GEOLOGICAL SURVEY OF CANADA

OPEN FILE 2081

DATA REPORT
DESCRIPTION AND COMPOSITION OF CORES AND GRAB SAMPLES, HUDSON 87-028 HUDSON BAY

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TABLE OF CONTENTS

FIGURES

TABLES

APPENDIX

INTRODUCTION

In this report, surficial sediment samples and cores collected along the track of geophysical surveys in Hudson Bay (Hudson 87-028) have been described and analysed to determine texture, composition and sediment provenance. The twelve cores and eight surficial samples are located throughout the bay (Table 1) (Fig. 1) and represent numerous stratigraphic units characterized by varying acoustic responses. This report is primarily descriptive and includes data presentation, the definintion of sedimentary facies in cores, and a preliminary interpretation of the depositional environment. Because certain lithologies and heavy mineral assemblages can be linked to distinctive bedrock sources outcropping beneath and/or adjacent to Hudson Bay, sediment composition is indicative of sediment transport paths and constrains any interpretation of depositional processes for sediments in the bay.

The stratigraphic framework within Hudson Bay is determined from high resolution (Huntec DTS) acoustic data. The cores described in this report were taken along the acoustic transect and represent all observed stratigraphic units. Therefore, they serve to ground truth the seismo-stratigraphic interpretation. The relationship between acoustic and sedimentological properties of the cores will be presented in a paper to follow (Henderson and Josenhans, in preparation).

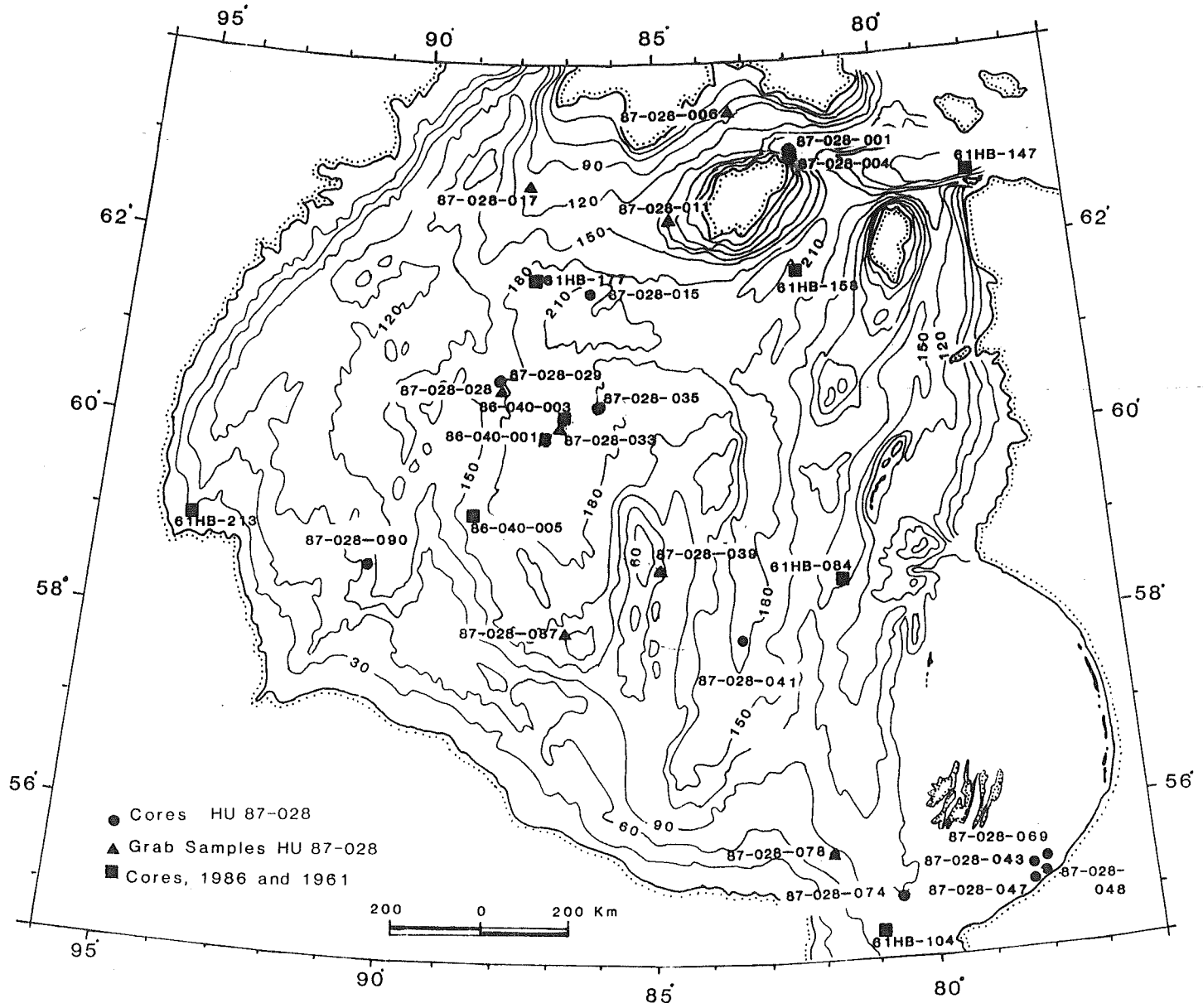


Figure 1: Location Map for cores and grab samples, Hudson Bay. Bathymetry contoured in metres.

TABLE 1

Hudson Bay Core Data

Sample Number	Location Latitude	Location Longtitude	Depth (m)	App. Penn.* (cm)	Core Length (cm)
HU 87-028					
001 (TWC)	63°01.54'	81°04.91'	273	158	122
(PC)				945	723
004 (TWC)	63°00.51'	81°04.91'	271	125	112
(PC)				1220	518
015 (TWC)	61°35.47'	86°19.26'	214	168	136
(PC)				511	188
029 (GC)	60°36.40'	88°11.20'	180	200	108
035 (GC)	60°21.47'	86°01.96'	183	320	202
041 (TWC)	57°54.08'	88°20.05'	182	115	82
(PC)	"	"		283	280
043 (TWC)	55°21.14'	78°14.24'	118	172	151
(PC)	"	"		915	490
047 (TWC)	55°09.69'	78°12.60'	46	170	132
(PC)				610	296
048 (TWC)	55°22.58'	77°40.69'	59	165	106
(PC)				610	218
069 (TWC)	55°28.62'	77°57.78'	165	170	139
(PC)				1020	753
074 (TWC)	55°06.11'	80°29.69'	95	66	95
(PC)				510	150
090 (TWC)	58°39.23'	90°17.09'	155	170	139
(PC)				950	699

*Apparent penetration: depth piston core barrel penetrated as measured from length of core barrel coated with sediment. Generally longer than recovered core.
(TWC) Trigger weight core
(PC) Piston core
(GC) Gravity core

GRAB SAMPLE DATA

Sample Number	Location Latitude	Location Longtitude	Depth (m)	Geographic Location
HU-87-028				
006	63°29.90'N	83°16.41'W	95	Evans Strait
011	62°21.94'	84°27.96'	51	Hudson Bay
017	62°41.54'	87°44.42'	95	Hudson Bay
028	60°36.50'	81°11.00'	180	Hudson Bay
033	60°11.75'	86°51.18'	199	Hudson Bay
039	58°42.48'	84°50.95'	91	Hudson Bay
078	55°35.45'	81°45.26'	77	Hudson Bay
087	57°58.43'	86°46.32'	119	Hudson Bay

BEDROCK GEOLOGY

Knowledge of the geology of the Hudson Bay region is essential to the understanding of sediment composition. The bay is underlain and surrounded by bedrock from three fundamentally different geological terranes which can be distinquished lithologically, mineralogically and chemically (Henderson, in prep.)(Fig. 2). These include:

(1) Precambrian igneous and high-grade metamorphic rocks of the the Canadian Shield.

(2) Essentially unmetamorphosed Proterozoic sedimentary and volcanic rocks. The most distinctive lithologies include the maroon and purple volcanic and sedimentary rocks of the Dubawnt Group, District of Keewatin (Donaldson, 1965, 1967; Cecile, 1973), and greywacke/argillites characteristic of the Omarolluk Formation outcropping in the Belcher Island Fold Belt and Sutton Inlier (Jackson, 1960; Dimroth et al, 1970; Ricketts and Donaldson, 1981). Similar greywackes are also present in the Kaminak Subprovince, however, their outcrop area, on the the west coast of the bay, is minor in comparison to that of the Omarolluk Formation.

(3) Paleozoic limestones and dolomites with minor sandstones, siltstones and evaporites, which underlie the bay and outcrop south of the bay in the Hudson Bay Lowlands. The Paleozoic carbonates are predominantly grey and buff. More distinctive lithologies include the red and pink

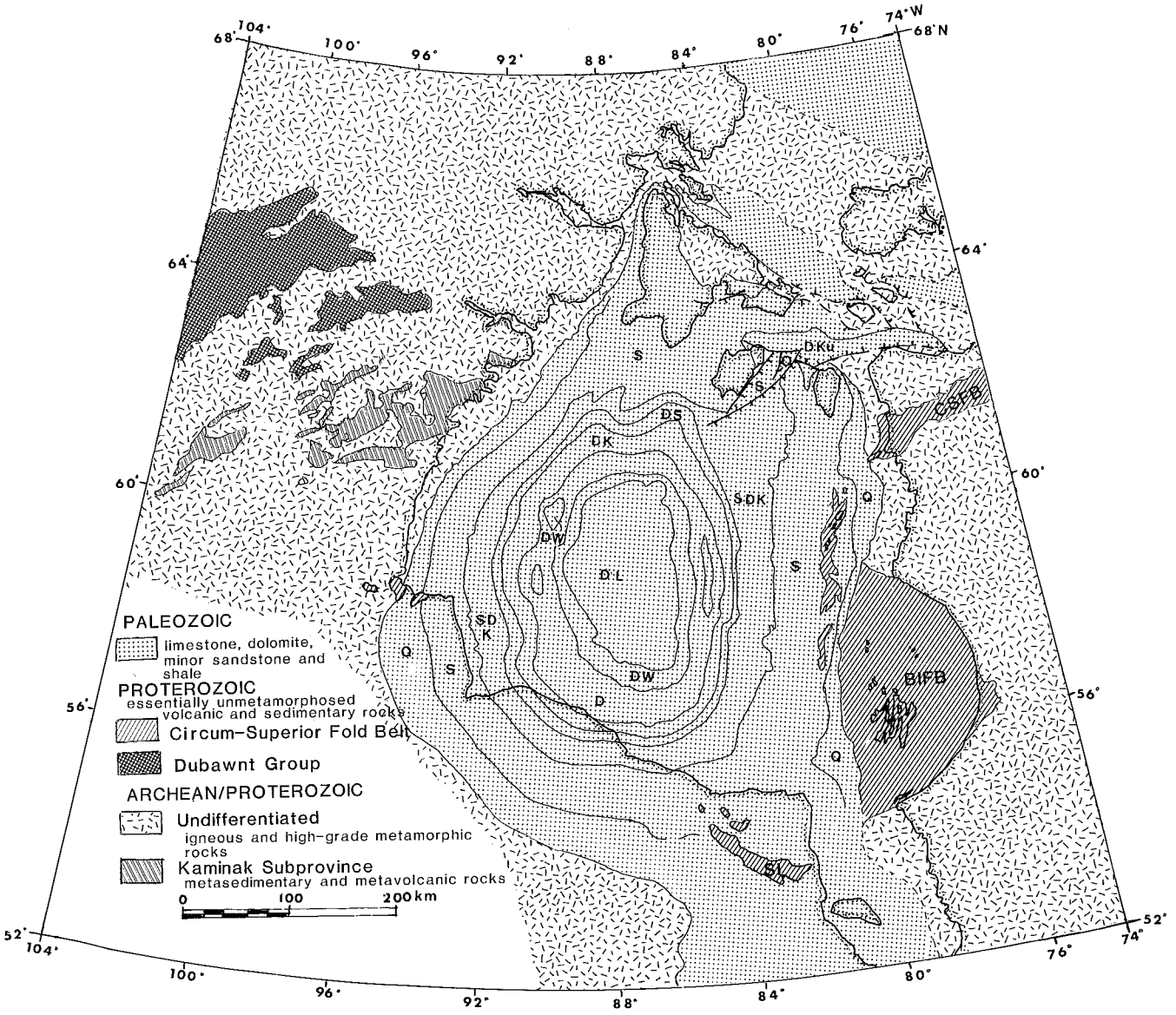


Figure 2: Bedrock Geology of Hudson Bay region. Designations within the Paleozoic sequence include: O, Ordovician formations, undifferentiated; S, Silurian formations, undifferentiated; SDK, Kenogami River Formation; DS, Stoping River Formation; DK, Kwataboahegan Formation; D, other Devonian formations, undifferentiated; DW, Williams Island Formation; DL, Long Rapids Formation; and DKu, Devonaian to Cretaceous (?), undivided. Within the Circum-Superior Fold Belt, designations include: CSFB, Cape Smith Fold Belt; BIFB, Belcher Island Fold Belt and SI, Sutton Inlier. (modified from Grant and Sanford, 1988).

calcareous mudstone of the Devonian Williams Island Formation, and the brick red fine-grained clastic rocks of the middle member of the Kenogami River Formation.

PREVIOUS WORK

Sedimentologic studies of Hudson Bay have concentrated on the foraminiferal content, texture and composition of the seafloor sediments (Leslie, 1963, 1964, 1965; Pelletier et al 1968; Pelletier, 1969, 1986; Shilts, 1982, 1986; Henderson, 1983; in prep.). Pelletier (1969, 1986) interpreted sediment distribution in terms of post-glacial marine processes, emphasizing the dispersal of fluvially-derived sediment by marine currents and sea-ice rafting. Compositional analyses, however, show that dispersal trends of distinctive erratics and heavy minerals result from glaciation of the bay and, consequently, the bottom sediments are glacigenic deposits modified, to varying degrees, by post-glacial marine processes (Henderson, in prep.). Similarly, results of combined geophysical-geological surveys in the bay reveal that the seafloor is covered by, essentially unburied, geomorphic features characteristic of the glacial and glaciomarine environment (Lewis and Sanford, 1971; Whittaker et al, 1985; Josenhans et al, 1988; Josenhans and Zevenhuizen, 1988).

Prior to this report, few direct observations have been presented on the stratigraphy of seafloor sediments. Leslie (1965) examined the texture and faunal assemblage of six

cores collected in 1961 and related the depositional environments to deglaciation of Hudson Bay (Appendix A)(Fig. 1). Short cores were also collected in 1971 (Lewis and Sanford, 1971), however, little work was done on this material. A summary of shipboard observations is available in Zevenhuisen (1986). Descriptions and lithological analysis of the coarser facies of several short cores collected in 1986 (Hudson 86-040) (Josenhans et al, 1988) are also summarized in Appendix A (Fig. 2).

METHOD

Cores were collected using the AGC (10cm diameter) piston corer. For the most part, sediment was recovered in two sections; the trigger weight core (TWC), which essentially serves as the trigger for initiating free fall of the piston corer (PC), and the piston core itself. Ideally, the recovered upper portion of the piston core overlaps with the trigger weight core. In practice, however, this rarely occurred, primarily, because of the soupy nature of the surficial unit which did not provide enough force to move the piston inside the corer upon seafloor contact.

Shipboard Procedures

All cores, with the exception of core 87-028-090, were split onboard ship and detailed sedimentological descriptions, Munsell colour determinations, and photographs were made. Core 87-088-090 was processed during a subsequent cruise. One half of the core was used for measurement of the

physical properties (velocity and shear strength), prior to sampling for determinations of bulk density, water content, salinity and faunal assemblages. The other half was archived. Results of the physical properties program are summarized in Marsters (1989) and faunal analyses of selected cores in de Vernal et al (1989).

Laboratory Procedures

Cores were later x-rayed at the Atlantic Geoscience Centre, Dartmouth, Nova Scotia and sampled for textural and compositional studies at approximately 25cm intervals. At the Geological Survey of Canada, Ottawa, subsamples were split into various size fractions for lithological and mineralogical analysis, carbonate determinations, clay geochemistry and grain-size analysis according to the flow chart illustrated in Figure 3.

Grain-size analysis was done by the Terrain Science Division, GSC. Texture was determined for particles ranging from 0.002mm to 2mm using standard sieve and pipette techniques as outlined by McDonald and Kelly (1968). Percentages of sand, silt and clay were also determined. The gravel fraction (> 2mm diameter) has been calculated as a percentage of the total sample weight analysed.

The method for lithological analysis (2-5.6mm fraction) is outlined in Henderson (in prep.). Clasts were separated into groups characteristic of various geological terranes surrounding and underlying Hudson Bay and include grey and red/pink carbonates, igneous and metamorphic (crystalline)

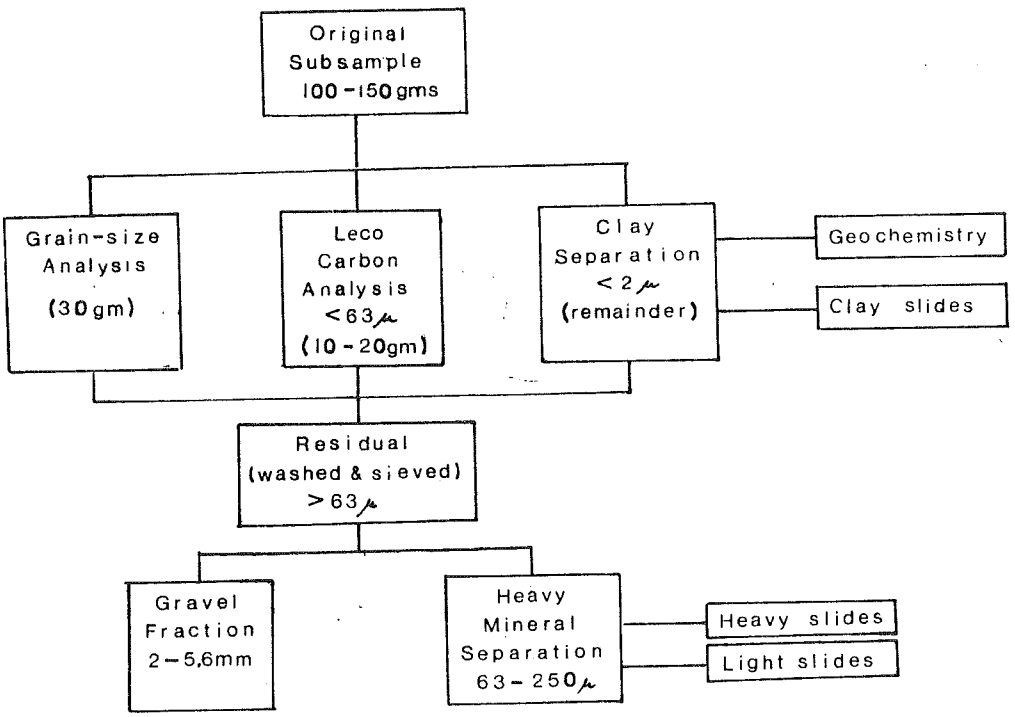


Figure 3: Flow chart for sample preparation.

rock types, and distinctive lithologies from the Proterozoic basins, particularly the Dubawnt and Belcher Island Groups, as outlined earlier. Proportions of each lithologic group are determined as a percentage by weight of the total 2-5.6mm size fraction.

Heavy mineral separation of the fine sand fraction (0.063-0.250mm) was done by the Terrain Sciences Division, GSC, Ottawa using the heavy liquid methylene iodide (sg. 3.3) and the technique outlined in Pare (1982). Magnetic minerals were removed from the heavy fraction with a hand magnet; all fractions were weighed and respective percentages determined. Both the heavy and light fractions were mounted in Araldite 502 (n=1.56) on microscope slides, and point counts were made using methods discussed by Pare (1982) and Henderson (in prep.). Percentages of individual minerals are calculated as a fraction of the total heavy mineral assembage excluding clinopyroxenes and amphiboles since the specific gravity of these minerals brackets that of the heavy liquid.

The clay-size fraction (<0.002mm) was separated from the bulk sample using the centrifuge and decantation methods of the Terrain Science Division (Higgins, 1982) and a 0.5N solution of sodium hexametaphosphate for sediment disagregation and suspension. Suspensions of the clay-size sediment were then mounted on glass slides (Gibbs, 1965) and analysed by x-ray diffractometer using CuKa Ni-filtered radiation (2° 2O/min; chart speed, 1000cps) at the GSC. The remainder of the clay-size fraction was oven-dried, ground

and analysed for a suite of elements by Chemex Labs Ltd., Vancouver, B.C. using I.C. Plasma-Atomic Emission spectroscopy analyses with nitric-aqua regia digestion.

Carbonate concentrations were also determined by the Terrain Science Division, GSC using the Leco Carbon Analyser. Bulk samples were air-dried, sieved to <0.063mm, and analyzed in two portions: one untreated, the other treated with dilute hydrochloric acid. The fraction of non-carbonate carbon, carbonate carbon and calcium carbonate equivalent is calculated. No differentiation is made between biogenic and lithogenic carbonate using this method.

RESULTS

Based on core descriptions and x-radiograph interpretations, sedimentary facies have been characterized using the lithofacies code of Eyles et al (1983) with some modification (Table 2). These facies are interpreted as representative of four main depositional environments defined as follows:

1) Post-glacial, open marine, environment: fine-grained clastic sediment transported into the bay by rivers or reworked from shallow nearshore deposits by wave or tidally-induced currents and deposited offshore.
2) Glaciomarine/Glaciolacustrine environment: Generally fine-grained, ice-proximal sediment deposited in a marine or lacustrine environment with the sediment supply and mechanisms of transport to proximal basins strongly

TABLE 2

Diamict Lithofacies Code and Symbols
(modified from Eyles et al, 1983)

Hyphens show possible combinations: second letter (m and c) indicates matrix or clast support (degree undefined). Third letter gives internal structure. Fourth letter (in parenthesis) suggests possible useful environmental characteristics.

FACIES CODE

Diamict, D:

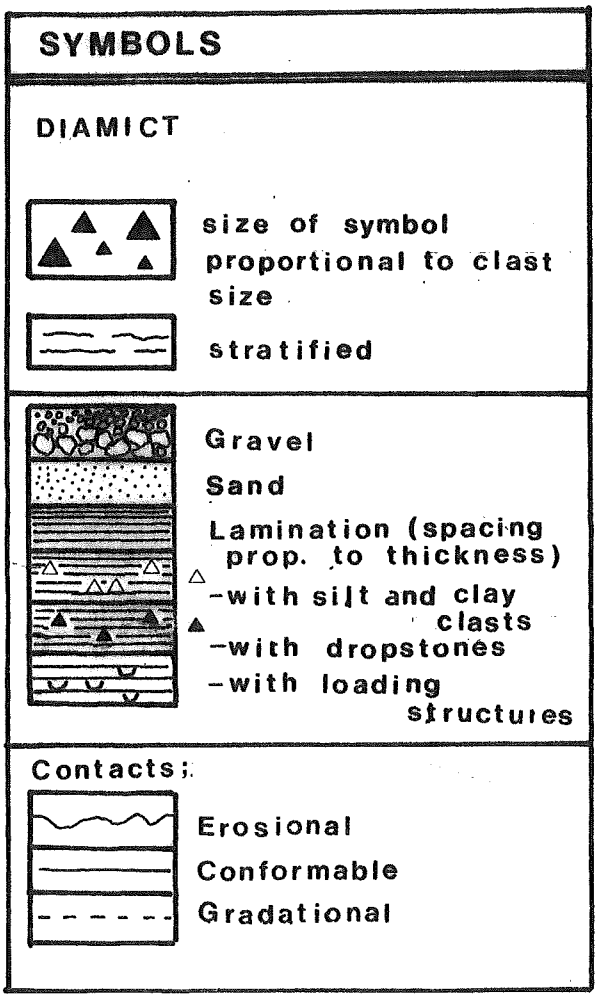
Dm : matrix supported
Dc : clast supported
D- m : massive
D- s : stratified
D- g : graded
Genetic interpretation, ()
D- -(r) : resedimented
D- -(c) : current reworked
D- -(s) : sheared

Sands, S:

Sr : rippled
St : trough cross-bedded
Sh : horizontal lamination
Sm : massive
Sg : graded
Sd : soft sediment deformation

Fine grained (mud), F:

Fl : laminated
Fm : massive
F-d : dropstones
Genetic Interpretation,()
F- -(d): deformed, dewatering
F- -(b): biogenic reworking



controlled by the debris entrained within the glacier;

3) Glacial environment: Unsorted sediment deposited directly by the glacier, either subglacially or at the ice margin;

4) Fluvial/Glaciofluvial Environment: Sorted sands and gravels deposited either by modern or older fluvial systems or, by glaciofluvial processes where the sediment source is related to material entrained within the glacier and the depositional site is subglacial or submarine.

Analytical results of all cores and grab samples, presented in the following section, include the following, where applicable:

a) Complete core descriptions based on visual observations at sea and sedimentary facies designation
b) X-radiograph interpretations of core
c) Summary log including interpretation of depositional environment
d) Textural analysis
e) Lithological analysis
f) Heavy mineral analysis
g) Leco carbonate data
h) Geochemical analysis
i) Clay mineralogy

Plots of textural and compositional analyses include only the more significant results. Complete data is listed in the accompanying tables. Due to textural limitations, certain subsamples lack sufficient sand or gravel for

lithological and/or heavy mineral studies and, in these cases, no sample point is indicated. This accounts for the apparent gaps in these results. When a sample was analysed, but a specific factor is absent, the point is plotted along the zero axis.

Data points at the base of cores HU-087-028-001, 004, 047, and 074 refer to analyses from sediment collected in the core cutter.

Horizontal lines on plots of textural and compositional analyses record major changes in sedimentation style and serve as means of visually unifying data.

RESULTS

CORE HU-87-028-001

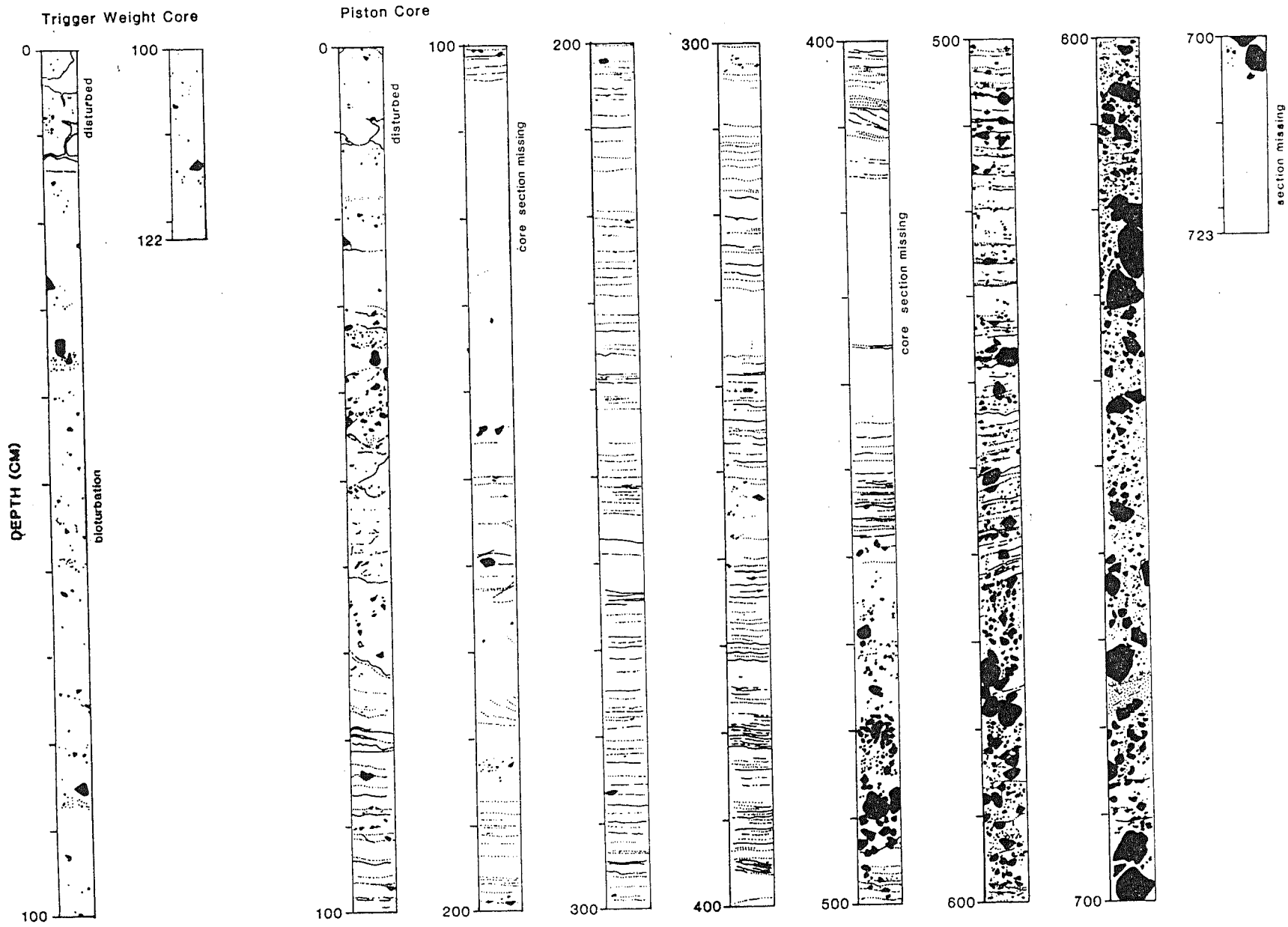
CORE DESCRIPTION

CORE	INTERVAL (cm)	SEDIMENT TYPE	COLOUR	LITHOFACIES CODE	PHYSICAL PROPERTIES
HU-87-028-001					
TWC	0 - 122	Olive grey silty clay (mud) mottled, few pebbles.	5Y 4/2	Fmd	high water content low bulk density
PC	0-28	Olive, grey mud, few pebbles, shell fragments, worm present near top of core.	5Y 4/2	Fmd	water content and bulk density similar to TWC
		--- gradational ---			
	28-42	Light olive grey clay, faintly laminated, lenses of pebbles.	5Y 6/2	Fld	Increase in bulk density, decrease in water content from unit above.
		- sharp undulating contact -			
	42-54	Olive grey mud, discontinuous diffuse lamination, minor lenses of coarser material.	5Y 5/2	Fl	
		--- gradational ---			
	54-66	Dark greyish brown mud, few pebbles.	2.5Y 5/2	Fmd	
		- contact dips steeply -			
	66-103	Greyish brown silty and sandy clay, silty laminations, approx. 0.5 cm thick	2.5Y 5/2	Fld	
	103-124	extruded from core			
	124-182	Greyish brown mud, few pebbles, slight lamination.	2.5Y 5/2	Fmd	
		(possibly disturbed)			
		--- gradational ---			
	182-318	Greyish brown silty mud, diffuse lamination, very few pebbles.	2.5Y 5/2	Fld	
		--- gradational ---			
	318-370	Dark grey and dark grey brown silty clay, laminated.	5Y 4/1	Fld	
		Lamination 0.5cm thick, few pebbles between 340-360cm	2.5Y 4/2		
		--- gradational ---			
	370-458	Reddish brown silty mud, thin lenses and laminations of yellow/ red (5YR 4/4) clay, one pebble near top of unit. Between 420-433 sample oozed out of core.	5YR 4/2	Fl	increase in water content, low bulk density, lower velocity than other fine-grained laminated sediments
		--- gradational ---			
	458-478	Dark greyish brown, silty clay, pebbles	10YR 4/2	Fmd	water content decreases, increase in bulk density and velocity
		--- gradational ---			
	478-495	Diamict, olive grey, calcareous, faintly stratified.	5Y 5/2	Dms(r)	
		--- sharp ---			

HU-87-028-001 (cont'd)

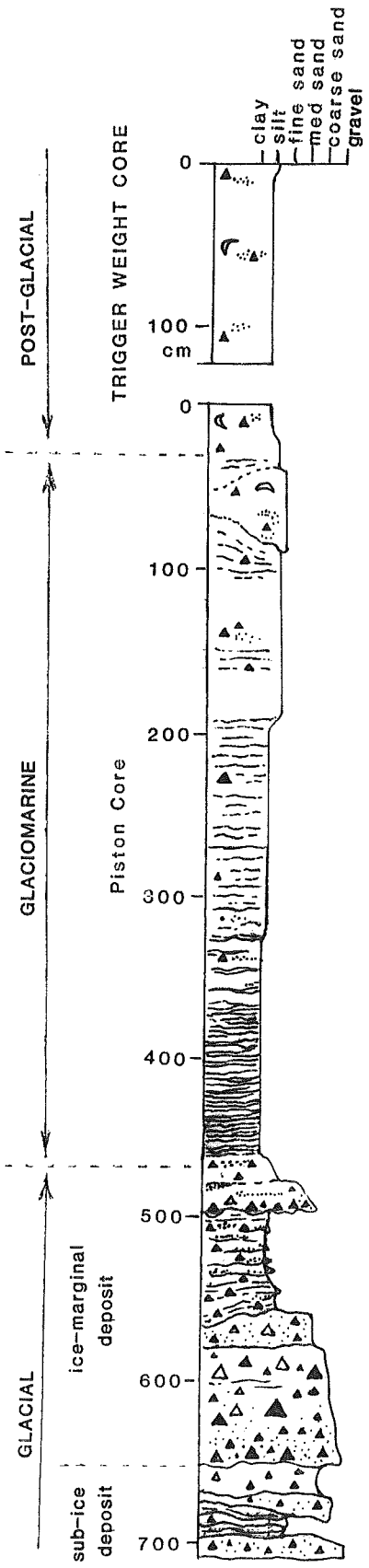
PC	495-538	Laminated olive grey, light olive grey, dark grey to red brown silty and sandy clay. Rhythmites thin toward top of unit. Sand content of unit increases towards the base. Below 507cm, the rhythmites consist of fining upward sequences.	5Y 5/2 2.5Y 5/2	Fld	Decrease in bulk density, and velocity. Increase in water content similar to overlying red brown laminated unit.
		--- gradational ---			
	538-564	Stratified olive and dark grey silty mud. Beds up to 5cm thick, many pebbles. Beds dip at base of unit.	2.5Y 5/2	Dmg(r) or Fmd	
		--- sharp, dipping ---			
	564-653	Light brownish grey diamicton, massive, stratified from 585-619cm, contains clay clasts.	2.5Y 6/2	Dmm Dms Dmm	sharp change in physical properties to base of core; increase in bulk density, decrease in water content.
		--- sharp ---			
	653-669	Dark grey silty diamicton	5Y 4/1	Dmm	
		- sharp undulates -			
	669-676	Light brownish grey silty diamicton	2.5Y 6/2	Dmm	
		- sharp, dipping -			
	676-679	Red brown silty mud, laminated, few pebbles.	5YR 4/4	Fld or Dms(s)	
	679-687	Light brownish grey silty diamicton, pebbles, vague stratification.	2.5Y 6/2	Dmm or Dms	
		--- gradational ---			
	687-693	Reddish brown silty mud, laminated, few pebbles.	5YR 4/4	Fld or Dms(s)	
		- sharp, dipping -			
	693-698	Dark grey silty diamicton	5Y 4/1	Dmm	
		- sharp, undulates -			
	698-710	Dark grey, sandy diamicton, massive	5Y 4/1	Dmm	

X-RADIOGRAPH INTERPRETATION HU 87-028-001



HU 87-028-001

W.D. 273m



	COLOUR	LITHOFACIES CODE
	5Y4/2	Fmd
	5Y4/2	Fmd
		Fld
	2.5Y4/2	Fmd
	2.5Y5/2	Fld
		Fmd
		Fld
		Fld
	5Y4/1 ⋮ ↓ 5YR4/3	Fl
	10YR4/2	Fmd
	5Y5/2	Dms(r)
	5Y5/2	Fld
		Fld/Dms
	2.5Y6/2	Dmm
		Dms
		Dmg
	5Y4/1	Dmm
	2.5Y6/2	Dmm
	5Y4/4	Dmm

Core: HU 87-028-001 Location: 63°01.54'N 81°04.91'W Water Depth: 273m
Evans Strait Core Length:
TWC 131cm
PC 723cm

TEXTURAL ANALYSIS
Analysis Type: C - complete grain size analysis
SSC - sand:silt:clay

Subsample Interval (cm)	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay <0.004mm	Analysis Type
TWC					
8-10	93.90	0.00	59.02	40.98	C
33-36	0.00	0.00	59.47	40.53	SSC
67-70	0.06	0.00	64.37	35.63	SSC
118-120	0.00	0.00	52.91	47.09	C
PC					
1-6	0.00	0.00	60.43	39.57	C
24-27	0.05	3.61	39.98	56.41	SSC
37-39	7.90	15.36	41.87	42.70	C
56-58	0.08	16.22	52.83	30.95	SSC
78-80	0.00	29.01	32.81	38.18	C
100-103	0.00	4.63	55.59	39.78	SSC
143-145	0.00	14.02	62.17	23.81	SSC
158-160	3.50	4.33	60.29	35.38	C
173-175	0.00	3.68	76.69	19.63	C
193-195	0.00	21.38	36.12	42.50	C
208-210	0.00	1.83	58.45	39.72	SSC
231-233	0.00	1.19	65.47	33.34	C
243-245	0.00	1.27	55.53	43.20	SSC
286-289	0.05	1.73	57.91	40.36	SSC
313-315	0.00	1.13	46.13	52.74	SSC
347-349	0.00	0.00	47.87	52.13	C
373-375	0.00	0.00	41.52	58.48	C
393-397	0.00	1.00	68.03	30.97	SSC
418-420	0.00	0.00	46.08	53.92	SSC
454-456	0.00	0.00	46.77	53.23	C
478-480	22.60	14.60	40.61	44.79	C
493-495	8.74	10.62	35.71	53.67	C
509-511	0.00	7.37	29.14	63.49	C
532-534	0.05	5.75	35.64	58.61	SSC
539-541	25.00	24.87	39.51	35.62	C
558-560	34.80	13.42	42.96	43.62	C
588-590	15.03	26.07	40.25	33.69	C
638-640	20.52	31.87	40.20	27.93	SSC
659-661	16.50	26.80	41.86	31.34	C
672-674	19.60	30.88	45.26	23.86	C
690-692	5.80	2.47	59.19	38.34	C
699-701	25.60	25.33	4.71	29.96	C
cutter	7.52	23.70	54.33	21.97	SSC

Core: HU-87-028-001 Location: 63°01.54'N 81°04.91'W Water Depth: 273m
Evans Strait Core Length:
TWC 131cm
PC 723cm

LITHOLOGICAL ANALYSIS (2-5.6mm fraction)
Total Weight - total weight of fraction analysed
Crystalline - Igneous and high-grade metamorphic rocks (Shield)

Subsample Interval (cm)	Total Weight (gms)	% Paleozoic Grey Carbonate	% Red Brown Carbonate	% Crystalline	% Others	Comments
PC						
37-39	3.50	97.1	0.0	2.9	0.0	-
478-480	3.42	83.0	0.3	16.4	0.3	possible Dubawnt sedimentary rock
493-495	1.05	89.0	0.0	11.0	0.0	-
539-541	0.83	94.0	0.0	6.0	0.0	-
558-560	1.39	85.6	0.0	14.4	0.0	-
576-580	10.88	98.2	0.0	1.6	0.2	-
588-590	3.61	97.5	0.0	2.5	0.0	-
615-620	9.54	95.0	0.0	5.0	0.0	Ord. and Sil. lithologies
638-640	5.49	95.4	0.0	4.6	0.0	-
659-661	5.96	91.4	0.0	8.6	0.0	-
672-674	6.02	96.2	0.0	3.8	0.0	-
690-692	0.74	10.8	89.2	0.0	0.0	red carbonate - Kenogami River Fm.
699-701	4.79	93.1	1.5	5.4	0.0	primarily Sil. Attawapiskat Fm
cutter	23.37	92.8	1.1	5.5	0.6	-

Core: HU-87-028-001 Location: 63°01.54'N 81°04.91'W Water Depth: 273m
Evans Strait Core Length:
TWC 131cm
PC 723cm

HEAVY MINERAL ANALYSIS (0.063-0.250mm)

Cpx - clinopyroxene Hem - hematite Hbl - hornblende Rut - rutile
Opx - orthopyroxene Goe - goethite Leu - leucoxene Zir - zircon
Gar - garnet Pyr - pyrite Ilm - ilmenite Unk - others and
Epi - epidote Sid - siderite Tit -titanite unknown
All values represent percentage of total number of grains counted (150 grains).

I. Total Count

Subsample Interval (cm) PC	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk	
37-39	2.7	11.3	39.3	4.0	2.0	3.3	22.0	0.0	2.7	1.3	5.3	1.3	0.0	1.3	3.4	(Monazite)
143-145	4.7	9.3	22.0	16.0	3.3	2.7	6.0	14.7	3.3	0.0	8.0	4.0	0.0	1.3	3.4	(Monazite/Kyanite)
158-160	2.7	6.0	18.0	12.7	4.7	3.3	0.7	12.7	19.3	1.3	4.7	1.3	0.0	1.3	11.3	(contamination)
478-480	1.3	17.3	25.3	6.7	8.7	3.3	16.0	6.7	1.3	0.7	1.3	4.0	0.0	4.0	3.3	
493-495	3.3	23.3	33.3	4.0	4.7	2.7	10.0	2.0	2.7	0.7	8.0	1.3	0.0	0.7	3.3	
558-560	4.7	20.0	32.0	8.7	2.7	0.7	7.3	1.3	4.7	1.3	8.7	5.3	0.0	0.7	2.0	(Staurolite)
576-580	10.7	28.0	9.3	1.3	3.3	3.3	18.0	1.3	5.3	0.7	6.7	4.0	0.0	6.0	2.0	(Staurolite)
588-590	5.3	17.3	16.7	6.0	3.3	5.3	12.0	5.3	2.7	1.3	12.7	4.7	0.0	3.3	3.3	(Staurolite/Spinel)
615-620	2.7	16.7	15.3	1.3	4.7	0.7	24.0	0.0	3.3	1.3	20.7	2.7	0.7	4.0	2.0	
638-640	8.0	23.3	15.3	4.0	4.7	3.3	17.3	0.0	2.7	0.0	12.7	5.3	0.0	2.7	0.7	
659-661	5.3	19.3	38.0	6.0	2.0	0.0	10.0	0.7	4.7	2.0	6.0	3.3	0.0	2.0	0.7	
672-674	6.7	10.7	47.3	4.0	1.3	0.0	10.7	0.7	2.0	0.7	10.7	1.3	0.0	2.7	1.3	
690-692	3.3	5.3	32.7	5.3	8.7	1.3	9.3	2.0	8.7	1.3	11.3	0.7	0.0	1.3	8.0	(contamination)(small sample)
699-701	3.3	10.7	38.7	6.7	1.3	0.7	8.7	0.7	4.0	1.3	14.7	2.7	0.0	4.0	2.7	(Spinel)
cutter	2.7	16.0	36.7	2.7	4.0	1.3	14.0	0.0	2.0	0.7	11.3	2.0	0.0	3.3	3.3	(Staurolite/Spinel)

II. Plotted Values (calculated percentages excluding cpx and hbl)

Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance,
bracketed minerals have values >10% <15%

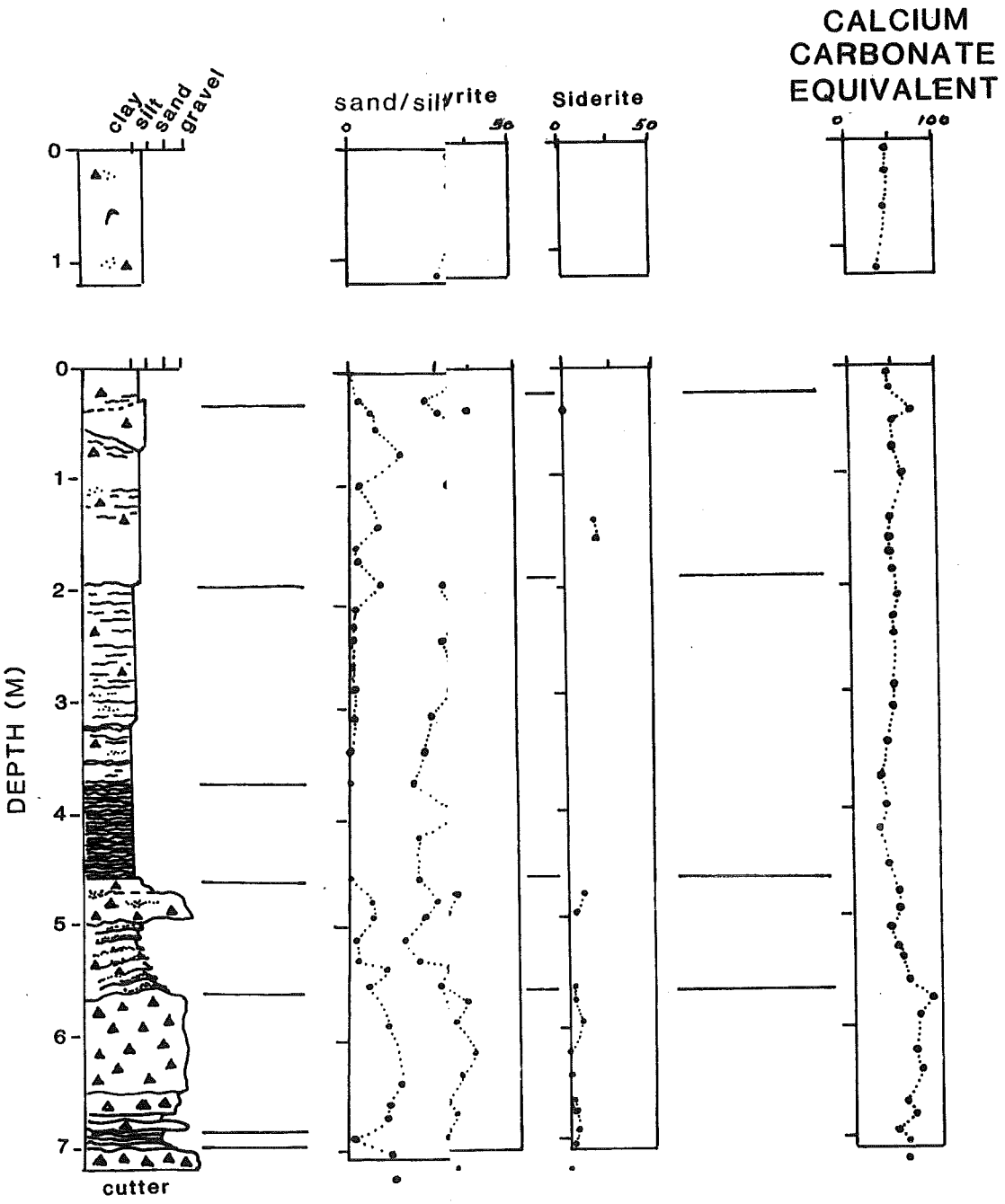
Subsample Interval (cm)	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
37-38	11.9	41.5	4.2	2.1	3.4	23.3	0.0	5.6	1.4	Gar/Pyr(Opx)
143-145	10.1	23.9	17.4	3.6	2.9	6.5	15.9	8.7	4.3	Gar/Epi/Sid(Opx)
158-160	7.7	23.1	16.2	6.0	4.2	0.9	16.2	6.0	1.7	Gar/Epi/Sid
478-480	17.8	25.9	6.9	8.9	3.4	16.0	6.9	1.3	4.1	Gar/Opx/Pyr
493-495	24.8	35.4	4.3	5.0	2.9	10.6	2.1	8.5	1.4	Gar/Opx(Pyr)
558-560	22.1	35.3	9.6	3.0	0.8	8.1	1.4	9.6	5.8	Gar/Opx
576-580	33.3	11.1	1.5	3.9	3.9	21.4	1.5	8.0	4.8	Opx/Pyr(Gar)
588-590	18.8	18.2	6.5	3.6	5.8	13.0	5.8	13.8	5.1	Opx/Gar(Ilm/Pyr)
615-620	17.8	16.2	1.4	5.0	0.7	25.5	0.0	22.0	2.9	Pyr/Ilm/Opx/Gar
638-640	26.1	17.1	4.5	5.2	3.7	19.3	0.0	14.2	5.9	Opx/Pyr/Gar(Ilm)
659-661	21.4	42.2	6.7	2.2	0.0	11.1	0.8	6.7	3.7	Gar/Opx(Pyr)
672-674	11.7	51.8	4.4	1.4	0.0	11.7	0.8	11.7	1.4	Gar(Opx/Pyr/Ilm)
690-692	6.0	37.2	6.0	9.9	1.5	10.6	2.3	12.8	0.8	Gar(Ilm/Pyr)
699-701	11.5	41.7	7.2	1.4	0.8	9.4	0.8	15.9	2.9	Gar/Ilm(Opx)
cutter	16.8	38.5	2.8	4.2	1.4	14.7	0.0	11.9	2.1	Gar/Opx(Pyr/Ilm)

Core: HU-87-028-001 Location: 63°01.54'N 81°04.91'W Water Depth: 273m
Evans Strait Core Length:
TWC 131cm
PC 723cm

LECO CARBONATE DATA (<0.063mm)

Subsample Interval (cm)	Total Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
TWC				
8-10	6.4	0.9	5.5	45.8
33-36	6.2	1.0	5.2	43.3
67-70	6.0	1.0	5.0	41.7
118-120	5.7	1.0	4.7	39.2
PC				
1-6	6.1	0.9	5.2	43.3
24-27	5.6	0.5	5.1	42.5
37-39	8.9	0.2	8.7	72.5
56-58	6.0	0.2	5.8	48.3
78-80	6.0	0.2	5.8	48.3
100-103	6.2	0.2	6.0	50.0
143-145	5.8	0.1	5.7	47.5
158-160	5.7	0.2	5.5	45.8
173-175	5.5	0.1	5.4	45.0
193-195	5.9	0.3	5.6	46.6
208-210	6.3	0.2	6.1	50.8
231-233	6.0	0.2	5.8	48.3
243-245	5.9	0.3	5.6	46.6
286-289	6.1	0.2	5.9	49.1
313-315	6.1	0.4	5.7	47.5
347-349	5.2	0.3	4.9	40.8
373-375	4.4	0.3	4.1	34.2
393-397	4.8	0.1	4.7	39.2
418-420	4.3	0.2	4.1	34.2
454-456	5.2	0.2	5.0	41.7
478-480	6.9	0.2	6.7	55.8
493-495	6.6	0.2	6.4	53.3
509-511	5.9	0.2	5.7	57.5
532-534	6.8	0.2	6.6	55.0
539-541	7.5	0.2	7.3	60.8
558-560	8.2	0.2	8.0	66.6
576-580	10.7	0.1	10.6	88.3
588-590	9.7	0.2	9.5	79.1
615-620	9.4	0.1	9.3	77.5
638-640	9.7	0.1	9.6	80.0
659-661	7.7	0.1	7.6	63.3
672-674	8.9	0.1	8.8	73.3
690-692	6.0	0.0	6.0	50.0
699-701	8.0	0.1	7.9	65.8
cutter	7.8	0.1	7.7	64.1

CORE HU-87-028-001

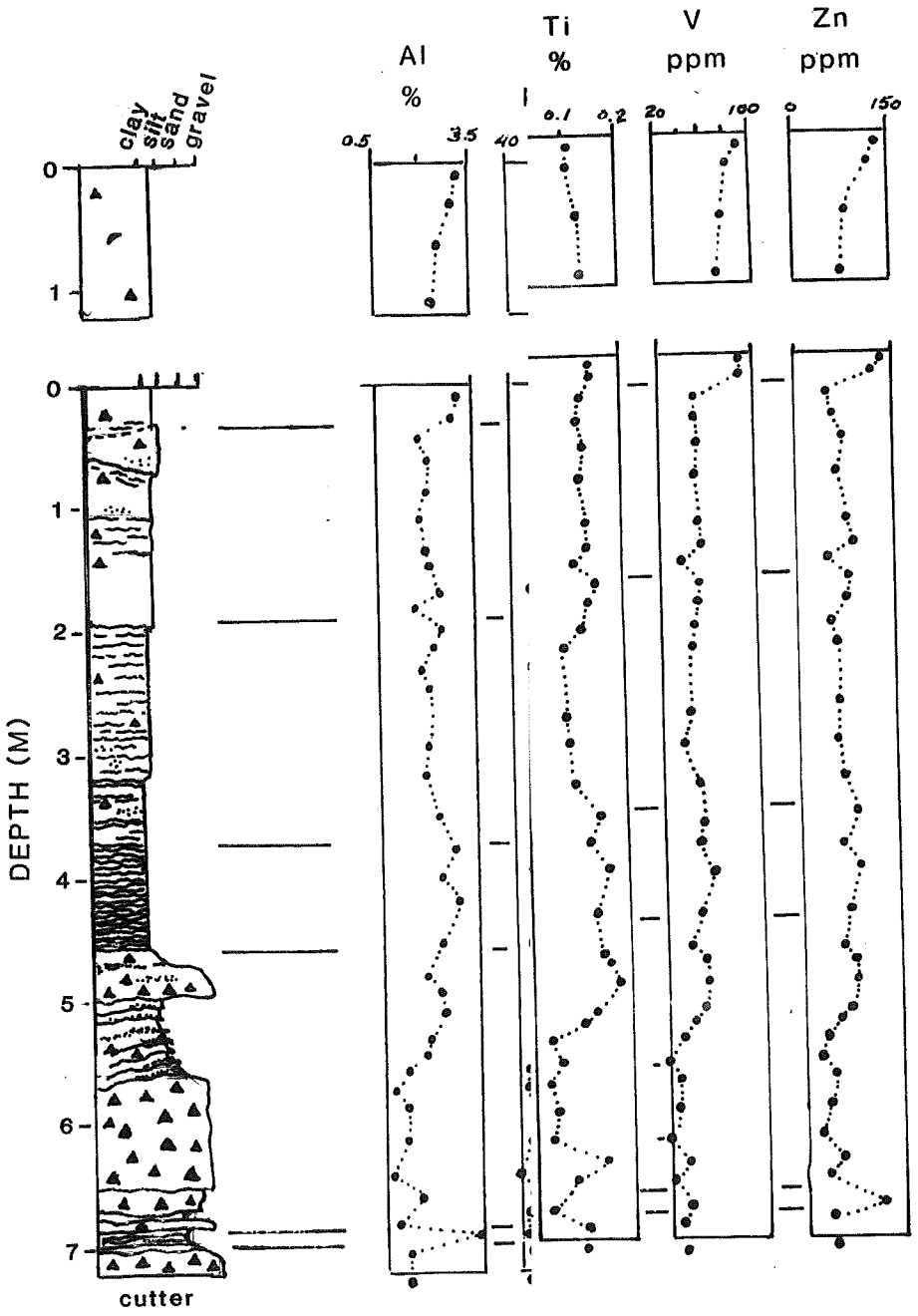


GEOCHEMICAL ANALYSIS (<0.002mm)
Analyses by Chemex Labs Ltd.
ICP-AES # AB825604

Core: Hu-87-028-001

Subsample Interval (cm)	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
TWC																					
8-10	3.12	10	220	2.04	20	100	33	4.46	1.20	2.78	426	1.53	49	9890	10	9	35	0.12	93	<5	134
33-36	2.95	<5	210	2.59	19	99	32	3.94	1.15	2.86	408	1.64	45	>10000	4	9	37	0.11	85	<5	123
67-70	2.60	20	160	3.16	18	86	22	3.38	1.02	2.92	332	2.18	40	>10000	<2	8	34	0.14	76	<5	102
118-120	2.36	30	160	3.72	16	68	22	3.20	0.94	3.04	316	1.58	38	>10000	<2	8	36	0.14	70	<5	96
PC																					
1-6	3.04	5	240	1.93	22	92	45	3.95	1.28	2.46	396	1.32	41	6840	12	10	40	0.14	92	10	139
24-27	3.02	<5	210	5.20	22	82	30	3.78	1.27	2.60	528	1.12	45	6280	2	10	72	0.14	92	20	127
37-39	1.89	<5	100	>15.00	14	48	10	2.25	0.79	2.55	426	0.61	24	4150	10	6	151	0.12	51	10	67
56-58	2.04	25	100	10.50	15	57	13	2.60	0.71	2.98	389	0.60	24	3800	6	7	89	0.11	50	10	71
78-80	2.16	<5	100	10.60	17	63	14	2.76	0.76	2.78	403	0.74	28	5230	8	7	93	0.12	51	10	76
100-103	1.98	<5	90	11.30	16	61	14	2.57	0.70	2.74	380	0.59	26	4010	<2	7	95	0.12	48	5	71
143-145	2.20	<5	100	9.96	16	64	14	2.82	0.76	2.94	393	0.66	27	4610	8	7	88	0.13	53	10	78
158-160	2.48	<5	110	8.43	19	79	18	3.10	0.78	2.50	395	0.78	35	5430	<2	7	94	0.13	56	15	87
173-175	1.77	<5	80	10.75	16	57	12	2.25	0.55	2.73	301	0.71	30	5670	<2	5	100	0.10	37	15	60
193-195	2.45	<5	100	9.99	18	74	18	2.95	0.74	2.49	401	0.56	34	3590	6	7	106	0.14	54	20	81
208-210	2.35	15	90	9.71	18	69	14	2.73	0.70	2.46	363	0.55	33	3430	12	6	100	0.13	51	15	77
231-233	1.94	<5	80	9.57	16	59	12	2.41	0.58	2.35	325	0.57	30	3970	8	5	97	0.11	43	20	64
243-245	2.12	<5	90	10.15	16	60	13	2.48	0.66	2.42	348	1.17	30	9490	<2	6	105	0.08	46	10	68
286-289	2.02	<5	80	9.83	15	62	12	2.45	0.64	2.44	334	1.26	26	>10000	12	6	99	0.08	43	15	68
313-315	2.02	5	80	9.27	16	53	12	2.29	0.59	2.11	312	1.10	27	9200	<2	5	95	0.08	36	20	63
347-349	2.21	<5	90	6.90	17	68	13	2.72	0.73	2.16	353	1.40	30	>10000	<2	6	81	0.09	48	20	75
373-375	2.69	<5	80	5.67	20	71	21	3.40	0.89	2.82	428	0.62	43	3570	<2	8	77	0.14	56	15	86
395-397	2.33	5	70	6.74	17	67	18	3.03	0.82	3.49	380	0.62	39	4200	8	6	73	0.12	47	5	75
418-420	2.90	10	80	5.01	21	85	26	3.82	0.97	2.91	438	0.67	46	4000	8	8	70	0.15	61	10	94
454-456	2.36	20	80	6.78	18	73	16	3.03	0.78	2.74	380	0.53	35	3330	16	6	78	0.13	49	10	77
478-480	2.03	5	100	10.15	18	67	14	2.68	0.72	2.38	370	0.46	28	2670	18	6	98	0.14	45	10	72
493-495	2.22	<5	120	10.05	18	79	13	3.00	0.85	2.43	411	0.54	33	3120	6	7	98	0.15	50	10	82
502	1.66	<5	90	7.40	14	57	8	2.34	0.61	2.82	301	0.99	25	8830	<2	5	63	0.07	37	5	66
509-511	2.34	<5	120	8.47	18	84	12	3.24	0.90	2.44	418	0.54	39	3320	4	7	88	0.17	54	10	86
532	1.68	<5	80	5.26	18	60	8	2.46	0.60	3.60	310	1.46	24	>10000	16	4	46	0.12	38	<5	58
532-534	2.04	10	100	12.85	15	67	10	2.78	0.77	2.55	402	0.48	31	2950	4	6	112	0.13	48	15	76
539-541	1.90	15	100	14.65	14	63	11	2.38	0.68	2.63	351	0.50	31	3300	<2	6	119	0.11	42	20	68
550	2.43	<5	90	8.72	14	62	13	2.18	0.54	2.30	255	1.07	30	9260	<2	6	84	0.07	37	10	68
558-560	1.38	<5	60	>15.00	10	45	7	1.63	0.52	2.84	247	1.85	22	>10000	6	4	116	0.04	30	15	46
576-580	0.74	<5	50	>15.00	7	27	4	0.98	0.31	2.35	232	0.31	14	2710	2	2	147	0.06	17	10	29
588-590	1.32	<5	70	>15.00	10	47	8	1.61	0.58	3.01	259	2.16	22	>10000	4	4	120	0.04	29	15	49
615-620	1.28	5	60	>15.00	11	42	7	1.57	0.53	2.84	270	1.52	21	>10000	8	4	142	0.05	27	10	45
638-640	0.69	<5	40	>15.00	7	31	5	0.99	0.28	2.89	184	0.66	15	6440	8	2	121	0.05	17	15	28
659-661	1.66	5	80	12.95	14	65	10	2.22	0.60	2.82	320	0.44	29	3040	8	5	102	0.14	36	20	63
672-674	1.01	5	50	>15.00	10	39	5	1.36	0.36	3.09	237	0.46	18	4090	<2	3	124	0.08	24	10	40
690-692	3.58	45	50	1.39	22	60	10	3.41	1.40	4.77	374	1.67	49	>10000	16	6	23	0.04	37	<5	125
699-701	1.37	5	60	15.00	12	50	7	1.70	0.49	3.02	264	0.51	17	4000	<2	4	102	0.10	32	5	50
CUTTER	1.42	<5	70	>15.00	11	51	16	1.78	0.51	2.72	311	0.37	23	2520	<2	4	127	0.10	32	5	53

CORE HU-87-028-001



MINERALOGY: CLAY-SIZE FRACTION (<0.002mm)

(No attempt has been made to determine relative abundance of minerals, except in the case of calcite and dolomite where peak heights are given based on 1000 cps. The relative abundance of these minerals is assumed to be proportional to peak height)

Core HU-87-028-001

Sample Interval	Chlorite	Illite	Kaolinite	Montmorillonite	Quartz	Feldspar Na & K		Calcite	Dolomite	Amphibole
TWC										
8-10	v	v				v			40	
118-120	v	v			v	v	v	70	390	tr
PC										
1-6	v	v				v				
56-58	v	v			v	v	v	200	330	tr
78-80	v	v			v	v		230	180	
143-145	v	v	v		v	v	v	190	210	tr
158-160	v	v			v	v	v	170	100	tr
173-175	v	v			v	v		240	160	tr
193-195	v	v	v		v	v		180	110	
208-210	v	v				v		150	80	
231-233	v	v			v	v		250	130	
243-245	v	v	v		v	v	v	290	140	
286-289	v	v	v			v		280	130	
313-315	v	v	v			v		270	110	
347-349	v	v			v	v	v	180	140	
373-375	v	v			v	v	v	100	250	tr
395-397	v	v			v	v	v	110	310	
418-420	v	v			v	v	v	90	310	
454-456	v	v			v	v	v	130	160	
478-480	v	v			v	v	v	280	110	tr
493-495	v	v				v		290	110	tr
502	v	v			v	v	v	150	150	tr
509-511	v	v				v		220	100	tr
532	v	v			v	v	v	50	210	tr
532-534	v	v			v	v		320	80	tr
539-541	v	v			v	v		340	110	
550	v	v	v			v		130	80	
558-560	v	v			v	v		380	180	
588-590	v	v				v		370	180	
659-661	v	v			v	v	v	270	300	
672-674	v	v				v		450	250	
690-692	v	v		v (major)					160	
699-701	v	v			v	v	v	310	230	
cutter	v	v				v		380	110	

RESULTS

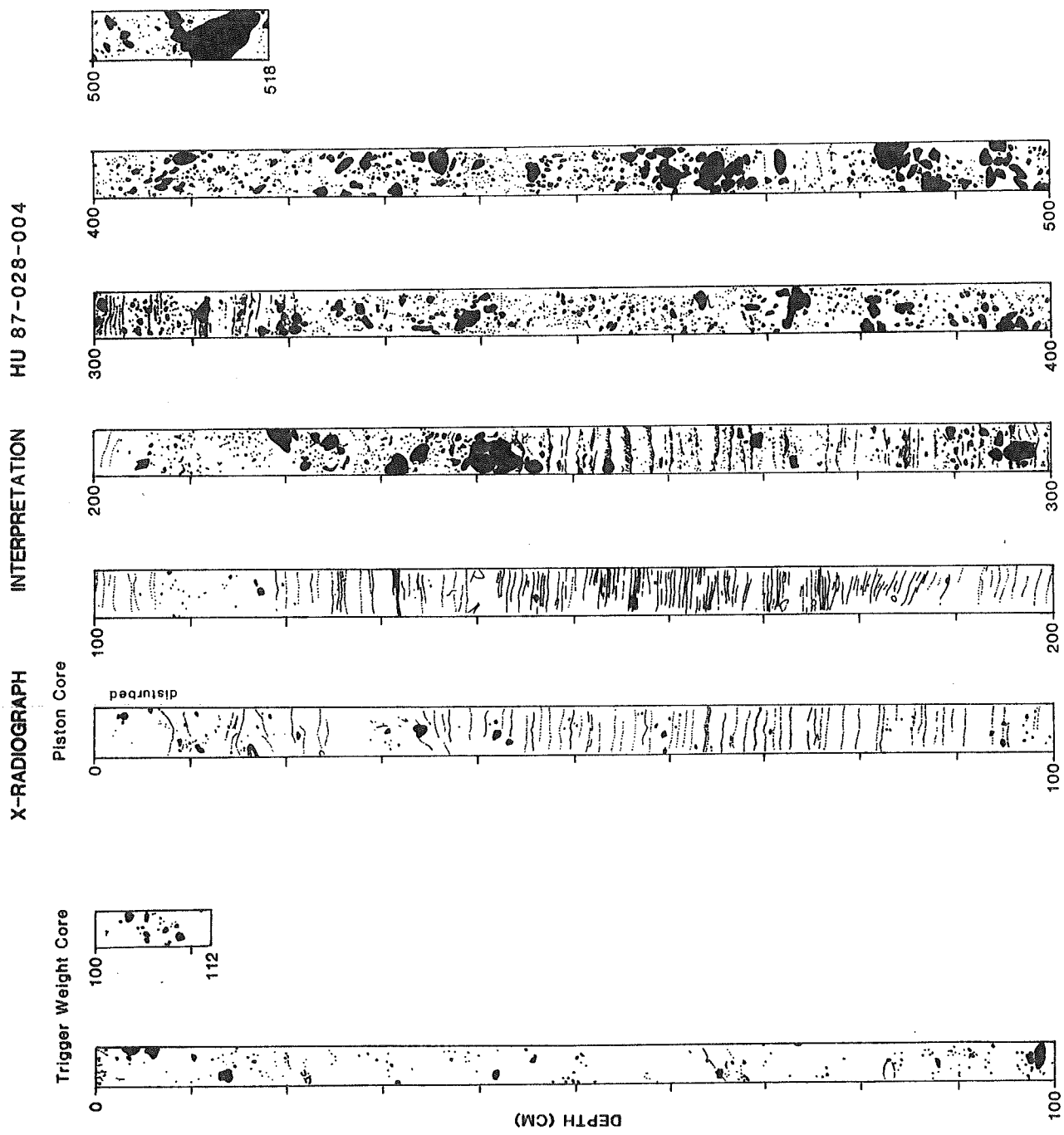
CORE HU-87-028-004

CORE DESCRIPTION

CORE	INTERVAL (cm)	SEDIMENT TYPE	COLOUR	LITHOFACIES CODE	PHYSICAL PROPERTIES
HU-87-028-004					
TWC	0-112	Olive grey silty clay (mud), few small scattered,angular pebbles, mottled, few shell fragments.	5Y 4/2	Fmd	Low bulk density, high water content compared to rest of core.
PC	1-16	Olive grey silty clay (mud), few pebbles, mottled.	5Y 4/2	Fmd	
		- sharp, undulating contact -			
	16-36	Grey mud to silty mud, massive to faintly laminated, very few pebbles	5Y 4/1	Fld to Fmd	
		--- gradational ---			
	36-90	Grey clay to silty clay, faintly laminated, very few pebbles.	5Y 4/1	Fld	
		--- gradational ---			
	90-118	Interlaminated grey clay and silty clay, and brown clay.	5Y 4/1	Fld	
		Gradational change down unit to brown silty clay, faintly laminated, more massive at base, few pebbles.	10YR 5/2		
		--- gradational ---			
	118-140	Dark reddish mud, massive to faintly laminated, lacks pebbles.	5YR 4/1	Fl	
		--- gradational ---			
	140-205	Reddish brown silty mud, thin lenses and irreglar lamination of light red/ yellow clay.	5YR 4/3	Fl	
		--- gradational ---			
	205-228	Dark greyish brown silty mud, massive, pebbles.	2.5Y 4/2	Fmd	
		- sharp undulating contact -			
	228-242	Olive grey diamicton, faintly stratified, graded, patches and stringers of light grey clay.	5Y 5/2	Dmg	
		--- sharp ---			
	242-288	Olive grey clay to silty clay, rhythmically bedded, beds approx. 1.5cm thick and composed of fining upward sequences.	5Y 4/2	Fld	
		Grades downward to greyish brown rhythmic bedding defined by colour contrast with reddish brown silty clay (textural change not defined)	2.5Y 5/2	Fld	
		--- gradational ---			
	288-318	Olive grey silty and sandy clay, many pebbles, stratified, dark grey clay interbeds, deformation at base.	5Y 5/2	Fld/ Dms	From this unit down, marked increase in sand and pebble content, gradual downward
		Gradational colour change down unit to grey brown silty clay or silty	2.5Y 5/2	Fld/ Dms	increase in bulk density and velocity to base of core,

HU-87-020-004 (cont'd)

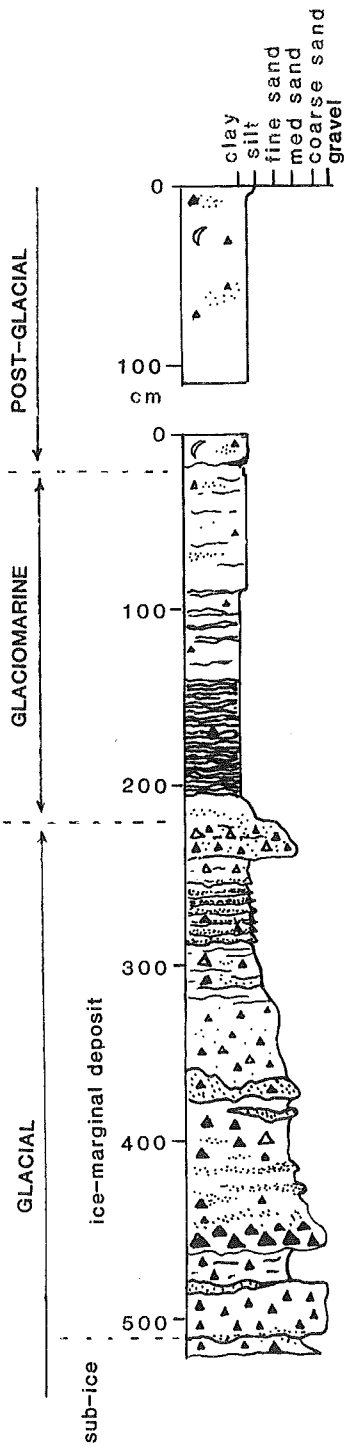
	diamicton, stratified with light grey silty clay.			corresponding decrease in water content.
	--- contact diffuse ---			
318-460	Grey diamicton, crudely stratified, irregular bed of greyish brown silty sand at 370cm Sand lenses present at base of unit.	5Y 5/1	Dms(c) Dmg	
	--- gradational ---			
460-475	Grey brown diamicton, faint stratification, contains light grey clay clasts near base of unit, coarsening upward.	2.5Y 5/2	Dms	
	--- gradational ---			
475-512	Grey brown sandy diamicton, massive, striations and "glacial" polish on pebbles.	2.5Y 5/2	Dmm	
	--- sharp contact ---			
512-518	Dark grey sandy diamicton	5Y 4/1	Dmm	


X-RADIOGRAPH INTERPRETATION HU 87-028-004
Piston Core
disturbed
Trigger Weight Core
DEPTH (CM)
0
100
200
300
400
500
518
112

CORE SUMMARY

HU 87-028-004

W.D. 271m



	COLOUR	LITHOFACIES CODE
	5Y4/2	Fmd
	5Y4/2	Fmd
	5Y4/1	Fld, Fmd
	5Y4/1	Fld
	10YR5/3	Fld
	5YR4/3	Fl
	2.5Y4/2	Fmd
	5Y5/2	Dmg
	5Y4/2	Fld
	2.5Y4/2	
	5Y5/2	Dms
	5Y4/2	
		Dms, Dmg
	2.5Y4/2	Dms
	5Y5/2	Dmm
	5Y5/1	Dmm

Core: HU-87-028-004 Location: 63°00.51'N 81°04.91'W Water Depth: 271m
Evans Strait Core Length:
TWC 112cm
PC 557cm

TEXTURAL ANALYSIS

Subsample Interval (cm)	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay <0.004mm	Analysis Type
TWC					
10-12	6.37	0.00	60.47	39.53	C
38-41	0.00	0.00	66.20	33.80	SSC
70-73	2.44	0.07	61.99	37.97	SSC
98-100	0.00	4.39	55.96	39.65	SSC
107-110	15.4	0.00	54.09	45.91	C
PC					
7-9	81.70	0.00	57.04	42.96	C
26-28	2.12	8.60	68.91	22.49	C
70-72	4.46	1.81	48.65	49.54	SSC
113-115	0.00	3.78	66.24	29.98	SSC
136-140	13.0	0.00	33.66	66.34	C
160-170	0.00	0.00	49.70	50.30	C
200-202	0.00	0.00	59.94	40.06	C
210-212	4.00	7.10	48.11	44.79	C
230-240	32.80	19.44	40.89	39.68	C
245-247	25.90	6.66	29.08	64.26	C
256-258	1.46	6.10	29.73	64.17	SSC
278-280	4.88	4.29	31.33	64.38	SSC
302-304	27.30	18.69	39.78	41.53	C
323-325	21.34	27.86	42.31	29.83	C
370-373	29.20	24.44	46.33	29.23	C
380-382	16.18	21.33	46.74	31.93	C
430-432	12.50	21.06	47.48	31.46	C
480-483	24.54	31.70	37.24	31.06	SSC
495-497	55.33	45.71	30.68	23.61	C
512-514	19.30	34.96	40.38	24.96	C
cutter	4.88	38.41	37.72	23.87	SSC

Core: HU-87-028-004 Location: 63°00.51'N 81°04.91'W Water Depth: 271m
Evans Strait Core Length:
TWC 112cm
PC 557cm

LITHOLOGICAL ANALYSIS (2-5.6mm fraction)
Total Weight - total weight of fraction analysed

Subsample Interval (cm) PC	Total Weight (gms)	% Paleozoic Grey Carbonate	% Red Brown Carbonate	% Crystalline	% Others	Comments
230-240	5.80	84.7	0.0	14.8	0.4	rounded frosted qtz
245-247	1.57	79.6	0.0	20.4	0.0	-
302-304	1.61	82.7	0.0	17.4	0.0	-
323-325	4.46	87.9	0.0	12.3	0.0	-
355-357	2.82	91.5	0.0	8.5	0.0	-
370-373	3.58	92.2	0.0	7.5	0.0	-
380-382	3.80	87.9	0.0	12.1	0.0	-
403-405	3.06	86.9	0.0	12.7	0.0	-
430-432	2.96	96.3	0.0	3.7	0.0	-
468-470	4.89	86.7	0.0	13.2	0.0	carbonate largely Sil., chert
480-483	5.93	98.3	0.0	0.8	0.8	quartz sandstone
495-497	8.77	97.7	0.0	2.3	0.0	Ord. and Sil. lithologies
512-514	1.92	88.0	0.0	6.8	5.2	qtz ss, few Ord. mainly Sil. CO_3s
cutter	18.03	95.1	0.6(?)	3.8	0.4	dk. grey shale

Core: HU-87-028-004 Location: 63°00.51'N 81°04.91'W Water Depth: 271m
Evans Strait Core Length:
TWC 112cm
PC 557cm

HEAVY MINERAL ANALYSIS (0.063-0.250mm)

I. Total Count

Subsample Interval (cm)	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk	
PC																
26-28	3.3	16.0	20.7	12.0	5.3	2.0	4.0	17.3	6.0	0.7	4.7	2.7	0.0	0.7	4.7	(Spinel)
230-240	3.3	18.0	26.0	4.0	4.7	6.0	5.3	6.0	3.3	0.7	13.3	6.0	0.0	1.3	2.0	(Spinel)
245-247	2.7	20.0	34.0	6.0	4.7	0.0	6.7	2.7	5.3	2.0	7.3	2.7	0.0	2.0	4.0	(Spinel)
302-304	4.0	14.0	32.0	4.0	1.3	0.0	12.7	2.0	5.3	2.7	10.0	2.7	0.0	4.0	5.3	(Spinel/Staurolite)
323-325	4.0	16.0	41.3	4.7	1.3	0.7	9.3	1.3	7.3	0.7	6.7	3.3	0.0	2.7	0.7	
355-357	2.0	15.3	40.0	6.0	2.0	0.0	9.3	2.0	4.0	2.0	9.3	2.0	0.0	2.7	3.4	(Staurolite)
370-373	2.7	18.0	34.7	4.0	2.7	0.7	8.7	1.3	9.3	0.7	10.0	2.7	0.0	2.7	2.0	(Kyanite)
380-382	1.3	14.7	36.0	5.3	4.7	0.0	13.3	2.7	5.3	0.7	6.7	3.3	0.0	2.7	2.7	
403-405	4.7	15.3	33.3	6.0	3.3	0.0	14.0	1.3	4.0	0.0	7.3	3.3	0.0	3.3	4.0	(Spinel)
430-432	4.0	6.0	40.0	8.7	2.7	0.7	12.7	1.3	2.7	1.3	14.0	1.3	0.0	2.0	2.7	(Spinel/Staurolite)
468-470	2.0	8.7	36.0	6.0	5.3	1.3	11.3	1.3	10.0	0.7	6.7	3.3	0.0	4.0	3.4	(Spinel)
480-483	3.3	13.3	36.7	6.0	0.0	0.7	10.0	1.3	7.3	2.7	10.7	2.0	0.0	2.7	3.3	(Staurolite)
495-497	5.3	18.7	34.0	5.3	2.0	1.3	5.3	1.3	10.0	0.7	6.0	3.3	0.0	3.3	3.3	(Spinel/Staurolite)
512-514	4.7	12.0	22.0	5.3	5.3	1.3	10.0	6.0	2.7	3.3	19.3	1.3	0.0	3.3	3.4	(Spinel/Staurolite)
cutter	4.7	6.7	27.3	4.0	4.7	0.0	13.3	10.0	1.3	0.0	18.0	1.3	0.7	4.7	3.4	(Spinel/Staurolite)

II. Plotted Values (calculated percentages excluding cpx and hbl)
Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance,
bracketed minerals have values >10% <15%

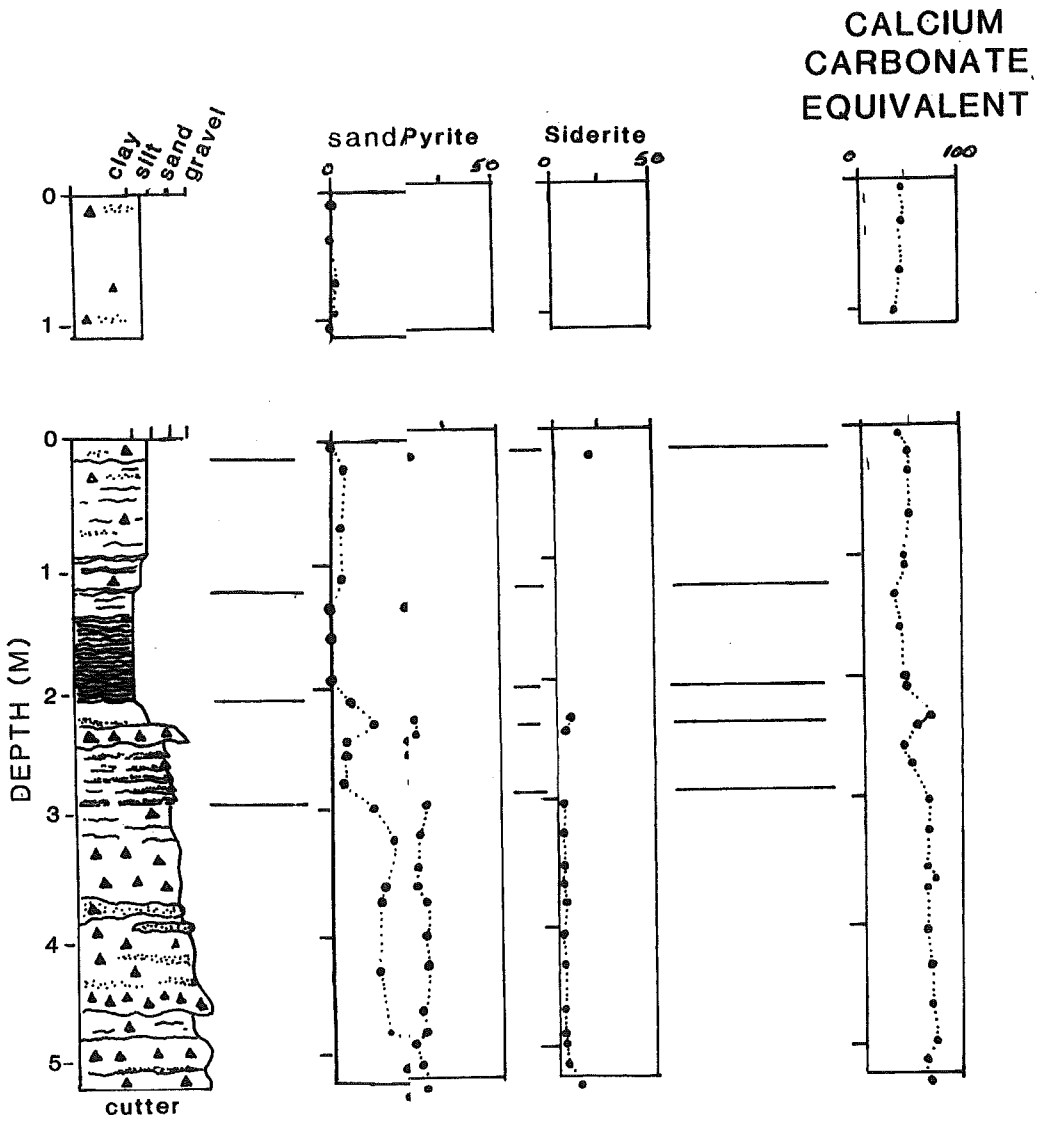
Subsample Interval (cm)	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
26-28	17.6	22.8	13.2	5.8	2.2	4.4	19.0	5.2	3.0	Gar/Sid/Opx(Epi)
230-240	19.3	27.8	4.3	5.0	6.4	5.7	6.4	14.2	6.4	Gar/Opx(Ilm)
245-247	21.7	36.9	6.5	5.1	0.0	7.3	2.9	7.9	2.9	Gar/Opx
302-304	15.4	35.3	4.4	1.4	0.0	14.0	2.2	11.0	3.0	Gar/Opx(Pyr/Ilm)
323-325	18.0	46.6	5.3	1.5	0.8	10.5	1.5	7.6	3.7	Gar/Opx(Pyr)
355-357	16.3	42.6	6.4	2.1	0.0	9.9	2.1	9.9	2.1	Gar/Opx(Ilm/Pyr)
370-373	20.5	39.4	4.5	3.1	0.8	9.9	1.5	11.4	3.1	Gar/Opx(Ilm/Pyr)
380-382	15.7	38.5	5.7	5.0	0.0	14.2	2.9	7.2	3.5	Gar/Opx(Pyr)
403-405	16.8	36.5	6.6	3.6	0.0	15.3	1.4	8.0	3.6	Gar/Opx/Pyr
430-432	6.4	42.8	9.3	2.9	0.8	13.6	1.4	15.0	1.4	Gar/Ilm(Pyr)
468-470	9.4	38.8	6.5	5.7	1.4	12.2	1.4	7.2	3.6	Gar(Pyr)
480-482	14.9	41.1	6.7	0.0	0.8	11.2	1.5	12.0	2.2	Gar/Opx(Ilm/Pyr)
495-497	22.0	40.1	6.3	2.4	1.5	6.3	1.5	7.1	3.9	Gar/Opx
512-514	12.9	23.8	5.7	5.7	1.4	10.8	6.5	20.8	1.4	Gar/Ilm(Opx/Pyr)
cutter	7.1	29.0	4.3	5.0	0.0	14.1	10.6	19.1	1.4	Gar/Ilm(Pyr/Sid)

Core: HU-87-028-004 Location: 63°00.51'N 81°04.91'W Water Depth: 271m
Evans Strait Core Length:
TWC 112cm
PC 557cm

LECO CARBONATE DATA (<0.063mm)

Subsample Interval (cm)	Total Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
TWC				
10-12	6.2	0.9	5.3	44.1
38-41	6.1	0.9	5.2	43.3
70-73	5.9	0.9	5.0	41.7
98-100	5.8	0.8	5.0	41.7
107-110	5.6	0.9	4.7	39.2
PC				
7-9	5.6	0.9	4.7	39.2
26-28	5.7	0.1	5.6	46.6
43-45	6.0	0.2	5.8	48.3
70-72	6.1	0.3	5.8	48.3
102-104	5.4	0.3	5.1	42.5
113-115	5.2	0.1	5.1	42.5
136-140	4.4	0.2	4.2	35.0
160-170	4.8	0.1	4.7	39.2
200-202	5.2	0.1	5.1	42.5
210-212	5.8	0.4	5.4	45.0
230-240	8.1	0.2	8.1	67.5
245-247	6.8	0.2	6.6	55.0
256-258	5.6	0.2	5.4	45.0
278-280	6.0	0.2	5.8	48.3
302-304	7.8	0.2	7.6	63.3
323-325	8.0	0.1	7.9	65.8
355-357	7.9	0.2	7.7	64.1
370-373	9.5	0.1	9.4	78.3
380-382	8.0	0.2	7.8	65.0
403-405	8.0	0.2	7.8	65.0
430-432	8.3	0.2	8.1	67.5
468-470	8.6	0.1	8.5	70.8
495-497	8.8	0.1	8.7	72.5
512-514	7.7	0.2	7.5	62.5
cutter	8.0	0.2	7.8	65.0

CORE HU-87-028-004

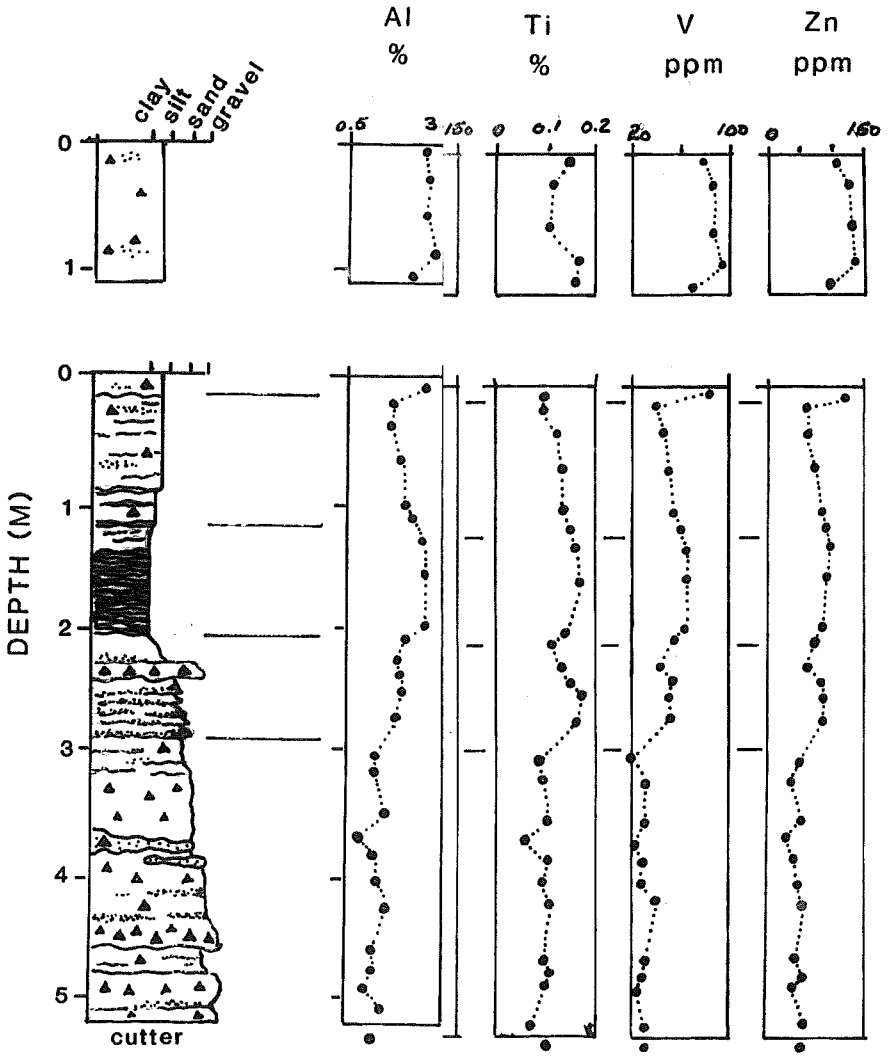


GEOCHEMICAL ANALYSIS (<0.002mm)

Core: Hu-87-028-004

Subsample Interval (cm)	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
TWC																					
10-12	2.79	<5	160	2.42	18	95	27	3.79	1.14	2.68	360	2.65	40	>10000	2	9	33	0.14	81	<5	115
38-41	2.87	10	210	1.98	19	96	31	3.82	1.17	2.59	377	1.83	45	>10000	<2	9	32	0.12	87	<5	127
70-73	2.80	30	200	1.91	18	93	31	3.81	1.16	2.60	391	1.79	47	>10000	<2	9	31	0.10	86	<5	128
98-100	3.12	5	280	2.13	21	98	35	4.20	1.23	2.65	500	1.07	52	4670	4	10	40	0.16	94	<5	134
107-110	2.38	10	140	2.82	18	60	20	3.30	0.96	2.76	358	2.36	36	>10000	<2	8	32	0.16	70	10	98
PC																					
7-9	2.97	20	260	1.78	23	94	31	3.68	1.19	2.41	432	1.58	47	9910	4	9	42	0.11	88	5	125
26-28	1.81	20	80	10.50	15	59	13	2.33	0.56	2.55	333	0.43	30	2670	18	5	99	0.11	40	10	61
43-45	1.93	20	80	10.15	15	62	13	2.45	0.60	2.37	356	0.48	28	2890	2	5	101	0.12	46	5	65
70-72	2.12	15	90	9.23	17	66	15	2.67	0.66	2.28	371	0.44	35	2570	<2	6	98	0.13	50	5	72
102-104	2.35	5	90	7.96	17	71	15	2.94	0.75	2.32	386	0.54	36	3180	10	6	91	0.13	54	5	81
113-115	2.50	20	90	6.90	18	66	17	3.22	0.80	2.49	402	0.57	42	3120	<2	7	85	0.14	61	10	85
136-140	2.85	40	90	3.90	19	78	20	3.80	0.97	2.61	442	0.71	53	4310	8	8	65	0.15	65	5	97
160-170	2.89	20	80	4.76	20	79	26	3.81	0.99	2.48	454	0.55	47	2740	10	8	71	0.16	66	10	91
200-202	2.73	40	80	5.13	17	74	18	3.44	0.93	2.57	414	0.79	48	5270	4	8	68	0.13	61	5	84
210-212	2.25	25	100	8.24	17	66	15	2.68	0.72	2.34	400	0.74	36	5060	<2	6	97	0.10	51	15	74
230-240	1.89	20	100	13.65	14	59	11	2.35	0.74	2.38	363	0.41	30	2380	<2	6	112	0.12	44	15	66
245-247	2.16	20	120	10.05	16	70	8	2.82	0.89	2.53	395	0.48	38	2890	<2	6	93	0.14	53	10	81
256-258	2.15	20	110	8.92	17	70	12	2.95	0.85	2.35	417	0.45	38	2590	<2	7	90	0.17	54	5	80
267	1.83	20	90	5.14	13	60	12	2.25	0.57	2.34	272	2.10	29	>10000	<2	5	52	0.07	40	10	65
278-280	2.07	25	110	9.95	16	66	12	2.94	0.84	2.35	426	0.50	34	2980	2	6	97	0.15	53	15	81
296	1.58	25	80	8.35	13	49	12	1.91	0.44	2.66	243	1.19	31	>10000	4	5	69	0.06	34	10	59
302-304	1.38	<5	70	14.85	13	46	7	1.92	0.53	2.74	284	0.69	23	5950	<2	4	106	0.08	36	20	56
323-325	1.31	<5	80	14.15	11	46	7	1.68	0.48	2.86	262	0.66	21	5700	<2	4	102	0.08	32	10	48
355-357	1.61	10	80	>15.00	12	49	9	1.84	0.52	2.74	289	0.54	16	4080	4	5	114	0.09	36	5	51
370-373	0.95	10	50	>15.00	9	31	4	1.12	0.33	3.48	178	0.72	14	7950	<2	2	99	0.05	22	10	33
380-382	1.41	<5	70	>15.00	12	40	7	1.64	0.46	2.83	257	0.38	18	2890	<2	4	103	0.09	30	10	46
403-405	1.36	<5	70	14.80	11	38	7	1.63	0.45	2.77	247	0.70	17	6340	<2	4	100	0.08	30	10	45
430-432	1.64	25	80	>15.00	13	49	8	1.89	0.52	2.76	282	0.57	25	4420	<2	5	112	0.09	36	20	53
468-470	1.24	15	60	>15.00	11	43	8	1.63	0.45	2.74	261	0.48	18	3860	6	4	113	0.08	30	10	47
480-483	1.28	10	60	>15.00	11	44	8	1.77	0.48	2.35	290	0.33	17	2120	12	4	109	0.09	31	10	52
495-497	1.17	10	70	>15.00	11	44	7	1.59	0.45	3.15	241	0.46	18	3580	12	3	101	0.08	28	5	48
512-514	1.45	5	100	14.25	13	50	9	1.83	0.48	3.01	260	1.33	18	>10000	<2	4	103	0.06	33	10	53
CUTTER	1.28	10	90	>15.00	12	47	31	1.70	0.41	2.71	275	0.33	12	2440	8	4	118	0.09	31	10	52

CORE HU-87-028-004



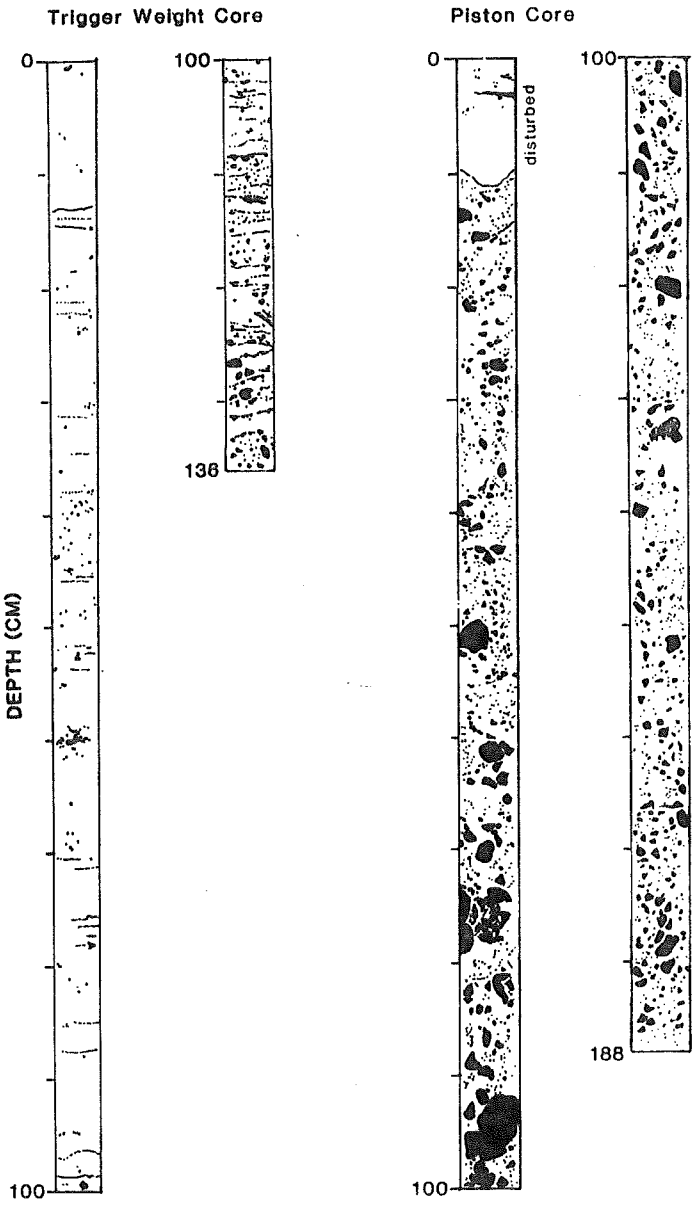
RESULTS

CORE HU-87-028-015

CORE DESCRIPTION

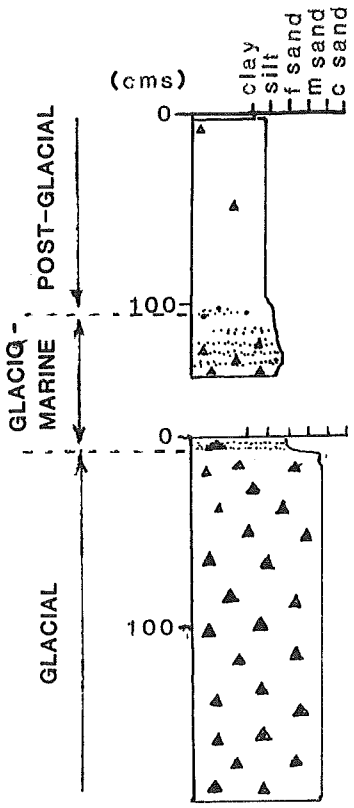
CORE	INTERVAL (cm)	SEDIMENT TYPE	COLOUR	LITHOFACIES CODE	PHYSICAL PROPERTIES
HU-87-028-015					
TWC	0-2	Dark grey brown soupy mud	2.5Y 3/2	Fm	
	2-97	Dark grey silty clay, massive to very faintly laminated, few small pebbles.	5Y 4/1	Fmd	High water content and low bulk density and velocity of surface unit changes gradually downcore.
		Gradational colour change down-core to dark grey brown	2.5Y 4/2		
		--- gradational ---			
	97-120	Dark grey brown silty and sandy clay, laminated, small pebbles present.	2.5Y 4/2	Fld	
		--- gradational ---			
	120-132	Dark grey brown silty clay with pebbles or silty diamicton (?), laminated, laminations of grey and red-brown silty and sandy sediment range from a few mm to 0.5cm	2.5Y 4/2	Fld	
		--- sharp contact --			
	132-136	Dark grey brown silty diamicton, massive	2.5Y 4/2	Dmm	
HU-87-028-015					
PC	0-3	Dark grey brown silty clay (or silty diamicton), laminated, with lamination defined by brown and grey/brown colour variations. Large limestone clast present at 10cm, therefore upper part of core may be disturbed.	2.5Y 4/2	Fld	
		--- sharp contact ---			
	3-188	Dark grey sandy diamicton, massive, some variation in grain-size throughout unit.	10YR 4/1	Dmm	Low water content and increased bulk density and velocity in unit is comparable to diamictons in other cores

X-RADIOGRAPH INTERPRETATION HU 87-028-015



CORE SUMMARY

HU 87-028-015



COLOUR	LITHOFACIES CODE
5Y 4/1	Fmd
2.5Y 4/2	Fld
2.5Y 4/2	Dms
2.5Y 4/2	Fld
10YR 4/1	Dmm

Core: HU-87-028-015 Location: 61°35.47'N 86°19.26'W Water Depth: 214m
Hudson Bay Core Length:
TWC 147cm
PC 182cm

TEXTURAL ANALYSIS

Subsample Interval (cm)	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay <0.004mm	Analysis Type
TWC					
3-6	18.50	0.00	46.50	53.50	C
50-53	3.03	0.00	44.67	55.33	SSC
78-81	0.00	2.87	38.03	59.10	SSC
98-101	4.81	15.21	37.14	47.65	SSC
109-111	1.94	7.02	34.79	58.19	SSC
113-115	12.24	7.23	33.39	59.32	C
127-130	2.07	20.90	47.22	31.88	SSC
133-136	55.10	35.77	40.35	23.87	C
PC					
10-12	12.95	35.94	38.47	25.59	C
20-35	12.21	35.70	39.59	24.71	SSC
70-72	6.06	37.13	38.85	24.02	C
97-99	6.45	39.60	37.91	22.49	SSC
115-117	15.09	37.20	38.55	24.25	SSC
140-142	5.70	37.73	38.59	23.68	SSC
160-162	5.38	39.16	38.38	22.46	SSC
184-186	16.46	36.47	39.09	24.44	C

LITHOLOGICAL ANALYSIS (2-5.6mm fraction)
Total Weight - total weight of fraction analysed

Subsample Interval (cm)	Total Weight (gms)	% Paleozoic Grey Carbonate	% Pink/red Carbonate	% Crystalline	% Dubawnt	% Others	Comments
TWC							
127-130	1.23	65.4	7.9	26.8	0.0	0.0	-
133-136	3.46	93.9	0.0	6.1	0.0	0.0	-
PC							
10-12	6.37	77.2	0.0	19.9	0.6	2.2	minor Sil., mainly Dev. CO_3
20-35	12.24	82.4	0.1	16.3	0.5	0.9	one greywacke pebble
70-72	5.78	73.4	0.7	22.8	0.9	2.2	minor Dev., definite Sil.
97-99	5.06	75.5	2.8	20.8	0.0	1.0	-
115-117	5.26	74.3	0.0	18.1	0.8	6.9	-
140-142	5.20	84.8	0.4	13.8	0.4	0.6	-
160-162	3.25	90.0	0.0	28.7	0.0	1.0	quartz sandstone
184-186	3.75	84.0	0.8	13.6	0.5	1.1	lower part of Dev. section red CO_3 Williams Is. Fm. (?)

Core: HU-87-028-015 Location: 61°35.47'N 86°19.26'W Water Depth: 214m
Hudson Bay Core Length:
TWC 147cm
PC 182cm

HEAVY MINERAL ANALYSIS (0.063-0.250mm)
I. Total Count

Subsample Interval (cm)	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk	
TWC																
133-136	5.3	9.3	9.3	12.0	6.7	0.7	24.7	3.3	6.0	2.0	10.7	4.0	0.0	0.7	5.4	(Spinel/Staurolite /Kyanite)
PC																
10-12	5.3	4.0	19.3	14.0	5.3	0.0	28.7	2.0	0.7	1.3	10.0	4.0	0.0	2.0	3.4	(Spinel/Kyanite)
20-35	2.0	4.0	14.7	10.7	11.3	0.0	26.0	1.3	2.7	2.0	17.3	2.0	0.0	2.7	3.3	
70-72	1.3	9.3	19.3	6.7	4.7	0.7	35.3	0.7	1.3	0.7	14.0	3.3	0.7	0.0	2.0	(Staurolite)
97-99	1.3	6.7	14.7	8.0	0.7	0.0	38.7	0.7	4.7	4.0	12.0	2.0	1.3	2.0	3.4	(Staurolite)
115-117	2.7	9.3	19.3	13.3	6.0	0.7	20.7	6.0	0.7	1.3	10.7	3.3	0.0	2.7	3.4	(Staurolite)
184-186	3.3	12.7	12.0	14.7	5.3	0.7	20.0	2.7	2.7	2.0	8.7	6.7	0.0	4.7	4.1	(Spinel/Staurolite)

II. Plotted Values (calculated percentages excluding cpx and hbl)
Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance,
bracketed minerals have values >10% <15%

Subsample Interval (cm)	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
TWC										
133-136	10.5	10.5	13.5	7.6	0.8	27.8	3.7	12.1	4.5	Pyr(Epi/Ilm/Gar/Opx)
PC										
10-12	4.3	20.5	14.9	5.6	0.0	30.5	2.1	10.6	4.3	Pyr/Gar/Epi(Ilm)
20-35	4.2	15.4	11.2	11.9	0.0	27.3	1.4	18.2	2.1	Pyr/Ilm/Gar(Epi/Hem)
70-72	9.5	19.8	6.9	4.8	0.7	36.2	0.7	14.4	3.4	Pyr/Gar(Ilm)
97-99	7.1	15.6	8.5	0.7	0.0	41.2	0.7	12.8	2.1	Pyr/Gar(Ilm)
115-117	9.6	20.0	13.8	6.2	0.7	21.4	6.2	11.1	3.4	Pyr/Gar(Epi/Ilm)
184-186	13.5	12.8	15.6	5.6	0.7	21.3	2.9	9.3	7.1	Pyr/Epi(Opx/Gar)

Core: HU-87-028-015 Location: 61°35.47'N 86°19.26'W Water Depth: 214m
Hudson Bay Core Length:
TWC 147cm
PC 182cm

LECO CARBONATE DATA (<0.063mm)

Subsample Interval (cm)	otal Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
TWC				
3-6	3.4	0.7	2.7	22.5
50-53	3.6	0.5	3.1	25.8
98-101	4.6	0.2	4.4	36.7
109-111	4.9	0.3	4.6	38.3
113-115	4.8	0.3	4.5	37.5
127-130	5.4	0.1	5.3	44.1
133-136	6.0	0.3	5.7	47.5
PC				
10-12	6.6	0.2	6.4	53.3
20-35	6.3	0.3	6.0	50.0
70-72	6.1	0.3	5.8	48.3
97-99	6.1	0.3	5.8	48.3
115-117	6.1	0.3	5.8	48.3
140-142	6.2	0.3	5.9	49.1
160-162	6.0	0.3	5.7	47.5
184-186	6.1	0.3	5.8	48.3

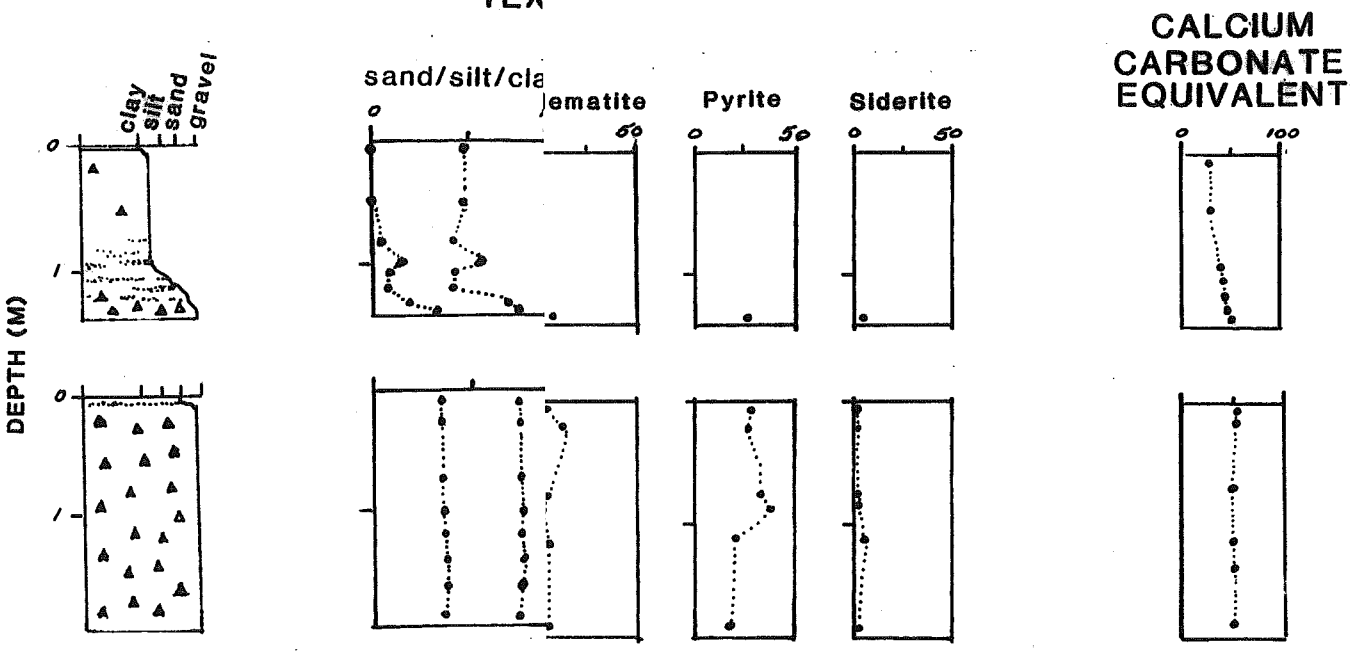
GEOCHEMICAL ANALYSIS (<0.002mm)

Core: Hu-87-028-015

Subsample Interval (cm)	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
TWC																					
3-6	3.19	15	290	1.19	29	99	22	4.89	1.36	2.52	689	1.58	57	>10000	10	10	36	0.20	115	<5	156
50-53	3.43	5	260	1.45	28	99	23	5.16	1.42	2.75	613	1.31	59	8690	14	11	43	0.23	105	<5	156
78-81	3.12	10	220	2.87	25	88	18	4.63	1.16	2.62	642	0.83	48	4410	10	10	55	0.20	78	<5	125
98-101	3.11	10	180	4.29	22	109	18	4.16	1.16	2.62	655	1.05	66	7440	8	9	67	0.16	77	<5	114
109-111	2.93	10	140	5.57	20	81	12	3.88	1.08	2.82	569	0.81	47	5310	2	9	70	0.15	72	<5	104
113-115	2.37	<5	100	3.64	16	71	14	3.12	0.90	2.69	504	2.49	41	>10000	4	7	48	0.06	59	<5	85
127-130	2.57	10	120	5.81	18	75	19	3.52	0.93	2.92	483	0.82	46	6030	6	8	68	0.12	63	<5	91
133-136	1.75	15	130	10.40	15	50	13	2.36	0.59	2.92	381	0.71	36	6040	<2	5	87	0.08	41	<5	61
PC																					
10-12	1.47	10	110	11.35	14	42	11	2.07	0.49	2.68	322	0.40	23	2940	16	4	102	0.08	33	10	55
20-35	1.70	15	130	11.50	15	53	14	2.38	0.56	2.49	364	0.36	29	2410	2	5	114	0.10	38	5	63
70-72	1.77	15	130	10.55	16	52	14	2.41	0.56	2.52	352	0.48	31	3500	10	5	108	0.10	38	10	65
97-99	2.06	30	150	10.35	17	62	16	2.73	0.63	2.34	395	0.55	38	4060	14	5	116	0.11	44	5	75
115-117	1.85	30	130	10.70	17	53	13	2.34	0.58	2.50	350	0.45	35	3250	8	5	109	0.09	38	10	62
140-142	1.75	<5	120	9.90	14	52	13	2.28	0.55	2.30	342	0.53	28	4080	<2	5	102	0.08	37	5	62
160-162	1.80	30	140	9.53	17	56	16	2.45	0.54	2.20	354	0.48	30	3400	<2	5	105	0.10	40	20	68
184-186	1.77	20	120	10.40	15	55	12	2.32	0.57	2.51	344	0.69	27	6690	10	5	105	0.08	38	15	63

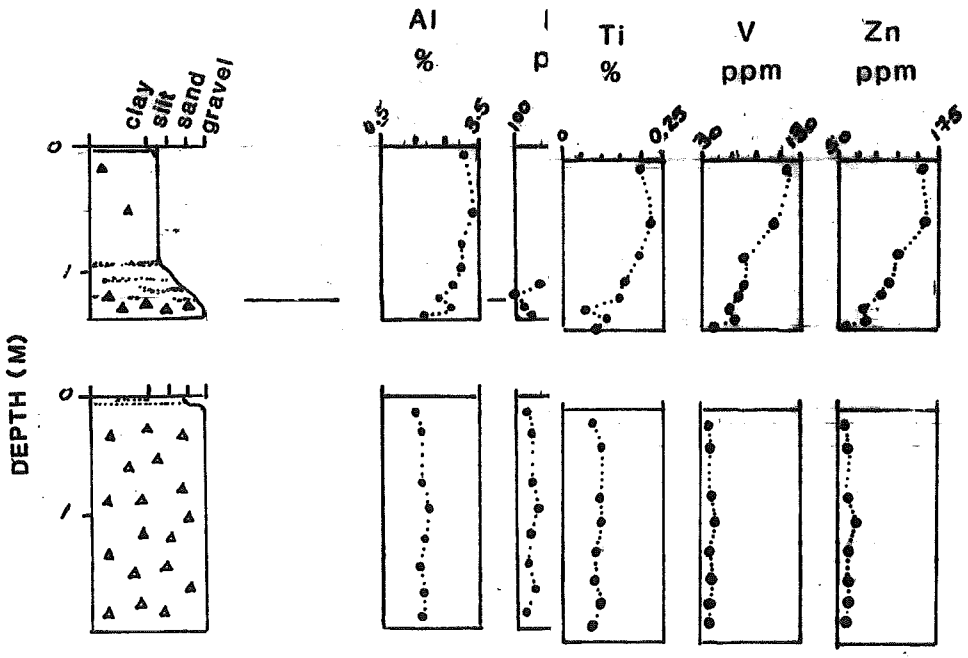
CORE HU-87-028-015

TEX



CORE HU-87-028-015

GEOCHEM



MINERALOGY: CLAY-SIZE FRACTION (<0.002mm)

(No attempt has been made to determine relative abundance of minerals, except in the case of calcite and dolomite where peak heights are given based on 1000 cps. The relative abundance of these minerals is assumed to be proportional to peak height)

Core HU-87-028-015

Sample Interval	Chlorite	Illite	Kaolinite	Montmorillonite	Quartz	Feldspar Na & K		Calcite	Dolomite	Amphibole
TWC										
3-6	v	v	v		v	v				
109-111	v	v			v	v	v	120	140	tr
PC										
10-12	v	v			v	v	v	370	360	
97-99	v	v			v	v	v	290	270	
115-117	v	v			v	v	v	270	240	

RESULTS

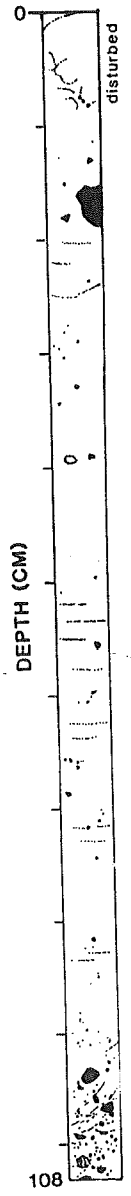
CORE HU-87-028-029

CORE DESCRIPTION

CORE	INTERVAL (cm)	SEDIMENT TYPE	COLOUR	LITHOFACIES CODE	PHYSICAL PROPERTIES
HU-87-028-029					
GC	0-1	Dark brown soupy mud, disturbed	10YR 3/3	F	
	1-98	Dark grey silty clay, few pebbles and shells present, very diffuse and faint lamination.	5Y 4/1	Fmd/ Fld	Water content high in upper part of core.
		22-24cm dark grey clay interbed	10YR 4/2		Sharp increase in bulk density and decrease in water content below
		--- gradational ---			
	98-102	Sandy diamicton, grey brown	10YR 4/2	Dmm	55m

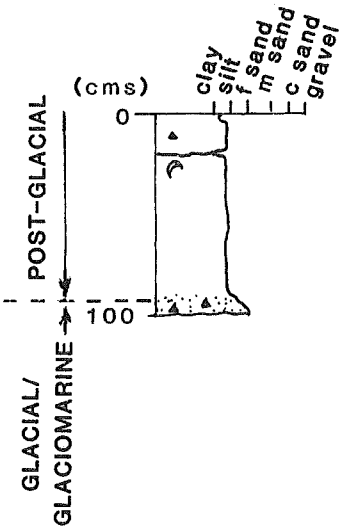
X-RADIOGRAPH INTERPRETATION
HU 87-028-029

Gravity Core



CORE SUMMARY

HU 87-028-029



COLOUR	LITHOFACIES CODE
5Y 4/1	Fmd
10YR 4/2	
10YR 4/2	Dmm

Core: HU-87-028-029 Location: 60°39.40'N 88°11.20'W Water Depth: 180m
Hudson Bay Core Length:
GC 108cm

TEXTURAL ANALYSIS

Subsample Interval (cm)	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay Analysis <0.004mm	Type
6-9	0.00	0.00	46.89	53.11	C
38-41	0.00	0.00	39.66	60.34	SSC
68-71	0.00	0.07	37.60	62.33	SSC
92-95	0.00	3.97	41.97	54.06	C
98-103	23.81	20.48	39.58	39.47	C

LITHOLOGICAL ANALYSIS (2-5.6mm fraction)
Total Weight - total weight of fraction analysed

Subsample Interval (cm)	Total Weight (gm)	% Paleozoic Grey Carbonate	% Pink/red Carbonate	% Crystalline	% Others	Comments
98-103	1.33	68.4	2.3	27.1	3.8	yellow brown carbonate

HEAVY MINERAL ANALYSIS (0.063-0.250mm)
I. Total Count

Subsample Interval (cm)	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk
98-103	5.3	6.7	19.3	13.3	8.0	2.7	1.3	12.0	8.0	2.7	14.7	2.7	0.0	0.7	2.7 (Kyanite/cont.)

II. Plotted Values (calculated percentages excluding cpx and hbl)
Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance, bracketed minerals have values >10% <15%

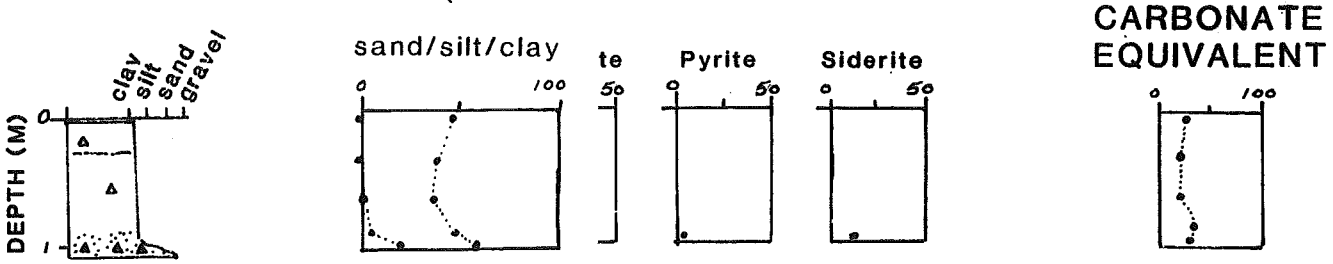
Subsample Interval (cm)	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
98-103	7.7	22.3	15.3	9.2	3.1	1.5	13.8	17.0	3.1	Gar/Ilm/Epi(Sid)

LECO CARBONATE DATA (<0.063mm)

Subsample Interval (cm)	Total Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
6-9	3.9	0.8	3.1	25.8
38-41	3.1	0.7	2.4	20.0
68-71	3.0	0.5	2.5	20.8
92-95	4.8	0.3	4.5	37.5
98-103	3.9	0.3	3.6	30.0

CORE HU-87- 028-029

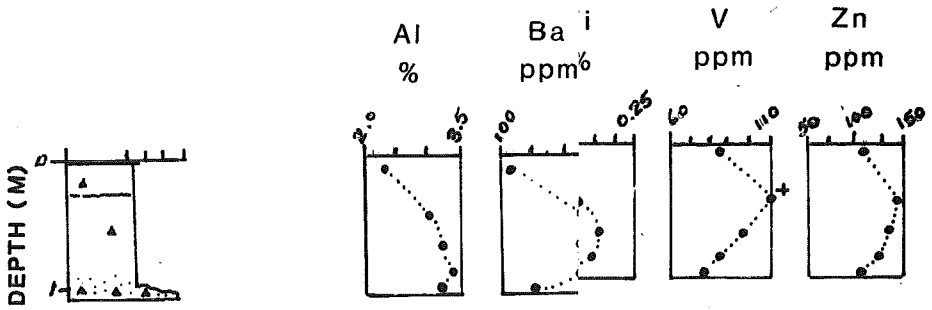
TEXTU



CALCIUM CARBONATE EQUIVALENT

CORE HU-87- 028-029

GEOCHEMIS



GEOCHEMICAL ANALYSIS (<0.002mm)

Core: Hu-87-028-029

Subsample Interval (cm)	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
GC																					
6-9	2.38	10	120	1.32	18	78	14	3.52	1.12	2.10	418	3.96	48	>10000	<2	8	26	0.08	84	<5	110
38-41	3.13	<5	230	1.29	36	96	18	4.75	1.48	2.58	988	1.36	64	8170	2	10	34	0.12	114	<5	146
68-71	3.29	15	230	1.47	31	94	19	4.64	1.49	2.64	714	1.01	57	5550	<2	10	38	0.18	98	<5	137
92-95	3.46	5	230	3.36	24	89	15	4.63	1.32	2.72	974	0.96	51	6130	6	9	64	0.15	84	<5	122
98-103	3.23	<5	160	3.20	20	88	22	3.73	1.12	2.62	777	1.46	45	>10000	10	9	62	0.08	77	<5	107

MINERALOGY: CLAY-SIZE FRACTION (<0.002mm)

(No attempt has been made to determine relative abundance of minerals, except in the case of calcite and dolomite where peak heights are given based on 1000 cps. The relative abundance of these minerals is assumed to be proportional to peak height)

Core HU-87-028-029

Sample Interval	Chlorite	Illite	Kaolinite	Montmorillonite	Quartz	Feldspar Na & K		Calcite	Dolomite	Amphibole
6-9	v	v			v	v			40	tr
92-95	v	v			v	v	v	50	70	

RESULTS

CORE HU-87-028-035

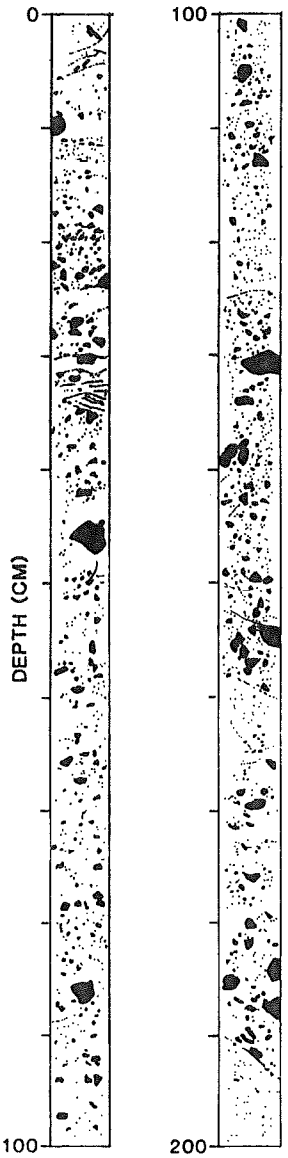
CORE DESCRIPTION

CORE	INTERVAL (cm)	SEDIMENT TYPE	COLOUR	LITHOFACIES CODE	PHYSICAL PROPERTIES
HU-87-028-035					
GC	0-2	Dark yellow brown soupy mud, disturbed	10YR 3/6	F	
	2-13	Dark brown silty clay, massive, few pebbles.	10YR 4/3	Fmd	Surface unit bulk density, and velocity low; water content high.
		--- gradational ---			
	13-22	Dark yellow brown slightly silty clay with sandy laminations and lenses, irregular patches of brick red material.	10YR 4/4	Fld or Dms	
		--- sharp contact ---			
	22-32	Dark brown silty clay with lamination of grey fine-grained sediment, many clay clasts.	10YR 4/3	Fl	
		--- sharp contact ---			
	32-57	Dark grey brown silty diamicton, sandy interbeds, many pebbles and clay clasts, faintly stratified.	10YR 4/2	Dms	
		--- gradational contact ---			
	57-154	Dark grey brown silty diamicton, massive, many small pebbles, few interbeds of poorly sorted sand.	10YR 4/4	Dmm	
		Gradational colour change to dark brown through unit.	10YR 3/3		
		--- sharp contact ---			
	154-161	Clay pebble conglomerate, beds contain subrounded brown or grey clay clasts approx. 1 cm diameter in dark grey silty clay matrix. Unit inclined.	10YR 4/1		
		--- sharp contact ---			
	161-168	Sand, muddy, disturbed, high water content.	5Y 4/2	S	
		--- sharp contact ---			
	168-202	Dark brown silty diamicton, many pebbles, patches of brick red material (clasts?)	10YR 3/3	Dmm	Bulk density and velocity increase downcore, water content decreases. Trends reflect variations in texture.

X-RADIOGRAPH INTERPRETATIC N

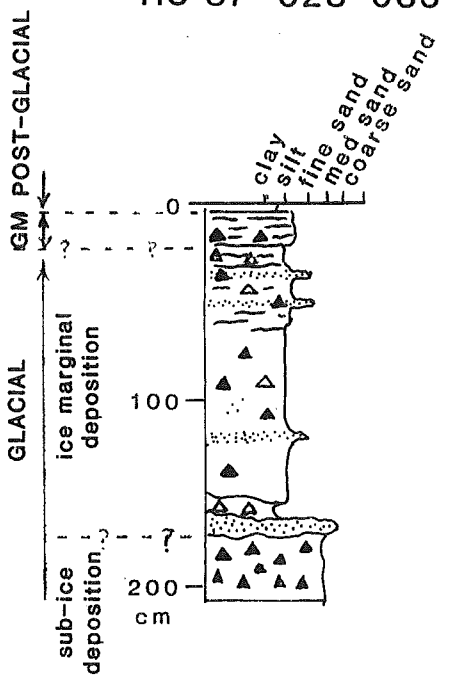
HU 87-028-035

Gravity Core



CORE SUMMARY

HU 87-028-035



COLOUR	LITHOFACIES CODE
10YR 4/3	Fld
10Yr 4/4	
10YR 4/2	Dms(c)
10YR 4/4	Dmm
↕	
10YR 3/3	Dmm
10YR 4/1	
5Y 4/2	S
10YR 3/3	Dmm

Core: HU-87-028-035 Location: Hudson Bay 60°21.47'N 86°01.96'W Water Depth: 183m
Core Length:
GC 202cm

TEXTURAL ANALYSIS

Subsample Interval (cm)	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay <0.004mm	Analysis Type
3-6	49.13	6.89	41.93	51.18	C
15-17	0.00	5.40	46.74	47.86	C
16-22	40.76	19.07	40.86	40.07	C
30-32	20.34	20.14	39.39	40.46	C
46-48	0.52	14.40	35.80	49.80	SSC
50-58	3.50	8.52	46.05	45.43	C
68-70	19.23	22.36	45.62	32.01	C
90-92	2.69	28.25	43.37	28.38	SSC
103-105	1.21	21.46	47.37	31.17	C
135-137	1.20	25.79	44.02	30.19	SSC
153-155	6.75	24.42	44.41	31.17	C
168-170	1.16	59.71	28.07	12.22	C
188-190	8.81	26.09	44.91	29.00	C

LITHOLOGICAL ANALYSIS (2-5.6mm fraction)
Total Weight - total weight of fraction analysed

Subsample Interval (cm)	Total Weight (gms)	% Paleozoic Grey Carbonate	% Pink/red Carbonate	% Crystalline	% Dubawnt	% Greywacke Argillite	% Others	Comments
16-25	5.80	76.4	8.6	11.9	0.3	1.9	0.9	-
30-32	1.80	66.7	10.0	16.7	0.6	6.1	0.0	-
46-48	0.75	90.7	5.3	2.7	1.3	0.0	0.0	Dubawnt rded qtz
50-58	0.75	61.3	14.7	21.3	0.0	2.7	0.0	-
68-70	1.83	78.1	9.8	3.8	0.0	1.1	7.1	dk f.-grd, PreC (?)
90-92	1.40	82.1	2.1	10.7	0.0	5.0	0.0	-
103-105	0.81	82.7	3.7	13.6	0.0	0.0	0.0	-
135-137	1.14	74.6	19.3	5.3	0.0	0.9	0.0	red Williams Is. Fm
153-155	1.07	71.0	6.5	22.4	0.0	0.0	0.0	red/pink Williams Is

Core: HU-87-028-035 Location: Hudson Bay 60°21.47'N 86°01.96'W Water Depth: 183m
Core Length:
GC 202cm

HEAVY MINERAL ANALYSIS (0.063-0.250mm)
I. Total Count

Subsample Interval (cm)	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk	
16-25	6.0	13.3	19.3	12.0	10.0	6.0	0.7	2.0	1.3	2.7	13.3	5.3	1.3	2.0	4.7	(Kyanite)
30-32	1.3	10.7	25.3	12.0	6.0	4.7	0.0	2.7	6.0	2.7	16.7	4.7	0.0	2.7	4.7	(contamination)
50-58	6.7	10.7	23.3	12.7	3.3	3.3	4.0	12.7	1.3	1.3	12.7	2.7	0.0	2.7	2.7	
68-70	8.7	9.3	16.0	14.7	1.3	2.7	8.7	10.7	4.7	6.0	5.3	6.0	1.3	2.7	2.1	(Spinel/Kyanite)
103-105	6.0	13.3	18.0	6.0	3.3	5.3	3.3	12.7	4.0	4.7	15.3	2.7	0.0	2.0	3.4	(Staurolite/ Monazite)
153-155	2.0	6.0	20.0	10.0	20.0	4.0	10.7	5.3	1.3	2.7	10.7	2.7	0.7	2.0	2.0	
168-170	6.0	12.7	21.3	12.0	5.3	0.0	10.7	8.7	2.7	2.7	9.3	3.3	0.0	2.0	3.4	(Stauolite/Kyanite)
188-190	4.0	15.3	18.7	12.7	6.7	4.0	6.0	8.7	2.0	4.0	9.3	5.3	0.0	1.3	2.0	(Staurolite)

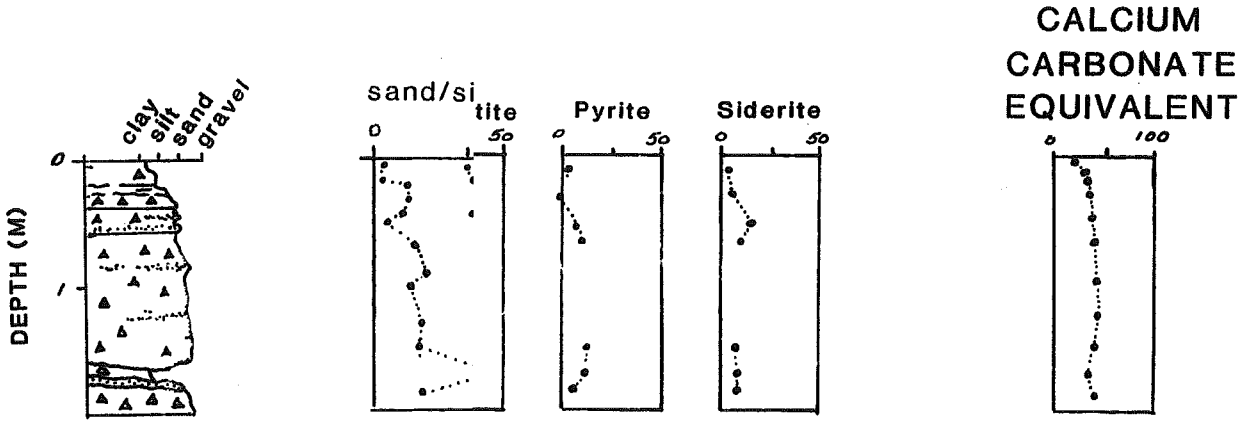
II. Plotted Values (calculated percentages excluding cpx and hbl)
Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance, bracketed minerals have values >10% <15%

Subsample Interval (cm)	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
16-25	14.3	20.8	12.9	10.8	6.5	0.8	2.2	14.3	5.7	Gar(Opx/Ilm/Epi/Hem)
30-32	11.5	27.3	12.9	6.5	5.1	0.0	2.9	18.0	5.0	Gar/Ilm(Epi/Opx)
50-58	11.6	25.3	13.8	3.6	3.6	4.3	13.8	13.8	2.9	Gar(Epi/Sid/Ilm/Opx)
68-70	10.7	18.5	17.0	1.5	3.1	10.0	12.4	6.1	6.9	Gar/Epi(Sid/Opx/Pyr)
153-155	6.2	20.7	10.3	20.7	4.1	11.1	5.5	11.0	2.8	Gar/Hem(Pyr/Ilm/Epi)
168-170	13.9	23.3	13.1	5.8	0.0	11.7	9.5	10.2	3.6	Gar(Opx/Epi/Pyr/Ilm)
188-190	16.3	19.9	13.5	7.1	4.3	6.3	9.2	9.9	5.6	Gar/Opx(Epi/Ilm)

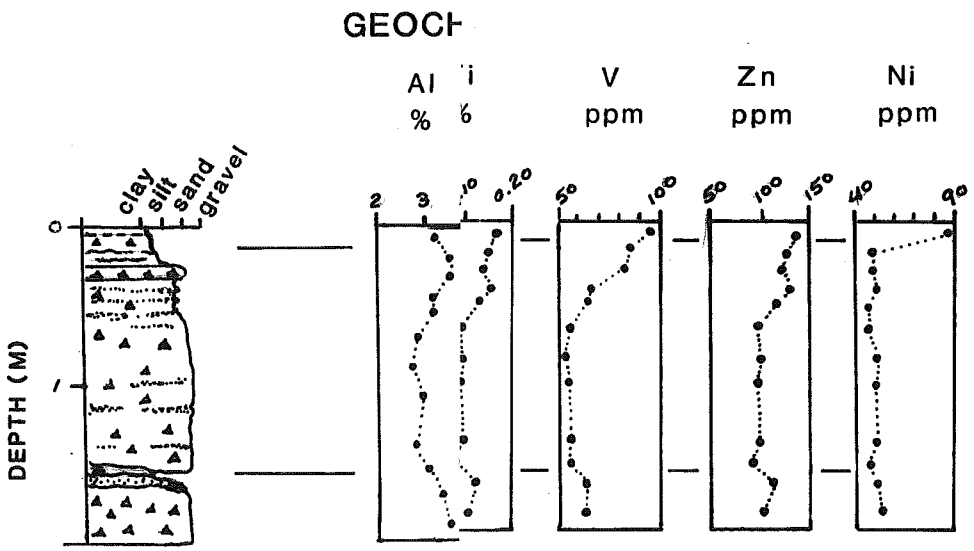
LECO CARBONATE DATA (<0.063mm)

Subsample Interval (cm)	Total Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
3-6	3.0	0.4	2.6	21.7
15-17	4.1	0.2	3.9	32.5
16-25	4.5	0.2	4.3	35.8
30-32	4.6	0.2	4.4	36.7
46-48	4.5	0.2	4.3	35.8
50-58	4.9	0.2	4.8	40.0
68-70	5.0	0.2	4.8	40.0
90-92	4.9	0.1	4.8	40.0
103-105	5.1	0.1	5.0	41.7
135-137	5.0	0.1	4.9	40.8
153-155	5.0	0.2	4.8	40.0
168-170	4.4	0.1	4.3	35.8
188-190	5.0	0.1	4.9	40.8

CORE HU-87-028-035



CORE HU-87-028-035



GEOCHEMICAL ANALYSIS (<0.002mm)

Core: Hu-87-028-035

Subsample Interval (cm)	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
GC																					
3-6	3.27	<5	760	1.23	37	92	28	5.05	1.35	2.43	6080	0.97	88	4220	20	10	54	0.18	96	<5	141
16-25	3.74	<5	180	3.48	26	83	24	5.95	1.46	2.53	825	0.95	52	5000	26	10	82	0.16	89	<5	119
30-32	3.68	10	180	3.84	19	77	15	5.78	1.47	2.56	531	0.87	50	4920	6	10	80	0.15	82	<5	116
46-48	3.16	5	150	6.31	20	83	22	4.15	1.04	2.45	577	0.51	51	2260	10	9	95	0.17	68	<5	105
50-58	3.28	<5	170	6.77	20	80	23	3.96	1.16	2.43	557	0.63	48	2790	10	9	100	0.13	65	<5	101
68-70	2.90	5	160	6.80	18	66	21	3.64	0.97	2.32	510	0.54	47	2400	<2	8	98	0.10	56	<5	93
90-92	2.63	<5	150	6.85	18	59	21	3.58	0.82	2.20	515	0.51	51	2220	2	7	98	0.10	52	<5	91
103-105	2.94	<5	150	6.55	18	60	21	3.71	0.94	2.44	496	0.64	51	3440	6	7	94	0.10	55	<5	96
135-137	2.85	<5	160	6.16	18	62	20	3.69	0.92	2.36	495	0.63	51	3360	<2	7	96	0.10	56	<5	94
153-155	3.00	20	160	7.21	19	62	23	3.73	1.01	2.49	521	0.60	50	2980	10	8	104	0.09	57	<5	95
168-170	3.29	5	210	6.34	20	84	21	4.02	1.12	2.93	524	0.87	52	5500	4	9	95	0.13	65	<5	106
188-190	3.32	10	180	6.36	20	63	23	4.07	1.09	2.44	540	0.64	55	3080	<2	8	106	0.11	63	<5	105

MINERALOGY: CLAY-SIZE FRACTION (<0.002mm)

(No attempt has been made to determine relative abundance of minerals, except in the case of calcite and dolomite where peak heights are given based on 1000 cps. The relative abundance of these minerals is assumed to be proportional to peak height)

Core HU-87-028-035

Sample Interval	Chlorite	Illite	Kaolinite	Montmorillonite	Quartz	Feldspar Na & K	Calcite	Dolomite	Amphibole
3-6	v	v				v v			
46-48	v	v		tr	v	v v	110		
50-58	v	v			v	v	120	70	
90-92	v	v		tr		v v	180	180	
103-105	v	v			v	v v	220	840	tr

RESULTS

CORE HU-87-028-041

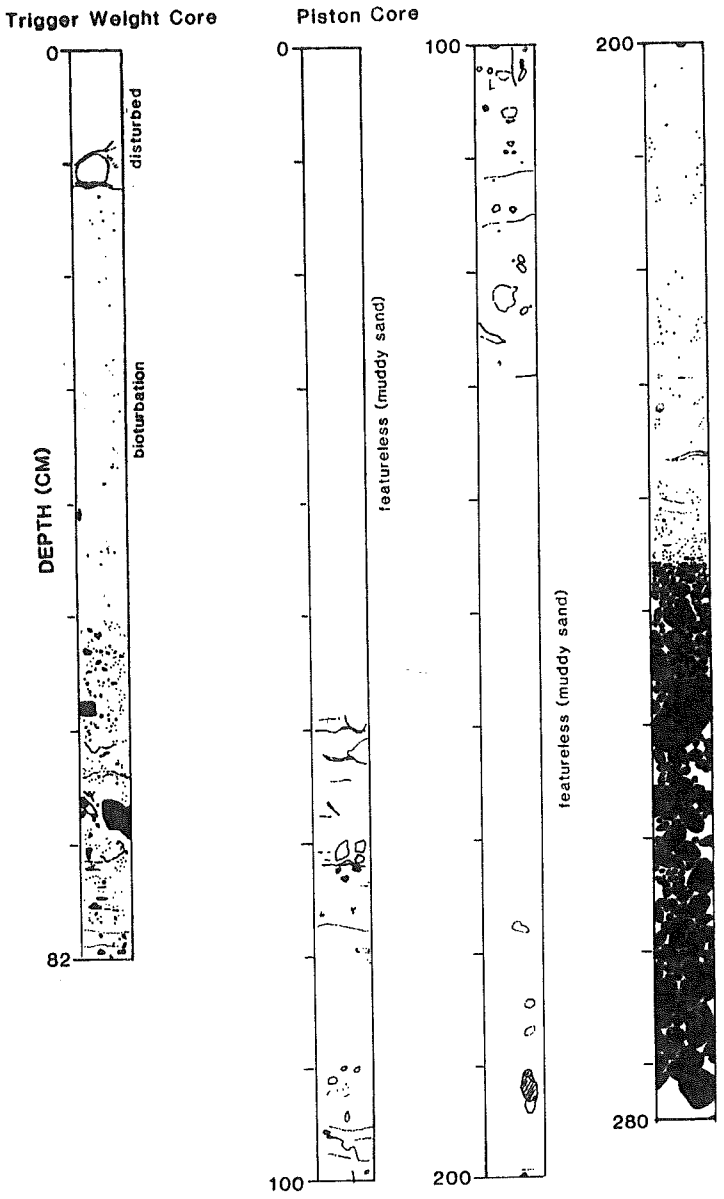
CORE DESCRIPTION

CORE	INTERVAL (cm)	SEDIMENT TYPE	COLOUR	LITHOFACIES CODE	PHYSICAL PROPERTIES
HU-87-028-041					
TWC	0-12	Olive grey silty clay -- gradational colour change --	5Y 4/2	F	No measurements taken, core disturbed.
	12-52	Dark greyish brown silty clay, very few pebbles, bioturbated, organic stringers at base of unit. -- sharp contact --	10YR 4/2	Fm	
	52-69	Dark grey brown silty clay interbedded with 1.5 - 2cm thick beds composed of clay clasts, clast colour changes downcore from red brown (5YR 5/4), to brown to grey. --- gradational ---	10YR 3/2	Fl	
	69-81	Dark grey silty clay (or silty diamicton (?)), with pebbles and grey clay clasts, laminated.	10YR 4/1	Fld	
HU-87-028-041 PC	(core disturbed - top taken at top of material in core liner although much overlying sand taken and bagged)				
	0-63	Olive grey muddy sand, disturbed --- sharp contact ---	5Y 4/2	S	pocket of organic material at 51cm
	63-72	Olive grey sandy clay interbedded with dark grey brown (10YR 4/2), dark grey brown and very dark olive grey clay layers, possible organic material at contact --- sharp contact ---	5Y 4/2	Fl	
	72-110	Medium sand, dark grey, contains irregular patches of laminated grey silty clay at 82-86cm and 100-108cm. Fine-grained material similar to overlying unit --- sharp contact ---	5Y 3/1	S	
	110-220	Dark greyish brown sand, massive, disturbed Contains organics at 158-157cm, 180-182cm etc --- gradational ---	2.5Y 4/2	S	
	220-295	Grain size increases downcore. At 240, rounded clast of organic material (3cm diam) capped by laminated fine sand. At 250cm, granule sand grades downward to poorly sorted clast supported gravel, granules to cobbles, organics present.			

HU-87-028-041

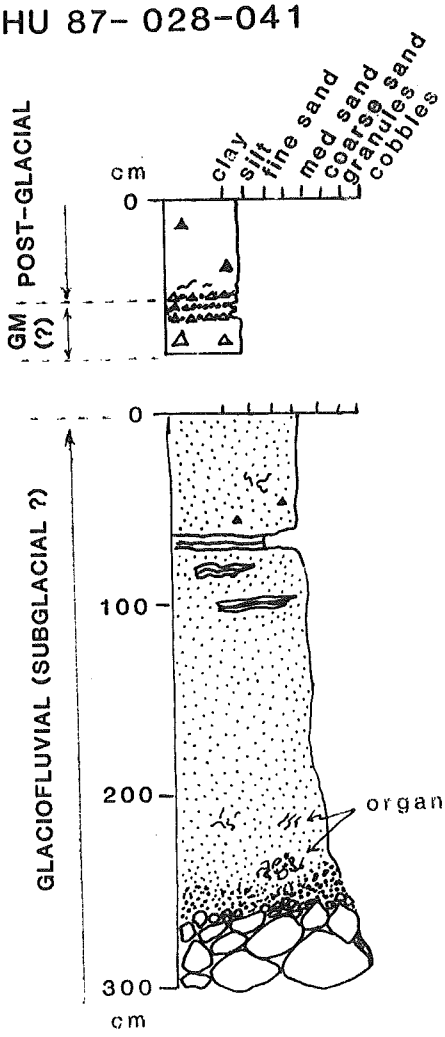
220-295 (cont'd)	At 260cm, gravel composed of angular to subangular clasts, some striated, size ranges up to 11cm long, lithologies include grywackes, pink carbonates, limestones and siltstones among others.

X-RADIOGRAPH INTERPRETATION HU 87-028-041



CORE SUMMARY

HU 87- 028-041



	COLOUR	LITHOFACIES CODE
	5Y 4/2	F
	10YR 4/2	Fmd
	10YR 3/2	Fl
	10YR 4/1	Fld
	5Y 4/2	S
	5Y 4/2	Fl
		S
	5Y 3/1	
	2.5Y 4/2	
		G

Core: HU-87-028-041 Location: 57°54.08'N 88°20.05'W Water Depth: 182m
Hudson Bay Core Length:
TWC 82cm
PC 280cm

TEXTURAL ANALYSIS

Subsample Interval (cm)	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay <0.004mm	Analysis Type
TWC					
5-8	0.00	0.00	39.62	60.38	C
29-32	0.00	2.61	31.92	65.47	SSC
44-54	17.42	9.05	35.75	55.20	C
55-56	13.45	9.55	34.38	56.07	C
59-62	3.40	20.41	43.61	35.98	SSC
74-76	3.77	8.25	34.65	57.10	C
PC					
5-7	0.00	78.79	18.13	3.08	SSC
48-50	0.00	87.40	10.09	2.51	SSC
63-65	16.62	25.85	32.42	41.73	C
89-91	0.00	85.66	11.86	2.48	C
100-102	0.00	63.02	33.18	3.80	SSC
128-130	0.00	65.03	31.18	3.80	C
155-157	0.00	67.22	28.33	4.45	SSC
180-182	0.00	76.23	20.62	3.15	SSC
205-207	0.00	81.23	16.41	2.36	SSC
228-230	0.00	80.84	16.28	2.88	C
240-242	3.77	74.32	21.62	4.06	SSC
257-260	71.60	51.16	41.46	6.98	C

LITHOLOGICAL ANALYSIS (2-5.6mm fraction)
Total Weight - total weight of fraction analysed

Subsample Interval (cm)	Total Weight (gms)	% Paleozoic Grey Carbonate	% Pink/red Carbonate	% Crystalline	% Dubawnt	% Greywacke Argillite	% Others	Comments
TWC								
44-54	0.43	66.7	0.0	11.9	0.0	21.4	0.0	-
59-62	0.43	20.9	27.9	30.2	0.0	4.7	16.3	Prot (?) metaseds
PC								
63-65	0.63	88.9	0.0	4.8	0.0	6.3	0.0	organic material
240-242	1.80	83.3	2.8	10.6	0.0	2.3	0.6	Prot (?) metaseds, fossil frags.
257-260	11.55	68.7	3.3	19.7	0.0	5.6	2.7	Prot.(?) metaseds

Core: HU-87-028-041 Location: 57°54.08'N 88°20.05'W Water Depth: 182m
Hudson Bay Core Length:
TWC 82cm
PC 280cm

HEAVY MINERAL ANALYSIS (0.063-0.250mm)

I. Total Count

Subsample Interval (cm)	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk	
5-7	4.7	21.3	12.7	6.0	14.7	2.0	14.7	4.0	2.0	4.0	7.3	3.3	0.0	1.3	1.4	(Staurolite)
48-50	4.0	11.3	20.7	10.0	14.0	0.7	12.7	3.3	4.7	1.3	12.0	1.3	0.7	2.7	0.7	
128-130	7.3	16.7	21.3	4.7	13.3	0.7	14.7	3.3	1.3	4.7	8.7	2.0	0.0	0.0	1.3	
180-182	2.0	11.3	23.3	3.3	15.3	0.0	18.0	2.0	2.7	1.3	9.3	4.7	0.7	2.0	4.1	(Spinel/Staurolite)
205-207	5.3	10.0	12.0	4.0	8.0	1.3	18.7	4.7	1.3	1.3	23.3	3.3	0.0	4.7	2.1	(Staurolite/Kyanite)
228-230	2.0	6.7	22.0	10.7	10.0	1.3	14.7	3.3	0.0	1.3	20.7	1.3	0.0	5.3	0.7	
240-241	2.0	12.7	18.0	6.0	12.0	0.7	22.7	2.0	2.0	1.3	11.3	3.3	0.0	3.3	2.7	(Spinel)
247-260	4.7	13.3	12.7	11.3	6.0	2.0	20.7	2.7	2.0	2.0	10.0	8.0	1.3	3.3	3.3	

II. Plotted Values (calculated percentages excluding cpx and hbl)
Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance, bracketed minerals have values >10% <15%

Subsample Interval (cm) PC	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
5-7	22.8	13.6	6.4	15.7	2.1	15.7	4.3	7.8	3.5	Opx/Hem/Pyr(Gar)
48-50	12.4	22.7	10.9	15.3	0.8	13.9	3.6	13.1	1.4	Gar/Hem(Pyr/Ilm/Opx/Epi)
128-130	18.3	23.3	5.1	14.6	0.8	16.1	3.6	9.5	2.2	Gar/Opx/Pyr/Hem
180-182	11.9	24.4	3.5	16.1	0.0	18.9	2.1	9.8	4.9	Gar/Pyr/Hem(Opx/Ilm)
205-212	10.7	12.8	4.3	8.6	1.4	20.0	5.0	25.0	3.5	Ilm/Pyr(Gar/Opx)
228-230	6.8	22.4	10.9	10.2	1.3	15.0	3.4	21.1	1.3	Gar/Ilm/Pyr(Epi/Hem)
240-241	13.2	18.7	6.2	12.5	0.7	23.6	2.1	11.8	3.4	Pyr/Gar(Opx/Hem/Ilm)
247-260	14.3	13.6	12.1	6.4	2.1	22.2	2.9	10.7	8.6	Pyr(Opx/Gar/Epi/Ilm)

Core: HU-87-028-041 Location: 57°54.08'N 88°20.05'W Water Depth: 182m
Hudson Bay Core Length:
TWC 82cm
PC 280cm

LECO CARBONATE DATA (<0.063mm)

Subsample Interval (cm)	Total Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
TWC				
5-8	2.5	0.7	1.8	15.0
29-32	2.6	0.3	2.3	19.2
44-54	3.9	0.2	3.7	30.8
55-56	4.5	0.2	4.3	35.8
59-62	5.0	0.2	4.8	40.0
74-76	4.8	0.2	4.6	38.3
PC				
5-7	4.7	0.1	4.6	38.3
48-50	4.8	0.1	4.7	39.2
63-65	4.1	0.2	3.9	32.5
89-91	5.1	0.1	5.0	41.7
100-102	4.9	0.0	4.9	40.8
128-130	4.7	0.1	4.6	38.3
155-157	4.8	0.1	4.7	39.2
180-182	4.7	0.1	4.6	38.3
205-207	4.4	0.0	4.4	36.7
228-230	4.8	0.1	4.7	39.2
240-242	4.8	0.1	4.7	39.2
257-260	5.2	0.2	5.0	41.7

CORE HU-87-028-041

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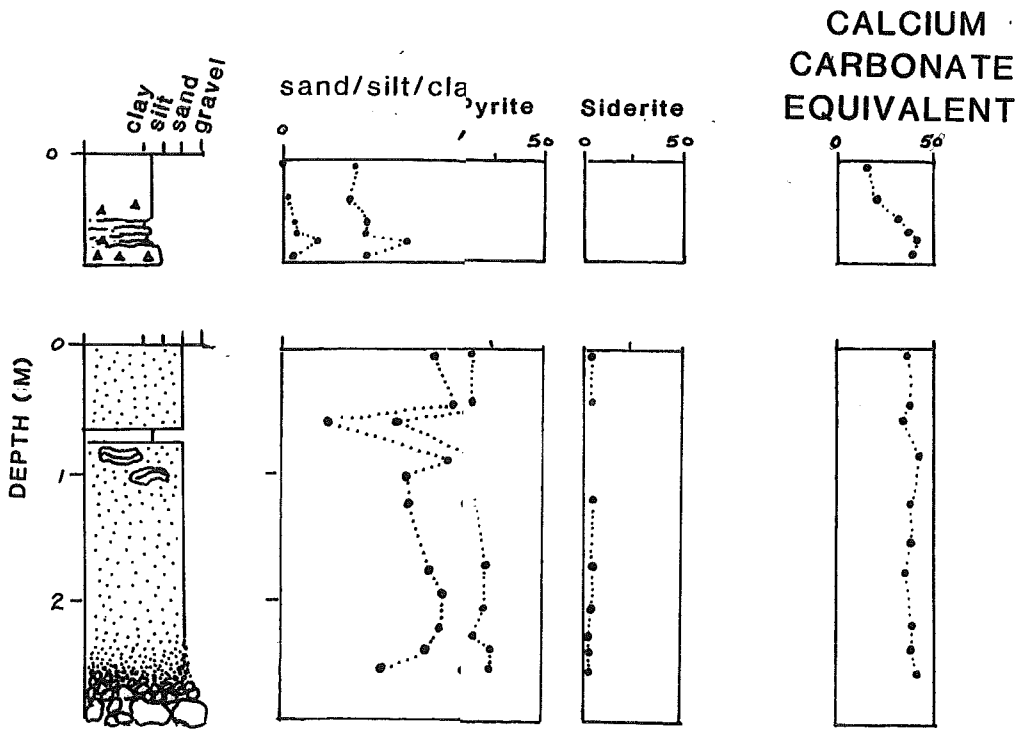

CORE HU-87-028-041

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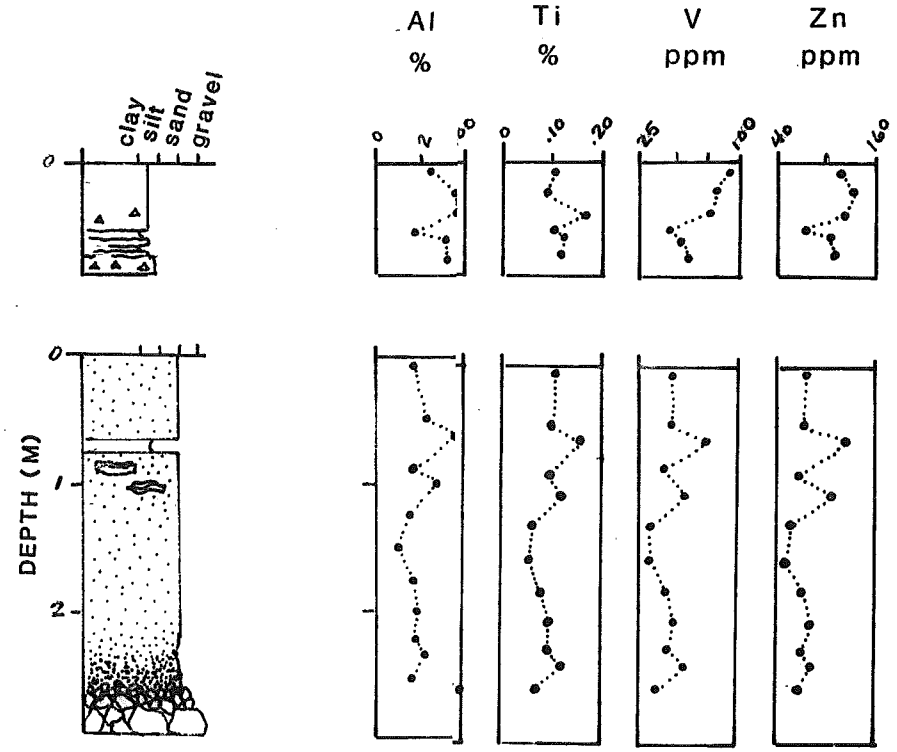


GEOCHEMICAL ANALYSIS (<0.002mm)

Core: Hu-87-028-041

Subsample Interval (cm)	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
TWC																					
5-8	2.58	<5	200	1.02	20	68	16	3.70	1.06	1.78	406	3.16	50	>10000	<2	8	34	0.10	94	<5	116
29-32	3.49	5	210	1.17	22	90	19	4.29	1.27	2.24	575	1.78	59	>10000	10	10	50	0.08	83	<5	130
44-54	3.62	5	180	2.82	24	99	26	4.68	1.27	2.45	653	0.74	57	3560	12	10	69	0.18	81	<5	122
55-56	1.90	<5	120	3.44	12	64	12	2.64	0.66	2.66	390	2.10	38	>10000	4	6	44	0.10	44	<5	70
59-62	2.96	<5	90	6.29	16	73	19	3.61	1.08	2.28	493	0.68	47	3940	10	8	85	0.12	58	<5	95
74-76	2.93	<5	120	2.05	18	83	17	3.73	1.00	2.29	498	1.22	48	>10000	10	8	59	0.11	66	<5	103
PC																					
5-7	1.78	30	100	5.72	14	56	30	2.92	0.54	2.44	596	2.46	26	>10000	20	4	64	0.10	48	<5	76
48-50	2.04	<5	100	5.06	18	58	24	3.18	0.64	2.34	440	2.98	30	>10000	48	4	62	0.10	48	<5	78
63-65	3.27	20	240	2.53	28	88	21	4.41	1.10	2.33	709	0.86	60	4710	4	10	70	0.17	76	10	124
89-91	1.80	<5	100	6.86	16	58	18	3.02	0.52	2.76	402	1.18	20	>10000	28	4	72	0.10	42	10	68
100-102	2.53	5	110	5.57	20	85	19	3.55	0.75	2.12	496	1.28	47	9910	14	6	85	0.12	64	15	101
128-130	1.46	15	80	6.68	12	49	15	2.43	0.46	2.41	427	2.15	28	>10000	14	4	69	0.07	35	10	56
155-157	1.09	25	70	8.79	12	33	13	2.07	0.31	2.71	373	0.65	21	5150	6	3	79	0.06	29	10	43
180-182	1.70	<5	90	5.79	16	50	17	2.94	0.53	2.30	450	1.90	35	>10000	8	5	65	0.08	43	15	70
205-207	1.86	20	80	5.84	19	63	21	3.10	0.51	2.50	501	1.24	40	>10000	8	5	63	0.10	49	10	81
228-230	1.86	30	100	5.40	18	42	16	3.06	0.60	2.30	424	3.48	34	>10000	<2	4	66	0.10	48	<5	74
240-242	2.16	30	120	6.06	18	56	18	3.24	0.66	2.46	452	1.84	40	>10000	12	4	76	0.12	58	<5	80
257-260	1.60	<5	150	8.86	15	52	16	2.37	0.51	2.46	450	1.25	30	>10000	4	4	100	0.08	40	10	60

MINERALOGY: CLAY-SIZE FRACTION (<0.002mm)

(No attempt has been made to determine relative abundance of minerals, except in the case of calcite and dolomite where peak heights are given based on 1000 cps. The relative abundance of these minerals is assumed to be proportional to peak height)

Core HU-87-028-041

Sample Interval	Chlorite	Illite	Kaolinite	Montmorillonite	Quartz	Feldspar Na & K		Calcite	Dolomite	Amphibole
TWC										
29-32	v	v				v				
59-62	v	v				v	v	140	270	
PC										
63-65	v	v			v	v		50	110	
100-102	v	v				v		60	60	
205-207	v	v			v	v	v	60	270	

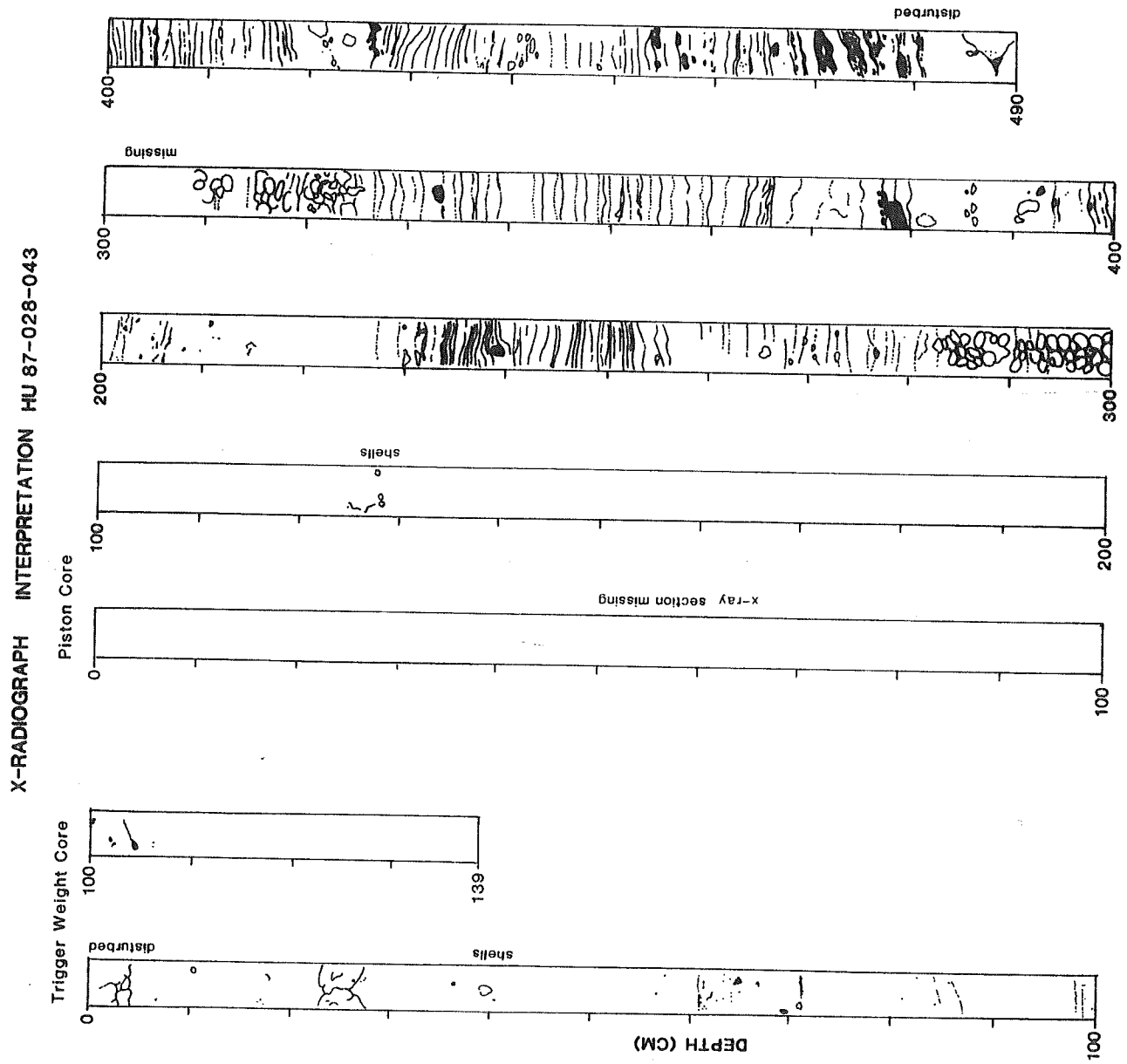
RESULTS

CORE HU-87-028-043

CORE DESCRIPTION

CORE	INTERVAL (cm)	SEDIMENT TYPE	COLOUR	LITHOFACIES CODE	PHYSICAL PROPERTIES
HU-87-028-043					
TWC	0-139	Olive grey silty clay with sulphide mottling	5Y 4/2	Fm	Low bulk density, high water content
PC	0-230	Olive grey silty clay with sulphide mottling, few shells present, bioturbation varies. At base of unit, gravel lens present, colour darkens, minor stringers of organic material, and clay clasts.	5Y 4/2 2.5Y 4/2	Fm	Slight increase in bulk density and decrease in water content at top of PC suggests minor consolidation during coring. In general, bulk density increases and water content decreases towards unit base.
		--- sharp contact ---			
	230-241	Laminated clay, alternation of white and green laminae 3 to 4mm thick.	5Y 5/1	Fl	Continued increase in bulk density and decrease in water content in rhythmically bedded sediments to base of core.
		--- gradational ---			
	241-283	Rhythmically bedded sequence, alternation of green and grey clay, rhythmites approx. 1cm thick. Very few pebbles.	5Y 5/1	Fl	
		--- gradational ---			
	283-287	Grey clay	2.5Y 4/0	F	
		--- gradational ---			
	287-328	Colour and texture of unit similar to rhythmically bedded material described above, but beds are disturbed and deformed. Sediment occurs as rounded clay balls or lumps although original bedding preserved in places.	5Y 5/1	Fl(d)	
		--- gradational ---			
	328-364	Rhythmically bedded sediment consisting of alternation of green and grey clay, layers range from 0.5 to 1cm thick	5Y 4/1	Fl	
		---- gradational ---			
	364-393	Bedding becomes more diffuse. At 376cm, white lamination (few mm thick) present within grey clay.			
		At 378cm, thick layer of grey clay (1.5cm) with white lamination and clay clasts and pebbles.	5Y 3/1	Fld	
		--- gradational ---			
	393-455	Rhythmically bedded sediment as above, layers approx. 2cm thick. From 412 to 426 and 428 to 452cm, two thick layers of grey clay present containing thin white	5Y 2.5/1	Fl	

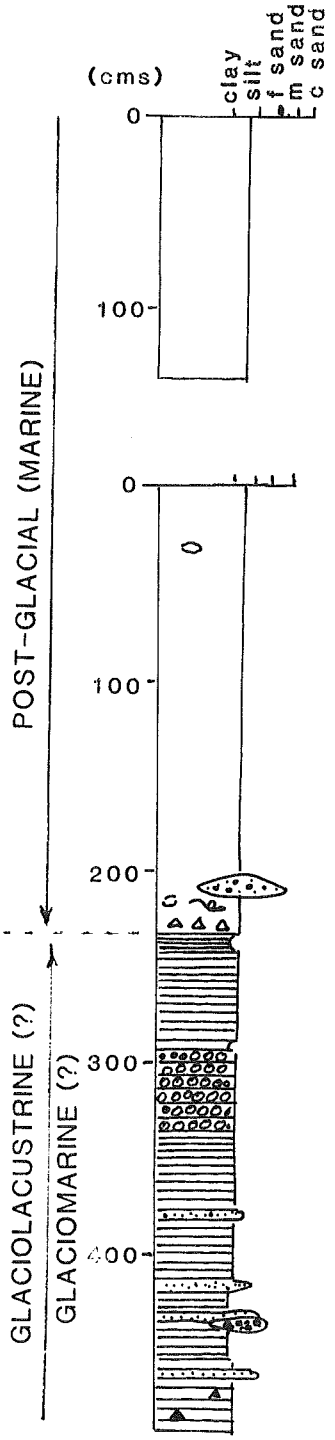
HU-87-028-043 (cont'd)		
	laminations. Sandy lamination at 413 and 441cm, gravel lens at 436.	
455-490	Rhythmically bedded sediment as above but laminations become more diffuse toward base of core. Few pebbles, sand at 458 and 462cm	Fld(?)


X-RADIOGRAPH INTERPRETATION HU 87-028-043
Trigger Weight Core
Piston Core
DEPTH (CM)
disturbed
shells
x-ray section missing
shells
missing
disturbed
0
100
139
200
300
400
490

CORE SUMMARY

HU 87-028-043

W.D. 118m



	COLOUR	LITHOFACIES CODE
0	5Y 4/2	Fm
100		
0	5Y 4/2	Fm
100		
200	2.5Y 4/2	
	5Y 5/1	Fl
300		Fl(d)
	5Y 4/1	Fl
	5Y 3/1	
400	5Y 2.5/1	
		Fld

Core: HU-87-028-043 Location: Great Whale River Water Depth: 118m
55°21.14'N 78°14.24'W Core Length:
TWC 151cm
PC 490cm

TEXTURAL ANALYSIS

Subsample Interval (cm)	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay <0.004mm	Analysis Type
TWC					
4-7	0.0	1.38	38.49	60.11	C
45-48	0.0	5.73	32.80	61.47	SSC
PC					
5-7	0.0	0.0	37.37	62.63	C
55-57	0.0	0.46	36.45	63.09	SSC
126-128	0.0	0.0	33.59	66.41	SSC
176-178	0.00	1.82	26.48	71.70	SSC
206-208	9.05	23.52	34.91	41.57	SSC
220-222	0.0	0.0	27.69	72.31	C
232-234	10.5	2.72	11.59	85.69	C
246-248	0.0	0.0	18.62	81.38	C
275-277	7.87	3.18	21.84	74.99	C
310-312	0.0	1.42	13.75	84.43	C
335-337	8.82	2.65	20.70	76.65	C
374-376	7.30	8.86	28.06	63.08	C
434-436	1.62	19.63	61.97	18.40	C
442-445	0.82	78.17	15.22	6.61	C
462-464	8.03	14.21	43.68	42.11	C
481-483	31.0	1.92	80.77	17.31	C

LITHOLOGICAL ANALYSIS (2-5.6mm fraction)
Total Weight - total weight of fraction analysed

Subsample Interval (cm)	Total Weight (gms)	% Paleozoic Grey Carbonate	% Crystalline	% Prot. Carbonate	% Prot. Greywacke	% Others
PC						
206-208	3.67	53.3	26.0	0.0	18.2	2.5
374-376	0.80	00.0	57.0	0.0	7.6	35.4
434-436	1.22	1.6	62.9	0.0	28.2	7.3
442-445	0.94	0.0	25.5	8.5	47.9	18.1
462-464	1.64	4.3	40.2	16.4	31.0	8.0

Core: Hu-87-028-043

HEAVY MINERAL ANALYSIS (0.063-0.250mm)

I. Total Count

Subsample Interval (cm)	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk
PC															
206-208	0.7	2.0	4.7	2.0	0.7	0.7	83.3	0.0	0.0	0.0	3.3	0.7	0.0	0.0	2.0
374-376	7.3	10.0	0.0	16.7	21.3	1.3	9.3	0.0	3.3	0.7	6.7	11.3	0.0	7.3	4.6
434-436	8.7	11.3	0.7	20.7	28.7	1.3	10.0	0.0	1.3	1.3	3.3	9.3	0.0	2.0	1.3
442-445	13.3	7.3	0.7	14.0	35.3	1.3	6.7	0.7	2.0	2.7	2.0	9.3	0.0	4.7	0.0
462-464	7.3	3.3	0.0	10.9	42.7	0.0	4.7	0.7	0.7	1.3	6.0	16.7	0.0	4.7	2.0

II. Plotted Values (calculated percentages excluding cpx and hbl)

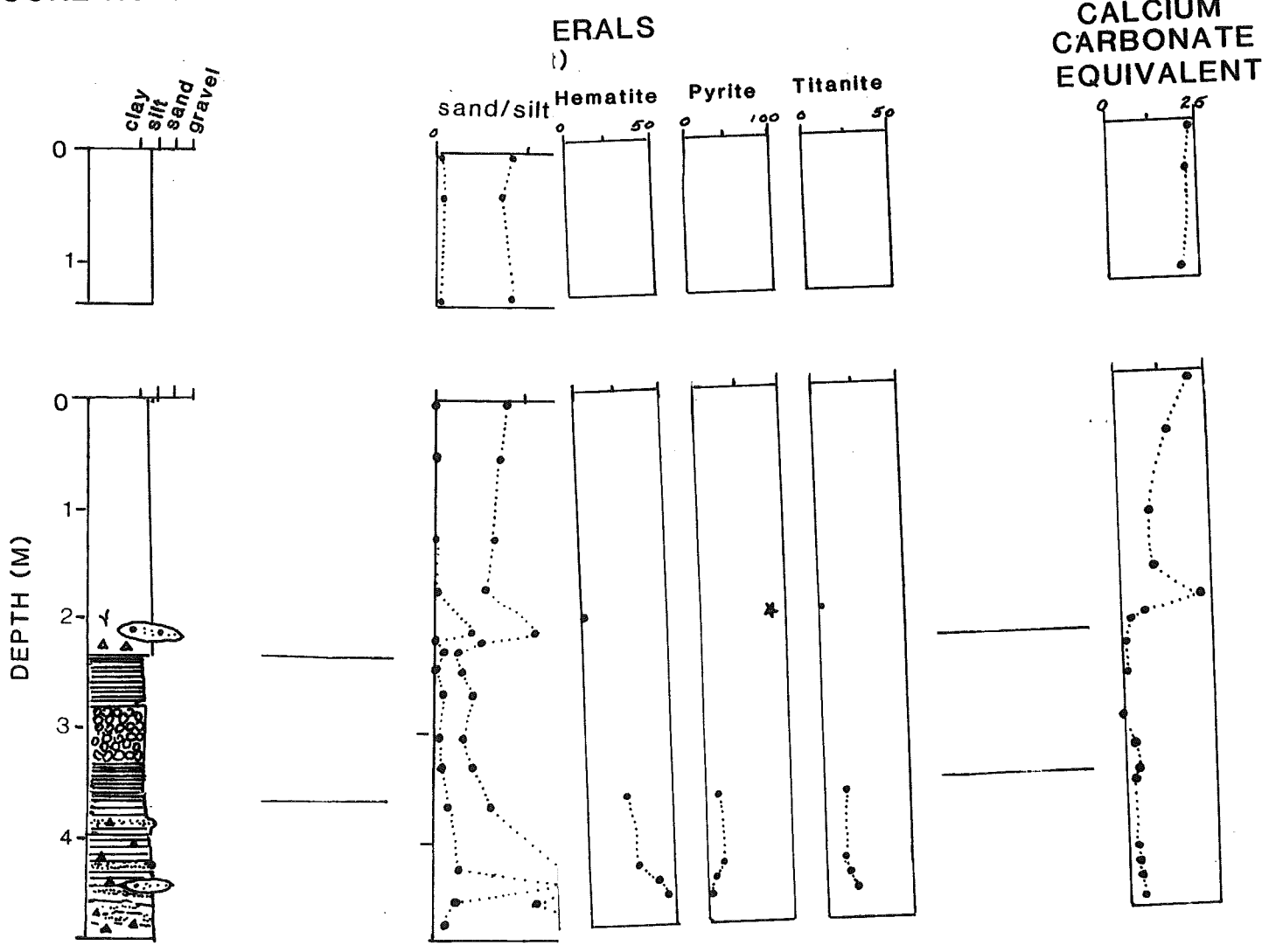
Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance, bracketed minerals have values >10% <15%

Subsample Interval (cm)	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
206-208	2.0	4.7	2.0	0.7	0.7	84.0	0.0	3.3	0.7	Pyr
374-376	11.2	0.0	18.7	23.8	1.5	10.4	0.0	7.5	12.6	Hem/Epi(Tit/Opx/Pyr)
434-436	12.6	0.8	22.3	31.9	1.4	11.1	0.0	3.7	10.3	Hem/Epi(Opx/Pyr/Tit)
442-445	8.6	0.8	16.5	41.7	1.5	7.9	0.8	2.4	11.0	Hem/Epi(Tit)
462-464	3.6	0.0	10.9	46.4	0.0	5.1	0.8	6.5	18.2	Hem/Tit(Epi)

LECO CARBONATE DATA (<0.063mm)

Subsample Interval (cm)	Total Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
TWC				
4-7	3.4	0.5	2.9	24.2
45-48	3.2	0.5	2.7	22.5
133-136	2.9	0.4	2.5	20.8
PC				
5-7	3.0	0.5	2.5	20.8
55-57	2.2	0.5	1.7	14.2
126-128	1.5	0.5	1.0	8.3
176-178	1.4	0.4	1.0	8.3
206-208	3.3	0.5	2.8	23.3
220-222	1.1	0.3	0.8	6.7
232-234	0.4	0.2	0.2	1.7
246-248	0.2	0.1	0.1	0.8
275-277	0.2	0.1	0.1	0.8
310-312	0.1	0.1	0.0	0.0
335-337	0.2	0.0	0.2	1.7
364-365	0.4	0.0	0.4	3.3
374-376	0.3	0.1	0.2	1.7
434-436	0.4	0.0	0.4	3.3
442-445	0.4	0.0	0.4	3.3
462-464	0.4	0.0	0.4	3.3
481-483	0.5	0.0	0.5	4.2

CORE HU-87-028-043

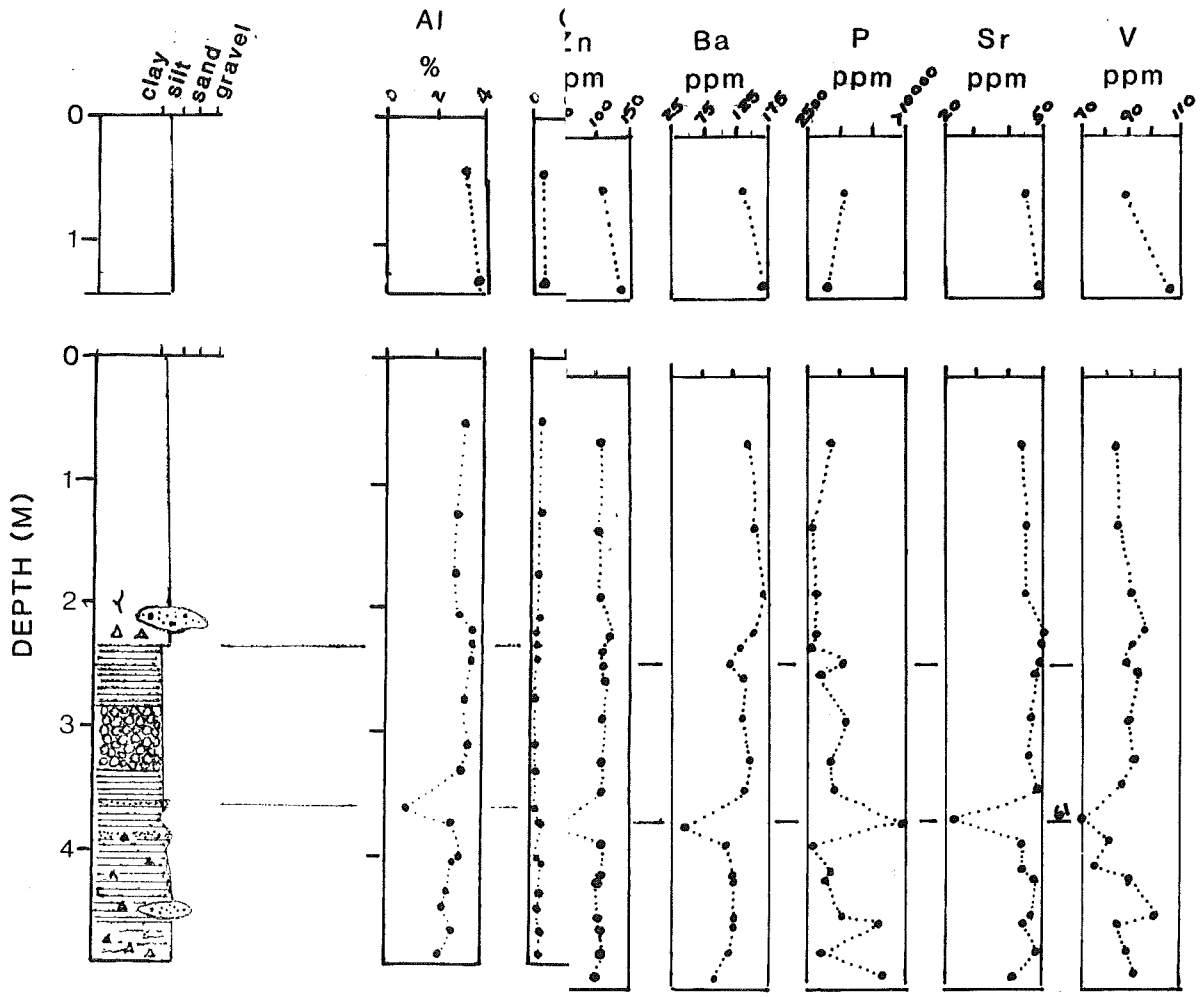


GEOCHEMICAL ANALYSIS (<0.002mm)

Core: Hu-87-028-043

Subsample Interval (cm)	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
TWC																					
45-48	3.27	<5	140	1.65	19	99	16	4.38	1.02	2.28	683	0.96	46	5030	8	10	46	0.16	89	<5	115
133-136	3.91	<5	170	1.39	25	103	20	5.12	1.35	2.44	873	0.95	54	4030	6	11	49	0.22	106	<5	132
PC																					
55-57	3.14	25	150	1.02	26	92	17	4.10	1.07	2.07	831	0.87	54	3880	<2	10	44	0.19	84	10	118
126-128	3.06	30	160	0.91	26	97	20	4.11	1.05	2.05	818	0.77	49	2820	4	11	45	0.22	85	5	114
176-178	2.91	20	170	0.98	26	102	22	4.01	1.01	2.04	779	0.80	55	3270	26	11	45	0.22	91	5	110
206-208	3.19	40	150	1.41	39	99	30	4.19	1.06	2.18	732	0.72	61	3170	28	11	52	0.21	95	15	121
220-222	3.40	25	130	0.97	29	114	26	4.51	1.20	2.20	629	0.70	55	2770	26	12	50	0.25	89	10	115
232-234	3.43	25	120	0.86	27	111	21	4.45	1.16	2.09	617	0.92	54	5230	14	12	49	0.21	87	15	114
246-248	3.56	<5	130	0.81	28	121	22	4.79	1.23	2.22	646	0.74	63	3310	<2	13	48	0.28	92	15	118
275-277	3.32	15	130	0.75	27	111	23	4.68	1.13	2.13	626	0.91	61	5600	14	11	47	0.23	89	15	115
310-312	3.35	25	140	0.81	27	111	26	4.50	1.19	2.28	668	0.79	63	3880	32	12	47	0.28	91	5	116
335-337	3.21	55	130	0.83	27	104	25	4.41	1.11	2.17	652	0.80	53	4190	8	11	49	0.27	88	10	110
364-365	0.99	15	40	0.86	11	57	7	2.90	0.30	0.98	348	1.15	29	>10000	14	4	23	0.12	61	10	39
374-376	2.86	15	110	0.92	25	94	21	4.23	0.95	2.11	655	0.60	48	2900	26	11	44	0.25	81	10	106
402-403	2.99	40	120	0.93	25	90	19	4.32	1.01	2.17	663	0.76	50	3980	4	10	45	0.20	75	15	107
403-406	2.83	70	120	1.17	26	90	29	4.57	0.92	2.10	698	0.68	46	3410	12	11	49	0.20	90	5	103
434-436	2.62	45	120	1.09	26	86	32	5.11	0.84	1.94	674	0.85	45	5010	22	10	47	0.16	101	<5	103
442-445	2.51	40	120	0.92	23	75	26	4.26	0.78	1.76	616	1.11	40	7820	16	10	45	0.13	84	<5	109
462-464	2.88	20	110	1.32	25	83	26	4.57	0.87	2.29	813	0.67	46	3570	22	11	48	0.22	89	<5	114
481-483	2.37	30	90	1.11	24	75	28	4.72	0.72	1.86	696	1.06	39	8460	6	9	41	0.20	91	<5	102

CORE HU-87-028-043



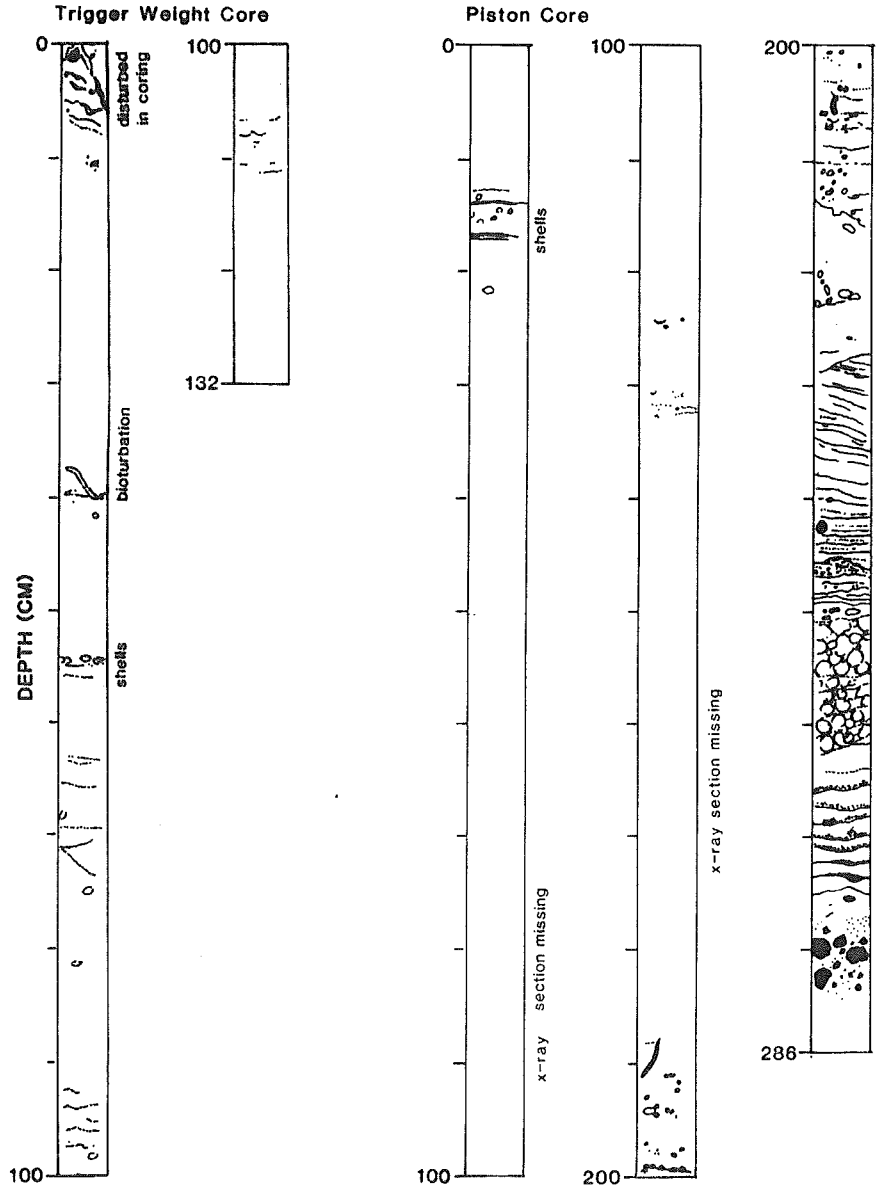
RESULTS

CORE HU-87-028-047

CORE DESCRIPTION

CORE	INTERVAL (cm)	SEDIMENT TYPE	COLOUR	LITHOFACIES CODE	PHYSICAL PROPERTIES
HU-87-028-047					
TWC	0-132	Olive grey silty clay with occasional shells and sand grains, mottled.	5Y 4/1	Fm	Low bulk density which decreases to base of TWC. Water content high and tends to increase to base of TWC
PC	0-215	Olive grey silty clay, mottled with dark grey (reduced?) patches, sandy lens between 5-6cm, worm in top cm.	5Y 4/1	Fm	Gradual increase in bulk density, decrease in water content to base of unit.
		--- sharp contact, dips slightly ---			
	215-229	Dark grey silty clay, mottled with irregular patches of "reduced" material.	10YR 4/1	Fm	Minor increase in water content, decrease in bulk density associated with unit and underlying unit
		--- contact sharp, dips ---			
	229-242	Dark grey clay, faintly laminated, minor faulting in unit extends up into overlying material	10YR 4/1	Fl	
		--- contact diffuse ---			
	242-250	Dark grey clay, faintly laminated, Few silty lamination, pebbles	10YR 4/1	Fld	Bulk density increase, and water content decrease to base of core.
		--- contact gradational ---			
	250-262	Sediment similar to overlying unit, but completely deformed, clay broken up into subangular clasts ranging in size from a few mm to 1cm, material has "cottage cheese" appearance. Original lamination may be preserved in places.		Fl(d)	
		--- contact gradational ---			
	262-275	Rhythmically bedded sediment, beds approx. 2cm thick, clay and silty clay, appears graded.	10YR 4/1	Fl	
		--- contact sharp, defined by --- 3mm thick sand bed			
	275-289	Dark grey diamicton, sandy, many angular pebbles, appears to fine upward.	7.5YR 4/0	Dmg(?)	

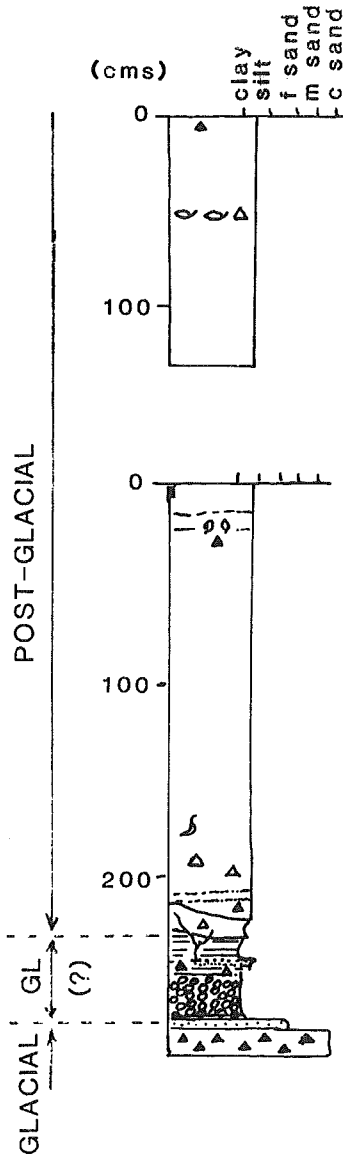
X-RADIOGRAPH INTERPRETATION HU 87-028-047



CORE SUMMARY

HU 87- 028-047

W.D. 46m



	COLOUR	LITHOFACIES CODE
	5Y 4/1	Fm
	5Y 4/1	Fm
	10YR 4/1	Fm
	10YR 4/1	Fl
	10YR 4/1	Fl(d)
	7.5YR 4/0	Fl Dmg(?)

Core: HU-87-028-047 Location: 55°09.69'N 79°12.60'W Water Depth: 46m
Great Whale River Core Length:
TWC 132cm
PC 296cm

TEXTURAL ANALYSIS

Subsample Interval (cm)	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay <0.004mm	Analysis Type
TWC					
5-8	0.0	6.15	47.69	46.15	C
110-115	0.0	4.90	44.46	50.60	C
PC					
6-8	0.0	4.76	46.10	49.14	C
90-92	0.00	0.84	41.00	58.16	SSC
198-200	5.78	12.64	40.65	46.71	C
218-220	10.64	1.75	33.09	65.16	C
233-235	0.00	0.00	12.04	87.96	C
245-247	86.60	17.58	14.85	67.57	C
258-260	0.0	0.0	3.81	96.19	C
268-270	0.0	0.0	6.28	93.72	C
286-288	44.16	49.77	32.65	17.58	C
Cutter	41.88	37.90	44.23	17.87	SSC

LITHOLOGICAL ANALYSIS (2-5.6mm fraction)
Total Weight - total weight of fraction analysed

Subsample Interval (cm)	Total Weight (gms)	% Paleozoic Grey Carbonate	% Crystalline	% Prot. Carbonate	% Prot. Greywacke	% Others
PC						
245-247	2.41	0.4	95.4	0.0	0.0	4.2
286-288	12.53	0.0	61.9	31.3	0.0	6.8
cutter	47.35	0.0	63.9	34.4	0.0	1.7

HEAVY MINERAL ANALYSIS (0.063-0.250mm)

I. Total Count

Subsample Interval (cm)	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk
245-247	10.7	6.0	0.7	14.7	26.0	0.7	5.3	0.0	6.7	0.0	3.3	14.7	0.0	6.7	4.7
286-288	12.7	4.7	6.0	34.0	18.7	0.7	8.7	0.0	0.7	0.7	2.0	8.0	0.0	1.3	2.0
cutter	12.0	3.3	5.3	30.0	17.3	0.7	8.0	0.0	2.0	2.0	6.7	9.3	0.0	3.3	0.0

Core: HU-87-028-047

II. Plotted Values (calculated percentages excluding cpx and hbl)
Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance, bracketed minerals have values >10% <15%

Subsample Interval (cm)	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
245-247	7.3	0.8	17.8	31.5	0.8	6.4	0.0	4.0	17.8	Hem/Epi/Tit
286-288	5.4	6.9	39.3	21.6	0.8	10.1	0.0	2.3	9.2	Epi/Hem(Pyr)
cutter	3.8	6.2	34.9	20.1	0.8	9.3	0.0	7.8	10.8	Epi/Hem(Tit)

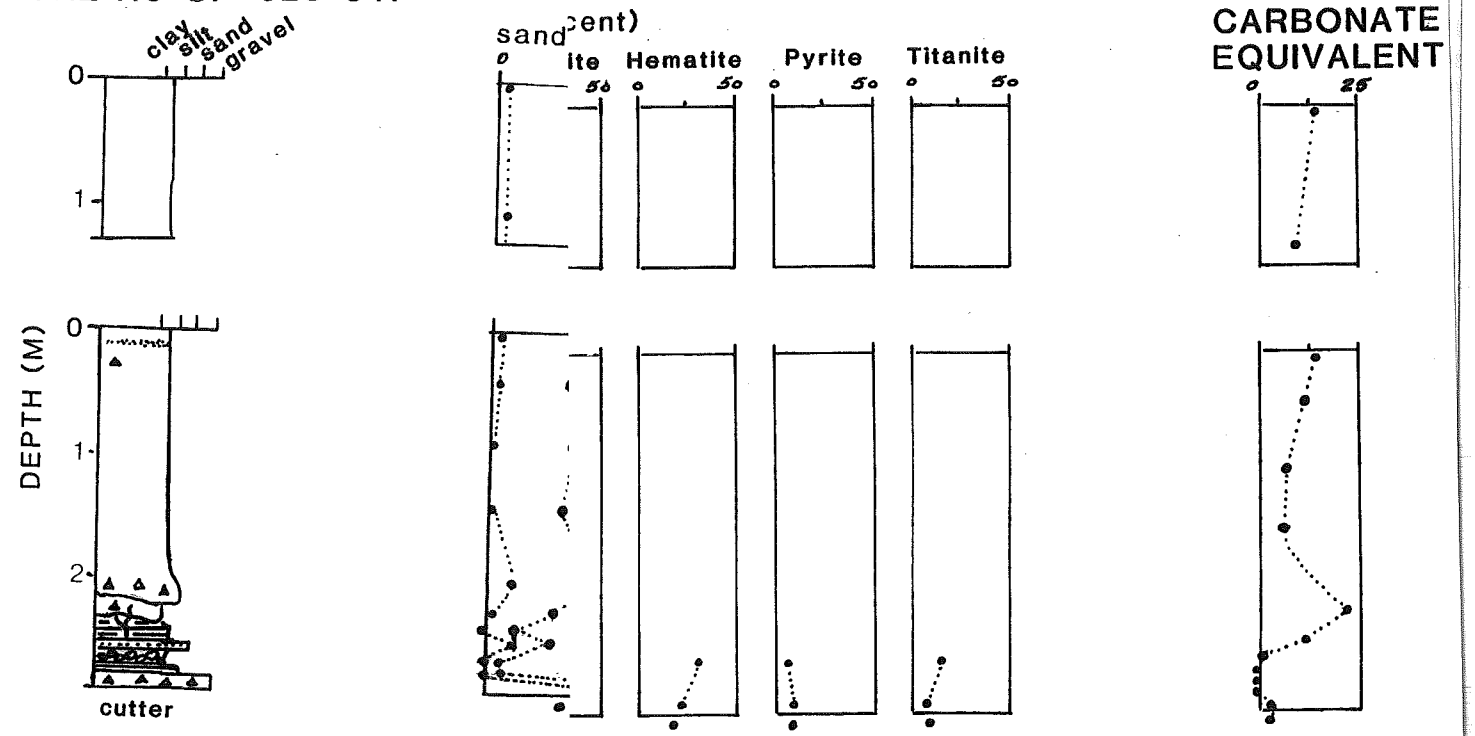
LECO CARBONATE DATA (<0.063mm)

Subsample Interval (cm)	Total Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
TWC				
5-8	2.1	0.4	1.7	14.2
110-115	1.6	0.4	1.2	10.0
PC				
6-8	2.1	0.4	1.7	14.2
38-40	1.8	0.4	1.4	11.7
90-92	1.4	0.5	0.9	7.5
138-140	1.2	0.5	0.7	5.8
198-200	3.1	0.4	2.7	22.5
218-220	1.7	0.3	1.4	11.7
233-235	0.3	0.2	0.1	0.8
245-247	0.1	0.1	0.0	0.0
258-260	0.1	0.1	0.0	0.0
268-270	0.1	0.1	0.0	0.0
286-288	0.4	0.0	0.4	3.3
cutter	0.4	0.0	0.4	3.3

CORE HU-87-028-047

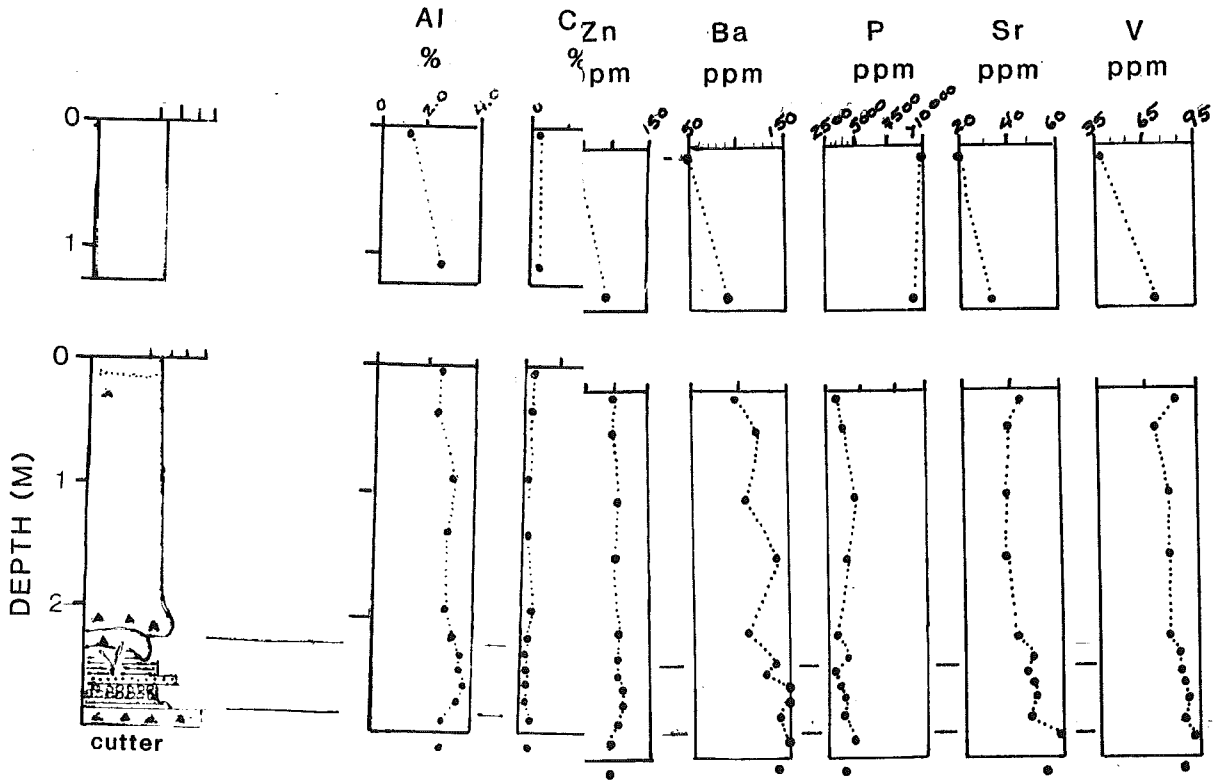
MINERALS

CALCIUM CARBONATE EQUIVALENT



CORE HU-87-028-047

GE



GEOCHEMICAL ANALYSIS (<0.002mm)

Core: Hu-87-028-047

Subsample Interval (cm)	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
TWC																					
5-8	1.24	20	402	0.86	10	60	8	1.72	0.62	0.98	186	7.22	18	>10000	<2	4	20	0.06	38	<5	46
110-115	2.37	<5	90	1.34	18	89	12	3.26	0.81	1.91	417	1.31	38	9360	<2	8	33	0.11	68	<5	86
PC																					
6-8	2.74	30	100	1.37	24	90	14	3.90	0.90	1.99	455	0.73	46	3170	12	10	44	0.20	83	<5	103
38-40	2.68	20	120	0.99	24	90	17	3.49	0.89	1.87	461	0.80	47	3490	2	10	40	0.19	73	<5	101
90-92	3.09	50	110	0.75	23	120	15	4.34	1.01	1.89	480	0.93	49	4370	4	10	39	0.25	78	<5	111
138-140	2.98	30	140	0.88	23	120	19	4.27	0.96	1.94	495	0.91	51	4040	<2	10	39	0.25	79	<5	104
198-200	2.99	5	110	1.19	26	101	21	4.26	0.91	1.95	465	0.72	51	3320	6	10	42	0.23	77	<5	111
218-220	3.27	25	140	1.12	25	125	25	4.70	1.05	2.10	546	0.84	54	4080	18	11	49	0.25	83	<5	111
233-235	3.62	10	130	0.81	24	129	30	5.19	1.12	2.08	560	0.68	65	2930	2	12	47	0.31	85	<5	113
245-247	3.67	<5	150	0.85	27	153	21	5.37	1.22	2.20	592	0.73	67	3220	6	13	49	0.32	88	<5	116
258-260	3.70	<5	150	0.88	26	147	22	5.39	1.21	2.21	601	0.73	67	3610	<2	12	50	0.34	89	<5	116
268-270	3.52	10	140	0.83	24	135	27	5.12	1.14	2.08	565	0.74	60	3580	4	12	49	0.34	86	<5	108
286-288	3.03	25	150	1.59	22	106	22	5.33	1.03	2.36	602	0.88	41	4370	8	11	59	0.25	91	<5	93
CUTTER	2.97	30	140	1.25	21	103	22	4.94	1.02	2.17	581	0.79	46	3640	<2	11	54	0.26	84	<5	92

MINERALOGY: CLAY-SIZE FRACTION (<0.002mm)

(No attempt has been made to determine relative abundance of minerals, except in the case of calcite and dolomite where peak heights are given based on 1000 cps. The relative abundance of these minerals is assumed to be proportional to peak height)

Core HU-87-028-047

Sample Interval	Chlorite	Illite	Kaolinite	Montmorillonite	Quartz	Feldspar Na & K	Calcite	Dolomite	Amphibole
TWC									
5-8	v	v			v	v v			tr
PC									
198-200	v	v				v			
233-235	v	v			v	v			tr
268-270	v	v			v	v			tr
cutter	v	v			v	v			

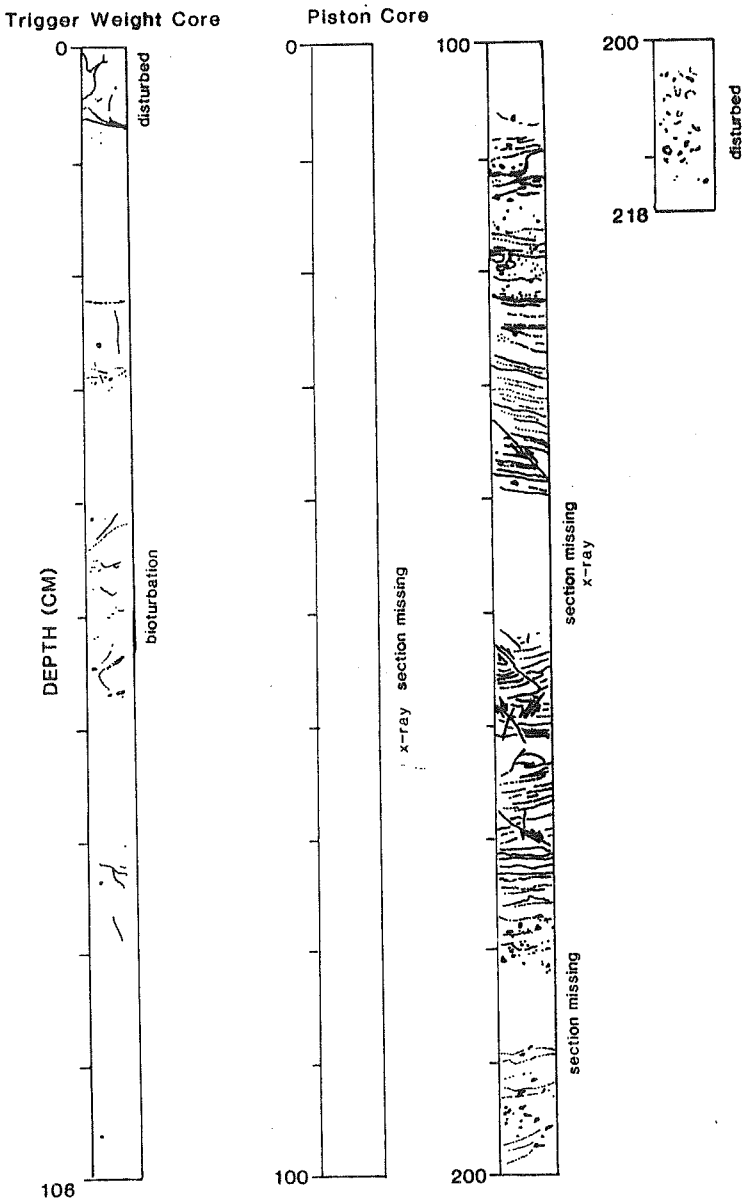
RESULTS

CORE HU-87-028-048

CORE DESCRIPTION

CORE	INTERVAL (cm)	SEDIMENT TYPE	COLOUR	LITHOFACIES CODE	PHYSICAL PROPERTIES
HU-87-028-048					
TWC	0-106	Olive grey silty clay, mottled with dark grey, reduced patches	5Y 4/1	Fm	Values of bulk density and water content comparable to similar sediment in TWC 47
PC	0-117	Olive grey silty clay, mottled as above Base of unit characterized by balls (possibly load structures) of olive grey silty clay which penetrate a massive grey (10YR 5/1) silty clay --- gradational ---	5Y 4/1	Fm	Base of unit noted by sharp drop in bulk density and shear strength and increase in water content.
	117-122	Grey silty clay, faintly laminated --- gradational ---	10YR 5/1	Fl	
	122-158	Rhythmically bedded sequences composed of clay and silty clay, and appears to fine upward. Colour variation from base consists of grey 10YR 5/1, grading up to olive grey 5Y 5/1, grading up to grey brown 10YR 5/2. Rhythmites approx. 2.5cm thick. Very few pebbles. Faulting present. --- gradational ---	10YR 5/1	Fl	
	158-169	Rhythmically bedded unit. Beds composed of 1cm thick, fining upward couplets consisting of dark grey brown clay (2.5Y 3/2) and dark grey silty clay (5Y 4/1). Faults present. --- sharp contact ---		Fl	
	169-198	Rhythmically bedded sequence. Couplets consist of fining upward units of olive grey clay (5Y 4/2) and very dark grey slightly silty clay (5Y 3/1). Variation in thickness: 169-180cm couplets average 1.5cm, 180-186cm couplets average 0.5cm, 186-198cm couplets average 2.0cm. Few pebbles present, unit faulted. --- gradational ---		Fld	Bulk density and velocities increase quickly from this unit in downcore profiles. Water content decreases.
	198-215	Rhythmically bedded unit, couplets average 4cm thick. Increase in pebble and sand content. This part of core appears to be disturbed.			

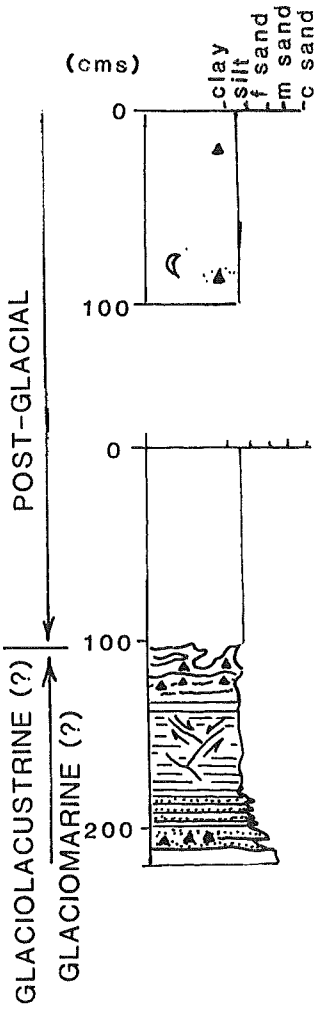
X-RADIOGRAPH INTERPRETATION HU 87-028-048



CORE SUMMARY

HU 87- 028-048

W.D.59m



	COLOUR	LITHOFACIES CODE
0–100 cms	5Y 4/1	Fm
0–100 cms	5Y 4/1	Fm
100–200 cms	10YR 5/1	Fld Fl
100–200 cms		Fld

Core: HU-87-028-048 Location: Great Whale River Water Depth: 59m
55°22.58'N 77°40.69'W Core Length:
TWC 106cm
PC 218cm

TEXTURAL ANALYSIS

Subsample Interval (cm)	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay <0.004mm	Analysis Type
TWC					
6-9	0.0	7.30	54.84	37.86	C
95-98	0.0	6.79	54.49	38.72	C
PC					
5-7	3.65	6.97	53.92	39.11	C
30-32	0.00	5.04	51.87	43.09	SSC
56-58	0.00	4.30	53.33	42.37	SSC
80-82	0.00	1.68	53.33	44.99	SSC
102-104	4.69	5.33	39.23	55.44	C
119-121	5.85	6.33	34.79	58.88	C
148-150	0.00	2.56	34.30	63.14	C
162-164	0.00	4.45	47.79	47.76	C
185-187	8.20	2.74	48.49	48.77	C

LITHOLOGICAL ANALYSIS (2-5.6mm fraction)
(insufficient material of this size fraction for analysis at any sample interval)

HEAVY MINERAL ANALYSIS (0.063-0.250mm)

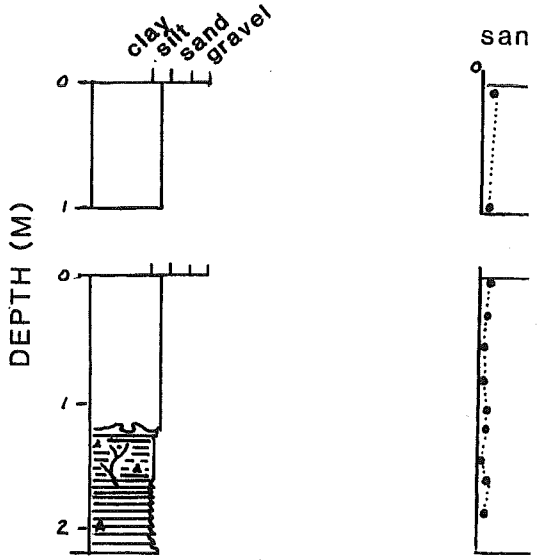
I. Total Count

Subsample Interval (cm)	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk
PC															
162-164	10.7	10.7	4.7	36.7	11.3	0.0	1.3	0.0	8.0	1.3	2.7	8.0	0.0	1.3	2.4

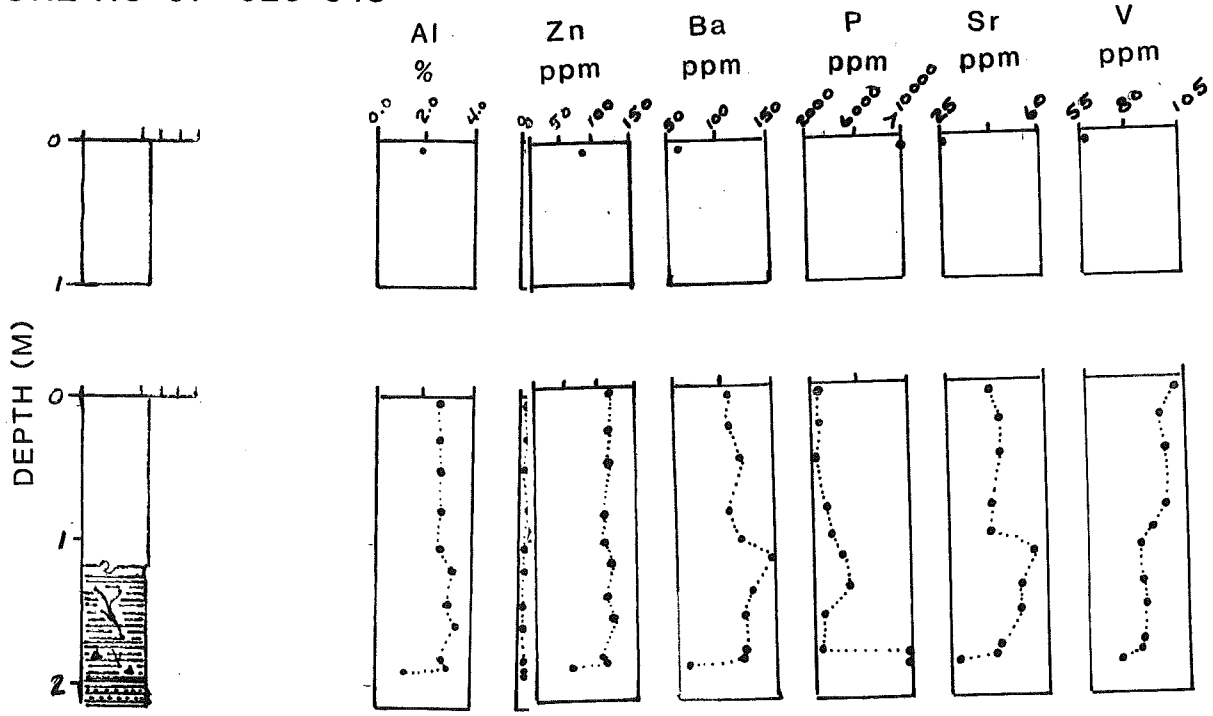
II. Plotted Values (calculated percentages excluding cpx and hbl)
Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance, bracketed minerals have values >10% <15%

Subsample Interval (cm)	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
162-164	13.2	5.8	45.1	13.9	0.0	1.6	0.0	3.3	9.8	Epi(Opx/Hem/Tit)

CORE HU-87-028-048



CORE HU-87-028-048



Core: HU-87-028-048

LECO CARBONATE DATA (<0.063mm)

Subsample Interval (cm)	Total Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
TWC				
6-9	1.5	0.5	1.0	8.3
95-98	1.4	0.5	0.9	7.5
PC				
5-7	1.7	0.5	1.2	10.0
30-32	1.4	0.4	1.0	8.3
56-58	1.6	0.4	1.2	10.0
80-82	1.7	0.4	1.3	10.8
102-104	1.1	0.3	0.8	6.7
119-121	0.1	0.0	0.1	0.8
148-150	0.1	0.1	0.0	0.0
162-164	0.0	0.0	0.0	0.0
185-187	0.0	0.0	0.0	0.0
190-191	0.1	0.1	0.0	0.0
191-192	0.0	0.0	0.0	0.0

GEOCHEMICAL ANALYSIS (<0.002mm)

Core: Hu-87-028-048

Subsample Interval (cm)	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
TWC																					
6-9	1.84	<5	60	1.14	14	66	10	3.10	0.64	1.58	350	2.62	34	>10000	<2	6	26	0.16	58	<5	76
PC																					
5-7	3.00	30	110	1.09	25	103	21	4.53	1.05	2.08	539	0.90	52	3520	10	11	43	0.23	103	<5	116
30-32	2.99	40	110	1.23	26	100	17	4.35	1.02	2.14	549	0.89	52	3340	6	11	44	0.23	97	<5	114
56-58	2.92	20	120	1.15	26	97	19	4.24	1.03	2.08	551	0.82	48	2980	14	11	44	0.24	98	5	111
80-82	2.76	10	110	1.33	25	97	20	4.11	0.91	2.08	534	0.89	49	3830	6	10	42	0.22	96	<5	109
102-104	2.79	30	120	0.99	26	93	18	4.08	1.00	2.04	547	0.91	49	4080	<2	10	42	0.24	91	<5	108
119-121	3.14	5	150	0.97	31	80	21	4.36	1.23	2.40	707	1.01	40	4920	<2	11	56	0.34	88	<5	112
148-150	3.08	45	130	0.89	28	107	19	4.39	1.14	2.18	618	0.95	48	5430	<2	11	49	0.29	88	<5	106
162-164	3.28	15	120	0.97	30	107	21	4.59	1.17	2.22	639	0.78	56	3510	<2	13	51	0.30	89	5	111
185-187	2.87	10	120	0.82	25	96	18	4.23	1.03	1.92	562	0.66	47	3390	10	11	45	0.27	85	<5	100
190-191	2.98	60	120	0.80	22	94	14	4.26	1.10	1.90	560	2.64	52	>10000	<2	10	44	0.24	84	<5	100
191-192	1.20	20	60	0.64	16	58	6	3.44	0.44	0.94	312	1.58	16	>10000	28	6	28	0.18	76	<5	50

RESULTS

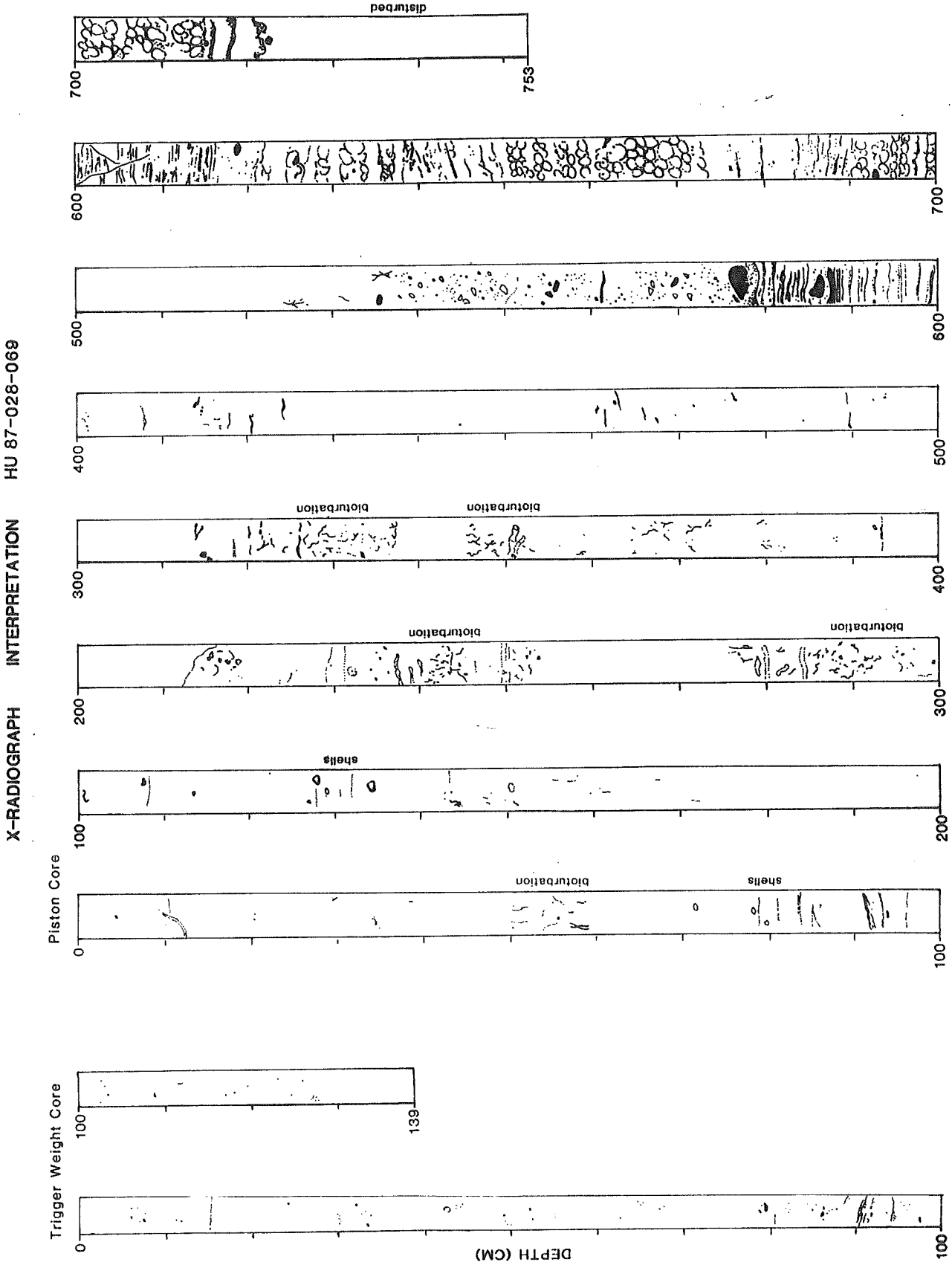
CORE HU-87-028-069

CORE DESCRIPTION

CORE	INTERVAL (cm)	SEDIMENT TYPE	COLOUR	LITHOFACIES CODE	PHYSICAL PROPERTIES
HU-87-028-069					
TWC	0-139	Olive grey silty clay with dark grey mottles, bioturbated, minor pebbles.	5Y 4/2	Fm	Low bulk density, high water content.
PC	0-532	Olive grey silty clay with dark grey mottles, bioturbation varies, very faint lamination in places, occasional shells, pebbles and stringers of organic material.	5Y 4/2	Fm	Physical properties comparable to TWC
		--- gradational change ---			
	532-570	Olive grey silty clay, as above, clay clasts and pebbles present, many stringers of organic material, up to 2cm long and 1mm wide	5Y 4/2	Fmd	Increase in bulk density and decrease in water content from overlying unit which is maintained downcore with an exception at 6m
		--- gradational contact ---			
	570-582	Dark grey silty clay, few pebbles, clay clasts, coarsens gradationally downcore	5Y 5/1	Fmd	
		--- sharp contact ---			
	582-604	Rhythmically banded sequence consisting of interbedded grey silty clay (10YR 5/1) and greyish brown clay (2.5Y 5/2), couplets which appear to fine upward. Rhythmites vary, thin upward from 1.5cm at base to 1cm thick near top of unit. Minor pebbles. Basal 10cm shows less rhythmic character in sedimentation.		Fld	
		--- gradational contact ---			
	604-618	Rhythmic sedimentation. Beds 3cm thick and consist of grey (10YR 5/1) laminated silty clay grading upward to dark grey (5Y 4/1) clay. Unit faulted.		Fl	
		--- gradational contact ---			
	618-670	Deformed rhythmically bedded sediment similar to above unit. Dark grey clay broken up into subrounded clasts forming texture similar to cottage cheese (lumpy), original bedding preserved in places. Complete disruption between 622 and 640cm and 650 and 670cm, clay clasts rounded to subangular, up to 2cm diameter.			

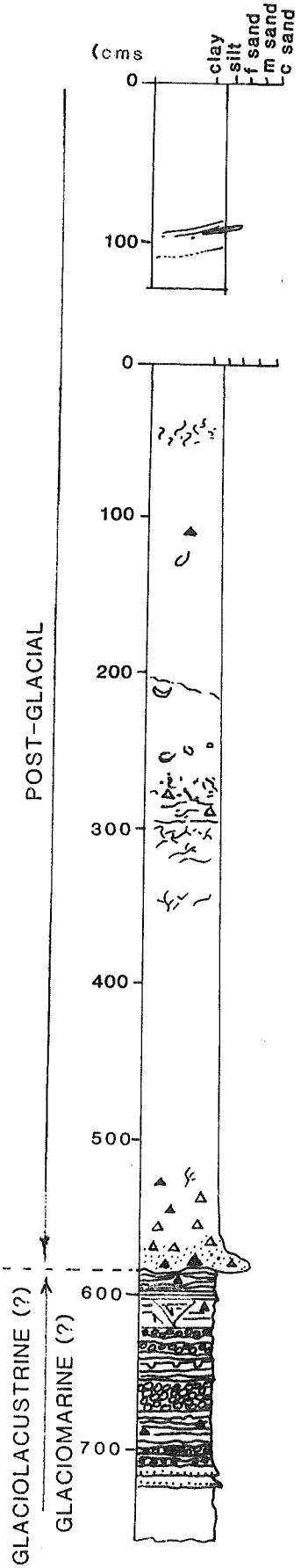
HU-87-028-069 (cont'd)

	--- gradational contact ---	
670-700	Rhythmically bedded unit similar to above. Couplets of variable thickness, basal contacts irregular, show minor deformation, few pebbles.	Fld
	--- contact sharp ---	
700-710	Deformed rhythmically bedded sediment, original bedding preserved but brown grey layers consist of clay clasts with appearance of cottage cheese.	Fl(d)
	--- gradational contact ---	Fl
710-720	Rhythmically bedded material as above. Two fining upward sequences.	
720-758	Base of core completely disrupted in coring process.	


X-RADIOGRAPH INTERPRETATION HU 87-028-069
Trigger Weight Core
Piston Core
DEPTH (CM)
0
100
139
shells
bioturbation
disturbed
700
753
600
500
400
300
200

HU 87-028-069

W.D. 165m



COLOUR	LITHOFACIES CODE
5Y 4/2	Fm, Fl
5Y 4/2	Fmd, Fl
5Y 4/2	Fmd
5Y 5/1	
10YR 5/1	Fld
	Fl(d)
	Fld
	Fl(d)
	Fl
	Fld

Core: HU-87-028-069 Location: Great Whale River 55°28.62'N 77°57.58'W Water Depth: 165m
Core Length:
TWC 139cm
PC 753cm

TEXTURAL ANALYSIS

Subsample Interval (cm)	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay <0.004mm	Analysis Type
TWC					
3-6	19.61	2.04	36.29	61.37	C
116-119	0.00	0.00	36.96	63.04	C
PC					
8-10	0.00	0.00	30.45	69.55	C
90-92	0.00	2.21	32.54	65.25	SSC
198-200	0.00	1.07	33.91	65.02	SSC
298-300	0.00	2.54	33.98	63.48	SSC
360-362	0.00	4.19	23.01	72.80	SSC
403-405	0.00	2.99	31.05	65.96	SSC
452-454	0.00	2.79	20.72	76.49	SSC
505-507	0.00	6.41	31.31	62.28	SSC
554-556	6.85	3.94	32.63	63.43	C
580-582	7.01	22.19	30.45	47.36	SSC
586-588	0.00	0.00	16.54	83.46	C
638-641	0.00	1.10	23.51	75.39	C
682-684	0.00	0.00	22.44	77.56	C
718-720	0.00	2.19	18.91	78.90	SSC

LITHOLOGICAL ANALYSIS (2-5.6mm fraction)
Total Weight - total weight of fraction analysed

Subsample Interval (cm)	Total Weight (gms)	% Paleozoic Grey Carbonate	% Crystalline	% Prot. Carbonate	% Prot. Greywacke	% Others
PC						
580-582	1.60	0.0	47.2	8.1	37.9	6.8

HEAVY MINERAL ANALYSIS (0.063-0.250mm)

I. Total Count

Subsample Interval (cm)	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk
580-582	6.7	14.0	1.3	7.3	52.7	0.0	2.0	0.0	2.0	2.7	6.0	2.7	0.0	1.3	1.3

II. Plotted Values (calculated percentages excluding cpx and hbl)
Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance, bracketed minerals have values >10% <15%

Subsample Interval (cm)	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
580-582	15.3	1.4	8.0	57.7	0.0	2.2	0.0	6.6	2.9	Hem/Opx

Core: HU-87-028-069

LECO CARBONATE DATA (<0.063mm)

Subsample Interval (cm)	Total Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
TWC				
3-6	3.2	0.5	2.7	22.5
116-119	2.8	0.4	2.4	20.0
PC				
8-10	2.9	0.4	2.5	20.8
90-92	2.2	0.6	1.6	13.3
198-200	2.2	0.6	1.6	13.3
298-300	2.0	0.5	1.5	12.5
360-362	1.8	0.5	1.3	10.8
403-405	1.5	0.5	1.0	8.3
452-454	1.4	0.5	0.9	7.5
505-507	1.4	0.5	0.9	7.5
554-556	2.0	0.3	1.7	14.2
580-582	0.4	0.1	0.3	2.5
586-588	0.3	0.1	0.2	1.7
593-594	0.3	0.0	0.2	1.7
594-596	0.3	0.0	0.3	2.5
638-641	0.3	0.1	0.2	1.7
682-684	0.4	0.1	0.3	2.5
718-720	0.3	0.1	0.2	1.7

GEOCHEMICAL ANALYSIS (<0.002mm)

Core: Hu-87-028-069

Subsample Interval (cm)	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
TWC																					
3-6	1.92	<5	80	1.38	18	62	8	3.04	0.66	1.72	428	2.54	34	>10000	<2	<5	6	0.12	54	<5	76
116-119	1.97	<5	80	1.35	15	66	10	2.70	1.01	1.33	582	>5.00	27	>10000	10	6	36	0.03	60	<5	75
PC																					
8-10	2.78	20	130	1.43	26	80	18	4.02	0.94	2.01	1010	0.81	49	3580	14	9	46	0.18	88	5	111
90-92	2.79	10	130	0.94	27	84	14	3.88	1.00	1.93	1050	1.58	46	>10000	8	10	42	0.17	86	<5	110
198-200	2.65	50	140	1.02	26	83	16	3.69	0.99	1.93	987	1.96	44	>10000	12	9	48	0.16	77	<5	106
298-300	2.73	<5	100	0.86	27	87	13	3.77	0.94	1.86	823	1.02	49	6080	6	10	39	0.19	77	<5	108
360-362	2.51	5	120	0.88	23	79	16	3.36	0.84	1.74	825	0.75	43	3340	<2	9	39	0.18	74	<5	96
403-405	2.69	40	140	0.85	25	89	17	3.68	0.95	1.87	854	0.81	50	3560	16	10	41	0.18	77	<5	104
452-454	2.73	20	150	0.92	27	91	18	3.74	0.93	1.92	926	0.81	51	3550	<2	10	42	0.20	86	<5	105
505-507	3.04	35	160	0.97	32	101	22	4.26	1.08	2.10	827	0.76	61	2900	8	11	47	0.24	98	<5	119
554-556	3.00	60	110	1.05	23	96	25	3.97	1.02	2.02	560	0.70	52	3410	18	11	48	0.24	82	<5	112
580-582	2.85	35	120	0.97	25	92	19	4.01	1.05	2.04	622	0.92	45	4630	<2	11	51	0.24	85	<5	100
586-588	3.20	15	120	0.95	25	104	19	4.22	1.10	2.07	579	0.66	55	2640	4	12	54	0.26	84	<5	106
593-594	2.63	15	100	0.58	20	78	16	3.49	1.07	1.55	450	>5.00	43	>10000	<2	9	45	0.03	70	<5	91
594-596	2.73	5	100	1.01	25	85	18	4.42	0.93	2.02	663	0.89	47	5090	18	10	47	0.17	87	<5	98
638-641	3.12	15	120	0.91	27	105	24	4.68	1.04	2.13	651	0.70	58	3470	16	11	49	0.23	87	<5	112
682-684	3.30	15	140	0.98	27	78	18	4.75	1.16	2.53	798	0.73	46	3240	12	11	45	0.22	86	5	115
718-720	3.51	25	150	0.91	29	98	27	4.80	1.28	2.48	773	0.96	54	4680	24	12	50	0.21	93	5	123

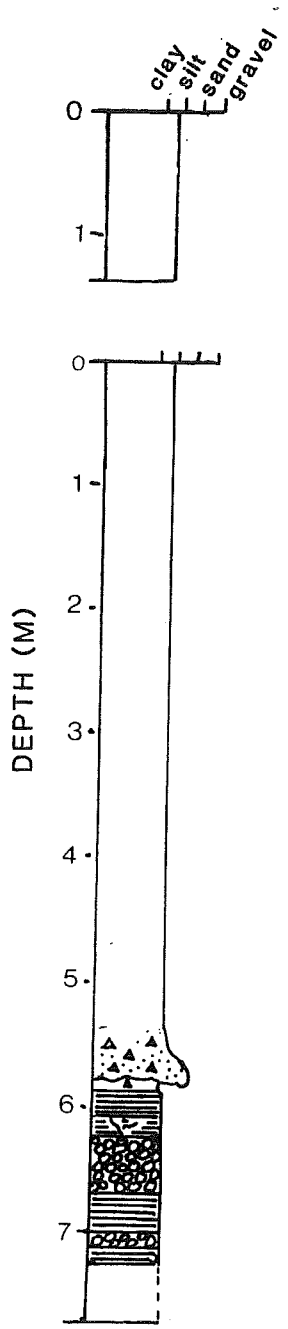
MINERALOGY: CLAY-SIZE FRACTION (<0.002mm)

(No attempt has been made to determine relative abundance of minerals, except in the case of calcite and dolomite where peak heights are given based on 1000 cps. The relative abundance of these minerals is assumed to be proportional to peak height)

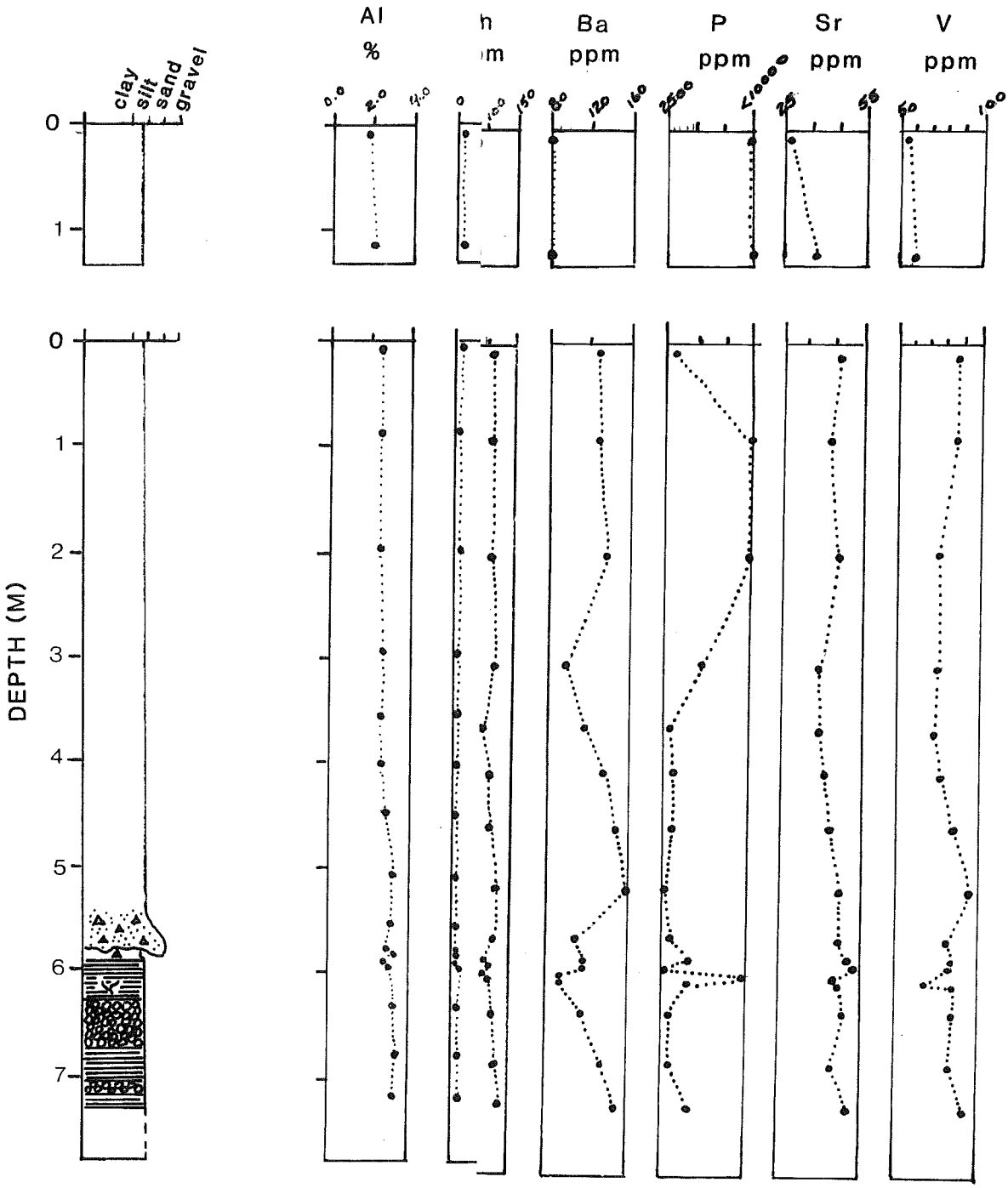
Core HU-87-028-069

Sample Interval	Chlorite	Illite	Kaolinite	Montmorillonite	Quartz	Feldspar Na & K	Calcite	Dolomite	Amphibole
PC									
593-594	v	v				v			
638-641	v	v			v	v	v		

CORE HU-87-028-06



CORE HU-87-028-069



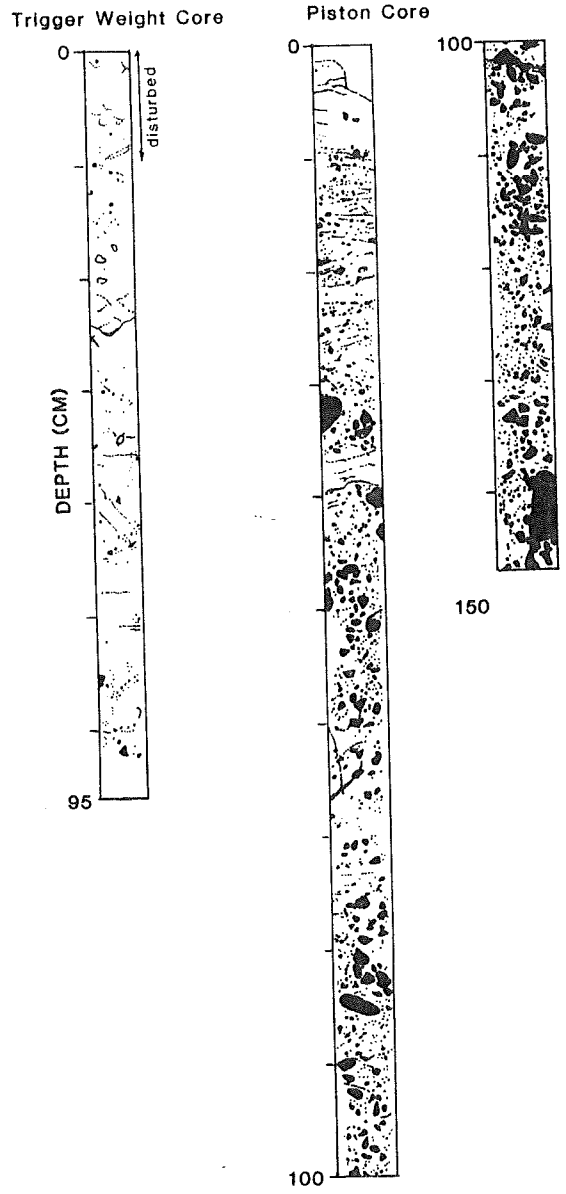
RESULTS

CORE HU-87-028-074

CORE DESCRIPTION

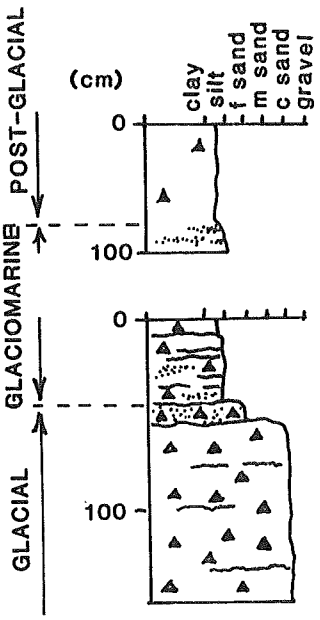
CORE	INTERVAL (cm)	SEDIMENT TYPE	COLOUR	LITHOFACIES CODE	PHYSICAL PROPERTIES
HU-87-028-074					
TWC	0-66	Olive grey silty clay with pebbles bioturbated, few discontinuous sandy and pebbly beds and laminations near base. Few shell fragments, large limestone cobble at 20cm	5Y 4/2	Fm Fld	Water content increases, bulk density decreases down trigger weight core.
PC	0-7	Olive grey silty clay, one pebble present, bioturbated --- sharp contact ---	5Y 4/2	Fmd	Bulk density and water contents similar to lower half of TWC
	7-45	Interbedded grey (10YR 5/1) clay, noncalcareous, minor silt and (10YR 4/2) grey brown, slightly siltier, clay. Bedding diffuse and colour changes gradational. Pebbles and sand present in siltier unit, increase in size and frequency toward base of unit. Lithologies include greywacke and limestone. --- sharp contact ---	10YR 5/1 and 10YR 4/2	Fld	
	45-51	Sandy clay, (diamicton (?), dark grey, many granules, massive. --- sharp contact ---	5Y 4/1	Dmm	Dramatic increase in bulk density and velocity, decrease in water content
	51-147	Dark grey brown diamicton, sandy, many pebbles, faint stratification	10YR 4/2	Dms	

X-RADIOGRAPH INTERPRETATION HU 87-028-074



CORE SUMMARY

HU-87-028-074



COLOUR	LITHOFACIES CODE
5Y 4/2	Fmd
	Fld
5Y 4/2	Fmd
10YR 5/1	Fld
10YR 4/2	
5Y 4/1	Dmm
10YR 4/2	Dms

Core: HU-87-028-074 Location: Hudson Bay 55°06.11'N 80°29.69'W Water Depth: 95m
Core Length:
TWC 65cm
PC 150cm

TEXTURAL ANALYSIS

Subsample Interval (cm)	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay <0.004mm	Analysis Type
TWC					
8-10	0.00	7.74	46.55	45.71	C
45-48	5.35	13.04	38.86	48.10	SSC
60-63	3.52	11.99	29.99	58.02	C
PC					
1-3	0.00	8.23	42.44	49.33	C
20-22	8.13	8.09	13.93	77.98	C
35-37	9.59	14.45	23.11	62.44	C
47-49	20.99	28.02	38.83	33.15	C
78-80	17.11	23.72	36.02	40.27	C
110-112	6.49	23.24	37.12	39.64	SSC
142-144	1.10	27.12	37.47	35.41	SSC
cutter	8.78	26.93	36.79	36.28	SSC

LITHOLOGICAL ANALYSIS (2-5.6mm fraction)
Total Weight - total weight of fraction analysed

Subsample Interval (cm)	Total Weight (gms)	% Paleozoic Grey Carbonate	% Pink/red Carbonate	% Crystalline	% Proterozoic Carbonate	% Greywacke Argillite	% Others	Comments
PC								
35-37	1.34	63.2	0.0	15.0	3.8	12.3	5.3	Prot. vol.& seds
47-49	2.75	57.6	0.0	18.8	0.0	12.3	11.2	Prot. vol., seds; Pal. shale
78-80	4.20	57.7	1.4	7.6	0.0	20.4	13.0	as above
110-112	3.60	57.5	0.0	20.6	0.0	17.5	4.4	other metaseds
142-144	2.60	58.8	0.4	21.2	0.0	19.2	0.4	-
cutter	18.10	53.6	2.3	20.6	0.0	19.1	4.3	Prot. Fe Fm, other metaseds

HEAVY MINERAL ANALYSIS (0.063-0.250mm)

I. Total Count

Subsample Interval (cm)	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk	
TWC																
60-63	6.7	20.7	16.0	9.3	10.0	0.7	2.7	3.3	4.7	4.0	10.0	3.3	0.0	4.0	4.7	(Staurolite/contamination)
PC																
35-37	9.3	32.0	14.0	8.0	3.3	0.7	9.3	0.0	3.3	2.0	10.0	0.0	0.0	5.3	2.7	
47-49	4.0	24.0	18.7	11.3	6.0	1.3	7.3	2.0	0.7	0.0	16.0	4.0	0.0	2.0	2.7	
78-80	8.7	32.7	20.0	4.7	4.0	0.7	9.3	2.7	1.3	0.0	8.7	2.0	0.0	2.7	2.7	(Spinel)
110-112	11.3	32.0	14.0	12.7	4.0	1.3	4.7	1.3	3.3	0.7	7.3	3.3	0.0	2.0	2.0	
cutter	9.3	24.0	12.7	14.0	10.0	0.7	10.7	0.7	1.3	0.7	9.3	2.0	0.0	2.0	2.7	(Spinel)

Core: HU-87-028-074

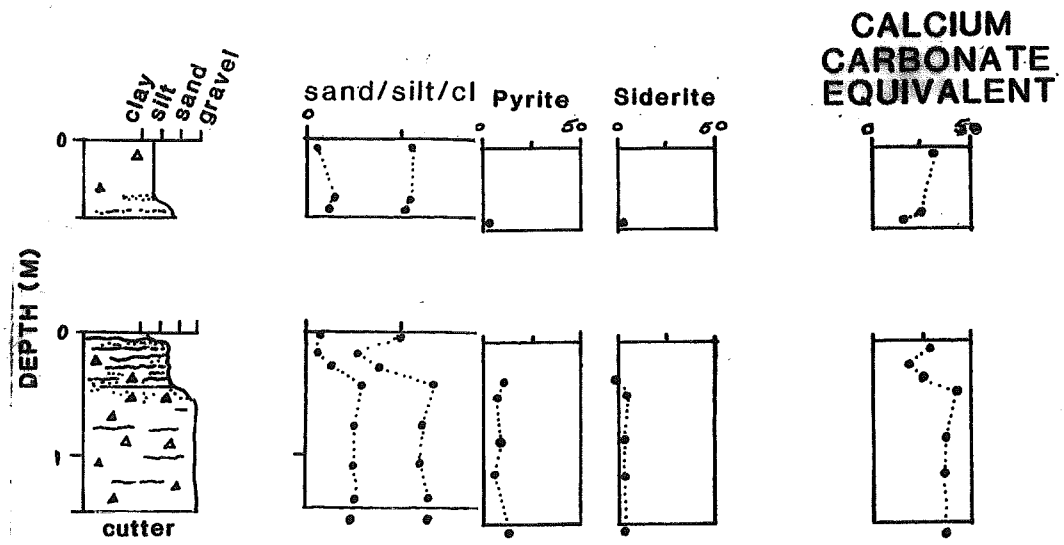
II. Plotted Values (calculated percentages excluding cpx and hbl)
Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance, bracketed minerals have values >10% <15%

Subsample Interval (cm)	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
TWC										
60-63	23.4	18.0	10.5	11.3	0.8	3.0	3.7	11.3	3.7	Opx/Gar(Hem/Ilm/Epi)
PC										
35-37	36.6	16.0	9.2	3.8	0.8	10.6	0.0	11.4	0.0	Opx/Gar(Ilm/Pyr)
47-49	25.2	19.6	11.9	6.3	1.4	7.7	2.1	16.8	4.2	Opx/Gar/Ilm(Epi)
78-80	36.3	22.2	5.2	4.4	0.8	10.3	3.0	9.7	2.2	Opx/Gar(Pyr/Ilm)
110-112	37.5	16.4	14.9	4.7	1.5	5.5	1.5	8.5	3.9	Opx/Gar/Epi
cutter	26.8	14.2	15.7	11.2	0.8	12.0	0.8	10.4	2.3	Opx/Epi(Gar/Pyr/Hem/Ilm)

LECO CARBONATE DATA (<0.063mm)

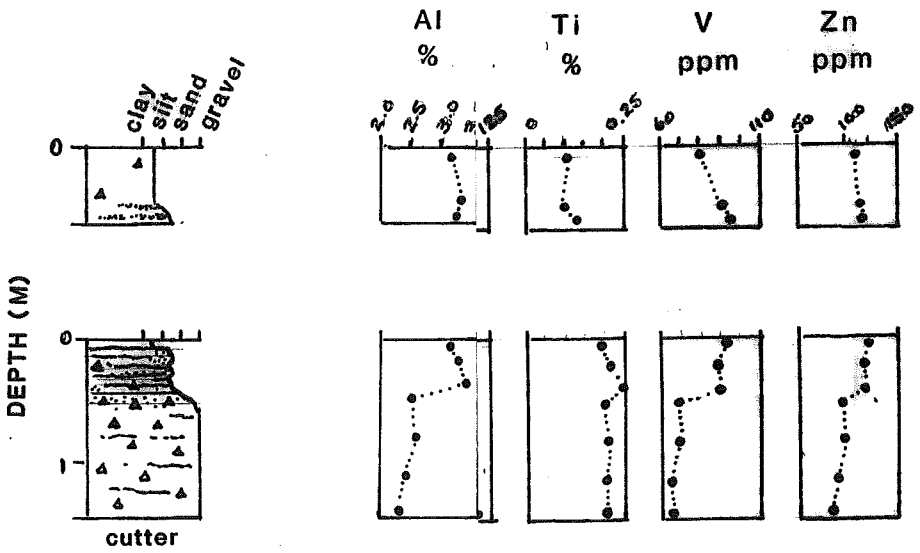
Subsample Interval (cm)	Total Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
TWC				
8-10	4.0	0.4	3.6	30.0
45-48	3.4	0.5	2.9	24.2
60-63	2.7	0.5	2.9	24.2
PC				
1-3	3.9	0.4	3.5	29.2
20-22	2.6	0.2	2.4	20.0
35-37	3.4	0.2	3.2	26.7
47-49	5.3	0.1	5.2	43.3
78-80	4.8	0.2	4.6	38.3
110-112	4.6	0.2	4.4	36.7
142-144	4.9	0.2	4.7	39.2
cutter	4.8	0.2	4.6	38.3

CORE HU-87-028-074



CORE HU-87-028-074

GEOC



GEOCHEMICAL ANALYSIS (<0.002mm)

Core: Hu-87-028-074

Subsample Interval (cm)	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
TWC																					
8-10	3.20	<5	120	1.63	21	91	15	4.19	1.05	2.29	462	1.82	47	>10000	6	9	43	0.11	82	<5	114
45-48	3.30	5	140	1.30	23	99	15	4.29	1.13	2.21	526	1.38	50	9440	10	10	42	0.10	91	5	117
60-63	3.27	<5	140	1.16	29	98	16	4.30	1.13	2.14	557	1.10	50	7040	6	10	41	0.13	94	5	117
PC																					
1-3	3.10	35	140	1.78	26	89	18	4.32	1.03	2.25	554	0.79	52	3460	16	10	54	0.19	91	5	120
20-22	3.30	50	120	2.36	30	103	23	4.80	0.97	2.48	647	0.69	55	3720	28	11	62	0.22	87	10	118
35-37	3.37	55	120	3.73	28	105	24	4.86	0.98	2.49	665	0.62	52	3150	16	11	72	0.26	89	5	118
47-48	2.56	15	130	8.84	23	87	19	3.64	0.77	2.36	531	0.58	45	3810	22	8	113	0.20	69	5	94
78-80	2.61	15	180	7.69	24	84	22	3.74	0.81	2.27	559	0.52	46	2720	2	9	114	0.21	69	10	95
110-112	2.36	45	160	7.68	23	76	20	3.51	0.71	2.29	513	0.48	40	2650	26	8	108	0.20	63	5	89
142-144	2.26	20	150	8.17	22	79	19	3.45	0.66	2.23	518	0.48	47	2590	16	8	111	0.20	62	15	88
cutter	2.49	<5	160	8.29	17	86	24	3.74	0.74	2.28	580	0.38	42	1690	8	9	101	0.19	64	<5	93

MINERALOGY: CLAY-SIZE FRACTION (<0.002mm)

(No attempt has been made to determine relative abundance of minerals, except in the case of calcite and dolomite where peak heights are given based on 1000 cps. The relative abundance of these minerals is assumed to be proportional to peak height)

Core HU-87-028-074

Sample Interval	Chlorite	Illite	Kaolinite	Montmorillonite	Quartz	Feldspar Na & K	Calcite	Dolomite	Amphibole
TWC									
8-10	v	v			v	v		60	
PC									
78-80	v	v				v	170	60	
142-144	v	v			v	v	250	130	

RESULTS

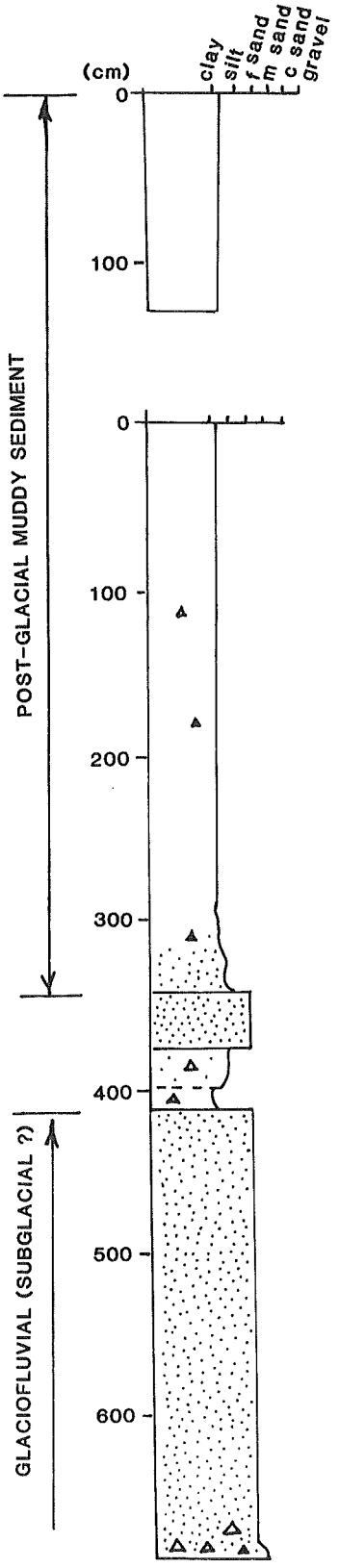
CORE HU-87-028-090

CORE DESCRIPTION

CORE	INTERVAL (cm)	SEDIMENT TYPE	COLOUR	LITHOFACIES CODE	PHYSICAL PROPERTIES
HU-87-028-090					
TWC	0-3	Olive grey silty clay, slightly mottled	5Y4/2	F	
	3-130	Olive grey silty clay with abundant sulphide mottles	5Y 4/2	Fm	Low bulk density and high water content. Little variation within TWC
PC	0-10	Top of the core disturbed and removed			
	10-57	Olive grey silty clay with abundant black sulphide mottles --- gradational ---	5Y 4/2	Fm	Low bulk density, high water content similar to TWC
	57-343	Dark grey silty clay with abundant sulphide mottles, scattered sand grains and granules. Bioturbation gradually decreases downward from 120cm --- sharp contact ---	5Y 4/1	Fm	Physical properties profiles generally featureless.
	343-371	Greyish brown sand with scattered sulphides, well sorted, massive, likely sucked up in core from lower stratigraphic level. --- sharp contact ---	2.5Y 5/2	S	
	371-398	Grey silty clay with sand and granules, discrete dark sulphide mottling --- gradational contact ---	5Y 5/1	Fmd	Increase in bulk density, decrease in water content, suggest draining of unit.
	398-409	Grey to greyish brown mud with pebbles --- sharp contact ---	2.5Y 5/2	Fmd	
	409-682	Greyish brown sand, well sorted, disturbed, no sedimentary structures present.	2.5Y 5/2	S	
	674-682	Silty clay clasts and granules occur within sand unit			

CORE SUMMARY

HU-87-028-090



	COLOUR	LITHOFACIES CODE
0–100 cm	5Y 4/2	Fm
0–100 cm	5Y 4/2	Fm
100–300 cm	5Y 4/1	
300–400 cm	2.5Y 5/2	S
400–500 cm	5Y 5/1 2.5Y 5/2	Fmd
500–600 cm	2.5Y 5/2	S

Core: HU-87-028-090 Location: Hudson Bay 58°39.23'N 90°17.09'W Water Depth: 155m
Core Length:
TWC 139cm
PC 699cm

TEXTURAL ANALYSIS

Subsample Interval (cm)	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay <0.004mm	Analysis Type
TWC					
9-12	0.00	0.00	62.29	37.72	C
74-77	0.00	0.11	65.48	34.41	SSC
132-135	0.00	0.00	60.89	39.11	C
PC					
16-18	0.00	0.00	55.41	44.59	C
47-49	0.00	4.07	52.81	43.12	SSC
78-80	0.00	0.00	55.35	44.65	SSC
148-150	0.00	0.00	55.39	44.61	SSC
238-240	0.00	0.00	52.53	47.47	SSC
282-284	0.00	2.62	45.27	52.11	SSC
316-318	0.00	2.75	49.72	47.53	SSC
338-340	0.00	0.00	48.04	51.96	C
350-352	0.00	91.23	5.80	2.95	C
373-375	0.96	3.62	43.99	52.39	SSC
400-402	10.20	14.99	40.65	44.36	C
410-412	0.00	91.92	5.60	2.68	C
500-502	0.00	94.02	3.48	2.50	SSC
550-552	0.00	95.37	2.30	2.33	C
570-572	0.00	95.28	2.52	2.20	C
660-662	0.00	95.41	2.78	1.81	C
683	6.13	37.65	46.32	16.03	C

LITHOLOGICAL ANALYSIS (2-5.6mm)
- insufficient material available

HEAVY MINERAL ANALYSIS (0.063-0.250mm)

I. Total Count

Subsample Interval (cm)	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk
350-352	0.7	6.7	3.3	8.0	5.3	0.7	23.3	30.0	2.7	4.0	10.0	0.7	0.0	2.7	2.0 (Spinel)
410-412	2.0	8.7	14.7	7.3	10.0	1.3	16.0	17.3	2.0	3.3	7.3	3.3	1.3	3.3	2.0
660-662	2.0	12.7	10.0	4.0	8.0	1.3	12.0	20.7	2.0	2.0	9.3	4.0	0.0	8.0	4.0 (Staurolite/Kyanite)

Core: HU-87-028-090

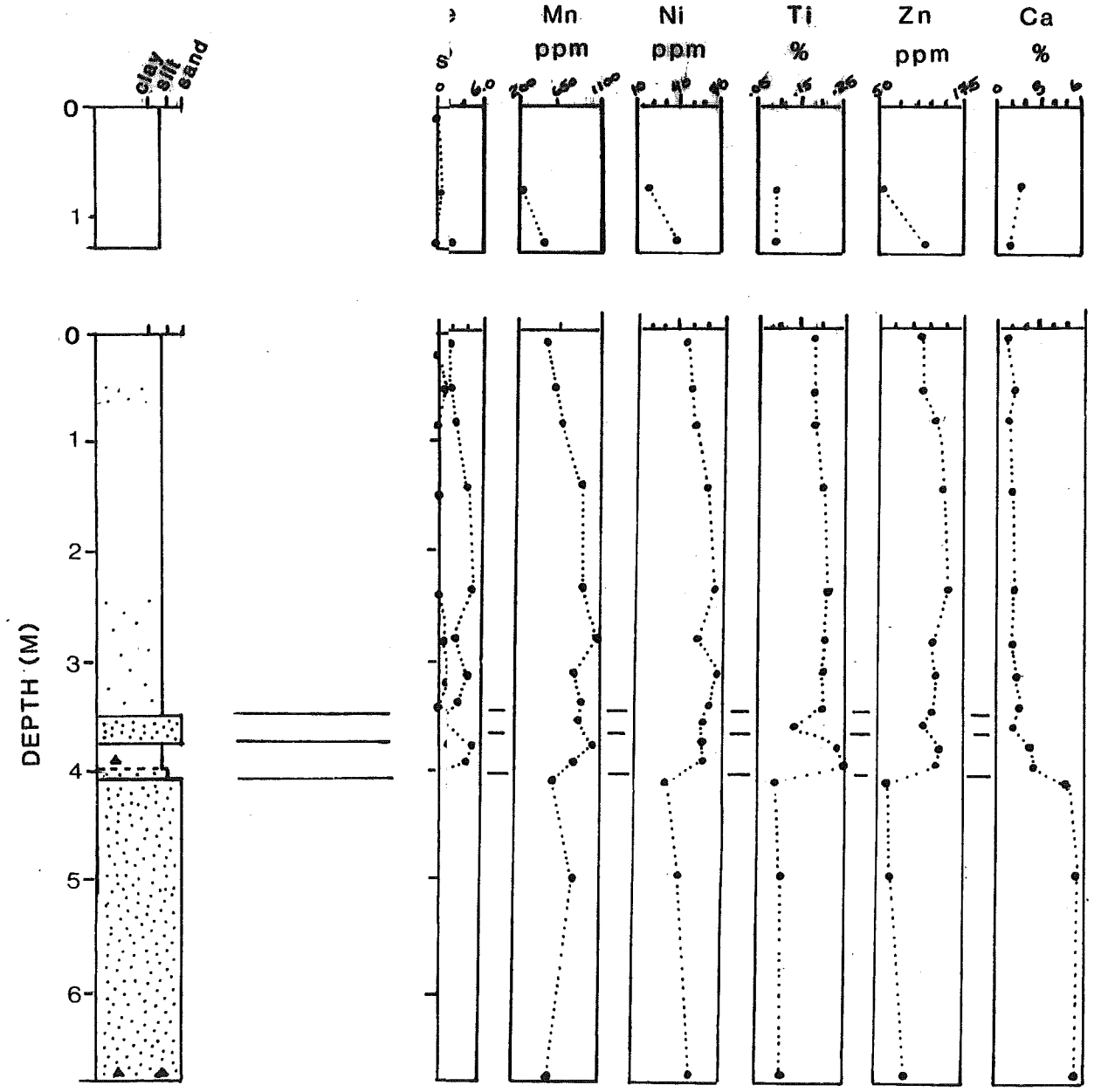
II. Plotted Values (calculated percentages excluding cpx and hbl)
Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance, brackted mierals have values >10% <15%

Subsample Interval (cm)	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
350-352	6.9	3.4	8.3	5.5	0.7	24.1	31.0	10.4	0.7	Sid/Pyr(Ilm)
410-412	9.1	15.3	7.6	10.4	1.4	16.7	18.0	7.6	3.4	Sid/Pyr/Gar(Hem)
660-662	13.2	10.4	4.2	8.3	1.3	12.5	21.6	9.7	4.2	Sid(Opx/Pyr/Gar/Ilm)

LECO CARBONATE DATA (<0.063mm)

Subsample Interval (cm)	Total Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
TWC				
9-12	3.1	1.0	2.1	17.5
74-77	4.0	0.8	3.2	26.7
132-135	3.0	0.8	2.2	18.3
PC				
16-18	2.9	0.8	2.1	17.5
47-49	2.9	0.8	2.1	17.5
78-80	2.8	0.7	2.1	17.5
148-150	2.7	0.7	2.0	16.7
238-240	2.6	0.5	2.1	17.5
282-284	2.8	0.4	2.4	20.0
316-318	2.9	0.3	2.6	21.7
338-340	3.5	0.3	3.2	26.7
350-352	4.2	0.1	4.1	34.2
373-375	3.4	0.3	3.1	25.8
400-402	3.5	0.4	3.1	25.8
410-412	4.2	0.1	4.0	34.2
500-502	3.1	0.1	3.0	25.0
550-552	4.3	0.0	4.3	35.8
570-572	3.4	0.0	3.4	28.3
660-662	2.6	0.0	2.6	21.7
683	4.9	0.3	4.6	38.3

CORE HU-87-028-090



GEOCHEMICAL ANALYSIS (<0.002mm)

Core: Hu-87-028-090

Subsample Interval (cm)	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
TWC																					
74-77	1.36	<5	80	1.80	8	58	6	1.92	0.58	1.70	220	2.34	18	>10000	<2	4	28	0.08	44	<5	52
132-135	2.98	<5	180	0.93	20	99	19	4.13	1.35	2.10	478	2.05	39	>10000	<2	9	43	0.08	101	15	118
PC																					
6-18	2.66	40	220	0.93	24	83	23	4.14	1.22	2.09	534	1.01	46	5290	2	9	45	0.18	108	10	120
47-49	2.65	30	250	1.04	24	83	24	4.33	1.19	2.17	615	1.02	50	5300	8	9	47	0.18	116	5	122
78-80	2.83	55	260	0.94	26	91	25	4.75	1.35	2.24	678	1.02	52	4770	36	10	48	0.18	120	<5	134
148-150	3.21	45	310	1.03	32	100	25	5.25	1.53	2.48	897	1.09	58	4940	18	11	55	0.20	133	5	148
238-240	3.34	65	280	1.16	45	98	24	5.59	1.59	2.64	919	1.10	66	5170	34	11	58	0.22	138	5	156
282-284	3.05	30	230	1.38	37	91	21	4.85	1.35	2.49	1100	0.83	55	3560	34	11	61	0.21	102	10	132
316-318	3.32	55	220	1.45	41	96	24	5.13	1.52	2.63	875	1.06	67	5400	14	11	65	0.20	111	10	141
338-340	3.17	40	240	1.85	35	91	22	4.81	1.41	2.58	916	0.81	61	3650	12	11	68	0.20	98	5	130
350-352	2.54	30	140	1.25	34	86	20	4.02	0.92	2.14	906	1.62	58	>10000	52	8	60	0.14	84	10	124
373-375	3.69	5	300	2.01	34	109	25	5.68	1.54	3.01	1005	0.80	56	3750	14	11	66	0.24	104	<5	148
400-402	3.73	5	250	2.05	32	98	33	5.31	1.45	2.91	875	0.79	57	4080	12	11	69	0.25	108	<5	144
410-412	1.58	10	150	4.95	17	73	13	2.66	0.58	2.58	620	3.33	36	>10000	18	5	56	0.07	45	<5	64
500-502	1.76	10	170	5.43	23	77	17	3.20	0.55	2.99	847	1.06	40	>10000	16	6	59	0.09	51	<5	72
683	2.60	<5	140	5.64	20	71	18	3.81	0.72	2.24	569	0.75	50	4840	14	7	76	0.10	58	<5	100

MINERALOGY: CLAY-SIZE FRACTION (<0.002mm)

(No attempt has been made to determine relative abundance of minerals, except in the case of calcite and dolomite where peak heights are given based on 1000 cps. The relative abundance of these minerals is assumed to be proportional to peak height)

Core HU-87-028-090

Sample Interval	Chlorite	Illite	Kaolinite	Montmorillonite	Quartz	Feldspar Na & K	Calcite	Dolomite	Amphibole
TWC									
9-12	v	v			v	v v		370	tr
PC									
16-18	v	v			v	v			tr
282-284	v	v		tr		v v		40	
660-662	v	v				v v		90	tr
683	v	v		tr	v	v	80	90	

RESULTS

GRAB SAMPLES

Grab Samples (HU-87-028)

TEXTURAL ANALYSIS

Sample Number	% Gravel >2mm	% Sand 2-0.063mm	%Silt 0.063-0.004mm	%Clay <0.004mm	Analysis Type
006	39.63	20.19	56.79	23.06	C
011	64.15	37.44	44.58	17.98	C
017	73.87	43.08	41.10	15.82	C
028	0.00	0.00	40.24	59.76	C
033	10.79	6.60	37.62	55.77	C
039	15.60	24.33	46.09	29.58	C
078	1.53	8.80	58.36	32.85	C
087	59.40	25.56	39.29	35.14	C

LITHOLOGICAL ANALYSIS (2-5.6mm fraction)
Total Weight - total weight of fraction analysed

Sample Number	Total Weight (gms)	% Paleozoic Grey Carbonate	% Pink/red Carbonate	% Crystalline	% Dubawnt Group	% Greywacke Argillite	% Others	Comments
006	17.94	94.8	0.0	4.9	0.0	0.0	0.4	shells & shell frags
011	9.57	91.2	0.0	7.8	0.6	0.2	0.2	few shells
017	22.40	73.2	0.0	25.9	0.1	0.1	0.6	Dubawnt questionable
033	1.74	55.4	0.0	36.5	0.0	3.4	4.6	Prot. metaseds
039	2.88	55.3	19.0	23.6	0.0	2.1	0.0	foss. pink carbonate
078	0.56	51.8	0.0	42.9	0.0	5.4	0.0	small sample (18 grs)
087	15.07	28.7	1.0	35.4	1.9	20.4	7.6	red/brown carbonate

HEAVY MINERAL ANALYSIS (0.063-0.250mm)

I. Total Count

Sample Number	Cpx	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Hbl	Leu	Ilm	Tit	Rut	Zir	Unk	
006	8.7	28.0	18.7	6.0	5.3	0.0	0.0	0.0	5.3	2.7	16.0	4.0	0.0	2.7	2.7	(Spinel)
011	2.0	13.3	24.7	11.3	13.3	0.0	2.7	0.7	0.0	0.0	21.3	6.7	0.0	2.0	2.0	
017	9.3	17.3	29.3	6.7	4.7	1.3	0.7	0.0	2.0	0.0	12.7	5.3	0.0	8.7	2.0	
028	4.0	25.3	17.3	11.3	10.7	0.7	0.0	2.0	8.0	0.7	12.7	2.7	0.7	2.7	1.3	
033	2.0	16.7	20.0	20.0	8.0	5.3	0.0	0.0	6.0	2.0	8.0	4.0	0.7	2.0	5.3	(Kyanite)
039	3.3	20.0	24.0	3.3	14.7	2.7	0.0	1.3	0.7	0.7	18.7	5.3	0.0	2.0	3.3	
087	7.3	14.7	21.3	11.3	20.0	2.0	0.0	1.3	1.3	0.7	14.0	1.3	0.0	2.7	2.0	

Grab Samples (HU-87-028)

Grab Samples (HU-87-028)

II. Plotted Values (calculated percentages excluding cpx and hbl)
Assemblage: includes all minerals with percentages >15%, in order of decreasing abundance, bracketed minerals have values >10% <15%

Sample Number	Opx	Gar	Epi	Hem	Goe	Pyr	Sid	Ilm	Tit	Assemblage
006	32.6	21.7	7.0	6.2	0.0	0.0	0.0	18.6	4.7	Opx/Gar/Ilm
011	13.6	25.2	11.5	13.6	0.0	2.8	0.7	21.7	6.8	Gar/Ilm(Opx/Hem/Epi)
017	19.5	33.0	7.6	5.3	1.5	0.8	0.0	14.3	6.0	Gar/Opx(Ilm)
028	28.7	19.6	12.8	12.2	0.8	0.0	2.3	14.4	3.0	Opx/Gar(Ilm/Epi/Hem)
033	18.2	21.7	21.7	8.7	5.8	0.0	0.0	8.7	4.3	Gar/Epi/Opx
039	20.8	25.0	3.4	15.3	2.8	0.0	1.3	19.5	5.5	Gar/Opx/Ilm/Hem
087	16.1	23.3	12.4	21.9	2.2	0.0	1.4	15.3	1.4	Gar/Hem/Opx/Ilm(Epi)

LECO CARBONATE DATA (<0.063mm)

Sample Number	Total Carbon	Non-carbonate Carbon	Inorganic Carbon	Ca Carbonate Equivalent
006	9.1	0.9	8.2	68.3
011	9.0	0.6	8.4	70.0
017	7.7	0.7	7.0	58.3
028	3.6	0.9	2.7	22.5
033	2.5	0.5	2.0	16.7
039	4.4	0.3	4.1	34.2
078	4.8	0.3	4.5	37.5
087	3.5	0.7	2.8	23.3

GEOCHEMICAL ANALYSIS (<0.002mm)

GRAB SAMPLES

Sample Number	Al %	As ppm	Ba ppm	Ca %	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Na %	Ni ppm	P ppm	Pb ppm	Sc ppm	Sr ppm	Ti %	V ppm	W ppm	Zn ppm
87028 006	2.40	10	220	4.40	12	79	27	2.79	0.99	2.48	256	1.34	34	6020	12	7	54	0.10	68	<5	99
87028 011	2.71	<5	420	3.53	14	87	32	3.11	1.13	2.75	309	1.67	38	9350	<2	8	58	0.09	74	10	104
87028 017	2.90	<5	280	2.99	16	97	34	3.78	1.28	2.60	393	1.33	43	5710	6	9	47	0.13	89	15	133
87028 028	3.18	<5	530	1.39	26	99	26	4.77	1.50	2.61	601	0.93	52	3370	2	11	46	0.20	113	5	148
87028 033	2.81	5	1010	1.35	39	79	23	4.37	1.19	2.28	7180	0.91	82	3620	4	9	61	0.16	92	<5	126
87028 039	3.02	<5	430	1.69	28	88	24	5.02	1.27	2.25	1690	1.05	57	4640	14	9	56	0.12	85	<5	137
87028 078	3.20	<5	140	2.79	20	92	22	4.77	1.04	2.41	576	0.75	53	2860	12	10	57	0.17	83	<5	135
87028 087	3.90	<5	410	1.33	25	114	32	5.71	1.63	2.71	744	0.99	58	3650	10	12	65	0.23	129	<5	168

SUMMARY AND INTERPRETATION

Compositional variation is present both within and between cores. For the purpose of this discussion, the cores will be considered individually and in relation to the regional stratigraphic settings. The sedimentology and composition is related to probable depositional processes, where possible, and sedimentation models are proposed.

Cores HU-87-028-001 and 004

The seismic profile of adjacent cores collected in Evans Strait (Fig. 1) indicates a continuity in acoustic facies between sites (Fig. 4). Roughly twenty metres of sediment is present on the subbottom profile consisting approximately of 3m of acoustically transparent muds, 5-6m of acoustically stratified sediments, and up to 10m of acoustically massive material overlying the smooth Paleozoic bedrock surface. The apparent penetration of the piston cores (Table 1) suggests that Core 001 bottomed out in an acoustically massive unit, interpreted as till (Josenhans et al, 1988), and Core 004 penetrated a less reflective, weakly stratified to massive lens-shaped body overlying this basal till. In general, the acoustic character of the units is reflected in the sedimentology and composition of the cores and a correlation is proposed (Fig. 4).

