HILATS ROCK CORING, VIBROCORING AND SEISMIC SURVEYS ON THE CONTINENTAL SHELF OF THE NORTHERN ANTARCTIC PENINSULA (FEBRUARY - MARCH 1998): CRUISE JR29

BY

R. V. DINGLE, P. MORRIS, M. LAVELLE & J. HOWE

1998

GEN/1997/GL2

Contents

HILATS ROCKDRILLING, RRS JAMES CLARK ROSS, ANTARCTICA 1998

BACK ROW (L to R): Neil Campbell (BGS), Dave Smith (BGS)
MIDDLE ROW (L to R): Roger Urgeles (U. Barcelona), John Howe (BAS), Peter Morris (BAS), Colin Brett (BGS), Ali Skinner (BGS), Richard Dingle (BAS), Jeronimo Lopez (U. Madrid), Mark Stewart (BAS), Pat Cooper (BAS), Mark Lavelle (BAS) Dept Earth Sci.
FRONT ROW (L to R): Eileen Gillespie (BGS), Sheila Alexander (BGS)

1. Introduction

Cruise 29 of the RRS *James Clark Ross* was to the northern Antarctic Peninsula to undertake geophysical and rockdrilling/vibrocoring surveys as part of the High Latitude Palaeoenvironments (HILATS) project of the Geoscience Division of the British Antarctic Survey (Figs. 1- 2). BAS had contracted the hire and operation of the geophysical and drilling equipment to the Marine Geology section of the British Geological Survey, Murchison House, Edinburgh. The main areas of operation were King George Island (South Shetlands archipelago), and off Seymour Island, in the James Ross Basin of the NW Weddell Sea. A subsidiary survey was undertaken on the continental shelf of the eastern Bransfield Strait (Fig. 3).

James Clark Ross sailed from Stanley, Falkland Islands on 12-Feb-98. It returned to disembark scientists and some equipment on 04-Mar-98, after a successful cruise during which 115 cores were attempted at 78 different sites, resulting in 26 rockcores, 36 sediment vibrocores, and 51 samples of loose material. Thirteen geophysical traverses were run, amounting to ~265 km of high resolution record navigated with DGPS.

1.1 Personnel

Scientific Party

BAS
R V Dingle (Chief Scientist)
Peter Morris (Data Processing)
Mark Lavelle (Geologist)
John Howe (Geologist)
Pat Cooper (Electronics)
Mark Stewart (Computing)

British Geological Survey
Ali Skinner (Team Leader)
Sheila Alexander (Navigation)
Colin Brett (Seismics)
Neil Campbell (Drilling)
Eileen Gillespie (Navigation)
Dave Smith (Seismics)

Guest Scientists
Jeronimo Lopez-Martinez (Universitdad Autonoma de Madrid)
Roger Urgeles-Esclasans (Universitat de Barcelona)

Ship's Complement

Burgan, M. Jerry S. (Master)
Chapman, Graham (1st Officer)
Gatti, Tony (2nd Officer)
Gooberman, David (3rd Officer)
Summers, John (Deck Officer)
Meese, Chris (Cadet)
Glostein, Mike (Radio Officer)
Anderson, Duncan (Chief Engineer)

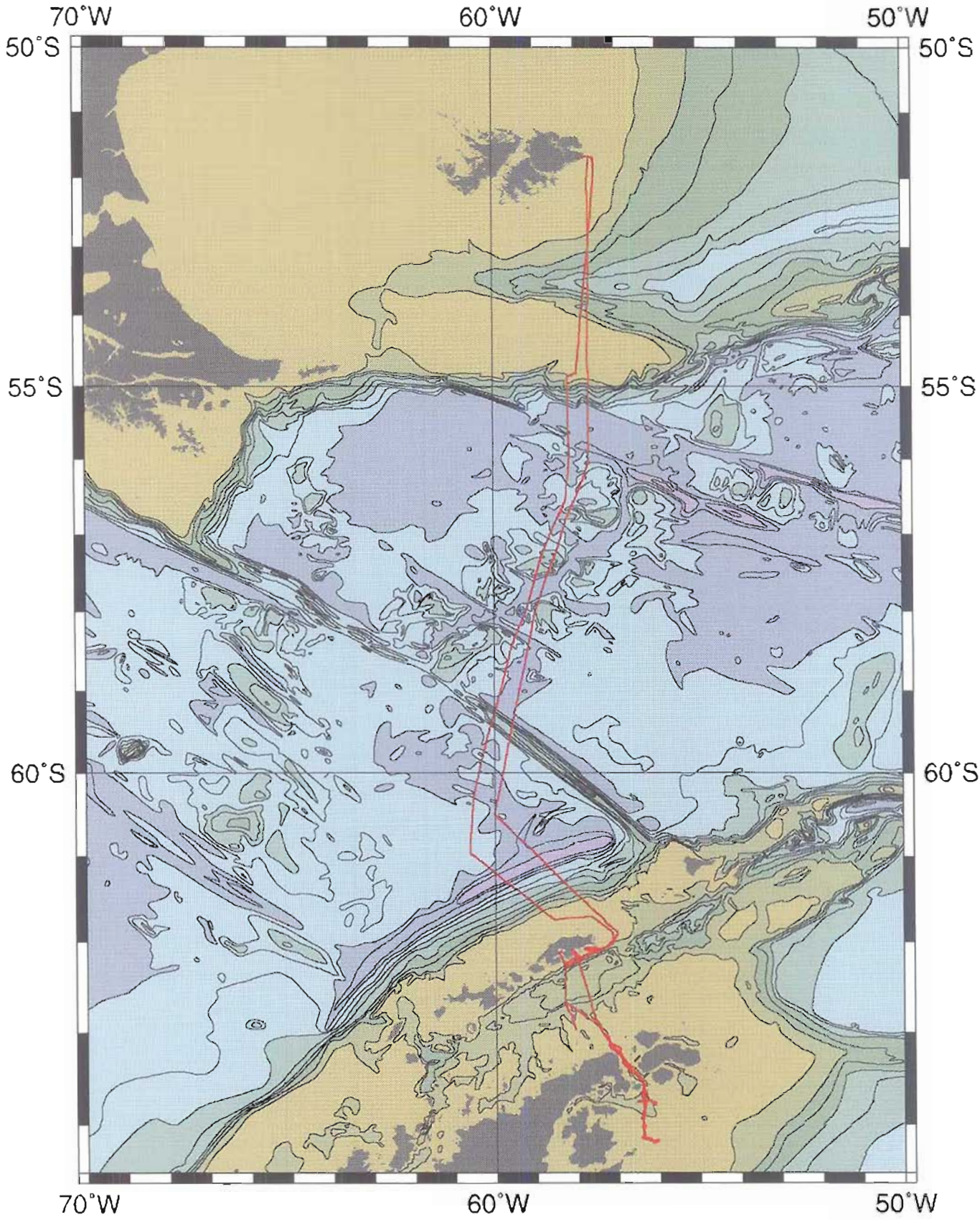

Figure 1. Track chart of JR29 cruise, 12-Feb-98 to 04-Mar-98

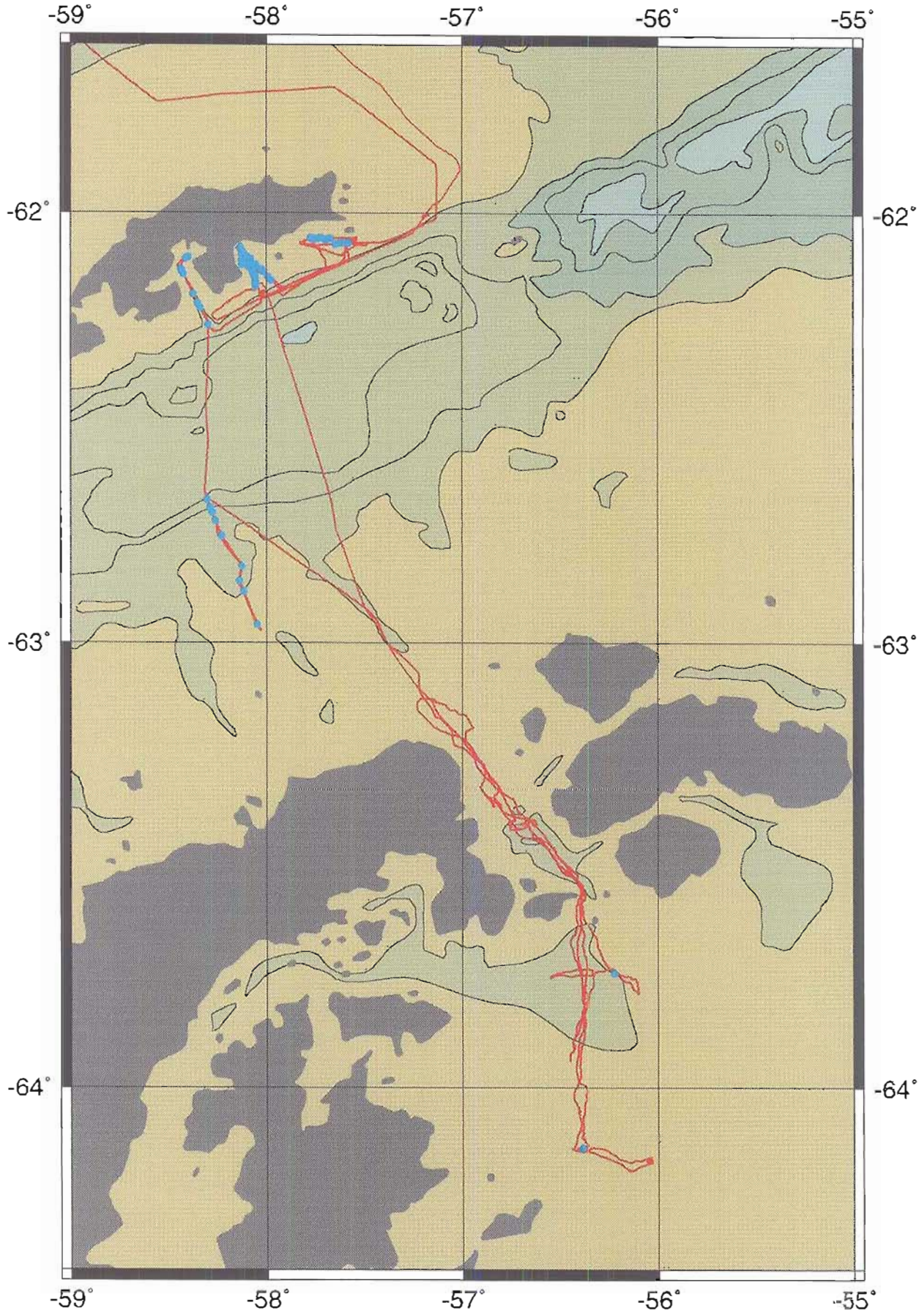

Figure 2. Track chart and sampling sites, northern Antarctic Peninsula

Figure 3. Deployment of BGS rockdrill off the Melville Peninsula.

Smith, Colin (2nd Engineer)
Griffiths, Dave (3rd Engineer)
Arber, Maurice (4th Engineer)
Rowe, A. Keith (Electrician)
Trevett, Doug (Deck Engineer)
Gibson, Hamish (Purser)
Stewart, George (Bosun)
Chalk, Charles (Bosun's Mate)
Williams, David (SG1)
Rees, David (SG1)
Clarke, Paul (SG1)
Owen, Howard (SG1)
Watson, David (SG1)
Williams, Larry (Motorman)
Bretland, David (Motorman)
Hunt, David (Chief Cook)
Carney, John (2nd Cook)
Hines, Mark (Steward)
Pratley, Clifford (2nd Steward)
Jones, Mark (Steward)
Moore, Thomas (Steward)

1.2 Rationale & Scientific Objectives

1.2.1 Oligocene-Miocene glacial sediments, King George Island. The work of BAS and Polish geologists has resolved the dating of the earliest known glacial sequences in West Antarctica, with the establishment of an Early Oligocene age for the Krakowiak Glacier and Low Head Mbs in the Polonez Cove - Lions Rump area. The contemporaneity of these rocks with the glacio-marine strata at nearby Magda Nunatak has also be recognised. Similarly, the ages of the Destruction Bay and Cape Melville Fms on the Melville Peninsula have been established as latest Oligocene and earliest Miocene, respectively. Recent surveys (1997) of the continental shelves adjacent to these two localities on King George Island by Spanish geologists working at the Marine Geology group in the University of Barcelona under Professor M Canals, have shown that extensive areas of basement are exposed in water depths suitable for the use of the British Geological Survey rock drill. A prime objective of this cruise was to map the sea-floor in both areas using high-resolution Sparker and Side-Scan Sonar imagery, and to extend our knowledge of the onshore strata with a view to discovering older or younger glaciogenic rocks than are currently known. In the case of older strata being sampled, this would extend our knowledge of the earliest glacial sequences in West Antarctica, which would have important implications for the history of cryosphere development in the Antarctic. Our objectives were to run sufficient high resolution seismic and SSS lines to produced preliminary geological and structural maps of the continental shelves off the Melville Peninsula and the Polonez Cove - Lions Rump area, and to sample the rockhead where possible, to complete the maps and to extend the known successions both back and forward in time.

1.2.2 Sedimentary history of the Holocene fill in King George and Admiralty bays, King George Island. Little is known of the sedimentation patterns, rates and neotectonism of the Quaternary (probably Holocene) fill in the large fjords on the eastern side of King George Island. Dr Lopez is currently working on the Quaternary geomorphology of the South Shetland Islands, including lacustrine deposits. His work, together with BAS's interest in incorporating case studies of specific modern and Quaternary glacial environments in HILATS2, strongly supports the initiation of a detailed and systematic study of Holocene nearshore marine records in this area. The South Shetland Islands are vulnerable to minor climate changes, and marine sediments can be expected to provide a sensitive record of recent climate history. Specific

aspects that can be addressed through a vibrocoring programme in these two fjords are:- Using calculations of sedimentation rates, the history of deglaciation of the King George Island offshore and its adjacent continental shelf can be assessed, and in particular, the history of retreat of the valley glaciers. Individual sediment ponds are probably fed by a combination of vertical fine fraction settling, and lateral, bottom-transported material from the sides of the fjords. These sources will record particular events in the glacial retreat, and short-term climate fluctuations in the Holocene record should be recognisable under the relatively rapid sedimentation rates expected. These could be mirrored in changes in marine productivity, and potentially, annual signals could be preserved. In addition, ash from eruptions of Deception Island should be recognizable, and allow inter-basinal correlations and comparisons of sedimentation rates to be made. Careful examination of the seismic records may reveal evidence of neotectonism, which may be dateable using the sediment stratigraphy. ASM radio carbon and ^{210}Pb dating techniques can be attempted. Our objectives were, therefore, to run high resolution seismic lines along the fjord's axes, and to sample as many of the ponded, draped, and proximal (near active glacier) environments, as time permitted.

1.2.3 Glacial sediments on margin of eastern Bransfield Strait. There are several published models which deal with glacial sedimentation on the continental shelves of Antarctica (e.g. Larter & Barker 1991), but few studies have conducted "ground truth" surveys. In view of plans for HILATS2 to undertake such work, a preliminary study of the stratigraphy and lithofacies of mid to outer shelf, and slope glacial environments is urgently needed. This coincides with the interest of Dr Canals (University of Barcelona), who requested cores as various sites for his own programme, and with which we hope to integrate the HILATS2 work. Our objectives were to conduct a high resolution Sparker profile along a line previously surveyed by Dr Canals using airguns, and to take vibrocores at specific sites to characterise various seismically distinct units. A minimum of one core from distal, median and proximal positions on the glacial wedge, as well as an attempt to sample older (i.e. pre-last glacial) units, was planned.

1.2.4 Early Tertiary and latest Cretaceous stratigraphy NE of Seymour Island. Early glacial (Oligocene) and late pre-glacial (Late Eocene) strata are known from King George and Seymour islands, respectively. However, no section has been identified in the peninsula (or anywhere else in Antarctica), where there is an unequivocal transition from pre- to earliest glacial environments. A strong candidate for such a site is off NE Seymour Island, where earlier seismic records (e.g. Anderson *et al.* 1992) suggested well-bedded, easterly dipping strata, relatively close to outcrops of Late Eocene strata on Seymour Island (Dingle & Lavelle 1998). Our main objective in this area was to conduct seismic surveys to identify suitable sequences for rockdrilling/vibrocoring across the Eocene/Oligocene boundary. In addition, the opportunity was to be taken to extend our knowledge on the relationships of the Lower Tertiary and latest Cretaceous outcrops on Seymour to major regional structural trends that have been recognised in bathymetric maps of the area (RVD unpublished data).

1.2.4 Surface Plankton sampling in Drake Passage. Dr Kate Darling at Edinburgh University has been using small subunit (SSU) ribosomal (r)RNA genes as molecular markers to differentiate specific foraminiferal morphospecies. She used material collected on JR19 last year, and requested further material this year. An objective was to collect samples in a transect from the Falkland Plateau to south of the Polar Front.

1.2.5. Oceanic Magnetic anomalies. As an ongoing requirement to augment the Geoscience Division database, particularly to fill gaps in coverage and hence better resolve patterns in more remote areas, the passage transects to and from the South Shetland Islands were positioned to achieve as much new data as possible, without compromising the work programme.

1.3 Cruise Narrative

Times are quoted GMT. Tracks shown in Figures 1 – 2.

05-Feb-98. BAS (plus guest scientists) and BGS contingents met at RAF Brize Norton for Tri-Star flight at ~23:00. Flight left on time.

06 – 07- Feb-98. High winds at Mount Pleasant necessitated diversion to Rio de Janeiro for Friday night, and an arrival at Mt Pleasant Saturday ~14:00.

07-08- Feb-98. Scientific party accommodated in Stanley at the BAS "Ross Complex". Very basic, and whilst adequate for temporary accommodation purposes, inadequate for longer stays during which any desk work is contemplated (typing, data sorting etc) or large parties are to be housed (rooms very small and insufficient toilets/washrooms).

09-11-Feb-98. Scientific party accommodated on *James Clark Ross*. Mobilizing equipment. BAS's new Director Professor Rapley stayed on board and was shown the ship's facilities during his visit to Stanley.

12-15-Feb-98. En passage across Drake Passage to King George Island. Weather generally poor. Proton magnetometer and 3.5 KHz data collected to supplement the Geoscience Division database. 3.5 KHz inoperative for most of passage: record very poor because of rough weather. Five surface water samples sieved for planktonic forams.

16-17-Feb-98. Undertook geophysical survey of the shelf to the south of Cape Melville. Ran four approximately E – W traverses towing Sparker and SSS at ~2.5 knots (Lines 1-4). Water depths were generally ~100m, but occasionally shallowed to 50m. Survey was planned on the basis of the TOPAZ bathymetric maps prepared from the *Hesperides* data, which proved to be reliable. Numerous small to medium-sized icebergs adrift, and grounded in shallows. Excellent weather. Survey stopped for 6 hours early on the 16th to give navigators a rest. Commenced rock-drilling in afternoon of the 16th, with sites selected on the basis of favourable seismic data. Sites with rockhead at or near the sea-floor were chosen. Several problems experienced with maintaining DP navigation at first site – unfamiliarity of navigators, and DP unsteadiness. Drilling terminated early morning of 17th by electrical short in drill cable. Necessitated cutting off 20m of wire, and re-potting the connectors. Headed for Polonez Shelf while this was carried out. Spent rest of the day running Sparker and SSS lines on the shelf to the east and southwest of Lions Rump-Polonez Cove-Low Head (Lines 5-7).

18-19-Feb-98. Resumed rock-drilling survey on the Melville Shelf. Drill operated successfully at a number of sites, but drill pipe bent at site VC-145, when a vibrocorer was attempted in what appeared to be thicker sediment cover. Completed Melville Shelf sampling in evening of 19th, and proceeded to King George Bay, where a Sparker traverse was started along axis of fjord at ~24:00.

20-22-Feb-98. Completed a traverse of 9 vibrocores along the axis of the King George Bay to sample the various assumed Holocene sedimentary facies recognised on the *Hesperides* and *JCR* seismic profiles. The majority of the cores were >5.0m long. Excellent weather: sunny and calm. Glaciers and ice streams on adjacent land appear to be crumbling into the sea. Trouble with the bow thrusters: faulty cooling fan. In the evening commenced a series of rock drill sites along the shelf between Polonez Cove and Magda Nunatak. The longest rock drill core collected during JR29 (RDC-164, 2.50m of agglomerate) was collected on the Magda Block. The steep slopes on some of the basement features caused trouble with the stability of the rock drill frame. Engine trouble occurred in the late morning of 21-Feb, followed by a serious loss of DP stability, which took 3 hours to settle down. Completed the planned series of sites on the Polonez Shelf by 09:00 22-Feb.

22-23- Feb-98. Ran a Sparker profile along the axis of Admiralty Bay, and half way up the eastern proximal extension. Weather was poor, with strong winds, rain, mist and poor visibility. Despite poor conditions, the seismic record was of good quality. Arctowski, the Polish base, appeared deserted, while

there was a supply ship at the Brazilian base. Undertook a series of vibrocores down the fjord to sample the various facies along its length, as well as one site on the upper continental slope at the mouth of the fjord. Again, the bulk of the cores were >5.0m long. Dr Lopez spoke to the Argentinean Marambio base to enquire the degree of sea ice cover NE of Seymour Island and in Antarctic Sound. Both were reported to be relatively free of ice and we resolved to attempt work around Seymour Island.

23-24-Feb-98. Crossed the Bransfield Strait to arrive at the base of the slope on the eastern Bransfield Strait margin at ~11:00. Made a seismic traverse upslope and onto the mid-shelf (Line 10) along the line of a series of potential coring sites proposed by Dr Canals (Barcelona). Traverse was completed by about 16:00. Proceeded to vibrocore at nine sites across the shelf and down the slope in various seismic facies of assumed last to possibly penultimate glacial age. The deepest site lay at the foot of the slope progrades (~1600m). At the deeper sites the vibrocore winch spooler was not efficient, and time was lost manually adjusting the lay of the cable on the drum. Once completed, the ship proceeded to a position near Hope Bay in the Antarctic Sound to wait for first light.

25-27-Feb-98. Left Hope Bay at ~09:00 and passed through small concentrations of ice at the southern entrance to Antarctic Sound. Proceeded to within 6 miles of target (64 10'S) before encountering the broken sea ice front. Followed this eastward to the eastern side of the relatively clear water. Ran a Sparker profile westward back along the ice front towards Seymour (Line 12). The sea ice migrated farther south during this period and we were able to cross the *Polar Duke* 91-28 line in places. Excellent profile clearly showing potential drilling/coring targets. Attempted the first of these, and at the second attempt (VC-204) collected a sample which was possibly Sobral or probably *Cucullaea* I (La Meseta). Ice moved back over the line before further sampling could take place and *JCR* retreated about 4 miles north to spend the night. The ice moved ~4 miles farther north during the night and the Captain decided to move the vessel out of the area for the rest of the day. On passage into Antarctic Sound passed the Argentinean ice breaker *Almirante Ireza* on her way south to Seymour and Marambio base. The Chief Scientist considered that the great scientific importance of sampling the Seymour section warranted staying in the area on the chance that sea ice conditions would ease in the near future. Instead of being hove to, we ran a speculative seismic line up the length of the sound, and another back to about the latitude of Hope Bay. This line was disrupted in two places by small sea ice barriers, and was somewhat irregular, but otherwise of useful quality. Hove to for the night in the vicinity of Hope Bay. At first light *JCR* proceeded down the sound in ideal conditions and into the northern Weddell again. Dr Lopez spoke to the *Almirante Ireza* to enquire about ice conditions. The barrier that had stopped us yesterday was not very wide, and had posed no problems to themselves, but they have 18,000 HP! The northern edge of the ice was found to be approximately where the *Almirante* had predicted, and although there were several wide leads into it, the Captain considered it too great a risk, and the vessel proceeded northwards again. In the northern Erebus & Terror Gulf there was sufficient open water for a W-E Sparker line (Line 13). The record was of good quality, but sediment cover proved too thick to penetrate to rockhead, even on "basement" highs. By the late afternoon, the weather was again considered too unfavourable to dally further in the area in case conditions deteriorated and the vessel was delayed. The ship proceeded into the Antarctic Sound. At this point the Chief Scientist considered it not justified to wait further in the area, and we set course for an overnight passage to King George Island.

28-Feb, 01-Mar-98. Arrived off Low Head at about 10:00 and proceeded to continue the rock drilling operation on the Polonez-Lions Rump shelf. Priority was given to re-sampling and extending coverage in the vicinity of RDC-170, where probable Krakowiak Glacier Member had been recovered previously. This was undertaken in ideal conditions, and a further good collection of short rock-cores was made.

01-04 Mar-98. Passage to Stanley across the Drake Passage. Good weather. Ran proton magnetometer traverse, and collected two further plankton surface water samples. Arrived off Stanley at first light.

04-07-Mar-98. Scientific party resident on board *JCR*. Demobilising the ship and cruise report writing.

07-08-Mar-98. Flight from Falklands to Brize Norton. Arrive BAS HQ ~1200

Table 1. Summary: seismics & sampling - JR29								
Date	Drill	VibC	Spark	SSS	LIne	Time	Cores	Location
						mins		
15-Feb			***	***	1	154		Melville Shelf
					2	122		
					3	224		
16-Feb	***		***	***	4	155	115-121	Melville Shelf
17-Feb			***	***	5	167		Polonez Shelf
					6	165		
					7	145		
18-Feb	***						122-139	Melville Shelf
19-Feb	***						140-152	Melville Shelf
			***		8	97		King George Bay
20-Feb		***					153-161	King George Bay
	***						162-163	Polonez Shelf
21-Feb	***						164-176	Polonez Shelf
22-Feb	***						177-179	Polonez Shelf
			***		9	169		Admiralty Bay
		***					180-184	Admiralty Bay
23-Feb		***					185-189	Admiralty Bay
			***		10	300		Bransfield Margin
24-Feb	***						195	Bransfield Margin
		***					196-202	Bransfield Margin
25-Feb			***		11	198		Seymour Shelf
	***						203	Seymour Shelf
		***					204	Seymour Shelf
26-Feb			***		12	904		Antarctic Sound
27-Feb			***		13	169		Erebus & Terror Gulf
		***					205	Erebus & Terror Gulf
28-Feb	***						206-228	Polonez Shelf
		***					224-229	Polonez Shelf
						---------	----------	
						2969		
						49.5 hrs	115 cores	

Table 2: summary of sampling, JR29										
Attempted						**Successful Rock Cores:**				
Rock drills		=	77			Melville shelf	=	12		
Vibrocores		=	38	115		Polonez shelf	=	14	26	
						Successful Vibrocores:				
Successful						Melville shelf	=	2		
Rock drills		=	26			King George Bay	=	9		
Vibrocores		=	36			Admiralty Bay	=	9		
				62		Bransfield margin	=	11		
						Seymour	=	1		
Unsuccessful						Erebus & Terror	=	1		
Rock drills		=	7			Polonez shelf	=	3	36	72
Vibrocores		=	2							
Sundry loose material						**Rock core lengths**				
in rock drill		=	51			0 - 10 cm	=	6		
						>10 - 25 cm	=	5		
No. different sites occupied						>25 - 50 cm	=	9		
Rock drill						>50 - 100 cm	=	4		
	Melville shelf	=	21			>100 cm	=	2	26	
	Polonez shelf	=	21							
	Bransfield M.	=	1			**Vibrocore lengths**				
	Seymour	=	1	44		0 - 100 cm	=	3		
						>100 - 200 cm	=	4		
Vibrocore						>200 - 300 cm	=	4		
	Melville shelf	=	2			>300 - 400 cm	=	2		
	King George Bay	=	9			>400 - 500 cm	=	8		
	Admiralty Bay	=	9			>500 <600 cm	=	15	36	
	Bransfield M.	=	9							
	Seymour	=	1							
	Erebus & Terror	=	1							
	Polonez shelf	=	3	34						

Table 3. JR29 Rock drill samples

Core No.	Statn	lat	lat	long	long	depth	Time	leng	lithology	locality	Fm
Melville shelf											
115	6	62	4.19	57	32.37	125	125	0.00	Mixed pebbles		
116	**6**	**62**	**4.19**	**57**	**32.37**	**125**	**42**	**0.40**	**Gr/blk siltstone**	**SE C. Melville**	**Cape Melville**
117	7	62	4.23	57	34.69	114	32	0.00	Mixed pebbles		
118	7	62	4.23	57	34.69	114	33	0.00	Mixed pebbles		
119	8	62	4.22	57	34.87	121	52	0.00	Mixed pebbles		
120	**8**	**62**	**4.22**	**57**	**34.87**	**121**	**62**	**0.45**	**Greyish/blk andesite**		
121	9	62	4.22	57	35.46	105	31	0.00	Mixed pebbles		
122	9	62	4.22	57	35.46	109	103	0.00	Mixed pebbles		
123	10	62	4.23	57	36.12	77	110	0.00	Mixed pebbles		
124	10	62	4.23	57	36.12	80	28	0.00	Mixed pebbles		
125	**10**	**62**	**4.23**	**57**	**36.12**	**80**	**52**	**0.32**	**Greyish/blk basalt**		
126	11	62	4.23	57	36.42	105	116	0.00	Mixed pebbles		
127	12	62	4.23	57	36.94	104	33	0.00	Mixed pebbles		
128	12	62	4.23	57	36.94	104	48	0.00	Mixed pebbles		
129	11	62	4.23	57	36.42	105	70	0.00	Mixed pebbles		
131	13	62	4.28	57	37.49	124	34	0.00	Mixed pebbles		
132	14	62	4.39	57	38.61	131	40	0.00	Mixed pebbles	JCR Ridge	
133	14	62	4.39	57	38.61	128	53	0.00	Mixed pebbles	JCR Ridge	
134	15	62	4.42	57	38.82	110	37	0.00	Tuff pebbles	JCR Ridge	
135	**15**	**62**	**4.41**	**57**	**38.82**	**110**	**35**	**0.14**	**Welded Tuff**	**JCR Ridge**	
136	16	62	3.60	57	40.23	82	26	0.00	Mixed pebbles	JCR Ridge	
137	**16**	**62**	**3.60**	**57**	**40.23**	**82**	**33**	**0.06**	**Dk basic intrusive**	**JCR Ridge**	
138	17	62	3.59	57	40.47	106	30	0.00	Tuff pebbles	JCR Ridge	
139	**17**	**62**	**3.59**	**57**	**40.47**	**105**	**34**	**0.36**	**Dk tuffaceous sst**	**JCR Ridge**	
140	18	62	3.77	57	41.72	157	40	0.00	no recovery		
141	19	62	3.76	57	42.15	155	38	0.00	Dk tuffaceous sst pebbles		
142	**20**	**62**	**3.48**	**57**	**43.26**	**85**	**45**	**0.09**	**Grey/blk tuffaceous sst**		
143	**20**	**62**	**3.48**	**57**	**43.26**	**84**	**23**	**0.05**	**Grey/blk tuffaceous sst**		
144	**21**	**62**	**3.62**	**57**	**44.39**	**70**	**39**	**0.73**	**Dk grey diamictite**		
146	22	62	3.65	57	44.82	64	32	0.00	Dk volcanic pebbles		
147	**23**	**62**	**3.65**	**57**	**45.21**	**62**	**30**	**0.06**	**Dk grey basalt**		
148	24	62	3.62	57	45.39	62	39	0.00	Mudst pebbles		
149	**24**	**62**	**3.62**	**57**	**45.39**	**63**	**40**	**0.07**	**Mudst**		**?Cape Melville**
150	**25**	**62**	**3.57**	**57**	**45.78**	**60**	**51**	**1.39**	**Laminated mudst & pebbles**		**?Cape Melville**
151	26	62	3.56	57	46.40	53	33	0.00	Mixed pebbles		
152	26	62	3.56	57	46.40	53	34	0.00	Tuff pebbles		
Polonez shelf											
162	36	62	6.65	58	7.37	80	39	0.00	Gr Qzrl pebbles	Magda Block	
163	36	62	6.65	58	7.37	80	38	0.00	Mixed pebbles	Magda Block	
164	**37**	**62**	**6.69**	**58**	**7.37**	**95**	**229**	**2.50**	**Agglomerate**	**Magda Block**	
165	38	62	7.27	58	6.29	147	32	0.00	Volcanoclastic pebbles	Lions Rump Block	
166	**38**	**62**	**7.27**	**58**	**6.29**	**143**	**27**	**0.05**	**agglomerate & pebbles**	**Lions Rump Block**	
167	39	62	7.31	58	6.14	150	39	0.00	Mixed pebbles & modern diamictites	Lions Rump Block	
168	39	62	7.31	58	6.14	150	50	0.00	Mixed pebbles	Lions Rump Block	
169	40	62	7.69	58	5.18	60	40	0.00	No recovery	Lions Rump Block	
170	**40**	**62**	**7.69**	**58**	**5.18**	**60**	**67**	**0.90**	**Dk grey/blue diamictite**	**Lions Rump Block**	**?Krakowiak**
171	41	62	7.73	58	5.11	72	67	0.00	Diamictite pebbles	Lions Rump Block	
172	41	62	7.73	58	5.11	72	24	0.00	Mixed pebbles	Lions Rump Block	
173	**42**	**62**	**8.45**	**58**	**4.00**	**93**	**36**	**0.36**	**Amygdaloidal basalt**	**Polonez Block**	
174	42	62	8.54	58	4.00	95	49	0.00	Basalt pebbles	Polonez Block	
175	**43**	**62**	**8.67**	**58**	**3.83**	**81**	**62**	**0.17**	**Amygdaloidal tuff**	**Polonez Block**	
176	**43**	**62**	**8.67**	**58**	**3.83**	**79**	**55**	**0.59**	**Dk homogenous volcanoclastics**	**Polonez Block**	
177	44	62	8.83	58	3.69	90	54	0.00	Slurry of modern diamictite with shell fragments	Polonez Block	?Krakowiak shell frags.
178	**45**	**62**	**9.15**	**58**	**3.29**	**120**	**63**	**0.21**	**Grey/blk vesicular volcanic rock**	**Polonez Block**	
179	45	62	9.15	58	3.29	110	105	0.00	Modern diamictite	Polonez Block	
206	66	62	10.05	58	3.18	119	30	0.00	Tuffaceous sst pebbles	Low Head Block	
207	66	62	10.05	58	3.18	119	33	0.00	Pebbly mud	Low Head Block	
208	67	62	9.63	58	3.37	102	33	0.00	No recovery	Low Head Block	
209	**67**	**62**	**9.63**	**58**	**3.37**	**102**	**42**	**0.78**	**Mud with siliceous mat over tuffaceous sst**	**Low Head Block**	
210	68	62	9.99	58	4.73	100	33	0.00	Mixed pebbles	Lions Rump Block	
211	**68**	**62**	**7.99**	**58**	**4.73**	**100**	**45**	**0.31**	**Dk grey intrusive over tuff. Sst**	**Lions Rump Block**	
212	69	62	7.88	58	4.99	90	66	0.00	Mixed pebbles	Lions Rump Block	
213	69	62	7.88	58	4.99	90	69	0.00	Mixed pebbles	Lions Rump Block	
214	**70**	**62**	**7.68**	**58**	**5.27**	**65**	**17**	**0.59**	**Shelly diamictite**	**Lions Rump Block**	**Low Head/Krakowiak**
215	**70**	**62**	**7.68**	**58**	**5.27**	**65**	**44**	**0.22**	**Diamictite**	**Lions Rump Block**	**?Low Head/Krakowiak**
216	40	62	7.68	58	5.18	85	60	0.00	Mixed pebbles	Lions Rump Block	
217	**40**	**62**	**7.68**	**58**	**5.18**	**85**	**80**	**0.29**	**Grey/blk volcanic rock**	**Lions Rump Block**	
218	40	62	7.69	58	5.18	70	24	0.00	Mixed pebbles	Lions Rump Block	
219	40	62	7.69	58	5.18	67	31	0.00	Mixed pebbles	Lions Rump Block	
220	71	62	8.59	58	3.89	82	17	0.00	No recovery	Polonez Block	
221	**71**	**62**	**8.59**	**58**	**3.89**	**82**	**71**	**0.46**	**Dk grey agglomerate**	**Polonez Block**	
222	72	62	9.08	58	3.37	134	43	0.00	Tuffaceous sst pebbles	Polonez Block	
223	**73**	**62**	**9.28**	**58**	**3.44**	**111**	**61**	**0.13**	**Grey/blk tuffaceous sst**	**Polonez Block**	
226	74	62	6.16	58	7.41	128	54	0.91	Olive/grey clay over mixed pebbles	Martello Block	
227	75	62	6.79	58	6.79	201	55	0.00	No recovery	Magda Block	
228	76	62	7.01	58	7.42	191		0.00	No recovery	Magda Block	
Bransfield Margin											
195	58	62	49.42	58	7.47	610	53	0.00	Mixed pebbles		
Seymour											
203	64	64	8.03	56	23.24	316	62	0.00	No sample		

Table 4. JR29 Vibrocores

Core No.	Statn No.	lat	lat	long	long	depth	leng	Time	top lithology	bottom lithology
Melville Shelf										
130	11	62	4.23	57	36.42	105	0.30	26	dk grey, modern diamictite	
145	21	62	3.62	57	44.39	70	1.27	33	Olive/grey muddy sand	dk grey sd
King George Bay										
153	27	62	9.45	57	58.52	425	4.80	44	Olive/grey sandy mud	Olive/grey muddy sd
154	28	62	9.01	57	59.46	494	5.18	42	Brown/blk sandy mud	Brown/blk sandy mud
155	29	62	8.29	58	0.85	426	5.40	45	Gr/grey sandy mud	Gr/grey muddy sd
156	30	62	7.99	58	1.45	446	4.95	39	Olive/grey sandy mud	Olive/grey muddy sd
157	31	62	7.27	58	3.25	395	5.01	34	Olive/grey sandy mud	Olive/grey muddy sd
158	32	62	6.49	58	4.79	360	5.03	71	Olive/grey sandy mud	Olive/blk silty sd
159	33	62	6.03	58	6.08	306	5.00	28	Gr/grey sandy mud	Olive/blk muddy sd
160	34	62	5.60	58	6.94	284	4.70	25	Olive/grey muddy sd	Olive/blk sandy mud
161	35	62	4.85	58	7.93	240	4.32	27	Gr/blk muddy sd	Gr/blk muddy sd
Admiralty Bay										
180	46	62	6.24	58	23.93	290	0.00	42	no sample	
181	46	62	6.24	58	23.93	290	3.60	34	Olive/grey clayey silt	Gr/blk silty sd
182	47	62	6.39	58	24.64	330	4.45	36	Olive/grey sandy silt	Olive/blk sandy silt
183	48	62	7.95	58	26.20	438	5.16	25	Gr/blk sandy silt	Gr/blk sandy silt
184	49	62	8.33	58	25.71	410	5.28	36	Gr/blk clayey silt	Dk olive/gr sandy silt
185	50	62	8.69	58	25.35	436	5.37	35	Olive/grey silty sd	Dk olive/gr silty sand
186	51	62	11.40	58	58.22	520	5.03	39	Gr/grey sandy silt	Dk grey/gr silt
187	52	62	12.71	58	58.21	320	5.28	44	Olive/grey sandy mud	Olive/grey silty sand
188	53	62	13.37	58	58.20	510	5.31	62	Olive/grey silty mud	Dk olive/grey sandy mud
189	54	62	15.75	58	58.17	720	5.63	56	Olive/grey sandy silt	Olive/grey sandy mud
Bransfield Margin										
190	55	62	57.49	58	2.79	647	2.38	60	Grey/olive sandy silt	Olive/grey sandy silt
191	55	62	57.49	58	2.79	640	2.10	38	Grey/olive sandy silt	Olive/grey sandy silt
192	56	62	52.89	58	6.98	674	5.55	48	Grey/Olive silt & sand	Olive/grey sandy silt
193	57	62	51.42	58	8.21	633	5.54	56	Grey/olive sandy silt	Olive/grey sandy silt
194	58	62	49.42	58	7.47	610	2.68	44	Olive/grey clayey silt	Olive/grey sandy silt
196	59	63	45.24	58	13.68	760	0.00	75	no sample	
197	59	62	45.24	58	13.68	758	3.71	45	Olive/grey silty sd	Olive/grey sand
198	60	62	43.12	58	15.55	810	0.52	67	Olive/grey muddy sd + pebbles	Dk olive/grey sand
199	60	62	43.12	58	15.55	810	4.25	61	Grey/olive muddy sand	Dk brown/grey muddy sd
200	61	62	42.00	58	16.50	1050	1.01	80	Grey/olive muddy sand	Dk brown/grey muddy sd
201	62	62	41.29	58	17.22	1264	0.80	100	Grey/olive muddy sand	Brown/grey muddy gravel
202	63	62	40.24	58	18.09	1630	1.07	131	Olive/brown clayey silt	Olive/grey muddy gravel
Seymour										
204	64	64	8.03	56	23.24	316	5.10	32	Olive/grey clayey sand	Olive/grey silty sd
										Cucculaea I or Sobral
Erebus & Terror Gulf										
205	65	63	44.40	56	13.30	498	5.42	91	Olive/grey diatom. Silt	Olive/grey diatom. Silt
Polonez Shelf										
224	66	62	10.05	58	3.18	120	1.92	18	Olive/grey sandy mud	Olive/grey sandy mud (+shells)
225	67	62	9.63	58	3.37	101	2.15	33	Olive/grey sandy mud (organic-rich)	Olive/grey muddy gravel
229	76	62	7.01	58	7.42	191	4.25	24	Olive/grey sandy silt (+worm tubes)	Olive/grey silty sand

2. Results

2.1 Summary

Results of the surveys and sampling are summarised in Tables 1 - 4.

General. Apart from two proton magnetometer and surface water sampling operations en passage between the Falklands and South Shetland Islands, cruise JR29 was confined to areas of the northern Antarctic Peninsula (Figs 1 & 2). Around King George Island, surveys were conducted in the vicinity of Cape Melville (Melville Shelf), along the deep axial portion of King George Bay, along the western side of King George Bay (Polonez-Lions Rump Shelf), along the outer shelf between Low Head and the entrance to Admiralty Bay (seismics only), and along the deep axial portion of Admiralty Bay (Fig. 4). A separate survey was conducted on the slope and distal shelf of eastern Bransfield Strait (Bransfield Margin). Because of obstructive sea ice it was not possible to undertake work planned NE of Seymour Island: a sole Sparker traverse was run and sampling carried out at one site. During the period in which *JCR* remained in the area in expectation that the wind directions would change and carry the sea ice edge farther south, a short Sparker line and one vibrocore were collected in the northern Erebus and Terror Gulf. Finally, a speculative Sparker traverse was run along the western side of Antarctic Sound, although it was discontinuous to avoid areas of sea ice.

Separate reports on the rockdrill/vibrocore and geophysical surveys have been prepared and submitted to BAS by the BGS team (Skinner 1998), and the guest scientists (Lopez-Martinez & Urgeles-Esclasans 1998).

Bathymetry. Bathymetric maps had been compiled prior to the cruise using various data sources. Off King George Island we had data from the Admiralty charts, plus multi-beam swath Bathymetry (TOPAZ system) compiled by our colleagues at the University of Barcelona from their 96/97 cruise on *Hesperides*. Off Seymour we had only Admiralty chart depths. We have produced an updated map for the area off southern King George Island which combines these earlier results with those from our current survey, using *JCR* 10KHz data (Fig. 5). The 12.5KHz so-called Precision Echo Sounder has given so much trouble on previous cruises that we were inclined to not use it. The system needs replacing and just takes up bench space.

Seismic surveying. A total of 13 traverses were run using the BGS Sparker and Side Scan Sonar. This equipment was operated by the BGS team. They mounted 12 hour / two person shifts from the UIC and deck, with a further navigation operator on the bridge. The SSS was operated only in water depths < ~200m, restricting its use to the Melville and Polonez shelves, while the Sparker was used in depths to >1600 m. In the relatively shallow areas amenable to SSS use, survey speeds were limited to ~2.5 knots to reduce the possibility of encountering navigation hazards, while in deeper water surveying was mostly carried out at ~4 knots. The SSS was towed ~20% water depth off the sea floor and gave a side range of ~150m either side of the ship's track.

A total of 49.5 hours (~265 km) of seismic surveying was carried out.

Sediment sampling. For this we used the BGS rock drill/vibrocore. It was operated by a two person team working 12 hour shifts, with a third BGS operator on the bridge using Norcom software surveying packages to monitor and duplicate the ship's position keeping. The latter was the Konsberg-Simrad Dynamic Positioning system, which was DGPS driven. For the drilling, the target was the stern position just aft of the A-frame where the drilling wire descends. Drilling was controlled and progress logged on a PC, and the drilling operation monitored via penetration and oil pressure values. In the event, pebbles lodged in the drilling bit proved the most common impediment to progress.

Vibrocores were cut into 1m lengths on deck, and lithological characters from smears at the top of each section logged in the wet laboratory by the BAS team. End caps were taped and hot wax

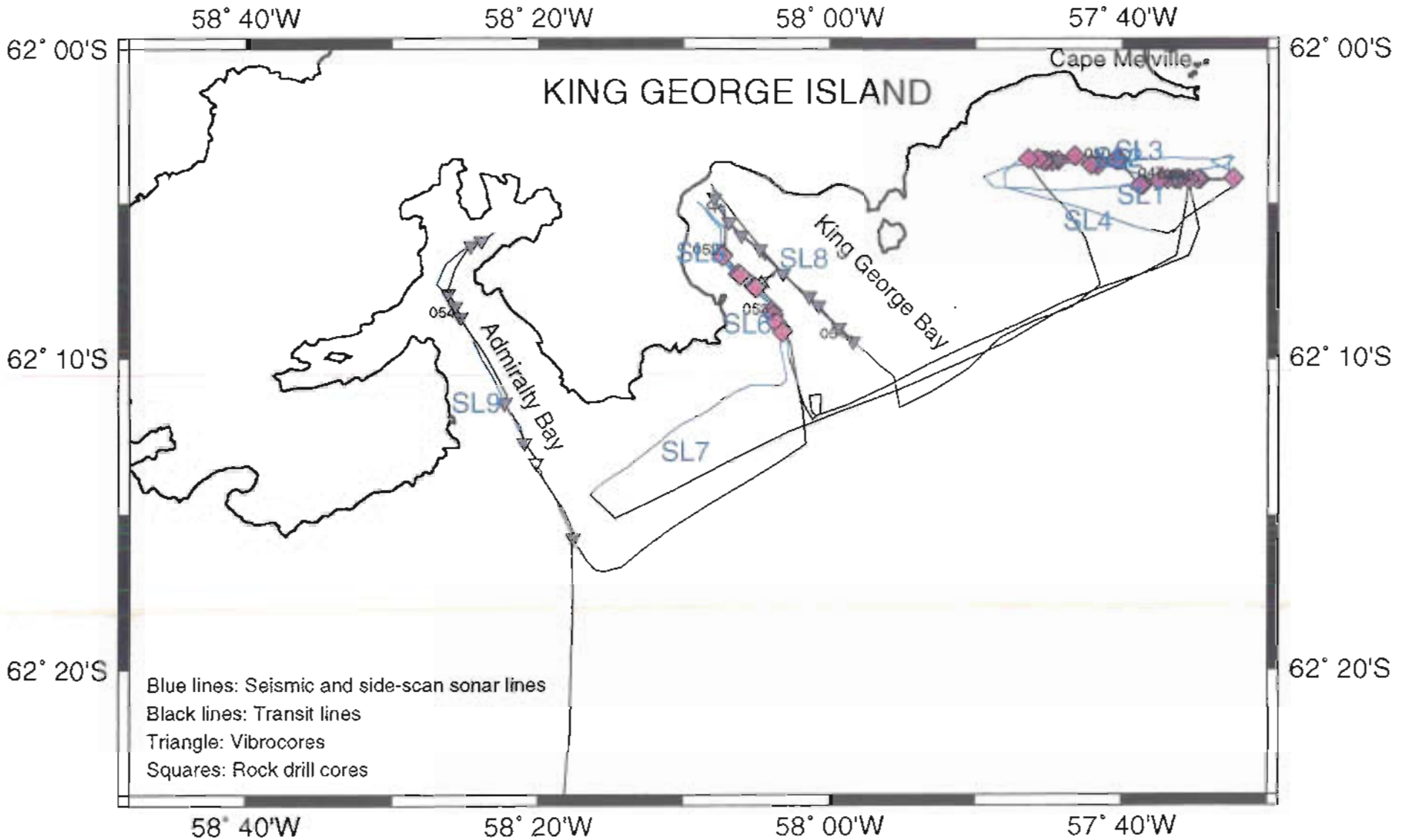

Figure 4. Geophysical surveys and sampling sites, King George Island

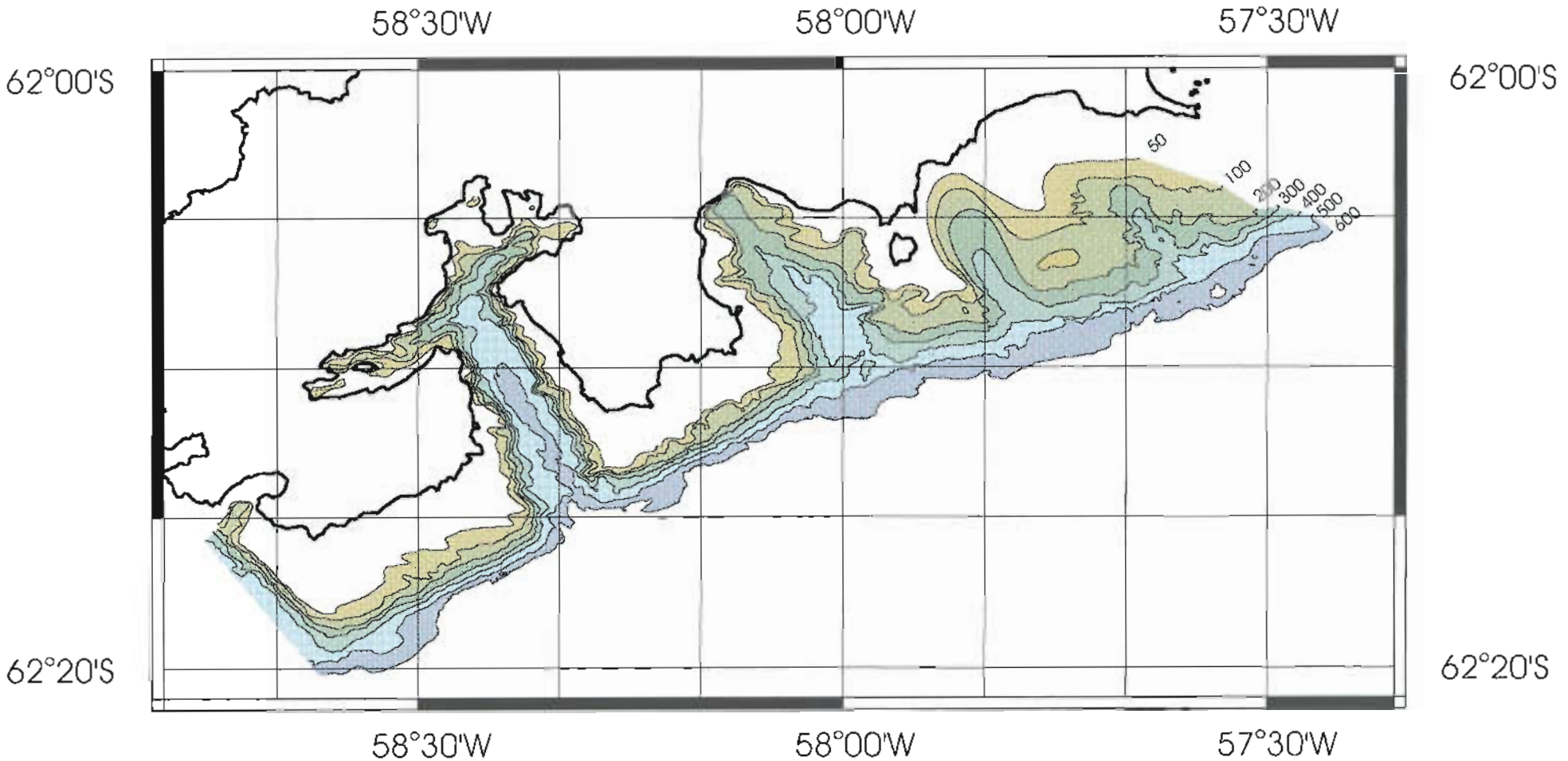

Fig 5 Bathymetry of the continental shelf off southern King George Island.

Data from British Admiralty charts, *Hesperides* swath bathymetry survey from Dr M. Canals (Barcelona) and JR29

sealed, and cores were stored at +4°C in the *JCR* cool room.

Rock cores were photographically logged with an optical system (Nikon, B&W) and digitally using a Kodak DC120 digital camera, and then described from hand specimens. The digital photographs (B&W) were later reduced and dropped onto the core logs (see Appendix).

Table 2 summarises the overall sampling statistics: 77 rock drill and 38 vibrocores were attempted, of which 26 rock drill and 36 vibrocores were successful. In the case of the rock cores, it was impossible to judge that samples were not from erratics, but cores which were clearly from erratics tended to show signs of rotation, with cut surfaces at various angles. Straight, cylindrical cut samples were considered from rockhead. In the case of a large boulder upon which the rig was perched, and which it prevented from rotating, this assumption would be erroneous. We had no means of drawing the distinction.

Each different site occupied by the ship was given a sequential number starting at 1 for the cruise, while cores were numbered sequentially starting at 115 within the Geoscience Division database. Consequently, several cores collected at one site would be numbered, for example JR29, station JR40, RDC (rock drill core) 169, 170, 216, 217, 218, 219. Vibrocores were labelled VC.

Seventy-eight separate sites were occupied, at which 22 rock cores and 34 vibrocores were collected. Most of the rock cores (58%) had a length of >25 cm (23% >50cm), while 42% of the vibrocores were >5m long.

2.2 Melville Shelf.

Three East - West Sparker and SSS traverses, plus a fourth oblique line, were run in the vicinity of the 100m contour 2 – 3 miles south of the Melville Peninsula (Figs 6 – 7). The peninsula consists of ~200m of fossiliferous mudstones with glacial erratics (Cape Melville Fm.) overlying tuffaceous sandstones (Destruction Bay Fm) and basal andesites and basalts (Sherratt Bay Fm) (e.g. Birkenmajer 1987). Dips are generally 5-10° S or SE . We have recently dated the succession as latest Oligocene (Destruction Bay Fm) to earliest Miocene (Cape Melville Fm.) (Dingle & Lavelle 1998). The whole succession is intruded by Miocene dykes (~20 Ma), and the large Melville Peak Pleistocene volcanic complex (Birkenmajer & Keller 1990).

A preliminary interpretation of the Sparker and SSS lines suggests that the wide <100m inner shelf south of the Melville Peninsula consists of a series of relatively flat rock surfaces with thin discontinuous modern sediment cover, and several elevated, steep-sided features that stand between 30 and 60m above the general level of the sea-floor (Figs 8 - 9). The lower-lying areas show low easterly dips, and from these we collected three samples of dark grey mudstones and siltstones, lithologically very similar to the Cape Melville Fm. At the western end of the area, the bedded sequences lie at two distinct levels, a higher western section and a lower-lying eastern part. It is from the eastern part that the Cape Melville-like mudstones were cored, while we obtained tuffaceous sandstones from the shallower, older strata. It is suggested that the latter may equate with the Destruction Bay Fm on Melville Peninsula. General morphological aspects suggest that this sedimentary succession is repeated twice farther east, and that more Cape Melville-like mudrocks occur at the extreme east of the section. Small igneous bodies intrude the sedimentary succession locally.

The three elevated terrains have differing morphologies. The largest lies in the central area and can be traced for at least 3 km on an NW-SE azimuth. We have dubbed this informally the "JCR Ridge", and from it recovered tuffaceous sandstones and basalt. The top has a rounded aspect and clearly consists of a bedded sequence at least 30m thick. Our sampling suggests that the JCR ridge is a basaltic complex overlain by bedded tuffs, and that it is intruded along a fault line that repeats the west – east dipping sediments.

A second intrusive complex, from which we collected basalt-like rocks, lies towards the western end of the profile. From the SSS survey, it seems that the most elevated portion lies to the north of seismic line 2. It lies at too shallow a water depth to safely sample without risking the ship. At least two circular/ovate features can be seen on the SSS record. Southeastward, this feature narrows and becomes less prominent.

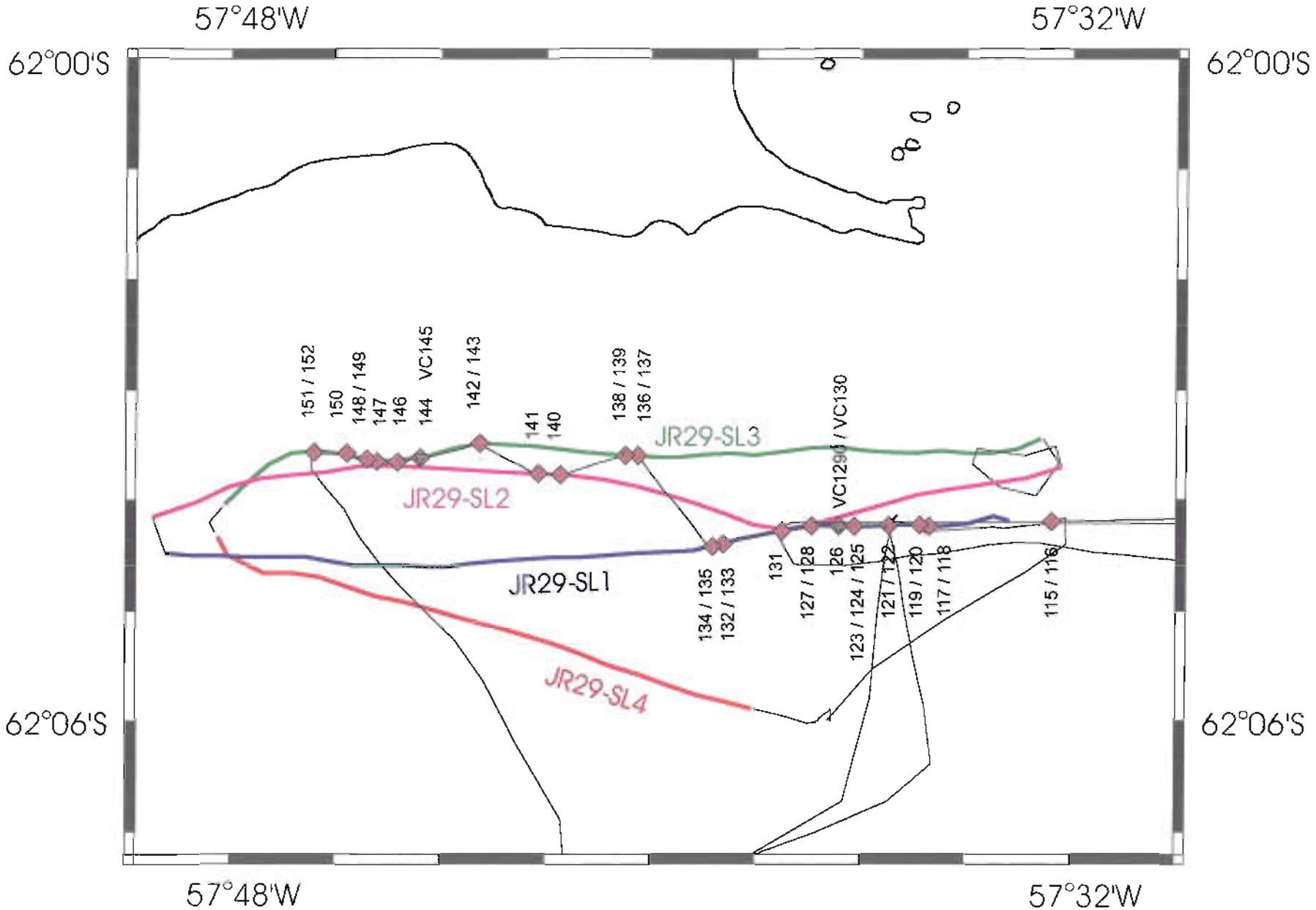

Fig 7. Geophysical survey lines 1-4 and sampling sites off Melville Peninsula

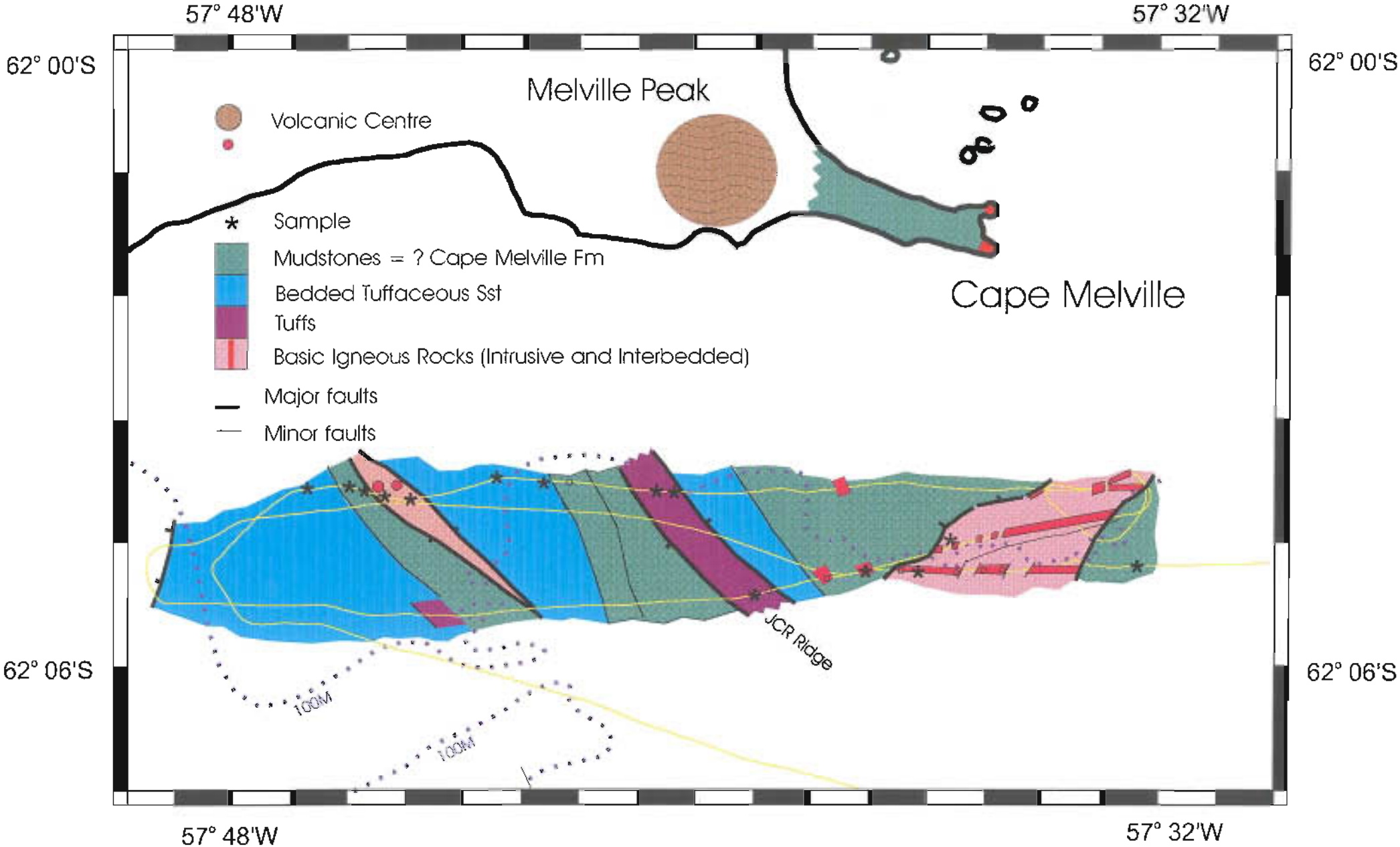

Figure 8. Preliminary geological map of the continental shelf off Melville Peninsula

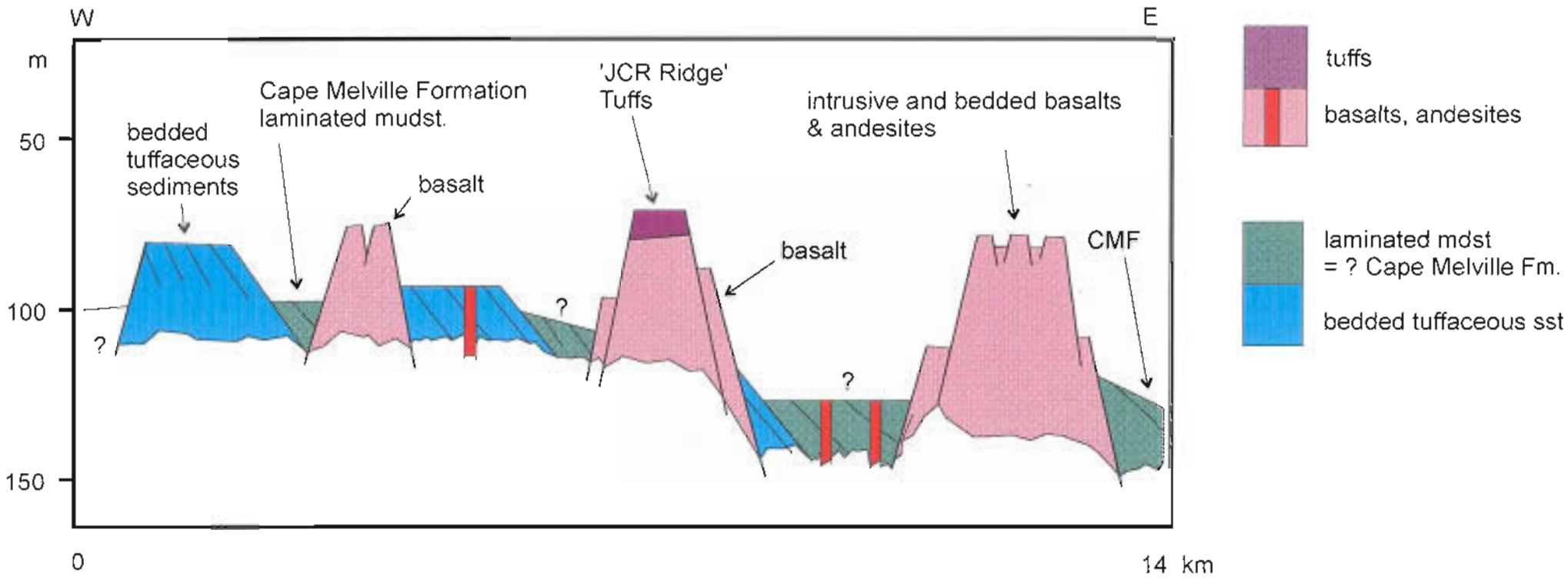

Fig 9. Schematic E - W section across Melville shelf based on geophysical surveys and rockcore samples

It also appears to lie along the line of a large fault zone that throws to the west and repeats the sedimentary succession.

At the eastern end of the area, sea-floor is rocky and elevated (<100m), with numerous small faulted eminences, as well as bedded sequences with hard elevated scarps. From this area we collected basic igneous rocks ("basalts"), and it is tentatively suggested that it is a wide, fault-bounded intrusive and bedded complex that separates the most easterly Cape Melville-like mudrocks from the rest of the succession.

Clearly, a more comprehensive survey is needed to map the area further, but the potential exists for targeting more Cape Melville-like rocks, which as we have found on the peninsula itself, may have sufficient shell material to undertake successful Sr isotope dating. At present we cannot speculate where the continental shelf succession lies in relation to the Miocene Cape Melville rocks onshore, but possibly a more extensive Miocene or late Oligocene sedimentary succession occurs offshore than is known currently from the Melville Peninsula.

2.3 Polonez Shelf.

The western side of King George Bay contains the classical outcrops of the Polonez Cove Formation documented by Polish workers and in which they recognised the earliest glacial sediments in West Antarctica (e.g. Birkenmajer 1987). We have recently dated these as Early Oligocene by Sr isotope stratigraphy, and showed them to be contemporaneous with the outcrops at nearby Magda Nunatak (Dingle & Lavelle 1998). The latter had previously been thought to be as old as Eocene (e.g. Birkenmajer 1992). Figures 10 - 12 show the cliff sections from offshore, in which the stratigraphy of the Low Head to Magda Nunatak area consists of basal andesitic lavas unconformably overlain by a glacial diamictite (tillite) with marine shells (Krakowiak Glacier Mb). This is followed by marine coquinas (Low Head Mb) and sandstones/mudrocks, and an upper sequence of lavas and tuffaceous sandstones and agglomerates (Boy Point Fm). One objective of JR29 was to sample possible extensions of the succession above or below those known onshore, i.e. to investigate possible pre-Oligocene or post-Early Oligocene glacial events.

Two seismic lines were run along the outer shelf between the head of King George Bay and a point SSE of Low Head (Fig. 13). A further line was run along the outer shelf between this point and the distal end of Admiralty Bay. The shelf along the western side of King George Bay is steep and very uneven, with numerous rocky prominences and deep gullies. This was a potentially difficult area in which to work, and the Master is to be commended for his care and skill in carrying it out. Figures 14 – 15 show a preliminary geological map and schematic section, constructed from the Sparker lines, between Low Head and Martello Tower. Here there are five large, steep-sided blocks separated by submarine valleys. The blocks contain reflectors which are truncated at the edges of the blocks. We interpret these as horst-like features composed, at least partly, of bedded strata, with boundary faults that run approximately normal to the strike of the shelf. Each horst has several subsidiary faulted units, and the highest point of each block lies at its northern end. Consequently, the overall structure appears to be that of a large tilted feature ~9km wide rising from the southern end of the Low Head Block to a highest point at the northern end of the Magda Block, where a large boundary fault drops basement over 100m to the north on the northern edge of the Martello Block. Structural collapse of the main tilted unit into component blocks along boundary faults, produced the present complex outline.

We drilled each of the individual blocks, and obtained cored rockhead from each, with the exception of the Martello Block. At this stage it would be premature to devise a correlation with the stratigraphy of the coastal exposures, but some general comments are in order.

1. We cored tuffaceous sandstones at several localities. Most of these lie near the southern end of the shelf (the exception lies on the Lions Rump Block).
2. Marine diamictites (muddy gravels and dark grey pebbly mudrocks with small shell fragments) were recovered from the Polonez and Lions Rump blocks. These are reminiscent of Krakowiak Glacier Mb and Low Head Mb sediments, respectively. On the Lions Rump Block, the diamictites were collected from the crest of a low, flat-topped rise which has a bedded upper part, suggesting that the diamictites overlie basic igneous rocks obtained from the same feature.
3. Agglomerates were recovered from the three central blocks, two of which also yielded dark basaltic volcanic rocks.

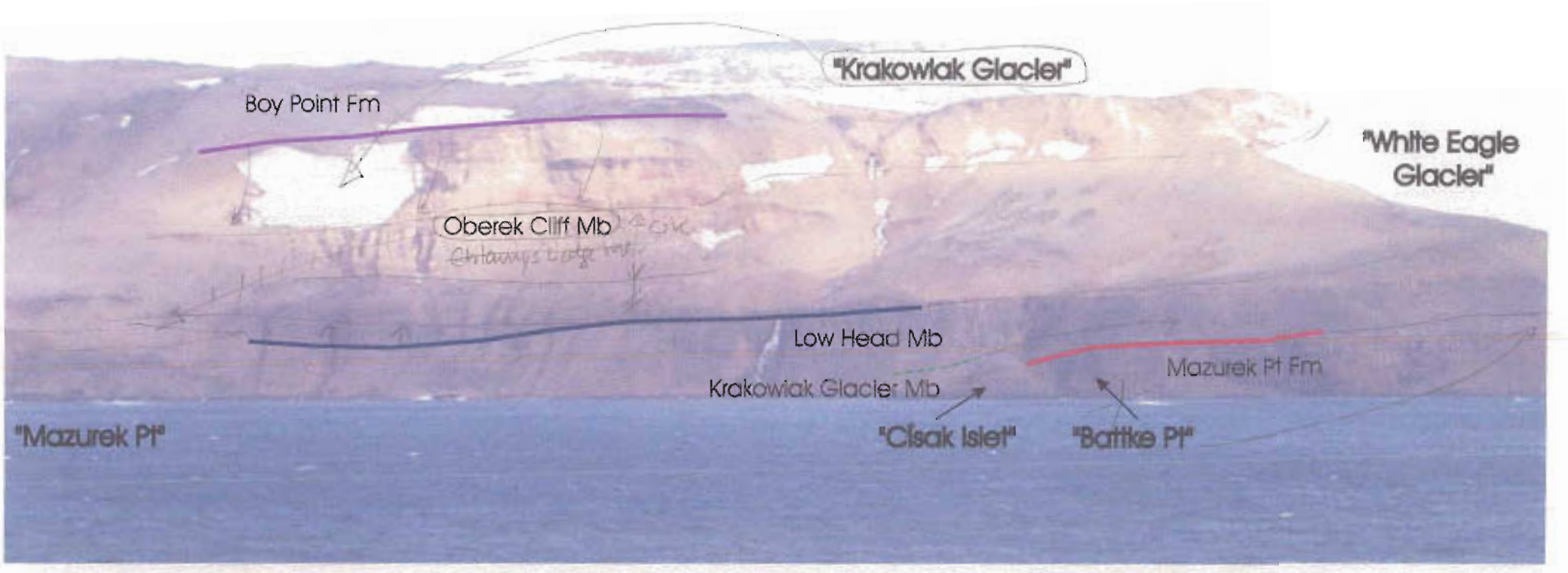

Figure 10: Cliff sections and basic geological units in the Polonez Cove Formation, south of Lions Rump.

Figure 11: Cliff sections north of Lions Rump

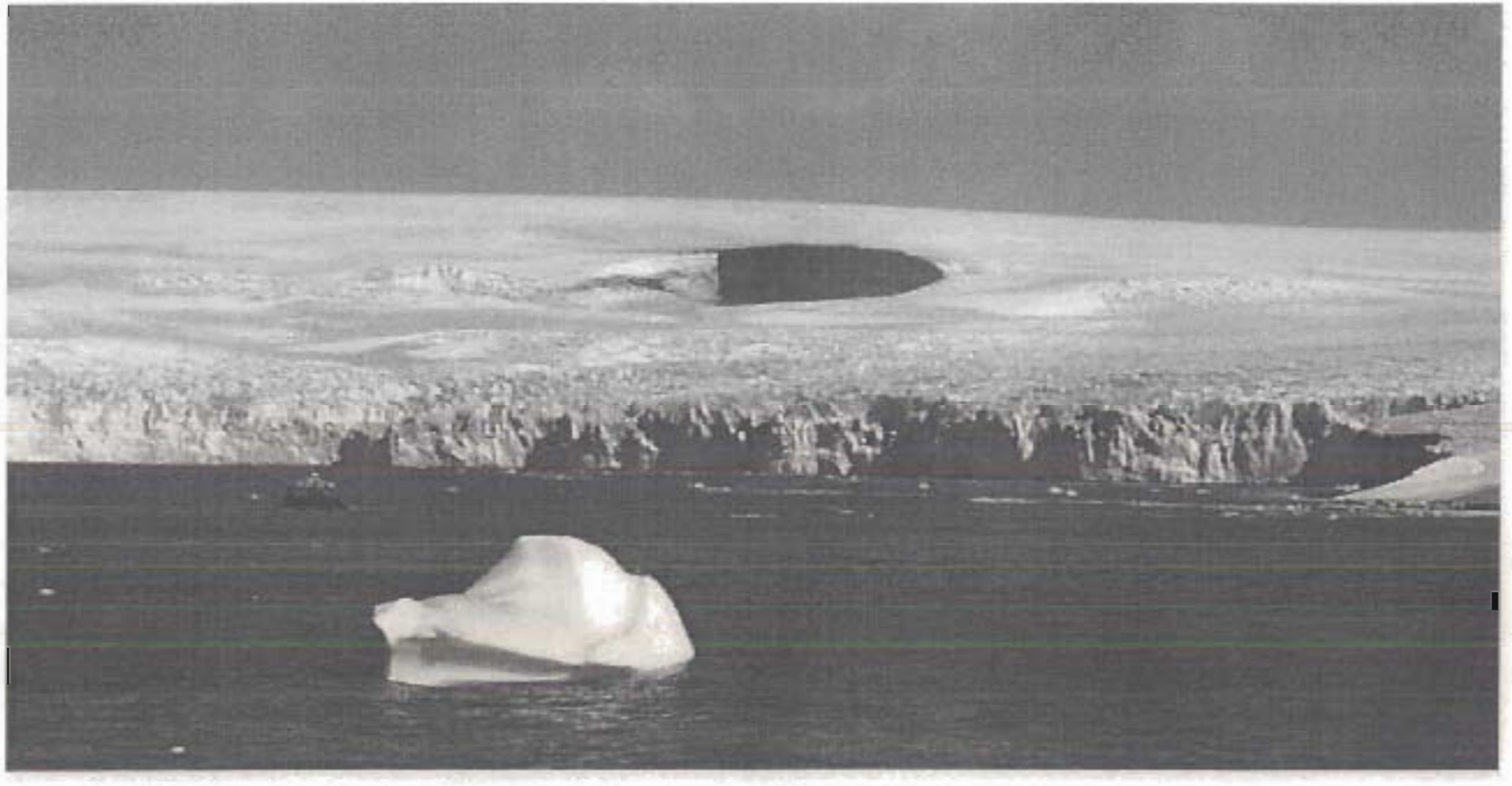

Figure 12: Magda Nunatak: a lateral equivalent to the Polonez Cove Formation

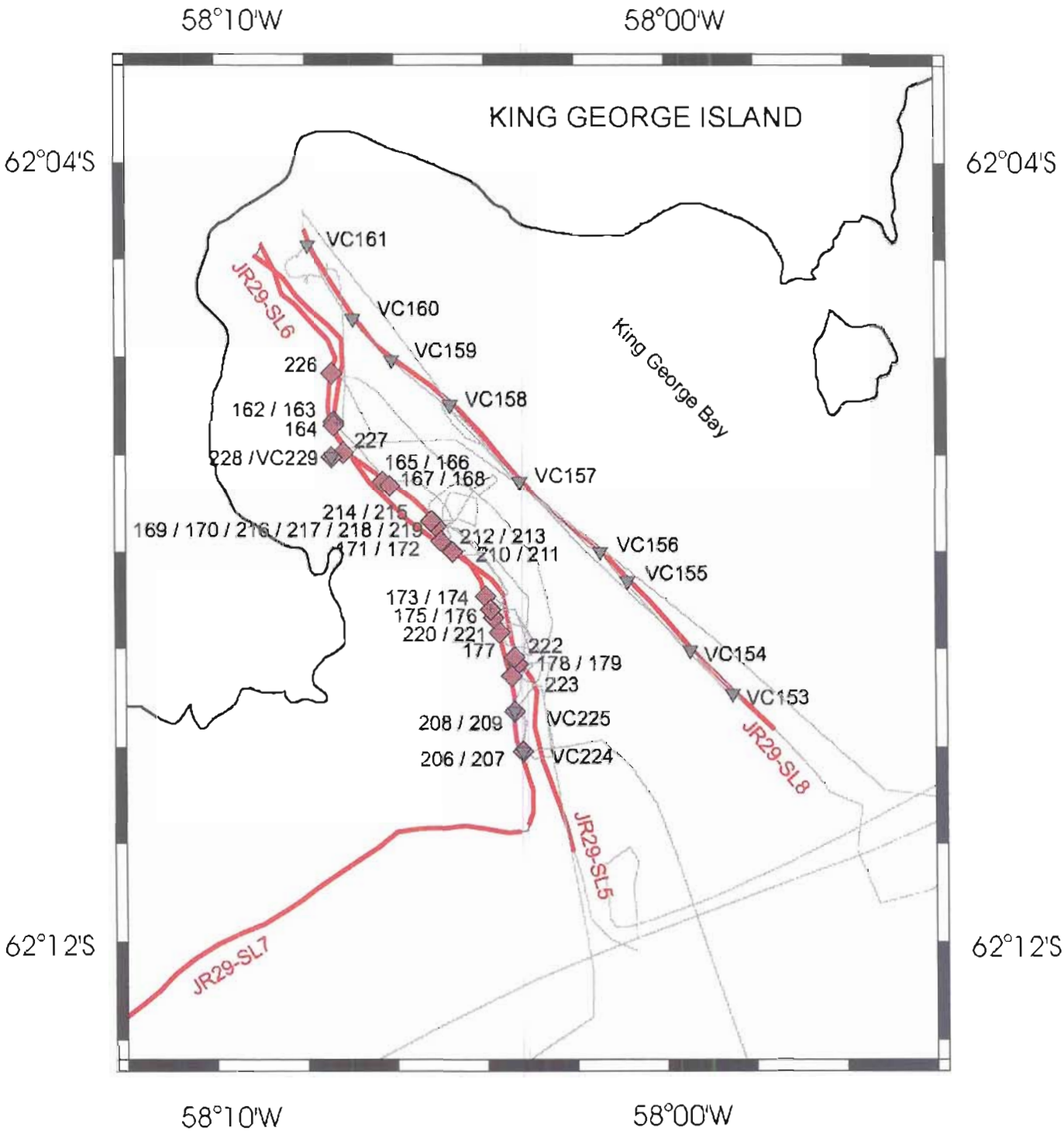

Figure 13

Geophysical survey lines 5-8 in King George Bay and on the Polonez - Lions Rump shelf

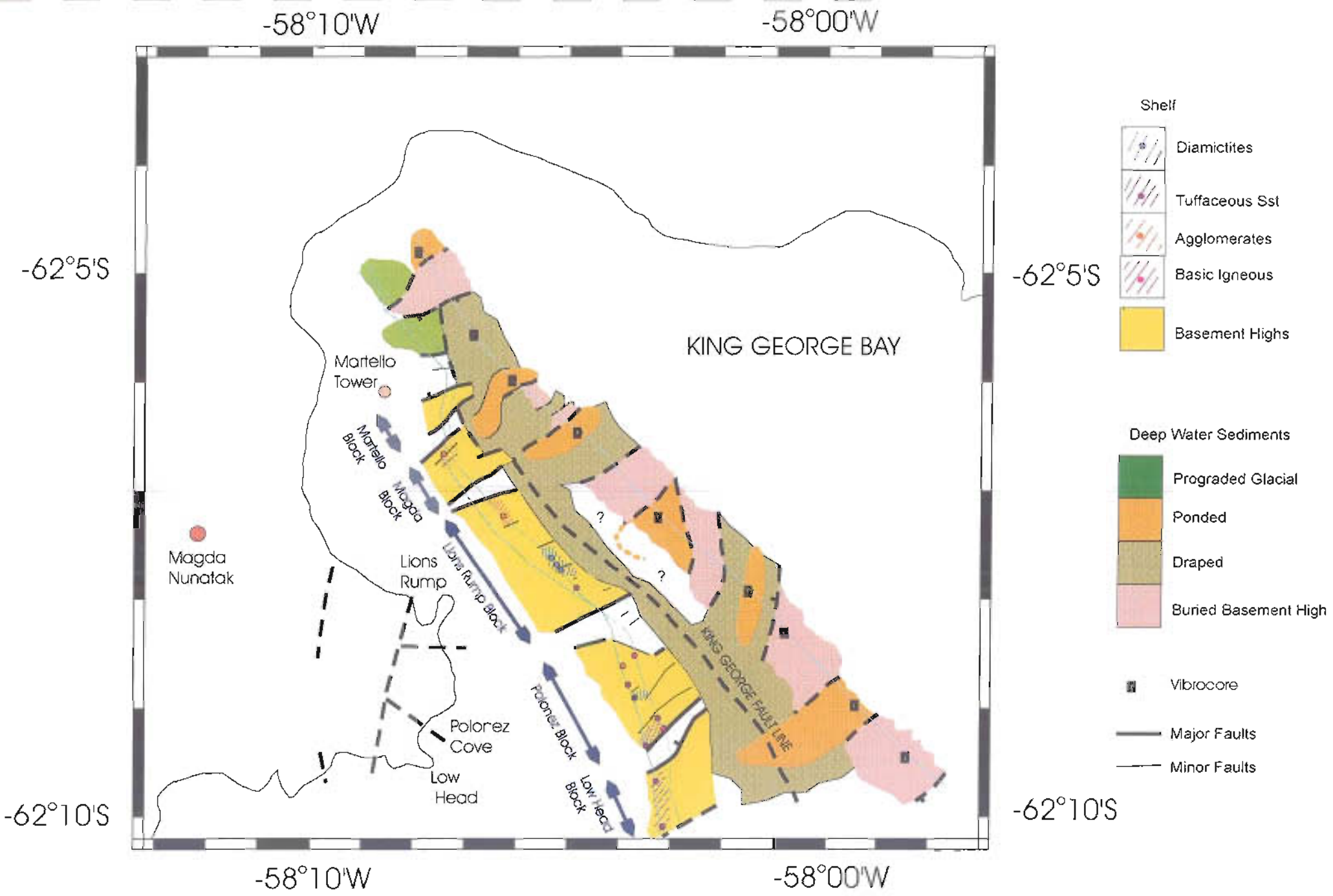

Figure 14. Preliminary geological map of King George Bay and the Polonez - Lions Rump shelf

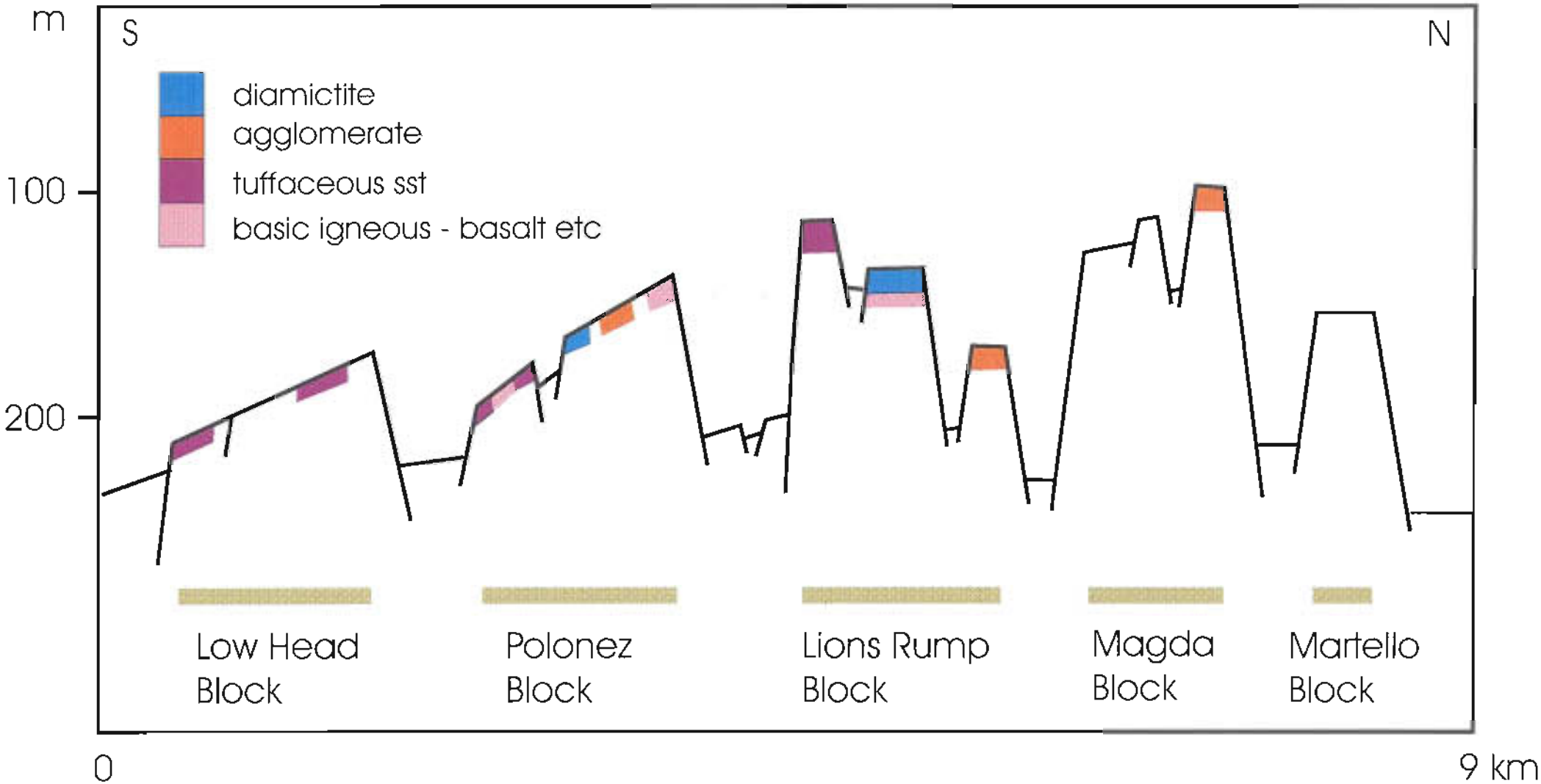

Figure 15. Schematic section between Low Head and Martello Tower on the Polonez shelf

Overall, the rock types were similar to those known from the coastal exposures, but until the diamictite can be dated, we cannot say whether the succession on the shelf lies at a stratigraphically lower level than that on land, because dips and strike in the shore exposures are variable. This raises the possibility that the diamictite on the Polonez and Lions Rump blocks is older than the Krakowiak Glacier Mb., which itself was the oldest unit that we have so far dated in the Polonez Cove area.

Considering the broader issue of the Polonez – Lions Rump shelf structures, the steepness and ruggedness of the discontinuity separating the shelf from the deep floor of King George Bay (a minimum of 300m lower), and the fact that south of Martello Tower there is no obvious correlation between basement high features on the fjord floor and those on the shelf, suggests that a large boundary fault separates the two terrains (King George Bay Fault).

2.4 King George Bay.

A sediment facies map constructed from the *Hesperides* data indicated that the axis of King George Bay is deep (>400m, Fig. 5) and divided transversely by basement highs, behind which sediments have become ponded, and over which they are draped. JR29 ran a high resolution line up the axis of the fjord (seismic line 8) to resolve the limits of the sediment facies more accurately , and to get further control on the azimuths of the basement structures. Figure 14 shows a map of King George Bay from its distal, upper continental slope end, to a position close to the glacier snout at the head of the bay, while Figure 16 shows a schematic longitudinal profile based on the Sparker record of JR29 Line 8. Six basement highs lie athwart the fjord and azimuths controlled by the *Hesperides* and *JCR* data indicate that they generally strike across the axis in a NE – SW direction in the northern part of the bay, while there is a more NNE – SSW trend in the middle part. At the distal end of the bay, there is a broad complex basement high, which lies across the shelf and forms the upper part of the continental slope. This strikes parallel to the shelf, which is roughly NE – SW. As mentioned above, there is no obvious congruity between the disposition of the basement ridges in the axis of King George Bay and the basement blocks on the Lions Rump – Polonez shelf.

Each of the basement features appears to have a complexly faulted upper surface (analogous to the faulted blocks mapped off the Polonez shelf), and they lie at progressively lower levels down the length of the fjord: ~300m at the head, to ~430m at the distal end. None of the ridges appears to have exposed basement rock, and all are buried under up to 50m of draped, weakly to well bedded sediments. Within each of the intervening basins there is a ponded, densely laminated sediment sequence that we suspect is composed of a combination of fine suspended material and bottom transported debris that has moved laterally down the steep flanks. This suggestion is supported by the different elevations of the infill in these basins and the interfingering nature of the contact between the ponded and laminated sediments. At the bay head, adjacent to the present ice cliffs, the level of the ponded sediments is high (~280m) and is relatively close to topping the first basement ridge. The level falls progressively down the axis to ~530m immediately behind the ridge on the upper slope. The ponded sediments in King George Bay are generally ~60m thick.

Vibrocores were taken in each of the ponded basins to assess whether there have been any significant differences in the sedimentary histories of each basin, and also to see whether there are any regional markers horizons (for example ash falls) that can be identified over large areas. A critical measure will be the sedimentation rates in such basins. Most of the cores are relatively sandy at the base, but only in proximal locations (in the ponded facies behind and atop the northern-most basement ridge) are the present surface sediments also sandy. This immediately suggests that during the recent past, sedimentation over most of King George Bay has been characterised by lower energy levels than previously obtained (presumably all the sequences are post-glacial).

2.5 Admiralty Bay.

An interpreted seismic section along the length of Admiralty Bay has been published by Griffiths & Anderson (1989). Similar basement features were identified to those seen on JR29 in King George Bay. Our Sparker traverse (JR29 Line 9) was run along the axis of Admiralty Bay (Fig. 17), between the two

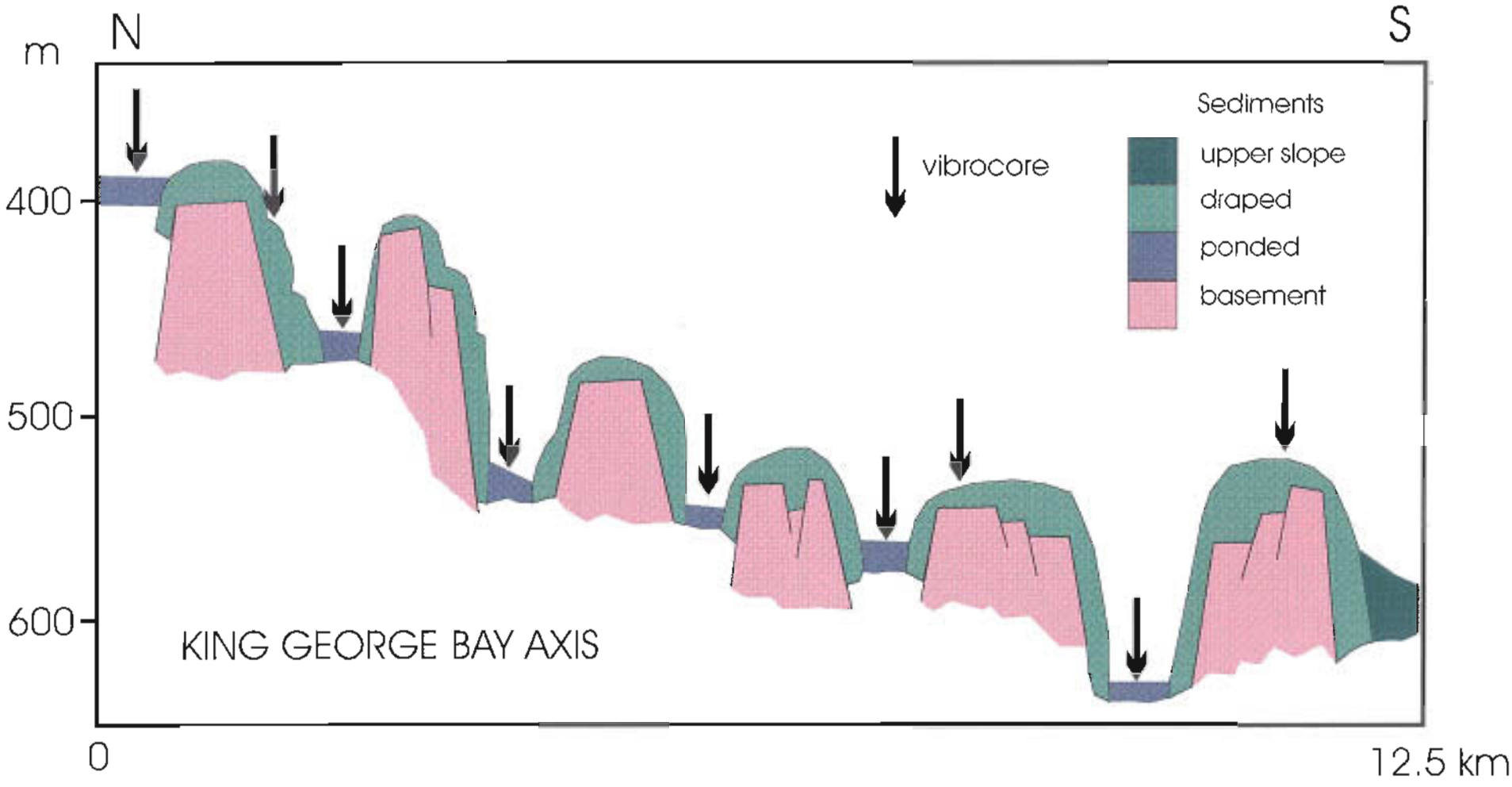

Figure 16. N - S geological section along the axis of King George Bay

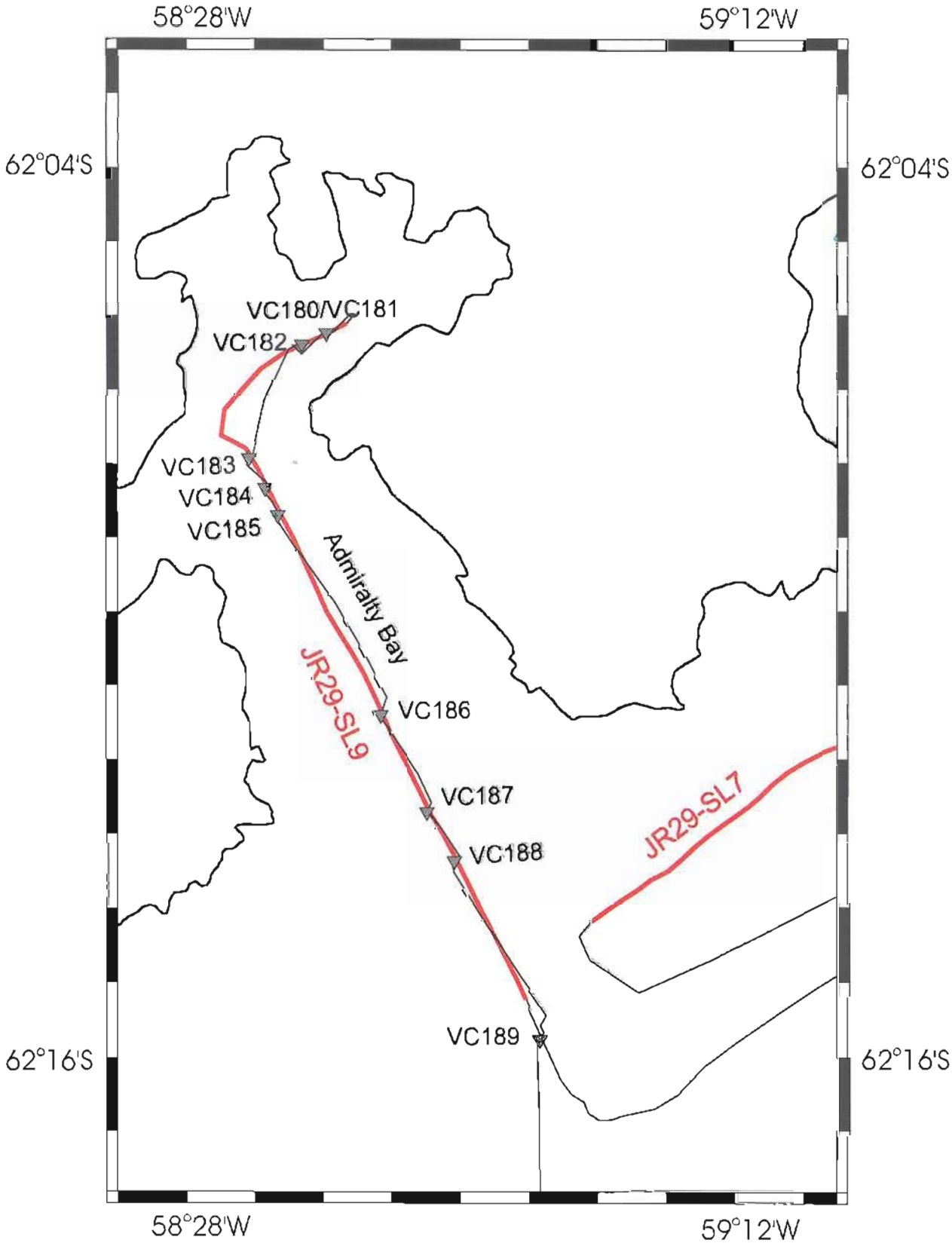

Figure 17.

Geophysical Survey line 9 and vibrocoring sites along the axis of Admiralty Bay

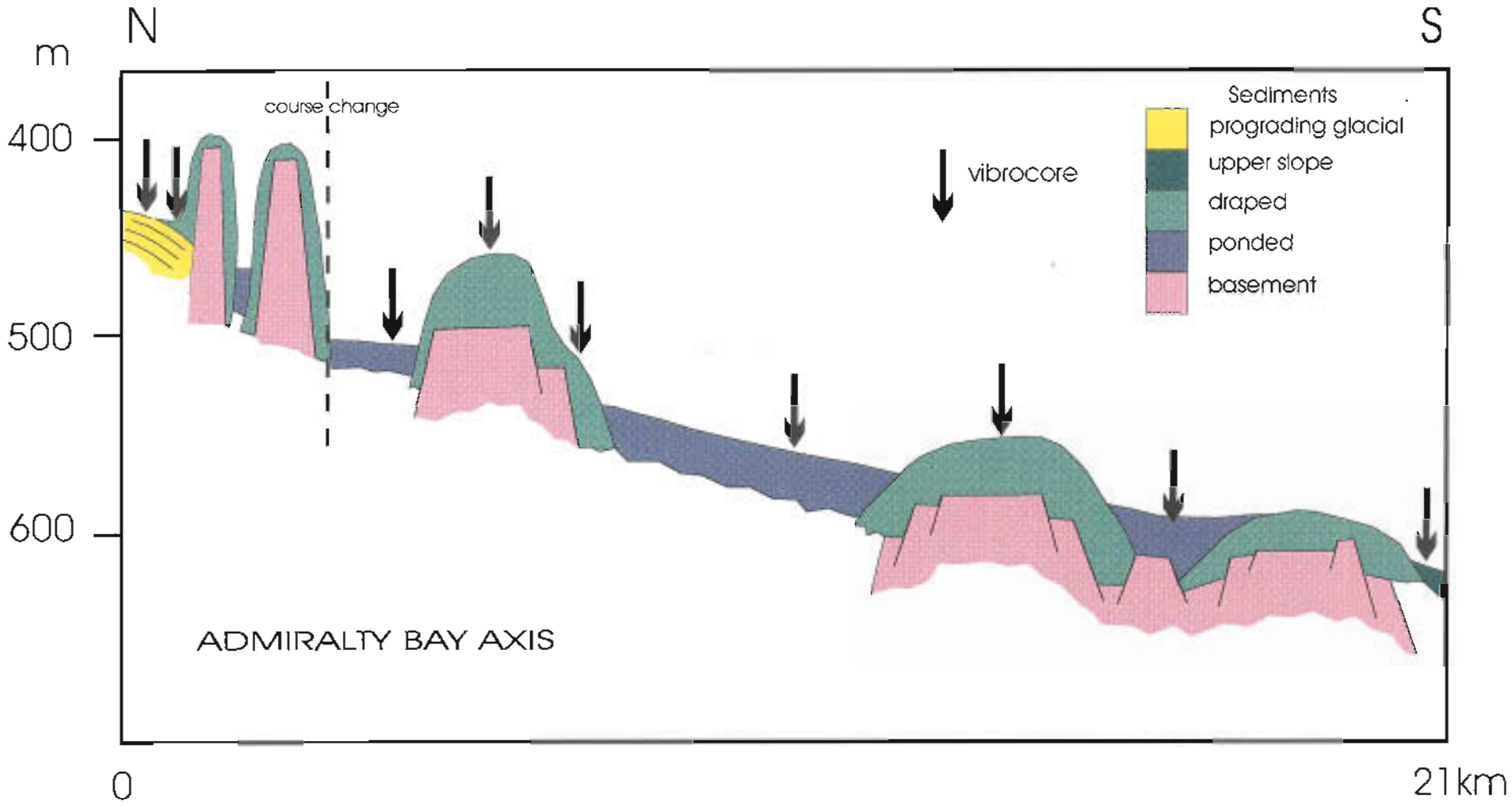

Figure 18. N - S geological section along the axis of Admiralty Bay

Hesperides longitudinal survey lines, and based upon which we had compiled a preliminary sediment facies map. Water depths locally exceed 500m in Admiralty Bay (Fig. 5).

As in King George Bay, the fjord axis is subdivided into compartments by transverse basement ridges (Fig. 18), but the overall structure appears simpler: a large ridge lies at the head of the bay (at the junction of the T), while a wide, double ridge occurs at the distal end. JR29 Line 9 ran ~3km into the eastern arm, at the head of the bay, where a further two smaller ridges were encountered. There is a progressive increase in depth to basement ridge crest in a SE direction down the bay axis: ~500m at the bay head, to >600m on the outer part of the ridge which lies athwart the bay entrance. All the ridges have a covering of draped sediment (= the "hummocky" bedded units of Griffith & Anderson (1989)), while densely laminated, ponded sediments fill in the inter-ridge basins. In the main basin in Admiralty Bay, the ponded sediments are ~80m thick. A further similarity between King George and Admiralty bays is the progressive increase in depth to the sediment basin floors down the fjord axis: ~500m at the head, to ~590m distally. The thickness of draped ridge crest sediment is considerably greater in Admiralty Bay, however: ~50m compared to generally <30m in King George Bay. The seismic character of the draped and ponded sediments appears identical in both bays, and it is probable that the two have had a similar sedimentary history.

A recent sedimentological study of the area, and the adjacent Maxwell Bay, indicates that the sedimentation rate within the laminated, ponded sediments in both Admiralty and Maxwell bays has been ~0.235 cm/yr for at least the last ~450 yrs (i.e. radiocarbon dates based on the upper 1m of cores examined) (Park *et al.* 1995, Yoon *et al.* 1997) Extrapolating this rate, the ~5m cores collected on JR29 from Admiralty Bay, could provide a detailed sedimentary history of the area for ~2,100 yr and on the same basis, the ~80m of laminated sediments suggests that ~34,000 yr of sedimentary record exists in Admiralty Bay. Yoon *et al.* (1997) estimated that the average thickness of laminated sediment in Maxwell Bay is ~50m, and that the history preserved there is ~17,000yr (though 50m @ 0.232cm/yr = 21,552 yr!). However, their estimate of sediment thickness was from a low resolution multi-channel record, and the sedimentary history of glacial retreat and record of initiation of sedimentation, based on the JR29 Admiralty Bay seismic data is likely to be more accurate. This also suggests that the sedimentation rate in King George has seen somewhat slower (~60m/34,000 yr = 0.18 cm/yr). However, if the sediments in all three bays post-glacial, then the sedimentation rate calculated by the Korean workers for the 1m of core they examined is either inaccurate, or unrepresentative of the ponded, laminated sedimentary unit as a whole. Probably the latter. In that case, assuming that the sedimentary succession is not older than 20,000 yr, minimum values of 0.35cm/yr seem more likely. Obviously, AMS radiocarbon or ^{210}Pb dates will be needed urgently for the JR29 cores to resolve the issue.

2.6 Bransfield Margin.

Numerous seismic sections across outer continental shelves and slopes around Antarctica have been published (e.g. Larter & Barker 1991), and models proposed to account for the depositional and erosional features revealed therein. One of the objectives of the proposed HILATS2 project will be to sample these and establish stratigraphies and depositional models for them. ODP Leg 178 (which has two BAS representatives) currently drilling on the margin off the western peninsula will shed light on their history. The Marine Geology group at Barcelona is also engaged in an analysis of the problem and it is hoped that BAS and Barcelona will cooperate in future activities. Barcelona proposed a total of 18 sites on the margin of the eastern Bransfield Strait, to the NW of the entrance to Antarctic Sound as vibrocoring targets. We were able to tackle nine of these (Fig. 19), ranging from the "discontinuous stratified" facies on the middle to outer shelf (VC 190-196) to the "prograding stratified facies" of the outer shelf/upper slope (197-201). In addition, a core was taken at the boundary between the slope and basinal facies (VC-202), and in an exposure of pre-last glacial "older material" on the mid-shelf (VC-194).

2.7 Weddell Sea & Antarctic Sound.

The Eocene succession exposed on Seymour Island (La Meseta Formation) appears not to quite reach

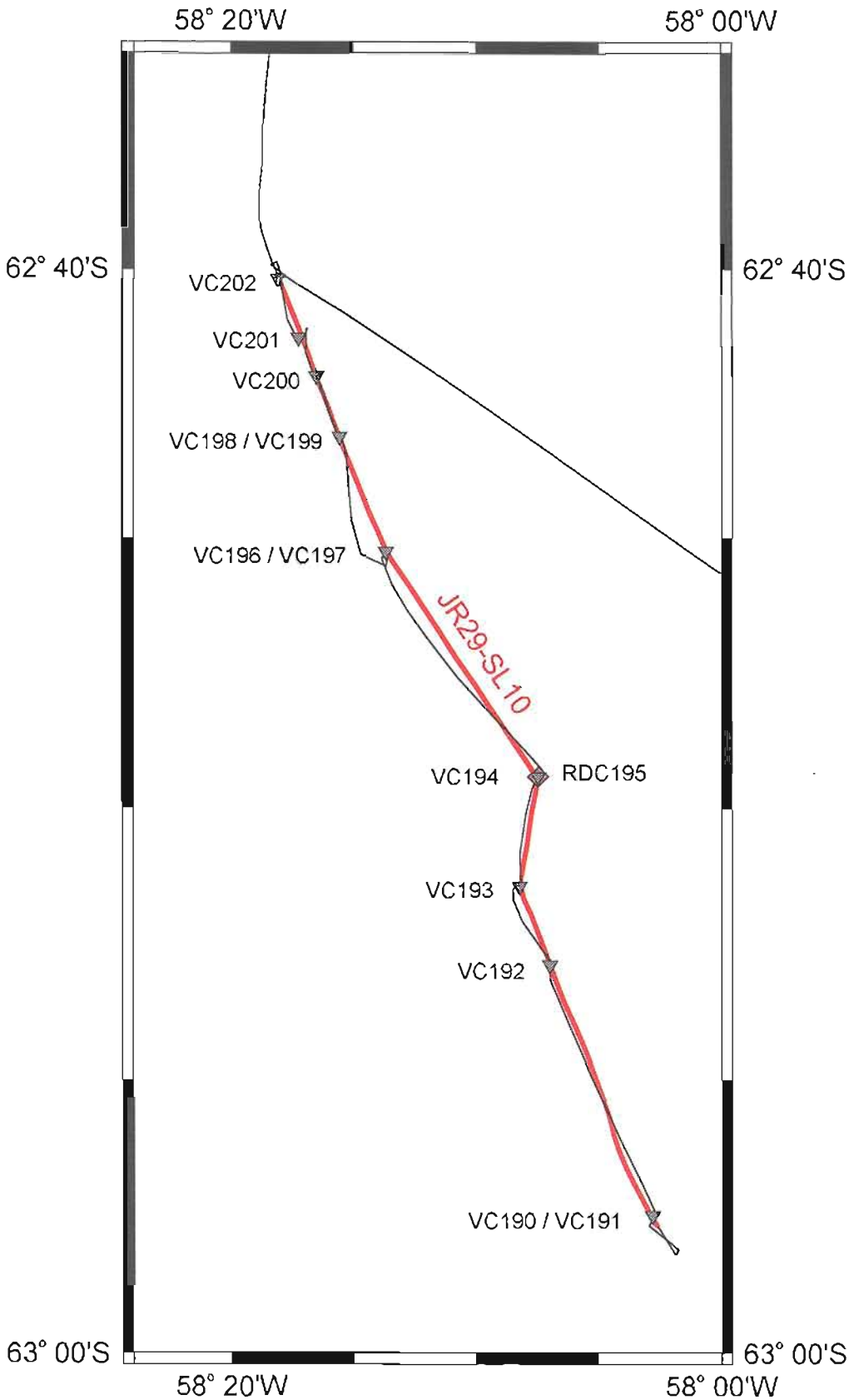

Figure 19. Geophysical Survey line 10 and vibrocoring sites on the Bransfield margin

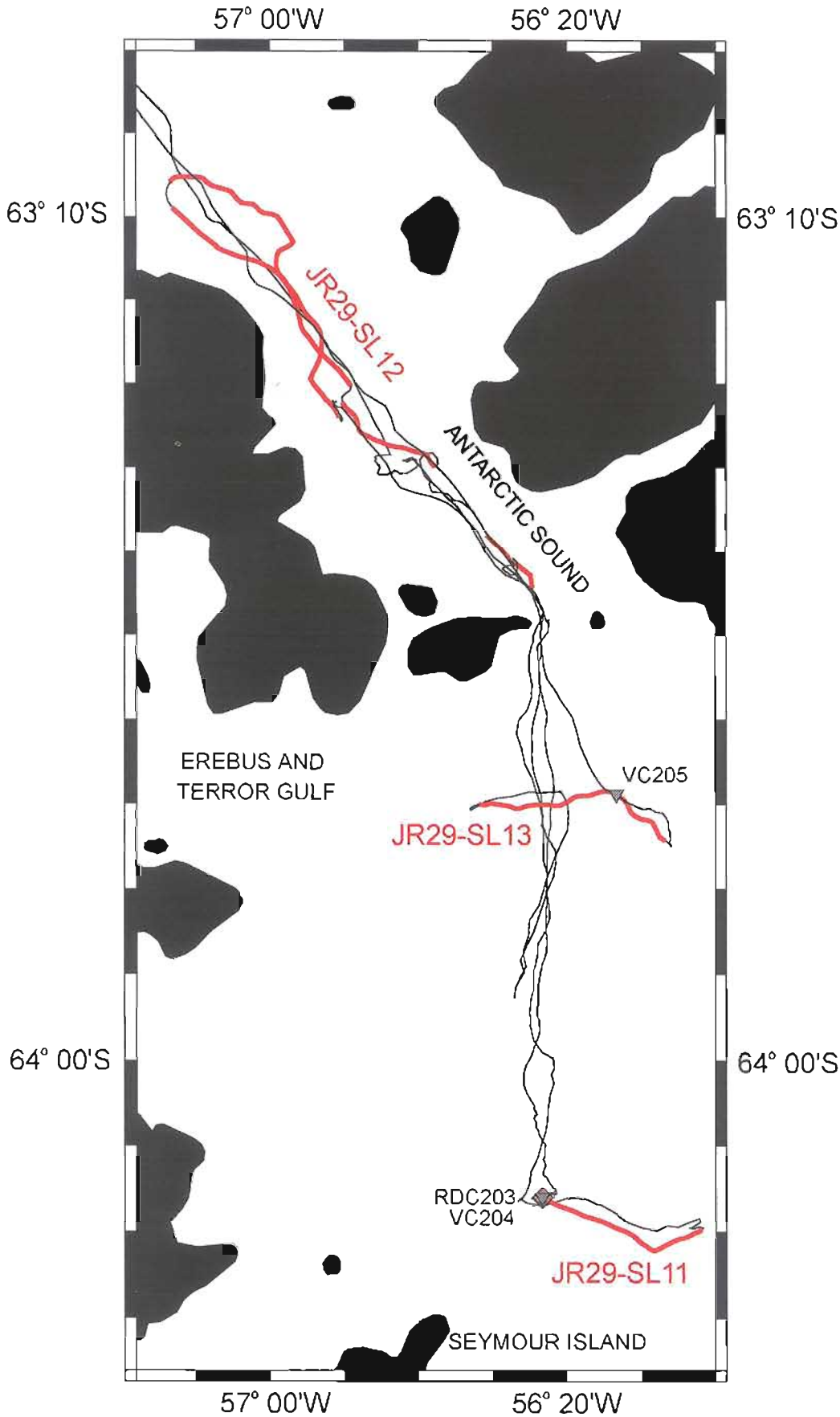

Figure 20. Geophysical survey Lines 11-13 in the Weddell Sea and Antarctic Sound

to the Eocene/Oligocene boundary, and the youngest dated sediments (Submeseta Mb) (34 Ma, Dingle & Lavelle 1998) show no unequivocal signs of having a glacial source, although the climate was probably cold (Dingle & Lavelle in press). Seismic lines from the NW Weddell analysed by Anderson *et al.* (1992) and Sloan *et al.* (1995) showed well-bedded, easterly dipping sediments NE of Seymour Island, and these authors have suggested that the succession includes the Palaeocene through to Eocene succession exposed on Seymour, in addition to strata that extend from Late Eocene to above a "mid-Oligocene" unconformity.

JR29 seismic line 11 ran along the edge of the sea-ice as it existed on 25-Feb-98 (Fig. 20). It followed a somewhat irregular course, but navigation was good, and at two points crossed the *Polar Duke* 91-28 profile. We recorded well-bedded sediments that dip eastwards at an apparent angle of ~5°. Unfortunately, we were able to collect only one sample, a 5m vibrocore (VC204) on a low scarp-like feature towards the western end of the traverse. This sample was a shelly, glauconitic sand with abundant small carbonaceous fragments, that is very similar lithologically to sediments collected on Seymour Island in 1996 at locality DJ.809 (*Cucullaea* II Mb of the La Meseta Fm) (Dingle & Lavelle 1997). A less likely alternative is DJ.812 in the middle part of Sobral 3. The former is ~40 Ma and the latter ~62 Ma. Sr isotope stratigraphy on the shell material, and/or $^{39}Ar/^{40}Ar$ dating on the glauconites should resolve the issue. The veracity of an Eocene/Oligocene age for the upper part of the sequence, while not being established, is supported by our data. JR29 operations were abandoned because of ice conditions and constraints of time, but clearly, this is a race that BAS should make every to win, as it might well contain the Holy Grail of the pre-glacial to glacial transition in West Antarctica. The opportunity should be taken to sample this section in detail during planned drilling/vibrocoring cruise to the northern Peninsula in the 1999/2000 at the start of HILATS2.

A further Sparker traverse (JR29 Line 13) was run approximately W – E in the northern part of the Erebus and Terror Gulf (slightly to the north of *Polar Duke* lines PD91-43 and PD91-29 shown in Anderson *et al.* (1992) (Fig. 20). Sloan *et al.* (1995) show the area as underlain by "chaotic reflectors" signifying "?Jurassic volcanics", but we found that the succession was predominantly well-bedded, presumably sedimentary strata. In the west, apparent dips are to the west, but over the crest of a shallow anticline in the western part, strata dip eastwards at relatively low angles, with occasionally harder horizons that form an uneven rockhead beneath ?Quaternary sediments. The latter proved too thick to penetrate with the drill/vibrocorer, even at their thinnest point. There is a wide, flat basin in this area >500m water depth, with sea-floor channels leading into it from the south and north, suggesting that any traction load transportation is to the west, into the Prince Gustav Channel.

A third Sparker traverse (JR29 Line 12) was run up the western side of Antarctic Sound (Fig. 20). It was disrupted on several occasions by sea-ice and deviations for icebergs, but should be a useful item for the BAS Geoscience archive. It had not been part of the original cruise plan, but was undertaken to usefully fill time waiting for the wind to turn in the Weddell Sea area. For the most part, water depths were >500m, where sea floor returns frequently gave rise to a chaotic pattern of large overlapping hyperbolae. This probably indicates a rugged bedrock and/or boulder strewn sea-floor. In shallower water, particular on the western part of the sound north of the latitude of Hope Bay, the sea-floor was relatively smooth, with a relatively thin , intermittent sediment (?glacial) cover, and numerous dipping bedded sequences, presumably of sedimentary rocks. No detailed analysis of these records was undertaken, as no sampling programme was planned.

2.8 Plankton sampling

During cruise JR19 (1997) a series of sea-surface plankton samples was collected in the Drake Passage – Bellingshausen Sea area (Anonymous 1997) for a DNA-based study that was being undertaken by Dr K Darling at the Department of Earth Sciences, University of Edinburgh. This work has proved successful, and a further comparative collection had been requested from the present cruise. Consequently, seven samples were collected from the uncontaminated sea water supply to the wet laboratory. Water was passed through 0.5mm and a 63 micron screens for 1-2 hours, and filtered to dryness on a 0.45 micron millepore filter. The filter paper was stored in plastic vials at –80°C in a chest freezer. The geographical location and SST of the filtered samples is shown in Table 5.

Table 5. Plankton Samples

		Latitude, S	Longitude, W	T, °C
JR29 - 1		53 161	57.669	8.36
JR29 - 2		54 847	58.167	7.38
JR29 - 3		54.104	58.155	7.10
JR29 - 4		57.823	59.118	3.00
JR29 – 5	start	61.172	60.044	2.70
	end	61.728	58.371	1.70
JR29 – 77	start	60.477	59.989	2.80
	end	59.966	59.777	3.00
JR29 – 78	start	53.483	54.640	8.40
	end	53.181	57.644	8.40

2.9 Magnetics. (P Morris)

Two long, good quality proton magnetometer profiles were obtained across the Drake Passage. These will be added into the BAS regional compilation. They are particularly valuable in that they cross a very sparsely sampled region to the NW of King George Island at an optimum orientation, and help to fill a serious gap in the magnetic coverage.

STCM measurements were made throughout the voyage, and the newly reconstructed instrument appears to be performing well. After appropriate processing, it should be possible to provide useful magnetic profiles along the seismic lines recorded during JR29 cruise as an aid for geological interpretation.

3. Equipment

3.1 Equipment List. (P Morris)

The principal scientific instruments used on cruise JR29 were:

1. Rockdrill/Vibrocorer MkII (BGS)

2. Sparker (EG&G) (BGS)

3. Side Scan Sonar (Waverley Sonar 3000) (BGS)

4. Proton Precession Magnetometer (Barringer 3000) (BGS)

5. Shipboard Three Component Magnetometer (STCM) (BAS)

6. 3.5KHz sub-bottom profiler (IOS) (BAS)

7. Simrad EA500 echo sounder

8. GPS Receiver – differential (Trimble 4000DL)

9. GPS Receiver –pitch & roll (Ashtech 3DF)

10. Heave Roll & Pitch recorded (TSS 10)

3.1 Rockdrill/Vibrocorer. (Modified from Skinner 1998)

The BGS 5m rockdrill with the option of vibrocoring by interchange of barrels and selection of different computer functions was the sampling tool used for the programme (Fig. 21). Deployment was over the stern of the vessel via a combined power hoist umbilical cable on a dedicated winch system. All functions were PC controlled and a monitor display allowed the operator to observe progress and make variations to the coring parameters. A digital log of seabed operations was recorded for each site.

In vibrocoring mode the tool can collect up to 6m of soft sediment core of variable lithology in an 88mm polycarbonate liner which is used for sample storage after cutting into suitable lengths and capping, taping and waxing each length. On this cruise, because it was being used in conjunction with the rotary drill the maximum length of core possible was 5.2m. This reduction in length is due to the necessary precaution of avoiding the vibration head striking the rotary kelly on the base of the frame. During the vibrocoring process a 12 tonne vibration force is delivered to the core cutting shoe and upon full penetration or refusal to go further (as seen on the operator display) the vibration is switched off and the barrel is retrieved back into the frame of the unit at a controlled speed before the corer leaves the seabed.

In rockdrilling mode the tool collects a core of 49mm diameter inside a steel liner from which it is then extracted upon recovery and stored in separated boxed trays. During the coring process the speed of rotation can be varied extensively between 0-600 RPM and either one or two flush pumps can be used. Penetration and oil pressure graphs were the most useful for interpretation of the drilling but there was a variety of sensors fitted, including pitch and roll to check for stability of the frame on the seabed and all can be displayed/interrogated during the operation.

The rockdrill/vibrocorer operated well and with a minimum of downtime. The latter occurred largely due to a cable termination and one loss of station position which damaged the kelly and housing when the barrel bent and was then pulled partly through it during the recovery process..

Figure 21: Deployment of the BGS rockdrill off Melville Peak

Deck handling and deployment of all equipment was extremely efficient and a testimony to the high calibre of deck crew on board *James Clark Ross* and the professionalism of the BGS team. The helpfulness and attention to detail of both teams is gratefully acknowledged. Similarly, the ship positioning and station keeping was excellent and did much to contribute to the minimum maintenance required on the seabed equipment.

3.2 Sparker. (Taken from Skinner 1998)

The sparker system comprised two sets of EG&G 231A Power Supplies and 232 Triggered Capacitor Banks, giving a maximum available power of 2kJ and a nine element EG&G sparkarray with multitip candles. The system was normally operated at 1kJ, firing through six candles, but the power was increased to 1.5kJ, firing through nine candles, in deeper water areas. Firing rate was normally one per second but slower in deeper water. A Teledyne, 10metre, 7 channel hydrophone was used, with the number of channels selected and summed as required. No downtime was experienced with the Sparker system.

3.3 SSS. (Taken from Skinner 1998)

The system used was a Waverley 3000 dual channel, 100kHz with display on a thermal printer. The system has automatic adaptive gain processing and was used throughout on a 150m per channel range. The fish was towed from a hydraulic winch with a 600m cable, limiting operations to less then 200m water depth. The data were recorded digitally on a Sony MDS-JE500 minidisc recorder. Data were recorded in both analogue and digital form. For analogue recording the summed hydrophone output was bandpass filtered, 250-800Hz, had time varying gain applied (TSS307 TVG) and was swell filtered (TSS305 Swell Filter) before displaying on a Waverley 3710 thermal linescan recorder. The data were recorded digitally using the BGS DAMP16 PC-based system, recording in SEGY format on Exabyte Tape. A Record length of 700msec and sampling interval of 0.1msec was used throughout. No downtime was experienced with the SSS system.

3.4 Magnetometers. (P Morris)

Towed System: Proton precession magnetometer (Barringer M123). This instrument was provided and maintained by BGS. It was run on the outward and return passages between Stanley and King George Island. The magnetometer had not been used for five or six years and there were initial problems in getting it to function correctly. These were cured when the fish was refilled with kerosene and subsequent operation was trouble free. The main drawback of using this particular instrument, as opposed to the RVS Varians generally employed by BAS is that there was no Level A unit available to connect it to the ABC logging system. It was however possible to provide a ten minute event mark from the ship's master clock to the magnetometer recorder. On the outward voyage the magnetic data had to be digitised manually from the chart record. This was recorded on a W&W 312 Chart recorder at two scales, 100 (orange pen) and 1000 (green pen) nT. By the return trip, a decoder had been constructed (by PJC) which allowed the digital BCD magnetometer output to be time stamped and logged to a PC hard disk.

Shipboard Three Component Magnetometer (STCM). JR-29 was the first outing for the STCM after it had been completely rebuilt following its collapse during the previous season on JR-18 and JR-19. The main electronics are now housed in a solid metal box which is clamped solidly to the rail behind the funnel on the monkey island in the same location as in the previous two cruises. The detector is mounted in a plastic tube fixed into the end of an alloy tube and both of these are clamped to the same mounting plate as the electronics box. Two location bolts prevent the tube from rotating. On initial startup one channel was found to be dead but after a broken wire had been located and repaired the instrument worked well and continued to do so for the remainder of the cruise. The only serious problem was that the STCM logging software hung on a couple of occasions and had to be rebooted.

Five compensation loops were run during the cruise.

	Date	Time	Lat	Lon
1	980212	20:55	-51.69	-57.51
2	980215	11:15	-60.97	-60.58
3	980226	14:12	-63.54	-56.40
4	980301	22:08	-62.00	-57.19
5	980304	01:12	-52.77	-57.63

The mean coefficient from these three calibration runs were used to reduce the data. On straight passages the total field data appears to be good. On runs through the ice in the Weddell Sea, however, where the ship's orientation was constantly changing , the compensation is not yet good enough to provide a really useful record. Further work is certainly required on this problem.

The TSS heave roll and pitch monitor has been replaced on the ship as part of the upgrade for the dynamic positioning system. It was hoped that this new instrument, unlike its faulty predecessor, could be used to provide reliable pitch and roll values for use in STCM processing. The TSShrp output was monitored and compared with pitch and roll from the Ashtech 3DF GPS system. Generally the agreement was excellent but quite frequently the TSS instrument would register a 90 degree roll. Unfortunately this fed back into the DP system and made it think that a sudden jump in position had taken place, with dire consequences. Once this fact had been discovered the TSShrp was disconnected from the DP system and is being returned to the manufacturer for repairs. Thus although the situation is much improved from previous years there was still no consistently reliable pitch and roll data available on this cruise.

3.5 Digital Camera. (J Howe)

For the first time on a Geoscience Division cruise, a digital camera (Kodak DC120) was employed, primarily to record images of fresh rock core, but also for records of coastal exposures, seen with the advantage of an offshore panorama.

A total of seven compressed images of best quality can be held in the camera's memory, with up to 2 megabytes of data of 1.2 million pixel resolution. For general core images, the camera was operated in manual mode, with two "Metz" flashguns, reflected off the ceiling at shutter speeds of 225 - 500 th/sec. For close-up shots, better results were obtained with direct flash and an automatic shutter setting.

To download images, the camera is connected via a serial cable to a PC containing Kodak's DC120 software. Images were transferred to hard disk in *.TIF format using *Corel Photo-Paint* (or other TWAIN compliant programs such as *PhotoEnhancer* or *Paint Shop Pro*). TIF file sizes are of the order of 3.5 MB for full resolution (1280x960 pixels) photos. Images were enhanced (brightness, contrast, colour) and cropped for publication using *Photo-Paint*. Final layout and text editing were carried out in *Corel Draw!* and the finished product saved as a compressed *.JPG file (~ 0.9 MB).

3.6 Navigation

BGS (Taken from Skinner 1998). This was a PC-based suite of navigation software which can interface to a number of Differential GPS (DGPS) systems, ship's gyro compass and various transponders

Offsets from the positioning devices can be set so that true sampling position can be calculated directly and, more importantly, the ship can re-position if required using a display centred over the equipment deployment position. During the trials this was the only system available, but since the installation of the Dynamic Positioning (DP) on *James Clark Ross*, the control console for that system now provides a full display of ship position and offsets at a scale controlled by the operator. As there are still software problems evident in the DP system, the Norcom display was used as a separate check of vessel movement, satellite behaviour etc. and as such allowed further warning of unexpected vessel movements. Data were logged to file on the PC hard disk.

