Dredge 23

USGS DREDGE LOG

SHIP/LEG FARNELLA

STATION # 37

DREDGE # D23

DATE JD 271 LOCAL 28 Sept 1985

TIME GMT 1054 LOCAL 2254

DEPTH INTERVAL(m) 1405-1305

DEPTH(m)corrected 1390-1300

LATITUDE 08° 52.0 TO 08°51.71 N

LONGITUDE 163°10.3 TO 163°10.6 E

TOTAL WEIGHT: DREDGE 70 CRUST 40

PERCENTAGE OF ROCK COVERED BY CRUST 100

PERCENT BROKEN FROM: OUTCROP 100 TALUS 0

THICKNESS OF MN CRUST: MAXIMUM 90 MINIMUM 5 AVERAGE 60

DOMINANT SURFACE TEXTURE Botryoidal + Smooth

SUBSTRATE LITHOLOGY Breccia

V. C and Pebble fragments - pebble-size in phosphatic cement

NODULES PRESENT 0

REMARKS: 1 large boulder w/ substrate; 2 small boulders, misc. w/ substrate the others only Crust; 8 crust cobbles, many pebbles of Crust + some w/ substrate

Dredge 3 ple Summary Sheet

Sample ID	Bulk CC	Layer CC	Pt & Au	REE	OC	DPTS/TS	XRD	35mm Ph	Archive	Paleo
~~U~~ ??										
D23-1	✓	✓ *	(2/3	to KORDI)			✓			
D23-2	1/2 TO KORDI									
~~but ??~~ D23-3	✓									
D23-4										
D23-5	1/2 TO	KORDI								
~~Samples in Lab~~ D23-6	✓	✓	✓	✓	✓	✓	✓	✓		
D23-7	2/3 TO	KORDI								
D23-8	1/2 TO	KORDI								
D23-9	1/2 TO	KORDI								
D23-10	1/2 TO	KORDI			✓					
D23-11										

* need to weigh D23-1D

USGS DREDGE LOG

Depth Interval ~~1400~~ 1390-1300

Cruise I.D. F10-89-CP

Station No. 37

Dredge No. 23

Julian Date 271

Local Date (m/d/y) _____

Chief Scientist Hein/Kang

Tech on Watch Corkie

	On Station	Dredge on Btm	Dredge off btm	Off Station
GMT	0851	0934	271/1054	271/1118
LATITUDE	08°52.3	08 52.0	08° 51.71 N	08° 51.53 N
LONGITUDE	163 10.3	163 10.3	163° 10.60 E	163° 10.62 E
WATER DEPTH	1770	1405	1305	1300

Site Description and Target : ~~[illegible]~~

OPERATION*	GMT	DEPTH (m)	WIRE OUT (m)	TENSION	HDG/SPD	COMMENTS
Stopping payout	0916	1500	1400m			waiting to get to ~~[illegible]~~ 1400m dg
Paying out	0920	1425	1400m			holding position until on bottom
Moving up line	0928	1450	1700m			Will try to hit slope as we move up
On bottom	0934	1405	1700m			Continuing to move up slope
Small bites	0936	1380	"			Starting to dredge
Small bites	0945	1330	"	1.5, 1.5		-
"	0952	1315	1700m	3.6		
"	0954	1315	"	4.7		
Bite	0957	1310	1825m	5.1		Hung up reeling in
Broke	1006	1310	1726m	4.8		
Bite	1006	1310	1719	2.0		
Bite	1008	1310	1719	2.5		
Bite	1010	1310	1719	3.9		
Bite	1012	1310	1719, 1740	2.8		hung up pay out 20m
Bring in wire	1014	1305		2.2, 2.8		kick off
Hung ~~Bite~~	1015	1305	1721	5.0		paying out 20m & bringing
Slipped off	1018	1305	1729	2.6, 2.1, 2.0, 2.0, 2.0, 2.2		
Bites.	1019	1305	1729	2.0		

*on/off bottom, bites, etc.

