Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Geological Survey of Canada
Commission géologique du Canada

601 Booth Street
Ottawa, Ontario
K1A 0E8

803993

May 31, 1993

Dr. R. Britten
Homestake Canada Ltd.
1000 - 700 West Pender Street
Vancouver, British Columbia
V6C 1G8

Dear Ron,

Please find enclosed the data and some profiles of sixteen samples of drill core collected by R.V. Kirkham during his 1986 orientation surface rock and drill-core sampling in the GSC Mitchell-Sulphurets study area.

Small pieces of drill core from Snowfield Gold Zone hole (S - 85 - 131; 50 + 60E, Sept. 29/85); were cut and slabbed with the reject crushed and ground to ≈ 150 mesh. The remainder was saved and examined by mineralogist D.C. Harris.

The Ni-Na_2O plot also shows drill hole logging observations for the position and depth of faults, quartz veins, pyrite abundance and alteration as logged by the company geologist (N.L.T.). Rod simply collected 6-12 inch drill core samples relatively evenly spaced throughout the hole (152.13 m deep). He did not include quartz veins (see SiO_2 data).

SiO_2, Al_2O_3, S%, Fe_2O_3 generally show little variation throughout the depth of the hole compared to the sodium depletion in the upper ½ portion of the hole. The K_2O/Na_2O and Th/K ratios and the alteration index and intrusive ratio plots also clearly depict this change in the more altered upper portion of the hole compared to the less altered bulk chemistry of the lower portion of the hole.

Sb, Mo, Cu, As, Zn, and sulphur have spotty anomalous contents throughout the hole. However, Au, Pb and Ba are consistently anomalous throughout while Ni, and Cr are depleted in the upper portions.

Lithogeochemical data would suggest that these rocks are trachyandesite, latite, monzonite by classification although both the upper and lower portions are variably altered and mineralized.

Don Harris has provided a detailed mineralogical description of each sample based on polished thin section examination.

This mineralogical data confirms the whole rock sodium contents. Altered albite phenocrysts are observed only in the lower than 80.0 metre section of the hole. This change may be either lithologic or less intense alteration. The potassium contents of the rock unit(s)? is not nearly as high as other areas of Mitchell Sulphurets where accompanying soda depletion yields values of less than one percent Na_2O.

It is interesting to note from Don's mineralogy and the trace element data that Zn, Pb as sphalerite and galena are anomalously high in this gold zone as compared to the Cu-Au porphyry systems or the moly zones. It is not known if these base metal enrichments are useful in vectoring gold enrichment in the Snowfield gold zone. The high barium contents are also unusual. Arsenic trace element contents relate to tennantite concentrations as trace to minor amounts. Antimony contents are low compared to the Au and Ag precious metal quartz vein systems such as west and shore zones of Brucejack Lake or the Josephine zone on Mitchell ridge above the Snowfield gold zone. Note the gold inclusions were too small to probe.

It is hoped that these lithogeochemical and mineralogical data will be useful background information for your exploration of the Snowfield gold zone.

Best wishes and success in this field season. Feel free to use this data as you wish and if we could be of further assistance please contact us in the future.

Yours very truly,

S.B. Ballantyne
D.C. Harris

SBB;DCH/mab

c.c. R.V. Kirkham

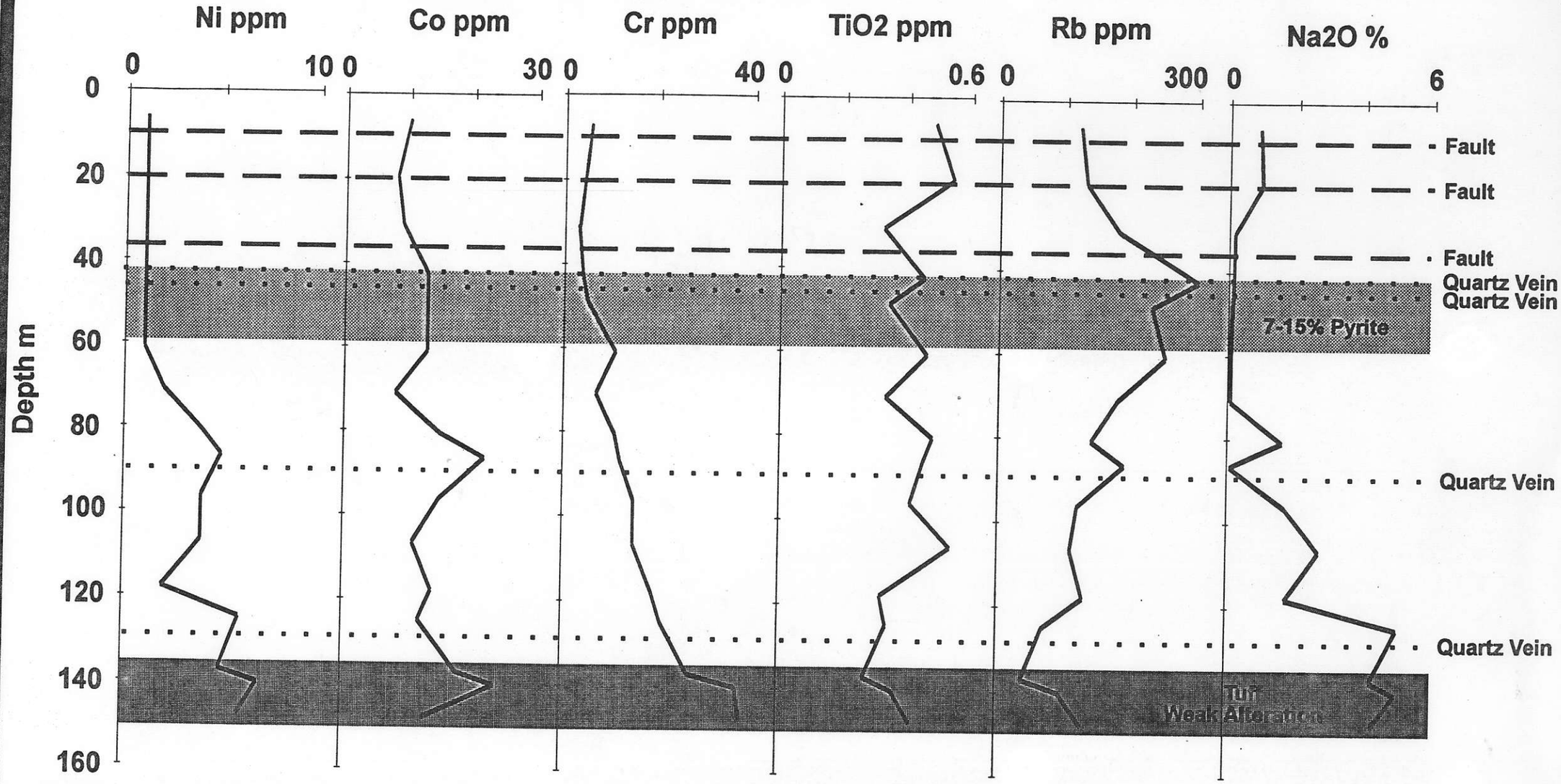
Snowfield Gold Zone DH 131
x=major, m=minor, t=trace