JCR. This was a crucial component for success of the cruise because of the potential danger of rig damage should the ship drift off station. It was for this reason the BGS team mounted a separate navigation watch on the bridge to liaise with ship's personnel.

The ship's navigation was a Konsberg Simrad SDP (OS) Dynamic Positioning System 11 (R1.2) driven by a DGPS input. By and large, the system operated well, and no serious incidents occurred. Clearly, however, the Simrad software needs to be fine-tuned, and the following are the more serious problems that need to be rectified (as observed by the scientists – the navigators will presumably have additional observations).

1. The DP occasionally dropped the DGPS input with subsequent drift off station. The reason for this was not obvious, because the BGS monitor did not experience such dropouts.
2. One source of error was spurious, intermittent spikes on the ship's heave, pitch and roll (the latter in particular). Large roll values would throw the DP into an emergency manoeuvre. The sensor was subsequently disconnected. (See further observations on the problem under 3.3 STCM, above).
3. The ship's stern thrusters are too weak to maintain station under some circumstances. The DP would try to use main engines to compensate, but these are too insensitive to respond to small requirements, and had to be disabled for the purposes of the DP. This situation resulted in inordinately long manoeuvres to acquire a station.
4. Reproducibility of the DP is not good, and appears to be no better than ¾ ship's length. This may because the software is unsure of the position of the "navigational centre" of the ship. In other words, if the co-ordinates of a site were keyed in on different occasions, the ship would not return to that site within a radius of error of ~¾ ship's length. This meant that frequently, the BGS and Hitachi logs gave a different location to the Simrad DP.
5. The DP system was unable to operate in the Trainer Mode, which effectively meant that the ship's officer were not in a position to simulate a troublesome situation and practice overcoming it. In other words, all their experience was "on the job", and in potentially critical situations.
6. Although the "Autotrack" option was fitted, it would not operate.

Despite these short comings, the Konsberg Simrad DP allowed the survey to be carried out successfully, and without it, it is unlikely that manual control could have been maintained to the same extent for reasons of officers' fatigue.

3.7 Data Processing. (P Morris)

Data streams logged on the ABC system during this cruise were:

Instrument	Mnemonic	Sample Interval
DGPS	gps_nmea	1 sec
GPS	gps_ash	1 sec
Echosounder	sim_500	1 sec

Gyro	gyro	1 sec
Heave monitor	tsshrp	1 sec
STCM	STCM	1 sec
Ocean Logger	oceanlog	5 sec

An MGD77 format cruise file (1 minute interval) was built up in stages from 1 minute interval datasets derived from the DGPS and echosounder data streams, rather than by using the level C utility to write files of this type. The depth data needed considerable editing in places. Magnetic data for the outward and return passages was sampled at a 1 minute interval, and then added to the file. Appropriate Carter corrections were applied to the depths, whilst the magnetic data were reduced to the appropriate IGRF (1995 revision).

4. Acknowledgements

The BAS scientists wish to thank Captain Burgen, his fellow officers and the crew for their splendid efforts both in their navigation and on the deck, in making JR29 a success under difficult circumstances. Also, our thanks go to the BGS team, so ably led by Ali Skinner, for their professionalism and comradeship on this thoroughly entertaining and scientifically productive cruise. The efforts of all have shown that the combination of the *James Clark Ross* and the BGS rockdrill is fully viable to undertake more extensive campaigns in the future.

Use has been made, with permission of the author, of sections of the BGS report (Skinner 1998) in the "Equipment" part of the present report.

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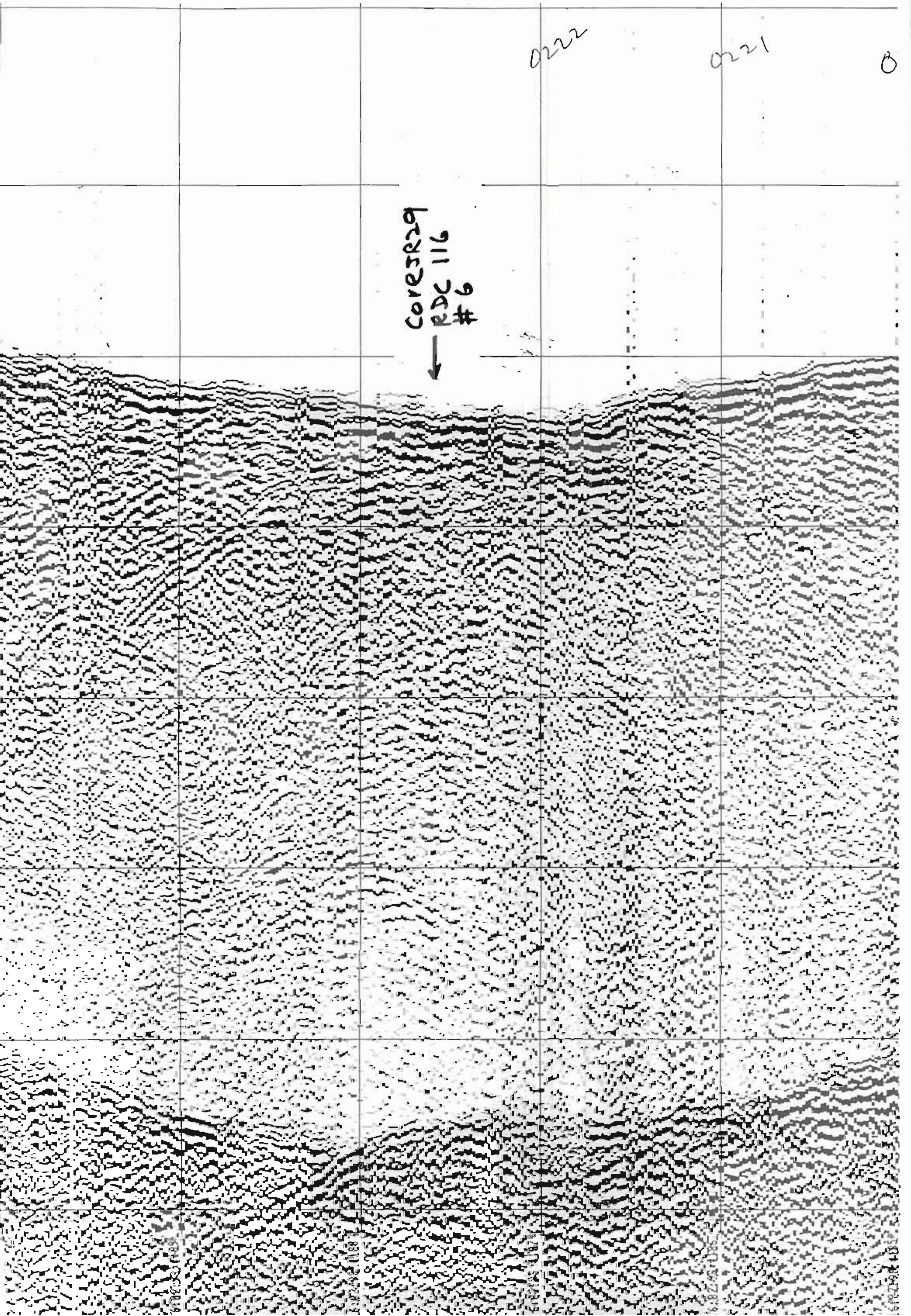
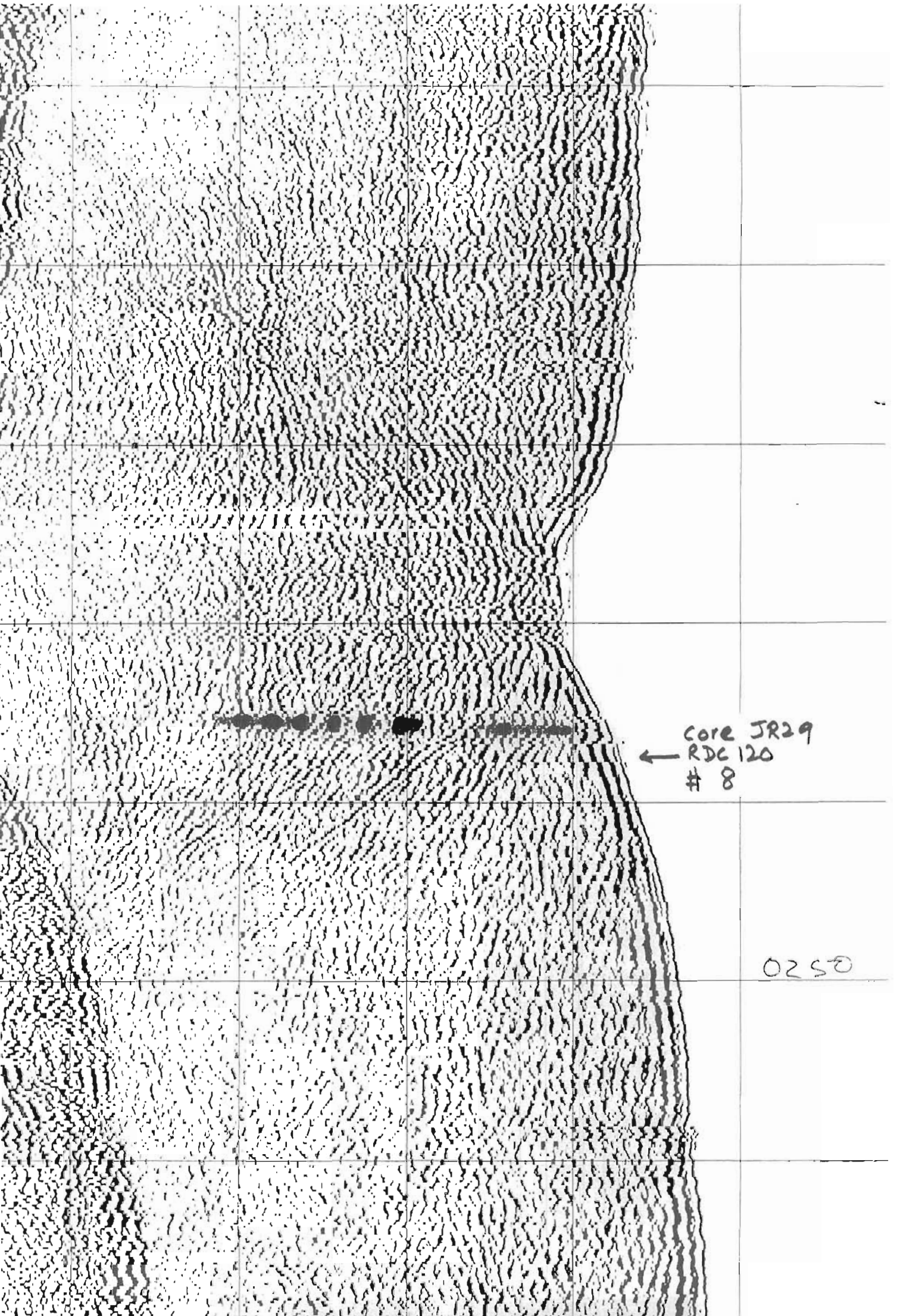
6. APPENDIX

6.1 Core/Seismic sites

Locations of all rock samples (bold items, Table 3) and vibrocores (Table 4) on seismic profiles.
Vertical scale interval = 40 milliseconds (TWT)


0222
0221
Core 5R29
RDC 116
#6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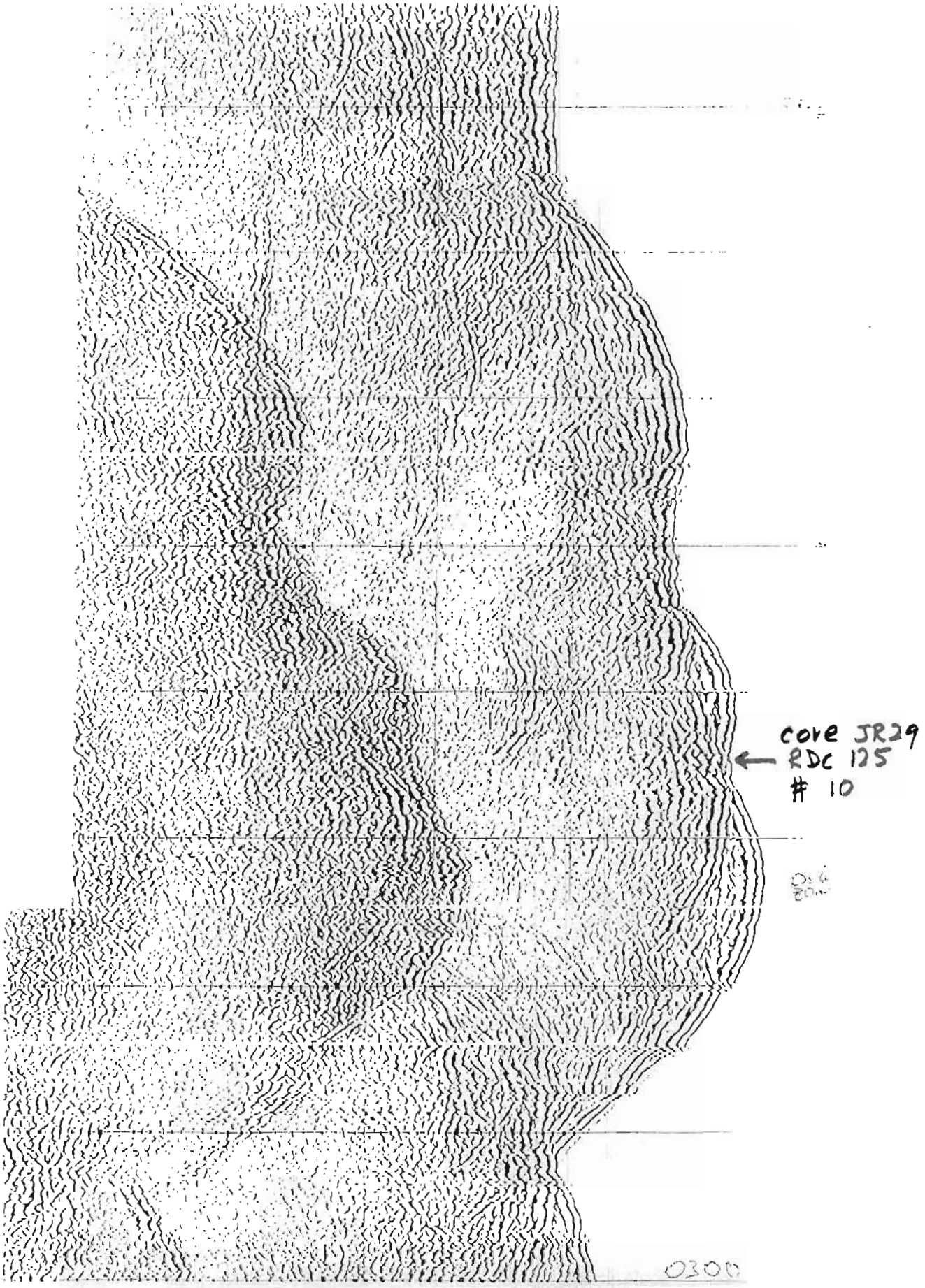
RDC 120
8
0250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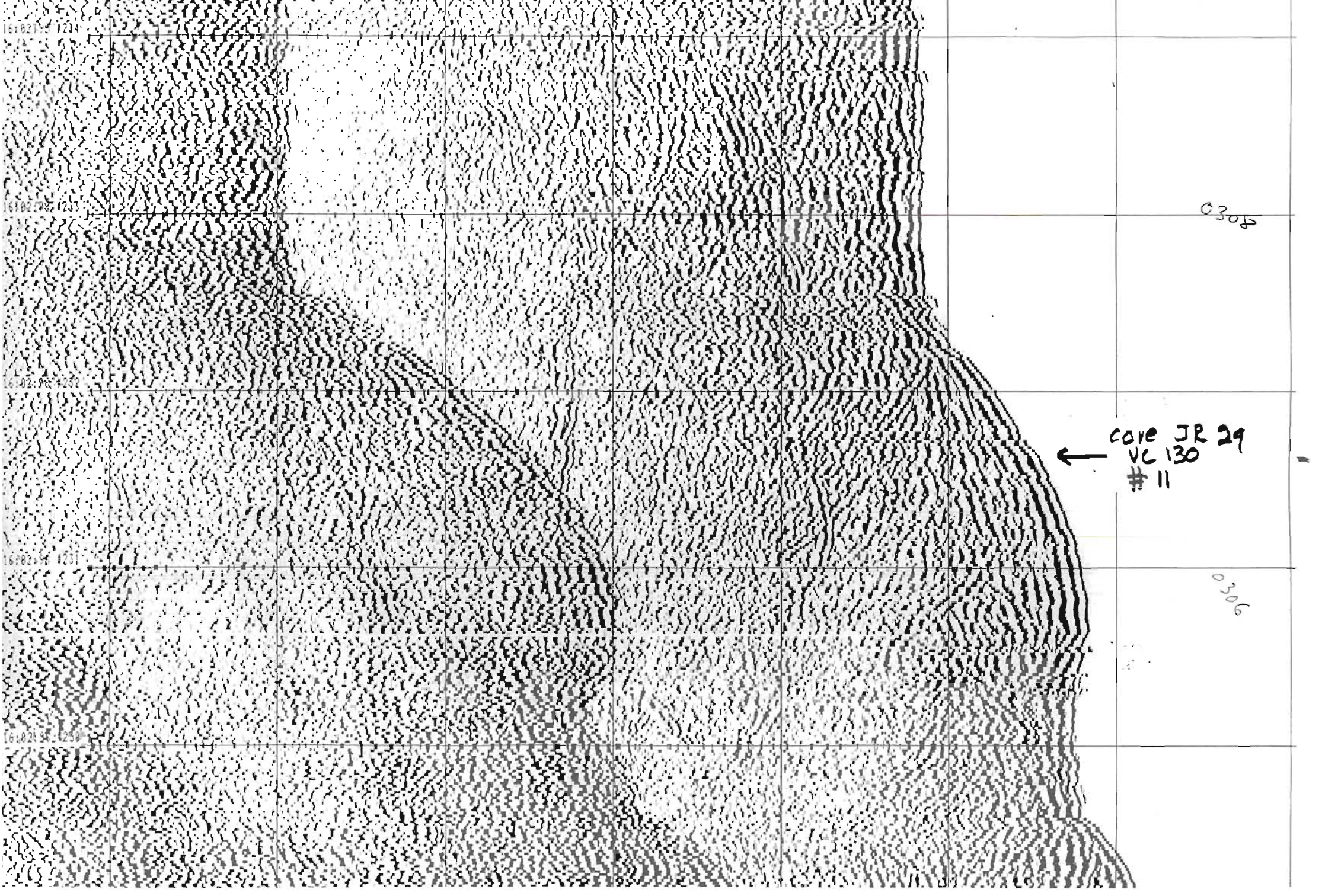
RDC 125
10
0300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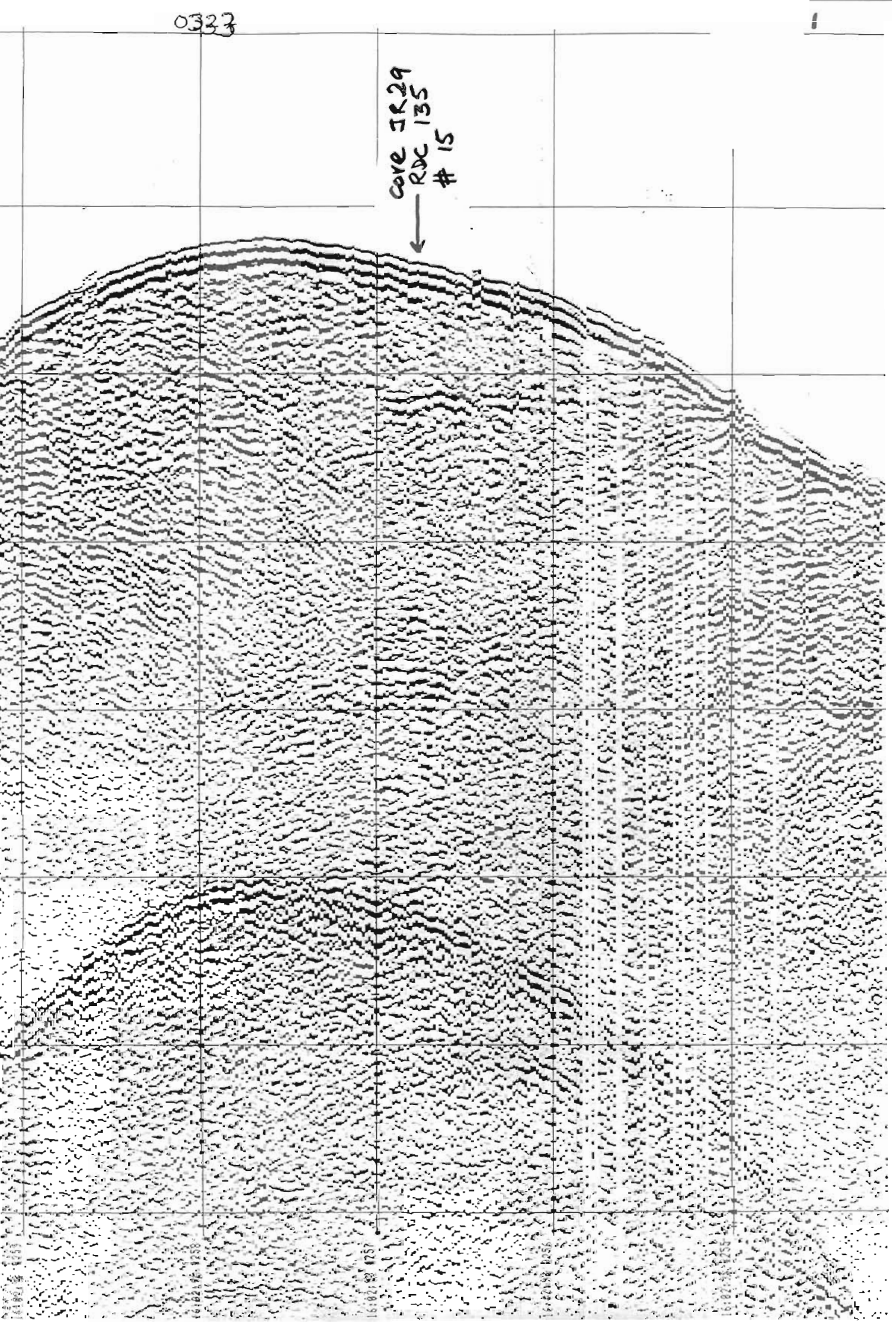
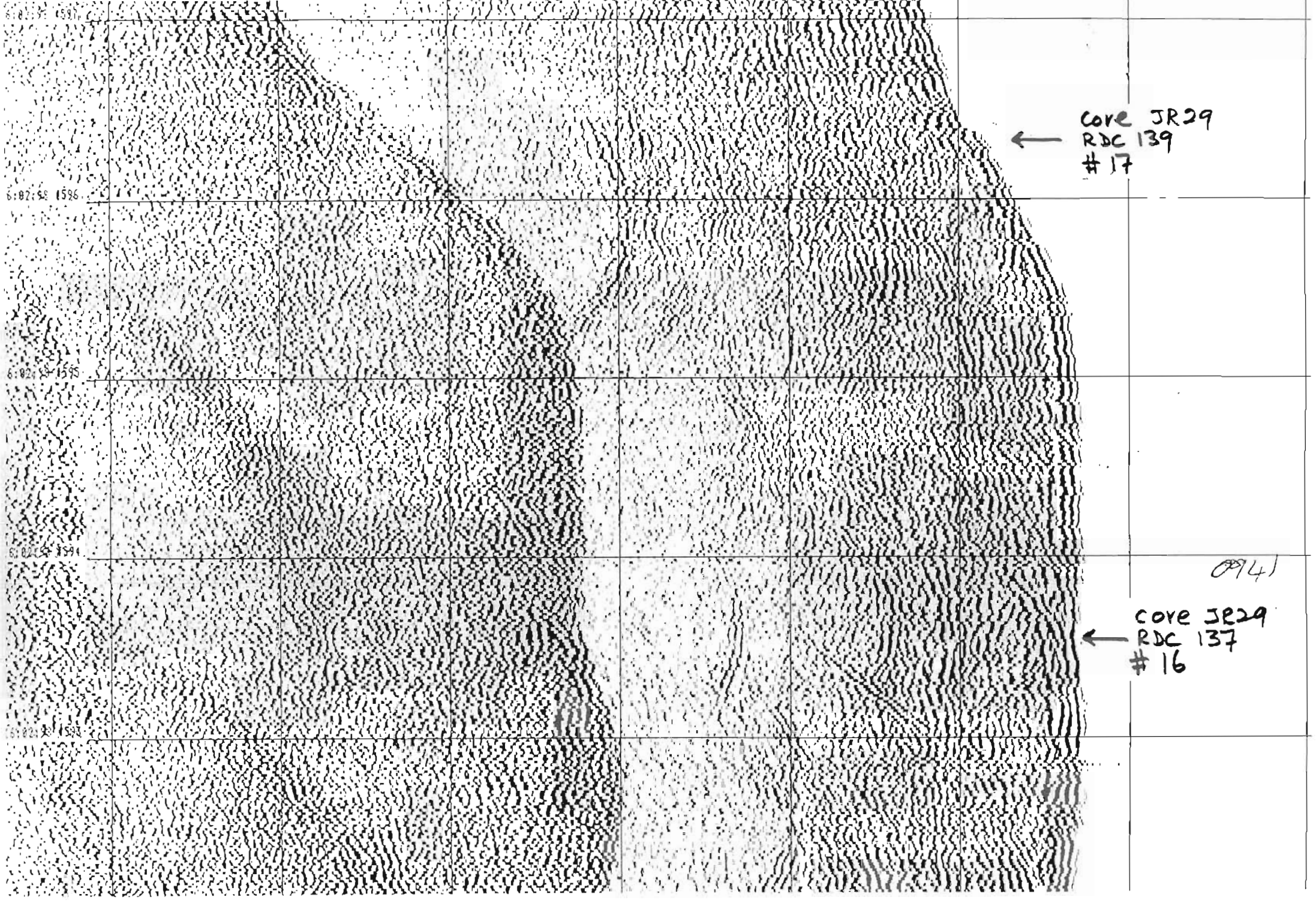
core JR 29
VC 130
#11
0306


CORE JR29
RDC 135
15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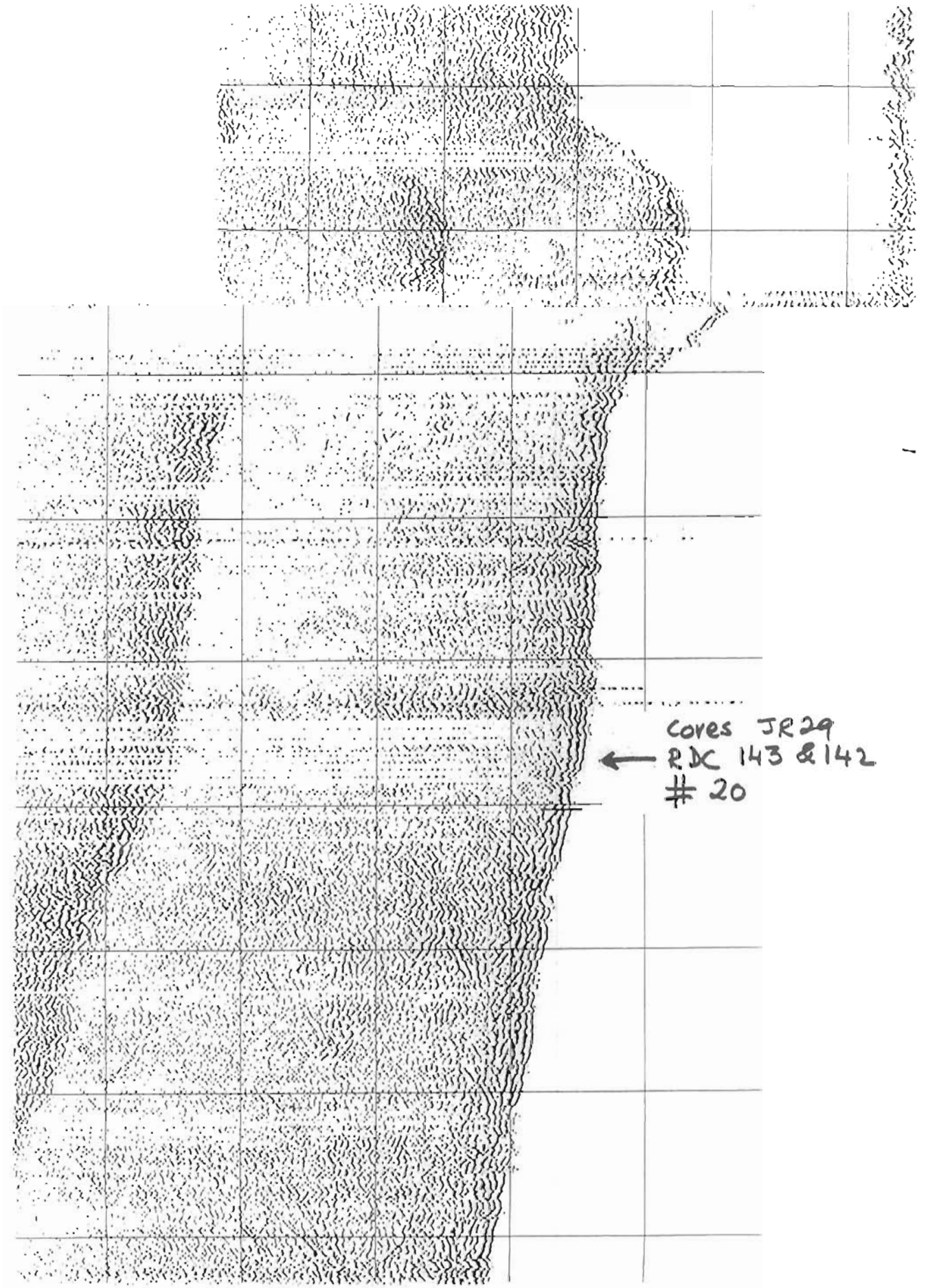
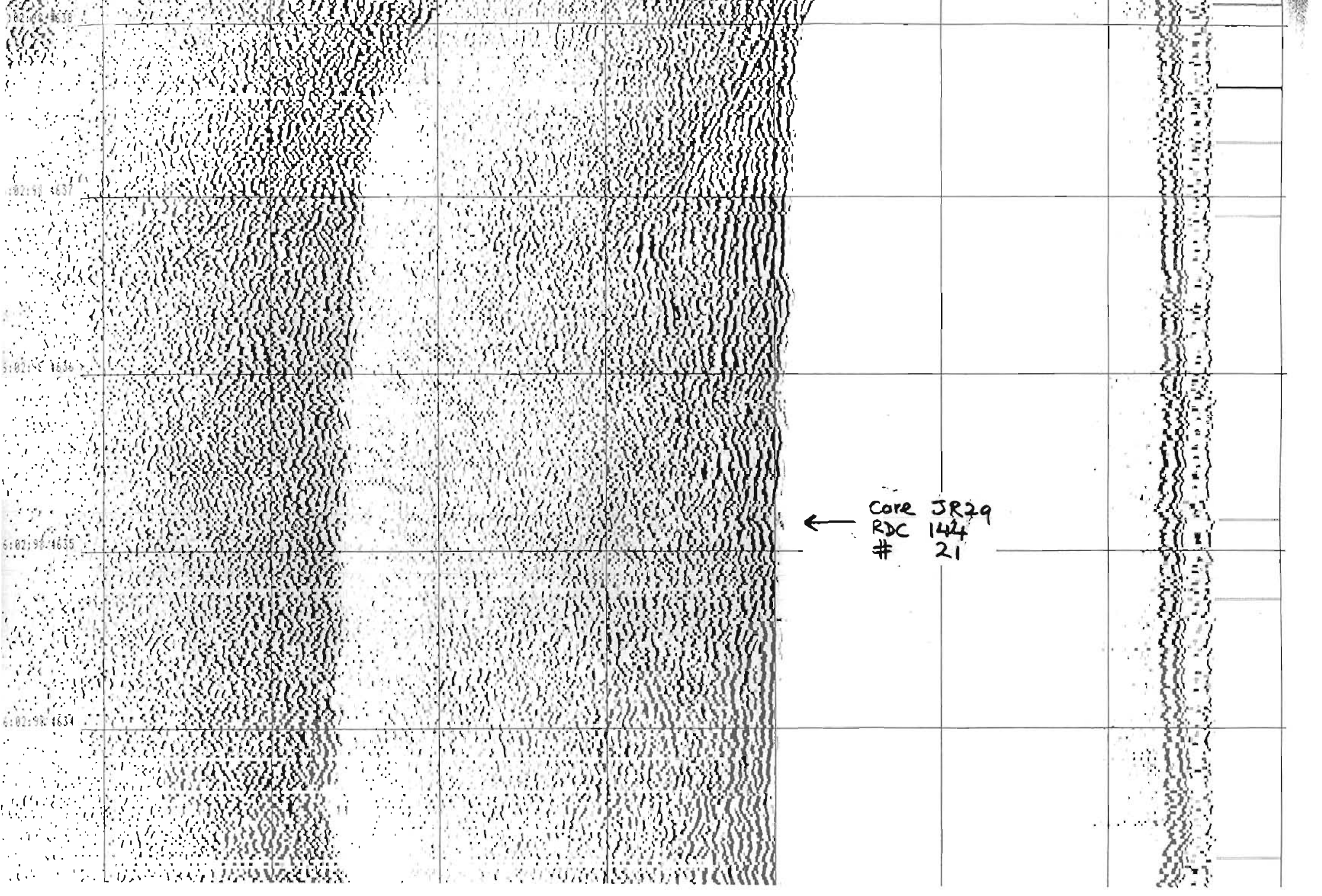
RDC 139
17
core JR29
RDC 137
16


Cores JR29
RC 143 & 142
20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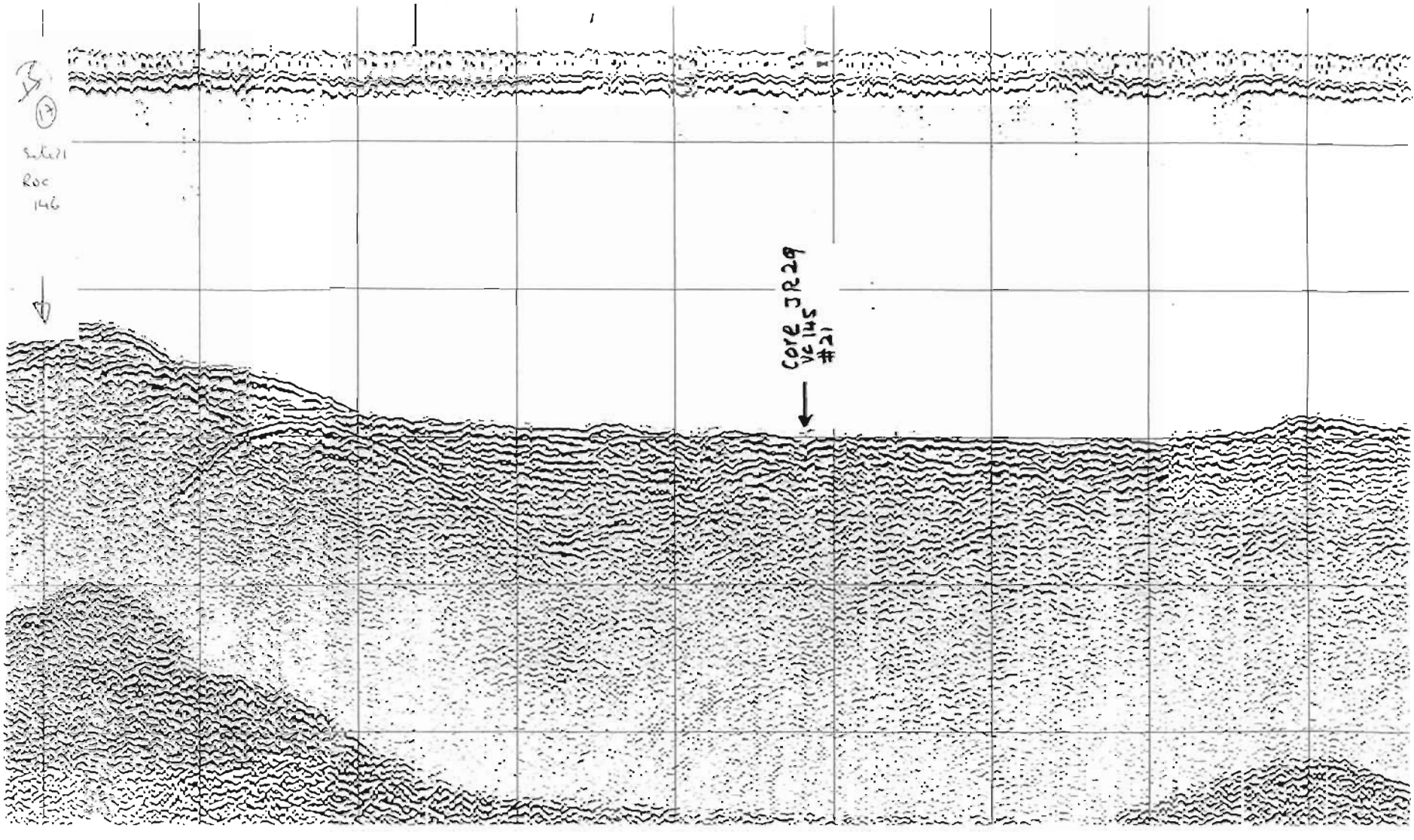
RDC 144
21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VC145
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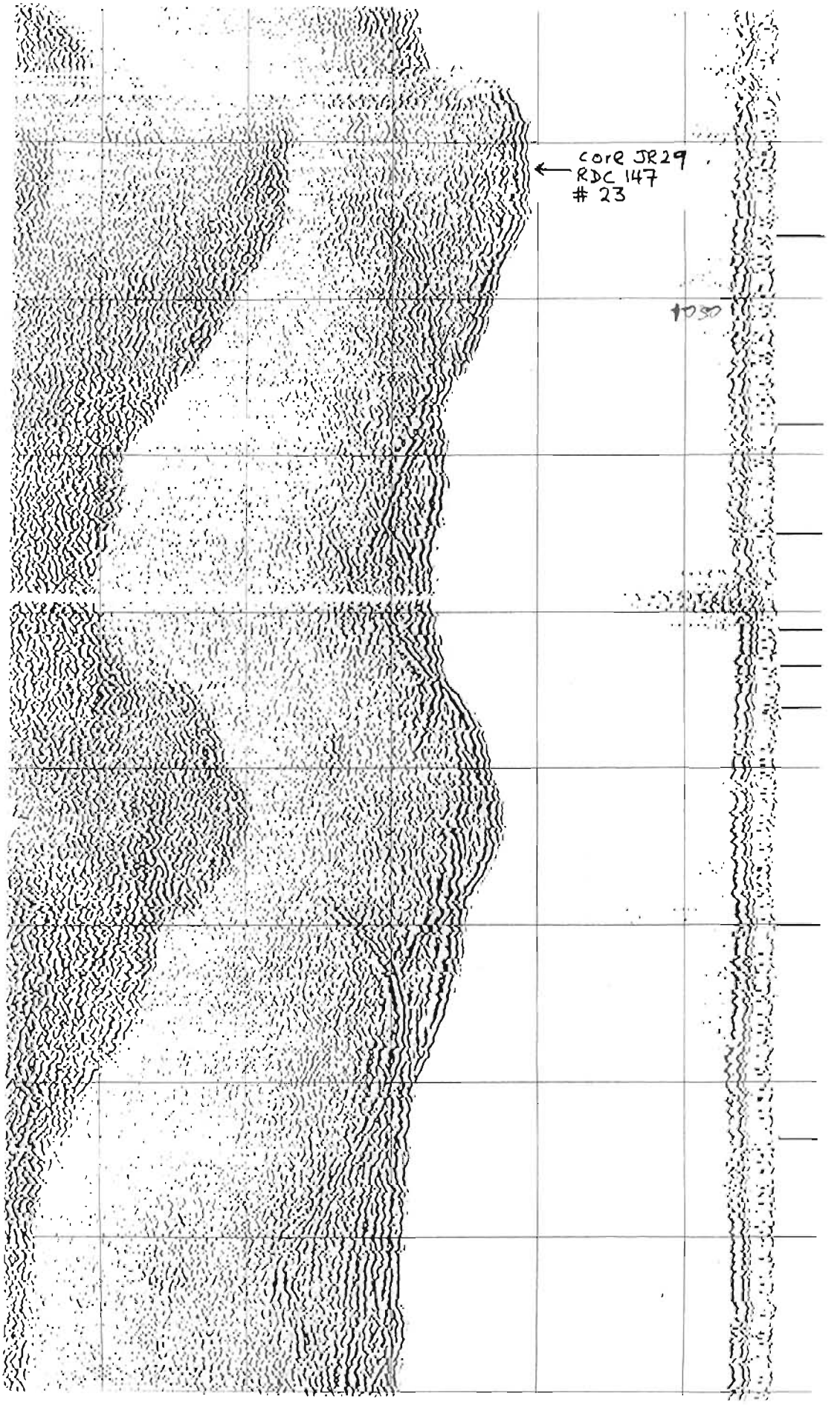
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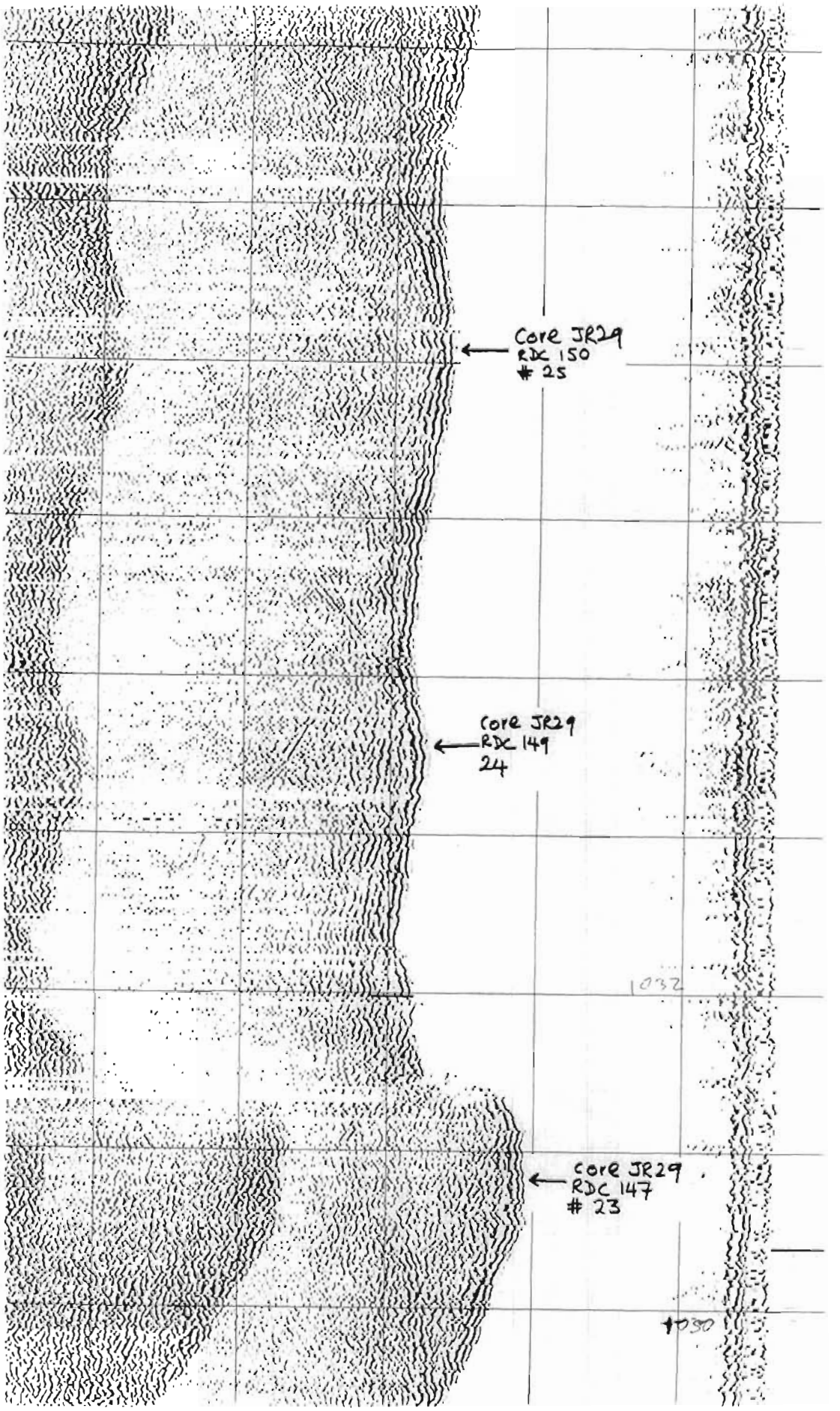
RDC 147
23
1030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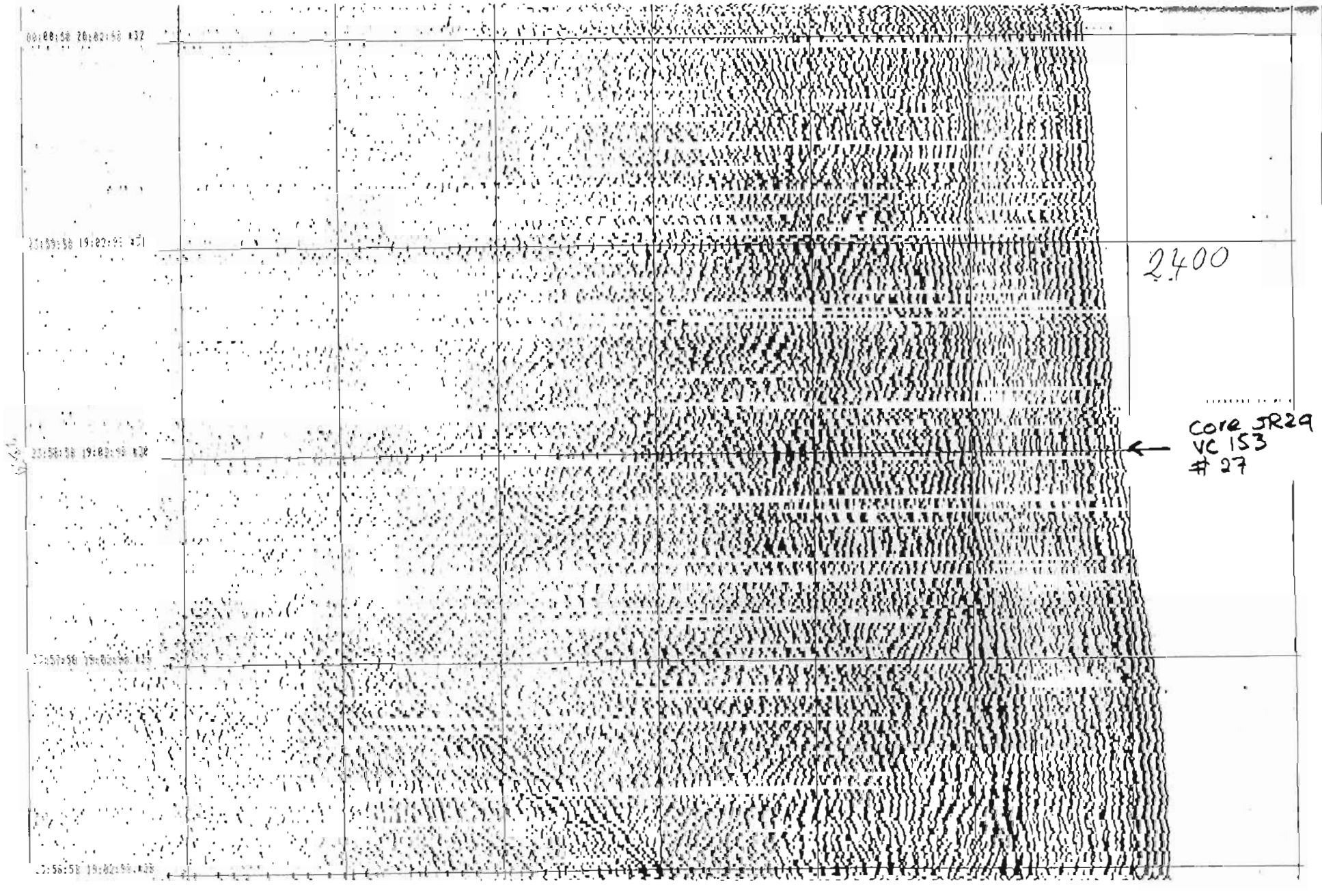
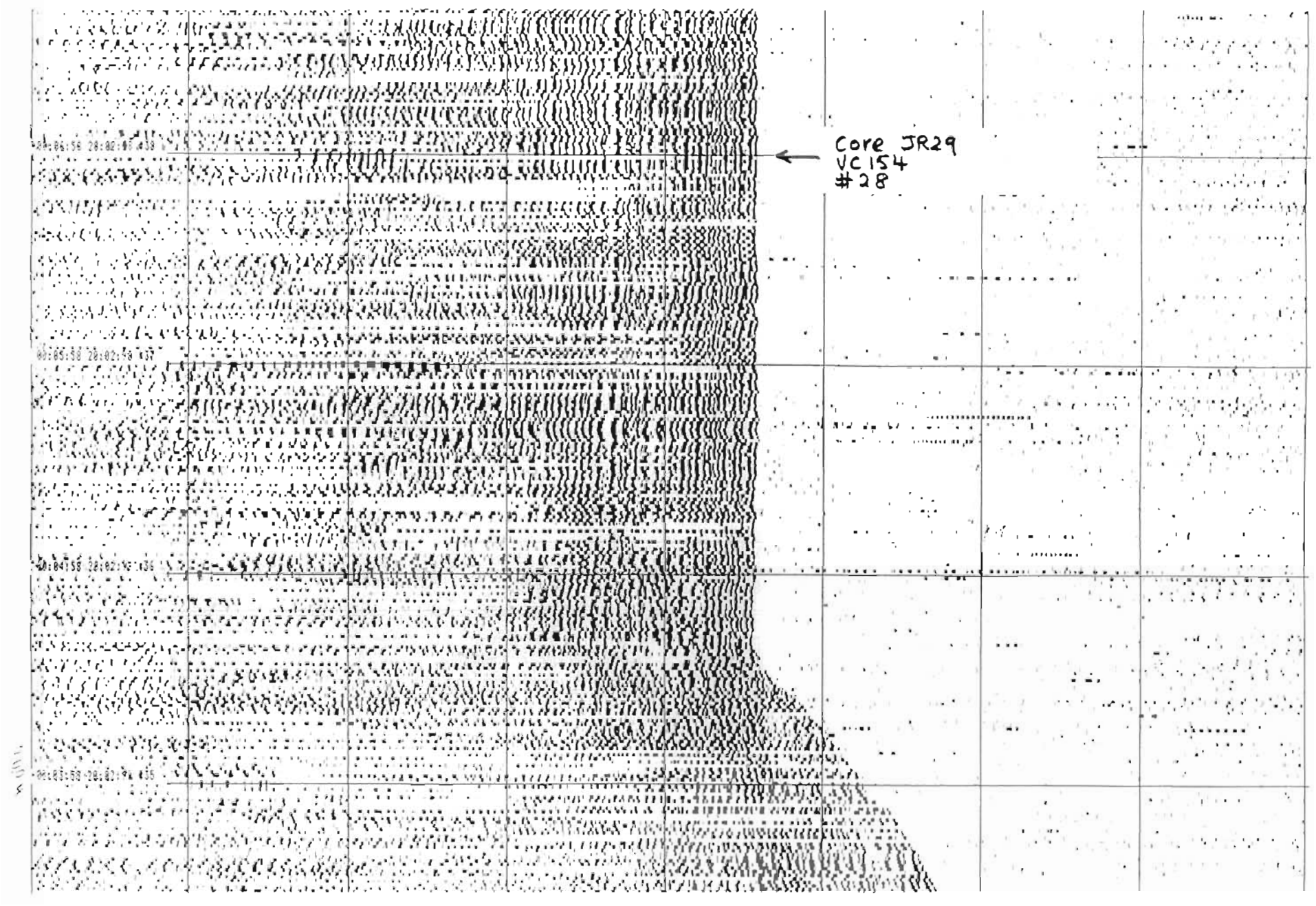
RDC 150
25
Core JR29
RDC 149
24
1032
core JR29
RDC 147
23
1030


2400
Core JR29
VC 153
27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VC154
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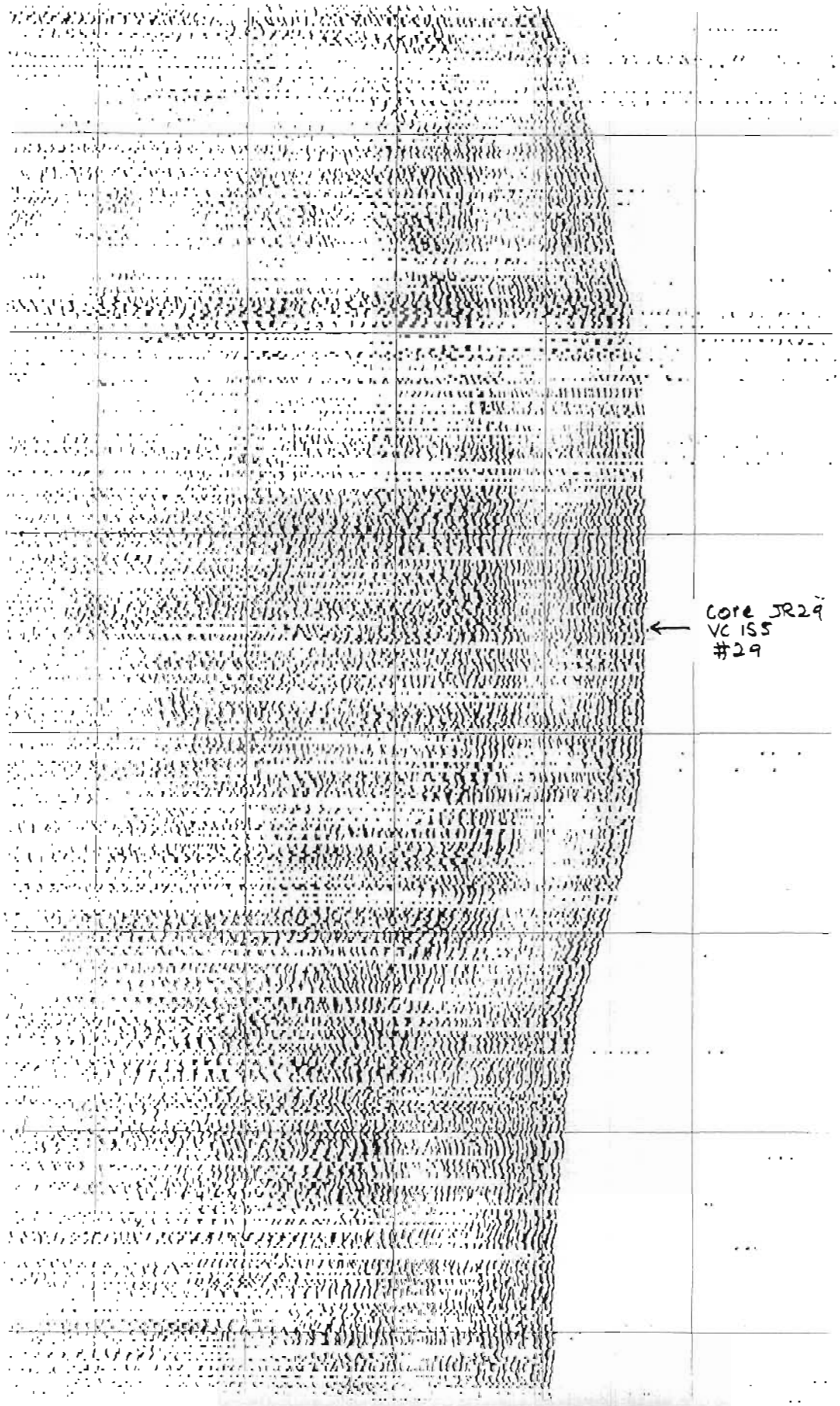
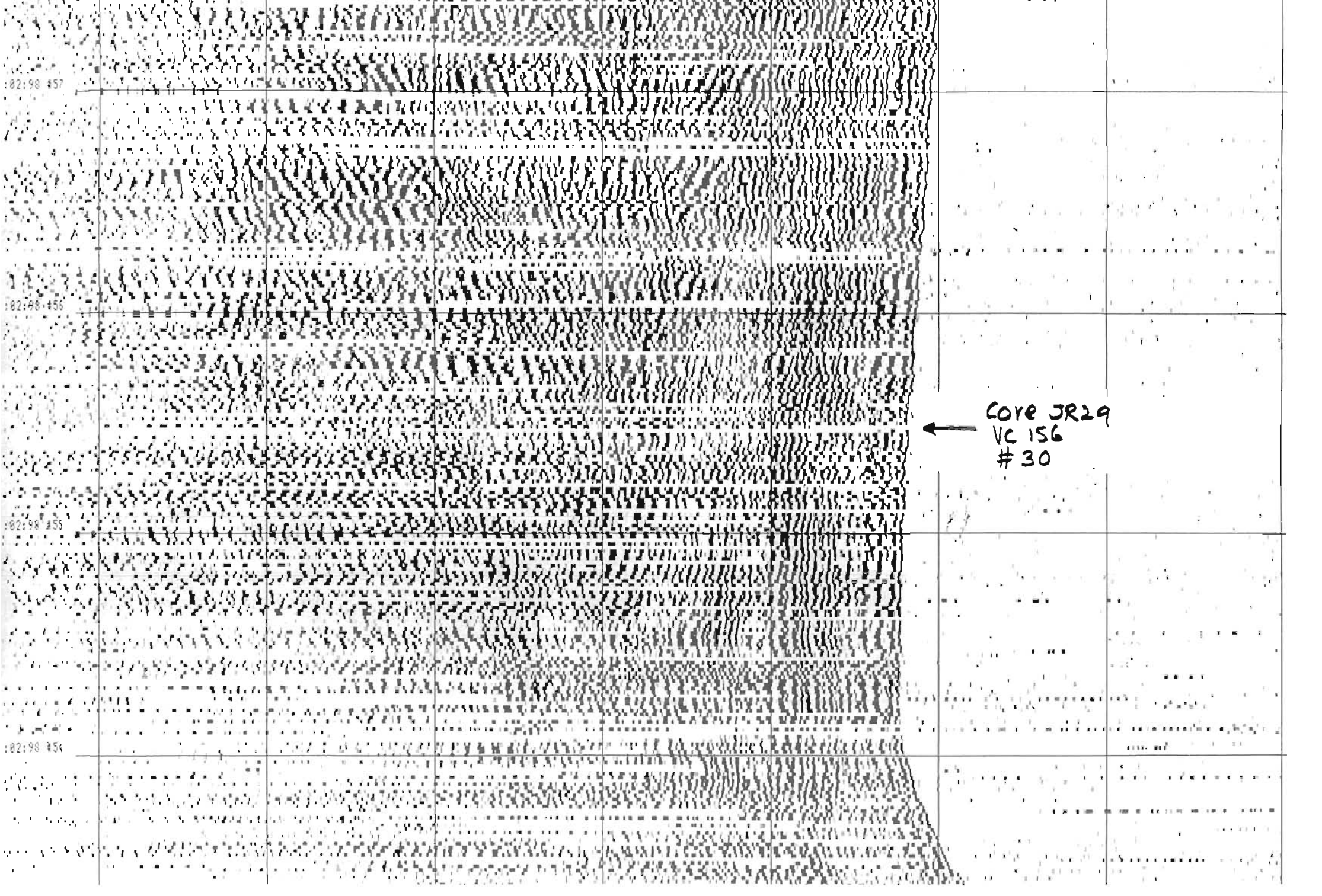

Core JR29
VC 155
#29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VC 156
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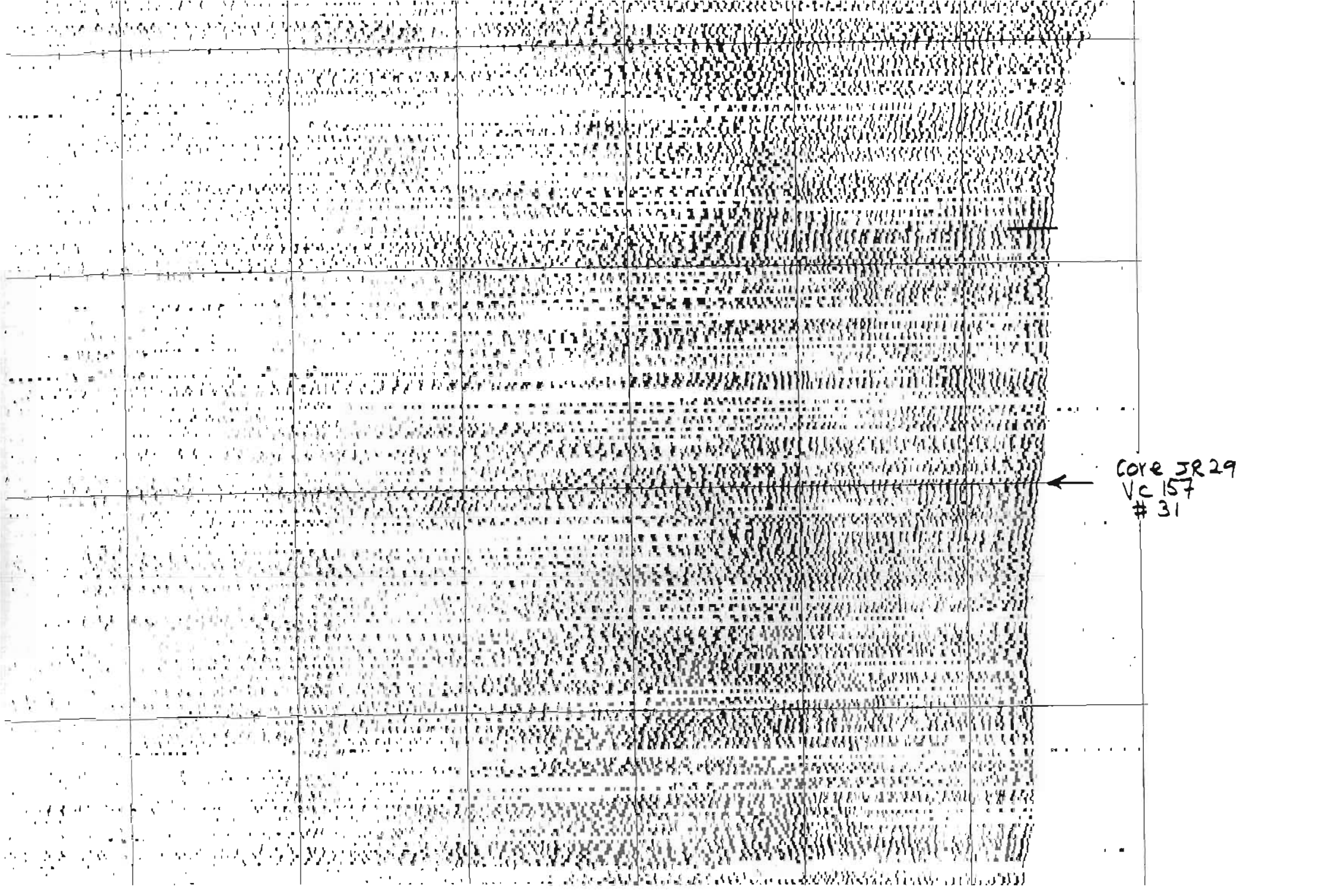
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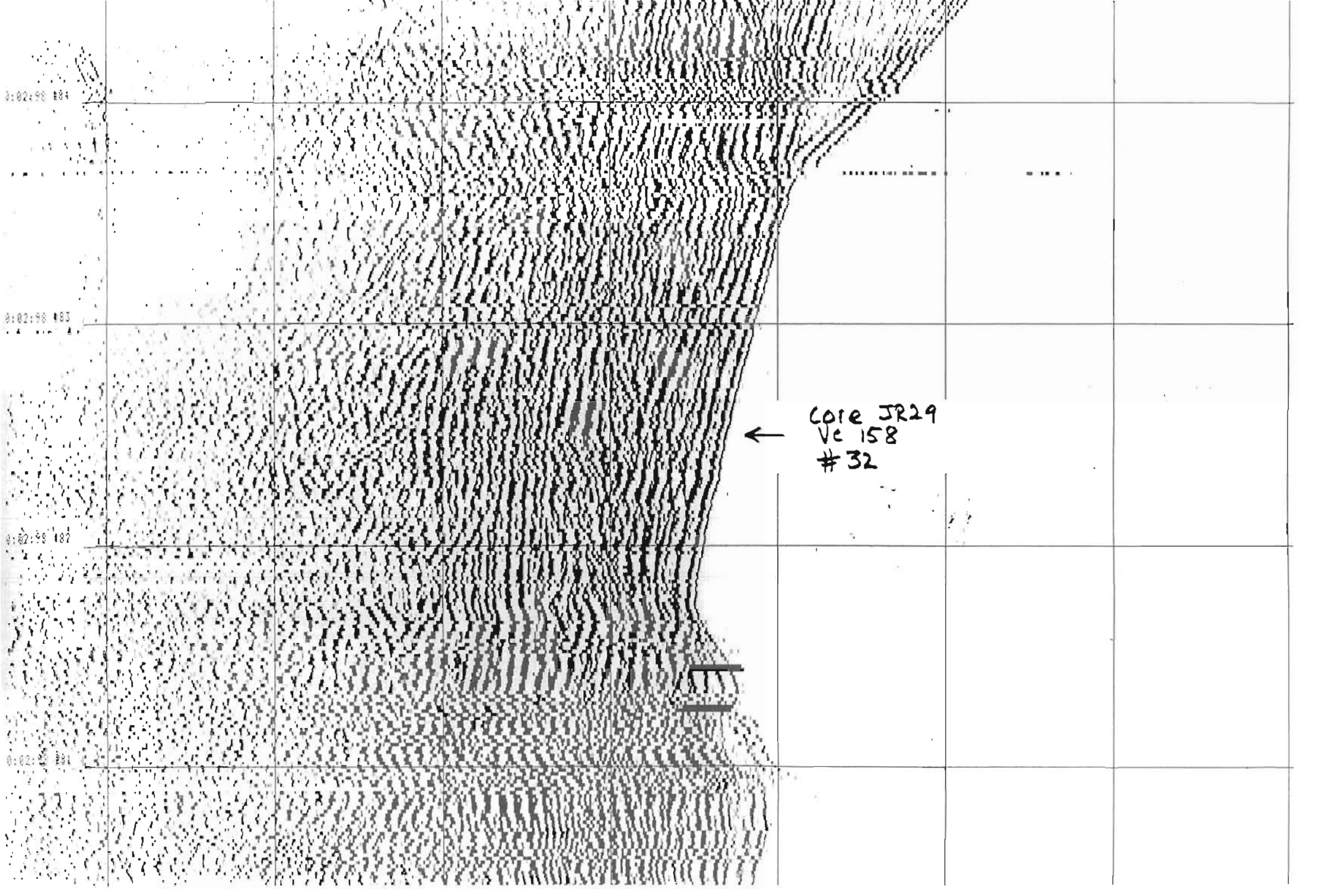
VC 157
31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Vc 158
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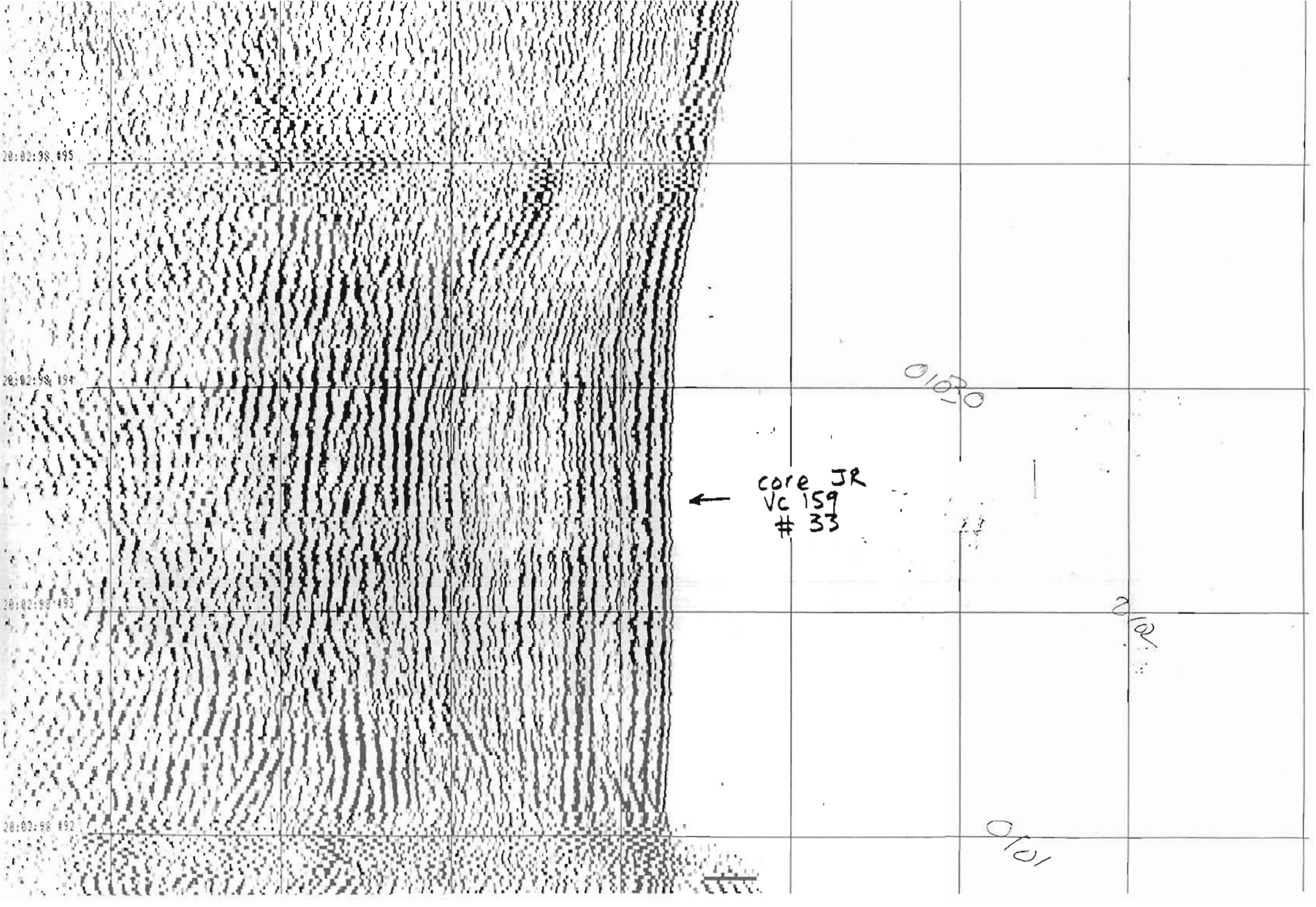
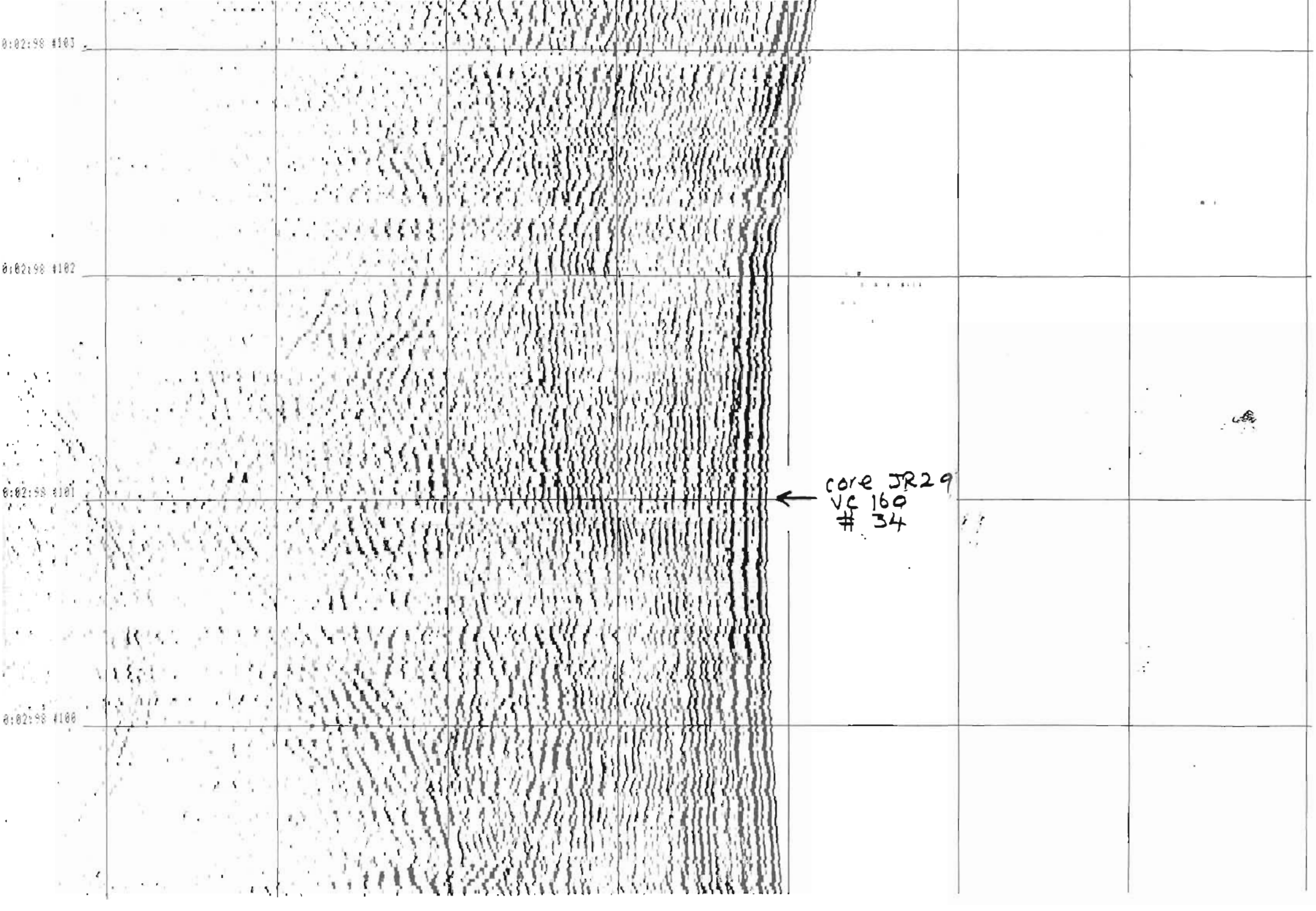

core JR
VC 159
33
0100
0101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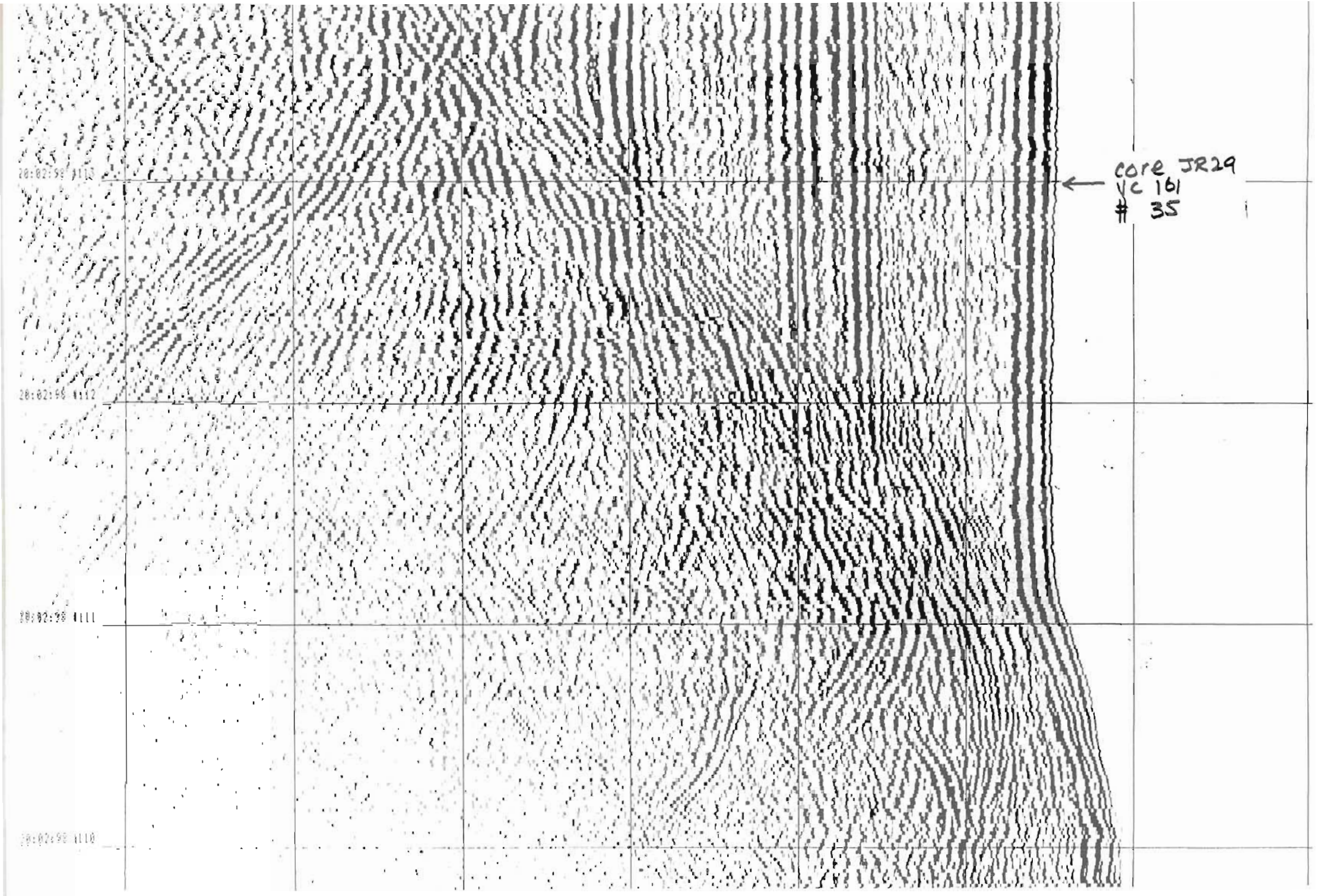
0:02:98 4102
0:02:98 4101
0:02:98 4100
core JR29
VC 169
34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VC 161
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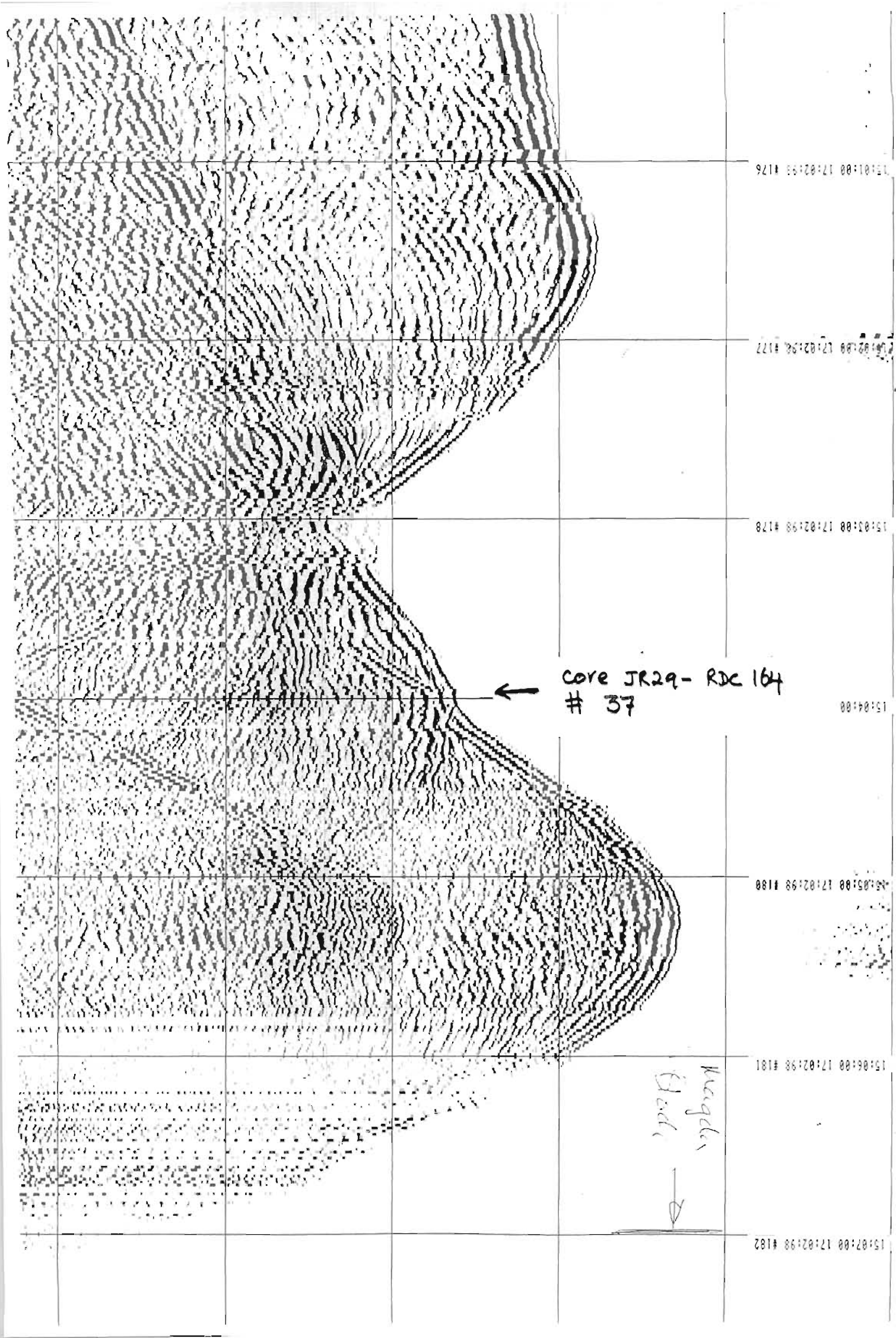
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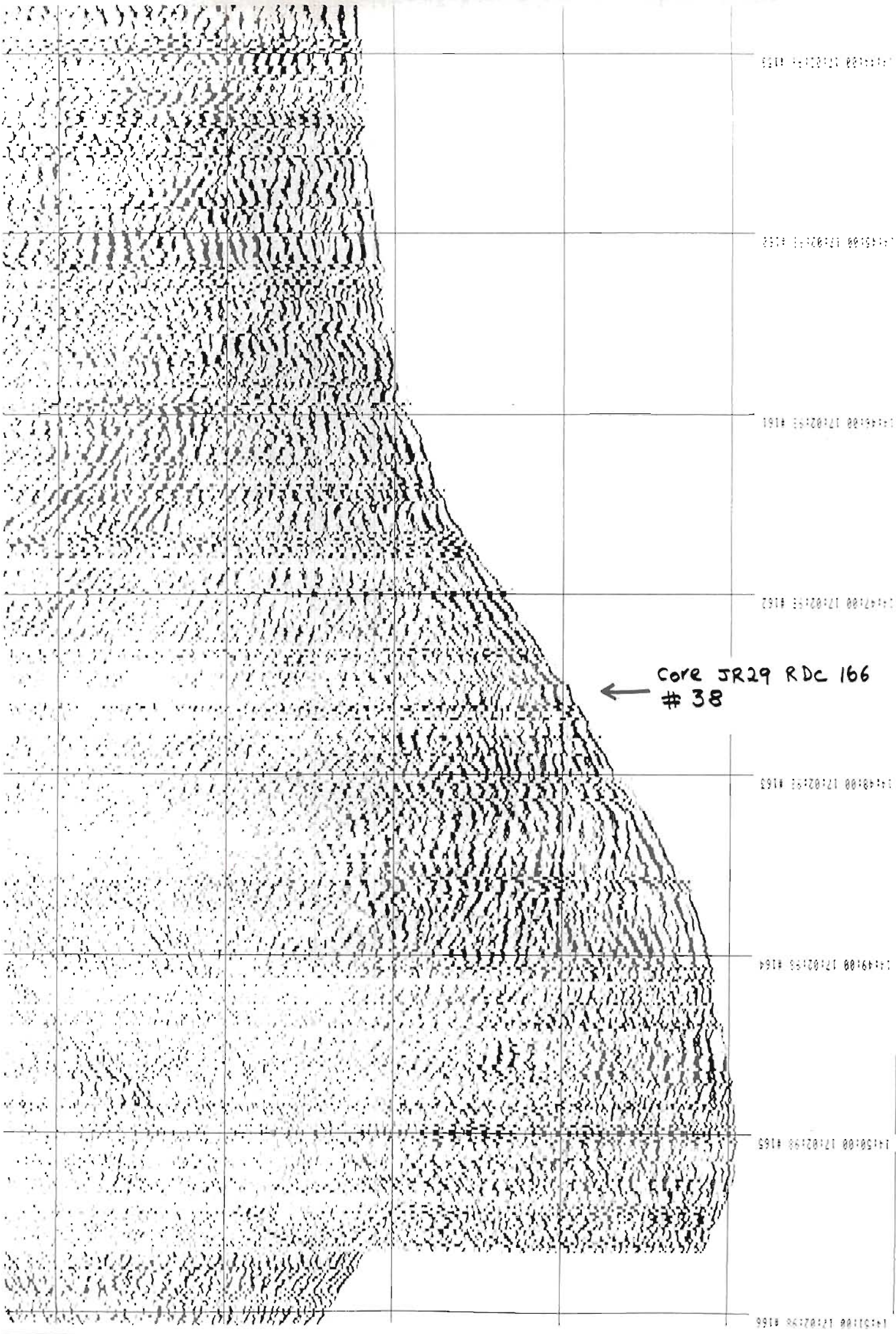
37
Mound
Flank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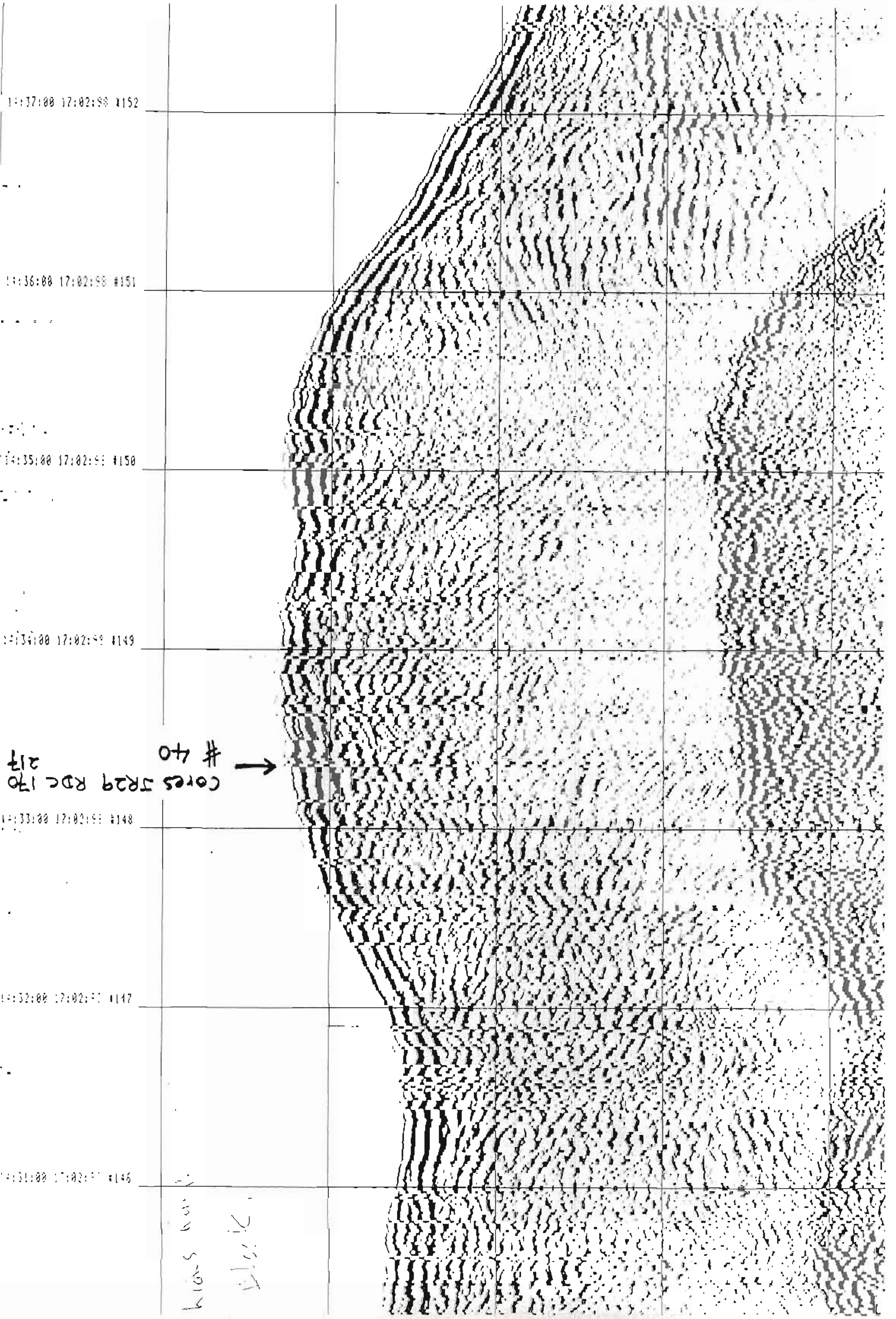
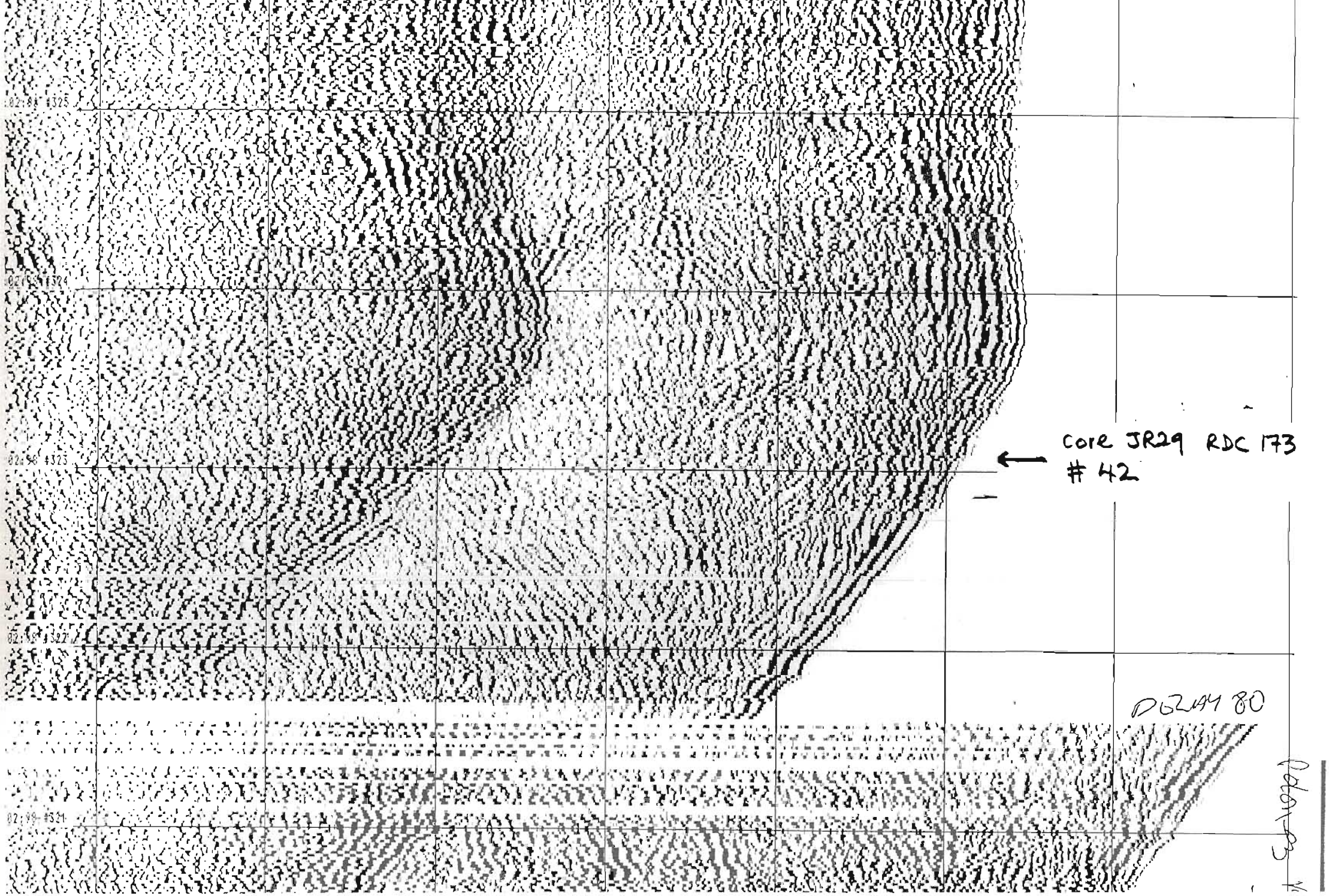


#152
#151
14:35:00 #150
#149
#148
#147
#146
40
Cores JR29 RDC 170
217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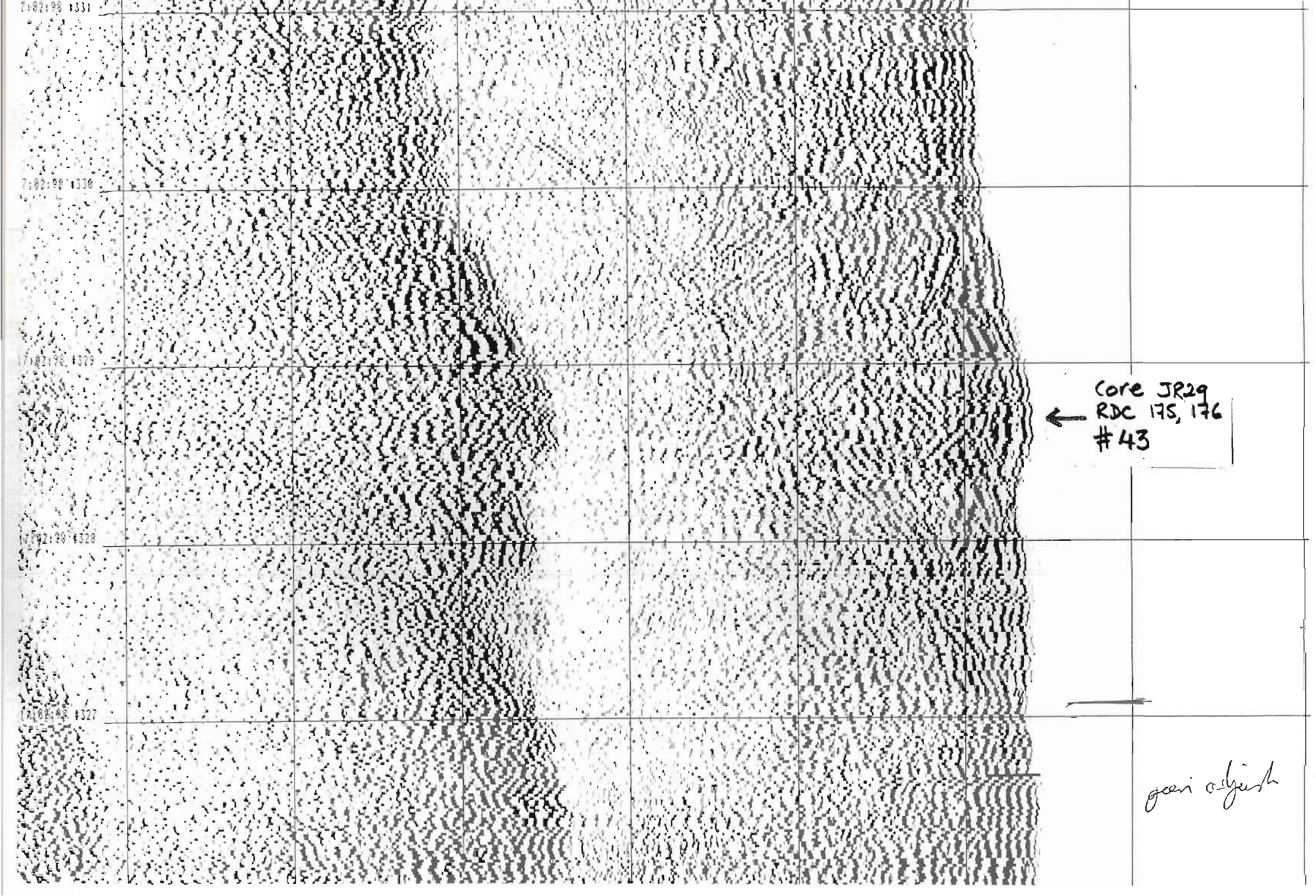
42
DG249 80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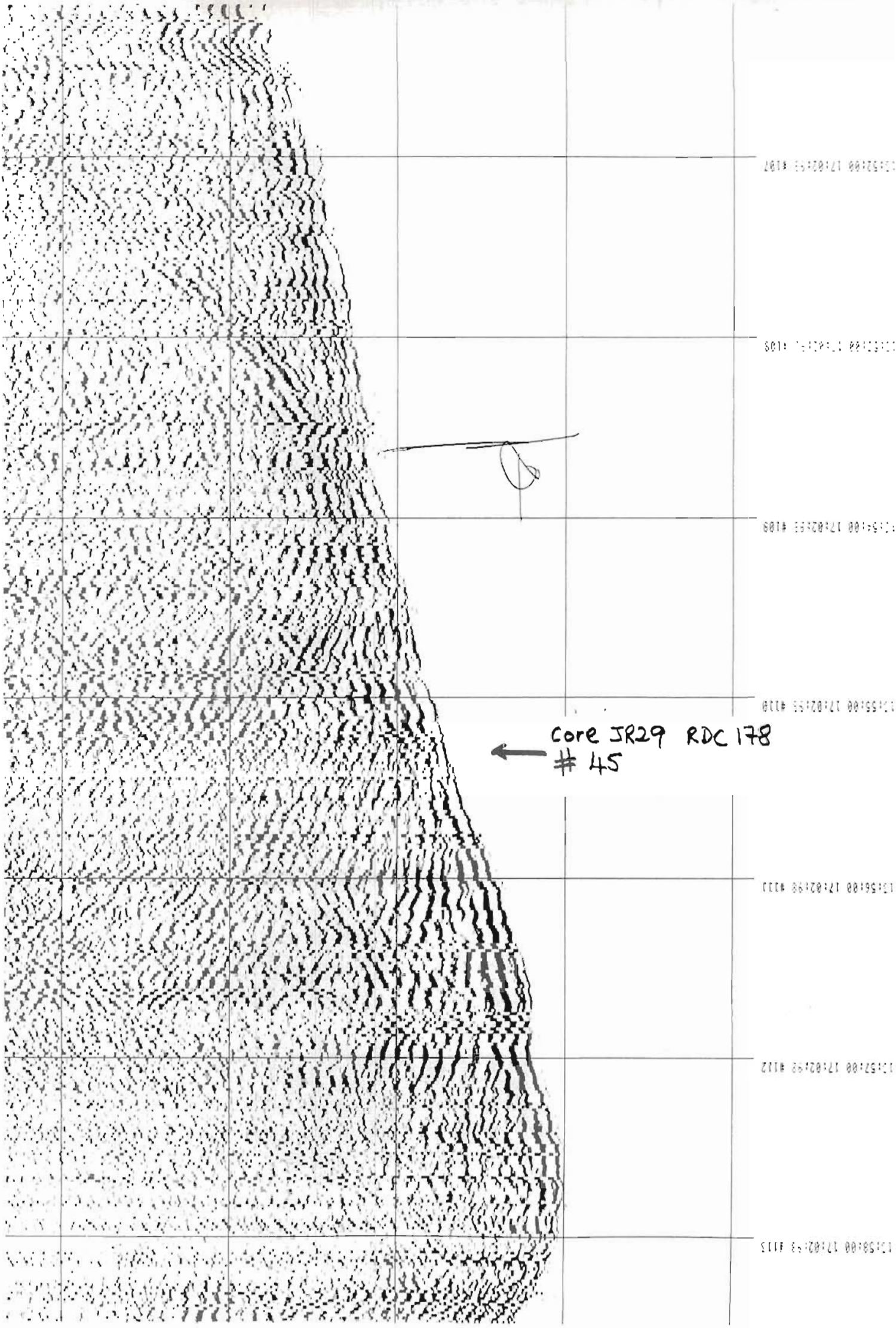
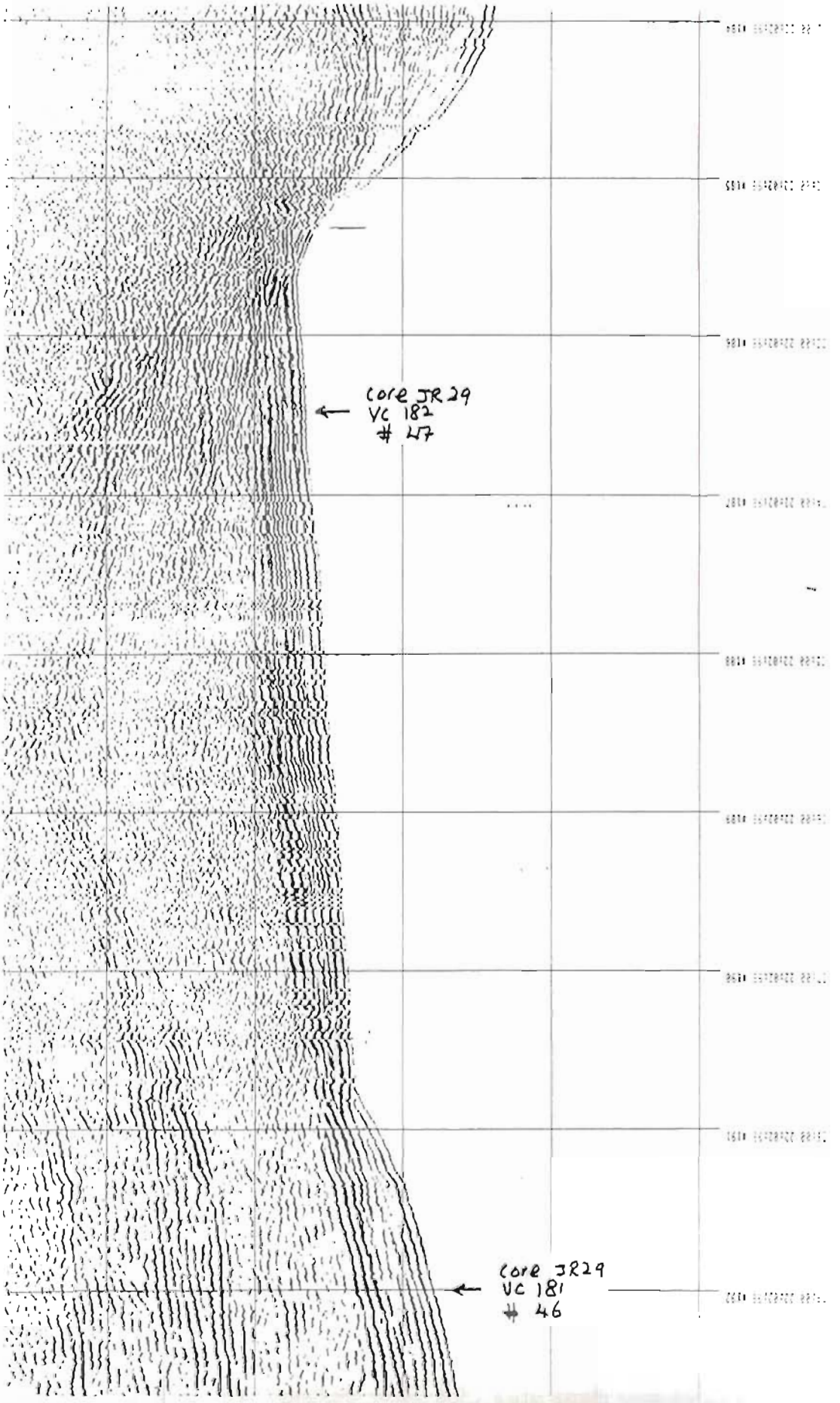
RDC 175, 176
#43


Core JR29 RDC 178
45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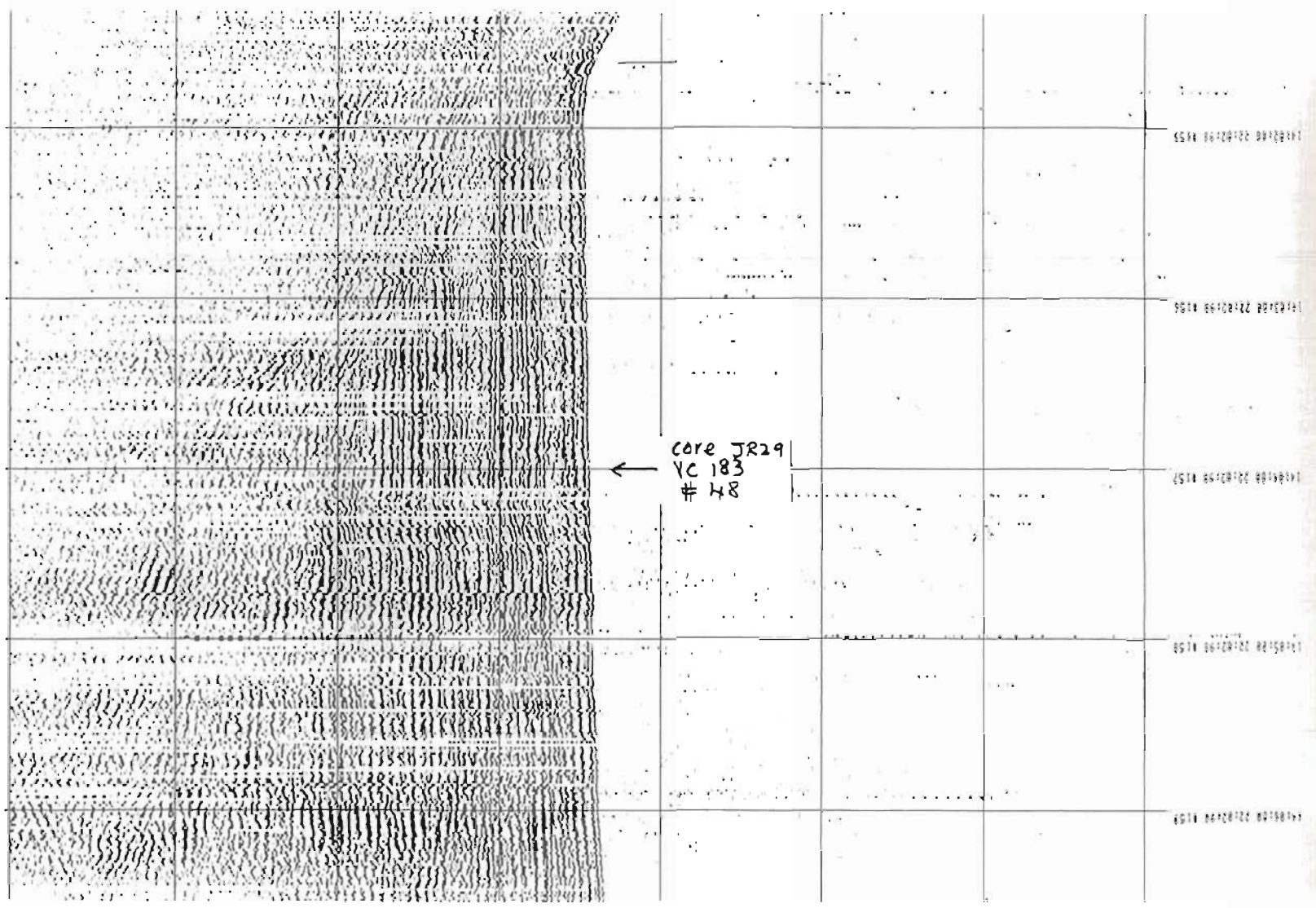
VC 182
47
core JR29
VC 181
46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YC 183
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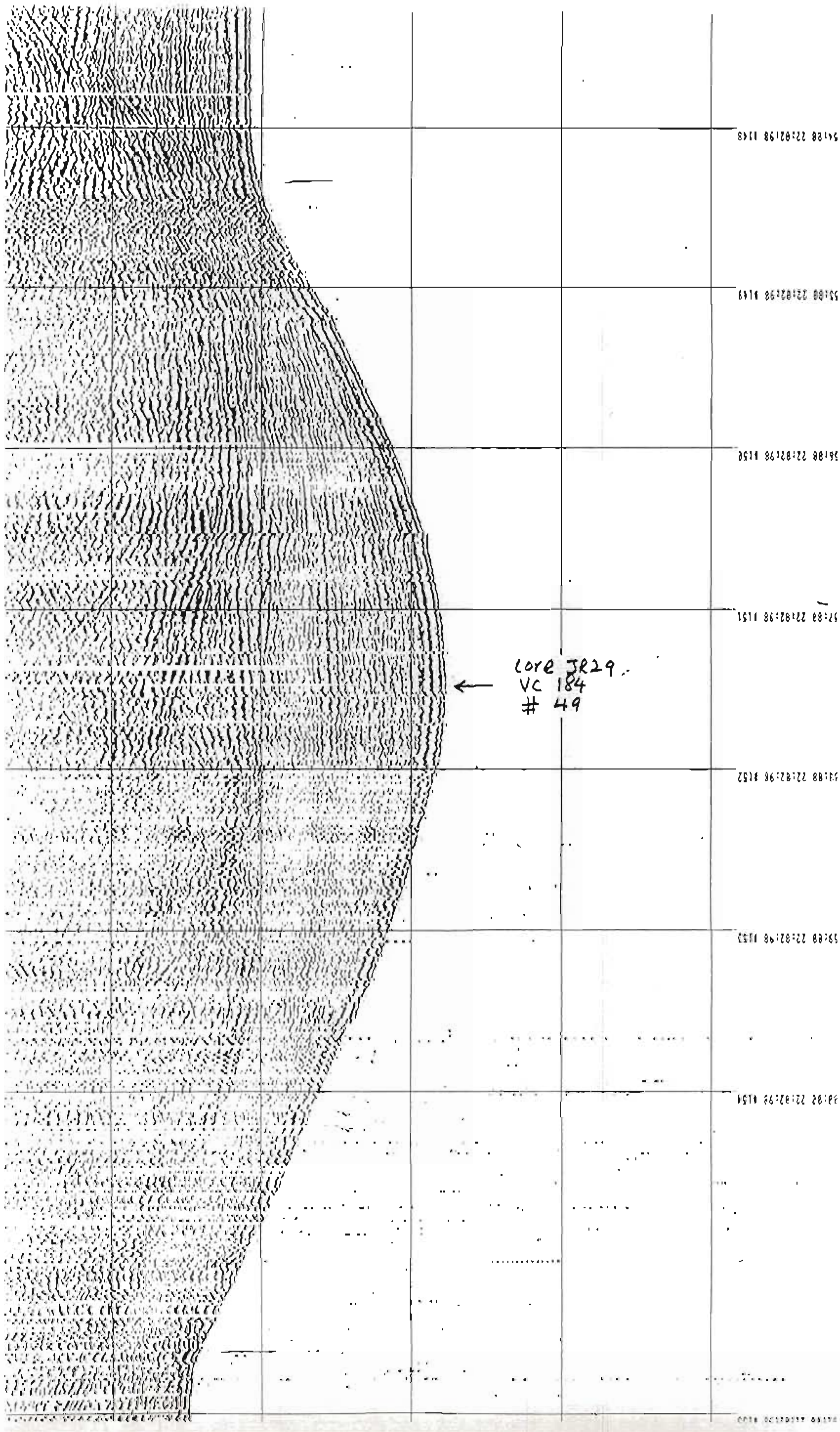
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VC 184
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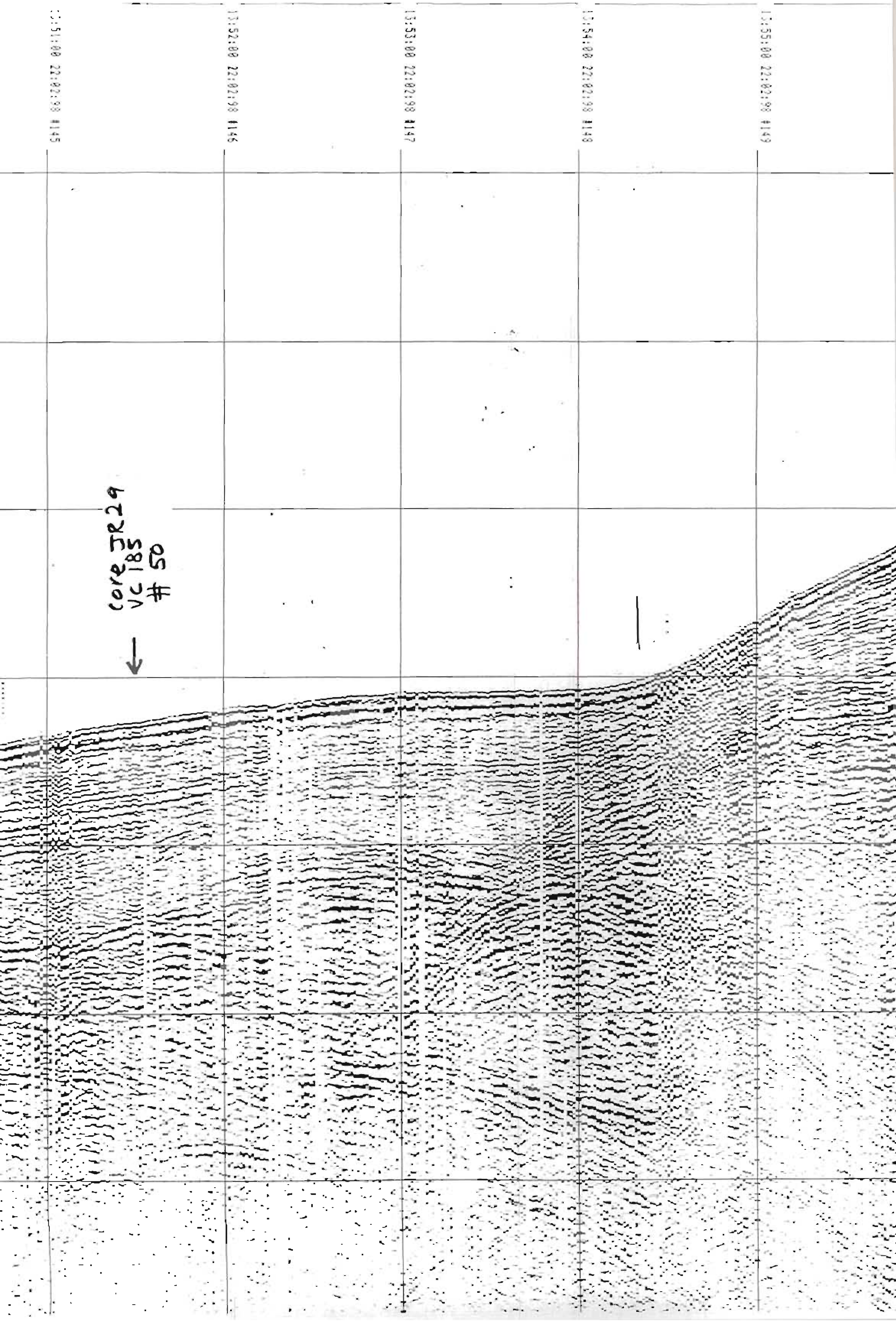
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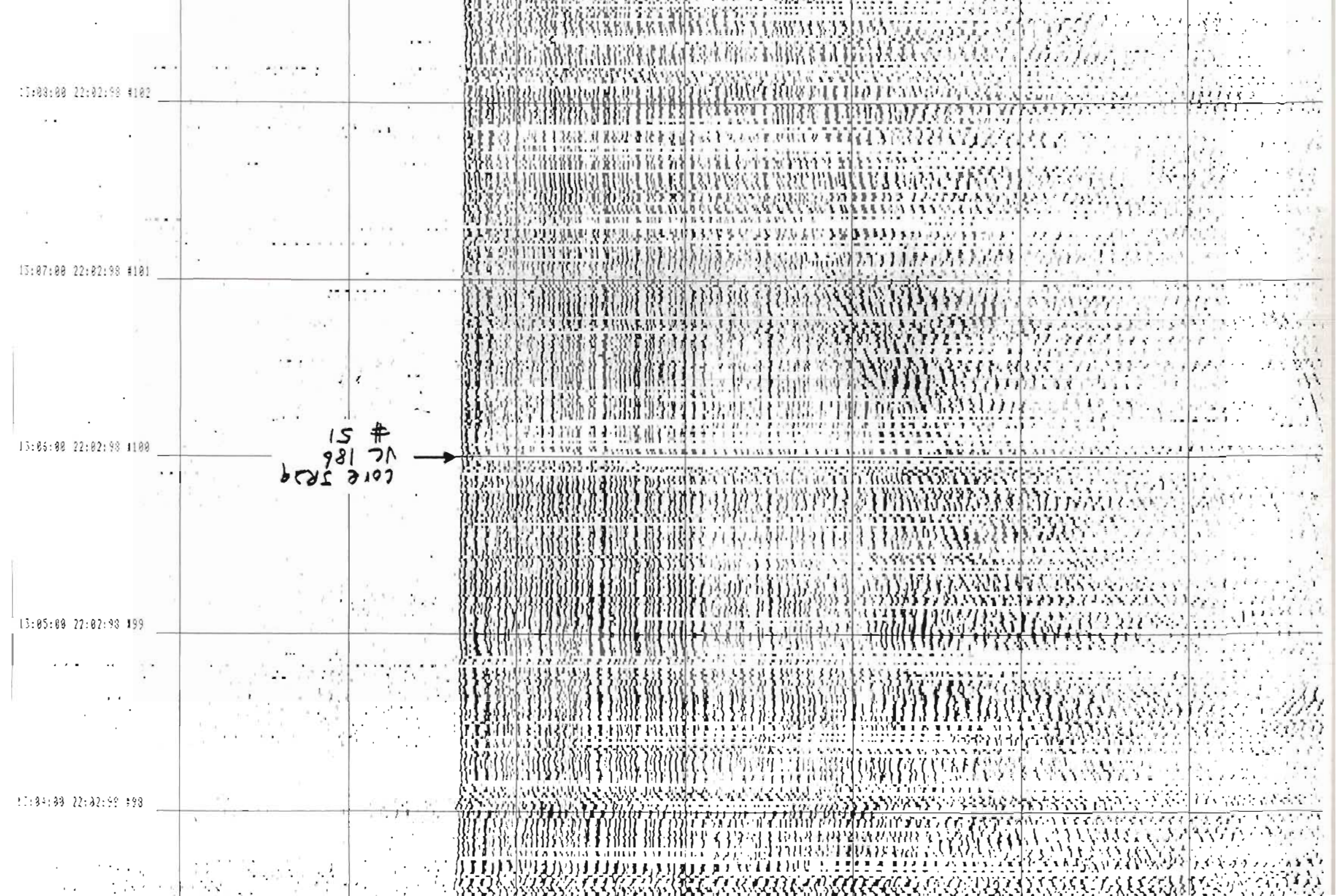
13:52:00 22:02:98 #146
13:53:00 22:02:98 #147
13:54:00 22:02:98 #148
13:55:00 22:02:98 #149
core JR29
VC 185
#50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15:07:00 22:02:98 #101
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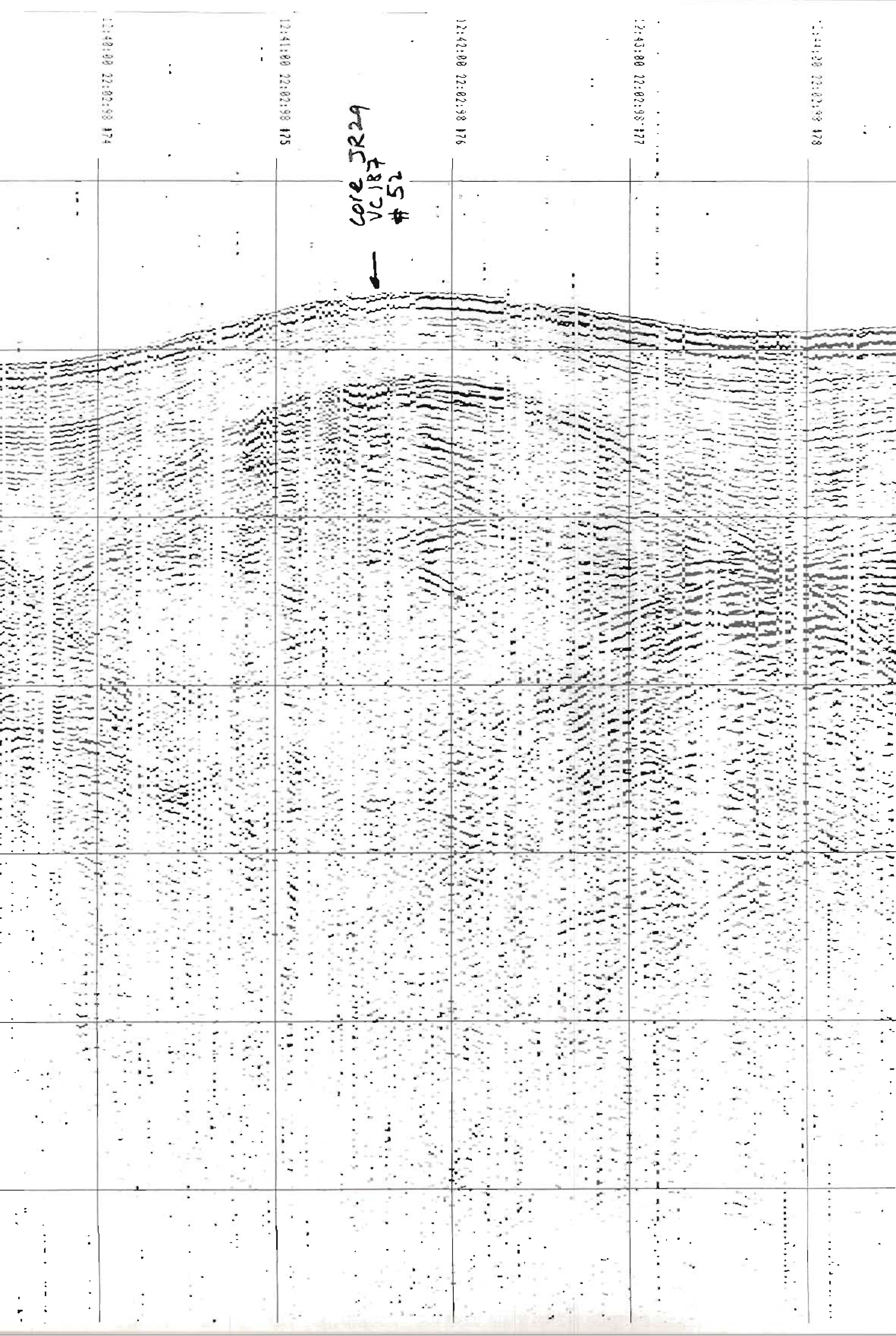
15:05:00 22:02:98 #99
15:04:00 22:02:98 #98
Core TR29
VC 186
51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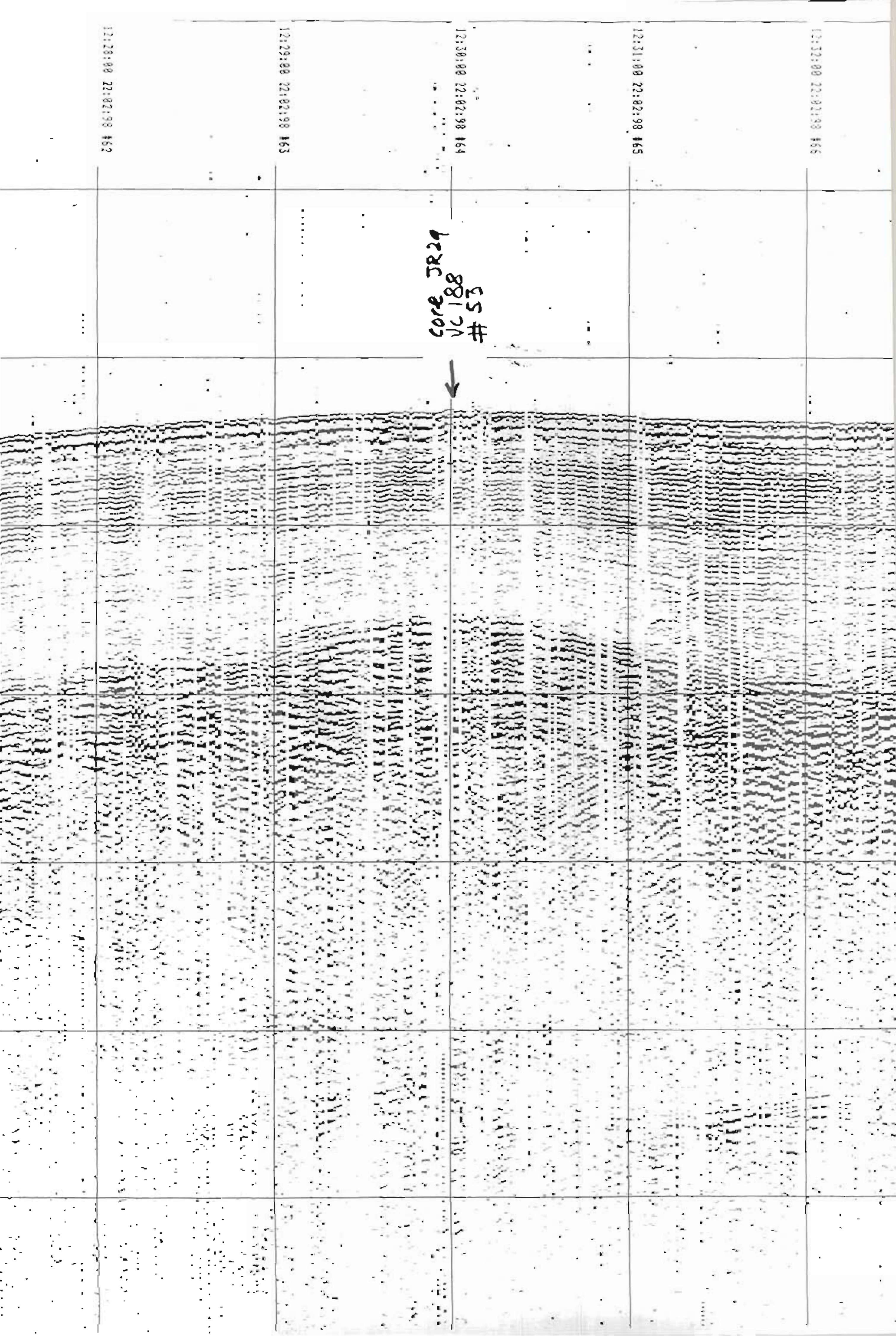
12:41:00 22:02:98 #75
12:42:00 22:02:98 #76
12:43:00 22:02:98 #77
12:44:20 22:02:98 #78
Core JR29
VC187
#52



12:28:00 22:02:98 #62
12:29:00 22:02:98 #63
12:30:00 22:02:98 #64
12:31:00 22:02:98 #65
12:32:00 22:02:98 #66
Core JR29
VC 188
#53

PROJECT JR / 29 | LINE 9 | FIX NOs.

SURVEY AREA ADMIRALTY BAY | LINE DIRECTION N

SEISMIC	✓	GRAVITYMETER		DEPTH		FIX INTERVAL	JULIAN DAY
SONAR		MAGNETOMETER		OTHER			DATE

SONAR TYPE SPARKER

6 x MULTITIP

1KJ

TELEDYNE 7 CHAN

WAVERLEY 3710

Millisec 320 msec

~~Metres~~ Millisec 40 msec

~~Metres~~

ection L → R

val 1·2 sec at start.

band 250-800 Hz

TYPE

Scale 'O'

Range

Calibration

Comment

SIGNAL PROCESSING

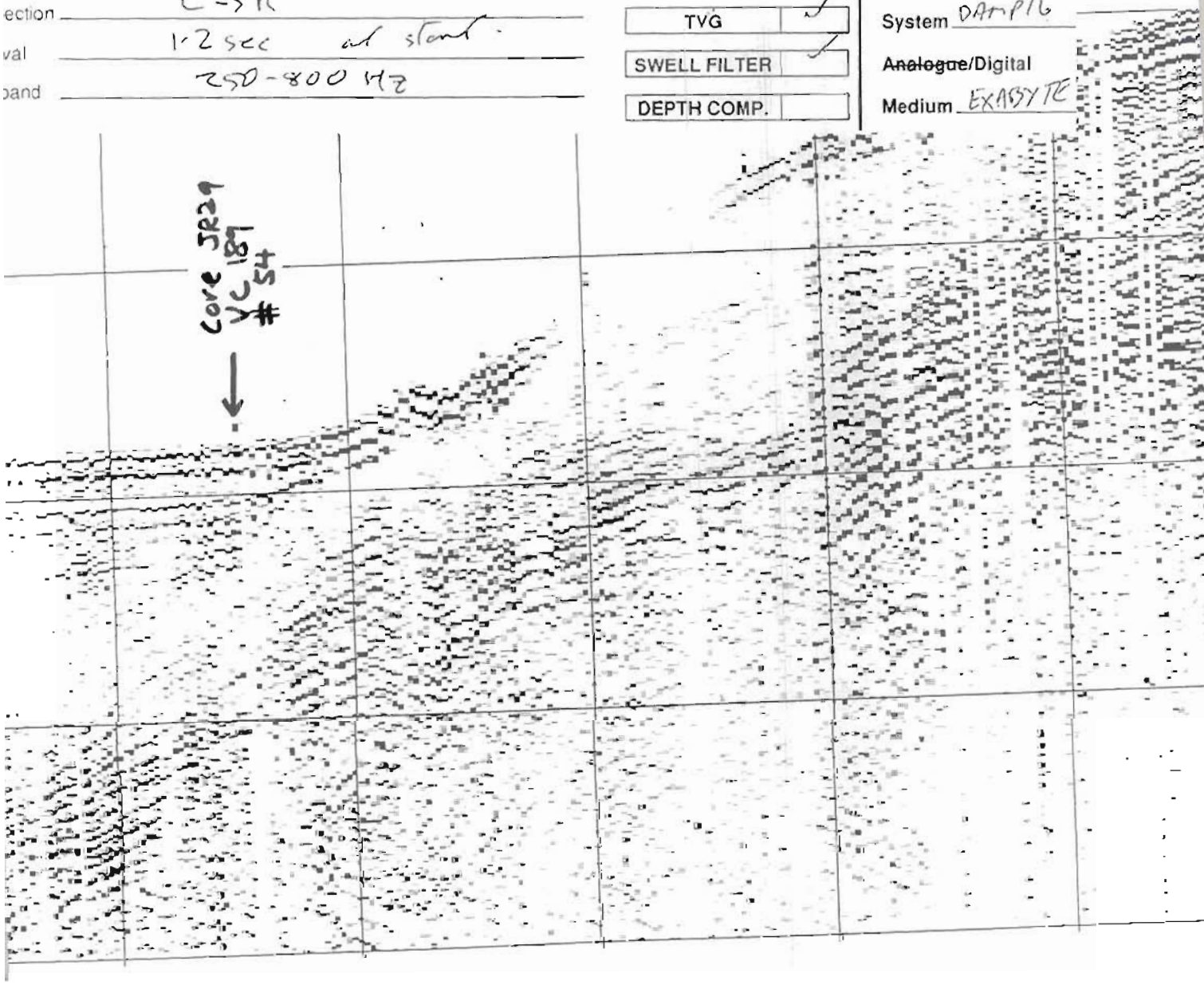
TVG	✓
SWELL FILTER	✓
DEPTH COMP.	

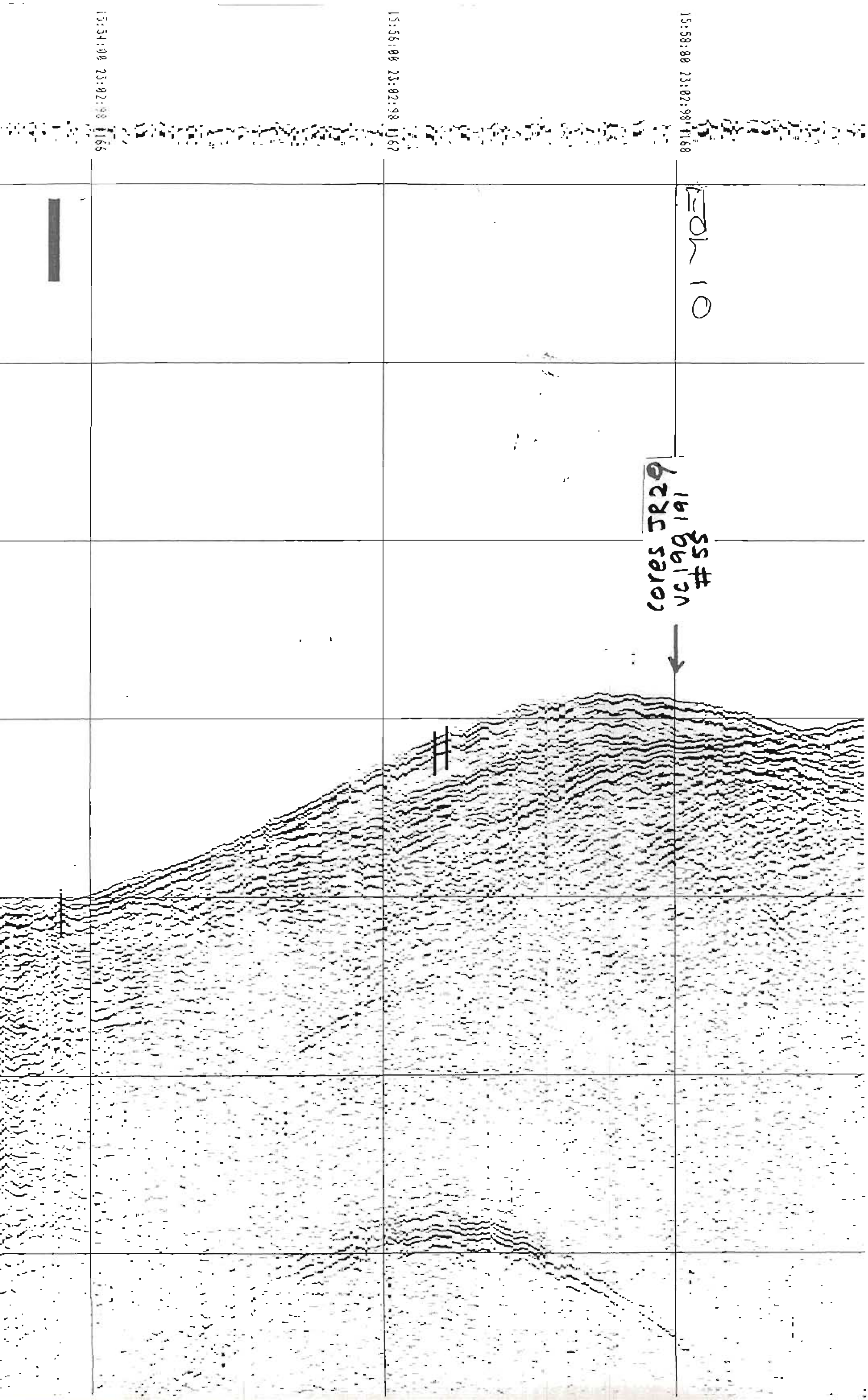
LOGGING

System DAMPIG

~~Analogue~~/Digital

Medium EXABYTE





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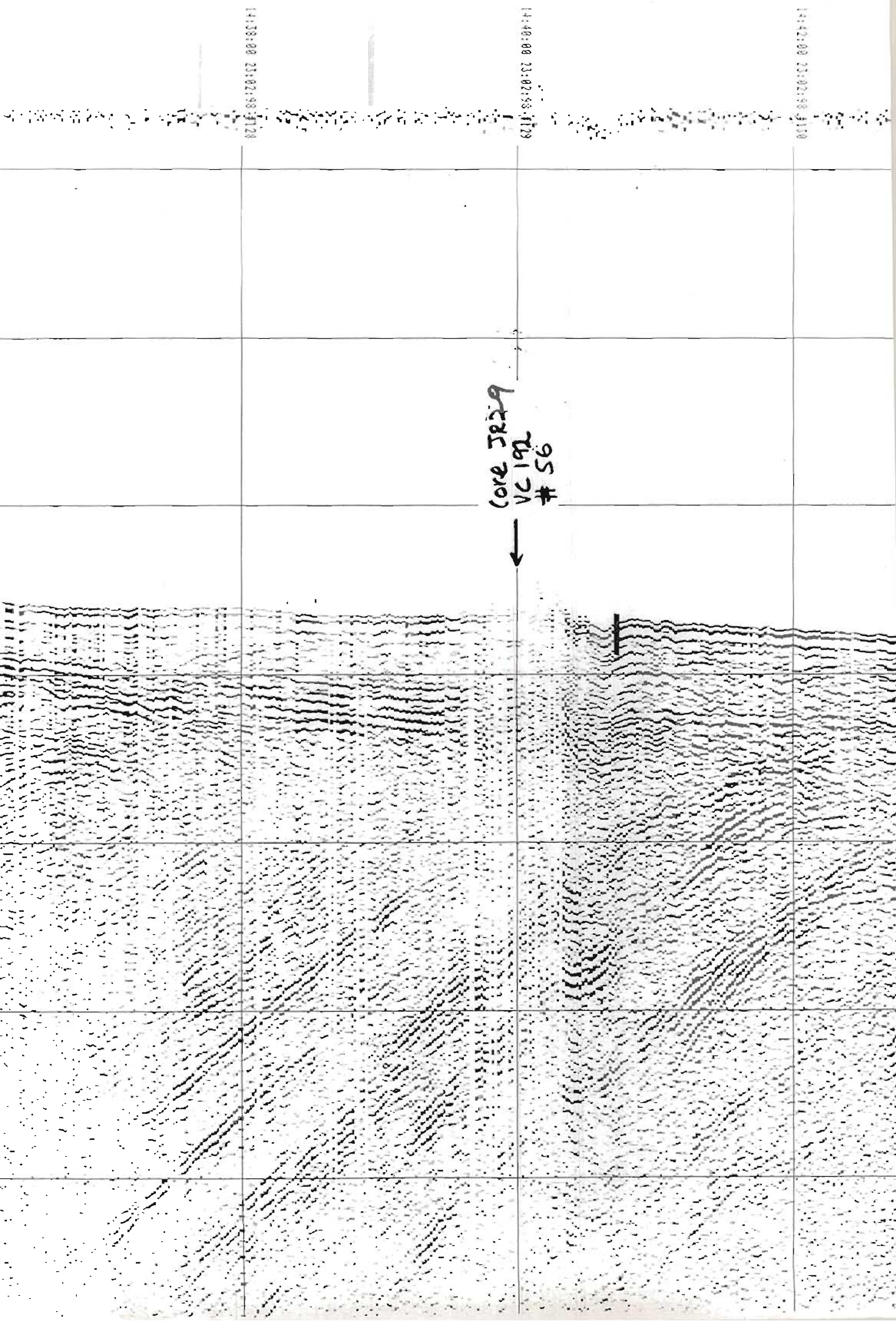
15:56:00 23:02:98 1167
15:58:00 23:02:98 1168
Line 10
cores JR29
vc190 191
#55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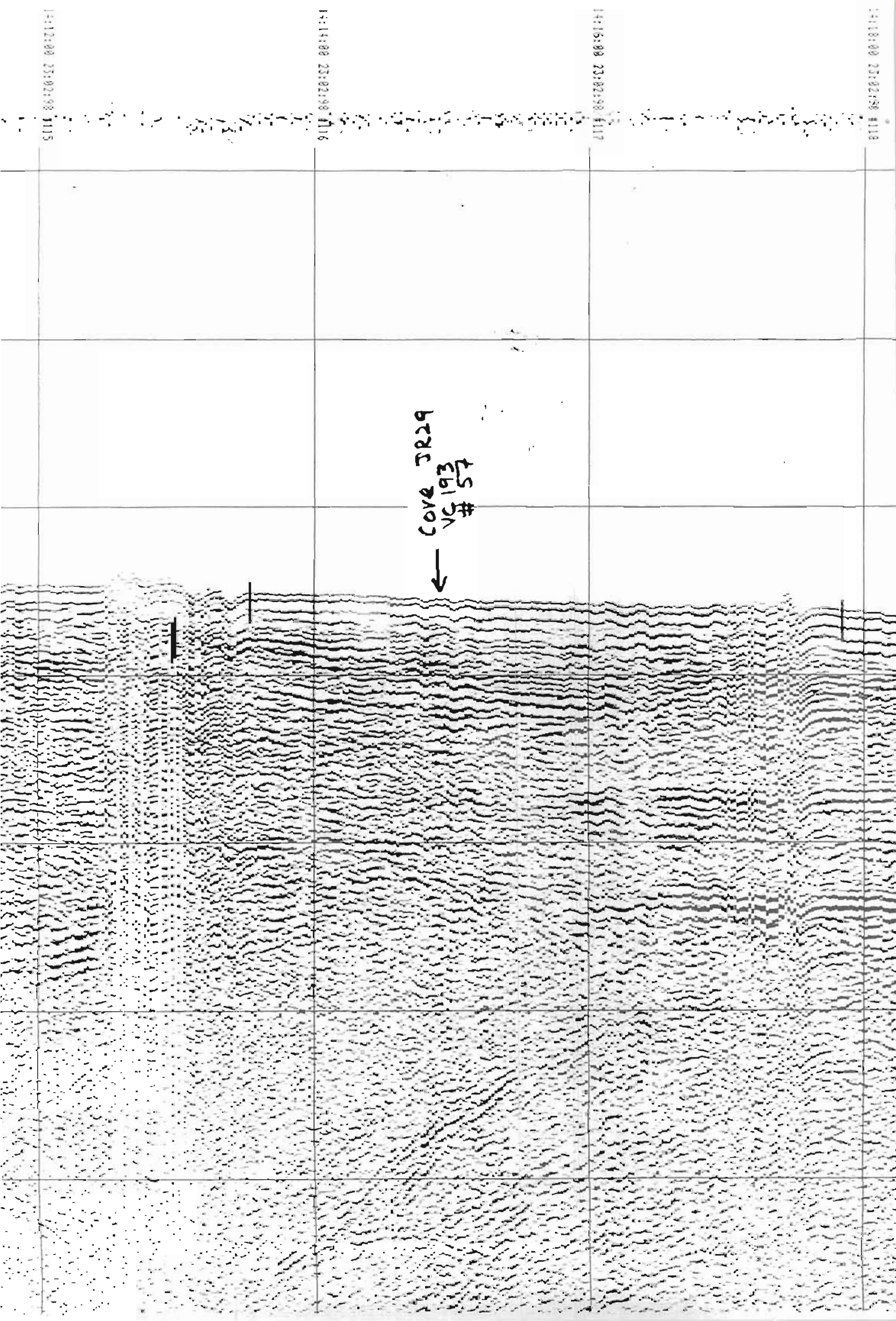
14:40:00 23:02:98 3129
14:42:00 23:02:98 3130
Core JR279
VC192
#56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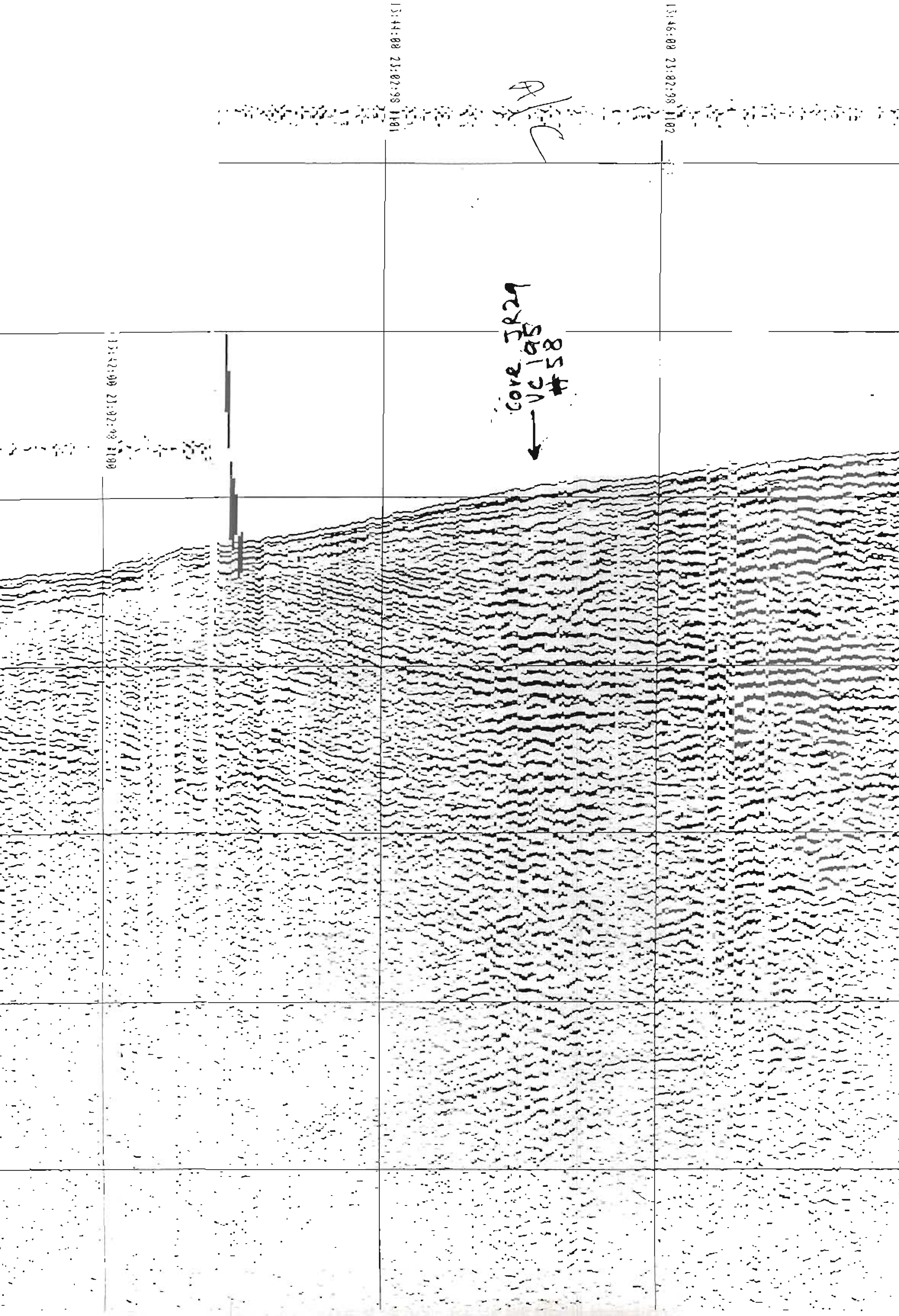
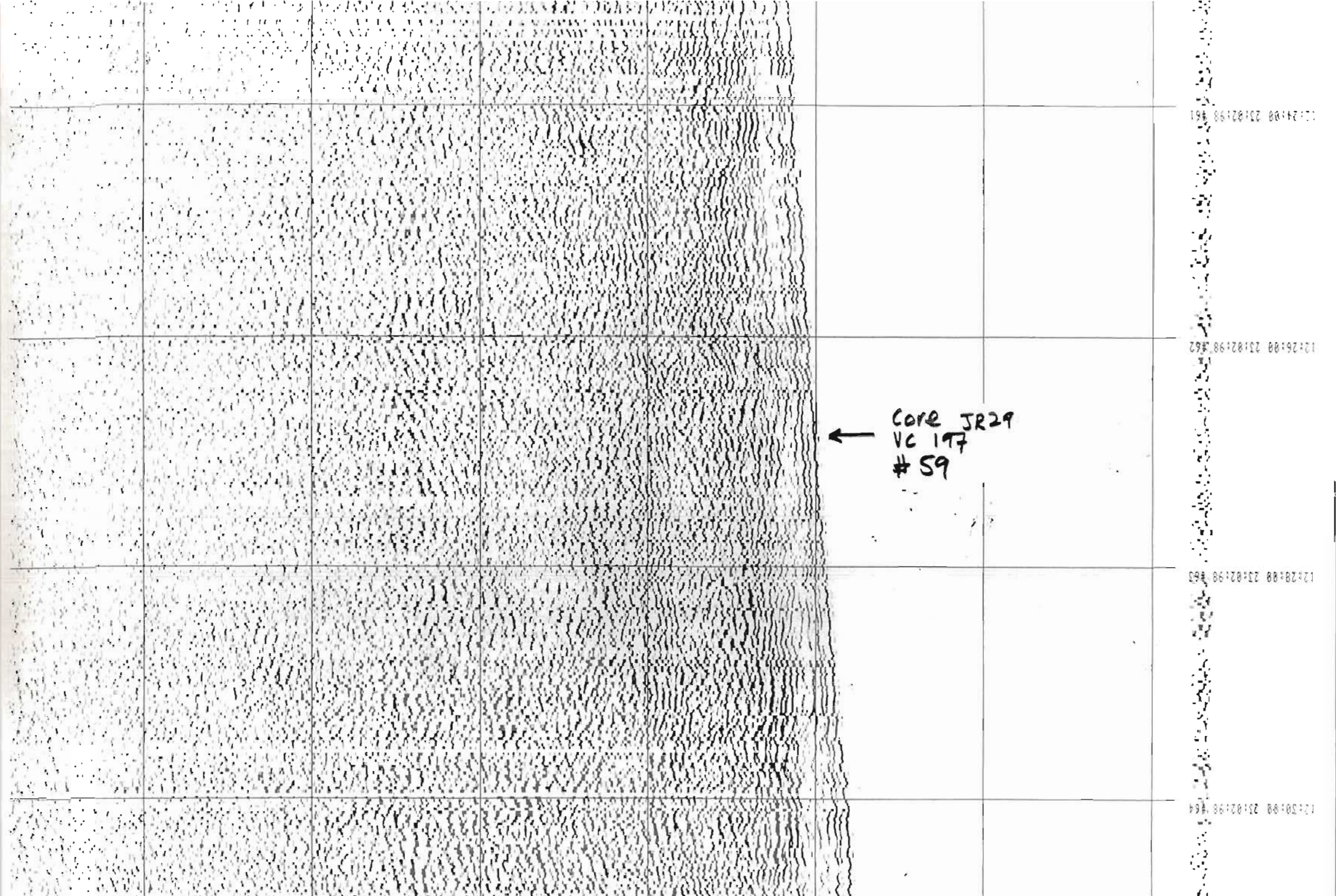
14:16:00 23:02:98 #117
14:18:00 23:02:98 #118
Core JR29
VC193
#57



Core JR29
VC 105
#58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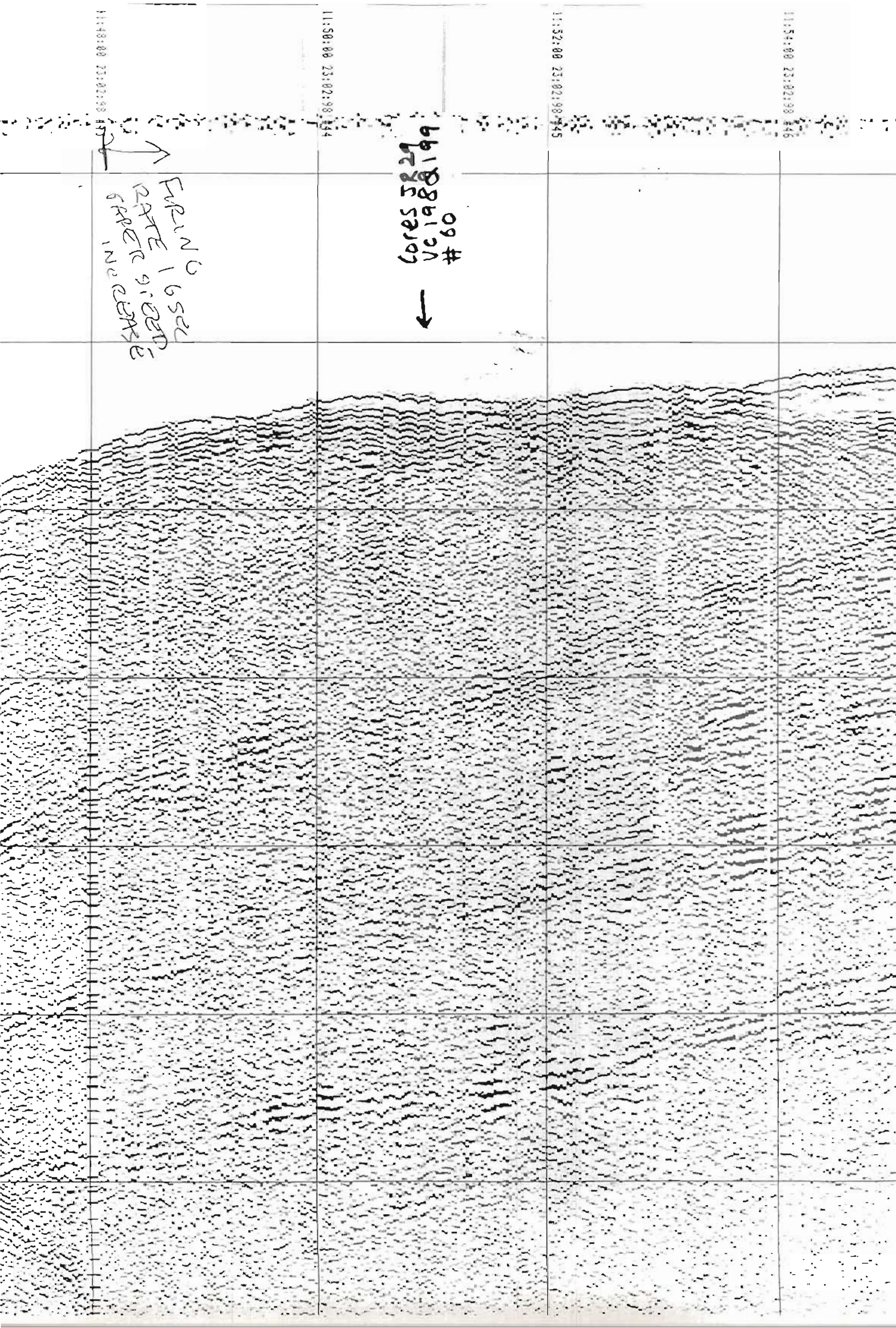
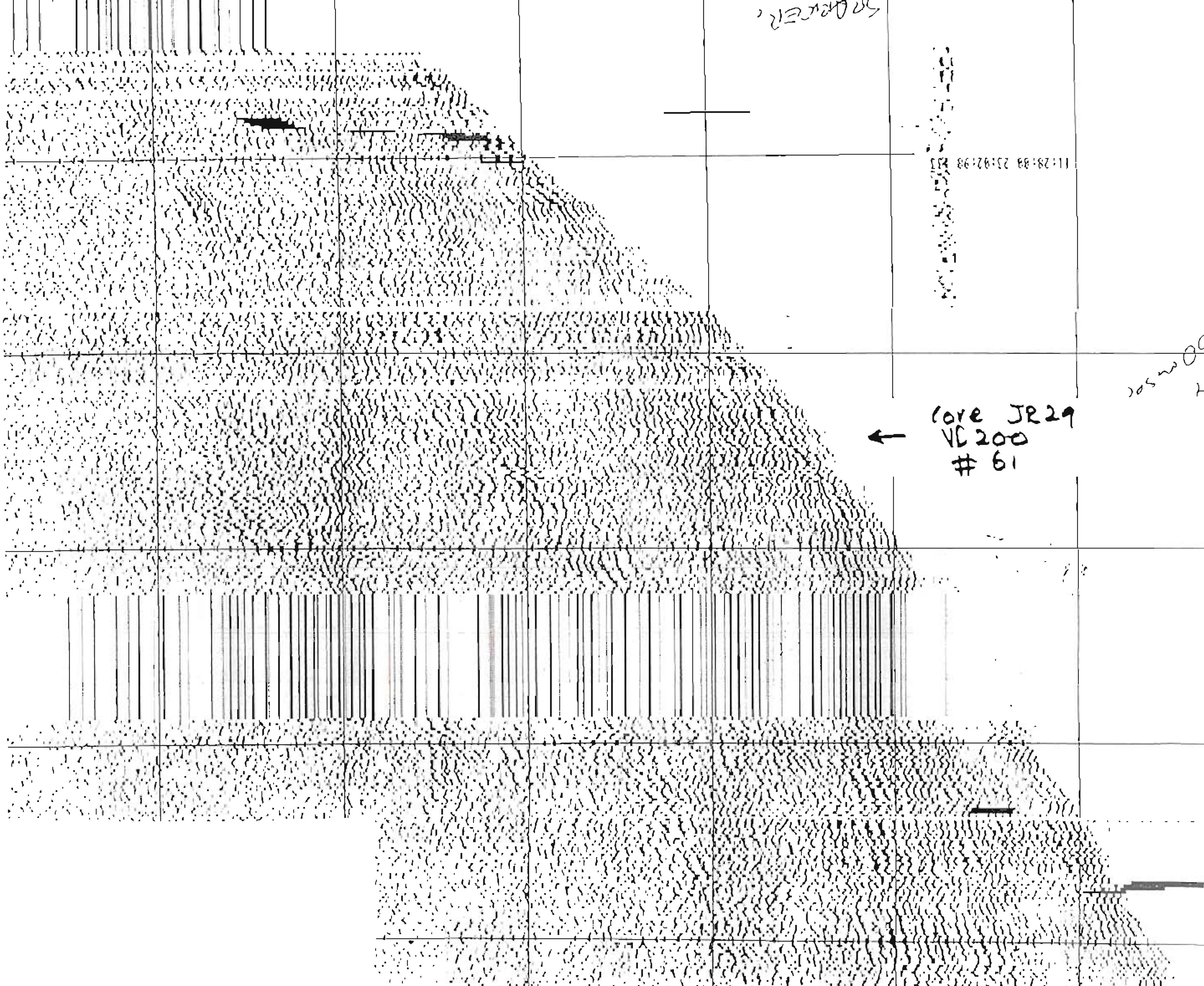
VC 197
#59



11:48:00 23:02:98
11:50:00 23:02:98
11:52:00 23:02:98
11:54:00 23:02:98
FIRING 16 SEC RATE AFTER SPEED INCREASE
Cores JR29
VC198/199
#60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VC200
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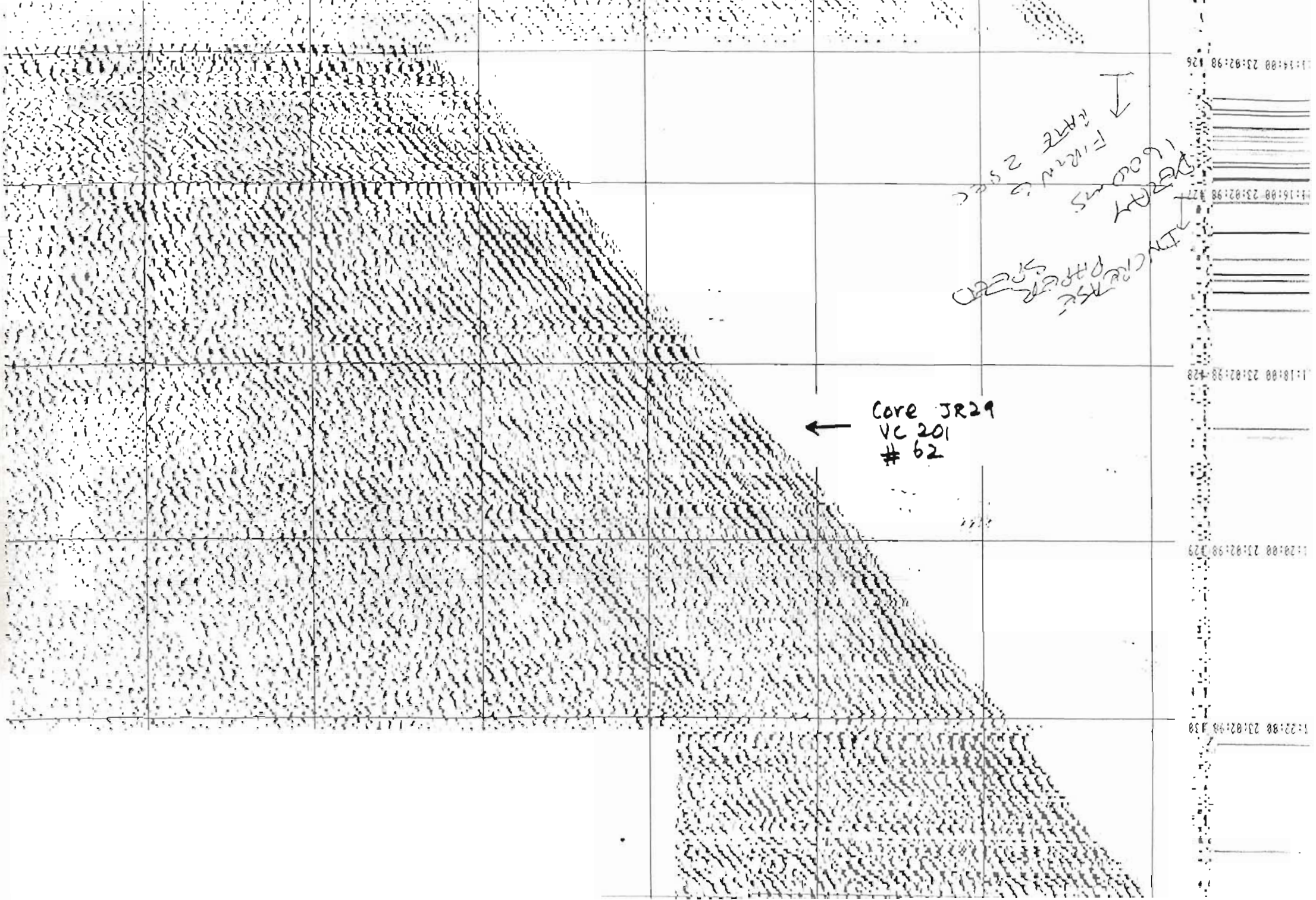
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VC 201
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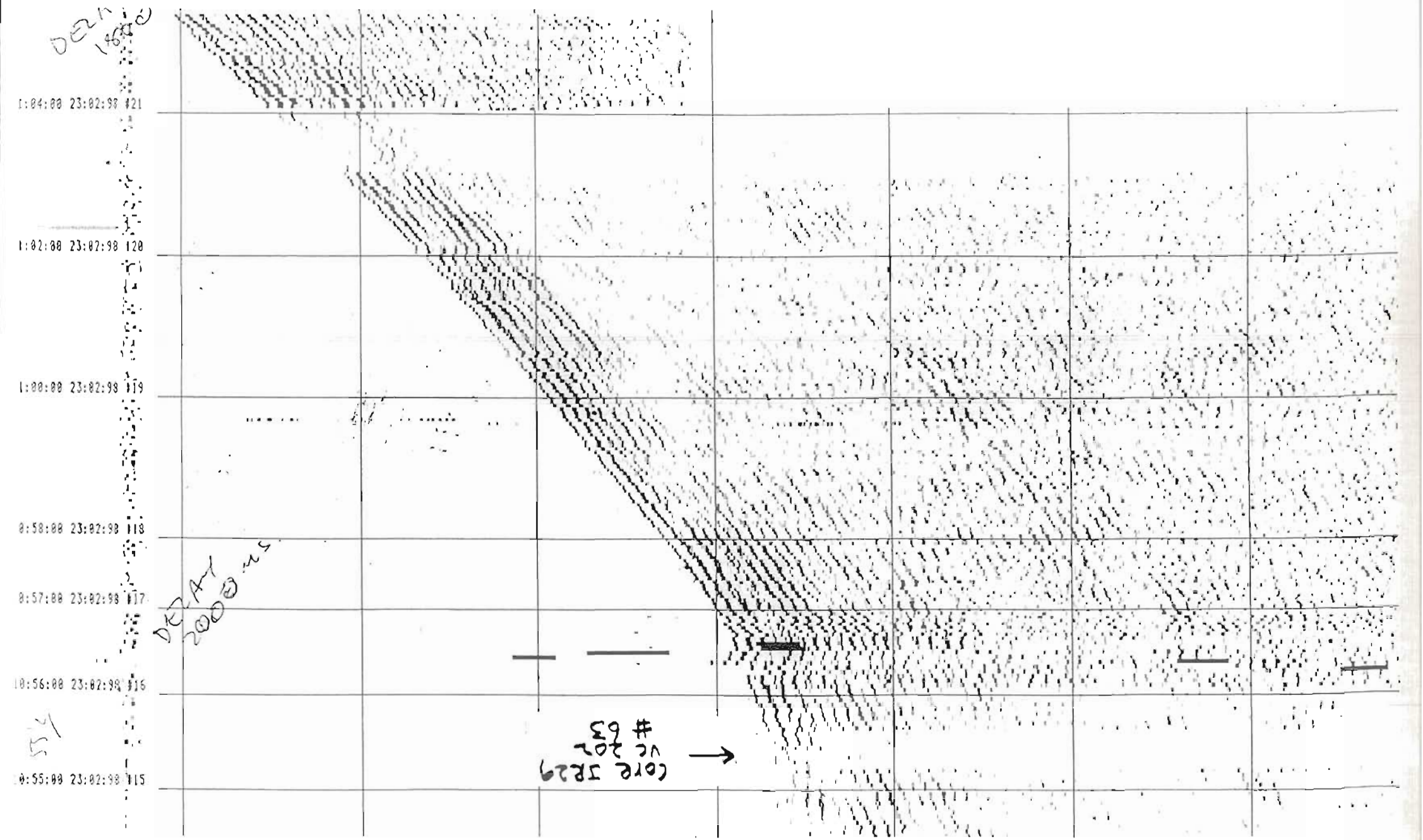
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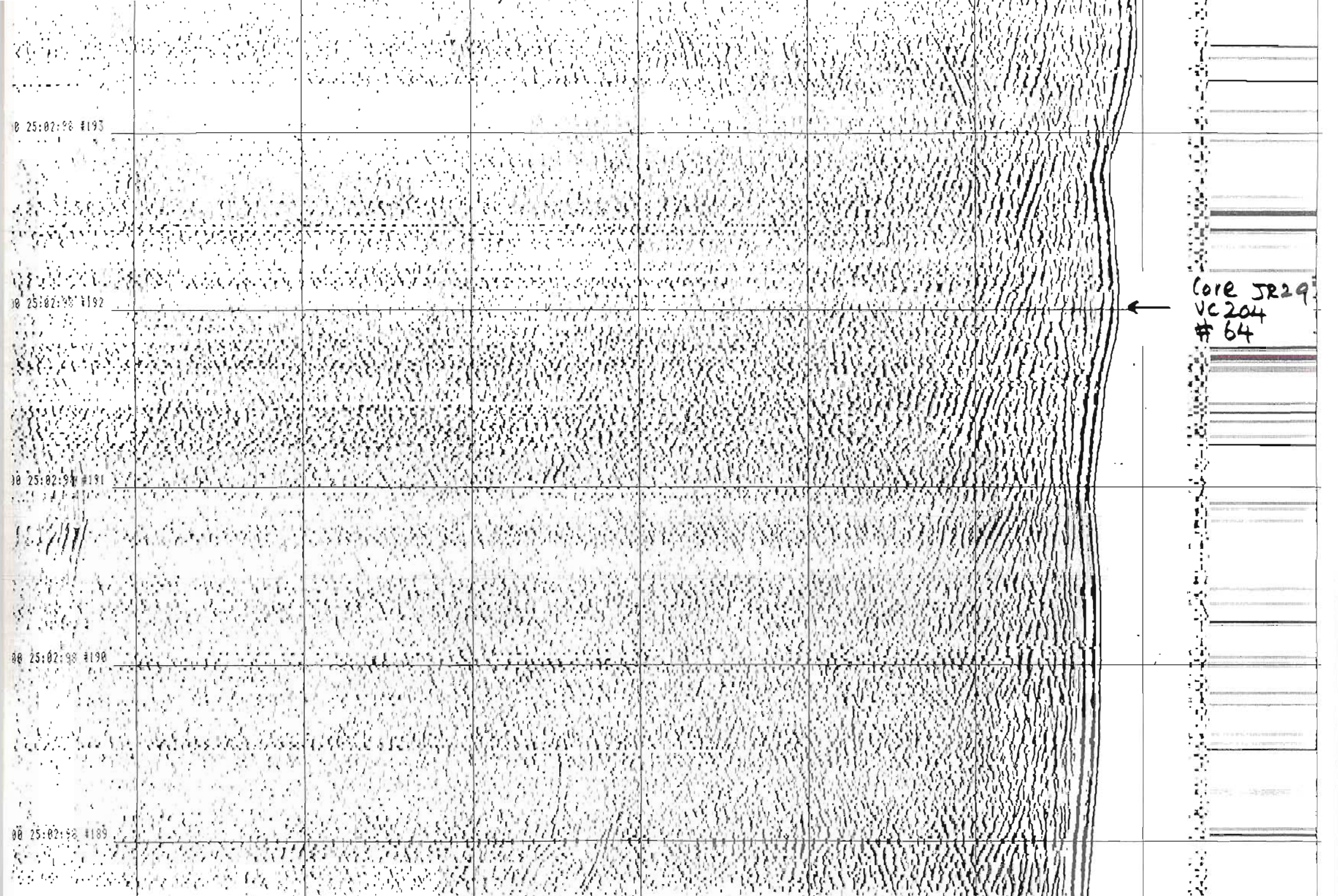
1:02:00 23:02:98 120
1:00:00 23:02:98 119
0:58:00 23:02:98 118
0:57:00 23:02:98 117
0:56:00 23:02:98 116
0:55:00 23:02:98 115
core TR29
vc 202
63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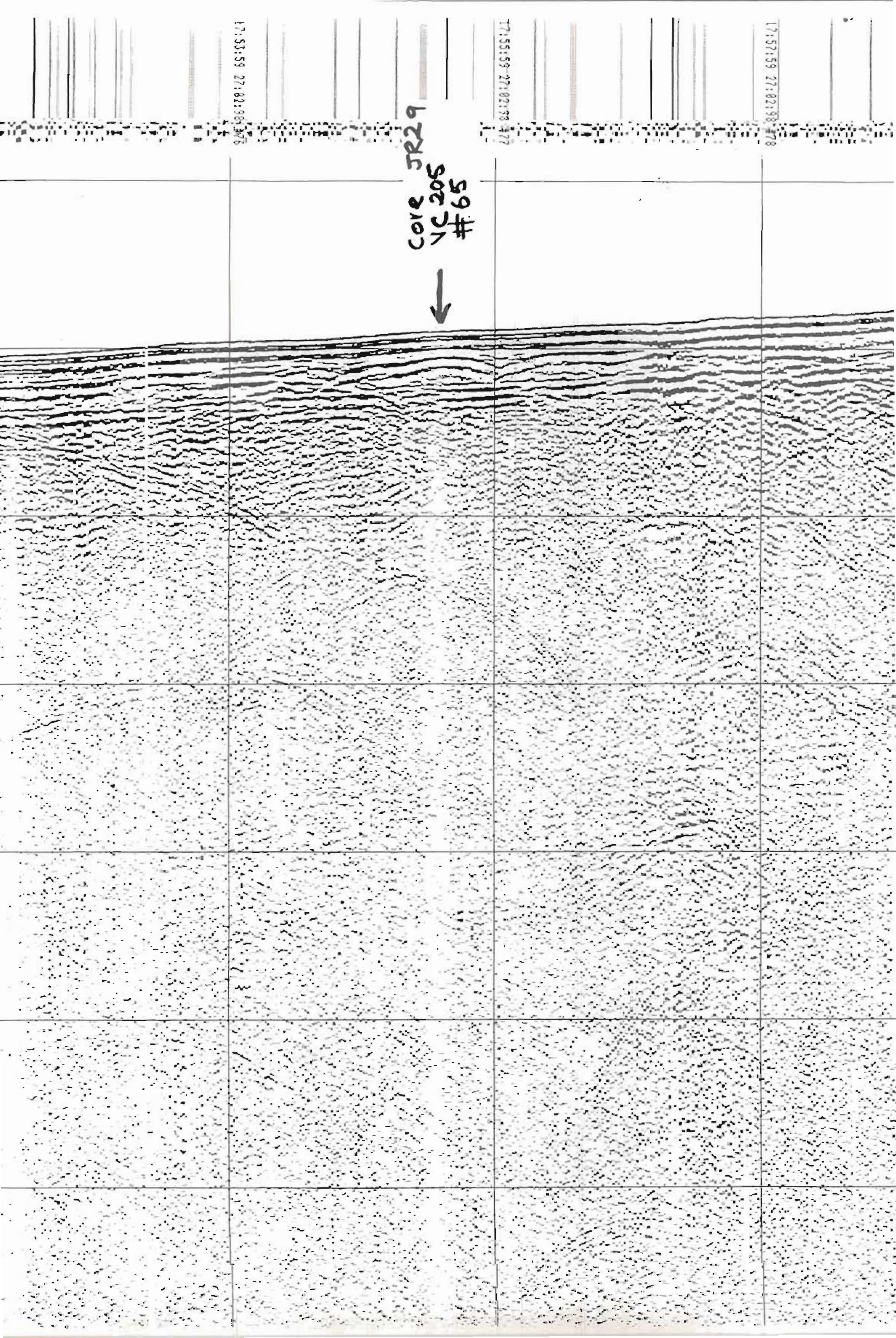
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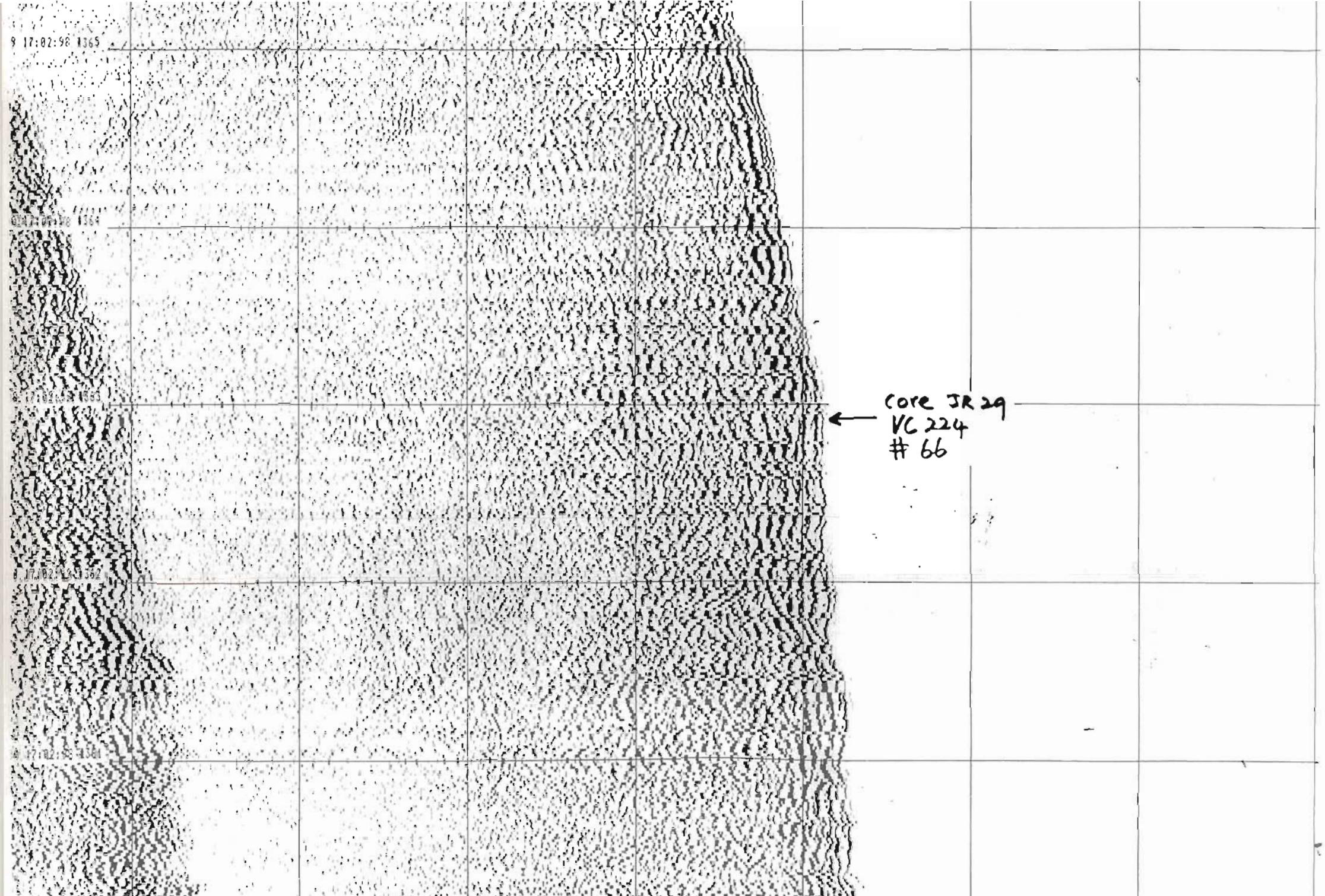
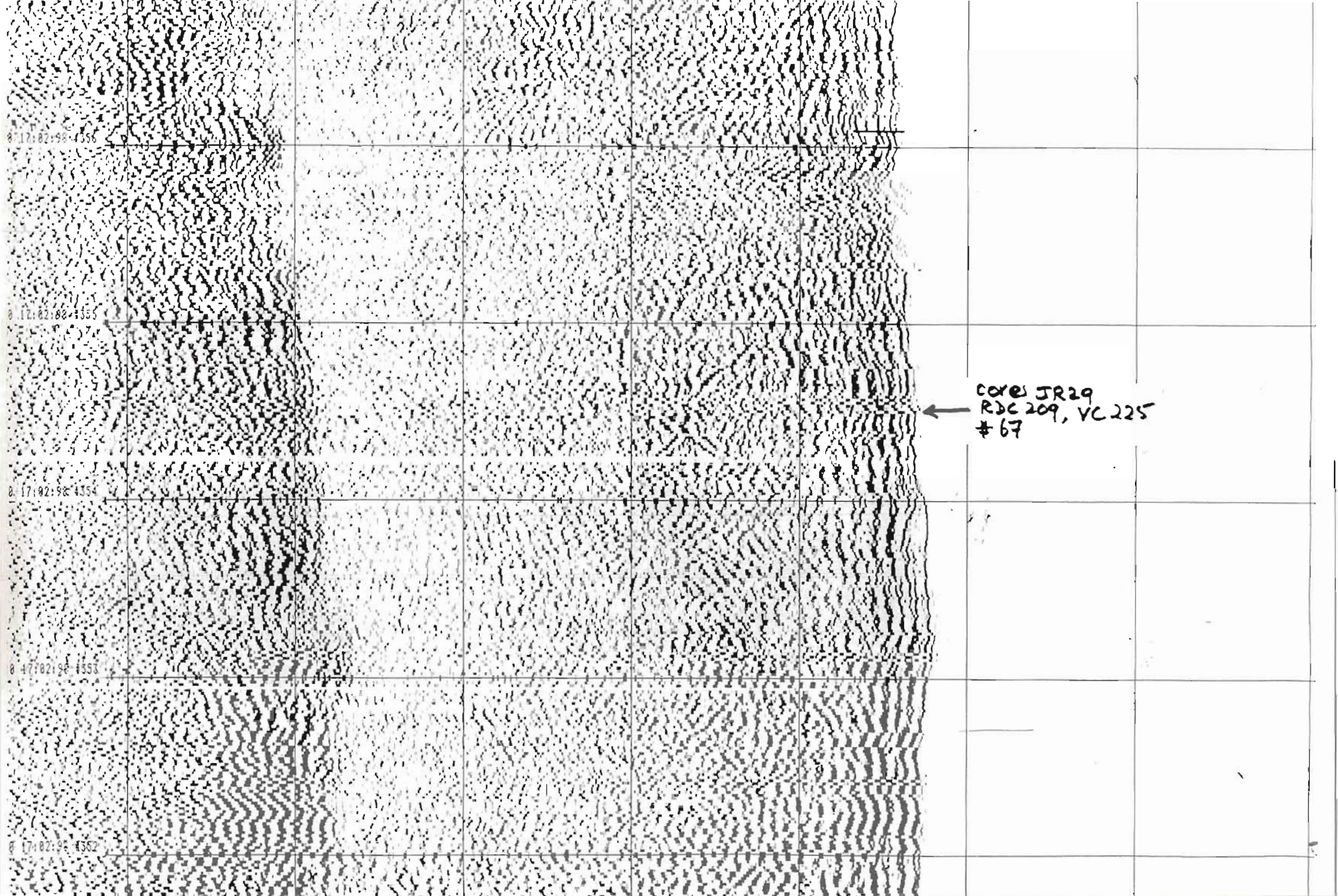

Core JR 29
VC 224
66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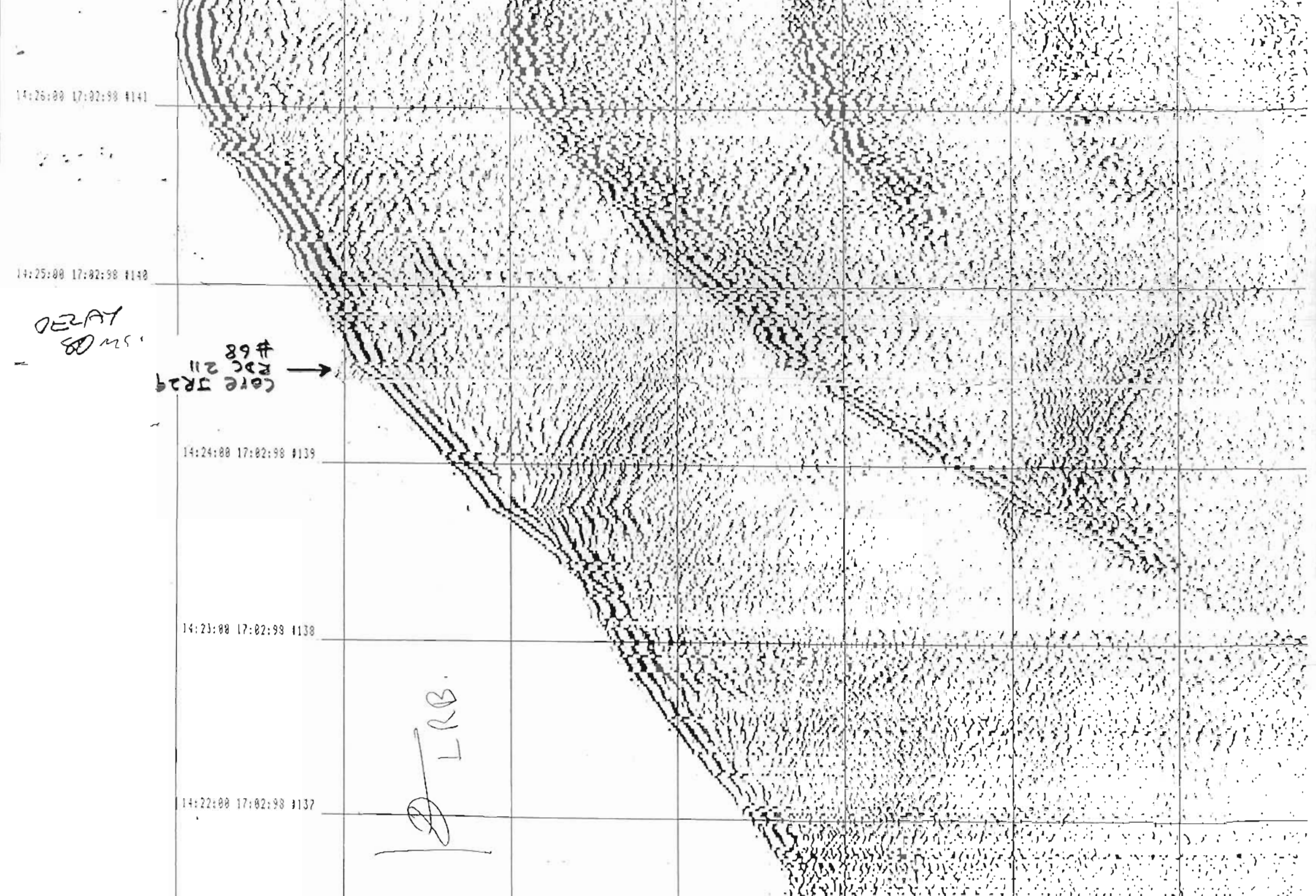
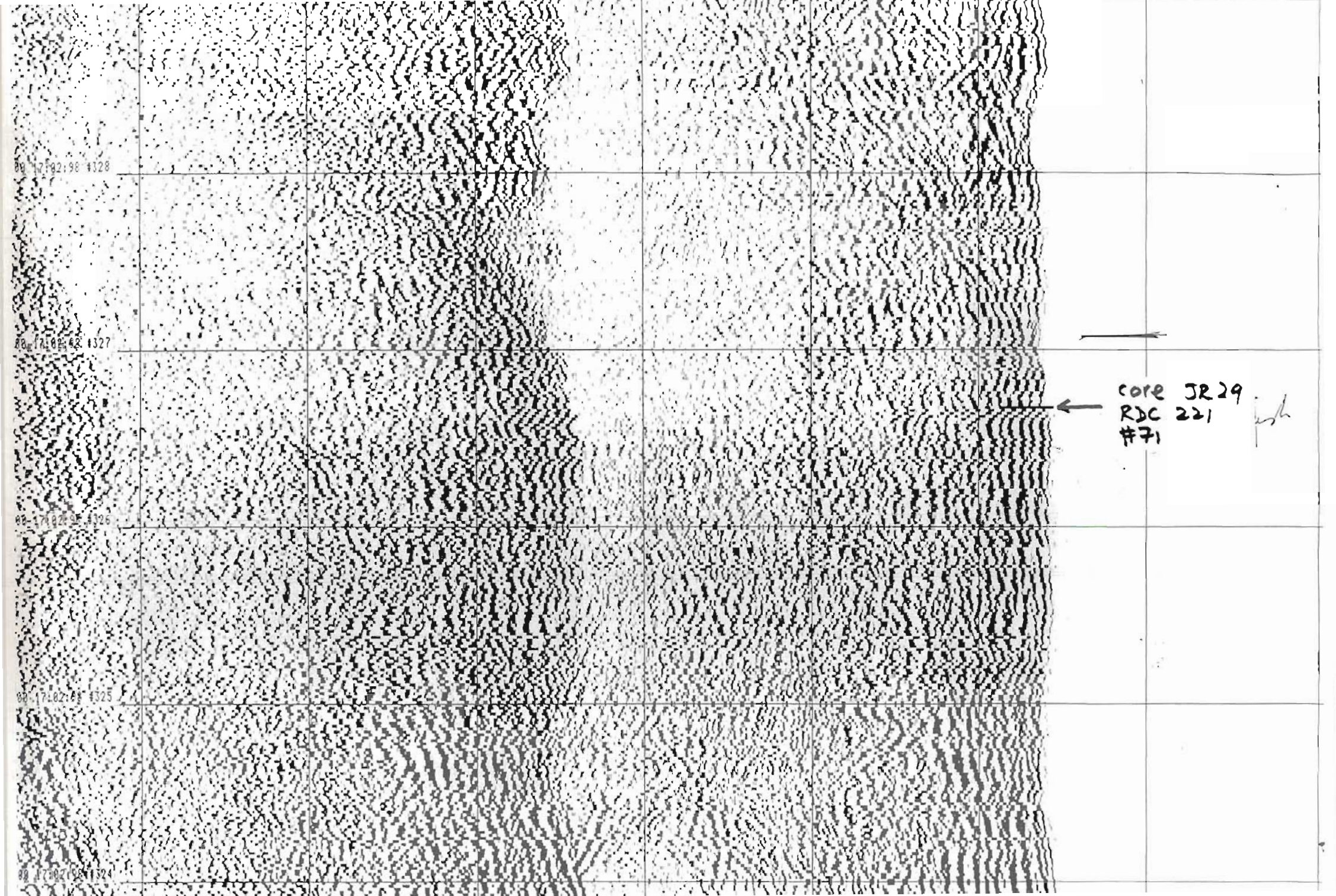
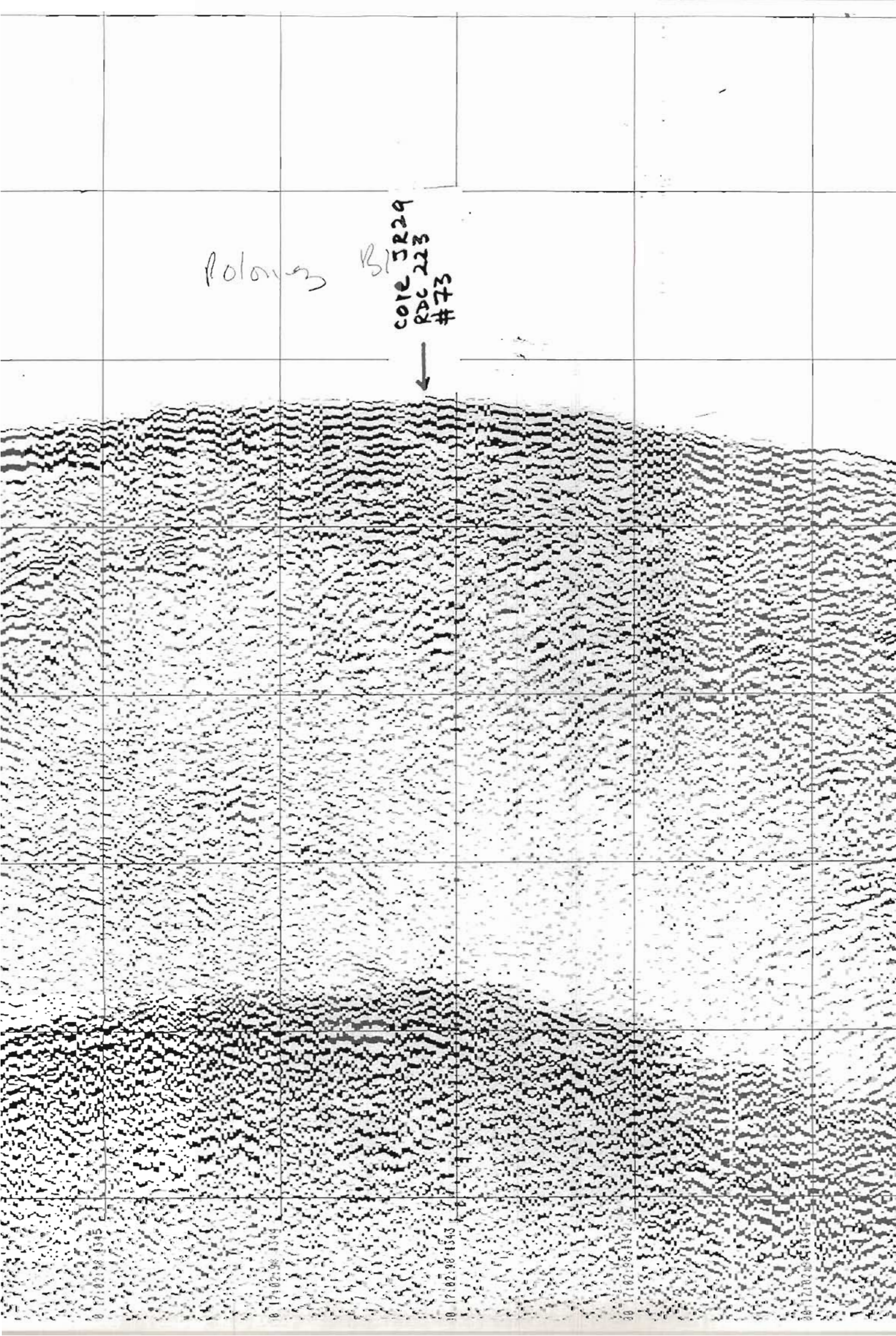
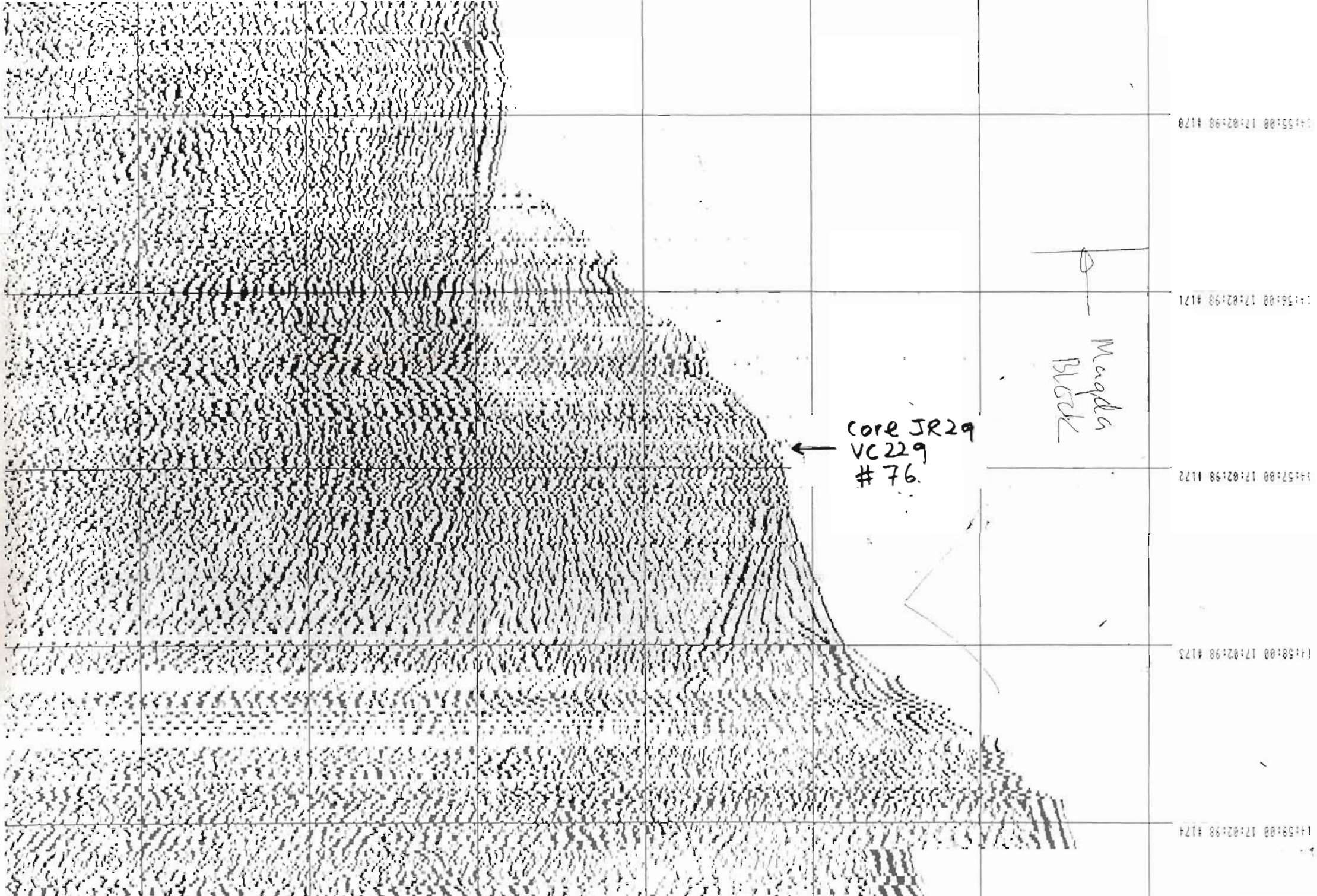
RDC 209, VC 225
#67


14:26:00 17:02:98 #141
14:25:00 17:02:98 #140
DELAY
80 ms
Core TR24
E3C 211
#68
14:24:00 17:02:98 #139
14:23:00 17:02:98 #138
14:22:00 17:02:98 #137
LRB


14:35:09 17:02:98 #148
14:34:00 17:02:98 #149
14:35:00 17:02
14:36:00 17:02:98 #151
14:37:00 17:02:98 #152
CoreSJR29
RDc 214, 215
#.70


core JR29
RDC 221
#71


Polonez B1
CORE JR29
RDC 223
#73


Magda Block
core JR29
VC229
#76.

6. APPENDIX

6.2 Sample Logs

Station No: JR29 - 006 Lat/Long (dm): 62 04.19 S 057 32.37 W

Core No: RDC - 115 Locality: Melville Peninsula WD: 125 m

Date/Time (GMT): 16-02-98 20:50 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .25 .50 .75 1.00 25	vc c m f vf g p c b; No. of Clasts Bioturbation; 1 5 3 1	**Unit 1 (no depth)** **PEBBLE GRAVEL** **Unconsolidated gravel composed predominantly of well rounded pebbles of Cape Melville Formation shale.** Shales: (78%) dark grey siltstone, medium - very large pebbles, rounded - well rounded, low sphericity. *Cape Melville Fm.* Andesite: (17%) med. grey feldspar-rich, med - very large pebbles. Granitoid: (3%) med. grey fine gr. Vesicular lava: (2%) dk. grey - black single large pebble. *Melville Peak*

Station No: JR29 - 006 Lat/Long (dm): 62 41.96 S 057 32.37 W

Core No: RDC - 116 Locality: Sherratt Bay WD: 125 m

Date/Time (GMT): 16-02-98 22:20 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50	vc c m f vf g p c b; No. of Clasts Bioturbation; 1 5 3 1	**Unit 1 0.00 - 0.03 m** **UN I/D IGNEOUS** Greyish olive (10Y 4/2) microcrystaline igneous pebble. **Unit 2 0.02 - 0.49 m** **SILTSTONE** Greenish-black siltstone (5GY 2/1). Some faint lamination visible in main section .

Station No: JR29 - 007 Lat/Long (dm): 62 04.23 S 057 34.69 W

Core No: RDC - 117 Locality: Sherratt Bay WD: 114 m

Date/Time (GMT): 17-02-98 00:00 Comments:

Core Photo	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10	vc c m f vf g p c b; No. of Clasts Bioturbation; 1 5 3 1	**Unit 1 (depth n/a)** **PEBBLE GRAVEL** **Unconsolidated gravel composed of granitic and basaltic pebbles.** Granitic: Qtz rich Basaltic: Green/black fine grained volcanic rock with calcite(?)-filled amygdales, chlorite(?), pyrite and small feldspar phenocrysts.

Station No: JR29 - 007 Lat/Long (dm): 62 04.23 S 057 34.69 W

Core No: RDC - 118 Locality: Sherratt Bay WD: 114 m

Date/Time (GMT): 17-02-98 01:00 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10	vc c m f vf g p c b; No. of Clasts Bioturbation; 1 5 3 1	**Un it 1 (depth n/a)** **PEBBLE GRAVEL** **Unconsolidated gravel composed of volcanic and granitic pebbles.** Granitic: microcrystalline. Volcanic: fine to medium grained green/black volcanic, with amygdales, chlorite(?), pyrite and small feldspar phenocrysts.

Station No: JR29 - 008 Lat/Long (dm): 62 04.22 S 057 34.87 W

Core No: RDC - 119 Locality: Sherratt Bay WD: 121 m

Date/Time (GMT): 17-02-98 01:57 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10 .15 0.20	vc c m f vf g p c b; No. of Clasts Bioturbation; 1 5 3 1	**Unit 1 (depth n/a)** **PEBBLE GRAVEL** **Unconsolidated gravel composed of granitic and volcanic pebbles and rock fragments.** Granitic: microcrystaline. Volcanic: fine to medium grained dark green/black volcanic rock with amygdales, pyrite and feldspar visible. Pebbles are sub-rounded to rounded, with some angular drill fragments.

Station No: JR29 - 008 Lat/Long (dm): 62 04.22 S 057 34.88 W

Core No: RDC - 120 Locality: Sherratt Bay WD: 121 m

Date/Time (GMT): 17-02-98 03:02 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf / g p c b) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45		**Unit 1 0.00 - 0.45 m** **ANDESITE** **Greyish black (N2) volcanic rock with small feldspar phenocrysts.** 0.00 - 0.06 m sub-angular andesite pebbles, probably lying on eroded surface of main volcanic unit. 0.06 - 0.13 m larger fragment of underlying rock unit. 0.13 - 0.45 m main volcanic (andesitic?) unit.

Station No: JR29 - 009 Lat/Long (dm): 62 04.22 S 057 35.46 W

Core No: RDC - 121 Locality: Sherratt Bay WD: 105 m

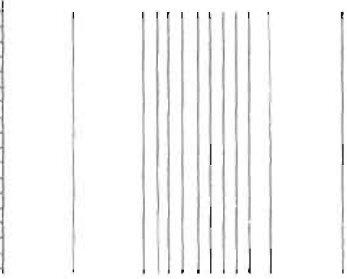
Date/Time (GMT): 17-02-98 04:52 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf / g p c b) Structures: No. of Clasts, Bioturbation (5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30		**Unit 1 (depth w/a)** **PEBBLE GRAVEL** **Unconsolidated gravel composed of two main pebble lithologies.** Andesite (30%): single core fragment (possibly drilled through cobble), and two angular, low sphericity very large pebbles. Typical South Shetlands lithology. Igneous unrid (70%): grey-blue-green (5BG 5/2) course grained very large igneous pebbles. Angular - subround, pyrite rich. [Pebbles similar to dropstone lithologies observed in *Cape Melville Fm.* on the peninsula]

Station No: JR29 - 009 Lat/Long (dm): 62 04.22 S 057 35.46 W

Core No: RDC - 122 Locality: Sherratt Bay WD: 109 m

Date/Time (GMT): 18-02-98 00:45 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f vf; g p s b; No. of Clasts; Bioturbation; 1 5 3 1)	Description
	0.00 .05 .10 .15		**Unit 1 (depth n/a)** **PEBBLE GRAVEL** **Unconsolidated gravel composed of siltstone and tuffaceous sandstone pebbles.** Siltstone: grey subangular pebbles Tuffaceous sandstone: green-grey containing chlorite and zeolites [check not the same lithology as 117-121which were logged as volcanic]. * single pebble encrusted with bryozoa i.e. seabed sample.

Station No: JR29 - 010 Lat/Long (dm): 62 04.23 S 057 36.12 W

Core No: RDC - 123 Locality: Sherratt Bay WD: 077 m

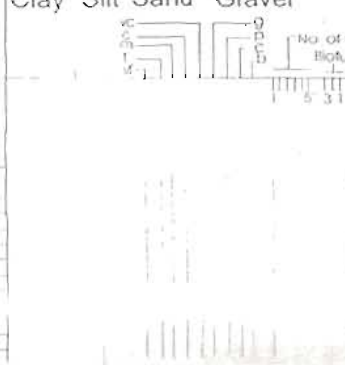
Date/Time (GMT): 18-02-98 05:28 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f vf; g p s b; No. of Clasts; Bioturbation; 1 5 3 1)	Description
	0.00 .05 .10 .15		**Unit 1 (depth n/a)** **PEBBLE GRAVEL** **Unconsolidated basaltic pebbles.** Basalt: grey-black (N2) subangular large to very large pebbles of basalt compostion, many showing amygdaloidal crystals of white feldspar (0.5 - 7.0 mm). [similar lithology to *Sherratt Bay Fm.* volcanics at Cape Melville]. Note that pebble shape has been partially altered by drilling friction.

Station No: JR29 - 010 Lat/Long (dm): 62 04.23 S 057 36.12 W

Core No: RDC - 124 Locality: Sherratt Bay WD: 080 m

Date/Time (GMT): 18-02-98 04:06 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f vf; g p s b; No. of Clasts; Bioturbation; 1 5 3 1)	Description
	0.00 .05 .10		**Unit 1 (depth n/a)** **PEBBLE GRAVEL** **Unconsolidated basaltic pebbles** Basalt: grey-black (N2) large to very large pebbles of vesicular basalt. Small white feldspar crystals common. Similar sample to RDC 123, but with smaller amygdales. [*Sherratt Bay Fm.*?]

Station No: JR29 - 010 Lat/Long (dm): 62 04.23 S 057 36.12 W

Core No: RDC - 125 Locality: Sherratt Bay WD: 080 m

Date/Time (GMT): 18-02-98 04:45 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10 .15 0.20 .25 .30	vc c m f m g p c b; No. of Clasts; Bioturbation; 1 5 3 1	**Unit 1 0.00 - 0.32 m** **BASALT** **Grey-black (N2) fine grained volcanic rock.** 0.00 - 0.10 m grey-black (N2) medium to very large basaltic pebbles, sub-rounded to sub-angular (some drilling induced). 0.10 - 0.17 m a.a. fractured half core of basalt. 0.17 - 0.32 m a.a. basalt whole core. Small vesicles (<0.5mm), occasional feldspar phenocrysts (1 - 3 mm).

Station No: JR29 - 011 Lat/Long (dm): 62 04.23 S 057 36.42 W

Core No: RDC - 126 Locality: Sherratt Bay WD: 105 m

Date/Time (GMT): 18-02-98 06:09 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45	vc c m f m g p c b; No. of Clasts; Bioturbation; 1 5 3 1	**Unit 1 (depth n/a)** **PEBBLE & SAND GRAVEL** **Unconsolidated small to large pebbles and coarse to very coarse sand of mixed mineralogy.** Basalt: grey-black (N2) to dark grey (N3) pebbles and sand form the bulk of the sample. Olivine phenocrysts upto 3mm observed. [Labelled (a)] Siltstone: dark green (5G 4/1) to light olive grey (5Y 5/2). [Possibly *Cape Melville Fm.* shale]. [labelled (b)] Granitoid: single large pebble; 20% quartz, 75% feldspar, 5% biotite. [Labelled (c)] Sandstone(?): three grey-black (N2) small to large subangular pebbles. [Labelled (d)]. Coarse and very coarse basaltic sand fractions are labelled (e) and (f).

Station No: JR29 - 012 Lat/Long (dm): 62 04.23 S 057 36.94 W

Core No: RDC - 127 Locality: Sherratt Bay WD: 104 m

Date/Time (GMT): 18-02-98 09:05 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf / g p c b) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10		**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated basalt and siltstone pebbles.** Basalt: grey-black (N2) baslatic pebbles displaying white feldspar and pyrite crystals. Single cylindrical drill fragment with mineralised (qtz) fracture surface. Siltstone: single grey-black (N2) subangular large pebble.

Station No: JR29 - 012 Lat/Long (dm): 62 04.23 S 057 36.94 W

Core No: RDC - 128 Locality: Sherratt Bay WD: 104 m

Date/Time (GMT): 18-02-98 10:24 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf / g p c b) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05		**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated basaltic pebbles** Basalt: greyish black (N2) small to large pebbles. Feldspars up to 0.8mm.

Station No: JR29 - 011 Lat/Long (dm): 62 04.23 S 057 36.42 W

Core No: VC - 129 Locality: Sherratt Bay WD: 105 m

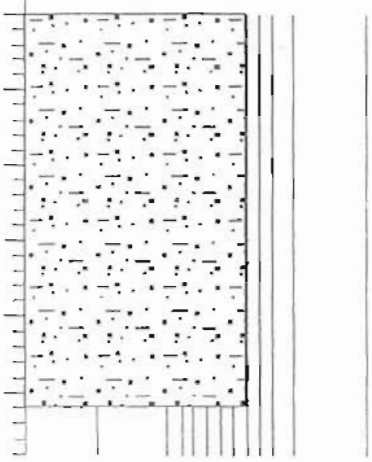
Date/Time (GMT): 18-02-98 12:00 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf / g p c b) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15 0.20		**Unit 1 (depth n/a)** **MUDDY PEBBLES** **Unconsolidated basalt and quartzite pebbles in muddy matrix.** Sample split into three size fractions: Coarse fraction: greyish black (N2) subangular medium to large baslatic pebbles showing small white feldspar phenocrysts. Fine fraction: small basaltic pebbles as above. Bluish grey (5B 5/1) angular to subangular small quartzite (?) pebbles. Mixed fraction: subangular to angular small to medium basaltic pebbles in a dark grey (N3) muddy matrix.

Station No: JR29 - 011 Lat/Long (dm): 62 04.23 S 057 36.42 W

Core No: VC - 130 Locality: Sherratt Bay WD: 105 m

Date/Time (GMT): 18-02-98 13:07 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f v) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25		**Unit 1 0.00 - 0.26m** **DIAMICT** **Unconsolidated very large pebble basaltic diamict** Monomict, greyish black (N2) subrounded to subangular basalt. Upto very large pebble size Clay matrix. Poorly sorted. 0.00 m single angular small calcite pebble.

Station No: JR29 - 013 Lat/Long (dm): 62 04.28 S 057 37.49 W

Core No: RDC - 131 Locality: Sherratt Bay WD: 124 m

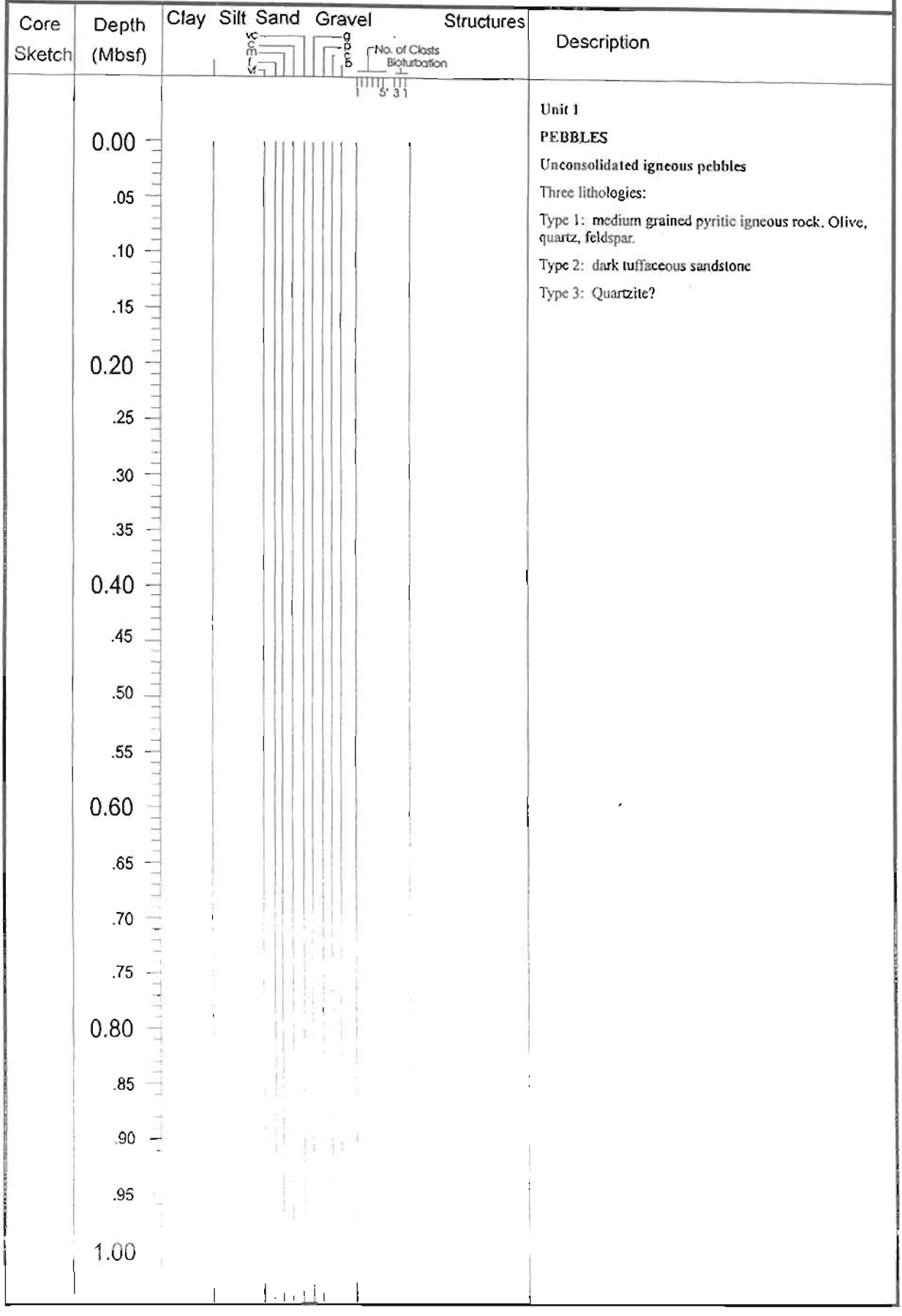
Date/Time (GMT): 18-02-98 14:23 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f v) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 25 .30 .35 0.40 .45 .50		**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated basalt and sandstone (?) pebbles** Basalt: greyish black (N2) subrounded to subangular medium to large pebbles. Feldspar phenocrysts up to 1mm. Sandstone (?): dark grey (N3) subrounded to subangular small to large pebbles.

Station No: JR29 - 014 Lat/Long (dm): 62 04.39 S 057 38.61 W

Core No: RDC - 132 Locality: Sherratt Bay WD: 131 m

Date/Time (GMT): 18-02-98 15:55 Comments: "JCR Ridge"



Description

Unit 1

PEBBLES

Unconsolidated igneous pebbles

Three lithologies:

Type 1: medium grained pyritic igneous rock. Olive, quartz, feldspar.

Type 2: dark tuffaceous sandstone

Type 3: Quartzite?

Station No: JR29 - 014 Lat/Long (dm): 62 04.39 S 057 38.61 W

Core No: RDC - 133 Locality: Sherratt Bay WD: 128 m

Date/Time (GMT): 18-02-98 16:50 Comments: "JCR Ridge"

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10	vc c m f vf g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated tuffaceous mudstone and sandstone pebbles** Mudstone: well rounded to subrounded tuffaceous (?) silty mudstone. Sandstone: angular dark grey tuffaceous sandstone.

Station No: JR29 - 015 Lat/Long (dm): 62 04.42 S 057 38.82 W

Core No: RDC - 134 Locality: Sherratt Bay WD: 110 m

Date/Time (GMT): 18-02-98 18:10 Comments: "JCR Ridge"

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10	vc c m f vf g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated tuffaceous sandstone** Angular welded fine grained tuff. Fractures surfaces calcite coated.

Station No: JR29 - 015 Lat/Long (dm): 62 04.42 S 057 38.82 W

Core No: RDC - 135 Locality: Sherratt Bay WD: 110 m

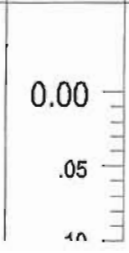
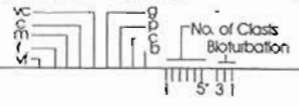
Date/Time (GMT): 18-02-98 19:30 Comments: "JCR Ridge"

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10 .15	vc c m f vf g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit 1 (0.00 - 0.14m)** **IGNIMBRITE(?)** **Welded tuff with well rounded to subrounded polymodal volcanic clasts and calcite veins.**

Station No: JR29 - 016 Lat/Long (dm): 62 03.60 S 057 40.23 W

Core No: RDC - 136 Locality: Sherratt Bay WD: 082 m

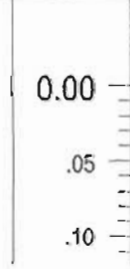
Date/Time (GMT): 18-02-98 21:30 Comments: Northern end "JCR Ridge"

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
			**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated tuffaceous sandstone and igneous pebbles.** Five tuffaceous sandstone pebbles; one intermediate igneous/granitoid pebble; one angular quartz-rich igneous pebble.

Station No: JR29 - 016 Lat/Long (dm): 62 03.60 S 057 40.23 W

Core No: RDC - 137 Locality: Sherratt Bay WD: 082 m

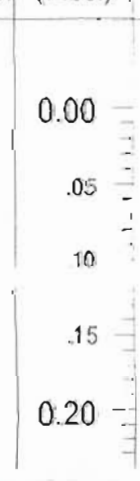
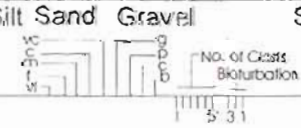
Date/Time (GMT): 18-02-98 22:03 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
			**Unit 1 0.00 - 0.06 m** **UN I/D IGNEOUS** **Short core and pebbles of unidentified igneous lithologies** Melanocratic basic (?) igneous intrusive core. Single leucocratic pebble.

Station No: JR29 - 017 Lat/Long (dm): 62 03.59 S 057 40.47 W

Core No: RDC - 138 Locality: Sherratt Bay WD: 106 m

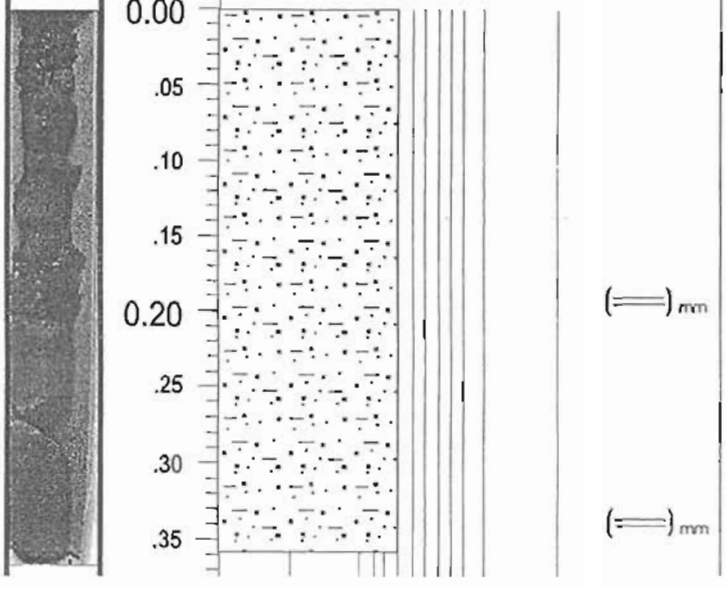
Date/Time (GMT): 18-02-98 23:20 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
			**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated tuffaceous sediments (?)** Greater than thirty pebbles of a fine grained welded (?) tuff, plus a single pebble of coarser tuffaceous sandstone. Cold water coral encrusting pebble indicates material is from sea floor.

Station No: JR29 - 017 Lat/Long (dm): 62 03.59 S 057 40.47 W

Core No: RDC - 139 Locality: Sherratt Bay WD: 105 m

Date/Time (GMT): 19-02-98 00:00 Comments:



Unit 1 0.00 - 0.36 m

TUFFACEOUS MUDSTONE

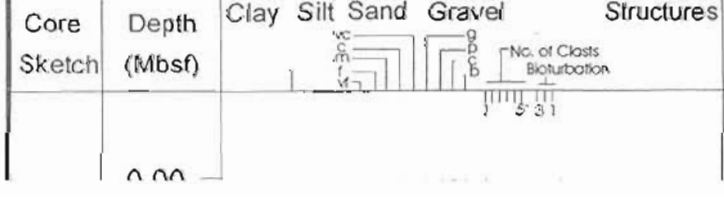
Fine grained tuffaceous mudstone, displaying clasts or phenocrysts of a white mineral [cf descriptions of Sherratt Bay Fm. basalt at earlier stations - ed.]

Laminated at 0.20 m and 0.34 m.

Station No: JR29 - 018 Lat/Long (dm): 62 03.77 S 057 41.72 W

Core No: RDC - 140 Locality: Sherratt Bay WD: 157 m

Date/Time (GMT): 19-02-98 02:00 Comments:

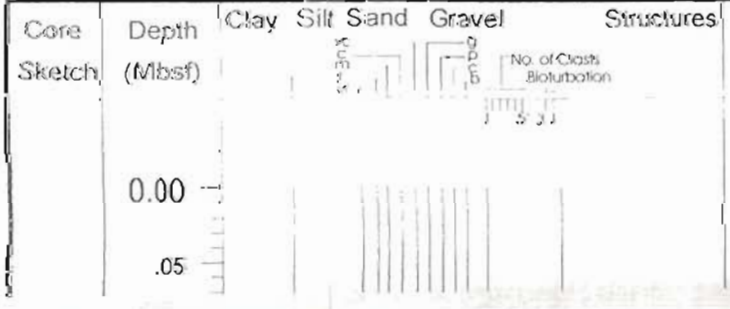


No recovery; drill penetrated 2.6 m bsf.

Station No: JR29 - 019 Lat/Long (dm): 62 03.76 S 057 42.15 W

Core No: RDC - 141 Locality: Sherratt Bay WD: 155 m

Date/Time (GMT): 19-02-98 03.22 Comments:



Unit 1 (depth n/a)

PEBBLES

Unconsolidated tuffaceous sandstone pebbles

Black (N1), subangular, small to large pebbles of tuffaceous sandstone. Sample split into two size

Station No: JR29 - 020 Lat/Long (dm): 62 03.48 S 057 43.26 W

Core No: RDC - 142 Locality: Sherratt Bay WD: 085 m

Date/Time (GMT): 19-02-98 04:46 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f v g p c b; No. of Clasts Bioturbation 1 5 3 1)	Description
	0.00 .05 .10		**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated tuffaceous sandstone pebbles** Very large greyish black (N2) tuffaceous sandstone pebbles. Greenish grey (5GY 5/1) phenocrysts (?) up to 8mm common.

Station No: JR29 - 020 Lat/Long (dm): 62 03.48 S 057 43.26 W

Core No: RDC - 143 Locality: Sherratt Bay WD: 084 m

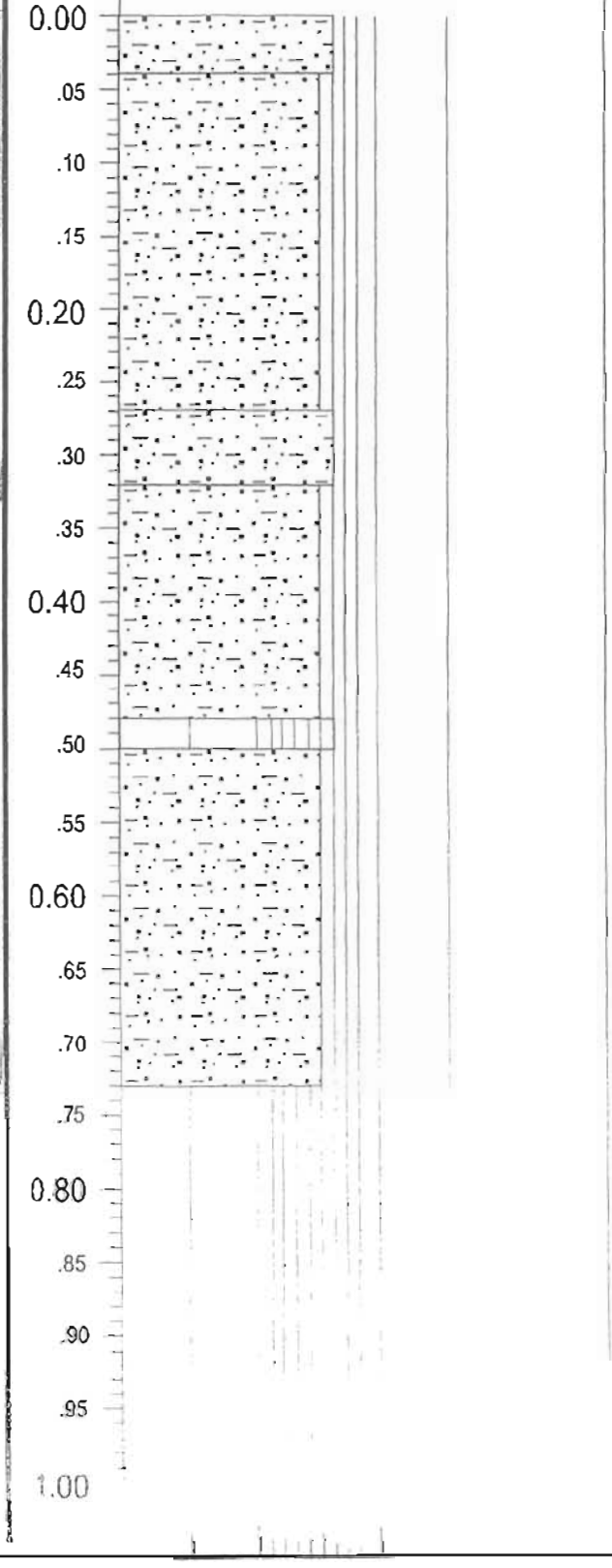
Date/Time (GMT): 19-02-98 05:48 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f v g p c b; No. of Clasts Bioturbation 1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55 0.60 .65		**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated unidentified volcanic rock** Greyish black (N2) volcanic rock with abundant greenish grey (5GY 6/1) phenocrysts (?) up to 2 mm in diameter. Single 5 cm long partially cored fragment. Six additional black (N1) fragments, most less crystalline than above. c.f. RDC-142.

Station No: JR29 - 021 Lat/Long (dm): 62 03.62 S 057 44.39 W

Core No: RDC - 144 Locality: Sherratt Bay WD: 070 m

Date/Time (GMT): 19-02-98 06:59 Comments:



Core Sketch | Depth (Mbsf) | Description

Unit 1 0.00 - 0.73 m

DIAMICT

Partially consolidated gravel and pebble diamict containing both volcanic and sedimentary clasts.

0.00 - 0.04 m: dark grey (N3) subrounded to subangular volcanic pebble layer.

0.04 - 0.27 m: medium dark grey (N4) gravelly mud, partially consolidated. Gravel fraction consists mostly of subrounded to subangular volcanic and occasional sedimentary lithologies.

0.27 - 0.32 m: pebbles a.a.

0.32 - 0.48 m: gravelly mud a.a.

0.48 -0.50 m: pebbles a.a.

0.50 - 0.73 m: gravelly mud a.a.

Station No: JR29 - 021 Lat/Long (dm): 62 03.62 S 057 44.39 W

Core No: VC - 145 Locality: Sherratt Bay WD: 070 m

Date/Time (GMT): 19-02-98 08:40 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .25 .50 .75 1.00 25	vc cs ms fs vfs m g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit I 0.00 - 1.30 m** **SAND AND MUDDY SAND** **Unconsolidated dark and olive grey sand and muddy sand.** 0.00 m: Olive grey (5Y 4/1) very fine muddy sand. Sand consists of quartz, grey feldspars, black subrounded to subangular volcanic fragments, red angular jasper (?) fragments (up to 1.5 mm) and occasional sponge spicules. 1.30 m: Dark grey (N3) fine to medium sand, containing subrounded to subangular quartz, feldspar and volcanic fragments. Sampling: core tube of 1.2 m length, with core catcher/cutter material stored in separate 0.30 m long tube.

Station No: JR29 - 022 Lat/Long (dm): 62 03.65 S 057 44.82 W

Core No: RDC - 146 Locality: Sherratt Bay WD: 064 m

Date/Time (GMT): 19-02-98 11:59 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05	vc cs ms fs vfs m g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit I (depth n/a)** **PEBBLES** **Unconsolidated volcanic pebbels (possibly up to cobble size)** Dark grey (N2) volcanic pebbles or possibly tuffaceous sandstone.

Station No: JR29 - 023 Lat/Long (dm): 62 03.65 S 057 45.21 W

Core No: RDC - 147 Locality: Sherratt Bay WD: 062 m

Date/Time (GMT): 19-02-98 14:19 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10	vc cs ms fs vfs m g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit I (depth n/a)** **PEBBLES** **Unconsolidated basalt pebbels and drilled fragments** Dark grey (N3) basalt pebbles, with feldspar phenocrysts up to 6 mm.

Station No: JR29 - 024 Lat/Long (dm): 62 03.62 S 057 45.39 W

Core No: RDC - 148 Locality: Sherratt Bay WD: 062 m

Date/Time (GMT): 19-02-98 15:30 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10	vc c m f v g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated tuffaceous mudstone pebbles** Large pebble of pyritic tuffaceous mudstone.

Station No: JR29 - 024 Lat/Long (dm): 62 03.62 S 057 45.39 W

Core No: RDC - 149 Locality: Sherratt Bay WD: 063 m

Date/Time (GMT): 19-02-98 16:30 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55 0.60 .65	vc c m f v g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit 1 0.00 - 0.07 m** **TUFFACEOUS MUDSTONE** **Tuffaceous mudstone core and pebbles.** Homogenous tuffaceous mudstone; jasper (?) common. Weathering rind observed.

Station No: JR29 - 025 Lat/Long (dm): 62 03.57 S 057 45.78 W

Core No: RDC - 150 Locality: Sherratt Bay WD: 060 m

Date/Time (GMT): 19-02-98 17:40 Comments:

Core Sketch

Depth (Mbsf)

Clay Silt Sand Gravel Structures

vc c m f v

g p c b

No. of Clasts Bioturbation

1 2 3 1

+approx. 0.70 m pebbles

0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55 0.60 .65 .70 .75 0.80 .85 .90 .95 1.00

(═══) mm

Description

Unit 1 0.00 - 0.70 m

PEBBLES

Unconsolidated pebbles

Unit 1a 0.70 - 0.93 m

TUFFACEOUS SANDSTONE

Short core of homogenous green/grey tuffaceous sandstone.

Unit 1b 0.93 - 1.39 m

TUFFACEOUS MUDSTONE

Possibly Cape Melville Fm.

1.20 m: Faint laminae

Station No: JR29 - 026 Lat/Long (dm): 62 03.56 S 057 46.40 W

Core No: RDC - 151 Locality: Sherratt Bay WD: 052 m

Date/Time (GMT): 19-02-98 19:30 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10 .15 0.20	vc c m f vf g p b No. of Clasts Bioturbation 1 5 3 1	**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated pebbles of three distinct lithologies** Type 1: dark homogenous sandstone Type 2: light grey coarse to medium sandstone Type 3: green - grey micaceous quartzite/sandstone "Clasts" of olive grey muddy sand from modern seafloor.

Station No: JR29 - 026 Lat/Long (dm): 62 03.56 S 057 46.40 W

Core No: RDC - 152 Locality: Sherratt Bay WD: 053 m

Date/Time (GMT): 19-02-98 20:10 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55	vc c m f vf g p b No. of Clasts Bioturbation 1 5 3 1	**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated tuffaceous pebbles** Welded tuffaceous sandstone with scoraceous appearance. Phenocrysts visible?

Station No: JR29 - 027 Lat/Long (dm): 62 09.45 S 057 58.52 W

Core No: VC - 153 Locality: King George Bay WD: 425 m

Date/Time (GMT): 20-02-98 03:58 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .25 .50 .75 1.00 .25 .50	vc c m f v g p c b No. of Clasts Bioturbation 1 5 3 1	Unit 1 0.00 - 4.80 m MUDDY SAND AND SANDY MUD Unconsolidated olive grey muddy sand and sandy mud, volcanic rock fragments and sponge spicules common. 0.00 m: olive grey (5Y 4/1) sandy mud with black volcanic, red (jasper?), and white (quartz/feldspar) grains. 0.67 m: olive grey (5Y 4/1) muddy sand. a.a. with occasional sponge spicules. 1.67 m: olive grey (5Y 4/1) muddy sand. a.a. with increase in volcanic particles. 2.67 m: olive grey (5Y 4/1) muddy sand a.a. 3.67 m: olive grey (5Y 4/1) muddy sand, a.a. with increase in spong spicules. 4.67 m: olive grey (5Y 4/1) muddy sand a.a.

Station No: JR29 - 028 Lat/Long (dm): 62 09.01 S 057 59.46 W

Core No: VC - 154 Locality: King George Bay WD: 494 m

Date/Time (GMT): 20-02-98 05:38 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .25 .50 .75 1.00 .25 .50 .75 2.00 .25	vc c m f v g p c b No. of Clasts Bioturbation 1 5 3 1	Unit 1: 0.00 - 5.18 m SANDY MUD, MUDDY SAND AND SAND Unconsolidated brownish black and brownish grey volcanic rich sandy mud, muddy sand and sand. 0.00 m: Brownish black (5YR 2/1) sandy mud, with 30% fine to very fine grained black (N2) subround to subangular poorly sorted volcanic sand. 1.11 m: brownish grey (5YR 4/1) muddy sand, a.a. Occasional mica fragments.

Station No: JR29 - 067 Lat/Long (dm): 62 09.63 S 058 03.37 W

Core No: RDC - 208 Locality: King George Bay WD: 102 m

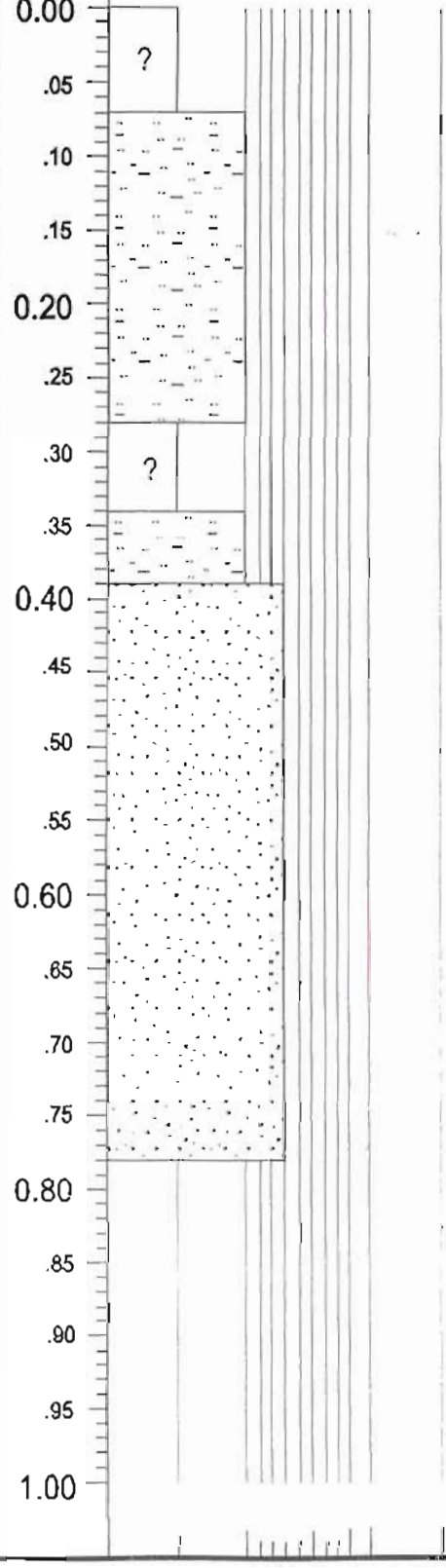
Date/Time (GMT): 28-02-98 13:49 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f vf; g p c b; No. of Clasts; Bioturbation; 1 S 3 1)	Description
	0.00		No recovery
	.05		
	.10		
	.15		
	0.20		
	.25		
	.30		
	.35		
	0.40		
	.45		
	.50		
	.55		
	0.60		
	.65		
	.70		
	.75		
	0.80		
	.85		
	.90		
	.95		
	1.00		

Station No: JR29 - 067 Lat/Long (dm): 62 09.63 S 058 03.37 W

Core No: RDC - 209 Locality: King George Bay WD: 102 m

Date/Time (GMT): 28-02-98 14:51 Comments:



Core Sketch | Depth (Mbsf) | Description

Unit 1 0.00 - 0.78 m

SILTS, PEBBLES AND TUFFACEOUS SANDSTONES

Uncosolidated clayey siltstone overlying tuffaceous sandstone pebbles, overlying tuffaceous sandstone core.

0.00 - 0.07 m: siliceous "hair" mat.

0.07 - 0.28 m: olive clayey silt, permeated by "hairs". Occasional sand size particles. Gastropods, bivalves and forams common.

0.28 - 0.34 m: siliceous "hair" mat.

0.34 - 0.39 m: olive clayey silt with shell material a.a.

0.39 - 0.78 m: fractured core and pebbles of consolidated well sorted medium grained tuffaceous sandstone.

Note: shell material from core top stored in petri dish.

Station No: JR29 - 068 Lat/Long (dm): 62 07.99 S 058 04.73 W

Core No: RDC - 210 Locality: King George Bay WD: 100 m

Date/Time (GMT): 28-02-98 16:30 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10	vc c m f vf g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated volcanic pebbles** Dark grey volcanic rock with blueish euhedral phenocrysts.

Station No: JR29 - 068 Lat/Long (dm): 62 07.99 S 058 04.73 W

Core No: RDC - 211 Locality: King George Bay WD: 100 m

Date/Time (GMT): 28-02-98 17:15 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55	vc c m f vf g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit 1 0.00 - 0.31 m** **VOLCANIC ROCK AND TUFFACEOUS SANDSTONE** **Consolidated core of igneous volcanic rock overlying tuffaceous sandstone** 0.00 - 0.16 m: Basic medium grained igneous intrusive displaying quartz phenocrysts and occasional black vitreous ferromanganese mineral. Possibly core through erratic. 0.16 - 0.31 m: tuffaceous sandstone (?) C.f. RDC-209.

Station No: JR29 - 069 Lat/Long (dm): 62 07.88 S 058 04.99 W

Core No: RDC - 212 Locality: King George Bay WD: 090 m

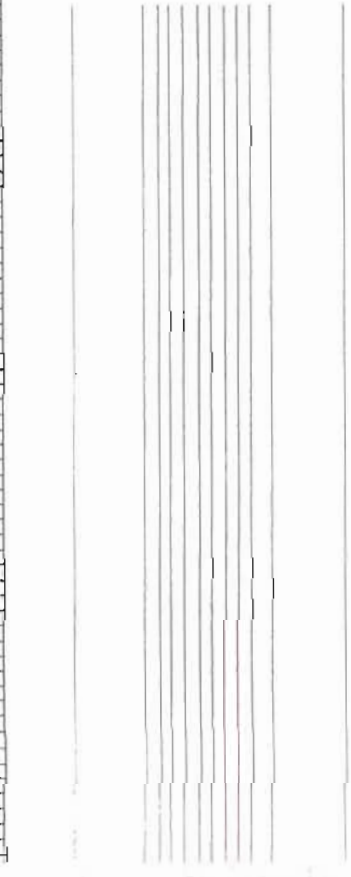
Date/Time (GMT): 28-02-98 19:00 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f vf; g p c b; No. of Clasts; Bioturbation 1 5 3 1)	Description
	0.00 .05 .10 .15		**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated gravel and pebbles** Pebbles are a mix of fine grained volcanics, granitic rocks and quartzites. Part of the muddy gravel matrix also recovered.

Station No: JR29 - 069 Lat/Long (dm): 62 07.88 S 058 04.99 W

Core No: RDC - 213 Locality: King George Bay WD: 090 m

Date/Time (GMT): 28-02-98 20:30 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f vf; g p c b; No. of Clasts; Bioturbation 1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55		**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated igneous pebbles** Undifferentiated igneous pebbles

Station No: JR29 - 070 Lat/Long (dm): 62 07.68 S 058 05.27 W

Core No: RDC - 214 Locality: King George Bay WD: 065 m

Date/Time (GMT): 28-02-98 23:00 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g cg mg)	Structures: No. of Clasts, Bioturbation (5 3 1)	Description
	0.00 – 1.00			**Unit 1 0.00 - 0.59 m** DIAMICTITE **Shelly consolidated diamict** Upper section contains gastropods, bivalves and bryozoa. Probably Low Head 4 Member.

Station No: JR29 - 070 Lat/Long (dm): 62 07.68 S 058 05.27 W

Core No: RDC - 215 Locality: King George Bay WD: 065 m

Date/Time (GMT): 28-02-98 23:50 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf / g p c b) No. of Clasts Bioturbation (1 5 3 1) Structures	Description
	0.00 .05 .10 .15 0.20	mm	**Unit 1 0.00 - 0.22 m** **PEBBLE and DIAMICT** **Quartzite pebble overlying diamict core** 0.00 - 0.11 m: pale green quartzite pebble. Pyritic shale clasts (TPG?) within pebble display faint laminae. 0.11 - 0.22 m: short fractured diamict core (Krakowiak or Low Head Members).

Station No: JR29 - 040 Lat/Long (dm): 62 07.68 S 058 05.18 W

Core No: RDC - 216 Locality: King George Bay WD: 085 m

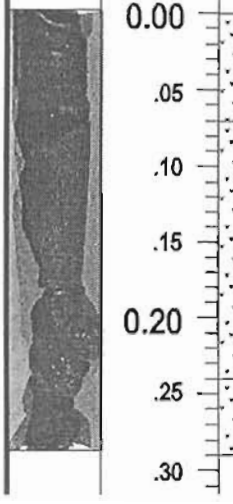
Date/Time (GMT): 01-03-98 01:00 Comments:

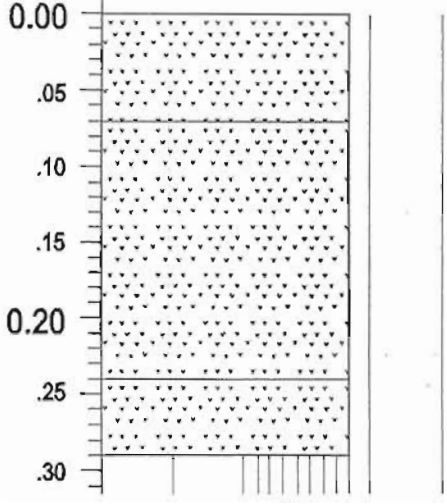
Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf / g p c b) No. of Clasts Bioturbation (1 5 3 1) Structures	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45		**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated volcanic, tuffaceous sandstone and granitic pebbles** Basic volcanic and tuffaceous sandstone pebbles. Short core through granitic boulder.

Station No: JR29 - 040 Lat/Long (dm): 62 07.68 S 058 05.18 W

Core No: RDC - 217 Locality: King George Bay WD: 085 m

Date/Time (GMT): 01-03-98 02:00 Comments:





Unit 1 0.00 - 0.29 m

VOLCANIC ROCK AND PEBBLES

Consolidated volcanic rock and pebbles

0.00 - 0.07 m: greyish black (N2) crystalline volcanic rock

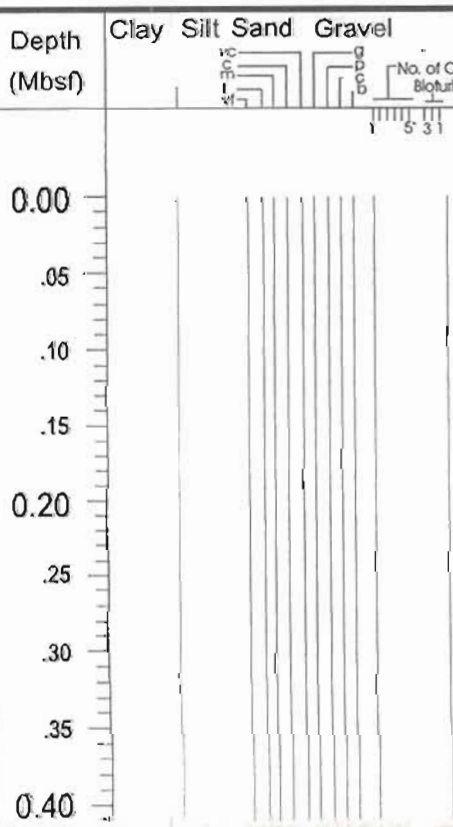
0.07 - 0.24 m: dark grey (N3) crystalline volcanic rock. Red areas distributed as grains and along planes may be rock fragments.

0.24 - 0.29 m: greyish black (N2) crystalline volcanic pebbles.

Station No: JR29 - 040 Lat/Long (dm): 62 07.69 S 058 05.18 W

Core No: RDC - 218 Locality: King George Bay WD: 070 m

Date/Time (GMT): 01-03-98 04:00 Comments:



Unit 1 (depth n/a)

PEBBLES

Unconsolidated angular to subrounded pebbles of five distinct populations

50% greyish black (N2) small pebbles of tuffaceous sandstone

25% greyish black (N2) "fine" tuffaceous sandstone

10% greenish grey (5GY 6/1) tuffaceous sandstone with black granules

10% greyish black (N2) un i/d volcanic rock

5% medium dark gry (N4) plagioclase and mafic rich un i/d igneous rock

Station No: JR29 - 040 Lat/Long (dm): 62 07.69 S 058 05.18 W

Core No: RDC - 219 Locality: King George Bay WD: 067 m

Date/Time (GMT): 01-03-98 04:37 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g p c b) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15		**Unit 1 (depth n/a)** **PEBBLES AND GRANULES** **Unconsolidated greyish black pebbles of tuffaceous sandstone and agglomerate.** 70% greyish black (N2) well rounded tuffaceous sandstone pebbles. 15% greyish black (N2) agglomerate granules. 15% greyish black (N2) un i/d igneous rock with white crystals up to 2 mm.

Station No: JR29 - 071 Lat/Long (dm): 62 08.59 S 058 03.89 W

Core No: RDC - 220 Locality: King George Bay WD: 082 m

Date/Time (GMT): 01-03-98 06:03 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g p c b) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50		No recovery. Well, only water anyway...

Station No: JR29 - 071 Lat/Long (dm): 62 08.59 S 058 03.89 W

Core No: RDC - 221 Locality: King George Bay WD: 082 m

Date/Time (GMT): 01-03-98 06:34 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10 .15 0.20 .25	vc c m f vf g p c b; No. of Clasts; Bioturbation 1 5 3 1	Unit 1 0.00 - 0.46 m PEBBLES AND AGGLOMERATE Unconsolidated granules, pebbles and core of agglomerate. 0.00 - 0.14 m: unconsolidated dark grey (N3) granule agglomerate. 0.14 - 0.18 m: unconsolidated dark grey (N3) medium pebble agglomerate. 0.18 - 0.46 m: consolidated dark grey (N3) agglomerate core, showing common amydales of white feldspar up to cm size. Basal part of core approximates to a tuffaceous sandstone.

Station No: JR29 - 072 Lat/Long (dm): 62 09.08 S 058 03.37 W

Core No: RDC - 222 Locality: King George Bay WD: 134 m

Date/Time (GMT): 01-03-98 08:47 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45	vc c m f vf g p c b; No. of Clasts; Bioturbation 1 5 3 1	Unit 1 (depth n/a) PEBBLES Unconsolidated pebbles Three greyish black (N2) tuffaceous sandstone pebbles.

Station No: JR29 - 073 Lat/Long (dm): 62 09.28 S 058 03.44 W

Core No: RDC - 223 Locality: King George Bay WD: 111 m

Date/Time (GMT): 01-03-98 10:15 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g p c b) No. of Clasts Bioturbation (1 5 3 1) Structures	Description
	0.00 .05 .10 .15 0.20		**Unit 1 0.00 - 0.43 m** **PEBBLES AND TUFFACEOUS SANDSTONE** **Unconsolidated subrounded to subangular pebbles of tuffaceous sandstone, overlying a short core of tuffaceous sandstone.** 0.00 - 0.30 m: unconsolidated subrounded to subangular pebbles and granules of tuffaceous sandstone; probably altered by drilling. 0.30 - 0.43 m: consolidated greyish black (N2) tuffaceous sandstone.

Station No: JR29 - 066 Lat/Long (dm): 62 10.05 S 058 03.18 W

Core No: VC - 224 Locality: King George Bay WD: 120 m

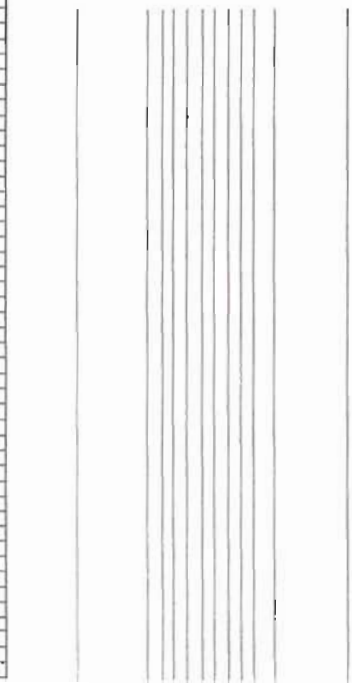
Date/Time (GMT): 01-03-98 11:55 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g p c b) No. of Clasts Bioturbation (1 5 3 1) Structures	Description
A	0.00 .25 .50 .75		**Unit 1 0.00 - 1.92 m** **SANDY MUD** **Unconsolidated sandy mud composed of volcanic fragments, quartz, sponge spicules and rare benthic foraminifera.** 0.00 m: olive grey (5Y 4/1) subangular to subrounded, poorly sorted sandy clayey silt. Very fine to fine grained sand (10 - 20%) composed of black (N1) and red coloured volcanic fragments, occasional sponge spicules and rare benthic foraminifera. 0.75 m: dark yellow brown (10YR 4/2) sandy mud. Approximately 20 - 30% fine to medium grained sand composed of subrounded to subangular quartz and volcanics. Rare small volcanic pebbles. Occasional sponge spicules, rare benthic formainifera and rare bivalve and gastropod fragments. 1.92 m: olive grey (5Y 3/2) sandy mud, composition as 0.00 m. Shell fragmets common, but no benthic foraminifera observed.
B	1.00 .25 .50 .75		
CC	2.00 .25 .50		

Station No: JR29 - 067 Lat/Long (dm): 62 09.63 S 058 03.37 W

Core No: VC - 225 Locality: King George Bay WD: 101 m

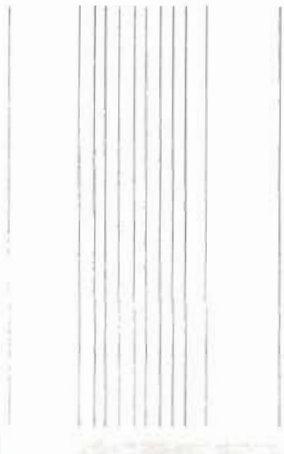
Date/Time (GMT): 01-03-98 12:55 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf / g p s) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
A	0.00 – .25 – .50 – .75		**Unit 1 0.00 - 2.13 m** **SANDY MUD AND MUDDY GRANULES/PEBBLES** **Unconsolidated olive grey sandy clayey silt, composed largely of volcanic fragments and quartz, with occasional sponge spicules and benthic foraminifera.** 0.00 m: Olive grey (5Y 4/1) poorly sorted sandy mud. 10% to 20% cry fine to fine grained sand composed of black (N1) subangular to subrounded volcanic fragments, red fragments (a.a.) and quartz. Occasional grains up to coarse sand size, occasional sponge spicules and rare benthic foraminifera. + 2 mm size fraction contains significant quantities of un i/d organic matter. 1.00 m: olive grey (5Y 4/1) poorly sotted sandy mud. Composition a.a. + 2 mm size fraction contains more lithics than 0.00 m. 2.13 m: olive grey (5Y 3/2) muddy sand made up of rounded granules to small pebbles of volcanics and quartz.
B	1.00 – .25 – .50 – .75		
CC	2.00		

Station No: JR29 - 074 Lat/Long (dm): 62 06.16 S 058 07.41 W

Core No: RDC - 226 Locality: Polonez Cove WD: 128 m

Date/Time (GMT): 01-03-98 14:00 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf / g p s) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 – .05 – .10 – .15 – 0.20 – .25		**Unit 1 0.00 - 0.91 m** **MUD AND PEBBLES** **Unconsolidated coarsening upward diamict overlying pebbels of mixed lithologies.** 0.00 - 0.66 m: unconsolidated mud conatining occasional pebbles and coarsening sharlpy towards top. Occasional siliceous "hairs" at 0.00 m. 0.66 - 0.91 m: unconsolidated granitic, metamorphic,

Station No: JR29 - 075 Lat/Long (dm): 62 06.79 S 058 07.16 W

Core No: RDC - 227 Locality: Polonez Cove WD: 201 m

Date/Time (GMT): 01-03-98 16:30 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00	vc c m f vf g p c b No. of Clasts Bioturbation 1 5 3 1	No recovery

Station No: JR29 - 076 Lat/Long (dm): 62 07.01 S 058 07.42 W

Core No: RDC - 228 Locality: Polonez Cove WD: 191 m

Date/Time (GMT): 01-03-98 16:00 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
		vc c m f vf g p c b No. of Clasts Bioturbation 1 5 3 1	No recovery; redesignated vibrocore site.

Station No: JR29 - 076 Lat/Long (dm): 62 07.01 S 058 07.42 W

Core No: VC - 229 Locality: Polonez Cove WD: 191 m

Date/Time (GMT): 01-03-98 18:50 Comments:

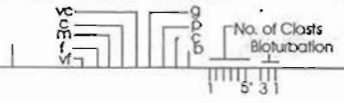
Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .25 .50 .75 1.00 .25 .50	vc c m f vf g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit 1 0.00 - 4.25 m** **SANDY SILT AND SILTY SAND** **Unconsolidated olive grey poorly sorted sandy silt and silty sand with common lithic fragments and cemented worm tubes.** 0.00 m: olive grey (5Y 3/2) very poorly sorted sandy silt with abundant cemented worm tubes. 0.99 m: olive grey (5Y 3/2) sandy silt, slightly darker than above as a result of an increase in black (N1) lithic fragments. 2.05 m: greenish olive (10Y 4/2) sandy silt, with higher sand content than above. 3.08 m: olive grey (5Y 3/2) sandy silt. 4.23 m: olive grey (5Y 3/2) silty sand.

Station No: JR29 - 052 Lat/Long (dm): 62 12.70 S 058 21.00 W

Core No: VC - 187 Locality: Admiralty Bay WD: 320 m

Date/Time (GMT): 23-02-98 03:29 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures
	0.00	
A	.25	
	.50	
	.75	
	1.00	
B	.25	
	.50	
	.75	
	2.00	
C	.25	
	.50	
	.75	
	3.00	
D	.25	
	.50	
	.75	
	4.00	
E	.25	
	.50	
	.75	
CC	5.00	



Unit I 0.00 - 5.28 m

SANDY MUD, SILTY SAND AND PEBBLES

Unconsolidated sandy mud and silty sand.

0.00 m: olive grey (5Y 4/1) poorly sorted sandy mud consisting of quartz and black and red lithics.

1.08 m: olive grey (5Y 4/1) silty sand; composiiton a.a., with occasional sponge spicules.

2.08 m: mixed olive grey (5Y 4/1) and dark greenish grey (5GY 4/1) silty sand composition a.a., But with single small volcanic pebble.

3.08 m: a.a., no pebble.

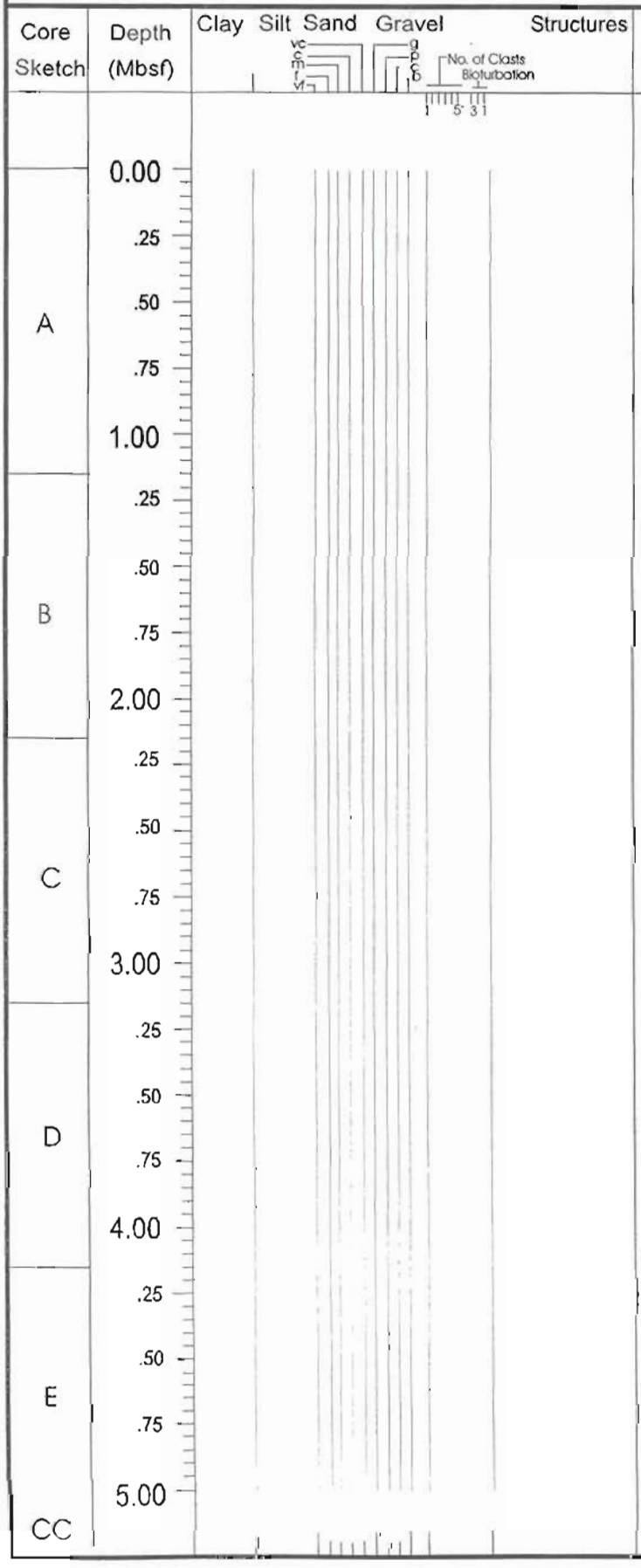
4.08 m: a.a.

5.28 m: (CC). Olive grey (5Y 4/1) silty sand consisting of medium to poorly sorted quartz and black and red volcanic fragments.

Station No: JR29 - 053 Lat/Long (dm): 62 13.37 S 058 20.21 W

Core No: VC - 188 Locality: Admiralty Bay WD: 510 m

Date/Time (GMT): 23-02-98 05:17 Comments:



Unit 1 0.00 - 5.31 m

SILTY MUD AND SANDY MUD

Unconsolidated silty mud and sandy mud

0.00 m: olive grey (5Y 4/1) silty mud with abundant subrounded quartz and black and red rock fragments.

1.15 m: olive grey (5Y 3/1) sandy mud, composition a.a., with significant sponge spicules.

2.15 m: a.a.

3.15 m: a.a

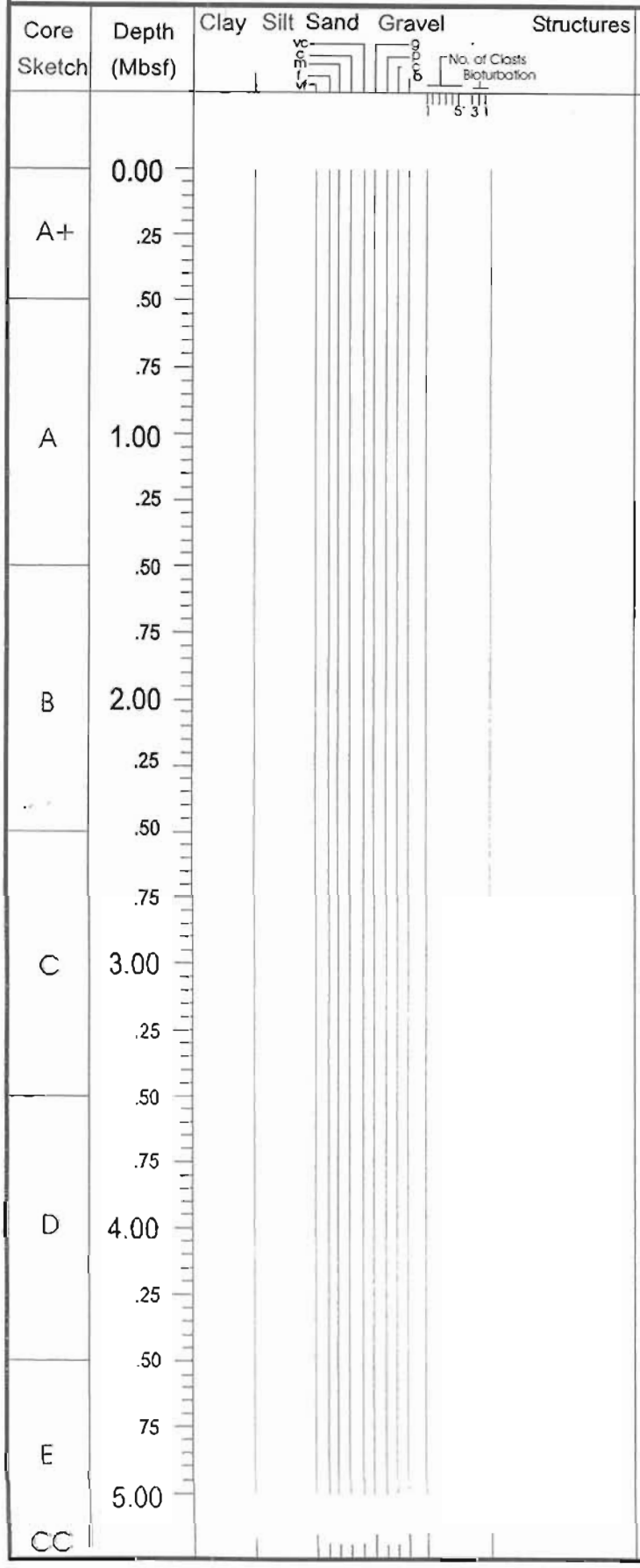
4.15 m: a.a.

5.31 m: dark olive grey (5Y 3/1), composition a.a.

Station No: JR29 - 054 Lat/Long (dm): 62 15.76 S 058 17.67 W

Core No: VC - 189 Locality: Admiralty Bay WD: 720 m

Date/Time (GMT): 23-02-98 07:20 Comments:



Unit 1 0.00 - 5.63 m

SANDY SILT AND SILTY SAND

Unconsolidated sandy silt and silty sand with rare diatoms

0.00 m: olive grey (5Y 6/1) sandy clayey silt. Approx. 20 - 30% sand consisting of: 35% black (N1) very fine to fine grained volcanics, angular to subangular, low sphericity, poorly sorted; 60% very fine to fine grained quartz, angular to subrounded, moderately sorted. Other: light brown (5YR 5/6) glassy mineral (altered volcanic or possibly garnet) in very fine sand fraction; sponge spicules common; rare diatoms.

1.50 m: light olive grey (5Y 6/1) clayey sandy silt. Approx. 40% sand consisting of: 65% quartz a.a.; 30% black very fine to fine grained volcanic fragments, angular to subangular low sphericity and moderately sorted; Other: light brown mineral a.a.; Sponge spicules common; rare diatoms.

2.50 m: light olive grey (5Y 6/1) sandy clayey silt. Approx. 25% sand with composition a.a. Sponge spicules rare; diatoms rare to few.

3.50 m: composition a.a., Sand fraction slightly coarser with occasional brown/black mica fragments. No diatoms observed.

4.50 m: light olive grey (5Y 6/1) silty sand. Approx. 90% very fine to fine grained quartz, subangular to subround, up to high sphericity; 10% volcanic fragments; sponge spicules common; no diatoms observed.

5.63 m: (CC). Sandy silt as 3.50 m, but mica more common. Rare sponge spicules; diatoms rare to few.

Station No: JR29 - 055 Lat/Long (dm): 62 57.49 S 058 02.79 W

Core No: VC - 190 Locality: Bransfield margin WD: 647 m

Date/Time (GMT): 28-02-98 17:00 Comments:

3

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g p c b) No. of Clasts Bioturbation (1 S 3 I) Structures	Description
	0.00		Unit I 0.00 - 2.38 m
A	.25		Poor recovery - site attempted again. CC in bag with subsamples.
	.50		
	.75		
B	1.00		
	.25		
	.50		
	.75		
C	2.00		
	.25		
	.50		
	.75		
	3.00		
	.25		
	.50		
	.75		
	4.00		
	.25		
	.50		
	.75		
	5.00		

Station No: JR29 - 055 Lat/Long (dm): 62 57.49 S 058 02.79 W

Core No: VC - 191 Locality: Bransfield margin WD: 640 m

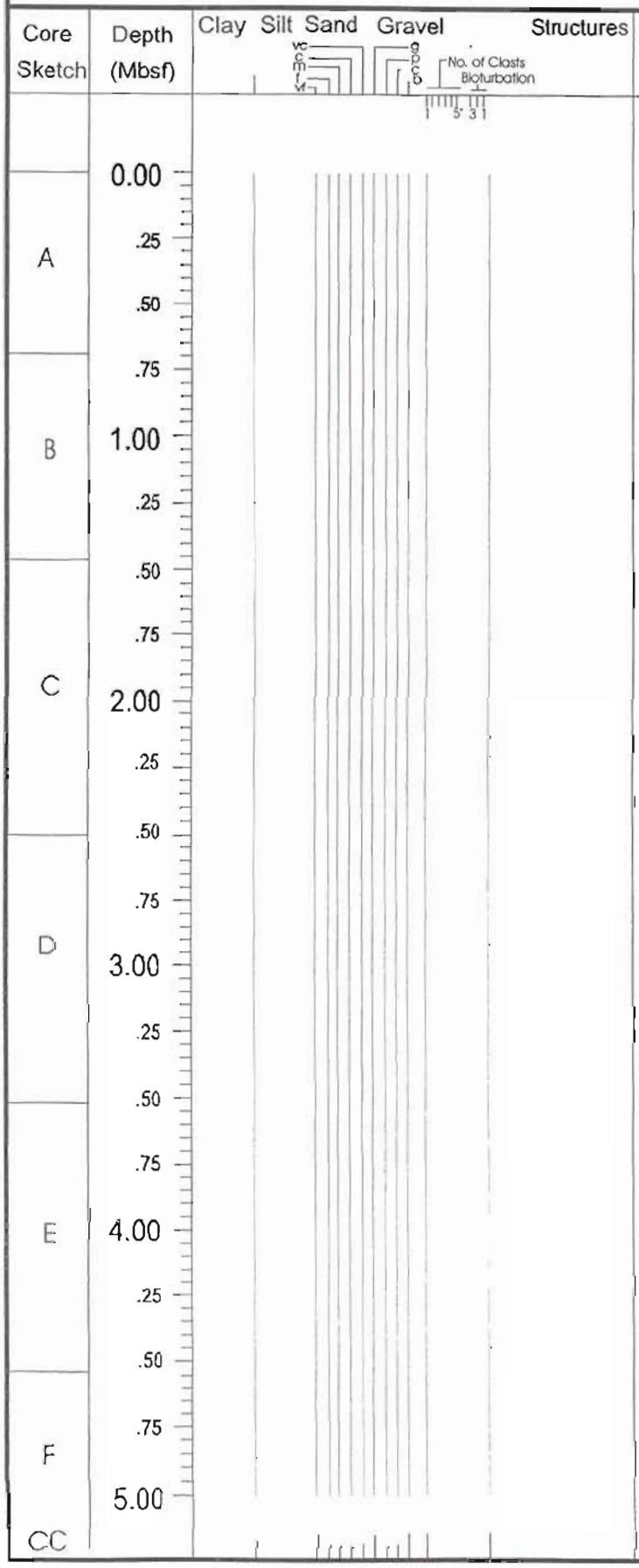
Date/Time (GMT): 23-02-98 18:00 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00	vc c m f vf g p c b; No. of Clasts; Bioturbation; 1 5 3 1	**Unit I 0.00 - 2.10 m**
A	.25 .50 .75		**SANDY SILT**
	1.00		**Unconsolidated sandy silt**
B	.25 .50 .75		0.00 m: greyish olive (10Y 4/2) poorly sorted clayey sandy silt consisting of quartz and subangular lithics. Sponge spicules common.
CC	2.00		0.91 m: olive grey (5Y 3/2) poorly sorted sandy silt consisting of subangular quartz and lithics.
	.25 .50 .75		2.10 m: (CC). Olive grey (5Y 3/2) sandy silt a.a.
	3.00		
	.25 .50 .75		
	4.00		
	.25 .50 .75		
	5.00		

Station No: JR29 - 056 Lat/Long (dm): 62 52.89 S 058 06.98 W

Core No: VC - 192 Locality: Bransfield margin WD: 674 m

Date/Time (GMT): 23-02-98 20:05 Comments:



Description

Unit 1 0.00 - 5.55 m

SANDY SILT AND SILTY SAND

Unconsolidated sandy silts and silty sand.

0.00 m: greyish olive (10Y 4/2) poorly sorted sandy silt. Subangular quartz and lithics.

0.69 m: olive grey (5Y 3/2) sandy silt. Subangular quartz and black and red lithics. Occasional sponge spicules.

1.47 m: olive grey (5Y 3/2) sandy silt. Subangular quartz, black lithics and opaque minerals. Abundant sponge spicules.

2.50 m: olive grey (5Y 3/2) sandy silt. Lower % of black lithics and quartz than above.

3.52 m: olive grey (5Y 3/2) sandy silt a.a. Sponge spicules common.

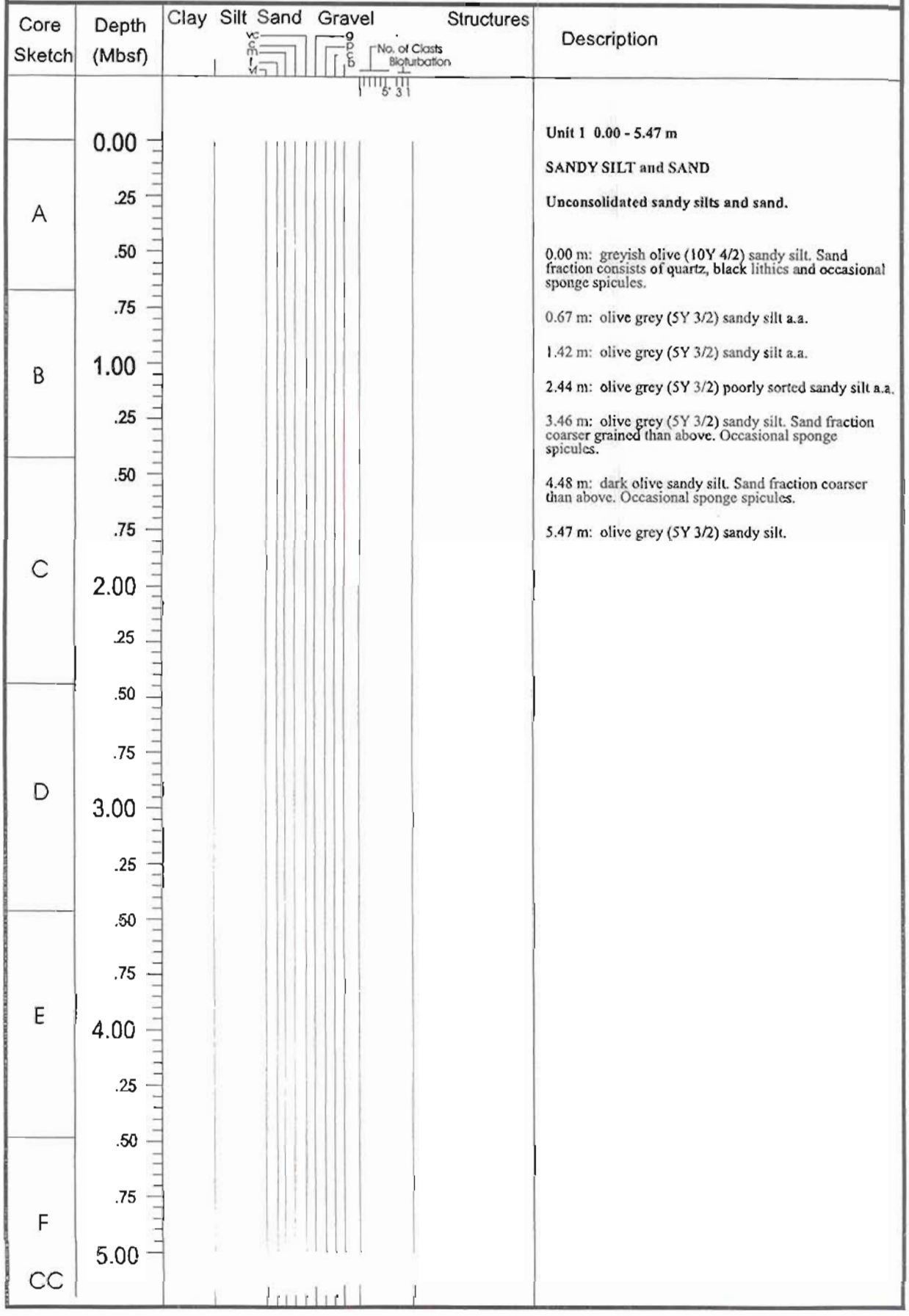
4.54 m: olive grey (5Y 3/2) silty sand. Abundant subangular quartz, black lithics and opaque minerals. Sponge spicules common.

5.55 m: (CC). Olive grey (5Y 3/2) sandy silt. Black lithics and sponge spicules common.

Station No: JR29 - 057 Lat/Long (dm): 62 51.42 S 058 08.21 W

Core No: VC - 193 Locality: Bransfield margin WD: 633 m

Date/Time (GMT): 23-02-98 22:10 Comments:



Unit 1 0.00 - 5.47 m

SANDY SILT and SAND

Unconsolidated sandy silts and sand.

0.00 m: greyish olive (10Y 4/2) sandy silt. Sand fraction consists of quartz, black lithics and occasional sponge spicules.

0.67 m: olive grey (5Y 3/2) sandy silt a.a.

1.42 m: olive grey (5Y 3/2) sandy silt a.a.

2.44 m: olive grey (5Y 3/2) poorly sorted sandy silt a.a.

3.46 m: olive grey (5Y 3/2) sandy silt. Sand fraction coarser grained than above. Occasional sponge spicules.

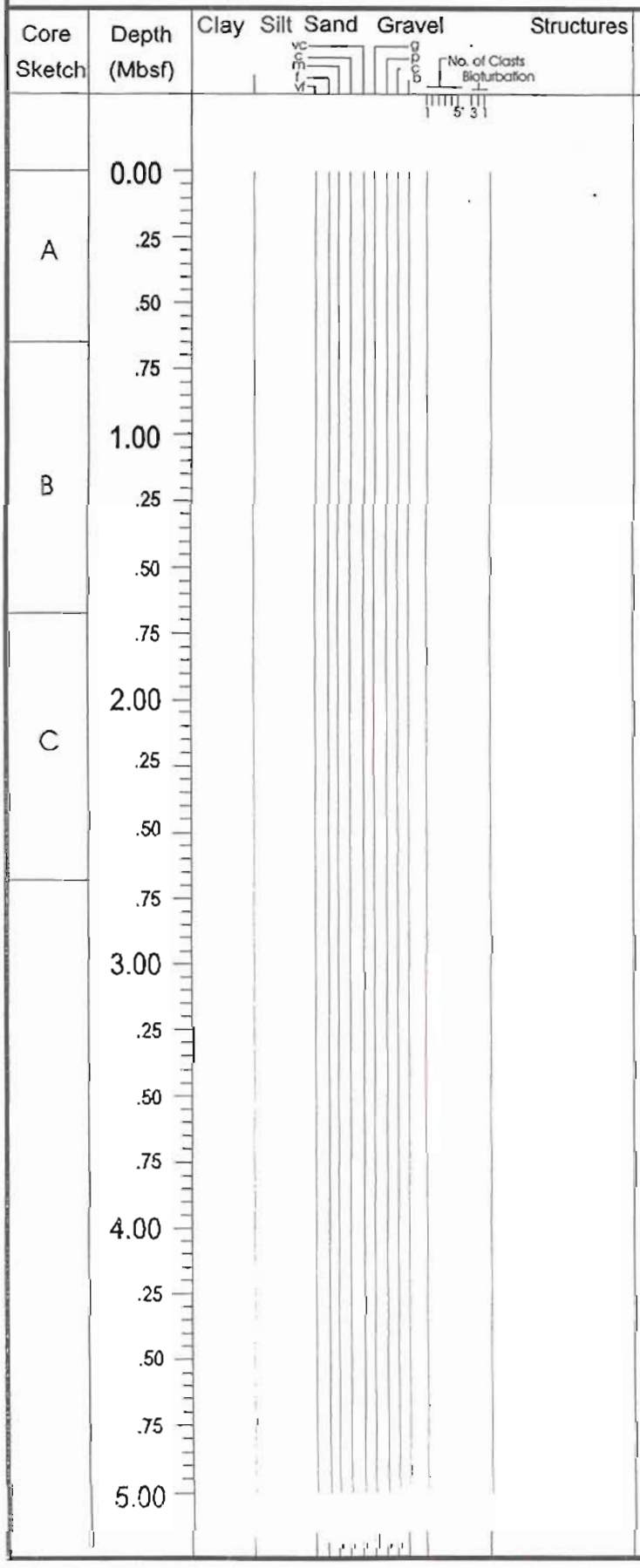
4.48 m: dark olive sandy silt. Sand fraction coarser than above. Occasional sponge spicules.

5.47 m: olive grey (5Y 3/2) sandy silt.

Station No: JR29 - 058 Lat/Long (dm): 62 49.42 S 058 07.47 W

Core No: VC - 194 Locality: Bransfield margin WD: 610 m

Date/Time (GMT): 23-02-98 23:46 Comments:



Unit 1 0.00 - 2.68 m

SANDY SILT

Unconsolidated poorly sorted sandy silts

0.00 m: olive grey (5Y 3/2) clayey sandy silt. Sand fraction consists of subangular to angular lithics and subrounded quartz. Core top is bioturbated.

0.65 m: olive grey (5Y 3/2) poorly sorted sandy silt. Sand fraction consists of fine to coarse grained quartz and black and red angular lithics.

1.67 m: olive grey (5Y 3/2) very poorly sorted sandy silt. Sand fraction consists of rare sponge spicules and subangular to angular quartz and lithics.

Station No: JR29 - 058 Lat/Long (dm): 62 49.42 S 058 07.47 W

Core No: RDC - 195 Locality: Bransfield margin WD: 610 m

Date/Time (GMT): 24-02-98 01:30 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (No. of Clasts, Bioturbation)	Description
	0.00 .05 .10 .15	1 5 3 1	**Unit 1 (depth n/a)** **PEBBLES** **Pebbles of mixed lithologies** Nine pebbles recovered. Six metasediments (TPG?), 4 metapelites, 2 metapsammites, 3 amygdaloidal basalts. All are subrounded to subangular.

Station No: JR29 - 059 Lat/Long (dm): 62 45.24 S 058 13.68 W

Core No: VC - 196 Locality: Bransfield margin WD: 760 m

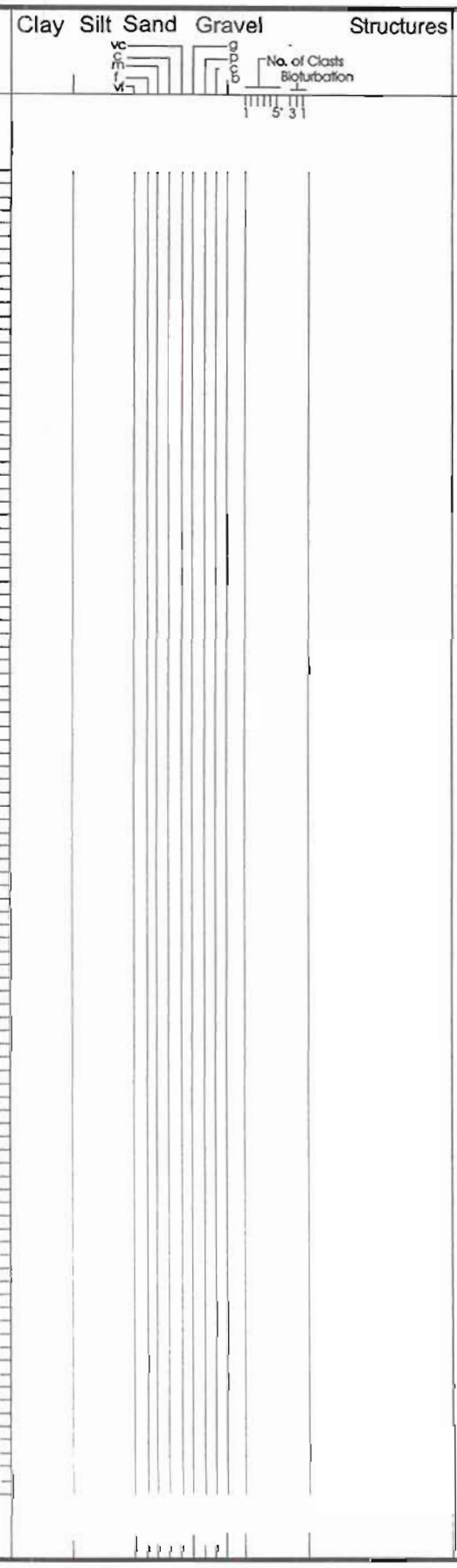
Date/Time (GMT): 24-02-98 03:40 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (No. of Clasts, Bioturbation)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55	5 3 1	**Unit 1 (depth n/a)** **SANDY MUD** **Unconsolidated sandy mud** ?? M: olive grey (5Y 3/1) sandy mud. Sand fraction is fine to medium grained subrounded to subangular quartz and black and red lithics. Occasional sponge spicules. NOTE: sample is from inverted catcher; barrel was empty, so sample may be from total depth rather than surface.

Station No: JR29 - 059 Lat/Long (dm): 62 45.24 S 058 13.68 W

Core No: VC - 197 Locality: Bransfield margin WD: 758 m

Date/Time (GMT): 24-02-98 05:16 Comments:



Unit 0.00 - 3.71 m

SILTY SAND, SAND AND SCATTERED PEBBLES

Unconsolidated silty sand and sand with scattered small to large pebbles.

0.00 m: olive grey (5Y 4/1) poorly sorted silty sand consisting of subrounded to subangular black and red lithic grains, quartz and feldspar.

0.71 m: olive grey (5Y 4/1) silty sand a.a., But slightly coarser grain size and more poorly sorted. Pebbles up to 5mm.

1.71 m: brownish grey (5YR 4/1) silty sand and pebbles a.a.

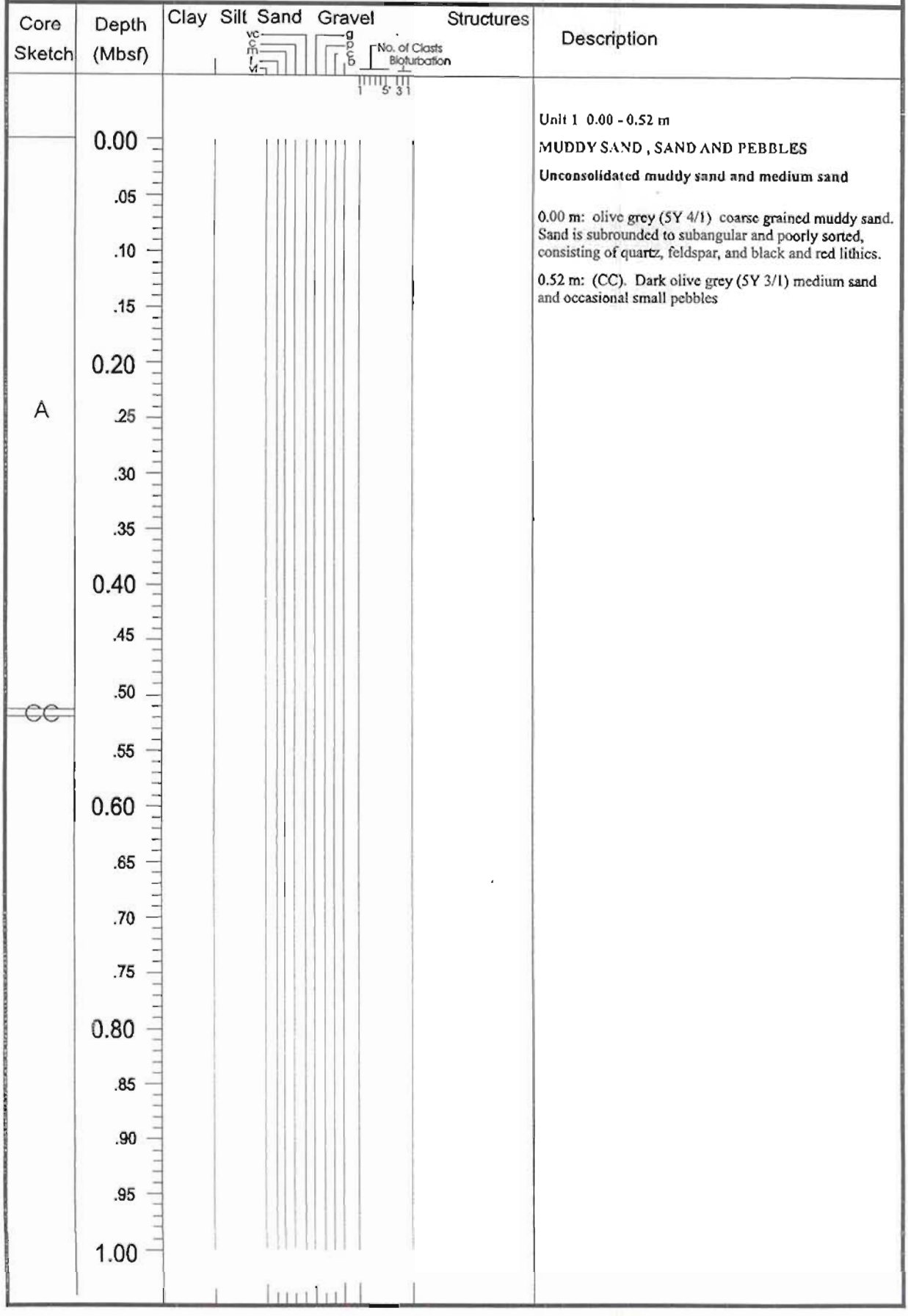
2.71 m: olive grey (5Y 4/1) silty sand a.a. with subrounded sandstone pebbles.

3.71 m: (CC). Very poorly sorted sand, up to very coarse grained, with scattered pebbles up to 6mm. Sand grains consist mainly of quartz and feldspar (45%), and dark lithics (45%).

Station No: JR29 - 060 Lat/Long (dm): 62 43.12 S 058 15.55 W

Core No: VC - 198 Locality: Bransfield margin WD: 810 m

Date/Time (GMT): 24-02-98 07:13 Comments:



Unit 1 0.00 - 0.52 m

MUDDY SAND , SAND AND PEBBLES

Unconsolidated muddy sand and medium sand

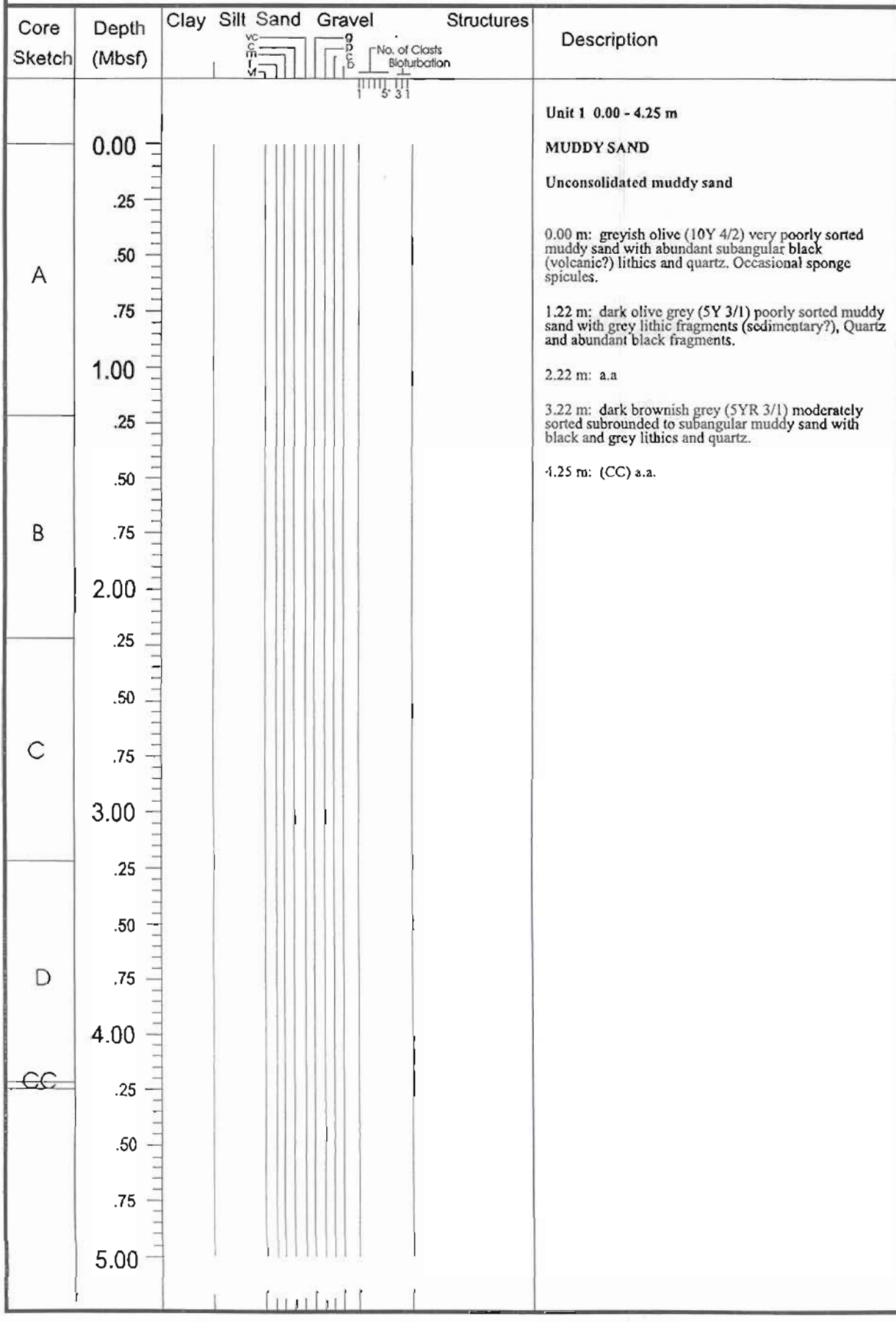
0.00 m: olive grey (5Y 4/1) coarse grained muddy sand. Sand is subrounded to subangular and poorly sorted, consisting of quartz, feldspar, and black and red lithics.

0.52 m: (CC). Dark olive grey (5Y 3/1) medium sand and occasional small pebbles

Station No: JR29 - 060 Lat/Long (dm): 62 43.12 S 058 15.55 W

Core No: VC - 199 Locality: Bransfield margin WD: 810 m

Date/Time (GMT): 24-02-98 08:39 Comments:



Unit 1 0.00 - 4.25 m

MUDDY SAND

Unconsolidated muddy sand

0.00 m: greyish olive (10Y 4/2) very poorly sorted muddy sand with abundant subangular black (volcanic?) lithics and quartz. Occasional sponge spicules.

1.22 m: dark olive grey (5Y 3/1) poorly sorted muddy sand with grey lithic fragments (sedimentary?), Quartz and abundant black fragments.

2.22 m: a.a

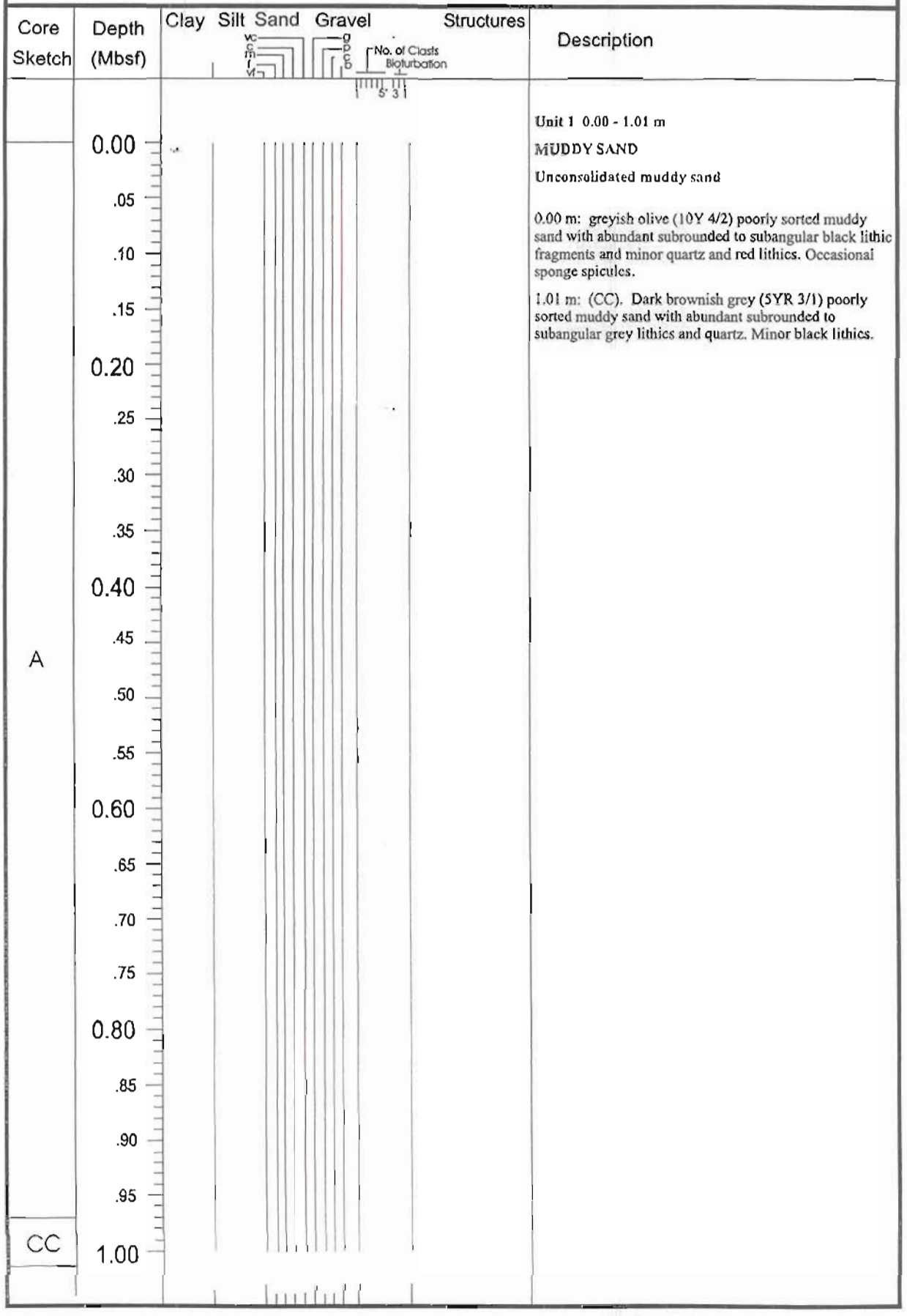
3.22 m: dark brownish grey (5YR 3/1) moderately sorted subrounded to subangular muddy sand with black and grey lithics and quartz.

4.25 m: (CC) a.a.

Station No: JR29 - 061 Lat/Long (dm): 62 42.00 S 058 16.50 W

Core No: VC - 200 Locality: Branfield margin WD: 1050 m

Date/Time (GMT): 24-02-98 10:42 Comments:



Unit 1 0.00 - 1.01 m

MUDDY SAND

Unconsolidated muddy sand

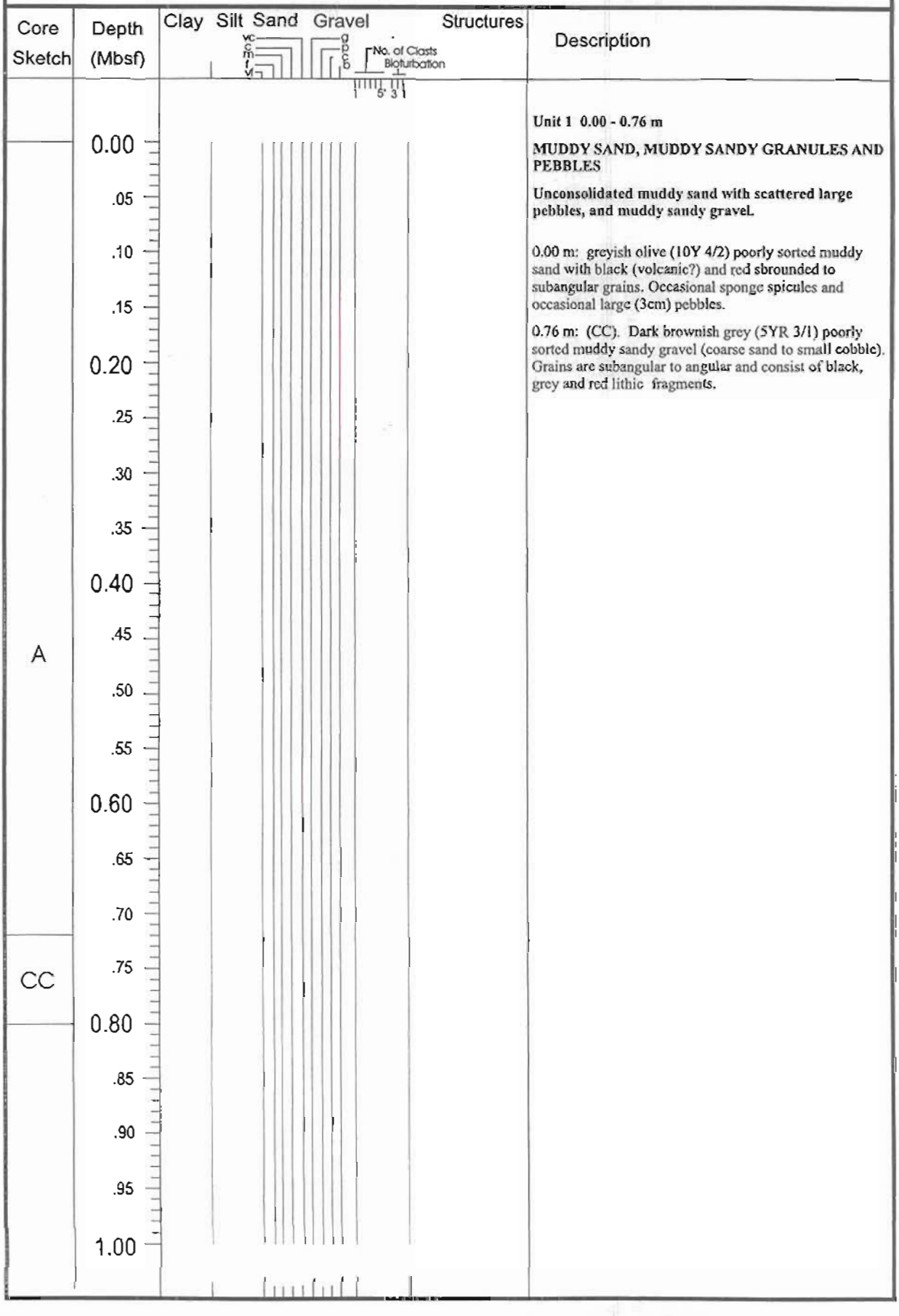
0.00 m: greyish olive (10Y 4/2) poorly sorted muddy sand with abundant subrounded to subangular black lithic fragments and minor quartz and red lithics. Occasional sponge spicules.

1.01 m: (CC). Dark brownish grey (5YR 3/1) poorly sorted muddy sand with abundant subrounded to subangular grey lithics and quartz. Minor black lithics.

Station No: JR29 - 062 Lat/Long (dm): 62 41.29 S 058 17.22 W

Core No: VC - 201 Locality: Bransfield margin WD: 1263 m

Date/Time (GMT): 24-02-98 13:19 Comments:



Unit 1 0.00 - 0.76 m

MUDDY SAND, MUDDY SANDY GRANULES AND PEBBLES

Unconsolidated muddy sand with scattered large pebbles, and muddy sandy gravel.

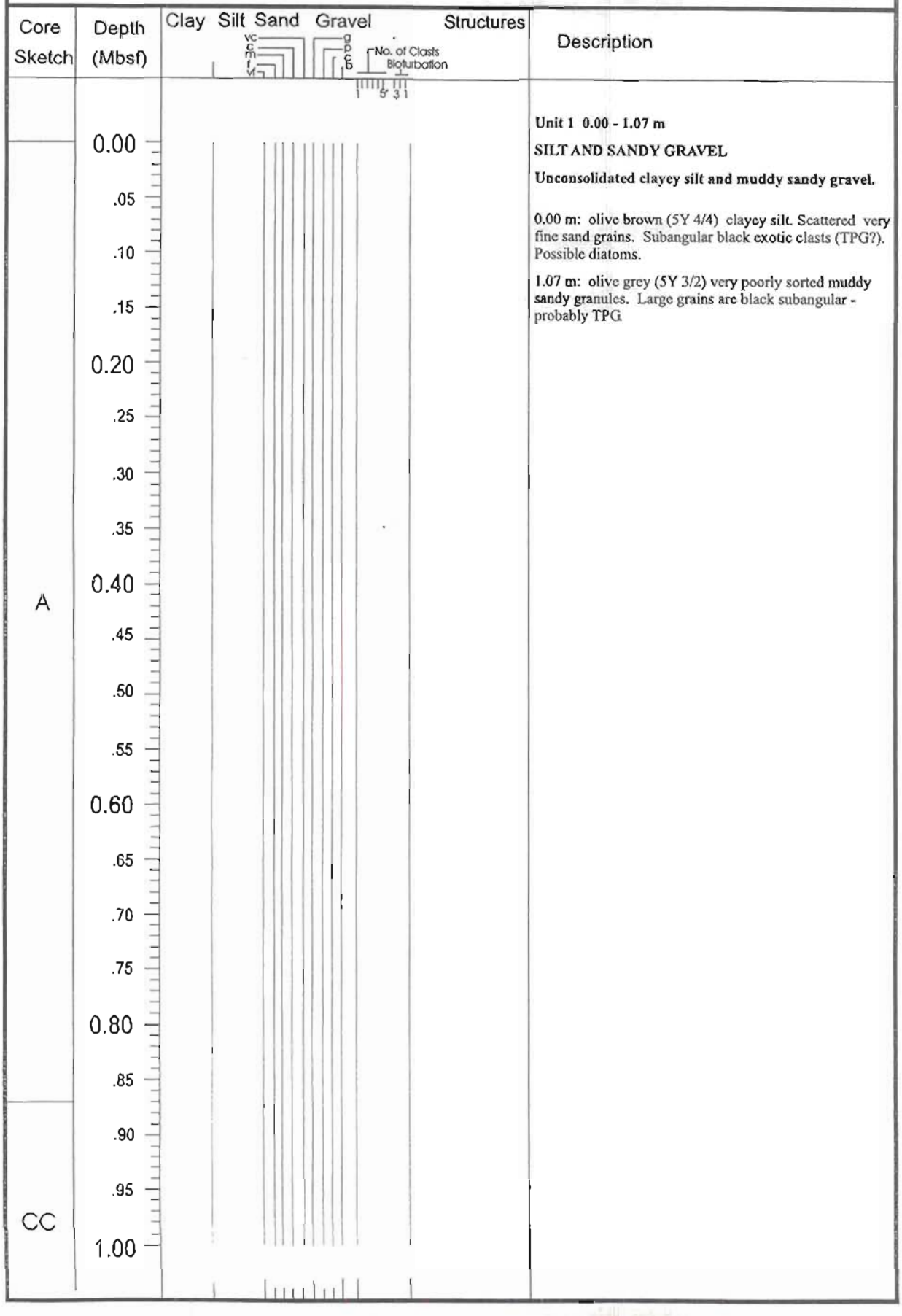
0.00 m: greyish olive (10Y 4/2) poorly sorted muddy sand with black (volcanic?) and red sbrounded to subangular grains. Occasional sponge spicules and occasional large (3cm) pebbles.

0.76 m: (CC). Dark brownish grey (5YR 3/1) poorly sorted muddy sandy gravel (coarse sand to small cobble). Grains are subangular to angular and consist of black, grey and red lithic fragments.

Station No: JR29 - 063 Lat/Long (dm): 62 40.24 S 058 18.09 W

Core No: VC - 202 Locality: Bransfield margin WD: 1630 m

Date/Time (GMT): 24-02-98 15:30 Comments:



Unit 1 0.00 - 1.07 m

SILT AND SANDY GRAVEL

Unconsolidated clayey silt and muddy sandy gravel.

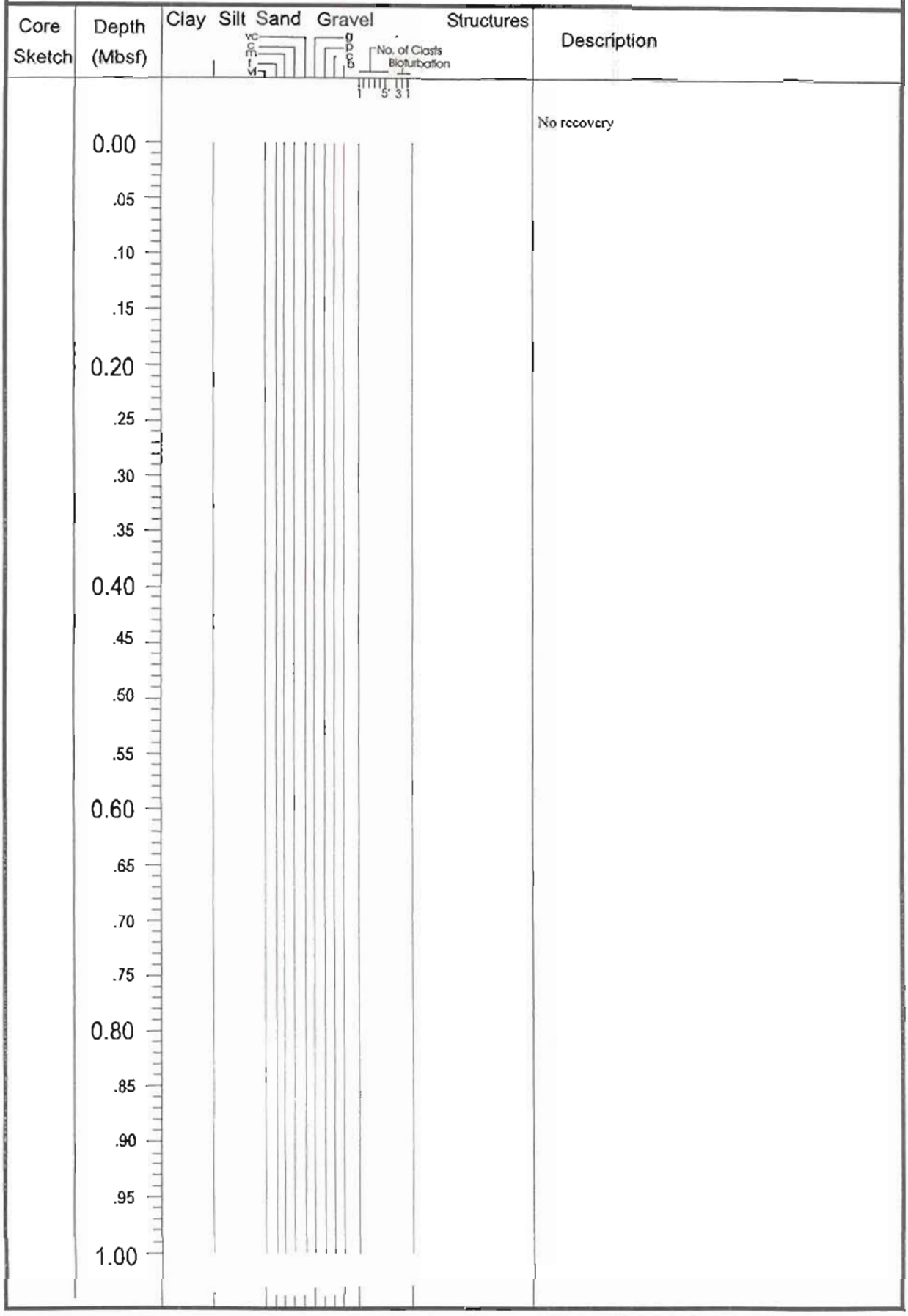
0.00 m: olive brown (5Y 4/4) clayey silt. Scattered very fine sand grains. Subangular black exotic clasts (TPG?). Possible diatoms.

1.07 m: olive grey (5Y 3/2) very poorly sorted muddy sandy granules. Large grains are black subangular - probably TPG

Station No: JR29 - 064 Lat/Long (dm): 64 08.03 S 056 23.24 W

Core No: RDC - 203 Locality: N. Seymour Island WD: 316 m

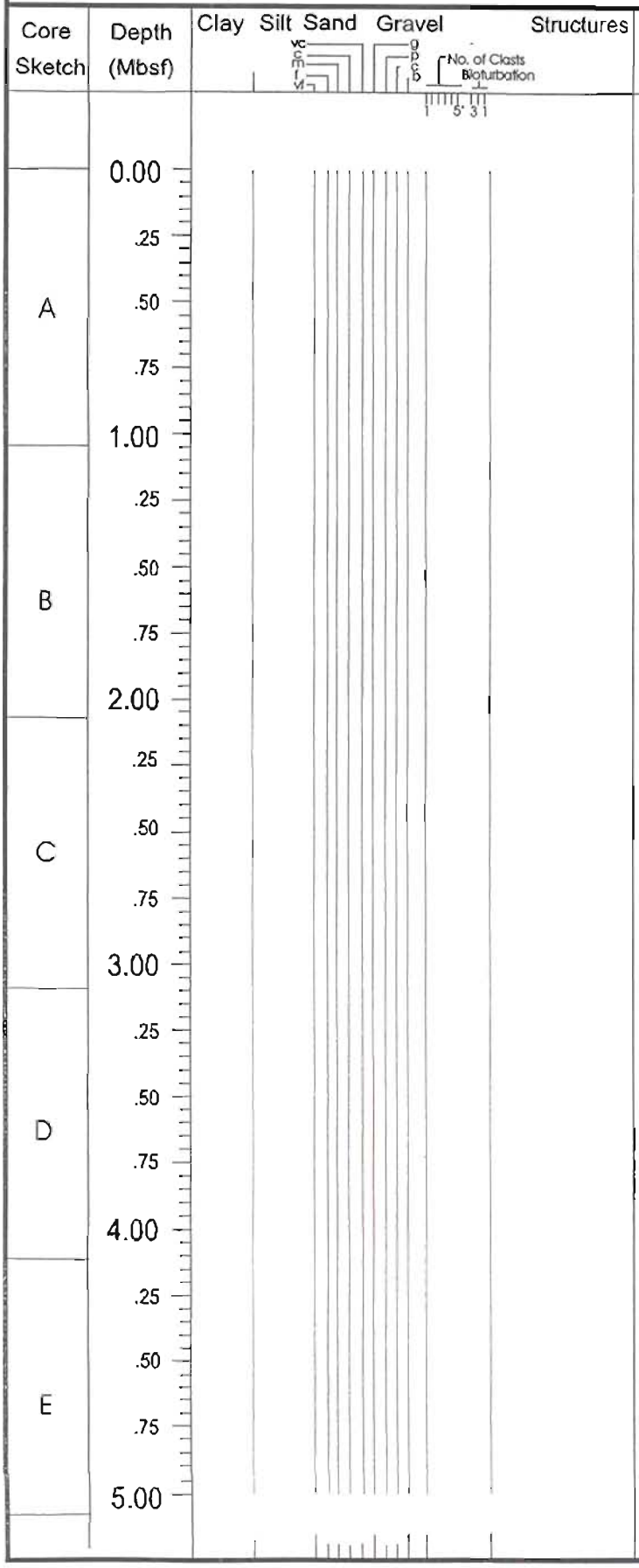
Date/Time (GMT): 25-02-98 20:50 Comments:



Station No: JR29 - 064 Lat/Long (dm): 64 08.03 S 056 23.24 W

Core No: VC - 204 Locality: Seymour Island WD: 316 m

Date/Time (GMT): 25-02-98 22:02 Comments:



Unit 1 0.00 - 5.11 m

SILTS, SILTY SANDS AND SANDS

Unconsolidated clayey silty sands, silty sands and sands. Glauconite, woody fragments and shell material common.

0.00 m: olive grey (5Y 3/2) clayey silty sand. Well sorted, subrounded to angular quartz, glauconite, carbonaceous matter and sponge spicules.

1.05 m: olive grey silty sand. Composition a.a.

2.07 m: olive grey sand. Composition a.a.

3.09 m: olive grey medium sand. Composition a.a.

4.11 m: Light olive grey (5Y 5/2) clayey silty sand.Composition a.a.

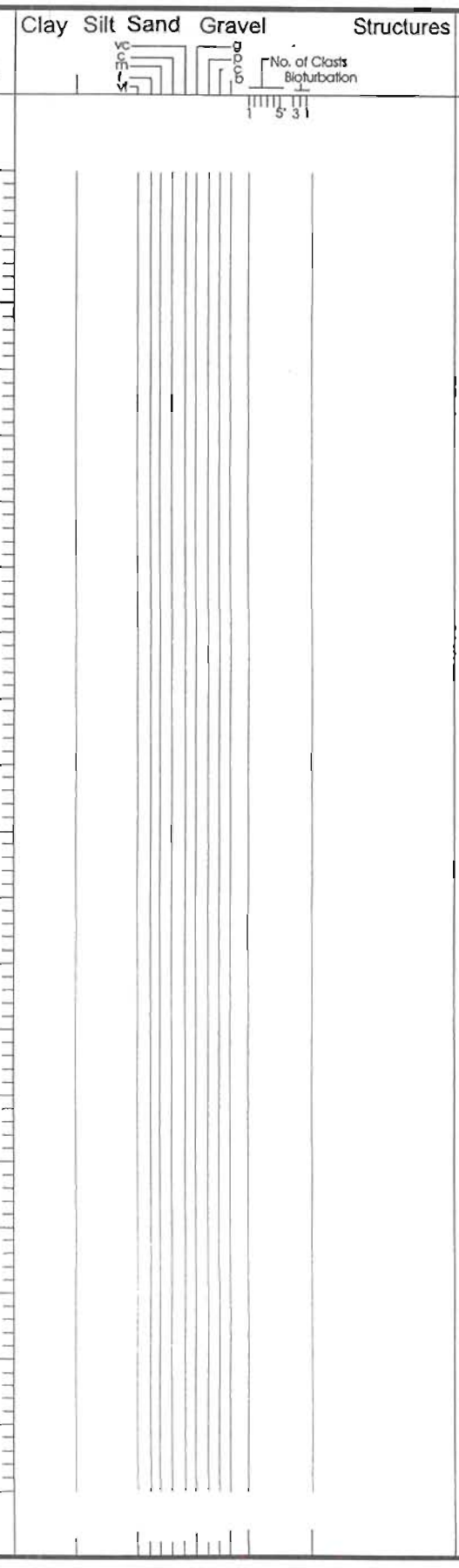
5.11 m: no CC.

Probably Cucculaea II or Sobral.

Station No: JR29 - 065 Lat/Long (dm): 63 44.40 S 056 13.30 W

Core No: VC - 205 Locality: N. Seymour Island WD: 498 m

Date/Time (GMT): 27-02-98 Comments:



Unit 1 0.00 - 5.42 m

SILT

Unconsolidated diatomaceous silts and sandy silts.

0.00 m: olive grey diatomaceous silt. Angular lithics. Diatom fluff - Actinocyclus and Chaetoceras.

0.59 m: olive grey (5Y 3/2) diatomaceous silt a.a. Occasional sponge spicules and chaetoceras spines. Slightly coarser grain size than above.

1.14 m: olive grey (5Y 3/2) sandy silt.

2.16 m: olive grey sandy silt.

3.18 m: Olive grey sandy silt.

4.20 m: olive grey diatomaceous silt.

5.42 m: olive grey diatomaceous silt.

Station No: JR29 - 066 Lat/Long (dm): 62 10.05 S 058 03.18 W

Core No: RDC - 206 Locality: King George Bay WD: 119 m

Date/Time (GMT): 28-02-98 11:34 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (No. of Clasts, Bioturbation)	Description
	0.00 .05 .10		**Unit 1 (depth n/a/)** **PEBBLES** **Unconsolidated tuffaceous sandstone pebbles** Pebbles up to 60mm diameter of greyish black (N2) subrounded to subangular tuffaceous sandstone.

Station No: JR29 - 066 Lat/Long (dm): 62 10.05 S 058 03.18 W

Core No: RDC - 207 Locality: King George Bay WD: 119 m

Date/Time (GMT): 28-02-98 12:36 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (No. of Clasts, Bioturbation)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55 0.60		**Unit 1 (depth n/a)** **DIAMICT** **Unconsolidated pebbles and gravel,, split into 7 bags.** Pebbles: A: 35%. Greyish black (N2) tuffaceous diamict. Clasts are medium grey and redish angular sandstones and volcanics. B: 40%. Dark grey (N3) volcanic rock consisting of 1-2mm mafic crystals and other un i/d greenish grey crystals. C: 10%. Greyish black (N2) volcanic rock fragments up to 8mm diameter. D: 7%. Medium light olive grey (5Y 5/1) granitic fragments. E: 5%. Medium olive grey (5Y 5/1) sandstone. F: 3%. Greyish black (N2) mudstone. G: mud faction; dark greenish grey (5GY 4/1).

Station No: JR29 - 039 Lat/Long (dm): 62 07.31 S 058 06.14 W

Core No: RDC - 168 Locality: King George Bay WD: 150 m

Date/Time (GMT): 21-02-98 09:10 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f vf; g p c b; No. of Clasts; Bioturbation 1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50		**Unit 1 (depth n/a)** **PEBBLES AND GRANULES** **Unconsolidated volcanic and sedimentary pebbles** Pebble fraction consists of: 40% greyish black (N2) volcanic rock with clear and dark crystals up to 3mm length. 20% black (N1) sandstones and siltstones. 15% dark greenish grey (5GY 4/1) crystalline volcanic rocks. 15% greyish black (N2) volcanic rock. Crystals are white (N9), light olive grey (5Y 6/1), the white crystals filling vesicles (calcite?). 10% dark grey (N3) volcanic rock with large (2-5mm) light greenish grey (5G 8/1) crystals, large crystals and occaional vesicles filled with reddish mineral aggregates. The finer fraction is composed of subrounded to subangular granules and very coarse sand. Composition a.a.

Station No: JR29 - 040 Lat/Long (dm): 62 07.69 S 058 05.18 W

Core No: RDC - 169 Locality: King George Bay WD: 060 m

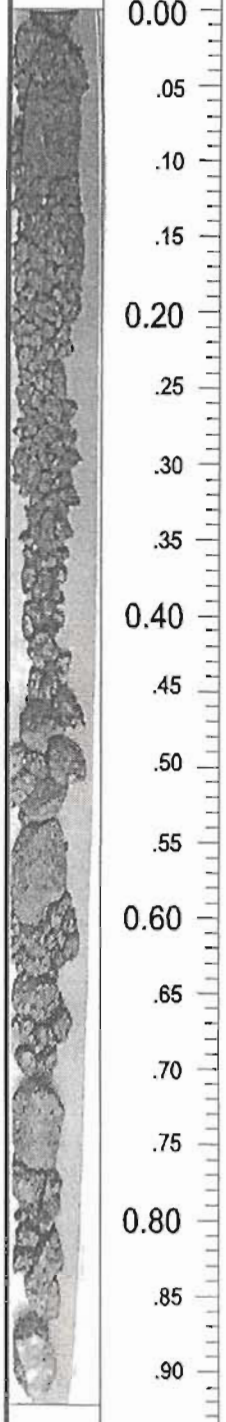
Date/Time (GMT): 21-02-98 11:08 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f vf; g p c b; No. of Clasts; Bioturbation 1 5 3 1)	Description
	0.00 .05 .10 .15 0.20		No recovery

Station No: JR29 - 040 Lat/Long (dm): 62 07.69 S 058 05.18 W

Core No: RDC - 170 Locality: King George Bay WD: 060 m

Date/Time (GMT): 21-02-98 15:03 Comments:



Clay Silt Sand Gravel Structures

vc c m f vf g p s b

No. of Clasts

Bioturbation

1 S 3 1

0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55 0.60 .65 .70 .75 0.80 .85 .90 .95 1.00

Unit 1 0.00 - 0.92 m

DIAMICT

Partially consolidated sedimentary diamict

Dark green - blue, very poorly sorted polymodal polymict diamictite. Clasts are angular to subangular and cemented in green mudstone matrix.

?Low Head 4 or Krakowiak Mb.

Station No: JR29 - 041 Lat/Long (dm): 62 07.73 S 058 05.11 W

Core No: RDC - 171 Locality: King George Bay WD: 061 m

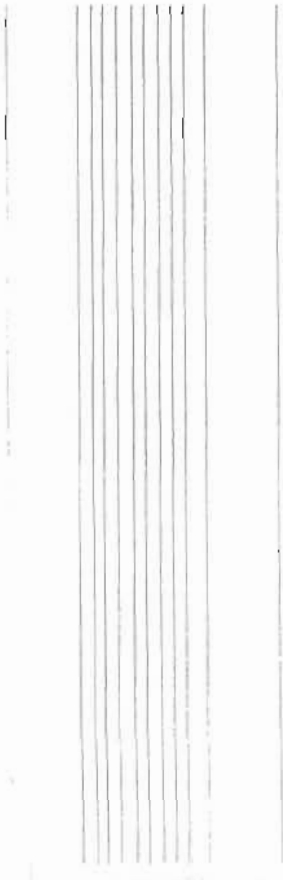
Date/Time (GMT): 21-02-98 16:40 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g p c b) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15		**Unit I (depth n/a)** **PEBBLES** **Unconsolidated sedimentary and volcanic pebbles.** Mixed assemblage of green polymodal polymict diamict pebbles and dark volcanics.

Station No: JR29 - 041 Lat/Long (dm): 62 07.73 S 058 05.11 W

Core No: RDC - 172 Locality: King George Bay WD: 072 m

Date/Time (GMT): 21-02-98 18:10 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g p c b) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55		**Unit I (dpeth n/a)** **PEBBLES** **Unconsolidated igneous and sedimentary pebbles** Four pebbles recovered: three "diamictites", one leucocratic igneous.

Station No: JR29 - 042 Lat/Long (dm): 62 08.45 S 058 04.00 W

Core No: RDC - 173 Locality: King George Bay WD: 093 m

Date/Time (GMT): 21-02-98 19:20 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f vf; g p c b; No. of Clasts; Bioturbation 1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40		**Unit 1 0.00 - 0.41 m** **AGGLOMERATE AND BASALT/ANDESITE** **Consolidated core and pebbles of agglomerate and basalt/andesite.** 0.00 - 0.04 m: reddish agglomerate showing phenocrysts of quartz and feldsdpar (?? ed). 0.04 - 0.41 m: dark brown, fine to medium grained amydaloidal texture, with zeolites, and well developed euhedral quartz crystals.

Station No: JR29 - 042 Lat/Long (dm): 62 08.45 S 058 04.00 W

Core No: RDC - 174 Locality: King George Bay WD: 95 m

Date/Time (GMT): 21-02-98 20:20 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f vf; g p c b; No. of Clasts; Bioturbation 1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30		**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated basalt pebbles** Two reddish weathered basaltic pebbles (cf RDC-132) showing well developed phenocrysts and amygdales of quartz and feldspar.

Station No: JR29 - 043 Lat/Long (dm): 62 08.67 S 058 03.83 W

Core No: RDC - 175 Locality: King George Bay WD: 081 m

Date/Time (GMT): 21-02-98 21:50 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g p c b) Structures: No. of Casts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55 0.60 .65 .70 .75 0.80 .85 .90 .95 1.00		**Unit I 0.00 - 0.17 m** **VOLCANICLASTIC ROCK** **Consolidated vesicular volcaniclastic rock** Two lithologies separated by fracture: 0.00 - 0.08 m: mottled grey/reddish brown speckled volcaniclastic rock. Flow aligned vesicles filled with green/brown/grey zeolite-like minerals. Matrix is finely crystaline, soft dark reddish grey. 0.08 - 0.17 m: medium grey volcaniclastic rock. Small vesicles filled with bright green and brown zeolite-like minerals. Matrix is grey and finely crystalline.

Station No: JR29 - 043 Lat/Long (dm): 62 08.67 S 058 03.83 W

Core No: RDC - 176 Locality: King George Bay WD: 79 m

Date/Time (GMT): 21-02-98 23:00 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g p c b) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55 0.60 .65 .70 .75 0.80 .85 .90 .95 1.00		**Unit 1 0.00 - 0.59 m** **VOLCANICLASTIC CORE AND PEBBLES** **Consolidated homogenous volcaniclastic rock** Dark grey to black volcaniclastic rock with subangular clasts (or euhedral?) of quartz and a weathered reddish mineral. Surface has pitted, weathered appearance.

Station No: JR29 - 044 Lat/Long (dm): 62 08.83 S 058 03.69 W

Core No: RDC - 177 Locality: King George Bay WD: 90 m

Date/Time (GMT): 22-02-98 02:30 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g cb cb) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30		**Unit 1 (depth n/a)** **PEBBLES AND GRANULES** **Unconsolidated pebbles and granules with shell material** Pebbles consist of: (A) 95% greyish black (N2) volcanic rock with clear and red crystals up to 3mm. (B) 5% reddish brown (10R 4/6) to blackish red (5R 2/2) siltstones and sandstones. Granules: finer fraction composed of greyish black (N2) gravel with occasional grains of very coarse sand: 70% greyish black (N2) volcanic fragments 20% reddish volcanic fragments 10% quartz. Grains are subangular to subrounded; finer fraction contains aragonitic shell fragments up to 5mm. Possibly drilling-disturbed Low Head 4 or Krakowiak Mb.

Station No: JR29 - 045 Lat/Long (dm): 62 09.15 S 058 03.29 W

Core No: RDC - 178 Locality: King George Bay WD: 120 m

Date/Time (GMT): 22-02-98 04:18 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g cb cb) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35		**Unit 1 0.00 - 0.21 m** **VOLCANIC ROCK CORE AND PEBBLES** **Consolidated volcanic rock core and unconsolidated pebbles of same composition.** Greyish black fractured volcanic rock with various black, grey and red crystals; light coloured crystals appear to be filling vesicles.

Station No: JR29 - 045 Lat/Long (dm): 62 09.15 S 058 03.29 W

Core No: RDC - 179 Locality: King George Bay WD: 110 m

Date/Time (GMT): 22-02-98 06:42 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f vf; g p b; No. of Clasts; Bioturbation 1 5 3 1)	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35		**Unit 1 (depth n/a)** **SAND, GRANULES AND PEBBLES** **Unconsolidated igneous pebbles, sand and granules.** Sample split into 4 bagged fractions: (A) Large pebbles: angular to subangular a. 45% brownish black (5YR 2/1) pebbles with very soft rounded bluish crystals (serpentines?) up to 5mm. b. 40% greyish black (N2) vesicular volcanic rock. c. 7% dark grey (N3) phanerytic igneous rock with crystals up to 2-5mm. d. 5% pinkish grey (5YR 8/1) very soft igneous rock. e. 3% light grey very soft rock with black crystals up to 8mm. (B) Medium pebbles: angular to subrounded, mostly consisting of d and e above. (C) Small pebbles: subangular to subrounded, mostly consisting of d and e above. (D) Coarse sand and granules: angular to subangular, mostly consisting of d and e above.

Station No: JR29 - 046 Lat/Long (dm): 62 06.24 S 058 23.93 W

Core No: VC - 180 Locality: Admiralty Bay WD: 290 m

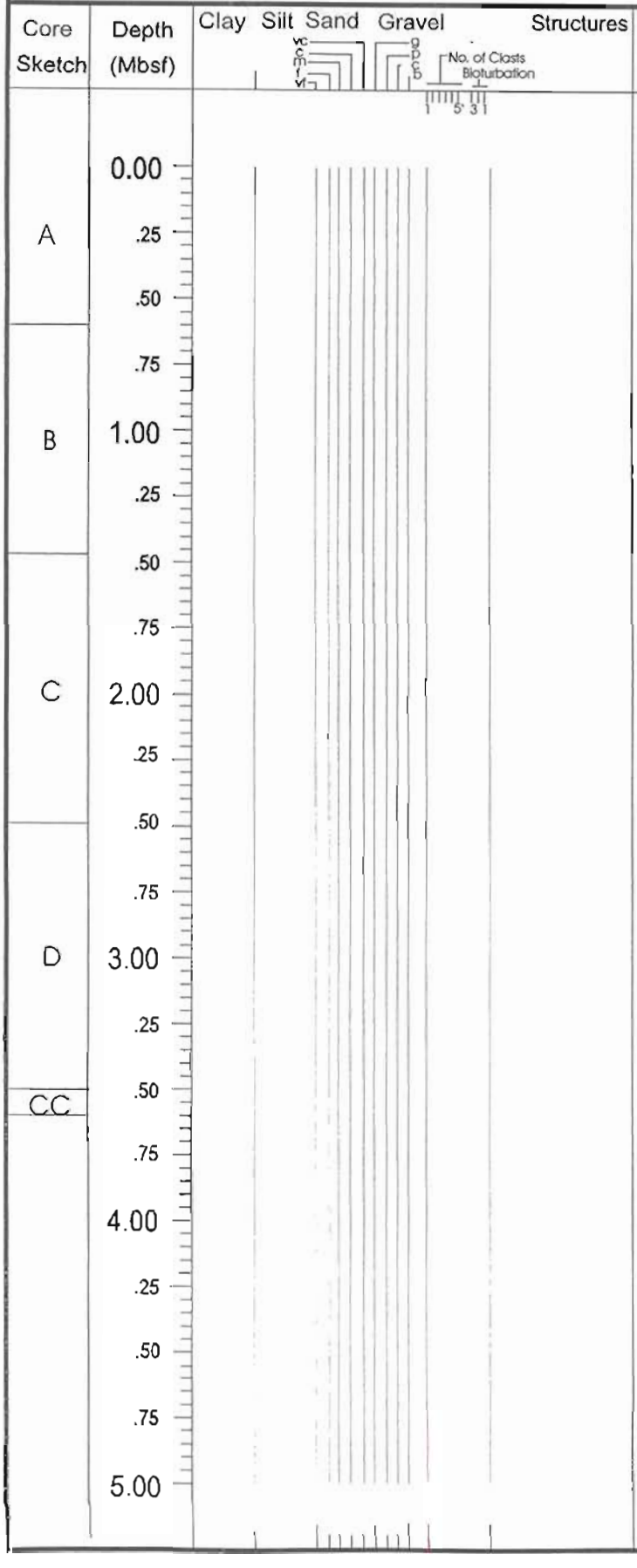
Date/Time (GMT): 22-02-98 17:00 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures (vc c m f vf; g p b; No. of Clasts; Bioturbation 1 5 3 1)	Description
	0.00 .25 .50 .75 1.00 .25 .50		1 m lost overboard from failed CC; run again VC-181. Total length 3.49 m.

Station No: JR29 - 046 Lat/Long (dm): 62 06.24 S 058 23.93 W

Core No: VC - 181 Locality: Admiralty Bay WD: 290 m

Date/Time (GMT): 22-02-98 17:50 Comments:



Unit 1 0.00 - 3.60 m

CLAYEY SILT, SANDY SILT AND SILTY SAND

Unconsolidated clayey silt, sandy silt and silty sands.

0.00 m: olive grey (5Y 4/1) very poorly sorted clayey silt. Silt consists of subangular black lithics, quartz and opaques. Echinoid and worm burrows found in top section.

0.60 m: olive black (5Y 2/1) sandy silt, consisting of black lithics, subrounded to subangualr quartz and occasional sponge spicules.

1.47 m: olive black (5Y 2/1) silty sand with greenish lithics and black angular fragments, quartz and red weather fragments.

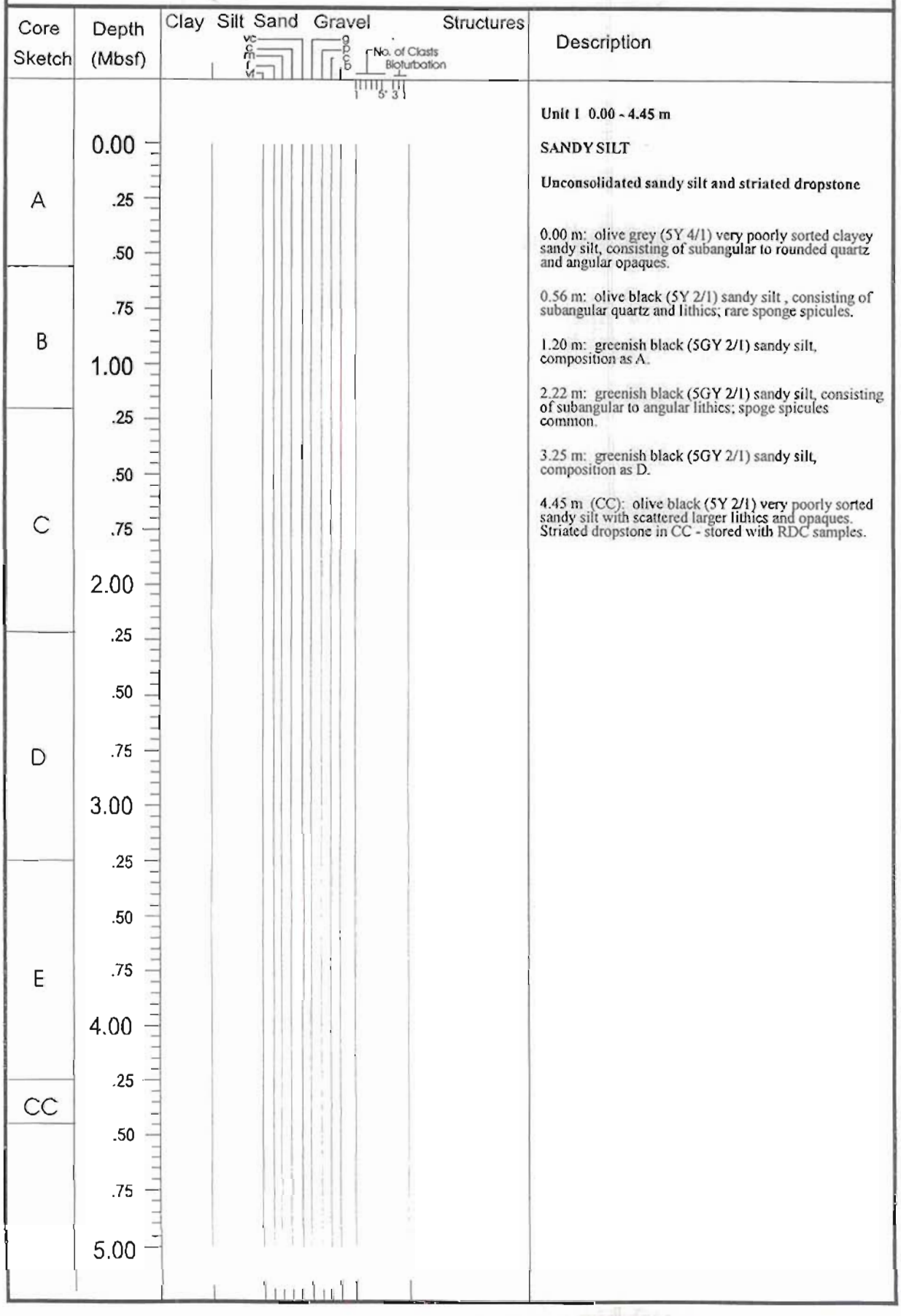
2.49 m: greenish black (5GY 2/1) moderately sorted silty sand, consisting of 80% black subangular lithics.

3.60 m (CC): olive black (5Y 2/1 silty sand; lithics and sponge spicules common.

Station No: JR29 - 047 Lat/Long (dm): 62 06.39 S 058 24.64 W

Core No: VC - 182 Locality: Admiralty Bay WD: 330 m

Date/Time (GMT): 21-02-98 19:00 Comments:



Unit I 0.00 - 4.45 m

SANDY SILT

Unconsolidated sandy silt and striated dropstone

0.00 m: olive grey (5Y 4/1) very poorly sorted clayey sandy silt, consisting of subangular to rounded quartz and angular opaques.

0.56 m: olive black (5Y 2/1) sandy silt , consisting of subangular quartz and lithics; rare sponge spicules.

1.20 m: greenish black (5GY 2/1) sandy silt, composition as A.

2.22 m: greenish black (5GY 2/1) sandy silt, consisting of subangular to angular lithics; spoge spicules common.

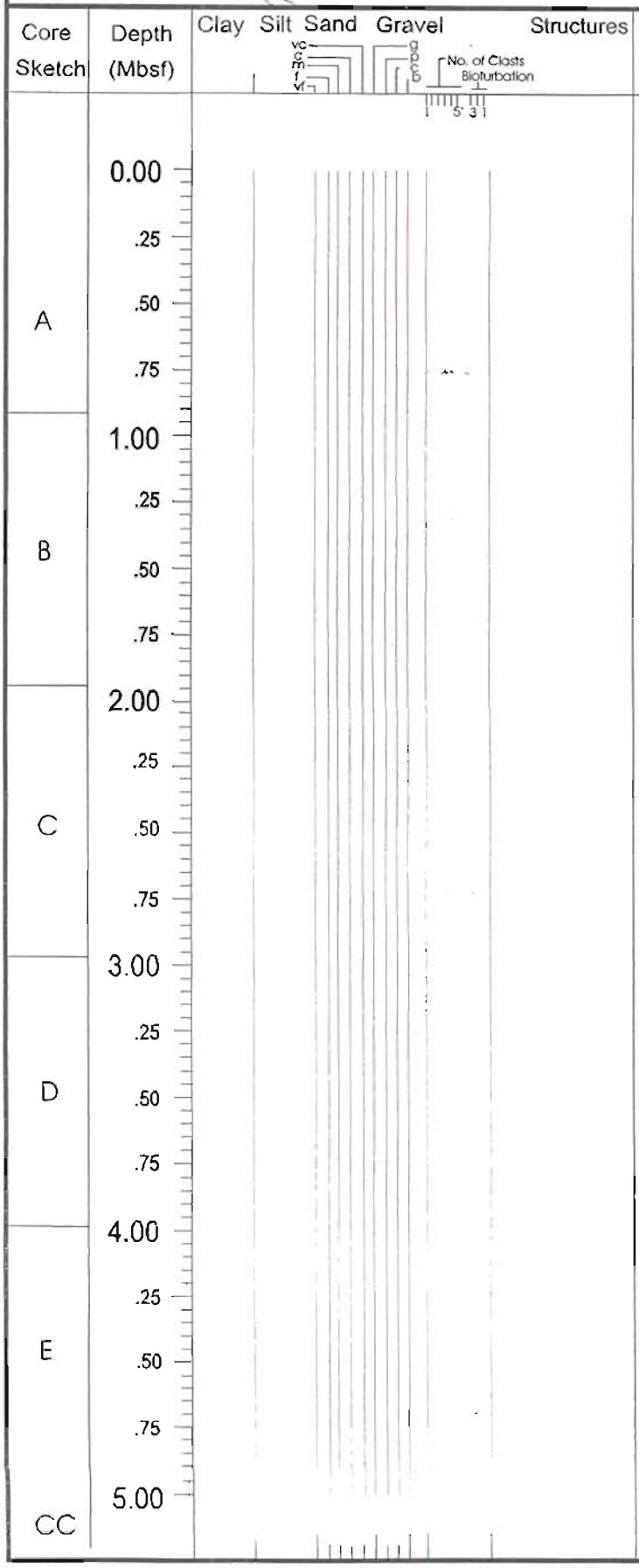
3.25 m: greenish black (5GY 2/1) sandy silt, composition as D.

4.45 m (CC): olive black (5Y 2/1) very poorly sorted sandy silt with scattered larger lithics and opaques. Striated dropstone in CC - stored with RDC samples.

Station No: JR29 - 048 Lat/Long (dm): 62 07.93 S 058 26.20 W

Core No: VC - 183 Locality: Admiralty Bay WD: 438 m

Date/Time (GMT): 21-02-98 21:45 Comments:



Unit 1 0.00 - 5.16 m

SANDY SILT AND SILTY SAND

Unconsolidated clayey sandy silt, silty sand and sandy silt.

0.00 m: greenish black (5GY 2/1) very poorly sorted clayey sandy silt. Sand fraction consists of subangular quartz and lithics. Surface waterlogged and bioturbated.

0.92 m: olive black (5Y 2/1) very poorly sorted silty sand. Sand fraction consists of subangular to angular lithics and quartz. Pyrite/mica(?) Common. Event seen in VC-180,181,182.

1.94 m: greenish black (5GY 2/1) silty sand, consisting of quartz, lithics a black vitreous mineral and sponge spicules.

2.97 m: olive black sandy silt. Two subangular black lithics.

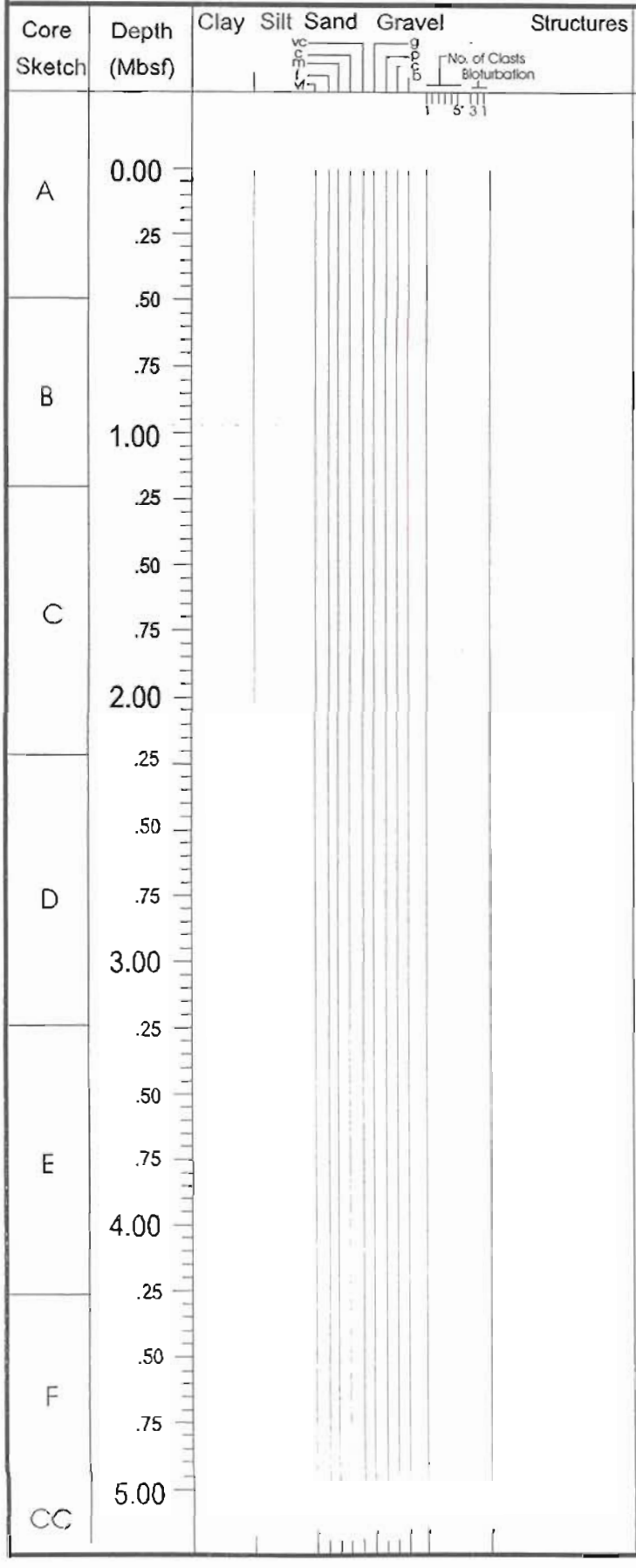
3.99 m: greenish black (5GY 2/1) poorly sorted sandy silt. Sand fraction consists of subangular black lithics and rare sponge spicules.

5.16 m: greenish black (5GY 2/1) sandy silt consisting of subangular lithics and no sponge spicules (?).

Station No: JR29 - 049 Lat/Long (dm): 62 08.33 S 058 25.71 W

Core No: VC - 184 Locality: Admiralty Bay WD: 410 m

Date/Time (GMT): 22-02-98 23:00 Comments:



Unit 1 0.00 - 5.38 m

SILTY SAND AND SANDY SILT

Unconsolidated silty sand and sandy silt.

0.00 m: greenish black (5GY 2/1) poorly sorted clayey silty sand. Subangular quartz, lithics and red mineral.

0.50 m: greenish black (5GY 2/1) moderately sorted silty sand. Composition a.a.

1.20 m: dark greenish grey (5GY 4/1) poorly sorted sandy silt. Sand fraction composed of quartz, black lithics, mica and common sponge spicules.

2.22 m: dark greenish grey (5GY 4/1) poorly sorted sandy silt. Composition a.a.

3.24 m: greenish black (5GY 2/1) poorly sorted sandy silt. Composition a.a.

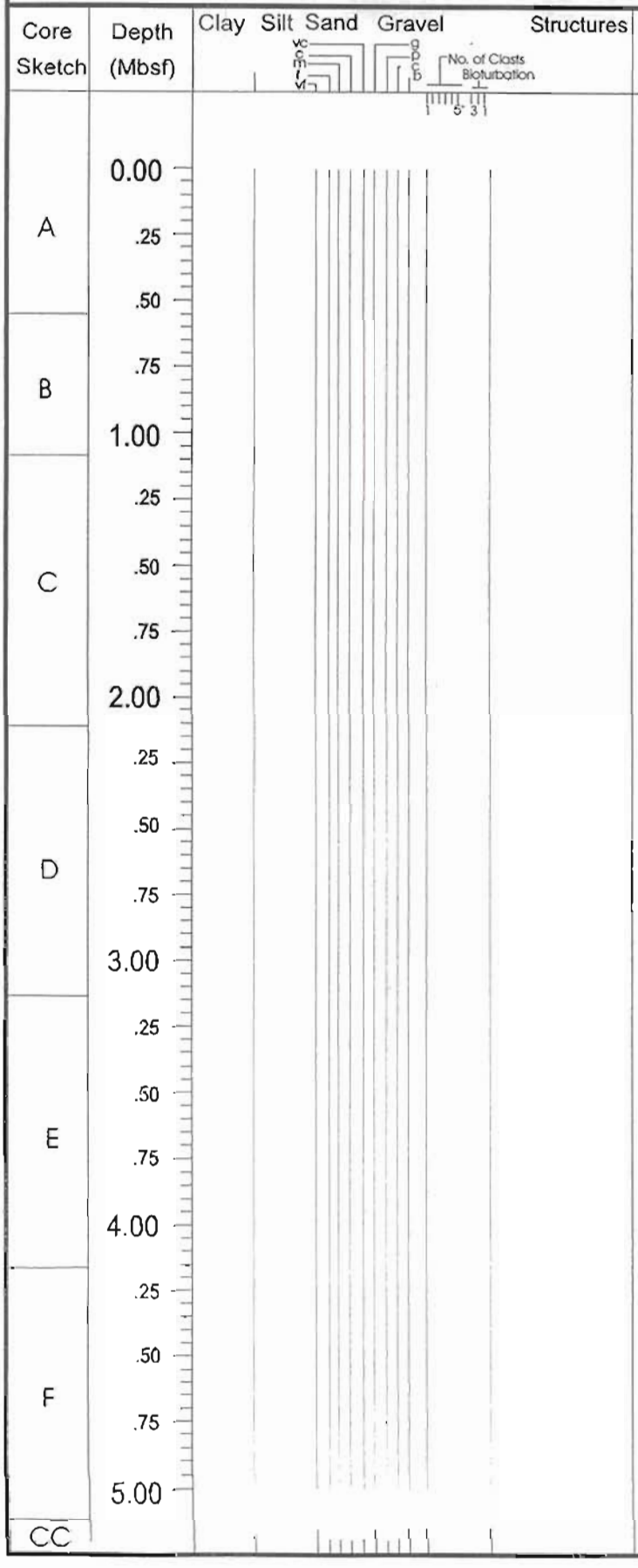
4.26 m: greenish black (5GY 2/1) poorly sorted sandy silt. Sand fraction composed of quartz and black lithics. No obvious sponge spicules or red mineral.

5.38 m (CC): greenish black (5GY 2/1) poorly sorted sandy silt. Composition a.a., But sponge spicules common.

Station No: JR29 - 050 Lat/Long (dm): 62 08.69 S 058 25.35 W

Core No: VC - 185 Locality: Admiralty Bay WD: 436 m

Date/Time (GMT): 23-02-98 00:26 Comments:



Unit 1 0.00 - 5.37 m

SILTY SAND AND SANDY SILT

Unconsolidated waterlogged silty sand and sandy silt.

0.00 m: dark greenish grey (5GY 4/1) waterlogged poorly sorted silty sands. Sand composed of subrounded to subangular black lithics and opaques plus rare red mineral. Core top is bioturbated.

0.55 m: dark greenish grey (5GY 4/1) very poorly sorted silty sand. Composed of angular lithics, quartz and opaques.

1.09 m: greenish black poorly sorted silty sand. Composition a.a. Waterlogged.

2.12 m: a.a. With occasional sponge fragments and rare red mineral. Waterlogged.

3.14 m: dark green very fine sandy silt. Red mineral more common than above, rare sponge spicules. Less waterlogged than above.

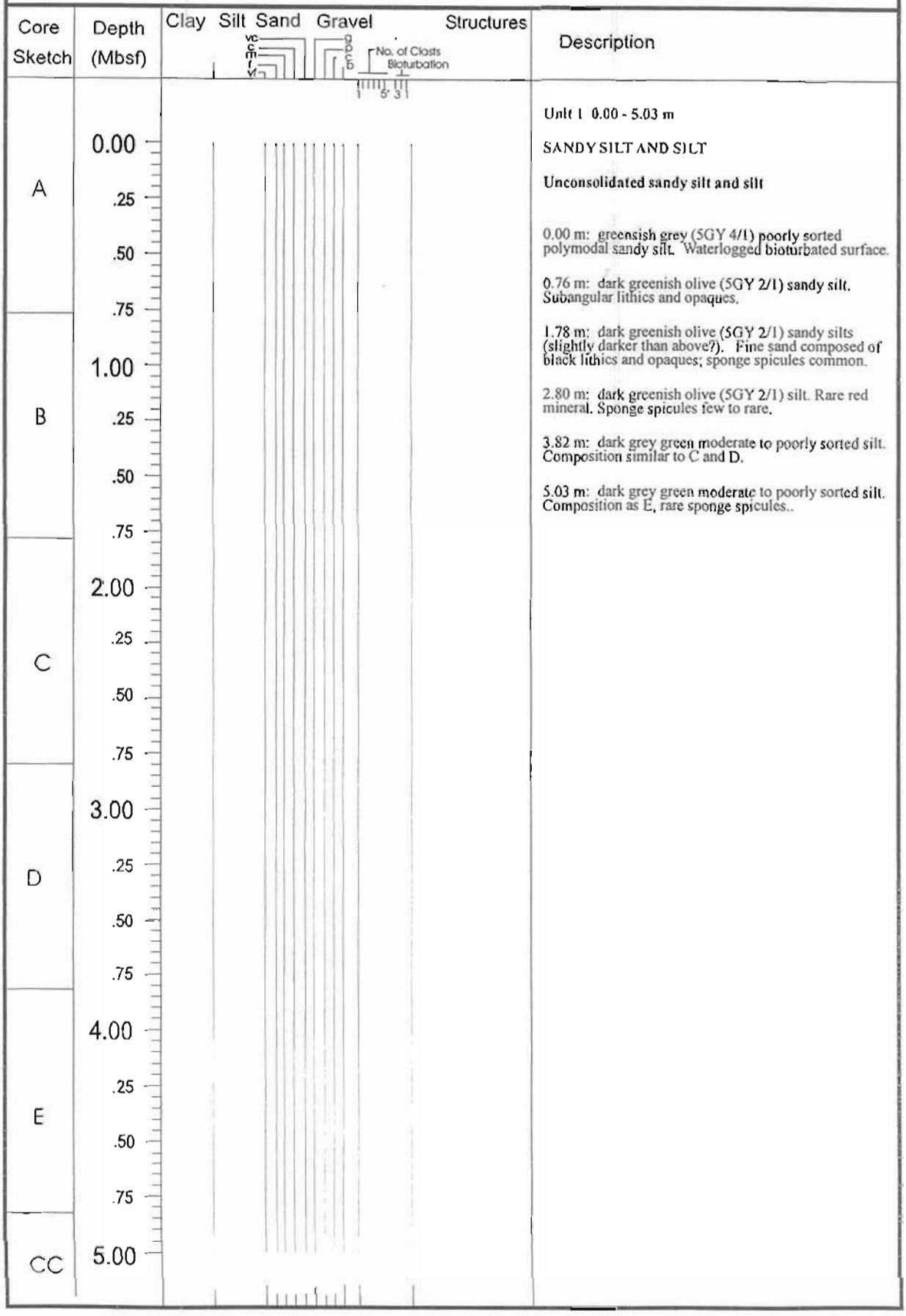
4.16 m: a.a.

5.37 m (CC): a.a., with common sponge spicules.

Station No: JR29 - 051 Lat/Long (dm): 62 11.40 S 058 22.35 W

Core No: VC - 186 Locality: Admiralty Bay WD: 520 m

Date/Time (GMT): 23-02-98 02:00 Comments:



Description

Unit I 0.00 - 5.03 m

SANDY SILT AND SILT

Unconsolidated sandy silt and silt

0.00 m: greensish grey (5GY 4/1) poorly sorted polymodal sandy silt. Waterlogged bioturbated surface.

0.76 m: dark greenish olive (5GY 2/1) sandy silt. Subangular lithics and opaques.

1.78 m: dark greenish olive (5GY 2/1) sandy silts (slightly darker than above?). Fine sand composed of black lithics and opaques; sponge spicules common.

2.80 m: dark greenish olive (5GY 2/1) silt. Rare red mineral. Sponge spicules few to rare.

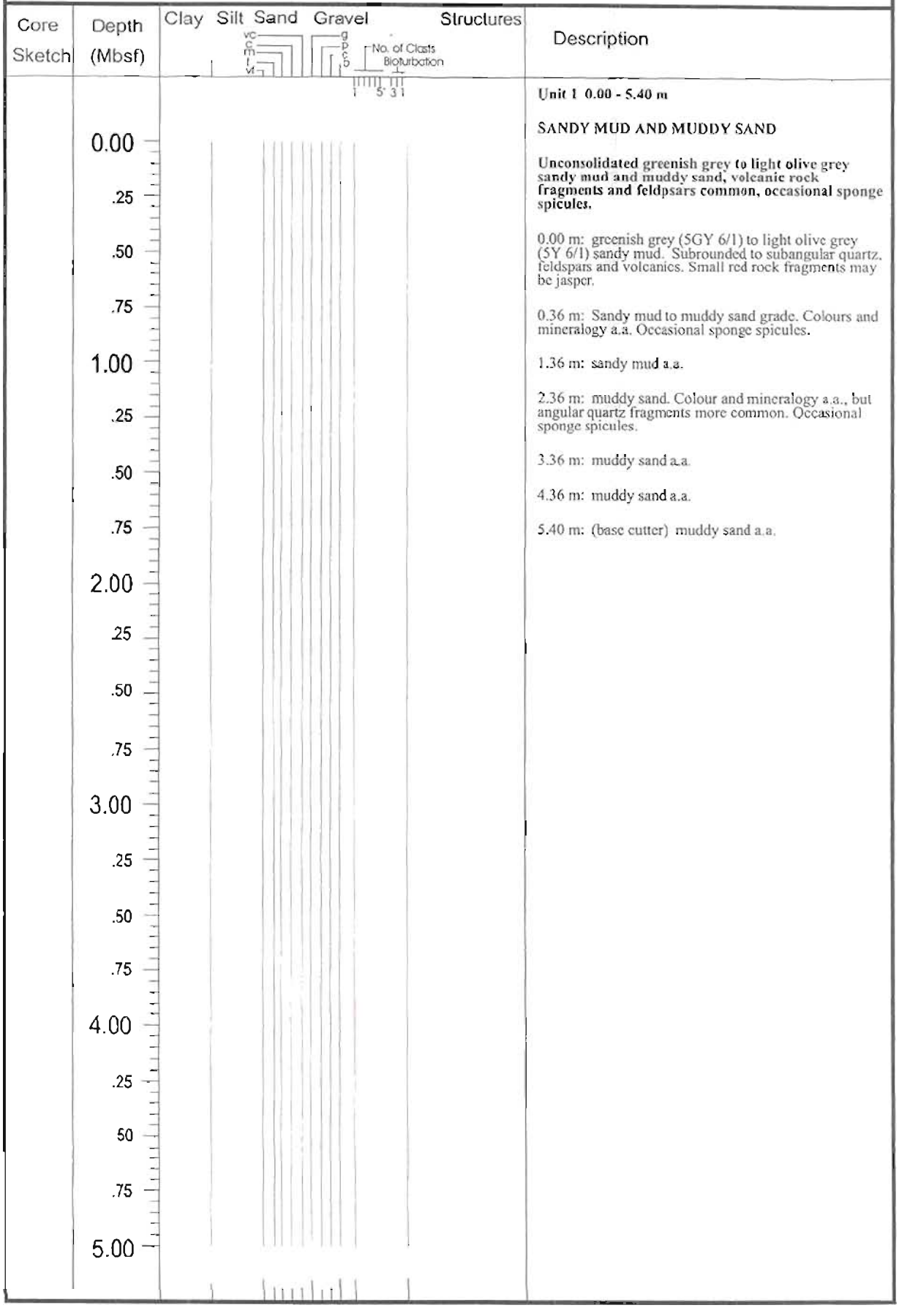
3.82 m: dark grey green moderate to poorly sorted silt. Composition similar to C and D.

5.03 m: dark grey green moderate to poorly sorted silt. Composition as E, rare sponge spicules..

Station No: JR29 - 029 Lat/Long (dm): 62 08.29 S 058 00.85 W

Core No: VC - 155 Locality: King George Bay WD: 426 m

Date/Time (GMT): 20-02-98 07:31 Comments:



Description

Unit 1 0.00 - 5.40 m

SANDY MUD AND MUDDY SAND

Unconsolidated greenish grey to light olive grey sandy mud and muddy sand, volcanic rock fragments and feldpsars common, occasional sponge spicules.

0.00 m: greenish grey (5GY 6/1) to light olive grey (5Y 6/1) sandy mud. Subrounded to subangular quartz, feldspars and volcanics. Small red rock fragments may be jasper.

0.36 m: Sandy mud to muddy sand grade. Colours and mineralogy a.a. Occasional sponge spicules.

1.36 m: sandy mud a.a.

2.36 m: muddy sand. Colour and mineralogy a.a., but angular quartz fragments more common. Occasional sponge spicules.

3.36 m: muddy sand a.a.

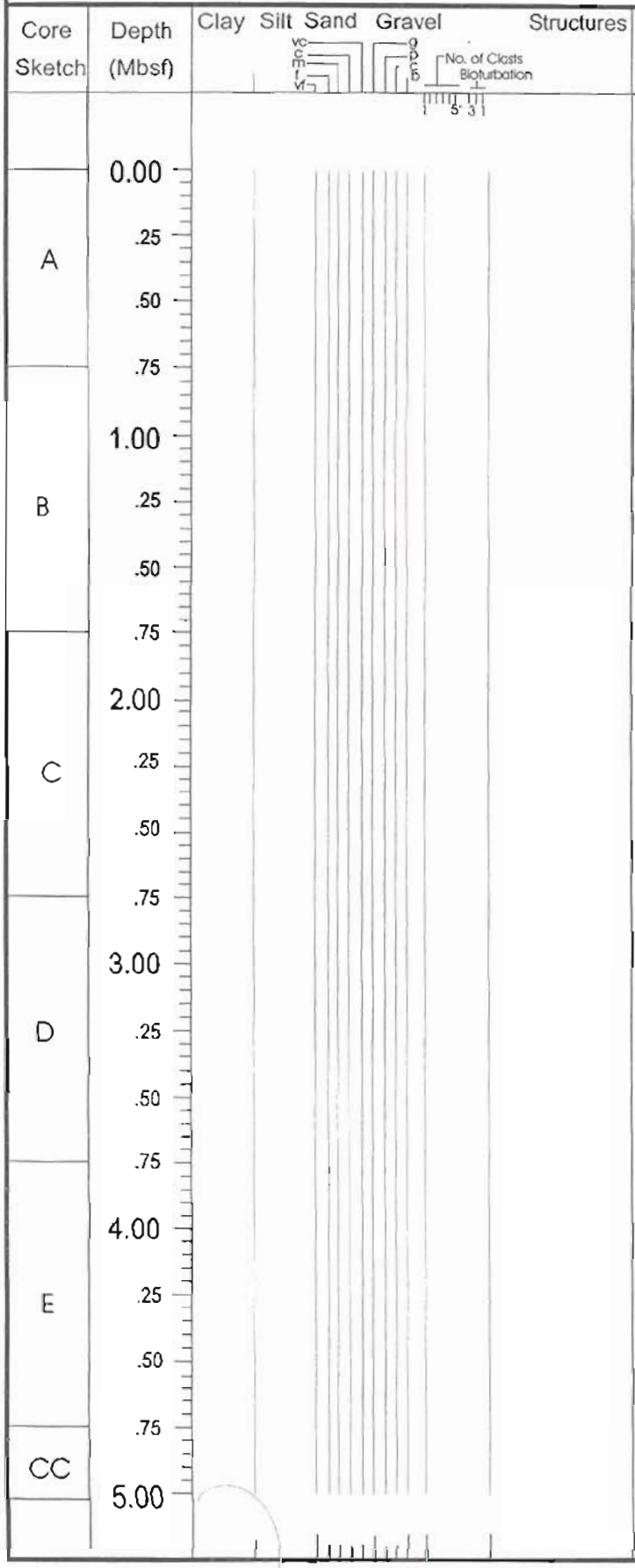
4.36 m: muddy sand a.a.

5.40 m: (base cutter) muddy sand a.a.

Station No: JR29 - 030 Lat/Long (dm): 62 07.99 S 058 01.45 W

Core No: VC - 156 Locality: King George Bay WD: 446 m

Date/Time (GMT): 20-02-98 09:10 Comments:



Structures

Description

Unit I 0.00 - 4.95 m

SANDY MUD

Unconsolidated sandy mud

0.00 m: light olive grey (5Y 6/1) sandy mud. Sand is subrounded to subangular and consists of black lithics, quartz, feldspar and jasper (?). Occasional sponge spicules.

0.75 m: a.a., but higher sand content and more sponge spicules. Sand is also slightly coarser than above with more angular quartz grains. Occasional diatoms?

1.75 m: as 0.00 m.

2.75 m: as 0.00 m. Occasional diatoms, poss. forams.

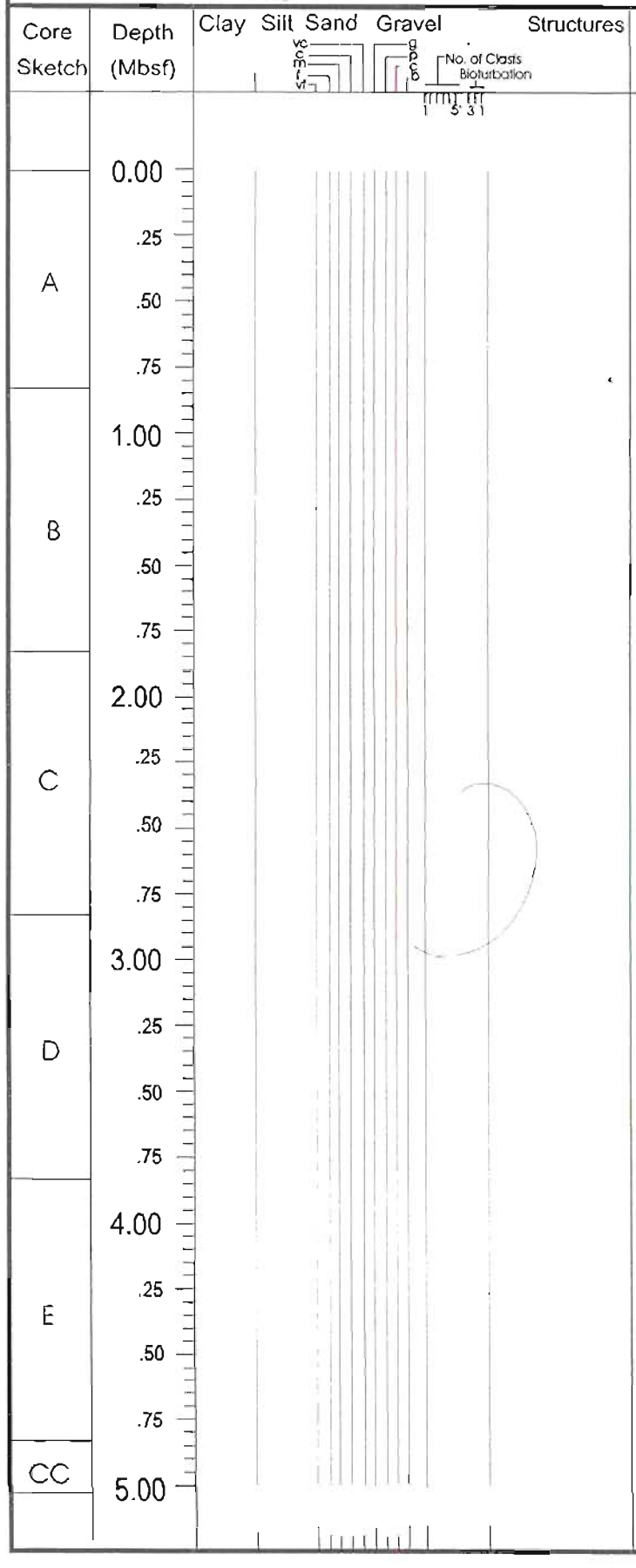
3.75 m: dark greenish grey sandy mud (5G 4/1). Sand composition a.a.

5.01 m (CC): olive grey (5Y 4/1) sandy mud. Sand composition a.a. Gastropod.

Station No: JR29 - 031 Lat/Long (dm): 62 07.27 S 058 03.25 W

Core No: VC - 157 Locality: King George Bay WD: 397 m

Date/Time (GMT): 19-02-98 11:02 Comments:



Description

Unit 1 0.00 - 5.01 m

SANDY MUD

Unconsolidated sandy mud

0.00 m: olive grey (5Y 3/2) sandy mud. Fine sand is poor to moderately sorted, subrounded to subangular black lithics, quartz, feldspar, jasper (?) and occasional sponge spicules.

0.83 m: olive grey (5Y 3/2) sandy mud a a.

1.83 m: olive grey (5Y 3/2) sandy mud a.a, with higher sponge spicules.

2.83 m: olive grey (5Y 3/2) sandy mud a.a.

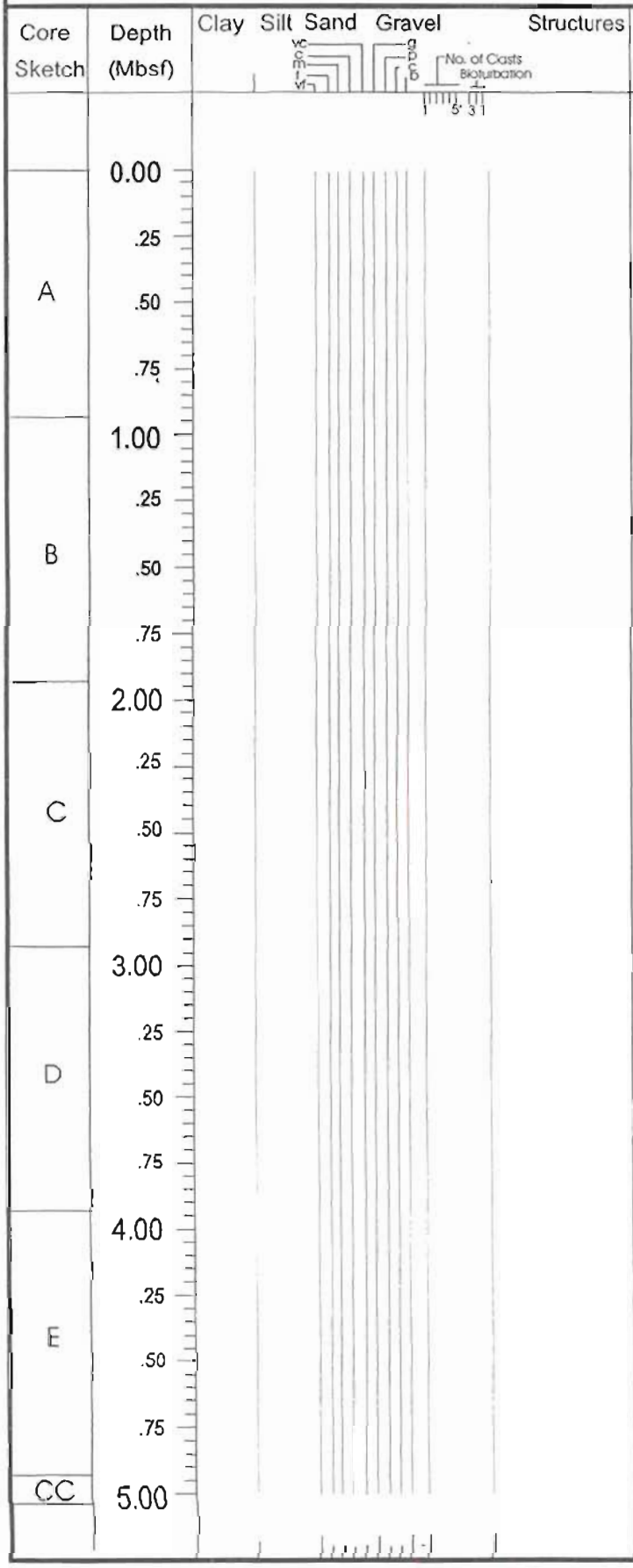
3.83 m: olive grey (5Y 3/2) sandy mud a.a.

5.01 (CC) m: light olive grey (5Y 6/1) to greenish grey (5GY 6/1) sandy mud. Sand is moderately sorted subangular to subrounded and consists of black lithics, feldspars, quartz and jasper (?).

Station No: JR29 - 032 Lat/Long (dm): 62 06.49 S 058 04.79 W

Core No: VC - 158 Locality: King George Bay WD: 360 m

Date/Time (GMT): 20-02-98 13:59 Comments:



Structures

Description

Unit I 0.00 - 5.03 m

SANDY MUD AND SILTY SAND

Unconsolidated sandy mud and basal silty sand.

0.00 m: olive grey (5Y 4/1) sandy mud. Fine sand is subrounded to subangular, largley volcanic with quartz and jasper in smaller amounts

0.93 m: dark greenish grey (5GY 4/1) sandy mud. Sand composition a.a.; sponge spicules.

1.93 m: dark greenish grey (5GY 4/1) sandy mud. a.a., but sand not so well sorted and grain size is very fine to fine sand.

2.93 m: dark greenish grey (5GY 4/1) sandy mud. As 0.93 m, but sponge spicules abundant.

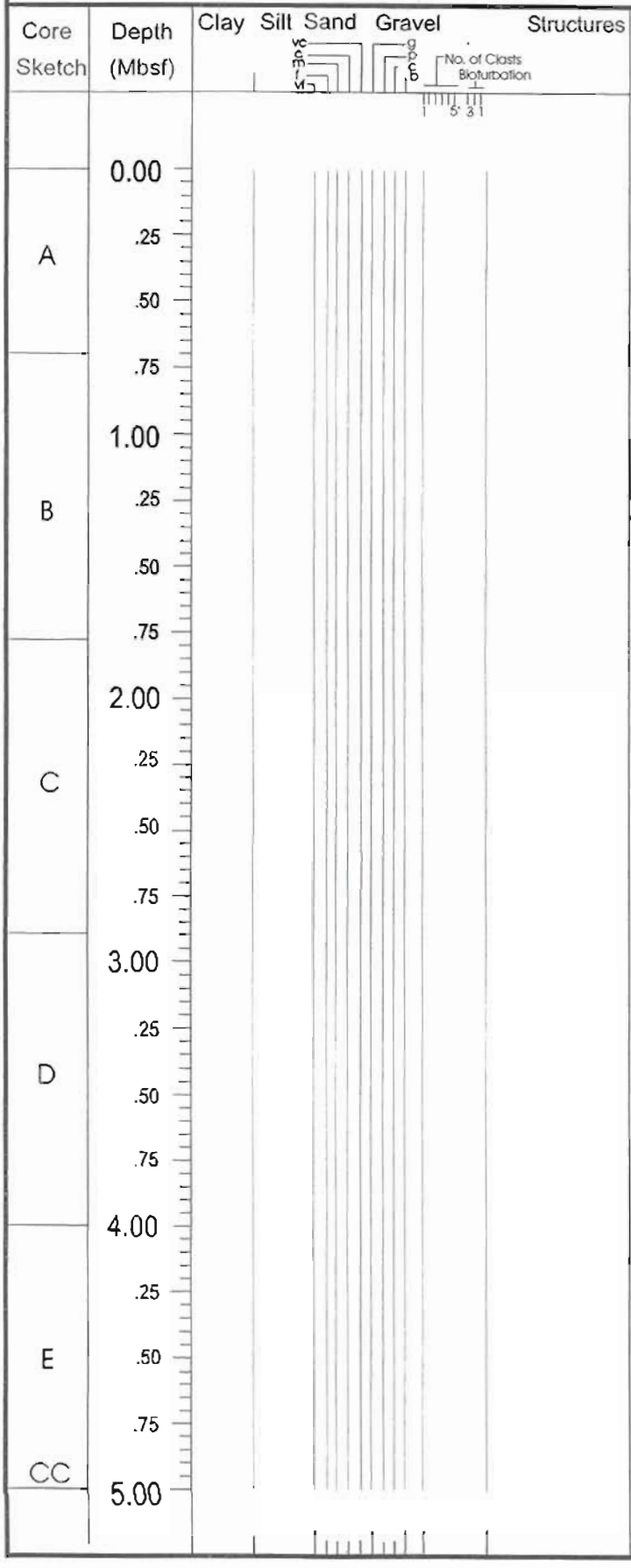
3.93 m: olive grey (5Y 4/1) poorly sorted sandy mud. Sand is very fine to medium grained.

5.03 m (CC): olive black (5Y 2/1) silty sand with angular quartz, lithics and sponge spicules.

Station No: JR29 - 033 Lat/Long (dm): 62 06.03 S 058 06.08 W

Core No: VC - 159 Locality: King George Bay WD: 306 m

Date/Time (GMT): 20-02-98 15:30 Comments:



Unit I 0.00 - ?5.00 m

SANDY MUD AND MUDDY SAND

Unconsolidated sandy mud and muddy sand

0.00 m: greenish grey (5GY 4/1) poorly sorted sandy mud. Black angular lithics, some quartz.

~0.70 m: olive black (5Y 2/1) poorly sorted sandy mud. >30% subangular black lithics and quartz. Occasional reddish mineral.

~1.77 m: olive black (5Y 2/1) poorly sorted sandy mud. >30% subangular black lithics and quartz. Occasional sponge spicules.

~2.90 m: olive black (5Y 2/1) poorly sorted sandy mud. Reduced black lithics and quartz; higher sponge spicules and bryozoa.

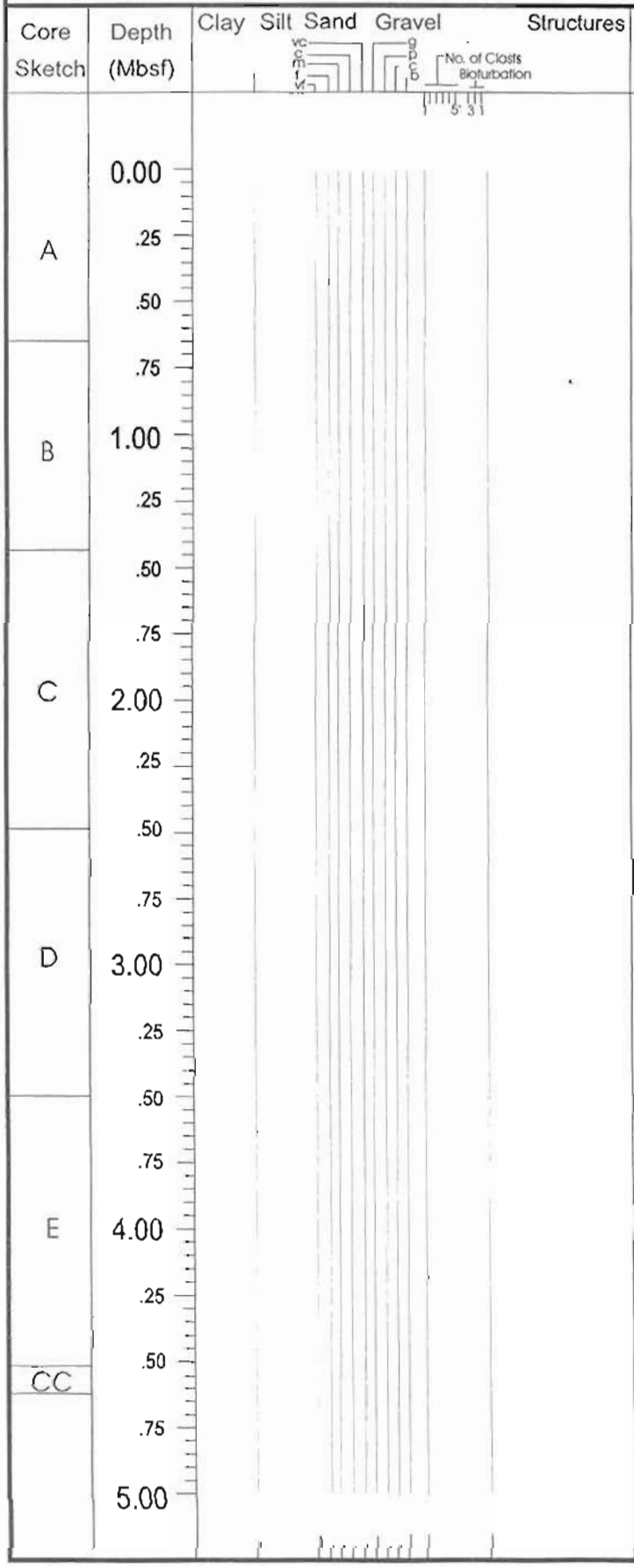
~4.00 m: greenish black (5YG 2/1) poorly sorted muddy sand. Abundant angular lithics and quartz; reddish mineral common. Occasional sponge spicules.

~5.00 m (CC): olive black (5Y 2/1) poorly sorted muddy sand. Angular black lithics and reddish mineral. Sponge spicules.

Station No: JR29 - 034 Lat/Long (dm): 62 05.60 S 058 06.94 W

Core No: VC - 160 Locality: King George Bay WD: 284 m

Date/Time (GMT): 20-02-98 17:10 Comments:



Description

Unit I 0.00 - 4.62 m

MUDDY SAND AND SANDY MUD

Unconsolidated muddy sand and sandy mud.

0.00 m: olive grey (5Y 4/1) poorly sorted muddy sand. Sand fraction consists of angular black lithics, quartz and sponge spicules, with occasional grains > 2mm.

~0.65 m: very dark brown (5YR 2/1) muddy sands. Sand fraction consists of subangular to angular black lithics (80%) and quartz. No sponge spicules observed.

~1.43 m: olive black (5Y 2/1) poorly sorted muddy sand. Sponge spicules present. Polymict sand.

~2.48 m: olive black (5Y 2/1) sandy mud. Subangular to angular black lithics; some subangular quartz <1mm.

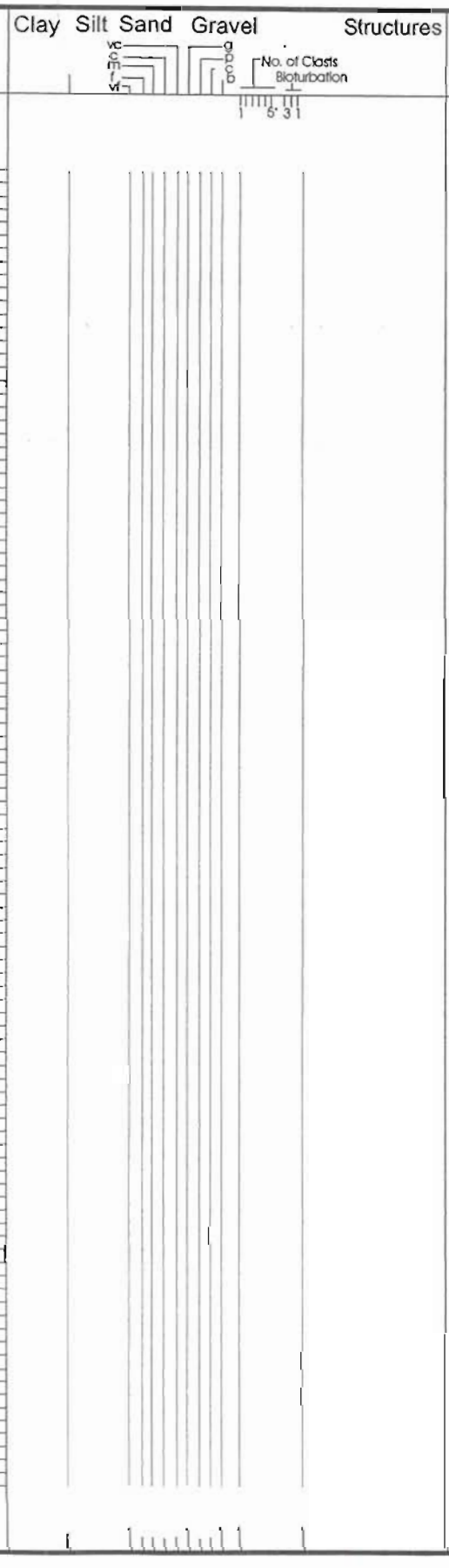
~3.50 m: olive black sandy mud. Subangular lithis; sponge spicules common.

~4.62 m (CC): olive black poorly sorted sandy mud. Subangular black lithics, quartz and sponge spicules.

Station No: JR29 - 035 Lat/Long (dm): 62 04.85 S 058 07.93 W

Core No: VC - 161 Locality: King George Bay WD: 240 m

Date/Time (GMT): 20-02-98 18:10 Comments:



Core Sketch	Depth (Mbsf)	Description
A	0.00	**Unit I 0.00 - 4.32 m**
		MUDDY SAND, SANDY MUD AND SAND
		Unconsolidated muddy sand, sandy mud and sand.
		0.00 m: greenish black (5GY 2/1) poorly sorted muddy sand. Black lithics and sponge spicules common. Burrowed surface.
B		0.51 m: black olive (5Y 2/1) poorly sorted sandy mud. Black lithics and quartz common. cf similar horizon in VC-160.
	1.00	1.27 m: moderatley sorted subangular to angular sand composed of quartz and lithics. Reddish mineral present.
C		2.28 m: greenish black (5GY 2/1) poorly sorted muddy sand. Subangular quartz and black lithics.
	2.00	3.30 m: a.a.
D		4.32 m (CC): a.a., sponge spicules common.
	3.00	
E		
	4.00	
CC		
	5.00	

Station No: JR29 - 036 Lat/Long (dm): 62 06.65 S 058 07.37 W

Core No: RDC - 162 Locality: King Gorge Bay WD: 080 m

Date/Time (GMT): 20-02-98 22:55 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf / g p c b) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00		Two pebbles of green quartzite and sea squirt recovered.

Station No: JR29 - 036 Lat/Long (dm): 62 06.65 S 058 07.37 W

Core No: RDC - 163 Locality: King George Bay WD: 080 m

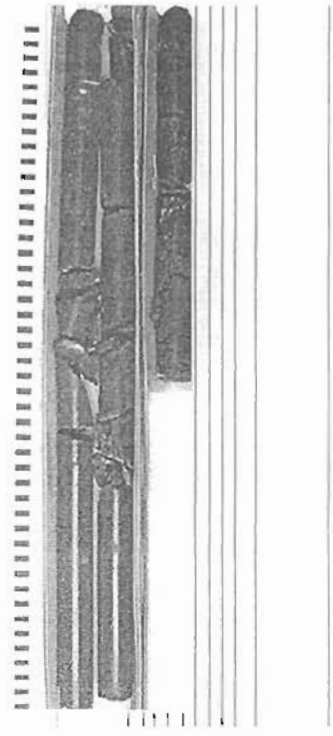
Date/Time (GMT): 20-02-98 23:30 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf / g p c b) Structures: No. of Clasts, Bioturbation (1 5 3 1)	Description
	0.00 .05 .10 .15 .55 0.60 .65 .70 .75 0.80 .85 .90 .95 1.00		Assorted pebbles recovered.

Station No: JR29 - 037 Lat/Long (dm): 62 06.69 S 058 07.37 W

Core No: RDC - 164 Locality: King George Bay WD: 095 m

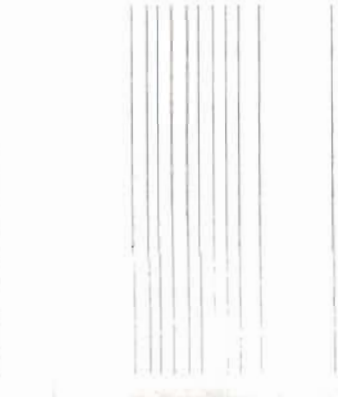
Date/Time (GMT): 21-02-98 00:34 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g p cb) No. of Clasts Bioturbation (1 5 3 1) Structures	Description
	0.00 .25 .50 .75 1.00 .25 .50 .75 2.00 .25		**Unit 1 0.00 - 2.34 m** **VOLCANIC BRECCIA AND AGGLOMERATE** **Consolidated volcanic breccia** 0.00 - 0.44 m: greyish black (N2) volcanic breccia. Poorly sorted clasts up to 5 cm are subrounded to angular volcanics of several types: dark greenish grey (5G 4/1), black (N1), dark red (5R 7/1). 0.44 - 1.28 m: greyish black (N2) agglomerate with rounded to subrounded greenish grey (5GY 6/1) and light olive grey (5Y 5/2) crystals up to 1.5 cm. Occasional black clasts < 4mm. 1.28 - 2.34 m: as 0.00 - 0.44 m, but smaller clast size (generally <2cm). Base of core marked by fracture with pale olive (10Y 6/2) crystallisation.

Station No: JR29 - 038 Lat/Long (dm): 62 07.27 S 058 06.29 W

Core No: RDC - 165 Locality: King George Bay WD: 147 m

Date/Time (GMT): 21-02-98 06:00 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel (vc c m f vf; g p cb) No. of Clasts Bioturbation (1 5 3 1) Structures	Description
	0.00 .05 .10 .15 0.20		**Unit 1 (depth n/a)** **PEBBLES** **Unconsolidated volcanic and volcaniclastic pebbles** Three pebbles of greyish black (N2) volcanic/volcaniclastic rock showing abundat light olive grey (5Y 5/2) crystals. Single pebble of crystalline volcanic rock, showing ligt greenish grey (5GY 8/1) feldspars up to 4mm. Some angular clasts up to 3 cm, giving a brechiodal aspect are included. A fracture surface covered with a moderate yellow (5Y 7/6) precipitate is preserved.

Station No: JR29 - 038 Lat/Long (dm): 62 07.27 S 058 06.29 W

Core No: RDC - 166 Locality: King George Bay WD: 143 m

Date/Time (GMT): 21-02-98 06:55 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10	vc c m f vf g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit I (depth n/a)** **VOLCANICLASTIC CORE AND PEBBLES** **Volcanic core and pebbles of sedimentary and volcanic origin.** Greyish black (N2) volcaniclastic core fragment with subrounded to subangular clasts up to 1mm. Pebbles of 2-5mm are volcanic and fine sandstone

Station No: JR29 - 039 Lat/Long (dm): 62 07.31 S 058 06.14 W

Core No: RDC - 167 Locality: King George Bay WD: 182 m

Date/Time (GMT): 21-02-98 08:00 Comments:

Core Sketch	Depth (Mbsf)	Clay Silt Sand Gravel Structures	Description
	0.00 .05 .10 .15 0.20 .25 .30 .35 0.40 .45 .50 .55	vc c m f vf g p c b No. of Clasts Bioturbation 1 5 3 1	**Unit I (depth n/a)** **MODERN DIAMICT** **Unconsolidated seafloor sediment** Split into two fractions: Finer fraction: poorly sorted greyish black (N2) very coarse sand and granules. Polymict composition of subrounded to subangular greyish black volcanic rock (70%), quartz (20%) and a red/green mineral (jasper and jadeite?). Coarser fraction: medium to very large pebbles (0.8 - 4 cm), poorly sorted, angular to rounded: 40% greyish black volcanic rock with clear crystals up to 3mm. 40% greyish black fine grained sandstones and siltstones. 8% dark grey crystaline volcanic rock. 8% dark greenish grey (5GY 4/1) crystalline volcanics. 2% (2 clasts) volcanic rock with abundant small "geodes" containing reddish and white crystals. 1% (1 clast) of agate and jadeite. 1% (1 clast) quartz.