OTHER COMMENTS:

USGS DREDGE LOG

Depth Interval _____ Julian Date 271

Cruise I.D. F10-89-CP Local Date (m/d/y) _____

Station No. 37 Chief Scientist Alin/Kang

Dredge No. 23 Tech on Watch Corkie

	On Station	Dredge on Btm	Dredge off btm	Off Station
GMT			271/1054	
LATITUDE			08° 51.71 N	
LONGITUDE			163 10.60 E	
WATER DEPTH			1305	

Site Description and Target : _____

OPERATION*	GMT	DEPTH (m)	WIRE OUT (m)	TENSION	HDG/SPD	COMMENTS
Bite	1020	1300	1720	2.5		
Bite	1021	1300	1720	5		paying out wire 1740
Bite	1023	1300	~~1740~~ 1734	3.4, 2.0		came off
Bite	1024	1300	1725	2.5		
Hung	1024	1300		5.8		pay out wire
Hung	1025	1300	1750			" " " now retrieve
	1026	1300	1745	2.9, 2.6		off
Hung	1027	~~1295~~ 1300	1755, 1746	5.1		1765 stop ~~1760~~
	1044	~~1305~~ 1305	1650	4.1		off
Bite	1048	1310	1561	2.3, 2.1, ~~2.0~~		
Bite	1049	1310	1545	2.9		
OFF Bottom	1054	1305	1350			
~~OFF~~ End Sta	1118					

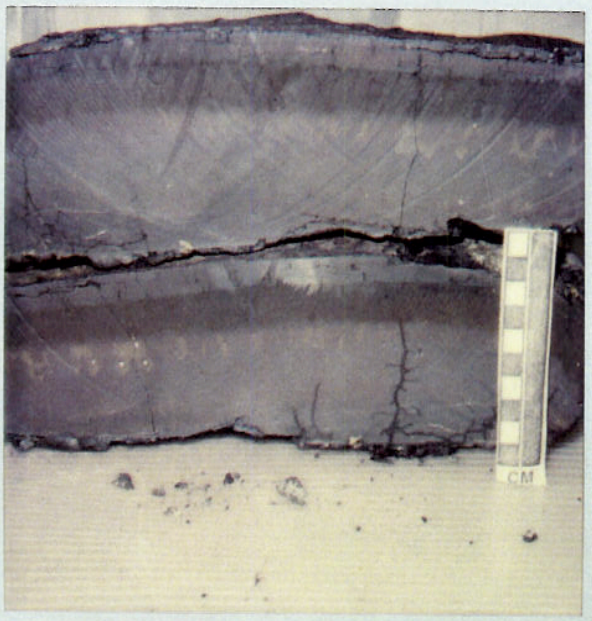
*on/off bottom, bites, etc.

OTHER COMMENTS:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 42 x 29 x 18 (cm) Location: Hezen Seamount

Sample Id: D23-1 Weight: 15 (kg) Depth: 1390-1300 (m)



Mn Crust Description

Surface Texture: Smooth to smoothed botryoidal one area has veins or rills that stand above the surface, microbotryoid.

Mn Crust Thickness (mm):
Min: 70 Max: 92 Ave: 80

Layers (Outer to Inner) (mm):

	Min	Max	Ave	Texture & Color
inner 1.	40	60	50	Dense, massive, phosphate partings in lower 10mm, upper 15 to 20mm has dominant botryoid columns w/ minor porosity
2.	15	20	Columner 17	layer of minor wavy lamination, moderately dense, this layer retains water more than upper or lower
outer 3.	7	12	9	layer of dense laminations, easily friable - 3 smaller layers
5.				
6.				

Comments and XRD Mineralogy:
the outer crust is so smooth and dense I have the suspicion that an outer surface was broken off. If this is the case it occured some time ago as shown by the forams and microbotryoids

ANALY

D 23-1 ; F10-89-CP

Subsample Number		Analysis	Layer Thickness
D23-1A	CC	Bulk	0 - 82 mm (>200gm
D23-1B	CC	Layer 1	0 - 10 mm (27.6gm
D23-1C	CC	Layer 2	10 - 27 mm (27.7gm
D23-1D	CC	Layer 3	27 - 79 mm (127gm

2/3 To KORDI

Se Won Chang took Subsample

Substrate Description

Rock Type: None

Description:

Biology ?: encrusting forams

Described By: Schulz Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP 2 cobbles Size: 18×13×5 23×15×5.5 (cm) Location: G Seamount

Sample Id: D23-2 Weight: 2 kg (kg) Depth: 1390-1300 (m)

Mn Crust Description

Surface Texture: Botryoidal

small part of the older part of crust (may have been) removed

Mn Crust Thickness (mm):
Min: ~16 Max: 57 Ave: 50

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	5	15	10	Massive and partially porous
2.	4	14	9	Highly porous
3.	7	15	11	Slightly porous
4.	lower part cut off		24	Massive and dense
5.				
6.				

Comments and XRD Mineralogy:
- Pores in layer 2 filled with iron oxide and phosphorite
- Basalt fragments included in layer 4.

ANALY D23-2; F10-89-CP

Subsample Number Analysis Layer Thickness

≈ ½ TO HORDI

Substrate Description

Rock Type: Trace of breccia (?)

Description:

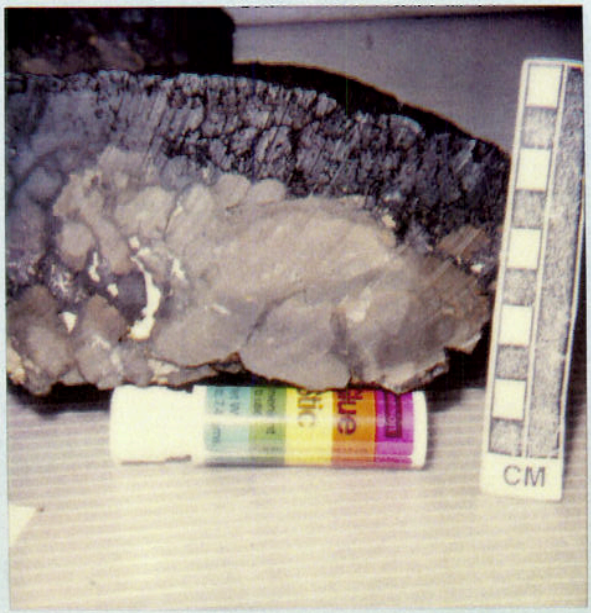
Biology ?: Encrusting forams

Described By: Yoon Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 20 X 18 X 8 (cm) Location: G Seamount

Sample Id: D23-3 Weight: ~2 (kg) Depth: 1390-1300 (m)



D23-3; F10-89-CP

Mn Crust Description

Surface Texture: Granular to botryoidal

Mn Crust Thickness (mm):
Min: 18 Max: 32 Ave: 25

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.				
2.				
3.				
4.				
5.				
6.				

Comments and XRD Mineralogy:
- Highly porous and partially massive
- Tiny pores filled with iron oxide and rarely with phosphorite
- Small basalt fragments included in lower part

Mn intrudes into re-entrants in the basalt

Substrate Description

Rock Type: Altered basalt

Description:
- fractured; cracks filled with phosphorite; plagio. phyric with pyroxene relatively fresh - olivine (?) → ittinggite

Biology ?: Forams

ANALYS

Subsample Number	Analysis	Layer Thickness
D23-3	CC	Bulk (164g)

Sample went across 1 whole slab; including the re-entrants where Mn was denser & phosphate indurated.

Substrate from 1" slab to M Pringle for Plag separate → may need more substrate eventually

Rock Taken Ar-Ar, Isotopes Staudigel

Described By: Yoon Subsampled By: Schulz

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: ~8×10×6 (cm) Location: Hezen Seamount
10×6×6

Sample Id: D23-4 Weight: ~2 (kg) Depth: 1390-1300 (m)

Mn Crust Description
Surface Texture: Botryoidal to granular, porous

Mn Crust Thickness (mm):
Min: 30 Max: 70 Ave: 40

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
piece 1 1.		70	70	very porous & Fe stained outer 10mm, below massive, dense
piece 2 2.	30	50	30	porous outer 10-15 mm, gradually more massive below
3.				
4.				
5.				
6.				

NO Photo

Comments and XRD Mineralogy:

ANALYSES

Subsample Number	Analysis	Layer Thickness

Substrate Description
Rock Type: Breccia

Description:
limestone & Phosphate (Hbrown colored) cemented, cobbles of altered massive basalts
minor phenocrysts (plag & olv) / piece
may be flow banded

Biology ?:

Described By: Schulz Subsampled By:

SAMPLE DESCRIPTION

7 Cobbles & pebbles

Cruise Id: F10-89-CP Size: ~5x5x4 (13x8x7) (cm) Location: G Seamount

Sample Id: D23-5 Weight: ~2kg (kg) Depth: 1390-1300 (m)

Mn Crust Description

Surface Texture: Botryoidal to irregular
Upper surface partly removed
x older parts are also partly removed in some pieces

Mn Crust Thickness (mm):
Min: 20 Max: 70 Ave: 45

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	9	13	11	massive and slightly porous
2.	3	7	5	Highly porous
3.	11	13	12	slightly porous
4.	lower part partly cut off		35	Massive and dense
5.				
6.				

LAYERS ARE FROM ONE SAMPLE AND DON'T REFLECT THE WHOLE GROUP

NO PHOTO

Comments and XRD Mineralogy:
- Generally massive and dense texture
- One sample shows all 4 layers
- The other samples shows only two layers; 1 and 2 layers or 3 and 4 layers

ANALYSES

Subsample Number	Analysis	LayerThickness
	½ to XRDI	

Substrate Description

Rock Type: Absent

Description:

Biology ?: Forams

Described By: Yoon Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 38 x 40 X 18 (cm) Location: G Seamount

Sample Id: D23-6 Weight: 37 (kg) Depth: 1390-1300 (m)

Mn Crust Description
Surface Texture: Smoothed w/ mud-bite cracks
Botryoidal on sides

Mn Crust Thickness (mm):
Min: 80 / 20 Max: 95 / 40 Ave: 85 / 25
Top Side

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	3	11	10	Black, parallel cracks to bedding plane
2.	7	16	11	very porous, sl Fe stain, irregular
3.	12	17	15	Slightly porous, minute cracks no orientation
4.	40	55	48	Black, massive sl. Fe stain
5.				
6.				

Comments and XRD Mineralogy:
At least 4 layers
laminated outer half, Dense massive inner half

ANALYSES: D23-6; F10-89-CP

Substrate Description
Rock Type: Breccia

Description:
brown Basalt granules to medium Pebbles in a creamy to brown phosphorite cement w/ also veins

Biology ?:

Subsample Number	Analysis	Layer Thickness	
D23-6A:	XRD, CC (BULK), Pt (0-85mm)		105g
	REE (17.8g)		
D23-6B:	XRD, CC	(0-10mm)	19.8g
	REE (6.0g)		
D23-6C:	XRD, CC	(10-22mm)	12.4g
	REE (5.5g)		
D23-6D:	XRD, CC	(22-34mm)	26.8g
	REE (5.7g)		
D23-6E:	XRD, CC	(34-84mm)	72g
	REE (23.1g)		
D23-6F:	OC, XRD		56.7g

DPTS

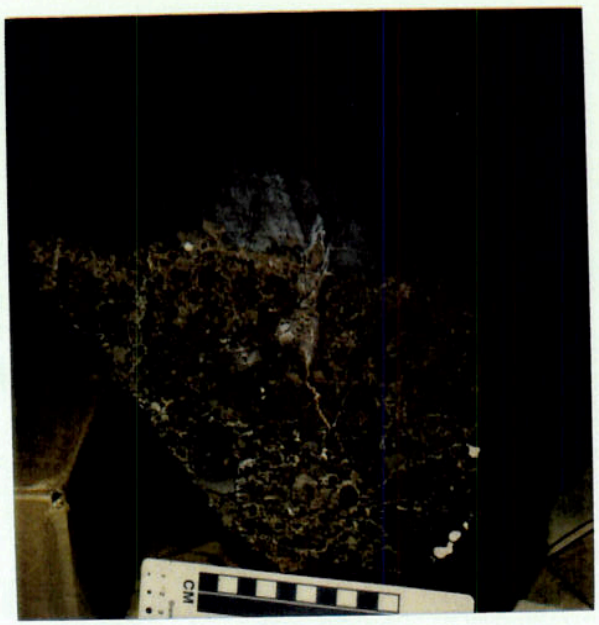
* GOOD FOR PALEOCEANOGRAPHY STUDIES. *

Described By: HEIN

Subsampled By: RD

1 2 3 4

D23.6
F10-89-CP



D23-6 F10-89-CP

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 26 X 16 X 41 (cm) Location: G Seamount

Sample Id: D23-7 Weight: 12 (kg) Depth: 1390-1300 (m)

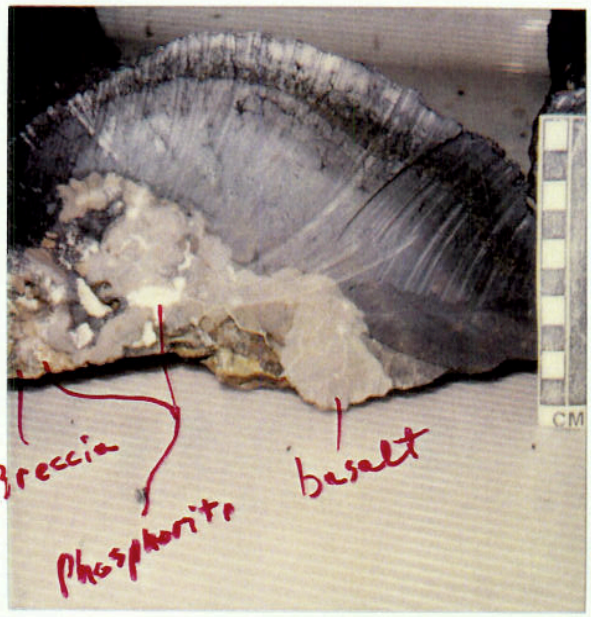
Mn Crust Description

Surface Texture: Subdued botryoidal to botryoidal & granular on sides

Mn Crust Thickness (mm):
Min: 28 Max: 90 Ave: 70

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	gradational		14	Dense, upper mm = recent botryoid
2.	sharp		8	V. Porous
3.	gradational		16	Layered, Columnar
4.			35	Black, dense, massive
5.				
6.				



Comments and XRD Mineralogy:
All Layers fractured

ANALY D23-7; F10-89-CP

Subsample Number	Analysis	LayerThickness

2/3 TO Kordi

Substrate Description

Rock Type: Breccia – Basalt

Description:
(cobble) large brown-gray basalt (clast?) w/ adjacent to pebble-size brown altered basalt clast, phosphorite cement (w/ Mn) breccia - Ocher i. patches

Biology ?: of cream phosphorite + veins in basalt

Described By: HEIN

Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: ~3×4×1.5 (cm) 8×8×4 (clayed) Location: G Seamount

Sample Id: D22-8 Weight: 0.5 kg (kg) Depth: 1390-1300 (m)

Mn Crust Description

Surface Texture: Botryoidal (< 10mm)
- older part of crust removed

Mn Crust Thickness (mm):
Min: 15 Max: 45 Ave: 30

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	3	5	4	Massive and dense
2.	10	18	14	Highly porous
3.	lower part removed		20	Massive and dense
4.				
5.				
6.				

gradational
gradational

NO PHOTO

Comments and XRD Mineralogy:
- Layer 2 : pores filled with iron oxide and phosphorite
- Layer 3 : thin phosphoride veinlets and basalt fragments included

ANALYSES

Subsample Number	Analysis	LayerThickness

½ TO HORDI

Substrate Description

Rock Type: Absent

Description:

Biology ?:

Described By: Yoon Subsampled By:

SAMPLE DESCRIPTION

small to large

Cruise Id: F10-89-CP Size: Pebbles" (cm) Location: G Seamount

Sample Id: D23-9 Weight: 1.8 kg (kg) Depth: 1390-1300 (m)

Mn Crust Description

Surface Texture: Outer Crusts Smooth to botryoidal

Mn Crust Thickness (mm):

Min: 5 Max: 33 Ave: 15

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.				
2.				
3.				
4.				
5.				
6.				

NO Photo

Comments and XRD Mineralogy:

about 75 incomplete Crust fragments - inner, outer, and side fragments

ANALYSES

Subsample Number	Analysis	LayerThickness

½ TO ½ ORD

Substrate Description

Rock Type: Breccia trace on 1 pebble

Description:

Biology ?:

Described By: HEIN

Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: Pebbles ≈ 24 (cm) Location: G Seamount

Sample Id: D23-10 Weight: 1.5 (kg) Depth: 1370-1300 (m)

Mn Crust Description
Surface Texture: Patina to stain

Mn Crust Thickness (mm):
Min:_____ Max:_____ Ave:_____

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.				
2.				
3.				
4.				
5.				
6.				

NO photo

Comments and XRD Mineralogy:

≈24 Substrate Fragments

ANALYSES

Subsample Number	Analysis	LayerThickness
D23-10	OC	Bulk Breccia 30gm
		½ TO HORDI

Substrate Description
Rock Type: Breccia

Description: Brown altered Basalt clasts of granule to pebble size in phosphorite cement

Biology ?: —

Described By: HEIN

Subsampled By: Schwab

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: up to 20 mm (cm) Location: Hezen Seamount

Sample Id: D23-11 Weight: < 1 (kg) Depth: 1390-1300 (m)

Mn Crust Description

Surface Texture:

Mn Crust Thickness (mm):

Min: Max: Ave:

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.				
2.				
3.				
4.				
5.				
6.				

NO PHOTO

Comments and XRD Mineralogy:

Substrate Description

Rock Type:

Description: Siliceous sponge pieces, very fine strands associated w/ each piece.

Biology ?:

ANALYSES

Subsample Number	Analysis	LayerThickness

Described By: Schulz Subsampled By: