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Electronic Supplementary Material for

Oceanic plateau subduction during closure of Bangong-Nujiang Tethys: Insights from Central Tibetan volcanic rocks

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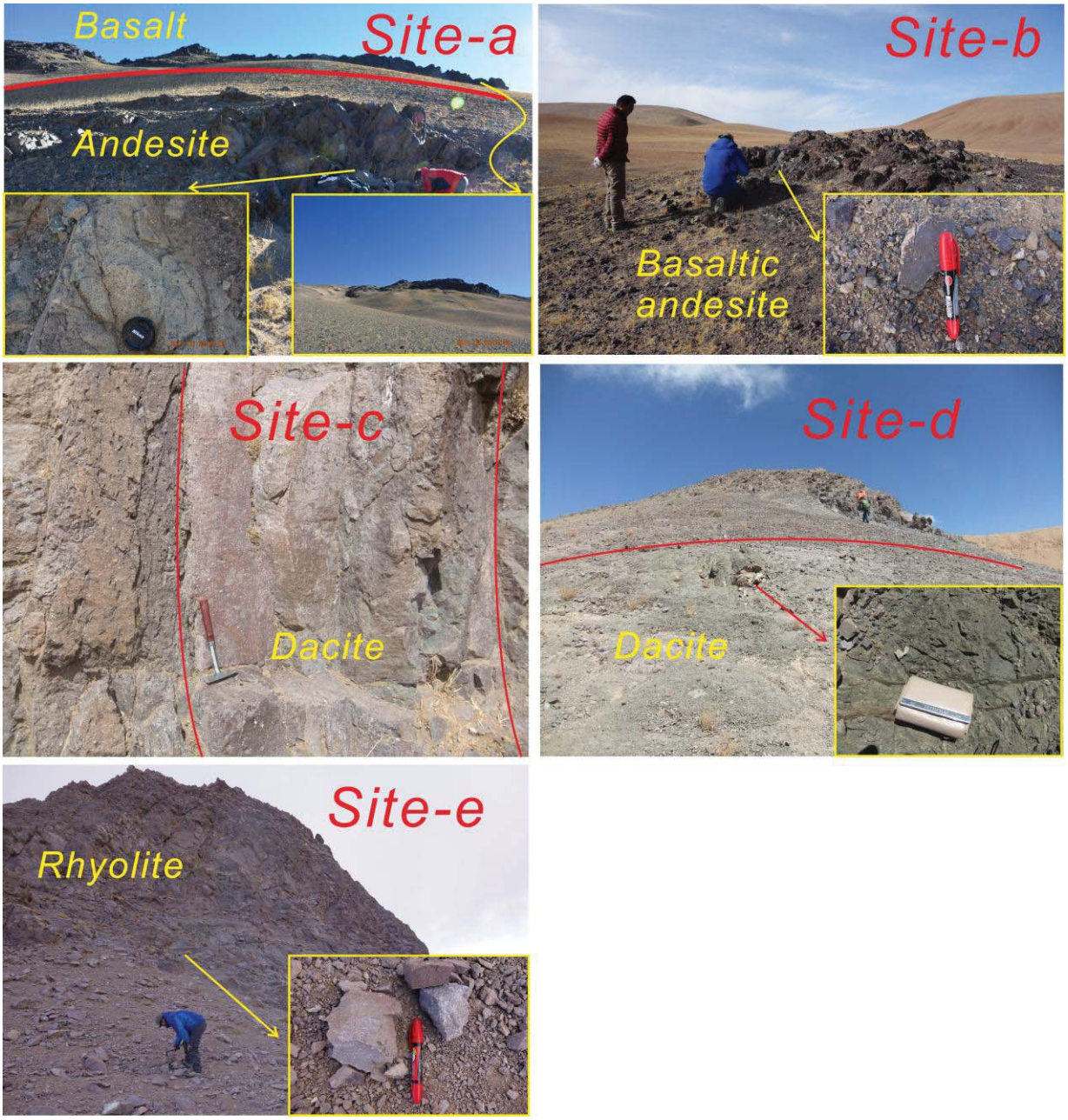
This data set presents ***Electronic Supplementary Material*** 1- field relationship photos, 2- Analytical methods, 3- Major and trace element data for the Gerze lavas, 4- Sr-Nd-Hf isotope data for the Gerze lavas, 5- LA-ICP-MS Zircon U-Pb age and Hf isotope data for the Gerze dacites, 6- SIMS Zircon U-Pb age data for the Gerze basalt, 7- Representative compositions of plagioclase and clinopyroxene phenocrysts of the Gerze lavas.

Supplementary Material 1 – Field relationship photos



Supplementary Material 2 - Analytical methods

Before preparing the powder samples, we firstly smashed the hand specimens into small chips and grains (size around 0.5-1.0 cm) and then selected those grains without amygdaloid bodies for grinding. ~200-mesh size powder samples were used to conduct whole-rock elemental and Sr-Nd isotopic analyses. Major element oxides were analyzed on fused glass beads with a Rigaku RIX 2000 X-ray fluorescence spectrometer. Calibration lines used in quantification were produced by bivariate regression of data from 36 reference materials encompassing a wide range of silicate compositions and analytical uncertainties are between 1% and 5% (Li et al., 2006).

Trace elements were analyzed with an Agilent 7500a ICP-MS. Analytical procedures were similar to those presented by Li et al. (2006). National rock standards (BHVO-2, GSR-1, GSR-2, GSR-3, AGV-2, W-2, and SARM-4) were used for calibration. Analytical precision is better than 5%. The detection limits are three times the standard deviation of the ten blank analyses [in ppb: Sc, 25.6; V, 5.1;Cr, 99; Co, 1.5; Ni, 27.6; Rb, 1.3; Ba, 6.8; Th, 0.3; U, 0.4; Nb, 10.1; Ta, 0.7; La, 0.5; Ce, 0.5; Pb, 10.9; Pr, 0.2; Sr, 0.3; Nd, 0.4; Zr, 11.3; Hf, 0.3; Sm, 0.8; Eu, 0.9; Ti, 35.8; Gd, 0.6; Tb, 0.1; Dy, 0.3; Y, 0.4; Ho, 0.1; Er, 0.2; Tm, 0.1; Yb, 0.3; Lu, 0.1].

Sr-Nd-Hf isotope analyses were conducted by a Micromass Isoprobe multi-collector mass spectrometer. Analytical methods are given in Li et al. (2006, 2007). Measured $^{86}Sr/^{88}Sr$, $^{143}Nd/^{144}Nd$, and $^{176}Hf/^{177}Hf$ values are fractionation corrected to $^{86}Sr/^{88}Sr$ =0.1194, $^{146}Nd/^{144}Nd$ =0.7219, and $^{179}Hf/^{177}Hf$ =0.7325, respectively. The $^{87}Sr/^{86}Sr$ ratio of the NBS987 standard and $^{143}Nd/^{144}Nd$ ratio of the Shin Etsu JNdi-1 standard measured were 0.710251± 6 (n=19, 2σ) and 0.512087± 3 (n=11, 2σ), respectively. $^{176}Hf/^{177}Hf$ of standard BCR-2 gives a ratio of 0.0.282881± 8 (2σ).

Major element analysis for clinopyroxene and plagioclase were carried out using a JXA-8100 electron microprobe. An accelerating voltage of 15 kV, a specimen current of 2.0×10^{-8} A, and a beam size of 1-2 μm were employed. The analytical errors are generally less than 2%. The analytical procedures were described in detail in Huang et al. (2007).

Zircon cathodoluminescence (CL) images were taken before U-Pb dating using a JEOL JXA-8100 Superprobe to better inspect internal morphology of individual zircons for selecting

analysis positions.

Measurements of U, Th, and Pb for sample QT04-1 were conducted using the Cameca IMS-1280 SIMS. U-Th-Pb ratios and their absolute abundances were determined relative to the standard zircon Plešovice and 91500, respectively, using operating and data processing procedures similar to those described by Li et al. (2010). Uncertainties on individual analyses in the data tables are reported at a 1σ level. Mean ages for pooled U/Pb and Pb/Pb analyses are quoted with 2σ and/or 95% confidence intervals. The weighted mean U-Pb ages and Concordia plots were processed using an Isoplot/Ex v.3.0 program.

Zircon dating U-Pb ages for dacite samples GZ01-1 and GZ26-1 were determined with an Agilent 7500a quadruple (Q)-ICPMS and a Neptune multi-collector (MC)-ICPMS with a 193 nm excimer ArF laser-ablation system (GeoLas Plus) (Xie et al., 2008). Zircon standard 91500 was used as an external standard and the $^{207}Pb/^{206}Pb$ and $^{206}Pb/^{238}U$ ratios were calculated using the ICPMSDataCal software. The weighted U-Pb ages and Concordia plots were processed using the Isoplot/Ex v.3.0 program.

Zircon Hf isotope measurements were subsequently done using LA-ICPMS with a beam size of 60 μm and laser pulse frequency of 8 Hz (Wu et al., 2006). Present $^{176}Hf/^{177}Hf$ ratios for the zircon standards MUD (0.282504 ± 2) and GJ-1 (0.282018 ± 4) were in good agreement within errors with the reported values (eg., Wu et al., 2006).

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Supplementary Material 3 - Major and trace element data for the Gerze lavas

Sample	ZB78-1	ZB78-2	ZB78-3	ZB78-4	QT04-1	QT04-2	GZ01-1	GZ26-1	GZ26-2	QT03-1	QT03-2	ZB79-1	ZB79-1R*	ZB79-2	ZB79-3	ZB79-4
rock type	NEB	NEB	NEB	NEB	basalt	basalt	dacite	dacite	dacite	andesite	andesite	rhyolite	rhyolite	rhyolite	rhyolite	rhyolite
SiO_2	55.97	54.17	48.95	47.56	48.67	46.72	62.38	62.44	61.18	57.41	60.64	71.96		71.85	72.42	71.62
TiO_2	1.82	2.03	2.05	1.83	1.63	1.21	0.87	0.82	0.81	0.65	0.61	0.26		0.25	0.25	0.26
Al_2O_3	13.18	14.54	14.87	13.47	14.81	14.81	15.88	15.59	15.27	16.62	15.52	14.14		14.12	13.92	13.93
Fe_2O_3	10.45	10.16	10.69	11.23	10.88	9.17	5.83	4.73	5.02	8.02	7.20	2.51		2.48	2.35	2.54
MnO	0.14	0.12	0.13	0.16	0.22	0.23	0.10	0.09	0.09	0.17	0.14	0.12		0.12	0.11	0.08
MgO	1.15	1.74	2.35	2.30	4.48	5.67	2.08	1.46	1.26	2.94	2.71	0.80		0.79	0.79	0.89
CaO	5.55	5.11	6.85	8.40	9.96	12.91	2.87	3.91	4.73	4.63	4.19	2.28		2.26	2.10	2.03
Na_2O	4.07	5.06	5.35	4.20	4.75	3.95	3.66	3.06	2.74	5.65	4.88	3.12		3.13	3.04	2.94
K_2O	2.26	1.68	1.26	1.91	0.11	0.14	4.36	4.22	4.01	0.22	0.32	2.80		2.80	2.58	2.92
P_2O_5	0.36	0.37	0.39	0.34	0.10	0.10	0.15	0.23	0.23	0.09	0.09	0.08		0.08	0.06	0.09
LOI	4.67	4.75	6.69	8.42	3.86	4.74	1.34	3.03	4.30	3.35	3.05	1.91		1.91	1.92	2.14
Total	99.60	99.73	99.58	99.82	99.47	99.65	99.51	99.57	99.64	99.75	99.35	99.98		99.79	99.54	99.43
Sc	19.8	22.1	22.5	26.5	45.4	50.4	13.2	12.0	11.8	26.9	28.33	4.90	4.92	5.09	4.94	5.19
V	125	179	177	191	443	355	64.2	61.9	59.1	182	195	15.6	15.6	14.3	15.3	13.6
Cr	12.3	8.28	7.95	9.46	24.1	180	322	85.0	115	43.0	44.9	13.5	8.66	9.95	7.44	12.0
Co	19.0	21.1	22.7	27.4	45.6	44.3	11.7	11.4	11.6	19.0	18.6	3.56	3.62	4.67	5.00	4.85
Ni	5.81	8.03	8.73	10.2	42.6	91.1	36.3	20.1	23.5	20.2	25.9	5.05	5.30	5.43	4.98	5.64
Rb	39.7	36.6	27.5	50.4	2.71	3.60	153	148	154	4.76	11.3	86.6	86.8	96.4	92.5	103
Ba	221	172	124	140	61.8	98.8	671	594	672	82.4	94.9	649	658	737	783	718
Th	4.60	5.37	5.35	4.97	0.52	0.25	25.0	23.1	24.9	2.65	3.12	7.48	7.41	7.95	7.64	8.01
U	0.43	1.27	1.22	0.78	0.43	0.18	2.13	3.32	3.01	0.63	0.72	1.45	1.43	1.91	1.82	1.91
Nb	10.0	11.8	11.9	12.1	1.95	1.53	22.9	22.9	23.7	2.84	3.55	3.56	3.58	3.82	3.72	3.74
Ta	0.73	0.84	0.84	0.80	0.13	0.11	1.56	1.55	1.60	0.22	0.24	0.32	0.31	0.34	0.33	0.33

La	20.1	20.9	19.2	20.3	3.10	2.52	62.8	59.7	63.3	8.64	8.78	16.6	17.0	17.6	17.2	18.2
Ce	46.4	47.4	45.6	46.9	9.44	8.23	124	120	126	18.6	19.6	30.1	29.7	31.1	29.7	31.3
Pb	7.70	9.92	9.31	11.8	0.76	0.85	31.7	26.8	27.2	5.94	6.84	12.2	12.1	15.5	15.4	13.6
Pr	6.18	6.48	6.25	6.14	1.70	1.50	14.6	14.3	14.7	2.36	2.51	3.04	3.11	3.17	3.16	3.20
Sr	201	194	224	252	51.1	163	211	161	192	123	147	299	304	343	327	312
Nd	26.8	28.1	27.4	26.0	9.39	8.40	52.7	52.0	54.3	10.1	10.9	10.5	10.9	11.0	10.8	11.3
Zr	302	323	320	296	109	89.3	336	320	297	62.3	92.0	95.2	95.4	104	103	101
Hf	6.39	7.16	7.05	6.49	2.87	2.33	8.38	8.02	7.32	1.95	2.49	2.72	2.68	2.81	2.75	2.88
Sm	6.27	6.61	6.60	6.29	3.43	3.06	9.70	9.76	10.1	2.57	2.83	1.74	1.79	1.92	1.84	1.94
Eu	1.94	1.74	1.77	1.68	1.41	1.21	1.45	1.38	1.43	0.82	0.89	0.47	0.48	0.51	0.48	0.50
Gd	6.58	6.94	6.73	6.55	4.27	3.81	8.33	8.62	8.59	2.81	3.20	1.47	1.52	1.64	1.50	1.64
Tb	1.11	1.19	1.17	1.13	0.85	0.75	1.23	1.29	1.29	0.51	0.58	0.18	0.18	0.21	0.18	0.21
Dy	6.82	7.40	7.46	6.94	5.61	4.94	6.87	7.25	7.25	3.31	3.79	0.92	0.97	1.08	0.97	1.12
Y	35.8	38.9	39.2	41.1	33.5	29.5	33.8	35.6	36.4	18.2	23.2	4.42	4.51	5.42	5.00	5.77
Ho	1.46	1.58	1.58	1.49	1.24	1.08	1.38	1.45	1.44	0.74	0.84	0.18	0.18	0.21	0.19	0.22
Er	3.99	4.31	4.41	4.19	3.49	3.00	3.69	3.77	3.83	2.06	2.40	0.44	0.47	0.55	0.48	0.57
Tm	0.58	0.63	0.65	0.62	0.51	0.43	0.55	0.55	0.56	0.32	0.37	0.07	0.07	0.08	0.07	0.08
Yb	3.59	3.91	4.14	3.92	3.23	2.74	3.62	3.46	3.48	2.02	2.36	0.43	0.42	0.53	0.48	0.53
Lu	0.57	0.63	0.64	0.62	0.51	0.42	0.57	0.53	0.53	0.33	0.39	0.07	0.07	0.08	0.07	0.09

* R means replicate measurement.

Supplementary Material 4 - Sr-Nd-Hf isotope data for the Gerze lavas (The chondrite values used to calculate the epsilon Hf and Nd values are 0.28277 and 0.51256, respectively; Initial and epsilon values calculated using 110 Ma)

Sample	GZ01-1	GZ26-1	QT03-1	QT03-2	QT04-1	QT04-1R	QT04-2	ZB78-1	ZB78-3	ZB78-3R	ZB78-4	ZB79-2	ZB79-3	ZB79-3R
Sm	9.7	9.8	2.6	2.8	3.4		3.1	6.3	6.6		6.3	1.9	1.8	
Nd	52.7	52.0	10.1	10.9	9.4		8.4	26.8	27.4		26.0	11.0	10.8	
Rb	153	148	4.8	11.3	2.7		3.6	39.7	27.5		50.4	96.4	92.5	
Sr	211	161	123	147	51		163	201	224		252	343	327	
Lu					0.51		0.42							
Hf					2.87		2.33							
$^{87}Sr/^{86}Sr$	0.7099	0.7104	0.7097	0.7099	0.7073	0.7072	0.7070	0.7056	0.7056	0.7056	0.7059	0.7063	0.7062	0.7061
$^{143}Nd/^{144}Nd$	0.5124	0.5124	0.5124	0.5125	0.5131	0.5131	0.5131	0.5127	0.5127	0.5127	0.5127	0.5126	0.5126	0.5126
$^{176}Hf/^{177}Hf$					0.2832		0.2832							
$^{147}Sm/^{144}Nd$	0.11	0.11	0.16	0.16	0.22	0.22	0.22	0.14	0.15	0.15	0.15	0.11	0.10	0.10
$^{87}Rb/^{86}Sr$	2.10	2.66	0.11	0.22	0.15	0.15	0.06	0.57	0.36	0.36	0.58	0.81	0.82	0.82
$^{176}Lu/^{177}Hf$					0.025		0.026							
εNd(t)	-3.3	-3.5	-3.3	-2.9	8.7	8.5	9.0	2.7	2.7	2.5	2.6	1.1	0.9	1.3
εHf(t)					17.19		17.20							
$(^{87}Sr/^{86}Sr)_i$	0.7066	0.7062	0.7095	0.7096	0.7071		0.7069	0.7047	0.7050	0.7050	0.7050	0.7050	0.7049	

* R means replicate measurement.

Supplementary Material 5 - LA-ICP-MS Zircon U-Pb age and Hf isotope data for the Gerze dacites

Analysis spot	Concentrations (ppm)			Measured ratios								Corrected ratios			
	Th	U	Th/U	$^{207}Pb/^{206}Pb$	1σ	$^{207}Pb/^{235}U$	1σ	$^{206}Pb/^{238}U$	1σ	$^{208}Pb/^{232}Th$	1σ	$^{207}Pb/^{235}U$	1σ	$^{206}Pb/^{238}U$	1σ
GZ01-1 01	88	213	0.41	0.0534	0.0028	0.1196	0.0060	0.0163	0.0003	0.0057	0.0003	0.1023	0.0053	0.0161	0.0003
GZ01-1 02	150	366	0.41	0.0513	0.0020	0.1153	0.0043	0.0162	0.0003	0.0052	0. 002	0.1153	0.0043	0.0163	0.0003
GZ01- 03	281	525	0.53	0.0513	0.0017	0.1162	0.0036	0.0164	0.0003	0.0049	0.0001	0.1162	0.0036	0.0164	0.0003
GZ01-1 04	342	207	1.65	0.0544	0.0031	0.1216	0.0065	0.0162	0.0004	0.0053	0.0001	0.1216	0.0065	0.0162	0.0004
GZ01-1 05	136	281	0.48	0.0480	0.0021	0.1138	0.0047	0.0172	0.0003	0.0052	0.0002	0.1138	0.0047	0.0172	0.0003
GZ01-1 06	261	321	0.81	0.0579	0.0025	0.1293	0.0052	0.0162	0.0003	0.0053	0.0001	0.1293	0.0052	0.0162	0.0003
GZ01-1 07	99	428	0.23	0.0495	0.0018	0.1138	0.0040	0.0167	0.0003	0.0055	0.0002	0.1138	0.0040	0.0167	0.0003
GZ01-1 08	117	348	0.34	0.0517	0.0021	0.1176	0.0046	0.0165	0.0003	0.0050	0.0002	0.1176	0.0046	0.0165	0.0003
GZ01-1 09	159	201	0.79	0.0498	0.0029	0.1116	0.0062	0.0163	0.0003	0.0048	0.0002	0.1116	0.0062	0.0163	0.0003
GZ01-1 10	147	202	0.73	0.0484	0.0030	0.1088	0.0065	0.0163	0.0004	0.0049	0.0002	0.1088	0.0065	0.0163	0.0004
GZ01-1 11	76	245	0.31	0.0479	0.0025	0.1080	0.0053	0.0163	0.0003	0.0053	0.0003	0.1080	0.0053	0.0163	0.0003
GZ01-1 12	129	242	0.53	0.0500	0.0029	0.1131	0.0062	0.0164	0.0004	0.0052	0.0002	0.1131	0.0062	0.0164	0.0004
GZ01-1 13	105	291	0.36	0.0495	0.0022	0.1190	0.0052	0.0174	0.0003	0.0056	0.0002	0.1190	0.0052	0.0174	0.0003
GZ01-1 14	186	181	1.02	0.0561	0.0031	0.1282	0.0069	0.0166	0.0004	0.0052	0.0002	0.1282	0.0069	0.0166	0.0004
GZ01-1 15	72	201	0.36	0.0533	0.0028	0.1197	0.0061	0.0163	0.0003	0.0050	0.0002	0.1197	0.0061	0.0163	0.0003
GZ01-1 16	115	193	0.60	0.0513	0.0042	0.1244	0.0097	0.0176	0.0005	0.0052	0.0003	0.1244	0.0097	0.0176	0.0005
GZ01-1 17	118	374	0.31	0.0457	0.0020	0.1079	0.0045	0.0171	0.0003	0.0052	0.0002	0.1079	0.0045	0.0171	0.0003
GZ01-1 18	139	282	0.49	0.0535	0.0023	0.1214	0.0050	0.0165	0.0003	0.0057	0.0002	0.1036	0.0053	0.0163	0.0003
GZ01-1 19	111	114	0.98	0.0592	0.0042	0.1382	0.0093	0.0169	0.0004	0.0052	0.0002	0.1382	0.0093	0.0169	0.0004
GZ01-1 20	124	210	0.59	0.0510	0.0027	0.1135	0.0057	0.0161	0.0003	0.0050	0.0002	0.1135	0.0057	0.0161	0.0003
GZ26-1 01	200	275	0.73	0.0510	0.0022	0.1194	0.0050	0.0170	0.0003	0.0054	0.0002	0.1194	0.0050	0.0170	0.0003
GZ26-1 02	366	253	1.45	0.0566	0.0049	0.1273	0.0106	0.0163	0.0005	0.0054	0.0002	0.1273	0.0106	0.0163	0.0005
GZ26-1 03	188	230	0.82	0.0495	0.0025	0.1168	0.0057	0.0171	0.0003	0.0054	0.0002	0.1168	0.0057	0.0171	0.0003
GZ26-1 04	98	192	0.51	0.0520	0.0028	0.1208	0.0061	0.0169	0.0003	0.0056	0.0002	0.1208	0.0061	0.0169	0.0003

GZ26-1 05	170	195	0.87	0.0511	0.0028	0.1167	0.0061	0.0166	0.0004	0.0053	0.0002	0.1167	0.0061	0.0166	0.0004
GZ26-1 06	144	350	0.41	0.0485	0.0020	0.1128	0.0045	0.0169	0.0003	0.0052	0.0002	0.1128	0.0045	0.0169	0.0003
GZ26-1 07	283	295	0.96	0.0526	0.0025	0.1209	0.0054	0.0167	0.0003	0.0053	0.0002	0.1209	0.0054	0.0167	0.0003
GZ26-1 08	102	165	0.62	0.0545	0.0034	0.1225	0.0072	0.0163	0.0004	0.0054	0.0002	0.1225	0.0072	0.0163	0.0004
GZ26-1 09	123	239	0.52	0.0598	0.0038	0.1356	0.0082	0.0165	0.0004	0.0060	0.0003	0.1026	0.0044	0.0162	0.0004
GZ26-1 10	139	198	0.70	0.0476	0.0028	0.1115	0.0063	0.0170	0.0004	0.0053	0.0002	0.1115	0.0063	0.0170	0.0004
GZ26-1 11	164	148	1.11	0.0564	0.0045	0.1289	0.0098	0.0166	0.0004	0.0055	0.0002	0.1289	0.0098	0.0166	0.0004
GZ26-1 12	151	759	0.20	0.0488	0.0015	0.1109	0.0032	0.0165	0.0003	0.0052	0.0002	0.1109	0.0032	0.0165	0.0003
GZ26-1 13	279	464	0.60	0.0584	0.0030	0.1280	0.0062	0.0159	0.0003	0.0056	0.0002	0.0994	0.0054	0.0157	0.0003
GZ26-1 14	76	133	0.57	0.0571	0.0041	0.1247	0.0084	0.0159	0.0004	0.0055	0.0003	0.0992	0.0119	0.0156	0.0004
GZ26-1 15	120	429	0.28	0.0542	0.0025	0.1255	0.0055	0.0168	0.0003	0.0053	0.0003	0.1255	0.0055	0.0168	0.0003
GZ26-1 16	99	353	0.28	0.0495	0.0022	0.1126	0.0047	0.0165	0.0003	0.0057	0.0003	0.1126	0.0047	0.0165	0.0003
GZ26-1 17	255	418	0.61	0.0534	0.0022	0.1201	0.0047	0.0163	0.0003	0.0054	0.0002	0.1076	0.0075	0.0162	0.0003
GZ26-1 18	110	267	0.41	0.0473	0.0026	0.1090	0.0057	0.0167	0.0003	0.0055	0.0002	0.1090	0.0057	0.0167	0.0003
GZ26-1 19	228	217	1.05	0.0548	0.0039	0.1272	0.0087	0.0169	0.0004	0.0056	0.0002	0.1272	0.0087	0.0169	0.0004
GZ26-1 20	196	171	1.15	0.0495	0.0033	0.1103	0.0070	0.0162	0.0004	0.0051	0.0002	0.1103	0.0070	0.0162	0.0004

Analysis spot	Corrected ages (Ma)															
	$^{207}Pb/^{235}U$	1σ	$^{206}Pb/^{238}U$	1σ	$^{176}Yb/^{177}Hf$	$^{176}Lu/^{177}Hf$	$^{176}Hf/^{177}Hf$	2σ	$^{176}Hf/^{177}Hf_i$	$\varepsilon_{Hf}(0)$	$\varepsilon_{Hf}(t)$	2σ	T_{DM} (Ma)	T_{DM}^{C} (Ma)	2σ	$f_{Lu/Hf}$
GZ01-1 01	99	5	103	2	0.0355	0.0013	0.2828	0.0000	0.2828	0	2.3	0.2	84	1021	20	-0.96
GZ 1-1 02	111	4	104	2	0.0436	0.0016	0.2828	.0000	0.2828	0.8	.2	1	653	966	19	-0.95
GZ01-1 03	112	3	105	2	0.0575	0.0021	0.2828	0.0000	0.2828	-0.2	2.1	0.8	704	1032	21	-0.94
GZ01-1 04	116	6	104	2	0.0568	0.0020	0.2827	0.0000	0.2827	-1	1.4	1.1	734	1081	22	-0.94
GZ01-1 05	109	4	110	2	0.0353	0.0013	0.2828	0.0000	0.2828	0.6	2.9	0.9	659	982	20	-0.96
GZ01-1 06	123	5	104	2	0.0357	0.0013	0.2829	0.0000	0.2829	4.1	6.5	1	515	755	15	-0.96
GZ01-1 07	109	4	107	2	0.0418	0.0016	0.2828	0.0000	0.2828	-0.7	1.7	0.9	714	1062	21	-0.95
GZ01-1 08	113	4	105	2	0.0390	0.0015	0.2828	0.0000	0.2828	0.4	2.8	0.9	668	992	20	-0.96
GZ01-1 09	107	6	104	2	0.0362	0.0013	0.2828	0.0000	0.2828	0.5	2.8	1.6	662	987	20	-0.96

GZ01-1 10	105	6	104	2	0.0314	0.0012	0.2828	0.0000	0.2828	0.6	3	1	655	979	20	-0.96
GZ01-1 11	104	5	104	2	0.0638	0.0022	0.2827	0.0000	0.2827	-2	0.3	0.9	782	1149	23	-0.93
GZ01-1 12	109	6	105	2	0.0383	0.0014	0.2828	0.0000	0.2828	1.9	4.3	0.8	605	895	18	-0.96
GZ01-1 13	114	5	111	2	0.0362	0.0013	0.2828	0.0000	0.2828	0.8	3.1	1	651	968	19	-0.96
GZ01-1 14	123	6	106	2	0.0359	0.0013	0.2828	0.0000	0.2828	0.2	2.5	0.9	674	1005	20	-0.96
GZ01-1 15	115	5	104	2	0.0258	0.0009	0.2827	0.0000	0.2827	-1.9	0.4	1.3	753	1140	23	-0.97
GZ01-1 16	119	9	112	3	0.0348	0.0013	0.2828	0.0000	0.2828	-0.2	2.1	0.9	691	1033	21	-0.96
GZ01-1 17	104	4	109	2	0.0445	0.0016	0.2828	0.0000	0.2828	-0.2	2.1	0.7	697	1034	21	-0.95
GZ01-1 18	100	5	104	2	0.0479	0.0018	0.2828	0.0000	0.2828	0.8	3.2	0.9	656	966	19	-0.95
GZ01-1 19	131	8	108	3	0.0320	0.0012	0.2829	0.0000	0.2829	3.2	5.6	1.4	550	813	16	-0.97
GZ01-1 20	109	5	103	2	0.0280	0.0010	0.2828	0.0000	0.2828	-0.3	2	0.8	690	1037	21	-0.97
GZ26-1 01	115	5	109	2	0.0351	0.0013	0.2828	0.0000	0.2828	-0.3	2.1	0.7	694	1036	21	-0.96
GZ26-1 02	122	10	104	3	0.0514	0.0018	0.2827	0.0000	0.2827	-1.7	0.7	1	758	1125	23	-0.95
GZ26-1 03	112	5	109	2	0.0342	0.0013	0.2828	0.0000	0.2828	-0.2	2.1	0.6	689	1031	21	-0.96
GZ26-1 04	116	6	108	2	0.0174	0.0006	0.2827	0.0000	0.2827	-1.6	0.8	0.6	734	1118	22	-0.98
GZ26-1 05	112	6	106	2	0.0298	0.0011	0.2828	0.0000	0.2828	-0.4	1.9	1.1	696	1045	21	-0.97
GZ26-1 06	108	4	108	2	0.0316	0.0012	0.2827	0.0000	0.2827	-1.3	1	0.6	732	1101	22	-0.97
GZ26-1 07	116	5	107	2	0.0460	0.0017	0.2826	0.0000	0.2826	-4.8	-2.5	1.3	884	1325	26	-0.95
GZ26-1 08	117	7	104	2	0.0291	0.0011	0.2827	0.0000	0.2827	-2	0.3	0.7	759	1145	23	-0.97
GZ26-1 09	99	4	103	2	0.0258	0.0010	0.2828	0.0000	0.2828	1.8	4.1	0.6	606	904	18	-0.97
GZ26-1 10	107	6	109	2	0.0291	0.0011	0.2828	0.0000	0.2828	0	2.4	0.8	678	1018	20	-0.97
GZ26-1 11	123	9	106	3	0.0441	0.0016	0.2827	0.0000	0.2827	-2.7	-0.4	0.8	797	1191	24	-0.95
GZ26-1 12	107	3	105	2	0.0385	0.0015	0.2827	0.0000	0.2827	-1.8	0.6	0.6	757	1132	23	-0.96
GZ26-1 13	96	5	100	2	0.0379	0.0014	0.2828	0.0000	0.2828	1.3	3.6	0.8	632	937	19	-0.96
GZ26-1 14	96	11	100	2	0.0223	0.0008	0.2827	0.0000	0.2827	-3	-0.6	0.7	794	1208	24	-0.97
GZ26-1 15	120	5	107	2	0.0304	0.0012	0.2827	0.0000	0.2827	-1.5	0.8	0.6	741	1116	22	-0.97
GZ26-1 16	108	4	106	2	0.0424	0.0016	0.2828	0.0000	0.2828	0.2	2.5	0.6	681	1010	20	-0.95
GZ26-1 17	104	7	104	2	0.0405	0.0015	0.2827	0.0000	0.2827	-1.3	1	0.6	740	1104	22	-0.96
GZ26-1 18	105	5	107	2	0.0320	0.0012	0.2828	0.0000	0.2828	0.6	2.9	0.7	658	982	20	-0.96

GZ26-1 19	122	8	108	3	0.0389	0.0014	0.2828	0.0000	0.2828	0.1	2.4	0.7	681	1013	20	-0.96
GZ26-1 20	106	6	103	2	0.0341	0.0013	0.2828	0.0000	0.2828	-0.1	2.3	0.7	685	1023	20	-0.96

Supplementary Material 6 - SIMS Zircon U-Pb age data for the Gerze basalt

	Measured ratios				Ages				Concentrations (ppm)			
Analysis spot	$^{207}Pb/^{235}U$	±	$^{206}Pb/^{238}U$	±	$^{207}Pb/^{235}U$	±	$^{206}Pb/^{238}U$	±	[U]	[Th]	[Pb]	Th/U
QT04-1@10	0.11102	2.22	0.0168	1.51	106.9	2.3	107.2	1.6	497	625	12	1.258
QT04-1@09	0.11767	2.15	0.0168	1.55	113.0	2.3	107.3	1.6	419	206	8	0.490
QT04-1@01	0.11267	2.12	0.0170	1.54	108.4	2.2	108.6	1.7	1114	683	23	0.613
QT04-1@11	0.13384	3.31	0.0177	1.53	127.5	4.0	113.4	1.7	258	157	6	0.608
QT04-1@04	0.15740	1.86	0.0232	1.59	148.4	2.6	148.0	2.3	887	872	28	0.982
QT04-1@13	0.16737	1.89	0.0237	1.50	157.1	2.8	151.2	2.2	503	461	16	0.915
QT04-1@03	0.16225	3.44	0.0242	1.52	152.7	4.9	154.1	2.3	353	419	12	1.187

Supplementary Material 7 – Representative compositions of plagioclase (Pl) **and clinopyroxene** (Cpx) **phenocrysts of the Gerze lavas**

Analysis spot	Na_2O	K_2O	F	ZnO	SiO_2	CaO	FeO	Al_2O_3	Cl	MnO	MgO	P_2O_5	Cr_2O_3	TiO_2	Total	mineral
QT03-2 01	7.99	0.07	0.00	0.00	71.69	0.21	0.08	20.35	0.01	0.02	0.00	0.01	0.03	0.01	100.5	Pl
QT03-2 02	9.35	0.19	0.00	0.00	69.12	0.22	0.04	20.09	0.06	0.00	0.01	0.00	0.01	0.00	99.1	Pl
QT03-2 03	8.47	0.08	0.00	0.00	71.86	0.29	0.03	20.26	0.00	0.02	0.00	0.00	0.01	0.00	101.0	Pl
QT03-2 04	8.28	0.09	0.00	0.00	71.41	0.23	0.05	20.05	0.00	0.00	0.00	0.00	0.00	0.01	100.1	Pl
QT03-2 05	8.64	0.05	0.01	0.01	71.42	0.14	0.06	20.34	0.00	0.04	0.00	0.03	0.01	0.00	100.7	Pl
QT03-2 09	9.51	0.05	0.01	0.00	70.46	0.14	0.04	20.01	0.01	0.00	0.00	0.00	0.01	0.01	100.3	Pl
QT03-2 10	7.67	0.31	0.00	0.00	71.23	0.37	0.08	21.19	0.00	0.00	0.01	0.02	0.00	0.00	100.9	Pl
QT03-2 15	9.10	0.05	0.00	0.00	71.06	0.26	0.01	20.38	0.00	0.00	0.00	0.01	0.00	0.00	100.9	Pl
QT03-2 16	8.22	0.03	0.00	0.00	71.42	0.25	0.00	20.20	0.01	0.02	0.00	0.00	0.02	0.00	100.2	Pl
QT03-2 17	7.75	0.06	0.00	0.00	71.76	0.43	0.04	20.82	0.01	0.00	0.01	0.01	0.00	0.00	100.9	Pl
QT03-2 18	8.66	0.04	0.00	0.00	71.79	0.14	0.01	20.21	0.02	0.00	0.00	0.01	0.01	0.00	100.9	Pl
QT03-2 24	7.80	0.07	0.00	0.02	71.53	0.38	0.21	20.70	0.00	0.00	0.00	0.03	0.02	0.01	100.8	Pl
QT04-1 03	9.46	0.09	0.04	0.00	70.60	0.13	0.03	19.66	0.01	0.00	0.00	0.00	0.00	0.02	100.0	Pl
QT04-1 04	9.98	0.03	0.00	0.00	68.77	0.11	0.04	19.28	0.00	0.02	0.00	0.00	0.02	0.00	98.3	Pl
QT04-1 10	10.08	0.07	0.08	0.05	70.78	0.09	0.07	20.17	0.01	0.01	0.00	0.00	0.00	0.00	101.4	Pl
QT04-1 11	8.51	0.04	0.00	0.00	71.37	0.23	0.03	20.09	0.01	0.00	0.00	0.00	0.01	0.01	100.3	Pl
QT04-1 12	9.33	0.04	0.06	0.00	71.49	0.12	0.05	19.99	0.00	0.01	0.02	0.04	0.02	0.00	101.1	Pl
QT04-1 13	9.66	0.00	0.00	0.02	70.02	0.06	0.07	19.98	0.00	0.02	0.00	0.04	0.00	0.00	99.9	Pl
QT04-1 14	9.71	0.06	0.00	0.01	70.63	0.16	0.05	19.65	0.01	0.01	0.00	0.00	0.00	0.00	100.3	Pl
QT04-1 15	9.20	0.03	0.00	0.03	71.09	0.10	0.10	19.94	0.00	0.00	0.01	0.03	0.00	0.01	100.5	Pl
QT04-1 16	9.08	0.04	0.00	0.00	71.26	0.07	0.03	19.80	0.01	0.01	0.00	0.00	0.00	0.00	100.3	Pl
QT04-1 23	10.52	0.05	0.06	0.00	70.54	0.23	0.02	19.53	0.01	0.01	0.01	0.00	0.00	0.00	100.9	Pl
QT04-2 04	8.78	0.05	0.00	0.05	70.64	0.14	0.04	19.38	0.02	0.00	0.00	0.00	0.00	0.01	99.1	Pl
QT04-2 05	9.34	0.08	0.00	0.00	71.14	0.17	0.07	18.87	0.02	0.01	0.00	0.01	0.01	0.01	99.7	Pl
QT04-2 11	10.20	0.04	0.00	0.00	70.89	0.16	0.10	19.71	0.00	0.00	0.00	0.01	0.00	0.00	101.1	Pl

ZB78-2 01	8.06	0.07	0.00	0.00	72.51	0.01	0.03	19.60	0.01	0.01	0.00	0.00	0.05	0.00	100.3	Pl
ZB78-2 02	7.09	0.06	0.00	0.01	73.24	0.00	0.04	19.69	0.01	0.01	0.00	0.01	0.00	0.00	100.1	Pl
ZB78-2 03	7.84	0.04	0.00	0.00	73.11	0.05	0.05	19.76	0.01	0.00	0.00	0.02	0.01	0.00	100.9	Pl
ZB78-2 04	8.15	0.05	0.03	0.01	72.17	0.02	0.03	19.57	0.00	0.02	0.00	0.00	0.01	0.01	100.1	Pl
ZB78-2 05	7.88	0.05	0.00	0.00	73.03	0.03	0.09	20.07	0.00	0.00	0.00	0.00	0.02	0.00	101.2	Pl
ZB78-2 07	7.13	0.08	0.00	0.00	72.95	0.07	0.06	19.92	0.00	0.03	0.00	0.00	0.00	0.00	100.2	Pl
ZB78-3 04	8.58	0.03	0.10	0.00	72.44	0.09	0.00	20.18	0.00	0.05	0.00	0.00	0.00	0.00	101.4	Pl
ZB78-3 07	9.09	0.06	0.08	0.04	72.20	0.02	0.04	20.37	0.01	0.00	0.01	0.00	0.00	0.00	101.9	Pl
ZB78-3 08	7.22	0.06	0.00	0.01	72.29	0.03	0.06	19.89	0.02	0.00	0.00	0.00	0.02	0.00	99.6	Pl
ZB78-3 09	9.74	0.02	0.00	0.00	71.49	0.04	0.03	19.65	0.00	0.00	0.00	0.01	0.00	0.00	101.0	Pl
ZB79-4 01	6.49	0.23	0.00	0.00	55.72	10.53	0.20	27.31	0.00	0.00	0.01	0.03	0.01	0.00	100.5	Pl
ZB79-4 02	6.69	0.32	0.10	0.05	57.84	8.66	0.22	25.38	0.00	0.00	0.01	0.00	0.02	0.02	99.3	Pl
ZB79-4 03	6.28	0.26	0.00	0.02	56.74	9.95	0.20	27.09	0.00	0.02	0.01	0.01	0.02	0.02	100.6	Pl
ZB79-4 04	6.76	0.27	0.02	0.00	57.06	9.52	0.21	26.12	0.00	0.04	0.00	0.00	0.00	0.04	100.0	Pl
ZB79-4 05	6.49	0.28	0.00	0.00	56.82	9.95	0.20	26.48	0.01	0.02	0.02	0.03	0.03	0.01	100.3	Pl
ZB79-4 06	7.27	0.43	0.00	0.05	59.50	8.11	0.13	25.27	0.00	0.02	0.01	0.01	0.01	0.02	100.8	Pl
ZB79-4 07	6.34	0.24	0.00	0.03	56.11	10.25	0.19	26.78	0.00	0.03	0.02	0.01	0.00	0.02	100.0	Pl
ZB79-4 08	7.13	0.41	0.00	0.00	57.77	8.83	0.15	25.69	0.00	0.00	0.00	0.01	0.01	0.00	100.0	Pl
ZB79-4 09	7.02	0.40	0.00	0.00	58.28	8.50	0.13	25.71	0.00	0.00	0.00	0.00	0.01	0.02	100.1	Pl
ZB79-4 10	6.97	0.31	0.00	0.02	57.46	9.32	0.17	25.89	0.00	0.00	0.00	0.00	0.02	0.00	100.2	Pl
ZB79-4 11	6.20	0.25	0.00	0.00	56.06	10.08	0.25	26.46	0.01	0.00	0.01	0.00	0.01	0.03	99.4	Pl
ZB79-4 12	6.39	0.24	0.00	0.01	56.09	10.27	0.21	26.75	0.00	0.01	0.01	0.03	0.00	0.02	100.0	Pl
ZB79-2 01	6.54	0.28	0.02	0.00	57.51	9.27	0.20	26.07	0.00	0.01	0.00	0.04	0.00	0.00	99.9	Pl
ZB79-2 03	6.47	0.25	0.00	0.00	56.18	9.78	0.21	26.48	0.01	0.02	0.03	0.01	0.00	0.00	99.4	Pl
ZB79-2 04	6.05	0.20	0.00	0.03	56.30	10.29	0.22	26.50	0.00	0.00	0.02	0.01	0.03	0.03	99.7	Pl
ZB79-2 05	6.39	0.26	0.08	0.00	56.29	10.21	0.24	27.01	0.00	0.03	0.02	0.00	0.00	0.00	100.5	Pl
ZB79-2 06	6.60	0.23	0.00	0.00	56.37	10.27	0.17	26.90	0.00	0.01	0.02	0.03	0.01	0.02	100.6	Pl
ZB79-2 07	6.10	0.20	0.00	0.00	55.86	10.37	0.22	27.38	0.01	0.02	0.02	0.01	0.02	0.02	100.2	Pl
ZB79-2 08	6.74	0.30	0.00	0.02	56.97	9.73	0.18	26.73	0.00	0.00	0.02	0.02	0.00	0.00	100.7	Pl

ZB79-2 09	6.28	0.23	0.00	0.00	55.88	10.06	0.23	26.64	0.00	0.02	0.02	0.03	0.00	0.00	99.4	Pl
ZB79-2 10	5.65	0.24	0.02	0.00	54.53	11.39	0.25	27.41	0.01	0.07	0.01	0.01	0.00	0.00	99.6	Pl
QT04-1 06	0.41	0.01	0.00	0.02	50.41	20.02	8.89	4.00	0.01	0.21	14.63	0.02	0.04	1.05	99.7	Cpx
QT04-1 07	0.56	0.00	0.00	0.03	49.48	20.42	9.15	4.63	0.00	0.26	13.90	0.03	0.03	1.30	99.8	Cpx
QT04-1 08	0.57	0.00	0.00	0.00	48.67	20.40	11.56	3.83	0.00	0.31	12.62	0.02	0.03	1.51	99.5	Cpx
QT04-1 09	0.45	0.00	0.00	0.04	51.96	20.87	9.29	2.22	0.00	0.22	14.79	0.02	0.00	0.71	100.5	Cpx
QT04-1 22	0.48	0.00	0.00	0.00	50.13	20.85	9.46	3.46	0.01	0.24	13.66	0.03	0.02	1.00	99.3	Cpx
QT04-1 24	0.42	0.01	0.00	0.05	51.33	21.41	7.92	2.67	0.00	0.19	14.93	0.03	0.04	0.68	99.7	Cpx
QT04-1 25	0.48	0.00	0.00	0.00	49.98	20.98	9.06	3.45	0.00	0.21	13.76	0.01	0.02	0.97	98.9	Cpx
QT04-1 26	0.46	0.01	0.00	0.00	50.54	21.02	8.56	3.30	0.01	0.22	14.31	0.00	0.02	0.93	99.4	Cpx
QT04-2 01	0.32	0.00	0.00	0.00	52.44	21.02	7.75	1.99	0.01	0.23	15.68	0.01	0.01	0.61	100.1	Cpx
QT04-2 02	0.27	0.00	0.00	0.00	52.45	21.14	7.16	1.95	0.00	0.19	15.82	0.02	0.04	0.53	99.6	Cpx
QT04-2 03	0.40	0.00	0.00	0.00	53.21	20.52	5.93	2.14	0.00	0.14	16.90	0.01	0.28	0.42	99.9	Cpx
QT04-2 06	0.36	0.02	0.00	0.01	50.08	20.39	6.62	5.01	0.00	0.14	15.26	0.02	0.68	0.91	99.5	Cpx
QT04-2 07	0.37	0.01	0.00	0.00	53.02	21.49	6.18	2.38	0.01	0.16	16.24	0.01	0.14	0.54	100.5	Cpx
QT04-2 08	0.37	0.02	0.00	0.00	51.18	21.08	6.36	4.14	0.00	0.15	15.52	0.00	0.39	0.58	99.8	Cpx
QT04-2 09	0.47	0.01	0.00	0.02	49.74	20.52	9.79	3.90	0.00	0.23	14.03	0.00	0.00	1.07	99.8	Cpx
QT04-2 12	0.61	0.01	0.00	0.00	49.29	20.41	10.93	4.00	0.01	0.27	13.18	0.02	0.00	1.41	100.1	Cpx
QT04-2 14	0.41	0.00	0.00	0.06	50.86	20.89	6.10	4.59	0.00	0.14	15.46	0.04	0.60	0.76	99.9	Cpx
QT04-2 16	0.44	0.00	0.00	0.00	51.00	20.93	6.73	4.14	0.00	0.16	15.43	0.02	0.10	0.75	99.7	Cpx