DREDGE 19

# USGS DREDGE LOG

SHIP/LEG EW-89-CP

STATION # 31

DREDGE # 19

DEPTH INTERVAL(m) 2160-2030

DEPTH(m)corrected 2160-1900

DATE JD 268 LOCAL 9-26-89

TIME GMT 18:22 LOCAL _____

LATITUDE 10°35.97'N TO 10°35.93'N

LONGITUDE 160°22.11'E TO 160°22.51'E

TOTAL WEIGHT: DREDGE 80 CRUST 10

PERCENTAGE OF ROCK COVERED BY CRUST 30

PERCENT BROKEN FROM: OUTCROP 100% TALUS 0%

THICKNESS OF MN CRUST: MAXIMUM 30 MINIMUM <1 AVERAGE 5

DOMINANT SURFACE TEXTURE Smooth; botryoidal; granular

SUBSTRATE LITHOLOGY #1 breccia #2 basalt #3 minor Limestone
all basalt pebbles & cobbles probably clasts from breccia -

NODULES PRESENT 0

REMARKS:

30 kg assorted pebbles + small cobbles (< 8 cm) in 3 plastic dredge bags
1 OF 3 → Basalts 3-8 cm → M Dringle
2 OF 3 → Assorted to KORDI
3 OF 3 → Pebbles ≤ 3 cm → M Dringle
All Cobbles + pebbles from disaggregated breccia
Thus, 100% broken from outcrop

Dredge S ple Summary Sheet

| Sample ID | Bulk CC | Layer CC | Pt & Au | REE | OC | DPTS/TS | XRD | 35mm Ph | Archive | Paleo |
|---|---|---|---|---|---|---|---|---|---|---|
| D19-1 | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | (1/2 to | KORDI) |
| D19-2 | Surface; B | (also scraped (D19-11 & 12 | | | | ✓ | | | | |
| D19-3 | | | | | ✓ | ✓ | | | | |
| D19-4 | END PIECE TO KORDI | | | | | | | | | |
| D19-5 | | | | | | | | | | |
| D19-6 | 1/2 TO KORDI | | | | | | | | | |
| D19-7 | | | | | ✓ | | | | | |
| D19-8 | END PIECE TO KORDI | | | | | | | | | |
| D19-9 | TO KORDI | | | | | | | | | |
| D19-10 | | | | | | | | | | |
| D19-11 | 1/2 TO KORDI | | | | | | | | | |
| D19-12 | | | | | | | | | | |
| D19-13 | | | | | | | | | | |
| D19-14 | | | | | | | | | | |
| D19-15 | 1/2 TO KORDI | | | | | | | | | |
| D19-16 | 1/2 TO KORDI, | 3 PEBBLES TO SCHLANGER | | | | | | | | |
| D19-17 | 1/2 TO SCHLANGER | | | | | | | | | |
| D19-18-39 | TO MALCOLM PRINGLE | | | | | | | | | |

remove for phosph. study

# USGS DREDGE LOG

Depth Interval 2160 - 2030 Julian Date 268

Cruise I.D. F10-89-CP Local Date (m/d/y) 9/26/89

Station No. 31 Chief Scientist Hein / Kang

Dredge No. 19 Tech on Watch Corky O'Zanne / Kevin

| | On Station | Dredge on Btm | Dredge off btm | Off Station |
|---|---|---|---|---|
| GMT | 18:22:30 | 19:04:42 | 22:20:33 | 23:00:22 |
| LATITUDE | 10 36.01 N | 10 35.97 N | 10 35.93 N | 10 35.85 N |
| LONGITUDE | 160 21.94 E | 160 22.11 E | 160 22.51 E | 160 22.06 E |
| WATER DEPTH | 2285 m | 2160 m | 2030 m | 2500 m |

Site Description and Target : W slope, NW summit of complex F

corrected water depth 2200 → 1900

| OPERATION* | GMT | DEPTH (m) | WIRE OUT (m) | TENSION | HDG/SPD | COMMENTS |
|---|---|---|---|---|---|---|
| on bottom | 1904 | 2160 | 2431 | — | 70/0.6 | |
| Paying Out | 1911 | 2100 | 2800 | | 111/1.0 | Scope to 2800 |
| bite | 2002 | 1815 | 2800 | 2.2 | 030/1.4 | bite |
| " | 2005 | 1805 | " | 4.9 | 060/2.0 | " |
| " | 2006 | 1802 | " | 2.8 | 053/2.2 | " |
| hung up | 2011 | 1800 | " | 6.0 | 017/0.7 | hung up / off it |
| paying out | 2012 | 1800 | 2829 | | 017/0.7 | wire out |
| bite | 2016 | 1795 | 2829 | 3.3 | 072/2.2 | bite |
| hung up | 2017 | 1795 | 2853 | 6.2 | | |
| " | 2028 | 1785 | 2460 | | 056/1.2 | taking wire in |
| broke off | 2052 | 2100 | 2460 | 4.5 | | broke off bite |
| on bottom | 2121 | 1870 | | 2.1 | 166/6.9 | on bottom, bite |
| bite | 2130 | 1820 | | 2.3 | | |
| | 2133 | 1810 | | 2.3 | | |
| | | " | | 2.3 | | |
| | | " | | 2.7 | | |
| | | " | | 2.6 | | |
| | 2136 | 1800 | | 4.2 | | |

*on/off bottom, bites, etc.

OTHER COMMENTS:

# USGS DREDGE LOG

DREDGE 19 (CONT)

Depth Interval _____ Julian Date 268

Cruise I.D. F10-89-CP Local Date (m/d/y) 9/26/89

Station No. 31 Chief Scientist Hein/Kang

Dredge No. 19 Tech on Watch Corky/Kevin O'Too

| | On Station | Dredge on Btm | Dredge off btm | Off Station |
|---|---|---|---|---|
| GMT | | | | |
| LATITUDE | | | | |
| LONGITUDE | | | | |
| WATER DEPTH | | | | |

Site Description and Target : _____

| OPERATION* | GMT | DEPTH (m) | WIRE OUT (m) | TENSION | HDG/SPD | COMMENTS |
|---|---|---|---|---|---|---|
| bite | 2138 | 1800 | 2460 | 4.8 | | |
| " | | " | " | 2.4 | | |
| " | | " | " | 2.9 | | |
| " | | 1800 | " | 2.7 | | |
| " | | " | | 2.5 | | |
| " | | " | | 2.3 | | |
| " | | " | | 2.9 | | |
| " | 2144 | " | | 4.7 | | |
| " | | | | 2.5 | | |
| " | | | | 4.7 | | |
| " | 2150 | | | 3.8 | | |
| " | 2154 | 1750 | 2460 | 2.8 | | start to bring in wire |
| " | " | " | | 2.4 | | |
| " | | " | | 2.7 | | |
| " | | " | | ~3.0 | | series of bites |
| stuck | 2200 | 1800 | 2549 | | | stuck |
| free | 2219 | 1920 | | | | Dredge free wire in |
| off bottom | 2220 | 2030 | 2150 | | | probably earlier |

*on/off bottom, bites, etc.

OTHER COMMENTS:
EOS 31 2300 2500

RHO - RHO navigation drifting faster than slip

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 30x16x11 (cm) Location: F Seamount

Sample Id: D19-1 Weight: ~8 kg (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: Botryoidal (large- and fine-scale) to smooth-lizard skin

Mn Crust Thickness (mm):
Min: 20 Max: 32 Ave: 26

Layers (Outer to Inner)(mm):

| | Min | Max | Ave | Texture & Color |
|---|---|---|---|---|
| 1. | 8 | 12 | 10 | Massive and partially porous (Black) |
| 2. | 10 | 20 | 15 | Porous (Brownish) |
| 3. | | | | |
| 4. | | | | |
| 5. | | | | |
| 6. | | | | |

F10-89-CP

D19-1

Comments and XRD Mineralogy:
- Sharp layer boundary
- Pores in layer 2 filled with iron oxide and phosphorite
- Small rock fragments (<5mm) included in layer 2

**ANALYSI**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|
| D19-1A: BULK | CC (24g) | 0-35 mm |
| D19-1B: (LAYER1) | CC (22g) | 0-15 mm |
| D19-1C: (LAYER2) | CC (26g) | 15-35 mm |
| D19-1D: | OC | Bulk Substrate (20.0g |
| TS | | |
| 1/2 to KORDI | | |
| | | 35 mm |

**Substrate Description**

Rock Type: Breccia

Description:
- altered brown basalt clasts cemented by yellow-green altered glassy volcanic debris
- Cracks filled with cream-colored phosphorite + some clasts coated w/ phosphorite

Biology ?: large phosphorite vein - cream-colored

Encrusting Forams

All this phosph. is replaced Foram sand

Described By: Yoon Subsampled By: HEIN

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 23 x 17 x 9 (cm) Location: F Seamount

Sample Id: D19-2 Weight: ~3 (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: Botryoidal to granular

Mn Crust Thickness (mm):
Min: 1 Max: 5 Ave: 3

Layers (Outer to Inner)(mm):

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

F10-89-CP
D19-2

Comments and XRD Mineralogy:

- Slightly porous texture

**Substrate Description**

Rock Type: Breccia

Description:

- Basalt clasts in the matrix of dark brown mud - Completely altered volcanic glass
- Cracks filled with calcite
- Basalt clasts commonly altered with weathered rim

Biology ?:

encrusting foram

ANALYS

| Subsample Number | Analysis | LayerThickness | |
|---|---|---|---|
| D19-2A* | CC | ≤ 0.5mm | (5.5gm) |
| D19-2B | CC | 0-5mm | (12.0gm |

[illegible]
[illegible] D19-11-12

T.S. *Fe-rich surface

matrix supported angular to subrounded pebbles

35mm

Described By: [illegible] Subsampled By: HEIN

# SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 20 x 12 x 10 (cm) Location: F Seamounts

Sample Id: D19-3 Weight: ~1.5 (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: Granular to subdued botryoidal

Mn Crust Thickness (mm):
Min: 0 Max: 4 Ave: 2

Layers (Outer to Inner)(mm):

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

F10-89-CP
D19-3

Comments and XRD Mineralogy:
- Porous texture
- Pores filled with iron oxide

ANALYSIS

| Subsample Number | Analysis | Layer Thickness |
|---|---|---|
| D19-3 | OC | (6.3g) Phosph. only |
| | TS | |

**Substrate Description**

Rock Type: Breccia

Description:
- altered basalt and manganese fragments as clasts in the matrix of phosphorite
- manganese dendrite
- basalts from fresh to highly altered

Cement supported angular to subrounded pebbles

35mm

Biology ?: forams

Described By: Yoon Subsampled By: RO

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 20 x 17 x 15 (cm) Location: F Seamount

Sample Id: D19-4 Weight: ~5 (kg) Depth: 2160-1900 (m)

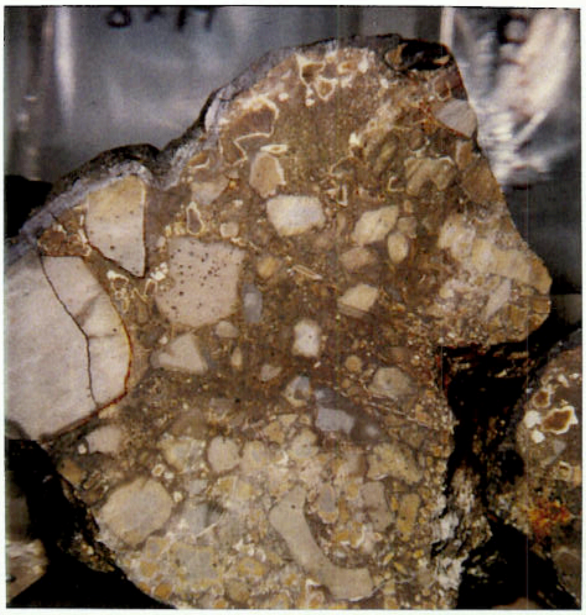
**Mn Crust Description**

Surface Texture: Botryoidal (with low relief) To Smooth

Mn Crust Thickness (mm):
Min: 2 Max: 5 Ave: 3

Layers (Outer to Inner)(mm):

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



F10-89-CP
D19-4

Comments and XRD Mineralogy:
: Slightly porous texture
: Tiny pores filled with iron oxide

**ANALYSIS**

| Subsample Number | Analysis | Layer Thickness |
|---|---|---|
| | end piece to KORDI | |

**Substrate Description**

Rock Type: Breccia

Description:
: Clasts include fresh to altered basalt, angular to Subrounded and phosphorite mostly matrix supported
: Cemented by volcanic sand and mud
: Cracks filled with calcite + grains bounded by Calcite

Biology ?: Encrusting Foramic

* 35mm

Described By: Yoon Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 13 x 10 x 6 (cm) Location: F Seamount

Sample Id: D19-5 Weight: ~1 kg (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: Botryoidal to granular mostly
partially fluted botryoidal

Mn Crust Thickness (mm):
Min: 0 Max: 8 Ave: 3

Layers (Outer to Inner)(mm):

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

no photo

Comments and XRD Mineralogy:
Highly porous texture

**ANALYSES**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|
| | | |

**Substrate Description**

Rock Type: Basalt and breccia

Description:
altered olivine and relatively fresh yellowish alteration rim
phyric vesicular and hornblende phyric on basalt
cracks filled with phosphorite
breccia cemented by altered volcanic glass and phosphorite

Biology ?: forams

Described By: Yoon Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 13 x 14 x 10 (cm) Location: F Seamount

Sample Id: D19-6 Weight: ~1.5 (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: Granular and irregular to smooth

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. | | | | |

see D19-1 for Rock Type photo

Comments and XRD Mineralogy:

Slightly porous texture

**ANALYSES**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|
| | ± TO FOR DI | |

**Substrate Description**

Rock Type: Volcanic breccia

Description: brown altered basaltic clasts (max. 33mm) in the matrix of yellow volcanic glassy debris (-green alteral)

Same Rock Type as D19-1

Mn rims some clasts; matrix supported

Biology ?: encrusting foram.

Described By: Yvon Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 15.5 X 17 X 9 (cm) Location: SEAMOUNT F

Sample Id: D19-7 Weight: 1.5 (kg) Depth: 2160-1900 (m)

**Mn Crust Description**
Surface Texture: granular - thin coat
To stain

Mn Crust Thickness (mm):
Min: <1 Max: 3 Ave: 1

Layers (Outer to Inner)(mm):

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

no photo

Comments and XRD Mineralogy:
PATINA TO THIN COAT OF MANGANESE COVERING APPROX. HALF THE OUTER SURFACE

**ANALYSES**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|
| D19-7 | OC | (12g) |

**Substrate Description**
Rock Type: BASALT

Description:
Lt grey to yellowish APHANTIC, small vesicles filled with iron oxide-like material, fractures filled with phosphorite

Biology ?:

Described By: RO Subsampled By:

Cruise Id: F10-89-CP Size: 19x18x10 (cm) Location: SEAMOUNT F

Sample Id: D19-8 Weight: 4 (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: THIN COAT, GRANULAR

Mn Crust Thickness (mm):
Min: <1 Max: 1.5 Ave: <1

Layers (Outer to Inner)(mm):

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

Phosphorite?

F10-89-CP
D19-8

Comments and XRD Mineralogy:
MANGANESE COATS APPROX 75% OF SAMPLE

**ANALYS**

| Subsample Number | Analysis | Layer Thickness |
|---|---|---|
| | | |

**Substrate Description**

Rock Type: SEDIMENTARY BRECCIA

End Piece to HORDI

Description: Sand TO PEBBLE SIZED CLASTS; ANGULAR TO SUB-ROUNDED; GRAIN SUPPORTED in places, matrix supported in others PHOSPHORITE CEMENT & MATRIX COMPOSED OF FINE GRAINED VOLCANI-CLASTICS; clasts COMPOSED OF ALTERED VOLCANIC rocks (GREY TO mottly RUST-RED)

Biology: ENCRUSTING FORAMS

35 mm

Described By: RD

Subsampled By:

# SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 11X12X9 (cm) Location: SEAMOUNT F

Sample Id: D19-9 Weight: 1 (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: granular, becoming small botryoidal = Lizard skin

Mn Crust Thickness (mm):
Min: <1 Max: 5 Ave: 3

Layers (Outer to Inner)(mm):

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

NO photo

Comments and XRD Mineralogy:

THICKER COAT ON TOP, THIN GRANULAR COAT ON SIDES, LAMINA ON BOTTOM

**ANALYSES**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|
| | | |

TO HORDI

**Substrate Description**

Rock Type: BASALT COBBLE in finer-grained SEDIMENTARY BRECCIA

Description:
Brownish - GREY, APHANITIC, DENSE, SMALL VESICLES INFILLED WITH IRON OXIDE and phosphorite

BRECCIA; Sand TO SMALL PEBBLE;

~~Biology~~ ?: ANGULAR to SUB-rounded, grain SUPPORTED - phosphorite cement, altered volcanic clasts

Described By: R.O.

Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 19 X 12 X 11.5 (cm) Location: SEAMOUNT F

Sample Id: D19-10 Weight: 1.5 (kg) Depth: 2160-1960 (m)

**Mn Crust Description**

Surface Texture: GRANULAR TO PATINA
Smooth

Mn Crust Thickness (mm):
Min: .2 Max: 6 Ave: 3

Layers (Outer to Inner)(mm):

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

F10-89-CP
D19-10

Comments and XRD Mineralogy:
THICKER COAT ON TOP, PATINA ON SIDES & BOTTOM

ANALYSI

Subsample Number Analysis LayerThickness

**Substrate Description**

Rock Type: BRECCIA

Description: fine to coarse pebble size; limestone cement supported. grains angular to subangular; grains mostly altered volcanics. Biology: manganese dendrites; iron staining of limestone; limestone slightly porous

→ encrusting forams

Described By: RO Subsampled By:

## SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 13×16×10 (layered) ~5.5×3×3 (small) (cm) Location: F Seamount

Sample Id: D19-11 Weight: ~3 kg (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: Botryoidal to granular

Mn Crust Thickness (mm):
Min: 0 Max: 19 Ave: 10

Layers (Outer to Inner)(mm):

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

no Photo

Comments and XRD Mineralogy:

- Porous to massive

22 Rocks Cut = 44 pieces

**Substrate Description**

Rock Type: Basalt cobbles & pebbles, some as part of Breccia

Description:

- altered olivine and fresh pyroxene and hornblende phyric basalt
- Breccia: basalt clasts cemented by phosphorite and volcanic glassy debris

Biology ?: Forams (altered)

**ANALYSES**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|
| | | |

½ TO THORDI

Scraped one - w/ D19-2

Described By: Yoon Subsampled By:

## SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 15×14×7 (largest) ~6×4×2 (small) (cm) Location: F Seamount

Sample Id: D19-12 Weight: ~3 kg (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: Botryoidal to granular, smooth to lizard skin

Mn Crust Thickness (mm):
Min: 0 Max: 17 Ave: 8

Layers (Outer to Inner)(mm):

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

No photo see D19-10 & D19-3

Comments and XRD Mineralogy:

· Massive to porous
· Pores and veinlets commonly filled with phosphorite

19 pebbles & Cobbles Cut
38 pieces

**Substrate Description**

Rock Type: Breccia

Description:
altered basalt clasts cemented by phosphorite - mostly cement supported

Biology ?:

**ANALYSES**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|
| | | |

Scraped one - w/ D19-2

Described By: Yoon Subsampled By:

## SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 12×7×6 ~ 5×5×2 (cm) Location: F Seamount

Sample Id: D19-13 Weight: ~1.5 (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: Botryoidal to granular

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

No photo

Layers (Outer to Inner)(mm):

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

Like D19-2 + D19-8

Comments and XRD Mineralogy:

· Massive and slightly porous
· Some patina

3 pebbles + Cobbles cut
6 pieces

**ANALYSES**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|

**Substrate Description**

Rock Type: Breccia

Description:
· altered basalt fragments cemented by volcanic mud (dark brown), lime-mud and phosphorite; some basalt vesicles filled with calcite

Biology ?: Forams

Described By: Yoon Subsampled By:

# SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 6x4x3 9x7x6 (cm) Location: F Seamount Comple

Sample Id: D19-14 Weight: 0.7 (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: Granular

Mn Crust Thickness (mm):

Min: 0 Max: 1 Ave: 1

Layers (Outer to Inner)(mm):

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

NO Photo

Comments and XRD Mineralogy:

No Patina

**ANALYSES**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|

**Substrate Description**

Rock Type: Breccia

Description:

brown altered olivine basalt fragments and clasts of cemented by phosphorite yellowish-green altered glassy volcanic pebbles phosphorite and clasts are sharply bounded

Biology ?:

Described By: Yoon Subsampled By:

# SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: ~ 4×5×3.5 (largest) (cm) Location: F Seamount

Sample Id: D19-15 Weight: ~2kg (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: Botryoidal to granular

~50 A number of small crust and substrate fragments

Mn Crust Thickness (mm):

Min: 0 Max: 12 Ave: 3

Layers (Outer to Inner)(mm):

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

NO plug

Comments and XRD Mineralogy:

- commonly porous texture

**ANALYSES**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|
| | | |

**Substrate Description**

Rock Type: Basalt and Breccia

Description:

Breccia cemented by altered glassy volcanic debris and lime-mud

few crust fragments w/out substrate

½ TO HORDI

Biology ?: Forams

Described By: Yoon Subsampled By:

# SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: ASSORTED MED-LRG PEBBLES (cm) Location: SEAMOUNT F

Sample Id: D19-16 Weight: 8 (kg) Depth: 2160-1500 (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 PICTURE

Comments and XRD Mineralogy:

**ANALYSES**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|

**Substrate Description**

Rock Type: SEDIMENTARY BRECCIA

Description:

ALTERED VOLCANIC CLASTS; limestone cement supported in places & GRAIN SUPPORTED WITH LIMESTONE CEMENT AND RARE PHOSPHORITE Cement in others

3 large pebbles to 5cm
Schlanger of Lms - ½ to HORDI

Biology ?:

Described By: RO Subsampled By:

## SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 10x8x6.5 (cm) Location: Seamount F

Sample Id: D19-17 Weight: 0.3 (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: patina

Mn Crust Thickness (mm):

Min: _____ Max: <1 Ave: _____

No picture

Layers (Outer to Inner)(mm):

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

Comments and XRD Mineralogy:

Very thin Mn encrusted borings and Mn disseminate as dendrite w/ black to dark brown color

**Substrate Description**

Rock Type: Foram Limestone

Description:

cream-colored friable and containing forams in burrow holes

Biology ?: None

**ANALYSES**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|
| | | |

½ TO Sq Schlanger

Described By: KANG Subsampled By:

## SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: _____ (cm) Location: SEAMOUNT F

Sample Id: D19 - 18 → 39 Weight: 15 (kg) Depth: 2160-1900 (m)

**Mn Crust Description**

Surface Texture: NONE

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: 20 assorted basalt large to small cobbles (some pieces probably trachyte)

Description: aphric to plagioclase-hornblende phyric, mostly massive. Moderately altered → altered. 2 pieces vesicular, one piece may have fresh glass

Biology ?:

**ANALYSES**

| Subsample Number | Analysis | LayerThickness |
|---|---|---|
| All pieces to M S Pringle for thin section, chemistry, & dating | | |
| Rock Taken Ar-Ar, Isotopes Staudigel (see box 1 of 13) | | |

Described By: MSP Subsampled By: MSP