# DREDGE SAMPLE LOG

| | | | JD | LOCAL |
|---|---|---|---|---|
| CRUISE | KODOS97-4 | DATE | 247 | 9-4-97 / 9-5-9 |
| STATION | 01 | | GMT | LOCAL |
| DREDGE | D15 | TIME | on 1208 off 1416 | on 0008 off 0216 |
| DEPTH INTERVAL(m) | 2209 - 1888 | LATITUDE (N,S) | on 8° 21.65 | off 8° 19.56' |
| DEPTH(m) CORRECTED | 2150 - 1950 | LONGITUDE (E,W) | 160° 36.86 | 160° 37.04' |

TOTAL WEIGHT : DREDGE 30 CRUST 25

%OF ROCK COVERED BY CRUST 100

%BROKEN FROM : OUTCROP >99 TALUS <1

THICKNESS OF CRUST : MAX 80 MIN patchy AVG 40

DOMINANT SURFACE TEXTURE small botryoidal

SUBSTRATE LITHOLOGY foraminiferal limestone 99%
palagonitized basalt 1% (2 pebbles)

D15

NODULES PRESENT ☺

REMARKS: crusts w/out substrate appear to have broken from the limestone recovered.
(only ~ 1% of rx - 2 cobbles - have both substrate & crust, all others are either crust w/o substrate or substrate w/out crust)

Mn patina in borings & cracks in the limestone

KODOS 97-4

D 15

Dredge Sample Summary Sheet

D15

| Sample ID | Bulk CC | Layer CC | Pt & Au | FEE | CC | DPTS/TS | XRD | 35mm Photo | ~~Archive~~ CFA | Paleo |
|---|---|---|---|---|---|---|---|---|---|---|
| D15-1A | ✓ | | ✓ | | | | ✓ | | | |
| D15-2A | ✓ | | | | | | ✓ | | | |
| D15-2B | | ✓ | | | | | ✓ | | | |
| D15-2C | | ✓ | | | | | ✓ | | | |
| D15-2D | | ✓ | | | | | ✓ | | | |
| D15-8A | | | | | ✓ | | ✓ | | (CFA if needed) | ✓ |
| D15-12A | | | | | | | ✓ | | | |

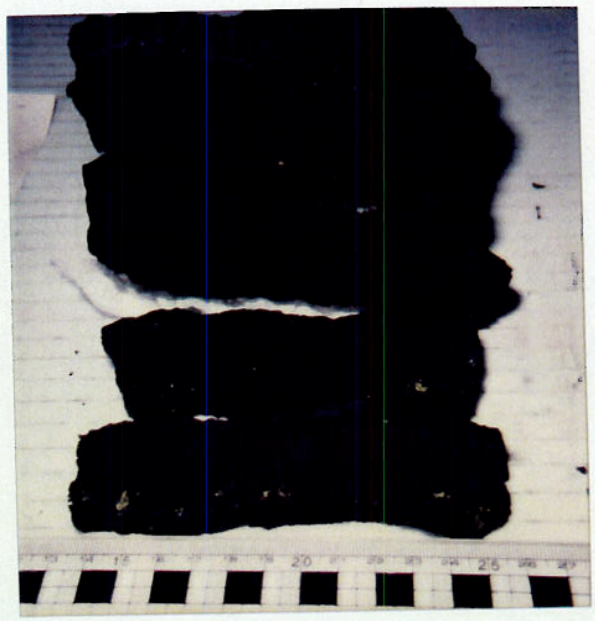
Powder to KO
~20g
~10g

XRD & paleo in same jars

# SAMPLE DESCRIPTION

Cruise Id: KODOS97-4 Size(cm): 22½ x 12½ x 3½ Location: RA

Sample Id: D15-1 Weight(kg): 1.2 kg Depth(m): 2150-1960




## Mn Crust Description

Surface Texture: Small Botryoidal

## Mn Crust Thickness(mm):

Min: 29 Max: 38 Ave: 33

## Outer to Inner Layers(mm)

| | Min | Max | Ave | Texture & Color |
|---|---|---|---|---|
| 1 | 12 | 16 | 14 | black, Laminated, dense |
| ~~2~~ | | | | |
| ~~3~~ 2 | 19 | 20 | 19 | Porous to vuggy at base |
| 4 | | | | vugs have sed infill |
| 5 | | | | |
| 6 | | | | |

## Comments and XRD Mineralogy:

## Substrate Description

RockType: No Substrate

Description: —

Biology: Few Encrusting Forams

Described by: Leanne Roberts

## Analyses

| Subsample No. | Analysis | Layer | Thick. | Wt.(g) |
|---|---|---|---|---|
| D15-1A | CC, PSE | BULK | 0-3 | ~200g |

50% USGS
50% HORDT

~10g powder to KORDT

Subsampled by: Roberts

# SAMPLE DESCRIPTION

Cruise Id: KODOS97-4 Size(cm): 16x7x5 Location: R2

Sample Id: D15-2 Weight(kg): 0.74 Depth(m): 2150 - 1950

## Mn Crust Description

Surface Texture: slightly current modified botryoidal granular on underside

## Mn Crust Thickness(mm):

Min: 43 Max: 64 Ave: 54

## Outer to Inner Layers(mm)

| | Min | Max | Ave | Texture & Color |
|---|---|---|---|---|
| 1 | 3 | 17 | 15 | massive black |
| 2 | 17 | 25 | 20 | muggy fe-stained |
| 3 | 15 | 19 | 17 | porous fe-stained |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |

KODOS 97-4 D15-2

## Comments and XRD Mineralogy:

## Analyses

| Subsample No. | Analysis | Layer | Thick. | Wt.(g) |
|---|---|---|---|---|
| D15-2A | cc | Bulk | 0-48 | 10 g |
| D15-2B | cc | Layer 1 | 0-11 | 25 g |
| D15-2C | cc | Layer 2 | 12-22 | 20 g |
| D15-2D | cc | Layer 3 | 23-50 | 25 g |

## Substrate Description

RockType: no substrate

50% USGS
50% HORDI

Description:

Biology:

Described by: S. Hein

Subsampled by: S. Hein & Laura B.

# SAMPLE DESCRIPTION

Cruise Id: KODOS97-4 Size(cm): 34x23.5x6 Location: R2

Sample Id: D15-3 Weight(kg): 4.4 Depth(m): 2150 - 1950

## Mn Crust Description

Surface Texture: botryoidal

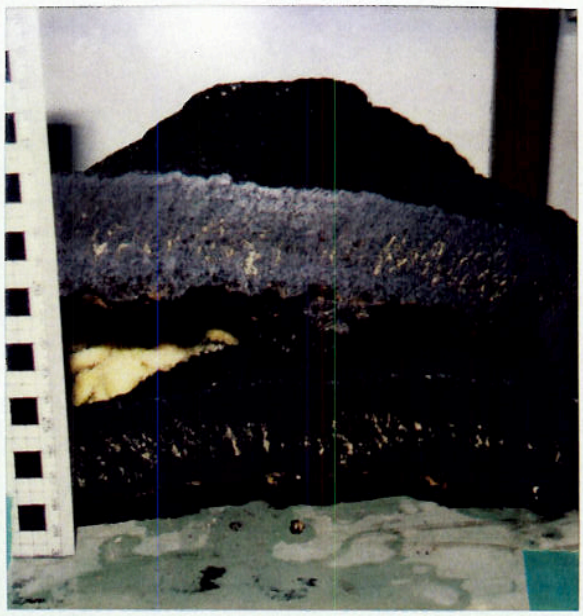
V. granular on underside

## Mn Crust Thickness(mm):

Min: 36 Max: 44 Ave: 40

## Outer to Inner Layers(mm)

| | Min | Max | Ave | Texture & Color |
|---|---|---|---|---|
| 1 | 10 | 13 | 10 | massive, black |
| 2 | 14 | 20 | 17 | vuggy, Fe-stained |
| 3 | 5 | 15 | 10 | massive, Fe-stained |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |



KODOS 97-4 D15-3

## Comments and XRD Mineralogy:

on the underside of the crust, the appears to have replaced a worm burrow substrate, resulting in several "tubes" - replaced worm tubes

## Substrate Description

RockType: no substrate recovered

Description:

Biology:

Described by: S Zielinski

## Analyses

Subsample No. Analysis Layer Thick. Wt.(g)