Depth(m)	Qtz	Chl	Musc	Carb	Alb	Rut	Py	Sph	Cpy	Ten	Moly	Gold
6.1	x	m	m	m		t	x	m	m	t	m	
19.5	x	m	m			m	x	m	m	t	t	
30.5	x	x	m	m		t	x	x	t		t	
42.7	x	m	m	m		m	x		m	t	t	
48.8	x	x	m	t		m	x	m	m	t	m	t
61.0	x	x	x	t		t	x		m	m	t	
70.5	x	m	m	t		t	m		m		t	
80.8	x	m	m	x	x	t	m		t	t	t	t
96.4	x	x	m	x	x	t	x	t	m	t	m	
106.7	m	m	m	m	x	t	x	x	x		t	
117.1	x	m	m	m	m	t	m		m	t	t	
117.7	x		x	x		t	m		t		t	
137.3	x	m	m	x	x	t	m	t	t		t	
140.3	x	m	m	x	x	t	x	t	t		t	

Summary

Several 5 micrometre gold grains identified in pyrite at 48.8 and 80.8 metres. Molybdenite is closely associated with quartz filled fractures. Pyrite occurs as coarse euhedral grains in the quartz filled fractures and as finely disseminated grains and patches in the rock matrix.
Sphalerite and chalcopyrite are the major ore minerals with pyrite. Galena and tennantite occur in trace amounts.
Rutile is widespread. The rock is highly chloritic and sericitic.
Altered albite phenocrysts occur at 80.8 m and lower, suggesting an altered intrusive phase.

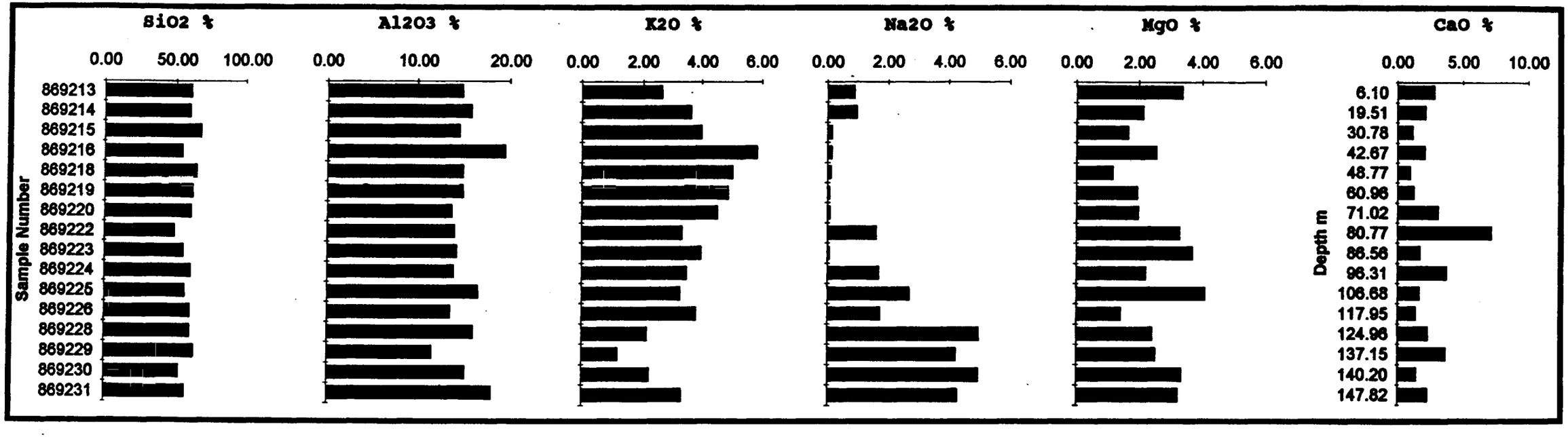
SNOWFIELD GOLD ZONE DRILL HOLE S-85-131



DDH 131

SAMPLE	DEPTHFT	DEPTHM	SIO2_PCT	AL2O3_PCT	K2O_PCT	NA2O_PCT	MGO_PCT	CAO_PCT	MNO_PCT	SPCT	FE2O3T_PCT	FeO	
869213	20	6.10	61.00	14.90	2.64	0.89	3.37	CB 2.82	0.63	2.23	7.82		
869214	64	19.51	59.90	15.90	3.64	0.96	2.14	2.15	0.44	4.35	8.94		
869215	101	30.78	67.70	14.60	4.00	0.16	1.66	1.18	0.18	3.11	7.49		
869216	140	42.67	54.40	19.50	5.85	0.15	2.55	2.08	0.23	1.58	6.73		
869218	160	48.77	64.50	15.00	5.04	0.12	1.17	1.01	0.08	2.52	4.81		
869219	200	60.96	62.00	15.00	4.89	0.08	1.95	1.27	0.15	3.21	6.59		
869220	233	71.02	61.00	13.80	4.53	0.09	1.98	CB 3.12	0.32	1.61	5.28		
869222	265	80.77	49.10	14.10	3.34	1.61	3.29	CB 7.18	0.68	1.47	7.24		
869223	284	86.56	55.40	14.30	3.98	0.08	3.69	1.74	0.27	2.96	9.08		
869224	316	96.31	60.70	14.00	3.49	1.70	2.23	CB 3.77	0.37	0.75	5.40		
869225	350	106.68	56.60	16.60	3.27	2.70	4.09	1.67	0.38	0.91	2.04 8.10	• 5.45	CALC DACITE
869226	387	117.95	60.10	13.60	3.82	1.74	1.43	1.40	0.11	3.03	4.91		
869228	410	124.96	60.20	16.10	2.15	5.00	2.43	2.30	0.31	0.70	1.84 5.20	• 3.02	TRACHYTE
869229	450	137.15	62.80	11.60	1.18	4.24	2.53	CB 3.68	0.33	1.48	1.77 5.67	• 3.51	* CALC-DACITE (CB ALT.)
869230	460	140.20	52.50	15.20	2.22	4.98	3.36	1.44	0.22	3.64	1.86 9.10	• 6.51	TRACHYANDESITE
869231	485	147.82	56.80	18.00	3.31	4.30	3.23	2.26	0.25	0.52	1.92 6.80	• 4.39	TRACHYANDESITE

DDH 131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Al2O3 %
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K2O %
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Na2O %
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MgO %
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CaO %
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117.95
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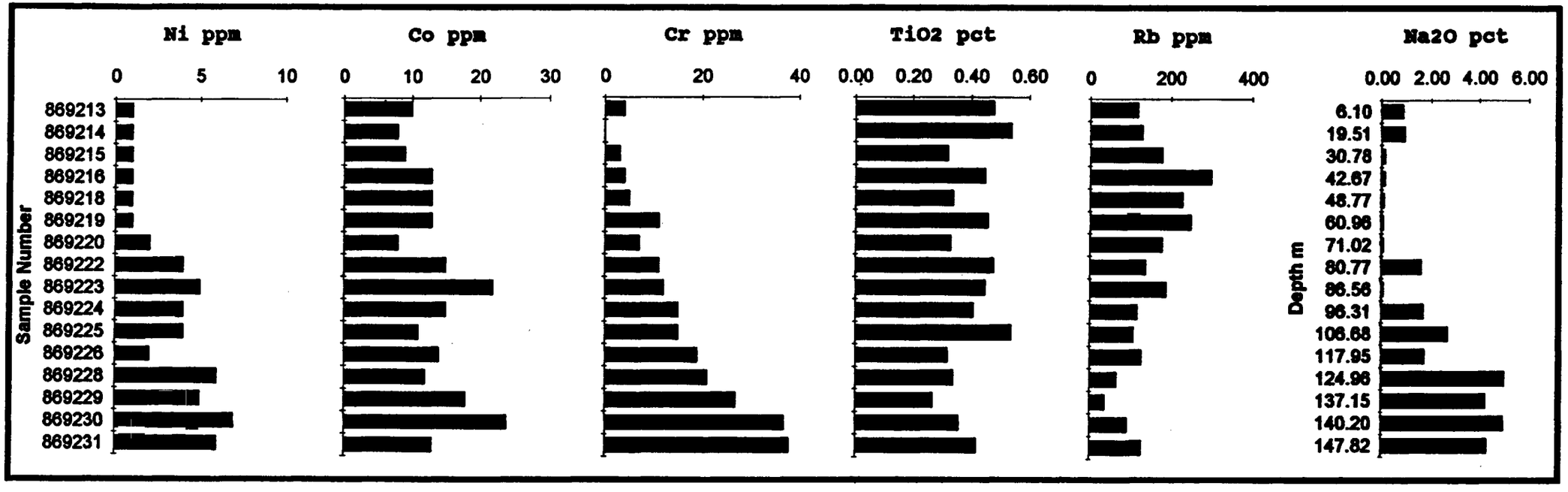
DDH 131

SAMPLE	DEPTHFT	DEPTHM	NI_PPM	CO_PPM	CR_PPM	TIO2_PCT	RB2_PPM	NA2O_PCT
869213	20.000	6.10	1	10	4	0.48	120	0.89
869214	64.000	19.51	1	8		0.54	130	0.96
869215	101.000	30.78	1	9	3	0.32	180	0.16
869216	140.000	42.67	1	13	4	0.45	300	0.15
869218	160.000	48.77	1	13	5	0.34	230	0.12
869219	200.000	60.96	1	13	11	0.46	250	0.08
869220	233.000	71.02	2	8	7	0.33	180	0.09
869222	265.000	80.77	4	15	11	0.48	140	1.61
869223	284.000	86.56	5	22	12	0.45	190	0.08
869224	316.000	96.31	4	15	15	0.41	120	1.70
869225	350.000	106.68	4	11	15	0.54	110	2.70
869226	387.000	117.95	2	14	19	0.32	130	1.74
869228	410.000	124.96	6	12	21	0.34	68	5.00
869229	450.000	137.15	5	18	27	0.27	38	4.24
869230	460.000	140.20	7	24	37	0.36	95	4.98
869231	485.000	147.82	6	13	38	0.42	130	4.30

DDH 131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Co ppm
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Cr ppm
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Rb ppm
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Na2O pct
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Depth m
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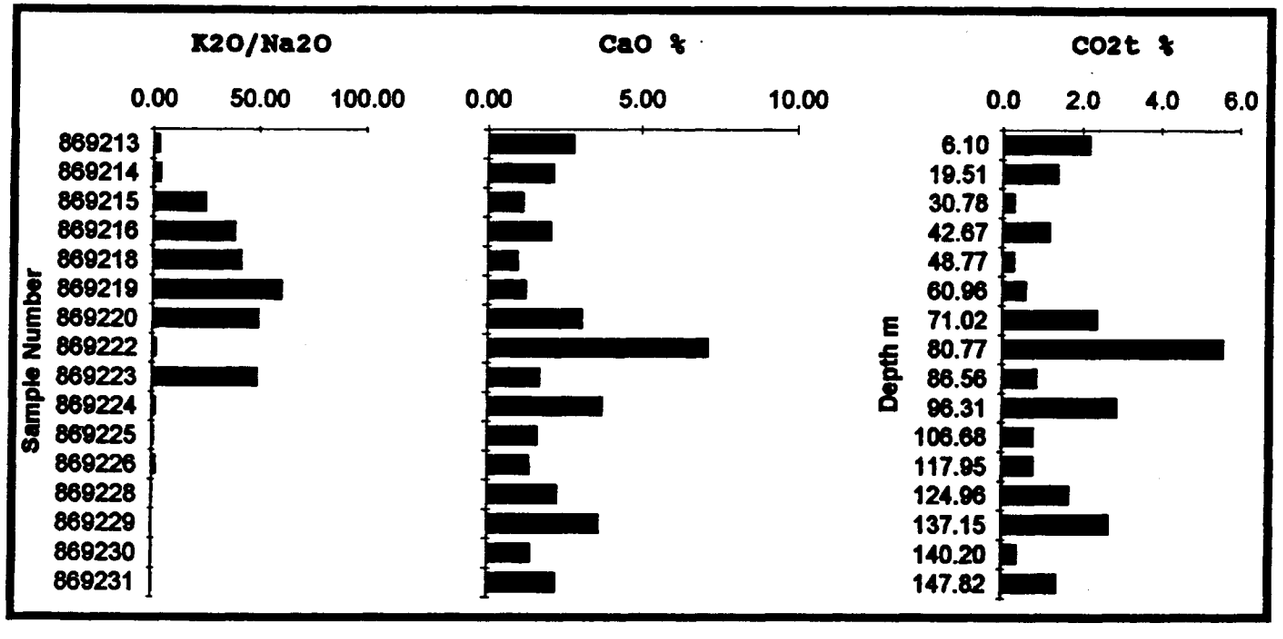
137.15
140.20
147.82

DDH 131

SAMPLE	DEPTHFT	DEPTHM	U2_PPM	TH2_PPM	U/TH	K2O_PCT	TH/K	NA2O_PCT	K2O/NA2O	CAO_PCT	CO2T_PCT	
869213	20	6.10	1.7	4.2	0.40	2.64	74.94	0.89	2.97	2.82	2.2	2730
869214	64	19.51	1.6	3.2	0.50	3.64	41.41	0.96	3.79	2.15	1.4	
869215	101	30.78	1.4	2.6	0.54	4.00	30.62	0.16	25.00	1.18	0.3	
869216	140	42.67	1.5	3.4	0.44	5.85	27.38	0.15	39.00	2.08	1.2	
869218	160	48.77	0.7	2.4	0.29	5.04	22.43	0.12	42.00	1.01	0.3	
869219	200	60.96	3.9	4.7	0.83	4.89	45.27	0.08	61.13	1.27	0.6	
869220	233	71.02	2.3	5.2	0.44	4.53	54.07	0.09	50.33	3.12	2.4	1900
869222	265	80.77	2.9	4.4	0.66	3.34	62.05	1.61	2.07	7.18	5.6	1270
869223	284	86.56	2.1	4.8	0.44	3.98	56.81	0.08	49.75	1.74	0.9	
869224	316	96.31	2.7	4.2	0.64	3.49	56.68	1.70	2.05	3.77	2.9	660
869225	350	106.68	2.3	5.1	0.45	3.27	73.46	2.70	1.21	1.67	0.8	
869226+	387	117.95	2.6	4.2	0.62	3.82	51.79	1.74	2.20	1.40	0.8	
869228	410	124.96	2.9	4.8	0.60	2.15	105.16	5.00	0.43	2.30	1.7	
869229	450	137.15	1.7	2.8	0.61	1.18	111.77	4.24	0.28	3.68	2.7	976
869230	460	140.20	3.3	5.4	0.61	2.22	114.57	4.98	0.45	1.44	0.4	
869231	485	147.82	2.7	5.9	0.46	3.31	83.96	4.30	0.77	2.26	1.4	

DDH 131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CaO %
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5.00
10.00
CO2t %
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4.0
6.0
Sample Number
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Depth m
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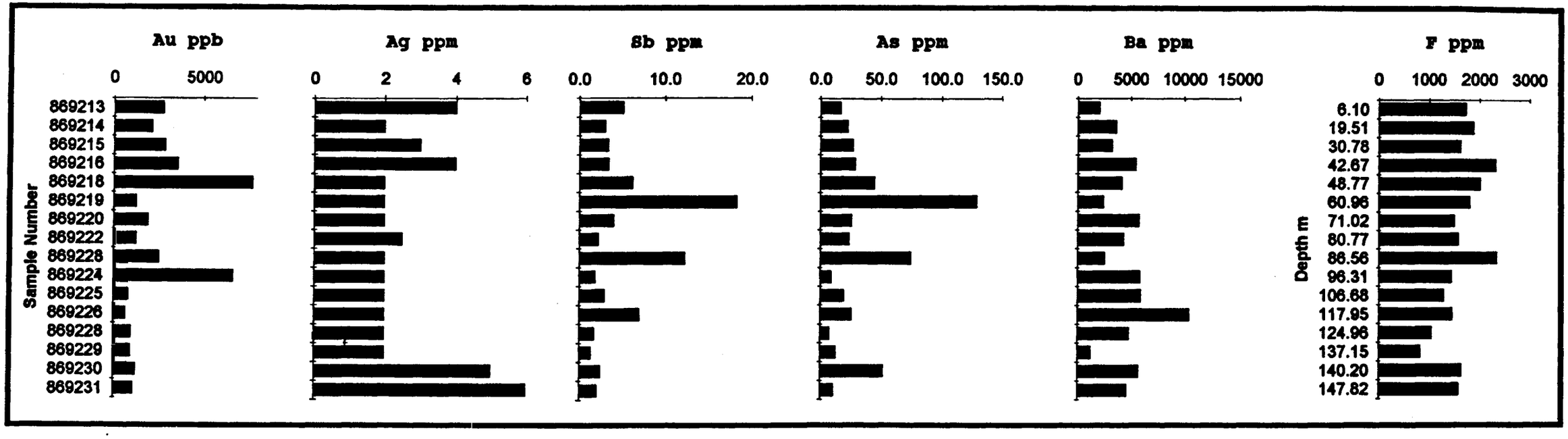
60.96
71.02
80.77
86.56
96.31
106.68
117.95
124.96
137.15
140.20
147.82

DDH 131

SAMPLE	DEPTHFT	DEPTHM	AU2_PPB	AG2_PPM	SB2_PPM	AS2_PPM	BA2_PPM	F_PPM	MO2_PPM	CU_PPM	SPCT
869213	20	6.10	2730	4	5.2	17.0	2100	1735	948	214	2.23
869214	64	19.51	2120	-2	3.1	23.0	3700	1893	43	156	4.35
869215	101	30.78	2840	3	3.4	27.0	3300	1636	140	417	3.11
869216	140	42.67	3560	4	3.5	29.0	5500	2314	87	623	1.58
869218	160	48.77	7780	-2	6.3	45.0	4200	2011	461	1120	2.52
869219	200	60.96	1260	-2	18.3	129.0	2500	1816	44	425	3.21
869220	233	71.02	1900	-2	4.1	26.0	5840	1513	382	354	1.61
869222	265	80.77	1270	3	2.3	24.0	4400	1590	32	114	1.47
869223	284	86.56	2520	-2	12.3	75.4	2600	2338	78	389	2.96
869224	316	96.31	6670	-2	1.9	9.4	5950	1458	810	313	0.75
869225	350	106.68	843	-2	3.0	20.0	6000	1303	75	302	0.91
869226	387	117.95	689	-2	7.1	26.0	10500	1463	200	587	3.03
869228	410	124.96	978	-2	1.8	7.7	4900	1057	77	394	0.70
869229	450	137.15	976	-2	1.4	13.0	1300	838	657	237	1.48
869230	460	140.20	1250	5	2.5	52.3	5780	1651	76	42	3.64
869231	485	147.82	1120	-6	2.1	11.0	4700	1589	69	316	0.52

DDH 131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96.31
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117.95
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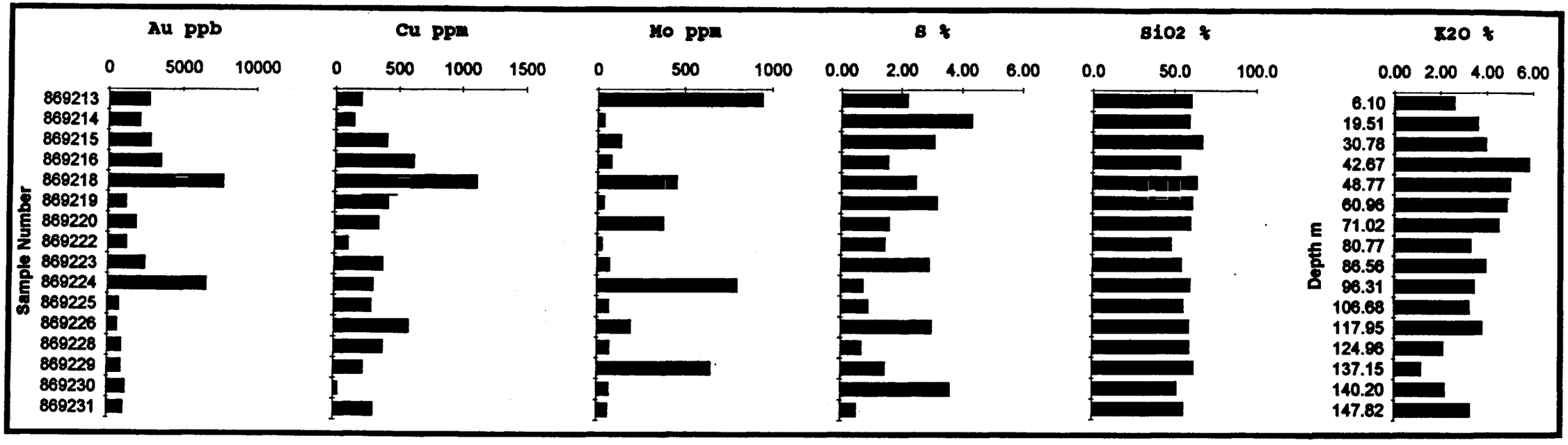
DDH 131

SAMPLE	DEPTHFT	DEPTHM	AU2_PPB	CU_PPM	MO2_PPM	SPCT	SIO2_PCT	K2O_PCT	R%	I
869213	20	6.10	2730	214	948	2.23	61.0	2.64	61.83	2.35
869214	64	19.51	2120	156	43	4.35	59.9	3.64	65.02	2.36
869215	101	30.78	2840	417	140	3.11	67.7	4.00	80.86	2.73
869216	140	42.67	3560	623	87	1.58	54.4	5.85	79.02	2.41
869218	160	48.77	7780	1120	461	2.52	64.5	5.04	84.60	2.43
869219	200	60.96	1260	425	44	3.21	62.0	4.89	83.52	2.40
869220	233	71.02	1900	354	382	1.61	61.0	4.53	66.98	1.78
869222	265	80.77	1270	114	32	1.47	49.1	3.34	43.00	1.16
869223	284	86.56	2520	389	78	2.96	55.4	3.98	80.82	2.47
869224	316	96.31	6670	313	810	0.75	60.7	3.49	51.12	1.56
869225	350	106.68	843	302	75	0.91	56.6	3.27	62.75	2.17
869226	387	117.95	689	587	200	3.03	60.1	3.82	62.57	1.95
869228	410	124.96	978	394	77	0.70	60.2	2.15	38.55	1.70
869229	450	137.15	976	237	657	1.48	62.8	1.18	31.90	1.27
869230	460	140.20	1250	42	76	3.64	52.5	2.22	46.50	1.76
869231	485	147.82	1120	316	69	0.52	56.8	3.31	49.92	1.82

DDH 131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SiO2 %
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K2O %
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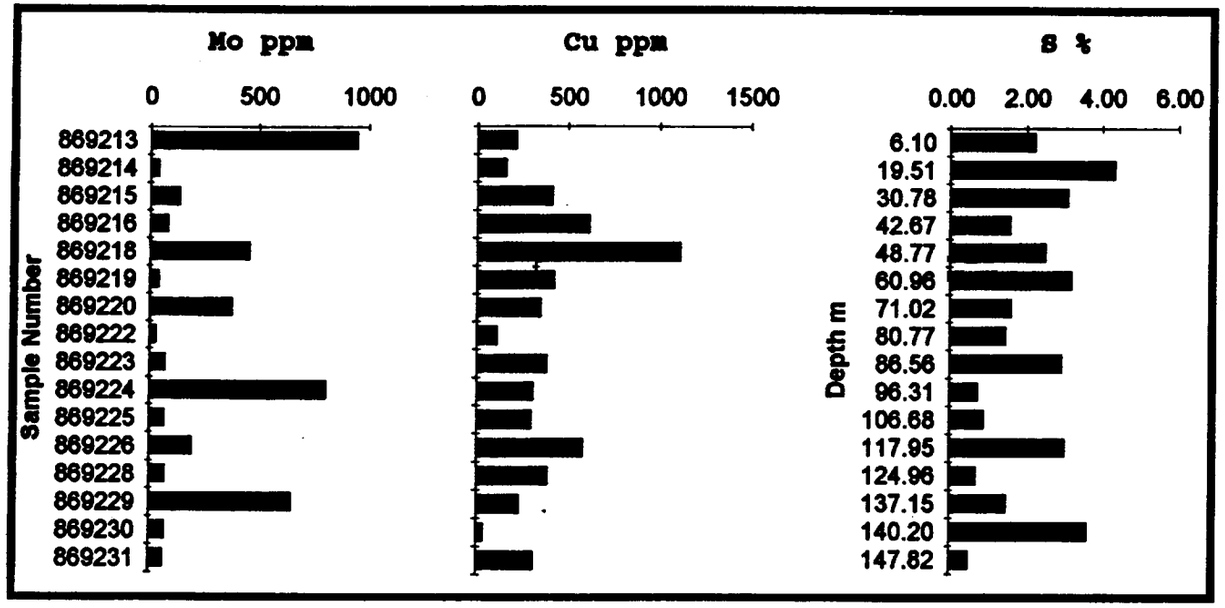
DDH 131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Depth m
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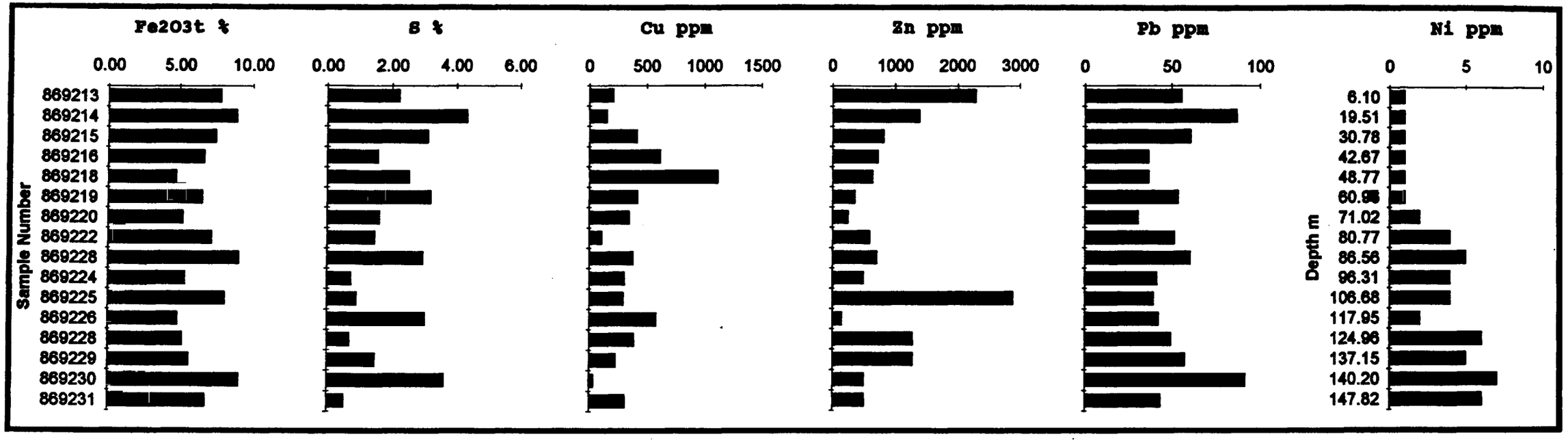
137.15
140.20
147.82

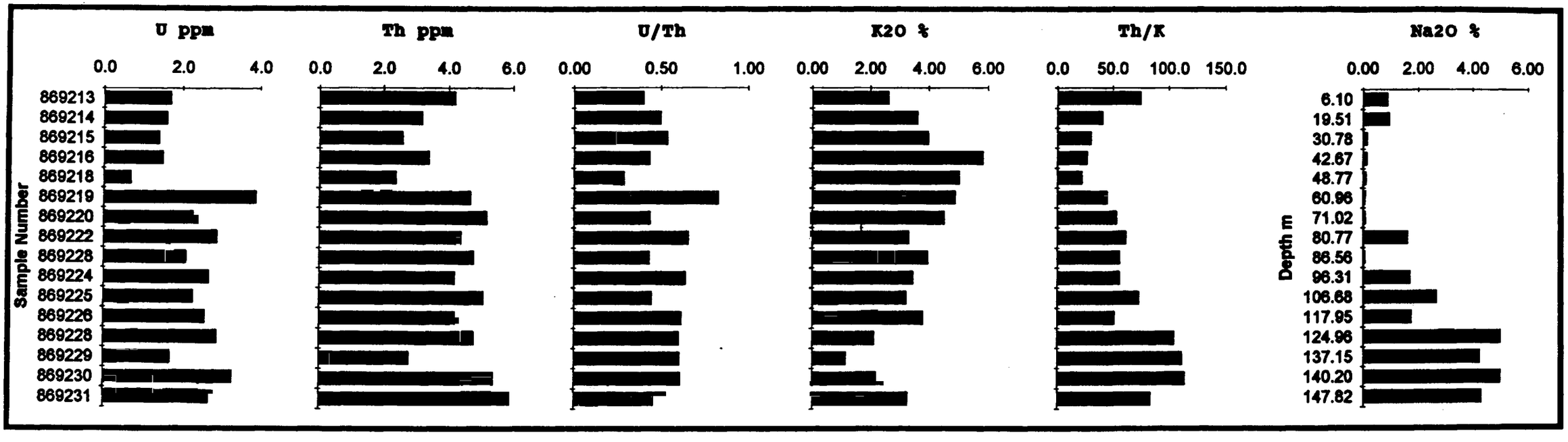
DDH 131

SAMPLE	DEPTHFT	DEPTHM	FE2O3T_PCT	SPCT	CU_PPM	ZN2_PPM	PB_PPM	NI_PPM	CR_PPM	TE_PPM
869213	20	6.10	7.82	2.23	214	2300	56	-1	4	-10
869214	64	19.51	8.94	4.35	156	1400	87	-1		-10
869215	101	30.78	7.49	3.11	417	830	61	-1	3	-10
869216	140	42.67	6.73	1.58	623	740	37	-1	4	-10
869218	160	48.77	4.81	2.52	1120	650	37	-1	5	-10
869219	200	60.96	6.59	3.21	425	370	54	1	11	-10
869220	233	71.02	5.28	1.61	354	260	31	2	7	-10
869222	265	80.77	7.24	1.47	114	610	52	4	11	-10
869223	284	86.56	9.08	2.96	389	720	61	5	12	-10
869224	316	96.31	5.40	0.75	313	510	42	4	15	-10
869225	350	106.68	8.10	0.91	302	2900	40	4	15	-10
869226	387	117.95	4.91	3.03	587	160	43	2	19	-10
869228	410	124.96	5.20	0.70	394	1300	50	6	21	-10
869229	450	137.15	5.67	1.48	237	1300	58	5	27	-10
869230	460	140.20	9.10	3.64	42	520	92	7	37	-10
869231	485	147.82	6.80	0.52	316	520	44	6	38	-10

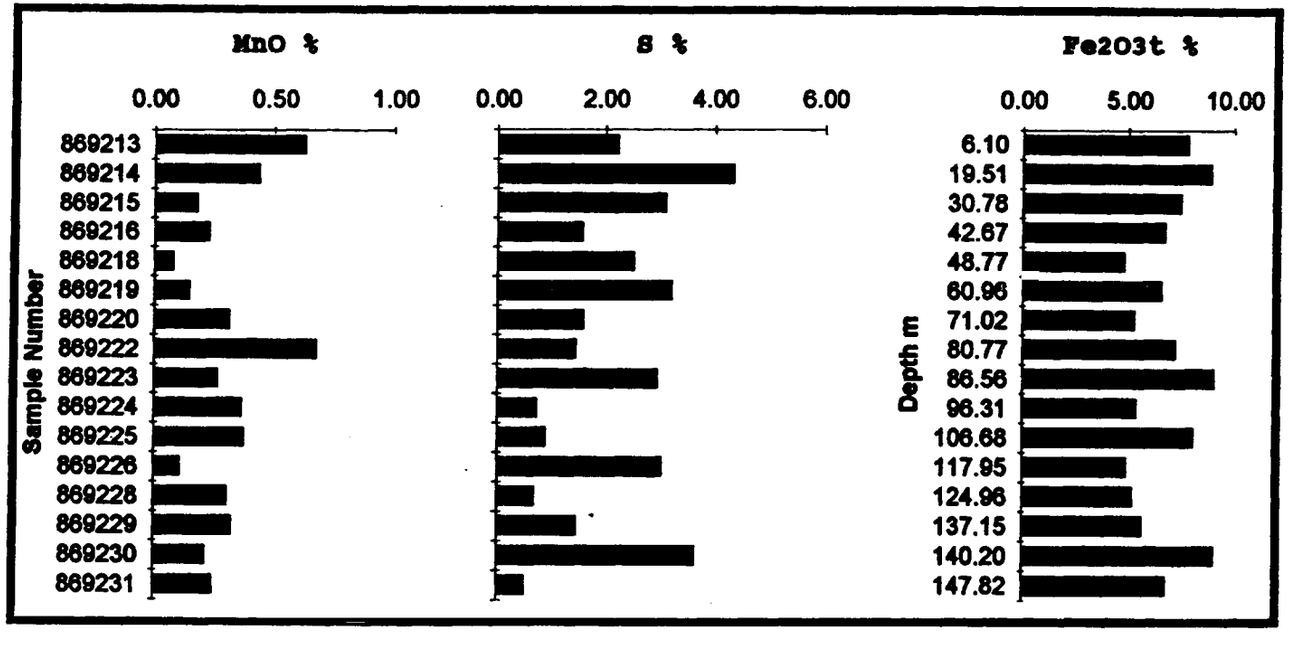
DDH 131


Fe2O3t %
0.00
5.00
10.00
S %
0.00
2.00
4.00
6.00
Cu ppm
0
500
1000
1500
Zn ppm
0
1000
2000
3000
Pb ppm
0
50
100
Ni ppm
0
5
10
Sample Number
869213
869214
869215
869216
869218
869219
869220
869222
869228
869224
869225
869226
869228
869229
869230
869231
Depth m
6.10
19.51
30.78
42.67
48.77
60.98
71.02
80.77
86.56
96.31
106.68
117.95
124.96
137.15
140.20
147.82

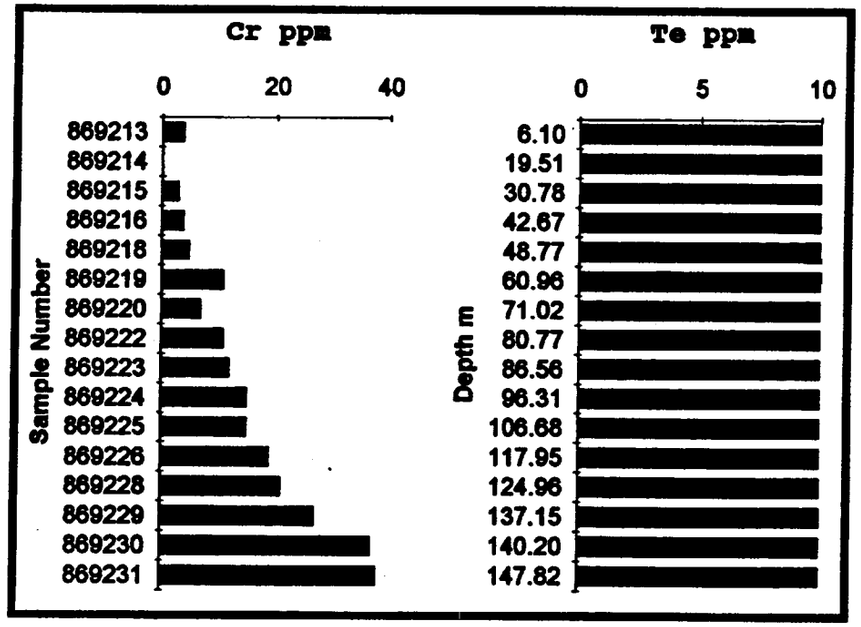
DDH 131


U ppm
0.0 2.0 4.0
Th ppm
0.0 2.0 4.0 6.0
U/Th
0.00 0.50 1.00
K2O %
0.00 2.00 4.00 6.00
Th/K
0.0 50.0 100.0 150.0
Na2O %
0.00 2.00 4.00 6.00
Sample Number
869213
869214
869215
869216
869218
869219
869220
869222
869228
869224
869225
869226
869228
869229
869230
869231
Depth m
6.10
19.51
30.78
42.67
48.77
60.96
71.02
80.77
86.56
96.31
106.68
117.95
124.96
137.15
140.20
147.82

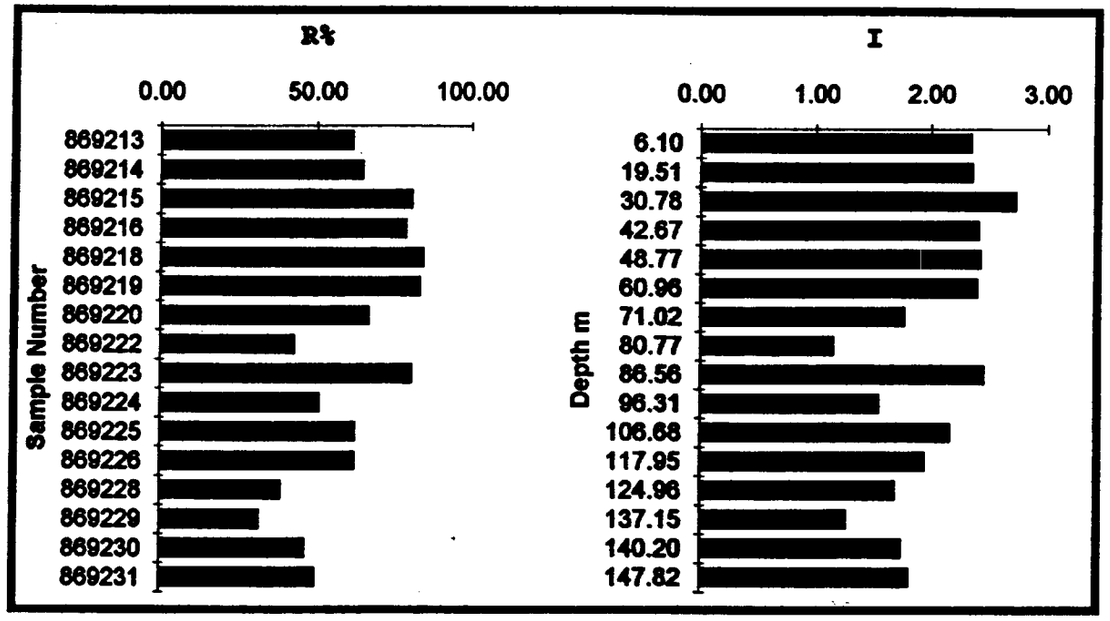
DDH 131


MnO %
0.00
0.50
1.00
S %
0.00
2.00
4.00
6.00
Fe2O3t %
0.00
5.00
10.00
Sample Number
869213
869214
869215
869216
869218
869219
869220
869222
869223
869224
869225
869226
869228
869229
869230
869231
Depth m
6.10
19.51
30.78
42.67
48.77
60.96
71.02
80.77
86.56
96.31
106.68
117.95
124.96
137.15
140.20
147.82

DDH 131


Cr ppm
0
20
40
Sample Number
869213
869214
869215
869216
869218
869219
869220
869222
869223
869224
869225
869226
869228
869229
869230
869231
Te ppm
0
5
10
Depth m
6.10
19.51
30.78
42.67
48.77
60.96
71.02
80.77
86.56
96.31
106.68
117.95
124.96
137.15
140.20
147.82

DDH 131



ALTERATION INDEX

$$R\% = \frac{K_2O + MgO}{K_2O + Na_2O + CaO + MgO} \times 100$$

INTRUSIVE RATIO

$$I = \frac{Al_2O_3}{K_2O + Na_2O + CaO}$$