Sedimentology

Diamicton facies at the base of both cores include beds of varying thickness, colour and grain-size. Bedding is graded to massive, and stratification and sandy interbeds are

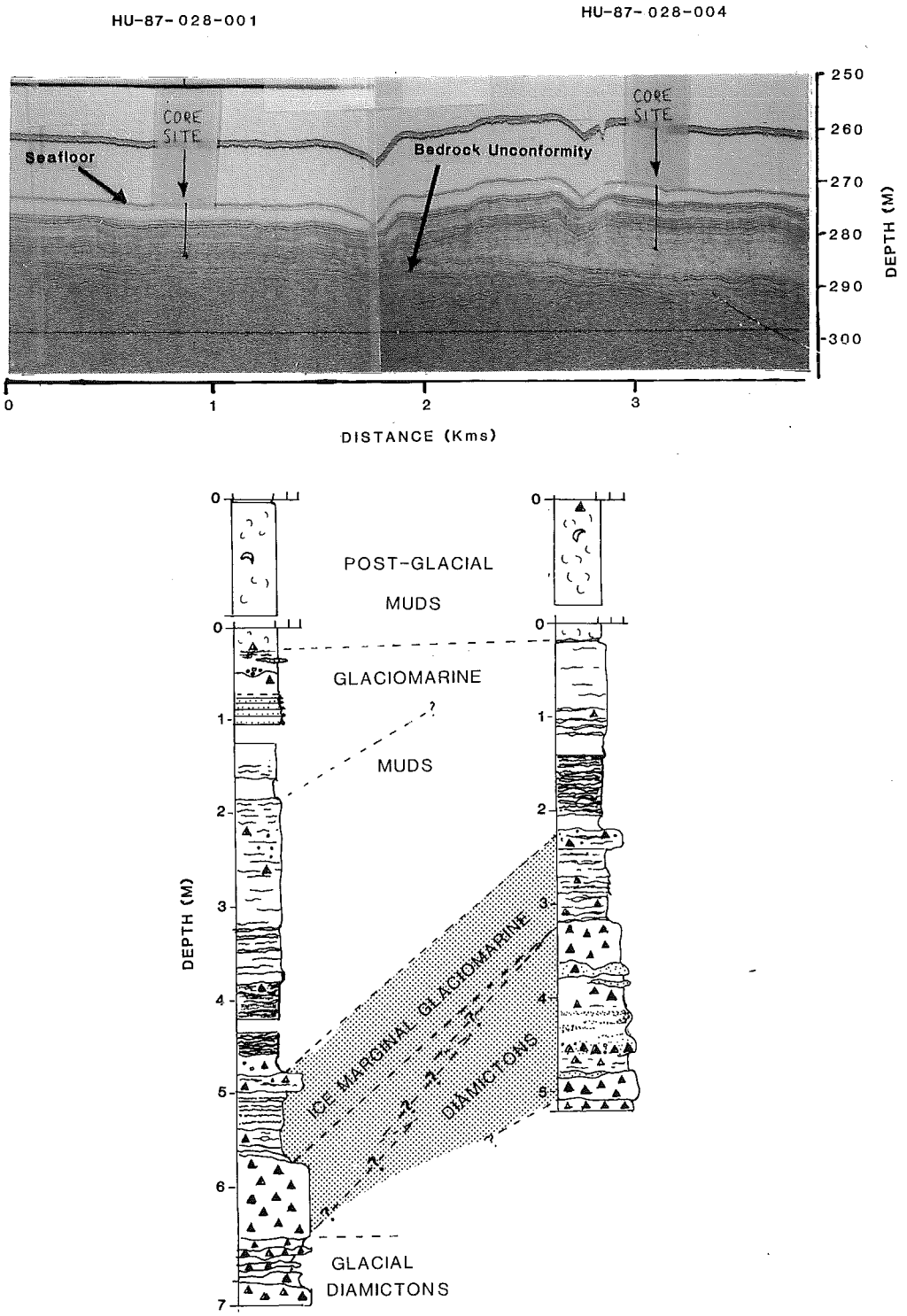


Figure 4: Relationship between acoustic and sedimentary facies at site of Cores 87-028-001 and 87-028-004.

increasingly evident upcore, particularly in core 004. The upper portion of the diamicton sequence consists of thin, fining upward rhythmites capped by a graded sandy diamicton. Shell material has been found in this unit and is presently being dated (Bilodeau, in preparation).

Overlying fine-grained laminated sediments grade upward from red brown, finely laminated, silty clay lacking pebbles to a grey brown siltier and sandier unit with thicker laminations (0.5cm) and pebbles. In Core 001, a unit is present between 28-182m which is not found in Core 004. This interval is characterized by massive to diffusely laminated grey brown to olive grey silty mud and contains lenses and interbeds of coarser sediment.

The trigger weight and uppermost portion of the piston cores consists of olive grey, massive mud containing few shells and pebbles. It appears that at least 1m of this unit is missing from the top of the piston core in both cases. The subbottom profile suggests only a small portion of the unit has been recovered since approximately 3m of acoustically transparent sediment is recorded on the seismic profiles.

Composition

Results of geochemical and carbonate analyses provide continuous compositional profiles through the cores and indicate good correlation of values between similar sedimentary facies. Calcium carbonate percentages are generally high in diamictons, ranging from 55-85%, compared to the overlying finer-grained sediments (<50%).

Lithologic analysis of diamictons indicates that the sediment is derived primarily from Paleozoic sources. Carbonate clasts are characteristic of Ordovician and Silurian formations outcropping beneath the bay (B.Sanford, pers. comm., Sept., 1988). A distinctive red brown unit within the diamicton sequence of Core 001 (687-693cm) contains red-brown erratics, similar to the Kenogami River Formation. This unit also contains a unique clay mineralogy dominated by smectitic mineral phases.

The heavy mineral assemblage generally reflects the input of sediment from additional sources since Paleozoic rocks provide few heavy minerals. Possible exceptions include siderite and pyrite. Although variable, the assemblage within the diamicton facies of both cores is dominated by garnet, orthopyroxene, ilmenite and pyrite. The first three minerals are primarily derived from anorthosites and granulite grade metamorphic rocks of the Shield terrane. Similar outcrops are present on Southampton Island, northern Coats Island and the Keewatin coast.

The heavy mineral assemblage of fine-grained laminated sediment at the top of the piston cores differs somewhat from the diamicton facies in the relative importance of epidote and siderite. Siderite, in the Hudson Bay area, has been linked to a source in the Devonian Kwataboahegan and Stooping River Formations (Skinner, 1973; Pare, 1982; Henderson, 1983, in prep.) and, epidote to Proterozoic sedimentary and volcanic basins (Pare, 1982; Thorliefson, in prep.;

Henderson, in prep.). With the exception of the cutter sample of Core 004, neither Devonian nor Proterozoic clasts or mineral assemblages are recognized in the compositional analysis of the diamicton facies, but the presence of these mineral species in the fine-grained laminated material suggests that these sediments may be derived from a much wider source terrane than the diamictons.

Interpretation

Depositional facies for the cores are indicated on the core summaries. The transition from subglacial and ice proximal glaciomarine sedimentation, characterized by the diamicton sequence, to more distal deposits, represented by fine-grained laminated sediment, is interpreted to reflect sediment deposition into the marine environment from a receding glacier. Increased input of coarse-grained sediment of wider provenance upcore, within the glaciomarine sequence, suggests the increased importance of debris derived from iceberg rafting. Post-glacial sediment, in general, lacks sedimentary structures possibly due to the influence of biogenetic processes on sediment reworking, coupled with a decline in sedimentation rate. Pebbles within the unit indicate that sea-ice rafting does ôccur although the frequency and effect on sedimentation appears relatively minor.

Compositional variation reflected in the heavy mineral assembalge of the basal diamictons of the cores suggests some differences in source terrane for these units. However, the

composition of the upper 80cm (approximately) of ice-marginal sediments and the finer-grained facies correlates well between the two cores.

Cores HU-87-028-015 and 029

These cores are taken in the northwestern quadrant of Hudson Bay (Fig. 1) in areas where the total sediment thickness, as seen in subbottom profile, varys from 7-10m. The seismo- and litho-stratigraphy is generally similar to cores from Evans Strait, although much compressed.

Sedimentology

Massive diamicton present at the base of the piston core (Core 015) grades upward to a dark grey brown, laminated silty clay with pebbles. Sedimentary stuctures and textures at the base of the trigger weight core are similar to those at the top of the piston core suggesting that some overlap (3cm) may occur. The upper part of the trigger weight core consists of dark grey to grey brown massive silty clay with few pebbles.

Core 029 is short but also fines upward from a grey brown sandy diamicton to dark grey, diffusely laminated, silty clay with pebbles.

Composition

Calcium carbonate values are generally lower than those of Evans Strait. Highest values are associated with diamicton facies and range from 48-53% in Core 015 and 30% in Core 029.

Geochemical results indicate variable concentrations within individual sedimentary facies. Within the uppermost

unit of Core 015, most elements, with the exception of Ca, Mg and Sr (all carbonate related elements), are enriched at/or near the surface and tend to decrease downcore. Under certain conditions, elements such as Co, Ni, Fe, and Mn, are precipitated at the sediment-seafloor interface as a result of the mobilization of cations during sediment burial. With the exception of Na and P (dispersant?), element concentrations in the surficial samples of Core 029 are lower than those of the underlying fine-grained sediments.

Clast lithologies consist predominantly of Paleozoic carbonates, derived primarily from Silurian and Devonian Formations (B. Sanford, pers. comm., 1988), and, to a lesser extent, igneous and metamorphic (crystalline) rock fragments. Within the massive diamicton of Core 015, Proterozoic Dubawnt Group erratics from outcrops in the District of Keewatin have been recognized.

The heavy mineral assemblage of Core 015 consists primarily of pyrite with epidote, ilmenite, garnet and orthopyroxene. The pyrite/epidote association dominates the heavy mineral fraction of tills within the Dubawnt dispersal train (Pare, 1982). Therefore, the assemblage suggests mixed provenance involving both Proterozoic Dubawnt Group rocks and igneous and metamorphic rocks characteristic of the Shield terrane.

The garnet, ilmenite, epidote assemblage of Core 029 also repesents an igneous and metamorphic and possibly Proterozoic source, although there is no evidence for the

latter in the coarser, gravel fraction. Siderite may be associated with Devonian carbonate rocks.

Interpretation

As with Evans Strait cores, the stratigraphy indicates deposition from a receding glacier. The massive diamicton at the base of Core 015 is interpreted to represent till deposited by ice flowing eastward from the District of Keewatin, as indicated by the presence of Dubawnt erratics and heavy mineral associations. The till is characterized by both textural and compositional homogeneity and may represent a sub-glacial deposit. The thin ice proximal glaciomarine sediments are interpreted to indicate rapid ice retreat.

Core HU-87-028-035

Core 035 is unique in several respects: a) little post-glacial sediment appears to be present (Fig. 5), b) the scoured (?) surficial deposit overlies channel-fill sediments (possibly Cretaceous)(A. Grant, pers. comm.,1987), and c) sediment colour is predominantly brown or yellow/brown.

Sedimentology

The contact between the basal dark brown, silty diamicton and overlying sediments is erosional and characterized by a thin sand bed overlain by a clay pebble conglomerate containing subrounded clasts of grey or brown clay in beds approximately 1cm thick. The overlying massive diamicton becomes increasingly stratified upcore (from 57cm) with sandy lenses and interbeds. Pebbles and clay clasts are common within these diamicton facies. The upper portion of the core (0-13m) consists of fine-grained massive sediment with few pebbles.

Composition

The carbonate content is highest in the diamicton facies averaging approximately 40%.

Geochemical profiles show some variation between lithofacies. High values of Ba, Co, Cu, Mn and Ni in the uppermost sample suggest that the top of the core represents sediment at, or close to, the seafloor. Sudden changes in concentrations near the base of the core (168-170m) are associated with the sand bed.

Below 57cm, the diamicton facies are characterized by

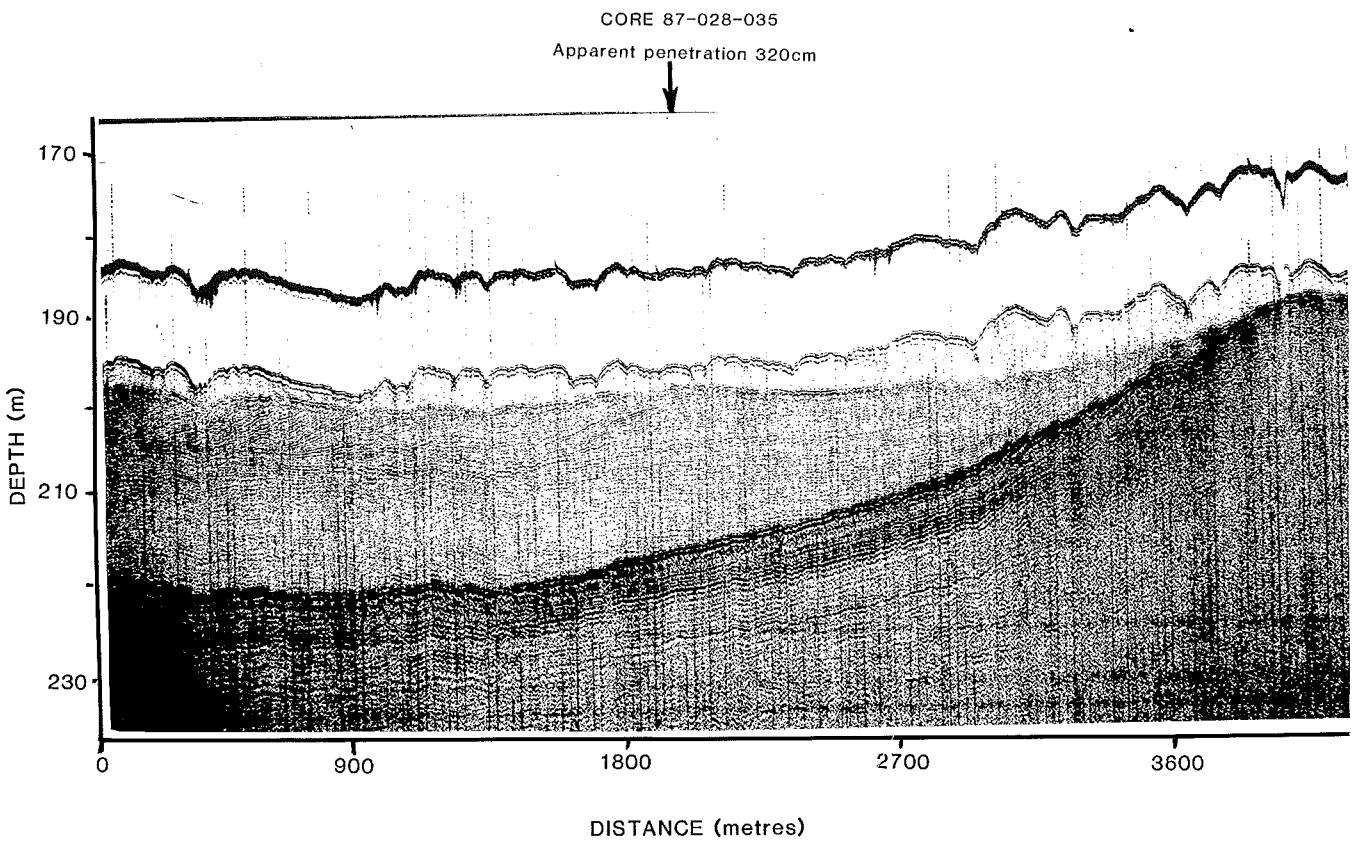


Figure 5: Huntec profile at site of Core 87-028-035.

Paleozoic grey and pink carbonates and crystalline clasts. The red/pink carbonates are derived from the Devonian Williams Island Formation (B. Sanford, personnel communication, 1988) which outcrops in central Hudson Bay, including the Midbay Bank. Minor greywacke/argillite clasts characteristic of the Proterozoic Omarolluk Formation, Belcher Island Group are also present. In the stratified diamictons and fine-grained sediments above 57cm, the composition of the gravel fraction also includes Dubawnt Group clasts.

The heavy mineral assemblage is mixed and reflects the compositional variation seen in the lithologic analysis. The dominant minerals are garnet, ilmenite and orthopyroxene characteristic of the Shield terrane surrounding the bay. Relatively high concentrations of epidote, hematite and pyrite suggest a Proterozoic source, and siderite, a Paleozoic, possibly Devonian source.

Interpretation

Inferred depositional facies are indicated on the summary log of Core 035. The nature of the contact between the compositionally and texturally similar diamicton facies at the base of the core indicates an erosional event, probably in an ice contact setting. Increased stratification upcore suggests glaciomarine deposition initially controlled by the glacier itself and finally dominated by iceberg rafting as suggested by the wider provenance of the upper units. Post-glacial sedimentation appears minimal.

Core HU-87-028-041

Core 041 was collected in southern Winisk Trough. Differences between the sediment in the trigger weight and piston cores suggests either some disturbance during coring or a missing section between the trigger weight and piston core.

Sedimentology

The piston core consists of coarse gravel at the base grading upward to pea gravel and sorted sand. Organic material is common within the core as thin stringers or large clasts. Fine-grained laminated sediment is present between (63-72cm) and within the sand facies (82-86cm and 100-108cm).

The base of the trigger weight core consists of a dark grey, laminated silty clay with pebbles and clay clasts. Upcore, the lamination becomes coarser and more pronounced. Thin beds of clay clasts are present with clast colour changing gradationally from grey at the base of the unit to brown to red brown (see core description). The overlying, massive, dark grey brown fine-grained unit decreases in sand and pebble content upcore with a gradational colour change to olive grey in the upper 12cm of the core.

Composition

As with previous cores, calcium carbonate values are highest in the coarser sediment, particularly the sand facies. In the trigger weight core, a distinct change is present between the laminated material at the base and the overlying more massive sediment. This change is also evident

in the geochemical profile.

Results of the geochemical analysis show depressed concentrations of all elements in the uppermost sample (TWC) with the exception of Na and V. Within the piston core, shifts in concentrations are associated with the fine-grained material.

No Dubawnt Group erratics are reported from the lithological analysis of the cores. Results indicate the sediment is derived primarily from Paleozoic sources, as well as crystalline and Proterozoic Belcher Island Group rocks. High concentrations of the Devonian pink/red carbonate are present in one sample interval of the trigger weight core.

The heavy mineral assemblage is mixed and consists predominantly of garnet, orthopyroxene, ilmenite, pyrite, and to a lesser extent, hematite and epidote. These minerals are consistent with the probable sources indicated in the lithological analysis.

Interpretation

Although the sorting and grain size of the sediments in the piston core indicate deposition by flowing water, the exact formation is a matter of some speculation. There is no direct evidence to suggest subglacial deposition, although sidescan sonar records from an area nearby reveal the presence of erosional channels. It is possible that that the deposit represents a submarine outwash fan formed at the mouth of a meltwater tunnel within the ice. Alternatively, the deposit may result from a catastrophic event such as the

sudden drainage of a proglacial lake. Entrained organic detritus in the core is non marine and has characteristics comparable to surface spectra of areas near the forest/tundra transition. This suggests that the material may be reworked from older interglacial deposits (Mott, 1989).

Cores HU-87-028-043, 047, 048, and 069

These cores were collected offshore from the mouth of Great Whale River in southeastern Hudson Bay in an area of thick sediment accumulation underlain by irregular Precambrian terrane. Detailed core location is shown in Figure 6.

Sedimentology

All cores are characterized by rhythmically bedded sediment overlain by massive, olive grey mud. A dark grey sandy diamicton is present at the base of core 047.

The thickness and the nature of the rhythmically bedded sediments varies between and within cores as indicated in the core descriptions. In general, bed thickness and grain size decreases upcore. One of the more striking features of the unit is the deformation. In certain areas, the muddy sediment has been broken up into subangular clasts ranging from a few mm to 1cm diameter giving a "cottage cheese" appearance. The bedding is commonly still visible within this deformed zone. Faults, when present within the bedded sediment, generally occur above intervals of "cottage cheese" deformation.

In all cases, the contact between the bedded and massive

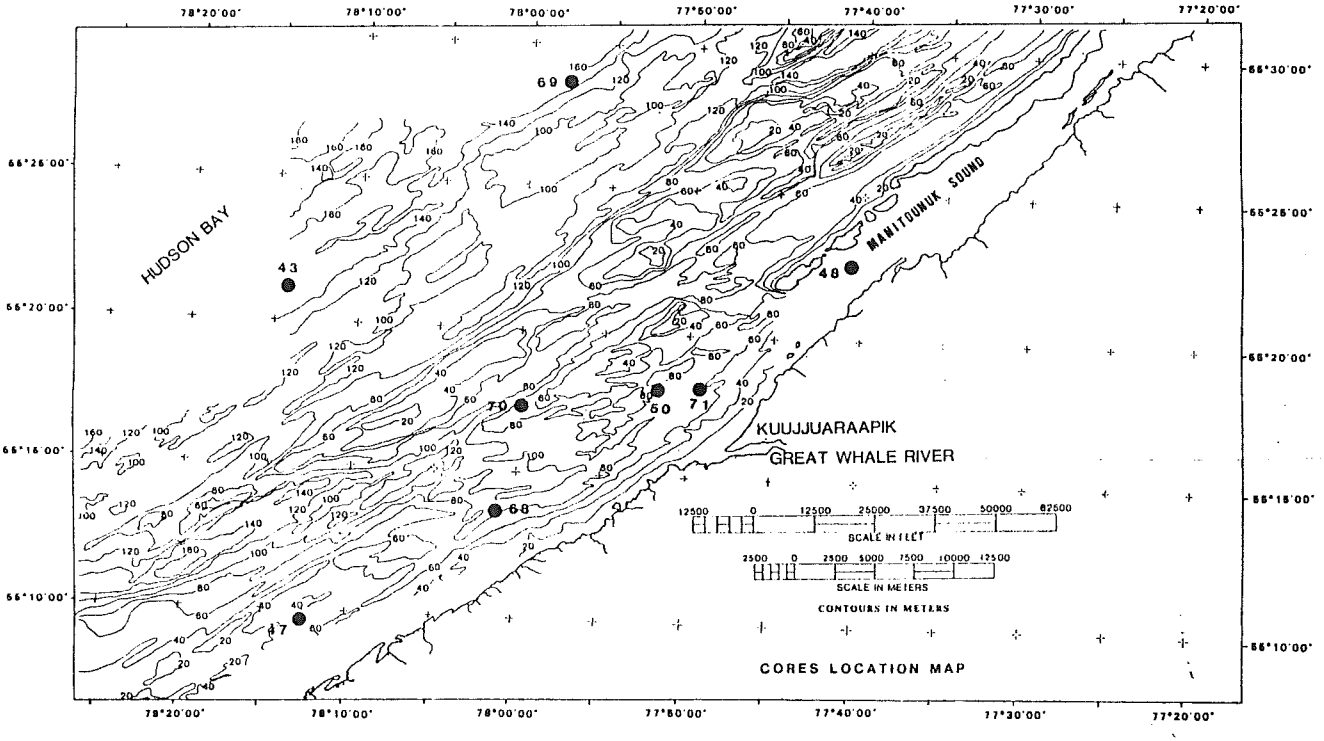


Figure 6: Detailed Location Map, Great Whale River cores.
(from N. Gonthier, M.Sc. thesis, McGill University)

facies is sharp and appears erosional. Pebbles and clay clasts, sandy lenses, and stringers of organic material are abundant in the sediment at the base of the generally fine-grained massive unit. This contact appears to represent a regional unconformity.

The upper facies in the cores consists of an olive grey, silty clay. Pebbles and shells are present, but rare. Bioturbation is indicated by the irregular, sinuous structures visible on core x-radiographs.

Composition

There is a marked change in all compositional parameters in these cores compared to those previously discussed.

Calcium carbonate percentages are generally low (<25%) in the upper facies and drop off to low or trace amounts within the bedded sequences reflecting the lack of sediment derived from Paleozoic sources.

Results of the geochemical analysis also show much higher concentrations of Co, Cr, Fe, Mn and Ni, than other cores. The major break between the massive and bedded sediments is commonly recognized in geochemical profiles, but major fluctuations within the bedded sequence are associated with specific laminations indicating compositional variation, possibly linked to texture, diagenetic processes and/or provenance.

Lithological and heavy mineral analysis is hampered by the texture of the sediments. Fine gravel composition (Cores 043 and 047) indicates the sediments are derived primarily

from crystalline and Proterozoic rocks. Paleozoic carbonates are present in Core 043 with clasts comprising over 50% of the gravel fraction in the post-glacial muds overlying the major contact. The Proterozoic component in Core 043 is more diverse than other cores in the area and consists of both carbonates and greywackes. Proterozoic carbonates do outcrop onshore east of the Manitounuk Islands (Chandler, 1988), however, greywackes are present primarily on the Belcher and adjacent islands (Dimroth et al, 1970) west and northwest of the core site.

The heavy mineral assemblage is dominated by hematite, epidote and titanite, and may include pyrite and orthopyroxene. This assemblage is characteristic of the Proterozoic rocks of the Belcher Islands and Richmond Gulf area (Henderson, in preparation).

Interpretation

The composition of the diamicton at the base of Core 047 indicates the area was glaciated by ice flowing from the east. Comparison with onshore stratigraphy suggests that the contact between the bedded and massive muds may represent the transition from lacustrine to marine sedimentation with the rhythmically bedded sediments representing lacustrine deposits of proglacial Lake Barlow-Ojibway (Hillaire-Marcel and Vincent, 1980). However, results of palynological and micropaleontological analysis of Core 069 are equivocal. Although the abundance of all species declines drastically at the contact and a zone barren of both foraminifera and

dinocysts is present below the contact, a sparse marine fauna has been recognized in the rhythmically bedded sediments at the base of the core (De Vernal et al, 1989).

Core HU-87-028-074

Core 074 was collected southwest of the Belcher Islands near the mouth of James Bay (Fig. 1).

Sedimentology

The basal unit, a dark grey brown sandy diamicton, is overlain by interbedded sandy silt, silty clay and clay which tends to fine upward. It is weakly bedded and pebbles are common near the base of the unit. Textural and visual comparison with the base of the trigger weight core suggests some overlap (7cm). The uppermost unit in the core consists of an olive grey, massive, silty clay with few pebbles.

Composition

Calcium carbonate values are high in the diamicton facies (averaging 38%), compared to the finer-grained sediment (averaging 25%).

Geochemical profiles reflect similar variations in lithofacies. Element concentrations vary but show no enrichment in the uppermost sample interval, with the exception of P and Na, suggesting that the core may not have collected surficial sediment.

Results of the lithological analysis indicate that the gravel component is derived from Paleozoic, crystalline and Proterozoic (Belcher Island) rocks. Carbonate concentrations

appear high considering the core is located fairly close to the Precambian/Paleozoic contact and assuming ice flow from the east as indicated by the Belcher Island lithologies.

The heavy mineral assemblage is dominated by orthopyroxene and garnet and includes epidote, pyrite, ilmenite and hematite. Orthopyroxene is common in both high grade metamorphic rocks and the more basic Proterozoic volcanic rocks and, consequently, the heavy mineral assemblage appears to reflect sediment input from both Proterozoic and igneous and metamorphic sources.

Interpretation

The core stratigraphy is similar to that seen in previous cores collected in northern Hudson Bay and is indicative of deposition from a receding glacier in the marine environment. Diamicton composition suggests that glacier flow was from the northeast across the Belcher and adjacent islands. This interpretation does not explain the high concentration of Paleozoic grey carbonates or the presence, however small, of red/pink Devonian clasts. Carbonate clasts would be derived from ice flow towards the southeast from the centre of the bay. This apparent contradiction may be related to Late Wisconsin ice surges from central Hudson Bay which have been related to the Cochrane and associated tills in the James Bay and Hudson Bay Lowlands (Hillaire-Marcel and Vincent, 1980; Henderson, in prep.).

Core 87HU028-090

Core 90 was collected northeast of the mouth of the Nelson River. The stratigraphy in the core has been disturbed to some extent by the coring process and, therefore, conclusions are general.

Sedimentology

The piston core is composed of massive, fairly well sorted sand overlain by olive grey silty clay with some bioturbation. This unit is similar to sediment sampled in the trigger weight core. The sand bed within the fine-grained facies of the piston core has been sucked up from below by the coring process.

Composition

Calcium carbonate values rarely exceed 30%, with highest values in the sand facies.

Geochemical profiles within the piston core exhibit marked variations in concentrations with lithofacies. In the trigger weight core, values tend to increase with depth.

No gravel fraction is present, however, heavy minerals were examined at various intervals in the sand facies. The assemblage is dominated by siderite but also includes pyrite and garnet and, to a lesser extent, ilmenite, hematite and orthopyroxene. Siderite has been associated with the Devonian and Stooping River Formations which outcrop onshore south of the coring location and extend in an annular pattern under Hudson Bay in the vicinity of Core 090.

Interpretation

The well sorted sand at the base of the core indicates deposition by a fluvial or glaciofluvial system. Sidescan sonographs from the area reveal transverse bedforms resembling sand waves on the seafloor overlain by post-glacial muds. The sharp contrast between the sand facies and the these muds indicates the difference between present and past current regimes in the area. It is evident that the sand was deposited in a high energy environment possibly associated with the deglaciation of Hudson Bay and the drainage of proglacial Lake Agassiz.

CONCLUSION

This report summarizes the stratigraphy of all cores collected in Hudson Bay and, more specifically, presents the results of textural and compositional analyses of cores and grab samples collected on Hudson cruise 87028. Detailed descriptions of the sedimentology and x-radiographs of these cores are used to define sedimentary facies and preliminary interpretations of depositional environments are proposed.

Core stratigraphy varies regionally throughout the bay. In central and northern Hudson Bay, sediment deposition by a receding glacier in a marine environment is postulated. Cores from the Great Whale River area appear to record the transition from glaciolacustrine (or glaciomarine) to marine sedimentation. Sorted sand and gravel present in cores collected in the southern Winisk Trough and north of the

Nelson River are indicative of deposition by moving water, possibly fluvial or, more likely, glaciofluvial systems.

Core composition can be related to known outcrop areas within and around Hudson Bay. Compositional variation between sedimentary facies and various regions of the bay provides constraints on the interpretation of depositional processes and ice flow directions.

The core analysis presented in this report will be integrated with geophysical and geotechnical data in order to map the extent, composition and depositional history of the various units within the bay. The results will provide a basis for defining areas of concentration for future work in Hudson Bay.

ACKNOWLEDGEMENTS

The project was funded by a joint contract between the Terrain Sciences Divison and Atlantic Geoscience Centre, Geological Survey of Canada. I would like to thank H. Josenhans for the opportunity to participate in the cruise and follow-up with the more detailed examination of the sedimentology and composition of the cores; Dr. J.S. Vincent for the support of the Terrain Sciences Division with sample preparation and analyses; Janice Marsters and Guy Bilodeau who were involved with me in describing and processing the cores onboard the CSS Hudson; and the AGC support staff, particularly Kate Jarrett, for her co-operation during core sampling.

APPENDIX A
PREVIOUS WORK

Table 1: Results of Analysis of 1961 Cores

Figure 1: Core Summaries, 1961 Cores
Figure 2: Core Summaries, 1986 Cores

APPENDIX A
RESULTS FROM ANALYSIS OF 1961 CORES, HUDSON BAY (Leslie, 1965)

Core No.	Location Lat.	Location Long.	Water Depth (m)	Core Length (cm)	Sediment Description	Interpretation
61HB 147	62°46'W	78°00'N	466	210	Silty clay and sandy silty clay. Few small pebbles (<1/2cm diam), decrease in abundance upcore.	A unique deep-water species and hardy cosmopolitan foram assemblage at base of core indicates deposition in water deeper than present during deglaciation. Increased foraminiferal abundance, deep-water fauna and the appearance of planktonic foraminifera upcore (>81cm) represent transition to marine conditions similar to present.
61HB 158	61°48'	81°58'	225	202	Olive grey silty clay, bioturbated, lacks pebbles.	Foraminiferal trends indicate uniform depositional environment. Planktonic foraminifera throughout core. Represents upper portion of post-glacial marine sediments under conditions similar to present.
61HB 177	61°44'	87°28'	201	107	0-37cm Olive grey, silty clay, few small pebbles. 37-49cm Sandy silt and silty sand, diffuse lamination. -----sharp contact----- 49-56cm Dark olive grey silty clay with thin light grey laminae at 1mm intervals 56-107cm Grey brown diamicton, massive.	Increase in foraminiferal number and diversity upcore. Significant expansion in population at 45cm. Planktonic forams only in surface sample. Lower 62cm dominated by hardy species and interpreted as a glaciomarine deposit formed at or near the ice margin. Intervening sediment represents transition to open marine conditions. Upper 42 cm represents environment similar to present, but water depth greater.
61HB 231	59°03'	94°01'	51	138	Interbedded sand, sandy silt, silty clay and clay.	Fluctuations present in abundance and diversity of benthic foraminifera. No planktonic forams, but abundant diatoms in upper half of core. Post-glacial deposit with sedimentation controlled by variations in currents and sediment supplied imposed by the Churchill River. Fauna suggests deposition in progressively shallower water.

61HB 084	58°35'	81°14'	177	102	0-97cm Olive grey clay, lacks pebbles and sand lenses, bioturbated. ----sharp contact---- 97-102cm Light grey diamicton	Foraminifera sparse in coarse sediment at base of core. Rapid increase in abundance and diversity in overlying material. Planktonic forams restricted to upper 64cm. Lower unit represents ice proximal glaciomarine deposit and upper unit, post-glacial open marine sediment. No transitional unit present as in other cores.
61HB 104	54°46'	80°58'	85	145	0-48cm Silty clay, dark brownish grey, upper 10cm bioturbated. 48-62cm Dark grey clay, lumpy. 62-147cm Clay, mottled dark greyish brown and very pale brown, irregular diffuse banding. At 140cm, thin (1/10mm) laminae of light and dark brown clay.	Lower 100cm of core has sparse fauna. Upper 47cm has abundant and diverse benthic foraminiferal population. Planktonic forams restricted to top 4cm. Lower unit interpreted as deposited in brackish environment immediately following glaciation; middle unit during transition to more saline contions; and upper unit in post-glacial open marine conditions indicating gradual shallowing.

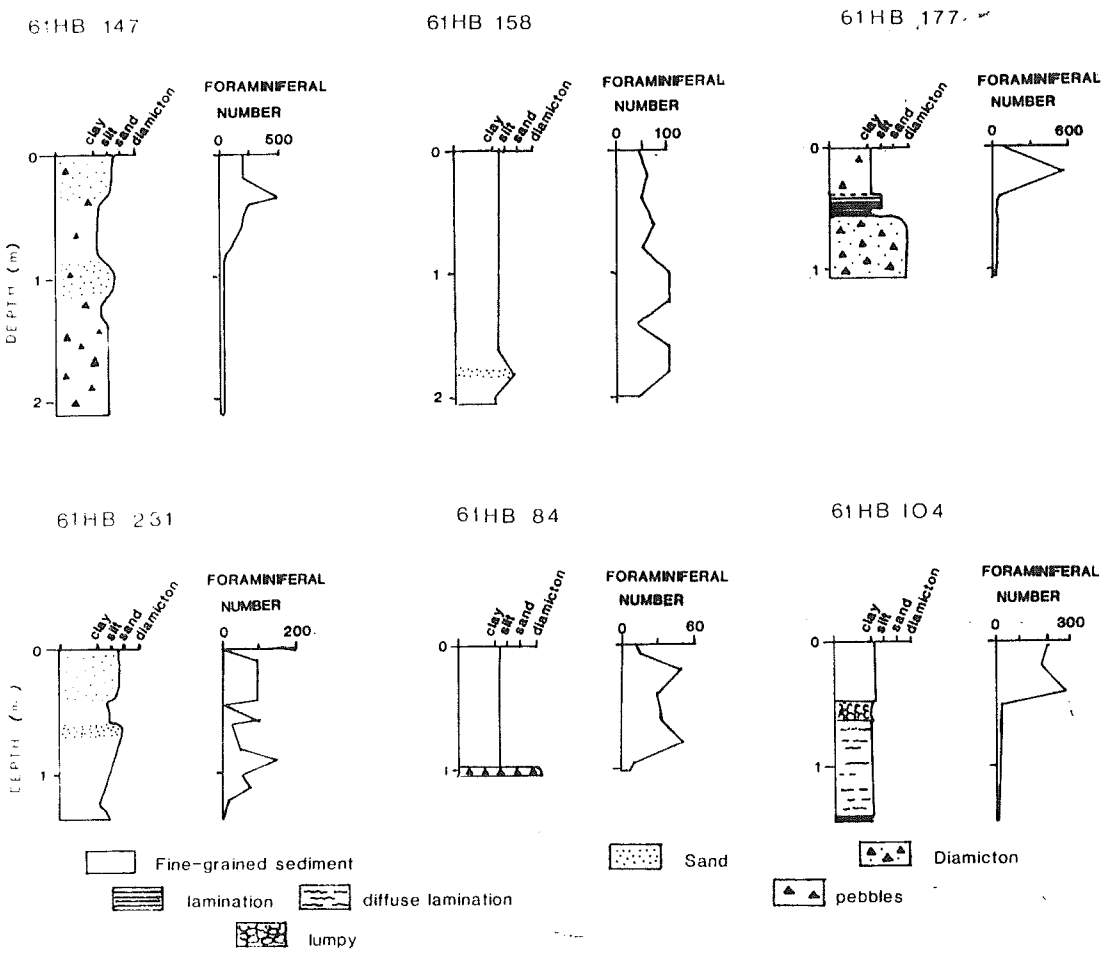
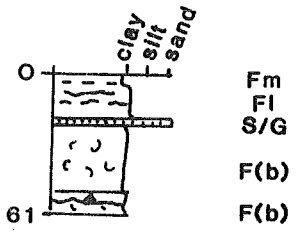


Figure 1: Summary of 1961 cores (based on descriptions from Leslie, 1965).

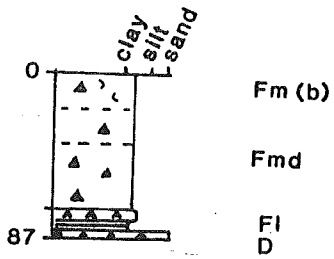
HU 86-040-001 TWC

WATER DEPTH 202m



HU 86-040-003 TWC

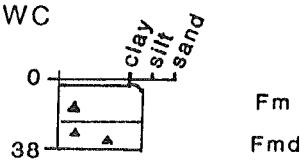
WATER DEPTH 201m



HU 86-040-005

WATER DEPTH 179m

TWC



PC

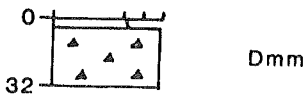


Figure 2: Summary of cores collected during Hudson cruise Hu-86-040.

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