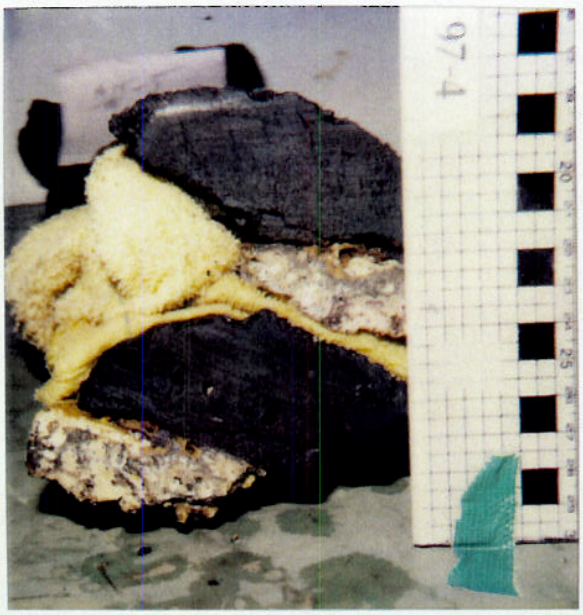
50% XRD
50% USGS

Subsampled by:

# SAMPLE DESCRIPTION

Cruise Id: KODOS97-4 Size(cm): 24.5x12x6.5 Location: R1

Sample Id: D15-4 Weight(kg): 1.05 Depth(m): 2150-1950




KODOS 97-4 D15-4

## Mn Crust Description

Surface Texture: botryoidal on top, smooth side

## Mn Crust Thickness(mm):

Min: 30 Max: 39 Ave: 35

## Outer to Inner Layers(mm)

| | Min | Max | Ave | Texture & Color |
|---|---|---|---|---|
| 1 | 4 | 5 | 4 | massive, black |
| 2 | 25 | 35 | 30 | massive, black |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |

## Comments and XRD Mineralogy:

this sample may be the upper portion of D15-11

## Analyses

| Subsample No. | Analysis | Layer Thick. | Wt.(g) |
|---|---|---|---|
| | | | |

100% hORDI

## Substrate Description

RockType: phosphorite

Description: tan, orange, white, & grey phosphorite w/ Mn dendrites + extensively dispersed Mn oxides differentially phosphatized

Biology:

Described by: S Zielinski

Subsampled by:

# SAMPLE DESCRIPTION

Cruise Id: KODOS97-4 Size(cm): 20.5 x 14.5 x 5 Location: R2

Sample Id: D15-5 Weight(kg): 1.60 Depth(m): 2150 - 1950

## Mn Crust Description

Surface Texture: botryoidal, very granular on underside

## Mn Crust Thickness(mm):

Min: 28 Max: 45 Ave: 40

## Outer to Inner Layers(mm)

| | Min | Max | Ave | Texture & Color |
|---|---|---|---|---|
| 1 | 2 | 4 | 3 | massive, black |
| 2 | 6 | 15 | 12 | massive, Fe-stained |
| 3 | 9 | 15 | 13 | massive, Fe-stained |
| 4 | 9 | 13 | 11 | massive, black |
| 5 | 0 | 5 | 4 | ferruginous, black |
| 6 | underside → | | | (underside granular) |

KODOS 97-4 D15-5

## Comments and XRD Mineralogy:

Part of the bottom surface is highly altered, a bright orange, which is the altered, Fe-stained upper surface of limestone or phosphorite

## Analyses

| Subsample No. | Analysis | Layer Thick. | Wt.(g) |
|---|---|---|---|
| | 50% USGS | | |
| | 50% HORDT | | |

## Substrate Description

RockType:

Description:

Biology:

Described by: S Zelinski

Subsampled by:

# SAMPLE DESCRIPTION

20 cobble sized crust fragments

Use Id: KODOS97-4 Size(cm): AVE: 11.5 x 7.5 x 4 — RANGE: 10x4² → 23x11 x 4 Location: R2

Sample Id: D15-6 Weight(kg): 7.8 Depth(m): 2150 - 1950

## Mn Crust Description

Surface Texture: small botryoidal; 5 are also current polished

## Mn Crust Thickness(mm):

AVE Min: 37 Max: 41 Ave: 41

thickest crust: min 45 max 52 Ave 50

thinest crust: min 33 max 35 Ave 35

## Outer to Inner Layers(mm)

| | Min | Max | Ave | Texture & Color |
|---|---|---|---|---|
| AVE 1 | 11 | 15 | 13 | massive; black |
| 2 | 27 | 32 | 27 | columnar; porous; |
| 3 | | | | Fe-stain on columnar margins |
| 4 | some | only | 1 massive layer — Ni-rich? | |
| 5 | some | 2 layers | massive then porous | |
| 6 | | | | |

KODOS 97-4 D15-6

## Comments and XRD Mineralogy:

In about 35% of x.s. layer 2 is columnar & non porous; 5% layer 2 is massive; remaining 60% as described above

2 pebbles are missing original surface layer

1 pebble is a bottom crust or side

## Substrate Description

RockType: ϕ

Description: ϕ

Biology: common encrusting forams; rare holdfast fragments

Described by: Lara B.

## Analyses

| Subsample No. | Analysis | Layer Thick. | Wt.(g) |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | XRD | 20% | |
| | ICPS | 40% | |

Subsampled by:

# SAMPLE DESCRIPTION

Cruise Id: KODOS97-4 Size(cm): 32 DCKS Location: R2

Sample Id: D15-7 Weight(kg): 1.4 Depth(m): 2160-1960

UNCUT

## Mn Crust Description

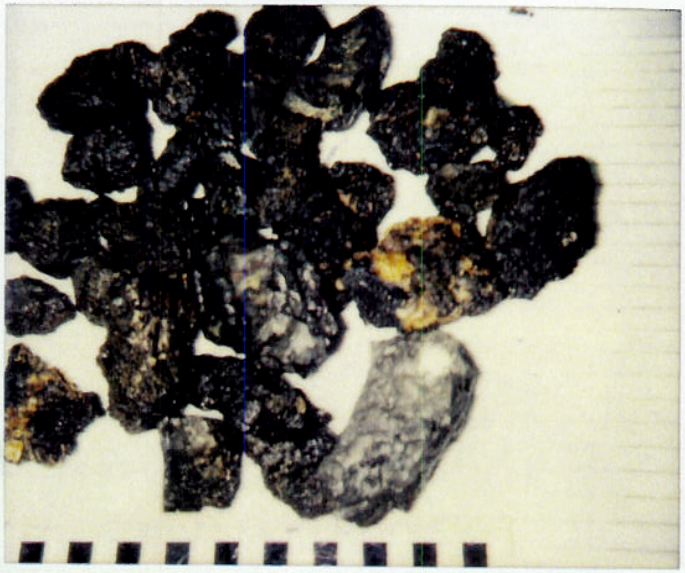
Surface Texture: Modified Botryoidal → granular → smooth

## Mn Crust Thickness(mm):

Min: 15 Max: 80 Ave: 20

## Outer to Inner Layers(mm)

| | Min | Max | Ave | Texture & Color |
|---|---|---|---|---|
| 1 | | | | black massive |
| 2 | | | | vuggy fill infill |
| 3 | | | | black massive |
| ~~4~~ | | | | |
| ~~5~~ | | | | |
| ~~6~~ | | | | |



KODOS 97-4 D15-7

## Comments and XRD Mineralogy:

layer 1 present on most samples
layer 2 present on some
layer 3 present on few

Incomplete Crust layers, side Crusts

## Analyses

| Subsample No. | Analysis | Layer Thick. | Wt.(g) |
|---|---|---|---|
| | | | |

## Substrate Description

RockType: Phosphorite on a few — 100% TOTAL

Description: Fe-stained

Biology: Encrusting Forams
Hold fast on one sample

Described by: Leanne Roberts

Subsampled by:

# SAMPLE DESCRIPTION

Cruise Id: KODOS97-4 Size(cm): 22 x 21 x 10 Location: R2

Sample Id: D15-8 Weight(kg): 2.8 Depth(m): 2150-1950

## Mn Crust Description

Surface Texture: Granular

## Mn Crust Thickness(mm):

Min: _____ Max: _____ Ave: patina

Patina

## Outer to Inner Layers(mm)

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

KODOS 97 ~~445-9~~

R15-8

## Comments and XRD Mineralogy:

Coats vugs, borings, & outer exposed to seawater

## Substrate Description

RockType: Foraminifera Limestone - Carbonate Sandstone

Description: Huge boring (pelecypods?) in off white To cream colored medium-grained forams; poorly consolidated, friable

Biology: NONE

Described by: Hein

## Analyses

| Subsample No. | Analysis | Layer Thick. | Wt.(g) |
|---|---|---|---|
| D15-8A | OC, XRD | Bulk Substrate | |
| | CFA if Needed | 40g | |
| | Paleo | for oc | |
| | XRD & Paleo in separate jar | | |
| | 50% HORD1 | | |
| | 50% USGS | | |

Subsampled by: Hein

# SAMPLE DESCRIPTION

ase Id: KODOS97-4 Size(cm): 7 cobbles Location: R2

mple Id: D15-9 Weight(kg): 3.0 Depth(m): 2150-1950

## Mn Crust Description

Surface Texture: Granular

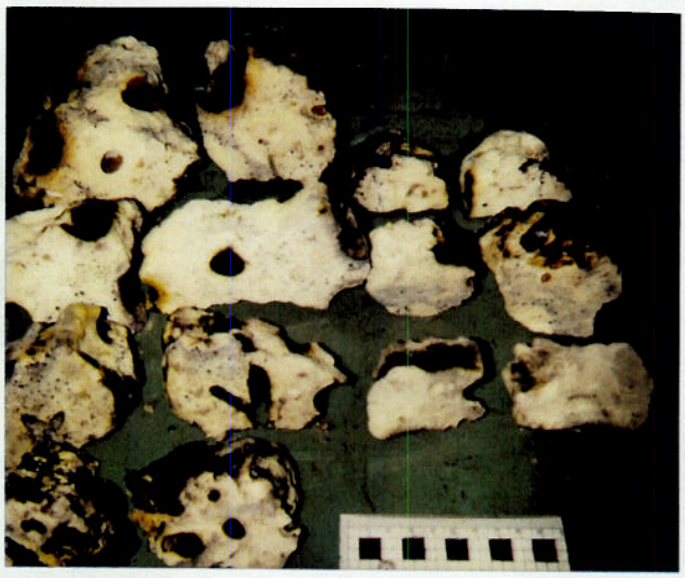
## Mn Crust Thickness(mm):

Min: _____ Max: _____ Ave: _____

Patina

## Outer to Inner Layers(mm)

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



KODOS 97-4 D15-9

## Comments and XRD Mineralogy:

## Analyses

Subsample No. Analysis Layer Thick. Wt.(g)

20% for DI
30% USGS

## Substrate Description

RockType: Foraminifera Limestone
Carbonate Sandstone

Description: off white, cream, toned-brown in some rugs, medium grained, large rugs lined w/ Mn & Fe oxides

Biology: None

Described by: Hein

Subsampled by:

# SAMPLE DESCRIPTION

Cruise Id: KODOS97-4 Size(cm): ~50 pebbles Location: R2

Sample Id: D15-10 Weight(kg): 2.2 kg Depth(m): 2150 - 1950

Uncut Foram SS

## Mn Crust Description

Surface Texture: Granular

## Mn Crust Thickness(mm):

Min: _____ Max: _____ Ave: _____

Patina

## Outer to Inner Layers(mm)

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

KODOS 97-4 D15-10

## Comments and XRD Mineralogy:

## Analyses

| Subsample No. | Analysis | Layer Thick. | Wt.(g) |
|---|---|---|---|
| | | | |

100% KORD ?

## Substrate Description

RockType: Foraminifera Limestone
Carbonate Sandstone

Description: Off white, Cream, To yellow-brown, medium-grained, Large vugs Lined w/ Mn or Fe

Biology: NONE

Described by: Hein

Subsampled by:

# SAMPLE DESCRIPTION

use Id: KODOS97-4 Size(cm): 25x10.5 x 3.5 / 17x10.5 x 5.5 Location: R2

Sample Id: D15-11 Weight(kg): 1.5 kg Depth(m): 2150-1950

## Mn Crust Description

Surface Texture: patina, missing upper crust - granular on underside & sides

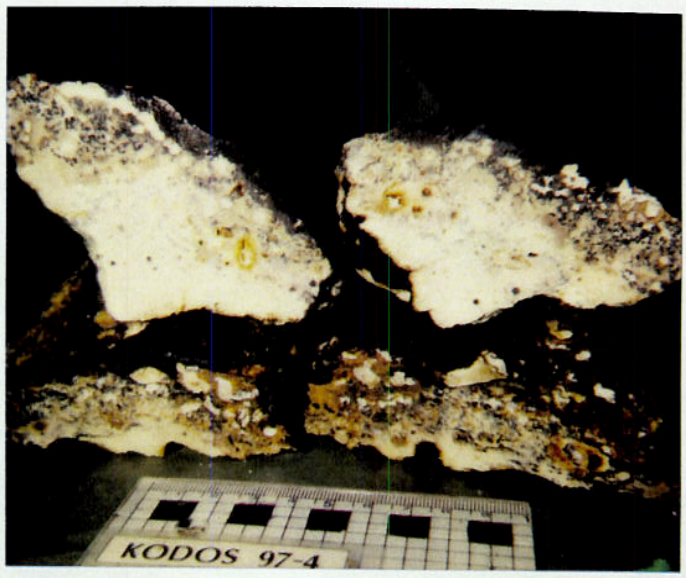
## Mn Crust Thickness(mm):

Min: 5+ Max: 9+ Ave: 7

part of lowermost Crust layer still present

## Outer to Inner Layers(mm)

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




KODOS 97-4
D15-11

## Comments and XRD Mineralogy:

- massive, Fe stained layer 3
- upper crust was broken by some causes

## Analyses

| Subsample No. | Analysis | Layer Thick. | Wt.(g) |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 50% | KORDI | | |
| 50% | USGS | | |

## Substrate Description

RockType: differentially phosphatized limestone grades w/ distance from crust into foraminiferal limestone

Description: This substrate can be divided two part
- upper part: brown, differentially phosphatized. Mn-oxide dendrites that grow from crust. disseminated Mn-oxide dendrites. phosphatized from limestone is in between crust & substrate or fill the vugs.
- lower part: pale brown, relatively massive Mn-oxide dendrites growth from middle toward upper part

Biology: None

Described by: SH park

Mn oxide grains

Subsampled by: Relatively sharp contact between phosphorite + Limestone

# SAMPLE DESCRIPTION

Base Id: KODOS97-4 Size(cm): 2 pebbles Location: R2

Sample Id: D15-12 Weight(kg): 0.14 Depth(m): 2150-1950

(the only talus in the dredge)

## Mn Crust Description

Surface Texture: smooth

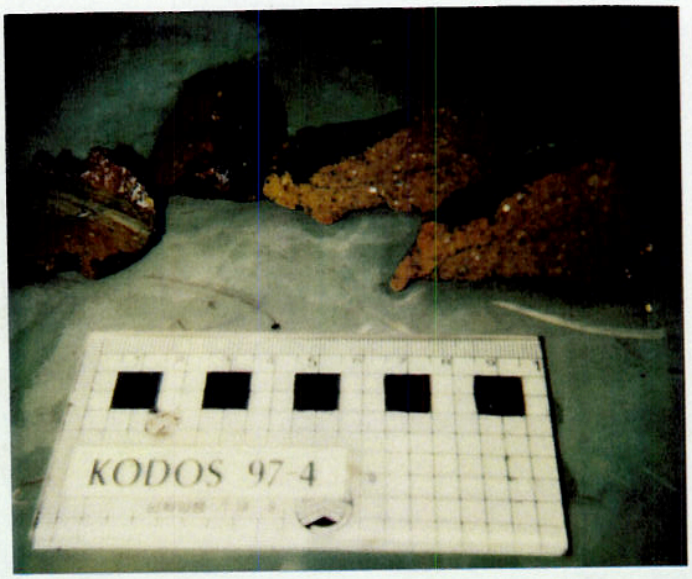
## Mn Crust Thickness(mm):

Min: _____ Max: _____ Ave: _____

patina

## Outer to Inner Layers(mm)

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




KODOS 97-4
D15-12

## Comments and XRD Mineralogy:

## Analyses

| Subsample No. | Analysis | Layer Thick. | Wt.(g) |
|---|---|---|---|
| D15-12A | XRD | Bulk substrate | |

## Substrate Description

RockType: Extremely altered basalt

50% MORB
50% USGS

Description: dark red-brown vesicular basalt
Completely altered to smectite+zeolites;
zeolites in vesicles

Biology: NONE

Described by: Hein

Subsampled by: Hein

# DREDGE OPERATIONS LOG

| | | | JD | LOCAL |
|---|---|---|---|---|
| CRUISE | KODOS97-4 | DATE | 247 | 9-4-97 / 9-5-97 |
| STATION | 21 | CHIEF SCIENTIST | Moore / Hein | |
| DREDGE NO. | D15 | TECH ON WATCH | Chi | |
| DEPTH INTERVAL(m) | 2209-1888 | | | |
| corrected | 2150-1950 | | | |

| ON STATION | DREDGE ON BOTTOM | DREDGE OFF BOTTOM | OFF STATION |
|---|---|---|---|
| | | 14:16 | |
| | | 08° 19. 555 | |
| | | 160° 37. 038 | |
| | | ~~MAP~~ 1888 | |

**Site Description and Target:** Continue (D15)

| Operation* | GMT | Depth(m) | Wire Out(m) | Tension | HDG/SPD | Comments |
|---|---|---|---|---|---|---|
| Bites | 13:49 | 1882 | 2040 | 1, 6, 1.6 | 12.2 / 0.6 | 08°19.678, 160°37.101 |
| ~~Off Bottom~~ | 14:00 | ~~1886~~ | 2000 | 1.2, 1.6 | 357.1 / 0.9 | 08°19.588, 160°37.048 |
| | | | | 1.7, 1.8, 1.9 | | |
| Bites | 14:06 | 1887 | 1995 | 1.7, 1.9, 1.9 | 290.3 / 0.1 | 08° 19. 603, 160 37. 026 |
| | ~14:10 | 1888 | 1950 | 2.1 2.0, 1.9, 1.9 2.1, 1.9 | | 2.2 2.2 2.4 2.7 2.8 |
| | | | | 2.9, 3.2, | 3.4 | |
| off Bottom | 14:16 | 1888 | 1927 | 1, 2 | 130.3 / 0.1 | 08° 19. 555, 160° 37. 038 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

*on/off bottom, bites, etc.

**Other Comments:**

# DREDGE OPERATIONS LOG

| | | | JD | LOCAL |
|---|---|---|---|---|
| CRUISE | KODOS97-4 | DATE | 247 | 9-4-97/9-5-97 |
| STATION | 21 | CHIEF SCIENTIST | Moon / Hein | |
| DREDGE NO. | D15 | TECH ON WATCH | Chi | |
| DEPTH INTERVAL(m) | 2209 – 1888 | | | |
| Corrected depth | 2150 – 1950 | | | |

| ON STATION | DREDGE ON BOTTOM | DREDGE OFF BOTTOM | OFF STATION |
|---|---|---|---|
| 1:24 | 12:08 | 1416 | |
| 08° 21.418 | 08° 21.654 | 8° 19.56 | NOT RECORDED |
| 160° 37.197 | 160° 36.863 | 160° 37.04 | |
| 2195 m | 2209 | 1888 | |

**Site Description and Target:**

dredging 2,250 ~ 1,850 m

| Operation* | GMT | Depth(m) | Wire Out(m) | Tension | HDG/SPD | Comments |
|---|---|---|---|---|---|---|
| on bottom | 12:08 | 2209 | 2380 | 0.9 | 83.9/2.6 | 08°21.654 160°36.863 |
| wire out | 12:14 | 2198 | 2650 | 1.8 | 187.4/1.5 | 08°21.575 160°37.135 |
| begin dredge | 12:15 | 2198 | 2660 | 1.1 | 153.8/1.1 | 08°21.534 160°37.159 |
| Dredging | 12:25 | 2201 | 2667 | 1.2 | 183.8/1.2 | 08°21.303 160°37.210 |
| " | 12:35 | 2124 | 2571 | 1.4 | 250.7/1.3 | 08°21.046, 160°37.191 |
| Small bite | 12:38 | 2061 | 2545 | 1.7 | 185.5/1.3 | 08°20.942, 160°37.243 |
| " | 12:41 | 1981 | 2527 | 1.8 | 165.4/1.1 | 08°20.881, 160°37.209 |
| " | " | " | " | 2.0, 2.2 | " | " |
| " | 12:46 | 1980 | 2476 | 1.8 | 179.1/0.9 | 08°20.761, 160°37.228 |
| dredging | 13:07 | 1819 | 2220 | 1.3 | 195.5/1.3 | 08°20.207, 160°37.122 |
| " | 13:32 | 1880 | 2110 | 1.0 | 54.6/1.1 | 08°19.777, 160°37.083 |
| Bites | 13:40 | 1880 | 2075 | 1.6, 1.8, | 215.2/0.0 | 08°19.820, 160°37.058 |
| ~ | 13:43 | | | 2.0, 1.9, 2.0 | 2.4 2.3 2.6 | 2.9, 3.2 |
| Bites | 13:44 | 1882 | 2050 | 1.6 | 80.4/0.6 | 08°19.755, 160°37.051 |

*on/off bottom, bites, etc.

**Other Comments:**