DREDGE SAMPLE LOG

			JD	LOCAL
CRUISE	KODOS97-4	DATE	244	9-1-97
STATION	16		GMT	LOCAL
DREDGE	D9	TIME	2:01 - 6:41	14:01-18:41
DEPTH INTERVAL(m)	1844 - 1487	LATITUDE	(N,S)	11°36.98 - 11°38.51
DEPTH(m) CORRECTED	2000 - 1900	LONGITUDE	(E,W)	161°41.81 - 161°39.7

TOTAL WEIGHT : DREDGE 19 kg CRUST 18 kg

%OF ROCK COVEREDBY CRUST no rock

%BROKEN FROM : OUTCROP 100% TALUS 0 %

THICKNESS OF CRUST : MAX ~~100+~~ MIN 20 AVG 60+

DOMINANT SURFACE TEXTURE Botryoidal

SUBSTRATE LITHOLOGY none

D9

NODULES PRESENT ∅

REMARKS: thick but incomplete crusts

A very neat crimson red shrimp

KODOS 97-4

D9

Dredge Sample Summary Sheet

Sample ID	Bulk CC	Layer CC	Pt & Au	REE	OC	DPTS/TS	XRD	35mm Photo	Archive	Paleo
D9-1A	✓						✓			
D9-5A	✓						✓			

powder to Ka
10g
10g

SAMPLE DESCRIPTION

Cruise Id: KODOS97-4 Size(cm): 34½ x 17 x 10 Location: Lomilik
Sample Id: D9-1 Weight(kg): 5.4 kg Depth(m): 2000-1900

Mn Crust Description

Surface Texture: Botryoidal → granular on sides

Mn Crust Thickness(mm):

Min: 100 Max: 110 + Ave: 105 +

Outer to Inner Layers(mm)

	Min	Max	Ave	Texture & Color
1	10	12	11	black massive botryoidal
2	20	27	24	black porous(top) enriching to vugy, vugs filled w/sed.
3	70		70+	black massive, slightly porous, few vugs filled w/CFA - central porous layer

Comments and XRD Mineralogy:

layer 3 not complete

layer 3 consists of 1cm thick sublayer ~1cm below top that is slightly porous & Fe oxide stained
CFA filled vugs are about 1cm below porous sublayer.

Substrate Description

RockType: No substrate.

Description: —

Biology: None

Described by: Leanne Roberts

Subsample No.	Analysis	Layer	Thick.	Wt.(g)
D9-1A	CC	BULK	0-105	~55g

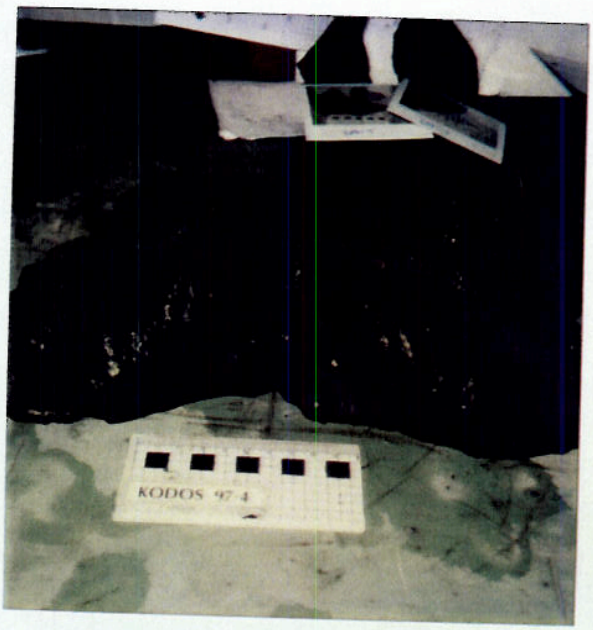
50% HORDI
50% USGS

wing powder to HORDI

Subsampled by:

SAMPLE DESCRIPTION

Cruse Id: KODOS97-4 Size(cm): 32x14x8 Location: Lomilik
Sample Id: D9-2 Weight(kg): 2.5kg Depth(m): 2000-1900



D9-2

Mn Crust Description

Surface Texture: Botryoidal

Mn Crust Thickness(mm):

Min: ~70 Max: 85+ Ave: 80

Outer to Inner Layers(mm)

	Min	Max	Ave	Texture & Color
1	3	6	4	massive black, botryoidal
2	30	35	32	reddish black
3				contain vugs filled w/ sediment
4				stained with Fe oxide
5	10	13	12	massive black
6	6	8	7	reddish black, porous
5	25	25+	25+	Fe oxide dendrite massive black Vuggy downward some vugs filled CFA

Comments and XRD Mineralogy:

layer 4 contains some vugs filled w/ CFA(?)

layer 5 incomplete - min Thickness

Substrate Description

RockType: Substrate is broken

Description:

Biology: encrusting foram

Described by: SH Park

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

70% KORDI
30% USGS

Subsampled by:

SAMPLE DESCRIPTION

Cruse Id: KODOS97-4 Size(cm): 24.5 X 15 X 5.9 Location: Lomilik

Sample Id: D9-3 Weight(kg): 1.9 kg Depth(m): 2000 - 1950

Mn Crust Description

Surface Texture: Most botryoidal side is modified or no botryoid. Some part is smooth

Mn Crust Thickness(mm):

Min: 55 Max: 60 + Ave: 60

Outer to Inner Layers(mm)

	Min	Max	Ave	Texture & Color
1	7	17	15	massive black, botryoidal
2	20	25	23	vuggy black. vugs are larger to downward & filled w/ sediment. Fe-oxide dendrite is in lower part
~~3~~				
~~4~~				
~~5~~				
~~6~~ 3	20	28	25	black, upper boundary is very porous. Lower part contain some vugs and vug is filled w/ residue of C

Comments and XRD Mineralogy:

Center of layer 3 is stained w/ Fe-oxide & have vivid dendrite

Substrate Description

RockType: None

Description:

Biology: encrusting foram

Described by: SH Park

Analyses

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

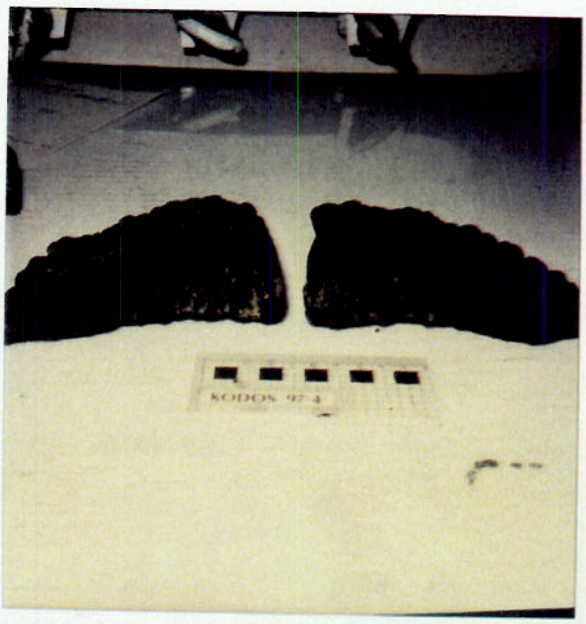
60% HORDI
40% USGS

Subsampled by:

SAMPLE DESCRIPTION

Cruse Id: KODOS97-4 Size(cm): 20 x 13 x 4 Location: Lomilik

mple Id: D9-4 Weight(kg): 1 Kg Depth(m): 2000-1900



D9 -4

Mn Crust Description

Surface Texture: Modified Botryoidal

Mn Crust Thickness(mm):

Min: 45 Max: ~48 Ave: ~46

Outer to Inner Layers(mm)

	Min	Max	Ave	Texture & Color
1	3	10	6	black massive, columnar
2	30	40	40	black porous (top) → vugy
3				vugs have sediment fill
4				
5				
6				

Comments and XRD Mineralogy:

layer 2 is incomplete + layer 3 is missing

Broke at Vuggy layer w/ brown mud in it

Substrate Description

RockType: None

Description: —

Biology: Encrusting forams
Hold fast

Described by: Leanne Roberts

Analyses

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

½ Hovdi

½ USGS

Subsampled by:

SAMPLE DESCRIPTION

Cruse Id: KODOS97-4 Size(cm): 10×8×2.5 to 20×14×4 10 pieces Location: Lomilik

nple Id: D9-5 Weight(kg): 4.5 kg Depth(m): 2000-1950

Mn Crust Description

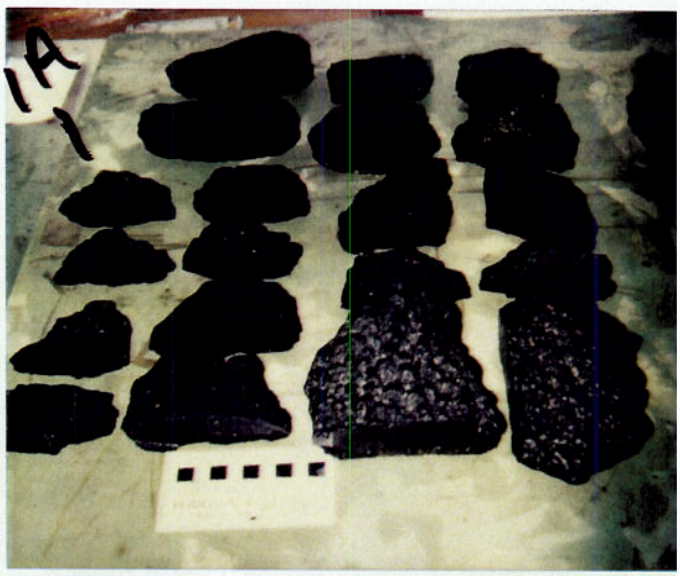
Surface Texture: botryoidal
modified mion botryoidal
- lizard skin, subdued botryoidal

Mn Crust Thickness(mm):

Min: 10 Max: 50 Ave: 45

Outer to Inner Layers(mm)

	Min	Max	Ave	Texture & Color
1	5	10	8	massive black
2	15	28	20	porous black. large voids stained with Fe oxide
3				
4	16	20	18	massive black
5				lower part is stained
6				with Fe oxide



KODOS 97-4
D9-5

Comments and XRD Mineralogy:

Every sample is incomplete
Most have layer 1 & layer 2
One sample have layer 1, 2, 3

Analyses

Subsample No.	Analysis	Layer Thick.	Wt.(g)
D9-5-1A	cc bulk	0-30	~105g

Substrate Description

RockType: None

50% HORDI
50% HORDI

Description:

MnO powder to HORDI

Biology: Most encrusting forams

Described by: Porth

Subsampled by:

SAMPLE DESCRIPTION

Cruse Id: KODOS97-4 Size(cm): 2 rocks 14½×14×6, 23×9×6 Location: Lomilik

Sample Id: D9-6 Weight(kg): 2.2kg (each rock weighs 1.1kg) Depth(m): 2000-1900

Mn Crust Description

Surface Texture: Modified Botryoidal granular on sides

Mn Crust Thickness(mm):

Rock 1 Min: 53 Max: 66+ Ave: 57+

Rock 2 " 55 " 60+ " 65+

Outer to Inner Layers(mm)

		Min	Max	Ave	Texture & Color
Rock 1	1	5	10	7	black massive
	2	16	21	18	black, porous, Fe-lined pores
	3	30	35	33	black massive, vugs filled w/CFA
Rock 2	4 1	17	22	20	black massive, asicular at base
	5 2	21	26	24	black porous → vugy, sed-infill in vu
	6 3	20	22	21	black massive slightly porous towards base of layer, incomplete

Comments and XRD Mineralogy:

layer 2 in Rock 1 has some sed infill
Rock 2 has no CFA in layer 3

Incomplete crusts! layer 3 is broken on both —

The side of crust 1 has a hematite lens(?) + goethite lens(?) ⊥ to layering + < 1 mm thick like a vein(?)

Substrate Description

RockType: NONE

Description: —

Biology: Encrusting Forams

Described by: Leanne Roberts

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

50% USGS
50% HORDI

Subsampled by:

SAMPLE DESCRIPTION

Cruse Id: KODOS97-4 Size(cm): 2 rocks Location: Lomilik

Sample Id: D9-7 Weight(kg): 725 g Depth(m): 2000-1900

1 CUT, 1 UNCUT

Mn Crust Description

Surface Texture: No surface

Mn Crust Thickness(mm):

Min: 25 (uncut sample) Max: 85 (cut sample) Ave:

Outer to Inner Layers(mm)

	Min	Max	Ave	Texture & Color
1				black massive
2				some Fe-oxide stains
3				- CFA & Fe-oxide
4				in veinlets
5				- CFA in cracks
6				

(3–5: cut sample)

D9-7

Comments and XRD Mineralogy:

black massive layer, no surface, possible substrate on 1 sample –

Layer 3 only, which is incomplete on the top of one sample and at the top & base of the other

Layer 3 is at least 85 mm thick

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

Substrate Description

RockType: ? Breccia < 2mm

100% HORDE

Description: Red Brown altered Volcanic

Biology: NONE

Described by: Leanne Roberts

Subsampled by:

SAMPLE DESCRIPTION

Cruse Id: KODOS97-4 Size(cm): 19 samples Location: Lomilik

mple Id: D9-8 Weight(~~kg~~): 875 g Depth(m): 2000-1900

UNCUT

D9-8

Mn Crust Description

Surface Texture: Botryoidal → granular

1 sample - smooth.

Mn Crust Thickness(mm):

Min: 12 Max: 35 Ave: 20

Outer to Inner Layers(mm)

	Min	Max	Ave	Texture & Color
1			-	black massive
2			-	black porous
3				w/ sed infill in pores
4				
5				
6				

Comments and XRD Mineralogy: (4 samples)

Appears to have two layers in few samples, all have layer 1 black massive

Analyses

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

100% HORDI

Substrate Description

RockType: No substrate

Description: –

Biology: Encrusting forams

Described by: Leanne Roberts

Subsampled by:

DREDGE OPERATIONS LOG

			JD	LOCAL
CRUISE	KODOS97-4	DATE	244 (9/1)	9-1-97
STATION	st 16	CHIEF SCIENTIST	Moon / Nein	
DREDGE NO.	D 9	TECH ON WATCH	Chi	
DEPTH INTERVAL(m)	1844-1487			

Corrected Z = 2000-1900

ON STATION	DREDGE ON BOTTOM	DREDGE OFF BOTTOM	OFF STATION
01:22	02:01		
11° 36.430	11° 36.952		
161° 42.264	161° 41.807		
1910	1844 (1909) ↑ pay out.		

Site Description and Target:

dredging from 2,000 to 1600 meters.
payout 2,300 → start to move, (<1.0 knot) → more payout 10
to 2400m. cloudy

Operation*	GMT	Depth(m)	Wire Out(m)	Tension	HDG/SPD	Comments
on bottom	02:01	1844	1909	0.6~0.7	301.4 / 0.7	11° 36.952, 161° 41.807
wire out	02:08	1806	2300	0.9	288.7 / 0.9	11° 37.012, 161° 41.707
starting to dredge	02:10	1806	2324	0.7	288.1 / 0.7	11° 37.036, 161° 41.672
dredging	02:20	1852	2371	0.9	286.6 / 0.9	11° 37.092, 161° 41.569
"	02:30	1888	2410	1.2, 1.7	290.1 / 0.8	11° 37.176, 161° 41.408
S. Bites. ①	02:35	1875	2394	1.8~2.4	288.5 / 0.7	11° 37.230 161.41.319
	02:48		2.5	2.8 2.6	2.6, 2.4, 2.8, 2.5, 2.8, 3.0	
M. Bites. ②	02.44	1850	2364	3.2, 3.2, 3.4	292.0 / 0.5	11° 37.224, 161.41.372
S. Bites	02.49	1848	2405	2.5, 2.8 3.2	299.5 / 0.7	11° 37.244, 161 41.276
M. Bites	02.54			3.3, 2.7, 3.5,	3.6, 3.8, 3.9 [4.0]	
S. Bites	03:00	1856	2397	3.5	284.7 / 0.8	11° 37.215 161 41.267
S Bites	03:16	1871	2393	2.6~3.0	295.8 / 0.5	11° 37.211, 161° 41.268
Bites	03:20	1867	2392	3.2~3.3	300.4 / 0.6	11° 37.217, 161° 41.275
B Bites	03:31	1879	2328	4.1~	288.1 0.8	11° 37.172 161° 41.308

*on/off bottom, bites, etc.

Other Comments: I didn't catch No 2 Bites.

2/3

DREDGE OPERATIONS LOG

			JD	LOCAL
CRUISE	KODOS97-4	DATE	244	9-1-97
STATION	St. 16	CHIEF SCIENTIST	Moon / Hetu	
DREDGE NO.	D. 9	TECH ON WATCH	chi	
DEPTH INTERVAL(m)				

ON STATION	DREDGE ON BOTTOM	DREDGE OFF BOTTOM	OFF STATION

Site Description and Target: Continue (D.9)

back ward

	Operation*	GMT	Depth(m)	Wire Out(m)	Tension	HDG/SPD	Comments
	pullout work	03:41	1838	2481	1.38	305.8 / 1.0	161.41.202, 11°37.233
	"	03:42	1869	2125	1.28	288.9 / 1.3	11°37.133, 161°41.594
→	pull out dredge	03:57	1993	2010	1.3	288.1 / 1.6	11°37.062, 161°41.660
1	wire out	04:03	~~[illegible]~~	~~[illegible]~~	1.0	278.0 / 1.8	11°37.108, 161.41.495
	starting dredge	"	1857	2200			
2.	wire out	04:11	1884	2400	1.0	293.1 / 0.4	11°37.149, 161°41.377
	starting dredge	"					
	dredging	04:17	1864	2389	1.7	314.7 / 0.9	11°37.217, 161°41.290
	S. Bites	04:20	1855	2401	2.5~5.1	289.1 / 0.5	11°37.238, 161°41.244
☆	Same Bites	04:31	1859	2371	3.1~5.1	294.8 / 1.1	11°37.188, 161°41.246
	Break	04:40	1872	2283	1.2	288.1 / 0.9	11°37.195, 161°41.302
	Dredging	04:45	1854	2268	1.2 ~~0.6~~	310.0 / 0.5	11°37.252, 161.41.214
	"	04:55	1828	2229	1.4	297.1 / 0.8	11°37.315, 161.41.050
	S. Bites	05:01	1820	2215	1.7	309.6 / 0.7	11°37.372, 161°40.982

*on/off bottom, bites, etc.

Other Comments:

DREDGE OPERATIONS LOG

			JD	LOCAL
CRUISE	KODOS97-4	DATE	244	9-1-97
STATION	st. 16	CHIEF SCIENTIST	Moore/Heim	
DREDGE NO.	D.9	TECH ON WATCH	chi	
DEPTH INTERVAL(m)				

ON STATION	DREDGE ON BOTTOM	DREDGE OFF BOTTOM	OFF STATION
		06:41	07=14
		11°38.505	11°38.749'
		161°39.748	161°39.480
		1487	1467

Site Description and Target: Continue (D.9).

Operation*	GMT	Depth(m)	Wire Out(m)	Tension	HDG/SPD	Comments
Dredging	05:10.	1816	2189	1.7	321.0 / 0.6	11°37.441, 161°40.829.
"	05:20	1763	2146	1.4	336.0 / 0.8	11°37.581, 161°40.647
"	05:30	1712	2088	1.3	333.9 / 0.8	11°37.773, 161°40.470
"	05:40	1653	2002	1.4	326.3 / 0.5	11°37.859, 161°40.348
"	05:50	1614	1936	1.2	324.7 / 0.7	11°37.954 161°40.234
"	06:00	1609	1882	1.3	335.0 / 0.5	11°38.100 161°40.062
"	06:10	1592	1849	1.2	330.3 / 0.5	11°38.262 161°39.923
"	06:20	1500	1805	1.3	315.7 / 0.4	11°38.426 161°39.743
"	06:30	1490	1742	1.4	299.5 / 0.6	11.38.435 161°39.723
Small bite	06:33	1492	1676	2.1	280.5 / 0.9	11.38.460 161°39.724
dredging	06:40	1495	1579	1.2	277.7 / 0.4	11.38.501 161°39.760
off bottom	06:41	1487	1660	1.4	278.6 / 0.4	11.38.505 161°39.748
on station	07=14	1467				11°38.749 161°39.480

*on/off bottom, bites, etc.

Other Comments: