Yun-Chuan Zeng, Ji-Feng Xu, Feng Huang, Ming-Jian Li, and Qin Chen, 2019, Generation of the 105–100 Ma Dagze volcanic rocks in the north Lhasa Terrane by lower crustal melting at different temperature and depth: Implications for tectonic transition: GSA Bulletin, https://doi.org/10.1130/B35306.1.

Data Repository

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APPENDIX DR1. ANALYTICAL METHODS

In-situ zircon U-Pb and Lu-Hf isotope analysis

Zircon grains were separated by standard density and magnetic separation techniques, and individually selected by hand-picking under a binocular microscope. Cathodoluminescence images are used to select the appropriate zircon grains for analysis. Zircon U–Pb isotope analysis was performed by laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) at China University of Geoscience (Wuhan). Laser sampling was performed using a GeoLas 2005. An Agilent 7500a ICP-MS instrument was used to acquire ion-signal intensities. The ellipsoidal spot was approximately 30×30 μm in size. Temora ($^{206}Pb/^{238}U$ age = 417 Ma) and NIST 610 were used as isotope and trace elements external standards, respectively. Analytical procedures and data processing are the same as those described by Liu et al. (2008).

Zircon Lu-Hf isotopes are performed by using a Neptune Plus MC–ICP-MS equipped with a laser ablation system, at Guangzhou Institute of Geochemistry, Chinese Academy of Sciences (GIGCAS). The Lu–Hf isotopic measurements were made on the spots which were previously analyzed for U–Pb ages as much as possible. The $^{176}Hf/^{177}Hf$ was normalized to $^{179}Hf/^{177}Hf$ = 0.7325 using an exponential law for mass bias correction. Correction for isobaric interference of ^{176}Lu on ^{176}Hf and ^{176}Yb on ^{176}Hf was performed using the recommended $^{176}Lu/^{175}Lu$ ratio of 0.02655 and $^{176}Yb/^{171}Yb$ ratio of 0.90184. Two Penglai zircon grains are analyzed after every five specimens and the $^{176}Hf/^{177}Hf$ value for Penglai zircon grains are from 0.282870 ± 14 to 0.282913 ± 14 with an average of 0.282897 ± 15 (n = 10).

Whole-rock major and trace elements analysis

Major element analyses were performed at GIGCAS (samples collected in 2015) and Institute of Geology and Geophysics, Chinese Academy of Sciences (IGGCAS) (samples collected in 2017). The analytical methods are similar in general. Firstly, fresh sample were crushed into small grains (~0.5 cm), and soaked in water with <3% HNO_3 until no bubbles were observed. Then, these small grains were further crushed into 200 meshes in an agate mortar. About 1.2 g rock powder were baked in the muffle furnace for more than 3 hours at 915 °C to determine the loss-on-ignition (LOI) value. Then about 0.5 g baked samples were fluxed with $Li_2B_4O_7$ (1:8) at ~1200°C to make homogeneous glass disks for major elements determination with a Rigaku ZSX100e X-ray fluorescence spectrometer (XRF). During analysis, USGS rock reference materials (GSR-1, GSR-2 and GSR-3) were used to monitor the data quality. The analytical uncertainties are estimated at 1-5%.

Major element analyses were performed at GIGCAS. For trace elements analysis, 35–45 mg sample powders were dissolved in Teflon bakers using a hybrid acid for 2–3 days (HF, HNO_3 and $HClO_4$ proportions are 2:2:1) at 120 °C. Then the solutions were dried and the residues were dissolved using the same hybrid acid again and moved in the high-pressure bombs at 190 °C for 48 hours. After that, the sample solutions were dried again and dissolved with 50% HNO_3 in the bombs at 170 °C for 4 hours. Subsequently, the sample solutions were diluted by 3% HNO_3 to 2000 times. Then, about 2.5g diluted solution was mixed with the internal standard solution (pure single element Rh solution) at 1:1 ratio. Finally, the hybrid solutions were used to trace-element data measures by inductively coupled plasma-mass spectrometry (ICP-MS). During the procedure, USGS international materials (BHVO-2, AGV-1, GSR-1, GSR-2, GSR-3, W-2, SY-4) and two blank samples were taken as the external calibration standards. The analytical precision was generally better than 10%. The analytical procedure method is the same as in Chen et al. (2010).

Whole-rock Sr–Nd Isotope Analysis

Powdered samples (~100 mg) for Sr and Nd isotopic analyses were dissolved using an acidic mixture of HF and HNO_3 (1:3) for 7 days at 120 °C in PFA beakers. The Sr-REE and Nd-REE separation were performed using cationic ion-exchange columns and HDEHP columns, respectively. The Sr and Nd isotopic data were obtained on thermal ionization mass spectrometer (TIMS) and multi-collector inductively-coupled plasma mass spectrometer (MC-ICP-MS) at GIGCAS, respectively. The normalized values for mass fractionation are $^{86}Sr/^{88}Sr = 0.1194$ and $^{146}Nd/^{144}Nd = 0.7219$, respectively, while the $^{87}Rb/^{86}Sr$, $^{147}Sm/^{144}Nd$ ratios were calculated from abundances of these trace elements measured by ICP-MS. The analytical procedure method is the same as in Chen et al. (2010).

In-situ plagioclase analysis

The in-situ major element compositions of plagioclase were performed at the Shandong Analysis Center of China Metallurgical Geology Bureau by using a JEOL JXA-8230 electron microprobe. An accelerating voltage of 15 kV at current of 20 nA, and a beam size of 1–2 μm were used for analysis.

References

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Liu, Y., Hu, Z., Gao, S., Günther, D., Xu, J., Gao, C. and Chen, H., 2008, In situ analysis of major and trace elements of anhydrous minerals by LA-ICP-MS without applying an internal standard. Chemical Geology, 257(1–2), 34–43. https://doi.org/10.1016/j.chemgeo.2008.08.004

FIGURES

Figure DR1-An-Ab-Or plot for plagioclase from the Dagze volcanic rocks. Note that the compositions of albite from the two group rocks are overlap.

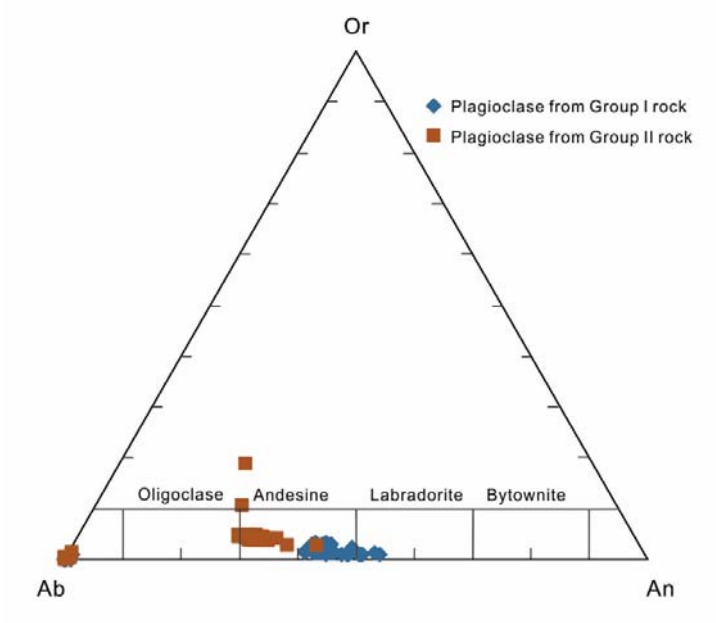

Table DR1- Zircon U–Pb isotopic data for the Dagze volcanic rocks

Num.	Th (ppm)	U (ppm)	Th/U	$^{207}Pb/^{235}U$ (ratio)	± 2σ	$^{206}Pb/^{238}U$ (ratio)	± 2σ	$^{207}Pb/^{235}U$ (Ma)	± 2σ	$^{206}Pb/^{238}U$ (Ma)	± 2σ
15DZC-01, mean = 100 ± 1 Ma, MSWD = 1.2, n = 22.											
1	89.4	88.8	1.0	0.1400	0.0164	0.0153	0.0003	133	15	98	2
2	232	199	1.2	0.1208	0.0092	0.0155	0.0003	116	8	99	2
3	78.1	76.6	1.0	0.1508	0.0145	0.0153	0.0003	143	13	98	2
4	247	200	1.2	0.2147	0.0312	0.0168	0.0004	197	26	107	3
5	80.1	76.8	1.0	0.2142	0.0352	0.0157	0.0004	197	29	100	3
~~6~~	~~74.3~~	~~77.8~~	~~1.0~~	~~0.1109~~	~~0.0389~~	~~0.0135~~	~~0.0006~~	~~107~~	~~36~~	~~87~~	~~4~~
~~7~~	~~196~~	~~162~~	~~1.2~~	~~0.0887~~	~~0.0133~~	~~0.0141~~	~~0.0002~~	~~86~~	~~12~~	~~90~~	~~2~~
8	81.6	83.3	1.0	0.1585	0.0176	0.0153	0.0003	149	15	98	2
9	449	299	1.5	0.0795	0.0284	0.0154	0.0004	78	27	98	2
10	305	222	1.4	0.1257	0.0114	0.0154	0.0002	120	10	99	2
11	249	188	1.3	0.0999	0.0117	0.0160	0.0003	97	11	102	2
12	186	128	1.5	0.0645	0.0120	0.0157	0.0003	64	11	100	2
13	55.9	62.2	0.9	0.1066	0.0201	0.0155	0.0003	103	18	99	2
~~14~~	~~63.5~~	~~65.2~~	~~1.0~~	~~0.4716~~	~~0.0564~~	~~0.0192~~	~~0.0007~~	~~392~~	~~39~~	~~122~~	~~4~~
15	54.9	63	0.9	0.0628	0.0387	0.0151	0.0006	62	37	96	4
16	50.1	50.5	1.0	0.1510	0.0314	0.0159	0.0005	143	28	102	3
17	53.1	61.2	0.9	0.1169	0.0393	0.0162	0.0005	112	36	104	3
18	254	189	1.3	0.1747	0.0446	0.0160	0.0007	163	39	102	4
19	44.3	54.8	0.8	0.1758	0.0369	0.0154	0.0005	164	32	99	3
20	418	262	1.6	0.1372	0.0146	0.0154	0.0003	131	13	99	2
21	455	288	1.6	0.2269	0.0509	0.0162	0.0006	208	42	104	4
22	51.8	61.2	0.8	0.0996	0.0116	0.0156	0.0003	96	11	100	2
23	452	329	1.4	0.1114	0.0167	0.0156	0.0003	107	15	99	2
24	89.4	88.8	1.0	0.0960	0.0107	0.0150	0.0002	93	10	96	1
25	232	199	1.2	0.0986	0.0093	0.0158	0.0002	95	9	101	2
15DZC-02, mean = 105 ± 1 Ma, MSWD = 0.9, n = 23.											
1	127	254	0.5	0.1182	0.0117	0.0166	0.0003	113	11	106	2
2	1147	1268	0.9	0.1018	0.0089	0.0163	0.0002	98	8	104	1
3	449	1014	0.4	0.0914	0.0106	0.0162	0.0003	89	10	104	2
4	293	522	0.6	0.1063	0.0115	0.0165	0.0003	103	11	106	2
5	819	1193	0.7	0.0987	0.0166	0.0163	0.0003	96	15	104	2
6	114	227	0.5	0.1072	0.0091	0.0161	0.0003	103	8	103	2
7	349	584	0.6	0.0978	0.0108	0.0160	0.0002	95	10	102	2
8	215	397	0.5	0.0565	0.0194	0.0167	0.0003	56	19	107	2
9	450	655	0.7	0.0794	0.0205	0.0166	0.0004	78	19	106	2
10	555	786	0.7	0.0888	0.0148	0.0166	0.0003	86	14	106	2
11	149	371	0.4	0.1313	0.0138	0.0163	0.0003	125	12	104	2
12	280	451	0.6	0.1023	0.0085	0.0168	0.0003	99	8	108	2

Table DR2-continuted

13	185	375	0.5	0.1333	0.0151	0.0164	0.0003	127	13	105	2
14	491	995	0.5	0.1250	0.0097	0.0166	0.0003	120	9	106	2
15	266	535	0.5	0.1068	0.0091	0.0166	0.0003	103	8	106	2
16	373	585	0.6	0.1114	0.0114	0.0165	0.0003	107	10	105	2
17	404	627	0.6	0.1019	0.0099	0.0164	0.0002	98	9	105	1
18	381	745	0.5	0.0940	0.0071	0.0161	0.0002	91	7	103	1
19	216	510	0.4	0.1401	0.0265	0.0170	0.0003	133	24	108	2
20	564	789	0.7	0.1211	0.0092	0.0162	0.0003	116	8	103	2
21	586	808	0.7	0.1087	0.0091	0.0167	0.0003	105	8	107	2
~~22~~	~~439~~	~~521~~	~~0.8~~	~~0.1111~~	~~0.0155~~	~~0.0178~~	~~0.0003~~	~~107~~	~~14~~	~~114~~	~~2~~
23	492	668	0.7	0.1348	0.0187	0.0166	0.0002	128	17	106	2
24	158	351	0.5	0.1078	0.0126	0.0162	0.0003	104	12	103	2
15DZC-06, mean = 104 ± 1 Ma, MSWD = 2, n = 24.											
1	131	233	0.6	0.1110	0.0085	0.0167	0.0003	107	8	106	2
2	187	341	0.5	0.1055	0.0049	0.0160	0.0002	102	4	102	1
3	187	341	0.5	0.1198	0.0045	0.0165	0.0002	115	4	105	1
4	105	306	0.3	0.1038	0.0067	0.0169	0.0003	100	6	108	2
5	108	210	0.5	0.1033	0.0053	0.0158	0.0002	100	5	101	1
6	196	360	0.5	0.1442	0.0083	0.0167	0.0002	137	7	107	1
7	184	361	0.5	0.1112	0.0076	0.0161	0.0002	107	7	103	1
8	114	261	0.4	0.1041	0.0088	0.0164	0.0003	101	8	105	2
9	102	160	0.6	0.0996	0.0058	0.0160	0.0002	96	5	102	1
10	170	292	0.6	0.1010	0.0052	0.0165	0.0002	98	5	105	1
11	110	224	0.5	0.1243	0.0099	0.0166	0.0002	119	9	106	1
12	213	436	0.5	0.1232	0.0158	0.0161	0.0002	118	14	103	1
13	123	244	0.5	0.0905	0.0077	0.0162	0.0002	88	7	104	2
14	131	233	0.6	0.1017	0.0043	0.0166	0.0002	98	4	106	1
15	269	372	0.7	0.0766	0.0066	0.0159	0.0002	75	6	102	2
16	167	363	0.5	0.1024	0.0067	0.0162	0.0002	99	6	103	1
17	138	343	0.4	0.1160	0.0061	0.0163	0.0002	111	6	104	1
18	266	407	0.7	0.1084	0.0054	0.0165	0.0002	104	5	106	1
19	327	485	0.7	0.1034	0.0066	0.0167	0.0002	100	6	107	1
20	145	245	0.6	0.1186	0.0058	0.0164	0.0002	114	5	105	1
21	212	403	0.5	0.1068	0.0054	0.0163	0.0002	103	5	104	1
22	221	375	0.6	0.0936	0.0068	0.0169	0.0002	91	6	108	1
23	137	255	0.5	0.1088	0.0062	0.0163	0.0002	105	6	104	1
24	294	429	0.7	0.1124	0.0091	0.0164	0.0003	108	8	105	2

Table DR2- Zircon trace element data for the Dagze volcanic rocks

Sample	15DZC-01															
Number	1	2	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SiO_2	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7
Ti	11.5	20.3	31.7	19.5	24.2	33.5	29.9	13.9	26.1	18.10	27.8	10.1	18.7	33.5	23.9	29.3
Y	2821	4436	2540	4397	2572	2015	2001	5015	4029	2640	5744	4934	3860	3582	2374	2078
Nb	1.86	3.70	1.54	3.74	1.61	1.41	1.30	3.62	3.04	1.77	8.60	3.61	2.79	1.29	1.31	1.62
La	0.60	0.27	0.00	0.25	0.00	0.13	0.08	0.60	0.63	0.20	1.26	0.61	0.00	0.11	49.72	0.00
Ce	22.8	48.2	15.2	49.9	15.4	15.7	11.5	49.0	38.3	20.2	81.1	49.9	34.0	23.6	139	12.3
Pr	0.45	0.37	0.21	0.36	0.23	0.03	0.16	0.45	0.45	0.19	0.58	0.46	0.16	0.46	17.68	0.17
Nd	3.72	5.95	2.82	6.12	3.46	1.80	1.56	6.28	6.58	2.67	8.44	6.10	3.90	6.70	92.5	2.53
Sm	6.13	13.4	7.71	15.9	10.3	4.93	4.72	14.5	15.8	6.71	20.1	17.2	10.9	16.1	34.0	5.86
Eu	2.93	5.40	3.42	5.86	3.34	2.16	2.13	6.00	5.08	2.75	6.98	6.06	4.70	6.92	4.39	2.01
Gd	47.8	88.2	45.3	92.4	47.3	32.5	29.1	94.5	84.2	44.7	112	94.9	75.3	80.6	70.7	33.9
Tb	17.8	31.1	16.3	31.8	16.8	12.1	11.2	34.0	28.0	16.8	39.8	34.1	26.0	27.2	18.2	12.4
Dy	237	401	222	408	229	167	158	435	356	222	506	434	337	328	215	171
Ho	91.3	150	84.9	151	87.6	66.6	66.0	164	132	86.7	189	164	127	117	77.8	68.2
Er	430	694	400	689	407	324	322	759	610	407	852	750	585	533	357	327
Tm	86.7	139	80.9	139	82.8	66.3	67.2	153	122	82.6	169	152	117	109	72.2	67.7
Yb	871	1400	818	1365	828	682	696	1546	1218	820	1650	1522	1203	1099	729	685
Lu	156	243	148	238	151	125	131	272	215	149	282	270	215	197	132	129
Hf	7620	10211	7564	9610	7486	7512	7074	8883	8399	7345	8034	8778	8291	6783	7534	6937
Ta	0.60	0.99	0.48	1.05	0.45	0.54	0.401	1.12	0.80	0.59	1.94	1.11	0.99	0.50	0.57	0.494
Th	89.4	232	78.1	247	80.1	74.3	53.6	293	196	81.6	449	305	249	186	85.6	55.9
U	88.8	199	76.6	200	76.8	77.8	61.8	220	162	83.3	299	222	188	128	82.8	62.2
T (℃)	831	897	955	892	919	963	947	852	929	883	937	817	887	963	918	944

Table DR2-continuted

Sample	15DZC-01										15DZC-06					
Number	16	17	18	19	20	21	22	23	24	25	1	2	3	4	5	6
SiO_2	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7
Ti	20.2	26.2	13.5	14.3	18.8	19.5	10.3	18.8	15.4	19.3	8.10	8.57	9.01	4.40	14.0	13.0
Y	1932	2020	1976	1920	3758	1513	5212	6370	1936	7629	1002	2378	4462	1749	2926	830
Nb	1.17	1.79	0.73	1.44	2.90	0.98	5.42	5.15	1.40	5.05	2.42	19.9	21.3	8.66	22.3	1.80
La	0.01	0.00	0.05	0.01	0.00	4.18	0.02	5.32	0.00	6.95	0.00	0.06	0.26	0.05	0.23	0.01
Ce	13.4	12.7	10.4	12.6	34.2	21.5	61.1	83.1	12.4	121	13.4	64.7	39.4	31.9	50.3	11.3
Pr	0.18	0.03	0.21	0.19	0.20	1.61	0.51	2.42	0.17	2.96	0.18	0.10	0.45	0.13	0.20	0.00
Nd	2.05	0.870	2.83	1.43	3.49	9.62	7.40	21.2	1.53	24.9	0.84	0.935	3.08	0.982	1.61	0.18
Sm	5.54	4.33	7.57	3.75	12.8	6.66	21.5	31.8	3.01	36.9	1.88	4.82	6.82	2.57	4.71	1.91
Eu	2.19	2.01	3.00	1.91	4.58	1.98	6.54	6.59	1.94	12.3	1.07	1.81	3.13	1.12	1.63	0.87
Gd	33.7	28.2	39.9	28.6	73.9	28.7	113	147	28.3	164	12.9	34.9	49.2	21.5	39.0	10.4
Tb	12.2	10.9	13.6	10.9	25.9	9.57	37.4	48.9	10.7	52.8	4.86	13.3	21.7	8.26	15.6	4.03
Dy	161	160	174	154	332	123	482	591	153	664	69.3	180	335	121	224	56.8
Ho	63.4	65.7	66.3	62.7	125	49.2	175	211	62.2	247	29.4	69.6	135	49.8	88.5	24.1
Er	298	320	305	304	573	239	783	925	305	1126	158	348	675	261	441	125
Tm	61.1	66.4	61.8	63.8	115	49.6	154	179	63.6	224	36.3	74.1	146	58.3	91.8	29.9
Yb	626	685	624	654	1167	513	1517	1716	667	2237	429	816	1561	671	988	345
Lu	113	128	114	122	211	95.1	261	290	124	397	90.8	144	273	125	170	73.2
Hf	7269	6804	7038	6546	7972	7581	8762	8516	6916	9627	9226	10977	11439	10206	10208	9416
Ta	0.389	0.517	0.347	0.374	1.02	0.381	1.24	1.43	0.40	1.40	0.89	6.33	5.52	3.05	6.62	0.86
Th	63.5	54.9	50.1	53.1	254	44.3	418	455	51.8	452	127	1147	449	293	819	114
U	65.2	63.0	50.5	61.2	189	54.8	262	288	61.2	329	254	1268	1014	522	1193	227
T (℃)	896	930	849	855	888	892	819	888	864	891	793	799	804	734	853	844

Table DR2-continuted

Sample	15DZC-06															
Number	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
SiO_2	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7
Ti	4.89	6.90	11.6	3.46	1.94	8.64	5.39	0.44	8.88	3.00	6.24	7.75	0.92	0.98	9.69	8.91
Y	2254	1448	1683	1954	1143	1668	733	2907	1823	1325	1496	2775	1833	1832	2185	2991
Nb	9.76	3.86	9.05	12.8	5.52	7.84	3.86	23.0	12.0	7.77	9.72	15.9	10.6	12.2	9.39	9.60
La	0.07	0.01	0.43	0.00	0.00	0.17	0.03	0.05	0.00	0.39	0.03	0.00	0.00	0.00	0.00	0.07
Ce	35.9	19.3	36.3	45.3	17.1	28.7	18.2	57.4	37.9	28.5	34.7	43.3	28.4	45.6	44.5	44.4
Pr	0.11	0.05	0.18	0.03	0.05	0.07	0.06	0.12	0.00	0.08	0.01	0.00	0.00	0.01	0.10	0.16
Nd	1.14	1.13	1.54	1.25	0.98	1.48	0.43	0.94	0.43	1.63	0.78	1.15	0.71	1.59	1.37	1.57
Sm	3.68	3.73	4.21	3.54	0.948	3.65	1.05	3.77	2.15	2.68	1.80	3.07	2.46	2.75	3.28	5.62
Eu	1.53	1.09	1.17	1.27	0.38	1.05	0.56	1.48	0.99	1.16	1.24	1.48	1.16	1.40	1.77	2.91
Gd	29.1	20.6	21.3	23.8	12.5	22.1	9.74	35.2	21.6	18.8	20.0	32.1	20.3	24.0	31.1	47.7
Tb	11.5	8.06	8.58	9.99	5.26	8.58	3.44	14.6	8.66	7.08	7.78	13.9	8.88	9.14	11.6	17.7
Dy	166	111	121	144	80.4	121	52.2	222	131	98.4	112	208	134	132	163	241
Ho	67.2	43.6	48.7	57.8	33.9	49.7	21.6	89.3	54.6	40.1	45.4	87.1	55.6	54.6	65.4	94.0
Er	337	216	251	298	178	250	115	454	285	203	229	433	290	280	332	455
Tm	73.4	47.1	55.9	64.9	40.3	54.9	25.9	97.5	63.7	45.5	50.1	94.4	64.3	62.7	73.0	93.9
Yb	815	534	638	724	455	606	297	1050	726	506	574	1014	723	714	820	1027
Lu	149	98.3	118	132	83.3	111	56.9	183	133	93.4	106	178	131	131	156	186
Hf	9712	11127	10459	11105	12039	10295	11030	10965	11779	11301	11650	11343	10988	11045	10969	9858
Ta	3.11	1.74	3.33	4.36	2.52	2.49	2.04	7.03	3.86	3.48	3.69	4.38	3.75	4.31	3.34	2.28
Th	349	215	450	555	149	280	185	491	266	373	404	381	216	564	586	439
U	584	397	655	786	371	451	375	995	535	585	627	745	510	789	808	521
T (°C)	744	777	832	712	664	800	753	559	803	700	767	789	608	613	812	744

Table DR-continued

Number	15DZC-06		15DZC-02													
Number	23	24	1	2	2	3	4	5	6	7	8	9	10	11	12	13
SiO_2	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7
Ti	8.16	4.99	5.7	2.07	5.47	0.363	1.25	0.701	11.0	10.5	11.4	8.4	10.8	8.33	9.25	5.7
Y	1774	1170	1072	1231	892	730	785	1174	1158	744	724	905	952	1291	920	1072
Nb	9.39	5.60	2.07	4.40	3.38	2.72	1.19	4.65	3.74	2.48	0.626	2.97	1.55	4.70	2.05	2.07
La	0.00	0.00	0.00	0.00	0.06	0.11	0.04	0.02	0.00	0.07	2.68	0.06	0.00	0.00	0.00	0.00
Ce	35.4	21.1	12.1	20.4	18.2	12.9	10.3	20.3	18.5	13.7	15.8	15.9	10.7	21.6	12.4	12.1
Pr	0.02	0.04	0.22	0.04	0.00	0.06	0.04	0.00	0.00	0.00	0.86	0.03	0.10	0.00	0.00	0.22
Nd	1.15	1.04	0.65	0.21	0.98	0.12	0.65	0.48	0.95	0.44	4.99	0.14	0.02	0.86	0.00	0.65
Sm	4.01	2.19	1.53	2.45	2.01	1.32	1.77	2.56	3.05	1.18	4.55	1.87	1.29	2.18	1.98	1.53
Eu	1.56	0.88	1.21	1.05	0.67	0.72	0.84	0.85	0.98	0.45	1.40	0.65	0.87	1.16	0.82	1.21
Gd	24.4	13.7	14.6	15.5	10.2	8.20	11.6	13.9	15.0	7.56	15.3	11.7	13.1	15.7	12.4	14.6
Tb	9.22	5.31	5.46	5.87	4.40	3.19	4.05	5.57	5.30	3.26	4.63	4.64	4.69	5.96	4.47	5.46
Dy	133	79.3	77.1	86.2	60.5	46.5	56.1	80.8	80.5	49.4	59.2	65.3	65.2	89.2	63.4	77.1
Ho	52.9	33.9	31.4	35.7	26.1	20.9	23.4	34.2	34.1	21.6	22.2	27.5	28.1	38.2	26.9	31.4
Er	267	181	163	190	140	117	121	181	183	117	110	139	148	207	142	163
Tm	58.0	42.0	38.0	44.3	33.0	29.9	28.8	42.6	42.8	28.8	25.1	32.4	33.9	48.5	33.5	38.0
Yb	655	498	437	513	400	369	342	495	510	349	283	364	395	577	387	437
Lu	124	98.5	91.6	106	82.9	81.1	73.1	104	106	75.1	58.3	74.5	82.2	118	81.7	91.6
Hf	10050	10804	9141	10181	11275	12309	10722	10346	10513	11087	10337	10381	9259	11154	9688	9141
Ta	3.06	2.16	0.74	1.41	1.36	1.49	0.59	1.67	1.68	1.07	0.47	1.17	0.49	1.87	0.91	0.74
Th	492	158	131	187	187	105	108	196	184	114	102	170	110	213	123	131
U	668	351	233	341	341	306	210	360	361	261	160	292	224	436	244	233
T (°C)	794	746	758	669	754	548	630	590	826	821	830	797	824	796	807	758

Table DR2-continued

Sample	15ZDC-02										
Number	14	15	16	17	18	19	20	21	22	23	24
SiO_2	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7	32.7
Ti	11.1	5.15	0.25	7.25	8.40	8.46	5.54	8.68	9.91	9.53	3.49
Y	1673	890	1045	1732	831	993	1271	1310	950	1374	706
Nb	2.62	2.89	3.08	5.96	3.13	1.57	4.04	3.47	2.01	4.17	2.05
La	0.08	0.90	0.00	0.11	0.12	0.04	0.00	0.04	0.06	0.10	0.00
Ce	20.6	18.3	17.4	28.9	21.4	12.6	21.4	18.4	13.7	23.5	13.4
Pr	0.07	0.25	0.00	0.09	0.16	0.11	0.05	0.04	0.10	0.00	0.12
Nd	1.51	1.37	0.74	2.85	0.46	1.46	0.42	2.00	0.82	1.14	0.48
Sm	2.89	1.71	1.89	5.91	2.17	3.81	2.23	2.61	1.80	2.81	1.01
Eu	2.04	0.75	0.69	1.71	0.86	1.66	0.98	1.36	1.09	1.29	0.68
Gd	26.7	10.9	12.9	26.6	12.2	18.2	15.0	16.6	13.0	18.9	9.84
Tb	9.22	4.19	4.73	9.88	4.49	5.96	5.98	6.55	4.90	7.16	3.34
Dy	126	60.8	69.2	132	59.1	77.0	86.9	94.3	68.5	102	49.7
Ho	51.0	26.0	30.5	53.5	24.0	30.0	37.6	38.9	29.0	41.0	20.7
Er	248	139	165	268	128	149	200	202	147	209	110
Tm	54.8	33.9	39.9	59.1	29.7	34.5	47.7	46.1	33.4	47.0	25.0
Yb	607	408	471	655	359	393	553	528	386	541	294
Lu	120	87.2	98.8	127	71.5	81.9	113	109	79.8	108	62.2
Hf	9365	11591	10971	9774	11213	10553	10530	9967	9830	9919	10329
Ta	0.85	1.56	1.21	1.78	1.36	0.70	1.59	1.25	0.79	1.36	0.71
Th	269	167	138	266	327	145	212	221	137	294	182
U	372	363	343	407	485	245	403	375	255	429	311
T (°C)	827	749	525	782	797	798	756	800	814	810	713

Zircon Ti-saturation temperature calculation is using the method of Frey and Watson (2007).

Table DR3- Zircon Lu–Hf isotope data for the Dagze volcanic rocks

Sample Number	$^{176}Yb/^{177}Hf$	$^{176}Lu/^{177}Hf$	$^{176}Hf/^{177}Hf$	± 2σ	$(^{176}Hf/^{177}Hf)_i$	εHf(t)	T_{DM} (Ma)
15DZC-01-01	0.033	0.001	0.283101	0.000014	0.283100	13.92	210
15DZC-01-02	0.035	0.001	0.283124	0.000012	0.283123	14.73	177
15DZC-01-03	0.031	0.001	0.283131	0.000021	0.283130	14.95	169
15DZC-01-04	0.034	0.001	0.283103	0.000013	0.283102	13.98	207
15DZC-01-05	0.105	0.002	0.283118	0.000019	0.283114	14.42	192
15DZC-01-08	0.035	0.001	0.283108	0.000017	0.283107	14.15	201
15DZC-01-10	0.096	0.001	0.283107	0.000013	0.283104	14.05	207
15DZC-01-11	0.036	0.001	0.283133	0.000014	0.283132	15.04	165
15DZC-01-15	0.141	0.002	0.283130	0.000016	0.283126	14.84	176
15DZC-01-16	0.104	0.002	0.282992	0.000017	0.282989	9.98	374
15DZC-01-17	0.034	0.000	0.283085	0.000013	0.283084	13.34	233
15DZC-01-18	0.036	0.001	0.283125	0.000016	0.283124	14.76	176
15DZC-01-20	0.111	0.002	0.283044	0.000017	0.283041	11.81	300
15DZC-01-21	0.112	0.002	0.283103	0.000021	0.283100	13.90	214
15DZC-01-22	0.057	0.001	0.283002	0.000022	0.283000	10.37	353
15DZC-01-23	0.114	0.002	0.283088	0.000023	0.283085	13.36	236
15DZC-01-24	0.089	0.001	0.283118	0.000012	0.283115	14.43	191
15DZC-01-25	0.039	0.001	0.283090	0.000014	0.283089	13.52	226
15DZC-02-01	0.022	0.000	0.283123	0.000013	0.283122	14.70	178
15DZC-02-02	0.039	0.001	0.283118	0.000011	0.283117	14.51	186
15DZC-02-03	0.036	0.000	0.283132	0.000012	0.283131	15.00	167
15DZC-02-04	0.036	0.000	0.283103	0.000013	0.283102	13.99	207
15DZC-02-05	0.017	0.000	0.283114	0.000017	0.283114	14.38	191
15DZC-01-01	0.033	0.001	0.283101	0.000014	0.283100	13.92	210
15DZC-01-02	0.035	0.001	0.283124	0.000012	0.283123	14.73	177
15DZC-01-03	0.031	0.001	0.283131	0.000021	0.283130	14.95	169
15DZC-01-04	0.034	0.001	0.283103	0.000013	0.283102	13.98	207
15DZC-01-05	0.105	0.002	0.283118	0.000019	0.283114	14.42	192
15DZC-01-08	0.035	0.001	0.283108	0.000017	0.283107	14.15	201
15DZC-01-10	0.096	0.001	0.283107	0.000013	0.283104	14.05	207
15DZC-01-11	0.036	0.001	0.283133	0.000014	0.283132	15.04	165
15DZC-02-06	0.028	0.000	0.283152	0.000016	0.283151	15.72	138
15DZC-02-07	0.176	0.004	0.283044	0.000022	0.283036	11.65	319
15DZC-02-08	0.037	0.000	0.283106	0.000013	0.283105	14.10	203
15DZC-02-11	0.165	0.003	0.283055	0.000016	0.283050	12.13	291
15DZC-02-12	0.029	0.000	0.283129	0.000011	0.283128	14.91	170
15DZC-02-13	0.031	0.000	0.283136	0.000012	0.283135	15.14	161
15DZC-02-14	0.115	0.002	0.283137	0.000011	0.283133	15.09	165
15DZC-02-15	0.181	0.003	0.283068	0.000011	0.283063	12.60	272
15DZC-02-16	0.144	0.002	0.283040	0.000012	0.283036	11.64	310

Table DR3-continued

15DZC-02-17	0.148	0.002	0.283078	0.000012	0.283073	12.96	255
15DZC-02-19	0.037	0.000	0.283145	0.000012	0.283144	15.45	149
15DZC-02-20	0.303	0.005	0.283122	0.000016	0.283113	14.37	202
15DZC-02-21	0.202	0.003	0.283158	0.000016	0.283153	15.78	138
15DZC-02-24	0.350	0.006	0.283072	0.000017	0.283062	12.55	289
15DZC-06-01	0.169	0.003	0.283142	0.000012	0.283135	15.15	165
15DZC-06-04	0.172	0.003	0.283108	0.000011	0.283102	13.98	216
15DZC-06-05	0.140	0.003	0.283085	0.000010	0.283080	13.19	247
15DZC-06-07	0.115	0.002	0.283074	0.000013	0.283069	12.82	261
15DZC-06-08	0.049	0.001	0.283106	0.000010	0.283104	14.04	206
15DZC-06-09	0.104	0.002	0.283050	0.000011	0.283046	12.00	294
15DZC-06-12	0.114	0.002	0.283092	0.000014	0.283087	13.45	235
15DZC-06-16	0.091	0.002	0.283108	0.000011	0.283104	14.05	209
15DZC-06-17	0.152	0.003	0.283072	0.000012	0.283066	12.69	271
15DZC-06-18	0.123	0.003	0.283093	0.000012	0.283088	13.47	234
15DZC-06-20	0.132	0.003	0.283100	0.000011	0.283095	13.73	224
15DZC-06-23	0.129	0.003	0.283064	0.000012	0.283059	12.46	278
15DZC-06-24	0.063	0.001	0.283094	0.000011	0.283091	13.59	226

Table DR4-Whole-rock geochemical data for the Dagze volcanic rocks

Sample	15DZC-02	15DZC-06	15DZC-08	15DZC-09	17DZC-01	17DZC-02	17DZC-03	17DZC-04	17DZC-08	17DZC-09	17DZC-11
						Group I					
SiO_2	65.52	70.16	67.93	66.49	66.47	70.66	70.89	67.46	69.17	71.59	69.21
TiO_2	0.42	0.54	0.53	0.41	0.47	0.36	0.40	0.44	0.40	0.37	0.40
Al_2O_3	15.80	15.05	15.64	15.47	16.44	15.23	15.24	16.52	15.02	15.20	15.13
$Fe_2O_3^T$	4.01	4.67	4.18	4.01	4.28	3.38	3.72	4.06	3.74	3.43	3.75
MnO	0.29	0.10	0.09	0.15	0.22	0.10	0.08	0.11	0.11	0.05	0.11
MgO	1.62	0.36	0.66	1.35	1.01	1.02	0.61	0.60	1.12	0.54	0.92
CaO	5.78	1.46	4.70	5.34	4.63	3.60	2.82	4.18	4.32	3.22	4.56
Na_2O	4.63	5.40	3.85	4.44	4.32	3.67	4.09	4.74	4.30	3.77	3.93
K_2O	1.80	2.13	2.28	2.20	2.00	1.84	2.00	1.73	1.69	1.69	1.83
P_2O_5	0.13	0.11	0.12	0.14	0.16	0.13	0.15	0.15	0.14	0.13	0.16
LOI	7.10	0.96	2.63	5.20	4.16	4.36	2.87	3.82	4.92	3.02	4.12
Total	99.48	99.59	100.04	99.48	99.85	99.64	99.96	99.51	99.61	99.19	99.29
$Mg^{\#}$	44.7	13.4	24.1	40.2	32.0	37.6	24.6	22.7	37.5	24.0	33.0
Sc	9.13	9.13	8.57	9.24	10.5	8.97	9.29	10.4	9.93	9.13	10.1
V	42.7	43.3	53.3	45.2	59.2	18.9	26.7	23.2	35.0	56.9	56.8
Cr	20.5	35.3	20.0	27.1	19.3	20.2	26.4	17.2	26.0	27.3	24.5
Co	10.6	5.63	6.23	8.18	9.74	10.4	6.92	9.03	10.1	6.00	10.2
Ni	16.6	8.39	11.4	19.3	16.7	20.2	13.2	15.7	16.8	12.9	17.1
Cu	29.8	19.1	15.6	29.3	35.5	29.7	36.1	35.0	30.3	42.3	31.9
Zn	51.5	33.7	32.4	47.1	50.8	58.1	38.7	46.1	56.5	43.0	104
Ga	14.0	9.98	13.2	12.3	14.4	12.9	13.0	14.4	12.7	13.0	13.7
Ge	1.30	1.34	1.35	1.28	1.42	1.35	1.48	1.47	1.26	1.25	1.35
Rb	46.6	36.0	43.6	47.3	45.6	38.0	45.7	35.1	44.4	42.8	46.4
Sr	303	395	324	269	276	264	307	296	225	254	318
Y	10.2	8.32	8.41	10.3	13.9	14.0	11.3	12.9	10.9	11.2	11.0
Zr	102	93.7	87.3	83.0	122	105	101	119	99.2	89.9	105
Nb	4.58	8.11	7.75	4.07	6.75	4.68	4.85	7.09	4.77	4.69	4.91
Cs	1.76	5.05	2.42	1.53	1.48	0.743	1.23	0.821	1.47	1.37	1.28
Ba	433	617	498	387	586	529	535	600	639	644	590
La	15.5	13.2	14.7	14.9	16.3	14.0	16.0	16.5	13.8	15.0	13.4
Ce	28.8	25.9	28.4	28.4	29.1	29.7	29.3	30.4	25.8	27.6	24.8
Pr	3.05	2.89	3.02	3.10	3.10	3.16	3.36	3.32	2.92	3.13	2.89
Nd	11.2	10.8	11.0	11.6	11.4	11.9	12.5	12.1	11.0	11.6	11.2
Sm	2.21	1.99	1.95	2.28	2.30	2.43	2.34	2.39	2.21	2.25	2.30
Eu	0.70	0.60	0.66	0.64	0.73	0.59	0.66	0.64	0.59	0.60	0.67
Gd	2.17	1.81	1.84	2.16	2.24	2.43	2.23	2.38	2.08	2.07	2.15
Tb	0.32	0.28	0.26	0.33	0.37	0.39	0.34	0.37	0.32	0.32	0.33
Dy	1.92	1.62	1.56	1.96	2.23	2.27	1.99	2.16	1.85	1.89	1.86
Ho	0.40	0.34	0.31	0.40	0.48	0.47	0.42	0.45	0.38	0.40	0.38

Er	1.15	0.98	0.84	1.08	1.34	1.27	1.16	1.28	1.03	1.11	1.03
Tm	0.18	0.15	0.13	0.17	0.21	0.19	0.18	0.20	0.15	0.17	0.15
Yb	1.22	0.99	0.82	1.12	1.34	1.24	1.16	1.28	1.02	1.17	1.01
Lu	0.21	0.16	0.13	0.18	0.22	0.20	0.19	0.22	0.17	0.19	0.17
Hf	2.70	2.77	2.55	2.46	3.04	2.89	2.72	3.05	2.57	2.47	2.77
Ta	0.37	0.71	0.66	0.34	0.49	0.38	0.37	0.52	0.35	0.35	0.37
Th	4.79	5.60	5.38	4.88	4.77	5.84	4.81	5.39	4.64	5.42	4.87
U	1.23	1.33	0.93	0.80	0.82	0.72	0.78	0.74	0.65	1.02	0.98
T_{Zr}(℃)	685	741	713	686	742	747	749	742	724	741	730

Table DR4-continued

Sample	15DZC -01	15DZC -03	15DZC -04	15DZC -05	15DZC -07	17DZC -05	17DZC -06	17DZC -07	17DZC -10	17DZC -12	17DZC -13
					Group II						
SiO_2	68.88	70.94	69.04	70.08	72.11	72.31	69.78	68.99	71.27	69.33	66.43
TiO_2	0.60	0.62	0.63	0.62	0.62	0.59	0.59	0.59	0.60	0.59	0.62
Al_2O_3	15.26	15.14	15.34	15.33	15.30	15.35	15.57	15.34	15.20	15.72	15.54
$Fe_2O_3^T$	3.06	4.00	4.24	4.44	2.76	2.50	3.51	2.74	2.92	3.52	3.60
MnO	0.13	0.08	0.09	0.09	0.04	0.03	0.04	0.06	0.04	0.05	0.12
MgO	1.23	0.49	0.84	0.59	0.54	0.43	0.33	1.17	1.06	0.72	1.69
CaO	4.08	2.19	2.77	2.29	2.68	2.63	3.00	4.27	3.42	3.29	4.94
Na_2O	4.18	4.04	4.40	4.01	3.54	3.91	4.30	4.22	3.40	4.20	4.49
K_2O	2.45	2.37	2.53	2.44	2.27	2.09	2.74	2.48	1.94	2.45	2.43
P_2O_5	0.13	0.13	0.12	0.11	0.15	0.15	0.14	0.14	0.14	0.14	0.15
LOI	3.40	2.39	2.85	2.30	2.88	2.67	1.69	3.80	4.07	2.67	4.65
Total	100.04	100.00	100.07	99.71	99.35	99.26	98.59	100.24	99.29	99.24	99.38
$Mg^{\#}$	44.5	19.7	28.3	21.0	28.3	25.8	15.8	46.1	42.1	29.2	48.4
Sc	11.4	9.61	8.78	8.64	10.7	10.9	10.9	10.6	8.21	11.1	12.6
V	58.9	52.1	57.0	48.2	51.5	50.1	63.1	52.5	67.5	66.4	103
Cr	31.1	28.1	46.5	33.8	30.3	20.7	31.4	25.9	30.5	27.6	25.2
Co	6.92	7.00	5.00	5.21	4.85	4.44	3.20	5.17	7.16	4.37	8.24
Ni	21.6	24.6	23.9	27.6	15.8	10.6	7.08	12.3	16.2	13.0	35.9
Cu	22.8	32.6	8.44	11.8	19.6	15.7	19.9	10.8	21.0	32.2	18.1
Zn	62.8	140	82.3	51.5	45.4	45.6	57.3	66.6	66.8	80.6	60.9
Ga	16.3	17.1	16.1	13.9	16.2	15.9	15.5	15.3	17.3	16.5	16.2
Ge	1.42	1.70	1.69	1.61	1.62	1.63	1.68	1.47	1.58	1.69	1.78
Rb	60.6	59.1	59.9	56.8	51.3	45.9	51.7	57.0	40.6	56.1	59.2
Sr	195	218	169	152	286	256	183	248	179	206	233
Y	29.0	27.5	25.2	23.7	31.5	36.9	33.9	32.6	33.0	37.5	34.6
Zr	262	269	230	196	254	278	259	245	281	261	242
Nb	7.95	8.42	7.52	6.11	8.24	9.62	8.88	8.76	9.89	9.06	8.70
Cs	2.62	3.16	2.16	1.89	3.92	3.56	0.829	2.09	2.58	2.51	2.13
Ba	429	472	334	324	376	374	349	384	320	408	330
La	20.5	20.6	19.3	17.4	22.6	23.4	22.3	20.9	17.4	22.4	22.0
Ce	42.3	43.6	40.9	34.1	48.6	49.5	46.5	43.9	39.4	47.5	45.8
Pr	5.42	5.40	4.98	4.16	6.13	6.20	5.92	5.54	4.82	5.94	5.76
Nd	21.8	21.5	19.8	16.6	24.6	24.5	23.7	22.2	19.7	23.7	23.0
Sm	4.87	4.78	4.22	3.59	5.33	5.37	5.11	4.91	4.42	5.23	5.06
Eu	1.22	1.15	1.10	0.96	1.29	1.27	1.23	1.21	1.09	1.28	1.23
Gd	4.91	4.73	4.26	3.69	5.36	5.54	5.23	5.08	4.63	5.33	5.27
Tb	0.84	0.80	0.76	0.67	0.91	0.96	0.91	0.90	0.83	0.95	0.92
Dy	5.28	5.10	4.74	4.11	5.79	6.03	5.61	5.49	5.13	5.95	5.54
Ho	1.15	1.10	1.03	0.90	1.22	1.27	1.22	1.19	1.13	1.31	1.20
Er	3.30	3.23	3.02	2.67	3.49	3.58	3.42	3.40	3.28	3.72	3.37

Tm	0.51	0.50	0.46	0.41	0.54	0.55	0.54	0.54	0.51	0.57	0.52
Yb	3.37	3.43	3.08	2.75	3.54	3.68	3.51	3.44	3.47	3.70	3.33
Lu	0.54	0.54	0.49	0.44	0.56	0.59	0.57	0.56	0.57	0.61	0.54
Hf	5.94	6.24	6.15	5.15	6.47	6.66	6.24	6.15	6.91	6.40	5.98
Ta	0.60	0.64	0.58	0.44	0.65	0.68	0.62	0.61	0.68	0.64	0.61
Th	6.85	7.41	6.51	6.56	8.07	7.73	7.41	7.26	5.66	7.50	7.10
U	2.11	1.87	1.60	1.31	2.00	1.96	2.14	2.34	1.48	2.01	2.03
T_{Zr} (°C)	805	841	809	809	838	844	819	796	840	820	779

Table DR-continued

Sample	17DZC -15	17DZC -16	17DZC -17	17DZC -18
	Group II			
SiO_2	70.44	70.39	69.43	70.29
TiO_2	0.61	0.60	0.59	0.59
Al_2O_3	15.88	15.38	15.10	15.45
$Fe_2O_3^T$	2.80	3.81	3.86	3.78
MnO	0.04	0.03	0.06	0.03
MgO	0.37	0.48	0.90	0.54
CaO	2.80	2.35	3.03	2.42
Na_2O	4.46	4.26	4.34	4.19
K_2O	2.46	2.55	2.55	2.55
P_2O_5	0.14	0.15	0.13	0.15
LOI	2.14	2.00	2.94	2.24
Total	99.29	99.27	99.41	99.30
$Mg^{\#}$	20.9	20.2	31.9	22.1
Sc	12.7	11.9	8.04	11.4
V	82.5	54.3	56.7	50.5
Cr	46.8	36.2	34.7	33.3
Co	4.82	4.05	6.71	6.26
Ni	17.8	19.4	25.7	28.7
Cu	20.2	8.59	9.13	9.84
Zn	61.7	95.6	89.7	98.6
Ga	18.9	16.6	14.6	18.8
Ge	1.75	2.00	1.56	2.05
Rb	75.4	66.5	38.6	76.3
Sr	222	237	140	276
Y	37.3	32.8	27.8	36.9
Zr	302	260	239	298
Nb	10.6	9.20	8.14	10.4
Cs	2.90	2.61	2.09	2.74
Ba	418	399	314	456
La	25.2	21.6	15.5	24.2
Ce	51.8	45.3	33.7	51.1

Pr	6.53	5.30	4.09	6.19
Nd	25.9	20.7	16.3	24.4
Sm	5.48	4.57	3.67	5.24
Eu	1.38	1.20	0.94	1.35
Gd	5.62	4.96	3.94	5.46
Tb	0.95	0.86	0.72	0.96
Dy	5.96	5.52	4.53	5.98
Ho	1.31	1.20	0.99	1.31
Er	3.73	3.47	2.91	3.75
Tm	0.58	0.55	0.45	0.59
Yb	3.81	3.60	3.02	3.87
Lu	0.62	0.58	0.49	0.64
Hf	7.28	6.51	5.87	7.30
Ta	0.73	0.64	0.56	0.73
Th	8.66	7.67	5.70	8.48
U	2.85	1.72	1.25	1.76
T_{Zr}(°C)	840	831	808	844

Annotation: LOI = loss on ignition. The major elemental data have been recalculated to anhydrous basis. Tzr, zircon saturation temperature based on the whole-rock-Zr thermometer (Watson and Harrison, 1983).

Table DR5-Whole-rock Sr-Nd isotope data for the Dagze volcanic rocks

Sample	15DZC -01	15DZC -03	15DZC -04	15DZC -05	15DZC -07	15DZC -02	15DZC -06	15DZC -08	15DZC -09
$^{87}Rb/^{86}Sr$	0.8658	0.7561	0.9889	1.0434	0.5008	0.4300	0.2547	0.3757	0.4909
$^{87}Sr/^{86}Sr$	0.706	0.7055	0.7059	0.7056	0.7054	0.7057	0.7057	0.7061	0.7059
$(^{87}Sr/^{86}Sr)_i$	0.7047	0.7043	0.7044	0.7040	0.7047	0.7051	0.7053	0.7055	0.7052
$\pm 2\sigma$ (10^{-6})	5	7	7	5	5	7	6	8	5
$^{147}Sm/^{144}Nd$	0.1377	0.1367	0.1313	0.1330	0.1332	0.1217	0.1134	0.1134	0.1209
$^{143}Nd/^{144}Nd$	0.512812	0.512806	0.512797	0.51281	0.512803	0.512757	0.512811	0.521809	0.512799
$\pm 2\sigma$ (10^{-6})	7	8	7	11	6	9	10	7	9
$(^{143}Nd/^{144}Nd)_i$	0.512717	0.512712	0.512707	0.512719	0.512711	0.512673	0.512734	0.512733	0.512716
εNd (t)	4.19	4.07	3.97	4.21	4.07	3.32	4.50	4.49	4.16

$^{87}Rb/^{86}Sr$ and $^{147}Sm/^{144}Nd$ ratios are calculated using Rb, Sr, Sm and Nd contents (Table DR4), measured by ICP-MS; $\varepsilon_{Nd}(t)$ values are calculated using present-day $(^{147}Sm/^{144}Nd)_{CHUR} = 0.1967$ and $(^{143}Nd/^{144}Nd)_{CHUR} = 0.512638$.

Table DR6- In-situ major element composition of plagioclase for the Dagze volcanic rocks

Sample	17DZC-01 (Group I)													
SiO_2	56.83	58.27	58.47	57.90	58.16	58.96	59.06	58.32	59.18	57.17	55.95	58.69	58.09	58.94
TiO_2	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.00	0.02	0.01
Al_2O_3	26.84	26.34	26.29	26.36	26.63	25.84	26.29	26.47	26.37	27.27	27.95	26.35	26.43	26.42
FeO	0.17	0.17	0.15	0.16	0.14	0.13	0.13	0.20	0.17	0.15	0.16	0.14	0.15	0.15
MgO	0.06	0.04	0.00	0.04	0.02	0.01	0.03	0.00	0.03	0.01	0.02	0.01	0.01	0.00
MnO	0.00	0.01	0.01	0.01	0.00	0.02	0.01	0.01	0.00	0.02	0.00	0.01	0.00	0.00
CaO	9.62	9.05	8.77	9.18	9.38	8.36	8.75	9.15	8.78	9.80	10.96	8.69	9.00	8.69
Na_2O	5.86	6.14	6.16	6.06	5.96	6.53	6.29	5.94	6.12	5.67	5.12	6.32	5.88	6.21
K_2O	0.18	0.20	0.22	0.21	0.22	0.22	0.25	0.21	0.37	0.20	0.16	0.27	0.55	0.24
P_2O_5	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.02	0.01	0.00	0.00	0.01	0.02
Total	99.6	100.2	100.1	99.9	100.5	100.1	100.8	100.3	101.0	100.3	100.3	100.5	100.1	100.7
An	47.06	44.39	43.46	45.03	45.95	40.91	42.84	45.42	43.24	48.25	53.70	42.51	44.34	42.96
Ab	51.88	54.46	55.25	53.75	52.77	57.81	55.73	53.34	54.59	50.57	45.35	55.94	52.43	55.61
Or	1.06	1.15	1.30	1.22	1.28	1.28	1.43	1.24	2.16	1.18	0.94	1.55	3.23	1.43

Table DR6-continued

Sample	17DZC-01 (Group I)													
SiO_2	59.18	58.50	57.08	56.96	57.39	56.83	56.91	58.03	57.00	56.74	58.38	58.22	59.29	59.39
TiO_2	0.00	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.04	0.02	0.01
Al_2O_3	26.12	26.75	27.89	27.88	27.81	27.87	28.04	26.70	27.56	27.50	26.63	26.56	26.59	26.36
FeO	0.13	0.16	0.15	0.15	0.15	0.14	0.20	0.19	0.12	0.17	0.15	0.16	0.15	0.13
MgO	0.00	0.01	0.00	0.00	0.00	0.01	0.02	0.02	0.04	0.00	0.02	0.01	0.02	0.03
MnO	0.01	0.02	0.01	0.02	0.01	0.03	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00
CaO	8.39	9.21	10.30	10.42	10.07	10.32	10.43	9.17	10.09	10.17	9.00	9.24	8.59	8.57
Na_2O	6.27	6.02	5.53	5.58	5.71	5.48	5.49	6.03	5.68	5.42	6.23	6.22	6.35	6.01
K_2O	0.53	0.21	0.16	0.18	0.25	0.18	0.18	0.26	0.23	0.19	0.26	0.24	0.25	0.52
P_2O_5	0.01	0.00	0.01	0.03	0.02	0.02	0.02	0.01	0.00	0.02	0.00	0.00	0.04	0.01
Total	100.7	100.9	101.2	101.2	101.4	100.9	101.3	100.4	100.7	100.2	100.7	100.7	101.3	101.0
An	41.19	45.25	50.27	50.28	48.64	50.49	50.68	44.97	48.86	50.36	43.74	44.48	42.19	42.70
Ab	55.70	53.50	48.79	48.70	49.89	48.48	48.29	53.54	49.80	48.53	54.78	54.17	56.37	54.19
Or	3.11	1.25	0.94	1.02	1.46	1.03	1.03	1.49	1.34	1.11	1.49	1.36	1.44	3.10

Table DR6-continued

Sample	17DZC-01			17DZC-04 (Group I)										
SiO_2	58.87	59.30	60.13	58.51	69.59	58.13	99.49	59.05	58.39	68.64	56.97	57.27	57.32	56.04
TiO_2	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.00
Al_2O_3	26.25	25.96	25.95	26.20	19.37	26.32	0.77	25.62	26.39	19.35	26.97	27.06	27.12	27.79
FeO	0.15	0.15	0.14	0.14	0.03	0.16	0.03	0.14	0.18	0.03	0.13	0.14	0.15	0.12
MgO	0.02	0.01	0.00	0.00	0.01	0.03	0.00	0.02	0.02	0.02	0.00	0.02	0.00	0.00
MnO	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.02
CaO	8.70	8.40	8.10	8.73	0.06	8.91	0.03	8.31	8.96	0.06	9.86	9.84	9.72	10.75
Na_2O	5.97	6.22	6.36	5.96	11.24	5.90	0.04	6.41	5.94	11.07	5.75	5.54	5.52	5.21
K_2O	0.43	0.25	0.26	0.61	0.03	0.45	0.00	0.34	0.40	0.04	0.19	0.41	0.29	0.26
P_2O_5	0.02	0.03	0.00	0.01	0.00	0.02	0.00	0.00	0.02	0.01	0.03	0.02	0.01	0.01
Total	100.4	100.3	101.0	100.2	100.3	99.9	100.4	99.9	100.3	99.2	99.9	100.3	100.1	100.2
An	43.45	42.10	40.68	43.1	0.3	44.3	28.2	40.9	44.4	0.3	48.1	48.3	48.5	52.5
Ab	54.01	56.39	57.76	53.3	99.5	53.1	67.5	57.1	53.3	99.4	50.8	49.3	49.8	46.0
Or	2.55	1.51	1.56	3.6	0.2	2.6	4.3	2.0	2.3	0.2	1.1	2.4	1.7	1.5

Table DR6-continued

Sample	17DZC-04			17DZC-08 (Group I)										
SiO_2	59.13	59.32	58.11	70.06	68.88	69.12	68.84	68.88	69.67	69.40	69.16	70.24	68.96	68.68
TiO_2	0.02	0.00	0.02	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.03	0.01	0.00
Al_2O_3	25.96	26.05	26.37	19.61	19.38	19.11	19.21	19.88	19.41	19.65	19.32	19.69	19.15	19.26
FeO	0.18	0.13	0.15	0.01	0.02	0.04	0.05	0.07	0.03	0.01	0.04	0.01	0.02	0.01
MgO	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.01	0.01	0.01
MnO	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01
CaO	8.47	8.41	8.75	0.07	0.04	0.04	0.07	0.22	0.02	0.02	0.04	0.02	0.06	0.23
Na_2O	6.24	6.36	5.96	11.42	11.01	11.10	10.96	10.96	11.26	11.34	11.20	11.29	10.90	10.91
K_2O	0.61	0.34	0.36	0.04	0.03	0.03	0.02	0.16	0.02	0.00	0.02	0.03	0.04	0.02
P_2O_5	0.02	0.00	0.02	0.02	0.02	0.00	0.01	0.00	0.02	0.01	0.00	0.01	0.02	0.00
Total	100.7	100.6	99.7	101.2	99.4	99.5	99.2	100.2	100.4	100.4	99.8	101.3	99.2	99.1
An	41.3	41.4	43.8	0.3	0.2	0.2	0.3	1.1	0.1	0.1	0.2	0.1	0.3	1.1
Ab	55.1	56.6	54.0	99.4	99.6	99.6	99.5	98.0	99.8	99.9	99.7	99.7	99.5	98.8
Or	3.5	2.0	2.1	0.2	0.2	0.2	0.1	0.9	0.1	0.0	0.1	0.2	0.2	0.1

Table DR6-continued

Sample	17DZC-13(Group II)													
SiO_2	63.46	61.56	61.88	61.19	60.36	60.98	61.84	60.49	60.79	61.75	61.18	60.51	60.45	61.31
TiO_2	0.06	0.03	0.04	0.01	0.00	0.01	0.02	0.04	0.01	0.00	0.00	0.00	0.00	0.00
Al_2O_3	21.03	23.06	22.60	23.47	24.21	23.87	23.01	23.59	23.61	23.19	22.96	24.04	24.09	23.45
FeO	0.71	0.40	0.45	0.38	0.41	0.35	0.54	0.44	0.34	0.38	0.59	0.36	0.40	0.40
MgO	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.02	0.03
MnO	0.03	0.02	0.01	0.02	0.03	0.04	0.04	0.04	0.03	0.04	0.04	0.01	0.04	0.01
CaO	4.77	5.82	5.45	6.09	6.34	6.47	5.70	6.33	6.36	5.46	5.71	6.64	6.70	5.97
Na_2O	6.68	7.03	7.03	7.15	6.62	6.86	6.98	6.89	6.94	7.30	7.07	6.99	6.58	6.91
K_2O	1.67	0.72	0.73	0.65	0.64	0.60	0.77	0.72	0.64	0.75	0.78	0.66	0.67	0.77

P_2O_5	0.01	0.02	0.03	0.01	0.02	0.01	0.01	0.03	0.02	0.00	0.00	0.01	0.00	0.02
Total	98.4	98.7	98.3	99.1	98.6	99.3	99.0	98.6	98.7	98.9	98.4	99.2	99.0	98.9
An	25.34	30.02	28.60	30.73	33.23	32.99	29.59	32.23	32.31	27.93	29.40	33.07	34.51	30.77
Ab	64.13	65.59	66.85	65.35	62.80	63.36	65.65	63.44	63.82	67.52	65.85	63.05	61.39	64.51
Or	10.53	4.39	4.56	3.92	3.98	3.65	4.76	4.33	3.87	4.55	4.75	3.89	4.10	4.72

Table DR6-continued

Sample	15DZC-01 (Group II)													
SiO_2	61.02	60.56	62.57	60.97	60.00	58.05	61.92	61.52	60.56	60.04	61.47	60.54	61.40	68.65
TiO_2	0.03	0.00	0.11	0.04	0.02	0.03	0.03	0.02	0.06	0.03	0.01	0.03	0.00	0.00
Al_2O_3	23.37	23.15	21.50	23.57	24.32	25.20	22.98	23.05	23.72	24.02	22.95	23.53	22.54	18.89
FeO	0.29	0.39	0.45	0.51	0.45	0.44	0.53	0.42	0.35	0.38	0.38	0.36	0.49	0.00
MgO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.01
MnO	0.04	0.01	0.03	0.04	0.00	0.07	0.03	0.05	0.05	0.00	0.03	0.02	0.01	0.00
CaO	6.23	6.10	4.23	6.17	7.28	8.40	5.90	5.76	6.38	6.55	5.73	6.49	5.50	0.05
Na_2O	7.24	6.87	6.36	6.87	6.50	6.08	7.05	7.08	6.88	6.84	7.07	6.79	7.35	10.70
K_2O	0.61	0.72	3.08	0.71	0.48	0.46	0.67	0.64	0.65	0.61	0.72	0.61	0.77	0.05
P_2O_5	0.02	0.01	0.05	0.03	0.02	0.01	0.00	0.04	0.00	0.00	0.01	0.02	0.01	0.00
Total	98.9	97.8	98.5	98.9	99.1	98.7	99.1	98.6	98.8	98.6	98.4	98.5	98.1	98.4
An	31.07	31.46	21.79	31.73	37.10	42.12	30.35	29.80	32.53	33.34	29.56	33.27	27.89	0.27
Ab	65.30	64.11	59.30	63.92	60.01	55.17	65.57	66.28	63.51	62.97	65.99	63.01	67.44	99.43
Or	3.63	4.43	18.90	4.35	2.89	2.72	4.08	3.92	3.97	3.69	4.45	3.72	4.67	0.30

Table DR6-continued

Sample	15DZC-07 (Group II)													
SiO_2	68.44	68.44	68.30	68.19	68.46	68.79	68.92	68.51	67.92	68.69	68.70	66.18	68.69	68.00
TiO_2	0.00	0.00	0.02	0.00	0.00	0.02	0.00	0.00	0.00	0.03	0.00	0.01	0.00	0.00
Al_2O_3	19.03	19.04	19.09	19.04	18.78	18.75	19.00	19.05	18.85	18.80	18.88	19.49	19.19	18.83
FeO	0.00	0.00	0.00	0.01	0.05	0.02	0.04	0.04	0.01	0.02	0.03	0.13	0.02	0.05
MgO	0.00	0.00	0.04	0.00	0.03	0.01	0.02	0.00	0.05	0.05	0.00	0.00	0.00	0.00
MnO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.58	0.00	0.03
CaO	0.07	0.02	0.03	0.22	0.02	0.03	0.02	0.04	0.05	0.08	0.10	0.14	0.05	0.05
Na_2O	10.86	10.83	10.95	11.01	10.82	11.16	10.77	10.91	10.75	10.68	11.14	10.07	11.03	11.15
K_2O	0.04	0.03	0.02	0.05	0.06	0.04	0.03	0.04	0.00	0.03	0.00	0.21	0.01	0.05
P_2O_5	0.01	0.01	0.01	0.00	0.02	0.01	0.01	0.01	0.02	0.00	0.00	0.01	0.00	0.01
Total	98.4	98.4	98.5	98.5	98.3	98.9	98.8	98.6	97.6	98.4	98.9	96.9	99.0	98.2
An	0.33	0.09	0.17	1.09	0.12	0.13	0.09	0.22	0.26	0.41	0.47	0.77	0.23	0.26
Ab	99.46	99.71	99.72	98.59	99.51	99.65	99.71	99.57	99.74	99.40	99.53	97.91	99.73	99.47
Or	0.21	0.20	0.11	0.32	0.37	0.22	0.19	0.21	0.00	0.19	0.00	1.32	0.04	0.27

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