

APPENDIX F

**ANALYTICAL DATA OBTAINED BY ICP-MS AT THE UNION COLLEGE
GEOLOGY DEPARTMENT, SCHENECTADY, NY (WILD ROGUE
WILDERNESS, SNOW CAMP MOUNTAIN, BLACK MOUNTAIN AND
LLANADA)**

Table F1: Metagabbro unit**Sample:** O/C-373a O/C-373b O/C-373b OC-374b MRH-23 MRH-78/1 MRH-78/2

	[3],[4]* 2	R.C. 1	[3],[4]* 2	[2] 2	[2] 2	[3],[4]* 2	[3],[4]* 2
V	373	-	333	247	343	372	285
Cr	29	-	46	9	75	27	37
Rb	1.83	1.90	1.61	2.51	1.51	3.58	3.11
Sr	448	449	454	436	386	476	510
Y	24.4	24.1	22.3	10.9	18.6	19.5	20.3
Zr	23.2	21.0	21.7	14.1	18.4	24.4	19.0
Nb	0.37	0.40	0.40	0.22	0.28	0.45	0.42
Cs	0.33	0.33	0.32	0.41	0.20	0.76	0.41
Ba	31.3	34.0	29.3	42.9	29.5	46.6	55.2
La	2.55	3.26	3.00	1.61	1.92	3.57	3.80
Ce	9.98	10.84	11.06	5.38	7.63	11.91	12.3
Pr	2.15	2.16	2.27	1.04	1.63	2.24	2.30
Nd	13.4	12.8	13.5	6.00	9.75	12.4	12.9
Sm	4.10	4.27	4.08	1.77	2.96	3.50	3.67
Eu	1.31	1.40	1.29	0.66	1.11	1.20	1.18
Gd	4.69	4.52	4.50	1.88	3.11	3.74	4.07
Tb	0.74	0.74	0.68	0.30	0.49	0.58	0.62
Dy	4.54	4.60	4.15	1.89	3.14	3.53	3.80
Ho	0.88	0.94	0.81	0.39	0.66	0.70	0.73
Er	2.64	2.57	2.43	1.14	1.95	2.05	2.20
Tm	0.42	0.37	0.38	0.18	0.30	0.32	0.34
Yb	2.44	2.35	2.30	1.14	1.90	1.96	2.05
Lu	0.35	0.37	0.34	0.18	0.29	0.28	0.30
Hf	0.893	1.00	0.843	0.55	0.77	0.90	0.73
Ta	0.013	0.020	0.014	0.017	0.020	0.014	0.016
Pb	0.500	0.64	0.459	0.51	0.18	0.51	0.57
Th	0.025	0.140	0.043	0.024	0.020	0.039	0.062
U	0.017	0.040	0.019	0.016	0.011	0.022	0.032

[2] ... 2nd analytical run

[3] ... 3rd analytical run

[4]*... 4th analytical run; *only Ta data used, replacing Ta values of 3rd analytical run

R.C. ... analyzed at Washington State University, courtesy of Richard Conrey (1998)

Table F2: Metatonalite unit

Sample:	OC-11-S16b	OC-368f
Reference:	[2]	[2]
	2	2
V	177	210
Cr	9	32
Rb	0.42	1.08
Sr	380	286
Y	23.6	26.4
Zr	61.6	38.8
Nb	2.34	1.69
Cs	0.04	0.05
Ba	46.0	86.2
La	17.1	8.99
Ce	37.2	24.0
Pr	4.76	3.43
Nd	19.9	15.5
Sm	4.46	3.90
Eu	1.07	0.94
Gd	4.48	4.22
Tb	0.68	0.68
Dy	4.10	4.48
Ho	0.82	0.94
Er	2.35	2.78
Tm	0.35	0.43
Yb	2.29	2.75
Lu	0.35	0.42
Hf	1.88	1.37
Ta	0.13	0.082
Pb	0.64	0.40
Th	2.48	1.25
U	0.55	0.30

[2] 2nd analytical run

2 ... number of digestions (equals number of analyses)

Table F3: Sheeted dike complex

Sample:	OC-1-S1	OC-1-S2	OC-4-S3	OC-5-S4	OC-6-S5	OC-58	O/C-325
Reference:	{2}, [2]	{2}, [2]	[2]	{2}, [1]	{2}, [2]	{2}, [1,2]	[3], [4]*
	4	4	2	4 (6)	4	4 (5)	2
V	270	376	258	200	260	233	200
Cr	204	14	326	54	190	73	1125
Rb	0.37	3.08	9.11	0.13	0.92	3.92	0.20
Sr	181	253	282	73	279	197	113
Y	21.3	23.3	18.7	19.9	12.8	17.1	15.0
Zr	72.8	50.7	61.5	43.9	46.8	43.7	49.5
Nb	2.77	1.72	1.66	1.25	1.22	1.84	1.02
Cs	0.12	0.27	0.36	0.03	0.05	0.24	0.08
Ba	37.2	86.2	155.5	20.5	85.2	51.8	10.7
La	3.45	5.51	5.90	1.82	7.80	4.05	5.63
Ce	8.61	14.82	12.48	4.80	14.70	9.73	11.79
Pr	1.33	2.30	1.78	0.79	1.86	1.49	1.72
Nd	6.91	11.20	8.32	4.27	7.94	7.43	7.54
Sm	2.19	2.93	2.31	1.52	1.90	2.17	2.07
Eu	0.73	1.28	0.68	0.58	0.79	0.87	0.63
Gd	2.89	3.50	2.73	2.31	2.12	2.71	2.33
Tb	0.52	0.60	0.46	0.47	0.35	0.47	0.38
Dy	3.42	3.82	3.01	3.34	2.17	3.06	2.43
Ho	0.73	0.82	0.63	0.75	0.46	0.64	0.52
Er	2.08	2.36	1.85	2.24	1.32	1.82	1.56
Tm	0.32	0.36	0.29	0.35	0.21	0.28	0.24
Yb	2.11	2.35	1.91	2.23	1.38	1.80	1.52
Lu	0.32	0.36	0.29	0.34	0.22	0.28	0.23
Hf	1.86	1.57	1.81	1.42	1.51	1.26	1.37
Ta	0.18	0.10	0.10	0.079	0.088	0.13	0.063
Pb	0.42	0.58	0.54	0.33	0.71	0.12	0.85
Th	0.29	0.61	1.06	0.32	1.39	0.32	0.83
U	0.12	0.37	0.40	0.12	0.39	0.12	0.31

{2} 2nd test run (Ta and Nb values not used!)

[1] ... 1st analytical run

[2] 2nd analytical run

[3] ... 3rd analytical run

[4]*... 4th analytical run; *only Ta data used which Ta values of 3rd analytical run

2, 4 ... total number of digestions per sample (usually equal to number of analyses)

e.g., {2}, [1]: average of data from second test run (n=2) and first analytical run (n=2)

(6), (5) ... total number of analyses per sample when larger than number of digestions

Table F3 (continued)

Sample:	OC-333	OC-356	OC-357b	OC-362	MRH-45a	MRH-45b	MRH-111
Reference:	[2]	[2]	[2]	[2]	{2}, [2]	{2}, [1]	{2}, [1]
	2	2	2	2	4	4 (6)	4
V	200	251	186	231	241	269	194
Cr	260	185	79	69	278	84	35
Rb	1.34	3.00	1.92	1.98	6.49	5.00	0.34
Sr	146	179	202	310	256	347	252
Y	16.9	22.2	13.8	17.9	13.4	21.4	19.1
Zr	34.8	64.9	32.5	55.8	47.8	68.7	34.9
Nb	1.73	3.07	0.93	1.43	1.32	1.99	0.73
Cs	0.10	0.25	0.29	0.11	0.21	0.14	0.06
Ba	37.8	92.5	85.2	77.5	96.3	93.1	20.2
La	2.39	3.32	2.39	8.05	6.26	19.10	3.90
Ce	6.36	9.30	4.99	17.81	12.23	37.27	9.42
Pr	1.02	1.44	0.73	2.56	1.62	4.98	1.56
Nd	5.22	7.48	3.65	11.85	7.45	22.37	8.39
Sm	1.68	2.37	1.27	2.98	1.86	5.21	2.58
Eu	0.65	0.91	0.45	1.00	0.57	1.80	0.87
Gd	2.32	3.11	1.78	3.14	2.10	4.87	3.17
Tb	0.42	0.57	0.32	0.49	0.35	0.69	0.52
Dy	2.74	3.68	2.18	2.99	2.22	3.92	3.32
Ho	0.57	0.78	0.46	0.61	0.47	0.77	0.71
Er	1.68	2.22	1.35	1.74	1.36	2.11	2.02
Tm	0.26	0.34	0.21	0.27	0.21	0.31	0.31
Yb	1.64	2.18	1.40	1.71	1.45	1.99	1.99
Lu	0.25	0.32	0.21	0.26	0.24	0.30	0.32
Hf	1.03	1.71	0.92	1.70	1.50	2.04	1.09
Ta	0.11	0.19	0.067	0.083	0.081	0.10	0.044
Pb	0.29	0.44	0.24	0.44	0.46	0.60	0.69
Th	0.18	0.22	0.25	1.53	0.99	2.19	0.53
U	0.09	0.08	0.14	0.60	0.27	0.68	0.18

Table F3 (continued)

Sample:	O/C-358	O/C-360
Reference:	[3], [4]*	[3], [4]*
	2	2
V	191	156
Cr	291	157
Rb	3.71	1.38
Sr	188	274
Y	6.49	4.70
Zr	8.50	6.76
Nb	0.15	0.12
Cs	0.08	0.06
Ba	28.9	46.4
La	0.72	0.67
Ce	1.68	1.48
Pr	0.28	0.24
Nd	1.56	1.28
Sm	0.61	0.45
Eu	0.29	0.25
Gd	0.87	0.62
Tb	0.15	0.11
Dy	1.05	0.75
Ho	0.22	0.16
Er	0.66	0.48
Tm	0.10	0.08
Yb	0.63	0.47
Lu	0.090	0.070
Hf	0.27	0.18
Ta	0.0084	0.0070
Pb	0.45	0.54
Th	0.052	0.068
U	0.040	0.026

Table F4: Pillow unit

Sample:	OC-113	OC-186	OC-224	OC-227a	OC-227b	OC-379	OC-380
Reference:	{2}, [1]	{2}, [1]	{2}, [2]	{2}, [2]	{2}, [1]	{2}, [2]	{2}, [1]
	4	4	4	4	4	4	4
V	277	375	387	263	428	312	167
Cr	53.5	18.0	42.5	27.0	32.5	9.7	8.0
Rb	3.87	0.74	0.84	5.38	3.98	0.20	0.19
Sr	163	87	161	179	169	58	61
Y	13.4	28.8	17.5	19.2	22.9	25.5	32.1
Zr	30.8	68.4	30.0	49.4	45.4	57.6	35.5
Nb	0.61	1.62	0.83	1.39	0.68	1.29	0.64
Cs	0.07	0.02	0.10	0.76	0.32	0.05	0.05
Ba	62.5	38.7	46.7	99.2	74.7	24.0	28.7
La	2.14	3.35	2.13	2.90	2.15	3.16	1.84
Ce	5.17	8.99	5.29	7.19	5.59	8.36	4.78
Pr	0.85	1.56	0.89	1.16	1.03	1.46	0.90
Nd	4.64	8.86	4.98	6.37	5.88	7.90	5.22
Sm	1.57	2.97	1.71	2.05	2.00	2.65	2.03
Eu	0.59	1.02	0.64	0.78	0.75	0.94	0.85
Gd	2.04	3.98	2.41	2.67	2.70	3.56	3.03
Tb	0.36	0.70	0.44	0.47	0.50	0.63	0.56
Dy	2.36	4.76	2.92	3.11	3.41	4.20	3.85
Ho	0.51	1.03	0.64	0.66	0.74	0.92	0.85
Er	1.51	3.03	1.87	1.97	2.16	2.63	2.45
Tm	0.23	0.46	0.30	0.30	0.33	0.41	0.39
Yb	1.58	3.00	1.98	2.06	2.21	2.63	2.55
Lu	0.25	0.48	0.31	0.32	0.37	0.42	0.42
Hf	0.99	2.09	1.02	1.39	1.40	1.79	1.25
Ta	0.037	0.092	0.063	0.096	0.037	0.087	0.038
Pb	2.29	1.06	0.52	0.90	1.13	1.46	0.91
Th	0.33	0.38	0.32	0.32	0.30	0.34	0.21
U	0.14	0.16	0.14	0.14	0.12	0.16	0.11

{2} 2nd test run (Ta and Nb values are not used!)

[1] ... 1st analytical run

[2] 2nd analytical run

4 ... number of digestions per sample (equals number of analyses)

e.g., {2}, [1]: average of data from second test run (n=2) and first analytical run (n=2)

Table F4 (continued)

Sample:	PB-1	O/C-231
Reference:	{2}, [2]	
	4	
V	314	
Cr	19.9	
Rb	0.42	
Sr	61	
Y	21.0	
Zr	40.4	
Nb	0.69	
Cs	0.02	
Ba	22.6	
La	1.93	
Ce	5.30	
Pr	0.96	
Nd	5.47	
Sm	1.92	
Eu	0.63	
Gd	2.73	
Tb	0.49	
Dy	3.33	
Ho	0.74	
Er	2.14	
Tm	0.34	
Yb	2.26	
Lu	0.36	
Hf	1.34	
Ta	0.060	
Pb	0.47	
Th	0.25	
U	0.15	

Table F5: Mule Mountain volcanics

Sample:	OC-80	OC-81a	OC-81b	OC-82	OC-88	GDH-96-7	GDH-96-8
Reference:	[2]	[2]	[2]	[2]	[2]	[3],[4]*	[3],[4]*
	2	2	2	2	2	2	2
V	130	239	238	328	363	232	281
Cr	7	381	515	33	94	49	75
Rb	9.59	6.72	7.13	6.17	0.18	2.66	4.44
Sr	134	150	148	228	233	220	194
Y	17.9	12.9	12.5	19.8	23.1	19.9	17.8
Zr	73.7	25.1	23.1	40.6	47.9	38.2	35.6
Nb	1.57	0.39	0.37	0.76	0.72	0.69	0.72
Cs	0.12	0.34	0.36	0.34	0.04	0.25	0.32
Ba	608	140	137	103	17	52	90
La	3.67	1.29	1.28	2.63	2.33	2.97	3.02
Ce	8.51	3.37	3.27	6.58	6.48	6.69	7.09
Pr	1.30	0.59	0.57	1.07	1.15	1.16	1.17
Nd	6.37	3.21	3.17	5.86	6.48	5.62	5.76
Sm	2.01	1.18	1.11	2.01	2.29	1.88	1.86
Eu	0.56	0.48	0.45	0.68	0.85	0.64	0.67
Gd	2.56	1.64	1.59	2.65	3.11	2.65	2.44
Tb	0.44	0.30	0.29	0.46	0.56	0.47	0.43
Dy	2.95	2.09	1.99	3.18	3.77	3.16	2.90
Ho	0.62	0.45	0.43	0.70	0.81	0.68	0.65
Er	1.87	1.33	1.27	2.09	2.36	2.04	1.98
Tm	0.30	0.21	0.20	0.33	0.37	0.32	0.32
Yb	1.97	1.40	1.34	2.15	2.41	2.02	1.99
Lu	0.32	0.22	0.21	0.33	0.37	0.30	0.31
Hf	2.25	0.76	0.71	1.34	1.51	1.19	1.15
Ta	0.097	0.033	0.035	0.051	0.053	0.041	0.041
Pb	1.19	0.99	1.05	1.78	1.06	2.93	2.87
Th	0.69	0.20	0.19	0.39	0.30	0.38	0.42
U	0.32	0.10	0.08	0.19	0.12	0.17	0.35

[2] 2nd analytical run

[3] 3rd analytical run

[4] ... 4th analytical run; * only Ta data used which replace Ta values of 3rd analytical run

2 ... number of digestions per sample (equals number of analyses)

Table F5 (continued)

Sample:	OC-147	OC-217
Reference:	[2]	[2]
	2	2
V	26	31
Cr	14	11
Rb	0.25	0.79
Sr	75	59
Y	44.6	41.0
Zr	111.8	112.8
Nb	2.18	2.14
Cs	0.02	0.04
Ba	96	321
La	5.59	4.99
Ce	14.93	13.57
Pr	2.53	2.33
Nd	13.65	12.68
Sm	4.57	4.18
Eu	1.39	1.21
Gd	6.04	5.38
Tb	1.06	0.94
Dy	7.01	6.49
Ho	1.49	1.43
Er	4.42	4.31
Tm	0.70	0.67
Yb	4.46	4.29
Lu	0.67	0.66
Hf	3.59	3.58
Ta	0.14	0.14
Pb	1.18	2.87
Th	0.75	0.72
U	0.31	0.39

Table F6: Half Moon Bar Gabbro (diabasic dikes)

Sample:	OC-174b	OC-375c	OC-375d
Run:	[2]	[2]	[2]
	2	2	2
V	242.7	235	256
Cr	44.0	18.5	18.1
Rb	5.19	2.94	2.88
Sr	357.9	370	410
Y	16.9	18.6	17.4
Zr	51	56.8	50.3
Nb	1.45	1.67	1.45
Cs	0.528	0.665	0.66
Ba	216	157.7	188
La	5.47	6.10	5.21
Ce	11.9	13.30	11.8
Pr	1.75	1.95	1.76
Nd	8.2	8.97	8.20
Sm	2.20	2.35	2.16
Eu	0.70	0.68	0.65
Gd	2.36	2.58	2.42
Tb	0.40	0.43	0.42
Dy	2.70	2.95	2.79
Ho	0.59	0.64	0.60
Er	1.75	1.89	1.81
Tm	0.27	0.30	0.28
Yb	1.81	1.97	1.86
Lu	0.28	0.31	0.30
Hf	1.55	1.74	1.55
Ta	0.08	0.094	0.083
Pb	0.53	0.68	0.75
Th	1.06	1.22	1.01
U	0.39	0.44	0.29

[2] 2nd analytical run

Table F7: Snow Camp Mountain area

Sample:	SM-96-2a	SM-96-2b.1	SM-96-2c.1	SM-96-2c.2	SM-96-2d.1	SM-96-3b	SM-96-3d
Reference:	[3], [4]*	[3]	[3], [4]*	[3], [4]*	[3], [4]*	[3], [4]*	[3]
	2	2	2	2	2	2	2
V	232	237	225	245	203	226	257
Cr	119	145	91	393	282	140	365
Rb	5.81	6.27	3.36	8.29	4.07	1.75	12.76
Sr	154	381	295	316	276	217	444
Y	14.2	21.6	15.9	15.6	15.2	21.5	23.1
Zr	33.2	65.9	38.4	41.0	42.0	70.8	60.8
Nb	0.83	2.03	0.84	0.97	1.35	1.82	2.51
Cs	0.10	0.31	0.30	0.61	0.55	0.13	2.49
Ba	127	369	553	893	723	61.2	257
La	2.43	3.79	2.61	4.22	1.79	3.78	3.70
Ce	6.16	10.0	6.04	10.1	5.04	9.52	10.1
Pr	0.98	1.58	0.98	1.62	0.84	1.54	1.68
Nd	4.98	8.05	4.74	8.11	4.54	7.53	8.32
Sm	1.57	2.48	1.59	2.46	1.58	2.36	2.69
Eu	0.51	0.82	0.60	0.85	0.51	0.73	0.99
Gd	1.98	3.08	2.07	2.75	1.99	2.99	3.49
Tb	0.34	0.54	0.37	0.43	0.36	0.51	0.60
Dy	2.26	3.46	2.47	2.64	2.38	3.36	3.94
Ho	0.49	0.74	0.54	0.54	0.51	0.72	0.82
Er	1.46	2.19	1.62	1.52	1.54	2.16	2.41
Tm	0.23	0.35	0.26	0.24	0.25	0.34	0.37
Yb	1.46	2.19	1.63	1.49	1.52	2.13	2.21
Lu	0.21	0.32	0.25	0.22	0.22	0.32	0.33
Hf	0.98	1.79	1.12	1.16	1.22	1.87	1.55
Ta	0.044	0.10	0.051	0.059	0.088	0.11	0.16
Pb	2.61	2.87	1.63	2.21	0.45	1.12	1.13
Th	0.28	0.41	0.29	0.46	0.29	0.43	0.24
U	0.11	0.17	0.15	0.17	0.11	0.19	0.085

Table F7 (continued)

Sample:	SM-96- 5a.1	SM-96-8b	SM-96- 10b	SM-96- 10c	SM-96- 10d	SM-96-11	SM-96- 12a
Reference:	[3], [4]* 2	[3] 2	[3], [4]* 2	[3] 2	[3] 2	[3] 2	[3], [4]* 2
V	237	162	473	399	375	333	136
Cr	83	13	28	11	15	24	432
Rb	7.26	23.61	1.00	0.57	0.20	7.26	19.17
Sr	537	515	293	93	117	329	319
Y	15.6	20.8	24.3	31.1	35.8	22.3	8.7
Zr	39.4	95.8	65.7	84.1	110	83.8	34.1
Nb	1.11	19.0	1.86	2.45	3.29	3.48	0.77
Cs	1.93	0.55	0.12	0.31	0.12	7.36	0.92
Ba	212	463	266	151	105	166	712
La	3.20	18.81	5.40	4.03	3.60	10.74	4.49
Ce	7.64	40.4	12.0	11.8	10.8	24.6	9.12
Pr	1.23	5.66	1.83	1.99	1.84	3.44	1.12
Nd	6.28	23.8	9.02	10.34	9.95	15.5	5.23
Sm	1.98	5.39	2.77	3.34	3.49	3.72	1.52
Eu	0.62	1.62	1.00	1.05	1.22	1.08	0.54
Gd	2.38	5.09	3.47	4.28	4.74	3.78	1.56
Tb	0.40	0.75	0.60	0.77	0.86	0.59	0.25
Dy	2.52	4.15	3.97	5.04	5.74	3.69	1.53
Ho	0.53	0.78	0.84	1.08	1.21	0.76	0.31
Er	1.55	2.08	2.53	3.25	3.61	2.24	0.91
Tm	0.25	0.30	0.40	0.51	0.57	0.36	0.14
Yb	1.56	1.74	2.50	3.11	3.54	2.24	0.88
Lu	0.23	0.25	0.36	0.44	0.50	0.33	0.13
Hf	1.20	2.87	2.00	2.40	2.89	2.38	0.90
Ta	0.066	1.14	0.10	0.14	0.20	0.18	0.046
Pb	1.31	4.92	2.82	1.48	1.72	0.84	2.07
Th	0.46	1.78	0.59	0.37	0.29	1.74	0.48
U	0.18	0.62	0.32	0.13	0.21	0.61	0.074

Table F7 (continued)

Sample:	SM-96- 12d	SM-96- 12e	SM-96- 13a	SM-96- 13b	SM-96- 13c
Reference:	[3], [4]* 2	[3], [4]* 2	[3] 2	[3] 2	[3] 2
V	186	218	313	402	348
Cr	45	399	58	12	6
Rb	2.05	1.27	1.12	6.14	0.46
Sr	133	95	79	72	55
Y	20.5	14.8	30.2	23.2	23.2
Zr	57.3	36.9	77.5	63.2	69.6
Nb	1.59	0.70	2.11	1.80	1.96
Cs	0.11	0.04	0.12	0.65	0.17
Ba	62.4	41.2	88.7	136	136
La	2.86	5.54	5.03	3.67	2.60
Ce	7.44	9.04	12.7	9.55	7.11
Pr	1.19	1.66	2.06	1.61	1.31
Nd	5.91	7.97	10.4	8.06	7.01
Sm	1.90	2.13	3.25	2.64	2.43
Eu	0.51	0.69	1.01	0.90	0.76
Gd	2.57	2.61	4.12	3.54	3.12
Tb	0.47	0.41	0.70	0.61	0.57
Dy	3.20	2.59	4.57	4.00	3.78
Ho	0.69	0.54	0.99	0.86	0.80
Er	2.10	1.55	2.89	2.58	2.33
Tm	0.34	0.23	0.45	0.41	0.37
Yb	2.12	1.38	2.76	2.47	2.26
Lu	0.31	0.20	0.41	0.38	0.32
Hf	1.55	1.08	2.17	1.90	1.95
Ta	0.091	0.040	0.13	0.10	0.12
Pb	0.48	1.27	1.07	1.60	1.17
Th	0.37	0.42	0.59	0.50	0.50
U	0.14	0.083	0.31	0.26	0.28

Table F8: Analytical data by ICP-MS, XRF and INAA, Black Mountain

Sample:	BM91-11C		BM91-12A		BM91-14	
Reference:	[5]	{1}	[5]	{1}	[5]	{1}
Ba	226	249	77.7	61	448	404
Ni	-	24	-	63	-	55
Sr	178	178	139	125	166	153
V	328	317	268	286	230	268
Y	34.0	35	40.8	37	32.7	29
Zr	99.1	95	103	89	83.1	68
Nb	3.31	5	3.50	5	2.52	5
Sc	-	35.6	-	38.8	-	38.5
Cr	39.1	25.5	131	125	154	146
Co	-	38.1	-	38.2	-	39.0
Zn	-	84.4	-	85.2	-	85.9
Cu	-	40.0	-	32.0	-	67
Rb	3.84	5	1.77	5	4.72	6
Cs	0.10	0.26	0.04	0.24	0.19	0.23
La	4.31	4.57	3.84	3.99	4.16	4.15
Ce	11.8	12.4	11.9	11.7	11.8	10.9
Pr	1.99	-	2.18	-	2.08	-
Nd	10.6	10.2	10.4	10.6	9.29	8.54
Sm	3.51	3.77	3.86	3.84	3.35	3.16
Eu	1.25	1.24	1.27	1.26	1.11	1.08
Gd	4.78	-	5.68	-	4.71	-
Tb	0.85	0.83	1.01	0.88	0.85	0.70
Dy	5.54	-	6.79	-	5.67	-
Ho	1.16	-	1.31	-	1.07	-
Er	3.35	-	3.89	-	3.13	-
Tm	0.52	-	0.59	-	0.47	-
Yb	3.41	3.54	4.05	3.69	3.25	2.98
Lu	0.51	0.50	0.54	0.55	0.41	0.42
Hf	2.74	2.68	2.73	2.67	2.15	2.12
Ta	0.19	0.22	0.22	0.24	0.18	0.20
Pb	1.12	-	0.32	-	1.01	-
Th	0.34	0.41	0.22	0.27	0.29	0.28
U	0.12	0.40	0.10	0.30	0.12	0.40

[5] ... analysis by ICP-MS at Union College (fifth analytical run 11/11/97)

{1} ... analysis by XRF and INAA, Giaramita et al. (1998)

Table F8 (continued)

Sample:	BM91-15		BM91-16		BM91-19	
Reference:	[5]	{1}	[5]	{1}	[5]	{1}
Ba	190	193	229	147	32.4	40
Ni	-	60	-	36	-	47
Sr	182	177	434	363	72.3	91
V	281	255	256	328	307	329
Y	26.1	29	35.9	30	28.3	33
Zr	73.8	73	84.0	98	79.9	82
Nb	2.57	5	3.44	5	2.68	5
Sc	-	38.7	-	38.4	-	28.0
Cr	146	140	65.1	66.6	37.9	30.5
Co	-	37.2	-	38.2	-	35.4
Zn	-	79.4	-	139	-	75.9
Cu	-	61	-	54	-	40
Rb	6.96	8	5.20	6	1.25	5
Cs	0.11	0.23	1.13	0.89	0.03	0.2
La	3.49	4.08	5.41	4.67	3.98	4.29
Ce	9.30	10.1	15.2	12.7	10.8	10.6
Pr	1.50	-	2.61	-	1.71	-
Nd	8.17	8.60	12.5	9.68	9.11	8.88
Sm	2.62	3.10	4.13	3.58	2.89	3.22
Eu	0.99	0.98	1.46	1.15	1.02	0.96
Gd	3.57	-	5.44	-	3.91	-
Tb	0.63	0.70	0.96	0.77	0.69	0.62
Dy	4.12	-	6.40	-	4.39	-
Ho	0.88	-	1.26	-	0.94	-
Er	2.55	-	3.53	-	2.73	-
Tm	0.39	-	0.52	-	0.43	-
Yb	2.59	2.75	3.31	3.27	2.82	2.87
Lu	0.40	0.41	0.46	0.45	0.43	0.40
Hf	2.04	2	2.18	2.43	2.21	2.09
Ta	0.14	0.14	0.19	0.25	0.14	0.19
Pb	0.63	-	0.27	-	0.61	-
Th	0.31	0.38	0.35	0.36	0.38	0.39
U	0.11	0.4	0.14	0.4	0.79	1.04

Table F8 (continued)

Sample:	BM91-2		BM91-25		BM91-27	
Reference:	[5]	{1}	[5]	{1}	[5]	{1}
Ba	32.7	47	137	120	72.1	48
Ni	-	24	-	45	-	62
Sr	239	224	226	201	311	302
V	275	334	286	331	294	289
Y	34.0	34	36.7	34	27.1	28
Zr	97.4	93	89.0	82	69.6	72
Nb	3.01	9	3.11	5	2.21	5
Sc	-	32.2	-	36.7	-	42.6
Cr	36.88	26.3	75.13	66.6	208	203
Co	-	28.1	-	37.5	-	41.3
Zn	-	90.3	-	93.2	-	67.1
Cu	-	49	-	65	-	64
Rb	0.47	5	6.50	6	11.4	12.0
Cs	0.05	0.22	0.17	0.30	0.06	0.25
La	4.75	4.40	3.56	3.37	2.89	3.19
Ce	13.2	11.0	10.5	9.59	8.28	8.64
Pr	2.28	-	1.85	-	1.44	-
Nd	11.04	9.18	9.40	8.56	7.57	7.97
Sm	3.66	3.59	3.32	3.34	2.66	2.93
Eu	1.24	1.11	1.20	1.09	0.99	0.99
Gd	4.83	-	4.65	-	3.83	-
Tb	0.86	0.72	0.83	0.72	0.68	0.68
Dy	5.75	-	5.70	-	4.46	-
Ho	1.16	-	1.15	-	0.92	-
Er	3.30	-	3.33	-	2.67	-
Tm	0.50	-	0.51	-	0.41	-
Yb	3.22	3.29	3.30	3.21	2.72	2.70
Lu	0.47	0.46	0.49	0.48	0.39	0.37
Hf	2.52	2.49	2.32	2.27	1.95	1.87
Ta	0.17	0.21	0.17	0.22	0.12	0.12
Pb	0.39	-	1.35	-	0.30	-
Th	0.37	0.33	0.23	0.26	0.18	0.28
U	0.08	0.40	0.09	0.4	0.07	0.4

Table F8 (continued)

Sample:	BM91-31		BM91-4		BM91-5	
Reference:	[5]	{1}	[5]	{1}	[5]	{1}
Ba	36.6	40	33.8	40	77.3	63
Ni	-	54	-	31	-	38
Sr	178	153	74.0	71	195	187
V	295	300	415	386	278	285
Y	35.5	34	48.1	48	33.7	31
Zr	75.9	91	143	135	87.6	72
Nb	3.42	5	4.33	12	2.98	10
Sc	-	38.4	-	34.1	-	36.1
Cr	182	160	54.0	32.3	67.9	57.9
Co	-	36.3	-	36.6	-	35.7
Zn	-	34.7	-	111	-	81.6
Cu	-	39	-	47	-	52
Rb	1.92	5	2.05	5	9.37	11
Cs	0.02	0.26	0.06	0.22	0.11	0.23
La	3.11	3.49	5.53	6.13	3.48	3.52
Ce	9.69	9.75	15.3	16.2	10.5	9.64
Pr	1.75	-	2.66	-	1.87	-
Nd	9.02	8.06	12.9	13.63	9.35	8.23
Sm	3.20	3.37	4.39	4.98	3.40	3.43
Eu	1.01	1.05	1.44	1.58	1.20	1.11
Gd	4.52	-	6.11	-	4.86	-
Tb	0.81	0.78	1.09	1.08	0.88	0.75
Dy	5.56	-	7.47	-	5.82	-
Ho	1.08	-	1.48	-	1.14	-
Er	3.13	-	4.27	-	3.36	-
Tm	0.48	-	0.65	-	0.51	-
Yb	3.22	3.37	4.37	4.35	3.42	3.21
Lu	0.47	0.48	0.63	0.59	0.47	0.46
Hf	1.97	2.35	3.77	3.72	2.40	2.24
Ta	0.19	0.21	0.27	0.27	0.19	0.21
Pb	0.07	-	0.85	-	0.32	-
Th	0.19	0.28	0.42	0.43	0.21	0.22
U	0.08	0.3	0.91	0.96	0.09	0.5

Table F8 (continued)

Sample:	BM91-7B		BM91-9	
Reference:	[5]	{1}	[5]	{1}
Ba	20.3	40	206	201
Ni	-	40	-	38
Sr	62.8	61	148	153
V	358	342	298	309
Y	29.5	30	29.4	34
Zr	80.9	81	86.9	82
Nb	2.58	5	3.26	15
Sc	-	38.8	-	30.8
Cr	102	84.8	36.2	26.7
Co	-	40.4	-	33.7
Zn	-	84.0	-	74.0
Cu	-	47	-	20
Rb	0.29	5	5.54	6
Cs	0.02	0.24	0.06	0.25
La	3.71	3.80	5.09	5.80
Ce	10.31	10.2	13.1	12.8
Pr	1.78	-	1.99	-
Nd	8.70	7.79	10.4	11.1
Sm	3.01	3.13	3.13	3.62
Eu	1.12	1.11	1.12	1.11
Gd	4.20	-	4.14	-
Tb	0.75	0.72	0.71	0.74
Dy	5.07	-	4.69	-
Ho	1.01	-	0.99	-
Er	2.91	-	2.89	-
Tm	0.44	-	0.45	-
Yb	2.97	2.94	2.91	3.06
Lu	0.42	0.43	0.45	0.44
Hf	2.17	2.16	2.48	2.31
Ta	0.15	0.20	0.17	0.21
Pb	1.41	-	0.98	-
Th	0.26	0.30	0.49	0.51
U	0.12	0.3	0.23	0.8

Table F9: Analytical data by ICP-MS, XRF and INAA, Llanada

Sample	LL91-1		LL91-10		LL91-11	
Reference:	[5]	{1}	[5]	{1}	[5]	{1}
Ba	14.7	24	115	135	11.5	60
Ni	-	113	-	12	-	325
Sr	45.6	46	150	138	83.2	82
V	205	225	296	316	194	198
Y	16.1	18	18.4	18	16.1	18
Zr	38.7	33	44.9	44	42.3	44
Nb	1.15	5	0.69	5	1.21	5
Sc	-	29	-	37	-	34
Cr	295	316	22.3	6	397	434
Co	-	31	-	26	-	57
Zn	-	46	-	73	-	65
Cu	-	33	-	67	-	63
Rb	0.29	3	5.07	9.2	0.37	4
Cs	0.16	0.2	0.47	0.51	0.01	0.24
La	1.89	2.09	2.96	2.97	1.31	1.58
Ce	5.00	5.63	7.26	6.71	3.81	4.68
Pr	0.86	-	1.24	-	0.68	-
Nd	4.62	4.83	5.43	5.30	3.76	4.34
Sm	1.51	1.71	1.81	1.75	1.29	1.75
Eu	0.60	0.60	0.59	0.56	0.46	0.57
Gd	2.10	-	2.37	-	1.75	-
Tb	0.37	0.37	0.41	0.34	0.32	0.38
Dy	2.41	-	2.65	-	2.08	-
Ho	0.52	-	0.53	-	0.45	-
Er	1.47	-	1.55	-	1.31	-
Tm	0.23	-	0.24	-	0.21	-
Yb	1.50	1.60	1.64	1.57	1.42	1.63
Lu	0.22	0.22	0.23	0.23	0.22	0.21
Hf	1.03	1.04	1.22	1.30	1.10	1.12
Ta	0.061	0.10	0.044	0.08	0.061	0.11
Pb	0.52	-	0.82	-	0.68	-
Th	0.13	0.13	0.49	0.44	0.18	0.22
U	0.03	0.3	0.20	0.40	0.51	0.47

[5] ... analysis by ICP-MS at Union College (fifth analytical run 11/11/97)

{1} ... analysis by XRF and INAA, Giaramita et al (in press)

Table F9 (continued)

Sample	LL91-13		LL91-14		LL91-16	
Reference:	[5]	{1}	[5]	{1}	[5]	{1}
Ba	91	86	47.9	59	52.1	54
Ni	-	13	-	23	-	232
Sr	153	141	90.2	90	161	137
V	294	327	209.3	301	197	207
Y	13.9	15	15.3	17	15.5	15
Zr	44.8	41	39.4	45	41.4	41
Nb	0.73	5	0.61	5	1.00	5
Sc	-	38	-	36	-	28
Cr	17.7	5	17.6	3	520	557
Co	-	29	-	28	-	34
Zn	-	51	-	80	-	72
Cu	-	13	-	90	-	51
Rb	5.13	7.52	3.01	5.48	6.19	6.38
Cs	0.14	0.23	0.24	0.24	0.09	0.19
La	2.40	2.28	2.62	2.75	1.99	2.05
Ce	6.08	5.60	6.50	6.77	4.96	5.55
Pr	1.03	-	1.08	-	0.85	-
Nd	4.89	4.28	4.69	5.35	4.48	3.93
Sm	1.56	1.51	1.58	1.65	1.40	1.52
Eu	0.50	0.47	0.56	0.55	0.53	0.51
Gd	1.98	-	2.08	-	1.86	-
Tb	0.34	0.32	0.36	0.32	0.32	0.33
Dy	2.24	-	2.39	-	2.07	-
Ho	0.44	-	0.48	-	0.43	-
Er	1.29	-	1.38	-	1.23	-
Tm	0.20	-	0.22	-	0.19	-
Yb	1.37	1.45	1.51	1.46	1.31	1.35
Lu	0.21	0.20	0.21	0.20	0.20	0.20
Hf	1.22	1.17	1.17	1.21	0.94	1.02
Ta	0.040	0.1	0.043	0.09	0.051	0.09
Pb	0.38	-	3.55	-	0.77	-
Th	0.42	0.42	0.45	0.47	0.14	0.16
U	0.20	0.40	0.45	0.57	0.41	0.44

Table F9 (continued)

Sample Reference:	LL91-18		LL91-2		LL91-3A	
	[5]	{1}	[5]	{1}	[5]	{1}
Ba	32.8	27	14.9	30	7.1	40
Ni	-	118	-	170	-	228
Sr	141	122	73.2	58	73.8	69
V	222	235	202	217	194	209
Y	18.3	17	18.1	17	16.6	16
Zr	38.9	36	36.9	39	35.8	44
Nb	0.47	5	0.77	5	1.05	5
Sc	-	31	-	37	-	29
Cr	309	350	346	291	503	544
Co	-	28	-	37	-	45
Zn	-	53	-	52	-	57
Cu	-	57	-	72	-	111
Rb	3.66	6.27	1.33	4	0.63	4
Cs	0.06	0.20	0.13	0.23	0.03	0.23
La	1.77	1.96	1.67	1.70	1.67	1.64
Ce	4.96	5.60	5.27	4.48	4.68	5.51
Pr	0.88	-	0.99	-	0.82	-
Nd	4.63	4.38	4.80	3.90	4.15	3.86
Sm	1.50	1.59	1.81	1.83	1.44	1.61
Eu	0.57	0.59	0.71	0.66	0.57	0.61
Gd	2.02	-	2.54	-	2.01	-
Tb	0.35	0.34	0.47	0.39	0.35	0.35
Dy	2.34	-	3.16	-	2.35	-
Ho	0.48	-	0.62	-	0.48	-
Er	1.44	-	1.75	-	1.38	-
Tm	0.22	-	0.27	-	0.21	-
Yb	1.46	1.59	1.85	1.82	1.41	1.43
Lu	0.23	0.23	0.25	0.26	0.21	0.21
Hf	0.97	0.97	1.11	1.16	0.93	1.02
Ta	0.025	0.11	0.053	0.1	0.057	0.17
Pb	0.34	-	0.44	-	0.76	-
Th	0.17	0.29	0.17	0.21	0.12	0.15
U	0.06	0.3	0.13	0.19	0.09	-

Table F9 (continued)

Sample	LL91-5		LL91-6		LL91-7	
Reference:	[5]	{1}	[5]	{1}	[5]	{1}
Ba	248	245	8.0	25	9.3	27
Ni	-	119	-	123	-	83
Sr	324	277	79.0	73	128	117
V	213	245	153	207	214	216
Y	19.8	19	16.8	16	16.5	17
Zr	45.1	55	36.3	43	37.8	53
Nb	0.86	5	1.06	5	1.11	5
Sc	-	38	-	29	-	27
Cr	224	267	522	479	245	272
Co	-	37	-	29	-	23
Zn	-	70	-	52	-	47
Cu	-	60	-	46	-	33
Rb	16.8	16.6	0.65	4	1.00	3
Cs	1.75	1.62	0.03	0.20	0.02	0.19
La	1.74	1.72	1.35	1.59	1.33	1.84
Ce	5.15	4.75	4.13	4.91	3.49	4.73
Pr	0.93	-	0.76	-	0.59	-
Nd	4.94	5.10	3.60	4.34	3.26	3.99
Sm	1.78	1.85	1.36	1.56	1.08	1.50
Eu	0.69	0.67	0.49	0.58	0.43	0.56
Gd	2.50	-	1.99	-	1.57	-
Tb	0.44	0.38	0.36	0.37	0.28	0.33
Dy	2.99	-	2.53	-	1.85	-
Ho	0.61	-	0.50	-	0.41	-
Er	1.76	-	1.42	-	1.19	-
Tm	0.27	-	0.22	-	0.19	-
Yb	1.77	1.78	1.54	1.72	1.24	1.45
Lu	0.26	0.27	0.21	0.23	0.19	0.21
Hf	1.15	1.17	0.99	1.09	0.89	0.93
Ta	0.047	0.13	0.064	0.12	0.053	0.09
Pb	0.23	-	0.52	-	1.09	-
Th	0.15	0.23	0.14	0.13	0.11	0.17
U	0.11	0.4	0.07	0.28	0.10	0.3

Table F9 (continued)

Sample Reference:	LL91-8		LL91-9	
	[5]	{1}	[5]	{1}
Ba	178	169	13.4	40
Ni	-	14	-	111
Sr	154	144	63.9	67
V	273	329	252	272
Y	16.3	16	24.3	27
Zr	41.9	45	61.3	61
Nb	0.59	5	0.41	6
Sc	-	33	-	29
Cr	20.6	6.6	249	311
Co	-	26	-	28
Zn	-	83	-	66
Cu	-	229	-	45
Rb	9.78	12.4	0.48	4.72
Cs	0.54	0.43	0.06	0.20
La	2.91	2.96	1.78	2.17
Ce	6.82	6.47	5.26	6.49
Pr	1.13	-	1.01	-
Nd	4.95	4.91	5.85	6.90
Sm	1.65	1.57	1.95	2.51
Eu	0.56	0.52	0.76	0.93
Gd	2.12	-	2.75	-
Tb	0.36	0.32	0.48	0.58
Dy	2.42	-	3.18	-
Ho	0.48	-	0.70	-
Er	1.41	-	2.05	-
Tm	0.23	-	0.32	-
Yb	1.56	1.43	2.06	2.40
Lu	0.23	0.22	0.33	0.35
Hf	1.17	1.19	1.63	1.71
Ta	0.04	0.09	0.030	0.08
Pb	2.11	-	1.03	-
Th	0.49	0.48	0.05	0.08
U	0.30	1	0.21	0.32