DREDGE 13

USGS DREDGE LOG

SHIP/LEG FARNELLA

STATION # 20

DREDGE # D13

DEPTH INTERVAL(m) 2130-2280

DEPTH(m)corrected 2130-2050

DATE JD 280 LOCAL 23 September 1989

TIME GMT 0826 LOCAL _____

LATITUDE 9°37.2' TO 9°37.3'

LONGITUDE 160°32.6' TO 160°33'

TOTAL WEIGHT: DREDGE 55Kg CRUST 15Kg

PERCENTAGE OF ROCK COVERED BY CRUST 95%

PERCENT BROKEN FROM: OUTCROP 98 TALUS 2

THICKNESS OF MN CRUST: MAXIMUM 90 mm MINIMUM < 1 mm AVERAGE 30 m

DOMINANT SURFACE TEXTURE irregular / polished & fluted / granular

SUBSTRATE LITHOLOGY 60% breccia and 30% limestone and 10% crust fragments

NODULES PRESENT 0

REMARKS: 3 boulders / several cobbles / crust fragments
no sponge fragments found

(F)

Dr[illegible]ge S[illegible]ple Summary Sheet

send from ~~sent for Paleo~~ →

Sample ID	Bulk CC	Layer CC	Pt & Au	REE	OC	DPTS/TS	XRD	35mm Ph	Archive	Paleo
D13-1										✓
D13-1-1	½ TO	KORD1								✓
D13-2	BASALT	TO M. PRINGLE		(END PIECE TO KORD1)						
D13-3	✓	✓		✓		✓	✓	✓		
D13-4	½ TO	KORD1								
D13-5										
D13-6	✓ (surface)									
D13-7	½ KORD1									
D13-8										
D13-9	½ TO	KORD1,	TWO PIECES TO SCHLANGER							
D13-10	ALL TO	KORD1	PEBBLE	TO M. PRINGLE						
D13-11										

USGS DREDGE LOG

Depth Interval 2130 - 2100 Julian Date 266

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

Station No. 20 Chief Scientist Hein/Kang

Dredge No. 13 Tech on Watch O'Toole

	On Station	Dredge on Btm	Dredge off btm	Off Station
GMT	0557	0641	0826	0904
LATITUDE	9 37.0	937.2	937.3	937.5
LONGITUDE	160 32.7	160 32.6	160 33.0	160 32.7
WATER DEPTH	2200	2130	~~2300~~ ~~2300~~ 2100	

Site Description and Target : _____

Rocks From ≈ 2130 - 2090

OPERATION*	GMT	DEPTH (m)	WIRE OUT (m)	TENSION	HDG/SPD	COMMENTS
On bottom	0641	2130	2305			Starting up line / letting out sc
Wire out	0656	1915	2800m			taking up slack
Starting to dredge	0718	1520	"			
Bites	0720	1560	"	2.4, 2.4		+ a few smaller ones
"	0722	1590	"	2.7, 2.3, 2.5		
"	0724	1480	"	3.1		
"	0726	1420	"	2.5, 2.5		
"	0728		"	3.2		
"	0730	1400	"	2.7		
"	0732		"	2.6		
Hung up	0733		"	6T		
Backing down	0745		~~288~~			trying to break it off
Still hung	0814	2100m	2378			Still backing down
Slipped off	0823	2255	2280			Bringing it up.
Off bottom	0826	2280	2270			

*on/off bottom, bites, etc.

OTHER COMMENTS:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 50x28x14 (cm) Location: Seamount F

Sample Id: D13-1 Weight: 13 (kg) Depth: 2130-2050 (m)

Mn Crust Description

Surface Texture: Botryoidal (irregular) / partially granular and smooth /

Mn Crust Thickness (mm):
Min: 0 Max: 8 Ave: 5

Layers (Outer to Inner)(mm):

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

F10-89-CP
D13-1

Comments and XRD Mineralogy:
Massive and slightly porous; pores filled with brownish iron oxide

Large Vugs + borings throughout the rock coated w/ Mn due to borings in host Lms

Substrate Description

Rock Type: Limestone

Description:
large and irregular-shaped cavities and cracks; black manganese spots pervasive = dendritic + diffusion along fractures

Biology ?: encrusting forams

ANALY

Subsample Number	Analysis	LayerThickness

end piece USGS
rest KORDI

Foram sand from vugs removed + put in plastic jar labled D13-1-1

USGS

Described By: Yoon Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 33X22X14 (cm) Location: [illegible]

Sample Id: D13-2 Weight: 11 (kg) Depth: 2130-2050 (m)

Mn Crust Description

Surface Texture: Botryoidal (small-scale) and partially granular: one side of botryoid polished & fluted by current action

Mn Crust Thickness (mm):
Min: 80 Max: 95 Ave: 87

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	20	25	23	Porous / brownish
2.	10	12	11	Massive and dense / black
3.	16	18	17	Porous / brownish micro fractured
4.	35	60	47	Massive and dense / black
5.				
6.				

This thick crust is encrusted by 2nd generation of Mn crust (2-8mm thick)

D13-2
F10-89-CP

Comments and XRD Mineralogy:
- Pores in layers 1 and 3 filled with iron oxide and phosphorite
- small basalt fragments (2x8mm) included in layer 3 + phosphorite clasts
- Cracks in layer 4 filled with cream-colored phosphorite ⊥ + //

Substrate Description

Rock Type: olivine, pyroxene basalt breccia cemented w/ phosphorite

Description: phosphorite-cemented breccia w/ basalt clasts up to 9 cm diameter. most altered w/ only pyx fresh, some cobble cores are fresher

Biology ?: forams

ANALYSI

Subsample Number	Analysis	LayerThickness
Rock Tower, Ar-Ar, Isotopes Staudigel		
	layers good for phosphate study	
Whole	basalt cobble, cut off end piece by malcolm	

Described By: Yvon Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 35x52x13 (cm) Location: F Seamount

Sample Id: D13-3 Weight: 20 (kg) Depth: 2130-2050 (m)

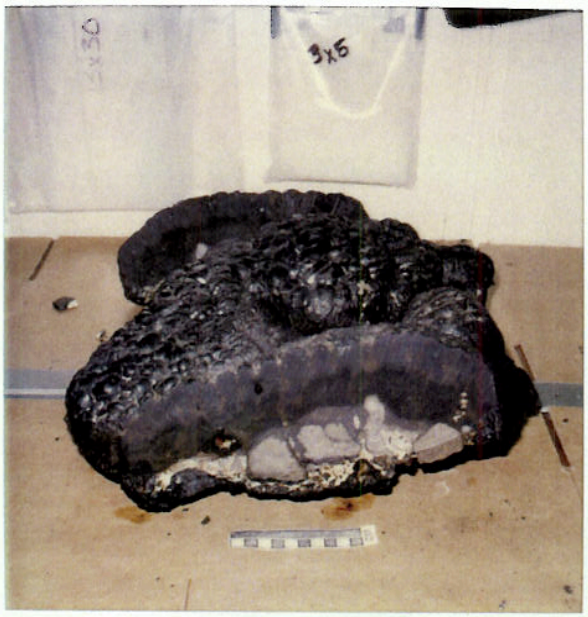
Mn Crust Description

Surface Texture: Botryoidal; one side of botryoid polished by current action. Mostly Polished + Fluted Surface -

Mn Crust Thickness (mm):
Min: 50 Max: 65 Ave: 57

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	20	25	23	Fe stain between botryoid domes Massive and dense
2.	20	30	25	Porous, laminated
3.	0	15	10	Massive and dense
4.				
5.				
6.				



F10-89-CP
D13-3

Comments and XRD Mineralogy:

Tiny pores filled with iron oxide separate botryoids in layer 1, surround clasts in layer 2, & line microcracks in layer 3

Substrate Description

Rock Type: olivine basalt breccia cemented by phosphorite & Mn-Fe oxides

Description:
olivine mostly altered; large basalt fragments encrusted thin (1-2mm) manganese Shark Teeth in cement, one cobble still has yellow-green olivine in center

Biology ?: forams

ANALY:

Subsample Number	Analysis	LayerThickness
(Jim Pringle will want to subsample cobbles in Menlo Park)		
D13-3A -	CC & REE	Bulk 0-55
D13-3B -	CC	Layer 1 0-20
D13-3C -	CC	Layer 2 - 20-43
D13-3D -	CC	Layer 3 - 43-55

DPTS

End Piece to HORDI

35 mm photos

Archive This Piece

Described By: Yoon Subsampled By: Jorie

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 12x9x4.5 7x6x3 (cm) Location: SEAMOUNT F

Sample Id: D13-4 Weight: 0.5 (kg) Depth: 2130-2050 (m)

Mn Crust Description

Surface Texture: IRREGULAR TO polished

Mn Crust Thickness (mm):
Min: <1 Max: 5 Ave: 2

Layers (Outer to Inner)(mm):

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

D13-4
F10-89-CP

Comments and XRD Mineralogy:
Manganese is coating limestone with patina to a thin coating.

ANALYS

Subsample Number	Analysis	Layer Thickness

Substrate Description

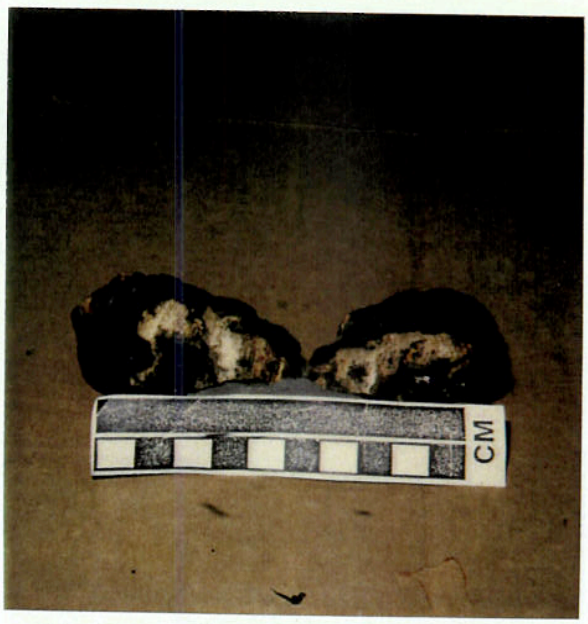
Rock Type: LIMESTONE

Description:
CREME TO BUFF COLOURED, POROUS TO VUGGY, IRON STAINING IN larger VUGS, dendritic manganese, manganese diffusing from fractures.

½ TO HARD

Biology ?:

Described By: R.O. Subsampled By:



D13-4
F10-89-CP

SAMPLE DESCRIPTION

6 Pieces (1 - large - used in petrographic)

Cruise Id: F10-89-CP Size: 11x9x2.5 11.5 x 9 x 2.5 (cm) Location: Seamount F

Sample Id: D13-5 Weight: ~1 (kg) Depth: 2130-2350 (m)

Mn Crust Description

Surface Texture: finely granular, friable

Mn Crust Thickness (mm):
Min: 10 Max: 30 Ave: 20

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	15	20	17	Black, porous, iron staining
2.	5	15	10	BLACK, DENSE, MASSIVE
3.				
4.				a little
5.				blacker in
6.				real life

Comments and XRD Mineralogy:

SOME OF THE CRUSTS ARE MISSING DENSE MASSIVE LAYER and all but one THE SUBSTRATE

Maybe mostly side pieces

ANALYS

Subsample Number	Analysis	Layer Thickness

Substrate Description

Rock Type: TWO SMALL PIECES HAVE SED. BRECCIA

Description:
POORLY SORTED; FINE TO COARSE GRAINED, ALTERED VOLCANICS. PHOSPHORITE CEMENT.

Biology ?: —

Described By: RO Subsampled By:

SAMPLE DESCRIPTION

14x9.x~.5 / 9x4x1

Cruise Id: F10-89-CP Size: cobbles (1+) (cm) Location: F Seamount

Sample Id: D13-6 Weight: ~2.5 (kg) Depth: 2130 - ~2150 (m)

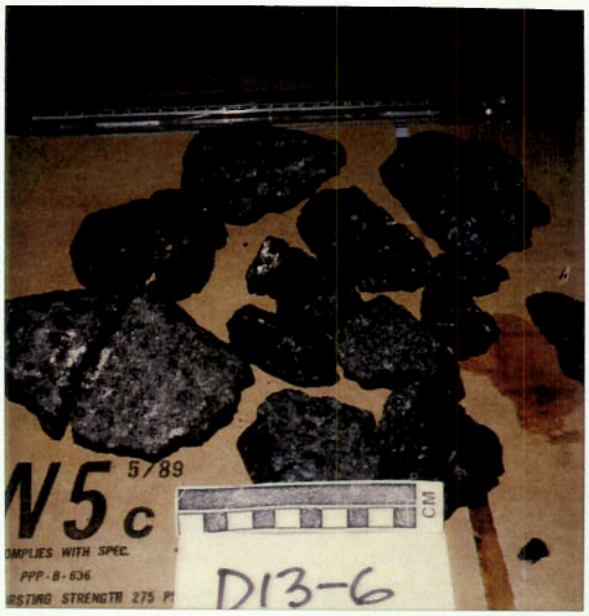
Mn Crust Description

Surface Texture: botryoidal to granular

Mn Crust Thickness (mm):
Min: 10 Max: 30 Ave: 15

Layers (Outer to Inner)(mm):

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



F10-89-CP
D13-6

Comments and XRD Mineralogy:
broken crusts w/ variable size. seems to be younger part layers of crust - older / underlying part missing or most

ANALYS

Subsample Number	Analysis	LayerThickness	
D13-6	CC	~0.5 mm	5.7 g

scraped surface of several pieces, some white material between the micro botryoids on a few of the samples.

Substrate Description

Rock Type: None

Description:

Biology ?: encrusting foram.

Described By: IAN G Subsampled By: JORIE

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 6 x 3 x 2 (small) 10 x 8 x 3 (largest) (cm) Location: F seamount

Sample Id: D13-7 Weight: ~65 (kg) Depth: 2130 - 2050 (m)

Mn Crust Description

Surface Texture: Smooth - fluted and polished under the current action; older part of crust removed except on 7 piece

Mn Crust Thickness (mm):
Min: 20 Max: 35 Ave: 25

Layers (Outer to Inner)(mm):

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

F10-89-CP
D13-7

Comments and XRD Mineralogy:

Slightly porous; tiny pores filled with brownish iron oxide and rarely with phosphorite

Substrate Description

Rock Type: Absent

Description:

Biology ?: forams

ANALY

Subsample Number	Analysis	LayerThickness

½ TO KORDI

Described By: Yoon Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: Assorted pieces small-medium pebbles (cm) Location: Seamount F

Sample Id: D13-8 Weight: 1 (kg) Depth: 2130-2050 (m)

Mn Crust Description

Surface Texture: granular to smooth

Mn Crust Thickness (mm):
Min: 5 Max: 20 Ave: 10

NO Picture

Layers (Outer to Inner)(mm):

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

Comments and XRD Mineralogy:
Fragments, pebble size
crust fragments

ANALYSES

Subsample Number	Analysis	LayerThickness

Substrate Description

Rock Type: none

Description:

Biology ?:

Described By: RO Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 4 Cobbles; 2 pebbles (cm) Location: F Seamount

Sample Id: D13-9 Weight: 2 total (kg) Depth: 2130-2050 (m)

Mn Crust Description

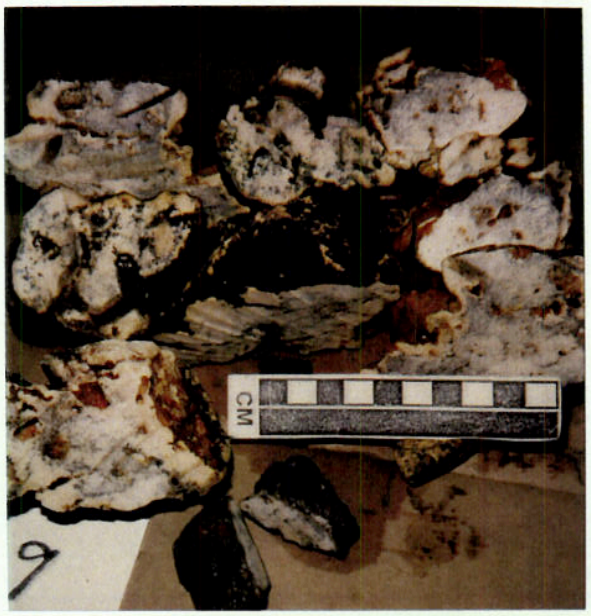
Surface Texture: 0 to patina

Smooth to granular

Mn Crust Thickness (mm):
Min: 0 Max: 2 Ave: <1

Layers (Outer to Inner)(mm):

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



F10-89-CP
D13-9

Comments and XRD Mineralogy:

some polished surfaces

ANALYS

Subsample Number	Analysis	LayerThickness

Substrate Description

Rock Type: limestone

Description:
dense massive nectal debris?
Surrounding Mn impregnated
Foram.? Lms - One pebble has a brown phosphorite(?)
Most pieces bored

