DREDGE 16

USGS DREDGE LOG

SHIP/LEG F10-89-CP

STATION # 26

DREDGE # D16

DATE JD 261 LOCAL 25 Sept 89

TIME GMT 23.02 LOCAL 11.02 AM

DEPTH INTERVAL(m) 1610 - 1605 m

DEPTH(m)corrected 1610 - 1600 m

LATITUDE 09:58:20N TO 09.58.27N

LONGITUDE 160.29.23E TO 160.29.04E

TOTAL WEIGHT: DREDGE 50 kg CRUST 35 kg

PERCENTAGE OF ROCK COVERED BY CRUST 100

PERCENT BROKEN FROM: OUTCROP 60 TALUS 40 (one boulder)

THICKNESS OF MN CRUST: MAXIMUM 100 MINIMUM 5 AVERAGE 40

DOMINANT SURFACE TEXTURE botryoidal; boulder is smooth on 3 sides

SUBSTRATE LITHOLOGY Basalt

NODULES PRESENT 3 cobble size ~ 20% of dredge on 3 sides, botryoidal on one

REMARKS: 1 large boulder-round w/ smooth Crust - probably thin Crust + basalt boulder; 1 boulder w/ Thick Crust >100 mm broken from outcrop; Many Crust fragments - Thickest 70 mm few pumice pebbles, siliceous sponge fragments, + one whole ear bone

Dr e S ple Summary Sheet

Sample ID	Bulk CC	Layer CC	Pt & Au	REE	OC	DPTS/IS	XRD	35mm Ph	Archive	Paleo
D16-1						✓				
D16-2	✓	✓	✓	✓		✓	✓			
D16-3										
D16-4	ALL TO	KORDI								
D16-5	✓	✓	✓	✓			1/2 TO	KORDI		
D16-6	✓				✓	✓				
D16-7	surface ✓									
D16-8	1/2 TO	KORDI								
D16-9	1/2 TO	KORDI								
D16-10										
D16-11										

Spray w/ plastic for display

~~Slab 1 sample~~

PIECE TO M.P

USGS DREDGE LOG

Depth Interval 1610 – 1605

Julian Date 267

Cruise I.D. F10-89-CP

Local Date (m/d/y) _____

Station No. 26

Chief Scientist Hein/Kang

Dredge No. 16

Tech on Watch O'Zanne, O'Toole

	On Station	Dredge on Btm	Dredge off btm	Off Station
GMT	19:26:38	19:54.54	22:28:34	2302:28
LATITUDE	09 57.96N	09:58:20N	09:58.27N	09 58.53N
LONGITUDE	160 29.18E	160 29.23E	160 29.04E	160 28.75E
WATER DEPTH	1615m	1610m	1605 m	1617m

Site Description and Target : Along top of southern slope of seamount just NW of Ujelang Atoll, ~~same~~ center of same line as camera run #1. Flat top → corrected depth 1610 → 1605 m

OPERATION*	GMT	DEPTH (m)	WIRE OUT (m)	TENSION	HDG/SPD	COMMENTS
on bottom	1954	1610	1640		350/1.0	on bottom
wire out	2012	1615	2400 m		359/0.8	wire out
possible bite	2056	1585	"		355/0.7	start getting some Tension
bite?	2104	1585	"	2T ?	196/1.0	bite?
bite	2111	1585	"	2.8	333/1.0	"
"	2115	1585	"	2.3	326/0.9	"
"	2116	1585	"	2.1	319/0.6	"
"	2120	1585	"	2.9	359/0.6	"
"	2123	1590	"	3.6	349/0.5	"
"	2125	1595	"	3.0	197/0.7	"
"	2130	1595	"	4.2	197/0.6	"
"	2136	1595	"	3.5	214/0.7	"
Stuck	2148	1590	"		183/0.8	Stuck
wire out	2151	1590	2430 wireout	2430		wire out
Unstuck	2226	1605	1750	6T	177/1	Break off ??
Off Bottom		1605	1675			

*on/off bottom, bites, etc.

OTHER COMMENTS:

Rho-Rho drifted south during run, actual dredge ~1-1½ miles long

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 35 x 17 x 22 (cm) Location: Seamount F

Sample Id: D16-1 Weight: 15 (kg) Depth: 1610-1600 (m)

Mn Crust Description

Surface Texture: Botryoidal

Mn Crust Thickness (mm):
Min: 80 Max: 105 Ave: 87

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	8	12	10	Massive and dense
2.	18	20	19	Porous / brownish
3.	13	17	15	Crudely laminated and slightly porous
4.	24	60	42	Massive and dense / black
5.				
6.				

F10-89-CP

D16-1

Comments and XRD Mineralogy:

Layer 2: pores filled with iron oxide and rarely with phosphorite

Layer 4: thin phosphorite-filled cracks parallel to layer boundary

Substrate Description

Rock Type: altered olivine basalt

Description:

altered orange olivine

cracks filled with phosphorite, calcite and manganese

Biology ?: forams

ANALYSI

Subsample Number	Analysis	LayerThickness
D16-1	TS	Large piece to Malcolm

Malcolm will want thin section of substrate basalt T.S.

Described By: Yoon Subsampled By:

[illegible] DESCRIPTION

Cruise Id: F10-89-CP Size: 22x18x10 (cm) Location: Seamount F

Sample Id: D16-2 Weight: ~8 (kg) Depth: 1610-1600 (m)

Mn Crust Description

Surface Texture: Botryoidal

Mn Crust Thickness (mm):
Min: 88 Max: 105 Ave: 93

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	3	5	4	Massive and slightly porous
2.	15	23	19	Porous / brownish
3.	10	12	11	Slightly porous and crudely laminated
4.	47	57	52	Massive and dense
5.			18	*LOWER CRUST Botryoidal
6.				

F10-89-CP
D16-2

Comments and XRD Mineralogy:

- layer 1 encrusting a set of layers 2, 3 and 4 (2nd generation?)
- Pores filled with iron oxide and rarely phosphorite
- sidal and basal parts of layer 1 porous and laminated

Substrate Description

Rock Type: Absent

Description:

Biology ?: encrusting forams

ANALYS

Subsample Number	Analysis	Layer Thickness	
D16-2 A: XRD	[illegible]	(90.5)	0-105 m
	REE	(12.4g)	
D16-2 B: XRD	CC	(5.0g)	0-5 mm
	~~REE~~		
D16-2C: XRD	CC	(19.0g)	5-20 m
	REE	(5.5g)	
D16-2D: XRD	CC	(14.0g)	20-31 m
	REE	(5.1g)	
D16-2E: XRD	CC	(55.7g)	31-95 m
	REE	(8.9)	
D16-2F: XRD	CC	(6-8g)	95-105 mm
	REE	(4.0g)	
D16-2A	DPTS		

* LOOKS AS IF SAMPLE BROKE OFF [illegible] NEW CRUST

½ of sample sent to Arno Klagenstuber for Pt extraction metallurgy

Described By: Joan Subsampled By: R.O.

SAMPLE DESCRIPTION

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

Sample Id: D16-3 Weight: 2.5 kg (kg) Depth: 1610-1600 (m)

Mn Crust Description

Surface Texture: Botryoidal To granular

Mn Crust Thickness (mm):
Min: 31 Max: 68 Ave: 45

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	3	18	14	Porous, botryoidal Fracture as cont.
2.	4	8	6	Dense, massive
3.	1	5	3	Porous filled w/ Clay +/or phosphorite
4.	10	15	13	wavy Laminated w/ phosph lamin. near base, dense
5.	6	14	8	Porous, laminated, some phos in pores
6.	0	11	4	Dense, massive

F10-89-CP
D16-3

Comments and XRD Mineralogy:
Spherical Fe-Mn Nodule

Substrate Description

Rock Type: Basalt

Description:
Olivine phyric gray basalt
olivine → iddingsite.

Biology ?: Encrusting Forams

ANALYSES

Subsample Number	Analysis	LayerThickness

Described By: HEIN Subsampled By:

SAMPLE DESCRIPTION

Cruise: 10-89-CP Size: 13.2 x 12.1 x [illegible] (cm) Location: [illegible]

Sample Id: D16-4 Weight: 2 (kg) Depth: 1610-1600 (m)

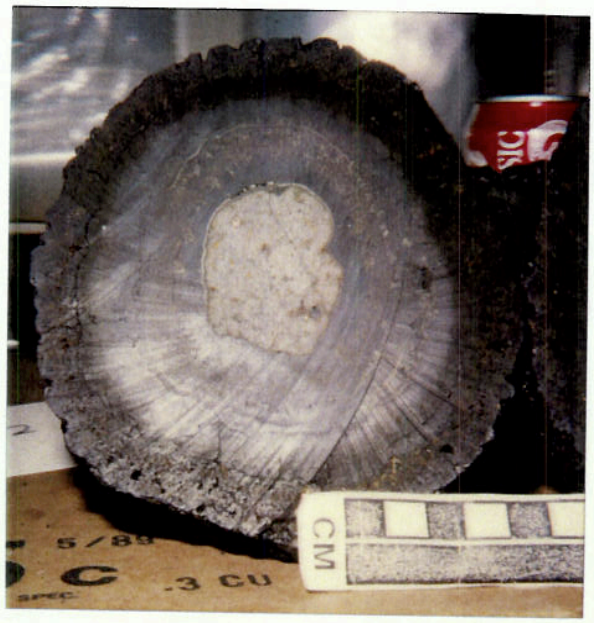
Mn Crust Description

Surface Texture: [illegible]

Mn Crust Thickness (mm):
Min: 41 Max: 50 Ave: 45

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
Sharp 1.	10	15	11	[illegible] Cont. = fracture
radiolarian 2.			7	[illegible] laminated
Sharp 3.			5	dense [illegible]
Sharp 4.			17	[illegible] lamina ted w/ [illegible]
5.			5	dense massive
6.				



F10-89-CP

D16-4

Comments and XRD Mineralogy:

Oblate spheroid Fe-Mn Nodule

Phosphorite laminae separate crust from basalt

Substrate Description

Rock Type: Basalt

Description: olivine phyric gray basalt [illegible]

Biology ?: Minor Encrusting Forams

ANALYS

Subsample Number	Analysis	LayerThickness

All To GORDI

Described By: HEIN

Subsampled By:

Cruise Id: F10-89-CP Size: 10x10x9.5 (cm) Location: F Seamount Compl

Sample Id: D16-5 Weight: 1.5 (kg) Depth: 1610-1600 (m)

Mn Crust Description

Surface Texture: Botryoidal to granular (Mn nodule)

Mn Crust Thickness (mm):
Min: 40 Max: 46 Ave: 43

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	8	19	14	Porous / filled with iron oxide
2.	8	12	10	Massive / phosphorite cracks
3.	1	5	3	Porous / filled with phosphorite
4.	5	10	8	Laminated / phosphorite cracks
5.	5	11	13	Porous / filled with phosphorite
6.				

F10-89-CP
D16-5

Comments and XRD Mineralogy:

ANALYS

Subsample Number	Analysis	Layer Thickness
(77gm) D16-5A	CC, Au, pt REE	bulk 0-43 mm (7.8 gm)
D16-5B	CC, REE	0-15 mm (29 gm (6.8 gm
D16-5C	CC, REE	15-30 mm (25. gm (5.5 g
D16-5D	CC, REE	30-42 mm (8.5 gm (3.3 gm

1/2 TO KORDI

Slab from Center of Nodule Sampled

Substrate Description

Rock Type: altered basalt (9x8 mm)

Description: altered mange olivine

Biology ?: forams

Described By: yoon

Subsampled By: HEIN

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 35 x 27 x 26 (cm) Location: Seamount F

Sample Id: D16-6 Weight: ~ 25 (kg) Depth: 1610-1600 (m)

Mn Crust Description

Surface Texture: Botryoidal to granular

Mn Crust Thickness (mm):
Min: 26 Max: 56 Ave: 45

Layers (Outer to Inner)(mm):

	Min	Max	Ave	Texture & Color
1.	0	18	9	Highly porous / filled with iron oxide
2.	11	15	13	Slightly porous and massive (black)
3.	6	24	15	Massive and crudely laminated / phosphorite cra
4.	0	5	3	Porous / filled with phosphorite
5.	4	8	6	Massive and dense
6.				

sharp
gradational
"
"

F10-89-CP CC sample
D16-6

Comments and XRD Mineralogy:
Mn-Fe nodule of Seamount type
= larger Nucleus, relatively
Small Crust

ANALYS

Subsample Number	Analysis	LayerThickness
D16-6A	OC	Substrate Bulk (16 gm)
"	TS	Malcolm
D16-6B	CC	(234 gm) (55 mm) (16 gm)

2 slabs of basalt cut out of center for Standard for Ar-Ar isotopes about 1 kg
½ TO FORDI

Substrate Description

Rock Type: gray basalt (18.5 x 18.5 cm)

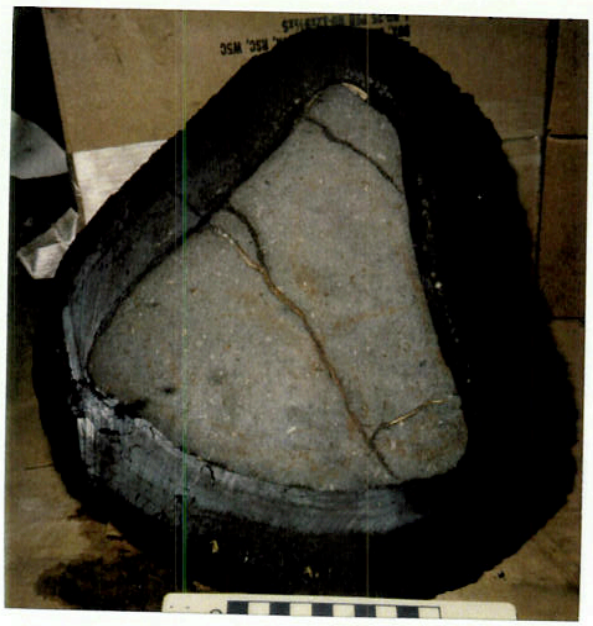
Description:
- altered orange olivine phyric
- phosphorite and iron oxide in cracks

Nucleus in 19 x 18 cm x section

Biology ?:

Described By: Yoon

Subsampled By: HEIN



D16-6
F10-89-CP

Cruise Id: F10-89-CP Size: 22 x 11.5 x 4.5 / 12 x 12.5 x 2 (4 smaller pieces) (cm) Location: SEAMOUNT F

Sample Id: D16-7 Weight: 1.5 (kg) Depth: 1610-1600 (m)

Mn Crust Description

Surface Texture: BOTRYOIDAL, < 1cm deep and wide

Mn Crust Thickness (mm):
Min: 10 Max: 48 Ave: 25

Layers (Outer to Inner)(mm):

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

NO photo

Comments and XRD Mineralogy:

ALL, BUT ONE PIECE, ARE UPPER CRUST FRAGMENTS. THE LARGEST PIECE HAS SOME DENSE MASSIVE LOWER CRUST, THIS FRAGMENT WAS BROKEN AWAY FROM THE LOWER CRUST. NO SUBSTRATE; FORAM MUD ON THE UNDERSIDE OF MOST PIECES

Substrate Description

Rock Type: none

Description:

Biology ?: Encrusting forams

ANALYSES

Subsample Number	Analysis	LayerThickness
D16-7 - SURFACE CC	Scrape	≤ 0.5mm (5.2gm)
Top surface of all pieces	scraped	

all sent to Arno Kleyenstüber in S. Africa for Pt extraction

Described By: Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 9×10×2 / 8.5×8×2 / 10×7×1.5 / 10×7×2.5 (cm) Location: Seamount F

Sample Id: D16-8 Weight: / (kg) Depth: 1610-1600 (m)

Mn Crust Description

Surface Texture: Botryoidal (with low relief) and granular from coats of Rocks

Mn Crust Thickness (mm):
Min: 15 Max: 20 Ave: 18

Layers (Outer to Inner)(mm):

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

no photo

Comments and XRD Mineralogy:
- Highly porous
- pores filled with iron oxide

ANALYSES

Subsample Number	Analysis	LayerThickness
D16-8-1:	XRD, BULK CC (79.5g)	0-20 mm

½ TO HORDI

Substrate Description

Rock Type: Absent

Description:

Biology ?: forams

Described By: Yoon Subsampled By: RO

SAMPLE DESCRIPTION

Cruise Id: F10-8[illegible]-CP Size: 10x6x2 (largest) (cm) Location: Seamount F1

Sample Id: D16-9 Weight: 1.5 (kg) Depth: 1610-1600 (m)

Mn Crust Description

Surface Texture: Botryoidal to granular (Mn crust fragments)

Mn Crust Thickness (mm):
Min: _____ Max: 90 Ave: 12

Layers (Outer to Inner)(mm):

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

No Photo

Comments and XRD Mineralogy:

- Highly porous and massive texture
- Pores filled with iron oxide and phosphorite

inner, outer, and side piece

ANALYSES

Subsample Number	Analysis	LayerThickness

Substrate Description

Rock Type: altered basalt

Description:

½ TO HORDT

Biology ?: forams

Described By: Yoon Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: 8X3x1.5 (largest) small pieces (cm) Location: Seamount F

Sample Id: D16-10 Weight: 0.2 (kg) Depth: 1610-1600 (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:
Pumice

ANALYSES

Subsample Number	Analysis	LayerThickness

Substrate Description
Rock Type: Pumice

Description: brown + gray
C

Biology ?:

Described By: Poon

Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F10-89-CP Size: various pebble (cm) Location: F Seamount Complex

Sample Id: D16-11 Weight: <1 (kg) Depth: 1610-1600 (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.				

Comments and XRD Mineralogy:

Sponge pieces and ear bone of whale

Siliceosponge - black, white & gray

Substrate Description

Rock Type:

Description:

Biology ?:

ANALYSES

Subsample Number	Analysis	LayerThickness

Described By: yoon

Subsampled By: