



Chemical analyses and K-Ar ages of samples from 13 drill holes, Medicine Lake volcano, California

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ABSTRACT

Chemical analyses and K-Ar ages are presented for rocks sampled from drill holes at Medicine Lake volcano, northern California. A location map and a cross-section are included, as are separate tables for drill hole information, major and trace element data, and for K-Ar dates.

INTRODUCTION

This report presents chemical analyses and K-Ar ages obtained from drill hole samples studied in support of geologic mapping at Medicine Lake volcano (MLV), northern California. The holes were drilled by private companies exploring for geothermal energy at the volcano. Drill core and cuttings were later made available for study; core is stored at the Energy and Geoscience Institute (EGI) warehouse in Salt Lake City, Utah.

Drill hole locations are shown in Figure 1 and a generalized cross-section is presented in Figure 2. Discussion of the significance of the chemical and age data will be presented elsewhere, although it is apparent from the cross-section and from Table 1 that a large percentage of MLV core consists of rocks with more than 63 percent SiO₂. A brief preliminary comparison of drill hole information and surface geologic mapping is found in Donnelly-Nolan (1990).

The classic reference for the geology of MLV is Anderson (1941). More recent general studies include Donnelly-Nolan (1988) and Donnelly-Nolan and others (1990).

METHODS

Rock samples were collected from drill core for 12 of the 13 drill holes studied by the author. For one hole, 17A6, only drill cuttings were available. Rocks were broken up using a hammer, then chipped into small fragments in a small ceramic jaw crusher. Samples were powdered in an alumina shatterbox.

Major elements (Table 2) were analyzed by X-Ray fluorescence (XRF) at the USGS chemical analysis laboratory in Denver, Colorado, by J. Taggart, A.J. Bartel, D.F. Siems, and J.S. Mee. In the original major element analyses, all iron was reported as Fe₂O₃ (FeTO₃). The normalized analyses presented in Table 2 were calculated by first recalculating all iron as FeO (=FeO*), summing all major elements without LOI (Loss on Ignition), and then recalculating all major elements to a 100 percent total.

Trace elements presented in Table 2 were analyzed by energy-dispersive XRF (KeveX) at the chemical analysis laboratory in Menlo Park, California, by P. Bruggman. Flame photometry analyses of Na₂O and K₂O in a subset of the samples is presented in Table 3; these analyses were performed by L. Espos, M. Dyslin, and T. Fries in Menlo Park, California. Also presented in Table 3 are Instrumental Neutron Activation trace element analyses (INAA) that were performed at the USGS chemical analysis laboratory in Reston, Virginia. Analysts for these data were G. Wandless, P. Baedeker, J.S. Mee, and C. Palmer.

K-Ar ages presented in Table 4 summarize data published in Donnelly-Nolan and Lanphere (2005), where complete analytical data are found.

Core boxes of drill hole 87-24 were mistakenly labeled 84-27 and are stored as such at the EGI warehouse; sample numbers for core samples from this hole are corrected here.

ACKNOWLEDGMENTS

Funding for this work was provided by the USGS Geothermal and Volcano Hazards Programs. We are grateful to the geothermal energy companies exploring at Medicine Lake volcano for making the samples available. Drill core samples were split from stored core at the Energy and Geoscience Institute in Salt Lake City, Utah. I am grateful to EGI staff for access to the core. I especially thank all of the chemists who analyzed the samples (see text for their names) and W. Loskutoff for help with sample collection and preparation.

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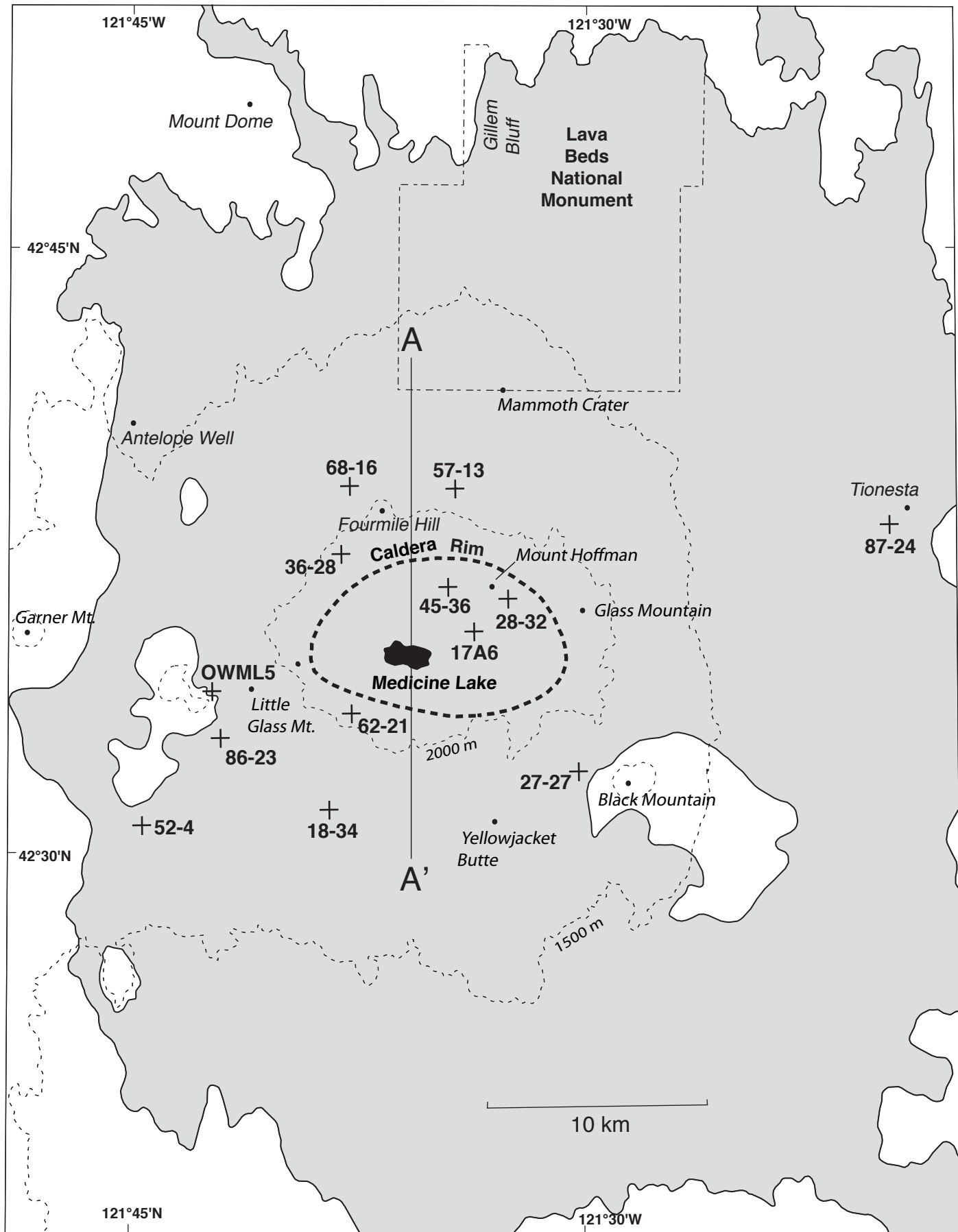


Figure 1. Map showing locations of drill holes (+ symbols). Lavas of Medicine Lake volcano are shown in gray. See Figure 2 for cross-section A-A'.

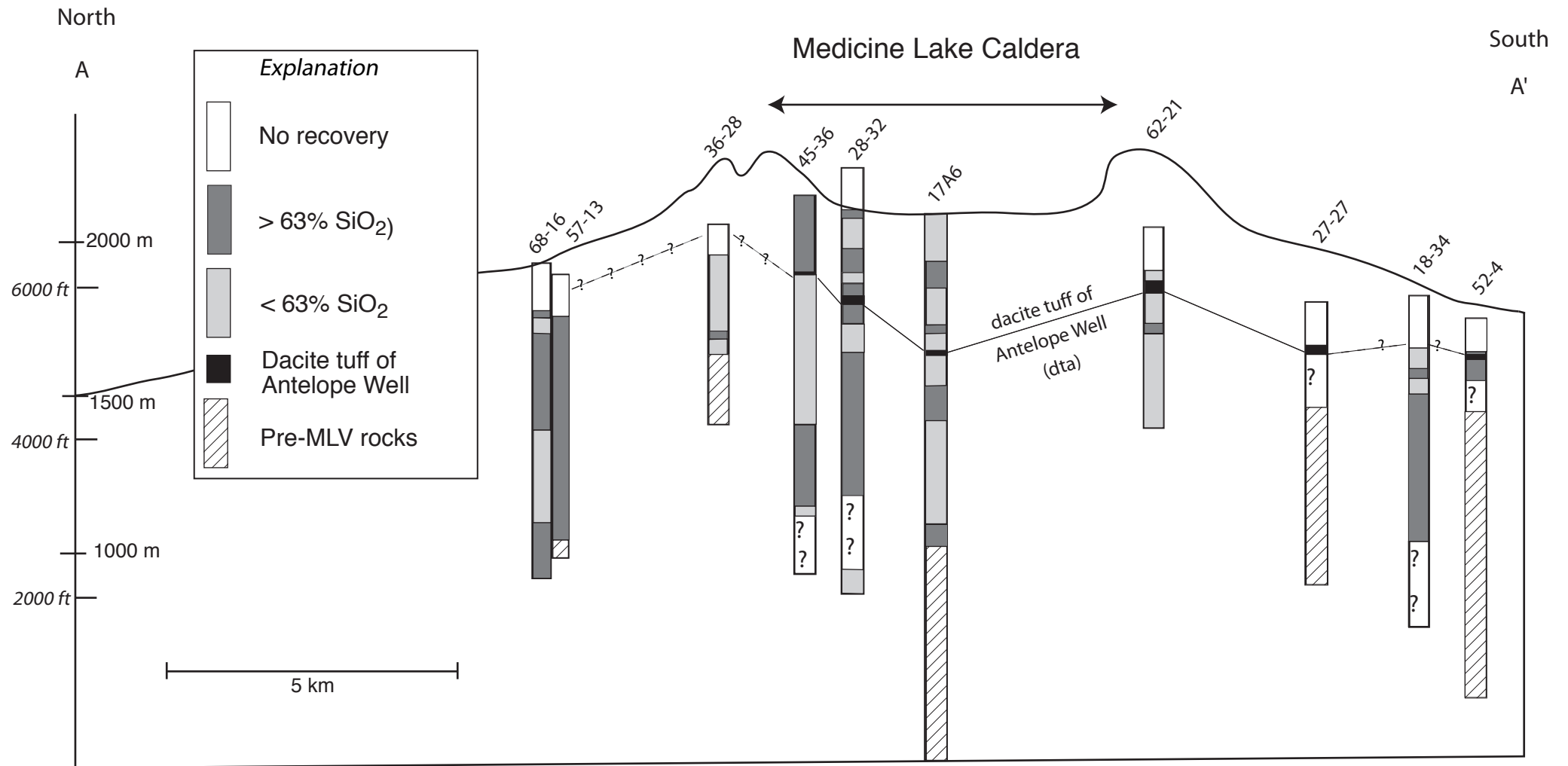


Figure 2. Cross-section A-A' (see Figure 1 for location) showing drill holes projected to line of section. Drill hole 87-24 on far east side of volcano is not included, nor are holes OWML5 and 86-23, where sampling began below lavas of Medicine Lake volcano (MLV).

Table 1. Summary of drill hole information*See Figure 1 for map locations*

<u>Hole No.</u>	<u>Ground Surface</u> <u>Elevation</u>	<u>Bottom</u> <u>Elevation</u>	<u>Total</u> <u>Depth</u>	<u>Depth to</u> <u>Top of Core</u>	<u>Total Feet</u> <u>of Core</u>	<u>Estimated elevation,</u> <u>Base of MLV</u>	<u>Feet of MLV</u> <u>Core</u>	<u>Feet of MLV Core</u> <u>with ≥63.0% SiO₂</u>	<u>Latitude</u> <u>N. 41°</u>	<u>Longitude</u> <u>W. 121°</u>
<i>Holes with drill core:</i>										
OWML5	6400	2398	4002	402	3600	above core	0	0	33.95'	42.46'
18-34	5840	2340	3500	519	2981	below core	2981	1749	30.93'	37.42'
27-27	5800	2800	2963	466	2497	5204	130	107	32.08'	30.17'
28-32	7240	2740	4500	420	4080	below core	4080	2534	36.40'	32.52'
36-28	6680	4534	2146	353	1793	5276	1051	53	37.45'	38.17'
45-36	6960	2960	4000	6	3994	below core	3994	1838	36.66'	34.54'
52-4	5600	1591	4009	367	3642	4648	585	287	30.73'	44.62'
57-13	6140	3140	3002	409	2593	3365	2366	2365	39.01'	34.24'
62-21	6600	4458	2142	487	1655	below core	1655	160	33.49'	37.74'
68-16	6280	2341	2939	471	2468	below core	2468	1857	39.13'	37.95'
86-23	6000	2497	3503	613	2890	above core	0	0	32.85'	42.13'
87-24	4440	3314	1126	10	1116	4200	210	0	38.21'	20.02'
TOTALS					32193		19310	10950		
								<i>56.1% of MLV Core</i>		
<i>Hole with drill cuttings only:</i>										
17A6	6771	-2849	9620	cuttings @ 10' intervals		below 3211	?	?	35.54'	33.74'

Note: all measurements are in feet

Table 2. Major element and EDXRF trace element data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X		
1	HOLE	DEPTH	MAJOR	ELEMENTS-Normalized										Original	Loss on	EDXRF	trace elements									
2	No.	in feet	SiO ₂	Al ₂ O ₃	FeO*	MgO	CaO	Na ₂ O	K ₂ O	TiO ₂	P ₂ O ₅	MnO	Total	Ignition	Rb	Sr	Y	Zr	Nb	Ba	Ni	Cu	Zn	Cr		
3	Major element data (columns C through N) in weight percent													Trace element data (columns O through X) in ppm												
4	17A6	110	58.96	16.77	7.26	2.91	6.25	4.65	1.43	1.28	0.35	0.14	99.16	0.02	46	539	35	186	10	519	15	79	81	30		
5	17A6	250	58.85	16.94	7.11	2.91	6.42	4.63	1.40	1.26	0.33	0.14	99.34	<0.01	45	546	34	182	11	506	24	56	66	24		
6	17A6	400	53.00	17.94	9.11	5.06	9.07	3.69	0.57	1.18	0.21	0.16	99.10	0.63	22	579	27	117	4	238	33	87	78	85		
7	17A6	510	51.92	18.73	8.59	5.56	9.72	3.46	0.56	1.09	0.19	0.16	99.16	0.35	21	489	24	103	4	785	51	100	76	86		
8	17A6	770	72.32	14.24	2.16	0.34	1.29	4.74	4.36	0.41	0.09	0.05	98.55	0.33	153	109	42	334	11	729	2	10	43	5		
9	17A6	1010	60.26	16.11	6.77	2.89	5.85	4.37	2.09	1.18	0.34	0.13	98.81	0.56	63	368	38	228	11	563	13	54	74	25		
10	17A6	1220	63.75	15.81	5.08	2.56	4.86	3.93	2.93	0.80	0.17	0.10	99.23	0.79	97	228	36	236	9	545	30	40	66	48		
11	17A6	1440	65.24	16.54	4.28	1.38	4.11	4.58	2.71	0.82	0.25	0.09	97.18	2.06	79	363	34	225	9	611	8	27	62	17		
12	17A6	1660	60.55	17.18	5.78	2.70	6.00	4.35	2.04	0.97	0.31	0.11	97.24	2.39	54	474	29	201	9	529	21	34	74	38		
13	17A6	1880	66.23	15.85	4.29	1.33	3.37	4.98	2.77	0.84	0.24	0.09	98.91	0.33	88	339	35	244	13	637	3	23	61	5		
14	17A6	2130	67.41	15.35	4.02	1.10	2.96	4.88	3.16	0.80	0.23	0.08	98.79	0.54	96	304	36	266	11	704	5	22	58	6		
15	17A6	2360	59.33	17.38	6.29	3.43	6.64	3.82	1.74	0.95	0.30	0.12	97.94	1.51	52	481	31	184	10	501	31	45	76	57		
16	17A6	2610	58.52	17.96	6.20	3.43	7.01	3.96	1.50	0.97	0.32	0.13	97.55	2.11	50	490	32	180	11	478	32	50	70	60		
17	17A6	2850	58.52	17.82	6.21	3.59	6.79	4.12	1.53	0.96	0.32	0.12	97.21	2.06	45	469	30	176	10	458	28	47	73	50		
18	17A6	3090	59.73	18.42	5.49	2.93	7.12	3.92	1.13	0.88	0.27	0.10	96.69	2.78	33	502	28	159	9	460	21	40	65	39		
19	17A6	3370	67.39	15.90	3.89	0.78	2.07	6.20	2.65	0.76	0.23	0.14	97.91	1.2	54	225	47	313	14	776	4	5	83	4		
20	17A6	3600	61.06	16.06	6.89	2.19	5.62	4.51	1.73	1.36	0.41	0.16	95.38	3.48	38	332	42	245	11	529	8	53	90	23		
21	17A6	3870	55.52	16.42	9.40	3.48	8.06	4.23	0.85	1.49	0.37	0.18	95.37	3.9	22	455	34	155	6	350	16	82	96	32		
22	17A6	4110	43.71	5.98	3.35	1.60	43.84	0.46	0.35	0.35	0.25	0.12	76.93	21.5	28	1057	19	97	4	605	27	32	38	35		
23	17A6	4300	54.77	15.71	9.71	3.87	9.03	4.00	0.86	1.49	0.39	0.18	96.52	3.18	20	438	38	150	5	372	11	92	96	40		
24	17A6	4650	56.51	15.78	9.09	2.93	7.15	4.38	1.85	1.68	0.45	0.18	95.99	2.87	40	403	40	190	7	634	14	70	94	25		
25	17A6	4750	58.55	16.06	8.39	2.61	5.72	4.80	1.55	1.60	0.54	0.18	97.39	1.86	29	376	44	230	11	555	5	33	90	13		
26	17A6	4850	60.67	15.89	6.66	2.03	5.86	5.04	1.91	1.29	0.50	0.16	96.97	1.96	38	373	45	213	9	639	11	42	86	17		
27	17A6	5010	60.46	16.96	5.96	2.44	6.59	4.45	1.62	1.06	0.32	0.14	96.73	2.27	36	399	36	194	9	526	13	38	66	33		
28	17A6	5250	59.10	17.83	5.87	2.55	7.04	4.22	2.07	0.94	0.25	0.12	97.08	1.99	49	409	33	162	8	445	18	43	60	47		
29	17A6	5510	64.19	15.95	5.12	1.54	3.92	5.66	2.33	0.90	0.25	0.13	97.13	1.52	48	274	45	294	13	702	11	41	73	11		
30	17A6	5820	54.04	17.70	8.59	4.51	9.14	3.80	0.59	1.21	0.27	0.15	98.08	1.55	14	456	25	130	6	245	20	71	77	89		
31	17A6	6050	53.86	17.22	9.16	3.62	9.46	3.96	0.80	1.43	0.33	0.17	96.21	2.73	20	495	34	151	6	384	81	183	86	52		
32	17A6	6310	60.52	16.23	6.72	2.65	5.26	4.73	2.11	1.25	0.37	0.15	98.05	1.21	45	334	40	268	10	637	21	30	76	29		
33	17A6	6580	74.14	12.87	2.20	0.75	1.67	2.87	5.03	0.33	0.09	0.05	98.16	0.99	126	101	40	166	14	165	21	28	29	14		
34	17A6	6810	55.67	19.28	6.75	3.60	8.61	3.63	1.13	0.96	0.22	0.15	97.72	1.59	28	438	30	122	5	221	65	55	82	82		
35	17A6	7100	74.61	13.42	1.68	0.28	0.85	3.88	5.00	0.18	0.05	0.03	98.56	0.62	130	58	40	168	14	150	125	15	19	16		
36	17A6	7410	52.10	18.05	8.86	6.22	9.14	3.38	0.71	1.13	0.27	0.13	97.89	1.63	40	499	39	139	9	262	118	44	55	153		
37	17A6	7700	58.00	17.65	7.16	3.43	6.97	4.05	1.28	1.14	0.25	0.09	97.67	1.76	61	470	40	171	6	333	17	70	75	36		
38	17A6	8000	68.43	15.30	3.36	1.27	3.39	3.90	3.38	0.66	0.25	0.06	98.42	0.99	125	307	34	208	10	773	10	14	38	7		
39	17A6	8210	73.13	14.48	1.72	0.51	2.13	4.10	3.45	0.33	0.10	0.04	98.92	0.5	111	241	23	156	8	837	3	17	39	10		
40	17A6	8550	69.69	14.83	3.03	0.96	2.87	4.10	3.64	0.58	0.22	0.08	98.76	0.88	132	258	38	231	13	980	6	22	63	5		
41	17A6	8800	71.71	14.57	2.27	0.67	2.30	4.19	3.70	0.41	0.12	0.06	98.42	0.48	125	243	30	194	7	854	2	10	33	6		
42	17A6	9060	64.02	16.23	4.92	1.68	4.22	5.00	2.46	0.97	0.39	0.11	98.48	0.61	71	306	40	266	12	700	11	15	72	8		
43	17A6	9210	68.68	15.33	3.39	0.90	3.17	4.43	3.21	0.60	0.22	0.07	98.22	0.53	91	286	34	195	8	882	67	31	46	13		
44	17A6	9500	71.76	14.70	2.20	0.59	2.42	4.15	3.60	0.41	0.13	0.06	98.91	0.43	103	241	30	188	9	830	18	14	39	8		
45	17A6	9620	72.67	14.72	1.60	0.46	2.25	4.03	3.80	0.32	0.11	0.04	98.70	0.53	94	238	22	153	4	892	65	16	23	14		
46	18-34	540	60.08	16.88	6.41	2.97	6.26	4.28	1.76	1.00	0.24	0.12	100.25	< 0.01	40	496	25	174	6	508	19	27	47			
47	18-34	582	52.44	19.25	7.08	6.44	9.67	3.22	0.75	0.83	0.20	0.12	100.52	< 0.01	18	687	17	116	5	327	108	115	42			
48	18-34	622	54.68	16.60	9.90	3.71	7.64	4.43	1.00	1.53	0.34	0.18	99.28	0.04	16	457	28	133	8	400	9	88	93	28		
49	18-34	677	55.28	15.95	10.02	3.64	7.62	4.22	1.07	1.67	0.33	0.19	100.79	< 0.01	17	401	32	162	5	426	18	71	75			
50	18-34	714	51.73	17.38	9.22	5.95	9.20	3.52	0.95	1.51	0.37	0.17	100.57	< 0.01	18	418	26	158	8	324	71	66	56			
51	18-34	781	68.81	15.09	3.43	1.04	2.57	4.29	3.84</																	

Table 2. Major element and EDXRF trace element data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	HOLE	DEPTH	MAJOR	ELEMENTS-Normalized										Original	Loss on	EDXRF	trace elements							
2	No.	in feet	SiO ₂	Al ₂ O ₃	FeO*	MgO	CaO	Na ₂ O	K ₂ O	TiO ₂	P ₂ O ₅	MnO	Total	Ignition	Rb	Sr	Y	Zr	Nb	Ba	Ni	Cu	Zn	Cr
58	18-34	1568	66.06	15.76	4.40	1.40	3.45	4.39	3.29	0.87	0.28	0.09	99.49	0.29	81	247	36	296	14	805	13	22	45	
59	18-34	1630	75.96	13.33	1.15	0.11	0.60	4.07	4.59	0.10	0.05	0.04	99.12	0.57	127	47	36	154	14	753	8	1	31	
60	18-34	2220	67.58	15.55	3.78	1.13	2.90	4.45	3.54	0.76	0.23	0.08	98.81	0.63	86	215	35	307	12	847	11	17	40	
61	18-34	2575	54.61	18.50	7.89	4.78	8.37	3.62	0.83	1.05	0.19	0.16	100.31	0.31	22	625	21	115	4	333	48	59	59	
62	18-34	2758	54.66	17.80	9.21	4.52	7.95	3.04	1.03	1.35	0.27	0.17	96.47	4.09	22	504	22	111	5	308	43	60	73	
63	18-34	2845	60.69	17.49	6.39	2.07	5.05	4.74	1.96	0.89	0.54	0.17	99.06	0.57	37	491	32	173	6	649	13	10	89	
64	18-34	3237	55.71	18.00	8.17	3.92	7.65	3.93	0.98	1.19	0.30	0.14	99.81	0.41	18	559	23	132	5	365	25	41	71	
65	18-34	3370	53.75	18.46	8.11	5.13	8.60	3.35	1.01	1.13	0.31	0.15	98.36	1.96	20	567	21	129	7	359	64	44	59	
66	18-34	3370	55.92	17.85	8.45	3.70	6.98	4.23	1.07	1.30	0.34	0.16	98.38	1.01	18	538	26	139	6	396	10	41	86	22
67	18-34	3406	53.72	20.38	6.68	4.03	9.91	3.29	0.66	0.97	0.23	0.13	97.89	2.47	13	624	19	105	2	244	53	43	59	
68	18-34	3478	54.02	18.79	7.70	5.17	8.79	3.46	0.65	1.02	0.25	0.15	98.20	1.8	10	579	21	104	4	283	48	43	76	78
69	18-34	3497	53.49	18.71	7.84	5.40	8.84	3.54	0.77	1.05	0.23	0.13	99.20	1.25	12	572	19	104	4	283	54	44	62	
70	27-27	527	65.07	16.09	4.83	1.50	3.89	4.85	2.48	0.96	0.23	0.10	99.97	0.18	63	363	27	217	8	623	10	24	49	
71	27-27	590	69.57	17.25	2.76	0.62	1.71	3.59	3.81	0.51	0.09	0.08	91.85	7.33	95	175	39	340	13	916	4	20	56	5
72	27-27	756	54.89	17.29	8.10	4.29	8.69	3.72	1.23	1.32	0.32	0.15	100.36	0.35	22	446	23	156	6	443	31	88	59	
73	27-27	1094	55.76	18.28	6.81	4.70	7.93	3.68	1.44	0.98	0.30	0.12	100.29	0.30	28	519	23	176	13	452	63	66	50	
74	27-27	1164	55.74	18.18	6.86	4.77	7.92	3.71	1.41	0.98	0.30	0.13	100.33	0.22	28	511	21	172	11	442	75	62	47	
75	27-27	1437	55.10	18.37	6.92	5.12	8.43	3.54	1.25	0.88	0.25	0.13	100.40	0.27	24	515	20	152	6	430	78	70	46	
76	27-27	1890	54.88	18.33	6.98	5.29	8.52	3.51	1.21	0.90	0.26	0.12	100.07	0.56	27	531	21	150	7	434	83	73	51	
77	27-27	2425	54.38	18.46	7.13	5.47	8.74	3.47	1.07	0.89	0.25	0.13	100.46	0.39	20	543	21	138	7	384	89	58	48	
78	27-27	2657	52.29	18.10	8.27	6.07	9.32	3.43	0.94	1.11	0.32	0.15	99.78	0.49	24	537	33	155	14	400	103	56	54	93
79	27-27	2917	48.26	17.88	9.23	9.19	11.28	2.69	0.25	0.91	0.12	0.17	99.44	1.41	0	501	21	54	1	133	157	70	34	
80	27-27	2968	55.49	18.80	6.66	4.86	8.35	3.55	1.04	0.90	0.22	0.12	99.66	0.94	20	628	18	118	4	322	77	65	47	
81	28-32	422	71.62	14.71	2.28	0.55	1.77	4.65	3.85	0.40	0.09	0.06	99.52	0.06	109	139	26	261	7	902	2	7	46	6
82	28-32	458	71.50	14.72	2.29	0.54	1.67	4.42	4.30	0.40	0.09	0.06	99.41	0.34	116	137	30	269	6	914	2	6	41	5
83	28-32	487	54.63	17.54	8.26	4.92	8.48	3.86	0.79	1.14	0.23	0.15	100.12	<0.01	20	564	23	122	3	340	22	28	80	70
84	28-32	504	59.13	17.34	6.44	3.42	6.22	4.28	1.73	0.99	0.30	0.13	99.30	0.46	45	426	27	181	9	504	27	36	88	40
85	28-32	512	58.01	17.24	7.25	3.04	6.93	4.46	1.33	1.28	0.32	0.14	99.40	0.32	36	557	33	167	8	474	11	109	77	31
86	28-32	688	54.55	17.30	9.00	4.93	8.41	3.45	0.76	1.22	0.21	0.17	99.25	0.18	19	425	26	133	5	283	30	77	87	79
87	28-32	823	72.02	14.40	2.29	0.43	1.37	4.71	4.20	0.42	0.08	0.06	99.53	0.25	134	105	40	331	11	743	3	10	46	3
88	28-32	844	72.05	14.41	2.27	0.41	1.34	4.73	4.24	0.41	0.08	0.06	99.49	0.15	131	95	36	323	10	734	2	12	46	4
89	28-32	1093	55.26	17.47	7.90	4.47	8.62	3.71	1.07	1.11	0.25	0.14	98.76	0.67	35	459	25	136	6	398	24	71	71	63
90	28-32	1216	72.63	14.20	2.00	0.54	1.56	4.08	4.45	0.40	0.09	0.05	98.11	1.69	143	120	29	252	9	717	1	13	33	3
91	28-32	1281	68.49	15.01	3.38	1.39	3.06	3.96	3.92	0.59	0.13	0.07	99.66	0.09	127	175	34	266	10	663	11	18	50	18
92	28-32	1302	64.01	15.52	5.86	1.80	4.22	4.57	2.61	1.04	0.23	0.13	98.59	1.01	68	318	32	230	8	557	4	21	71	6
93	28-32	1365	55.63	17.38	7.95	4.11	8.53	3.73	1.11	1.17	0.25	0.14	98.66	0.72	28	589	22	144	6	295	14	93	79	58
94	28-32	1397	67.86	14.98	3.75	1.63	3.16	4.05	3.71	0.64	0.15	0.08	99.89	0.02	115	197	34	265	9	647	15	25	49	13
95	28-32	1427	66.75	15.10	4.14	1.93	3.54	4.04	3.53	0.69	0.17	0.09	99.78	0.1	104	216	31	251	9	634	16	26	50	23
96	28-32	1565	66.54	15.17	4.25	1.91	3.62	4.03	3.51	0.71	0.17	0.09	99.36	0.06	106	209	28	254	9	632	17	33	56	25
97	28-32	1598	72.26	14.33	2.31	0.59	1.56	3.89	4.52	0.41	0.09	0.05	95.87	3.94	137	125	32	289	9	701	6	27	46	6
98	28-32	1822	56.89	16.49	8.92	3.11	7.33	4.26	1.21	1.36	0.26	0.17	96.74	3.21	28	446	28	159	6	388	15	52	82	25
99	28-32	1866	59.62	20.08	5.07	2.50	6.33	3.72	1.56	0.83	0.19	0.10	96.65	3.15	39	459	23	140	4	401	11	74	60	46
100	28-32	1964	51.53	17.21	9.61	6.13	9.46	3.30	0.76	1.49	0.35	0.17	97.48	2.4	10	352	26	137	8	268	69	78	79	134
101	28-32	1981	71.39	14.81	2.60	0.69	1.89	3.24	4.66	0.53	0.13	0.06	94.82	4.78	127	142	34	329	9	725	6	18	49	4
102	28-32	2044	70.89	14.74	2.59	0.77	1.97	3.79	4.53	0.52	0.14	0.06	95.91	3.86	125	147	35	321	10	742	3	16	41	6
103	28-32	2127	58.98	16.53	7.39	3.28	5.93	4.35	1.78	1.31	0.29	0.17	97.61	1.77	50	361	30	186	8	417	13	76	81	30
104	28-32	2157	63.72	15.80	5.86	1.42	4.41	4.26	2.92	1.14	0.35	0.11	96.83	2.44	81	274	31	223	11	656	7	38	73	7
105	28-32	2171	73.06	14.70	2.59	0.72	1.48	2.37	4.45	0.49	0.08	0.07	90.73	8.77	114	117	35	328	10	820	2	17	50	4
106	28-32	2566	76.96	13.28	1.27	0.00	0.38	3.36	4.59	0.10	0.00	0.05	92.00	7.63	146	15	52	165	15	98	0	2	67	3
107	28-32	2827	54.82	17.56	8.77	4.45	7.86	3.83	1.09	1.16	0.23	0.24	89.70	9.33	25	449	27	146	6	302	20	57	73	69
108	28-32	2893	72.56	14.68	2.24	0.45	1.21	3.69	4.53	0.49	0.08	0.06	94.92	4.78	122	108	35	338	9	833	2	12	45	4
109	28-32	3453	54.38	18.58	7.67	4.34	9.27	3.46	0.73	1.08	0.35	0.13	96.06	3.13	15	479	27	149	9	416	56	56	72	97
110	28-32	3621	55.44	19.75	6.61	4.29	8.79	3.65	0.27	0.87	0.22	0.12	95.39	4.1	11	658	22	123	6	269	79	79	73	83
111	28-32	3732	55.79	17.82	8.09	3.77	8.39	3.48	1.03	1.19	0.32	0.14	95.13	4.32	21	455	26	142	7	398	21	76	73	54
112	28-32	4183	62.73	15.76	6.61	1.65	3.87	4.82	2.63	1.23	0.56	0.15	95.87	3.17	47	376	38	214	9	778	6	29	79	4

Table 2. Major element and EDXRF trace element data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	HOLE	DEPTH	MAJOR	ELEMENTS-Normalized																				
2	No.	in feet	SiO ₂	Al ₂ O ₃	FeO*	MgO	CaO	Na ₂ O	K ₂ O	TiO ₂	P ₂ O ₅	MnO	Original Total	Loss on Ignition	EDXRF Rb	trace elements Sr	Y	Zr	Nb	Ba	Ni	Cu	Zn	Cr
113	28-32	4334	60.12	18.41	7.15	2.08	4.01	4.49	2.04	1.27	0.33	0.09	96.91	2.29	44	521	30	151	7	889	12	57	73	41
114	28-32	4417	54.73	16.93	8.75	5.50	8.38	3.03	1.18	1.11	0.22	0.16	97.22	2.24	26	383	27	108	7	298	74	70	90	65
115	28-32	4427	61.41	16.34	7.16	2.20	2.88	5.48	2.36	1.40	0.62	0.16	97.49	1.84	45	364	44	225	11	750	4	12	92	4
116	36-28	443	58.51	17.40	6.38	3.83	7.35	3.93	1.42	0.88	0.17	0.12	100.69	0.06	39	453	20	135	5	442	28	59	49	
117	36-28	568	58.65	17.20	7.11	3.32	6.78	4.16	1.45	1.02	0.19	0.12	100.18	0.20	25	465	20	142	6	454	18	60	55	
118	36-28	637	58.56	17.54	6.60	3.52	6.45	4.16	1.69	1.04	0.29	0.14	99.94	0.84	35	428	26	186	9	499	38	40	63	
119	36-28	714	55.03	16.06	10.09	3.59	7.26	4.45	1.17	1.79	0.37	0.18	100.14	0.28	21	413	31	171	8	460	17	114	74	
120	36-28	836	52.76	16.24	9.99	5.25	9.22	3.48	0.95	1.58	0.34	0.19	100.23	0.37	11	342	31	169	5	335	43	84	65	
121	36-28	882	50.39	17.27	10.09	6.29	9.73	3.42	0.65	1.60	0.38	0.18	100.14	<0.01	13	424	24	145	8	293	53	88	76	114
122	36-28	913	50.80	17.67	9.63	6.14	9.45	3.46	0.75	1.54	0.38	0.17	100.08	<0.01	10	422	31	150	7	301	70	74	77	105
123	36-28	1049	55.48	16.85	8.68	3.85	8.25	4.05	1.06	1.36	0.25	0.17	100.09	0.35	22	505	23	135	6	367	18	84	68	
124	36-28	1159	55.64	16.99	8.59	3.89	8.13	4.02	1.03	1.31	0.24	0.16	99.24	0.32	28	520	28	139	4	345	8	86	75	46
125	36-28	1206	61.04	16.24	6.78	2.63	5.49	4.02	2.25	1.16	0.30	0.10	98.05	1.21	66	325	30	191	8	561	17	57	77	16
126	36-28	1277	63.75	15.68	5.39	2.15	4.32	3.92	3.41	1.05	0.23	0.10	98.79	1.54	80	181	41	314	10	618	21	30	55	
127	36-28	1368	60.28	18.33	5.29	3.54	6.62	3.74	1.29	0.64	0.16	0.10	98.78	0.6	27	666	18	117	4	390	35	38	59	43
128	36-28	1533	58.17	18.41	6.14	4.10	7.23	3.67	1.23	0.76	0.19	0.10	99.01	1.33	28	620	16	115	2	369	53	31	46	
129	36-28	1645	62.45	16.85	5.35	3.57	5.57	3.42	1.84	0.67	0.16	0.12	95.52	4.72	42	403	21	128	6	499	66	29	54	
130	36-28	1726	56.14	16.38	9.49	3.40	7.15	3.89	1.28	1.68	0.39	0.20	96.84	3.70	22	401	30	177	8	455	17	78	77	
131	36-28	1778	70.70	15.68	2.62	1.15	2.75	3.36	3.16	0.40	0.11	0.09	92.77	7.29	133	350	24	178	6	1158	18	5	39	
132	36-28	1787	51.87	21.83	8.66	8.60	5.68	0.86	1.08	1.09	0.09	0.26	82.34	18.2	35	223	17	71	2	432	83	57	58	
133	36-28	1808	49.62	18.03	8.67	8.25	11.57	2.40	0.18	0.98	0.16	0.15	96.85	4.01	4	477	21	89	3	102	127	45	47	
134	36-28	1839	72.87	14.64	2.05	0.91	1.85	1.50	5.80	0.28	0.05	0.04	92.43	7.64	92	179	24	146	9	735	10	4	31	
135	36-28	1887	51.39	17.06	10.24	5.71	8.82	3.45	0.76	1.82	0.43	0.32	96.04	4.58	13	396	33	157	11	295	61	84	63	
136	36-28	1934	75.84	13.74	1.45	0.30	1.82	3.31	3.31	0.15	0.06	0.04	89.68	10.1	96	118	24	136	8	683	8	0	31	
137	36-28	2010	51.01	18.20	10.50	6.02	7.81	3.43	0.64	1.70	0.51	0.17	92.82	6.93	10	408	33	155	10	359	68	65	89	102
138	45-36	18	64.97	15.77	5.27	1.32	3.29	5.72	2.15	1.01	0.35	0.14	100.16	0.01	44	339	37	268	11	874	2	17	88	4
139	45-36	59	64.65	15.84	5.38	1.33	3.38	5.75	2.14	1.04	0.35	0.14	99.74	<0.01	47	346	36	262	11	867	5	18	92	4
140	45-36	260	72.11	14.52	2.22	0.44	1.42	4.68	4.06	0.39	0.09	0.06	98.70	0.86	127	120	36	300	10	750	5	7	44	4
141	45-36	569	72.30	14.42	2.19	0.42	1.36	4.69	4.10	0.39	0.07	0.06	98.03	1.45	131	107	36	309	10	755	3	8	62	6
142	45-36	769	50.99	18.10	8.56	7.21	10.55	2.84	0.42	0.99	0.17	0.17	97.61	2.5	9	387	21	99	4	162	86	94	66	133
143	45-36	828	63.39	16.31	5.59	2.21	4.50	4.47	2.25	0.95	0.23	0.09	97.46	2.19	60	402	31	187	9	525	4	37	66	12
144	45-36	854	64.17	16.25	5.21	1.82	4.24	4.73	2.34	0.92	0.22	0.10	98.43	0.85	61	398	29	203	8	539	3	49	72	5
145	45-36	864	66.34	15.99	4.28	1.36	3.25	3.95	3.64	0.86	0.24	0.09	96.78	2.83	80	326	30	226	9	649	3	14	65	6
146	45-36	866	68.64	16.29	3.60	2.49	2.59	2.19	3.36	0.64	0.11	0.10	89.96	9.89	80	185	26	254	7	538	2	36	66	4
147	45-36	877	54.21	17.76	7.64	4.80	8.90	3.46	1.35	1.24	0.49	0.14	97.66	1.99	877	751	27	169	11	558	28	51	89	51
148	45-36	1260	58.31	17.74	6.30	4.07	7.26	3.43	1.60	0.87	0.29	0.12	97.06	2.35	39	474	22	161	8	453	56	50	77	62
149	45-36	1419	60.99	15.94	7.36	2.28	4.49	5.26	1.82	1.29	0.40	0.17	98.03	1.49	38	339	38	204	11	538	3	36	91	4
150	45-36	1477	56.30	16.12	9.36	3.36	6.72	4.83	1.20	1.52	0.40	0.18	99.06	0.83	23	397	32	159	8	420	15	81	97	22
151	45-36	1524	56.34	16.64	8.68	3.01	6.56	5.01	1.28	1.60	0.67	0.19	97.66	1.77	25	430	41	189	10	512	6	23	104	7
152	45-36	1603	57.35	18.11	7.13	3.48	6.61	3.89	1.74	1.23	0.29	0.17	93.50	5.92	34	398	37	266	11	519	25	36	79	37
153	45-36	1859	54.72	16.37	9.42	3.63	7.47	4.69	1.07	1.77	0.67	0.19	97.51	2.26	15	422	36	163	8	443	8	31	98	10
154	45-36	1997	53.89	16.53	10.35	4.11	8.24	4.13	0.59	1.65	0.34	0.18	98.54	1.39	15	437	33	147	8	364	15	105	87	46
155	45-36	2121	58.03	16.68	7.63	3.52	6.22	4.43	1.69	1.26	0.36	0.17	98.53	1.34	37	363	34	217	11	541	27	43	85	31
156	45-36	2269	61.46	15.98	6.71	2.17	4.76	4.67	2.45	1.28	0.37	0.15	98.36	1.2	53	289	42	314	12	679	8	20	80	11
157	45-36	2384	50.41	18.06	9.49	5.92	10.08	3.32	0.62	1.54	0.39	0.18	96.82	3.11	12	422	27	132	8	271	69	61	81	104
158	45-36	2521	63.30	15.98	5.87	1.96	4.71	3.89	2.78	1.08	0.32	0.10	96.99	2.03	75	295	33	210	8	616	8	34	66	8
159	45-36	2610	83.48	9.00	0.80	0.00	0.07	1.05	5.50	0.07	0.00	0.02	98.79	0.8	109	10	44	120	11	121	2	1	46	4
160	45-36	2852	62.04	16.24	6.17	2.03	5.09	4.00	2.72	1.21	0.36	0.13	96.07	3.69	72	297	35	241	8	639	9	25	73	12
161	45-36	3205	73.08	14.74	1.41	0.30	0.81	2.37	7.08	0.14	0.00	0.06	97.85	1.65	198	56	104	186	20	185	8	6	84	4
162	45-36	3290	75.84	12.91	1.67	0.35	1.06	4.06	3.90	0.16	0.00	0.05	97.76	1.33	126	72	53	147	18	91	8	5	68	3
163	45-36	3315	65.42	15.94	5.06	1.24	2.88	5.55	2.50	0.97	0.30	0.13	97.15	2.29	62	344	36	255	10	833	1	9	90	5
164	45-36	3421	59.52	17.94	5.45	3.93	7.06	3.33	1.70	0.72	0.24	0.11	97.02	2.77	39	505	21	143	8	612	54	28	66	101
165	45-36	3809	53.29	17.49	7.40	7.25	10.24	2.65	0.54	0.85	0.13	0.14	97.43	2.3	10	227	25	113	4	199	126	54	64	124
166	45-36	3919	51.73	18.35	8.76	6.50	9.63	3.05	0.30	1.22	0.29	0.17	97.40	2.3	5	427	25	128	7	231	110	45	87	154
167	45-36	3968	55.52	16.30	9.38	3.58	5.89	5.54	1.23	1.69	0.67	0.20	97.92	1.81	23	437	37							

Table 2. Major element and EDXRF trace element data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	HOLE	DEPTH	MAJOR	ELEMENTS-Normalized										Original	Loss on	EDXRF	trace elements							
2	No.	in feet	SiO ₂	Al ₂ O ₃	FeO*	MgO	CaO	Na ₂ O	K ₂ O	TiO ₂	P ₂ O ₅	MnO	Total	Ignition	Rb	Sr	Y	Zr	Nb	Ba	Ni	Cu	Zn	Cr
168	52-4	368	63.61	16.44	5.38	2.01	4.45	4.38	2.39	0.99	0.23	0.11	98.53	1.99	57	366	28	204	6	572	13	32	59	
169	52-4	382	75.50	13.25	1.26	0.25	0.89	3.87	4.65	0.25	0.05	0.03	99.74	0.31	136	80	30	189	11	776	8	9	27	
170	52-4	628	75.69	13.22	1.25	0.20	0.87	3.84	4.64	0.20	0.05	0.03	99.23	0.45	133	78	27	183	7	785	8	5	23	
171	52-4	709	60.12	18.35	5.29	3.12	6.70	3.85	1.67	0.65	0.15	0.09	99.22	0.71	42	644	16	119	1	405	35	53	47	
172	52-4	816	60.43	18.36	5.27	3.07	6.68	3.93	1.40	0.62	0.15	0.09	99.71	0.02	41	635	18	126	4	406	33	17	38	
173	52-4	958	63.95	16.46	5.28	1.81	4.73	3.97	2.54	0.94	0.24	0.09	100.20	0.45	82	400	27	164	9	699	11	11	57	
174	52-4	1300	52.55	17.98	8.05	5.63	8.78	3.74	1.15	1.55	0.44	0.14	100.42	< 0.01	23	548	23	174	18	339	69	56	49	
175	52-4	1757	57.10	17.85	7.43	3.61	7.08	4.05	1.27	1.13	0.37	0.13	99.42	0.01	27	567	22	148	6	435	16	43	76	31
176	52-4	2010	55.53	17.49	8.52	3.83	7.31	4.04	1.24	1.41	0.48	0.14	98.71	0.62	23	519	29	156	6	424	12	49	87	28
177	52-4	2195	54.35	17.57	8.84	4.05	7.98	3.97	1.10	1.49	0.50	0.15	98.85	0.45	23	520	30	152	11	408	21	46	90	50
178	52-4	2299	52.60	21.96	7.10	2.66	10.21	3.43	0.65	1.03	0.25	0.11	98.68	0.78	15	648	21	113	6	258	32	46	66	63
179	52-4	2542	50.79	17.34	10.50	5.90	8.84	3.59	0.79	1.64	0.42	0.18	98.00	1.6	16	466	26	138	9	310	37	74	78	93
180	52-4	3007	50.77	17.96	11.87	4.52	7.65	4.05	0.83	1.79	0.38	0.19	97.59	1.14	12	454	31	141	4	333	29	36	101	13
181	52-4	3482	56.82	17.72	7.04	5.20	7.45	3.60	0.83	0.94	0.25	0.14	96.66	2.77	43	462	22	123	4	336	80	55	62	126
182	52-4	3592	63.84	17.37	4.27	2.59	5.40	3.89	1.86	0.56	0.15	0.07	97.73	1.64	47	648	18	109	4	469	22	35	47	23
183	52-4	3650	55.53	17.91	7.50	5.46	8.01	3.49	0.65	1.02	0.27	0.15	95.69	3.82	23	457	39	113	7	287	85	60	68	123
184	52-4	3784	56.72	16.69	8.10	4.14	7.50	3.52	1.52	1.27	0.27	0.27	95.53	3.8	38	450	29	148	6	386	17	75	76	46
185	52-4	3845	56.86	16.61	8.08	4.06	7.57	3.52	1.54	1.27	0.26	0.23	96.00	3.51	35	431	29	142	4	352	17	71	78	42
186	52-4	3907	61.09	17.22	5.46	3.55	5.93	3.80	1.81	0.77	0.27	0.10	98.16	1.43	43	667	18	142	4	517	39	20	53	47
187	52-4	3968	59.64	18.26	5.66	3.60	6.94	3.55	1.36	0.69	0.17	0.12	97.52	2.09	70	668	19	114	3	515	38	44	62	45
188	57-13	429	71.10	14.76	2.49	0.67	1.87	4.46	4.00	0.51	0.10	0.05	99.86	0.25	118	170	34	294	10	807	9	12	31	
189	57-13	580	73.00	14.09	2.02	0.35	1.11	4.34	4.58	0.41	0.06	0.04	98.85	0.50	120	94	38	355	14	905	9	7	32	
190	57-13	729	72.85	14.15	2.06	0.37	1.14	4.66	4.21	0.45	0.07	0.04	99.20	0.26	112	96	37	345	11	917	8	9	32	
191	57-13	796	72.92	14.12	2.05	0.34	1.14	4.47	4.44	0.41	0.06	0.04	99.37	0.27	119	97	39	354	12	914	8	8	33	
192	57-13	815	73.42	14.58	1.98	0.38	1.05	3.43	4.65	0.41	0.05	0.05	94.87	4.09	130	89	36	335	10	782	3	13	41	5
193	57-13	838	73.37	14.21	1.80	0.30	1.09	3.94	4.81	0.39	0.05	0.04	95.87	3.78	118	101	36	312	13	892	8	5	30	
194	57-13	1180	74.30	13.83	1.62	0.32	1.12	3.63	4.80	0.28	0.05	0.03	95.59	3.72	135	93	32	252	8	806	8	10	22	
195	57-13	1231	76.17	13.10	1.14	0.19	0.78	3.48	4.84	0.22	0.05	0.03	95.56	4.10	133	67	29	172	11	744	10	5	19	
196	57-13	1459	75.87	13.26	1.16	0.19	0.83	3.74	4.69	0.18	0.05	0.03	95.15	4.64	130	74	30	167	12	738	11	5	21	
197	57-13	1682	76.14	13.20	1.09	0.19	0.65	3.22	5.33	0.07	0.06	0.06	90.99	8.59	194	48	38	122	10	578	10	0	39	
198	57-13	2020	76.41	13.14	1.12	0.11	0.66	3.64	4.76	0.06	0.05	0.05	99.06	0.36	136	53	29	131	9	734	9	0	14	
199	57-13	2031	73.80	14.05	1.82	0.12	0.83	4.22	4.66	0.37	0.05	0.07	98.44	0.99	119	82	38	340	11	878	11	9	30	
200	57-13	2389	70.39	14.69	3.07	0.69	2.02	4.32	4.01	0.62	0.15	0.04	98.36	1.12	104	163	37	301	14	812	14	13	42	
201	57-13	2389	69.44	14.77	3.46	0.84	2.28	4.37	3.85	0.72	0.21	0.07	97.87	1.08	98	181	35	293	13	790	2	17	55	5
202	57-13	2772	71.65	14.18	2.73	1.04	2.39	3.20	4.23	0.36	0.07	0.13	94.07	4.73	126	180	41	124	9	1112	8	17	73	13
203	57-13	2787	50.58	16.45	11.73	5.79	9.17	3.33	0.48	1.92	0.35	0.20	97.94	2.73	11	422	32	145	6	334	74	61	80	
204	57-13	2802	49.64	16.58	12.07	6.28	8.97	3.29	0.68	1.91	0.38	0.21	99.02	1.43	13	418	31	144	6	325	75	67	85	
205	57-13	2888	51.22	16.58	11.55	5.64	8.29	3.41	0.87	1.85	0.40	0.20	97.10	2.59	23	409	36	159	9	371	52	57	101	37
206	57-13	2937	55.83	18.95	6.33	4.87	8.18	3.57	1.07	0.85	0.23	0.12	98.31	1.33	17	627	18	119	6	319	67	37	48	79
207	57-13	2980	55.30	17.85	7.66	4.63	8.38	3.60	1.07	1.09	0.29	0.13	98.29	1.19	25	497	22	135	6	452	31	67	71	65
208	62-21	558	57.09	16.84	7.71	4.43	7.41	3.75	1.41	1.04	0.17	0.14	99.99	0.11	34	339	30	173	4	375	41	72	55	
209	62-21	677	65.08	16.42	5.04	1.32	3.82	4.53	2.47	0.96	0.23	0.12	97.35	2.44	56	368	26	208	8	631	15	30	57	
210	62-21	742	56.98	16.89	8.49	3.37	7.22	4.40	0.88	1.32	0.29	0.17	97.44	2.61	16	423	26	153	5	450	25	76	76	
211	62-21	903	53.59	16.25	10.46	3.96	7.97	4.35	0.96	1.78	0.48	0.20	98.35	1.41	12	430	30	149	6	398	23	80	71	
212	62-21	961	53.30	17.84	10.21	2.91	7.73	4.44	1.28	1.74	0.41	0.13	98.09	1.74	19	462	32	176	10	436	28	79	84	
213	62-21	1022	51.97	17.70	9.78	4.92	8.44	4.17	0.86	1.55	0.42	0.18	97.64	1.9	16	463	30	154	8	346	21	73	76	50
214	62-21	1051	63.00	16.62	5.86	1.56	4.03	4.93	2.52	1.09	0.30	0.08	98.09	1.60	50	310	38	268	14	591	20	31	56	
215	62-21	1085	65.23	15.42	5.60	1.19	3.04	4.81	3.21	1.02	0.32	0.15	99.18	0.71	75	229	46	343	15	740	16	17	68	
216	62-21	1202	53.52	17.26	9.84	4.26	8.52	3.91	0.68	1.53	0.30	0.17	98.97	1.01	4	446	29	136	4	360	28	100	65	
217	62-21	1354	54.65	16.52	9.45	4.51	7.84	4.00	1.05	1.49	0.32	0.18	99.11	1.08	15	386	31	164	7	381	30	139	52	
218	62-21	1490	52.71	17.33	8.55	5.51	10.34	3.50	0.54	1.13	0.23	0.16	99.59	0.69	9	614	23	122	5	236	33	88	54	
219	62-21	1659	53.44	18.24	6.82	7.09	9.94	2.94	0.56	0.72	0.13	0.12	95.02	5.24	5	481	18	96	4	211	104	46	44	
220	62-21	1720	60.22	18.24	5.71	3.56	7.04	2.95	1.29	0.70	0.22	0.07	94.92	4.73	31	489	19	147	7	666	68	43	49	
221	62-21	2041	56.83	17.00	8.32	4.29	6.86	3.97	0.91	1.35	0.29	0.18	95.01	4.65	13	528	19	137	5	374	19	84	61	
222	62-21	2101	59.90	17.54	5.64	3.90	6.73	3.66	1.55	0.73	0.24	0.11	98.10	1.39	47	506	23	133	6	487	57	27	65	76

Table 2. Major element and EDXRF trace element data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	HOLE	DEPTH	MAJOR	ELEMENTS-Normalized										Original	Loss on	EDXRF	trace elements							
2	No.	in feet	SiO ₂	Al ₂ O ₃	FeO*	MgO	CaO	Na ₂ O	K ₂ O	TiO ₂	P ₂ O ₅	MnO	Total	Ignition	Rb	Sr	Y	Zr	Nb	Ba	Ni	Cu	Zn	Cr
223	62-21	2128	56.58	17.01	8.30	3.96	7.92	3.58	0.82	1.35	0.29	0.20	96.14	3.64	24	580	28	144	6	329	12	91	72	28
224	68-16	520	72.71	14.28	2.05	0.55	1.62	3.97	4.34	0.36	0.08	0.04	98.98	0.30	129	138	31	245	11	818	9	8	29	
225	68-16	549	50.42	16.84	10.71	6.02	10.08	3.22	0.56	1.62	0.32	0.20	100.35	0.29	11	362	31	138	6	318	66	103	75	
226	68-16	628	58.90	16.31	7.60	2.86	5.89	4.51	1.75	1.56	0.46	0.15	100.16	0.05	47	368	32	206	9	517	19	43	74	
227	68-16	753	72.60	14.34	2.12	0.37	1.19	4.47	4.37	0.43	0.07	0.04	98.58	0.27	116	105	38	349	11	930	8	9	36	
228	68-16	828	70.46	15.02	2.81	0.62	1.93	4.63	3.75	0.58	0.12	0.07	99.51	0.21	96	177	33	299	12	907	8	5	41	
229	68-16	1159	75.35	13.32	1.37	0.25	0.94	3.68	4.79	0.22	0.05	0.02	98.49	0.31	139	85	29	201	10	772	11	6	21	
230	68-16	1673	76.14	13.05	1.15	0.20	0.77	3.69	4.74	0.17	0.05	0.03	98.23	1.19	133	73	30	159	9	762	10	4	20	
231	68-16	1739	63.99	16.20	5.53	1.81	4.51	4.22	2.52	0.90	0.22	0.09	98.74	0.75	67	342	27	196	7	696	15	38	59	
232	68-16	1991	58.60	18.18	6.27	3.72	7.42	3.57	1.20	0.76	0.17	0.10	99.15	0.94	32	627	18	116	3	366	61	44	50	
233	68-16	2107	58.30	18.31	6.15	4.05	7.39	3.52	1.24	0.74	0.19	0.10	98.96	1.08	35	640	19	123	8	379	57	52	49	
234	68-16	2345	60.61	18.98	5.79	2.59	5.97	3.52	1.57	0.72	0.14	0.10	95.97	3.55	47	520	22	137	4	501	43	65	60	40
235	68-16	2360	74.97	13.98	1.40	0.33	0.93	3.28	4.89	0.13	0.05	0.04	95.25	4.23	104	97	25	144	7	854	8	0	41	
236	68-16	2378	75.26	13.59	1.37	0.24	0.89	3.42	5.02	0.13	0.05	0.04	95.82	3.54	103	90	24	142	8	878	9	0	33	
237	68-16	2891	75.76	13.39	1.38	0.00	0.83	4.30	4.11	0.16	0.00	0.06	97.96	0.24	104	89	21	142	5	882	1	0	38	4
238	86-23	723	58.45	18.71	5.96	3.73	7.46	3.68	1.00	0.73	0.18	0.10	99.55	0.74	24	765	16	113	2	299	40	53	46	
239	86-23	834	58.61	18.66	5.98	3.67	7.43	3.63	1.02	0.73	0.17	0.10	99.28	0.62	24	757	19	115	2	312	39	47	46	
240	86-23	897	58.09	18.82	6.03	3.84	7.61	3.64	0.94	0.75	0.18	0.10	99.48	0.60	24	777	18	115	2	321	41	44	676	
241	86-23	976	73.53	14.81	1.59	0.55	2.00	3.77	3.46	0.22	0.05	0.03	97.41	1.94	111	251	17	151	7	826	8	4	30	
242	86-23	1010	74.00	14.41	1.51	0.42	1.87	3.55	3.95	0.21	0.05	0.03	96.65	2.86	120	234	17	149	6	819	8	4	28	
243	86-23	1064	59.32	19.26	5.25	3.08	7.34	3.45	1.45	0.61	0.15	0.09	98.68	1.35	35	723	17	126	3	391	38	36	45	
244	86-23	1842	57.72	18.42	6.06	4.22	7.59	3.54	1.31	0.80	0.22	0.10	98.90	1.18	33	784	19	141	4	448	53	44	46	
245	86-23	2469	56.41	18.23	7.00	4.03	8.14	3.54	1.14	1.03	0.36	0.13	98.98	1.25	25	746	25	168	7	515	36	45	53	
246	86-23	2766	52.61	16.99	8.98	5.71	8.38	3.74	1.30	1.47	0.66	0.16	98.68	1.48	26	881	27	190	8	589	66	47	62	
247	86-23	2766	52.78	16.91	8.95	5.73	8.19	3.85	1.31	1.46	0.67	0.16	98.55	1.17										
248	86-23	3085	53.41	17.18	9.54	5.05	7.95	3.65	1.00	1.45	0.61	0.15	98.21	1.87	13	537	29	172	9	508	63	50	79	
249	86-23	3415	50.40	16.98	9.26	7.24	10.75	3.07	0.49	1.39	0.26	0.16	94.02	5.95	8	265	30	114	5	148	115	62	75	190
250	87-24	72A	48.66	18.32	8.13	9.60	11.51	2.48	0.18	0.82	0.13	0.16	100.78	<0.01	1	233	21	73	1	75	163	93	50	200
251	87-24	72B	50.97	14.63	10.17	7.06	12.11	2.99	0.27	1.39	0.19	0.20	100.20	<0.01	4	225	34	112	5	102	55	161	59	274
252	87-24	271	74.77	13.91	1.72	0.34	0.84	3.41	4.79	0.16	0.00	0.05	94.33	4.95	134	48	58	162	19	71	5	11	87	3
253	87-24	321	56.70	16.99	8.07	3.78	7.34	3.79	1.64	1.23	0.33	0.15	98.59	0.94	34	456	27	153	7	490	15	63	83	41
254	87-24	491	68.83	17.66	3.29	0.36	1.36	3.95	3.95	0.40	0.07	0.11	94.92	4.33	72	140	43	392	12	901	2	22	77	4
255	87-24	508	52.70	16.96	7.70	8.45	9.46	2.65	1.06	0.73	0.14	0.15	99.89	0.25	24	203	24	105	3	213	177	83	58	275
256	87-24	552	49.84	17.72	10.33	7.01	9.59	3.31	0.47	1.28	0.26	0.18	100.45	<0.01	5	440	28	102	3	206	81	98	84	97
257	87-24	623	57.18	20.51	7.40	4.00	5.32	3.29	1.05	0.99	0.11	0.14	94.86	4.73	33	508	26	165	7	465	40	27	71	52
258	87-24	678	48.30	17.77	9.00	9.27	11.04	2.78	0.32	1.11	0.23	0.17	100.59	<0.01	11	343	29	103	7	126	164	99	65	198
259	87-24	730	59.26	21.05	7.04	3.51	3.75	2.87	1.39	0.87	0.12	0.13	90.48	9.36	40	328	24	175	8	510	44	50	83	57
260	87-24	879	49.05	18.61	9.02	8.16	10.52	2.89	0.35	0.97	0.24	0.17	99.86	0.14	9	414	29	91	4	186	156	88	66	153
261	87-24	910	49.08	18.17	9.12	8.49	10.44	2.93	0.37	0.99	0.24	0.17	100.65	<0.01	11	405	29	89	6	164	136	94	67	151
262	87-24	1047	71.95	15.71	2.35	0.53	1.12	3.23	4.80	0.24	0.00	0.08	92.53	6.79	101	102	35	270	10	817	0	8	61	4
263	87-24	1055	62.73	17.07	5.01	2.20	5.21	3.67	2.95	0.80	0.26	0.10	97.79	1.38	68	432	29	186	8	619	8	44	65	11
264	OWML5	1698	62.88	13.04	8.41	1.94	4.58	3.86	2.62	1.82	0.70	0.14	99.04	0.21	55	340	38	240	9	679	14	114	62	9
265	OWML5	2466	56.85	17.97	6.78	5.01	7.64	3.67	0.91	0.85	0.19	0.12	99.24	0.15	19	719	19	113	4	285	62	68	64	64
266	OWML5	2769	57.27	19.16	5.82	4.10	8.13	3.30	1.23	0.68	0.18	0.11	98.76	1.03	29	789	18	112	3	286	42	40	65	40
267	OWML5	3403	57.72	18.32	6.60	3.05	6.95	4.14	1.59	1.12	0.41	0.10	97.90	1.58	37	584	27	196	11	604	15	45	81	28
268	OWML5	4000	53.17	17.76	8.47	5.06	8.83	3.76	0.97	1.36	0.46	0.15	99.48	0.15	27	795	31	179	10	399	36	73	78	67

Table 3. Flame photometry and INAA data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	HOLE	DEPTH	Flame photometry		INAA													
2	No.	in feet	Na ₂ O	K ₂ O	Sc	Cr	Co	Ni	Zn	As	Rb	Sr	Zr	Mo	Sb	Cs	Ba	La
3			Columns C & D in weight percent			Columns E through R, and S through AD, in ppm (except column AB)												
4	17A6	8210			4.91	5	2.5	<16	31.1	0.76	105	214	128	2.8	0.161	5.55	816	17.8
5	17A6	9620			4.56	28	7.38	183	19.3	<0.4	86	211	129	2.4	0.207	3.03	820	16.3
6	18-34	540	4.48	1.745	21.4	25	18.2	< 70.0	75	< 2.90	45	600	190		0.25	0.90	520	16.6
7	18-34	582	3.44	0.753	23.2	114	32.7	110	74	< 2.30	12	854	110		< 0.300	0.44	340	10.6
8	18-34	622			34	14	26.9	<22	102	<0.9	21	517	129	<3	<0.1	0.89	396	13.2
9	18-34	677	4.41	1.055	36.5	21	27.1	< 90.0	120	1.10	34	446	< 400		0.16	1.10	420	14.0
10	18-34	714	3.68	0.939	30.6	110	35	76	91	1.20	22	< 700	190		0.23	0.90	340	14.0
11	18-34	781	4.51	3.88	9.13	5	6.5	< 40.0	48	6.40	120	209	280		1.2	7.40	779	23.7
12	18-34	919	4.09	1.866	19.6	17	19.4	< 70.0	71	1.10	57	468	160		< 0.400	2.80	580	17.5
13	18-34	920	4.18	4.72	3.9	< 2.50	0.45	< 30.0	36	5.20	140	< 120	150		0.98	5.60	784	30.8
14	18-34	1059	4.72	3.89	8.62	2	4.18	< 40.0	53	5.70	100	204	320		1.0	6.13	897	25.5
15	18-34	1170	4.61	2.822	15.0	5	11.6	< 60.0	80	2.10	73	298	280		0.53	2.40	780	27.5
16	18-34	1297	4.18	4.49	4.36	< 1.70	1.5	< 30.0	33	6.90	130	114	180		1.3	7.10	790	24.5
17	18-34	1568	4.65	3.31	12.4	3	8.89	< 50.0	65	2.00	89	248	310		0.69	4.20	804	27.4
18	18-34	1630	4.35	4.62	3.89	< 2.60	0.41	< 31.0	40	8.00	130	56	160		1.7	7.48	750	30.1
19	18-34	2220	4.73	3.57	10	3	6.7	< 50.0	54	5.20	97	261	360		0.84	5.20	870	27.8
20	18-34	2575	3.84	0.837	25.2	60	29.5	50	86	< 2.20	19	762	93		< 0.300	0.87	320	10.5
21	18-34	2758	3.07	0.965														
22	18-34	2845	4.97	1.933	10.7	< 1.60	10.7	< 50.0	95.6	< 2.10	42	603	220		< 0.220	1.70	670	20.1
23	18-34	3237	4.16	0.962	24.3	28	24.3	< 80.0	93.0	< 2.50	19	610	< 290		< 0.310	0.66	380	12.2
24	18-34	3370	3.47	0.963	22.2	65	30.1	49	86.1	0.84	16	651	< 240		< 0.300	0.56	380	12.3
25	18-34	3406	3.36	0.602	22.1	88	24.0	< 70.0	77	0.97	9	750	100		< 0.310	0.29	260	8.9
26	18-34	3478			23.6	83	28.6	51	77	1.02	15	650	108	<3	<0.1	0.60	282	9.47
27	18-34	3497	3.63	0.752														
28	27-27	527	4.97	2.464	14.07	3	9.32		61		64	410	251		0.275	2.28	619	19.4
29	27-27	590			7.91	5	3.63	<14	50.8	5.60	101	189	307	<6	0.94	5.75	936	32.3
30	27-27	756	3.92	1.221	30.1	61	25.5		85		26	540	140			1.04	417	14.9
31	27-27	1094	3.82	1.431														
32	27-27	1164	3.82	1.396														
33	27-27	1437	3.65	1.249														
34	27-27	1890	3.59	1.218														
35	27-27	2425	3.57	1.071														
36	27-27	2657			26.4	133	34	95	79	21.60	19	530	103		0.33	0.56	292	14.8
37	27-27	2917	2.72	0.255	36.7	210	46.5	154	76.3	5.40		550				0.47	136	3.06
38	27-27	2968	3.67	1.019	19.5	84	25.2	74	67.1	1.64	24	690	115			1.42	319	11
39	28-32	512			25.16	25	18.88	<21	69.8	<0.8	33	597	172	<4	0.159	4.36	457	15.3
40	28-32	823			6.41	2	2.73	<16	37	2.70	139	92	311	<3	0.74	8.11	715	23.8
41	28-32	1093			28.6	72	27.6	22	62.8	0.93	30	553	<190	<4	0.14	3.15	388	12.1
42	28-32	1281			10.69	21	8.38	<13	36.4	4.90	132	184	236	<4	1.04	7.36	655	22.4
43	28-32	1397			11	19	10.19	19	42.4	5.20	123	217	261	<4	1.16	6.97	646	22.1
44	28-32	1427			12.31	25	11.81	23	41.8	4.60	114	221	279	2.1	1.1	6.49	614	21.4
45	28-32	1598			5.39	3	4.6	10	36.5	5.90	144	134	267	3.2	1.38	9.53	730	24.1
46	28-32	1822			32.2	22	24.7	<30	72.7	<0.7	30	510	200	4.8	0.15	1.49	377	13
47	28-32	1866			18.9	49	14.2	<30	46.8	1.60	41	508	148	<3	0.22	2.50	392	12.3
48	28-32	2044			6.65	4	4.24	<18	35.6	8.30	132	161	314	<5	1.76	8.50	728	25.3
49	28-32	2127			25.9	22	21	<26	86	1.50	50	395	239	<6	0.25	1.86	450	15.3
50	28-32	2157			15.65	1	13.45	<27	70	1.40	87	290	208	<0.4	0.26	3.32	640	22.5
51	28-32	2171			6.93	2	2.65	<13	38.7	5.30	121	124	323	2.3	0.987	8.10	818	25.4
52	28-32	2566			4.54	<1	0.207	<10	53	11.30	160	<30	166	4.3	2.54	13.73	95	42.8
53	28-32	2827			29.4	64	25.7	25	79	1.62	21	496	150	<3	0.73	10.89	303	11.6
54	28-32	3453			25.4	96	27.8	61	79	2.49	13	560	157	<2	1.2	1.46	400	16.1
55	28-32	4334			29.2	33	17.6	<24	76	2.00	43	591	216	<3	0.39	1.31	880	15.8
56	36-28	443	4.02	1.408														
57	36-28	568	4.26	1.457	22.2	21	21.1		77		33	530	160		0.2	1.42	410	14.1
58	36-28	637	4.25	1.676														
59	36-28	714	4.52	1.154	33.9	4	25.6		112		24	440	130			0.44	440	15.2
60	36-28	836	3.61	0.941	38.2	118	33.8		107		23	420	210		0.22	1.16	350	14.1
61	36-28	882			36.7	123	38.9	63	99	<0.8	10	500	143	<6	<0.1	0.29	212	12.4
62	36-28	1049	4.09	1.039														
63	36-28	1159			34.4	47	25.9	<40	89	<0.7	25	580	151	<3	0.16	1.00	366	11.5
64	36-28	1206			21	10	20.2	<28	77	<0.7	75	362	221	<1	0.17	2.44	573	19.9
65	36-28	1277	4.06	3.34	16.9	14	13.63		67.8	5.90	90	205	290		1.16	5.30	600	21.4
66	36-28	1368			14.87	54	19.8	54	63	1.21	26	735	94	<3	<0.1	0.74	379	12
67	36-28	1533	3.71	1.208	16.6	58	22.4	57	70		30	700	120			0.68	373	11.5
68	36-28	1645	3.36	1.732	13.18	49	18.4	50	65	2.39	48	450	87		0.244	2.80	501	16.3
69	36-28	1726	3.97	1.248	28.4	11	21.7		101	2.50	27	490	170		0.25	0.98	440	15.8
70	36-28	1778	3.27	2.891	5.49	3	4.54		50.2	2.70	128	366	148		0.451	8.48	1110	21.4
71	36-28	1787	0.73	0.879	23.1	88	30.2	44	69.2	3.27	43	240				2.65	459	5.72

Table 3. Flame photometry and INAA data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	HOLE	DEPTH	Flame photometry		INAA													
2	No.	in feet	Na ₂ O	K ₂ O	Sc	Cr	Co	Ni	Zn	As	Rb	Sr	Zr	Mo	Sb	Cs	Ba	La
72	36-28	1808	2.41	0.187	31.5	204	38.7	104	72	1.39		580					100	6.23
73	36-28	1839	1.49	5.31	4.18	6	2.33		42.9	0.67	96	183	160		0.55	4.15	706	21.6
74	36-28	1887	3.42	0.745	33.9	93	31.2	73	100	1.90	15	490			0.19		310	13.7
75	36-28	1934	3.18	2.99	3.03	< 1.20	0.76	< 30.0	36	0.96	99	98	140		0.57	5.70	690	20.6
76	36-28	2010			30.2	93	33.2	57	104	1.10	9	466	125	<5	0.24	0.70	375	15.4
77	45-36	18			16.2	<1	6.39	<23	78	1.50	47	359	279	<1	0.248	2.03	850	22.6
78	45-36	59			16	1	6.51	<15	74.9	<0.9	46	369	256	<2	0.28	1.97	829	22.5
79	45-36	569			6.41	2	2.49	<11	58.9	2.60	138	101	335	<4	0.6	8.17	749	24.9
80	45-36	769			35.3	136	38	79	56.8	<0.6	7	437	141	<4	<0.1	1.20	164	6.31
81	45-36	828			17	5	13.16	<17	56.4	<0.7	59	426	158	<4	0.168	2.43	531	16.6
82	45-36	877			22.1	51	24.3	35	85.4	<0.6	40	840	140	<3	0.178	1.92	554	27.1
83	45-36	1419			21.8	3	12.98	<20	85.4	<0.9	39	365	197	<3	0.16	1.00	566	19.7
84	45-36	1477			30.8	6	22.8	<25	84	<0.9	25	441	171	<6	<0.2	0.49	435	15
85	45-36	1859			30.7	3	22.7	<23	95	<0.9	16	491	186	<4	0.12	0.43	441	17.2
86	45-36	1997			35.6	33	30.3	35	86	2.90	13	480	177	<6	0.12	1.91	352	12.9
87	45-36	2269			20.8	5	14.51	<20	71.9	2.00	56	323	316	<6	0.63	1.80	657	25.7
88	45-36	2384			31.8	119	34.9	64	72	1.53	11	500	150	<5	0.18	3.94	264	12.1
89	45-36	2610			3.1	<0.9	0.187	<8	41.1	4.64	119	<40	124	5.6	8.65	3.56	128	33.6
90	45-36	2852			18.2	8	12.71	<19	62	1.12	78	340	237	<2	1.67	3.42	615	21.1
91	45-36	3315			15.72	2	4.94	<18	74.3	1.70	67	365	242	<3	0.68	3.14	839	22.5
92	45-36	3421			16.2	86	19.3	60	58.9	0.93	39	584	105	<7	0.335	2.06	605	17.9
93	45-36	3968			29.2	2	20.6	<23	94	<1	28	519	174	<5	0.13	0.67	516	18.1
94	52-4	368	4.43	2.290	15.8	13	11.92		70.8	1.90	63	373	180		0.42	3.91	585	18.3
95	52-4	382	4.04	4.64														
96	52-4	628	4.05	4.70	3.90	< 1.30	1.2	< 30.0	32	7.40	140	< 140	170		1.6	7.56	780	25.1
97	52-4	709	3.97	1.642														
98	52-4	816	4.22	1.382	13.6	13	18.1	30	58		33	710			0.146	0.50	384	11.9
99	52-4	958	4.12	2.470	13.59	3	11.48		67.7	1.40	84	433	120		0.24	4.95	624	19.5
100	52-4	1300	3.96	1.138	24.6	95	29.9	73	81		26	590	140			0.71	326	16.9
101	52-4	2195			27.4	51	27.9	24	101	2.16	22	610	150	<5	<0.2	0.58	428	16.9
102	52-4	2542			31.4	105	36.9	44	101.5	<0.8	19	540	120	<5	<0.1	<0.1	296	13.6
103	52-4	3007			25.5	4	41	38	124	4.60	14	509	170	<6	<0.2	0.41	326	12.8
104	52-4	3650			20.8	139	27.6	83	74	<0.7	39	510	118	<4	0.16	6.72	300	10.3
105	52-4	3784			28.9	41	24	49	80	1.91	30	481	147	<3	0.29	0.93	368	11.8
106	52-4	3845			29.1	41	24.3	<40	82	2.15	29	483	144	<7	0.3	1.00	384	12.1
107	57-13	429	4.66	3.97	6.88	2	3.62		42	4.00	111	175	251		0.8	6.46	775	24
108	57-13	580	4.57	4.61	6.73	< 2.20	1.9	< 40.0	35	5.80	130	99	330		1.1	7.20	920	26.5
109	57-13	729	4.86	4.20														
110	57-13	796	4.68	4.49	6.78	< 3.00	1.99	< 40.0	39	4.80	128	87	350		1.2	7.02	957	26.4
111	57-13	815			6.27	<1	2.37	<12	38	5.30	128	79	344	3.1	1.13	8.50	834	26.4
112	57-13	838	3.95	4.61														
113	57-13	1180	3.78	4.69	4.77	< 1.70	1.90	< 40.0	29	8.60	142	< 150	230		1.5	9.65	840	24.0
114	57-13	1231	3.58	4.66														
115	57-13	1459	3.77	4.54	3.64	2	1.05	< 30.0	27	7.20	138	92	180		1.5	7.39	749	24.8
116	57-13	1682	3.12	4.91	2.70	< 1.60	0.28	< 28.0	38	7.70	206	< 120	96		1.5	8.55	590	30.9
117	57-13	2020	3.95	4.80	3.17	< 1.10	0.29	< 30.0	29	4.80	141	59	120		0.64	3.76	710	35.9
118	57-13	2031	4.47	4.69	6.45	< 6.00	1.6	< 40.0	37	4.90	130	< 170	300		1.0	4.40	900	26.9
119	57-13	2389	4.52	4.00	8.97	4	4.3	< 50.0	51	2.40	99	266	290		0.61	4.80	820	26.7
120	57-13	2772			7.97	12	6.38	<14	65	6.90	127	184	133	<4	1.42	16.80	1150	27.6
121	57-13	2787	3.38	0.470														
122	57-13	2802	3.43	0.658	33.1	59	40.9	60	113		18	500				1.34	337	12.1
123	57-13	2888			32	35	37.9	44	114	<1	18	465	166	<4	<0.1	1.33	380	14.7
124	62-21	558	4.05	1.386	27.4	73	25.9		79		38	373	140		0.25	1.24	370	11.5
125	62-21	677	4.62	2.378	14.11		9.22		61.9	1.17	58	392	214		0.25	2.06	576	18.8
126	62-21	742	4.53	0.859	26.9	19	20.3		93		24	500				0.94	460	14.7
127	62-21	903	4.54	0.952	33.6	12	26.1		109	4.90	15	520	120		0.28		410	14.9
128	62-21	961	4.61	1.240														
129	62-21	1051	5.13	2.453														
130	62-21	1085	5.00	3.17	13.8	3	6.94		78	3.40	81	243	320		0.8	3.60	750	26.9
131	62-21	1202	4.16	0.675														
132	62-21	1353.5	4.19	1.036	31.6	57	28.6		99	2.20	22	460	190		0.24	0.64	379	13.4
133	62-21	1490	3.52	0.521														
134	62-21	1659	2.86	0.518														
135	62-21	1720	2.94	1.211	15.2	82	17.9	52	60.1	8.10	33	530			0.57	0.95	625	17.4
136	62-21	2041	3.89	0.851	28	27	21.7		84	3.10	11	580	180		0.22	0.74	366	12.5
137	62-21	2101			17.4	80	21.2	54	62	1.80	47	537	127	<3	0.087	1.62	481	15.4
138	62-21	2128			30.4	28	23.3	<22	84	17.50	19	640	<260	<3	0.23	1.77	326	13.1
139	68-16	520	4.21	4.40	5.77	3	3.25	< 40.0	36	5.70	140	130	260		1.3	7.85	860	25.2
140	68-16	549	3.42	0.567	41.5	127	38.3	79	110	< 2.60	14	373	< 300		< 0.400	0.61	320	12
141	68-16	628	4.78	1.773	23.7	10	17.9	< 50.0	87	1.20	52	410	160		0.31	2.40	550	19.2

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	HOLE	DEPTH	Flame photometry		INAA													
2	No.	in feet	Na ₂ O	K ₂ O	Sc	Cr	Co	Ni	Zn	As	Rb	Sr	Zr	Mo	Sb	Cs	Ba	La
142	68-16	753	4.76	4.38	6.90	< 3.10	2.13	< 40.0	38	5.50	123	81	330		1.0	6.85	931	27.2
143	68-16	828	4.92	3.79	8.45	< 1.70	3.06	< 40.0	44	4.20	103	192	290		0.80	5.07	898	26.7
144	68-16	1159	3.99	4.83	4.30	< 1.50	1.5	19	29	9.60	150	95	200		1.7	8.79	791	24.8
145	68-16	1673	3.93	4.70	3.68	< 1.40	1.1	< 31.0	28	7.10	140	55	170		1.5	7.59	770	25.5
146	68-16	1739	4.49	2.474	14.8	< 4.00	14.7	< 60.0	64	1.70	74	369	230		0.44	3.76	710	20.9
147	68-16	1991	3.77	1.183	18.6	62	23.7	49	70	3.20	33	717	160		0.21	3.80	400	12
148	68-16	2107	3.68	1.228	17.7	56	23.1	60	68	1.60	34	814	140		< 0.310	2.10	410	13
149	68-16	2345			16.4	49	18.1	48	66	9.00	48	589	100	<2	0.292	7.18	519	14.8
150	68-16	2360	3.39	4.73	3.24	< 0.900	0.946	< 30.0	45.6	2.70	112	91	120		0.68	5.98	857	23.5
151	68-16	2378	3.49	4.88	3.20	< 1.20	0.769	< 30.0	38	2.60	114	94	130		0.66	5.79	906	23.3
152	68-16	2891			3.07	1	0.78	<8	40.3	1.42	112	92	117	<2	0.56	3.22	870	23
153	86-23	723	3.78	0.980														
154	86-23	834	3.81	0.994	16.3	39	20.8	42	65		20	750				0.36	296	9.8
155	86-23	897	3.77	0.927														
156	86-23	976	3.90	3.40	2.89		2.28		38.2	1.90	108	245	156		0.315	5.76	778	20.3
157	86-23	1010	3.68	3.89														
158	86-23	1064	3.56	1.407	13.3	8	16.9	40	61.5		32	760	124			1.24	3.97	11.9
159	86-23	1842	3.69	1.253														
160	86-23	2469	3.59	1.084	20.6	48	21.9		81	1.80	22	820	200		0.157	0.60	495	20.7
161	86-23	2766	3.83	1.268														
162	86-23	2766			23.4	98	32.1	60	87	<0.8	18	930	190	<4	<0.1	0.32	577	27
163	86-23	3085	3.71	0.960	21.6	77	30.2	51	101		14	550	180		0.16	0.33	490	21.1
164	86-23	3415			33	242	39.4	123	75	<0.6	11	267	94	<6	<0.1	0.43	163	7.59
165	87-24	72A			36.6	233	46.5	179	61	<0.5	<4	256	<160	<5	<0.1	<0.1	<120	3.14
166	87-24	72B			64	310	41.1	84	88	<1	9	229	150	4.1	<0.1	<0.2	98	5.41
167	87-24	271			5.48	7	2.03	<13	74.6	16.30	141	45	165	3.7	2.98	10.03	73	21.7
168	87-24	321			28	32	24.9	<22	89	1.00	33	530	160	<3	0.17	1.07	500	17.3
169	87-24	491			9.84	2	2.08	<15	76	2.54	84	160	410	<6	0.46	4.75	935	30.6
170	87-24	552			34.2	103	43.8	95	96	<0.6	8	486	113	<7	<0.3	<0.3	199	7.42
171	87-24	623			20.4	77	23.8	53	86	1.22	36	585	149	3.1	0.29	4.58	501	17
172	87-24	678			38.5	237	47.2	177	71	<0.6	6	371	105	<5	<0.1	<0.2	157	6.23
173	87-24	730			16.3	59	19.6	49	84	1.97	42	384	165	<2	0.24	5.04	503	19.2
174	87-24	879			33.8	181	45.3	162	77	<0.6	<5	440	84	<5	<0.1	<0.2	185	7.22
175	87-24	910			34.9	183	44.9	172	79	<0.6	6	410	140	<6	<0.1	<0.2	184	6.55
176	87-24	1047			7.81	1	1.2	<13	57.8	2.61	115	107	272	<4	0.59	6.74	871	28.3
177	87-24	1055			15.36	15	13.57	<17	66	1.28	67	497	183	<6	0.27	3.07	626	21

Table 3. Flame photometry and INAA data

	A	B	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
1	HOLE	DEPTH	INAA											
2	No.	in feet	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Hf	Ta	Au,ppb	Th	U
3														
4	17A6	8210	33.2	14.9	3.31	0.813	0.436	1.73	0.241	3.72	0.749	<4	8.66	3.26
5	17A6	9620	30.4	13.1	3.15	0.84	0.448	1.85	0.267	3.69	0.965	<4	8.85	3.37
6	18-34	540	34.2	17	4.34	1.19	0.71	2.3	0.35	4.07	0.490	< 14.0	4.69	1.5
7	18-34	582	22.4	11	2.94	0.988	0.46	1.5	0.21	2.28	0.250	< 12.0	1.90	0.54
8	18-34	622	28.2	17.3	4.84	1.525	0.785	2.8	0.407	3.05	0.403	<6	1.95	0.62
9	18-34	677	30.6	19	5.45	1.66	0.97	3.59	0.53	3.93	0.450	< 12.0	2.00	0.70
10	18-34	714	31	18	5.06	1.5	0.85	3.1	0.44	3.6	0.530	< 11.0	2.00	0.63
11	18-34	781	49	24	5.48	1.02	0.95	3.7	0.528	7.28	1.010	< 12.0	12.00	4.3
12	18-34	919	36	17	4.24	1.07	0.65	2.1	0.29	3.9	0.540	< 10.0	5.27	1.6
13	18-34	920	61	27	5.74	0.379	1.0	4.1	0.600	5.2	1.170	< 11.0	13.10	4.3
14	18-34	1059	52.5	27	5.68	1.15	0.92	4.08	0.587	8.08	1.080	< 8.00	10.80	4.0
15	18-34	1170	56	26	6.43	1.4	1.0	3.78	0.56	6.83	1.100	< 9.00	7.54	2.6
16	18-34	1297	48.9	22	4.36	0.498	0.76	3.2	0.466	5.3	0.950	< 11.0	13.00	4.5
17	18-34	1568	56	27	6.11	1.32	0.98	3.8	0.56	7.20	1.170	< 9.00	9.08	3.1
18	18-34	1630	61.5	26	5.65	0.392	0.97	4.0	0.595	5.24	1.160	< 11.0	13.00	4.2
19	18-34	2220	57	28	6.03	1.3	1.0	3.9	0.58	7.6	1.100	< 10.0	10.00	3.5
20	18-34	2575	23	13	3.54	1.12	0.58	2.0	0.29	2.4	0.230	< 13.0	1.80	0.61
21	18-34	2758												
22	18-34	2845	44.8	24	6.16	1.69	0.88	3.1	0.46	4.39	0.550	< 8.00	3.59	1.1
23	18-34	3237	27	14	4.24	1.29	0.62	2.18	0.33	2.82	0.290	< 19.0	1.30	0.45
24	18-34	3370	26	13	4.00	1.19	0.53	2.2	0.31	2.65	0.270	< 17.0	1.50	0.51
25	18-34	3406	20	8.8	3.19	1.0	0.46	1.7	0.25	2.0	0.650	< 15.0	0.83	0.33
26	18-34	3478	20	12.7	3.39	1.049	0.525	1.82	0.259	2.2	0.252	<5	0.99	0.33
27	18-34	3497												
28	27-27	527	39.1	18.6	4.74	1.15	0.72	2.68	0.388	5.19	0.650		6.70	2.07
29	27-27	590	56.9	26.1	6.39	1.001	0.943	4.52	0.646	8.55	1.240	11.5	13.53	4.2
30	27-27	756	31.3	18.3	4.49	1.36	0.689	2.47	0.334	3.4	0.592		2.55	0.93
31	27-27	1094												
32	27-27	1164												
33	27-27	1437												
34	27-27	1890												
35	27-27	2425												
36	27-27	2657	32.5	15.9	4.35	1.27	0.633	2.15	0.215	2.99	0.625		1.55	0.32
37	27-27	2917	7.9	6	2.24	0.84	0.54	2.42	0.385	1.31	0.111		0.26	
38	27-27	2968	22.4	11.5	3.25	0.93	0.518	1.58	0.238	2.41	0.300		1.94	0.35
39	28-32	512	32.9	18.8	4.48	1.465	0.744	2.53	0.383	3.78	0.541	<5	3.03	0.85
40	28-32	823	48.7	22.7	5.42	0.841	0.853	4.18	0.599	8.53	1.080	<8	13.96	4.73
41	28-32	1093	25.8	14.9	3.91	1.19	0.635	2.27	0.339	3	0.396	<5	2.58	0.95
42	28-32	1281	45.3	20.8	5	0.914	0.789	3.51	0.5	6.88	0.951	<4	13.97	5.01
43	28-32	1397	45.2	19.9	4.8	0.96	0.739	3.32	0.486	6.83	0.950	<5	12.84	4.62
44	28-32	1427	43.1	17.3	4.58	0.981	0.734	3.3	0.478	6.49	0.900	<4	11.94	3.92
45	28-32	1598	48.1	20.5	4.72	0.773	0.723	3.4	0.491	7.38	1.038	<5	15.60	5.52
46	28-32	1822	28.9	16.8	4.65	1.42	0.795	3.03	0.459	3.87	0.372	<5	2.98	1.2
47	28-32	1866	25.3	13.3	3.46	0.981	0.532	1.93	0.276	3.15	0.391	<8	3.72	1.32
48	28-32	2044	50.9	22.8	5.46	0.935	0.797	3.81	0.543	8.03	1.000	<7	13.87	4.7
49	28-32	2127	33.3	18.3	4.75	1.38	0.856	3.12	0.435	4.51	0.510	<12	4.22	1.24
50	28-32	2157	45.4	25.4	5.89	1.34	0.899	3.32	0.46	5.44	0.830	<5	7.44	2.15
51	28-32	2171	51.2	22.7	5.27	0.845	0.791	3.74	0.535	8.22	1.007	<5	11.40	3.91
52	28-32	2566	86	39	9.39	0.177	1.39	6.46	0.898	6.49	1.310	<6	13.74	4.61
53	28-32	2827	25.5	13.9	3.97	1.24	0.687	2.82	0.395	3.55	0.354	<6	2.93	1.07
54	28-32	3453	33.8	19.4	4.62	1.32	0.689	2.51	0.345	3.38	0.569	<6	1.90	0.57
55	28-32	4334	32.2	18.7	4.75	1.27	0.724	2.73	0.395	3.4	0.411	<6	2.83	0.92
56	36-28	443												
57	36-28	568	28	13.8	3.63	1.03	0.575	2.18	0.312	3.3	0.405		3.89	1.11
58	36-28	637												
59	36-28	714	33.5	19.7	5.43	1.71	0.94	3.49	0.487	3.97	0.526		2.16	0.74
60	36-28	836	31.7	21.9	5.15	1.66	0.96	3.46	0.504	4.09	0.470		1.96	0.49
61	36-28	882	27.9	16	4.59	1.56	0.84	3.07	0.436	3.18	0.510	<6	1.16	0.27
62	36-28	1049												
63	36-28	1159	25.8	14	4.22	1.43	0.705	2.67	0.384	3.15	0.327	<6	2.18	0.8
64	36-28	1206	41	22.8	5.5	1.32	0.827	3.15	0.427	4.76	0.704	<6	6.16	1.93
65	36-28	1277	44.2	22	5.59	1.32	1.04	4.1	0.623	7.55	0.840		9.02	2.81
66	36-28	1368	23.5	12.1	2.88	0.842	0.36	1.16	0.174	2.39	0.316	<6	3.28	0.94
67	36-28	1533	22.9	10.7	2.78	0.85	0.418	1.28	0.189	2.42	0.294		2.69	0.89
68	36-28	1645	31.3	13.4	3.39	0.79	0.51	1.92	0.296	3.12	0.492		4.96	1.5
69	36-28	1726	33.5	21.6	5.3	1.68	0.91	3.48	0.477	4.08	0.550		2.43	0.73
70	36-28	1778	40.4	14.8	3.77	0.77	0.6	2.57	0.345	4.78	0.775		9.06	2.94
71	36-28	1787	13	7.4	2.5	0.89	0.473	1.63	0.236	1.7	0.165		0.72	

Table 3. Flame photometry and INAA data

	A	B	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
1	HOLE	DEPTH	INAA											
2	No.	in feet	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Hf	Ta	Au,ppb	Th	U
72	36-28	1808	14	9.3	2.54	0.93	0.483	1.94	0.284	1.61			0.46	
73	36-28	1839	40.3	16.9	3.63	0.525	0.54	2.25	0.328	4.08	0.734		9.11	2.75
74	36-28	1887	30.2	16.6	5.12	1.61	0.84	3.06	0.453	3.34	0.530		1.42	0.41
75	36-28	1934	39.7	14	3.46	0.42	0.52	2.2	0.33	3.92	0.950	< 15.0	9.66	3.2
76	36-28	2010	34.9	20.7	5.69	1.76	0.919	3.29	0.447	3.53	0.496	<5	1.39	0.5
77	45-36	18	48.1	25.8	6.72	1.97	1.02	4.11	0.579	6.39	0.810	<5	4.98	1.58
78	45-36	59	46.5	26.4	6.59	1.94	1.009	3.79	0.544	6.09	0.788	<5	4.64	1.46
79	45-36	569	50.7	22.3	5.57	0.807	0.846	4.06	0.584	8.09	1.130	<8	13.18	4.51
80	45-36	769	14.5	9.8	2.91	0.995	0.567	2.13	0.341	2.1	0.163	7.2	1.00	0.38
81	45-36	828	34.9	18.3	4.47	1.17	0.663	2.54	0.35	4.55	0.565	<6	5.50	1.95
82	45-36	877	54.5	27.7	5.65	1.481	0.687	1.87	0.273	3.69	0.759	<5	4.24	1.3
83	45-36	1419	41.9	24.9	6.48	1.72	1.04	3.94	0.564	5.07	0.628	<5	4.03	1.49
84	45-36	1477	33.9	21.3	5.55	1.72	0.951	3.52	0.51	3.91	0.480	11.5	2.23	0.68
85	45-36	1859	38.4	25.6	6.87	2.03	1.074	3.67	0.538	3.86	0.444	<5	1.92	0.69
86	45-36	1997	28	18.1	5.16	1.6	0.85	3.19	0.458	3.43	0.413	<5	1.73	0.53
87	45-36	2269	54.5	29	7.45	1.81	1.16	4.92	0.706	7.65	0.856	<6	5.53	1.76
88	45-36	2384	27.5	16.9	4.64	1.46	0.79	2.82	0.403	3.07	0.485	<5	1.05	0.3
89	45-36	2610	60.6	30.8	7.58	0.129	1.13	5.93	0.845	4.57	0.916	<3	9.47	3.42
90	45-36	2852	44.8	23.5	6.13	1.56	0.932	3.81	0.549	5.92	0.820	<5	7.39	2.66
91	45-36	3315	48.3	25.6	6.7	1.91	0.96	3.6	0.54	6.21	0.800	<7	4.77	1.45
92	45-36	3421	35.3	17.5	3.98	0.971	0.509	1.56	0.238	3.43	0.511	<5	4.83	1.56
93	45-36	3968	40.7	25.3	7.1	2	1.07	3.85	0.549	4.2	0.518	<9	2.13	0.74
94	52-4	368	37	20	4.66	1.15	0.752	2.64	0.405	4.88	0.620		6.21	2.16
95	52-4	382												
96	52-4	628	48.4	19	4.30	0.41	0.72	3.1	0.461	5.36	0.980	< 17.0	14.10	4.6
97	52-4	709												
98	52-4	816	23.2	11.3	2.81	0.81	0.41	1.26	0.208	2.57	0.275		3.16	1.01
99	52-4	958	39	19.8	4.43	1.017	0.6	1.88	0.291	3.76	0.720		7.94	2.5
100	52-4	1300	35.1	18	4.73	1.39	0.725	2.27	0.338	3.46	1.300		1.82	0.62
101	52-4	2195	37.4	23.2	5.58	1.65	0.824	2.76	0.384	3.54	0.587	<6	1.98	0.64
102	52-4	2542	29.7	20.9	5.33	1.61	0.867	2.97	0.409	3.21	0.529	<5	0.91	0.46
103	52-4	3007	29.3	17.8	5.39	1.7	0.951	3.45	0.464	3.56	0.336	<6	0.77	0.23
104	52-4	3650	22.3	13.3	3.52	1.09	0.566	2.04	0.287	2.65	0.334	<5	2.32	0.77
105	52-4	3784	24.8	14.5	4.04	1.22	0.668	2.38	0.334	3.22	0.410	<5	2.67	0.98
106	52-4	3845	26.9	15.2	4.11	1.27	0.689	2.42	0.333	3.32	0.425	<6	2.86	0.94
107	57-13	429	47.1	20.5	4.82	0.82	0.75	3.27	0.47	7.44	0.920		11.92	4.34
108	57-13	580	53	21	5.49	0.73	0.95	3.9	0.57	8.7	1.000	< 18.0	12.50	4.3
109	57-13	729												
110	57-13	796	51.8	22	5.41	0.77	0.93	3.8	0.588	8.61	1.000	< 14.0	12.50	4.3
111	57-13	815	51.9	22.3	5.21	0.73	0.789	3.79	0.545	8.5	1.090	<6	13.28	4.43
112	57-13	838												
113	57-13	1180	47	19	4.56	0.57	0.75	3.5	0.513	6.6	< 0.700	< 16.0	14.80	5.3
114	57-13	1231												
115	57-13	1459	46.2	18	4.22	0.38	0.72	3.19	0.451	4.90	0.930	< 16.0	13.70	4.8
116	57-13	1682	58.7	25	5.53	0.49	0.91	4.0	0.567	4.27	1.000	< 14.0	11.60	3.6
117	57-13	2020	68	27	6.80	0.64	0.91	3.5	0.503	4.92	0.980	< 16.0	12.30	3.9
118	57-13	2031	51	25	5.45	0.67	0.82	4.0	0.57	8.4	1.000	< 17.0	13.00	4.5
119	57-13	2389	51	25	5.62	1.0	0.96	3.6	0.54	7.17	1.100	< 17.0	11.40	4.1
120	57-13	2772	55.3	25.5	5.72	0.714	0.871	4.09	0.581	4.22	0.942	<6	10.37	3.14
121	57-13	2787												
122	57-13	2802	27.2	19.1	5.22	1.68	0.91	3.4	0.475	3.3	0.348		1.01	0.41
123	57-13	2888	32.6	19.8	5.53	1.78	0.943	3.53	0.5	3.72	0.380	<5	1.46	0.47
124	62-21	558	24.7	14.9	3.98	1.22	0.79	3.09	0.462	4.16	0.369		3.97	1.25
125	62-21	677	36.6	18.7	4.65	1.14	0.7	2.61	0.38	4.91	0.624		6.21	2.01
126	62-21	742	30.9	19.2	4.81	1.43	0.79	2.85	0.41	3.48	0.439		2.63	0.9
127	62-21	903	31.2	19.7	5.7	1.66	0.93	3.27	0.465	3.49	0.409		1.57	0.6
128	62-21	961												
129	62-21	1051												
130	62-21	1085	57.2	31.6	7.55	1.69	1.23	4.96	0.745	8.3	1.060		8.63	3.1
131	62-21	1202												
132	62-21	1353.5	29.9	17.2	5.06	1.53	0.88	3.5	0.523	3.91	0.430		1.97	0.67
133	62-21	1490												
134	62-21	1659												
135	62-21	1720	33.5	15.7	3.74	0.95	0.474	1.23	0.233	3.29	0.455		4.57	1.12
136	62-21	2041	26	16.7	3.9	1.21	0.61	2.1	0.305	2.95	0.407		2.25	0.74
137	62-21	2101	29.6	14.2	3.39	0.94	0.484	1.59	0.217	3	0.410	<5	3.67	0.99
138	62-21	2128	28.2	16.2	4.19	1.39	0.642	2.38	0.329	3.14	0.449	<6	2.31	0.81
139	68-16	520	48.6	20	4.86	0.702	0.74	3.3	0.468	6.64	0.940	< 14.0	14.90	5.4
140	68-16	549	25	16	4.88	1.6	0.83	3.5	0.51	3.1	0.300	< 16.0	1.60	< 1.00
141	68-16	628	40	22	6.25	1.61	0.87	3.6	0.49	4.86	0.560	< 15.0	4.76	1.6

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	A	B	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
1	HOLE	DEPTH	INAA											
2	No.	in feet	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Hf	Ta	Au,ppb	Th	U
142	68-16	753	52.2	24	5.52	0.809	0.85	3.9	0.566	8.48	1.000	< 16.0	12.10	4.33
143	68-16	828	51.1	24	5.60	1.01	0.88	3.7	0.533	7.26	0.420	< 17.0	9.97	3.5
144	68-16	1159	46.8	17	4.35	0.49	0.77	3.2	0.45	5.66	0.990	< 14.0	15.90	5.6
145	68-16	1673	47.3	20	4.30	0.40	0.79	3.3	0.462	4.97	1.010	< 14.0	13.90	4.9
146	68-16	1739	41	18	4.75	1.1	0.66	2.6	0.36	4.66	0.650	< 14.0	6.79	2.2
147	68-16	1991	22	11	3.07	0.85	0.39	1.5	0.22	2.5	0.270	< 16.0	2.90	< 1.40
148	68-16	2107	25	11	3.17	0.85	0.36	1.4	0.22	2.5	0.270	< 16.0	2.90	1.0
149	68-16	2345	32.3	14.5	3.63	0.909	0.526	1.95	0.27	3.33	0.495	<6	4.78	1.58
150	68-16	2360	42.9	17	3.75	0.44	0.60	2.6	0.35	4.24	0.773	< 11.0	10.60	3.4
151	68-16	2378	42.3	16	3.80	0.415	0.56	2.5	0.35	4.1	0.730	< 13.0	10.50	3.8
152	68-16	2891	42.4	17.6	3.73	0.463	0.509	2.34	0.342	4.17	0.797	<7	10.57	3.29
153	86-23	723												
154	86-23	834	20.4	12.4	2.82	0.88	0.42	1.31	0.185	2.23	0.197		1.58	0.68
155	86-23	897												
156	86-23	976	35.8	14	2.77	0.515	0.36	1.29	0.2	3.7	0.800		11.35	3.63
157	86-23	1010												
158	86-23	1064	23.5	11.3	2.98	0.79	0.382	1.2	0.189	2.45	0.283		2.54	0.91
159	86-23	1842												
160	86-23	2469	43.2	21.7	5.02	1.32	0.636	2.22	0.302	3.65	0.520		2.40	0.9
161	86-23	2766												
162	86-23	2766	59	32.5	7.23	1.9	0.85	2.54	0.358	4.36	0.691	<9	2.43	0.67
163	86-23	3085	44.4	24.3	6.15	1.64	0.85	2.62	0.38	3.8	0.575		1.32	0.59
164	86-23	3415	18.2	13.7	3.97	1.31	0.734	2.65	0.369	2.66	0.269	<5	1.09	0.42
165	87-24	72A	7.9	6.2	2.23	0.885	0.519	2.29	0.33	1.57	0.139	<5	0.28	<0.3
166	87-24	72B	13.9	12.3	3.89	1.337	0.889	3.87	0.551	2.72	0.230	<6	0.53	0.3
167	87-24	271	53.2	30	9.11	0.213	1.65	7.26	1.02	6.93	1.520	<5	13.92	4.53
168	87-24	321	35.8	19.6	5.06	1.41	0.708	2.68	0.381	3.68	0.482	<6	2.86	0.96
169	87-24	491	63.5	31.2	7.37	1.14	1.15	5.4	0.812	10.32	1.080	<6	9.47	2.7
170	87-24	552	17.9	13.3	3.88	1.36	0.745	2.7	0.381	2.32	0.286	<5	0.35	<0.3
171	87-24	623	34.5	17.6	4.07	1.22	0.596	2.35	0.339	4.21	0.600	<9	4.97	1.16
172	87-24	678	15.1	12	3.36	1.2	0.639	2.55	0.369	2.21	0.373	<5	0.40	<0.3
173	87-24	730	38.4	17.2	4.19	1.034	0.609	2.51	0.35	4.82	0.710	<7	6.80	1.33
174	87-24	879	16.8	12.7	3.39	1.14	0.631	2.43	0.35	1.94	0.180	<6	0.39	<0.2
175	87-24	910	16.4	11.4	3.26	1.12	0.622	2.36	0.35	1.95	0.183	<5	0.37	0.24
176	87-24	1047	60	25	5.94	0.843	0.882	4.21	0.618	7.33	1.070	<6	13.28	3.64
177	87-24	1055	41.7	21.9	5.09	1.16	0.7	2.55	0.36	4.74	0.600	13	6.71	2.12

Table 4. K-Ar ages on drill core samples

See Figure 1 for map locations and Donnelly-Nolan and Lanphere (2005) for analytical data

<i>Hole No.</i>	<i>Depth in feet</i>	<i>Age in ka</i>	<i>Correlated Unit</i>
52-4	628	382±8	rhyolite of Grasshopper Flat
57-13	1459	324±7	not at surface
68-16	753	297±6	rhyolite east of Callahan Flow
68-16	1673	397±8	not at surface

All experiments were performed on whole-rock samples of rhyolite