

SUPPLEMENTAL FILE

X-Ray Fluorescence Methods

Juvenile mafic lavas and scoria (151 samples) were collected for major-oxide and trace-element analyses by X-Ray Fluorescence (XRF) spectrometry from our map area. Samples were chipped to ≤ 5 mm-diameter, and altered pieces were removed by hand. Some eruptives contain vesicles filled with abundant secondary zeolites, carbonates, gypsum and anhydrite, clays, and loess in vesicles, which were analyzed in the absence of any fresher material. These were first cleaned by heating them to 60°C for an hour to dissolve any gypsum and anhydrite, then 90°C for an hour to dissolve any zeolites, and then put in an ultrasonic bath for 8 hours to disaggregate any remaining foreign material. Fresh samples and vesicle filled samples cleaned in the laboratory, from the same unit, were analyzed and compared with no evidence of fractionation during the cleaning process. After cleaning, any samples with adhering foreign material were removed from the separate, and ~50 g of material was sent to the GeoAnalytical Laboratory at Washington State University in Pullman, Washington for analyses using the methods of Johnson et al. (1999). Fresh rock chips were powdered in an Al-swing mill, diluted with a flux of di-lithium tetraborate ($\text{Li}_2\text{B}_4\text{O}_7$) at a 2:1 ratio (flux to rock), and fused to a bead at 1000°C. The bead was powdered, refused, and polished to provide a smooth surface for analysis. The fused beads were analyzed on a ThermoARL Advant'XP+ sequential XRF spectrometer for 10 major-oxide and 19 trace-elements.

Inductively Coupled Plasma-Mass Spectrometry Methods

All samples, but one, analyzed by XRF were also analyzed by inductively coupled plasma-mass spectrometry (ICP-MS) for 27 trace-elements on an Agilent 7700 quadrupole mass spectrometer at the GeoAnalytical Laboratory at Washington State University in Pullman, Washington (details at: <http://cahnrs.wsu.edu/soe/facilities/geolab/technotes/>). Samples were subjected to a combination fusion-dissolution method that consists of mixing a low-dilution fusion with di-lithium tetraborate, followed by open-vial mixed acid digestion. This results in the full digestion of resistant mineral phases and removes the bulk of unwanted matrix elements, allowing for 14 rare earth elements (REEs) and 13 addition trace-elements to be analyzed without making assumptions as to the presence or absence of resistant mineral phases. Rare earth elements are not present in Table S1 as these are being used for future petrogenetic studies.

Powdered samples (~2 g) are added to an identical amount of di-lithium tetraborate and fused to a bead at 1000°C for 30 minutes. Once cooled, the bead is ground in a C-steel ring mill, and 250 mg is added to a 30 mL Teflon PFA vial for dissolution. The acid dissolution is done with 2 mL of HNO_3 , 2 mL of HClO_4 , and 6 mL of HF at 110°C. After evaporation is complete, the sample is wetted with de-ionized H_2O , and 2 mL of HClO_4 add and heated to 160°C and allowed to evaporate. Then 10 mL of de-ionized H_2O , 3 mL of HNO_3 , 5 drops of H_2O_2 , and 2 drops of HF are warmed on a hot plate until a clear solution is achieved. Samples are then transferred to a 60 mL high density polyethylene (HDPE) bottle and diluted with 60 g of de-ionized H_2O . The final solution is diluted a further 10 times at the initiation of analysis, yielding a final dilution factor of 1:4800 relative to the amount of fused sample. Instrument drift is corrected using Ru, In, and Re as internal standards, while internal standardization for REEs uses a linear interpolation between In and Re to compensate for mass-dependent differences in the

rate and degree of drift (*e.g.*, Doherty, 1989). At least 3 internal standards of known composition are distributed among the unknowns for comparison.

$^{40}\text{Ar}/^{39}\text{Ar}$ Radiometric Dating Methods

Samples for $^{40}\text{Ar}/^{39}\text{Ar}$ dating were collected from 16 basaltic units exposed within our mapping area. Dense samples with a crystalline groundmass were chosen for analysis. Each sample was crushed in a roller mill, ultrasonicated, and sieved to the 250 to 355 μm -size fraction. Approximately 150 mg of fresh groundmass was separated from phenocryst phases using a LB-1 Barrier Frantz magnetic separator and careful handpicking under a binocular microscope. Groundmass separates were packaged in Cu-foil along with Bodie Hills sanidine monitor minerals (9.797 ± 0.003 Ma, equivalent to Fish Canyon sanidine at 28.100 ± 0.015 Ma; Fleck and Calvert, 2016), encapsulated in quartz vials that were wrapped in 0.5 mm-thick Cd-foil to shield samples from thermal neutrons during irradiation, and irradiated for 1 hour in the central thimble of the U.S. Geological Survey TRIGA reactor in Denver, Colorado (Dalrymple et al., 1981) at a power level of 1 MW. The reactor vessel was rotated continuously and oscillated vertically during irradiation to minimize vertical and lateral neutron flux gradients.

Argon isotope analyses were conducted at the U.S. Geological Survey-Menlo Park facility using a MAP216 single-collector mass spectrometer with a Bauer-Signer source and a Johnson MM1 electron multiplier. Argon was extracted from fluence monitors in a single heating step (*i.e.*, total fusion) using a New Wave CO₂ laser, whereas argon from groundmass separates of unknown age was extracted in 7 to 15 discrete temperature steps (typically spanning the temperature range 550°C to 1400°C) using a Mo-shielded custom resistance furnace with a Mo-crucible. Extracted Ar was exposed to a 4 A tungsten filament, 125 K cold finger, and two SAES ST-175 getters (one operated at 300°C, and one at room temperature) to remove active gases. Prior to measurement of Ar isotopic composition, samples were degassed at 500°C until undesirable gases (*e.g.*, water, nitrogen, and hydrocarbons as measured by a Granville-Phillips 835 VQM) were reduced to acceptable levels. Instrumental mass discrimination was calculated by repeated measurement of air, assuming $^{40}\text{Ar}/^{36}\text{Ar}_{\text{Air}} = 298.56 \pm 0.31$ (Lee et al., 2006). Ages were calculated using the decay constants recommended by Steiger and Jäger (1977). Uncertainties in $^{40}\text{Ar}/^{39}\text{Ar}$ ages are reported at the 1σ level unless otherwise noted, and include propagated uncertainties in counting statistics and J-values. See Calvert and Lanphere (2006) and Fleck et al. (2014) for additional details regarding analytical techniques, mass spectrometer design, and irradiation procedures.

Instrumental mass discrimination was calculated by repeated measurement of atmospheric argon. Initially, mass discrimination was calculated assuming $^{40}\text{Ar}/^{36}\text{Ar}_{\text{atmosphere}} = 295.5 \pm 0.5$ (Steiger and Jäger, 1977). In July 2016, the Menlo Park argon laboratory began calculating mass discrimination assuming $^{40}\text{Ar}/^{36}\text{Ar}_{\text{atmosphere}} = 298.56 \pm 0.31$ (Lee et al., 2006). The change in the assumed $^{40}\text{Ar}/^{36}\text{Ar}$ of atmospheric argon does not result in a bias in ages between the two irradiations, because both monitors and unknowns from each irradiation were calculated in the same manner.

^{36}Cl Cosmogenic Surface-Exposure Dating Methods

Samples for ^{36}Cl cosmogenic surface-exposure dating were collected using a hammer and chisel from 2 mafic units exposed within our mapping area. Samples were collected from areas on the lava flow, which were high standing relative to the surrounding topography to minimize shielding. Sample R15MS006 (from unit **ban3**) was collected from a large (~4 x 4 x 4 m), flat-

topped block on the surface of the lava flow, located ~1.35 km southeast of its source vent. Sample R14AC099 (from unit **bdu**) was collected from a lava bomb located ~140 m northeast of the vent that sourced this sample. Each sample was trimmed such that only the upper ~4 cm of material was collected. For both R15MS006 and R14AC099, dip of the sample surface collected was negligible (<5°). Shielding factors for each sample location were calculated from the inclination of the visible horizon at 30° increments of azimuth (following Goose and Phillips, 2001). In all cases the angle to the horizon was ≤6° in all directions, but shielding factors were still calculated for the sake of completeness. Sample locations and elevations were measured by GPS using the WGS1984 UTM Zone 37N datum, and later confirmed using high-resolution 0.5 m-resolution lidar elevation data for sample R14AC099 and a 1 m-resolution digital elevation model (DEM) for sample R15MS006. Erosion rates are estimated to be low (≤ 1 mm/kyr) based on the preservation of small scale (<1 cm), irregular surface features on each flow. Given the uncertainty in the erosion rate for each sample site, we conservatively assume an erosion rate of 1 ± 1 mm/kyr.

Chemical separation and analysis of samples took place at the Purdue Rare Isotope Measurement (PRIME) Laboratory at Purdue University in West Lafayette, Indiana. Samples were chemically dissolved, spiked with a ^{35}Cl enriched tracer (e.g., Desilets et al., 2006), and analyzed via accelerator mass spectrometry. Splits of each sample were analyzed for their major-oxide concentrations via wavelength dispersive XRF and their trace-element concentrations via inductively coupled plasma-atomic emission spectrometry (ICP-AES) and ICP-MS at the U.S. Geological Survey in Denver, Colorado following Taggart (2002). Trace-elements of particular importance for the calculation of ^{36}Cl cosmogenic surface-exposure ages include U and Th that can produce thermal neutrons during alpha decay, and B, Li, Sm, and Gd, which have large thermal neutron absorption cross-sections, and therefore reduce the production of ^{36}Cl from ^{35}Cl . Of these elements, all were above detection limits except for B and Li. Given the detection limit for B and Li is 10 ppm, we assume the concentration of B and Li in each sample is 5 ± 5 ppm.

Cosmogenic surface-exposure ages were calculated using the online CRONUScalc ^{36}Cl Exposure Age Calculator v2.0 (Cosmic-Ray Produced Nuclide Systematics on Earth Project: <http://www.physics.purdue.edu/primelab/CronusProject/cronus/>) that utilizes a MATLAB-based code and is described in Marrero et al. (2016). Ages were calculated using the Lal/Stone time independent scaling model (Lal, 1991; Stone, 2000). We refer the reader to Marrero et al. (2016) for a detailed discussion of production rates for various production pathways, details of scaling models, and other parameters used in the calculation of ^{36}Cl cosmogenic surface-exposure ages.

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TABLE S1. MAJOR-OXIDE AND TRACE-ELEMENT ANALYSES FROM NORTHERNMOST HARRAT RAHAT ERUPTIVES

Sample	R14AC056	R14TS012	R14TS093	R14TS096	R14TS097	R14TS098	R14TS100	R14TS102	R14TS103	R14TS104
Easting	579189	573283	576082	578490	577423	577456	576357	576852	577161	577619
Northing	2693655	2704764	2695967	2695914	2696155	2696076	2701088	2703743	2704116	2704619
Unit	bla-l									
<u>XRF major-oxide data (Wt%)</u>										
SiO ₂	46.90	46.77	46.68	46.84	47.01	46.51	46.86	47.03	46.86	46.74
TiO ₂	2.97	3.00	3.00	3.02	3.01	2.10	3.07	3.05	3.02	3.04
Al ₂ O ₃	16.00	16.07	16.02	16.10	16.27	16.03	16.17	16.19	16.10	16.02
FeO*	12.66	12.98	13.12	12.84	12.96	11.49	12.85	13.03	12.86	13.09
MnO	0.22	0.22	0.22	0.22	0.22	0.18	0.22	0.22	0.22	0.22
MgO	6.35	6.05	6.02	5.95	5.93	9.47	5.96	6.00	6.03	6.01
CaO	8.80	8.67	8.60	8.73	8.46	10.48	8.54	8.35	8.59	8.50
Na ₂ O	4.19	4.23	4.31	4.26	4.12	3.00	4.26	4.19	4.26	4.28
K ₂ O	0.95	0.97	0.99	0.99	0.99	0.43	1.00	0.98	0.99	1.02
P ₂ O ₅	0.97	1.02	1.05	1.05	1.03	0.30	1.06	0.94	1.05	1.08
LOI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	99.11	99.70	99.81	99.65	99.63	99.19	99.48	99.43	99.91	99.53
Mg#	49.85	48.01	47.62	47.87	47.53	62.02	47.90	47.69	48.15	47.62
<u>XRF trace-element data (ppm)</u>										
Sc	26	26	25	26	25	30	24	25	25	25
Cr	129	101	106	105	101	327	85	94	105	106
Ni	68	58	58	60	58	201	56	60	60	63
V	219	211	213	214	209	270	212	210	214	206
Ga	19	20	22	20	21	19	20	22	22	21
Zn	100	100	103	102	101	85	105	106	105	104
Cu	50	42	46	48	47	107	45	46	46	45
Rb	8	9	9	9	9	4	9	9	9	10
Ba	150	154	162	163	163	51	155	162	161	169
Sr	570	600	594	597	604	455	602	596	597	592
Pb	1	1	2	2	1	1	2	2	2	3
Th	2	2	3	2	3	2	3	3	3	3
U	0	2	1	1	1	1	2	1	2	2
Zr	245	255	261	265	260	149	263	259	264	269
Y	36	36	35	37	35	23	38	32	36	37
Nb	22	22	22	23	23	8	23	22	22	24
La	26	25	25	30	28	10	27	29	25	28
Ce	63	71	70	72	69	28	73	58	67	69
Nd	40	38	39	43	40	18	42	34	41	41
<u>ICP-MS trace-element data (ppm)</u>										
Sc	25.84	24.93	23.49	24.29	23.26	28.71	23.34	23.47	24.03	24.11
Cs	0.08	0.14	0.11	0.09	0.10	0.04	0.09	0.09	0.10	0.10
Rb	7.53	7.99	8.02	7.93	7.92	2.97	7.90	7.74	7.99	8.41
Ba	143.96	149.20	155.16	154.21	153.66	45.32	153.11	151.86	154.41	160.45
Sr	587.39	603.34	597.65	605.19	600.98	449.64	599.14	597.39	603.96	595.10
Pb	2.00	1.98	2.10	2.11	2.14	1.09	2.07	2.12	2.05	2.00
Th	1.59	1.56	1.59	1.63	1.62	0.64	1.59	1.49	1.63	1.68
U	0.51	0.51	0.52	0.50	0.53	0.21	0.52	0.50	0.51	0.56
Zr	259.46	263.55	266.49	270.37	264.15	151.20	268.16	263.99	268.66	275.38
Hf	5.65	5.68	5.72	5.85	5.77	3.54	5.80	5.77	5.71	5.95
Ta	1.51	1.50	1.54	1.54	1.52	0.62	1.56	1.55	1.56	1.59
Y	35.99	36.42	36.67	37.34	34.36	22.37	36.56	32.78	36.98	37.67
Nb	21.76	22.04	22.42	22.67	22.23	8.68	22.68	22.24	22.54	23.11

Note: Major-oxide analyses were performed by X-ray fluorescence (XRF) and recalculated anhydrous, but original loss on ignition (LOI) and totals are given. Trace-element analyses were performed by both XRF and inductively coupled plasma-mass spectrometry (ICP-MS). Unit abbreviations are defined in Table 1 and Figure 5. Those followed by -l are from effusive lava flows, those followed by -v are from scoria cones, and those labelled Qv are from undifferentiated mafic Quaternary vents. Easting and northing are reported in the WGS1984 UTM Zone 37N coordinate system.

TABLE S1. (CONTINUED)

Sample	R14TS142	R15DD150A	R14AC097	R14AC098	R14DS029	R15DC012	R15DC013	R14TS139	R15DC014	R14AC102
Easting	571589	577175	550430	550299	550432	550437	550304	550159	550560	570359
Northing	2709371	2697425	2700232	2700517	2700249	2700244	2700514	2700267	2699723	2708589
Unit	bla-l	bla-l	bdu-l	bdu-l	bdu-l	bdu-l	bdu-l	bdu-v	bdu-v	bdw-l
XRF major-oxide data (Wt%)										
SiO ₂	46.57	46.81	45.74	45.80	45.68	46.00	46.07	46.27	45.98	45.52
TiO ₂	1.99	1.83	3.19	3.19	3.18	3.20	3.21	3.18	3.20	3.37
Al ₂ O ₃	16.67	16.24	16.52	16.54	16.48	16.57	16.56	16.73	16.60	15.98
FeO*	11.55	11.36	13.26	13.22	13.38	12.95	12.85	13.28	13.08	14.05
MnO	0.18	0.18	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.21
MgO	8.64	8.98	7.05	6.99	7.01	7.02	7.08	6.95	6.94	6.58
CaO	10.75	11.31	9.39	9.37	9.50	9.46	9.37	9.26	9.42	9.10
Na ₂ O	3.02	2.76	3.63	3.64	3.55	3.55	3.61	3.10	3.56	3.83
K ₂ O	0.38	0.32	0.71	0.73	0.72	0.72	0.71	0.71	0.70	0.75
P ₂ O ₅	0.24	0.20	0.32	0.33	0.33	0.33	0.34	0.33	0.33	0.61
LOI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	99.97	98.96	100.14	99.98	99.66	99.42	99.89	99.40	99.85	99.93
Mg#	59.72	61.04	51.29	51.17	50.93	51.79	52.20	50.92	51.25	48.13
XRF trace-element data (ppm)										
Sc	29	32	28	26	27	26	26	25	27	25
Cr	166	224	75	77	75	75	73	72	72	103
Ni	129	142	79	77	78	77	78	78	76	73
V	272	277	313	312	311	330	314	310	319	303
Ga	18	20	21	19	20	19	20	21	20	20
Zn	86	85	91	90	90	87	91	90	88	101
Cu	81	97	53	54	55	53	54	47	55	64
Rb	4	4	8	8	8	7	6	8	7	8
Ba	45	38	89	90	92	89	92	91	103	107
Sr	446	383	602	603	598	595	593	599	614	532
Pb	0	1	0	1	0	1	1	1	1	0
Th	1	1	0	3	0	1	1	0	1	1
U	2	2	1	0	1	0	1	1	0	2
Zr	138	124	182	187	188	186	187	187	186	202
Y	22	21	25	26	24	24	24	24	25	29
Nb	8	7	16	16	16	16	16	17	15	16
La	6	10	18	18	18	18	13	15	15	20
Ce	23	25	40	35	39	39	39	40	40	47
Nd	15	16	23	21	23	26	24	24	23	30
ICP-MS trace-element data (ppm)										
Sc	29.25	32.26	26.05	25.44	26.36	25.90	25.26	25.30	25.62	26.75
Cs	0.04	0.03	0.08	0.09	0.07	0.08	0.10	0.13	0.07	0.06
Rb	2.68	2.29	6.26	6.31	6.16	6.08	6.01	6.27	5.66	5.55
Ba	39.29	32.45	86.42	88.74	86.75	87.18	87.79	86.81	99.13	98.33
Sr	451.92	389.18	614.55	608.76	605.44	608.36	604.85	612.90	619.76	535.57
Pb	0.86	0.83	1.23	1.38	1.23	1.27	1.43	1.90	1.30	1.47
Th	0.55	0.44	1.02	1.09	1.12	1.07	1.09	1.12	1.04	1.05
U	0.19	0.15	0.35	0.35	0.38	0.36	0.35	0.36	0.33	0.33
Zr	141.21	126.44	191.00	192.62	192.95	192.09	191.16	193.38	190.12	207.22
Hf	3.31	2.99	4.22	4.31	4.39	4.32	4.30	4.34	4.34	4.64
Ta	0.56	0.45	1.23	1.21	1.19	1.12	1.13	1.26	1.11	1.23
Y	21.93	21.24	24.49	24.57	24.66	24.40	24.35	24.08	24.29	29.18
Nb	7.55	6.08	15.31	15.67	15.72	15.63	15.66	15.92	15.58	15.88

TABLE S1. (CONTINUED)

Sample	R14TS099	R14TS141	R16DD219	R16DD221	R15AC119	R14TRO133	R14DS007	R14DS019	R14DS071	R15TS153
Easting	576748	570506	572955	573572	576981	572287	582139	570244	579363	570324
Northing	2698472	2708054	2703478	2700545	2697403	2690493	2684296	2689670	2683815	2692263
Unit	bdw-l	bdw-l	bdw-l	bdw-l	bdw-v	ban3-l	ban3-l	ban3-l	ban3-l	ban3-l
<u>XRF major-oxide data (Wt%)</u>										
SiO ₂	45.67	46.04	46.53	45.76	45.55	48.19	48.81	47.46	48.69	47.84
TiO ₂	3.56	2.60	2.09	3.50	3.40	2.44	2.36	2.57	2.28	2.50
Al ₂ O ₃	16.18	16.06	16.07	16.15	16.09	16.42	16.49	16.50	16.39	16.35
FeO*	13.58	12.75	12.34	13.61	13.91	12.81	12.23	12.71	12.20	12.69
MnO	0.21	0.19	0.19	0.21	0.20	0.23	0.24	0.22	0.24	0.23
MgO	6.17	7.64	8.48	6.34	6.31	4.90	4.61	5.46	4.60	4.94
CaO	9.30	10.60	10.57	9.10	9.22	7.61	7.74	8.22	8.23	8.17
Na ₂ O	3.83	3.18	3.07	3.88	3.90	4.84	4.91	4.59	4.82	4.71
K ₂ O	0.80	0.52	0.38	0.78	0.79	1.33	1.49	1.11	1.48	1.31
P ₂ O ₅	0.70	0.42	0.29	0.67	0.63	1.23	1.12	1.18	1.09	1.24
LOI	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.00	0.19	0.00
Total	99.59	99.46	99.53	99.37	99.14	99.26	99.23	99.12	99.19	99.35
Mg#	47.36	54.27	57.65	47.99	47.32	43.11	42.75	45.96	42.74	43.55
<u>XRF trace-element data (ppm)</u>										
Sc	25	28	31	27	26	21	21	21	21	21
Cr	66	198	258	81	88	39	31	36	43	36
Ni	56	115	144	66	71	37	35	46	40	41
V	293	280	285	304	266	148	140	179	138	156
Ga	20	20	18	20	20	22	22	22	22	23
Zn	103	93	94	101	97	115	119	111	120	114
Cu	57	90	109	60	66	37	36	44	40	44
Rb	7	5	4	7	6	11	12	10	12	11
Ba	117	75	52	113	106	228	255	179	256	222
Sr	577	443	370	548	547	571	575	586	546	580
Pb	1	0	0	1	1	3	2	1	3	2
Th	2	1	2	2	2	2	2	2	3	3
U	1	0	2	1	1	2	2	3	2	2
Zr	216	149	123	211	200	316	347	276	352	320
Y	30	25	23	29	28	43	43	39	43	44
Nb	18	11	7	17	16	26	28	22	29	26
La	18	8	9	20	23	36	39	28	35	35
Ce	50	34	25	49	47	84	91	72	88	84
Nd	30	20	16	30	28	49	52	45	50	48
<u>ICP-MS trace-element data (ppm)</u>										
Sc	25.42	27.48	30.68	26.20	25.09	21.62	19.93	21.51	20.32	21.86
Cs	0.06	0.04	0.03	0.05	0.04	0.09	0.12	0.09	0.14	0.11
Rb	5.87	3.99	2.71	5.53	5.30	9.59	11.34	8.30	11.64	10.46
Ba	113.21	71.93	49.13	104.88	98.82	218.61	242.07	171.70	244.43	212.97
Sr	578.47	448.34	374.29	557.43	536.59	586.79	570.54	589.83	541.77	592.41
Pb	1.68	1.09	0.87	1.57	1.65	2.55	2.88	1.94	3.01	2.69
Th	1.17	0.73	0.55	1.11	1.06	1.94	2.14	1.55	2.17	1.91
U	0.43	0.28	0.17	0.37	0.30	0.60	0.69	0.52	0.79	0.65
Zr	221.73	154.12	123.59	218.35	204.13	335.45	355.39	283.60	361.85	328.32
Hf	4.94	3.47	2.93	4.74	4.56	7.22	7.59	6.00	7.52	6.90
Ta	1.21	0.81	0.56	1.20	1.11	1.82	1.96	1.48	1.91	1.74
Y	30.29	24.36	22.19	30.15	28.37	43.83	43.01	40.25	42.94	43.61
Nb	17.31	10.78	7.60	16.78	15.78	26.97	28.10	21.92	28.12	25.96

TABLE S1. (CONTINUED)

Sample	R15TS158	R15TS163	R15TS164	R15TS166	R15TS168	R15TS177	R15TS179	R15MS005	R14TRO127	R14DS003
Easting	571577	574462	574315	573446	573936	569640	573940	579196	575567	585842
Northing	2693259	2687945	2687303	2686639	2684583	2681190	2682581	2681997	2695045	2685818
Unit	ban3-l	mh11-l	mh11-l							
<u>XRF major-oxide data (Wt%)</u>										
SiO ₂	47.96	47.71	46.88	46.80	48.17	48.49	49.03	46.96	48.33	48.14
TiO ₂	2.48	2.53	2.66	2.69	2.44	2.40	2.34	2.67	2.57	2.57
Al ₂ O ₃	16.35	16.29	16.42	16.45	16.51	16.45	16.43	16.53	16.25	16.34
FeO*	12.68	12.65	12.82	12.84	12.32	12.52	12.41	12.60	13.28	13.24
MnO	0.23	0.24	0.21	0.22	0.22	0.23	0.24	0.22	0.27	0.26
MgO	5.12	5.10	6.06	5.80	5.29	4.97	4.50	5.73	3.66	3.73
CaO	8.05	8.62	9.07	8.93	8.60	7.97	7.61	8.67	6.63	6.77
Na ₂ O	4.58	4.33	4.02	4.17	4.34	4.66	4.89	4.42	5.44	5.45
K ₂ O	1.31	1.25	0.92	0.98	1.21	1.35	1.51	1.01	1.76	1.73
P ₂ O ₅	1.24	1.27	0.93	1.12	0.90	0.96	1.04	1.19	1.82	1.77
LOI	0.00	0.28	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	99.67	99.28	98.59	99.19	99.59	98.93	99.43	99.36	99.41	99.23
Mg#	44.42	44.40	48.35	47.24	45.94	44.05	41.80	47.40	35.31	35.84
<u>XRF trace-element data (ppm)</u>										
Sc	21	23	24	23	23	24	22	24	18	17
Cr	39	40	50	18	51	45	33	19	0	0
Ni	40	40	57	41	49	41	35	40	3	8
V	155	155	208	200	183	162	139	197	83	90
Ga	22	22	19	20	21	22	21	21	24	23
Zn	116	117	104	103	110	113	121	106	130	126
Cu	42	42	54	43	52	45	40	42	23	27
Rb	12	11	7	8	10	12	12	8	15	15
Ba	230	226	150	153	196	220	248	165	298	295
Sr	614	585	580	623	544	538	541	603	591	591
Pb	1	2	1	3	1	2	3	0	4	3
Th	3	3	2	3	2	3	3	2	3	2
U	1	4	1	2	1	1	1	0	1	1
Zr	320	316	242	255	304	330	360	258	409	398
Y	44	44	35	37	38	39	43	40	50	50
Nb	27	26	19	21	24	26	29	21	39	39
La	35	35	25	28	30	32	35	29	48	49
Ce	85	89	60	67	79	78	85	71	111	108
Nd	49	50	36	40	44	45	46	43	64	62
<u>ICP-MS trace-element data (ppm)</u>										
Sc	21.53	20.11	23.13	22.35	22.30	22.12	21.00	22.79	16.27	17.00
Cs	0.11	0.12	0.08	0.08	0.11	0.11	0.13	0.08	0.12	0.14
Rb	10.08	9.22	6.46	7.31	9.82	10.61	12.18	7.35	14.12	14.27
Ba	222.07	213.41	137.79	152.45	190.06	219.68	250.37	156.51	292.36	286.50
Sr	623.13	567.86	576.88	616.85	533.74	552.11	545.73	613.42	595.80	599.89
Pb	2.65	2.64	1.99	2.13	2.48	2.78	3.90	1.91	3.20	2.86
Th	1.91	1.87	1.34	1.41	1.74	1.96	2.17	1.49	2.31	2.54
U	0.67	0.68	0.47	0.55	0.59	0.67	0.73	0.51	0.63	0.86
Zr	328.45	318.88	245.15	257.90	304.40	340.80	370.83	265.88	421.76	413.29
Hf	6.89	6.74	5.42	5.56	6.39	7.16	7.59	5.81	8.71	8.53
Ta	1.73	1.71	1.29	1.37	1.53	1.75	1.90	1.44	2.50	2.52
Y	43.81	42.26	34.46	37.92	37.93	41.15	43.98	39.57	52.11	51.72
Nb	25.82	25.47	18.77	20.18	23.34	26.20	28.87	20.78	39.55	38.54

TABLE S1. (CONTINUED)

Sample	R16DC035	R16DC037	R14TRO129	R15TS162	R14DS018	R16DC032	R14TRO136	R14DS020	R15TS167
Easting	573190	576426	575230	576251	573815	573197	566320	567624	573558
Northing	2693539	2691800	2694101	2688448	2690975	2691111	2687792	2689103	2685688
Unit	mh11-l	mh11-l	ban2-l	ban2-l	bpu-l	bpu-l	bsk-l	bsk-l	bsk-l
<u>XRF major-oxide data (Wt%)</u>									
SiO ₂	49.08	48.51	47.18	47.45	45.80	46.15	46.46	47.04	47.03
TiO ₂	2.59	2.55	2.67	2.66	3.65	3.68	2.65	2.70	2.63
Al ₂ O ₃	16.47	16.29	16.21	16.26	16.49	16.38	16.06	16.42	16.27
FeO*	13.44	13.35	13.73	13.32	13.09	13.17	12.83	12.82	12.79
MnO	0.26	0.26	0.25	0.25	0.19	0.19	0.22	0.22	0.23
MgO	3.71	3.69	4.38	4.32	6.62	6.65	5.99	5.89	5.29
CaO	6.22	6.86	7.48	7.60	8.68	8.54	9.98	8.88	9.02
Na ₂ O	5.07	4.95	5.08	5.05	3.95	3.88	3.95	4.12	4.38
K ₂ O	1.72	1.73	1.42	1.47	0.97	0.94	0.94	0.96	1.19
P ₂ O ₅	1.44	1.82	1.60	1.61	0.56	0.43	0.93	0.94	1.18
LOI	0.00	0.10	0.00	0.00	0.00	0.00	0.39	0.00	0.18
Total	99.87	99.25	99.40	99.39	99.79	99.32	99.00	99.50	99.39
Mg#	35.32	35.36	38.72	39.12	50.05	50.01	48.07	47.62	45.02
<u>XRF trace-element data (ppm)</u>									
Sc	16	17	19	20	24	24	26	26	23
Cr	0	0	6	6	66	65	85	66	43
Ni	2	3	16	18	78	76	57	53	40
V	78	78	126	124	298	293	208	219	164
Ga	23	23	21	21	20	19	22	22	22
Zn	126	124	118	120	92	90	103	109	114
Cu	25	25	34	36	52	48	64	60	52
Rb	15	14	13	14	9	9	9	9	10
Ba	305	297	224	223	138	140	160	157	197
Sr	601	627	594	602	628	616	512	537	563
Pb	4	3	2	2	1	2	1	1	3
Th	3	3	3	4	4	3	2	2	2
U	2	1	2	2	1	0	1	2	1
Zr	408	401	315	330	233	234	243	245	291
Y	42	50	46	47	26	23	34	34	40
Nb	40	39	33	36	24	24	21	21	27
La	39	46	43	42	24	19	26	27	35
Ce	87	111	97	94	49	42	62	63	76
Nd	51	62	54	56	29	22	35	38	45
<u>ICP-MS trace-element data (ppm)</u>									
Sc	16.98	17.04	17.99	18.57	23.18	24.32	26.88	24.65	21.63
Cs	0.15	0.14	0.11	0.13	0.08	0.10	0.09	0.07	0.10
Rb	13.97	13.68	12.53	13.15	7.92	8.11	7.58	7.38	8.72
Ba	296.72	294.92	222.14	225.34	129.47	129.41	151.36	151.00	189.40
Sr	610.67	638.19	598.88	602.96	632.89	628.98	532.90	541.05	559.73
Pb	3.17	3.21	2.52	2.65	1.62	1.72	1.87	1.85	1.86
Th	2.42	2.58	2.17	2.30	1.59	1.52	1.38	1.35	1.67
U	0.81	0.87	0.67	0.73	0.45	0.50	0.52	0.49	0.57
Zr	424.54	418.25	325.26	337.17	238.68	242.58	252.39	252.60	294.72
Hf	8.77	8.62	6.72	7.06	5.18	5.24	5.47	5.41	6.24
Ta	2.58	2.52	2.19	2.26	1.62	1.68	1.41	1.40	1.72
Y	43.94	52.67	46.77	47.51	27.45	23.80	36.35	35.91	39.62
Nb	39.68	38.95	34.45	35.51	23.78	24.39	21.15	21.29	26.34

TABLE S1. (CONTINUED)

Sample	R15MS025	R14AC100	R14TS086	R14TS090	R15DC024	R15JR006	R15JR010	R16DD200	R16DD220	R14TS087
Easting	567121	571046	572807	572476	570141	568577	571544	569641	572475	572628
Northing	2684069	2701163	2701076	2701093	2704580	2706560	2703271	2705169	2702621	2701135
Unit	bsk-l	bsu-l	bsu-v							
<u>XRF major-oxide data (Wt%)</u>										
SiO ₂	47.25	45.98	46.03	45.78	46.18	45.95	45.97	45.96	45.92	46.09
TiO ₂	2.62	3.18	3.20	3.08	3.07	2.98	3.18	3.11	3.21	3.19
Al ₂ O ₃	16.25	16.44	16.37	16.43	16.26	16.24	16.33	16.22	16.33	16.33
FeO*	13.14	13.14	12.78	12.92	13.11	13.10	13.24	13.07	13.21	12.99
MnO	0.23	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
MgO	5.39	6.95	6.98	7.36	7.30	7.62	7.16	7.38	7.06	7.20
CaO	8.47	9.39	9.76	9.89	9.30	9.62	9.15	9.32	9.19	9.52
Na ₂ O	4.29	3.63	3.54	3.31	3.51	3.34	3.69	3.66	3.76	3.40
K ₂ O	1.19	0.74	0.75	0.68	0.72	0.65	0.74	0.73	0.75	0.72
P ₂ O ₅	1.17	0.37	0.39	0.37	0.36	0.32	0.35	0.37	0.38	0.37
LOI	0.00	0.72	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	99.15	98.72	99.38	99.09	99.62	99.47	99.25	99.90	99.42	99.43
Mg#	44.83	51.15	51.97	53.01	52.45	53.53	51.73	52.82	51.42	52.33
<u>XRF trace-element data (ppm)</u>										
Sc	22	28	26	27	25	26	26	27	26	26
Cr	47	131	102	140	144	150	108	159	114	114
Ni	40	97	88	102	98	119	94	104	90	95
V	172	303	297	291	293	290	295	299	300	295
Ga	22	18	19	19	19	19	20	19	18	19
Zn	114	91	86	86	88	87	89	88	89	88
Cu	51	59	59	60	63	69	58	65	60	57
Rb	10	8	7	7	7	6	8	8	8	7
Ba	186	103	115	112	100	91	94	94	101	112
Sr	552	563	577	572	564	547	566	553	570	586
Pb	2	1	2	1	0	1	2	1	1	1
Th	2	2	1	2	1	2	1	1	1	2
U	2	2	0	0	1	0	0	2	1	1
Zr	294	183	181	173	180	167	180	184	186	182
Y	41	24	25	23	25	24	24	25	25	24
Nb	26	17	17	16	17	15	17	18	18	17
La	29	17	19	17	18	16	17	18	20	17
Ce	82	45	41	37	37	33	43	39	39	36
Nd	48	26	23	23	22	21	24	21	21	19
<u>ICP-MS trace-element data (ppm)</u>										
Sc	21.73	26.07	24.97	25.20	25.70	25.42	25.37	26.64	26.15	25.14
Cs	0.10	0.05	0.07	0.06	0.05	0.05	0.05	0.07	0.07	0.06
Rb	9.37	6.67	6.51	5.59	5.99	5.59	6.34	6.67	6.74	6.12
Ba	186.28	93.96	103.82	97.06	94.31	82.94	93.23	92.89	95.62	98.88
Sr	547.19	564.32	577.24	571.27	575.61	550.48	568.05	549.59	577.40	590.53
Pb	2.22	1.34	1.31	0.76	1.24	1.19	1.25	1.32	1.34	1.33
Th	1.71	1.15	1.20	1.13	1.14	1.03	1.11	1.18	1.18	1.17
U	0.57	0.37	0.39	0.34	0.31	0.37	0.36	0.36	0.35	0.43
Zr	296.58	188.40	188.96	179.37	184.23	171.22	180.56	185.48	189.91	186.08
Hf	6.23	4.23	4.31	4.05	4.12	3.88	4.09	4.24	4.31	4.21
Ta	1.69	1.18	1.22	1.16	1.19	1.06	1.19	1.19	1.24	1.20
Y	40.61	24.79	24.99	23.79	24.59	23.65	24.03	24.44	24.91	24.62
Nb	26.14	17.32	17.52	16.55	16.98	15.30	17.15	17.28	17.90	17.43

TABLE S1. (CONTINUED)

Sample	R14TS088	R14TS089	R14TS092	R14TRO111	R16DD191	R16DD192	R14DC043	R15TS155	R14DC044	R16DC028
Easting	572643	572676	572363	559736	559346	556167	567839	569546	569592	569565
Northing	2701021	2700967	2701777	2692493	2693977	2694396	2695071	2694630	2696481	2694515
Unit	bsu-v	bsu-v	bsu-v	bun-l	bun-l	bun-l	bnu-l	bnu-l	bnu-l	bnu-l
<u>XRF major-oxide data (Wt%)</u>										
SiO ₂	45.78	46.18	46.05	45.80	45.17	45.22	47.70	47.49	47.71	45.86
TiO ₂	3.10	2.95	3.04	3.37	3.49	3.50	2.74	2.77	2.73	3.51
Al ₂ O ₃	16.17	15.88	16.27	15.93	16.10	16.09	17.12	17.07	17.40	16.21
FeO*	13.09	12.87	13.04	13.63	13.89	13.85	12.21	12.36	11.97	13.04
MnO	0.19	0.20	0.19	0.21	0.21	0.21	0.20	0.20	0.19	0.19
MgO	7.25	7.81	7.78	6.40	6.45	6.76	5.83	5.96	5.86	6.91
CaO	9.84	9.92	9.15	8.97	9.07	8.62	8.49	8.48	8.56	8.77
Na ₂ O	3.48	3.19	3.46	3.88	3.81	3.98	4.23	4.20	4.15	3.94
K ₂ O	0.74	0.65	0.68	0.93	0.90	0.89	1.00	0.98	0.94	0.99
P ₂ O ₅	0.36	0.35	0.34	0.88	0.92	0.88	0.50	0.50	0.48	0.58
LOI	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00
Total	98.05	98.85	99.51	99.31	99.21	99.05	99.41	99.45	98.88	99.04
Mg#	52.32	54.60	54.17	48.21	47.92	49.15	48.60	48.85	49.24	51.22
<u>XRF trace-element data (ppm)</u>										
Sc	25	29	26	25	24	24	21	23	22	24
Cr	124	214	170	103	59	84	13	9	9	88
Ni	96	120	132	72	66	86	46	47	47	85
V	294	299	282	270	268	282	231	246	238	294
Ga	19	19	20	20	19	19	21	21	22	20
Zn	86	89	86	101	99	100	93	95	91	89
Cu	55	75	61	61	53	53	46	44	45	56
Rb	7	8	7	10	9	9	10	10	9	9
Ba	106	94	97	144	138	133	127	120	119	144
Sr	574	502	542	555	638	591	607	618	619	622
Pb	1	1	0	0	2	1	1	2	2	2
Th	1	2	2	1	2	2	2	2	2	3
U	1	2	0	1	1	2	1	2	0	1
Zr	174	172	169	219	218	214	255	251	243	233
Y	25	25	24	31	31	30	29	28	28	27
Nb	17	16	16	21	23	21	22	22	22	25
La	16	17	17	24	25	24	23	24	26	22
Ce	39	43	34	53	62	54	51	49	55	52
Nd	22	26	20	32	38	31	30	30	30	29
<u>ICP-MS trace-element data (ppm)</u>										
Sc	25.37	27.40	25.19	25.85	23.99	24.32	21.50	21.88	20.80	23.67
Cs	0.07	0.08	0.06	0.10	0.07	0.04	0.10	0.07	0.07	0.08
Rb	6.31	5.71	5.92	8.09	7.32	7.00	8.66	8.54	8.10	8.48
Ba	96.18	85.80	85.89	138.59	133.34	129.80	121.65	115.28	113.68	136.66
Sr	567.15	502.99	544.39	558.44	640.88	599.61	623.14	619.13	634.36	630.47
Pb	0.85	0.83	0.73	1.69	1.78	1.69	1.88	1.95	1.86	1.65
Th	1.13	1.08	1.07	1.37	1.32	1.28	1.70	1.72	1.61	1.67
U	0.52	0.37	0.36	0.42	0.48	0.40	0.59	0.54	0.55	0.63
Zr	181.10	179.38	174.06	222.83	224.05	220.55	259.12	259.03	248.05	241.78
Hf	4.02	4.02	4.01	4.91	4.98	4.86	5.72	5.67	5.49	5.23
Ta	1.16	1.09	1.10	1.47	1.51	1.49	1.55	1.50	1.46	1.75
Y	24.07	25.13	23.74	32.42	31.71	31.01	29.61	29.31	28.30	27.39
Nb	16.84	15.46	15.63	21.39	22.36	22.01	21.92	21.65	21.10	24.50

TABLE S1. (CONTINUED)

Sample	R14AC026	R15DC035	R15MS001B	R14TRO128	R15TS159	R15TS160	R16DC033	R15TS156	R14AC101	R14DS072
Easting	571442	570988	571467	575282	571598	573123	572747	573373	569852	579881
Northing	2698800	2700632	2698609	2694403	2692496	2691515	2696731	2692102	2699714	2684304
Unit	brm-l	brm-l	brm-l	brm-v	bmz-l	bmz-l	bmz-l	bmz-v	ban1-l	ban1-v
<u>XRF major-oxide data (Wt%)</u>										
SiO ₂	46.94	47.01	47.05	46.78	45.83	46.36	46.98	46.27	47.21	49.22
TiO ₂	2.26	2.10	2.26	2.38	3.64	3.08	2.46	3.07	2.70	2.41
Al ₂ O ₃	16.51	16.45	16.61	16.34	16.45	16.46	16.08	16.37	16.31	16.63
FeO*	12.35	12.19	12.46	12.34	12.82	13.30	13.05	13.43	13.38	12.61
MnO	0.19	0.19	0.19	0.18	0.19	0.20	0.20	0.20	0.24	0.24
MgO	7.62	8.15	7.59	8.18	6.71	6.34	7.40	6.26	4.70	4.11
CaO	9.67	9.87	9.55	9.47	8.84	8.72	9.06	8.82	7.73	7.47
Na ₂ O	3.53	3.24	3.38	3.39	3.97	4.05	3.64	4.06	4.99	4.78
K ₂ O	0.59	0.52	0.58	0.61	0.98	0.87	0.69	0.90	1.35	1.50
P ₂ O ₅	0.34	0.29	0.33	0.34	0.56	0.61	0.43	0.63	1.39	1.03
LOI	-0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.65
Total	100.37	99.94	99.83	99.66	99.40	99.25	99.99	98.71	99.77	98.42
Mg#	55.02	57.00	54.69	56.77	50.91	48.56	52.92	48.01	41.03	39.24
<u>XRF trace-element data (ppm)</u>										
Sc	28	28	27	25	25	24	25	25	20	21
Cr	167	175	147	181	69	81	178	82	17	6
Ni	116	131	109	167	81	73	124	75	26	21
V	265	263	258	261	297	252	248	225	143	129
Ga	21	19	19	18	20	20	20	20	22	22
Zn	96	92	95	92	95	94	99	93	113	111
Cu	78	84	75	77	53	63	71	56	44	34
Rb	4	5	5	5	9	7	5	8	14	14
Ba	87	69	91	88	143	179	111	122	209	229
Sr	441	422	450	467	629	543	469	531	576	553
Pb	2	0	1	1	0	1	1	1	1	3
Th	1	1	2	2	3	2	0	2	2	3
U	1	0	1	1	1	2	1	1	1	2
Zr	178	156	169	152	230	219	199	219	306	354
Y	25	23	25	23	26	32	28	31	43	45
Nb	12	9	11	13	24	20	15	21	33	32
La	14	12	18	11	23	21	15	18	37	36
Ce	36	28	34	27	54	51	41	48	84	89
Nd	21	18	22	19	29	29	24	29	52	50
<u>ICP-MS trace-element data (ppm)</u>										
Sc	28	27.50	26.62	25.55	24.69	24.52	26.41	23.99	19.92	19.91
Cs	---	0.04	0.03	0.04	0.12	0.05	0.04	0.05	0.10	0.14
Rb	4	3.37	3.87	4.99	8.56	6.36	4.27	6.79	12.02	12.90
Ba	87	67.85	79.86	82.75	132.44	170.25	98.71	110.34	203.57	237.80
Sr	441	422.09	450.28	473.12	648.64	543.77	470.54	524.94	587.24	555.73
Pb	2	1.07	1.08	1.21	1.71	1.88	1.40	1.51	2.36	3.03
Th	1	0.65	0.76	0.88	1.63	1.28	0.97	1.27	2.16	2.32
U	1	0.23	0.22	0.30	0.54	0.43	0.27	0.44	0.69	0.83
Zr	178	158.59	173.22	152.76	238.11	223.92	203.07	219.59	315.39	366.36
Hf	---	3.60	3.90	3.52	5.10	4.95	4.44	4.87	6.48	7.65
Ta	---	0.65	0.74	0.93	1.61	1.39	0.94	1.34	2.22	2.10
Y	25	23.56	25.06	23.50	27.42	31.98	28.28	31.23	43.84	45.17
Nb	12	9.19	10.78	13.29	24.21	20.49	13.66	20.00	32.39	32.25

TABLE S1. (CONTINUED)

Sample	R15JR007	R15TS157	R16DC034	R16DD198	R16DD203	R14DC041	R15TS151	R16DD210	R16DD212	R16DD215
Easting	567501	572494	572346	566345	570968	564323	570347	568529	569101	567451
Northing	2703792	2693640	2695526	2703751	2704290	2692718	2698238	2701372	2700678	2700439
Unit	bra-l	bra-l	bra-l	bra-l	bra-l	bjs-l	bru-l	bru-l	bru-l	bru-l
<u>XRF major-oxide data (Wt%)</u>										
SiO ₂	46.89	47.25	47.03	46.67	47.02	46.60	46.42	46.98	46.31	46.16
TiO ₂	1.93	1.74	2.08	1.68	1.78	2.57	3.16	2.75	2.85	3.17
Al ₂ O ₃	15.78	15.96	15.17	14.91	16.88	16.87	16.24	16.12	16.18	16.18
FeO*	11.84	10.80	12.32	11.66	11.28	12.45	13.23	13.03	13.14	13.50
MnO	0.18	0.18	0.19	0.18	0.17	0.18	0.21	0.22	0.21	0.21
MgO	9.60	9.25	9.37	11.47	8.52	7.36	6.22	6.08	6.51	6.26
CaO	10.09	11.43	10.31	10.14	10.76	9.33	8.45	8.74	9.19	8.41
Na ₂ O	2.99	2.63	2.88	2.71	3.04	3.58	4.28	4.08	4.04	4.30
K ₂ O	0.45	0.58	0.48	0.37	0.34	0.73	1.02	0.97	0.82	1.02
P ₂ O ₅	0.25	0.18	0.17	0.22	0.20	0.34	0.78	1.03	0.76	0.78
LOI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	99.48	99.40	99.03	99.46	99.63	99.32	99.62	99.61	98.80	99.85
Mg#	61.63	62.91	60.12	66.09	59.94	53.94	48.24	48.06	49.55	47.87
<u>XRF trace-element data (ppm)</u>										
Sc	29	32	30	29	30	25	24	25	25	25
Cr	340	339	543	602	144	105	94	98	107	97
Ni	214	164	199	313	134	94	70	69	87	74
V	262	281	280	253	260	265	228	200	240	237
Ga	18	18	20	16	20	18	21	20	20	20
Zn	91	81	88	86	83	82	95	103	98	100
Cu	98	120	95	99	98	68	49	56	56	51
Rb	4	7	5	4	4	7	10	9	8	10
Ba	62	129	75	54	52	101	142	180	184	140
Sr	393	349	380	363	413	568	593	517	527	605
Pb	0	0	3	1	2	2	1	2	2	3
Th	0	2	1	1	1	1	1	3	2	1
U	1	1	2	1	1	0	2	1	1	2
Zr	138	107	134	122	112	175	236	224	193	240
Y	23	20	19	20	21	23	32	35	31	33
Nb	8	19	12	7	8	16	23	21	18	24
La	9	6	10	6	5	18	24	29	19	26
Ce	29	26	21	24	16	37	59	66	51	62
Nd	18	15	12	16	12	21	36	39	31	36
<u>ICP-MS trace-element data (ppm)</u>										
Sc	29.15	32.77	30.99	29.68	29.40	24.53	23.19	23.99	24.17	23.41
Cs	0.03	0.06	0.03	0.03	0.03	0.07	0.07	0.08	0.05	0.08
Rb	2.87	6.41	3.69	2.34	2.53	6.34	8.40	8.04	6.40	8.47
Ba	58.01	116.43	67.73	46.40	45.27	92.66	140.88	177.45	180.89	142.70
Sr	401.80	354.55	384.05	362.47	419.25	565.61	605.40	518.86	529.81	602.73
Pb	0.95	0.99	0.97	0.80	0.98	1.33	1.80	1.84	1.57	1.76
Th	0.56	0.81	0.69	0.49	0.54	1.14	1.47	1.49	1.21	1.49
U	0.18	0.21	0.25	0.17	0.18	0.29	0.50	0.55	0.46	0.49
Zr	143.08	107.76	136.66	122.36	114.22	176.77	242.82	230.96	197.87	245.12
Hf	3.31	2.71	3.35	2.83	2.74	4.01	5.32	5.03	4.41	5.31
Ta	0.56	1.25	0.81	0.48	0.54	1.15	1.58	1.43	1.25	1.55
Y	22.12	20.46	19.20	19.30	21.06	23.32	32.84	35.65	30.59	32.73
Nb	8.11	19.20	11.45	6.69	7.64	17.12	22.94	21.15	18.27	22.96

TABLE S1. (CONTINUED)

Sample	R15DD005	R15DD009	R15TS154	R15MS020	R15MS047	R16DD228	R16DC044	R16DD214	R16DD216	R16DD217
Easting	563258	563526	570575	563271	564458	567359	570196	564647	566681	565415
Northing	2697625	2694955	2693846	2698094	2700091	2694491	2690002	2699435	2697072	2697318
Unit	bsh-l	bsh-l	bsh-l	bsh-l	bsh-l	bsh-l	bsh-v	bbd-l	bbd-l	bbd-l
<u>XRF major-oxide data (Wt%)</u>										
SiO ₂	46.70	46.53	47.06	46.87	46.88	46.78	46.70	45.94	45.97	45.90
TiO ₂	2.66	2.63	2.72	2.64	2.63	2.59	2.83	2.98	2.95	2.93
Al ₂ O ₃	17.11	17.10	17.08	17.13	17.16	17.35	16.53	16.41	16.55	16.56
FeO*	12.80	12.43	12.31	12.60	12.52	12.22	12.89	13.42	13.34	13.30
MnO	0.19	0.19	0.20	0.19	0.19	0.19	0.20	0.20	0.20	0.20
MgO	6.27	6.64	6.36	6.33	6.16	6.50	6.43	6.56	6.60	6.74
CaO	9.01	9.64	9.00	9.03	9.22	9.19	9.06	9.52	9.27	9.44
Na ₂ O	3.90	3.62	3.85	3.81	3.89	3.92	3.94	3.63	3.72	3.61
K ₂ O	0.83	0.74	0.85	0.85	0.82	0.80	0.81	0.72	0.76	0.71
P ₂ O ₅	0.53	0.48	0.58	0.54	0.52	0.47	0.60	0.63	0.63	0.61
LOI	1.42	0.29	0.00	1.05	0.09	0.00	0.00	0.72	0.00	0.00
Total	98.03	99.28	99.67	98.39	99.53	99.07	99.33	98.71	99.20	99.68
Mg#	49.23	51.42	50.56	49.90	49.36	51.32	49.71	49.21	49.51	50.08
<u>XRF trace-element data (ppm)</u>										
Sc	24	23	24	23	25	25	24	27	28	28
Cr	14	11	7	17	11	9	99	57	58	62
Ni	52	55	51	53	52	55	80	64	65	67
V	238	241	239	241	258	252	266	274	276	276
Ga	20	20	20	19	19	20	19	20	20	20
Zn	92	87	94	93	90	91	93	96	97	95
Cu	57	53	55	44	56	60	65	58	60	58
Rb	9	7	8	9	8	9	8	7	8	7
Ba	106	112	124	112	106	101	105	126	115	121
Sr	573	611	600	581	599	592	541	535	513	515
Pb	0	0	1	1	1	1	3	1	1	2
Th	1	0	2	0	2	2	2	2	1	2
U	0	1	2	1	2	2	1	1	1	2
Zr	206	199	217	210	211	200	213	178	181	173
Y	28	27	28	28	29	27	31	28	27	27
Nb	18	16	18	19	19	16	19	20	20	19
La	19	15	19	24	25	16	18	17	17	18
Ce	44	43	52	50	51	49	43	44	42	39
Nd	26	25	30	29	27	24	27	27	22	21
<u>ICP-MS trace-element data (ppm)</u>										
Sc	23.51	23.21	23.72	22.77	23.34	24.25	24.72	26.55	26.55	25.86
Cs	0.08	0.07	0.07	0.07	0.04	0.05	0.06	0.07	0.06	0.06
Rb	7.08	6.00	7.49	7.08	6.03	7.14	6.22	5.95	6.40	5.83
Ba	103.43	106.40	115.57	106.26	105.71	98.55	97.30	123.92	114.10	116.08
Sr	577.26	609.45	611.11	584.59	601.51	603.25	546.41	538.21	514.88	514.58
Pb	1.41	1.39	1.78	1.53	1.48	1.75	1.46	1.27	1.27	1.23
Th	1.23	1.15	1.30	1.24	1.25	1.16	1.25	1.19	1.18	1.13
U	0.42	0.41	0.42	0.42	0.41	0.40	0.46	0.39	0.41	0.37
Zr	210.93	201.90	224.17	214.91	214.76	206.54	220.22	179.73	184.59	176.90
Hf	4.63	4.47	4.96	4.81	4.77	4.54	4.94	4.10	4.14	4.06
Ta	1.20	1.15	1.27	1.25	1.25	1.15	1.28	1.41	1.40	1.34
Y	27.53	26.35	29.36	28.10	28.28	26.70	31.44	27.75	28.14	27.08
Nb	17.39	16.45	18.41	18.03	17.89	16.74	18.60	20.62	20.93	20.12

TABLE S1. (CONTINUED)

Sample	R16DD218	R15DC032	R16DD207	R16DD208	R16DD213	R14TRO110	R15DD004	R15DD006	R15DD007	R15DD008
Easting	564575	566170	565110	565973	565385	560875	561043	561256	560952	561329
Northing	2697958	2699079	2702237	2702957	2698996	2694324	2699529	2692850	2694258	2696460
Unit	bbd-l	bqr-l	bqr-l	bqr-l	bqr-l	bhu-l	bhu-l	bhu-l	bhu-l	bhu-l
<u>XRF major-oxide data (Wt%)</u>										
SiO ₂	45.74	46.68	47.28	47.44	46.57	47.38	46.65	47.72	47.39	46.66
TiO ₂	3.37	3.25	2.11	2.30	2.91	1.31	3.16	1.26	1.38	3.18
Al ₂ O ₃	15.70	16.74	16.59	16.54	16.59	15.29	16.04	15.90	15.55	16.20
FeO*	14.02	12.48	12.10	12.61	13.31	11.37	13.50	10.84	11.44	13.44
MnO	0.22	0.19	0.19	0.19	0.20	0.18	0.20	0.18	0.18	0.19
MgO	6.01	6.62	7.61	6.80	6.25	10.67	6.35	10.14	9.82	6.29
CaO	9.34	9.01	9.81	9.20	8.62	10.81	8.86	10.99	11.18	9.21
Na ₂ O	3.82	3.68	3.35	3.71	4.04	2.53	3.98	2.55	2.60	3.66
K ₂ O	0.93	0.87	0.63	0.79	0.99	0.29	0.84	0.28	0.31	0.76
P ₂ O ₅	0.83	0.48	0.33	0.42	0.53	0.14	0.42	0.14	0.15	0.40
LOI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73
Total	100.01	99.17	99.37	99.80	99.02	99.53	99.69	99.94	99.30	99.23
Mg#	45.90	51.22	55.49	51.66	48.19	65.02	48.25	64.95	62.97	48.09
<u>XRF trace-element data (ppm)</u>										
Sc	28	23	29	26	23	35	26	34	34	25
Cr	49	103	211	169	64	640	93	524	584	106
Ni	52	89	110	91	68	245	68	221	214	72
V	268	258	261	279	228	271	262	257	266	270
Ga	21	20	21	21	18	18	19	18	19	20
Zn	107	86	96	97	87	84	93	86	87	93
Cu	68	60	89	79	58	107	61	110	111	56
Rb	10	9	7	8	9	4	7	3	4	7
Ba	137	111	168	122	129	61	108	54	67	98
Sr	559	602	434	438	567	238	542	231	244	558
Pb	1	1	2	3	0	1	1	0	0	1
Th	2	1	2	2	3	2	1	1	0	2
U	1	0	0	0	1	2	1	1	0	1
Zr	228	203	167	199	225	87	220	82	89	200
Y	34	26	24	27	29	22	29	20	22	27
Nb	25	21	16	19	22	5	18	4	5	16
La	21	20	13	15	22	5	16	5	9	19
Ce	56	46	31	41	49	18	45	13	17	45
Nd	34	27	19	24	28	12	26	8	12	24
<u>ICP-MS trace-element data (ppm)</u>										
Sc	27.86	22.73	27.81	26.11	22.54	34.93	23.82	32.13	33.40	25.10
Cs	0.08	0.07	0.06	0.06	0.05	0.01	0.06	0.01	0.02	0.05
Rb	8.32	7.50	5.57	7.27	7.42	1.99	6.06	2.28	2.87	5.50
Ba	134.73	112.69	162.88	120.60	119.05	56.10	103.75	53.45	62.55	92.44
Sr	559.77	611.81	433.84	439.61	568.15	240.88	539.29	234.85	245.20	560.83
Pb	1.78	1.54	2.28	1.67	1.61	0.80	1.89	0.68	0.83	1.42
Th	1.56	1.50	1.08	1.32	1.42	0.42	1.18	0.40	0.42	1.12
U	0.42	0.35	0.37	0.43	0.39	0.12	0.35	0.11	0.15	0.37
Zr	232.67	206.90	169.36	201.48	228.41	85.34	221.90	83.14	90.40	205.82
Hf	5.22	4.59	3.86	4.45	5.09	2.21	4.90	2.09	2.28	4.62
Ta	1.70	1.49	1.09	1.32	1.53	0.40	1.22	0.37	0.40	1.13
Y	34.45	25.99	24.59	27.21	29.57	20.82	28.31	20.48	21.80	26.68
Nb	25.36	21.39	16.29	19.65	22.33	5.40	17.37	5.02	5.62	15.96

TABLE S1. (CONTINUED)

Sample	R15JR008	R15TS172	R15MS026	R14TRO114	R16DC042	R15TS148B	R15TS149	R15MS038	R15MS039
Easting	561699	561047	562501	559796	559397	562937	566023	563063	564637
Northing	2701406	2700501	2692863	2687771	2688513	2707246	2706133	2706166	2708368
Unit	bhu-l	bhu-l	bhu-l	bau-l	bau-l	bmu-l	bmu-l	bmu-l	bmu-l
<u>XRF major-oxide data (Wt%)</u>									
SiO ₂	46.61	46.51	46.64	47.06	46.94	47.20	47.24	47.42	47.50
TiO ₂	2.90	3.13	2.88	1.76	3.01	2.26	2.16	2.28	2.26
Al ₂ O ₃	15.83	16.28	15.88	15.87	16.22	16.99	17.05	16.69	16.92
FeO*	13.12	13.21	12.89	11.54	13.76	12.02	11.82	12.04	11.96
MnO	0.20	0.20	0.19	0.17	0.21	0.18	0.18	0.18	0.18
MgO	7.42	6.70	7.31	9.95	6.23	7.18	7.21	7.23	7.13
CaO	9.37	9.12	9.51	10.03	8.72	9.75	9.95	9.30	9.32
Na ₂ O	3.50	3.71	3.61	2.98	3.81	3.29	3.31	3.69	3.56
K ₂ O	0.70	0.75	0.71	0.43	0.76	0.75	0.74	0.79	0.79
P ₂ O ₅	0.35	0.39	0.36	0.21	0.33	0.38	0.34	0.37	0.38
LOI	0.00	0.00	0.00	0.00	0.00	0.37	0.27	0.00	0.00
Total	99.68	99.22	99.26	99.47	99.79	99.33	99.53	100.05	99.55
Mg#	52.84	50.11	52.91	63.08	47.28	54.22	54.73	54.34	54.15
<u>XRF trace-element data (ppm)</u>									
Sc	27	24	27	28	25	25	25	24	23
Cr	196	105	193	301	98	173	116	166	154
Ni	105	75	104	246	64	125	111	121	121
V	279	277	282	241	252	235	233	232	229
Ga	19	19	19	17	20	19	19	19	19
Zn	93	96	92	81	94	88	87	88	87
Cu	68	57	70	92	61	61	72	72	67
Rb	6	7	6	5	5	7	7	7	8
Ba	86	97	89	67	111	115	114	115	124
Sr	484	552	483	380	510	515	615	503	514
Pb	0	2	0	0	0	1	0	2	1
Th	0	1	1	1	2	2	2	1	2
U	0	1	1	1	1	0	2	0	0
Zr	184	200	185	121	204	179	162	182	180
Y	26	25	27	21	25	23	23	25	24
Nb	15	16	15	9	17	18	17	19	19
La	16	18	16	7	14	19	17	15	18
Ce	37	41	44	24	37	39	37	40	38
Nd	22	21	24	14	21	23	18	23	22
<u>ICP-MS trace-element data (ppm)</u>									
Sc	27.06	24.48	28.14	28.09	25.26	24.13	24.49	24.75	23.66
Cs	0.06	0.06	0.06	0.03	0.04	0.04	0.03	0.04	0.05
Rb	5.35	5.44	5.89	3.12	4.84	5.56	5.30	6.95	6.64
Ba	86.05	92.24	88.71	55.82	99.24	112.25	109.90	111.53	119.71
Sr	480.25	556.65	495.87	386.25	524.13	513.11	621.10	507.17	517.97
Pb	1.42	1.50	1.49	0.73	1.40	1.35	1.34	1.46	1.46
Th	1.07	1.13	1.11	0.61	1.03	1.30	1.14	1.28	1.27
U	0.27	0.39	0.38	0.23	0.32	0.36	0.26	0.30	0.39
Zr	187.90	204.31	191.57	122.00	213.70	182.96	166.12	187.32	182.85
Hf	4.31	4.58	4.35	2.86	4.67	4.02	3.71	4.17	4.13
Ta	1.06	1.12	1.06	0.63	1.19	1.23	1.12	1.25	1.26
Y	25.60	26.19	26.53	20.86	24.44	23.99	22.99	24.60	24.49
Nb	14.45	15.79	15.26	8.75	16.77	17.99	16.46	18.44	18.41

TABLE S1. (CONTINUED)

Sample	R15MS045B	R16DD197	R16DD199	R14TS101	R15DC051	R15DD003	R15TS144	R15TS145	R15TS146	R15TS147
Easting	562389	566940	568791	576726	558402	559572	559083	558444	560996	560873
Northing	2708423	2705335	2704983	2703121	2701903	2704888	2706424	2706973	2702922	2704393
Unit	bmu-l	bis-l	bis-l	bpr-v	bhg-l	bhg-l	bhg-l	bhg-l	bhg-l	bhg-l
<u>XRF major-oxide data (Wt%)</u>										
SiO ₂	47.48	46.53	46.52	46.62	45.49	45.74	45.51	45.77	45.33	45.69
TiO ₂	2.25	2.70	2.81	2.41	3.50	3.33	3.34	3.35	3.46	3.31
Al ₂ O ₃	16.61	16.04	16.33	16.64	16.17	16.05	16.10	16.14	16.08	16.07
FeO*	11.97	13.44	13.29	12.41	13.55	13.39	13.60	13.67	13.85	13.69
MnO	0.18	0.21	0.21	0.19	0.21	0.21	0.21	0.21	0.21	0.21
MgO	7.50	6.57	6.56	7.80	6.49	6.83	6.65	6.47	6.45	6.56
CaO	9.26	9.00	8.94	10.00	8.69	8.85	8.95	8.90	8.85	9.02
Na ₂ O	3.60	3.76	3.75	3.12	4.03	3.89	3.91	3.75	3.95	3.69
K ₂ O	0.78	0.87	0.77	0.49	0.92	0.87	0.89	0.88	0.92	0.94
P ₂ O ₅	0.37	0.88	0.82	0.31	0.92	0.84	0.85	0.86	0.90	0.84
LOI	0.00	0.72	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Total	99.50	99.24	99.59	99.37	99.68	100.03	99.39	99.58	99.83	99.50
Mg#	55.36	49.21	49.45	55.45	48.69	50.25	49.19	48.37	47.96	48.69
<u>XRF trace-element data (ppm)</u>										
Sc	24	25	26	30	24	26	25	26	25	25
Cr	186	139	112	97	73	130	116	112	98	119
Ni	128	100	91	100	74	89	81	78	71	78
V	229	234	217	279	269	272	273	273	274	271
Ga	19	21	19	19	22	19	21	21	20	20
Zn	88	103	102	97	100	102	99	99	100	98
Cu	72	62	63	72	55	57	59	62	58	58
Rb	7	8	6	4	9	9	8	9	9	8
Ba	111	146	140	85	140	137	138	139	139	136
Sr	488	699	558	469	581	551	556	563	580	671
Pb	1	1	2	0	0	2	0	1	1	0
Th	1	1	2	1	1	2	1	2	2	0
U	0	2	2	0	2	1	0	1	1	1
Zr	183	200	200	155	217	205	207	210	215	204
Y	24	32	31	25	31	30	30	31	32	31
Nb	19	19	19	10	22	20	21	21	23	21
La	17	22	22	12	26	27	23	22	23	23
Ce	43	55	51	33	58	52	56	58	55	53
Nd	24	31	31	18	36	33	33	37	34	32
<u>ICP-MS trace-element data (ppm)</u>										
Sc	24.63	24.55	23.66	29.11	23.52	25.15	24.63	25.49	24.73	23.69
Cs	0.06	0.10	0.05	0.04	0.06	0.11	0.12	0.07	0.07	0.16
Rb	6.65	6.95	5.14	3.17	7.42	7.77	7.58	7.32	7.33	7.07
Ba	111.37	141.06	133.22	72.71	133.81	130.29	134.30	135.12	135.66	128.72
Sr	497.13	700.59	557.78	473.63	594.04	561.72	563.59	571.46	591.62	662.70
Pb	1.42	1.58	1.52	0.67	1.62	1.64	1.45	1.71	1.65	1.65
Th	1.32	1.32	1.30	0.71	1.30	1.26	1.28	1.31	1.29	1.23
U	0.41	0.46	0.37	0.24	0.41	0.40	0.45	0.39	0.37	0.45
Zr	186.39	208.02	203.85	159.37	222.37	209.22	212.25	216.24	221.72	203.91
Hf	4.14	4.51	4.53	3.72	4.85	4.66	4.71	4.82	4.92	4.50
Ta	1.28	1.30	1.29	0.72	1.53	1.40	1.44	1.44	1.52	1.37
Y	24.49	32.40	31.63	25.57	31.88	30.74	31.00	31.53	31.96	30.02
Nb	18.68	18.83	18.68	10.30	22.42	20.57	20.75	20.85	22.17	19.70

TABLE S1. (CONTINUED)

Sample	R15TS148A	R15MS033	R15MS036	R15MS037	R15DD001	R15DD002	R15TS143	R16DD201	R16DD222
Easting	561928	560359	559820	561322	566980	567045	565516	568964	566408
Northing	2703692	2705204	2705256	2703723	2706733	2708609	2708122	2705235	2695456
Unit	bhg-l	bhg-l	bhg-l	bhg-l	bur-l	bur-l	bur-l	bha-l	brh-l
<u>XRF major-oxide data (Wt%)</u>									
SiO ₂	45.74	45.49	45.68	45.43	46.35	46.72	45.99	46.47	45.81
TiO ₂	3.30	3.42	3.38	3.47	3.04	3.56	3.36	2.73	3.19
Al ₂ O ₃	16.08	16.11	16.05	16.14	16.65	15.87	16.34	16.33	16.38
FeO*	13.72	13.74	13.58	13.73	13.18	13.23	13.95	12.89	13.56
MnO	0.21	0.21	0.21	0.21	0.20	0.22	0.21	0.20	0.21
MgO	6.53	6.61	6.63	6.40	6.18	5.42	5.38	7.36	6.28
CaO	8.91	9.04	8.91	8.86	9.28	8.50	9.01	9.64	9.25
Na ₂ O	3.77	3.56	3.86	3.95	3.58	4.28	3.75	3.20	3.78
K ₂ O	0.89	0.95	0.88	0.90	0.83	1.13	1.12	0.69	0.82
P ₂ O ₅	0.84	0.87	0.82	0.90	0.71	1.06	0.88	0.50	0.74
LOI	0.07	0.68	0.00	0.00	2.48	0.00	1.66	0.48	0.00
Total	99.15	98.66	99.20	99.89	96.88	99.41	97.67	98.59	99.54
Mg#	48.53	48.79	49.15	48.02	48.14	44.77	43.28	53.10	47.84
<u>XRF trace-element data (ppm)</u>									
Sc	25	26	25	25	24	28	23	27	27
Cr	114	99	123	87	71	40	56	171	56
Ni	78	74	80	68	66	46	52	105	57
V	271	277	277	276	232	218	230	256	272
Ga	21	20	20	21	20	22	20	20	21
Zn	100	101	101	99	97	108	101	95	99
Cu	58	57	58	52	59	65	58	68	60
Rb	10	7	10	8	8	11	10	6	8
Ba	136	131	133	133	129	169	153	122	130
Sr	557	604	551	593	556	514	564	600	520
Pb	2	1	0	0	0	1	2	1	2
Th	2	1	1	2	2	2	2	2	2
U	0	0	1	1	1	3	2	1	3
Zr	205	204	202	208	203	271	224	187	199
Y	30	31	30	31	29	39	32	28	31
Nb	21	21	20	22	20	29	25	16	22
La	19	24	20	24	22	28	22	19	19
Ce	54	61	54	60	49	65	58	37	51
Nd	34	36	33	35	29	43	34	26	30
<u>ICP-MS trace-element data (ppm)</u>									
Sc	24.83	24.55	25.56	24.72	23.33	26.64	22.92	25.86	26.45
Cs	0.06	0.10	0.13	0.08	0.06	0.07	0.04	0.05	0.06
Rb	8.77	6.54	7.82	6.98	6.25	8.79	8.47	4.98	6.91
Ba	133.33	129.95	131.40	133.00	124.67	165.08	146.26	115.81	130.00
Sr	567.92	612.33	562.53	598.65	565.95	524.82	570.78	604.61	530.09
Pb	1.56	1.58	1.58	1.58	1.56	2.13	1.73	1.43	1.51
Th	1.27	1.24	1.24	1.18	1.31	1.77	1.42	1.08	1.28
U	0.32	0.28	0.43	0.35	0.44	0.52	0.53	0.30	0.41
Zr	210.17	211.03	210.54	211.52	209.25	279.56	230.68	190.00	202.27
Hf	4.70	4.66	4.75	4.83	4.70	6.12	5.01	4.31	4.52
Ta	1.41	1.42	1.40	1.50	1.44	2.01	1.68	1.10	1.51
Y	30.96	30.98	30.82	31.11	29.79	40.18	32.92	27.91	30.39
Nb	20.29	21.16	20.58	22.09	21.14	29.46	24.21	15.59	22.11

TABLE S1. (CONTINUED)

Sample	R16DD225	R15JR009	R15MS048	R15MS049	R16DD223	R15MS046	R16DD204	R16DD205	R16DD206
Easting	564445	563792	563946	563707	565010	564417	564328	563860	563675
Northing	2697040	2701658	2700266	2701628	2696277	2700349	2701627	2701588	2702282
Unit	brh-l	bqu-l	bqu-l	bqu-l	bqu-l	bpa-l	bpa-l	bpa-l	bpa-l
<u>XRF major-oxide data (Wt%)</u>									
SiO ₂	47.15	46.91	46.76	46.84	46.76	47.20	46.94	47.46	46.86
TiO ₂	2.42	1.92	1.69	1.92	1.63	2.47	2.31	2.33	2.37
Al ₂ O ₃	16.17	16.63	16.51	16.72	16.40	16.11	15.95	16.04	16.01
FeO*	12.17	11.75	11.40	11.79	11.42	12.50	12.27	12.46	12.43
MnO	0.20	0.18	0.18	0.18	0.17	0.20	0.19	0.19	0.19
MgO	7.12	8.51	8.91	8.48	9.15	8.08	7.87	7.40	7.19
CaO	10.27	10.55	11.25	10.59	11.24	8.91	10.11	9.59	10.14
Na ₂ O	3.21	2.94	2.82	2.87	2.77	3.27	3.17	3.30	3.22
K ₂ O	0.80	0.38	0.30	0.37	0.29	0.83	0.79	0.83	1.19
P ₂ O ₅	0.48	0.23	0.19	0.24	0.17	0.44	0.39	0.40	0.41
LOI	0.91	0.00	0.32	0.00	0.11	2.48	0.49	0.04	1.91
Total	98.34	98.90	99.04	99.74	99.71	97.13	99.32	99.17	97.59
Mg#	53.68	58.94	60.77	58.78	61.35	56.14	55.96	54.06	53.40
<u>XRF trace-element data (ppm)</u>									
Sc	31	29	29	29	31	27	29	29	28
Cr	196	188	205	175	247	204	258	270	235
Ni	104	153	167	156	182	130	143	151	137
V	256	260	263	262	311	235	247	262	245
Ga	19	18	20	19	19	19	19	19	18
Zn	93	88	84	87	86	91	88	91	88
Cu	79	88	101	91	105	70	77	79	75
Rb	8	4	4	3	2	7	7	9	8
Ba	121	53	46	52	44	114	141	128	115
Sr	448	396	350	399	361	434	439	447	577
Pb	2	1	0	0	2	0	0	1	1
Th	2	0	1	1	1	2	2	3	2
U	2	0	1	0	0	0	1	2	2
Zr	196	122	109	125	109	191	186	180	180
Y	29	23	21	23	20	28	26	28	25
Nb	15	7	6	8	5	19	18	18	19
La	21	11	8	11	8	21	17	15	19
Ce	46	24	23	21	23	45	41	38	41
Nd	27	17	16	14	15	24	25	22	21
<u>ICP-MS trace-element data (ppm)</u>									
Sc	31.53	28.01	29.73	28.92	30.52	25.86	28.22	28.39	26.43
Cs	0.07	0.01	0.02	0.01	0.02	0.06	0.05	0.08	0.09
Rb	6.48	2.09	2.04	2.01	1.93	6.61	6.18	7.21	7.24
Ba	119.40	46.36	40.12	47.00	37.62	108.26	136.43	125.28	110.48
Sr	460.02	393.81	354.30	400.79	367.13	436.83	439.74	450.82	579.73
Pb	1.54	0.82	0.71	0.80	0.76	1.54	1.64	1.60	1.61
Th	1.22	0.53	0.42	0.54	0.40	1.26	1.24	1.21	1.25
U	0.22	0.15	0.15	0.14	0.14	0.42	0.41	0.38	0.31
Zr	201.76	123.77	110.56	127.13	108.72	197.66	189.06	183.81	183.15
Hf	4.50	2.98	2.74	3.04	2.64	4.49	4.21	4.22	4.18
Ta	1.12	0.56	0.44	0.58	0.44	1.31	1.24	1.28	1.24
Y	29.10	22.00	21.10	22.24	20.82	27.28	26.50	27.85	26.45
Nb	16.44	7.80	6.09	8.04	5.92	19.03	18.11	18.48	18.00

TABLE S1. (CONTINUED)

Sample	R16DD224	R16DD227	R15TS161	R16DD194	R16DD195
Easting	565042	568942	574371	564612	566729
Northing	2696357	2693711	2689742	2699733	2702401
Unit	bpa-l	bpa-v	bre-l	Qv	Qv
XRF major-oxide data (Wt%)					
SiO ₂	46.77	47.65	47.97	46.39	47.02
TiO ₂	2.45	2.20	1.88	2.85	2.10
Al ₂ O ₃	15.96	15.96	15.77	15.95	17.14
FeO*	12.73	11.92	11.00	13.33	12.01
MnO	0.20	0.19	0.17	0.19	0.18
MgO	7.59	7.94	7.92	7.61	7.36
CaO	9.37	9.60	10.45	9.12	9.49
Na ₂ O	3.62	3.35	3.58	3.55	3.66
K ₂ O	0.86	0.83	0.88	0.64	0.72
P ₂ O ₅	0.46	0.38	0.39	0.36	0.32
LOI	0.00	0.00	1.01	0.18	0.52
Total	99.40	99.57	98.60	99.67	99.01
Mg#	54.15	56.90	58.79	53.07	54.85
XRF trace-element data (ppm)					
Sc	26	28	25	27	25
Cr	208	272	313	178	121
Ni	136	146	159	133	110
V	237	250	220	550	184
Ga	19	19	19	18	19
Zn	91	90	93	86	86
Cu	150	80	86	60	78
Rb	9	9	10	7	7
Ba	113	147	203	97	106
Sr	462	429	587	491	501
Pb	3	1	2	1	2
Th	2	2	2	2	2
U	1	2	1	1	2
Zr	201	179	218	179	161
Y	27	26	23	26	22
Nb	19	17	23	17	16
La	19	20	21	14	13
Ce	43	40	43	39	35
Nd	25	21	24	21	18
ICP-MS trace-element data (ppm)					
Sc	26.83	28.28	24.23	25.11	24.32
Cs	0.05	0.11	0.09	0.04	0.06
Rb	7.05	7.35	8.75	5.12	6.21
Ba	112.13	144.48	191.75	94.51	98.44
Sr	473.70	438.31	578.29	489.74	497.64
Pb	1.61	1.64	1.91	1.53	1.40
Th	1.27	1.23	1.65	1.29	1.12
U	0.35	0.40	0.48	0.43	0.38
Zr	207.36	182.38	221.36	184.20	162.40
Hf	4.62	4.14	4.48	4.11	3.64
Ta	1.32	1.17	1.57	1.20	1.10
Y	28.11	26.87	22.00	26.08	22.51
Nb	19.49	17.39	23.52	16.97	16.15

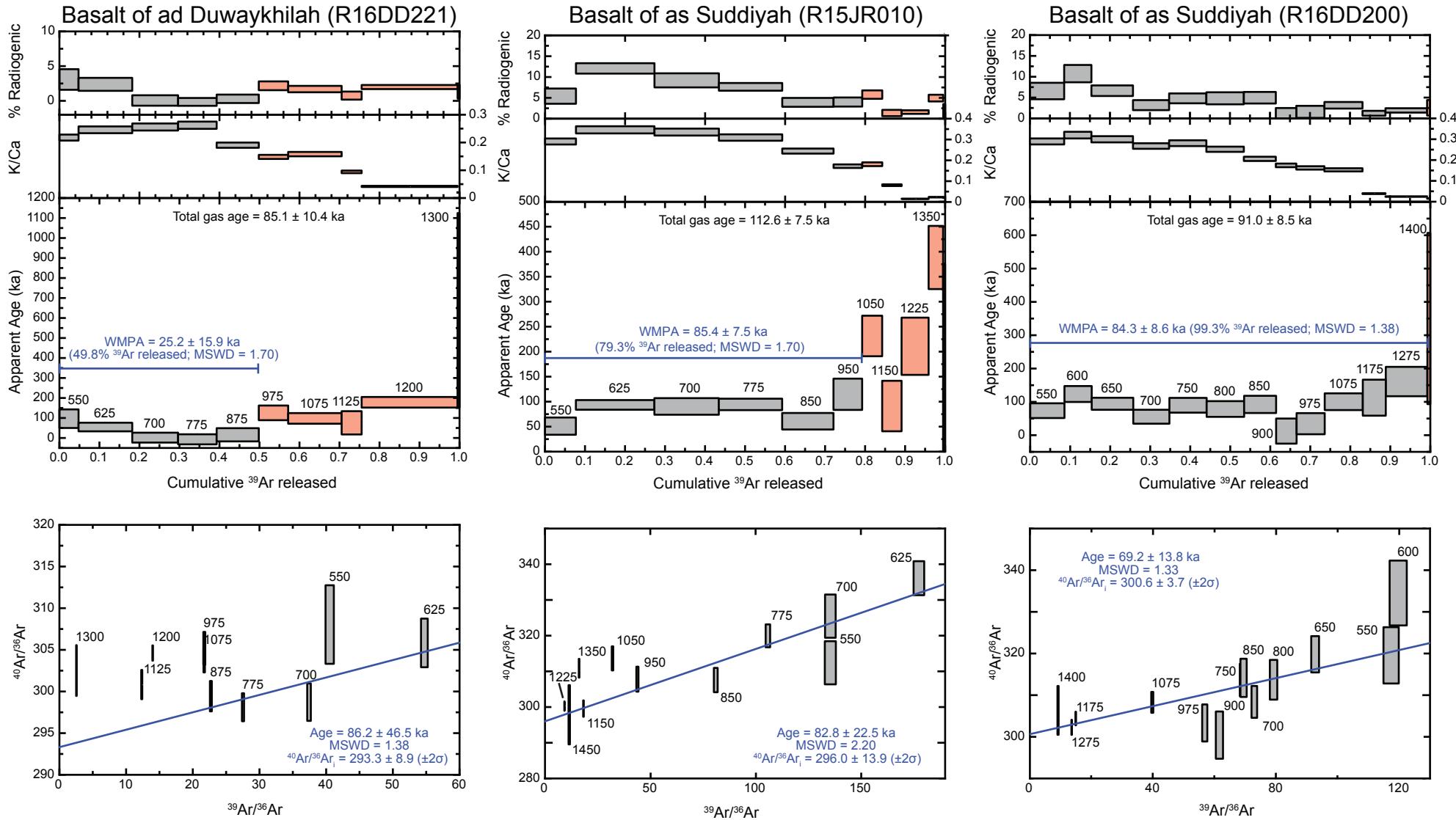


Figure S1 (Part 1).

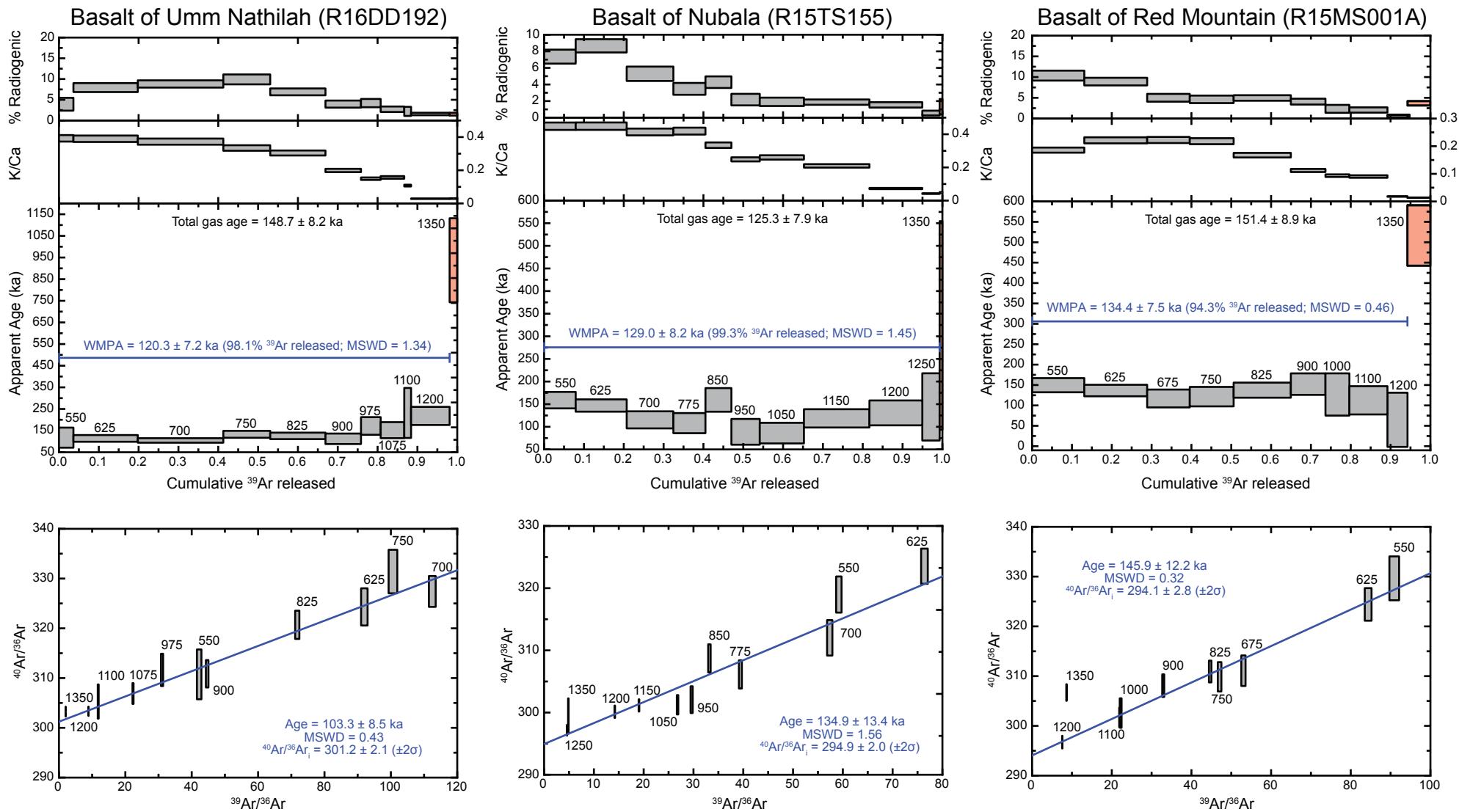


Figure S1 (Part 2).

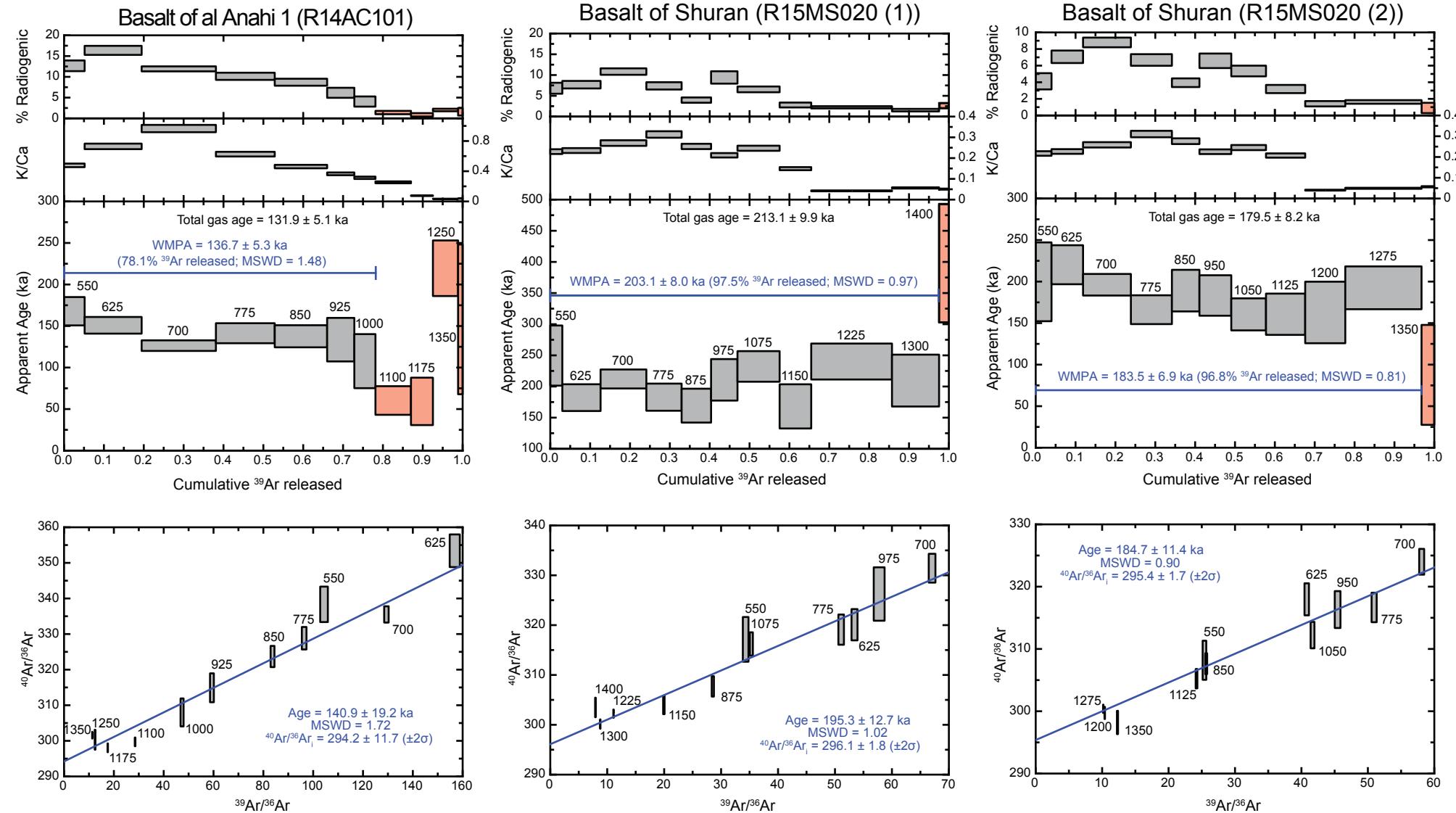


Figure S1 (Part 3).

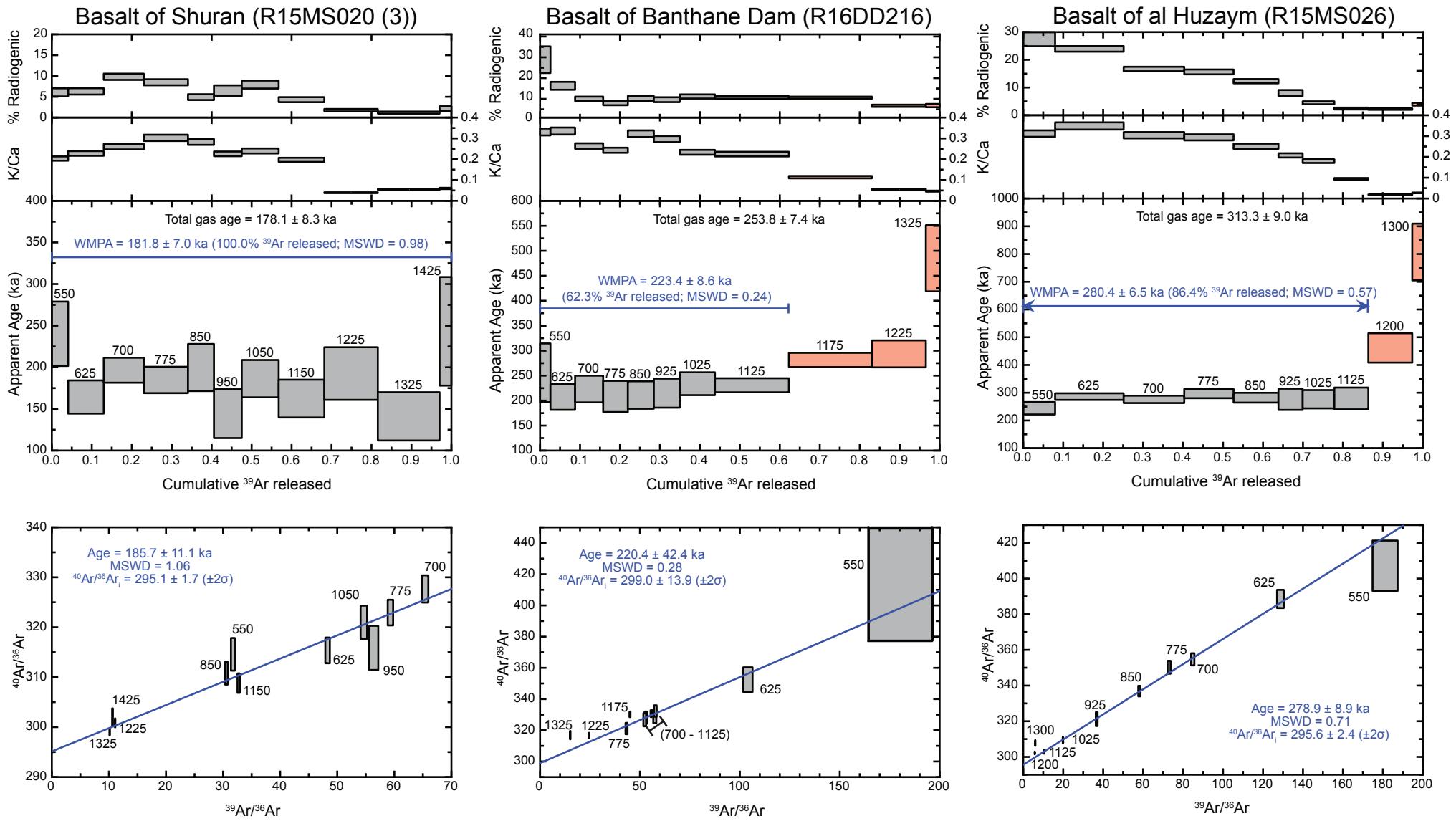
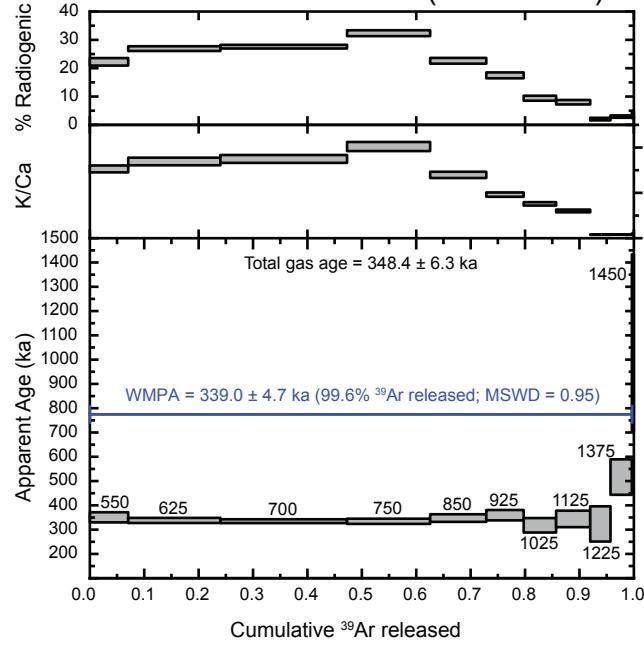
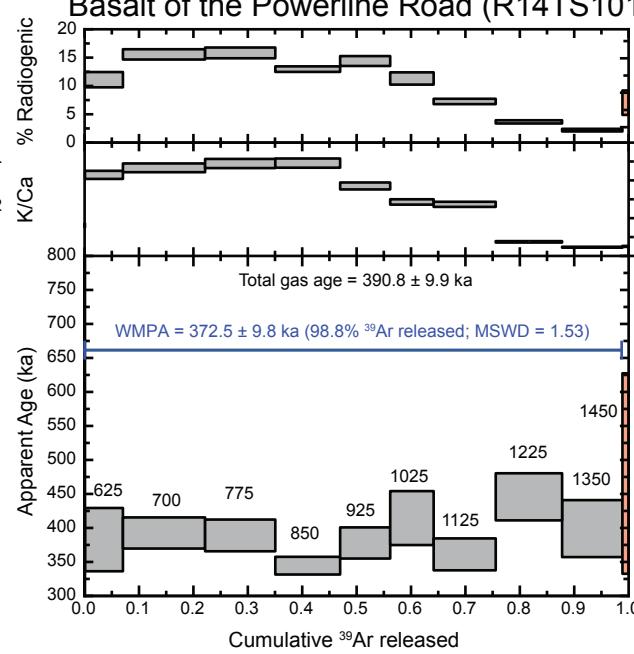


Figure S1 (Part 4).

Basalt of al Mustarah (R15MS039)



Basalt of the Powerline Road (R14TS101)



Basalt of al Harrah al Gharbiyah (R15MS037)

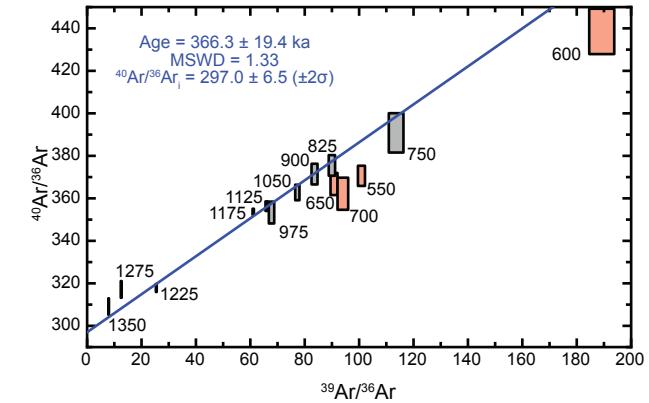
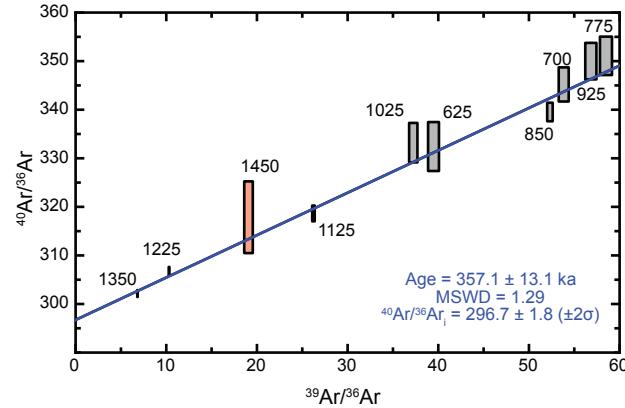
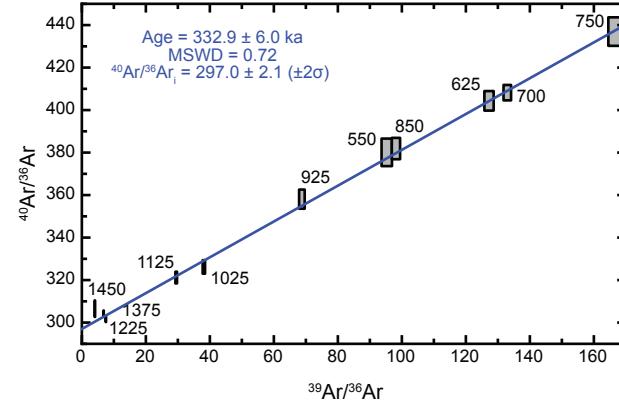
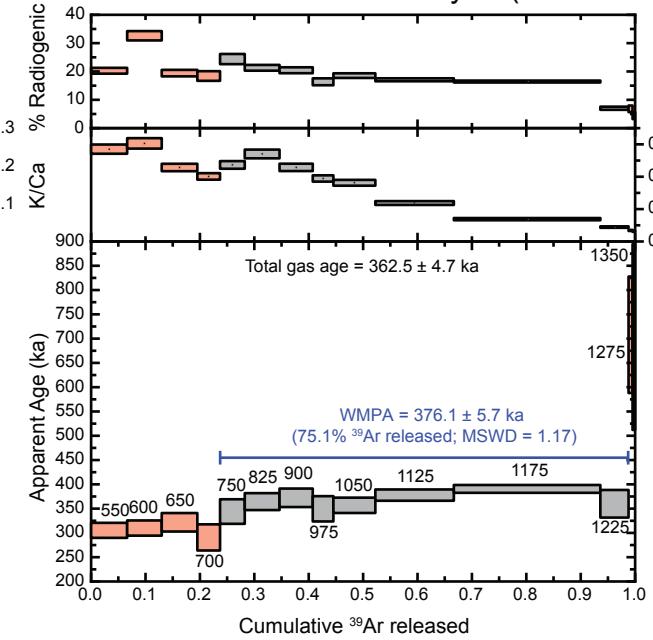


Figure S1 (Part 5).

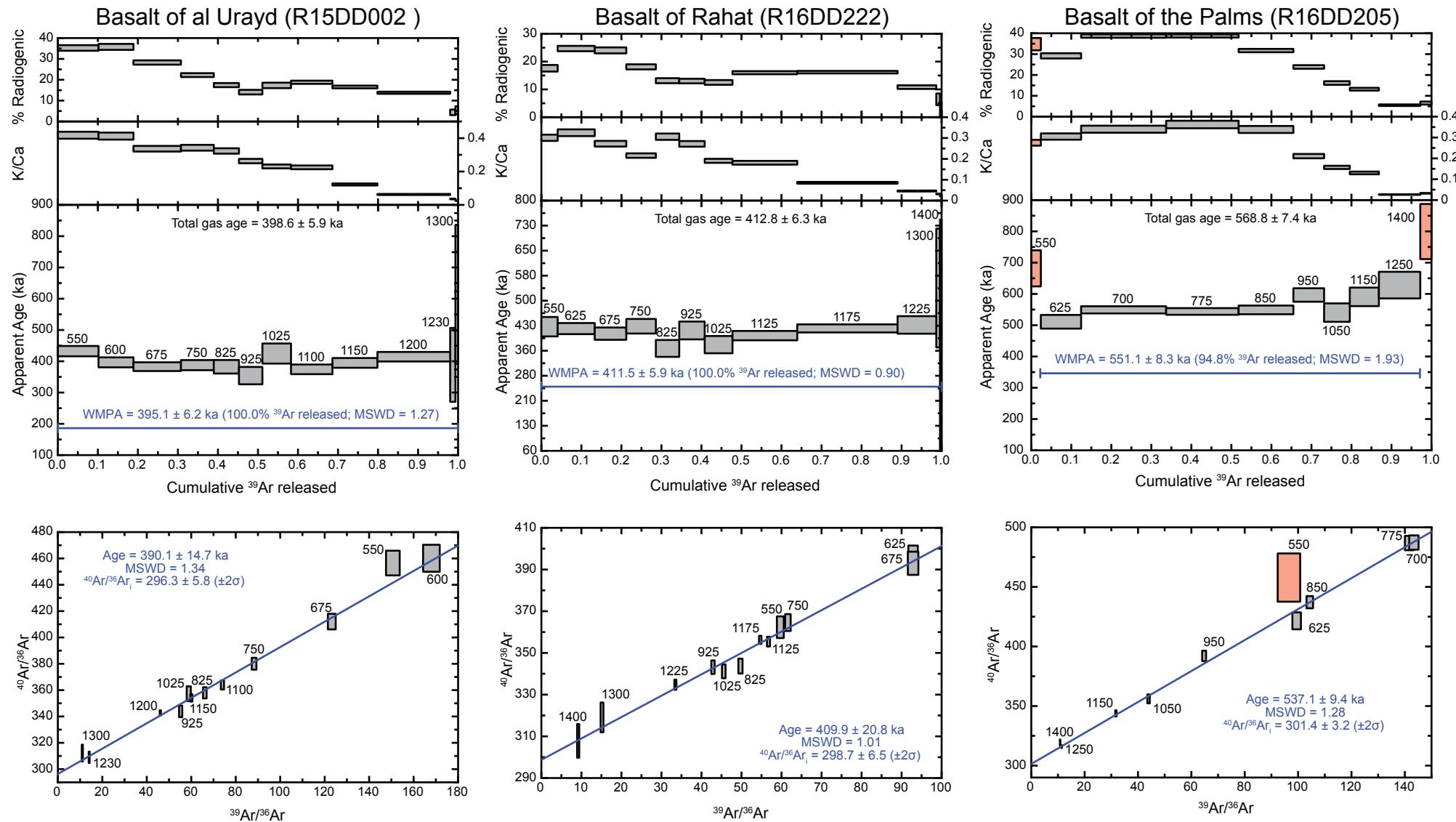


Figure S1 (Part 6).

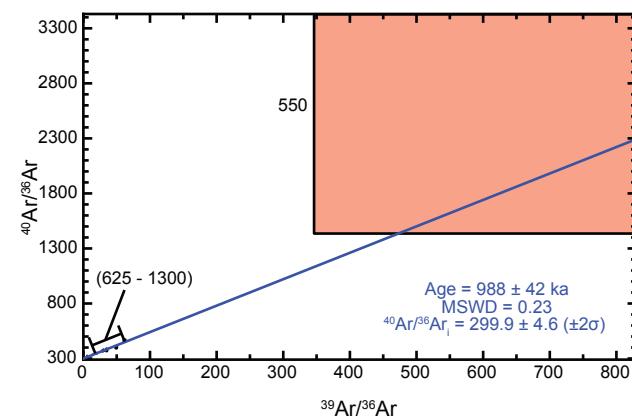
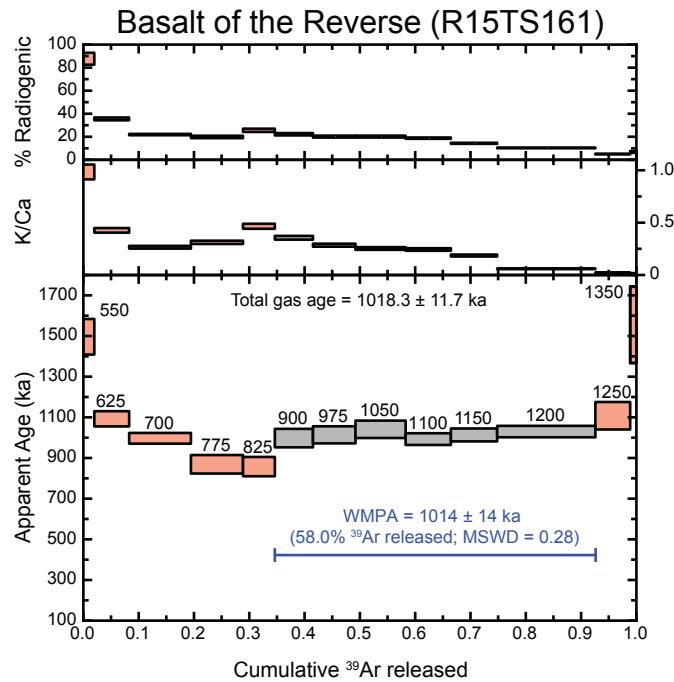


Figure S1 (Part 7).