½ TO HORDS
2 pieces to Sy Schlanger
coating of 1mm

Biology ?:

Described By: HEIN

Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 24 x 14 x 10 (cm) Location: F Seamount

Sample Id: D13-10 Weight: 2 (kg) Depth: 2130-2050 (m)

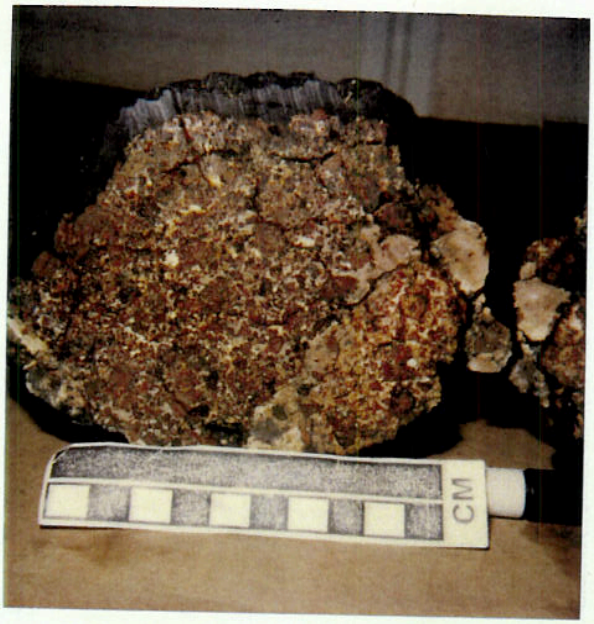
Mn Crust Description

Surface Texture: Polished + fluted to botryoidal granular on sides

Mn Crust Thickness (mm):
Min: 3 Max: 9 Ave: 6

Layers (Outer to Inner)(mm):

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



F10-89-CP
D13-10

Comments and XRD Mineralogy:
Massive black

ANALYSI

Subsample Number	Analysis	LayerThickness

Substrate Description

Rock Type: Breccia

Description: Clasts of highly altered sand to pebble sized brown basalt. < 1% grey basalt, in a creamy colored phosphorite cement

Biology ?: Encrusting forams

All To HORDT

Pebble of basalt removed for Malcolm

Described By: HEIN

Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 13 x 11 x 7 (cm) Location: F Seamount

Sample Id: D13-11 Weight: ≤ 1 (kg) Depth: 2130-2050 (m)

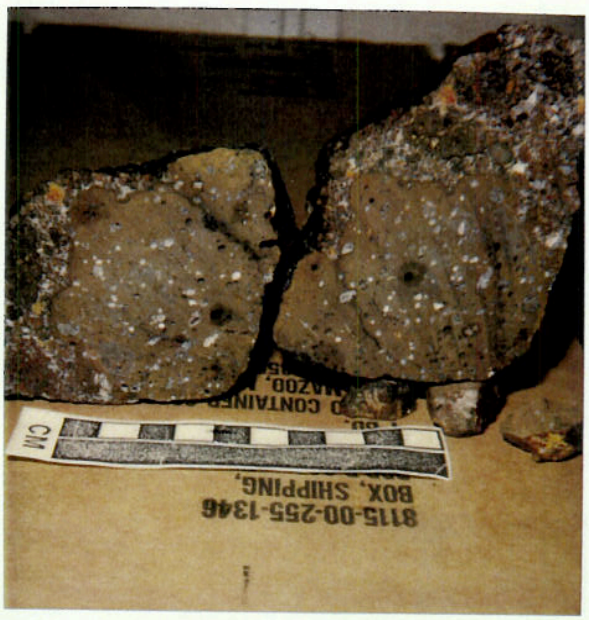
Mn Crust Description

Surface Texture: granular to smooth patina

Mn Crust Thickness (mm):
Min: <1 Max: 2 Ave: <1

Layers (Outer to Inner)(mm):

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



F10-89-CP
D13-11

Comments and XRD Mineralogy:

ANALYS

Subsample Number Analysis Layer Thickness

Substrate Description

Rock Type: olivine, pyroxene phyric basalt cobble in Calcite cemented breccia

Description: yellowish brown - green patches - small, highly altered porphyretic basalt pebbles, brown, red;

Cut by Malcolm → given to Malcolm for t.s. etc.

Biology ?:

Described By: HEIN

Subsampled By: