68	6.26	4.54	1.89	1.01	0.3	24.2	811	4.29	1.01	68.1	4.21	205	5.64		96	225	3.92	0.57	17.3724	0.7094		1.1373
430	2	Intrusive Complex	273.7	(Zhang et al., 2008)	78.81	39.75	19	Wp-59	Olivine pyroxenite	(Zhang et al., 2008)	42.72	3.99	4.85	17.09	0.19	13.61	15.66	0.71	0.81	0.13	1.29	7.8	265	11.3	1.1	37.5	2.5	211	6		17.2	45.5	1.02	0.15	36.7647	2.1802		0.9116
431	2	Intrusive Complex	273.7	(Zhang et al., 2008)	78.81	39.75	19	Wp-60	Pyroxenite	(Zhang et al., 2008)	38.56	5.43	6.08	22.69	0.22	10.53	13.95	1.08	0.48	0.31	1.14	9.6	334	15.3	2	58.1	3.8	268	8.6		27.7	69.7	1.3	0.19	44.6923	2.0975		0.9565
432	2	Intrusive Complex	273.7	(Zhang et al., 2008)	78.81	39.75	19	Wp-63	Nepheline aeg. syenite	(Zhang et al., 2008)	58.3	1.19	16.68	6.11	0.15	1.78	3.48	6.53	4.07	0.26	0.85	168	1464	19.8	1.8	57.7	3.7	479	11.2		92.3	159	2.07	0.32	27.8744	0.6251		0.4574
433	2	Intrusive Complex	273.7	(Zhang et al., 2008)	78.81	39.75	19	Wp-73	Olivine-bearing gabbro	(Zhang et al., 2008)	43.75	4.08	10.62	15.5	0.19	9.92	10.31	2.98	1.58	0.77	1.01	38.3	814	16.4	1.5	58.6	3.7	369	9.2		56.3	133	1.77	0.26	33.1073	1.0409		0.6536
434	2	Intrusive Complex	273.7	(Zhang et al., 2008)	78.81	39.75	19	Wp-75	Olivine-bearing gabbro	(Zhang et al., 2008)	45.52	3.35	14.28	12.75	0.21	5.54	7.4	5.41	1.2	0.79	1.85	20.5	1134	11.7	1.1	59.5	3.9	420	10.1		57.2	138	2.28	0.35	26.0965	1.0402		0.7795
435	2	Intrusive Complex	273.7	(Zhang et al., 2008)	78.81	39.75	19	W13	Diabase	(Zhang et al., 2008)	46.74	2.91	10.11																									

NO.	Region	Geologic unit	Age/Ma	Ref. for ages	Long.	lati.	Distance/km	Sample name	Sample lithology	Ref. for elements	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃ ¹	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	LOI	Rb	Sr	Th	U	Nb	Ta	Zr	Hf	Pb	La	Ce	Yb	Lu	Nb/Yb	Nb/La	Ce/Pb	Nb*
467	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1129	Oxide clinopyroxenite	(Cao et al., 2014)	33.61	8.33	3.99	27.67	0.2	11.09	15.25	0.27	0.02	0.01		0.28	76.8	0.08	0.02	11.5	1.1	90.9	3.35		3.98	14.7	0.97	0.14	11.8557	2.8894		6.9073
468	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1130	Oxide clinopyroxenite	(Cao et al., 2014)	33.96	8.15	3.92	27.17	0.2	11.03	15.31	0.29	0.02	0.01		0.39	85.9	0.09	0.02	11.8	1.12	90.8	3.32		3.97	14.1	0.95	0.14	12.4211	2.9723		6.6906
469	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1131	Oxide clinopyroxenite	(Cao et al., 2014)	34.68	7.59	4.09	25.78	0.2	11.49	15.7	0.36	0.06	0.02		0.82	87.6	0.27	0.05	10.2	0.95	94.5	3.23		4.24	15.3	0.97	0.14	10.5155	2.4057		3.2310
470	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1138	Oxide clinopyroxenite	(Cao et al., 2014)	34.72	7.81	3.92	25.85	0.2	11.71	15.61	0.27	0.02	0.01		0.45	86.3	0.11	0.02	10.6	0.92	91.3	3.37		4.08	14.5	1	0.14	10.6000	2.5980		5.3626
471	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1139	Oxide clinopyroxenite	(Cao et al., 2014)	33.85	7.25	3.92	25.78	0.2	11.4	16.08	0.3	0.03	0.01	0.72	0.57	117	0.27	0.02	9.6	0.85	86.8	3.11		4.02	14.4	1.02	0.14	9.4118	2.3881		3.1230
472	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1140	Oxide clinopyroxenite	(Cao et al., 2014)	34.89	7.75	3.93	25.86	0.2	11.59	15.68	0.27	0.01	0.01		0.24	86.7	0.07	0.02	10.9	1.03	92.8	3.32		3.94	14.8	1.02	0.14	10.6863	2.7665		7.0344
473	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1142	Oxide clinopyroxenite	(Cao et al., 2014)	32.68	9.7	3.51	28.25	0.17	10.71	14.81	0.27	0.03	0.01		1.27	72.4	0.08	0.07	4.07	0.23	82.2	2.87		3.03	10.8	0.72	0.1	5.6528	1.3432		2.8017
474	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1146	Oxide clinopyroxenite	(Cao et al., 2014)	33.3	8.65	4.04	26.8	0.18	10.97	15.23	0.31	0.07	0.01		4.72	75.2	0.36	1.31	9.51	0.79	93.9	3.54		3.94	13.3	0.88	0.12	10.8068	2.4137		2.7063
475	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1149	Oxide clinopyroxenite	(Cao et al., 2014)	35.5	7.64	4.07	25.25	0.2	10.94	15.57	0.3	0.02	0.01	0.01	0.43	90.6	0.07	0.02	11.5	1.08	102	3.62		4.71	17.6	1.15	0.16	10.0000	2.4416		6.7879
476	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1137A	Clinopyroxenite,fine-grained	(Cao et al., 2014)	36.11	7.6	3.78	24.51	0.21	11.1	15.75	0.28	0.01	0.01	0.08	0.52	99.1	0.1	0.02	10.7	1.01	89.4	3.28		4.03	15	0.95	0.14	11.2632	2.6551		5.7125
477	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1137B	Clinopyroxenite,fine-grained	(Cao et al., 2014)	35.89	7.35	3.92	24.49	0.2	11.49	15.9	0.3	0.03	0.01		0.55	119	0.19	0.02	13.3	0.99	91.8	3.23		3.95	14	0.99	0.14	13.4343	3.3671		5.2032
478	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1141	Clinopyroxenite,fine-grained	(Cao et al., 2014)	36.36	7.25	4.44	24.29	0.22	10.92	15.39	0.48	0.12	0.04		2.18	164	0.3	0.07	38	1.2	108	3.63		8.51	33.1	1.18	0.17	32.2034	4.4653		8.0604
479	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1147	Clinopyroxenite,fine-grained	(Cao et al., 2014)	36.5	7.79	3.9	23.63	0.19	10.99	15.91	0.3	0.03	0.01	0.26	0.44	89.4	0.1	0.05	10.3	0.81	110	3.88		4.96	18.2	1.2	0.17	8.5833	2.0766		4.9567
480	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1148	Clinopyroxenite,fine-grained	(Cao et al., 2014)	36.67	7.21	3.93	24.38	0.18	11.07	15.71	0.32	0.04	0.01		7.13	581	0.4	0.37	24.6	1.81	163	4.79		19.2	45.4	1.26	0.18	19.5238	1.2813		3.0085
481	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1171	Olivine clinopyroxenite	(Cao et al., 2014)	42.67	3.68	7.08	17.12	0.2	14.1	12.84	1.24	0.5	0.48		12.3	696	2.19	0.57	25.5	1.8	193	5.12		34.8	78.4	1.47	0.21	17.3469	0.7328		0.9900
482	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1172	Olivine clinopyroxenite	(Cao et al., 2014)	44.82	4.04	12.41	15.16	0.19	7.44	10.59	2.76	1.28	0.84	0.01	29.4	1181	4.37	1.15	56.8	4.18	279	7.32		59.4	127	2.2	0.31	25.8182	0.9562		1.1948
483	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1173	Olivine clinopyroxenite	(Cao et al., 2014)	41.76	4.98	8.16	17.61	0.17	11.08	14.02	1.29	0.34	0.2		7.69	614	1.51	0.39	25.4	1.84	169	4.69		20.1	46.4	1.29	0.17	19.6899	1.2637		1.5626
484	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1174	Olivine clinopyroxenite	(Cao et al., 2014)	42.51	3.72	6.88	17.28	0.2	14.42	12.85	1.23	0.4	0.45		9.27	669	1.89	0.51	24.9	1.79	181	4.98		31.8	69.2	1.36	0.19	18.3088	0.7830		1.0886
485	2	Wajilitag intrusive comple	283	(Shangguan et al., 2016)	78.94	39.54	41	BC1175	Olivine clinopyroxenite	(Cao et al., 2014)	41.46	5.16	7.31	18.3	0.17	11.2	14.53	1.09	0.35	0.15		8.67	546	1.52	0.4	25.6	1.88	169	4.94		18.2	43.8	1.24	0.18	20.6452	1.4066		1.6496
486	2	Mazha intrusion	280	Estimated*	78.80	39.80	17	ZK4602-1	Olivine clinopyroxenite	(Cao et al., 2017)	39.4	2.8	6.2	21.7	0.23	17.9	9.94	0.67	0.13	0.04	0.53	2.18	217	0.27	0.95	4.47	0.36	39.5	1.37	1.27	3.62	9.35	0.57	0.08	7.8421	1.2348	7.3622	1.5324
487	2	Mazha intrusion	280	Estimated*	78.80	39.80	17	ZK4602-2	Olivine clinopyroxenite	(Cao et al., 2017)	39.3	2.17	6.46	20.5	0.23	19.8	9.03	0.57	0.09	0.05	1.38	1.48	225	0.2	0.85	2.79	0.24	30.8	1.14	2.22	3.18	8.49	0.51	0.07	5.4706	0.8774	3.8243	1.1857
488	2	Mazha intrusion	280	Estimated*	78.80	39.80	17	ZK4602-3	Olivine clinopyroxenite	(Cao et al., 2017)	38.7	2.39	6.08	21.1	0.24	19.8	8.98	0.53	0.12	0.05	1.63	6.07	200	0.22	4.32	3.61	0.29	33.5	1.19	1.08	4.71	11	0.52	0.08	6.9423	0.7665	10.1852	1.2019
489	2	Mazha intrusion	280	Estimated*	78.80	39.80	17	ZK4602-4	Olivine clinopyroxenite	(Cao et al., 2017)	42.2	1.96	7.39	17.9	0.21	18	10.6	1.01	0.19	0.14		4	303	0.76	3.94	5.67	0.42	60.7	1.88	1.34	10.1	23.4	0.84	0.12	6.7500	0.5614	17.4627	0.6936
490	2	Mazha intrusion	280	Estimated*	78.80	39.80	17	ZK4602-5	Olivine clinopyroxenite	(Cao et al., 2017)	39.3	1.99	5.56	21.3	0.24	22	8.33	0.52	0.14	0.03	0.19	3.51	202	0.25	0.03	3.47	0.26	32.8	1.18	1.72	3.48	8.81	0.49	0.07	7.0816	0.9971	5.1221	1.2609
491	2	Mazha intrusion	280	Estimated*	78.80	39.80	17	ZK4602-6	Olivine clinopyroxenite	(Cao et al., 2017)	39.7	2.4	7.73	20.4	0.21	18.2	9.99	0.72	0.1	0.04	0.01	1.74	296	0.17	0.51	3.13	0.24	33.1	1.19	1.22	3.97	9.95	0.53	0.08	5.9057	0.7884	8.1557	1.2913
492	2	Mazha intrusion	280	Estimated*	78.80	39.80	17	ZK4602-7	Olivine clinopyroxenite	(Cao et al., 2017)	39.6	2.49	6.29	21.2	0.22	19.4	9.97	0.63	0.1	0.03		1.82	217	0.17	0.523	4.07	0.32	37.9	1.29	0.95	4.17	10.5	0.57	0.08	7.1404	0.9760	11.0526	1.6383
493	2	Mazha intrusion	280	Estimated*	78.80	39.80	17	ZK4602-8	Olivine clinopyroxenite	(Cao et al., 2017)	39.5	2.84	6.99	21.5	0.21	17.6	10.4	0.7	0.13	0.02		3.04	248	0.47	3.09	3.74	0.31	39.4	1.44	0.73	4.07	10.2	0.61	0.09	6.1311	0.9189	13.9726	0.9165
494	2	Mazha intrusion	280	Estimated*	78.80	39.80	17	ZK4602-9	Olivine clinopyroxenite	(Cao et al., 2017)	38.2	3.12	7.12	23.1	0.21	17.1	10.4	0.59	0.06	0.02		0.93	257	0.08	0.94	2.29	0.19	31	1.17	0.97	2.4	6.77	0.51	0.07	4.4902	0.9542	6.9794	1.7713
495	2	Mazha intrusion	280	Estimated*	78.80	39.80	17	ZK4602-10	Olivine clinopyroxenite	(Cao et al., 2017)	35	2.56	6.15	28.3	0.22	17.4	8.52	0.43	0.3	0.02	0.66	13	197	0.18	0.85	2.82	0.24	36	1.24	1.93	2.89	7.49	0.43	0.06	6.5581	0.9758	3.8808	1.3251
496	2	Bachu Kimberlite	300	(Zhang et al., 2013)	78.93	39.57	38	W10-51	Kimberlitic rock	(Jiang et al., 2004)	39.84	1.48	3.18	10.8	0.14	15.63	19.51	1.47	0.42	0.97	6.68	8.92	1191	16.9	3.55	102	3.88	544	7.68		130	257	4.09	0.46	24.9389	0.7846		0.7375
497	2	Bachu Kimberlite	300	(Zhang et al., 2013)	78.93	39.57	38	W10-11	Kimberlitic rock	(Jiang et al., 2004)	35.19	2.15	4.48	14.85	0.19	16.52	13.13	1.09	0.69	2.09	8.82	14.2	1134	50.9	9.32	149	5.52	438	7.99		306	602	5.34	0.58	27.9026	0.4869		0.4046
498	2	Bachu Kimberlite	300	(Zhang et al., 2013)	78.93	39.57	38	W10-12	Kimberlitic rock	(Jiang et al., 2004)	34.66	2.37	4.29	15.82	0.2	18.78	11.09	1.01	0.73	1.98	8.24	44.7	1413	55.2	8.76	179	6.17	500	9		329	668	4.49	0.59	39.8664	0.5441		0.4502
499	2	Bachu Kimberlite	300	(Zhang et al., 2013)	78.93	39.57	38	W10-22	Kimberlitic rock	(Jiang et al., 2004)	31.82	1.75	3.41	15.72	0.21	21.52	14.35	0.1	1.09	1.95	7.18	26.2	1143	33.8	6.47	143	4.32	401	6.04		204	441	3.56	0.39	40.1685	0.7010		0.5837
500	2	Bachu Kimberlite	300	(Zhang et al., 2013)	78.93																																	

NO.	Region	Geologic unit	Age/Ma	Ref. for ages	Long.	lati.	Distance/km	Sample name	Sample lithology	Ref. for elements	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃ ¹	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	LOI	Rb	Sr	Th	U	Nb	Ta	Zr	Hf	Pb	La	Ce	Yb	Lu	Nb/Yb	Nb/La	Ce/Pb	Nb*
539	4	Gudongshan Section	298.3	(Shao et al., 2015)	76.70	37.52	303	Y8-7	Basalt	(Shao et al., 2015)	45.2	4.07	13.8	16.77	0.2	5.22	7.76	2.95	1.29	1.27	0.85	16.4	381	4.1	N	30.1	1.67	327	7.9	N	41.7	92.8	3.99	0.58	7.5439	0.7218		0.7802

Notes:		
Ref.	—	Reference;
Estimated*	—	Age of magmatic rocks estimated by Han et al. (2019) .
Distance / km	—	The distance from the sample points to plume head (294.447 km, 4410.079 km). The projected coordinate system is UTM Zone 81° N (WGS 84).
region	—	1, Tarim Basin (Bachu); 2, Tarim Basin (North); 3, Tarim Basin (Southwest); 4, Tarim Basin (Central-West).
Nb*	—	Nb anomaly, (Nb/0.713)/ [√] [(Th/0.085)×(La/0.687)], normalized by the Primitive Mantle (Sun and McDonough, 1989).

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