Adam Seamount 2300 – 2235 m

SAMPLE ID	*Mn CHEM	Pt & Au*	REE *	Si Chem*	P.Sect.	35mm Pho	Archive	Paleo	XRD				
D9-1								X	X				
D9-2													
D9-3					(2) TS				X				
D9-4													
D9-5													
D9-6													
D9-7													
D9-8					4– TS				2				
D9-9	Bulk			Hyaloclastite	TS								
D9-10													
D9-11													
D9-12													
D9-13													
D9-14	layers	layers											
D9-15													
D9-16	layers	layers	3layers										
D9-17													
D9-18													
D9-19													
D9-20													
D9-21	layers/Bulk	layers	Bulk		dpts								
D9-22					TS								
D9-23	Bulk2–												

* All chemistry samples have XRD mineralogy done also.

SAMPLE ID	*Mn CHEM	Pt & Au*	REE *	Si Chem*	P.Sect.	35mm Pho	Archive	Paleo	XRD				
D9-21													
D9-25													
D9-26													
D9-27													
D9-28													
D9-29	Bulk				dpts								
D9-30					TS								
D9-31	Bulk				TS								
D9-32													
D9-33													
D9-34	Bulk			phosphorite	TS								
D9-35					TS								
D9-36													
D9-37													
D9-38													
D9-39													
D9-40													
D9-41	Bulk				dpts								
D9-42													

* All chemistry samples have XRD mineralogy done also.

Only larger samples
D9 Described individually

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 47 x 37 x 21 cm Location: Adam Seamount

Sample Id: D9-1 Weight: 36 kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: Smooth - lizard skin on top - fine-botryoidal + granular on sides

Mn Crust Thickness:
Min: 5 Max: 27 Ave: 15

Layers (Outer to Inner): layered + Lam.

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

smooth-lizard skin on top-□ fine-botryoidal + granular on sides

D9-1

Comments and XRD Mineralogy:

upper 2½ cm impregnated w/ Mn

Substrate Description

Rock Type: Volcanic Tuff

Description:
Soft poorly indurated, poorly bedded Tuff
extensively burrow mottled + bored - bioturbated

RX broken from outcrop

ANALYSES

Subsample & Type	Analysis	Weight
D9-1A	OC	Bulb Substrate
	XRD	
	Paleo	
D9-1B	XRD	Mn impregnated Substrate
		Glass altered to palagonite

Described By: d.j. Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 23x13x14 Location: Adam

Sample Id: D9-2 Weight: 5.6 kg Depth: 2300-2235

Mn Crust Description

Surface Texture: Botryoidal to Bulbous Botryoidal

Mn Crust Thickness:

Min: 15 Max: 120 Ave: 50

Layers (Outer to Inner): Nodule

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

D9-2

Comments and XRD Mineralogy: Mn accreted onto 2 or more nuclei, one hyaloclastite, one an old crust or Nodule fragment + cemented together w/ mn several other rock fragments cemented in including a chert frag.

Substrate Description

Rock Type: Hyaloclastite, chert, old crust - nodule - Breccia

Description:

ANALYSES

Subsample & Type	Analysis	Weight

Described By: Subsampled By:

over

D9-2

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 28x23x16cm Location: Adam Seamount

Sample Id: D9-3 Weight: 10.7 kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: Smooth w/ lizzed skin

Mn Crust Thickness:

Min: 14 Max: 27 Ave: 22

laminated & layered

Layers (Outer to Inner):

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

F7-87-SC

D9-3

Comments and XRD Mineralogy:

Mn impregnation near Top - Mn dendrites; Mn in fractures;

Crust easily detected from substrate

Substrate Description

Rock Type: Tuff or hyaloclastite mixed w/ phosphorite cemented microbreccia

Description:

Angula Basalt clasts - sand sized in phosphorite cement, extensively burrowed w/ burrows filled w/ Tuff or hyaloclastite

ANALYSE

Subsample & Type	Analysis	Weight
D9-3	TS	(2) of Host Rx
XRD of some part of substrate (2 separate XRD's)		
XRD white (mostly phillipsite)		Ames

Described By: Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: Various-small Location: Adam Seamount

Sample Id: D9-4 Weight: 15 Kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: Botryoidal To smooth

Mn Crust Thickness:

Min: 15 Max: 30 Ave: 20

Layers (Outer to Inner):

	Min	Max	Ave	Texture
1.	one to	three	layers,	massive to
2.				Laminated
3.				
4.				
5.				
6.				

2 bags

Comments and XRD Mineralogy:

Bagged all small crust + Nodule fragments

Substrate Description

Rock Type: NONE

Description:

ANALYSES

Subsample & Type	Analysis	Weight

Described By: D.S. Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: Various - medium Location: Adam Seamount

Sample Id: D9-5 Weight: 30 kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: Smooth mostly - some botryoidal

Mn Crust Thickness:
Min: 20 Max: 58 Ave: 38

Layers (Outer to Inner):

	Min	Max	Ave	Texture
1.	One to	5 layers	, massive to	
2.	laminated			
3.				
4.				
5.				
6.				

5 bags

Comments and XRD Mineralogy:

Bagged medium-sized cut crust fragments -

ANALYSES

Subsample & Type	Analysis	Weight

Substrate Description

Rock Type: NONE

Description:

Described By: D.J.

Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: EW-87-SC Size: various - medium Location: Adam Seamount

Sample Id: D9-6 Weight: 10 kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: Smooth dominantly

Mn Crust Thickness:

Min: 20 Max: 60 Ave: 40

Layers (Outer to Inner):

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

2 bags

Comments and XRD Mineralogy:

Crusts with some substrate or contamination in crust of substrate material

Substrate Description

Rock Type:

Description:

ANALYSES

Subsample & Type	Analysis	Weight

Described By: D.J. Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: Various Location: Adam Seamount

Sample Id: D9-7 Weight: 2.7 kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: Smooth to subtly botryoidal

Mn Crust Thickness:

Min: 30 Max: 80 Ave: 45

Layers (Outer to Inner):

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

1 bag

Comments and XRD Mineralogy:

assortment of cut medium-sized nodules - most w/out nuclei; some w/ phosphate

Substrate Description

Rock Type:

Description:

ANALYSES

Subsample & Type	Analysis	Weight

Described By: D. S. Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: Various Location: Adam Seamount

Sample Id: D9-8 Weight: 4.5 kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: Smooth

Mn Crust Thickness:

Min: 0 Max: 10 Ave: 4

Layers (Outer to Inner):

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

1 bag

Comments and XRD Mineralogy:

Substrate Description

Rock Type: Various: Trachyite, phosphorite Bedded, Basalt, breccia, X-bedded SS, Altered ashy material mixed w/ phosphorite

NO!

Description:

ANALYSES

Subsample & Type	Analysis	Weight
D9-8A	TS	
Trachyite NO!	calc-alkaline erratic	
D9-8B	TS	
Trachyite		erratic!
D9-8C	TS	
bedded phosphorite		
D9-8C	XRD	
D9-8D	TS.	
D9-8	XRD	
X-bedded SS		

Described By: D.J. Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: Various - 9 Rocks Location: Adam Seamount

Sample Id: D9-9 Weight: 4 kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: Smooth to subtly botryoidal,

Mn Crust Thickness:

Min:_____ Max:_____ Ave:_____

Layers (Outer to Inner):

	Min	Max	Ave	Texture	
Rock A 1.	20	50	35	layered	Photo
B 2.	30	42	35	layered nodule	Photo
C 3.	10	16	13	Laminated	
E 4.	25	36	30	Laminated	Photo
5.					
6.				Best 3 photographed	

D9-9A

Comments and XRD Mineralogy:

Various Thicknesses Crusts on hyaloclastites - Fe-Mn penetrates + replaces(?) the adjacent parts of some samples

Substrate Description

Rock Type: Hyaloclastite

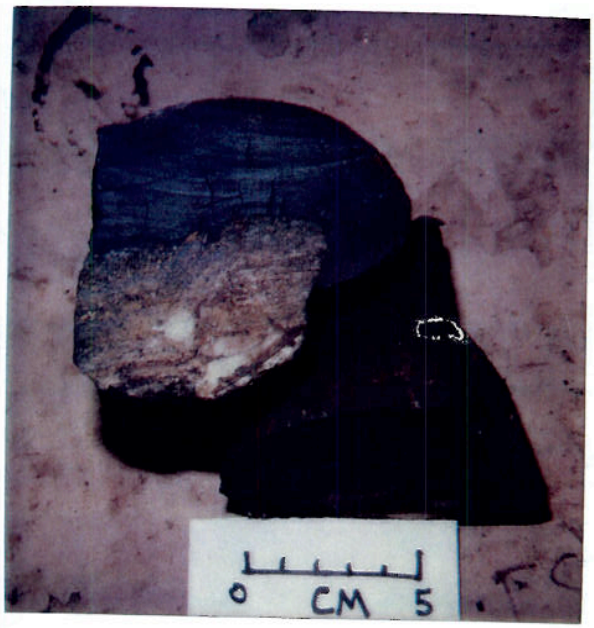
Description:

laced w/ Mn - best piece sent for chem, but still lots of Mn

ANALYSES

Subsample & Type	Analysis	Weight
D9-9D	XRD	Hyaloclastite substrate
"	Oxide Chem	" "
"	TS	" "
D9-9A Bulk	CC	Crust 35 mm
D9-9A	XRD	

Described By: DJ Subsampled By: DJ



D9-9E

D9-9B

SAMPLE DESCRIPTION

Adam Seamount

Cruise Id: EW-87-SC Size: 15 x 10 x 8 cm Location: Adam Seamount

Sample Id: D9-10 Weight: 1.5 kg Depth: 2300-2235

2300-2235

Mn Crust Description

Surface Texture: smooth, granular in lows

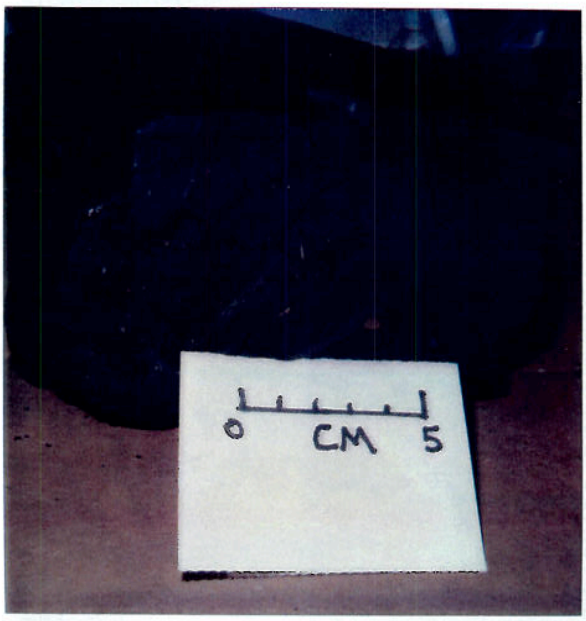
Smooth, granular in lows

Mn Crust Thickness:

Min: 65 mm Max: 85 mm Ave: 75 mm

Layers (Outer to Inner):

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



D9-10

Comments and XRD Mineralogy:

laminated in places but no distinct layering

common fracturing

Fragments of basalt + phosphorite in crust

Laminated in places but no distinct layering

common fracturing

Fragments of basalt + phosphorite in crust

ANALYSI

Subsample & Type	Analysis	Weight

Substrate Description

Rock Type: ϕ

Description:

Described By: DJ Subsampled By:

SAMPLE DESCRIPTION

Adam Seamount

Cruise Id: EW-87-SC Size: 9 x 12.5 x 6.5 cm Location: Adam Seamount

Sample Id: D9-11 Weight: 1.0 kg Depth: 2300-2235

2300-2235

Mn Crust Description

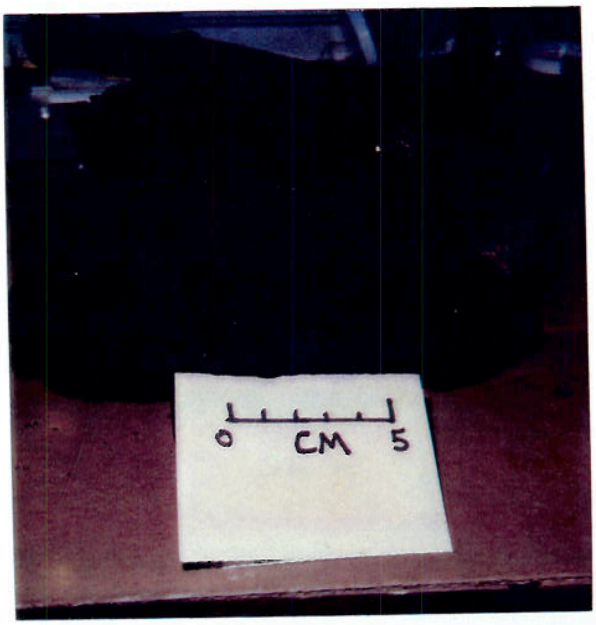
Surface Texture: Smooth

Mn Crust Thickness:

Min: 65 Max: 75 Ave: 70 mm

Layers (Outer to Inner):

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



D9-11

Comments and XRD Mineralogy:

2 Mn nodules cemented by Fe mn + have Mn crust over all

Nodules are fractured

2 Mn nodules cemented by Fe mn + have Mn crust over all

Nodules are fractured

Substrate Description

Rock Type: ∅

Description:

ANALYSES

Subsample & Type	Analysis	Weight

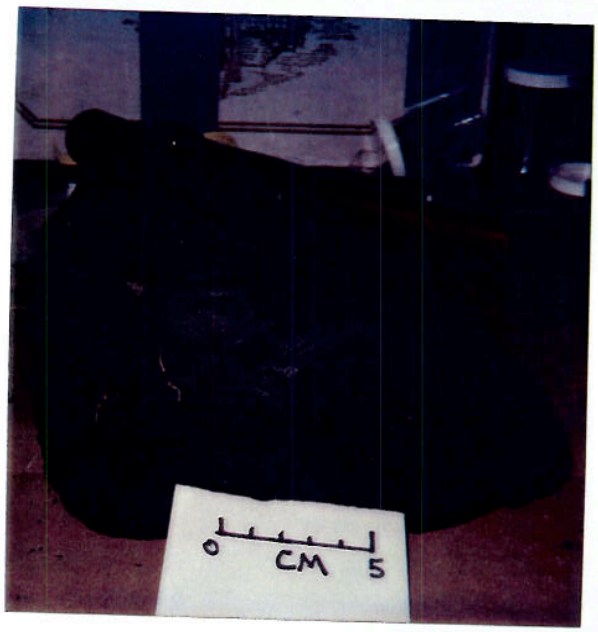
Described By: D.J. Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 19x10x8 mm Location: Adam [illegible]

Sample Id: D9-12 Weight: 1.0 Depth: [illegible]

2300-2235



D9-12

Mn Crust Description

Surface Texture: smooth, granular on bottom

Mn Crust Thickness:
Min: 45 Max: 82 Ave: 78 mm

Layers (Outer to Inner):

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

Comments and XRD Mineralogy:

Fractured nodules overlain by thick laminated crust

Substrate Description

Rock Type: Ø

Description:

ANALYSI

Subsample & Type	Analysis	Weight

Described By: D. J. Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 16 x 14 x 9 cm Location: Adam Seamount

Sample Id: D9-13 3 Weight: 6.5 kg Depth: 2300-2235

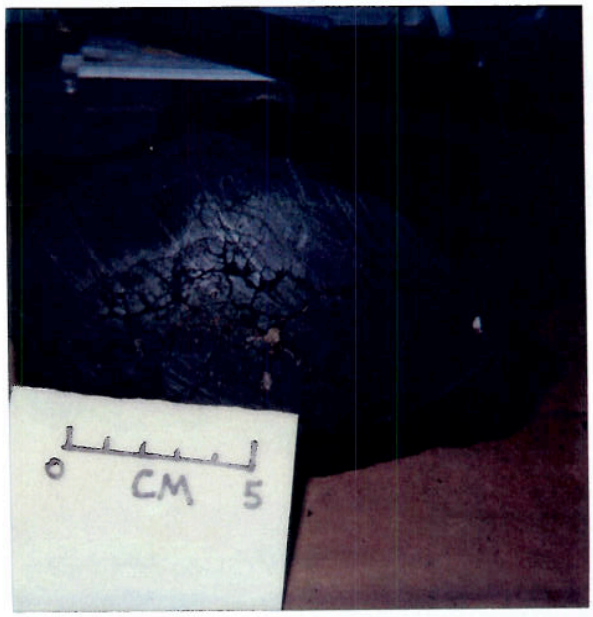
Mn Crust Description

Surface Texture: smooth, granular bottom

Mn Crust Thickness:
Min: 35 Max: 90 Ave: 75

Layers (Outer to Inner):

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



D9-13

Comments and XRD Mineralogy:
see D9-12
fractured concretion w/overlying Mn crust

Substrate Description

Rock Type:

Description:

ANALYSES

Subsample & Type	Analysis	Weight

Described By: MS Subsampled By:

SAMPLE DESCRIPTION

Adam Seamount

Cruise Id: F7-87-SC Size: 13.5x12.5x6.5 cm Location: Adam Seamount

Sample Id: D9-14 Weight: 1.0 Kg Depth: 2300-2235

Mn Crust Description

Surface Texture: smooth, [illegible] [illegible]

Mn Crust Thickness:

Min: 3 Max: 14 Ave: 7 mm

Layers (Outer to Inner):

	Min	Max	Ave	Texture
1.	3	14	7	layered
2.				
3.				
upper nucleus 4.	7	26	22	fractured, laminate
lower nucleus 5.	15	29	27	fractured, massive w/ thick layers
6.				

D9-14

Comments and XRD Mineralogy:

fractured concretions (nucleus) overlain by thick layered crust.

Thicker than D9-13

Substrate Description

Rock Type: Ø

Description:

ANALYSIS

Subsample & Type	Analysis	Weight
D9-14 A	CC, Pt, Au, ~~REE~~	Bulk
B	CC, Pt, Au, ~~REE~~	lower nucleus 30 mm fractured concretion
C	CC, Pt, Au, ~~REE~~	thin layer inner 20 mm upper nucleus

may need to get more sample for REE to

Removed REE - NOT submitted

Ree samples submitted for Hy Chem

Described By: D J. Subsampled By: L B

SAMPLE DESCRIPTION

Adam Seamount

Cruise Id: F7-87-SC Size: 10.5 x 10.0 x 7.0 cm Location: Adam Seamount

Sample Id: D9-15 Weight: 0.75 kg Depth: 2300-2235

2300-2235

D9-15

Mn Crust Description

Surface Texture: smooth, granules in rows

Mn Crust Thickness:
Min: 55 Max: 75 Ave: 60 mm

Layers (Outer to Inner):

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

Comments and XRD Mineralogy:

Fractured central area w/ massive Mn surrounding flat.

Occasional, small phosphorite slabs

Substrate Description

Rock Type: ϕ

Description:

ANALYSE

Subsample & Type	Analysis	Weight

Described By: DJ Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 10 x 9 x 7 cm Location: Adam Seamount

Sample Id: D9-16 Weight: 0.5 kg Depth: 2300-2235

Mn Crust Description

Surface Texture: Smooth

Mn Crust Thickness:

Min: 35 Max: 70 Ave: 55 mm

Layers (Outer to Inner):

	Min	Max	Ave	Texture
1.	6	15	10	laminated
2.	30	50	45	massive, fractured
3.				
4.				
5.				
6.				

D9-16

Comments and XRD Mineralogy:

Fractured lobate central area surrounded by lam Mn crust

Substrate Description

Rock Type: Ø

Description:

ANALYS

Subsample & Type	Analysis	Weight
A bulk	CC	55 mm
A bulk	REE	
A bulk	Pt, Au	
B outer laminated	CC	10 mm
B 15mm	REE	
B	Pt	
C inner fractured	CC	45 mm
C nucleus. May have sediment	REE	
C contamination since fractures sed filled. All visible contamination removed	Pt, Au	
Slab to Halliday		

Described By: DJ Subsampled By: [illegible]

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 14x8x7 cm Location: Adam Seamount

Sample Id: D9-17 Weight: 0.5 Kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: smooth, subtly botriodal

Mn Crust Thickness:
Min: 55 Max: 85 Ave: 65 mm

Layers (Outer to Inner):

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

D9-17

Comments and XRD Mineralogy:

Central phosphate-rich (dissem and small grains) core pos. old nodule. Surrounded by lam Mn

Substrate Description

Rock Type: Ø

Description:

ANALYSES

Subsample & Type	Analysis	Weight

Described By: DJ Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 20 x 12.5 x 9.5 cm Location: Adam Seamount

Sample Id: D9-18 Weight: 3.0 kg Depth: 2310-2235

Mn Crust Description

Surface Texture: smooth, granular subtle botriods w/ submetalic botriods on sides, granular lows.

Mn Crust Thickness:

Min: 45 Max: 95 Ave: 85 mm

Layers (Outer to Inner):

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

D9-18

Comments and XRD Mineralogy:

Central fractured area of dense kaotic Mn. surrounded by thin laminated outer area. Center has possible 2 nuclei

Substrate Description

Rock Type: Ø

Description:

ANALYS

Subsample & Type	Analysis	Weight

Described By: DJ Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 27 x 22 x 7.5 cm Location: Adam Seamount

Sample Id: D9-19 Weight: 10 Kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: large subtle botroids w/ metallic shine on sides, granular bottom

Mn Crust Thickness:

Min: 40 Max: 80 Ave: 70 mm

Layers (Outer to Inner):

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

D9-19

Comments and XRD Mineralogy:

Lower area laced w/phosphate

Upper wavy laminations w/ occasional phosphate blebs.

Substrate Description

Rock Type: Ø

Description:

ANALYSE

Subsample & Type	Analysis	Weight
Se Won Chang took subsample 10/97		

Described By: DJ Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 18 x 12.5 x 7 cm Location: Adam

Sample Id: D9-20 Weight: 1 Depth: 2300-2235

Mn Crust Description

Surface Texture: smooth, bulbous

Mn Crust Thickness:

Min: 50 Max: 70 Ave: 60

Layers (Outer to Inner):

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

D9-20

Comments and XRD Mineralogy:

Lower central area kaotic fractured overlain by layered & fractured Mn. Non fractured laminated Mn overlies all.

Substrate Description

Rock Type: Ø

Description:

ANALYSES

Subsample & Type	Analysis	Weight

Described By: DJ

Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 15 x 10 x 6 cm Location: Adam

Sample Id: D9-21 Weight: 1.25 Kg Depth: 2300-2235

Mn Crust Description

Surface Texture: smooth abraded surface, granular bottom

Mn Crust Thickness:
Min: 45 Max: 60 Ave: 50 mm

Layers (Outer to Inner):

	Min	Max	Ave mm	Texture
1.			3.0	laminated thickly ~~layered~~ submetallic grey
2.			25	fractured lam submetal grey
3.			25	lam dull grey
4.				
5.				
6.				

D9-21

Comments and XRD Mineralogy: see above

Substrate Description

Rock Type: Ø

Description:

ANALY

Subsample & Type	Analysis	Weight
D9-21A, Bulk	CC, REE, Pt, [illegible] PTS, XRD	[illegible]
D9-21B,	CC, Pt, Au, REE, XRD	outer Surface 3 to 4 mm
D9-21C,	CC, Pt, Au, REE, XRD	[illegible]
D9-21D	CC, Pt, Au, REE, XRD	25 mm, lower

did not submit layers for REE

Described By: DJ. Subsampled By: DJ

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 26 x 16 x 11 mm Location: Adam

Sample Id: D9-22 Weight: 8 Kg Depth: 2300 - 2235

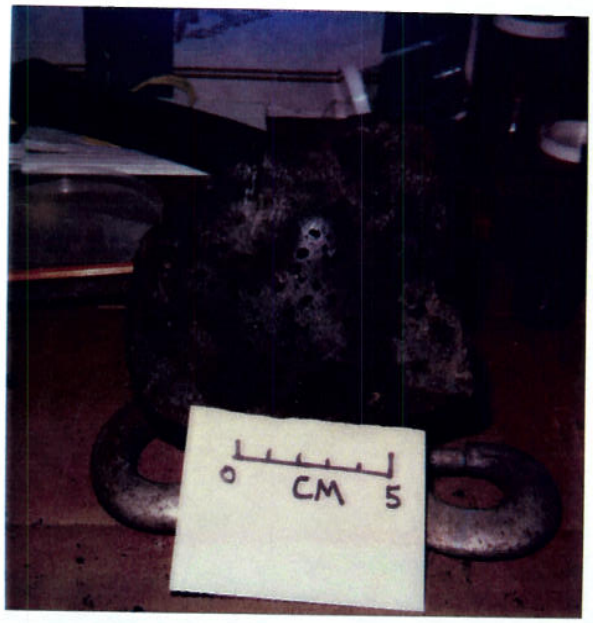
Mn Crust Description

Surface Texture: Smooth

Mn Crust Thickness:
Min: 1 Max: 4 Ave: 3 m.m

Layers (Outer to Inner):

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



D9-22

Comments and XRD Mineralogy:

Massive

ANALYSE

Subsample & Type	Analysis	Weight
Substrate	TS	

Substrate Description

Rock Type: Altered vesicular basalt

Description:

taken samples for thin section + K-Ar dating

Described By: DJ Subsampled By:

SAMPLE DESCRIPTION

Nodule

Cruise Id: F7-87-SC Size: 5.5 x 5.0 x 4.5 cm Location: Adam

Sample Id: D9-23 Weight: ~ 100 gm Depth: 2300 - 2235

Mn Crust Description

Surface Texture: smooth

Mn Crust Thickness:

Min: 50 Max: 60 Ave: 55

Layers (Outer to Inner):

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

D9-23

Comments and XRD Mineralogy:

very layers concentric

Nucleous

~~Substrate~~ **Description**

Rock Type: granular Mn

Description:

ANALYS

Subsample & Type	Analysis	Weight
1/2 of nodule	SC	wfont nucleus
	XRD	

Described By: DJ Subsampled By: DJ

SAMPLE DESCRIPTION

Cruise Id: EW-87-SC Size: 18x13x10 cm Location: Adam

Sample Id: D9-24 Weight: 7Kg Depth: 2300-2235

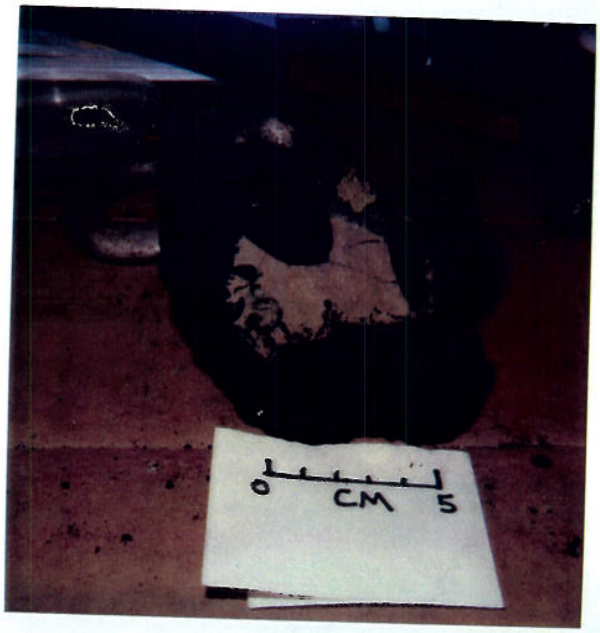
Mn Crust Description

Surface Texture: bot to subtly botryoidal surface

Mn Crust Thickness:
Min: 5 mm Max: 40 mm Ave: 30 mm

Layers (Outer to Inner):

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



D9-24

Comments and XRD Mineralogy:

Laminated crust, fills holes in phosphorite, lines micro geometry of holes in phosphorite

ANALYSE.

Subsample & Type	Analysis	Weight
35mm Slide both halves		G Smith 6/90
D9-24A		
DPTS subs.		G Smith 3.91
D9-24B	XRD	G Smith 3/91
	Oa	
	Sc	

~~Substrate~~ Description Nucleus

Rock Type: phosphorite

Description:

Phos possibly laced by marine life

Samples Sent

Described By: DS Subsampled By: GS

D9-24 B

F7-8M-SC
D9-24

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 8 x 7.5 x 7.5 cm Location: Adam

Sample Id: D9-25 Weight: 250 gm Depth: 2300 - 2235

Mn Crust Description

Surface Texture: subtly botryoidal lizard skin

Mn Crust Thickness:

Min: 75 Max: 85 Ave: 80

Layers (Outer to Inner):

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

D9-25

Comments and XRD Mineralogy:

spherical nodule w/ wavy lams. Radial fractures

ANALYSES

Subsample & Type	Analysis	Weight

~~Substrate~~ **Description** Nucleus

Rock Type: phos grains w/ old nodule

Description:

Described By: DS

Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 10x8x8 cm Location: Adam

Sample Id: D9-26 Weight: 400 gm Depth: 2360-2235

Mn Crust Description

Surface Texture: Lizard skin texture

Mn Crust Thickness:
Min: 70 Max: 90 Ave: 75 mm

Layers (Outer to Inner):

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

D9-26

Comments and XRD Mineralogy:

Fractured lower crustal area surrounded by fractured laminated crust

Substrate Description

Rock Type: 0

Description:

ANALYSI

Subsample & Type	Analysis	Weight

Described By: DJ Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 12x9.5x8 cm Location: Adam

Sample Id: D9-27 Weight: 700 gm Depth: 2300 - 2235

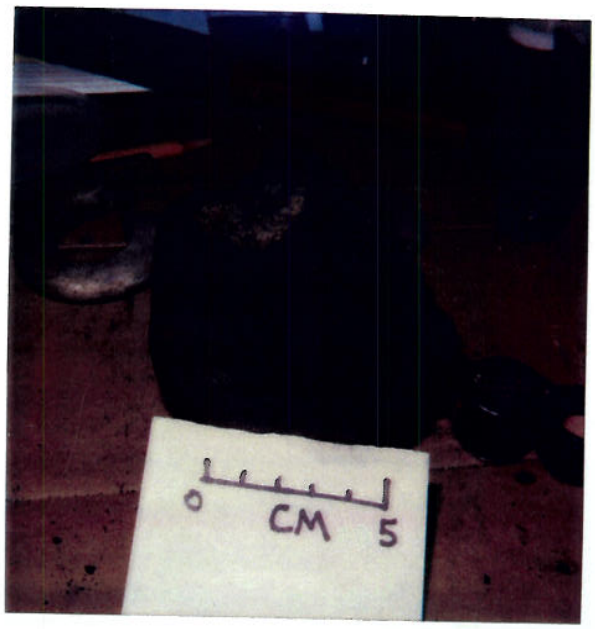
Mn Crust Description

Surface Texture: Smooth, subtle botryoidal

Mn Crust Thickness:
Min: 60 Max: 90 Ave: 76

Layers (Outer to Inner):

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



D9-27

Comments and XRD Mineralogy:
Possible nodule
Central fractured area surrounded by wavy laminated crust

ANALYSI

Subsample & Type	Analysis	Weight

Substrate Description

Rock Type: ∅

Description:

Described By: DJ Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 15 x 9.5 x 5.5 cm Location: Adam

Sample Id: D9-28 Weight: 1Kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: smoothed subtly bot surface

Mn Crust Thickness:
Min: 40 Max: 55 Ave: 47 mm

Layers (Outer to Inner):

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

D9-28

Comments and XRD Mineralogy:

Lower crust has disseminated phosphate surrounded by ~~[illegible]~~ Mn massive

Upper laminated MnO_2

Uppermost layer is red-brown w/ white streaks of Feldspar?

Substrate Description

Rock Type: Ø

Description:

ANALYSE

Subsample & Type	Analysis	Weight

Described By: DJ Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: EF7-87-SC Size: 13.5 x 5.5 ^{2} cm Location: Adam

Sample Id: D9 - 29 Weight: 700 gm Depth: 2300 - 2235

Mn Crust Description

Surface Texture: botryoidal; granular bottom

Mn Crust Thickness:
Min: 21 Max: 60 Ave: 55

Layers (Outer to Inner):

	Min	Max	Ave	Texture
1.			12	
2.			25	
3.			18	
4.				
5.				
6.				

D9-29

Comments and XRD Mineralogy:

Substrate Description

Rock Type: Ø

Description:

ANALYSE

Subsample & Type	Analysis	Weight
D9-29	XRF	Bulk
D9-29	thin sections	
D9-29	CC	Bulk 55 mm
Split	Be + other isotopes	Various
Various layers	Pb, Sr isotopes	Hein

Described By: DS Subsampled By: DS

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 19x15.5x6.5 cm Location: Adam

Sample Id: D9-30 Weight: 5kg Depth: 2300-2235

Mn Crust Description

Surface Texture: Smooth

Mn Crust Thickness:

Min: 1 Max: 3 Ave: 3 mm

Layers (Outer to Inner):

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

D9-30

Comments and XRD Mineralogy:

Red brown, massive

Substrate Description

Rock Type: Walt's Bluaschist

No blue chist!

Description:

[illegible] medium [illegible]

erratic

ANALYS

Subsample & Type	Analysis	Weight
Substrate	TS	

Described By: DJ Subsampled By: DJ

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 14.5 x 6.5 x 5.5 cm Location: Adam

Sample Id: D9-31 Weight: 4 kg Depth: 2300-2235

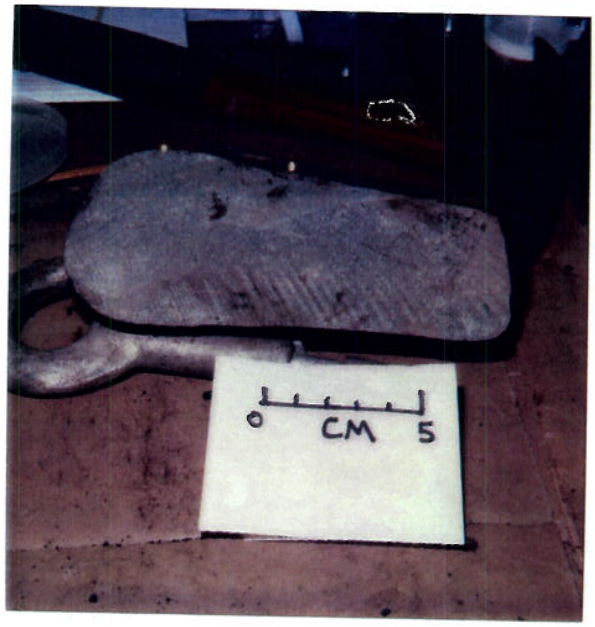
Mn Crust Description

Surface Texture: smooth

Mn Crust Thickness:
Min: 1 Max: 5 Ave: 4 mm

Layers (Outer to Inner):

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



D9-31

Comments and XRD Mineralogy:

Massive, red-brown

Substrate Description

Rock Type: Wolf's Greywacke

Description: also pebbly breccia

ANAL

Subsample & Type	Analysis	Weight
Substrate D9-31	-2 CC	4mm Bulk

Described By:

Subsampled By: DJ

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 10x9x8.5 cm Location: Adam

Sample Id: D9 -32 Weight: 600 kg Depth: 2300 -2235

Mn Crust Description

Surface Texture: smooth, abraded
botryoidal

Mn Crust Thickness:
Min: 80 Max: 105 Ave: 90

Layers (Outer to Inner):

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

D9-32

Comments and XRD Mineralogy:
Spherical Nodule

Substrate Description Nucleus
Rock Type:
Old crust
Description:
red-brown like surface of D9-28

ANALYSE

Subsample & Type	Analysis	Weight

Described By: DS Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 16x14x9 cm Location: Adam

Sample Id: D9-33 Weight: 4 kg Depth: 2300-2235

Mn Crust Description

Surface Texture:

Mn Crust Thickness:

Min: 3 Max: 7 Ave: 6 mm

Layers (Outer to Inner):

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

D9-33

Comments and XRD Mineralogy:

Massive

Burrows are lined with a metallic luster mineral(?) end of one burrow for SEM?

Burrows are lined with a metallic luster mneral(?) end of one burrow for SEM?

Dolomite?

Substrate Description

Rock Type: ~~phosphorite~~

Description:

Brittle bedded ~~phosphorite~~ Dolomite w/ large bio burrows ~1.5-1.0 cm across. Burrows open to surface partly infilled by massive Mn. Some burrows filled w/ cream [illegible] mud

Described By: DJ Subsampled By:

ANALY

Subsample & Type	Analysis	Weight
D9-33A	XRD, OC, C+O, TS	
D9-33B, XRD (mud from vugs)		
D9-33C - Metallic from vug XRD		
Polished section cut off face perpendicular to the [illegible]		

Note: 2 bags of sample

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 18x 17x 7 cm Location: Adam

Sample Id: D9-34 Weight: 5 kg Depth: 2300-2235

Mn Crust Description

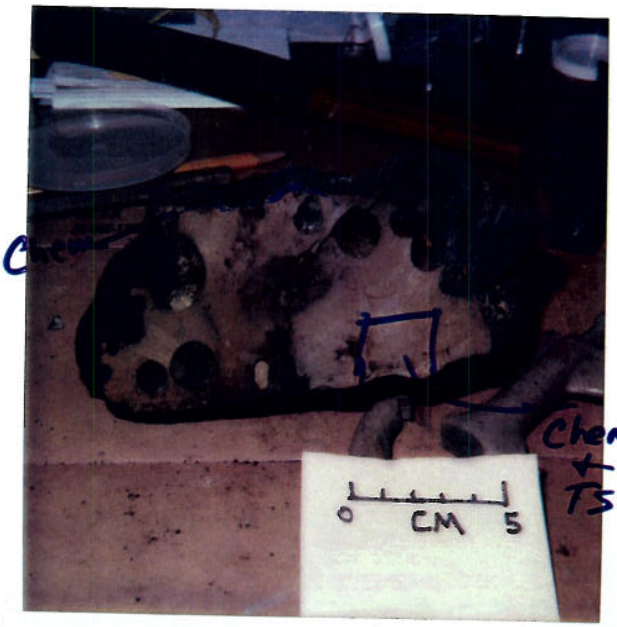
Surface Texture: smooth to modified botriodal

Mn Crust Thickness:

Min: 7 Max: 18 Ave: 12 mm

Layers (Outer to Inner):

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



D9-34

Comments and XRD Mineralogy:

Massive

Substrate Description

Rock Type: Bored phosphorite Dolomite

Description:

Borings <2.7 cm across

Bores exposed to surface

infilled by Mn

ANALYS

Subsample & Type	Analysis	Weight
D9-34A	CC	10-14 mm thick Bulk
D9-34A	XRD	
D9-34B	XRD	
D9-34B	oxide chem	
D9-34B	TS	
D9-34B	O+C Isotopes	

Described By: DJ Subsampled By: DJ

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 17x14x6cm Location: Adam

Sample Id: D9-35 Weight: 3.4 Kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: Smooth, modified but in places

Mn Crust Thickness:

Min: 1 Max: 7 Ave: 2

Layers (Outer to Inner):

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

D9-35

Comments and XRD Mineralogy:

Massive

Substrate Description

Rock Type: Fractured ~~Syenite~~

No syenite - granitic rock - erratic probably from Salinian Block

Description:

kelp-rafted

ANALYS

Subsample & Type	Analysis	Weight
Substrate	TS	

Described By: DS Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 16 x 9.5 x 5.5 Location: Adam

Sample Id: D9-36 Weight: 1.2 Kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: Smooth

Mn Crust Thickness:

Min: 15 Max: 20 Ave: 17

Layers (Outer to Inner):

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

D9-36

Comments and XRD Mineralogy:

Massive

ANALYS

Subsample & Type	Analysis	Weight

Substrate Description

Rock Type: ~~Basalt~~ No!

Description: Sedimentary

Described By: DJ Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 16x12x7.5 cm Location: Adam

Sample Id: D9-37 Weight: 1 Kg Depth: 2300-2235

Mn Crust Description
Surface Texture: Bulbous smooth

Mn Crust Thickness:
Min: 30 Max: 80 Ave: 60 cm

Layers (Outer to Inner):

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

D9-37

Comments and XRD Mineralogy:

Several generations of Mn crust surround phos.

Substrate Description 2 nuclei
Rock Type: phosphorite

Description:

ANALYS

Subsample & Type	Analysis	Weight

Described By: DS Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: EF-87-SC Size: 14 x 9.5 x 5 cm Location: Adam

Sample Id: D9-38 Weight: 0.8 kg Depth: 2300 - 2235

Mn Crust Description

Surface Texture: smooth, hazardy granular in lows

Mn Crust Thickness:
Min: 2 Max: 5 Ave: 3.5 mm

Layers (Outer to Inner):

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

D9-38

Comments and XRD Mineralogy:

massive

Substrate Description

Rock Type: Basement mudstone

Description:

Mudstone w/ common Mn dendrites
Burrows infilled w/ Mn

ANALYSES

Subsample & Type	Analysis	Weight

Described By: DS Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 15x13x7 cm Location: Adam

Sample Id: D9-39 Weight: 800gm Depth: 2300-2235

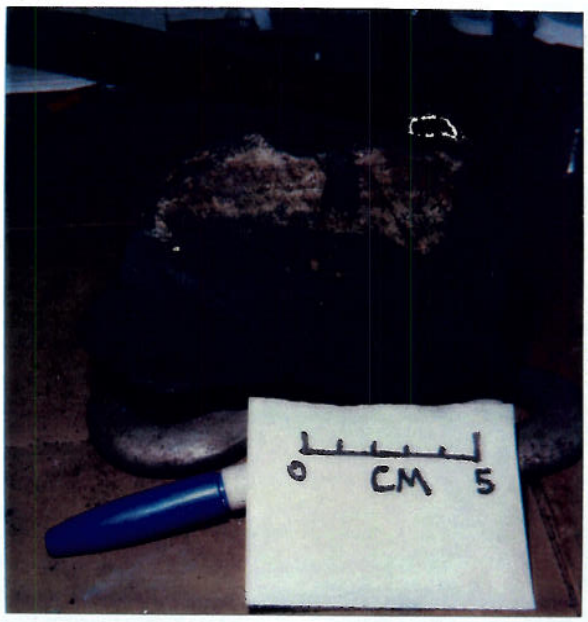
Mn Crust Description

Surface Texture: Smooth
with BULBOUS
LIZARD SKIN

Mn Crust Thickness:
Min: 40 Max: 50 Ave: 45

Layers (Outer to Inner):

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



D9-39

Comments and XRD Mineralogy:

Lower crust matrix supports PO4 + basalt grains (1-3 mm)
Laminated asphalt Mn overlies

Substrate Description

Rock Type: Hyaloclastite

Description:

ANALYSE

Subsample & Type	Analysis	Weight

Described By: DJ Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 20 x 15 x 11 cm Location: Adam

Sample Id: D9-40 Weight: 4.0 Kg Depth: 2300-2235

Mn Crust Description

Surface Texture: smooth bulbous

Mn Crust Thickness:

Min:_____ Max:_____ Ave:_____

Layers (Outer to Inner):

	Min	Max	Ave	Texture
1.	25	50	35	layered & laminated
2.	25	30	22	chaotic
3.				
4.				
5.				
6.				

D9-40

Comments and XRD Mineralogy: Nodule (?)

several generations of Mn surround nucleous → chaotic appearance scattered 1-3 mm poly blebs

~~Substrate~~ Description Nucleus

Rock Type: Hyaloclastite (diffuse)

Description:

ANALYS

Subsample & Type	Analysis	Weight

Described By: D.J. Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: F7-87-SC Size: 15.5 x 13.5x4.5 Location: Adam

Sample Id: D9-41 Weight: 1.5Kg Depth: 2300-2235

Mn Crust Description

Surface Texture: smooth, subtly bulbous

Mn Crust Thickness:
Min: 38 Max: 47 Ave: 40 mm

Layers (Outer to Inner):

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

D9-41

Comments and XRD Mineralogy:

laminated red brown

increasing Rd-brown, decreasing fractures toward top

ANALYSE

Subsample & Type	Analysis	Weight
D9-41	pts	
"	cc	Bulk - 40 mm
"	XRD	

Substrate Description

Rock Type: Hyaloclastite

Description:

Described By: DS Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: EW-87-SC Size: 10×10×6.5 cm Location: Adam

Sample Id: D9-42 Weight: 1 Kg Depth: 2300 × 2235

Mn Crust Description

Surface Texture: smooth bulbous

Mn Crust Thickness:

Min: 36 Max: 45 Ave: 38 mm

Layers (Outer to Inner):

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

D9-42

Comments and XRD Mineralogy:

Massive w/ local layers

Substrate Description

Rock Type: Hydroclastite impregnated w/ MnO_2

Description:

ANALYS__

Subsample & Type	Analysis	Weight

Described By: D.S. Subsampled By: