

### 36. DATA REPORT: COMPOSITION OF BASALTIC LAVAS FROM THE SEAWARD-DIPPING REFLECTOR SEQUENCE RECOVERED DURING DEEP SEA DRILLING PROJECT LEG 81 (HATTON BANK)<sup>1</sup>

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Deep Sea Drilling Project (DSDP) Leg 81 on Hatton Bank was the first successful attempt to determine the origin of seaward-dipping reflector sequences (SDRS), now known to be a characteristic feature of volcanic rifted margins. Basaltic lava flows cored at each of the four sites (552–555) established the volcanic origin of SDRS (Roberts, Schnitker, et al., 1984).

Hatton Bank, on the southwestern tip of Rockall Plateau, forms the southern limit of the North Atlantic SDRS, and the basaltic rocks recovered during Leg 81 represent volcanism distal to the axis of the ancestral Iceland plume. As such, these rocks provide useful reference material with which to compare basaltic lavas from other parts of the North Atlantic igneous province, especially other parts of the SDRS. The strongly depleted nature of these basalts has been noted by Joron et al. (1984), Richardson et al. (1984), and Merriman et al. (1988). All these authors comment on the similarity between the Hatton Bank basalt and normal mid-ocean-ridge basalt (N-MORB).

The purpose of this brief report is to present new X-ray fluorescence (XRF) spectrometric data for a suite of basaltic lavas from Hatton Bank, analyzed as part of a larger study on North Atlantic magmatism (Brodie, 1995). The data were obtained in Edinburgh, in the same laboratory and by essentially the same methods as those used for the analysis of Leg 152 samples (Fitton et al., Chap. 28, this volume) and the results are therefore directly comparable. The Hatton Bank samples were ground in a tungsten carbide mill, whereas those from Leg 152 were ground in agate, but we have no reason to believe that this will have affected any of the elements analyzed in this study. Grinding in tungsten carbide is known to contaminate samples with W, Co, and Ta, but we have not been able to detect any addition of Nb. Great care was taken over the determination of the very low concentrations of Nb, which are thought to be accurate to better than  $\pm 0.2$  ppm.

The new data (Table 1, and included on CD-ROM, back pocket, this volume) are used by Fitton et al. (Chap. 28, this volume) and Larsen et al. (Chap. 27, this volume) as a reference set for comparison with data from basaltic rocks recovered during Leg 152. Basaltic lavas forming the post-breakup SDRS at 63°N on the southeast Greenland Margin are broadly similar to the Hatton Bank basalts in their depletion in incompatible elements and in their unusually high Sc contents. However, basalts from the two sections of SDRS differ in detail. The N-MORB character of the Hatton Bank basalts is confirmed, but post-breakup lavas from 63°N, closer to the center of the ancestral Iceland plume, are shown to resemble depleted Icelandic basalt.

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**Table 1. XRF analyses of volcanic rocks from Hatton Bank (DSDP Leg 81).**

Sample:	R55201	R55202	R55204A	R55204B	R55205	R55206	R55305	R55308	R55309	R55310	R55311	R55312	R55313	R55314
Hole:	552	552	552	552	552	552	553A	553A	553A	553A	553A	553A	553A	553A
Core:	22	22	22	22	23	23	39	40	40	41	41	42	42	42
Section:	1	1	2	2	1	2	2	3	4	1	2	1	2	3
Interval (cm):	0-3	34-36	15-18	41-43	136-138	9-12	30-32	101-104	58-61	55-59	47-50	92-95	57-60	91-94
Piece:	1	4	2	4A	1	1	3	ID	2C	9	7	12	6B	11
Depth (mbsf):	284.00	284.34	285.65	285.91	289.86	290.09	513.80	525.51	526.58	531.55	532.97	541.42	542.57	544.41
SiO <sub>2</sub>	46.41	46.22	46.52	47.36	46.80	46.90	49.29	52.87	52.97	52.48	52.53	48.75	49.01	48.81
Al <sub>2</sub> O <sub>3</sub>	10.54	11.52	11.02	12.58	11.50	12.07	14.52	13.13	13.30	14.52	14.36	16.30	15.10	14.17
Fe <sub>2</sub> O <sub>3</sub>	19.99	19.59	19.53	18.14	19.15	18.63	13.02	14.35	14.41	12.89	13.02	11.23	12.27	14.42
MgO	10.60	9.02	8.88	6.68	8.28	7.70	7.07	5.68	5.67	5.94	5.70	7.50	7.67	7.05
CaO	3.76	3.98	4.47	5.75	5.16	5.76	10.18	8.64	8.81	7.95	7.82	9.71	10.76	10.13
Na <sub>2</sub> O	2.66	2.87	2.85	3.03	2.64	2.88	2.55	2.90	2.87	3.19	3.04	2.68	2.45	2.40
K <sub>2</sub> O	0.11	0.13	0.14	0.21	0.15	0.16	0.24	0.09	0.10	0.08	0.09	0.04	0.04	0.06
TiO <sub>2</sub>	3.06	3.54	3.28	3.80	3.29	3.25	1.34	1.32	1.32	1.51	1.52	1.21	1.18	1.51
MnO	0.14	0.14	0.11	0.12	0.11	0.12	0.23	0.34	0.29	0.23	0.27	0.23	0.24	0.28
P <sub>2</sub> O <sub>5</sub>	0.28	0.32	0.28	0.36	0.29	0.28	0.10	0.14	0.14	0.17	0.17	0.08	0.06	0.10
LOI	2.59	2.71	2.87	1.99	2.69	2.02	1.12	0.52	0.48	1.37	1.43	2.29	1.51	1.48
Total	100.13	100.04	99.95	100.02	100.06	99.77	99.65	99.98	100.36	100.33	99.94	100.02	100.29	100.40
Nb	3.8	4.1	4.0	5.1	4.0	4.1	1.0	1.2	1.1	1.2	1.0	0.8	0.8	0.7
Zr	181.2	191.1	181.2	235.0	188.9	183.9	66.4	107.2	103.6	114.2	115.9	55.0	54.9	52.4
Y	66.7	68.1	66.2	83.9	69.3	66.8	31.1	43.0	42.3	39.7	38.5	24.4	18.8	26.4
Sr	105.4	112.1	107.3	127.0	110.8	115.5	78.7	69.5	70.3	81.0	80.3	85.6	78.9	76.6
Rb	0.4	0.6	0.4	1.6	0.6	1.0	6.3	0.3	1.0	0.7	0.4	0.1	0.0	0.8
Zn	149.1	147.1	138.4	169.1	147.9	147.4	135.8	120.1	118.6	132.9	121.9	110.5	105.8	111.9
Cu	239	265	277	272	265	271	75	235	82	120	76	369	220	176
Ni	50	57	64	72	58	78	83	48	48	56	54	86	95	87
Cr	103	148	122	127	149	185	129	55	55	80	82	221	185	185
V	525	631	631	659	624	650	456	365	369	383	397	447	420	409
Ba	12	21	14	22	13	16	<5	<5	<5	<5	<5	<5	<5	<5
Sc	54	57	60	63	58	59	62	49	51	57	57	67	62	58

Notes: Major elements in weight percent, trace elements in ppm. \*Total Fe as Fe<sub>2</sub>O<sub>3</sub>.

**Table 1 (continued).**

Sample:	R55315	R55316	R55317	R55318	R55319	R55320	R55321	R55322	R55323	R55324	R55325	R55326	R55327	R55328
Hole:	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A
Core:	43	43	43	43	44	44	44	45	45	45	45	46	46	46
Section:	2	3	4	5	1	2	3	3	4	5	6	1	2	3
Interval (cm):	41-44	106-109	81-84	97-100	68-71	87-90	37-40	14-17	132-135	131-134	86-89	86-89	65-68	113-116
Piece:	3	8A	1G	1F	2A	2A	1C	3	8F	4C	2E	1E	2B	2D
Depth (mbsf):	551.91	554.06	555.31	556.97	560.18	561.87	562.87	565.14	567.82	569.31	570.36	572.36	573.65	575.63
SiO <sub>2</sub>	50.90	48.50	50.74	49.05	50.88	51.10	51.03	48.99	48.97	49.51	49.64	49.41	49.72	49.80
Al <sub>2</sub> O <sub>3</sub>	14.25	13.88	13.23	14.65	13.17	13.19	14.63	15.07	14.06	13.78	13.64	13.57	13.61	13.60
Fe <sub>2</sub> O <sub>3</sub>	14.89	14.44	15.38	12.50	15.35	15.22	13.52	13.38	13.22	14.10	14.32	14.05	14.24	14.33
MgO	5.87	6.79	6.06	7.53	6.13	6.19	6.02	7.57	7.13	7.55	7.45	7.67	7.77	7.69
CaO	7.83	11.25	9.70	11.25	9.57	9.76	8.73	8.10	11.77	11.25	11.30	11.24	11.20	11.32
Na <sub>2</sub> O	3.10	2.60	2.55	2.34	2.66	2.47	2.91	2.68	2.25	2.18	2.21	2.15	2.13	2.16
K <sub>2</sub> O	0.17	0.31	0.07	0.04	0.07	0.06	0.07	0.41	0.04	0.04	0.05	0.04	0.05	0.04
TiO <sub>2</sub>	1.58	2.28	1.45	1.12	1.45	1.40	1.53	1.21	1.15	1.12	1.14	1.09	1.08	1.11
MnO	0.18	0.21	0.28	0.23	0.29	0.28	0.27	0.15	0.30	0.25	0.25	0.27	0.26	0.25
P <sub>2</sub> O <sub>5</sub>	0.14	0.21	0.13	0.08	0.13	0.12	0.13	0.04	0.08	0.08	0.08	0.07	0.08	0.08
LOI	1.38	0.22	0.60	1.22	0.34	0.37	1.13	2.53	1.06	0.52	0.26	0.15	0.32	0.15
Total	100.29	100.70	100.19	100.02	100.02	100.16	99.96	100.13	100.03	100.38	100.33	99.71	100.45	100.53
Nb	1.0	0.9	1.1	1.3	1.0	1.1	1.0	0.7	0.7	0.4	0.6	0.2	0.7	0.8
Zr	102.3	95.6	95.2	101.1	92.6	93.2	95.4	55.2	57.0	54.2	54.9	52.3	51.0	53.6
Y	44.4	41.4	43.9	42.6	42.8	43.5	41.5	16.5	29.3	28.0	28.5	27.7	27.3	28.3
Sr	79.0	68.5	69.9	74.7	69.5	69.5	78.4	79.3	74.3	69.4	69.6	69.0	68.4	69.0
Rb	2.9	0.5	0.4	0.3	0.6	0.6	0.1	6.2	0.1	0.4	0.2	0.1	0.5	0.2
Zn	162.5	126.4	132.8	131.6	124.8	127.3	126.7	186.2	106.9	104.5	108.2	102.3	100.2	103.3
Cu	84	320	123	161	181	163	150	136	154	55	88	111	220	132
Ni	58	61	59	59	59	61	62	77	80	81	79	79	79	79
Cr	94	89	89	95	89	93	108	107	98	97	91	94	95	93
V	493	436	435	471	434	418	481	421	419	404	397	387	386	389
Ba	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Sc	62	52	54	60	54	55	66	65	60	56	55	56	55	57

Table 1 (continued).

Sample:	R55330	R55331	R55334	R55335	R55337	R55338	R55340	R55341	R55344	R55345	R55347	R55349	R55351	R55352
Hole:	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A
Core:	46	46	47	47	48	48	48	48	49	49	49	50	50	51
Section:	5	5	3	4	2	3	5	6	3	4	6	1	3	1
Interval (cm):	59-62	138-141	80-84	76-79	122-125	133-136	88-91	107-110	72-75	108-111	33-36	71-75	9-12	85-88
Piece:	5A	6H	2B	5B	4	1B	2C	4B	1B	1D	1B	11	1A	6C
Depth (mbsf):	578.09	578.88	584.30	585.76	590.22	591.83	594.38	596.07	600.22	602.08	604.33	606.21	608.59	615.35
SiO <sub>2</sub>	48.60	48.89	49.13	48.77	49.01	49.10	49.32	49.10	49.12	48.75	48.90	48.44	49.12	49.38
Al <sub>2</sub> O <sub>3</sub>	13.75	13.92	13.51	14.28	13.45	13.24	13.26	13.34	13.32	13.55	14.38	13.73	14.86	15.21
Fe <sub>2</sub> O <sub>3</sub> *	16.09	15.49	15.23	14.03	15.28	15.57	15.64	15.32	15.67	15.08	13.79	13.94	12.27	11.58
MgO	7.68	7.54	7.13	7.41	7.04	7.16	7.24	7.09	7.07	7.01	7.16	9.27	9.30	7.73
CaO	8.57	9.39	10.01	8.70	10.70	10.54	10.64	10.67	10.81	10.88	10.47	9.12	9.46	11.14
Na <sub>2</sub> O	2.63	2.55	2.50	2.83	2.28	2.23	2.18	2.23	2.25	2.49	2.48	2.30	2.42	2.34
K <sub>2</sub> O	0.07	0.07	0.06	0.10	0.05	0.06	0.05	0.05	0.05	0.06	0.07	0.05	0.05	0.04
TiO <sub>2</sub>	1.50	1.49	1.49	1.67	1.44	1.43	1.40	1.41	1.41	1.45	1.53	0.96	1.01	1.09
MnO	0.13	0.15	0.24	0.18	0.29	0.26	0.23	0.29	0.22	0.20	0.21	0.16	0.21	0.25
P <sub>2</sub> O <sub>5</sub>	0.11	0.11	0.11	0.14	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.03	0.07	0.08
LOI	1.39	1.12	0.97	2.10	0.33	0.52	0.13	0.48	0.32	0.19	0.88	2.12	1.83	1.56
Total	100.52	100.73	100.38	100.21	99.99	100.21	100.20	100.10	100.34	99.76	99.98	100.13	100.60	100.39
Nb	0.7	0.7	0.9	1.1	0.6	0.8	0.7	0.7	1.0	0.9	0.8	0.6	0.6	0.4
Zr	73.8	76.1	76.4	82.3	75.1	74.5	73.0	74.8	74.4	74.0	77.3	46.3	47.3	51.5
Y	31.3	39.0	37.5	38.9	36.2	36.3	35.5	36.9	36.0	36.2	35.0	34.3	26.8	23.4
Sr	80.4	78.8	78.5	86.1	74.0	73.1	71.1	72.5	70.5	74.5	79.0	68.8	71.8	78.0
Rb	0.7	1.4	0.4	1.6	0.1	0.9	0.4	0.3	0.3	-0.1	0.5	1.0	0.6	0.6
Zn	109.4	119.5	119.9	135.8	120.0	121.7	118.9	124.1	121.4	116.6	117.6	80.3	88.2	101.9
Cu	142	73	83	204	121	138	113	181	209	121	198	32	180	200
Ni	74	71	70	73	83	82	81	83	81	79	86	93	96	91
Cr	101	98	95	103	152	153	156	160	157	157	168	180	195	164
V	455	464	464	520	427	445	426	444	440	436	474	353	385	412
Ba	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Sc	61	59	55	64	54	53	53	54	56	54	62	56	63	62

Table 1 (continued).

Sample:	R55353	R55355	R55358	R55359	R55361	R55364	R55365	R55366	R55367	R55369	R55371	R55372	R55373	R55375
Hole:	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A	553A
Core:	51	52	52	53	53	54	54	54	54	55	55	55	56	56
Section:	2	1	4	1	3	2	3	4	5	3	5	6	1	3
Interval (cm):	62-65	52-55	33-36	81-84	118-121	62-65	112-115	95-98	58-61	117-120	78-81	50-54	12-15	87-90
Piece:	2B	2B	4C	6D	15	10	8D	2D	4	8	1G	1B	2	9
Depth (mbsf):	616.62	618.52	622.83	624.31	627.68	634.62	636.62	637.95	639.08	645.67	648.28	649.50	650.62	654.37
SiO <sub>2</sub>	49.26	49.62	48.52	49.26	49.50	48.99	49.83	49.88	49.29	49.02	49.38	49.78	49.11	48.90
Al <sub>2</sub> O <sub>3</sub>	14.06	13.91	13.84	14.62	14.85	12.05	13.30	13.35	14.63	14.12	13.71	13.89	14.41	14.75
Fe <sub>2</sub> O <sub>3</sub>	13.05	13.40	16.77	12.37	13.68	18.86	15.94	16.06	14.27	14.40	14.01	14.16	12.71	12.27
MgO	7.76	8.01	7.80	7.88	7.03	8.19	6.79	6.91	7.09	7.38	7.61	7.30	8.26	9.49
CaO	11.42	11.36	7.01	11.05	9.42	5.48	9.93	10.08	8.67	10.05	11.01	11.18	9.92	8.46
Na <sub>2</sub> O	2.20	2.15	2.43	2.29	2.62	2.20	2.36	2.36	2.79	2.59	2.18	2.23	2.40	2.50
K <sub>2</sub> O	0.04	0.04	0.47	0.04	0.04	0.68	0.04	0.04	0.07	0.04	0.03	0.04	0.04	0.04
TiO <sub>2</sub>	1.03	1.01	1.07	1.09	1.42	1.21	1.33	1.29	1.50	1.21	1.10	1.13	1.18	1.11
MnO	0.25	0.29	0.09	0.24	0.32	0.10	0.34	0.32	0.24	0.23	0.36	0.32	0.25	0.18
P <sub>2</sub> O <sub>5</sub>	0.07	0.07	0.03	0.08	0.10	0.07	0.09	0.09	0.09	0.08	0.08	0.09	0.09	0.07
LOI	0.97	0.55	1.96	1.29	1.31	2.61	0.53	0.16	1.62	1.09	0.74	0.24	1.66	2.46
Total	100.11	100.41	99.98	100.20	100.29	100.44	100.48	100.54	100.25	100.22	100.21	100.35	100.03	100.22
Nb	0.4	0.7	0.2	0.5	0.6	0.6	0.6	0.7	0.7	0.6	0.3	0.7	0.7	0.6
Zr	49.5	48.5	50.4	50.6	65.1	55.1	64.1	62.7	67.7	57.2	53.4	56.8	54.9	50.6
Y	25.9	26.1	17.1	25.8	33.8	21.4	35.4	33.5	37.0	29.3	28.7	29.3	27.7	18.8
Sr	68.3	66.7	73.7	75.2	81.2	69.8	70.8	72.0	81.1	71.4	69.3	67.6	77.5	78.3
Rb	0.4	0.1	7.1	0.0	0.6	9.0	0.3	-0.1	0.6	0.0	0.6	0.7	0.4	0.3
Zn	101.4	97.3	73.9	101.4	123.5	82.8	126.5	119.6	129.0	110.8	107.1	111.5	101.5	112.0
Cu	186	182	94	188	96	191	124	206	199	71	176	137	399	317
Ni	86	85	77	84	63	55	62	60	64	79	79	82	85	84
Cr	150	147	121	132	90	63	69	66	76	129	127	127	138	140
V	383	374	385	407	492	388	452	449	497	422	400	406	429	412
Ba	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Sc	55	54	60	59	68	57	58	56	69	57	57	56	60	60

Table 1 (continued).

Sample:	R55378	R55379	R55380	R55383	R55401	R55402	R55403	R55404	R55405	R55406	R55501	R55502	R55503	R55504
Hole:	553A	553A	553A	553A	554A	554A	554A	554A	554A	554A	555	555	555	555
Core:	58	58	58	59	7	7	7	7	9	14	68	68	69	69
Section:	1	2	3	4	1	2	3	4	1	1	2	3	1	4
Interval (cm):	54-57	75-78	48-51	80-83	33-36	70-74	57-60	29-32	110-114	32-35	141-144	122-126	108-111	46-49
Piece:	4D	9B	6	6A	3A	5B	8	3B	9	4	7C	12A	3L	4
Depth (mbsf):	669.04	670.75	671.98	678.30	133.33	135.20	136.57	137.79	180.00	199.82	673.41	674.72	681.08	684.96
SiO <sub>2</sub>	48.98	48.56	49.03	49.28	50.17	50.56	50.84	50.56	48.61	50.45	48.68	49.12	49.34	49.43
Al <sub>2</sub> O <sub>3</sub>	14.49	14.64	15.57	14.36	13.87	13.81	13.74	13.70	14.58	14.27	14.43	14.49	14.12	14.10
Fe <sub>2</sub> O <sub>3</sub> *	12.48	11.71	11.16	12.54	13.22	13.51	13.33	13.54	13.90	12.60	12.90	12.94	13.55	13.82
MgO	9.24	9.18	9.05	8.31	6.79	7.01	6.97	7.07	6.24	6.91	6.55	6.52	6.75	6.36
CaO	9.96	10.33	10.11	11.73	11.65	11.65	11.64	11.59	11.44	11.51	11.04	11.05	10.75	11.28
Na <sub>2</sub> O	2.24	2.20	2.44	1.96	2.35	2.29	2.25	2.32	2.44	2.27	2.64	2.67	2.57	2.60
K <sub>2</sub> O	0.20	0.04	0.05	0.04	0.26	0.29	0.24	0.22	0.28	0.33	0.04	0.04	0.07	0.04
TiO <sub>2</sub>	1.00	0.98	1.03	0.94	1.04	1.04	1.03	1.03	1.18	1.16	1.71	1.70	1.64	1.67
MnO	0.10	0.20	0.18	0.27	0.21	0.21	0.21	0.21	0.18	0.19	0.32	0.29	0.24	0.26
P <sub>2</sub> O <sub>5</sub>	0.08	0.07	0.06	0.07	0.11	0.08	0.08	0.07	0.10	0.08	0.14	0.13	0.13	0.13
LOI	1.83	2.53	1.79	0.70	0.21	-0.16	-0.65	-0.12	0.81	0.51	1.55	1.01	0.94	0.54
Total	100.59	100.44	100.45	100.19	99.87	100.29	99.68	100.20	99.76	100.28	99.99	99.96	100.10	100.24
Nb	0.5	0.4	0.6	0.5	0.8	1.0	0.9	0.9	1.3	1.2	1.4	1.4	1.4	1.3
Zr	46.8	46.6	48.4	46.8	50.8	53.0	52.4	51.5	61.5	59.9	100.0	98.4	96.5	99.8
Y	23.9	25.5	18.2	25.5	25.0	25.4	26.5	24.7	27.7	27.2	41.3	40.5	39.7	41.2
Sr	73.4	71.9	76.5	64.1	82.5	82.4	82.4	79.7	84.6	82.1	111.3	109.5	106.2	107.0
Rb	2.9	0.1	0.4	0.8	4.0	7.1	4.8	4.3	4.3	5.7	0.5	0.4	1.0	0.9
Zn	73.5	91.4	99.7	88.6	108.8	106.0	98.0	105.2	115.8	104.4	105.2	109.1	105.4	142.0
Cu	45	103	127	147	102	100	123	120	158	158	249	250	238	246
Ni	107	112	114	110	61	58	61	58	80	98	94	92	92	90
Cr	332	373	401	327	78	74	76	75	283	273	217	216	217	217
V	362	362	382	339	373	357	360	374	401	377	447	451	434	432
Ba	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	8	<5
Sc	56	58	58	52	60	56	60	60	58	57	54	57	50	55

Table 1 (continued).

Sample:	R55505	R55506	R55507	R55508	R55509	R55510	R55511	R55512	R55513	R55514	R55515	R55516	R55517	R55518
Hole:	555	555	555	555	555	555	555	555	555	555	555	555	555	555
Core:	70	75	76	76	80	81	82	83	90	90	91	95	95	96
Section:	1	2	1	4	3	3	1	1	2	4	1	1	3	2
Interval (cm):	127-130	72-75	81-84	87-90	116-119	88-91	124-127	80-83	63-66	53-56	92-95	100-103	16-19	27-30
Piece:	5B	5D	2C	3A	2G	5C	1E	1A	1E	1D	4A	2	3	3
Depth (mbsf):	690.77	739.22	747.31	751.87	788.66	797.88	804.74	813.80	881.63	884.53	889.92	928.00	930.16	938.27
SiO <sub>2</sub>	48.62	48.38	48.82	48.71	49.25	49.18	49.11	48.87	49.10	49.30	48.62	49.21	49.14	49.10
Al <sub>2</sub> O <sub>3</sub> *	15.70	14.99	13.98	14.35	12.82	13.58	13.70	13.85	13.26	13.28	14.03	13.98	14.07	13.97
Fe <sub>2</sub> O <sub>3</sub>	10.94	10.37	11.56	11.57	13.20	12.87	12.32	12.86	14.27	14.04	13.41	12.82	12.75	12.69
MgO	8.18	8.08	8.04	7.93	7.97	8.09	8.34	7.28	7.00	6.91	7.96	7.74	7.73	7.79
CaO	10.62	11.66	12.34	12.40	10.60	9.93	9.94	11.56	11.22	11.37	9.84	12.55	12.58	12.51
Na <sub>2</sub> O	2.54	2.42	2.32	2.40	2.64	2.63	2.54	2.53	2.61	2.49	2.66	2.10	2.23	2.22
K <sub>2</sub> O	0.03	0.03	0.19	0.02	0.50	0.77	0.70	0.04	0.07	0.05	0.08	0.10	0.06	0.08
TiO <sub>2</sub>	1.07	1.08	1.02	1.05	1.20	1.27	1.18	1.26	1.32	1.27	1.33	1.05	1.04	1.04
MnO	0.26	0.27	0.23	0.28	0.33	0.22	0.23	0.27	0.24	0.22	0.24	0.21	0.21	0.20
P <sub>2</sub> O <sub>5</sub>	0.07	0.07	0.07	0.07	0.08	0.08	0.09	0.08	0.08	0.09	0.09	0.07	0.07	0.07
LOI	2.06	2.58	1.53	1.58	1.49	1.62	1.90	1.51	1.17	1.08	1.72	0.51	0.28	0.48
Total	100.08	99.93	100.09	100.36	100.07	100.25	100.06	100.10	100.34	100.10	99.98	100.34	100.16	100.15
Nb	0.2	0.5	0.6	0.7	0.7	0.6	0.7	0.9	0.8	0.9	0.9	0.7	0.5	0.4
Zr	51.8	50.7	47.8	49.7	59.9	60.5	60.8	61.9	64.9	69.5	66.0	51.2	51.4	50.6
Y	23.4	26.7	28.6	27.6	31.2	33.7	32.1	30.3	36.1	36.9	36.1	29.1	27.9	29.4
Sr	94.4	94.6	95.0	86.6	93.0	101.1	88.6	91.6	89.0	89.7	97.1	74.8	75.3	75.2
Rb	0.9	0.5	1.6	0.4	6.3	7.6	6.6	0.2	0.7	0.3	1.7	3.2	1.8	2.8
Zn	86.5	95.9	86.0	90.6	94.5	84.1	98.0	101.4	101.1	104.6	104.3	111.9	124.2	101.5
Cu	183	198	187	192	168	175	180	214	179	170	182	189	189	186
Ni	88	95	88	88	64	65	64	85	61	62	71	86	87	88
Cr	216	380	351	343	99	123	125	160	95	98	104	327	333	348
V	360	371	351	346	385	364	377	413	404	371	407	340	341	348
Ba	<5	<5	<5	<5	41	45	21	<5	<5	<5	6	10	<5	6
Sc	56	62	56	55	51	54	52	57	52	54	61	55	55	56

Table 1 (continued).

Sample:	R55519	R55520	R55521	R55522	R55523	R55524	R55525	R55526	R55527
Hole:	555	555	555	555	555	555	555	555	555
Core:	96	96	97	97	97	98	98	98	98
Section:	4	6	1	3	5	1	3	5	6
Interval (cm):	81-85	35-39	81-84	70-73	102-105	55-58	104-107	75-78	83-86
Piece:	3A	3	3B	4A	2D	1H	3G	4A	5
Depth (mbsf):	941.81	944.35	946.81	949.70	953.02	955.55	959.04	961.75	963.33
SiO <sub>2</sub>	49.03	48.86	48.34	49.30	49.01	48.88	49.07	48.88	49.12
Al <sub>2</sub> O <sub>3</sub>	14.01	14.12	13.87	14.15	14.11	14.30	14.14	14.13	14.09
Fe <sub>2</sub> O <sub>3</sub> *	12.47	12.19	12.90	12.44	12.43	12.19	12.43	12.22	12.45
MgO	7.87	7.85	7.71	7.85	7.84	7.85	8.03	8.08	8.03
CaO	12.60	12.53	12.36	12.81	12.57	12.66	12.64	12.50	12.56
Na <sub>2</sub> O	2.21	2.20	2.12	2.24	2.31	2.17	2.19	2.17	2.12
K <sub>2</sub> O	0.06	0.04	0.04	0.04	0.05	0.04	0.05	0.05	0.04
TiO <sub>2</sub>	1.00	1.02	1.12	1.00	1.00	1.00	1.00	1.02	1.00
MnO	0.20	0.21	0.21	0.21	0.20	0.19	0.20	0.20	0.20
P <sub>2</sub> O <sub>5</sub>	0.06	0.06	0.07	0.07	0.07	0.06	0.07	0.07	0.06
LOI	0.58	1.09	0.84	0.23	0.69	0.85	0.49	0.61	0.45
Total	100.09	100.17	99.58	100.34	100.28	100.20	100.30	99.92	100.12
Nb	0.6	0.5	1.0	0.4	0.7	0.8	0.4	0.5	0.8
Zr	48.6	47.3	47.9	48.7	49.2	46.6	48.5	50.4	49.9
Y	27.9	27.5	28.0	28.0	28.3	28.1	27.1	27.9	28.6
Sr	76.1	78.2	77.5	77.0	76.5	76.1	74.5	76.9	75.0
Rb	1.5	0.7	0.7	0.9	1.5	0.3	1.1	1.1	1.8
Zn	104.2	90.1	100.1	88.9	85.0	81.6	93.7	86.0	84.2
Cu	188	186	178	191	177	175	177	184	181
Ni	88	91	90	86	93	95	93	91	92
Cr	351	355	347	306	397	411	397	382	388
V	345	350	377	332	335	332	329	338	336
Ba	6	<5	<5	<5	<5	<5	<5	<5	<5
Sc	58	55	56	55	55	55	57	57	55