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GLACIOLOGICAL, OCEANOGRAPHIC AND SEDIMENTOLOGICAL DATA FROM MACKAY GLACIER AND GRANITE HARBOUR ANTARCTICA

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GLACIOLOGICAL, OCEANOGRAPHIC AND SEDIMENTOLOGICAL DATA FROM THE MACKAY GLACIER AND GRANITE HARBOUR REGION, ANTARCTICA

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1. INTRODUCTION

This publication presents a range of glaciological, oceanographic and sedimentological data from the Mackay Glacier and Granite Harbour, on the coast of Victoria Land, Antarctica, (Fig. 1). The data were gathered between 1981 and 1985 by expeditions from Victoria University of Wellington (see reports of Barrett (1982), Pyne and Barrett (1983), Pyne (1984) and Pyne (1985), and are the basis of a PhD thesis by the author (Macpherson, in prep.). The thesis attempts to quantify the sediment flux into Granite Harbour in order to help understand the processes of transport and deposition in a marine polar setting.

Other related studies include Carter et al (1981) on McMurdo Sound oceanography, Barrett et al (1983) on sedimentation in McMurdo Scound, Barrett et al (1984) on the geochemistry of cores from Granite and New Harbours, Ward (1984) on modern benthic foraminifera in the McMurdo Sound area (including Granite Harbour), and Dunbar et al (in press) on suspended sediment beneath annual sea ice in the McMurdo Sound area.

Figure 1. Satellite Image Map of McMurdo Sound region showing Granite Harbour, Mackay Glacier and environs with respect to international bases on Ross Island. (Map is from USGS Experimental Printing; Sheet: McMurdo Sound Antarctica. 1972 - 1974).

2. GLACIOLOGY

2.1 Methods

A pole network was established on the Mackay Glacier and Tongue in November 1982 by surveyors from the Department of Lands and Survey, New Zealand, in order to determine rate of glacier movement.

The initial survey was made by simultaneously observing horizontal and vertical angles to each pole from two points of a survey control network established on bedrock west of Cuff Cape. (See sketch map, Fig. 2). Subsequent monitoring was by the 'hanging line' method, where a horizontal and vertical angle were measured to each pole, as well as the distance to that pole being measured electronically from a single known point, (MGT2). During the 1983 winter, approximately 2 km of the Mackay Glacier Tongue calved, taking with it poles 2/1 and 2/2. An additional survey for position and height was made in late January 1985, to verify the uniformity of movement over a summer period.

Results of Mackay Glacier movement and ablation are given in Tables 1 and 2 respectively.

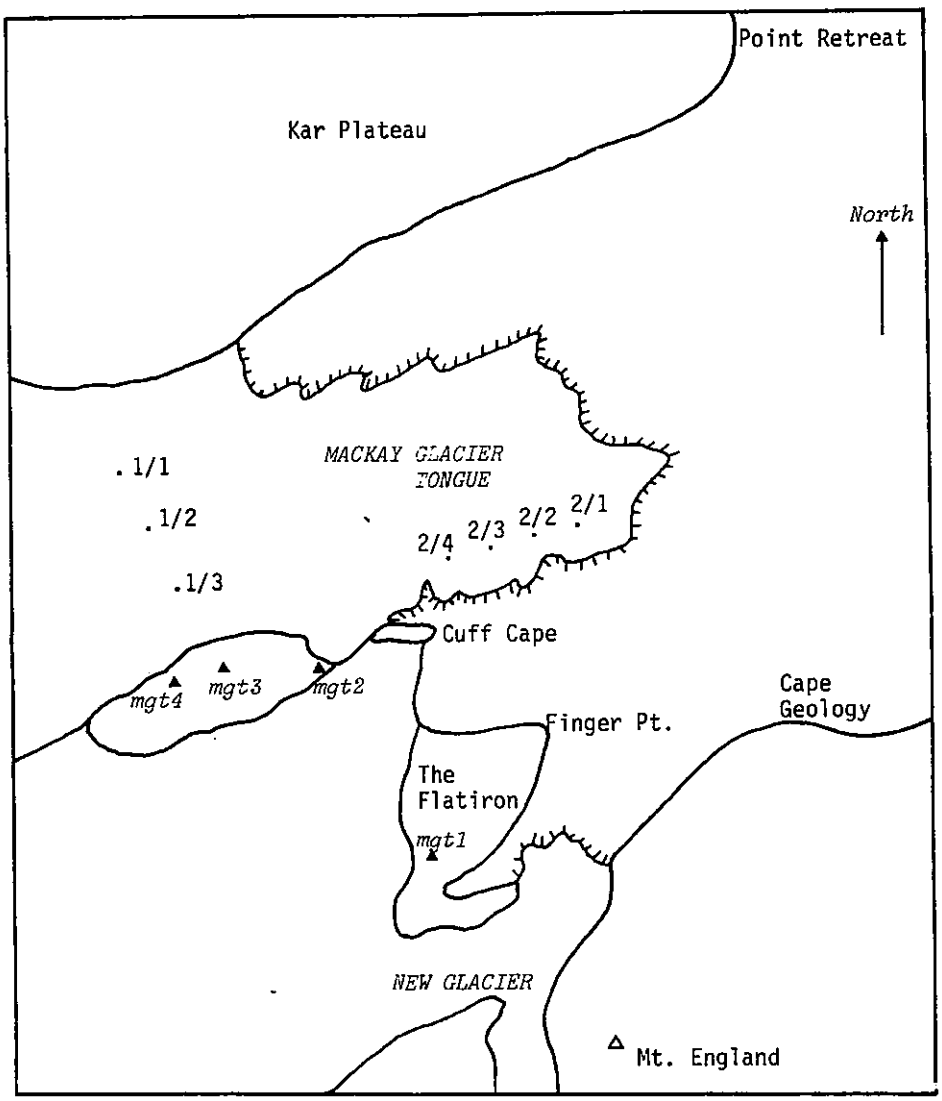
Table 1. Movement of the Mackay Glacier and Tongue from 1982 to 1985, based on observations each summer and recalculated for a 365 day year. Results are from Lands and Survey Department (New Zealand) field observations made by Hawke (1982-83), Mansen (1983-84) and Belgrave (1984-85). Initial positioning of pole network was by simultaneous resections; subsequent positioning by 'hanging line' method. ΔH is change in surface elevation between measurements. Percentage of year between November 1984 and January 1985 measurements was 23%. Poles prefixed '1' are situated on the Glacier, and '2' on the Tongue.

Pole	1982-83			1983-84			Nov 84-Jan 85			Avg. Annual ΔH	Avg. Annual Movt
	Dist. (m)	ΔH (m)	Annual Movt (m)	Dist. (m)	ΔH (m)	Annual Movt (m)	Dist. (m)	ΔH (m)	% Annual Movt		
1/1	210.6	-40.8	221.5	194.4	+14.7	215.0	50.3	-5.4	23	-13.1	218.3
1/2	235.0	-2.9	247.2	211.1	-11.2	233.5	52.5	-21.6	22	-7.1	240.4
1/3	222.4	-8.1	234.0	187.6	-5.2	207.5	46.8	-1.1	23	-6.7	220.8
2/1											
2/2											
2/3	268.2	+1.1	281.9	251.4	-0.4	278.0	59.8	0.07	21	+0.4	280.0
2/4	264.0	0	277.7	244.5	0.6	270.4	59.1	-0.3	22	+0.3	274.1

Table 2. Surface ablation of the Mackay Glacier and Tongue between 1982 and 1984. Measurements were made on bamboo stakes frozen 2 m into surface ice. Poles prefixed '1' are situated on the Glacier and '2' on the Tongue. Measurements are corrected annual values.

Pole	1982-83	1983-84	Average
1/1	54 cm	83 cm	69 cm
1/2	45 cm	34 cm	40 cm
1/3	71 cm	40 cm	56 cm
2/3	55 cm	50 cm	53 cm
2/4	65 cm	60 cm	63 cm

Figure 2. Sketch map of the Mackay Glacier pole network locations. (Not to scale). The Mackay Glacier calved during the austral autumn of 1983 removing poles 2/1 and 2/2 from the network. MGT1, 2, 3 and 4 are the survey control network established in 1982. Subsequent monitoring was undertaken from MGT2 only. True north is shown.



3. BATHYMETRY

A bathymetric map of Granite Harbour has been compiled from spot depths measured from the sea ice, and depth records from the USCGC Glacier (Fig. 3).

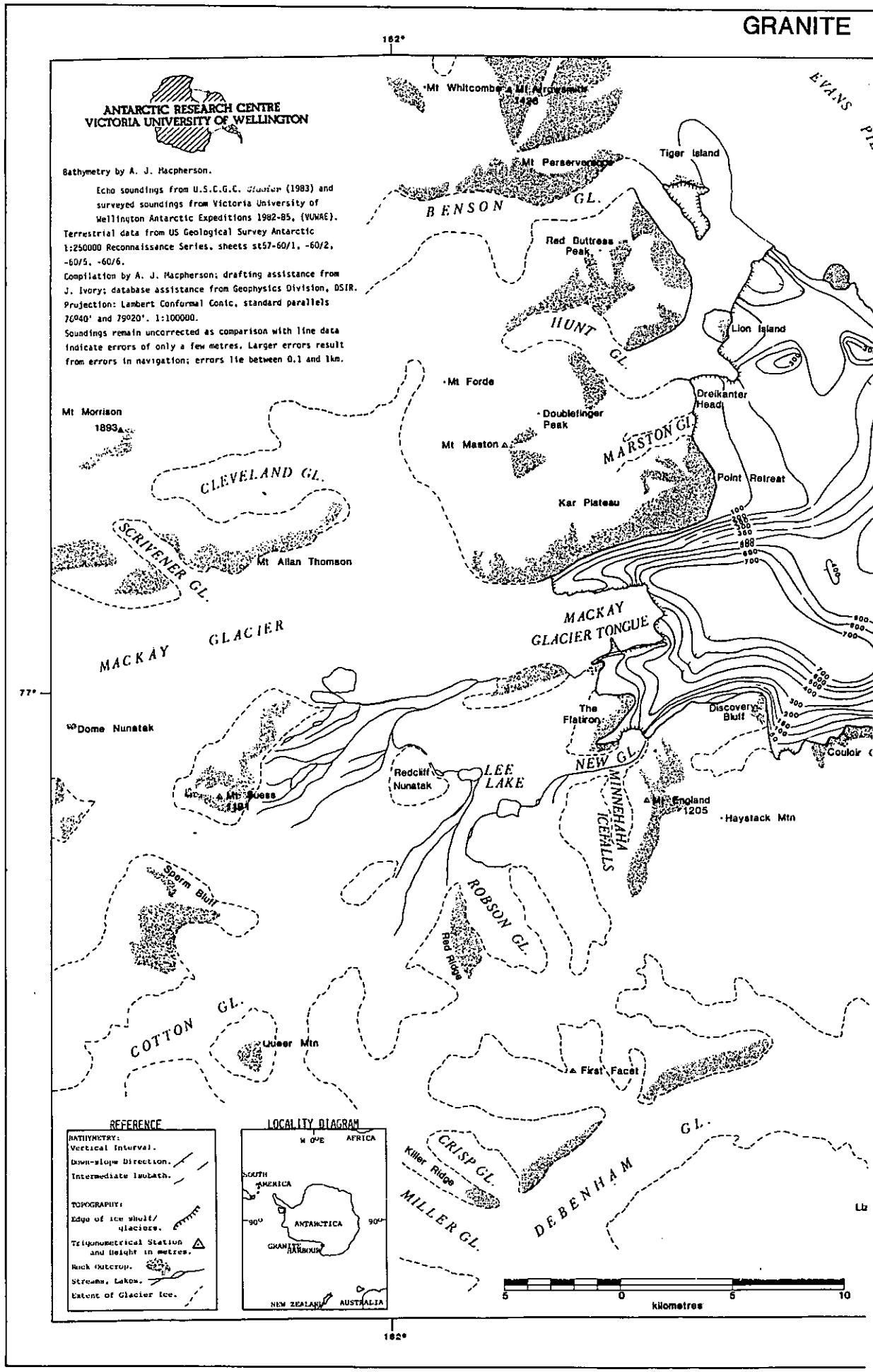
Spot depths to the sea floor have been measured at almost all VUWAE sample sites within Granite Harbour since investigation began in 1981 (Table 3). Prior to 1983, sounding line readings were taken at sites surveyed with respect to major peaks around the Harbour; site positions being determined by graphical resections on a 1:100 000 base. Accuracy is considered to be within 200 m.

Sites 83-12, 83-14 and 83-15 were occupied during Cruise IV of USCGC Glacier (Feb. 12-19, 1983). Depths were recorded from ship's echo soundings and positions fixed by NavSat. Accuracy at these sites is considered to be within 100 m.

Since the establishment of a survey control network in the Granite Harbour region in October 1983, all subsequent sites have been surveyed to beacons, locations of which have been determined using Electronic Distance Measuring and resections by New Zealand Lands and Survey Department. Site positions have subsequently been plotted from graphical resections and are considered to be accurate to within 100 m. Depths were determined by echo soundings utilising a portable 16 and 50 khz unit and by lowering the transducers through holes in the sea ice. Comparison with sounding line data at some sites indicate readings are within 3%.

Cruise IV of USCGC Glacier in Feb. 1983 resulted in continuous depth recordings of approximately 400 km within the Granite Harbour locality. These readings were linked to NavSat which provided navigational fixes. Errors with navigation caused by infrequent satellite passes and manual update of ship's speed resulted in the ship's track being accurate to about a kilometre.

Figure 3. Bathymetric Map of Granite Harbour. (approx) 1:250000.



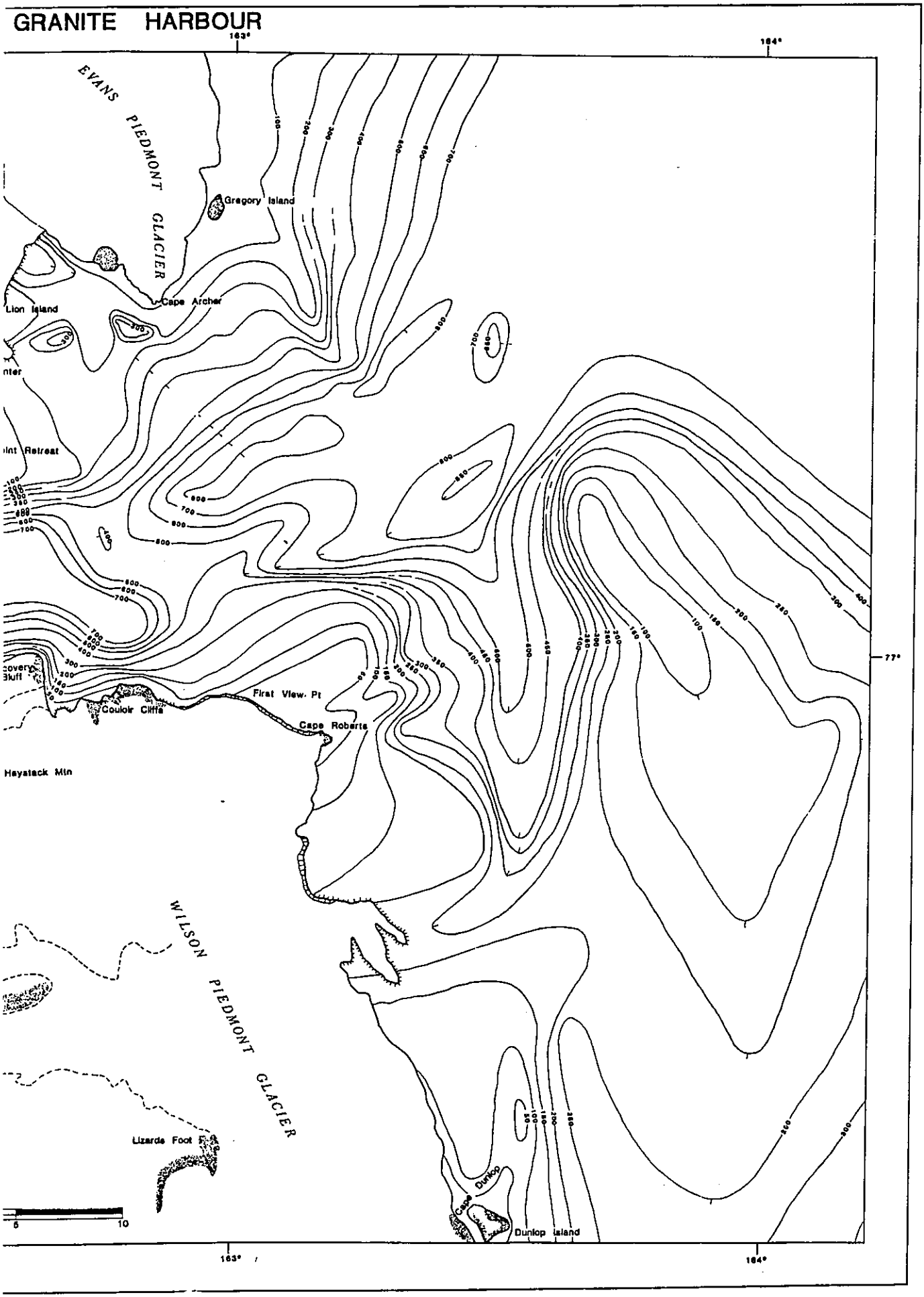

GRANITE HARBOUR
163°
164°
77°
EVANS PIEDMONT GLACIER
Gregory Island
Cape Archer
Lion Island
Retreat
First View Pt
Couloir Cliffs
Cape Roberts
Haystack Mtn
WILSON PIEDMONT GLACIER
Lizards Foot
Dunlop
Dunlop Island
5
10

Table 3. Sample site locations and spot depths to sea floor at sites within Granite Harbour. Positioning of sites by graphical resection to known trigs around Granite Harbour except sites 83-12, -14 and -15, which were positioned by satellite navigation.

Sample type: SC refers to Sphincter Core
SPM " " Suspended Particulate Matter
ST " " Sediment Trap
Sal " " Salinity
A " " Aeolian Sediment

Sample Site	Latitude	Longitude	Sample Type	Depth
81-12	76 59.6	163 9.4	SC	110 m
81-13	76 56.9	163 2.0	SC	537 m
81-14A	76 52.8	162 55.0	SC	346 m
81-15	76 59.1	162 30.0	SC	550 m
81-16	77 2.2	162 26.2	SC	266 m
81-17	77 1.8	163 24.0	SC	358 m
82-1	76 59.1	162 21.3	SC	303 m
82-2	76 57.4	162 26.0	SC	757 m
83-12	76 54.8	163 21.5	SC	788 m
83-14	76 53.0	162 45.0	SC	165 m
83-15	76 58.3	162 38.6	SC	700 m
83-31	76 59.2	162 23.0	SC ST	260 m
83-32	76 56.7	162 28.7	SC ST	395 m
83-33	76 58.4	162 27.2	SC	460 m
83-34	76 56.5	162 32.0	SC ST	530 m
83-35	76 58.0	162 36.0	SC	704 m
83-36	77 00.15	162 48.2	SC ST	763 m
83-37	76 57.1	162 47.9	SC	572 m
83-38	76 55.8	162 54.4	SC	804 m
83-39	76 53.6	162 48.4	SC	265 m
83-40	76 53.1	162 36.3		200 m
83-42	76 59.2	162 26.5		135 m
83-43	76 57.3	162 25.7		610 m
83-44				475 m
83-45	76 57.5	162 20.3		136 m
83-46				545 m
83-47				155 m
83-48	77 01.3	163 10.7	ST	77 m
83-49			ST	241 m
83-50	76 55.3	162 53.6	ST	727 m
83-51	76 51.3	162 59.0	ST	281 m
83-52	76 52.2	162 37.0	ST	258 m
83-53	76 57.6	162 41.4	ST	429 m
83-54	76 56.2	162 41.4		764 m
84-1	76 55.86	162 58.9	Sal SPM A	700+ m
84-2	77 0.59	163 8.8		40 m
84-3	76 59.13	162 46.5	Sal SPM ST	700+ m
84-4	76 57.90	162 28.0	Sal SPM ST	535 m
84-5	76 57.00	162 27.9	Sal SPM	702 m
84-6	76 57.53	162 18.5	Sal SPM	123 m
84-7	76 57.26	162 24.4	Sal SPM	335 m
84-8	76 59.40	162 20.8	Sal SPM A	63 m
84-9	76 59.27	162 25.0	Sal SPM A	115 m
84-10	76 59.06	162 28.0	Sal SPM	235 m
84-11	76 59.86	162 29.4	Sal SPM A	360 m
84-12	77 1.06	162 26.4	Sal SPM	245 m
84-13	76 55.46	163 16.0	Sal SPM	715 m
84-14	76 54.43	162 42.2	Sal A	235 m
84-15	76 52.05	162 51.3	Sal SPM A	285 m
84-16	76 50.20	162 40.0	Sal SPM	390 m
84-17	76 54.12	162 52.1	Sal SPM	390 m
84-18	76 54.25	162 48.8	Sal	240 m
84-19	76 55.10	162 46.8	Sal SPM	295 m
84-20	76 55.56	162 50.9	Sal	310 m
84-21	76 55.14	162 53.7	Sal SPM	385 m
84-22	76 57.03	162 41.1	Sal SPM ST	550 m

4. OCEANOGRAPHY

4.1 Suspended Particulate Matter and Salinity

During October-December 1984, 22 sites were occupied on the seasonal ice within Granite Harbour (Fig. 4).

At each site, a hydrocast was made with a tripod, meter block and petrol driven winch through a 30 cm hole in the 2 m thick seasonal ice. Hydrocasts were made with plastic 'Nisken' bottles or with nickel bronze 'Nansen' bottles at regularly spaced depths through the water column. Current measurements by savonious rotor (static threshold of 7 cm sec^{-1}), through the tidal cycle at several localities (Macpherson, A.J., in Pyne and Barrett, 1983) detected no water movement and average tidal currents were calculated to be approximately 0.1 cm sec^{-1} over a smooth tidal cycle for the whole of Granite Harbour. Therefore it was considered unnecessary to take a series of hydrocasts over a tidal cycle.

A measured aliquot of around 2 litres from each depth was suction filtered through pre-weighed 47 mm diameter 'Nuclepore' membrane filters of 0.8 micron nominal pore size. Filters were subsequently frozen and returned in that state to the laboratory where they were thawed, dried and weighed following the procedure of Strickland and Parsons (1968). Results are given in Table 4 .

Salinity was determined in the laboratory from a 250 ml aliquot with an 'Autolab' inductive salinometer. Temperature measurements were not made at the time of sample collection. However, previous workers have shown that the prevailing watermass in McMurdo Sound has a salinity range of 34.6-34.9‰ and temperatures of about -1.9°C (Carter et al, 1981). Granite Harbour results are given in Table 5.

4.2 Sediment Traps

During Oct-Dec 1983, three multi and nine single, conical, fibreglass sediment traps were deployed within Granite Harbour, all but two single traps being recovered after periods of 4-8 weeks. During Oct-Dec 1984, four strings of three single traps were deployed for approximately 8 weeks, and all but one string were recovered.

Multiple traps were deployed through natural cracks in the seasonal ice more than a metre wide or through seal holes, whereas single traps were deployed through 30 cm diameter holes augered in the annual sea ice. The 1983 traps were suspended approximately 5 m above the sea floor while lowermost 1984 traps were suspended approximately 10 m above the sea floor. All were suspended on 4 mm polyethylene or nylon rope attached to a 3 mm wire 'leader' which ran through, and was attached to the surface of the sea ice. Moorings were held taut by 10-20 kg of lead weight hung below the lowermost trap. After deployment, the augered holes were allowed to refreeze.

The traps collect sediment settling out of the water column over an area of 0.05 m^2. The sediment is contained in removable polycarbonate tubes at the base of each trap (Fig. 5).

Recovery involved augering a hole adjacent to the anchored wire and 'fishing' through the sea ice with a hook and rod arrangement until the anchored wire was snagged. The mooring line was then winched up or pulled up by motor toboggan.

Upon collection, 1983 samples were frozen whereas 1984 samples were preserved in alcohol prior to returning them to the laboratory. Samples were then flushed with distilled water and centrifuged (to remove salts), air dried, weighed and total flux determined.

The Antarctic Research Centre assisted a research party from Rice University, Houston, Texas in the deployment and recovery of a six trap string off the mouth of Granite Harbour.

Results from all sediment traps recovered are given in Table 6.

Figure 4. Oceanographic Sample site locations, Granite Harbour.

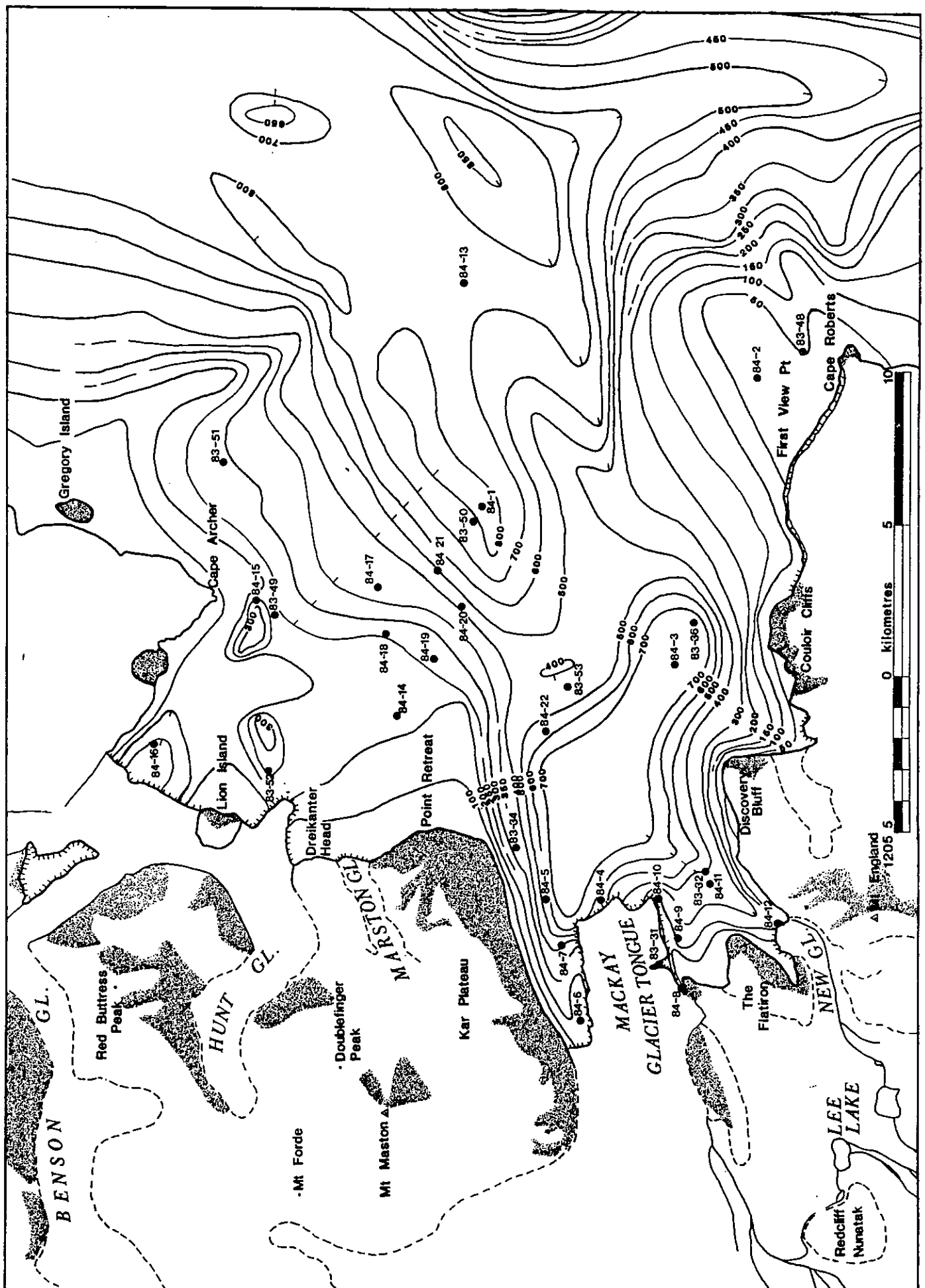
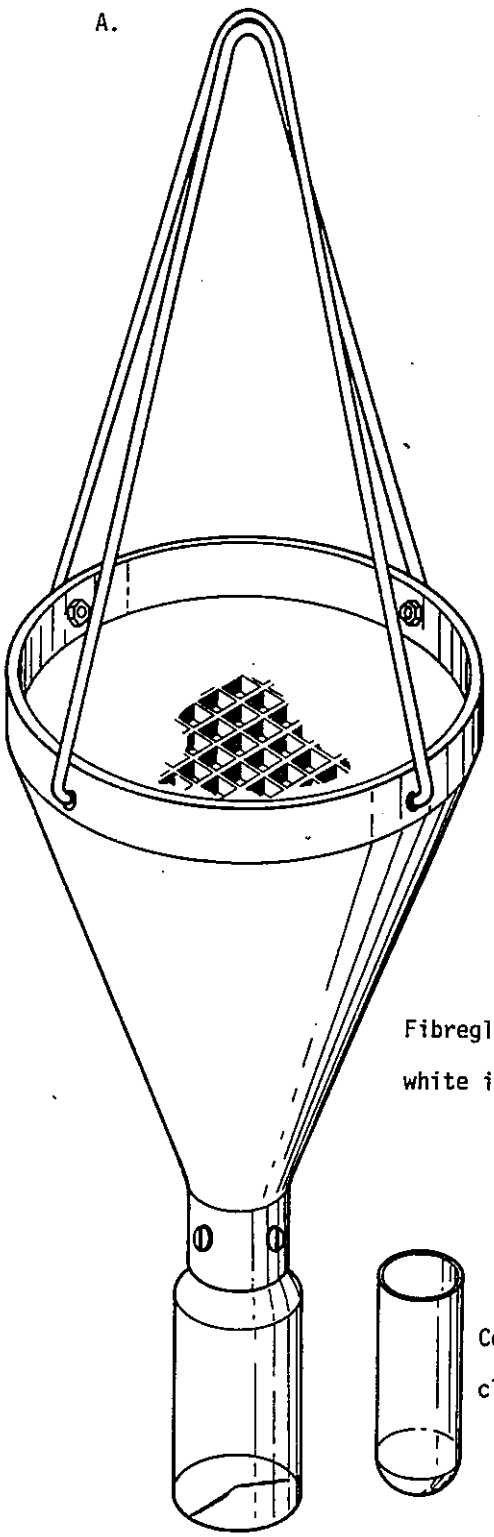


Figure 5. Antarctic Research Centre sediment trap, deployed at various depths in Granite Harbour. Several traps can be linked in series by suspending lower traps on nylon line from the stainless steel bridle of a higher trap, A, and B, comparison of cross-sectional plans of traps used in Antarctic shelf deployments by Victoria University of Wellington, (NZARP trap), Rice University (Rice and Soutar), and Kiel University. Collecting area for each trap is given above upper surface. NZARP and Kiel traps use polystyrene light diffusers for upper baffle material. Rice and Soutar traps use honeycomb Hexel. The trap at upper left is equiped with an intervalometer device.

A.



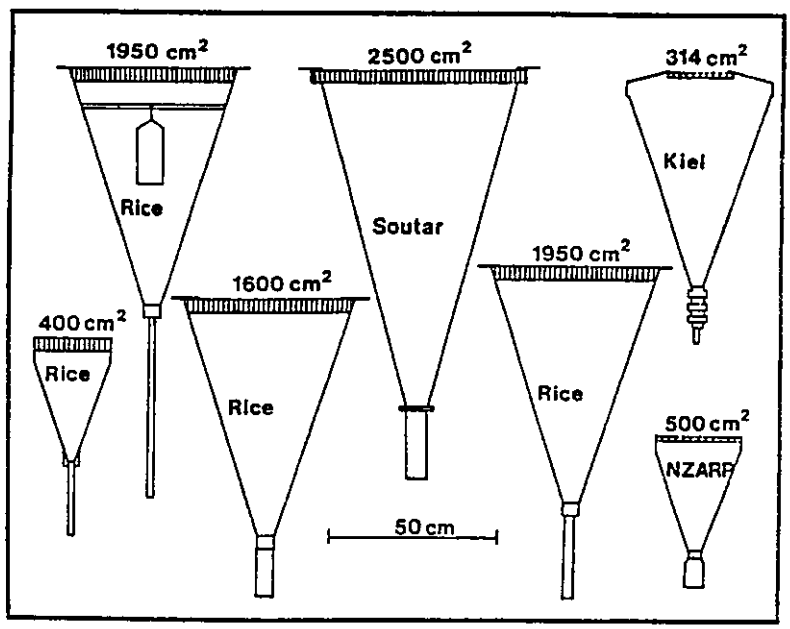
Bridle,
6 mm stainless steel rod,
with threaded ends.

Current baffle,
styrene lighting diffuser.

Fibreglass cone,
white internal gelcoat.

Collector,
clear polycarbonate bottle or tube.

B.



(After Dunbar, 1985).

Table 4. Suspended Particulate Matter vacuum filtered from aliquots collected at various sites in Granite Harbour (Fig. 4). The depth to the sea floor is given as the last depth at each sample site. Procedure for filtering and weighing followed that of Strickland and Parsons (1968), with 'Nuclepore' filters of 0.8 micron nominal pore size being used. Weights have been recalculated for 'blank' correction. Errors may result from undissolved salts.

Site	Depth (m)	Weight mg ℓ^{-1}
84-1	50	1.20
	100	0.82
	200	0.25
	300	1.65
	400	0.40
	500	2.77
	600	0.36
	700	0.80
	900	0.50
	?	
84-2	38	0.87
	40	
84-3	50	0.18
	100	0.63
	200	0.32
	300	0.09
	400	0.09
	500	0.05
	600	0.04
	700	0.13
	?	
84-4	50	0.30
	100	0.38
	200	1.00
	300	0.68
	400	0.21
	500	0.30
	535	
84-5	700	14.5
	702	
84-6	120	0.88
	123	
84-7	50	0.61
	100	0.55
	200	0.39
	300	2.65
	335	
84-8	60	0.46
	63	
84-9	100	0.21
	112	0.16
	115	
84-10	50	0.40
	100	0.60
	200	0.16
	233	0.20
	235	
84-11	50	-0.05
	100	0.06
	200	0.32
	300	0.30
	355	0.15
	360	
84-12	50	0.67
	100	0.40
	200	0.16
	240	0.21
	245	
84-13	50	0.13
	100	0.28
	200	0
	300	0.24
	400	0.43
	500	0.64
	600	0.37
	700	0.44
	715	
84-15	50	1.71
	100	1.00
	200	0.45
	280	0.55
	285	
84-16	50	0.30
	100	0.35
	200	0.25
	300	0.85
	380	0.51
	390	
84-17	50	1.60
	100	0.38
	200	0.26
	300	0.16
	390	
84-19	50	0.20
	100	0.21
	200	0.50
	290	4.99
	295	
84-21	50	0.25
	100	0.60
	200	0.10
	300	0.38
	380	0.35
	385	
84-22	50	0.15
	200	-0.35
	400	0.30
	548	0.20
	550	
Cuff Cape Stream (estimated discharge = 75 ℓ m^{-1})		6.00

Table 5. Salinity measurements from aliquots collected at various sites in Granite Harbour (Fig. 4). The depth to the sea floor is given as the last depth at each site. Salinities were measured in a controlled temperature room by an 'Autolab' inductive salinometer.

Site	Depth (m)	Salinity ‰
84-1	50	34.793
	100	.800
	200	.843
	300	.851
	400	.840
	500	.883
	600	.898
	700	.910
	900	.894
	?	
84-2	38	34.886
	40	
84-3	50	34.757
	100	.750
	200	.804
	300	.812
	400	.843
	500	.855
	600	.800
	700	.804
	?	
84-4	30	34.789
	50	.793
	100	.793
	200	.800
	300	.828
	400	.875
	500	.894
	535	.890
	535	
84-5	30	34.781
	50	.789
	100	.793
	150	.793
	200	.796
	250	.804
	300	.816
	400	.871
	500	.894
	600	.890
	700	.902
	702	
84-6	30	34.796
	50	.793
	100	.789
	120	.789
	123	
84-7	30	34.750
	50	.789
	100	.793
	150	.793
	200	.796
	250	.800
	300	.804
	335	.875
	335	
84-8	30	34.816
	50	.793
	60	.789
	63	
84-9	30	34.785
	50	.800
	100	.796
	112	.793
	115	
84-10	30	34.793
	50	.796
	100	.793
	150	.793
	200	.796
	233	.804
	235	
84-11	50	34.890
	100	.800
	200	.812
	240	.808
	360	
84-12	50	34.890
	100	.800
	200	.812
	240	.808
	245	
84-13	10	34.824
	25	.824
	50	.875
	100	.832
	150	.832
	250	.828
	350	.859
	450	.883
	600	.926
	700	35.063
	715	
84-14	30	34.796
	50	.789
	100	.800
	150	.832
	200	.816
	234	.820
	235	
84-15	50	34.800
	100	.816
	150	.843
	200	.843
	250	.820
	280	.828
	285	
84-16	50	34.851
	100	.804
	150	.828
	200	.820
	250	.808
	300	.859
	380	.840
	390	
84-17	30	34.793
	50	.796
	100	.804
	150	.816
	200	.832
	250	.859
	390	
84-18	30	34.804
	50	.796
	100	.808
	150	.800
	200	.828
	235	.855
	240	
84-19	30	34.808
	50	.796
	100	.808
	150	.812
	200	.840
	250	.836
	290	.894
	295	
84-20	30	34.808
	50	.918
	100	.820
	150	.785
	200	.890
	250	.824
	300	.828
	310	
84-21	30	34.992
	50	35.031
	100	34.828
	150	.804
	200	.812
	250	.836
	300	.832
	380	.871
	385	
84-22	30	34.828
	50	.832
	100	.800
	200	.800
	300	.875
	400	.886
	500	.941
	548	.926
	550	

Table 6. Sediment trap daily fluxes from traps deployed in various configuration for up to 4-8 weeks in Granite Harbour (Fig. 4). Sediment trap design is shown in Fig. 5. Flux has been calculated on a daily basis. The depth to sea floor is given as the last depth at each site.

Trap Site	Depth (m)	Flux (mg m^{-2} d^{-1})
83-31	255	605
	260	
83-32	390	14
	395	
83-34	525	470
	530	
83-36	758	600
	763	
83-48	72	51
	77	
83-49	236	141
	241	
83-50	722	1331
	727	
83-51	276	235
	281	
83-52	253	75
	258	
83-53	424	103
	429	
84-3	20	7.9
	125	10.8
	325	1.6
	700+	
84-4	20	2.3
	160	143.5
	360	0.2
	525	3.6
	535	
84-13*	35	62
	130	37
	220	44
	320	46
	406	33
	500	87
	590	85
	685	234
	715	
84-22	20	8.1
	200	1.4
	400	1.2
	540	0.5
	550	

*84-13 corresponds to Mooring I of Rice University, Houston, Texas, in Dunbar et al (in press).

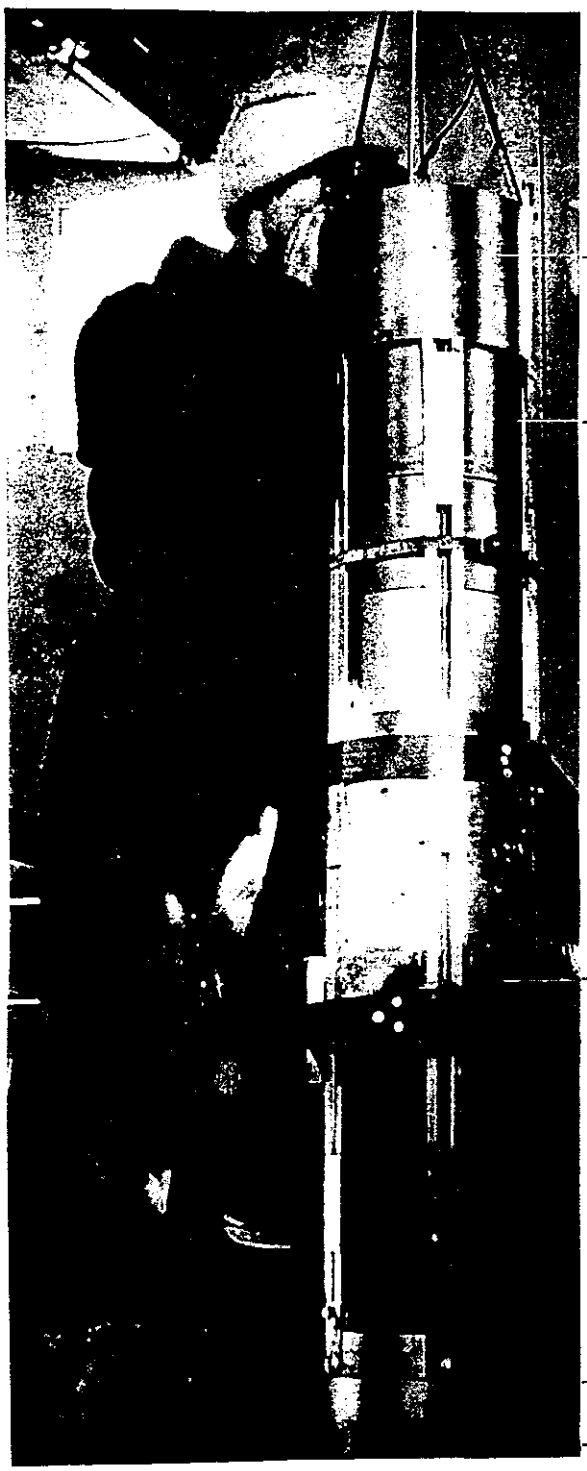
5. CORE DESCRIPTIONS

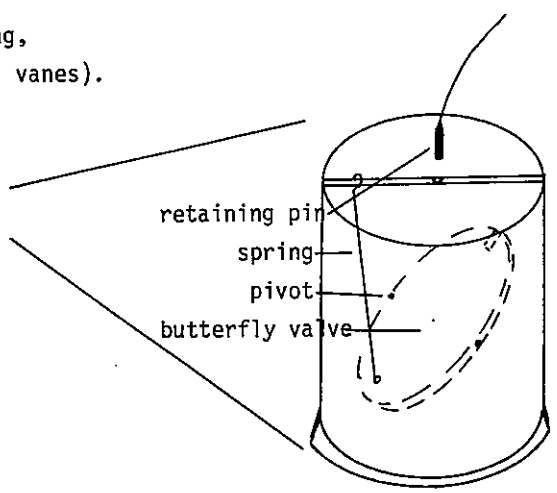
The following descriptions are of cores taken from the floor of Granite Harbour during the austral summer months of 1981 to 1984. The cores were collected with a sphincter corer built at Victoria University of Wellington from a design by Burke (1968), but with substantial modifications (Fig. 6). The design of the sphincter cover is such that the detail of the sediment/water interface is preserved intact, the core is preserved from any flushing during its recovery to the surface, and only the outer few millimetres of the 200 mm diameter core is disturbed.

Cores were taken from both the USCGC Glacier and through 30 cm holes augered in the annual sea ice (Fig. 7). Cores prefixed 81 and 82 were split and described in the field. The remainder were frozen upon recovery and forwarded to Wellington where they were thawed for splitting and description during May-June, 1985. Archive splits of each core remain in a frozen state at the Antarctic Research Centre, Victoria University of Wellington.

Figure 6. Antarctic Research Centre, (Victoria University of Wellington) Sphincter Corer.

The corer is lowered by winch to within 5 to 8 metres of the seafloor, from where it is allowed to free fall stabbing into the sediment.
The cable is gently winched up until, 1. The retaining pin is pulled out of the cocked 'butterfly' valve causing it to spring closed, thus protecting the sediment/water interface.
2. The rotating ring within the sample catcher and it's attached nylon sleeve are pulled closed thus cutting the sediment.
3. The corer is pulled out of the sediment.
Upon retrival the corer is dismantled and the soft sediment contained within a plastic barrel liner is removed.





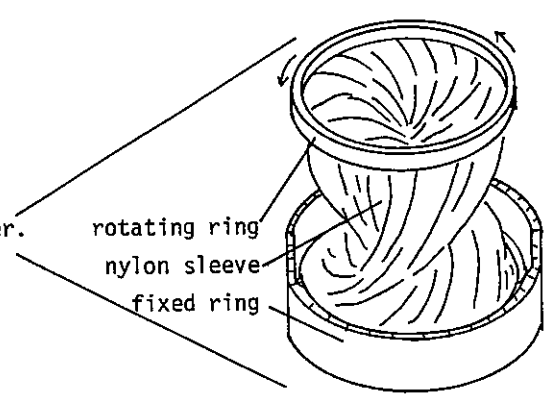
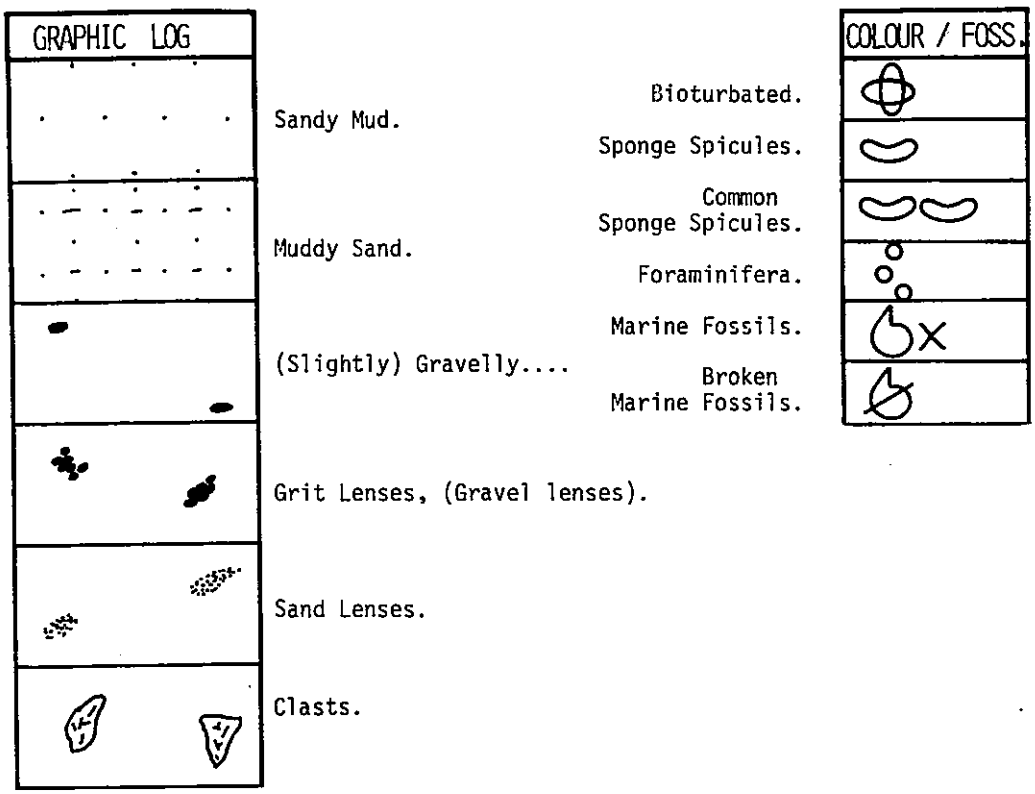


Figure 7. Sphincter Core and other assorted Sample Site locations, Granite Harbour.

Figure 8. Core Description, key to forms. The following forms describe longitudinal splits of sphincter cores from Granite Harbour, (see Fig.7). Graphic and fossil symbols are given below. Textural classifications are after Folk (1974). Core colours, (Munsell notation and name),are from comparison with the Revised Standard Soil Colour Charts,Japan (1967). Frequency curves of subsample grain size analysis' from each core are shown on the forms.The depth to the top of the sampling interval is shown alongside the baseline of each curve. Depths in fractions of metres.



- *VUW #* 81 - 12 *DATE* 26/11/81 *DESCRIBED BY* B.L. Ward *LITHOLOGY* Sandy Mud *TYPE* Sphincter
- *LENGTH (m)* .1 *LOCALITY* 5km north of Cape Roberts, Granite Harbour. *LATITUDE* 76° 59.6'S *LONGITUDE* 163° 9.4'E *DEPTH (m)* 110
- *STORED* ARC / VUW *SUBSAMPLES* 0 - .05, .05 - .08, .08 - .10

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1		7.5Y 4/3	0 - .1 Very poorly sorted, slightly gravelly, sandy mud.	0 4 8Ø
	0.2		7.5Y 5/2	Dark olive to olive grey at base. Soft. Becomes sandier towards base. Heavy sponge mat on surface. Bioturbated, foraminifera and sponge spicules throughout. .09	
	0.3				
	0.4				
	0.5				
	0.6				
	0.7				
	0.8				20% 15 10 5
	0.9				

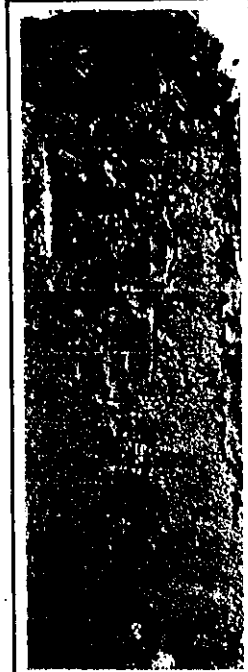
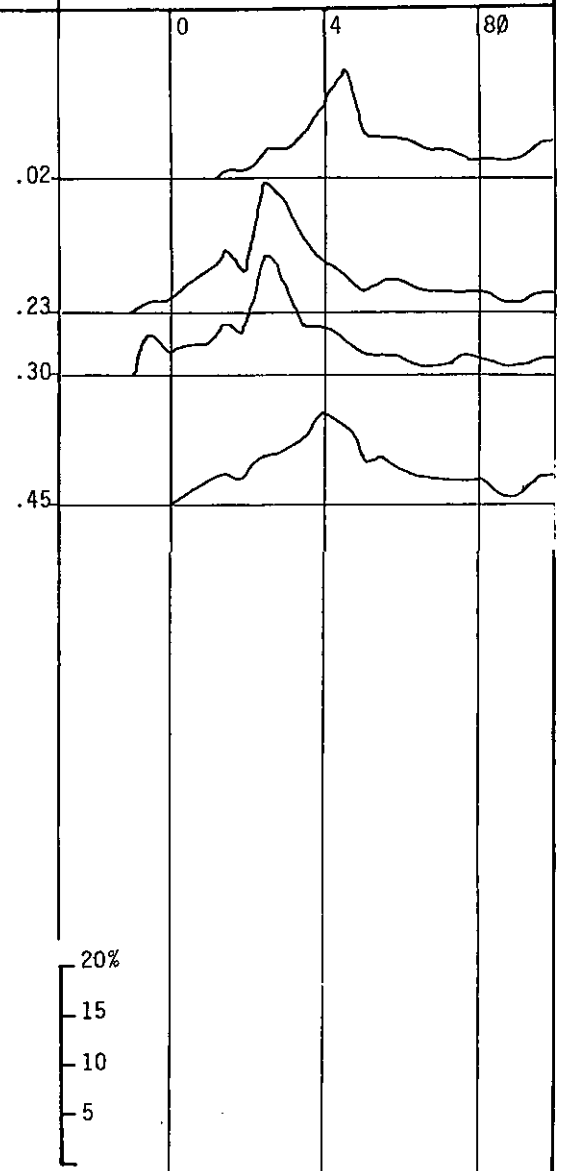
- *VUW #* 81 - 13 *DATE* 27/11/81 *DESCRIBED BY* B.L. Ward *LITHOLOGY* Muddy Sand *TYPE* Sphincter
- *LENGTH (m)* .06 *LOCALITY* 10km north of Cape Roberts, Granite Harbour. *LATITUDE* 76° 56.9'S *LONGITUDE* 163° 2.0'E *DEPTH (m)* 537
- *STORED* ARC/VUW *SUBSAMPLES* 0 - .06

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/3 10Y 3/2	0 - .06 Poorly sorted muddy sand. Dark olive to olive black at base. Sloppy at top. Sandier below .02m. Common granitic clasts up to 30mm long. Common worm tubes.	0 - .06 20% 15 10 5

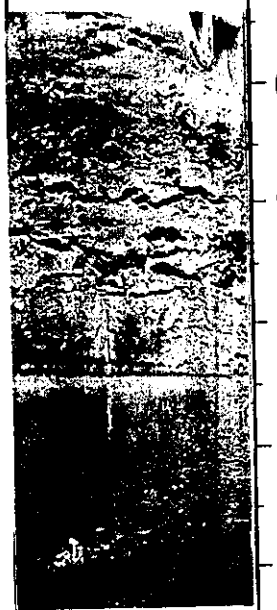
- *VUW #* 81 - 14A *DATE* 02/12/81 *DESCRIBED BY* B.L. Ward *LITHOLOGY* Sandy Mud *TYPE* Sphincter
- *LENGTH (m)* .34 *LOCALITY* 3 km south of Cape Archer, Granite Harbour. *LATITUDE* 76° 52.8'S *LONGITUDE* 162° 55'E *DEPTH (m)* 346
- *STORED* ARC / VUW *SUBSAMPLES* 0 - .03, .33 - .36

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y4/2 7.5Y 2/2 7.5Y 4/2 7.5Y 3/2	0 - .32 Extremely poorly sorted, sandy mud. Dark olive with an olive black area from .07 to .14m. Becomes sandier towards bottom. Scattered sponge spicules throughout. Increase in clasts below .24m. .32 - .34 Extremely poorly sorted, slightly gravelly, muddy sand. Olive black. Scattered sponge spicules throughout.	0 4 8Ø .02 .34 20% 15 10 5

- *VUW #* 81 - 15 *DATE* 29/11/81 *DESCRIBED BY* B.L. Ward *LITHOLOGY* Sandy Mud *TYPE* Sphincter
- *LENGTH (m)* .56 *LOCALITY* South of Mackay Glacier Snout, Granite Harbour *LATITUDE* 76° 59.1'S *LONGITUDE* 162° 30'E *DEPTH (m)* 550.5
- *STORED* ARC / VUW *SUBSAMPLES* 0 - .03, .21 - .24, .27 - .32, .43 - .46

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/3 7.5Y 5/2 10Y 5/2 7.5Y 4/2 7.5Y 4/2	0 - .37 Extremely poorly sorted, sandy mud. Dark olive to olive grey. Grey (7.5Y 5/1) Mottles common but decrease in abundance towards base. Angular mud clasts on top. Slightly gravelly from .21 to .24m. Laminated sand lens from .32 to .39m. Bivalves 8mm long on top. Common sponge spicules throughout. Diffuse but distinct boundary. .37 - .56 Extremely poorly sorted sandy mud. Greyish olive. Slightly gravelly from .43 to .46m. Abundance of sand lenses increases towards base. Bioturbation common to base. Polychaete worm in centre bottom of core. Sponge spicules common throughout.	

- *VUW #* 81 - 16 *DATE* 30/11/81 *DESCRIBED BY* B.L. Ward *LITHOLOGY* Sandy Mud *TYPE* Sphincter
- *LENGTH (m)* .51 *LOCALITY* New Glacier snout, Granite Harbour. *LATITUDE* 77° 2.2'S *LONGITUDE* 162° 26.2'E *DEPTH (m)* 266
- *STORED* ARC / VUW *SUBSAMPLES* 0 - .03, .25 - .27, .41 - .44.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/3 10Y 4/2 10Y 4/2	0 - .56 Extremely poorly sorted, sandy mud. Dark olive to olive grey at base. Black (10Y 3/1) mottles at top. Top soft, sloppy. Sedimentary clasts in lenses from .18 to .24m. Worm tubes common to .16m. Common sponge spicules throughout. Reduced area in centre of core.	0 4 8Ø .02 .26 .43 20% 15 10 5

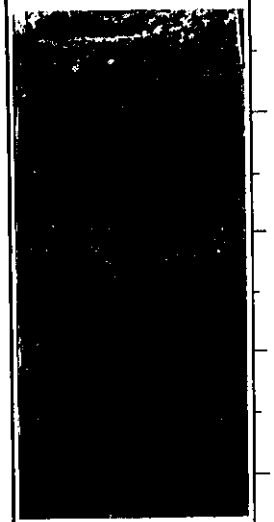
- *VUW #* 81 - 17 *DATE* 03/12/81 *DESCRIBED BY* B.L. Ward *LITHOLOGY* Muddy Sand *TYPE* Sphincter
- *LENGTH (m)* .03 *LOCALITY* 5km east of Cape Roberts, Granite Harbour mouth. *LATITUDE* 77° 1.8'S *LONGITUDE* 163° 24.0'E *DEPTH (m)* 358
- *STORED* ARC / VUW *SUBSAMPLES* 0 - .03

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9			0 - .03 Very poorly sorted, slightly gravelly, muddy sand. Bryozoa, sea spider and small brittle star on top. Sponge spicules common.	0 4 80 .02 20% 15 10 5

- *VUW #* 82 - 1 *DATE* 16/11/82 *DESCRIBED BY* A.R. Pyne *LITHOLOGY* Gravelly Muddy Sand *TYPE* Sphincter
- *LENGTH (m)* .30 *LOCALITY* Within crack, Mackay Glacier Tongue. *LATITUDE* 76° 59.1'S *LONGITUDE* 162° 21.3'E *DEPTH (m)* 303
- *STORED* ARC / VUW *SUBSAMPLES* 0 - .02, .04 - .08, .12 - .15, .18 - .24, .25 - .30.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1			0 - .30 Poorly sorted, gravelly, muddy sand. Clasts common throughout. Common sponge spicules throughout.	0 4 8Ø 20% 15 10 5
	0.2				
	0.3				
	0.4				
	0.5				
	0.6				
	0.7				
	0.8				
	0.9				

- *VUW #* 82 - 2 *DATE* 17/11/82 *DESCRIBED BY* A.R. Pyne *LITHOLOGY* Sandy Mud *TYPE* Sphincter
- *LENGTH (m)* .43 *LOCALITY* NE tip, Mackay Glacier Tongue *LATITUDE* 76° 57.4'S *LONGITUDE* 162° 26'E *DEPTH (m)* 757
- *STORED* ARC / VUW *SUBSAMPLES* 0 - .02, .02 - .11, .11 - .21, .21 - .27, .27 - .31, .31 - .36, .36 - .40, .40 - .43.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9			0 - .22 Poorly sorted sandy mud. Yellowish-greenish olive to yellow olive. Black mottle from .08 - .13m. Soft. Sandy lens from .11 to .13m. Common sponge spicules and worm tubes. .22 - .43 Poorly sorted sandy mud. Dark olive grey to dark grey at base. Firm. Becomes sandier towards base. .40mm Granitic clast at .27m. Clasts up to 25mm common. Sponge spicules common.	0 4 8Ø 20% 15 10 5

- *VUW #* 83 - 12 *DATE* 30/05 85 *DESCRIBED BY* A.J. Macpherson *LITHOLOGY* Sandy Mud *TYPE* Sphincter
- *LENGTH (m)* .64 *LOCALITY* Mouth of Granite Harbour. *LATITUDE* 76° 54.8'S *LONGITUDE* 163° 21.5'E *DEPTH (m)* 788
- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m; GSA @ 0, .1, .2, .3, .4, .5, .62.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		5Y 4/4 7.5Y 4/3	0 - .64 Poorly sorted sandy mud. Dark olive with common olive black mottles from .22 to .44m. Sloppy to .07m, but firms to base. Sparse sponge spicules, sparsely bioturbated over top .15m. Bivalve on top surface. Absence of any clasts. :Yoldiella sabrina (Hedley) on top.	0 4 8Ø 0 .1 .2 .3 .4 .5 .62 20% 15 10 5

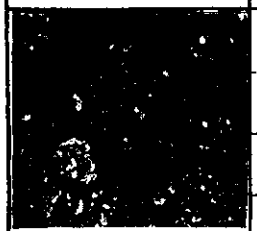
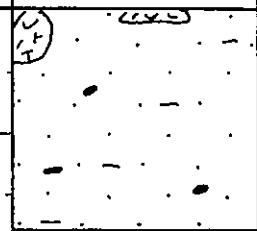
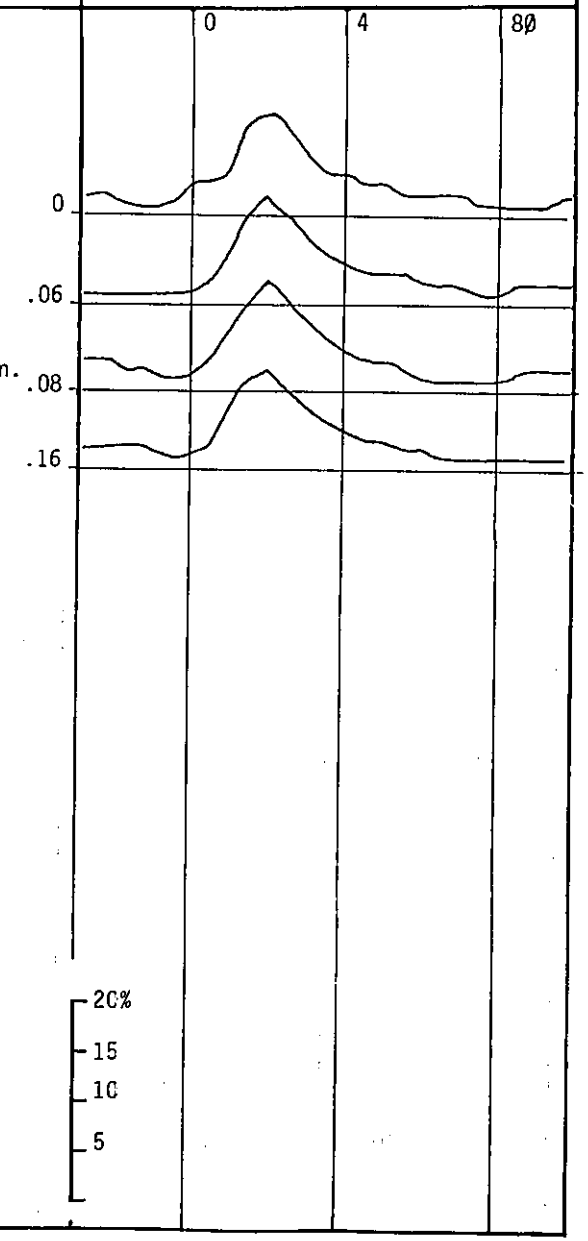
- *VUW #* 83 - 14 *DATE* 24/05/85 *DESCRIBED BY* A.J. Macpherson *LITHOLOGY* Muddy Sand. *TYPE* Sphincter
- *LENGTH (m)* .13 *LOCALITY* Off Lion Island, Granite Harbour. *LATITUDE* 76° 53.0'S *LONGITUDE* 162° 45.0'E *DEPTH (m)* 165
- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m; GSA @ 0, .06, .08, .11.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0,1 – 0,2 – 0,3 – 0,4 – 0,5 – 0,6 – 0,7 – 0,8 – 0,9		7.5Y 4/2 7.5Y 3/2	0 - .13 Poorly sorted, gravelly, muddy sand. Greyish olive to olive black at base. Coarsens slightly to base. Common angular Granitic clasts up to 45mm. Common sponge spicules and bioturbation. (Sparse soft worm tubes). Common sandy lenses throughout. Occasional sub-angular striated clasts.	0 4 8Ø 0 .06 .11 20% 15 10 5

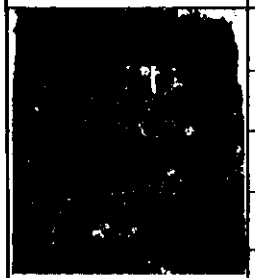
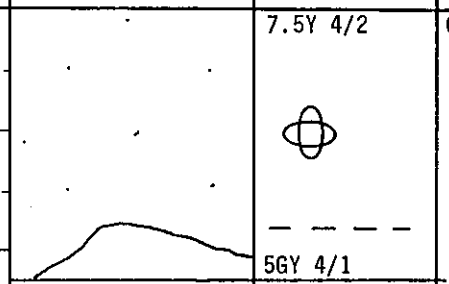
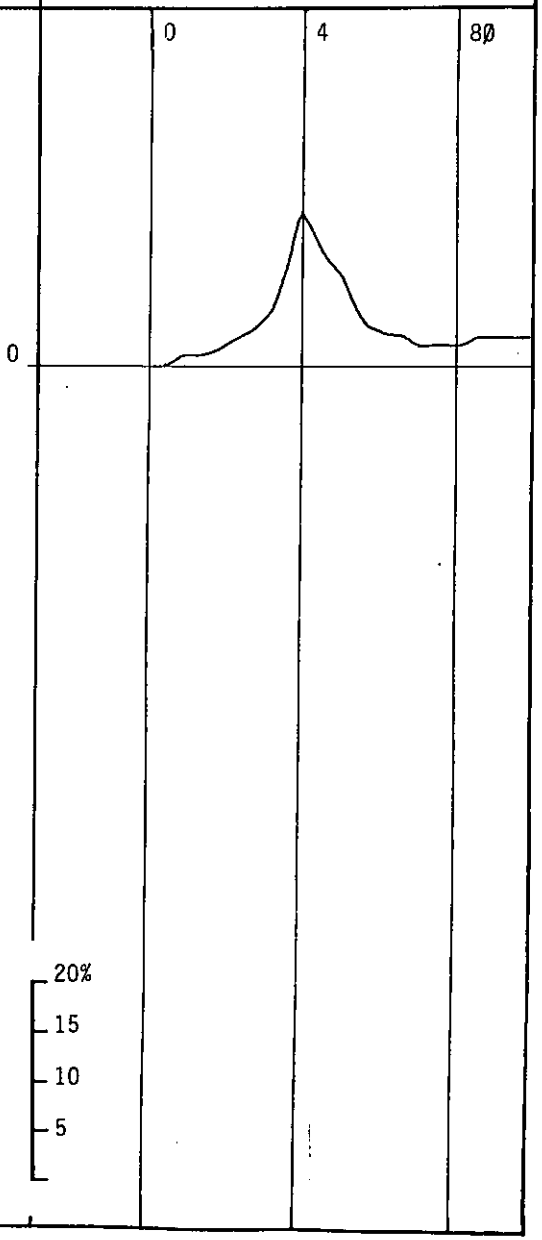
- *VUW #* 83 - 15 *DATE* 12/06/85 *DESCRIBED BY* A.J. Macpherson *LITHOLOGY* Sandy Mud *TYPE* Sphincter
- *LENGTH (m)* .65 *LOCALITY* Central Granite Harbour. *LATITUDE* 76° 58.3'S *LONGITUDE* 162° 38.6'E *DEPTH (m)* 700
- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m, GSA @ 0,.1, .2, .3, .44, .53, .55, .63

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/3 5GY 4/1 7.5Y 4/3	0 - .46 Poorly sorted sandy mud. Dark olive at top but becomes greyish olive below .05m. Top .02m sloppy, but firms to base. Sparse black (2.5GY 2/1) mottles below .1m. Sparse sponge spicules and angular clasts. Lack of bioturbation. Sparse shelly fragments throughout. Small (9mm) bivalve on top. .46 - .55 Slightly gritty, sandy mud. Olive grey. Puggy. Sparse sponge spicules. Sharp upper and lower contacts. .55 - .65 Slightly sandy mud. Dark olive. Firm.	0 4 3Ø 0 20% 15 10 5

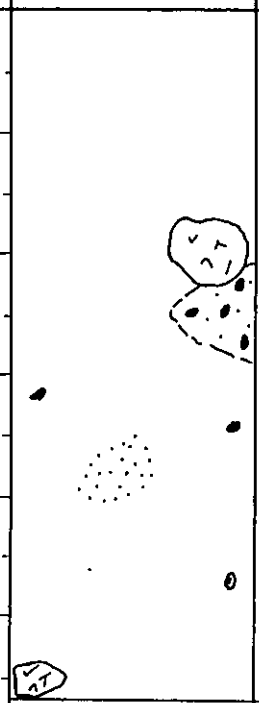
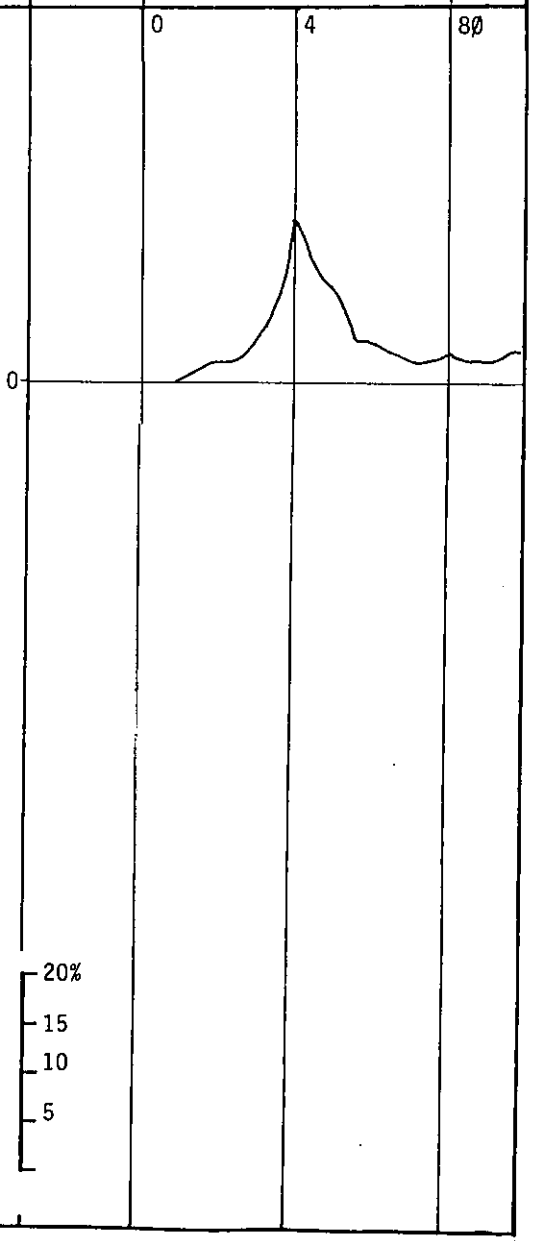
- *VUW #* 83 - 31 *DATE* 23/05/85 *DESCRIBED BY* A.J. Macpherson *LITHOLOGY* Gravelly, Muddy Sand. *TYPE* Sphincter
- *LENGTH (m)* .18 *LOCALITY* Within canyon, Mackay Glacier Tongue. *LATITUDE* 76° 59.2'S *LONGITUDE* 162° 23.0'E *DEPTH (m)* 260
- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m, GSA @ 0, .06, .08, .16.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		5Y 4/2 	0 - .18 Very poorly sorted, gravelly, muddy sand. Grey, with sparse greyish olive (7.5Y 4/2) mottles. Firm. Common sandy lenses throughout. Common granitic clasts (mostly striated) up to 42mm. long. Sparse carbonaceous shale up to 30mm long. Sparse reddish grey (5R 3/1) Aztec Siltstone clasts towards base. Sparse bioturbation, (soft worm tubes) 4mm dia. by 25mm long towards top. Sponge spicules common. Bryozoa common.	

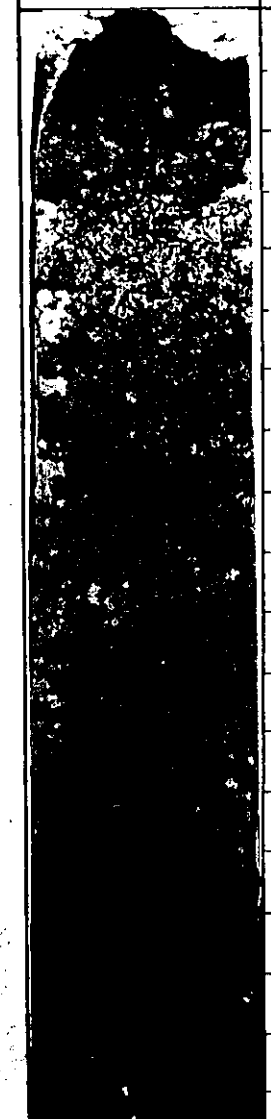
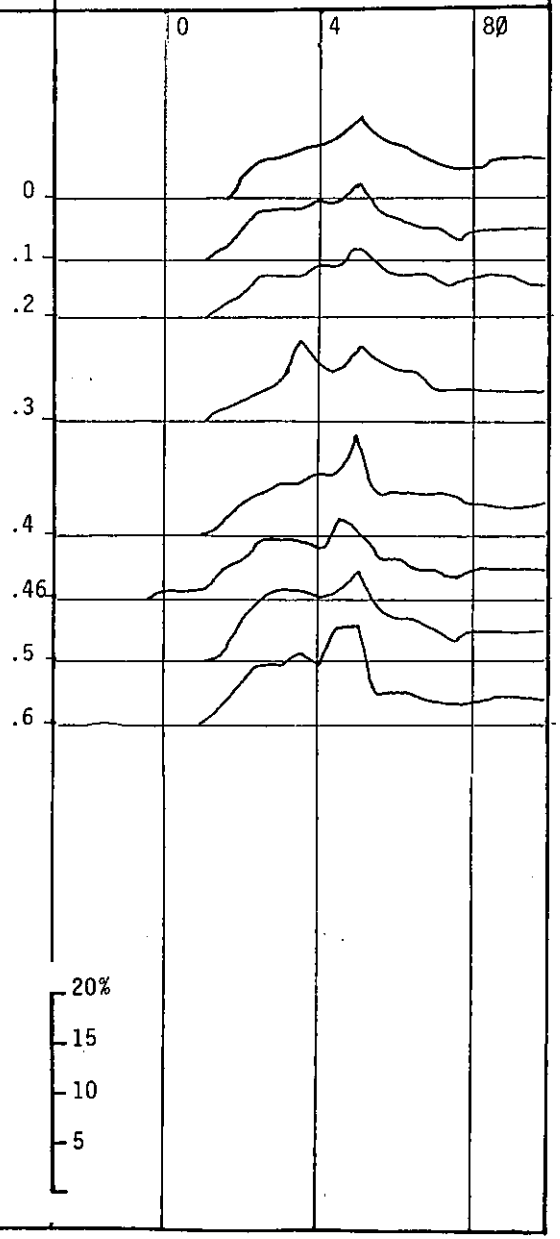
- *VUW #* 83 - 32a *DATE* 21/05/85 *DESCRIBED BY* A.J. Macpherson. *LITHOLOGY* Fine Sandy Mud. *TYPE* Sphincter
- *LENGTH (m)* .22 *LOCALITY* Off Cape Geology, Granite Harbour. *LATITUDE* 76° 56.7'S *LONGITUDE* 162° 28.7'E *DEPTH (m)* 395
- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m, GSA @ 0, .1, .16, .20.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/2 5GY 4/1	0 - .17 Poorly sorted, fine sandy mud. Greyish olive with occasional black (N 2/0) mottles. Sloppy at top but stiffens towards base. (.08 - .12: poorly sorted gritty mud in sponge spicule mat.) Angular basaltic clast at base. Sharp contact. .17 - .22 Very poorly sorted gravelly mud. Dark grey. Firm. Gravel up to 18mm. :Soft worm tubes and polychaete worms up to 8mm dia. by 60mm long common. Sparse calcareous worm tubes up to 4mm dia. towards top. Micaceous flakes common.	

- *VUW #* 83 - 32b *DATE* 27/05/85 *DESCRIBED BY* A.J. Macpherson *LITHOLOGY* Sandy Mud *TYPE* Sphincter
- *LENGTH (m)* .57 *LOCALITY* Off Cape Geology, Granite Harbour. *LATITUDE* 76° 56.7'S *LONGITUDE* 162° 28.7'E *DEPTH (m)* 395
- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m, GSA @ 0, .1, .2, .24, .28, .3, .38, .5, .55.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/3 10Y 4/1	0 - .30 Poorly sorted, fine sandy mud. Dark olive with occasional black (N 1.5/0) mottles. Slightly sloppy at top but stiffens below .05m. Very poorly sorted gritty mud associated with sponge spicules from .21 to .29m. Abundant sponge spicules throughout with sponge mat on surface. Common bioturbation throughout. Gradational contact. .30 - .36 Poorly sorted gritty mud. Grey. Firm. Common angular granitic grit. Common sponge spicules. .36 - .57 Poorly sorted sandy mud. Grey. Firm. Gradational change to a gritty mud at base. :Common micaceous flakes throughout.	

- *VUW #* 83 - 33 *DATE* 07/06/85 *DESCRIBED BY* A.J. Macpherson *LITHOLOGY* Sandy Mud *TYPE* Sphincter
- *LENGTH (m)* .92 *LOCALITY* Off snout, Mackay Glacier Tongue. *LATITUDE* 76° 58.4'S *LONGITUDE* 162° 58.4'E *DEPTH (m)* 460
- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m, GSA @ 0, .1, .2, .3, .4, .46, .5, .6, .7, .8, .9.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/3 10Y 4/2 10Y 4/2	0 - .92 Very poorly sorted, sandy mud. Dark olive to olive grey. Sloppy to .05m, but firms to base. Sparse sandy lenses except from .45 to .49m where lenses are associated with common sponge spicules. Sparse sponge spicules throughout rest. Absence of clasts and bioturbation.	

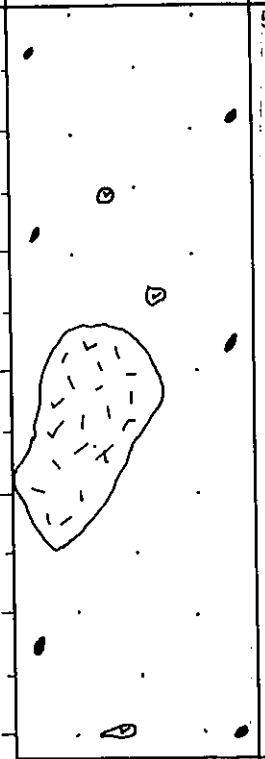
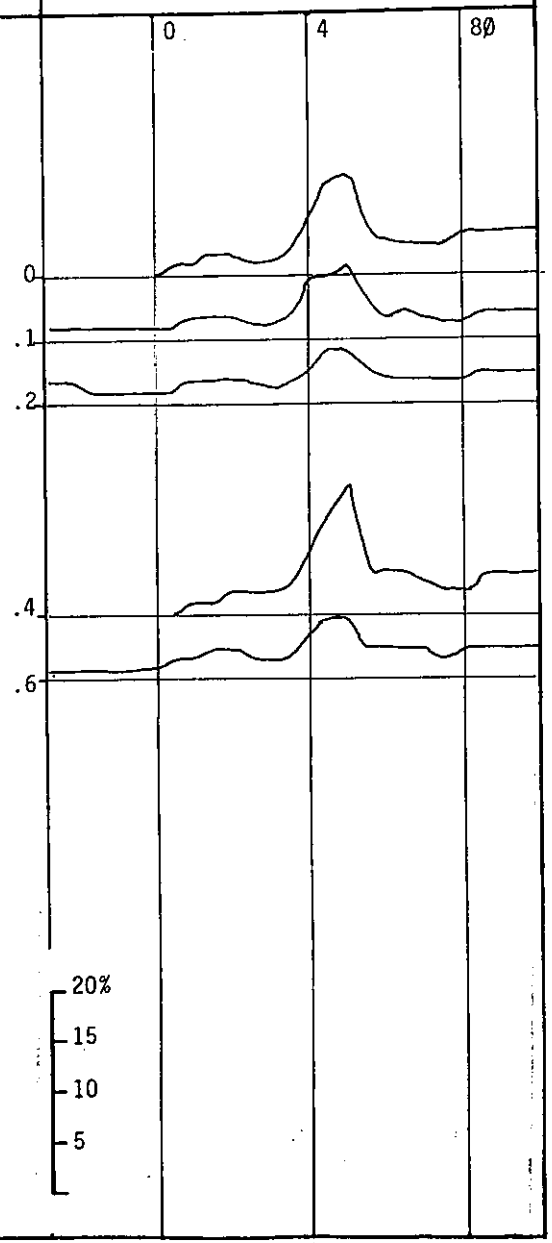
- *VUW # 83 - 34* *DATE* 28/05/85 *DESCRIBED BY* A.J. Macpherson *LITHOLOGY* Gravelly, Sandy Mud. *TYPE* Sprincter

- *LENGTH (m)* .65 *LOCALITY* Off SE corner, Kar Plateau, Granite Harbour. *LATITUDE* 76° 56.5'S *LONGITUDE* 162° 32'E *DEPTH (m)* 530

- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m, GSA @ 0, .08, .1, .2, .3, .4, .5, .63.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/3 10Y 4/2 10Y 4/2	0 - .10 Very poorly sorted gravelly sandy mud. Dark olive. Firm. Sparse worm tubes, worms and sponge spicules. Gradational colour change to base. .10 - .65 Poorly sorted sandy mud. Olive grey. Firm at top, but becomes sloppy below .2m. Sparse granitic clasts up to 15mm. sparse sandy lenses up to 30mm dia. from .2 to .4m. Sparse sponge spicules throughout. Sparse bioturbation to .25m. Unit fines slightly to base.	0 0 4 8Ø 20% 15 10 5

- *VUW #* 83 - 35 *DATE* 24/05/85 *DESCRIBED BY* A.J. Macpherson *LITHOLOGY* Gravelly, Sandy Mud. *TYPE* Sphincter
- *LENGTH (m)* .62 *LOCALITY* Central Granite Harbour. *LATITUDE* 76° 58.0'S *LONGITUDE* 162° 36'E *DEPTH (m)* 704
- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m, GSA @ 0,.1, .2, .3, .4, .5, .6.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		5Y 4/2 7.5Y 4/3	0 - .62 Very poorly sorted, gravelly, sandy mud. Greyish olive with common olive black (7.5Y 2/2) mottles. Sloppy to .05m but firms to base. Common angular granitic and lamphrophyre clasts throughout. 170mm lamphrophyre boulder from .25 to .42m.(No sand or grit associated with it.) Sparse sandy lenses throughout. Sparse sub-rounded and striated clasts. Common shell fragments and bivalves (8mm long) throughout. Common sponge spicules. Bryozoa on top. Calcareous worm tubes 3mm dia. by 45mm long in top .1m. Soft worm tubes to .43m. Brittle star on top. :Yoldiella sabrina (Hedley) present at .03, .12, .28 .33, .41m.	

- *VUW #* 83 - 36 *DATE* 10/06/85 *DESCRIBED BY* A.J. Macpherson *LITHOLOGY* Sandy Mud. *TYPE* Sphincter
- *LENGTH (m)* 1.49 *LOCALITY* Avalanche Bay, Granite Harbour. *LATITUDE* 77° 00.2'S *LONGITUDE* 162° 48.2'E *DEPTH (m)* 763
- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m, GSA @ 0 - .4, .4, .5, .6, .7, .8, .9, 1.0, 1.1, 1.2, 1.3, 1.4, 1.49.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/3 7.5Y 4/3	0 - .40 Poorly sorted sandy mud. Dark olive. Sloppy. Occasional black mottles. Sparse sponge spicules. :Corer penetrated deeper than barrel length, hence this interval was sampled in bulk. .40 - 1.19 Moderately well sorted, sandy mud. Dark olive with sparse black (10Y 4/1) mottles around .8m. Firm. Sparse sandy lenses associated with abundant sponge spicules around 1.0m. Sparse sponge spicules. Sparse bioturbation to .65m. (Soft worm tube at .62m). Shell fragments associated with sponge mat at .76m.	0 4 8Ø 0 20% 15 10 5

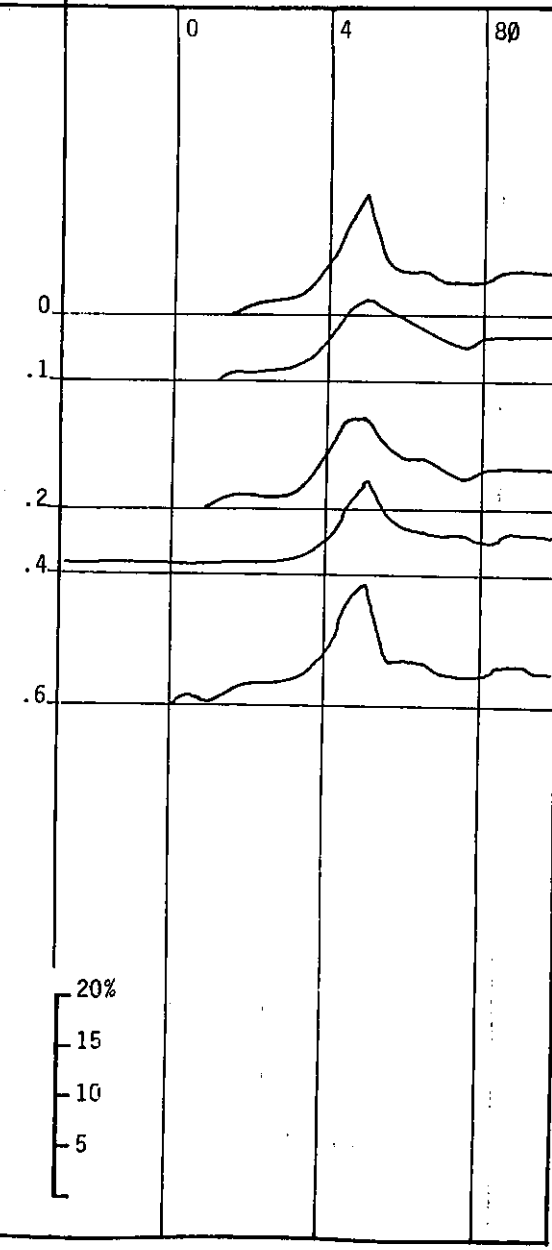
- VUW # 83 - 36 *DATE* *DESCRIBED BY* *LITHOLOGY* *TYPE*
- *LENGTH (m)* *LOCALITY* *LATITUDE* *LONGITUDE* *DEPTH (m)*
- *STORED* *SUBSAMPLES*

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/3 7.5Y 4/3 5Y 4/3 5Y 4/4	:Continued from previous log. 1.19 - 1.49 Moderately well sorted sandy mud. Dark olive. Firm. Sparse sponge spicules.	0 4 8Ø 20% 15 10 5

- *VUW #* 83 - 37 *DATE* 07/06/85 *DESCRIBED BY* A.J. Macpherson. *LITHOLOGY* Slightly Gravelly Sandy Mud. *TYPE* Sphincter
- *LENGTH (m)* .84 *LOCALITY* Central Granite Harbour. *LATITUDE* 76° 57.1'S *LONGITUDE* 162° 47.9'E *DEPTH (m)* 572
- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m, GSA @ 0, .1, .2, .3, .4, .5, .6, .7, .82.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/3    10Y 4/2 	0 - .84 Poorly sorted, slightly gravelly sandy mud. Dark olive to olive grey below .3m. Sloppy at top but firms below .1m. Occasional sandy lenses associated with abundant sponge spicules (localised). Clasts up to 25mm common below .3m. Sparse sponge spicules. Sparse shell fragments to .3m. Bivalves on top. Sparse bioturbation (soft worm tubes) to .3m. Calcareous worm tube on top. :Yoldiella sabrina (Hedley) on top.

ANALYTICAL RESULT



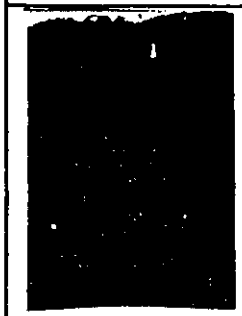
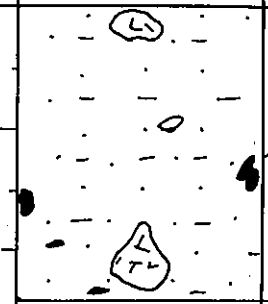
- *VUW #* 83 - 38 *DATE* 11/06/85 *DESCRIBED BY* A.J. Macpherson *LITHOLOGY* Sandy Mud *TYPE* Sphincter
- *LENGTH (m)* .79 *LOCALITY* Central Granite Harbour. *LATITUDE* 76° 55.8'S *LONGITUDE* 162° 54.4'E *DEPTH (m)* 804
- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m, GSA @ 0, .1, .2, .3, .43, .5, .6, .7, .77.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION	ANALYTICAL RESULT
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/3 7.5Y 4/3 7.5Y 4/1 7.5Y 4/3 7.5Y 4/3	0 - .41 Poorly sorted sandy mud. Dark olive. Sloppy at top but firms below .1m. Common olive black (7.5Y 3/2) mottles throughout. Sparse sponge spicules. Sparse bioturbation to .05m. Shell fragments on top. .41 - .46 Sandy mud. Grey. Puggy. Sparse grit up to 8mm. Sparse sponge spicules. Sharp contact. .46 - .79 Poorly sorted sandy mud. Dark olive. Firm. Common olive black (7.5Y 3/2) mottles throughout. Sparse granitic clasts up to 20mm below .74m. Sparse sponge spicules. :Yoldiella sabrina (Hedley) living on top.	0 4 8Ø 0 .1 .2 .4 .6 20% 15 10 5

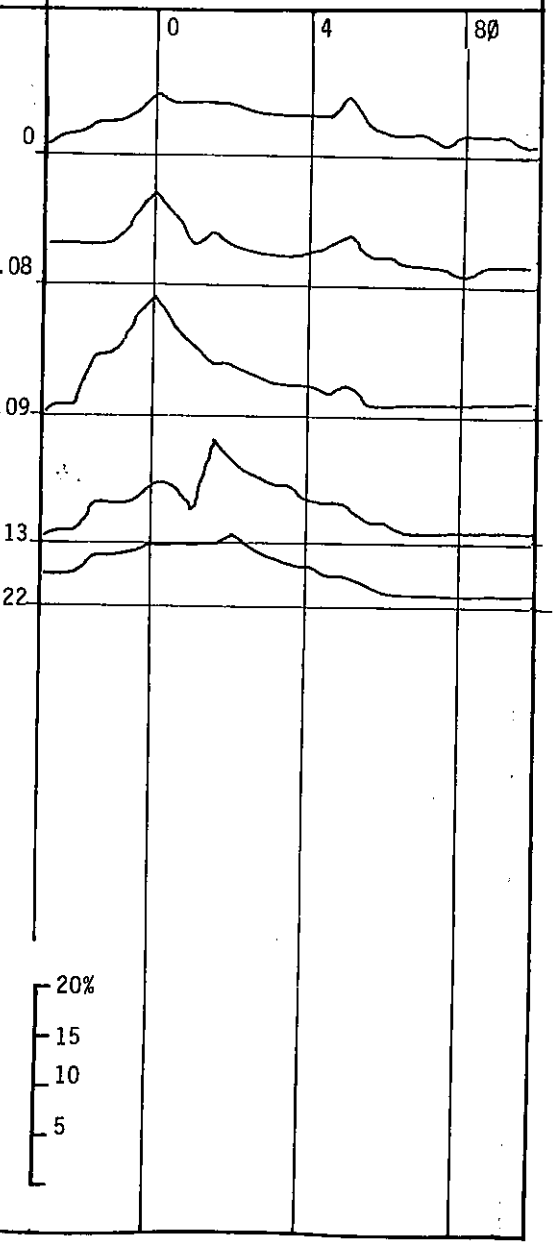
- VUW # 83 - 39 *DATE* 22/05/85 *DESCRIBED BY* A.J. Macpherson *LITHOLOGY* Gravelly Sandy Mud. *TYPE* Sphincter

- *LENGTH (m)* .24 *LOCALITY* Northern Granite Harbour. *LATITUDE* 76° 53.6'S *LONGITUDE* 162° 48.4'E *DEPTH (m)* 265

- *STORED* ARC / VUW *SUBSAMPLES* ^{210}Pb every .05m, GSA @ 0, .08, .09, .13, .22.

PHOTOGRAPH	(M)	GRAPHIC LOG	COLOUR	LITHOLOGIC DESCRIPTION
	0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9		7.5Y 4/2 2.5GY 4/1 5GY 4/1	0 - .08 Very poorly sorted muddy sand. Greyish olive. Firm, but stiffens to base. Sparse calcareous worm tubes. Sharp angular contact. .08 - .17 Very poorly sorted gravelly mud. Dark olive grey. Firm. Common angular granitic clasts up to 30mm. Sparse sponge spicules and worm tubes. Gradational contact over 20mm. .17 - .24 Extremely poorly sorted gravelly, muddy sand. Dark olive grey. Firm. Common angular granitic clasts up to 97mm. (Avg. =25mm).

ANALYTICAL RESULT



6. GRAIN SIZE DATA

6.1 Sample Collection

The notes below briefly describe the occurrence and collection procedure for samples from which grain size distributions were determined. Sample locations are shown in Fig. 4 and Fig. 7.

6.1.1 Mackay Glacier Sediment (Table 8): Basal glacier and englacial samples were collected by cutting out and melting blocks of debris enriched ice. Basal debris was observed in small overturned bergs close to the grounding line of the Mackay Glacier. Englacial debris was observed within the southern ice stream of the Mackay Glacier. Supraglacial samples were collected by 'cleaning out' small meltpools on the surface of the Glacier and Glacier Tongue.

6.1.2 Iceberg and Icecliff Sediment (Table 9): These samples were collected by melting down blocks of ice from debris rich bands in bergs or ice cliffs in Granite Harbour. Sampling often involved scaling the vertical sides of bergs or cliffs.

6.1.3 Aeolian Sediment (Table 10): Fine and very fine sand accumulating in surface snow and the top few centimetres of sea ice was collected over a 10 sq m area at several sites within Granite Harbour. The snow and ice was melted in a copper drum using a petrol immersion heater. Collected weights are given in Table 16.

6.1.4 Trapped Sediment (Table 11): Conical, fibreglass traps deployed for periods of between four and eight weeks beneath annual sea ice collected sediment settling out of the water column. Sediment was frozen or preserved in alcohol upon recovery and analysed in New Zealand.

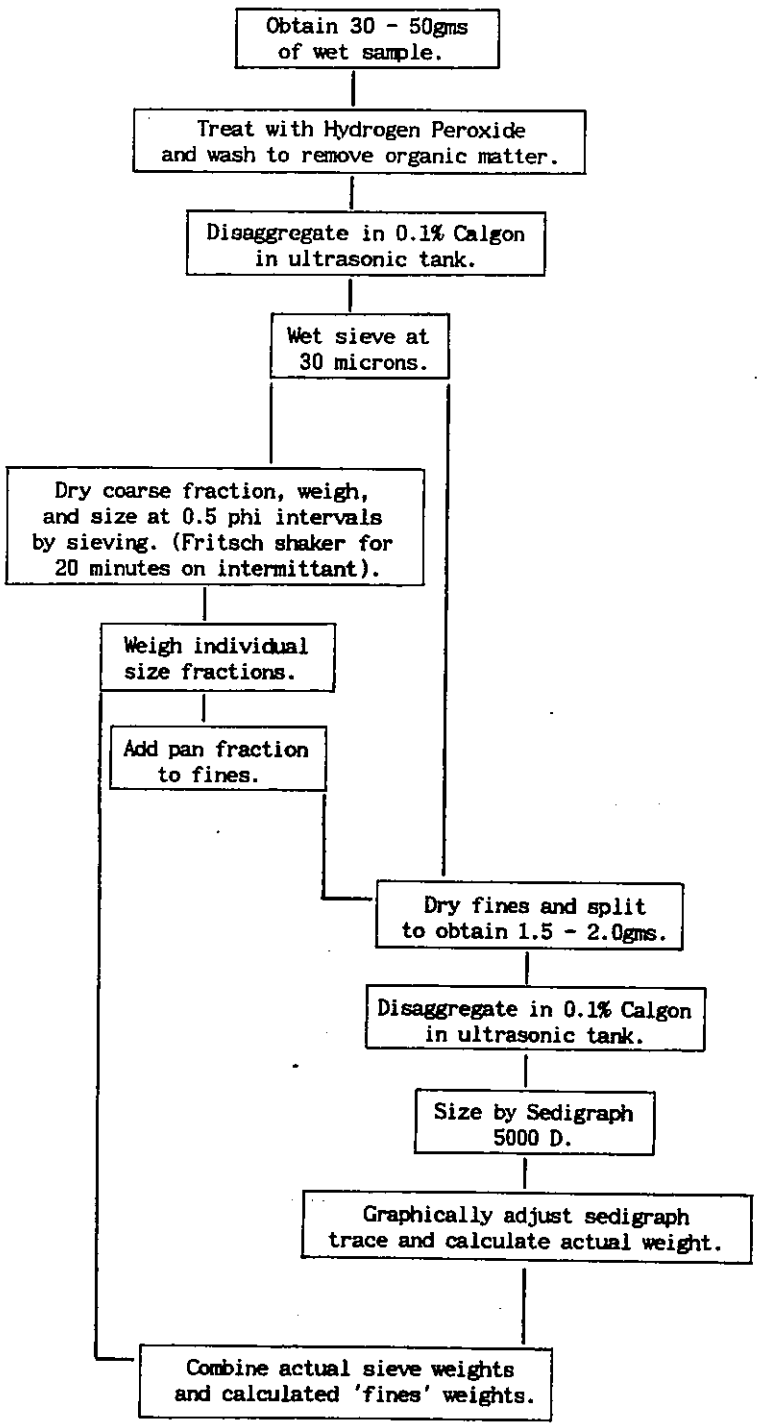
6.1.5 Sea Floor Sediment (Table 12): Sphincter cores taken at various sites in Granite Harbour were frozen upon recovery and returned to New Zealand for splitting and subsampling. The cores are described in Section 5 above.

6.2 Methods

In the laboratory subsamples of 30 to 50 g were obtained from mud samples with a blade, and from loose sand samples with a sample splitter. Fig. 9 is a flow chart for sample preparation.

Marine samples were treated with H_2O_2 and washed to remove organic matter (Carver 1971). Samples judged to be more than 5% mud were separated into fine and coarse fractions by wet sieving at 30 μm. The coarse fraction was sized at ½ phi intervals by sieves and a Fritsch automatic shaker. The pan fraction (finer than 5 phi) was added to the fines from wet sieving. The fine fraction thus collected was sized by Sedigraph 5000D, which produces a continuous record from settling analysis by using a soft X-ray beam to follow the declining density of the sediment suspension (Micrometrics, 1978; Stein, 1985). Proportions of the sample in each size class were read off at ½ phi intervals down to 10 phi. These were converted to weight in each size class which could be combined with the coarse data to yield a complete size distribution. The standard statistics (percentiles, graphic and moment measures, proportions of gravel, sand, silt and clay), were then calculated and a histogram plotted for each sample (Tables 8 to 12).

Figure 9. Flow chart for grain size analysis of marine sediments. The following procedure was used for all marine sediment analyses in this report and with some minor modifications, for most other samples.



6.3 Discussion of Errors

The precision in grain size analysis is high, but accuracy is harder to achieve. Replicate analyses for sphincter core samples 33, 0-02 cm and 38, 0-02 cm are given in Table 12, and show differences of only 0.07 phi and 0.10 phi in mean and standard deviation respectively.

Two independent checks of sieve mesh size by microscopically measuring the mesh diameter show only small differences from manufacturer's stated diameter (average 0.02 phi) (Table 7). The sieves are manufactured to be simple multiples of ½ phi. However there are small differences that constitute a perceptible bias in the data unless the correct class boundaries are used in calculating the statistics. All analyses have been corrected in this way and can be identified by having class limits which are not exactly ½ phi boundaries. Corrections have also been made for the variations in the height of the histogram bars due to these small variations in size class width.

From earlier comparison of pipette and sedigraph analyses, a deficiency of varying proportions was observed in the coarse silt fraction of Sedigraph data and is an inherent feature of this machine. For the analyses in this data series, samples have been 'corrected' by graphically adjusting the sedigraph curve to join smoothly with the fine end of the sieve size curve. This adjustment rarely affects the mean and standard deviation by more than 0.1 phi.

Table 7. Comparison of Sieve Ratings with Mean ($\bar{x}$) and Standard Deviation (s) for Sieve Apertures from 6 sets of 10 measurements per sieve. Differences between successive size classes in parentheses.
Full procedure outlined in Barrett (1980), 'Sieve Calibration, August 1980' unpublished manuscript obtainable on request from the author.

Sieve Rating		Microscope Calibration 1985 A. Macpherson		1980 P. Barrett		Difference from Rated Values for 1985 data	
microns	phi	x	s	x	s	Sieve Ratings	½ phi interval
32	4.97	5.04	0.05			+0.07	+0.04
		(0.46)					
45	4.47	4.58	0.03	4.53	0.11	+0.11	+0.08
		(0.58)		(0.47)			
63	3.99	4.00	0.02	4.06	0.06	+0.01	0
		(0.49)		(0.53)			
90	3.47	3.51	0.02	3.53	0.06	+0.04	+0.01
		(0.53)		(0.57)			
125	3.00	2.98	0.01	2.96	0.02	-0.02	-0.02
		(0.49)		(0.51)			
180	2.47	2.49	0.01	2.45	0.02	+0.02	-0.01
		(0.41)		(0.39)			
250	2.00	2.08	0.02	2.06	0.04	+0.08	+0.08
		(0.56)		(0.62)			
355	1.49	1.52	0.02	1.44	0.04	+0.03	+0.02
		(0.49)		(0.46)			
500	1.00	1.03	0.02	0.98	0.04	+0.03	+0.03
		(0.54)		(0.49)			
710	0.49	0.49	0.02	0.49	0.03	0	-0.01
		(0.50)		(0.48)			
1000	0.00	-0.01	0.01	0.01	0.01	-0.01	-0.01

Table 8. Mackay Glacier Grain Size Data, basal, englacial and supraglacial. Summary Statistics.
Sample collection and analytical procedure are outlined in Section 6.
Sample locations are shown on Figure 7.
83 - 64.Uppermost basal berg in southern ice canyon, Mackay Glacier Tongue.
83 - 65.Lowermost basal berg in southern ice canyon, Mackay Glacier Tongue.
83 - 66.Basal berg to north of Mackay Glacier Tongue.
83 - 67.Lag from terminal ice-cored morraine, southern ice stream, Mackay Glacier.
83 - 68.Englacial debris from southern ice stream, Mackay Glacier.
84 berg.Basal debris from berg at southern grounding line, Mackay Glacier.
82 - 1 to 84 - s3.Supraglacial debris from Mackay Glacier and Tongue.

	PERCENTILES								FOLK MEASURES				MOMENT MEASURES							
	1	5	16	25	50	75	84	95	MEAN	SDEV	SKEW	KURT	MEAN	SDEV	SKEW	KURT	GRVL	SAND	SILT	CLAY
83 - 64	-7.7	-4.4	-1.3	0.5	2.1	4.6	6.8	11.0	2.56	4.36	0.16	1.53	2.86	4.02	0.86	3.27	17.3	54.4	15.6	12.7
83 - 65	-3.8	-2.7	-1.2	0.3	1.9	3.4	4.6	9.7	1.76	3.31	0.09	1.67	2.22	3.52	1.03	4.55	17.3	63.1	11.9	7.7
83 - 66a	-7.5	-4.1	-1.4	-0.5	1.8	3.8	5.4	10.2	1.93	3.87	0.13	1.37	2.19	3.89	0.88	3.73	19.5	57.1	14.1	9.3
83 - 66b	-8.0	-3.9	-1.4	-0.7	1.2	3.0	4.0	7.8	1.26	3.12	0.08	1.29	1.48	3.28	1.07	4.90	21.3	63.0	11.0	4.8
83 - 67	-3.5	-2.4	-0.9	-0.1	1.1	2.0	2.4	3.3	0.84	1.69	-0.23	1.13	0.83	1.74	-0.48	3.19	15.4	82.7	1.8	0.0
83 - 68	-6.6	-4.7	-2.8	-1.8	1.0	3.9	6.2	11.0	1.48	4.63	0.22	1.12	1.74	4.52	0.87	3.06	32.4	43.4	12.1	12.0
84 berg	-6.3	-3.4	-0.8	0.8	1.9	2.9	3.7	8.4	1.59	2.91	-0.03	2.27	1.99	3.16	1.02	5.55	15.0	71.0	8.4	5.6
82-1	-0.3	0.7	1.5	1.9	2.5	3.2	3.5	4.2	2.53	1.03	-0.04	1.07	2.51	1.06	-0.24	3.25	0.0	92.9	7.1	0.0
82-2	-0.3	0.9	1.7	2.0	2.7	3.3	3.7	4.4	2.67	1.04	-0.02	1.06	2.65	1.08	-0.34	3.69	0.4	90.2	9.4	0.0
82-3	-0.8	0.1	1.2	1.6	2.5	3.4	3.7	4.6	2.46	1.32	-0.03	1.04	2.46	1.32	-0.22	2.94	0.5	88.7	10.8	0.0
83 - 61	-2.3	-0.6	0.4	0.9	1.7	2.5	2.8	3.7	1.65	1.23	-0.06	1.12	1.68	1.47	1.14	11.43	2.6	94.0	2.9	0.5
83 - 62	-2.6	-1.8	-1.0	-0.6	0.4	1.2	1.5	2.1	0.28	1.22	-0.10	0.86	0.25	1.24	-0.16	2.46	16.7	83.2	0.1	0.0
83-s1	0.2	0.8	1.4	1.7	2.3	2.9	3.1	3.7	2.28	0.86	-0.01	1.04	2.28	0.89	0.01	3.18	0.0	97.5	2.5	0.0
84-s2	0.5	1.4	2.0	2.3	2.9	3.5	3.7	4.3	2.90	0.88	-0.07	1.05	2.89	0.91	-0.26	3.42	0.0	90.3	9.7	0.0
84-s3	0.4	1.2	1.8	2.1	2.8	3.3	3.5	4.0	2.71	0.84	-0.12	0.99	2.71	0.88	-0.37	3.32	0.0	95.2	4.8	0.0

Table 9. Iceberg and Icecliff Grain Size Data. Summary Statistics.
Sample collection and analytical proceedure are outlined in Section 6.
Sample locations are shown on Figure 7.

	PERCENTILES								FOLK MEASURES				MOMENT MEASURES							
	1	5	16	25	50	75	84	95	MEAN	SDEV	SKEW	KURT	MEAN	SDEV	SKEW	KURT	GRVL	SAND	SILT	CLAY
3 - 63	-5.2	-3.4	-1.7	-0.4	1.8	3.7	4.9	8.9	1.66	3.51	0.05	1.25	1.97	3.58	0.73	3.73	21.2	56.7	15.1	7.0
cliffs	-4.4	-3.3	-2.1	-1.4	0.6	2.6	3.6	6.5	0.67	2.90	0.13	1.01	0.85	3.01	0.83	4.03	30.0	56.9	10.8	2.4

Table 10. Aeolian Grain Size Data. Summary statistics.
Sample collection and analytical proceedure are outlined in Section 6.
Sample locations are shown on Figure 4.

	PERCENTILES								FOLK MEASURES				MOMENT MEASURES							
	1	5	16	25	50	75	84	95	MEAN	SDEV	SKEW	KURT	MEAN	SDEV	SKEW	KURT	GRVL	SAND	SILT	CLAY
1-1	1.4	2.6	3.2	3.4	3.9	4.8	6.2	9.5	4.45	1.81	0.57	2.01	4.63	2.25	1.99	7.10	0.0	55.2	36.0	8.8
1-2	1.2	2.4	3.3	3.6	4.0	4.8	5.6	8.5	4.27	1.50	0.43	2.00	4.48	1.91	2.07	8.78	0.0	51.2	42.5	6.3
1-9	1.3	2.4	3.0	3.2	3.6	4.2	4.7	8.3	3.77	1.34	0.42	2.36	4.06	1.93	2.69	11.48	0.0	71.1	23.3	5.5
1-11	1.7	2.5	3.0	3.2	3.6	4.2	4.8	8.4	3.80	1.35	0.45	2.27	4.13	1.96	2.69	11.08	0.0	70.1	24.4	5.6
1-14	1.9	2.8	3.3	3.6	4.4	6.6	8.3	12.3	5.33	2.66	0.63	1.30	5.52	2.90	1.35	3.80	0.0	42.0	41.1	16.9
1-15	2.0	2.4	2.8	3.0	3.4	4.3	4.8	7.5	3.69	1.28	0.46	1.60	3.93	1.78	2.80	12.60	0.0	70.2	25.6	4.1

Table 11. Sediment Trap Grain Size Data. Summary Statistics.
Sample collection and analytical proceedure are outlined in Section 6.
Sample locations are shown on Figure 4.

	PERCENTILES								FOLK MEASURES				MOMENT MEASURES							
	1	5	16	25	50	75	84	95	MEAN	SDEV	SKEW	KURT	MEAN	SDEV	SKEW	KURT	GRVL	SAND	SILT	CLAY
-31	-10.4	-6.0	-1.8	0.3	4.7	9.1	10.6	13.6	4.50	6.05	-0.07	0.92	6.45	3.49	0.77	2.01	0.0	45.7	22.3	31.9
-36	3.4	4.3	5.3	6.0	7.9	9.5	10.3	11.9	7.82	2.37	0.01	0.88	8.08	2.64	0.35	2.19	0.0	2.9	49.0	48.0
-49	2.9	4.4	5.4	6.0	7.8	9.4	10.3	12.0	7.81	2.36	0.08	0.92	8.03	2.61	0.44	2.25	0.0	3.4	50.6	46.0
-50a	3.9	5.0	5.9	6.8	8.4	9.7	10.3	11.6	8.20	2.11	-0.06	0.94	8.56	2.44	0.25	2.27	0.0	1.1	41.6	57.3
-50b	3.1	4.5	5.7	6.5	8.9	10.8	11.7	13.6	8.77	2.89	-0.02	0.86	9.04	2.94	-0.11	1.68	0.0	3.1	36.6	60.3

Table 12. Seafloor Grain Size Data. Summary Statistics.
Sample collection and analytical procedure are outlined in Section 6.
Sample locations are shown on Figure 7.
Postion within each core of each sample is given in centimetres.

		PERCENTILES								FOLK MEASURES				MOMENT MEASURES							
		1	5	16	25	50	75	84	95	MEAN	SDEV	SKEW	KURT	MEAN	SDEV	SKEW	KURT	GRVL	SAND	SILT	CLAY
81-12, 109m	8-10cm	-0.1	1.6	2.9	3.4	4.6	7.5	9.1	12.2	5.52	3.17	0.44	1.06	5.58	3.16	0.74	2.70	0.1	38.8	39.1	22.1
81-13, 537m	0-06cm	-0.6	0.6	1.4	1.8	2.7	3.9	4.6	8.5	2.90	1.99	0.35	1.52	3.19	2.39	1.99	7.90	0.0	77.2	17.3	5.5
81-14, 345m	0-03cm	0.2	0.9	1.9	2.5	4.0	6.7	9.6	13.8	5.19	3.89	0.48	1.26	5.07	3.55	0.88	2.61	0.0	50.3	29.7	20.1
81-14, 345m	33-36cm	-0.9	0.1	1.2	1.9	3.4	5.3	7.8	13.7	4.13	3.72	0.42	1.62	4.25	3.53	1.03	3.24	0.8	59.6	24.0	15.6
81-15, 550m	0-03cm	1.0	2.4	3.7	4.2	7.2	11.7	13.5	17.0	8.12	4.67	0.30	0.80	7.68	3.73	-0.04	1.47	0.0	21.4	32.4	46.2
81-15, 550m	21-24cm	-1.2	0.2	1.4	2.2	3.5	7.9	10.5	14.7	5.13	4.45	0.55	1.04	5.02	4.02	0.65	2.15	1.4	54.3	19.8	24.5
81-15, 550m	27-32cm	-1.6	-0.2	1.3	2.2	3.9	10.2	12.7	17.8	5.96	5.57	0.55	0.92	5.58	4.42	0.41	1.65	0.0	51.9	16.1	32.1
81-15, 550m	43-46cm	-0.0	1.2	2.8	3.5	5.4	9.7	11.4	14.8	6.54	4.23	0.38	0.89	6.43	3.76	0.31	1.80	0.1	34.7	32.5	32.7
81-16, 266m	0-03cm	1.1	2.1	2.8	3.3	4.8	7.7	10.0	13.8	5.86	3.59	0.50	1.09	5.81	3.33	0.79	2.38	0.0	39.5	37.1	23.4
81-16, 266m	25-27cm	0.8	1.8	2.5	2.9	4.1	6.6	9.4	13.7	5.34	3.51	0.57	1.34	5.28	3.27	1.02	2.86	0.0	48.8	32.1	19.1
81-16, 266m	41-44cm	0.4	1.3	2.3	2.7	3.7	6.0	10.1	18.9	5.36	4.61	0.68	2.13	5.01	3.50	1.10	2.88	0.0	56.5	24.5	19.0
81-17, 358m	0-03cm	-0.9	-0.5	0.4	0.9	2.5	3.3	3.8	9.9	2.19	2.44	0.09	1.80	2.67	2.77	1.88	7.20	0.8	87.1	5.8	6.3
83-12, 788m	0-2cm	1.6	4.0	5.2	5.9	8.5	10.8	11.9	14.2	8.53	3.23	0.07	0.85	8.48	2.97	-0.23	2.01	0.0	5.2	38.7	56.0
83-12, 788m	10-12cm	2.6	3.8	4.4	4.8	7.0	10.5	12.1	15.2	7.83	3.67	0.37	0.82	7.70	3.19	0.22	1.55	0.0	9.0	46.7	44.3
83-12, 788m	20-22cm	2.3	3.3	3.9	4.7	7.4	10.6	12.0	14.8	7.78	3.76	0.22	0.80	7.73	3.31	0.09	1.54	0.0	17.3	36.8	46.0
83-12, 788m	30-32cm	1.4	4.0	4.9	5.7	8.6	11.0	12.2	14.5	8.57	3.40	0.05	0.81	8.48	3.08	-0.25	1.89	0.0	5.2	38.3	56.4
83-12, 788m	40-42cm	-1.0	-1.0	4.0	4.6	7.6	10.3	11.5	13.9	7.70	4.15	-0.05	1.07	7.31	4.02	-0.67	3.04	6.6	9.7	36.5	47.1
83-12, 788m	50-52cm	2.7	4.0	5.1	6.1	9.0	11.7	13.0	15.6	9.02	3.74	0.08	0.85	8.82	3.04	-0.35	1.79	0.0	5.3	34.3	60.4
83-12, 788m	60-62cm	1.5	3.2	4.2	4.7	8.3	10.4	11.4	13.3	7.93	3.33	-0.07	0.73	7.96	3.27	-0.12	1.68	0.0	13.9	33.2	53.0
83-14, 165m	0-02cm	0.0	1.3	2.0	2.5	3.9	7.0	9.1	12.5	5.00	3.46	0.50	1.04	5.04	3.40	0.88	2.69	0.4	51.7	26.6	21.3
83-14, 165m	06-08cm	-6.3	-4.0	-1.8	-0.6	1.6	4.0	5.7	12.0	1.79	4.31	0.20	1.42	2.24	4.15	0.86	3.27	22.3	53.0	13.1	11.6
83-14, 165m	11-13cm	-7.1	-5.3	-3.6	-2.8	0.7	3.5	4.3	9.5	0.46	4.23	0.05	0.96	0.89	4.07	0.92	3.44	40.7	41.8	10.8	6.7
83-15, 700m	0-02cm	3.1	3.9	4.6	5.1	7.2	10.3	11.6	14.4	7.81	3.36	0.32	0.83	7.78	3.04	0.24	1.64	0.0	6.9	49.3	43.8
83-31, 260m	0-02cm	-4.2	-2.5	0.2	1.2	2.5	6.3	9.5	14.7	4.08	4.94	0.46	1.39	3.82	4.39	0.63	2.48	10.5	54.5	14.5	20.5
83-31, 260m	06-08cm	-2.5	-0.7	1.2	1.6	3.0	7.2	10.1	15.1	4.75	4.62	0.57	1.15	4.55	4.12	0.69	2.30	4.2	55.1	17.5	23.2
83-31, 260m	08-10cm	-5.3	-2.3	0.7	1.3	2.5	6.6	9.6	14.4	4.28	4.78	0.50	1.29	4.00	4.28	0.70	2.44	9.0	55.7	13.9	21.3
83-31, 260m	16-18cm	-9.6	-5.5	-1.5	0.8	2.2	5.0	8.3	13.6	2.99	5.35	0.21	1.87	3.08	4.46	0.60	2.72	17.7	52.0	13.7	16.7
83-32a, 395m	0-02cm	1.0	2.2	3.3	3.7	4.7	8.5	10.3	13.9	6.11	3.53	0.59	1.00	6.07	3.32	0.73	2.22	0.0	34.6	37.6	27.8
83-32b, 395m	0-02cm	1.0	2.4	3.4	3.7	4.8	8.7	10.4	13.9	6.20	3.50	0.60	0.96	6.17	3.32	0.70	2.16	0.0	34.0	37.6	28.4
83-33#1,460m	0-02cm	-1.0	2.3	3.6	4.4	6.6	10.3	11.8	14.9	7.33	3.98	0.28	0.88	7.22	3.56	0.01	2.00	1.0	19.7	37.6	41.7
83-33#2,460m	0-02cm	1.8	2.5	3.7	4.4	6.6	10.0	11.5	14.4	7.26	3.77	0.27	0.88	7.26	3.37	0.19	1.70	0.0	20.2	39.8	40.0
83-33, 460m	10-12cm	1.4	2.1	3.2	4.0	6.4	10.6	12.3	15.9	7.30	4.39	0.34	0.86	7.14	3.65	0.16	1.56	0.0	25.4	33.3	41.3
83-33, 460m	20-22cm	1.2	2.2	3.6	4.5	7.1	10.7	12.4	15.9	7.70	4.28	0.25	0.90	7.45	3.54	0.02	1.66	0.0	20.1	36.4	43.5
83-33, 460m	30-32cm	1.3	2.3	3.4	4.2	6.4	10.1	11.8	15.1	7.17	4.03	0.33	0.88	7.12	3.49	0.21	1.69	0.0	23.4	37.6	38.9
83-33, 460m	40-42cm	1.3	2.1	3.2	4.1	6.2	10.1	12.0	15.8	7.15	4.25	0.36	0.92	6.99	3.55	0.25	1.67	0.0	24.4	38.0	37.5
83-33, 460m	45-47cm	-0.2	1.3	2.5	3.3	5.2	9.7	11.7	15.8	6.48	4.47	0.44	0.93	6.36	3.79	0.32	1.80	0.3	32.4	33.7	33.7
83-33, 460m	50-52cm	1.3	2.0	2.9	3.5	5.4	9.4	11.3	15.2	6.52	4.13	0.45	0.92	6.49	3.56	0.43	1.80	0.0	30.5	36.4	33.2
83-33, 460m	60-62cm	1.2	1.9	2.8	3.4	4.9	9.2	10.9	14.3	6.19	3.92	0.49	0.89	6.29	3.55	0.49	1.87	0.0	31.7	36.3	32.0
83-34, 530m	0-02cm	1.3	2.5	4.1	4.5	6.4	9.9	11.3	14.1	7.24	3.57	0.34	0.89	7.18	3.33	0.22	1.86	0.3	14.8	45.7	39.2
83-35, 704m	0-02cm	0.2	1.7	4.0	4.5	7.3	10.6	12.1	15.1	7.81	4.05	0.17	0.90	7.48	3.58	-0.07	1.81	0.2	15.7	38.6	45.6
83-35, 704m	10-12cm	-22.8	-12.9	-3.5	1.1	4.9	9.4	11.0	14.2	4.14	7.72	-0.24	1.34	4.97	5.34	-0.25	1.89	20.5	17.4	28.3	33.9
83-35, 704m	20-22cm	-16.1	-10.6	-5.4	-2.9	4.1	8.5	10.3	13.7	2.97	7.61	-0.21	0.87	3.61	5.68	0.10	1.62	31.5	17.8	22.9	27.8
83-35, 704m	40-42cm	0.3	2.0	4.0	4.5	6.4	10.1	11.5	14.5	7.30	3.77	0.32	0.91	7.16	3.51	0.07	2.00	0.8	15.7	42.4	41.2
83-35, 704m	60-62cm	-10.3	-5.7	-1.1	1.3	4.9	9.2	11.0	14.6	4.90	6.10	-0.02	1.06	5.03	5.07	-0.16	1.94	16.4	22.7	28.8	32.1
83-36, 763m	0-40cm	3.1	3.8	4.5	4.9	8.0	10.9	12.3	15.0	8.24	3.65	0.18	0.77	8.08	3.17	0.03	1.51	0.0	7.7	42.4	49.8
83-37, 572m	0-02cm	1.7	3.6	4.4	4.8	7.4	10.5	11.9	14.6	7.89	3.53	0.25	0.80	7.76	3.24	0.08	1.66	0.0	9.3	44.5	46.2
83-37, 572m	10-12cm	-1.0	2.7	4.4	5.0	7.4	10.4	11.7	14.4	7.84	3.60	0.18	0.88	7.66	3.41	-0.22	2.41	1.1	10.0	43.2	45.7
83-37, 572m	20-22cm	-0.5	2.7	4.2	4.7	7.0	10.5	12.0	15.1	7.76	3.81	0.29	0.89	7.54	3.40	-0.03	1.99	0.4	11.7	44.2	43.6
83-37, 572m	40-42cm	-2.4	0.6	4.0	4.6	7.0	10.4	11.9	15.1	7.64	4.18	0.18	1.02	7.25	3.77	-0.28	2.33	2.3	13.8	40.9	43.0
83-37, 572m	60-62cm	0.0	2.0	4.0	4.4	6.5	10.2	11.8	15.1	7.42	3.95	0.35	0.92	7.21	3.52	0.10	1.82	0.1	16.2	42.5	41.2
83-38#1,804m	0-02cm	2.6	3.9	4.7	5.3	8.6	11.0	12.1	14.3	8.45	3.42	0.01	0.75	8.43	3.11	-0.19	1.66	0.0	6.4	36.8	56.7
83-38#2,804m	0-02cm	3.0	4.0	4.8	5.5	9.0	11.2	12.3	14.4	8.68	3.44	-0.03	0.75	8.68	3.09	-0.31	1.72	0.0	4.6	34.1	61.3
83-38, 804m	10-12cm	2.5	3.9	4.7	5.5	8.6	11.1	12.3	14.7	8.52	3.52	0.06	0.80	8.47	3.07	-0.20	1.73	0.0	5.6	37.9	56.5
83-38, 804m	20-22cm	2.7	3.7	4.4	5.0	8.7	11.0	12.0	14.2	8.38	3.49	-0.03	0.72	8.40	3.19	-0.21	1.59	0.0	9.0	33.4	57.6
83-38, 804m	39-41cm	3.3	4.3	5.1	6.1	8.5	14.4	17.9	24.9	10.51	6.31	0.53	1.01	8.74	2.98	-0.21	1.68	0.0	2.7	40.1	57.2
83-38, 804m	60-62cm	1.9	3.7	4.5	5.3	8.7	11.1	12.3	14.6	8.50	3.60	-0.00	0.77	8.47	3.19	-0.30	1.77	0.0	8.6	32.5	58.9
83-39, 265m	0-02cm	-7.1	-4.1	-1.3	-0.2	2.2	5.1	7.7	12.1	2.89	4.69	0.22	1.23	2.93	4.35	0.59	2.61	17.9	46.4	20.7	15.0
83-39, 265m	08-10cm	-4.0	-2.4	-0.9	-0.3	2.1	5.8	8.2	12.1	3.13	4.46	0.36	0.98	3.18	4.32	0.69	2.44	14.6	47.2	21.5	16.6
83-39, 265m	09-11cm	-4.8	-2.4	-1.1	-0.7	0.6	3.4	5.1	10.9	1.52	3.58	0.51	1.34	1.86	3.86	1.27	3.96	18.2	59.8	11.6	10.4
83.39, 265m	13-15cm	-4.5	-2.3	-0.6	0.2	2.0	4.3	6.0	11.8	2.45	3.78	0.29	1.40	2.78	3.84	0.95	3.49	13.0	59.7	15.2	12.1
83-39, 265m	22-24cm	-3.6	-2.4	-1.1	-0.3	1.7	4.3	6.9	12.2	2.51	4.20	0.36	1.30	2.63	4.10	0.95	3.16	17.0	56.1	13.3	13.6

Table 8. Mackay Glacier Grain size Data.

GRAIN SIZE ANALYSIS (BARRETT 1968, ADAMS 1975, MOD BARRETT 1977). FOR GRAPHIC MEASURES OF FOLK & WARD 1957 PERCENTILES ARE DETERMINED BY INTERPOLATION OF NORMAL PROBABILITY CURVE. FREQUENCY PERCENT NORMALIZED ON PLOTS FOR UNEVEN CLASS SIZES.

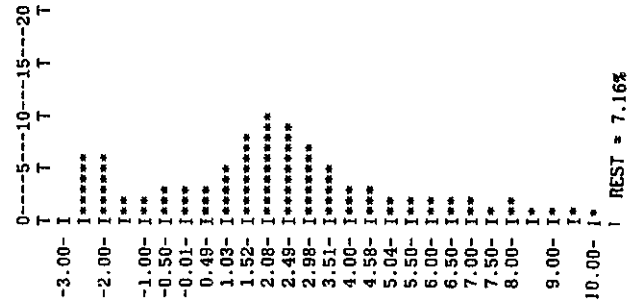
CLASS MIDPTS-3.75-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.50
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

ASSORTED GLACIAL SAMPLES FROM GRANITE HARBOUR, ROSS DEPENDENCY.

83 - 64

DATA 0.00 3.67 1.39 0.77 0.74 0.73 1.50 2.35 3.30 2.10 2.03 1.50 0.87 0.91 0.49 0.62 0.65 0.62 0.44 0.38 0.44 0.82 0.79 2.09
FREQUENCY % 0.0 12.6 4.8 2.6 2.6 2.5 4.8 8.2 10.1 8.8 7.1 4.8 3.0 2.7 1.8 2.3 2.2 2.1 1.5 1.3 1.5 2.8 2.7 7.2
CUMULATIVE % 0.0 12.6 17.3 20.0 22.5 25.0 30.1 38.2 49.5 56.7 63.6 68.8 71.7 74.9 76.5 78.7 80.9 83.0 84.5 85.8 87.3 90.1 92.8100.0

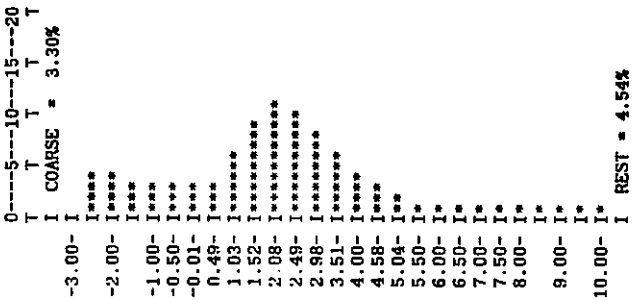
PERCENTILES (1,5,16,25,50,75,84,95) -7.73 -4.42 -1.26 0.49 2.11 4.62 6.82 11.03
MOMENT MEASURES MEAN 2.86 STDEV 4.02 SKEW 0.86 KURT 3.27
GRAPHIC (FOLK) MEAN 2.56 STDEV 4.36 SKEW 0.16 KURT 1.53 GRAVEL = 17.33 SAND = 54.42 SILT = 15.58 CLAY = 12.67



83 - 65

DATA 1.39 3.30 2.60 1.15 1.20 1.27 2.53 3.87 5.33 3.39 3.43 2.81 1.58 1.55 0.90 0.52 0.49 0.46 0.38 0.32 0.38 0.67 0.66 1.91
FREQUENCY % 3.3 7.8 6.2 2.7 2.9 3.0 5.6 9.4 11.3 9.8 8.3 6.3 3.8 3.2 2.3 1.3 1.2 1.1 0.9 0.8 0.9 1.6 1.6 4.5
CUMULATIVE % 3.3 11.1 17.3 20.1 22.9 25.9 31.9 41.1 53.8 61.8 70.0 76.7 80.4 84.1 86.2 87.5 88.6 89.7 90.6 91.4 92.3 93.9 95.5100.0

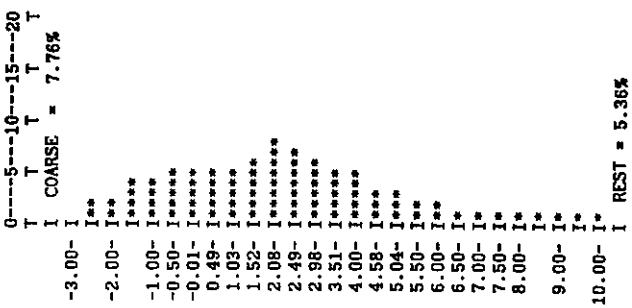
PERCENTILES (1,5,16,25,50,75,84,95) -3.79 -2.69 -1.19 0.34 1.91 3.37 4.56 9.68
MOMENT MEASURES MEAN 2.22 STDEV 3.52 SKEW 1.03 KURT 4.55
GRAPHIC (FOLK) MEAN 1.76 STDEV 3.31 SKEW 0.09 KURT 1.67 GRAVEL = 17.32 SAND = 63.10 SILT = 11.88 CLAY = 7.70



83 - 66a

DATA 1.52 0.66 1.64 1.00 0.91 0.94 1.16 1.20 1.73 1.11 1.20 1.00 0.95 0.63 0.54 0.34 0.37 0.27 0.24 0.17 0.20 0.41 0.36 1.05
FREQUENCY % 7.8 3.4 8.4 5.1 4.7 4.8 5.5 6.2 7.9 6.9 6.2 4.8 4.9 2.8 3.0 1.9 1.9 1.4 1.2 0.9 1.0 2.1 1.8 5.4
CUMULATIVE % 7.8 11.1 19.5 24.6 29.2 34.0 39.9 46.1 54.9 60.6 66.7 71.8 76.6 79.8 82.6 84.3 86.2 87.6 88.8 89.7 90.7 92.8 94.6100.0

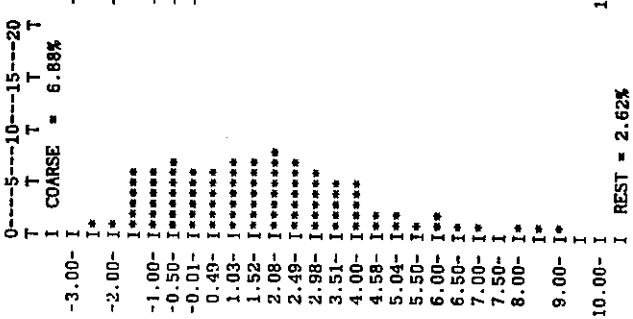
PERCENTILES (1,5,16,25,50,75,84,95) -7.49 -4.11 -1.37 -0.46 1.77 3.83 5.41 10.23
MOMENT MEASURES MEAN 2.19 STDEV 3.89 SKEW 0.88 KURT 3.73
GRAPHIC (FOLK) MEAN 1.93 STDEV 3.87 SKEW 0.13 KURT 1.37 GRAVEL = 19.49 SAND = 57.14 SILT = 14.08 CLAY = 9.29



83 - 66b

DATA 4.44 1.64 7.64 4.56 3.89 3.95 4.78 4.36 5.76 3.57 3.64 3.29 2.86 1.83 1.42 0.83 1.00 0.69 0.59 0.28 0.45 0.76 0.62 1.69
FREQUENCY % 6.9 2.5 11.8 7.1 6.2 6.1 6.9 6.9 8.0 6.7 5.8 4.8 4.5 2.4 2.4 1.4 1.5 1.1 0.9 0.4 0.7 1.2 1.0 2.6
CUMULATIVE % 6.9 9.4 21.3 28.3 34.4 40.5 47.9 54.6 63.6 69.1 74.7 79.8 84.3 87.1 89.3 90.6 92.1 93.2 94.1 94.5 95.2 96.4 97.4100.0

PERCENTILES (1,5,16,25,50,75,84,95) -7.96 -3.94 -1.38 -0.73 1.18 3.01 3.97 7.82
MOMENT MEASURES MEAN 1.48 STDEV 3.28 SKEW 1.07 KURT 4.90
GRAPHIC (FOLK) MEAN 1.26 STDEV 3.12 SKEW 0.08 KURT 1.29 GRAVEL = 21.26 SAND = 63.00 SILT = 10.99 CLAY = 4.76



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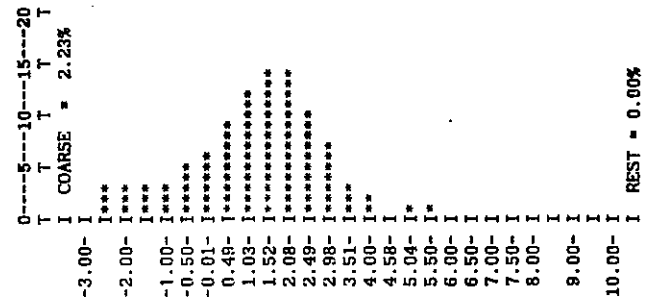
CLASS MIDPTS-3.75-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.50
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

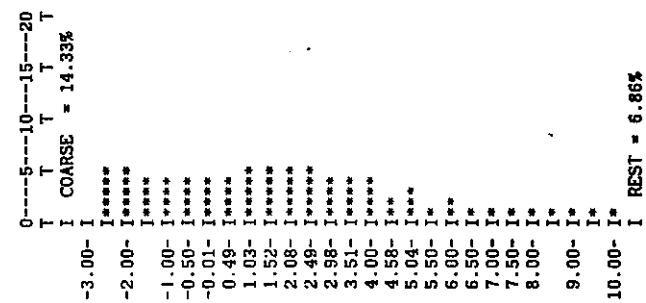
83 - 67
       DATA 0.76 2.15 2.35 1.55 2.16 2.99 4.51 4.80 5.29 2.72 2.26 1.26 0.63 0.19 0.16 0.28 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
 FREQUENCY %  2.2  6.3  6.9  4.6  6.5  8.8 12.3 14.4 13.9  9.7  6.8  3.5  1.9  0.5  0.5  0.9  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
CUMULATIVE %  2.2  8.5 15.4 20.0 26.3 35.1 48.4 62.4 78.0 86.0 92.6 96.3 98.2 98.7 99.2100.0100.0100.0100.0100.0100.0100.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -3.50 -2.43 -0.93 -0.11  1.09  1.96  2.38  3.29
MOMENT MEASURES MEAN  0.83  STDEV 1.74  SKEW-0.48  KURT  3.19
GRAPHIC (FOLK)  MEAN  0.84  STDEV 1.69  SKEW-0.23  KURT  1.13  GRAVEL = 15.44 SAND = 82.71 SILT =  1.85 CLAY =  0.00
```



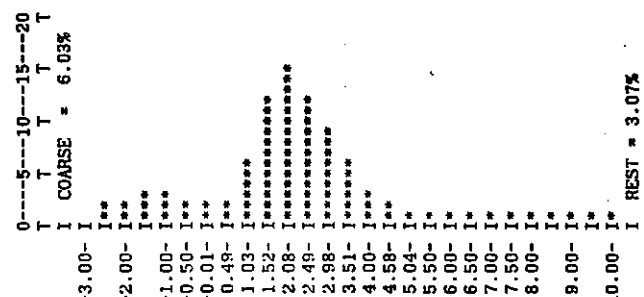

```
83 - 68
       DATA 9.82 6.37 6.03 3.08 2.62 2.92 3.55 3.06 3.95 2.54 2.93 2.75 2.38 1.68 1.59 0.80 1.06 0.93 0.86 0.60 0.80 1.86 1.66 4.70
 FREQUENCY % 14.3  9.3  8.8  4.5  3.9  4.3  4.8  4.6  5.1  4.5  4.4  3.8  3.5  2.1  2.5  1.3  1.5  1.4  1.3  0.9  1.2  2.7  2.4  6.9
CUMULATIVE % 14.3 23.6 32.4 36.9 40.7 45.0 50.2 54.6 60.4 64.1 68.4 72.4 75.9 78.3 80.6 81.8 83.4 84.7 86.0 86.8 88.0 90.7 93.1100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -6.63 -4.67 -2.79 -1.83  1.01  3.87  6.24 10.97
MOMENT MEASURES MEAN  1.74  STDEV 4.52  SKEW 0.87  KURT  3.06
GRAPHIC (FOLK)  MEAN  1.48  STDEV 4.63  SKEW 0.22  KURT  1.12  GRAVEL = 32.42 SAND = 43.45 SILT = 12.14 CLAY = 11.99
```




```
84 berg
       DATA 5.84 3.23 5.43 2.41 1.84 2.31 6.3011.5216.23 9.86 8.91 6.22 3.18 2.20 1.20 1.02 0.87 0.82 0.77 0.61 0.66 1.32 1.17 2.97
 FREQUENCY %  6.0  3.3  5.6  2.5  1.9  2.4  6.0 12.1 15.0 12.4  9.4  6.1  3.3  2.0  1.3  1.1  0.9  0.8  0.8  0.6  0.7  1.4  1.2  3.1
CUMULATIVE %  6.0  9.4 15.0 17.5 19.4 21.7 28.2 40.1 56.9 67.1 76.3 82.7 86.0 88.2 89.5 90.5 91.4 92.3 93.1 93.7 94.4 95.7 96.9100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -6.31 -3.40 -0.79  0.77  1.85  2.91  3.70  8.44
MOMENT MEASURES MEAN  1.99  STDEV 3.16  SKEW 1.02  KURT  5.55
GRAPHIC (FOLK)  MEAN  1.59  STDEV 2.91  SKEW-0.03  KURT  2.27  GRAVEL = 14.97 SAND = 70.99 SILT =  8.41 CLAY =  5.64
```



GRAIN SIZE ANALYSIS (BARRETT 1968, ADAMS 1975, MOD BARRETT 1977). FOR GRAPHIC MEASURES OF FOLK & WARD 1957 PERCENTILES ARE DETERMINED BY INTERPOLATION OF NORMAL PROBABILITY CURVE. FREQUENCY PERCENT NORMALIZED ON PLOTS FOR UNEVEN CLASS SIZES.

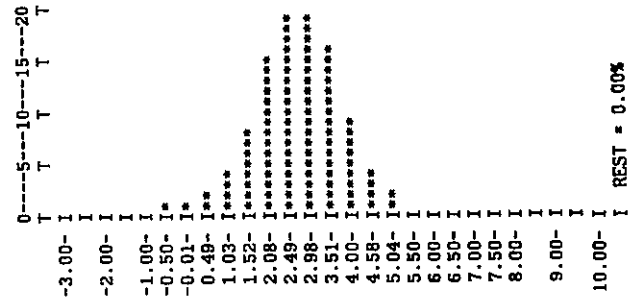
CLASS MIDPTS-3.75-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.50
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

SUPRAGLACIAL SAMPLES FROM GRANITE HARBOUR, ROSS DEPENDENCY, ANTARCTICA.

82-1

DATA	0.00	0.00	0.01	0.15	0.29	0.52	1.09	1.98	4.29	3.90	4.89	4.34	2.34	1.13	0.57	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FREQUENCY %	0.0	0.0	0.0	0.6	1.2	2.0	3.9	7.9	15.0	18.6	19.5	16.0	9.3	3.8	2.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CUMULATIVE %	0.0	0.0	0.0	0.6	1.8	3.8	8.0	15.8	32.5	47.8	66.8	83.8	92.9	97.3	99.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

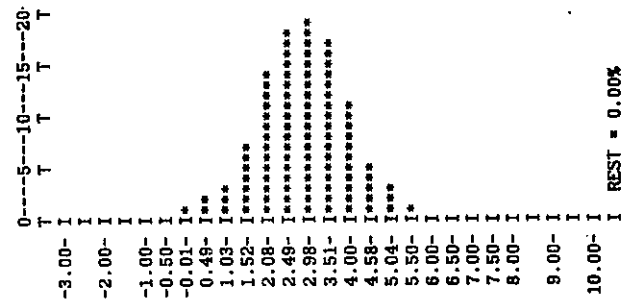
PERCENTILES (1,5,16,25,50,75,84,95) -0.29 0.68 1.53 1.85 2.55 3.21 3.52 4.22
MOMENT MEASURES MEAN 2.51 STDEV 1.06 SKEW-0.24 KURT 3.25
GRAPHIC (FOLK) MEAN 2.53 STDEV 1.03 SKEW-0.04 KURT 1.07 GRAVEL = 0.04 SAND = 92.89 SILT = 7.07 CLAY = 0.00



82-2

DATA	0.00	0.00	0.08	0.07	0.19	0.32	0.58	1.43	3.14	3.01	3.94	3.79	2.20	1.20	0.55	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FREQUENCY %	0.0	0.0	0.4	0.3	0.9	1.5	2.6	7.0	13.5	17.7	19.4	17.3	10.8	5.0	2.9	1.1	0.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0
CUMULATIVE %	0.0	0.0	0.4	0.7	1.6	3.2	6.0	12.9	28.1	42.6	61.6	80.0	90.6	96.4	99.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

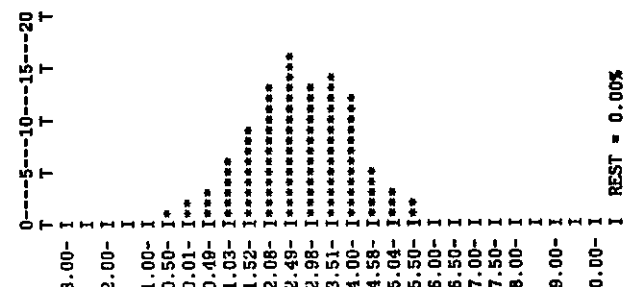
PERCENTILES (1,5,16,25,50,75,84,95) -0.31 0.87 1.66 1.98 2.68 3.35 3.67 4.40
MOMENT MEASURES MEAN 2.65 STDEV 1.08 SKEW-0.34 KURT 3.69
GRAPHIC (FOLK) MEAN 2.67 STDEV 1.04 SKEW-0.02 KURT 1.06 GRAVEL = 0.39 SAND = 90.19 SILT = 9.42 CLAY = 0.00



82-3

DATA	0.00	0.00	0.16	0.41	0.68	1.03	1.92	2.53	4.58	3.96	3.96	4.40	3.43	1.71	0.84	0.58	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FREQUENCY %	0.0	0.0	0.5	1.4	2.3	3.4	5.9	8.5	13.5	15.9	13.3	13.7	11.5	4.9	3.0	2.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CUMULATIVE %	0.0	0.0	0.5	1.9	4.1	7.5	13.9	22.2	37.3	50.4	63.4	77.9	89.2	94.9	97.7	99.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

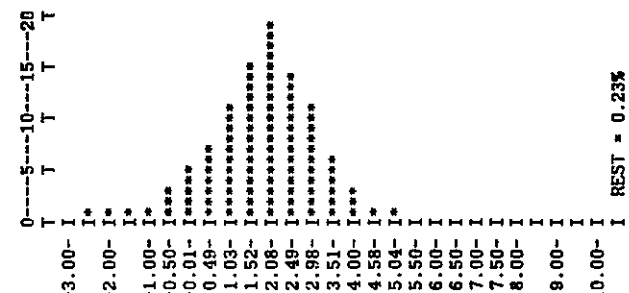
PERCENTILES (1,5,16,25,50,75,84,95) -0.76 0.14 1.17 1.64 2.48 3.39 3.74 4.59
MOMENT MEASURES MEAN 2.46 STDEV 1.32 SKEW-0.22 KURT 2.94
GRAPHIC (FOLK) MEAN 2.46 STDEV 1.32 SKEW-0.03 KURT 1.04 GRAVEL = 0.53 SAND = 88.72 SILT = 10.75 CLAY = 0.00



83 - 61

DATA	0.00	0.53	0.58	1.23	2.04	2.83	4.96	6.54	9.09	5.10	4.87	2.88	1.15	0.61	0.28	0.08	0.08	0.07	0.05	0.05	0.05	0.06	0.05	0.10
FREQUENCY %	0.0	1.2	1.3	2.8	4.8	6.5	10.6	15.4	18.8	14.4	11.5	6.3	2.7	1.2	0.7	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2
CUMULATIVE %	0.0	1.2	2.6	5.4	10.1	16.7	28.1	43.2	64.2	76.0	87.3	93.9	96.6	98.0	98.6	98.8	99.0	99.2	99.3	99.4	99.5	99.7	99.8	100.0

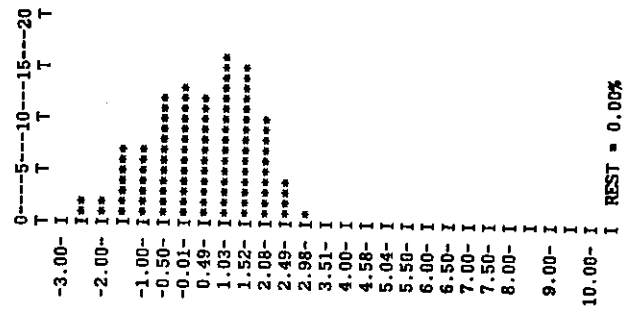
PERCENTILES (1,5,16,25,50,75,84,95) -2.26 -0.56 0.45 0.90 1.70 2.45 2.82 3.68
MOMENT MEASURES MEAN 1.68 STDEV 1.47 SKEW 1.14 KURT 11.43
GRAPHIC (FOLK) MEAN 1.65 STDEV 1.23 SKEW-0.06 KURT 1.12 GRAVEL = 2.56 SAND = 94.02 SILT = 2.93 CLAY = 0.48



```
CLASS MIDPTS-3.75-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.50
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

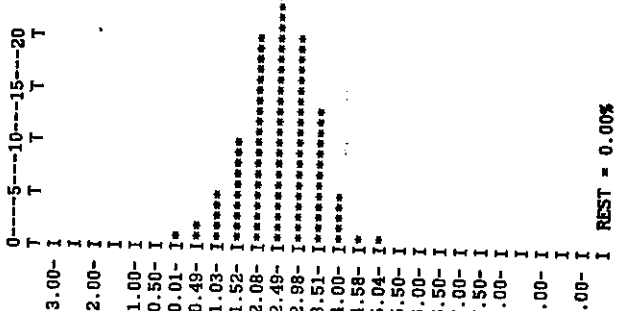
83 - 62
        DATA 0.00 0.61 2.44 2.19 2.29 2.15 3.06 2.60 1.99 0.53 0.25 0.07 0.03 0.01 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
 FREQUENCY %  0.0  3.3 13.4 12.0 12.8 11.8 15.6 14.6  9.8  3.5  1.4  0.4  0.2  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
CUMULATIVE %  0.0  3.3 16.7 28.8 41.3 53.1 69.9 84.2 95.1 98.0 99.4 99.8 99.9100.0100.0100.0100.0100.0100.0100.0100.0100.0100.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -2.57 -1.78 -1.03 -0.64  0.36  1.19  1.51  2.07
MOMENT MEASURES MEAN  0.25  STDEV 1.24  SKEW-0.16  KURT  2.46
GRAPHIC (FOLK)  MEAN  0.28  STDEV 1.22  SKEW-0.10  KURT  0.86  GRAVEL = 16.74 SAND = 83.21 SILT =  0.05 CLAY =  0.00
```



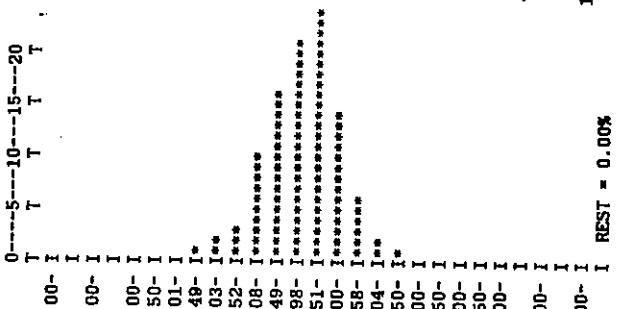

```
83-s1
        DATA 0.00 0.00 0.00 0.01 0.14 0.51 1.67 2.79 6.37 5.54 5.43 3.82 1.36 0.48 0.19 0.04 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
 FREQUENCY %  0.0  0.0  0.0  0.0  0.5  1.8  5.5 10.0 20.1 19.5 12.7  4.9  1.5  0.7  0.2  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
CUMULATIVE %  0.0  0.0  0.0  0.0  0.5  2.3  8.2 18.1 40.5 60.1 79.2 92.7 97.5 99.2 99.9100.0100.0100.0100.0100.0100.0100.0100.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  0.19  0.80  1.44  1.72  2.28  2.86  3.13  3.70
MOMENT MEASURES MEAN  2.28  STDEV 0.89  SKEW 0.01  KURT  3.18
GRAPHIC (FOLK)  MEAN  2.28  STDEV 0.86  SKEW-0.01  KURT  1.04  GRAVEL =  0.00 SAND = 97.50 SILT =  2.50 CLAY =  0.00
```




```
84-s2
        DATA 0.00 0.00 0.00 0.04 0.08 0.23 0.81 1.32 4.47 5.28 7.98 9.87 5.39 2.69 0.76 0.34 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
 FREQUENCY %  0.0  0.0  0.0  0.1  0.2  0.6  1.9  3.4 10.2 16.4 20.7 23.7 14.0  5.9  2.1  0.9  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
CUMULATIVE %  0.0  0.0  0.0  0.1  0.3  0.9  3.0  6.3 17.7 31.2 51.5 76.6 90.3 97.2 99.1100.0100.0100.0100.0100.0100.0100.0100.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  0.54  1.36  2.02  2.32  2.95  3.47  3.74  4.33
MOMENT MEASURES MEAN  2.89  STDEV 0.91  SKEW-0.26  KURT  3.42
GRAPHIC (FOLK)  MEAN  2.90  STDEV 0.88  SKEW-0.07  KURT  1.05  GRAVEL =  0.00 SAND = 90.35 SILT =  9.65 CLAY =  0.00
```




```
84-s3
        DATA 0.00 0.00 0.00 0.02 0.07 0.24 0.52 1.46 3.45 3.61 5.49 6.23 2.90 0.98 0.18 0.06 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
 FREQUENCY %  0.0  0.0  0.0  0.1  0.3  1.0  1.9  5.9 12.2 17.5 22.2 23.3 11.7  3.4  0.8  0.3  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
CUMULATIVE %  0.0  0.0  0.0  0.1  0.4  1.3  3.4  9.2 22.8 37.2 58.9 83.7 95.2 99.0 99.8100.0100.0100.0100.0100.0100.0100.0100.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  0.38  1.21  1.84  2.15  2.78  3.30  3.52  3.99
MOMENT MEASURES MEAN  2.71  STDEV 0.88  SKEW-0.37  KURT  3.32
GRAPHIC (FOLK)  MEAN  2.71  STDEV 0.84  SKEW-0.12  KURT  0.99  GRAVEL =  0.00 SAND = 95.16 SILT =  4.84 CLAY =  0.00
```

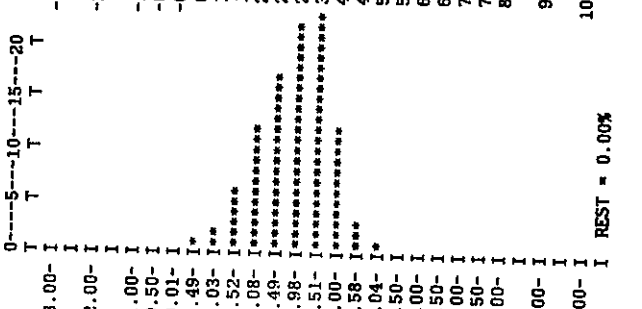


Table 9. Iceberg and Icecliff Grain Size Data.

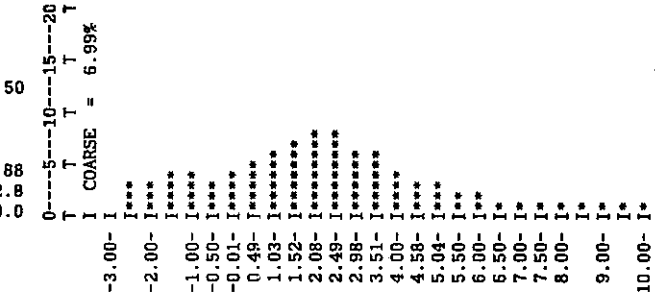
GRAIN SIZE ANALYSIS (BARRETT 1968, ADAMS 1975, MOD BARRETT 1977). FOR GRAPHIC MEASURES OF FOLK & WARD 1957 PERCENTILES ARE DETERMINED BY INTERPOLATION OF NORMAL PROBABILITY CURVE. FREQUENCY PERCENT NORMALIZED ON PLOTS FOR UNEVEN CLASS SIZES.

CLASS MIDPTS-3.75-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.50
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

83 - 63

DATA	2.16	2.13	2.26	0.89	1.25	1.42	1.95	2.05	2.88	1.90	1.94	1.90	1.35	1.20	0.96	0.49	0.49	0.46	0.37	0.30	0.39	0.67	0.60	0.88
FREQUENCY %	7.0	6.9	7.3	2.9	4.1	4.6	5.8	6.8	8.3	7.5	6.4	5.8	4.5	3.3	3.4	1.7	1.6	1.5	1.2	1.0	1.3	2.2	1.9	2.8
CUMULATIVE %	7.0	13.9	21.2	24.1	28.1	32.7	39.0	45.7	55.0	61.2	67.4	73.6	78.0	81.8	84.9	86.5	88.1	89.6	90.8	91.8	93.0	95.2	97.2	100.0

PERCENTILES (1,5,16,25,50,75,84,95) -5.17 -3.43 -1.68 -0.39 1.78 3.66 4.89 8.89
MOMENT MEASURES MEAN 1.97 STDEV 3.58 SKEW 0.73 KURT 3.73
GRAPHIC (FOLK) MEAN 1.66 STDEV 3.51 SKEW 0.05 KURT 1.25 GRAVEL = 21.20 SAND = 56.75 SILT = 15.09 CLAY = 6.96



CC cliffs

DATA	2.81	4.72	5.04	2.87	2.50	2.63	2.64	3.01	3.05	1.87	1.89	2.00	1.43	1.11	0.79	0.53	0.53	0.49	0.48	0.34	0.25	0.42	0.25	0.32
FREQUENCY %	6.7	11.2	12.0	6.8	6.1	6.3	5.8	7.3	6.5	5.4	4.6	4.5	3.5	2.3	2.0	1.4	1.3	1.2	1.1	0.8	0.6	1.0	0.6	0.8
CUMULATIVE %	6.7	17.9	30.0	36.8	42.7	49.0	55.3	62.5	69.7	74.2	78.7	83.5	86.9	89.5	91.4	92.7	93.9	95.1	96.2	97.0	97.6	98.6	99.2	100.0

PERCENTILES (1,5,16,25,50,75,84,95) -4.42 -3.25 -2.13 -1.38 0.57 2.57 3.58 6.46
MOMENT MEASURES MEAN 0.85 STDEV 3.01 SKEW 0.83 KURT 4.03
GRAPHIC (FOLK) MEAN 0.67 STDEV 2.90 SKEW 0.13 KURT 1.01 GRAVEL = 29.95 SAND = 56.92 SILT = 10.77 CLAY = 2.36

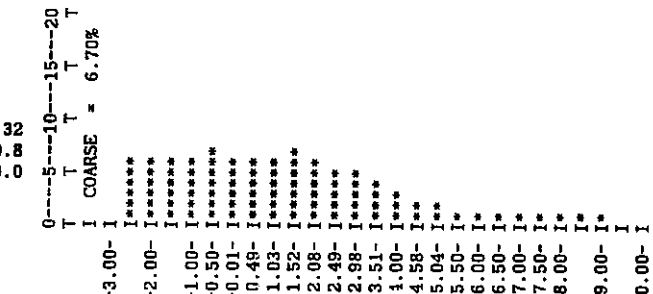


Table 10. Aeolian Grain Size Data.

CLASS MIDPTS-0.75 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.50
CLASS LIMITS-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

SAMPLES COLLECTED DURING 1984 FIELD SEASON, GRANITE HARBOUR.

84-1

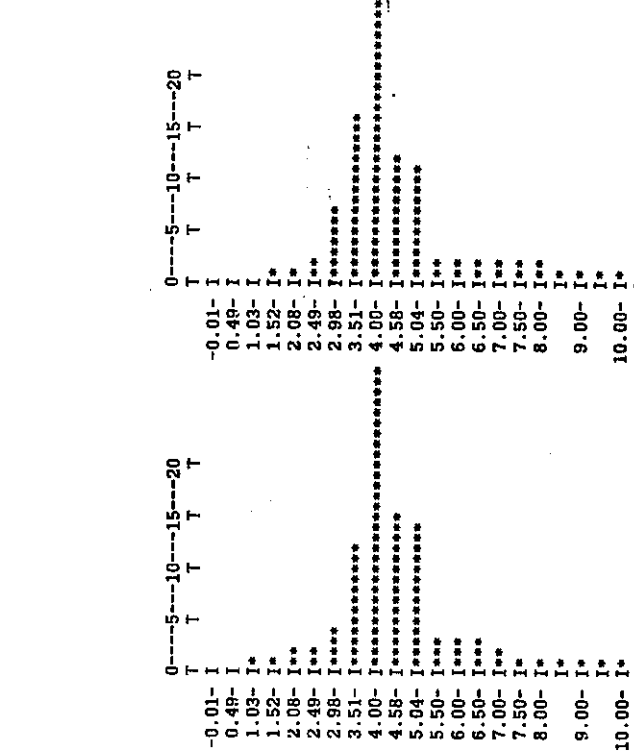
DATA	0.00	0.06	0.07	0.12	0.26	0.33	1.37	3.66	5.80	2.86	2.19	0.40	0.38	0.51	0.49	0.38	0.40	0.56	0.45	0.85				
FREQUENCY %	0.0	0.3	0.3	0.6	1.1	1.9	6.6	16.3	28.0	11.7	11.3	2.1	1.8	2.4	2.3	1.8	1.9	2.6	2.1	4.0				
CUMULATIVE %	0.0	0.3	0.6	1.2	2.4	4.0	10.5	27.8	55.2	68.7	79.1	81.0	82.8	85.2	87.5	89.3	91.2	93.9	96.0	100.0				

PERCENTILES (1,5,16,25,50,75,84,95) 1.39 2.60 3.19 3.44 3.91 4.85 6.25 9.50
MOMENT MEASURES MEAN 4.63 STDEV 2.25 SKEW 1.99 KURT 7.10
GRAPHIC (FOLK) MEAN 4.45 STDEV 1.81 SKEW 0.57 KURT 2.01 GRAVEL = 0.00 SAND = 55.20 SILT = 36.00 CLAY = 8.80

84-2

DATA	0.00	0.04	0.14	0.23	0.51	0.50	1.04	3.22	7.18	4.28	3.20	0.66	0.76	0.66	0.47	0.28	0.35	0.64	0.38	0.57				
FREQUENCY %	0.0	0.2	0.5	0.9	1.8	2.4	4.2	12.1	29.2	14.7	13.9	2.9	3.0	2.6	1.9	1.1	1.4	2.5	1.5	2.3				
CUMULATIVE %	0.0	0.2	0.7	1.6	3.7	5.7	9.8	22.6	51.2	68.3	81.0	83.6	86.7	89.3	91.2	92.3	93.7	96.2	97.7	100.0				

PERCENTILES (1,5,16,25,50,75,84,95) 1.22 2.37 3.27 3.56 3.98 4.81 5.56 8.47
MOMENT MEASURES MEAN 4.48 STDEV 1.91 SKEW 2.07 KURT 8.78
GRAPHIC (FOLK) MEAN 4.27 STDEV 1.50 SKEW 0.43 KURT 2.00 GRAVEL = 0.00 SAND = 51.21 SILT = 42.45 CLAY = 6.33



```
CLASS MIDPTS-0.75 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.50
CLASS LIMITS-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

84-9
        DATA 0.02 0.03 0.05 0.50 0.24 0.76 3.13 7.45 7.82 2.93 1.76 0.50 0.42 0.25 0.27 0.18 0.25 0.45 0.35 0.76
 FREQUENCY %  0.1  0.1  0.2  1.8  0.8  3.3 11.4 25.0 28.4  9.0  6.8  1.9  1.5  0.9  1.0  0.6  0.9  1.6  1.2  2.7
CUMULATIVE %  0.1  0.2  0.4  2.1  3.0  5.7 16.8 43.3 71.1 81.5 87.8 89.6 91.1 92.0 92.9 93.6 94.5 96.1 97.3100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.30  2.40  2.95  3.17  3.62  4.20  4.75  8.31
MOMENT MEASURES MEAN  4.06  STDEV 1.93  SKEW 2.69  KURT 11.48
GRAPHIC (FOLK)  MEAN  3.77  STDEV 1.34  SKEW 0.42  KURT  2.36  GRAVEL =  0.00 SAND = 71.12 SILT = 23.33 CLAY =  5.55

84-11
        DATA 0.02 0.04 0.08 0.14 0.50 1.31 4.4611.0410.90 4.42 2.49 0.63 0.47 0.47 0.53 0.45 0.45 0.58 0.50 1.18
 FREQUENCY %  0.0  0.1  0.2  0.4  1.1  3.9 11.2 25.6 27.4  9.4  6.7  1.7  1.2  1.2  1.3  1.1  1.1  1.4  1.2  2.9
CUMULATIVE %  0.0  0.1  0.3  0.7  1.9  5.1 16.1 43.3 70.1 80.9 87.1 88.6 89.8 90.9 92.2 93.3 94.4 95.9 97.1100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.72  2.48  2.98  3.18  3.63  4.25  4.80  8.36
MOMENT MEASURES MEAN  4.13  STDEV 1.96  SKEW 2.69  KURT 11.08
GRAPHIC (FOLK)  MEAN  3.80  STDEV 1.35  SKEW 0.45  KURT  2.27  GRAVEL =  0.00 SAND = 70.07 SILT = 24.37 CLAY =  5.56

84-14
        DATA 0.00 0.00 0.03 0.04 0.13 0.17 0.59 2.21 2.88 1.79 1.23 0.48 0.45 0.72 0.58 0.34 0.34 0.48 0.48 1.48
 FREQUENCY %  0.0  0.0  0.2  0.3  0.8  1.4  4.2 14.5 20.4 10.7  9.3  3.6  3.1  5.0  4.0  2.4  2.4  3.3  3.3 10.3
CUMULATIVE %  0.0  0.0  0.2  0.5  1.4  2.6  6.7 22.0 42.0 54.4 62.9 66.2 69.3 74.3 78.4 80.7 83.1 86.4 89.7100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.90  2.82  3.35  3.59  4.38  6.58  8.26 12.25
MOMENT MEASURES MEAN  5.52  STDEV 2.90  SKEW 1.35  KURT  3.80
GRAPHIC (FOLK)  MEAN  5.33  STDEV 2.66  SKEW 0.63  KURT  1.30  GRAVEL =  0.00 SAND = 41.96 SILT = 41.12 CLAY = 16.92

84-15
        DATA 0.00 0.00 0.03 0.03 0.33 1.63 4.89 7.75 4.54 2.65 1.86 0.81 0.63 0.37 0.29 0.18 0.22 0.33 0.25 0.55
 FREQUENCY %  0.0  0.0  0.1  0.1  1.1  7.3 18.3 26.7 16.9  8.4  7.4  3.2  2.3  1.4  1.1  0.7  0.8  1.2  0.9  2.0
CUMULATIVE %  0.0  0.0  0.1  0.2  1.4  7.4 25.3 53.6 70.2 79.9 86.7 89.7 92.0 93.3 94.4 95.1 95.9 97.1 98.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.96  2.38  2.77  2.97  3.45  4.27  4.84  7.45
MOMENT MEASURES MEAN  3.93  STDEV 1.78  SKEW 2.80  KURT 12.60
GRAPHIC (FOLK)  MEAN  3.69  STDEV 1.28  SKEW 0.46  KURT  1.60  GRAVEL =  0.00 SAND = 70.23 SILT = 25.64 CLAY =  4.13
```

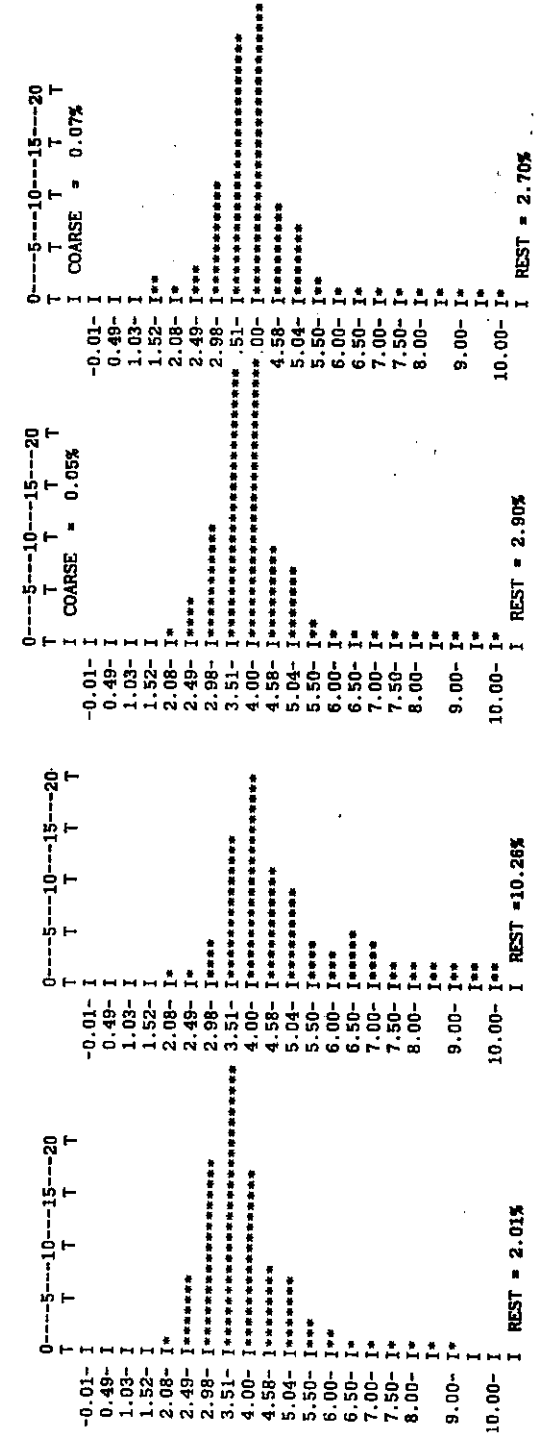


Table 11. Sediment Trap Grain Size Data.

GRAIN SIZE ANALYSIS (BARRETT 1968, ADAMS 1975, MOD BARRETT 1977). FOR GRAPHIC MEASURES OF FOLK & WARD 1957 PERCENTILES ARE DETERMINED BY INTERPOLATION OF NORMAL PROBABILITY CURVE. FREQUENCY PERCENT NORMALIZED ON PLOTS FOR UNEVEN CLASS SIZES.

CLASS MIDPTS 3.50 4.52 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.50
CLASS LIMITS 4.00 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

SEDIMENT TRAP SAMPLES FROM GRANITE HARBOUR, ANTARCTICA:1983 SEASON.

83-31
DATA 0.43 0.06 0.03 0.03 0.03 0.02 0.02 0.02 0.06 0.06 0.18
FREQUENCY % 45.7 6.1 3.5 3.2 3.2 2.1 2.1 2.1 6.4 6.4 19.1
CUMULATIVE % 45.7 52.1 55.3 58.5 61.7 63.8 66.0 68.1 74.5 80.9100.0

PERCENTILES (1,5,16,25,50,75,84,95)-10.41 -5.98 -1.76 0.32 4.69 9.08 10.57 13.60
MOMENT MEASURES MEAN 6.45 STDEV 3.49 SKEW 0.77 KURT 2.01
GRAPHIC (FOLK) MEAN 4.50 STDEV 6.05 SKEW-0.07 KURT 0.92 GRAVEL = 0.00 SAND = 45.74 SILT = 22.34 CLAY = 31.91

83-36
DATA 0.03 0.10 0.06 0.07 0.07 0.05 0.06 0.09 0.17 0.13 0.19
FREQUENCY % 2.9 9.4 6.4 6.9 6.9 4.9 5.9 8.8 16.7 12.7 18.6
CUMULATIVE % 2.9 12.7 18.6 25.5 32.4 37.3 43.1 52.0 68.6 81.4100.0

PERCENTILES (1,5,16,25,50,75,84,95) 3.40 4.34 5.31 5.97 7.89 9.47 10.25 11.85
MOMENT MEASURES MEAN 8.08 STDEV 2.64 SKEW 0.35 KURT 2.19
GRAPHIC (FOLK) MEAN 7.82 STDEV 2.37 SKEW 0.01 KURT 0.88 GRAVEL = 0.00 SAND = 2.94 SILT = 49.02 CLAY = 48.04

83-49
DATA 0.03 0.05 0.07 0.07 0.08 0.05 0.05 0.07 0.14 0.10 0.16
FREQUENCY % 3.4 5.5 8.7 8.0 9.2 5.7 5.7 8.0 16.1 11.5 18.4
CUMULATIVE % 3.4 9.2 17.2 25.3 34.5 40.2 46.0 54.0 70.1 81.6100.0

PERCENTILES (1,5,16,25,50,75,84,95) 2.92 4.37 5.44 5.98 7.75 9.39 10.25 12.00
MOMENT MEASURES MEAN 8.03 STDEV 2.61 SKEW 0.44 KURT 2.25
GRAPHIC (FOLK) MEAN 7.81 STDEV 2.36 SKEW 0.08 KURT 0.92 GRAVEL = 0.00 SAND = 3.45 SILT = 50.57 CLAY = 45.98

83-50a
DATA 0.01 0.04 0.05 0.05 0.05 0.04 0.04 0.10 0.18 0.15 0.18
FREQUENCY % 1.1 4.3 6.1 5.6 5.6 4.5 4.5 11.2 20.2 16.9 20.2
CUMULATIVE % 1.1 5.6 11.2 16.9 22.5 27.0 31.5 42.7 62.9 79.8100.0

PERCENTILES (1,5,16,25,50,75,84,95) 3.93 4.95 5.93 6.79 8.36 9.68 10.32 11.61
MOMENT MEASURES MEAN 8.56 STDEV 2.44 SKEW 0.25 KURT 2.27
GRAPHIC (FOLK) MEAN 8.20 STDEV 2.11 SKEW-0.06 KURT 0.94 GRAVEL = 0.00 SAND = 1.12 SILT = 41.57 CLAY = 57.30

83-50b
DATA 0.20 0.36 0.36 0.36 0.36 0.33 0.27 0.36 0.75 0.90 2.30
FREQUENCY % 3.1 5.3 6.0 5.5 5.5 5.0 4.1 5.5 11.5 13.7 35.1
CUMULATIVE % 3.1 8.5 14.0 19.5 25.0 30.1 34.2 39.7 51.1 64.9100.0

PERCENTILES (1,5,16,25,50,75,84,95) 3.06 4.47 5.69 6.50 8.90 10.83 11.73 13.57
MOMENT MEASURES MEAN 9.04 STDEV 2.94 SKEW-0.11 KURT 1.68
GRAPHIC (FOLK) MEAN 8.77 STDEV 2.89 SKEW-0.02 KURT 0.86 GRAVEL = 0.00 SAND = 3.05 SILT = 36.64 CLAY = 60.31

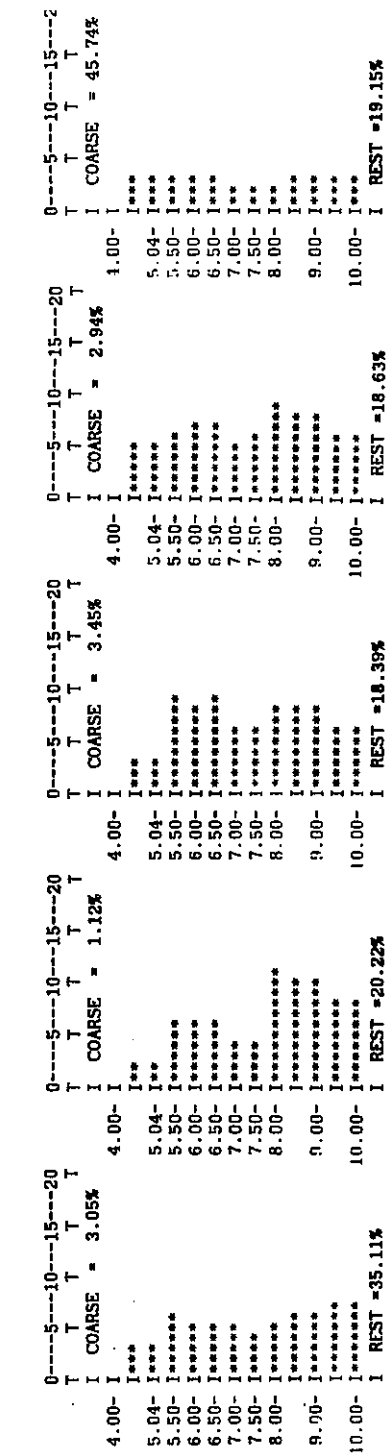


Table 12. Seafloor Sediment Grain Size Data.

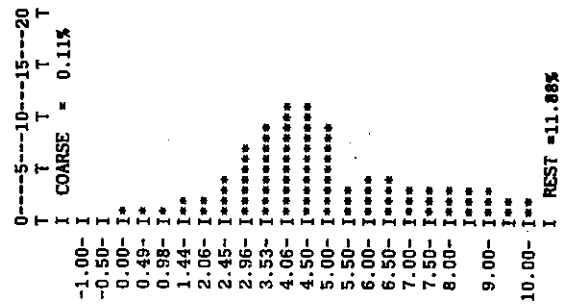
GRAIN SIZE ANALYSIS (BARRETT 1968, ADAMS 1975, MOD BARRETT 1977). FOR GRAPHIC MEASURES OF FOLK & WARD 1957 PERCENTILES ARE DETERMINED BY INTERPOLATION OF NORMAL PROBABILITY CURVE. FREQUENCY PERCENT NORMALIZED ON PLOTS FOR UNEVEN CLASS SIZES.

CLASS MIDPTS-2.00-0.75-0.25 0.25 0.73 1.21 1.75 2.26 2.70 3.24 3.80 4.28 4.75 5.25 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-1.00-0.50 0.00 0.49 0.98 1.44 2.06 2.45 2.96 3.53 4.06 4.50 5.00 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

81-12, 109m

8-10cm DATA	0.02	0.08	0.10	0.11	0.20	0.29	0.54	0.57	1.26	1.86	2.07	1.71	1.71	0.62	0.78	0.70	0.54	0.54	0.54	1.01	0.85	2.17
FREQUENCY %	0.1	0.4	0.5	0.6	1.1	1.7	2.4	4.0	6.8	8.9	10.7	10.6	9.4	3.4	4.3	3.8	3.0	3.0	3.0	5.5	4.7	11.9
CUMULATIVE %	0.1	0.5	1.1	1.7	2.8	4.4	7.3	10.5	17.4	27.5	38.9	48.2	57.6	61.0	65.2	69.1	72.0	75.0	77.9	83.5	88.1	100.0

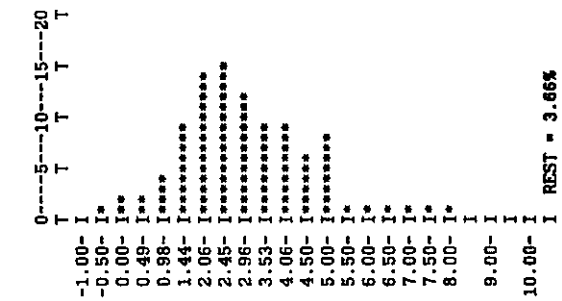
PERCENTILES (1,5,16,25,50,75,84,95) -0.07 1.59 2.87 3.40 4.59 7.50 9.10 12.23
MOMENT MEASURES MEAN 5.58 STDEV 3.16 SKEW 0.74 KURT 2.70
GRAPHIC (FOLK) MEAN 5.52 STDEV 3.17 SKEW 0.44 KURT 1.06 GRAVEL = 0.11 SAND = 38.75 SILT = 39.08 CLAY = 22.06



81-13, 537m

0-06cm DATA	0.00	0.25	0.34	0.33	0.84	1.77	3.66	2.57	2.69	2.29	2.14	1.12	1.68	0.23	0.23	0.16	0.14	0.11	0.11	0.20	0.20	0.80
FREQUENCY %	0.0	1.1	1.6	1.5	3.9	8.8	13.5	15.1	12.1	9.2	9.2	5.8	7.7	1.1	1.1	0.7	0.6	0.5	0.5	0.9	0.9	3.7
CUMULATIVE %	0.0	1.1	2.7	4.2	8.1	16.1	32.9	44.6	57.0	67.4	77.2	82.3	90.0	91.1	92.1	92.9	93.5	94.0	94.5	95.4	96.3	100.0

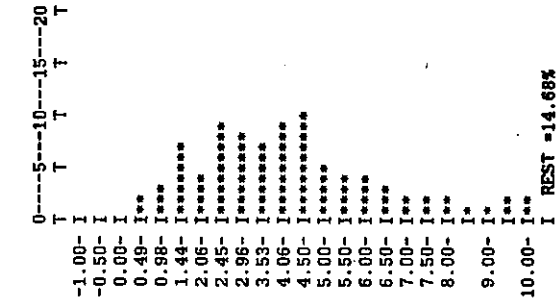
PERCENTILES (1,5,16,25,50,75,84,95) -0.57 0.61 1.43 1.80 2.67 3.93 4.59 8.52
MOMENT MEASURES MEAN 3.19 STDEV 2.39 SKEW 1.99 KURT 7.90
GRAPHIC (FOLK) MEAN 2.90 STDEV 1.99 SKEW 0.35 KURT 1.52 GRAVEL = 0.00 SAND = 77.22 SILT = 17.29 CLAY = 5.49



81-14, 345m

0-03cm DATA	0.00	0.04	0.09	0.43	0.88	1.78	1.45	1.83	2.14	2.16	2.46	2.25	1.25	1.14	0.97	0.74	0.51	0.45	0.51	0.40	1.02	3.87
FREQUENCY %	0.0	0.2	0.3	1.7	3.4	7.3	4.4	8.9	8.0	7.2	8.8	9.7	4.7	4.3	3.7	2.8	1.9	1.7	1.9	1.5	3.9	14.7
CUMULATIVE %	0.0	0.2	0.5	2.1	5.5	12.2	17.7	24.6	32.8	41.0	50.3	58.8	63.6	67.9	71.6	74.4	76.3	78.0	79.9	81.5	85.3	100.0

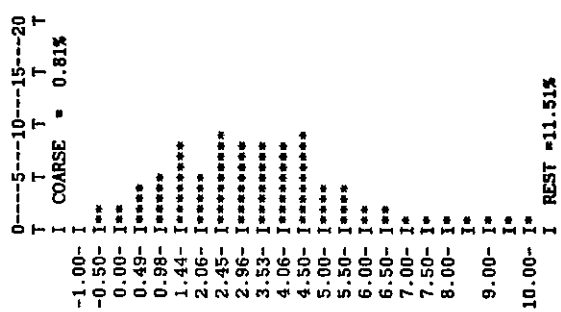
PERCENTILES (1,5,16,25,50,75,84,95) 0.23 0.93 1.88 2.47 4.04 6.66 9.64 13.82
MOMENT MEASURES MEAN 5.07 STDEV 3.55 SKEW 0.88 KURT 2.61
GRAPHIC (FOLK) MEAN 5.19 STDEV 3.89 SKEW 0.48 KURT 1.26 GRAVEL = 0.00 SAND = 50.28 SILT = 29.65 CLAY = 20.06



81-14, 345m

33-36cmDATA	0.37	0.85	0.85	1.65	2.28	3.55	2.75	3.25	3.90	4.30	3.90	3.74	1.86	1.70	1.08	0.85	0.62	0.62	0.54	0.70	1.16	5.27
FREQUENCY %	0.8	1.9	1.9	3.7	5.1	8.4	4.8	9.1	8.4	8.2	8.0	9.3	4.1	3.7	2.4	1.9	1.4	1.4	1.2	1.5	2.5	11.5
CUMULATIVE %	0.8	2.7	4.5	8.1	13.1	20.9	26.9	34.0	42.5	51.9	60.4	68.6	72.6	76.3	78.7	80.5	81.9	83.2	84.4	86.0	88.5	100.0

PERCENTILES (1,5,16,25,50,75,84,95) -0.92 0.08 1.17 1.88 3.42 5.32 7.82 13.66
MOMENT MEASURES MEAN 4.25 STDEV 3.53 SKEW 1.03 KURT 3.24
GRAPHIC (FOLK) MEAN 4.13 STDEV 3.72 SKEW 0.42 KURT 1.62 GRAVEL = 0.81 SAND = 59.58 SILT = 24.04 CLAY = 15.57



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CLASS MIDPTS-2.00-0.75-0.25 0.25 0.73 1.21 1.75 2.26 2.70 3.24 3.80 4.28 4.75 5.25 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-1.00-0.50 0.00 0.49 0.98 1.44 2.06 2.45 2.96 3.53 4.06 4.50 5.00 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

81-15, 550m
 0-03cm DATA 0.00 0.01 0.04 0.06 0.11 0.28 0.27 0.53 0.78 1.26 1.65 2.21 0.91 0.91 0.99 0.74 0.66 0.58 0.58 0.74 1.65 8.41
 FREQUENCY %  0.0  0.0  0.2  0.3  0.5  1.3  0.9  2.9  3.3  4.7  6.7 10.7  3.9  3.9  4.2  3.2  2.8  2.5  2.5  3.2  7.1 36.0
CUMULATIVE %  0.0  0.0  0.2  0.5  0.9  2.1  3.3  5.6  8.9 14.3 21.4 30.8 34.7 38.6 42.8 46.0 48.8 51.3 53.8 57.0 64.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.01  2.37  3.67  4.24  7.24 11.72 13.46 17.00
MOMENT MEASURES MEAN  7.68  STDEV 3.73  SKEW-0.04  KURT  1.47
GRAPHIC (FOLK)  MEAN  8.12  STDEV 4.67  SKEW 0.30  KURT  0.80  GRAVEL =  0.00 SAND = 21.35 SILT = 32.43 CLAY = 46.21
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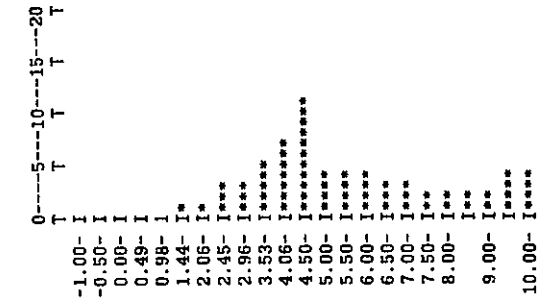


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81-15, 550m
 21-24cmDATA 0.40 0.40 0.38 0.80 1.12 1.53 1.54 3.04 3.27 2.22 1.41 0.99 0.72 0.96 0.84 0.66 0.48 0.48 0.60 0.66 1.26 5.18
 FREQUENCY %  1.4  1.4  1.3  2.8  3.9  5.7  4.3 13.5 11.1  6.7  4.6  3.9  2.5  3.3  2.9  2.3  1.7  1.7  2.1  2.3  4.4 17.9
CUMULATIVE %  1.4  2.8  4.1  6.8 10.7 16.0 21.3 31.8 43.1 50.8 55.7 59.1 61.6 64.9 67.8 70.1 71.7 73.4 75.5 77.7 82.1100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -1.22  0.19  1.44  2.21  3.47  7.89 10.48 14.67
MOMENT MEASURES MEAN  5.02  STDEV 4.02  SKEW 0.65  KURT  2.15
GRAPHIC (FOLK)  MEAN  5.13  STDEV 4.45  SKEW 0.55  KURT  1.04  GRAVEL =  1.38 SAND = 54.28 SILT = 19.80 CLAY = 24.53
```
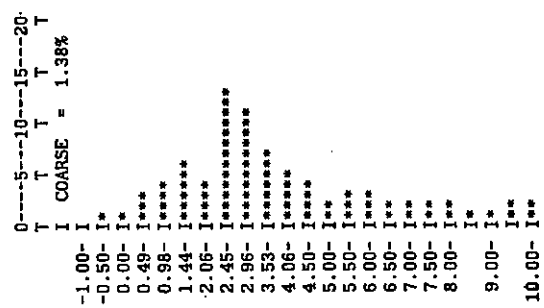
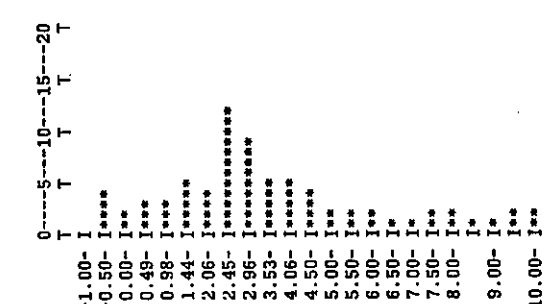
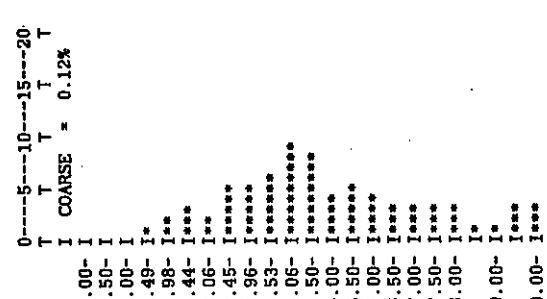



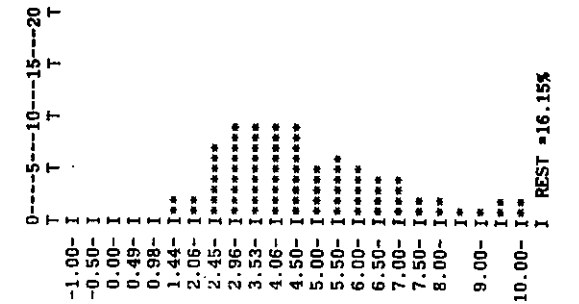

```
81-15, 550m
 27-32cmDATA 0.00 0.84 0.53 0.77 0.76 1.04 1.08 2.07 2.19 1.43 1.14 0.78 0.41 0.57 0.57 0.31 0.31 0.36 0.36 0.46 0.98 5.89
 FREQUENCY %  0.0  3.7  2.3  3.4  3.4  4.9  3.8 11.6  9.4  5.5  4.7  3.9  1.8  2.5  2.5  1.4  1.4  1.6  1.6  2.0  4.3 25.8
CUMULATIVE %  0.0  3.7  6.0  9.4 12.7 17.2 22.0 31.0 40.6 46.9 51.9 55.3 57.1 59.6 62.1 63.4 64.8 66.3 67.9 69.9 74.2100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -1.64 -0.19  1.32  2.20  3.86 10.19 12.69 17.79
MOMENT MEASURES MEAN  5.58  STDEV 4.42  SKEW 0.41  KURT  1.65
GRAPHIC (FOLK)  MEAN  5.96  STDEV 5.57  SKEW 0.55  KURT  0.92  GRAVEL =  0.00 SAND = 51.86 SILT = 16.06 CLAY = 32.08
```



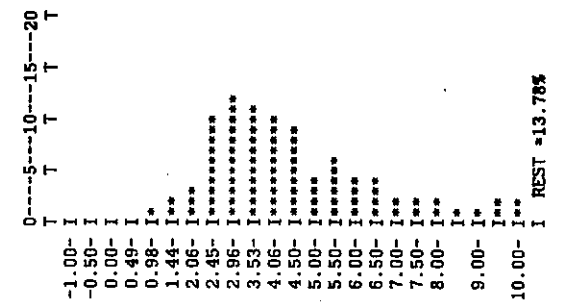

```
81-15, 550m
 43-46cmDATA 0.02 0.07 0.08 0.17 0.26 0.48 0.42 0.69 0.85 1.20 1.56 1.15 0.69 0.79 0.74 0.55 0.50 0.50 0.50 0.50 1.04 3.92
 FREQUENCY %  0.1  0.4  0.5  1.0  1.6  3.1  2.0  5.3  5.0  6.3  8.8  7.8  4.1  4.7  4.4  3.3  3.0  3.0  3.0  3.0  6.2 23.5
CUMULATIVE %  0.1  0.5  1.0  2.0  3.6  6.5  9.0 13.1 18.2 25.4 34.8 41.7 45.8 50.5 55.0 58.3 61.3 64.3 67.3 70.3 76.5100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -0.02  1.23  2.75  3.50  5.44  9.75 11.43 14.84
MOMENT MEASURES MEAN  6.43  STDEV 3.76  SKEW 0.31  KURT  1.80
GRAPHIC (FOLK)  MEAN  6.54  STDEV 4.23  SKEW 0.38  KURT  0.89  GRAVEL =  0.12 SAND = 34.65 SILT = 32.49 CLAY = 32.73
```



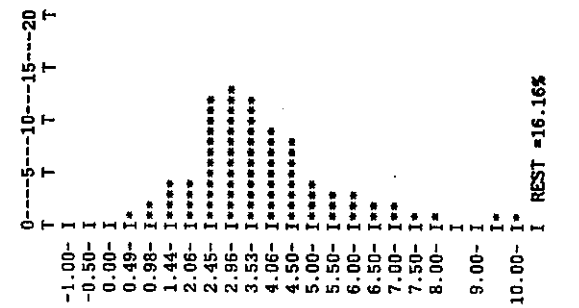
```
CLASS MIDPTS-2.00-0.75-0.25 0.25 0.73 1.21 1.75 2.26 2.70 3.24 3.80 4.28 4.75 5.25 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-1.00-0.50 0.00 0.49 0.98 1.44 2.06 2.45 2.96 3.53 4.06 4.50 5.00 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

81-16, 266m
 0-03cm DATA 0.00 0.00 0.02 0.02 0.08 0.28 0.40 0.93 1.56 1.81 1.53 1.30 0.90 1.08 0.86 0.72 0.59 0.36 0.41 0.45 0.77 2.71
 FREQUENCY %  0.0  0.0  0.1  0.1  0.5  1.8  1.9  7.1  9.1  9.5  8.6  8.8  5.4  6.4  5.1  4.3  3.5  2.1  2.4  2.7  4.6 16.2
CUMULATIVE %  0.0  0.0  0.1  0.2  0.7  2.4  4.8 10.3 19.6 30.4 39.5 47.3 52.6 59.1 64.2 68.5 72.0 74.1 76.6 79.3 83.8100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.10  2.08  2.79  3.26  4.76  7.67 10.04 13.80
MOMENT MEASURES MEAN  5.81  STDEV 3.33  SKEW 0.79  KURT  2.38
GRAPHIC (FOLK)  MEAN  5.86  STDEV 3.59  SKEW 0.50  KURT  1.09  GRAVEL =  0.00 SAND = 39.51 SILT = 37.07 CLAY = 23.42
```



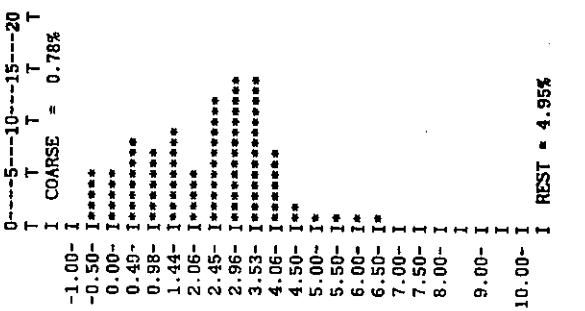

```
81-16, 266m
 25-27cmDATA 0.00 0.01 0.02 0.05 0.12 0.34 0.49 1.18 1.83 1.95 1.59 1.22 0.66 0.90 0.69 0.55 0.34 0.34 0.28 0.28 0.55 2.14
 FREQUENCY %  0.0  0.1  0.1  0.3  0.8  2.4  2.5  9.7 11.6 11.0  9.7  8.9  4.2  5.8  4.4  3.5  2.2  2.2  1.8  1.8  3.5 13.8
CUMULATIVE %  0.0  0.1  0.2  0.5  1.3  3.5  6.6 14.2 26.0 38.6 48.8 56.7 60.9 66.7 71.2 74.7 76.9 79.1 80.9 82.7 86.2100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  0.84  1.78  2.54  2.92  4.13  6.57  9.36 13.73
MOMENT MEASURES MEAN  5.28  STDEV 3.27  SKEW 1.02  KURT  2.86
GRAPHIC (FOLK)  MEAN  5.34  STDEV 3.51  SKEW 0.57  KURT  1.34  GRAVEL =  0.00 SAND = 48.81 SILT = 32.07 CLAY = 19.12
```



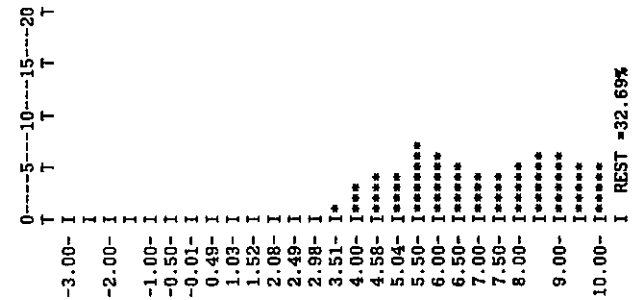

```
81-16, 266m
 41-44cmDATA 0.00 0.02 0.03 0.10 0.19 0.46 0.59 1.18 1.71 1.69 1.23 0.95 0.54 0.44 0.42 0.27 0.22 0.12 0.17 0.12 0.24 2.06
 FREQUENCY %  0.0  0.2  0.2  0.8  1.5  3.9  3.7 11.9 13.1 11.6  9.1  8.5  4.2  3.5  3.3  2.1  1.7  0.9  1.3  0.9  1.9 16.2
CUMULATIVE %  0.0  0.2  0.4  1.2  2.7  6.3 10.9 20.2 33.6 46.8 56.5 63.9 68.2 71.6 74.9 77.0 78.7 79.7 81.0 82.0 83.8100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  0.41  1.31  2.29  2.65  3.70  6.02 10.09 18.86
MOMENT MEASURES MEAN  5.01  STDEV 3.50  SKEW 1.10  KURT  2.88
GRAPHIC (FOLK)  MEAN  5.36  STDEV 4.61  SKEW 0.68  KURT  2.13  GRAVEL =  0.00 SAND = 56.47 SILT = 24.55 CLAY = 18.98
```



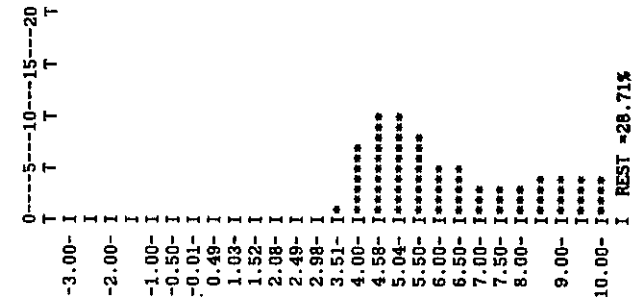

```
81-17, 358m
 0-03cm DATA 0.43 2.54 2.83 4.40 3.87 4.67 3.49 4.95 7.93 9.03 4.12 0.96 0.51 0.39 0.42 0.30 0.15 0.21 0.24 0.24 0.51 2.72
 FREQUENCY %  0.8  4.6  5.2  8.2  7.2  9.2  5.1 11.6 14.2 14.4  7.1  2.0  0.9  0.7  0.8  0.5  0.3  0.4  0.4  0.4  0.9  5.0
CUMULATIVE %  0.8  5.4 10.6 18.6 25.6 34.1 40.5 49.5 63.9 80.4 87.9 89.6 90.6 91.3 92.0 92.6 92.9 93.2 93.7 94.1 95.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -0.94 -0.52  0.35  0.94  2.47  3.32  3.76  9.95
MOMENT MEASURES MEAN  2.67  STDEV 2.77  SKEW 1.88  KURT  7.20
GRAPHIC (FOLK)  MEAN  2.19  STDEV 2.44  SKEW 0.09  KURT  1.80  GRAVEL =  0.78 SAND = 87.11 SILT =  5.79 CLAY =  6.32
```



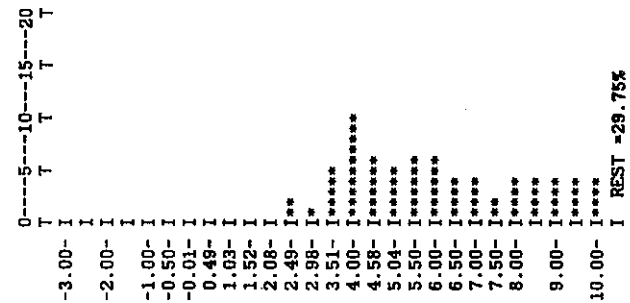
```
CLASS MIDPTS-3.50-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

83-12. 788m
 0-2cm  DATA 0.00 0.00 0.00 0.01 0.01 0.01 0.02 0.02 0.02 0.01 0.02 0.06 0.20 0.34 0.29 0.50 0.41 0.34 0.28 0.28 0.38 0.91 0.79 2.38
 FREQUENCY %  0.0  0.0  0.0  0.1  0.1  0.1  0.3  0.3  0.2  0.2  0.3  0.8  2.8  4.0  4.3  7.5  5.6  4.7  3.8  3.8  5.2 12.5 10.9 32.7
CUMULATIVE %  0.0  0.0  0.0  0.1  0.3  0.4  0.7  1.0  1.2  1.4  1.6  2.5  5.2  9.9 13.9 20.7 26.4 31.0 34.9 38.7 44.0 56.5 67.3100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.61  3.97  5.20  5.88  8.48 10.79 11.91 14.19
MOMENT MEASURES MEAN  8.48  STDEV 2.97  SKEW-0.23  KURT  2.01
GRAPHIC (FOLK)  MEAN  8.53  STDEV 3.23  SKEW 0.07  KURT  0.85  GRAVEL =  0.00 SAND =  5.22 SILT = 38.74 CLAY = 56.04
```



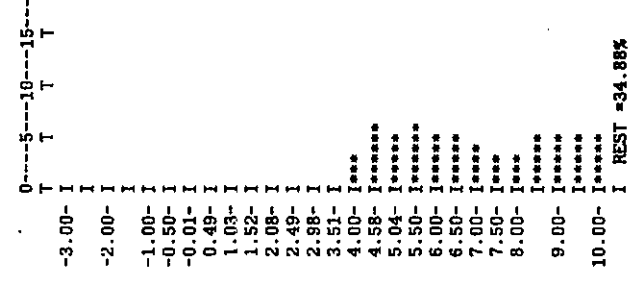

```
83-12. 788m
 10-12cmDATA 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.02 0.02 0.01 0.01 0.07 0.33 0.62 0.45 0.36 0.25 0.25 0.16 0.15 0.15 0.42 0.38 1.47
 FREQUENCY %  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.4  0.3  0.2  0.2  1.3  6.6 10.4  9.6  7.6  4.9  4.9  3.1  2.9  2.9  8.2  7.4 28.7
CUMULATIVE %  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.4  0.8  1.0  1.2  2.5  9.0 21.1 29.9 36.9 41.8 46.7 49.8 52.7 55.7 63.9 71.3100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  2.55  3.76  4.37  4.79  7.03 10.54 12.09 15.23
MOMENT MEASURES MEAN  7.70  STDEV 3.19  SKEW 0.22  KURT  1.55
GRAPHIC (FOLK)  MEAN  7.83  STDEV 3.67  SKEW 0.37  KURT  0.82  GRAVEL =  0.00 SAND =  8.98 SILT = 46.68 CLAY = 44.34
```



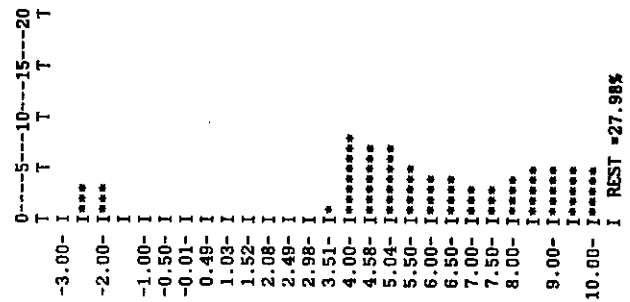

```
83-12. 788m
 20-22cmDATA 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.01 0.02 0.08 0.04 0.30 0.53 0.37 0.26 0.32 0.32 0.24 0.24 0.14 0.20 0.44 0.48 1.69
 FREQUENCY %  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.2  0.3  1.7  0.7  5.0  9.5  5.6  5.0  6.1  5.6  4.2  4.2  2.5  3.5  7.7  8.5 29.8
CUMULATIVE %  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.2  0.5  1.9  2.6  7.9 17.3 23.8 28.3 34.0 39.6 43.8 48.1 50.5 54.0 61.8 70.2100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  2.27  3.27  3.95  4.71  7.39 10.62 12.00 14.81
MOMENT MEASURES MEAN  7.73  STDEV 3.31  SKEW 0.09  KURT  1.54
GRAPHIC (FOLK)  MEAN  7.78  STDEV 3.76  SKEW 0.22  KURT  0.80  GRAVEL =  0.00 SAND = 17.25 SILT = 36.80 CLAY = 45.95
```



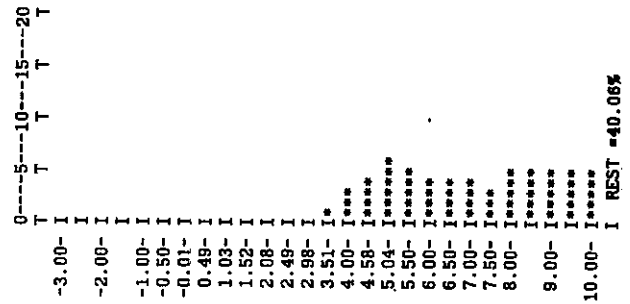

```
83-12. 788m
 30-32cmDATA 0.00 0.00 0.00 0.00 0.02 0.02 0.02 0.01 0.02 0.02 0.01 0.03 0.20 0.48 0.31 0.39 0.33 0.33 0.28 0.22 0.22 0.72 0.72 2.33
 FREQUENCY %  0.0  0.0  0.0  0.0  0.3  0.3  0.3  0.2  0.3  0.4  0.2  0.4  3.1  6.2  5.0  6.3  4.9  4.9  4.2  3.3  3.3 10.8 10.8 34.9
CUMULATIVE %  0.0  0.0  0.0  0.0  0.3  0.6  0.9  1.0  1.3  1.6  1.8  2.2  5.2 12.4 17.1 22.9 27.8 32.8 37.0 40.3 43.6 54.3 65.1100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.37  3.97  4.94  5.72  8.60 11.02 12.17 14.49
MOMENT MEASURES MEAN  8.48  STDEV 3.08  SKEW-0.25  KURT  1.89
GRAPHIC (FOLK)  MEAN  8.57  STDEV 3.40  SKEW 0.05  KURT  0.81  GRAVEL =  0.00 SAND =  5.24 SILT = 38.32 CLAY = 56.44
```



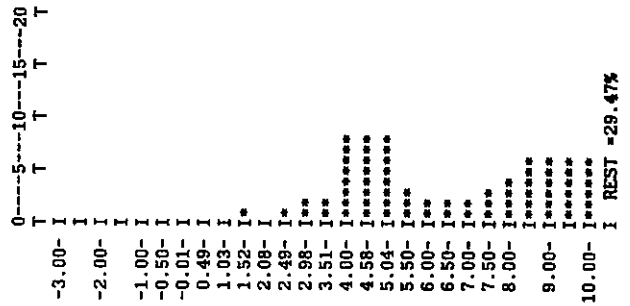
```
CLASS MIDPTS-3.50-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

83-12, 788m
 40-42cmDATA 0.00 0.45 0.00 0.00 0.01 0.01 0.01 0.02 0.01 0.01 0.01 0.07 0.51 0.53 0.46 0.31 0.26 0.26 0.21 0.21 0.24 0.64 0.66 1.90
 FREQUENCY %  0.0  6.6  0.0  0.0  0.2  0.1  0.1  0.3  0.1  0.2  0.2  1.0  7.7  6.7  7.4  5.0  3.8  3.8  3.1  3.1  3.5  9.4  9.7 28.0
CUMULATIVE %  0.0  6.6  6.6  6.6  6.8  6.9  7.1  7.4  7.5  7.7  7.8  8.8 16.3 24.2 30.9 35.5 39.3 43.2 46.2 49.3 52.9 62.3 72.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -1.00 -1.00  3.98  4.64  7.59 10.34 11.52 13.93
MOMENT MEASURES MEAN  7.31  STDEV 4.02  SKEW-0.67  KURT  3.04
GRAPHIC (FOLK)  MEAN  7.70  STDEV 4.15  SKEW-0.05  KURT  1.07  GRAVEL =  6.63 SAND =  9.72 SILT = 36.52 CLAY = 47.13
```



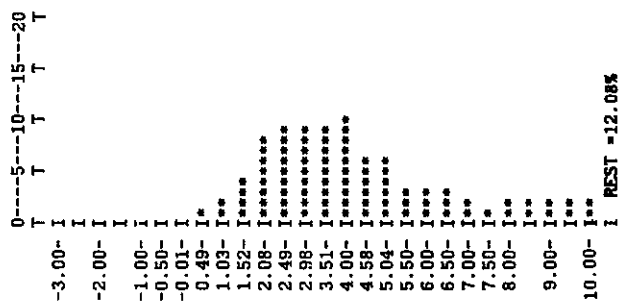

```
83-12, 788m
 50-52cmDATA 0.00 0.00 0.00 0.00 0.00 0.01 0.01 0.01 0.01 0.01 0.03 0.05 0.20 0.32 0.32 0.29 0.26 0.26 0.24 0.16 0.29 0.66 0.61 2.50
 FREQUENCY %  0.0  0.0  0.0  0.0  0.0  0.2  0.1  0.2  0.1  0.2  0.5  0.8  3.3  4.4  5.6  5.1  4.2  4.2  3.8  2.6  4.6 10.6  9.8 40.1
CUMULATIVE %  0.0  0.0  0.0  0.0  0.0  0.2  0.3  0.5  0.6  0.8  1.3  2.1  5.3 10.4 15.5 20.2 24.4 28.5 32.4 34.9 39.6 50.2 59.9100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  2.72  3.97  5.09  6.08  8.99 11.71 13.00 15.63
MOMENT MEASURES MEAN  8.82  STDEV 3.04  SKEW-0.35  KURT  1.79
GRAPHIC (FOLK)  MEAN  9.02  STDEV 3.74  SKEW 0.08  KURT  0.85  GRAVEL =  0.00 SAND =  5.29 SILT = 34.29 CLAY = 60.42
```



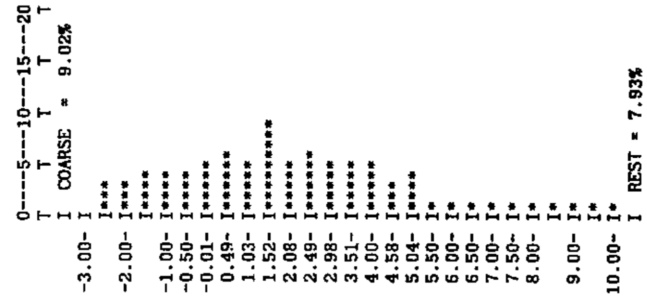

```
83-12, 788m
 60-62cmDATA 0.00 0.00 0.00 0.00 0.00 0.02 0.01 0.03 0.02 0.03 0.12 0.12 0.44 0.50 0.41 0.16 0.14 0.14 0.14 0.16 0.24 0.64 0.70 1.68
 FREQUENCY %  0.0  0.0  0.0  0.0  0.0  0.4  0.2  0.5  0.3  0.6  2.1  2.0  7.9  7.6  7.8  3.1  2.5  2.5  2.5  2.8  4.2 11.2 12.3 29.5
CUMULATIVE %  0.0  0.0  0.0  0.0  0.0  0.4  0.5  1.1  1.4  1.9  4.0  6.1 13.9 22.6 29.8 32.6 35.1 37.5 40.0 42.8 47.0 58.2 70.5100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.48  3.25  4.16  4.74  8.26 10.41 11.37 13.33
MOMENT MEASURES MEAN  7.96  STDEV 3.27  SKEW-0.12  KURT  1.68
GRAPHIC (FOLK)  MEAN  7.93  STDEV 3.33  SKEW-0.07  KURT  0.73  GRAVEL =  0.00 SAND = 13.86 SILT = 33.16 CLAY = 52.98
```



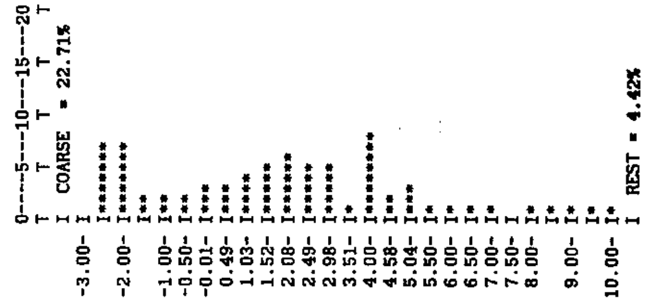

```
83-14, 165m
 0-02cm DATA 0.00 0.00 0.08 0.05 0.05 0.11 0.34 0.78 1.79 1.41 1.63 1.87 1.81 1.36 0.99 0.61 0.58 0.51 0.34 0.27 0.41 0.94 0.81 2.30
 FREQUENCY %  0.0  0.0  0.4  0.3  0.3  0.6  1.7  4.2  8.4  9.0  8.7  9.3  9.7  6.2  5.7  3.5  3.0  2.7  1.8  1.4  2.2  4.9  4.3 12.1
CUMULATIVE %  0.0  0.0  0.4  0.7  0.9  1.5  3.3  7.4 16.8 24.2 32.8 42.6 52.1 59.2 64.4 67.6 70.7 73.4 75.2 76.6 78.7 83.7 87.9100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  0.05  1.27  2.04  2.54  3.89  6.96  9.07 12.49
MOMENT MEASURES MEAN  5.04  STDEV 3.40  SKEW 0.88  KURT  2.69
GRAPHIC (FOLK)  MEAN  5.00  STDEV 3.46  SKEW 0.50  KURT  1.04  GRAVEL =  0.42 SAND = 51.68 SILT = 26.63 CLAY = 21.27
```



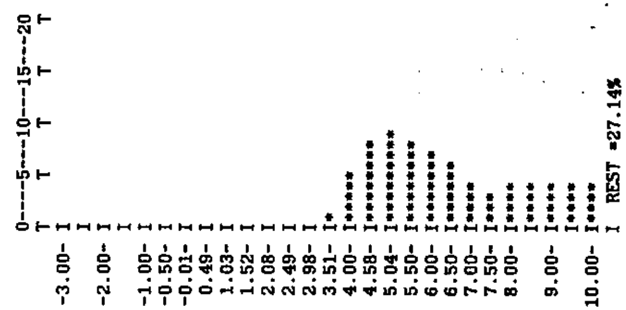
```
CLASS MIDPTS-3.50-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

83-14, 165m
 06-08cmDATA 3.06 2.03 2.47 1.33 1.51 1.92 1.67 2.86 1.72 1.80 1.82 1.82 1.53 1.26 1.15 0.42 0.42 0.36 0.30 0.24 0.30 0.63 0.63 2.69
 FREQUENCY %  9.0  6.0  7.3  3.9  4.5  5.7  4.6  8.6  4.5  6.5  5.5  5.1  4.6  3.2  3.7  1.3  1.2  1.1  0.9  0.7  0.9  1.9  1.9  7.9
CUMULATIVE %  9.0 15.0 22.3 26.2 30.6 36.3 41.2 49.6 54.7 60.0 65.4 70.7 75.3 79.0 82.4 83.6 84.8 85.9 86.8 87.5 88.4 90.2 92.1100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -6.25 -4.01 -1.85 -0.65  1.56  3.97  5.66 12.02
MOMENT MEASURES MEAN  2.24  STDEV 4.15  SKEW 0.86  KURT  3.27
GRAPHIC (FOLK)  MEAN  1.79  STDEV 4.31  SKEW 0.20  KURT  1.42  GRAVEL = 22.27 SAND = 52.98 SILT = 13.11 CLAY = 11.64
```



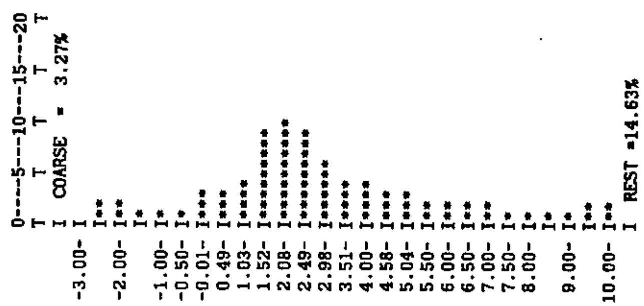

```
83-14, 165m
 11-13cmDATA 7.91 4.60 1.67 0.81 0.87 0.96 1.46 1.71 2.47 1.47 1.58 0.52 2.70 0.95 0.89 0.43 0.43 0.38 0.30 0.17 0.21 0.40 0.40 1.54
 FREQUENCY % 22.7 13.2  4.8  2.3  2.5  2.8  3.9  5.0  6.3  5.1  4.6  1.4  7.9  2.4  2.8  1.3  1.2  1.1  0.9  0.5  0.6  1.1  1.1  4.4
CUMULATIVE % 22.7 35.9 40.7 43.0 45.5 48.3 52.5 57.4 64.5 68.7 73.2 74.7 82.5 85.2 87.8 89.0 90.2 91.3 92.2 92.7 93.3 94.4 95.6100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -7.07 -5.31 -3.63 -2.81  0.71  3.53  4.31  9.47
MOMENT MEASURES MEAN  0.89  STDEV 4.07  SKEW 0.92  KURT  3.44
GRAPHIC (FOLK)  MEAN  0.46  STDEV 4.23  SKEW 0.05  KURT  0.96  GRAVEL = 40.71 SAND = 41.77 SILT = 10.80 CLAY =  6.72
```




```
83-15, 700m
 0-02cm DATA 0.00 0.00 0.00 0.00 0.00 0.01 0.01 0.02 0.04 0.03 0.06 0.23 0.94 1.74 1.68 1.46 1.32 1.10 0.80 0.66 0.80 1.61 1.61 5.26
 FREQUENCY %  0.0  0.0  0.0  0.0  0.0  0.1  0.0  0.1  0.2  0.2  0.3  1.1  4.9  7.7  9.4  8.2  6.8  5.7  4.1  3.4  4.1  8.3  8.3 27.1
CUMULATIVE %  0.0  0.0  0.0  0.0  0.0  0.1  0.1  0.2  0.4  0.6  0.9  2.1  6.9 15.9 24.6 32.1 38.9 44.6 48.7 52.1 56.2 64.6 72.9100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  3.06  3.86  4.59  5.07  7.19 10.28 11.64 14.40
MOMENT MEASURES MEAN  7.78  STDEV 3.04  SKEW 0.24  KURT  1.64
GRAPHIC (FOLK)  MEAN  7.81  STDEV 3.36  SKEW 0.32  KURT  0.83  GRAVEL =  0.00 SAND =  6.91 SILT = 49.33 CLAY = 43.76
```



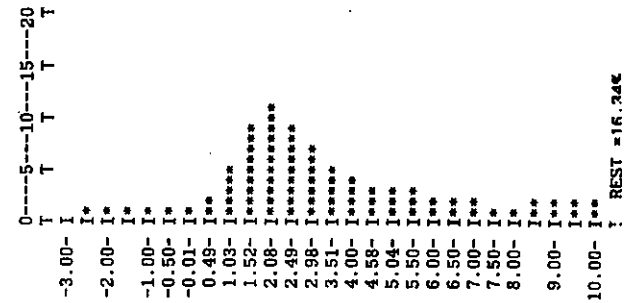

```
83-31, 260m
 0-02cm DATA 1.41 1.89 1.22 0.60 1.27 1.27 2.01 3.92 4.87 3.02 2.72 2.02 1.77 1.30 1.05 0.76 0.83 0.70 0.70 0.45 0.45 1.21 1.33 6.30
 FREQUENCY %  3.3  4.4  2.8  1.4  3.0  2.9  4.3  9.3 10.1  8.6  6.4  4.4  4.2  2.6  2.6  1.9  1.9  1.6  1.6  1.0  1.0  2.8  3.1 14.6
CUMULATIVE %  3.3  7.7 10.5 11.9 14.8 17.8 22.5 31.6 42.9 49.9 56.2 60.9 65.0 68.0 70.4 72.2 74.1 75.8 77.4 78.4 79.5 82.3 85.4100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -4.17 -2.52  0.19  1.18  2.50  6.26  9.54 14.69
MOMENT MEASURES MEAN  3.82  STDEV 4.39  SKEW 0.63  KURT  2.48
GRAPHIC (FOLK)  MEAN  4.08  STDEV 4.94  SKEW 0.46  KURT  1.39  GRAVEL = 10.49 SAND = 54.49 SILT = 14.49 CLAY = 20.52
```



CLASS MIDPTS-3.50-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

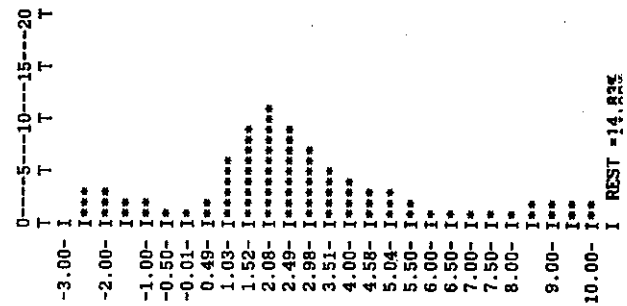
83-31, 260m
06-08cmDATA 0.00 0.74 1.14 0.54 0.48 0.93 2.47 3.81 5.69 3.44 3.11 2.28 1.86 1.49 1.34 1.08 1.08 0.92 0.84 0.54 0.54 1.53 1.53 7.30
FREQUENCY % 0.0 1.7 2.6 1.2 1.1 2.1 5.1 8.7 11.4 9.4 7.1 4.8 4.2 2.9 3.3 2.6 2.4 2.1 1.9 1.2 1.2 3.4 3.4 16.3
CUMULATIVE % 0.0 1.7 4.2 5.4 6.5 8.6 14.1 22.6 35.4 43.1 50.0 55.1 59.3 62.6 65.6 68.0 70.5 72.5 74.4 75.6 76.8 80.2 83.7100.0

PERCENTILES (1,5,16,25,50,75,84,95) -2.49 -0.66 1.15 1.63 2.98 7.25 10.11 15.09
MOMENT MEASURES MEAN 4.55 STDEV 4.12 SKEW 0.69 KURT 2.30
GRAPHIC (FOLK) MEAN 4.75 STDEV 4.62 SKEW 0.57 KURT 1.15 GRAVEL = 4.21 SAND = 55.08 SILT = 17.52 CLAY = 23.19



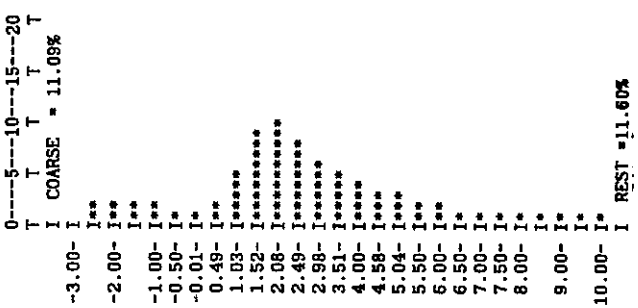
83-31, 260m
08-10cmDATA 0.00 2.44 1.34 0.58 0.57 1.01 2.83 3.64 5.23 3.05 2.69 2.10 1.67 1.24 1.12 0.62 0.62 0.62 0.62 0.44 0.56 1.30 1.43 6.22
FREQUENCY % 0.0 5.8 3.2 1.4 1.4 2.4 6.2 8.9 11.1 8.9 6.5 4.7 4.1 2.5 2.9 1.6 1.5 1.5 1.5 1.0 1.3 3.1 3.4 14.8
CUMULATIVE % 0.0 5.8 9.0 10.4 11.8 14.2 20.9 29.6 42.1 49.3 55.7 60.8 64.7 67.7 70.4 71.8 73.3 74.8 76.3 77.3 78.7 81.8 85.2100.0

PERCENTILES (1,5,16,25,50,75,84,95) -5.28 -2.32 0.65 1.27 2.54 6.57 9.64 14.37
MOMENT MEASURES MEAN 4.00 STDEV 4.28 SKEW 0.70 KURT 2.44
GRAPHIC (FOLK) MEAN 4.28 STDEV 4.78 SKEW 0.50 KURT 1.29 GRAVEL = 9.01 SAND = 55.72 SILT = 13.92 CLAY = 21.34



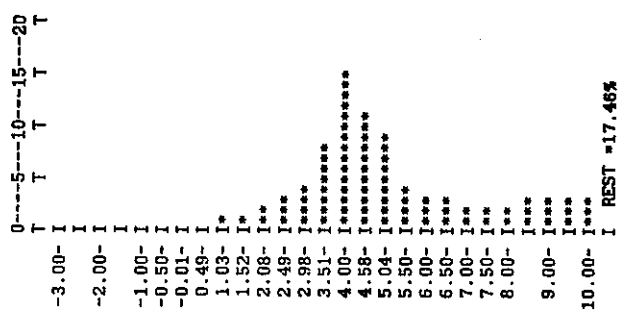
83-31, 260m
16-18cmDATA 5.95 1.88 1.64 0.57 0.71 1.32 2.61 4.64 6.13 3.53 3.37 2.76 2.24 1.64 1.41 0.93 0.93 0.79 0.66 0.46 0.53 1.32 1.39 6.22
FREQUENCY % 11.1 3.5 3.1 1.1 1.4 2.5 4.5 8.8 10.2 8.0 6.4 4.9 4.3 2.6 2.9 1.9 1.7 1.5 1.2 0.9 1.0 2.5 2.6 11.6
CUMULATIVE % 11.1 14.6 17.7 18.7 20.0 22.5 27.4 36.0 47.5 54.0 60.3 65.5 69.6 72.7 75.3 77.1 78.8 80.3 81.5 82.4 83.3 85.8 88.4100.0

PERCENTILES (1,5,16,25,50,75,84,95) -9.59 -5.52 -1.53 0.77 2.24 4.98 8.25 13.64
MOMENT MEASURES MEAN 3.08 STDEV 4.46 SKEW 0.60 KURT 2.72
GRAPHIC (FOLK) MEAN 2.99 STDEV 5.35 SKEW 0.21 KURT 1.87 GRAVEL = 17.66 SAND = 51.99 SILT = 13.71 CLAY = 16.65

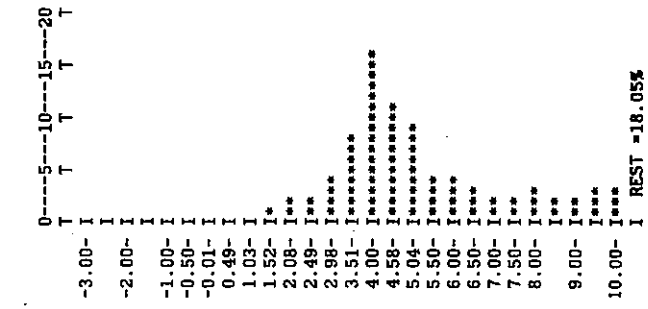


83-32a, 395m
0-02cm DATA 0.00 0.00 0.00 0.00 0.02 0.05 0.09 0.18 0.33 0.33 0.62 1.25 2.23 1.93 1.25 0.58 0.42 0.42 0.32 0.32 0.29 0.78 0.74 2.57
FREQUENCY % 0.0 0.0 0.0 0.0 0.1 0.3 0.6 1.2 2.0 2.7 4.3 8.0 15.5 11.3 9.2 4.3 2.9 2.9 2.2 2.2 2.0 5.3 5.0 17.5
CUMULATIVE % 0.0 0.0 0.0 0.0 0.1 0.5 1.1 2.3 4.6 6.8 11.0 19.5 34.6 47.8 56.3 60.2 63.0 65.9 68.1 70.2 72.2 77.5 82.5100.0

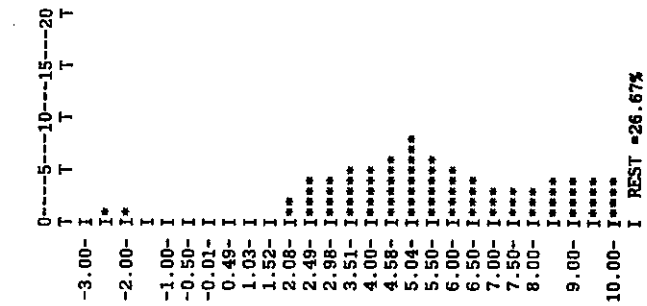
PERCENTILES (1,5,16,25,50,75,84,95) 0.97 2.17 3.32 3.71 4.70 8.51 10.32 13.93
MOMENT MEASURES MEAN 6.07 STDEV 3.32 SKEW 0.73 KURT 2.22
GRAPHIC (FOLK) MEAN 6.11 STDEV 3.53 SKEW 0.59 KURT 1.00 GRAVEL = 0.00 SAND = 34.65 SILT = 37.57 CLAY = 27.79



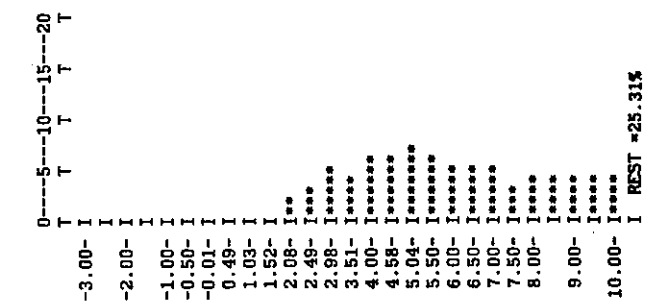
```
CLASS MIDPTS-3.50-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

83-32b, 395m
 0-02cm DATA 0.00 0.00 0.00 0.00 0.04 0.06 0.09 0.18 0.36 0.37 0.75 1.63 3.07 2.49 1.54 0.70 0.70 0.61 0.39 0.30 0.52 0.96 1.04 3.48
 FREQUENCY %  0.0  0.0  0.0  0.0  0.2  0.3  0.4  1.0  1.7  2.3  4.0  8.0 16.2 11.1  8.7  3.9  3.6  3.2  2.0  1.6  2.7  5.0  5.4 18.0
CUMULATIVE %  0.0  0.0  0.0  0.0  0.2  0.5  1.0  1.9  3.8  5.7  9.6 18.0 34.0 46.9 54.9 58.5 62.1 65.3 67.3 68.9 71.6 76.6 82.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.04  2.35  3.40  3.74  4.76  8.68 10.43 13.87
MOMENT MEASURES MEAN  6.17  STDEV 3.32  SKEW 0.70  KURT  2.16
GRAPHIC (FOLK)  MEAN  6.20  STDEV 3.50  SKEW 0.60  KURT  0.96  GRAVEL =  0.00 SAND = 33.97 SILT = 37.60 CLAY = 28.42
```



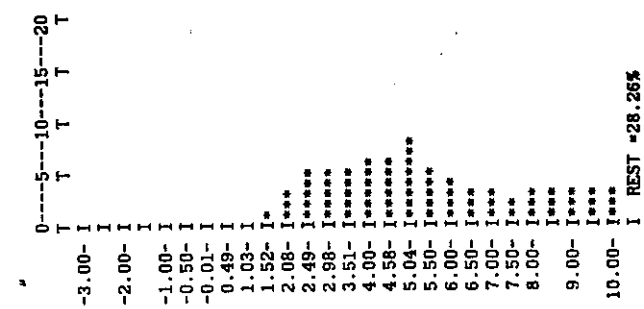

```
83-33#1,460m
 0-02cm DATA 0.00 0.22 0.00 0.00 0.00 0.01 0.02 0.08 0.43 0.63 0.91 1.03 1.10 1.51 1.52 1.11 1.04 0.91 0.70 0.70 0.56 1.68 1.54 5.71
 FREQUENCY %  0.0  1.0  0.0  0.0  0.0  0.0  0.1  0.4  1.8  3.6  4.3  4.5  5.2  6.1  7.7  5.6  4.9  4.3  3.3  3.3  2.6  7.8  7.2 26.7
CUMULATIVE %  0.0  1.0  1.0  1.0  1.0  1.1  1.2  1.5  3.5  6.5 10.7 15.6 20.7 27.7 34.8 40.0 44.9 49.1 52.4 55.7 58.3 66.1 73.3100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -1.00  2.31  3.56  4.37  6.63 10.25 11.80 14.95
MOMENT MEASURES MEAN  7.22  STDEV 3.56  SKEW 0.01  KURT  2.00
GRAPHIC (FOLK)  MEAN  7.33  STDEV 3.98  SKEW 0.28  KURT  0.88  GRAVEL =  1.03 SAND = 19.66 SILT = 37.60 CLAY = 41.71
```




```
83-33#2,460m
 0-02cm DATA 0.00 0.00 0.00 0.00 0.00 0.00 0.02 0.06 0.34 0.48 0.76 0.81 0.98 1.13 1.06 0.96 0.84 0.90 0.79 0.51 0.62 1.23 1.29 4.33
 FREQUENCY %  0.0  0.0  0.0  0.0  0.0  0.0  0.1  0.4  1.8  3.4  4.5  4.5  5.8  5.7  6.7  6.1  4.9  5.3  4.6  3.0  3.6  7.2  7.5 25.3
CUMULATIVE %  0.0  0.0  0.0  0.0  0.0  0.0  0.1  0.5  2.5  5.3  9.7 14.4 20.2 26.8 33.0 38.6 43.5 48.7 53.4 56.3 60.0 67.2 74.7100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.76  2.46  3.65  4.43  6.64 10.04 11.49 14.44
MOMENT MEASURES MEAN  7.26  STDEV 3.37  SKEW 0.19  KURT  1.70
GRAPHIC (FOLK)  MEAN  7.26  STDEV 3.77  SKEW 0.27  KURT  0.88  GRAVEL =  0.00 SAND = 20.16 SILT = 39.80 CLAY = 40.04
```



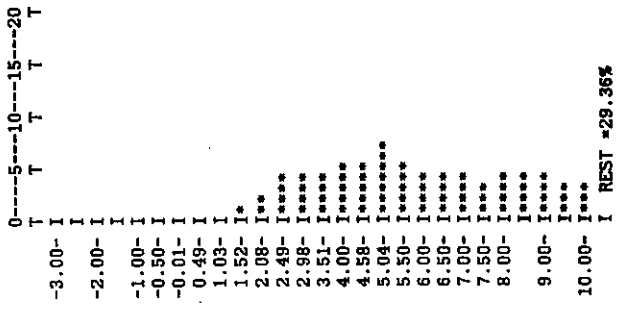

```
83-33, 460m
 10-12cmDATA 0.00 0.00 0.00 0.00 0.00 0.02 0.06 0.29 0.94 0.97 1.23 1.33 1.47 1.67 1.78 1.06 0.98 0.83 0.68 0.53 0.76 1.66 1.59 7.03
 FREQUENCY %  0.0  0.0  0.0  0.0  0.0  0.1  0.2  1.2  3.4  4.8  5.0  5.0  6.0  5.8  7.8  4.6  3.9  3.3  2.7  2.1  3.1  6.7  6.4 28.3
CUMULATIVE %  0.0  0.0  0.0  0.0  0.0  0.1  0.3  1.5  5.3  9.2 14.1 19.5 25.4 32.1 39.2 43.5 47.4 50.8 53.5 55.6 58.7 65.4 71.7100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.38  2.05  3.18  3.97  6.39 10.55 12.32 15.93
MOMENT MEASURES MEAN  7.14  STDEV 3.65  SKEW 0.16  KURT  1.56
GRAPHIC (FOLK)  MEAN  7.30  STDEV 4.39  SKEW 0.34  KURT  0.86  GRAVEL =  0.00 SAND = 25.36 SILT = 33.32 CLAY = 41.32
```



CLASS MIDPTS-3.50-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

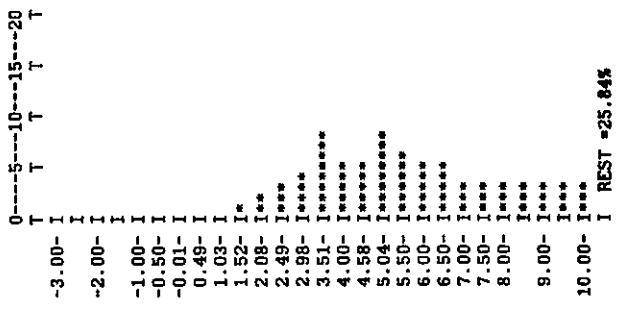
83-33, 460m
20-22cmDATA 0.00 0.00 0.00 0.03 0.06 0.04 0.06 0.22 0.65 0.75 0.95 1.10 1.23 1.57 1.57 1.19 1.02 1.11 0.94 0.85 0.94 1.87 1.70 7.42
FREQUENCY % 0.0 0.0 0.0 0.1 0.2 0.2 0.2 0.9 2.3 3.6 3.8 4.1 5.0 5.4 6.8 5.1 4.0 4.4 3.7 3.4 3.7 7.4 6.7 29.4
CUMULATIVE % 0.0 0.0 0.0 0.1 0.4 0.5 0.8 1.6 4.2 7.2 10.9 15.3 20.1 26.4 32.6 37.3 41.3 45.7 49.4 52.8 56.5 63.9 70.6100.0

PERCENTILES (1,5,16,25,50,75,84,95) 1.21 2.21 3.59 4.46 7.09 10.71 12.42 15.90
MOMENT MEASURES MEAN 7.45 STDEV 3.54 SKEW 0.02 KURT 1.66
GRAPHIC (FOLK) MEAN 7.70 STDEV 4.28 SKEW 0.25 KURT 0.90 GRAVEL = 0.00 SAND = 20.14 SILT = 36.37 CLAY = 43.49



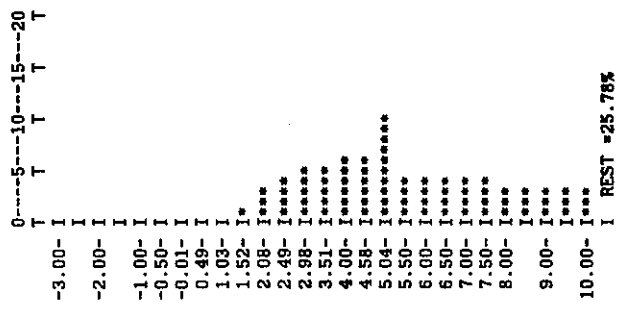
83-33, 460m
30-32cmDATA 0.00 0.00 0.00 0.00 0.07 0.05 0.09 0.19 0.64 0.81 1.14 2.56 1.50 1.72 2.14 1.53 1.53 1.44 1.05 0.86 1.05 1.92 2.01 7.77
FREQUENCY % 0.0 0.0 0.0 0.0 0.2 0.2 0.3 0.6 1.9 3.3 3.9 8.0 5.1 4.9 7.7 5.5 5.1 4.8 3.5 2.9 3.5 6.4 6.7 25.8
CUMULATIVE % 0.0 0.0 0.0 0.0 0.2 0.4 0.7 1.3 3.5 6.2 9.9 18.5 23.4 29.2 36.3 41.4 46.5 51.2 54.7 57.6 61.1 67.5 74.2100.0

PERCENTILES (1,5,16,25,50,75,84,95) 1.30 2.34 3.38 4.16 6.37 10.13 11.77 15.11
MOMENT MEASURES MEAN 7.12 STDEV 3.49 SKEW 0.21 KURT 1.69
GRAPHIC (FOLK) MEAN 7.17 STDEV 4.03 SKEW 0.33 KURT 0.88 GRAVEL = 0.00 SAND = 23.45 SILT = 37.65 CLAY = 38.91



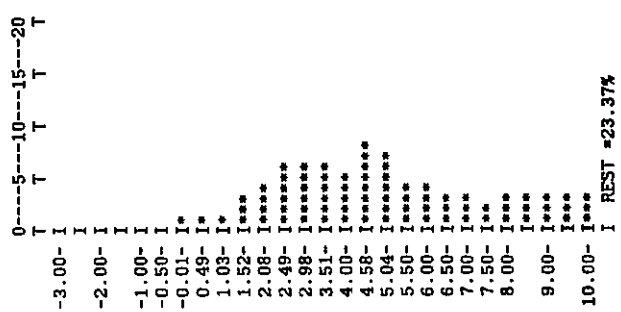
83-33, 460m
40-42cmDATA 0.00 0.00 0.00 0.00 0.02 0.04 0.08 0.32 0.99 1.13 1.58 1.68 1.72 2.14 2.73 1.27 1.27 1.18 1.18 1.09 0.91 1.82 1.82 7.98
FREQUENCY % 0.0 0.0 0.0 0.0 0.1 0.1 0.2 1.1 2.9 4.5 5.2 5.1 5.7 6.0 9.6 4.5 4.1 3.8 3.8 3.5 2.9 5.9 5.9 25.8
CUMULATIVE % 0.0 0.0 0.0 0.0 0.1 0.2 0.5 1.5 4.7 8.3 13.4 18.9 24.4 31.3 40.2 44.3 48.4 52.2 56.0 59.5 62.5 68.3 74.2100.0

PERCENTILES (1,5,16,25,50,75,84,95) 1.35 2.12 3.24 4.05 6.21 10.14 11.99 15.75
MOMENT MEASURES MEAN 6.99 STDEV 3.55 SKEW 0.25 KURT 1.67
GRAPHIC (FOLK) MEAN 7.15 STDEV 4.25 SKEW 0.36 KURT 0.92 GRAVEL = 0.00 SAND = 24.43 SILT = 38.03 CLAY = 37.54

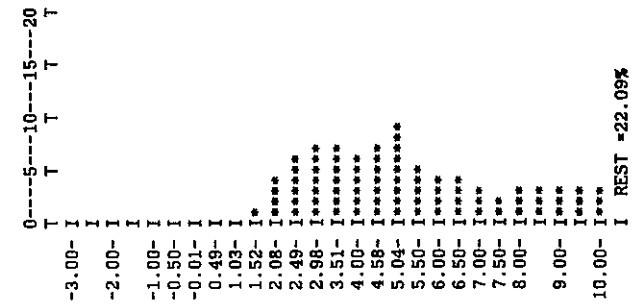


83-33, 460m
45-47cmDATA 0.00 0.00 0.08 0.11 0.18 0.28 0.29 0.74 1.32 1.27 1.60 1.66 1.47 2.52 1.87 0.99 0.99 0.85 0.78 0.57 0.71 1.42 1.42 6.44
FREQUENCY % 0.0 0.0 0.3 0.4 0.7 1.0 1.0 2.7 4.3 5.6 5.9 5.7 5.4 7.9 7.4 3.9 3.6 3.1 2.8 2.1 2.6 5.2 5.2 23.4
CUMULATIVE % 0.0 0.0 0.3 0.7 1.3 2.4 3.4 6.1 10.9 15.5 21.3 27.3 32.7 41.8 48.6 52.2 55.8 58.9 61.7 63.8 66.3 71.5 76.6100.0

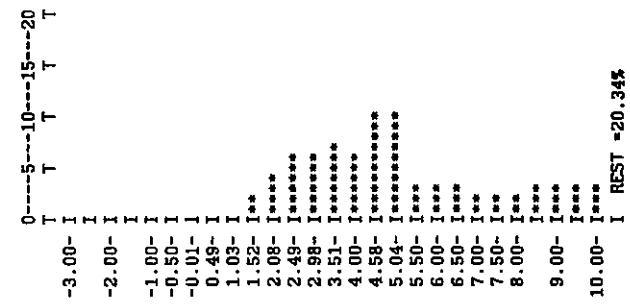
PERCENTILES (1,5,16,25,50,75,84,95) -0.23 1.35 2.54 3.31 5.22 9.67 11.68 15.76
MOMENT MEASURES MEAN 6.36 STDEV 3.79 SKEW 0.32 KURT 1.80
GRAPHIC (FOLK) MEAN 6.48 STDEV 4.47 SKEW 0.44 KURT 0.93 GRAVEL = 0.29 SAND = 32.37 SILT = 33.67 CLAY = 33.67



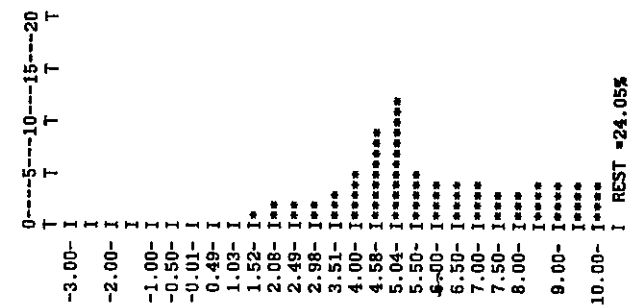
```
CLASS MIDPTS-3.50-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

83-33, 460m
 50-52cmDATA 0.00 0.00 0.00 0.00 0.01 0.04 0.12 0.35 1.39 1.52 2.00 2.13 1.70 2.46 2.56 1.28 1.12 1.22 0.88 0.72 0.80 1.76 1.60 6.71
 FREQUENCY %  0.0  0.0  0.0  0.0  0.0  0.1  0.4  1.2  4.1  6.1  6.7  6.6  5.7  7.0  9.2  4.6  3.7  4.0  2.9  2.4  2.6  5.8  5.3 22.1
CUMULATIVE %  0.0  0.0  0.0  0.0  0.0  0.2  0.6  1.7  6.3 11.3 17.9 24.9 30.5 38.6 47.0 51.2 54.9 58.9 61.8 64.2 66.8 72.6 77.9100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.28  1.97  2.85  3.52  5.37  9.43 11.35 15.24
MOMENT MEASURES MEAN  6.49  STDEV 3.56  SKEW 0.43  KURT  1.80
GRAPHIC (FOLK)  MEAN  6.52  STDEV 4.13  SKEW 0.45  KURT  0.92  GRAVEL =  0.00 SAND = 30.49 SILT = 36.35 CLAY = 33.16
```



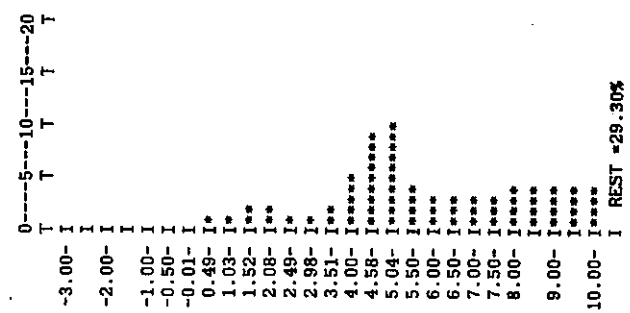

```
83-33, 460m
 60-62cmDATA 0.00 0.00 0.00 0.01 0.02 0.05 0.08 0.43 1.20 1.28 1.47 1.70 1.39 2.68 2.25 0.69 0.69 0.69 0.58 0.58 0.58 1.44 1.38 4.90
 FREQUENCY %  0.0  0.0  0.0  0.0  0.1  0.2  0.3  1.8  4.4  6.5  6.2  6.7  5.9  9.6 10.2  3.1  2.9  2.9  2.4  2.4  2.4  6.0  5.7 20.3
CUMULATIVE %  0.0  0.0  0.0  0.0  0.1  0.3  0.7  2.4  7.4 12.7 18.8 25.9 31.7 42.8 52.1 55.0 57.9 60.7 63.1 65.5 68.0 73.9 79.7100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.17  1.87  2.77  3.45  4.94  9.18 10.88 14.33
MOMENT MEASURES MEAN  6.29  STDEV 3.55  SKEW 0.49  KURT  1.87
GRAPHIC (FOLK)  MEAN  6.19  STDEV 3.92  SKEW 0.49  KURT  0.89  GRAVEL =  0.00 SAND = 31.67 SILT = 36.28 CLAY = 32.05
```




```
83-34, 530m
 0-02cm DATA 0.00 0.00 0.07 0.02 0.01 0.02 0.03 0.21 0.47 0.35 0.45 0.70 1.22 2.58 2.60 1.19 1.04 1.04 0.89 0.67 0.74 1.78 1.79 5.66
 FREQUENCY %  0.0  0.0  0.3  0.1  0.0  0.1  0.1  0.9  1.8  1.8  2.0  2.8  5.3  9.5 12.0  5.5  4.4  4.4  3.8  2.8  3.1  7.6  7.6 24.1
CUMULATIVE %  0.0  0.0  0.3  0.4  0.4  0.5  0.6  1.5  3.5  5.0  6.9  9.9 15.1 26.1 37.1 42.2 46.6 51.0 54.8 57.6 60.8 68.3 75.9100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.28  2.49  4.06  4.53  6.39  9.87 11.28 14.14
MOMENT MEASURES MEAN  7.18  STDEV 3.33  SKEW 0.22  KURT  1.86
GRAPHIC (FOLK)  MEAN  7.24  STDEV 3.57  SKEW 0.34  KURT  0.89  GRAVEL =  0.30 SAND = 14.79 SILT = 45.69 CLAY = 39.23
```



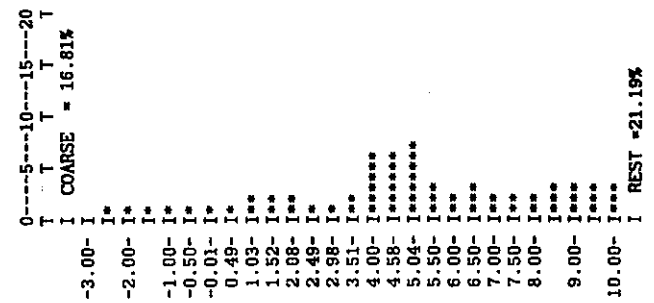

```
83-35, 704m
 0-02cm DATA 0.00 0.00 0.04 0.10 0.04 0.13 0.27 0.38 0.53 0.28 0.25 0.44 1.16 2.35 2.01 0.89 0.74 0.74 0.67 0.59 0.82 1.93 1.78 6.69
 FREQUENCY %  0.0  0.0  0.2  0.4  0.2  0.6  1.1  1.7  2.1  1.5  1.1  1.8  5.2  8.9  9.6  4.2  3.2  3.2  2.9  2.6  3.6  8.5  7.8 29.3
CUMULATIVE %  0.0  0.0  0.2  0.6  0.8  1.4  2.5  4.2  6.5  7.8  8.8 10.8 15.9 26.1 35.0 38.9 42.1 45.3 48.3 50.9 54.4 62.9 70.7100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  0.20  1.73  4.01  4.52  7.33 10.60 12.09 15.11
MOMENT MEASURES MEAN  7.48  STDEV 3.58  SKEW-0.07  KURT  1.81
GRAPHIC (FOLK)  MEAN  7.81  STDEV 4.05  SKEW 0.17  KURT  0.90  GRAVEL =  0.18 SAND = 15.68 SILT = 38.59 CLAY = 45.55
```



CLASS MIDPTS-3.50-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

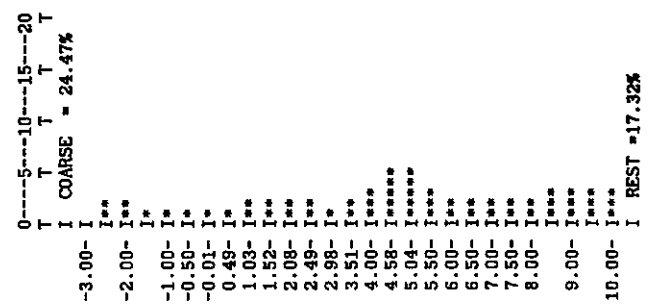
83-35, 704m
10-12cmDATA 2.92 0.31 0.33 0.12 0.10 0.21 0.30 0.30 0.35 0.20 0.18 0.31 0.95 1.16 1.18 0.51 0.42 0.46 0.42 0.38 0.38 1.10 1.10 3.68
FREQUENCY % 16.8 1.8 1.9 0.7 0.6 1.2 1.6 1.8 1.8 1.4 1.1 1.7 5.6 5.8 7.4 3.2 2.4 2.6 2.4 2.2 2.2 6.3 6.3 21.2
CUMULATIVE % 16.8 18.6 20.5 21.2 21.8 23.0 24.7 26.4 28.4 29.6 30.6 32.4 37.9 44.6 51.4 54.3 56.7 59.4 61.8 64.0 66.1 72.5 78.8100.0

PERCENTILES (1,5,16,25,50,75,84,95)-22.85-12.93 -3.48 1.12 4.95 9.38 10.96 14.17
MOMENT MEASURES MEAN 4.97 STDEV 5.34 SKEW-0.25 KURT 1.89
GRAPHIC (FOLK) MEAN 4.14 STDEV 7.72 SKEW-0.24 KURT 1.34 GRAVEL = 20.50 SAND = 17.39 SILT = 28.27 CLAY = 33.85



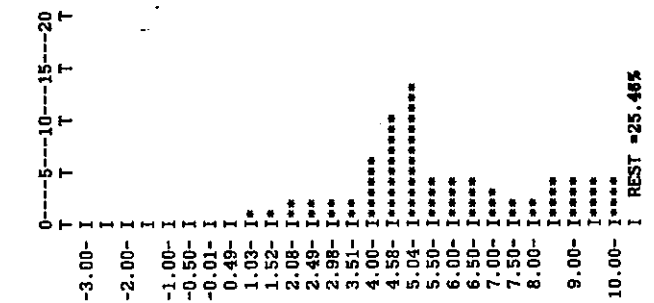
83-35, 704m
20-22cmDATA 5.68 0.95 0.69 0.32 0.33 0.33 0.50 0.43 0.55 0.29 0.28 0.41 0.69 1.29 0.98 0.57 0.57 0.57 0.38 0.38 0.57 1.19 1.24 4.02
FREQUENCY % 24.5 4.1 3.0 1.4 1.5 1.4 2.0 1.9 2.1 1.5 1.2 1.7 3.0 4.8 4.6 2.7 2.5 2.5 1.6 1.6 2.5 5.1 5.3 17.3
CUMULATIVE % 24.5 28.6 31.5 32.9 34.3 35.8 37.9 39.8 42.1 43.4 44.6 46.4 49.3 54.9 59.1 61.6 64.0 66.5 68.1 69.8 72.2 77.3 82.7100.0

PERCENTILES (1,5,16,25,50,75,84,95)-16.07-10.63 -5.42 -2.87 4.07 8.53 10.28 13.67
MOMENT MEASURES MEAN 3.61 STDEV 5.68 SKEW 0.10 KURT 1.62
GRAPHIC (FOLK) MEAN 2.97 STDEV 7.61 SKEW-0.21 KURT 0.87 GRAVEL = 31.54 SAND = 17.79 SILT = 22.88 CLAY = 27.79



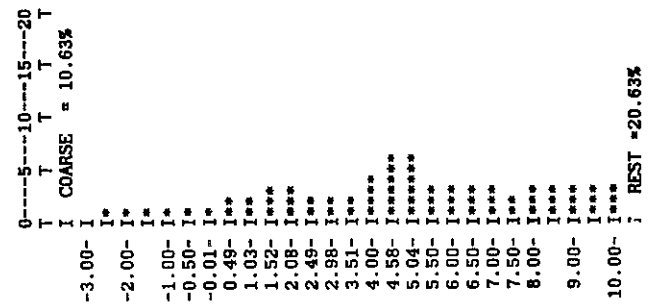
83-35, 704m
40-42cmDATA 0.00 0.16 0.00 0.00 0.04 0.02 0.17 0.26 0.48 0.33 0.32 0.51 1.21 2.42 2.47 0.84 0.77 0.77 0.71 0.52 0.52 1.74 1.61 5.42
FREQUENCY % 0.0 0.8 0.0 0.0 0.2 0.1 0.7 1.2 2.0 1.9 1.5 2.3 5.8 9.8 12.6 4.3 3.6 3.6 3.3 2.4 2.4 8.2 7.6 25.5
CUMULATIVE % 0.0 0.8 0.8 0.8 0.9 1.0 1.8 3.1 5.3 6.9 8.4 10.8 16.4 27.8 39.4 43.4 47.0 50.6 53.9 56.4 58.8 67.0 74.5100.0

PERCENTILES (1,5,16,25,50,75,84,95) 0.32 2.02 3.97 4.45 6.42 10.06 11.51 14.46
MOMENT MEASURES MEAN 7.16 STDEV 3.51 SKEW 0.07 KURT 2.00
GRAPHIC (FOLK) MEAN 7.30 STDEV 3.77 SKEW 0.32 KURT 0.91 GRAVEL = 0.75 SAND = 15.69 SILT = 42.37 CLAY = 41.19

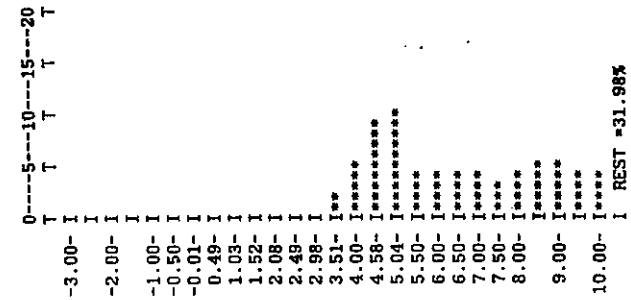


83-35, 704m
60-62cmDATA 2.99 0.84 0.79 0.37 0.38 0.46 0.73 0.76 0.99 0.54 0.43 0.69 1.02 2.08 1.57 0.81 0.81 0.74 0.74 0.61 0.74 1.68 1.55 5.80
FREQUENCY % 10.6 3.0 2.8 1.3 1.4 1.6 2.4 2.8 3.1 2.3 1.6 2.3 3.7 6.4 6.1 3.1 2.9 2.6 2.6 2.2 2.6 6.0 5.5 20.6
CUMULATIVE % 10.6 13.6 16.4 17.7 19.1 20.7 23.3 26.0 29.6 31.5 33.0 35.5 39.1 46.5 52.1 54.9 57.8 60.5 63.1 65.3 67.9 73.9 79.4100.0

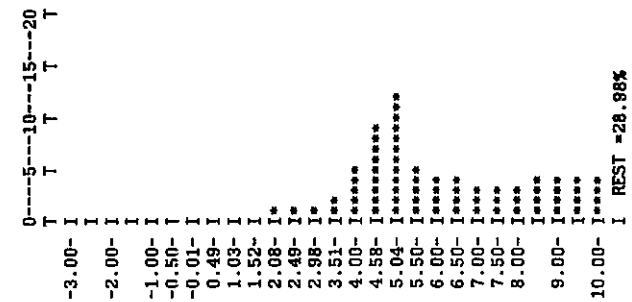
PERCENTILES (1,5,16,25,50,75,84,95)-10.26 -5.68 -1.15 1.34 4.87 9.20 10.97 14.58
MOMENT MEASURES MEAN 5.03 STDEV 5.07 SKEW-0.16 KURT 1.94
GRAPHIC (FOLK) MEAN 4.90 STDEV 6.10 SKEW-0.02 KURT 1.06 GRAVEL = 16.43 SAND = 22.65 SILT = 28.81 CLAY = 32.11



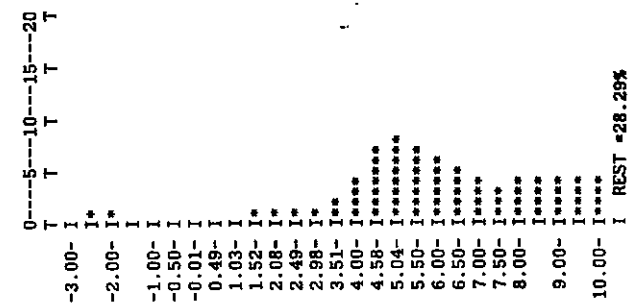
```
CLASS MIDPTS-3.50-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

83-36, 763m
 0-40cm DATA 0.00 0.00 0.00 0.00 0.00 0.00 0.01 0.02 0.02 0.02 0.02 0.26 0.66 1.37 1.18 0.52 0.52 0.47 0.57 0.43 0.47 1.19 1.14 4.17
 FREQUENCY %  0.0  0.0  0.0  0.0  0.0  0.0  0.1  0.2  0.1  0.2  0.2  1.9  5.2  9.1  9.8  4.3  4.0  3.6  4.4  3.3  3.6  9.1  8.7 32.0
CUMULATIVE %  0.0  0.0  0.0  0.0  0.0  0.0  0.1  0.2  0.4  0.5  0.7  2.7  7.7 18.3 27.3 31.3 35.3 38.9 43.3 46.5 50.2 59.3 68.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  3.12  3.79  4.48  4.93  7.98 10.88 12.25 15.04
MOMENT MEASURES MEAN  8.08  STDEV 3.17  SKEW 0.03  KURT  1.51
GRAPHIC (FOLK)  MEAN  8.24  STDEV 3.65  SKEW 0.18  KURT  0.77  GRAVEL =  0.00 SAND =  7.75 SILT = 42.41 CLAY = 49.85
```



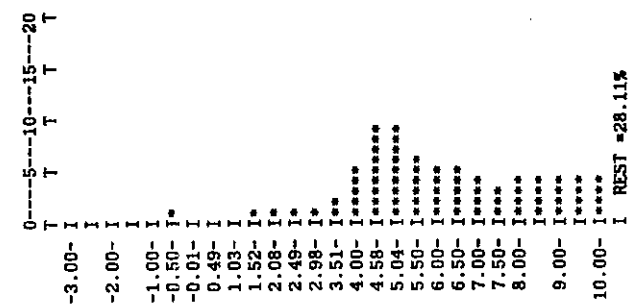

```
83-37, 572m
 0-02cm DATA 0.00 0.00 0.00 0.02 0.01 0.01 0.02 0.04 0.09 0.08 0.11 0.20 0.57 1.25 1.41 0.60 0.51 0.47 0.43 0.43 0.38 1.06 1.06 3.57
 FREQUENCY %  0.0  0.0  0.0  0.2  0.1  0.1  0.2  0.3  0.7  0.8  0.9  1.5  4.7  8.7 12.4  5.3  4.1  3.8  3.5  3.5  3.1  8.6  8.6 29.0
CUMULATIVE %  0.0  0.0  0.0  0.2  0.2  0.3  0.5  0.8  1.5  2.2  3.1  4.7  9.3 19.5 30.9 35.8 39.9 43.7 47.2 50.7 53.8 62.4 71.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.70  3.55  4.41  4.82  7.40 10.51 11.85 14.59
MOMENT MEASURES MEAN  7.76  STDEV 3.24  SKEW 0.08  KURT  1.66
GRAPHIC (FOLK)  MEAN  7.89  STDEV 3.53  SKEW 0.25  KURT  0.80  GRAVEL =  0.00 SAND =  9.33 SILT = 44.48 CLAY = 46.19
```



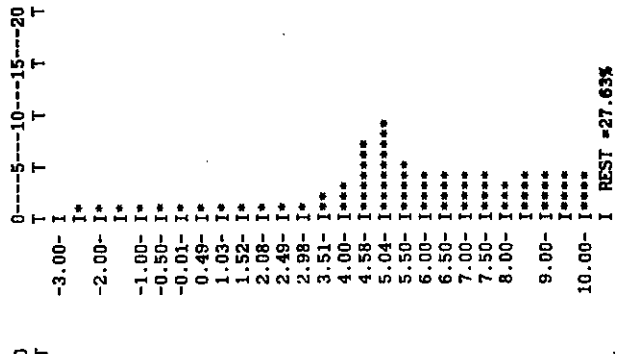

```
83-37, 572m
 10-12cmDATA 0.00 0.24 0.00 0.05 0.04 0.06 0.07 0.13 0.23 0.17 0.20 0.35 0.81 1.61 1.52 1.40 1.24 1.01 0.85 0.70 0.78 1.81 1.86 5.97
 FREQUENCY %  0.0  1.1  0.0  0.2  0.2  0.3  0.3  0.6  1.0  1.0  1.0  1.6  3.9  6.6  7.8  7.2  5.9  4.8  4.0  3.3  3.7  8.6  8.8 28.3
CUMULATIVE %  0.0  1.1  1.1  1.4  1.6  1.8  2.2  2.8  3.9  4.7  5.6  7.3 11.1 18.8 26.0 32.6 38.5 43.3 47.3 50.6 54.3 62.9 71.7100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -1.00  2.66  4.39  4.98  7.41 10.41 11.71 14.37
MOMENT MEASURES MEAN  7.66  STDEV 3.41  SKEW-0.22  KURT  2.41
GRAPHIC (FOLK)  MEAN  7.84  STDEV 3.60  SKEW 0.18  KURT  0.88  GRAVEL =  1.14 SAND = 10.00 SILT = 43.18 CLAY = 45.69
```



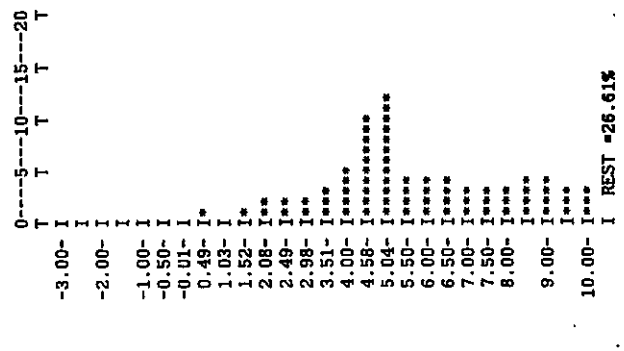

```
83-37, 572m
 20-22cmDATA 0.00 0.00 0.09 0.12 0.07 0.06 0.09 0.12 0.22 0.17 0.20 0.40 0.97 2.09 1.65 1.16 1.02 1.02 0.80 0.65 0.73 1.67 1.53 5.80
 FREQUENCY %  0.0  0.0  0.4  0.6  0.3  0.3  0.4  0.6  1.0  1.0  1.0  1.8  4.8  8.7  8.7  6.1  4.9  4.9  3.9  3.2  3.5  8.1  7.4 28.1
CUMULATIVE %  0.0  0.0  0.4  1.0  1.4  1.6  2.1  2.7  3.7  4.6  5.5  7.5 12.2 22.3 30.3 35.9 40.9 45.8 49.7 52.8 56.4 64.5 71.9100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -0.51  2.72  4.25  4.74  7.05 10.46 11.99 15.11
MOMENT MEASURES MEAN  7.54  STDEV 3.40  SKEW-0.03  KURT  1.99
GRAPHIC (FOLK)  MEAN  7.76  STDEV 3.81  SKEW 0.29  KURT  0.89  GRAVEL =  0.44 SAND = 11.73 SILT = 44.21 CLAY = 43.63
```



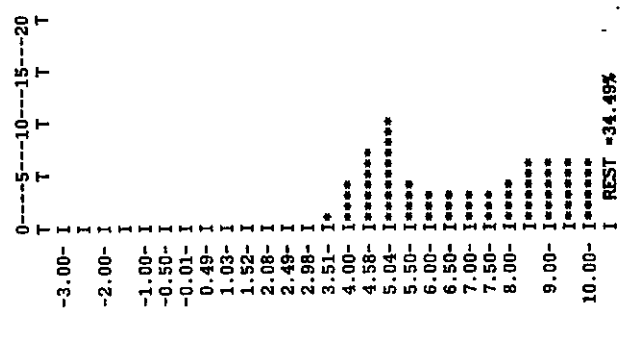
```
CLASS MIDPTS-3.50-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

83-37, 572m
 40-42cmDATA 0.00 0.29 0.24 0.12 0.20 0.23 0.25 0.24 0.36 0.25 0.27 0.47 0.76 1.97 1.96 1.06 0.91 0.91 0.91 0.84 0.76 1.83 1.67 6.30
 FREQUENCY %  0.0  1.3  1.1  0.5  0.9  1.0  1.0  1.1  1.4  1.3  1.2  1.9  3.4  7.4  9.3  5.1  4.0  4.0  4.0  3.7  3.3  8.0  7.3 27.6
CUMULATIVE %  0.0  1.3  2.3  2.9  3.7  4.7  5.8  6.9  8.5  9.6 10.7 12.8 16.1 24.8 33.4 38.0 42.0 46.0 50.0 53.7 57.0 65.0 72.4100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -2.38  0.63  3.98  4.59  7.00 10.39 11.93 15.07
MOMENT MEASURES MEAN  7.25  STDEV 3.77  SKEW-0.28  KURT  2.33
GRAPHIC (FOLK)  MEAN  7.64  STDEV 4.18  SKEW 0.18  KURT  1.02  GRAVEL =  2.32 SAND = 13.82 SILT = 40.88 CLAY = 42.98
```



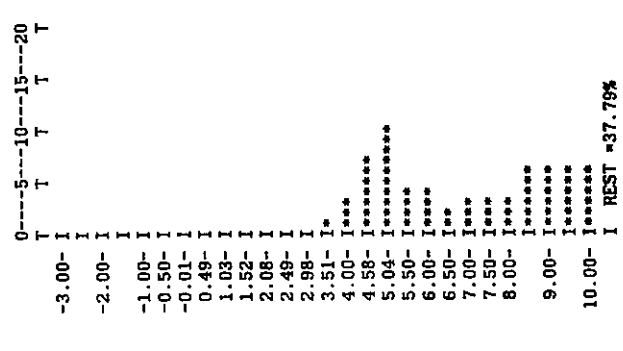

```
83-37, 572m
 60-62cmDATA 0.00 0.00 0.03 0.08 0.10 0.13 0.11 0.29 0.37 0.32 0.34 0.57 1.13 2.47 2.44 0.77 0.77 0.77 0.58 0.58 0.64 1.61 1.48 5.65
 FREQUENCY %  0.0  0.0  0.1  0.4  0.5  0.6  0.5  1.4  1.6  1.8  1.6  2.5  5.4 10.0 12.5  3.9  3.6  3.6  2.7  2.7  3.0  7.6  7.0 26.6
CUMULATIVE %  0.0  0.0  0.1  0.5  1.0  1.6  2.1  3.5  5.2  6.7  8.3 11.0 16.3 28.0 39.5 43.1 46.7 50.4 53.1 55.8 58.8 66.4 73.4100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  0.00  2.02  3.97  4.45  6.45 10.25 11.84 15.08
MOMENT MEASURES MEAN  7.21  STDEV 3.52  SKEW 0.10  KURT  1.82
GRAPHIC (FOLK)  MEAN  7.42  STDEV 3.95  SKEW 0.35  KURT  0.92  GRAVEL =  0.14 SAND = 16.20 SILT = 42.49 CLAY = 41.17
```



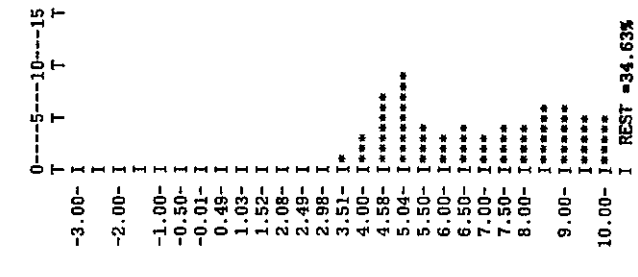

```
83-38#1,804m
 0-02cm DATA 0.00 0.00 0.00 0.00 0.01 0.00 0.01 0.02 0.03 0.02 0.03 0.11 0.40 0.76 0.89 0.34 0.30 0.30 0.34 0.30 0.37 1.08 1.09 3.37
 FREQUENCY %  0.0  0.0  0.0  0.0  0.1  0.0  0.1  0.2  0.3  0.2  0.3  1.1  4.2  6.7  9.9  3.8  3.1  3.1  3.5  3.1  3.8 11.1 11.2 34.5
CUMULATIVE %  0.0  0.0  0.0  0.0  0.1  0.1  0.2  0.4  0.7  0.9  1.2  2.4  6.4 14.2 23.3 26.8 29.9 33.0 36.4 39.5 43.3 54.4 65.5100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  2.63  3.87  4.68  5.26  8.61 10.95 12.05 14.30
MOMENT MEASURES MEAN  8.43  STDEV 3.11  SKEW-0.19  KURT  1.66
GRAPHIC (FOLK)  MEAN  8.45  STDEV 3.42  SKEW 0.01  KURT  0.75  GRAVEL =  0.00 SAND =  6.45 SILT = 36.85 CLAY = 56.70
```



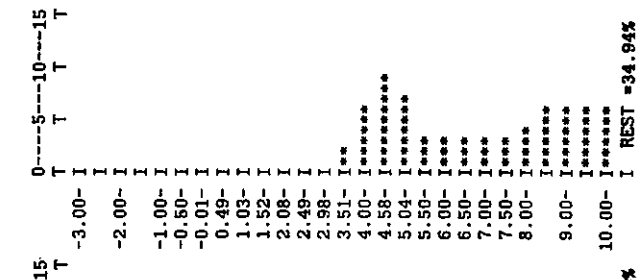

```
83-38#2,804m
 0-02cm DATA 0.00 0.00 0.00 0.00 0.01 0.01 0.01 0.01 0.02 0.02 0.01 0.07 0.26 0.70 0.82 0.36 0.33 0.18 0.25 0.25 0.25 1.08 1.09 3.48
 FREQUENCY %  0.0  0.0  0.0  0.0  0.1  0.1  0.1  0.1  0.2  0.3  0.1  0.7  2.9  6.6  9.7  4.2  3.6  2.0  2.7  2.7  2.7 11.7 11.8 37.8
CUMULATIVE %  0.0  0.0  0.0  0.0  0.1  0.2  0.3  0.4  0.7  0.9  1.0  1.7  4.6 12.2 21.1 25.0 28.6 30.5 33.2 35.9 38.7 50.4 62.2100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  3.00  4.05  4.80  5.50  8.97 11.20 12.27 14.42
MOMENT MEASURES MEAN  8.68  STDEV 3.09  SKEW-0.31  KURT  1.72
GRAPHIC (FOLK)  MEAN  8.68  STDEV 3.44  SKEW-0.03  KURT  0.75  GRAVEL =  0.00 SAND =  4.56 SILT = 34.09 CLAY = 61.35
```



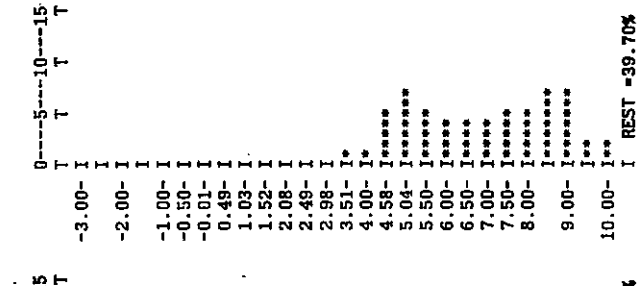
```
CLASS MIDPTS-3.50-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

83-38, 804m
 10-12cmDATA 0.00 0.00 0.00 0.00 0.01 0.02 0.01 0.01 0.03 0.03 0.03 0.13 0.36 0.90 0.89 0.40 0.36 0.40 0.36 0.49 0.49 1.33 1.15 3.92
 FREQUENCY %  0.0  0.0  0.0  0.0  0.1  0.2  0.1  0.1  0.2  0.3  0.3  1.1  3.2  6.9  8.5  3.8  3.2  3.5  3.2  4.3  4.3 11.7 10.2 34.6
CUMULATIVE %  0.0  0.0  0.0  0.0  0.1  0.3  0.4  0.4  0.7  1.0  1.2  2.4  5.6 13.5 21.4 24.9 28.1 31.6 34.8 39.1 43.5 55.2 65.4100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  2.55  3.93  4.74  5.51  8.56 11.06 12.27 14.73
MOMENT MEASURES MEAN  8.47  STDEV 3.07  SKEW-0.20  KURT  1.73
GRAPHIC (FOLK)  MEAN  8.52  STDEV 3.52  SKEW 0.06  KURT  0.80  GRAVEL =  0.00 SAND =  5.57 SILT = 37.90 CLAY = 56.54
```



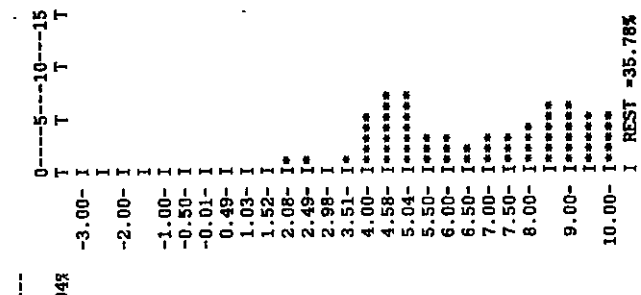

```
83-38, 804m
 20-22cmDATA 0.00 0.00 0.00 0.00 0.00 0.00 0.01 0.01 0.03 0.03 0.03 0.15 0.56 0.94 0.57 0.24 0.24 0.24 0.24 0.24 0.34 1.02 1.05 3.19
 FREQUENCY %  0.0  0.0  0.0  0.0  0.0  0.0  0.1  0.1  0.3  0.4  0.3  1.5  6.3  8.9  6.8  2.9  2.6  2.6  2.6  2.6  3.7 11.2 11.5 34.9
CUMULATIVE %  0.0  0.0  0.0  0.0  0.0  0.0  0.1  0.2  0.5  0.9  1.2  2.8  9.0 19.3 25.5 28.1 30.8 33.4 36.0 38.7 42.4 53.6 65.1100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  2.69  3.74  4.42  5.00  8.68 10.97 12.04 14.23
MOMENT MEASURES MEAN  8.40  STDEV 3.19  SKEW-0.21  KURT  1.59
GRAPHIC (FOLK)  MEAN  8.38  STDEV 3.49  SKEW-0.03  KURT  0.72  GRAVEL =  0.00 SAND =  8.98 SILT = 33.41 CLAY = 57.61
```



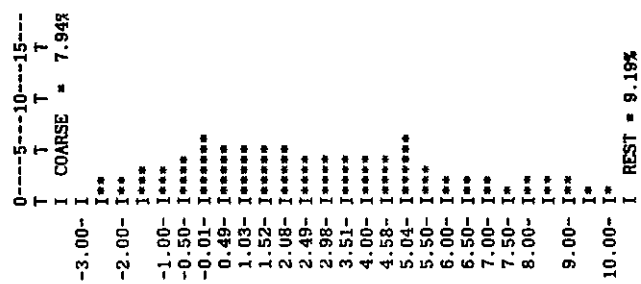

```
83-38, 804m
 39-41cmDATA 0.00 0.00 0.00 0.00 0.01 0.01 0.00 0.01 0.01 0.01 0.01 0.06 0.13 0.59 0.58 0.45 0.40 0.40 0.40 0.49 0.45 1.30 0.34 3.72
 FREQUENCY %  0.0  0.0  0.0  0.0  0.1  0.1  0.0  0.1  0.1  0.1  0.1  0.6  1.4  5.4  6.7  5.2  4.3  4.3  4.3  5.2  4.8 13.9  3.6 39.7
CUMULATIVE %  0.0  0.0  0.0  0.0  0.1  0.2  0.2  0.3  0.4  0.5  0.6  1.3  2.7  9.0 15.2 20.0 24.2 28.5 32.8 38.0 42.8 56.7 60.3100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  3.32  4.28  5.13  6.09  8.52 14.44 17.88 24.86
MOMENT MEASURES MEAN  8.74  STDEV 2.98  SKEW-0.21  KURT  1.68
GRAPHIC (FOLK)  MEAN 10.51  STDEV 6.31  SKEW 0.53  KURT  1.01  GRAVEL =  0.00 SAND =  2.67 SILT = 40.13 CLAY = 57.20
```




```
83-38, 804m
 60-62cmDATA 0.00 0.00 0.00 0.00 0.01 0.01 0.01 0.02 0.06 0.06 0.04 0.10 0.42 0.73 0.53 0.23 0.23 0.20 0.23 0.26 0.33 1.04 0.91 3.02
 FREQUENCY %  0.0  0.0  0.0  0.0  0.1  0.1  0.1  0.2  0.6  0.9  0.5  1.1  5.1  7.5  6.8  3.0  2.7  2.4  2.7  3.1  3.9 12.3 10.8 35.8
CUMULATIVE %  0.0  0.0  0.0  0.0  0.1  0.2  0.4  0.6  1.3  2.0  2.5  3.7  8.6 17.3 23.6 26.3 29.0 31.4 34.1 37.2 41.1 53.4 64.2100.0

 PERCENTILES (1,5,16,25,50,75,84,95)  1.89  3.68  4.51  5.28  8.72 11.12 12.27 14.61
MOMENT MEASURES MEAN  8.47  STDEV 3.19  SKEW-0.30  KURT  1.77
GRAPHIC (FOLK)  MEAN  8.50  STDEV 3.60  SKEW-0.00  KURT  0.77  GRAVEL =  0.00 SAND =  8.65 SILT = 32.46 CLAY = 58.89
```




```
83-39, 265m
 0-02cm DATA 1.20 0.58 0.92 0.64 0.87 0.83 0.83 0.67 0.81 0.53 0.58 0.65 0.61 0.76 0.79 0.35 0.33 0.23 0.25 0.17 0.25 0.46 0.42 1.39
 FREQUENCY %  7.9  3.8  6.1  4.2  5.9  5.5  5.1  4.5  4.8  4.3  3.9  4.1  4.1  4.3  5.7  2.5  2.2  1.5  1.7  1.1  1.7  3.0  2.8  9.2
CUMULATIVE %  7.9 11.8 17.9 22.1 27.8 33.3 38.8 43.3 48.6 52.1 56.0 60.3 64.3 69.3 74.5 76.9 79.0 80.6 82.2 83.3 85.0 88.0 90.8100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -7.11 -4.06 -1.28 -0.24  2.24  5.13  7.70 12.07
MOMENT MEASURES MEAN  2.93  STDEV 4.35  SKEW 0.59  KURT  2.61
GRAPHIC (FOLK)  MEAN  2.89  STDEV 4.69  SKEW 0.22  KURT  1.23  GRAVEL = 17.86 SAND = 46.43 SILT = 20.70 CLAY = 15.01
```



```
CLASS MIDPTS-3.50-2.50-1.50-0.75-0.25 0.24 0.76 1.27 1.80 2.28 2.73 3.24 3.76 4.29 4.81 5.27 5.75 6.25 6.75 7.25 7.75 8.50 9.5012.00
CLASS LIMITS-3.00-2.00-1.00-0.50-0.01 0.49 1.03 1.52 2.08 2.49 2.98 3.51 4.00 4.58 5.04 5.50 6.00 6.50 7.00 7.50 8.00 9.0010.00

83-39, 265m
 08-10cmDATA 0.00 2.37 2.55 2.29 2.86 2.22 1.42 1.67 1.41 0.87 0.99 1.05 1.10 1.55 1.53 0.86 0.86 0.81 0.57 0.57 0.48 1.10 1.14 3.35
 FREQUENCY %  0.0  7.0  7.6  6.8  8.7  6.6  3.9  5.1  3.7  3.2  3.0  2.9  3.3  4.0  4.9  2.8  2.6  2.4  1.7  1.7  1.4  3.3  3.4 10.0
CUMULATIVE %  0.0  7.0 14.6 21.4 30.0 36.6 40.8 45.7 49.9 52.5 55.5 58.6 61.9 66.5 71.0 73.6 76.1 78.6 80.2 81.9 83.4 86.6 90.0100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -4.03 -2.41 -0.89 -0.28  2.09  5.77  8.18 12.08
MOMENT MEASURES MEAN  3.18  STDEV 4.32  SKEW 0.69  KURT  2.44
GRAPHIC (FOLK)  MEAN  3.13  STDEV 4.46  SKEW 0.36  KURT  0.98  GRAVEL = 14.63 SAND = 47.23 SILT = 21.51 CLAY = 16.63
```



```
83-39, 265m
 09-11cmDATA 1.31 1.09 4.47 3.91 4.44 3.35 2.68 1.85 2.01 1.09 1.18 1.16 0.94 1.09 1.07 0.49 0.46 0.34 0.31 0.31 0.31 0.77 0.74 2.42
 FREQUENCY %  3.5  2.9 11.8 10.3 12.0  8.9  6.6  5.0  4.7  3.5  3.2  2.9  2.5  3.1  1.4  1.2  0.9  0.8  0.8  0.8  2.0  2.0  2.0  6.4
CUMULATIVE %  3.5  6.4 18.2 28.5 40.3 49.1 56.2 61.1 66.4 69.3 72.5 75.5 78.0 80.9 83.7 85.0 86.2 87.1 88.0 88.8 89.6 91.6 93.6100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -4.76 -2.41 -1.14 -0.66  0.56  3.42  5.14 10.88
MOMENT MEASURES MEAN  1.86  STDEV 3.86  SKEW 1.27  KURT  3.96
GRAPHIC (FOLK)  MEAN  1.52  STDEV 3.58  SKEW 0.51  KURT  1.34  GRAVEL = 18.18 SAND = 59.83 SILT = 11.59 CLAY = 10.40
```



```
33.39, 265m
 13-15cmDATA 1.27 1.15 2.93 1.82 2.28 2.34 1.29 4.22 3.68 2.32 2.45 2.48 1.72 1.81 1.62 0.66 0.62 0.43 0.39 0.35 0.39 0.89 0.86 3.25
 FREQUENCY %  3.1  2.8  7.1  4.4  5.6  5.7  2.9 10.4  8.0  6.9  6.1  5.7  4.3  3.8  4.3  1.7  1.5  1.0  0.9  0.8  0.9  2.2  2.1  7.9
CUMULATIVE %  3.1  5.9 13.0 17.4 22.9 28.6 31.7 42.0 50.9 56.5 62.5 68.5 72.7 77.1 81.0 82.6 84.1 85.1 86.1 86.9 87.9 90.0 92.1100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -4.51 -2.26 -0.65  0.18  2.02  4.30  5.97 11.79
MOMENT MEASURES MEAN  2.78  STDEV 3.84  SKEW 0.95  KURT  3.49
GRAPHIC (FOLK)  MEAN  2.45  STDEV 3.78  SKEW 0.29  KURT  1.40  GRAVEL = 12.98 SAND = 59.68 SILT = 15.21 CLAY = 12.13
```



```
83-39, 265m
 22-24cmDATA 1.07 2.43 4.10 2.45 2.63 2.63 2.98 2.78 3.52 2.19 2.25 2.08 1.59 1.48 1.26 0.64 0.55 0.55 0.51 0.37 0.60 1.06 1.06 3.95
 FREQUENCY %  2.4  5.4  9.2  5.5  6.0  5.9  6.2  6.3  7.0  6.0  5.1  4.4  3.6  2.9  3.1  1.6  1.2  1.2  1.1  0.8  1.3  2.4  2.4  8.8
CUMULATIVE %  2.4  7.8 17.0 22.5 28.3 34.2 40.9 47.1 55.0 59.9 64.9 69.6 73.1 76.4 79.2 80.7 81.9 83.1 84.3 85.1 86.4 88.8 91.2100.0

 PERCENTILES (1,5,16,25,50,75,84,95) -3.62 -2.41 -1.09 -0.28  1.73  4.33  6.88 12.17
MOMENT MEASURES MEAN  2.63  STDEV 4.10  SKEW 0.95  KURT  3.16
GRAPHIC (FOLK)  MEAN  2.51  STDEV 4.20  SKEW 0.36  KURT  1.30  GRAVEL = 16.99 SAND = 56.11 SILT = 13.32 CLAY = 13.57
```

7. OTHER SEDIMENT PROPERTIES

7.1 Pebble Composition and Fabric

After splitting and sampling for grain size analysis, sphincter cores were sieved to retain pebbles coarser than 8 mm. In addition, pebbles from overturned Mackay Glacier bergs were measured for axial orientation relative to ice banding (Table 13), and a random sample retained. All pebbles were then measured for axial length, Krumbein Roundness and their lithology determined (Table 14). The distribution of lithologies is also presented (Table 15).

7.2 Sand Composition

The composition of sand from various environments within Granite Harbour was determined by grain counts of the 1 to 4 phi class interval after grain size analysis. Grains were mounted in araldite, sectioned, and stained with sodium cobaltinitrite to enable distinction between quartz, k-feldspar and sodic plagioclase. Counts were made of 500 grains on an electrically activated click-stage. Results are given in Table 16.

7.3 Mud Composition

Mud from sphincter core subsamples and sediment traps was analysed at Rice University, Houston, for opaline silica by kinetic dissolution experiment in 85°C NaOH, and for organic carbon by standard LECO techniques. No samples contained appreciable carbonate. Results are given in Table 17.

Table 13. Pebble orientation of basal debris from the Mackay Glacier. Debris was observed in overturned bergs, close to the grounding line, on the southern side of the Mackay Glacier. Average dip of sediment layers within which debris was contained was 34° at 313° (Mag) (i.e. Berg rollover was 146°). Magnetic deviation at 13 November 1983 was 153°. Values are uncorrected.

Pebble	Apparent Dip of A-B plane	Dip Direction of A-B plane	Pebble	Apparent Dip of A-B plane	Dip Direction of A-B plane
1	28	343	26	19	298
2	21	310	27	15	281
3	26	307	28	39	317
4	34	281	29	8	301
5	29	295	30	21	307
6	35	308	31	4	231
7	28	292	32	6	291
8	24	295	33	12	285
9	30	296	34	12	306
10	28	309	35	2	302
11	34	316	36	26	318
12	27	310	37	11	292
13	18	269	38	11	294
14	25	308	39	36	313
15	33	305	40	27	314
16	24	297	41	18	297
17	21	300	42	36	321
18	26	310	43	36	295
19	14	141	44	6	308
20	10	292	45	33	305
21	25	297	46	17	286
22	18	294	47	14	322
23	24	323	48	20	289
24	45	295	49	27	297
25	32	291	50	36	314

Table 14. Characteristics of pebbles from Granite Harbour grouped by depositional environment.
A = Basal debris layer of Mackay Glacier exposed as overturned iceberg; B = presumed lodgement till exposed on seafloor; C = presumed ice rafted seafloor sediment. Data for individual pebbles in each group is followed by a summary of average values.
B/A and C/B are axial ratios; SPH = maximum projection sphericity, (Dobkins and Folk, 1970); OPI = oblate prolate index, (Dobkins and Folk, 1970); Krnss = visual roundness, (Krumbein, 1941)
Size is in phi units; s = striated.

A. BASAL BERG. SOME SAMPLES MEASURED IN FIELD BUT NOT RETAINED FOR ANALYSIS

78 PEBBLES IN TOTAL

DATA AS READ

	B/A	C/B	SPH	OPI	KRNSS	SIZE	LITHOLOGY	STR
83 BERG 1	0.75	1.00	0.91	6.64	0.00	-6.0		
83 BERG 2	0.58	0.93	0.80	7.55	0.00	-4.0		
83 BERG 3	0.83	0.33	0.45	-9.49	0.00	-4.1		
83 BERG 4	0.75	0.74	0.75	1.10	0.00	-6.6		
83 BERG 5	0.78	0.97	0.90	5.29	0.00	-5.1		
83 BERG 6	0.56	0.90	0.77	7.78	0.00	-3.6		
83 BERG 7	0.51	0.60	0.57	6.73	0.00	-4.7		
83 BERG 8	0.70	0.57	0.61	0.00	0.00	-6.1		
83 BERG 9	0.71	0.30	0.40	-6.33	0.00	-4.3		
83 BERG 10	0.55	0.74	0.67	6.27	0.00	-5.5		S
83 BERG 11	0.81	0.66	0.71	-1.87	0.00	-5.0		
83 BERG 12	0.65	0.40	0.47	-1.02	0.00	-6.1		S
83 BERG 13	0.79	0.67	0.71	-1.18	0.00	-5.7		S
83 BERG 14	0.80	0.42	0.52	-6.00	0.00	-4.9		S
83 BERG 15	0.65	0.94	0.83	6.50	0.00	-4.3		
83 BERG 16	0.59	0.82	0.74	6.21	0.00	-4.3		
83 BERG 17	0.69	0.63	0.65	1.04	0.00	-4.7		
83 BERG 18	0.80	0.61	0.67	-2.25	0.00	-5.9		S
83 BERG 19	0.80	0.61	0.67	-2.25	0.00	-5.9		
83 BERG 20	0.85	0.85	0.85	0.56	0.00	-6.8		
83 BERG 21	0.74	0.63	0.67	-0.40	0.00	-7.5		S
83 BERG 22	0.72	0.75	0.74	1.85	0.00	-6.3		S
83 BERG 23	0.81	0.48	0.57	-4.68	0.00	-4.6		
83 BERG 24	0.63	0.69	0.67	3.47	0.00	-6.9		S
83 BERG 25	0.56	0.59	0.58	4.81	0.00	-7.1		S
83 BERG 26	0.72	0.80	0.77	2.84	0.00	-7.3		
83 BERG 27	0.55	0.96	0.80	8.46	0.00	-5.8		S
83 BERG 28	0.90	0.58	0.67	-5.52	0.00	-5.7		
83 BERG 29	0.41	0.79	0.64	11.49	0.00	-5.6		
83 BERG 30	0.78	0.57	0.63	-2.28	0.00	-6.0		
83 BERG 31	0.68	0.84	0.78	4.32	0.00	-7.3		S
83 BERG 32	0.75	0.71	0.72	0.55	0.00	-5.8		
83 BERG 33	0.55	0.60	0.58	5.25	0.00	-5.5		S
83 BERG 34	0.66	0.56	0.59	1.05	0.00	-4.7		
83 BERG 35	0.68	1.00	0.88	7.38	0.00	-5.5		S
83 BERG 36	0.67	0.45	0.51	-1.04	0.00	-6.7		S
83 BERG 37	0.72	0.80	0.77	2.78	0.00	-6.3		
83 BERG 38	0.55	0.54	0.55	4.66	0.00	-6.3		S
83 BERG 39	0.67	0.59	0.61	1.14	0.00	-6.7		
83 BERG 40	0.83	0.42	0.52	-6.93	0.00	-5.4		
83 BERG 41	0.80	0.55	0.62	-3.09	0.00	-5.4		S
83 BERG 42	0.66	0.49	0.54	0.00	0.00	-6.9		S
83 BERG 43	0.51	0.80	0.69	7.98	0.00	-6.1		
83 BERG 44	0.67	0.46	0.52	-0.85	0.00	-5.0		S
83 BERG 45	0.51	0.88	0.73	8.75	0.00	-5.4		
83 BERG 46	0.81	0.45	0.54	-5.53	0.00	-5.0		S
83 BERG 47	0.60	0.99	0.84	8.11	0.00	-6.8		S
83 BERG 48	0.38	0.79	0.61	13.06	0.00	-6.2		
83 BERG 49	0.87	0.71	0.76	-2.54	0.00	-6.1		S
83 BERG 50	0.78	0.91	0.86	3.54	0.00	-6.3		

83 BERG	1	0.54	0.69	0.64	6.14	0.40	-5.3	METAQUAR	S
83 BERG	2	0.69	0.69	0.69	1.90	0.40	-5.5	METAQUAR	S
83 BERG	3	0.84	0.67	0.72	-2.52	0.50	-5.7	METAQUAR	S
83 BERG	4	0.78	0.90	0.85	3.35	0.50	-5.5	GRANODIO	S
83 BERG	5	0.85	0.68	0.73	-2.45	0.30	-6.1	AZTEC	S
83 BERG	6	0.82	0.61	0.67	-2.95	0.40	-5.5	WELLER	S
83 BERG	7	0.63	0.44	0.49	0.48	0.20	-5.5	AZTEC	S
83 BERG	8	0.99	0.54	0.66	-9.04	0.20	-5.9	GRANODIO	S
83 BERG	9	0.71	0.77	0.75	2.54	0.40	-6.1	WELLER	
83 BERG	10	0.60	0.80	0.73	5.48	0.40	-5.9	DIABASE	S
83 BERG	11	0.74	0.85	0.81	3.15	0.50	-5.0	DIABASE	S
83 BERG	12	0.54	0.83	0.72	7.40	0.40	-5.3	GRANITE	S
83 BERG	13	0.67	0.73	0.71	2.92	0.50	-5.3	DIABASE	S
83 BERG	14	0.89	0.83	0.85	-1.15	0.50	-5.1	DIABASE	S
83 BERG	15	0.96	1.00	0.99	5.21	0.40	-5.0	DIABASE	S
83 BERG	16	0.45	0.97	0.75	10.85	0.40	-4.8	AZTEC	S
83 BERG	17	0.90	0.52	0.63	-6.79	0.40	-4.9	DIABASE	S
83 BERG	18	0.79	0.31	0.42	-9.04	0.30	-4.5	AZTEC	S
83 BERG	19	0.62	0.80	0.73	5.22	0.50	-4.8	METAQUAR	S
83 BERG	20	0.60	0.92	0.79	7.15	0.50	-4.6	METAQUAR	S
83 BERG	21	0.64	0.76	0.71	4.20	0.50	-4.3	WELLER	
84 BERG	1	0.75	0.52	0.59	-2.26	0.10	-6.1	GNEISS	
84 BERG	2	0.82	0.47	0.57	-5.32	0.30	-5.8	GRANITE	
84 BERG	3	0.62	0.56	0.58	2.29	0.30	-5.8	DIABASE	
84 BERG	4	0.48	0.38	0.41	7.64	0.20	-5.3	GNEISS	
84 BERG	5	0.83	0.51	0.60	-4.74	0.40	-6.1	DIABASE	
84 BERG	6	0.98	0.22	0.37	-21.60	0.10	-6.2	METABASA	
84 BERG	7	0.61	0.37	0.44	-0.06	0.20	-6.3	GNEISS	

78 PEBBLES IN WINDOW

SIZE-PHI MEAN =	-5.61	STDEV = 0.84	SUM SQUARES =	53.83	PEBBLES = 78
FOLK SPH MEAN =	0.67	STDEV = 0.13	SUM SQUARES =	1.32	PEBBLES = 78
O-P INDX MEAN =	1.31	STDEV = 5.76	SUM SQUARES =	2554.37	PEBBLES = 78

B/A MEAN =	0.70	STDEV = 0.13	SUM SQUARES =	1.34	PEBBLES = 78
C/B MEAN =	0.67	STDEV = 0.19	SUM SQUARES =	2.89	PEBBLES = 78
K RNESS MEAN =	0.13	STDEV = 0.19	SUM SQUARES =	2.81	PEBBLES = 78

STRIATED CLASTS 40 51%

MEAN SIZE (MM) = 48.9 RANGE (MM) = 11.7 TO 178.9

B. CORE OF TILL EXPOSED ON SEA FLOOR

19 PEBBLES IN TOTAL

DATA AS READ

		B/A	C/B	SPH	OPI	KRNSS	SIZE	LITHOLOGY	STR
83-14	1	0.50	0.92	0.75	9.17	0.30	-5.1	GRANITE	S
83-14	2	0.82	0.84	0.84	1.10	0.20	-5.2	GRANITE	S
83-14	3	0.70	0.81	0.77	3.41	0.50	-4.6	DIABASE	S
83-14	4	0.70	0.78	0.75	3.00	0.40	-4.5	GRANODIOR	S
83-14	5	0.71	0.93	0.85	5.42	0.50	-4.4	GRANODIOR	S
83-31	1	0.59	0.60	0.59	3.94	0.50	-5.3	SANDSTON	S
83-31	2	0.67	0.76	0.73	3.41	0.40	-5.5	DIABASE	S
83-31	3	0.76	0.69	0.71	0.28	0.30	-5.4	METAQUAR	
83-31	4	0.88	0.63	0.70	-4.28	0.30	-5.3	DIABASE	
83-31	5	0.86	0.64	0.70	-3.58	0.30	-5.1	DIABASE	S
83-31	6	0.80	0.74	0.76	-0.11	0.20	-4.9	DIABASE	S
83-31	7	0.96	0.75	0.82	-5.06	0.40	-4.8	WELLER	
83-31	8	0.46	0.93	0.73	10.45	0.50	-4.9	GRANODIOR	
83-31	9	0.88	0.87	0.87	0.20	0.40	-4.6	WELLER	
83-31	10	0.74	0.61	0.65	-0.51	0.20	-4.3	DIABASE	
83-31	11	0.64	0.26	0.35	-4.06	0.20	-3.5	WELLER	
83-39	1	0.66	0.81	0.76	4.31	0.20	-6.3	GRANITE	S
83-39	2	0.71	0.97	0.88	6.40	0.60	-5.3	GRANITE	S
83-39	3	0.84	0.73	0.77	-1.52	0.40	-5.0	DIORITE	S

19 PEBBLES IN WINDOW

SIZE-PHI	MEAN =	-4.95	STDEV = 0.58	SUM SQUARES =	6.12	PEBBLES =	19
FOLK SPH	MEAN =	0.74	STDEV = 0.12	SUM SQUARES =	0.25	PEBBLES =	19
O-P INDX	MEAN =	1.68	STDEV = 4.43	SUM SQUARES =	353.42	PEBBLES =	19
B/A	MEAN =	0.73	STDEV = 0.13	SUM SQUARES =	0.31	PEBBLES =	19
C/B	MEAN =	0.75	STDEV = 0.16	SUM SQUARES =	0.49	PEBBLES =	19
K RNESS	MEAN =	0.36	STDEV = 0.13	SUM SQUARES =	0.29	PEBBLES =	19

STRIATED CLASTS 12 63%

MEAN SIZE (MM) = 30.8 RANGE (MM) = 11.3 TO 77.4

C. CORE FROM SEA FLOOR

190 PEBBLES IN TOTAL

DATA AS READ

		B/A	C/B	SPH	OPI	KRNSS	SIZE	LITHOLOGY	STR
83-5	1	0.45	0.84	0.68	10.12	0.20	-4.8	DIABASE	
83-5	2	0.67	0.90	0.82	5.58	0.40	-4.9	METAQUAR	
83-15	1	0.69	0.54	0.59	-0.04	0.60	-5.3	DIABASE	S
83-15	2	0.69	0.64	0.65	1.23	0.40	-4.1	GRANODIOR	S
83-15	3	0.66	0.50	0.55	0.14	0.60	-3.3	WELLER	
83-15	4	0.78	0.58	0.64	-2.04	0.30	-3.2	DIABASE	S
83-15	5	0.70	0.34	0.43	-4.32	0.30	-3.1	GRANITE	
83-15	1	0.73	0.85	0.81	3.56	0.30	-4.4	GRANITE	S
83-32B	1	0.60	0.42	0.47	1.20	0.50	-5.7	DIABASE	S
83-32B	2	0.47	0.85	0.70	9.45	0.20	-5.8	METAQUAR	
83-32B	3	1.00	0.43	0.57	-11.56	0.20	-4.8	GRANODIOR	
83-32B	4	0.60	0.64	0.63	3.85	0.20	-4.4	GRANODIOR	
83-32B	5	0.75	0.57	0.62	-1.39	0.10	-4.5	GRANITE	
83-32B	6	0.70	0.43	0.51	-2.39	0.10	-4.2	GRANITE	
83-32B	7	0.88	0.79	0.82	-1.54	0.50	-4.2	DIABASE	
83-32B	8	0.76	0.75	0.75	0.94	0.30	-4.0	GRANODIOR	
83-32B	9	0.70	0.78	0.75	2.78	0.40	-3.8	METAQUAR	
83-32B	10	0.77	0.43	0.52	-4.66	0.30	-3.5	DIABASE	
83-32B	11	0.57	0.66	0.63	5.15	0.20	-3.6	DIABASE	
83-32B	12	0.67	0.43	0.50	-1.40	0.30	-3.0	DIABASE	
83-32B	13	0.99	0.87	0.91	-4.83	0.30	-3.0	DIABASE	
83-32B	14	0.86	0.97	0.93	4.15	0.20	-3.8	DIABASE	
83-32B	15	0.87	0.79	0.82	-1.17	0.40	-3.1	DIABASE	
83-32B	16	0.88	0.68	0.74	-3.30	0.50	-3.7	DIABASE	
83-32B	17	0.92	0.62	0.71	-5.39	0.40	-3.6	GRANODIOR	
83-32B	18	0.77	1.00	0.92	6.52	0.30	-3.8	GRANODIOR	
83-32B	19	0.45	0.76	0.64	9.72	0.20	-3.4	GRANODIOR	
83-32B	20	0.93	0.54	0.65	-7.17	0.30	-3.2	GRANODIOR	
83-32B	21	0.96	0.89	0.91	-2.53	0.30	-3.1	GRANODIOR	
83-32B	22	0.96	0.75	0.81	-4.92	0.40	-3.1	GRANODIOR	
83-32B	23	1.00	0.72	0.80	-6.96	0.30	-3.3	GRANODIOR	
83-32B	24	0.91	0.27	0.41	-15.29	0.20	-3.1	GRANODIOR	
83-32B	25	0.96	0.64	0.73	-6.50	0.40	-3.1	GRANODIOR	
83-32B	26	0.93	0.88	0.89	-1.37	0.50	-3.1	GRANODIOR	
83-32B	27	0.85	0.55	0.64	-4.55	0.50	-3.5	GRANODIOR	
83-32B	28	0.79	0.90	0.86	3.41	0.30	-3.1	GRANODIOR	
83-32B	29	0.79	0.62	0.67	-1.73	0.30	-2.9	GRANODIOR	
83-32B	30	0.59	0.65	0.63	4.14	0.30	-3.3	GRANITE	
83-32B	31	0.87	0.46	0.57	-7.08	0.40	-2.8	GRANITE	
83-32B	32	0.78	0.80	0.79	1.42	0.50	-3.4	METAQUAR	

83-32B	1	0.67	0.55	0.59	0.47	0.40	-5.8	GRANODIOR	S
83-32B	2	0.81	0.91	0.87	3.14	0.50	-4.6	GRANODIOR	
83-32B	3	0.80	0.47	0.57	-4.81	0.40	-4.1	GRANODIOR	S
83-32B	4	0.78	0.86	0.83	2.54	0.50	-4.2	GRANODIOR	S
83-32B	5	0.66	0.82	0.76	4.34	0.50	-4.0	GRANODIOR	S
83-32B	6	0.87	0.65	0.72	-3.56	0.40	-3.9	GRANODIOR	S
83-32B	7	0.95	0.50	0.62	-8.64	0.30	-3.7	GRANODIOR	
83-32B	8	0.99	0.72	0.80	-6.74	0.30	-3.9	GRANODIOR	S
83-32B	9	0.62	0.97	0.83	7.57	0.40	-3.8	GRANODIOR	
83-32B	10	0.84	0.80	0.81	-0.15	0.30	-3.6	GRANODIOR	
83-32B	11	0.81	0.77	0.79	0.12	0.20	-3.8	GRANODIOR	
83-32B	12	0.73	0.93	0.86	4.90	0.30	-3.6	GRANODIOR	
83-32B	13	0.71	0.75	0.73	2.36	0.30	-3.6	GRANODIOR	
83-32B	14	0.74	0.53	0.59	-1.75	0.30	-3.5	GRANODIOR	
83-32B	15	0.54	0.75	0.67	6.83	0.40	-3.2	GRANODIOR	
83-32B	16	0.69	0.93	0.84	5.62	0.30	-3.4	GRANODIOR	
83-32B	17	0.65	0.53	0.56	1.02	0.20	-3.2	GRANODIOR	
83-32B	18	0.87	0.43	0.55	-7.85	0.30	-3.2	GRANODIOR	
83-32B	19	0.96	1.00	0.98	5.23	0.40	-3.4	GRANODIOR	
83-32B	20	0.88	0.70	0.75	-2.96	0.50	-3.2	GRANODIOR	
83-32B	21	0.75	0.87	0.83	3.47	0.60	-3.2	GRANODIOR	
83-32B	22	0.81	0.67	0.71	-1.55	0.40	-3.3	GRANODIOR	
83-32B	23	0.92	0.83	0.86	-2.17	0.30	-3.0	GRANODIOR	
83-32B	24	0.70	0.57	0.61	-0.16	0.30	-3.1	GRANODIOR	
83-32B	25	0.95	0.87	0.89	-2.51	0.30	-3.1	GRANODIOR	
83-32B	26	0.83	0.53	0.61	-4.42	0.30	-4.0	GRANITE	
83-32B	27	0.66	0.99	0.86	7.24	0.40	-4.1	GRANITE	
83-32B	28	0.87	0.73	0.78	-2.16	0.40	-4.0	GRANITE	
83-32B	29	0.63	0.55	0.57	1.86	0.50	-3.8	GRANITE	
83-32B	30	0.48	0.58	0.55	7.94	0.30	-3.8	GRANITE	
83-32B	31	0.68	0.95	0.85	6.23	0.40	-4.0	GRANITE	
83-32B	32	0.80	0.80	0.80	0.81	0.40	-3.7	GRANITE	
83-32B	33	0.89	0.81	0.83	-1.47	0.40	-3.5	GRANITE	
83-32B	34	0.64	0.73	0.70	3.75	0.30	-3.5	GRANITE	
83-32B	35	0.96	0.40	0.53	-11.49	0.20	-3.5	GRANITE	
83-32B	36	0.91	0.59	0.68	-5.73	0.20	-3.4	GRANITE	
83-32B	37	0.68	0.82	0.77	4.14	0.20	-3.4	GRANITE	
83-32B	38	0.78	0.62	0.67	-1.52	0.40	-3.3	GRANITE	
83-32B	39	0.80	0.55	0.63	-3.25	0.30	-3.3	GRANITE	
83-32B	40	0.84	0.49	0.59	-5.69	0.30	-3.0	GRANITE	
83-32B	41	0.68	0.83	0.78	4.20	0.40	-3.1	GRANITE	
83-32B	42	0.82	0.94	0.90	3.76	0.50	-3.2	GRANITE	
83-32B	43	0.94	0.87	0.89	-2.05	0.40	-4.3	DIABASE	
83-32B	44	0.83	0.69	0.73	-1.93	0.40	-3.8	DIABASE	
83-32B	45	0.90	0.94	0.93	1.80	0.30	-3.7	DIABASE	
83-32B	46	0.52	0.84	0.72	8.18	0.40	-3.5	DIABASE	
83-32B	47	0.53	0.37	0.41	4.40	0.30	-3.2	DIABASE	
83-32B	48	0.97	0.90	0.92	-2.87	0.50	-3.6	DIABASE	
83-32B	49	0.59	0.80	0.72	6.02	0.20	-3.2	DIABASE	
83-32B	50	1.00	0.89	0.93	-5.61	0.20	-3.4	DIABASE	
83-32B	51	0.79	0.85	0.83	2.04	0.40	-3.0	DIABASE	
83-32B	52	0.74	0.88	0.83	3.83	0.20	-3.6	METAQUAR	
83-32B	53	0.75	0.30	0.41	-8.06	0.20	-3.3	METAQUAR	
83-32B	54	0.80	0.36	0.47	-7.62	0.30	-3.0	METAQUAR	
83-32B	56	0.73	0.65	0.68	0.27	0.30	-3.9	DIORITE	
83-32B	57	0.82	0.69	0.73	-1.53	0.40	-3.7	DIORITE	

83-33	1	0.78	0.54	0.61	-2.94	0.60	-6.0	DIABASE	S
83-33	1	0.68	0.79	0.76	3.50	0.50	-4.0	DIABASE	
83-33	2	0.55	0.81	0.71	6.97	0.30	-3.8	DIABASE	
83-33	3	0.79	0.81	0.80	1.39	0.20	-3.6	DIABASE	
83-33	4	0.66	0.59	0.61	1.31	0.40	-3.0	GRANITE	S
83-33	5	0.86	0.80	0.82	-0.91	0.20	-3.1	DIABASE	
83-34	1	0.96	0.52	0.64	-8.46	0.60	-3.5	AZTEC	S
83-34	2	0.56	1.00	0.82	8.98	0.40	-4.0	GRANODIOR	
83-34	3	0.94	0.58	0.68	-6.62	0.50	-3.5	GRANODIOR	
83-34	4	0.76	0.47	0.55	-3.54	0.60	-5.0	DIABASE	S
83-34	5	0.84	0.66	0.71	-2.60	0.40	-4.3	DIABASE	S
83-34	6	0.76	0.86	0.83	3.01	0.50	-4.3	DIABASE	S
83-34	7	0.79	0.66	0.70	-1.04	0.30	-4.0	DIABASE	
83-34	8	0.69	0.71	0.70	2.20	0.30	-3.8	DIABASE	
83-34	9	0.84	0.86	0.85	1.04	0.50	-3.8	DIABASE	
83-34	10	0.93	0.73	0.79	-4.09	0.50	-3.7	DIABASE	
83-34	11	0.80	0.67	0.71	-1.24	0.40	-3.8	DIABASE	
83-34	12	0.85	0.55	0.64	-4.82	0.30	-3.7	DIABASE	
83-34	13	0.94	0.28	0.42	-15.91	0.20	-3.5	DIABASE	
83-34	14	0.69	0.56	0.60	-0.00	0.40	-3.5	DIABASE	
83-34	15	0.67	0.68	0.68	2.31	0.30	-3.6	DIABASE	
83-34	16	0.74	0.81	0.78	2.51	0.30	-3.5	DIABASE	
83-34	17	0.87	0.60	0.68	-4.27	0.30	-3.5	DIABASE	
83-34	18	0.90	0.24	0.37	-17.17	0.20	-3.3	DIABASE	
83-34	19	0.81	0.63	0.68	-2.32	0.30	-3.5	DIABASE	
83-34	20	0.64	0.55	0.58	1.63	0.30	-3.3	DIABASE	
83-34	21	0.97	0.79	0.85	-4.74	0.40	-3.5	DIABASE	
83-34	22	0.97	0.83	0.87	-4.58	0.50	-3.5	DIABASE	
83-34	23	0.89	0.51	0.62	-6.49	0.30	-3.1	DIABASE	
83-34	24	0.77	0.45	0.54	-4.28	0.30	-3.1	DIABASE	
83-34	25	0.91	0.32	0.45	-13.12	0.30	-3.0	DIABASE	
83-34	26	0.86	0.67	0.73	-3.14	0.30	-3.1	DIABASE	
83-34	27	0.78	0.41	0.51	-5.54	0.20	-3.0	DIABASE	
83-34	28	0.96	0.34	0.48	-13.55	0.30	-2.8	DIABASE	
83-34	29	0.92	0.33	0.47	-12.79	0.20	-3.0	DIABASE	
83-34	30	0.79	0.71	0.74	-0.33	0.40	-4.8	GRANODIOR	S
83-34	31	0.81	0.68	0.72	-1.54	0.40	-4.5	GRANODIOR	
83-34	32	0.91	0.79	0.83	-2.55	0.40	-4.2	GRANODIOR	
83-34	33	0.88	0.55	0.64	-5.55	0.40	-3.6	GRANODIOR	
83-34	35	0.76	0.77	0.77	1.18	0.30	-3.6	GRANODIOR	
83-34	36	0.73	0.68	0.70	0.88	0.30	-3.5	GRANODIOR	
83-34	37	0.65	0.36	0.44	-1.85	0.20	-3.1	GRANODIOR	
83-34	38	0.71	0.75	0.73	2.20	0.20	-3.2	GRANODIOR	
83-34	39	0.88	0.53	0.63	-5.95	0.30	-3.2	GRANODIOR	
83-34	40	0.73	0.65	0.67	0.32	0.30	-3.1	GRANODIOR	
83-34	41	0.86	0.58	0.66	-4.48	0.30	-3.1	GRANODIOR	
83-34	42	0.79	0.63	0.68	-1.68	0.40	-4.0	GRANITE	
83-34	43	0.74	0.61	0.65	-0.62	0.30	-3.5	GRANITE	
83-34	44	0.78	0.87	0.84	2.70	0.50	-3.4	GRANITE	
83-34	45	0.67	0.97	0.85	6.77	0.30	-3.3	GRANITE	
83-34	46	0.96	0.64	0.73	-6.55	0.40	-3.2	GRANITE	
83-34	47	0.78	0.70	0.73	-0.15	0.30	-3.3	AZTEC	

83-34	1	0.72	0.87	0.82	4.01	0.40	-4.5	DIABASE	
83-34	2	0.76	0.85	0.82	2.73	0.30	-4.4	DIABASE	
83-34	3	0.77	0.72	0.74	0.30	0.40	-4.3	DIABASE	
83-34	4	0.77	0.68	0.70	-0.30	0.40	-3.9	DIABASE	
83-34	5	0.96	0.83	0.87	-3.83	0.50	-3.8	DIABASE	
83-34	6	0.87	0.36	0.48	-10.08	0.30	-3.2	DIABASE	
83-34	7	0.92	0.83	0.86	-2.05	0.30	-3.4	DIABASE	
84-35	1	0.88	0.41	0.53	-8.67	0.30	-5.4	METAQUAR	S
84-35	2	0.93	0.68	0.75	-4.80	0.20	-5.6	METAQUAR	S
84-35	3	0.97	0.60	0.71	-7.31	0.40	-5.2	METAQUAR	
84-35	4	0.77	0.56	0.62	-2.33	0.50	-4.9	DIABASE	S
84-35	5	0.55	0.86	0.74	7.46	0.40	-4.7	DIABASE	
84-35	6	0.75	0.62	0.66	-0.74	0.30	-4.7	DIABASE	S
84-35	7	0.53	0.93	0.77	8.55	0.20	-4.8	DIABASE	
84-35	8	0.58	0.78	0.71	5.89	0.30	-4.6	DIABASE	
84-35	9	0.42	0.88	0.69	11.40	0.30	-4.1	DIABASE	
84-35	10	0.57	0.76	0.69	6.01	0.20	-4.1	DIABASE	
84-35	11	0.74	0.34	0.44	-5.92	0.20	-4.0	DIABASE	
84-35	12	0.59	0.77	0.71	5.58	0.20	-4.2	DIABASE	
84-35	13	0.39	0.54	0.48	12.90	0.20	-3.4	DIABASE	
84-35	14	0.56	0.75	0.68	6.29	0.30	-3.5	DIABASE	
84-35	15	0.91	0.71	0.77	-3.70	0.20	-3.3	DIABASE	
84-35	16	0.69	0.57	0.61	0.49	0.50	-3.0	DIABASE	
84-35	17	0.58	0.49	0.51	3.06	0.30	-3.3	AZTEC	
84-35	18	0.77	0.34	0.44	-7.37	0.30	-2.9	AZTEC	S
84-35	19	0.72	0.88	0.82	4.10	0.50	-3.7	WELLER	
83-37	1	0.83	0.64	0.70	-2.50	0.30	-4.8	WELLER	S
83-37	2	0.53	0.43	0.46	5.02	0.30	-3.7	DIABASE	
83-37	3	0.56	0.94	0.79	8.11	0.20	-3.9	DIABASE	
83-37	4	0.64	0.68	0.67	3.06	0.30	-3.7	DIABASE	
83-37	5	0.75	0.65	0.68	-0.12	0.50	-3.5	DIABASE	
83-37	6	0.49	0.96	0.77	9.92	0.30	-3.4	DIABASE	
83-37	7	0.68	0.77	0.74	3.39	0.40	-3.2	DIABASE	
83-37	8	0.89	0.61	0.69	-4.83	0.30	-3.3	DIABASE	
83-37	9	0.91	0.23	0.36	-18.55	0.40	-3.0	DIABASE	
83-37	10	0.75	0.59	0.64	-1.25	0.40	-3.2	DIABASE	
83-37	11	0.90	0.55	0.65	-6.06	0.30	-3.1	DIORITE	
83-38	1	0.70	0.66	0.67	1.18	0.50	-3.8	GRANITE	
83-38	2	0.81	0.51	0.60	-4.30	0.50	-3.5	METAQUAR	
83-38	3	0.78	0.70	0.72	-0.31	0.30	-3.3	DIABASE	

190 PEBBLES IN WINDOW

SIZE-PHI MEAN = -3.70 STDEV = 0.63 SUM SQUARES = 75.42 PEBBLES = 190
FOLK SPH MEAN = 0.70 STDEV = 0.14 SUM SQUARES = 3.51 PEBBLES = 190
O-P INDX MEAN = -0.80 STDEV = 5.61 SUM SQUARES =5952.23 PEBBLES = 190

B/A MEAN = 0.77 STDEV = 0.14 SUM SQUARES = 3.52 PEBBLES = 190
C/B MEAN = 0.68 STDEV = 0.19 SUM SQUARES = 6.51 PEBBLES = 190
K RNESS MEAN = 0.34 STDEV = 0.11 SUM SQUARES = 2.15 PEBBLES = 190
STRIATED CLASTS 24 12%

MEAN SIZE (MM) = 13.0 RANGE (MM) = 7.0 TO 63.1

Table 15. Distribution of pebble lithologies, from various sources in Granite Harbour. A/ Basal berg, B/ Cores of till exposed on the sea floor and C/ Cores of sea floor sediment. Pebble collection procedure is outlined in section 7.1.

A/ BASAL BERG. SOME SAMPLES MEASURED IN FIELD BUT NOT RETAINED FOR ANALYSIS

78 PEBBLES IN TOTAL
STRIATED CLASTS 40 51%

MEAN SIZE (MM) = 48.9 RANGE (MM) = 11.7 TO 178.9
50 PEBBLES (64.% OF TOTAL) EXCLUDED BECAUSE LITHOLOGY NOT RECORDED

VOLCANIC	=	0 (0.%)
PLUTONIC	=	12 (42.%)
GRANITE	=	2 (7.%)
GRANODIO	=	2 (7.%)
DIABASE	=	8 (28.%)
METAMORPHIC	=	9 (32.%)
METAM FOLIATED	=	3 (10.%)
GNEISS	=	3 (10.%)
METAM UNFOLIATED	=	6 (21.%)
METAQUAR	=	5 (17.%)
METABASA	=	1 (3.%)
SEDIMENTARY	=	7 (25.%)
AZTEC	=	4 (14.%)
WELLER	=	3 (10.%)

B/ CORE OF TILL EXPOSED ON SEA FLOOR

19 PEBBLES IN TOTAL
STRIATED CLASTS 12 63%

MEAN SIZE (MM) = 30.8 RANGE (MM) = 11.3 TO 77.4

19 PEBBLES INCLUDED IN TABLE BELOW

VOLCANIC	=	0 (0.%)
PLUTONIC	=	14 (74.%)
GRANITE	=	4 (21.%)
GRANODIO	=	3 (15.%)
DIORITE	=	1 (5.%)
DIABASE	=	6 (31.%)
METAMORPHIC	=	1 (5.%)
METAM FOLIATED	=	0 (0.%)
METAM UNFOLIATED	=	1 (5.%)
METAQUAR	=	1 (5.%)
SEDIMENTARY	=	4 (21.%)
SANDSTON	=	1 (5.%)
WELLER	=	3 (15.%)

C/ CORES FROM SEA FLOOR

190 PEBBLES IN TOTAL
STRIATED CLASTS 24 12%

MEAN SIZE (MM) = 13.0 RANGE (MM) = 7.0 TO 63.1

190 PEBBLES INCLUDED IN TABLE BELOW

VOLCANIC	=	0 (0.%)
PLUTONIC	=	171 (90.%)
GRANITE	=	30 (15.%)
GRANODIO	=	56 (29.%)
DIORITE	=	3 (1.%)
DIABASE	=	82 (43.%)
METAMORPHIC	=	12 (6.%)
METAM FOLIATED	=	0 (0.%)
METAM UNFOLIATED	=	12 (6.%)
METAQUAR	=	12 (6.%)
SEDIMENTARY	=	7 (4.%)
AZTEC	=	4 (2.%)
WELLER	=	3 (1.%)

Table 16. Composition (in percent) of the sand fraction (1-4 Phi) from point counting (500 grains/thin section) of various environments in Granite Harbour. Sections were stained with sodium cobaltnitrite to enable distinction between Quartz, K-feldspar and Sodic Plagioclase, however distinction between the Plagioclase was difficult.

Sample Number	ENVIRONMENT	GRANITIC BASEMENT				FERRAR/BEACON			McMURDO VOLCANICS		OTHER	
		Angular Quartz	K-feldspar	Na-feldspar	Hornblende and Mica	Dolerite Fragments	Pyroxene	Rounded Quartz	Glass	Volcanic Fragments	Opaques	Calcite
83-61	MACKAY	45	8	21	6	1	2	10	1	5	1	-
83-62	SUPRAGLACIAL	41	11	21	2	2	6	13	1	1	1	1
83-66A	MACKAY GLACIER	40	16	30	3	1	2	6	1	1	-	-
83-66B		40	16	25	4	1	3	7	1	1	1	1
83-67		43	11	32	3	-	1	9	-	1	-	-
83-68		33	17	35	8	1	-	4	1	-	-	1
83-63	ENGLACIAL/BERG	28	10	41	5	4	2	7	-	2	1	-
84-9	AEOLIAN	36	10	34	8	-	3	4	1	2	1	1
84-14		19	16	35	5	1	1	5	4	6	3	5
83-70	CAPE ROBERTS REGOLITH	22	17	31	2	1	3	6	2	16	-	*
83-12	SEA FLOOR CORES (Approx. same location)	19	17	28	2	-	3	2	5	19	4	1
83-33		48	9	29	4	-	3	3		3	1	-
83-39		44	18	22	2		2	4	4	4		
83-31	SEA FLOOR CORE (Approx. same location)	68	4	16	2	1	-	6	1	1	1	-
83-64	BASAL BERG	58	5	15	2	-	4	13		2	-	-
83-65		53	5	20	2	2	1	15	1	1	-	-
84-1	AEOLIAN	20	8	21	7	-	4	4	3	18	3	12
83-50	SEDIMENT TRAP (Approx. same location)	29	5	20	2	1	1	2	14	20	5	1
83-38	SEA FLOOR CORE	18	14	33	2		1	1	3	26	1	1
84-11	AEOLIAN (Approx. same location)	33	15	34	10	-	1	3	1	2	1	-
83-32B	SEA FLOOR CORE	33	14	33	2	1	2	7	2	6	-	-

Table 17. Organic silica and carbon content of muddy sediment samples from tops of cores (A), and sediment traps (B) in Granite Harbour. Analyst: A. Leventer, Rice University, Texas. Sphincter core subsamples are corrected for salt content of the dried sediment based on wet and dry weights of the samples. The cores were frozen upon being taken and thawed immediately prior to subsampling, however the salt content used probably represent minimum values. Values are given in weight % of dry sample.

Part A. Sphincter Core Mud Compositions.

Sphincter Core	Sub-sample Depth	% Salt	% Opal	% Org. C	c/Opal
83-14	0-4 cm	1.2	5.1	0.64	1/8
83-15	0-4 cm	3.8	20.4	1.37	1/15
83-32b	0-4 cm	2.2	11.0	1.46	1/7.5
83-33	0-4 cm	2.5	11.6	0.87	1/13.5
	20-22	1.8	8.3	1.06	1/8
	40-42	1.9	7.1	0.95	1/7.5
	60-62	2.3	9.6	1.17	1/8
	80-82	1.7	7.5	1.06	1/7
	92-94	1.6	7.8	0.87	1/9
83-34	0-4	2.9	14.9	0.91	1/16.5
83-35	0-4	4.8	28.4	1.86	1/15.5
83-36	0-40	5.8	35.0	1.98	1/17.5
	40-42	6.3	38.4	2.47	1/15.5
	60-62	7.0	33.1	2.30	1/14.5
	80-82	4.6	28.7	1.96	1/14.5
	100-102	5.6	30.3	1.95	1/15.5
	120-122	8.0	38.7	2.76	1/14
	140-142	8.5	40.0	2.44	1/16.5
83-37	0-4	3.9	25.8	1.58	1/16.5
	20-22	3.9	22.2	2.57	1/8.5
	40-42	2.9	15.7	1.24	1/12.5
	60-62	2.4	17.4	1.36	1/13
	80-82	4.1	22.9	1.54	1/15
83-38	0-2	8.0	40.9	2.52	1/16
	20-22	6.2	35.2	2.70	1/13
	40-42	6.5	32.6	2.26	1/14.5
	45-47	3.5	19.7	2.20	1/9
	60-62	7.3	37.7	2.21	1/17
	80-82	5.1	32.6	2.10	1/15.5

PART B. Sediment Trap Mud Compositions

Trap	Depth (m)	% Opal	% Org.C	c/Opal	Flux mg m^{-2} d^{-1} Total	Opal	Org.C
83-31	260	6.5	3.19	1/2	605	39.3	19.3
83-34	530	25.7	3.11	1/8	470	120.8	14.6
83-36	763	34.2	3.02	1/11	600	205.2	18.1
83-48	77	28.4	7.85	1/3.6	51	14.5	4.0
83-49	241	19.1	2.67	1/8	141	26.9	3.8
83-50	727	38.0	7.20	1/5	1331	505	95.8
83-51	281	21.0	3.29	1/6	235	49.3	7.7
83-52	258	18.5	3.27	1/5	75	13.8	2.5
83-53	429	24.4	4.24	1/6	103	24.9	4.4
*84-13	35	22.5			62	14	
	130	25.5			37	9	
	220	28.0			44	12	
	320	29.5			46	12	
	405	-			33	-	
	500	34			87	29	
	590	33.5			85	28	
	685	38			234	89	

*84-13 corresponds to mooring I of Rice University from Dunbar et al (in press).

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