Sample Description

Cruise I.D: L5-83-HW Sample I.D: Sta: D24-1A Location: S.P. Lee Guyot

Size: _____ Weight: _____

Mn crust thickness:

Total: min: _____ max: _____ ave: _____

Inner crust: min: _____ max: _____ ave: _____

Outer crust: min: _____ max: _____ ave: _____

Surface texture: _____

Internal structure: _____

layered: _____
laminated: _____
massive: _____
porous: _____
dendritic: _____
other: _____

Mineralogy (XRD): _____

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: _____

Description: _____

Mineralogy (XRD):

This sample must be confused with another one, because there is no D24-1A (Is it D24-A1? If so - see next page)

Analyses and subsamples:

analysis:	analyst:
XRD	C. Daniel
I: substrate	
chemistry bulk substrate	

D24

Sample Description

Cruise I.D: L5-83-HW

Sample I.D: Sta: 41 D 24-A1-1

Location: S.P. Lee

D = 2400 m

Size: 41x23x17cm Weight: ~6 Kg

Mn crust thickness: — crust with silt mixed

Total: min: 0.2 cm max: 4 cm ave: 1.0 cm

Inner crust: min: ____ max: ____ ave: ____

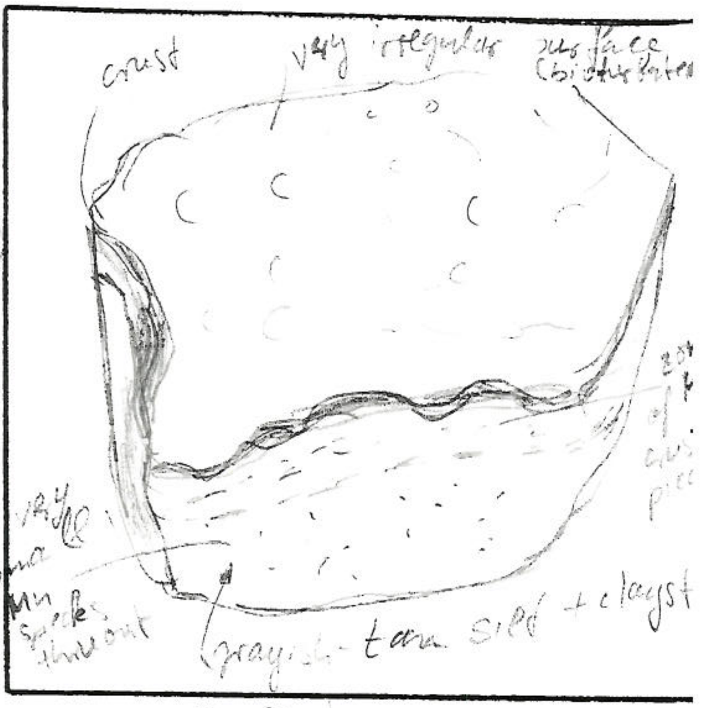
Outer crust: min: 0.1 max: 0.5 ave: 0.3 cm — solid Mn crust without silt

Surface texture: irregular (bioturbated?)

Internal structure:

- layered:
- laminated:
- massive: ✓ to granular
- porous:
- dendritic:
- other: when crust is broken open it has a very open structure, almost vuggy. Spaces are filled with mud.

Mineralogy (XRD):



Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: silt + claystone, calcareous, poorly indurated

Description: pale tan to grayish silt (to v. fine sand) with lot of forams. Forams seem to be Recent burrow infillings.

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
organic matter	Bill Tren 3/27

L5-83-HW

D24-A1

SAMPLE DESCRIPTION

...e Id: L5-83-HW Size: 26 x 25 x 12 Location: S.P. Lee Guyot

Sample Id: D24-A2 Weight: 8 Kg Depth: 2400 m

Mn Crust Description

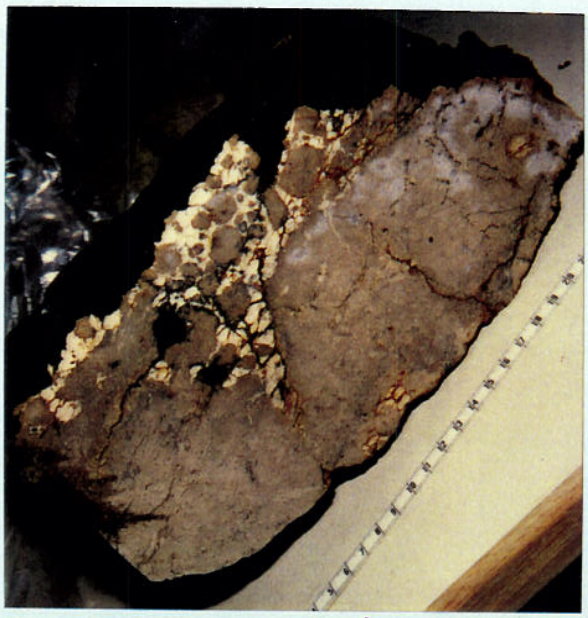
Surface Texture: Botryoidal: Mn is dense and uniform in cross section

Mn Crust Thickness:

Min: 10 mm Max: 20 mm Ave: 12 mm

Layers (Outer to Inner):

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



L5-83-HW
D24-A2

...nents and XRD Mineralogy:

ANALYSES

Subsample & Type	Analysis	Weight
35mm slide		G. Smith

Phosphate Study

Substrate Description

Rock Type: Phosphorite, two colors of phosphorite pinkish brown that appears to be replacement of limestone and cream colored w/clasts of the other phosphate enclosed

Description:

Described By: J. Schulz Subsampled By:

SAMPLE DESCRIPTION

se Id: L5-83-HW Size: 18x13x4 cm Location: S. P. Lee Crypt

Sample Id: D24 - D1 Weight: <1 kg Depth: 2400m

Mn Crust Description

Surface Texture: No Crust

Mn Crust Thickness:

Min:_____ Max:_____ Ave:_____

Layers (Outer to Inner):

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

L5-83-HW
D24-D1

nents and XRD Mineralogy:

Substrate Description

Rock Type: Bioturbated Silty Mudstone, yellowish cream colored, w/ bioturbations in a grayer colored mudstone, poorly indurated

Description:

There are silt & sand size Mn clasts in the sample

ANALYSES

Subsample & Type	Analysis	Weight

Described By: J. Schultz Subsampled By:

SAMPLE DESCRIPTION

se Id: L5-83-HW Size: 25 x 12.5 x 4.5 Location: S.P. Lee Guyot

Sample Id: D24-D2 Weight: 1 kg Depth: 2400 m

Mn Crust Description

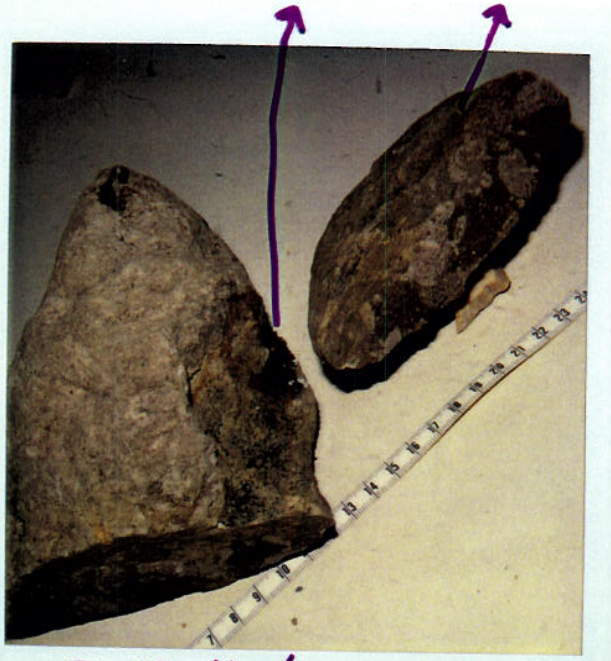
Surface Texture: Several small patches of crust. patina to 1mm thick, porous to botryoidal, the largest area of crust appears between sand and sandy [illegible]

Mn Crust Thickness:

Min:_____ Max:_____ Ave:_____

Layers (Outer to Inner):

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



L5-83-HW
D24-D2

nents and XRD Mineralogy:

Substrate Description

Rock Type: Bioturbated Volcaniclastic sandstone, with Carbonaceous Sandy mudstone above (?) there is a layer of wavy green clay between the two lithologies, probably nontronite (?) burrows are infilled with tan to cream colored mud! where the sand is not bioturbated it is fining upward

Description:

Described By: J. Schulz Subsampled By:

ANALYSES

Subsample & Type	Analysis	Weight

SAMPLE DESCRIPTION

se Id: L5-83-HW Size: 10x9x3.5 cm Location: S.P. Lee Seamount

Sample Id: D24-D3 Weight: 1 kg Depth: 2400 m

Mn Crust Description

Surface Texture: NO CRUST

Mn Crust Thickness:

Min:_____ Max:_____ Ave:_____

Layers (Outer to Inner):

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

nents and XRD Mineralogy:

ANALYSES

Subsample & Type	Analysis	Weight

Substrate Description

Rock Type: Carbonaceous Sandy Mudstone Poorly sorted (bioturbated?) light pinkish brown; Poorly indurated

Description:

Some of the sand-size grains have to be Mn clasts. Slightly foraminiferal.

Described By: J. Schultz Subsampled By:

SAMPLE DESCRIPTION

Core Id: L5-83-HW Size: 12x9x6cm Location: S.P. Lee Guyot

Sample Id: D24-A3-1 Weight: ~1kg Depth: 2130

Mn Crust Description

Surface Texture: Porous to smooth; patina of Mn coating up to 1mm thick, not continuous around the sample

Mn Crust Thickness:

Min:_____ Max:_____ Ave:_____

Layers (Outer to Inner):

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

nents and XRD Mineralogy:

D24-A3-1
L5-83-HW

ANALYSES

Subsample & Type	Analysis	Weight

Substrate Description

Rock Type: Carbonate mud with bioturbation w/ Fe and Mn staining in burrow traces

Description:

Described By: J. Schulz Subsampled By:

SAMPLE DESCRIPTION

...se Id: **L5-83-HW** Size: 8 x 7 x 3.5 cm Location: S.P. Lee Guyot

Sample Id: D24-A3-2 Weight: <1kg Depth: 2400 M

Mn Crust Description

Surface Texture: smooth to granular, patina of Mn

Mn Crust Thickness:

Min: ______ Max: ______ Ave: ______

Layers (Outer to Inner):

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

D24-A3-2

L5-83-HW

...nents and XRD Mineralogy:

ANALYSES

Subsample & Type	Analysis	Weight

Substrate Description

Rock Type: Very altered volcaniclastic clasts in sandy mudstone matrix

Description:

Described By: T. Schulz

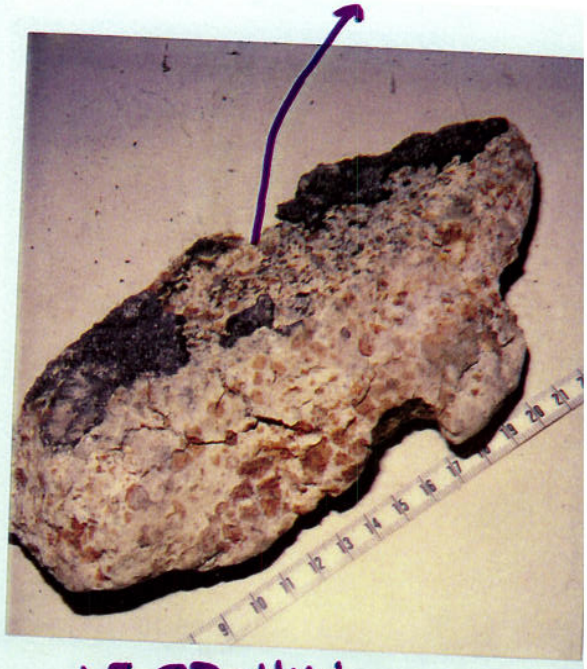
Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: L5-83-HW Size: 23x11x4 cm Location: S.P. Lee Guyot

Sample Id: D24-A3-3 Weight: <1kg Depth: _____

Crust from [illegible]



L5-83-HW

D24-A3-3

Mn Crust Description

Surface Texture: smooth to granular up to 2mm thick dense uniform through 2mm thickness

Mn Crust Thickness:

Min: _____ Max: _____ Ave: _____

Layers (Outer to Inner):

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

Comments and XRD Mineralogy:

ANALYSES

Subsample & Type	Analysis	Weight
Bulk new crust	CC (Restore)	8g 6/88 Job# BZ89 ↑ (from submittal sheet)

Substrate Description

Rock Type: Vermiculated volcanic clasts in silty mud matrix poorly undulated similar to D23-A3-2

Description:

Vug on bottom of sample has small white xtals lining it. does not react with HCL perhaps a zeolite.

There is a suggestion of layering or bedding with large clasts. (see D24-A3-4)

Described By: J. Schulz Subsampled By: Jung Keuk Kang 6/88

SAMPLE DESCRIPTION

se Id: L5-83-HW Size: 11 x 7 x 5 cm Location: S.P. Lee Guyot

Sample Id: D24-A3-4 Weight: <1 kg Depth: 2400m

Mn Crust Description

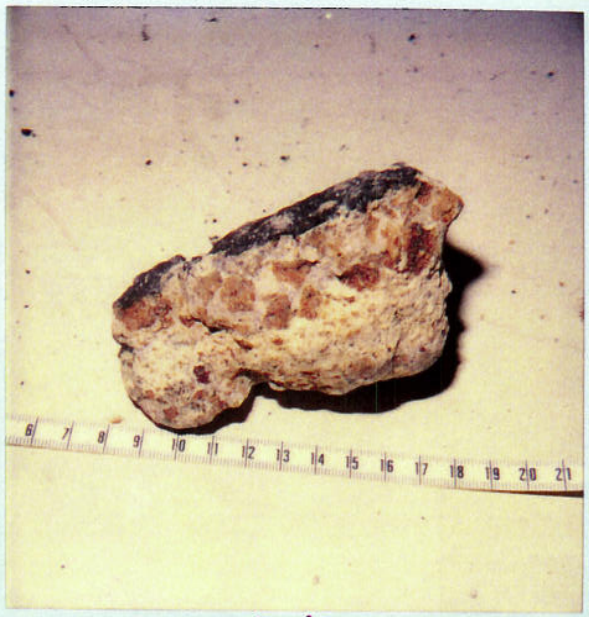
Surface Texture: smooth to granular, porous

Mn Crust Thickness:

Min: 1mm Max: 2mm Ave:

Layers (Outer to Inner):

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



L5-83-HW

D24-A3-4

nents and XRD Mineralogy:

ANALYSES

Subsample & Type	Analysis	Weight

Substrate Description

Rock Type: Volcaniclastic breccia highly altered. Layers of large clasts in waxy clay matrix separated by finer grained

Description:

sandy mudstone. The upper layer of large clasts has and interesting wavy light brown clay matrix.

This sample is similar to D24-A3-3 However the bedding is more obvious here

Described By: J. Schmitz Subsampled By:

SAMPLE DESCRIPTION

Sample Id: L5-83-HW Size: 21 x 19 x 5 cm Location: SP Ice Mount

Sample Id: D24-A3-5 Weight: 2 kg Depth: 2450

Mn Crust Description

Surface Texture: Patina of Mn up to 1mm

Mn Crust Thickness:

Min:_____ Max:_____ Ave:_____

Layers (Outer to Inner):

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

nents and XRD Mineralogy:

ANALYSES

Subsample & Type	Analysis	Weight

Substrate Description

Rock Type: Limestone. Cream colored bioturbated micrite

Description:

Described By: J. Schultz Subsampled By:

SAMPLE DESCRIPTION

se Id: L5-83-HW Size: 2x1x4 Location: S. P. Lee Guyot

Sample Id: D24-A3-6 Weight: [illegible] Depth: [illegible]

Mn Crust Description

Surface Texture: Botryoidal to porous botryoidal

Mn Crust Thickness:

Min: 1mm Max: 4mm Ave: 2mm

Layers (Outer to Inner):

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

L5-83-HW

D24-A3-6

nents and XRD Mineralogy:

ANALYSES

Subsample & Type	Analysis	Weight
XRD		
I: substrate		C. Daniel

Substrate Description

Rock Type: Altered Volcaniclastic Breccia with larger clasts in layers same stuff as D24-A3-3 & D24-A3-4

Description:

Described By: J. Sch[illegible] Subsampled By:

SAMPLE DESCRIPTION

se Id: L5-83-HW Size: 30 x 26 x 15 cm Location: S.P. Lee Guyot

Sample Id: D24-A3-7 Weight: [illegible] kg Depth: 2400

Mn Crust Description

Surface Texture: Botryoidal to smooth to granular
Mn occurs on all sides of this boulder

Mn Crust Thickness:
Min: patina Max: 13 mm Ave: _____

Layers (Outer to Inner):

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

L5-83-HW
D24-A3-7

ments and XRD Mineralogy:

The thickest crust is on one side of boulder, here it is dense and fairly uniform there is a thin (up to 3 mm) layer of creamy colored phosphate beneath the Mn crust phosphate may also be cementing clast on one side (not sawn through)

Substrate Description

Rock Type: Volcaniclastic Breccia in Green sandy mudstone matrix

Description:

Some of the clasts are more highly altered than others.

ANALYSES

Subsample & Type	Analysis	Weight

Described By: J. Schulz Subsampled By:

SAMPLE DESCRIPTION

se Id: L5-83-HW Size: 17x12x13cm Location: S.P. Lee Guyot

Sample Id: D24-A3-8 Weight: 2 kg Depth: 2400 m

Mn Crust Description

Surface Texture: Botryoidal and generally granular and porous.

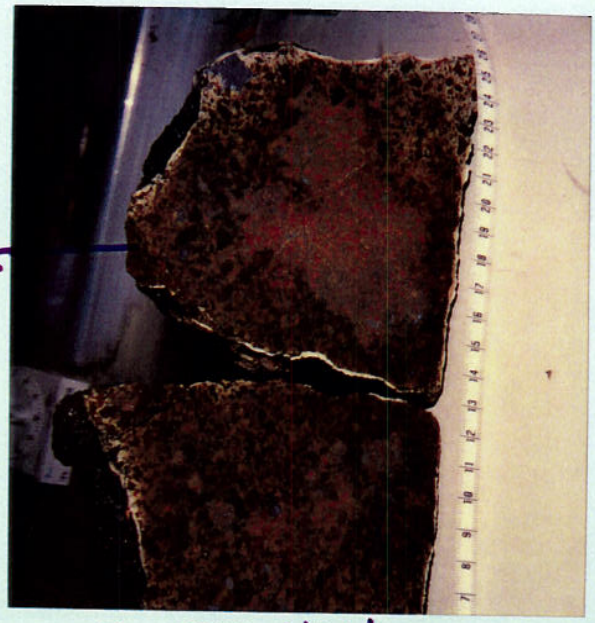
Mn Crust Thickness:

Min: <1mm Max: 9mm Ave:

Layers (Outer to Inner):

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

differential [illegible] to center drying more quickly.



L5-83-HW

D24-A3-8

nents and XRD Mineralogy:

This boulder is covered on all sides by a thin (up to 3mm) layer of cream colored phosphorite, which is in turn covered by Mn crust.

— Broke along a "fracture" which is Fe and iron stained, on closer examination iron stain is crystalline material, very fine acicular xtls. another fracture was filled with foraminiferal sand.

Substrate Description

Rock Type: Volcaniclastic Breccia

Altered basalt clasts and very fresh grey basalt clasts in a green clay

Description:

matrix

ANALYSES

Subsample & Type	Analysis	Weight

Described By: J. Schulz Subsampled By:

Sample Description

Cruise I.D: L5-83-HW Sample I.D: Sta: D24-A3-9 & 10 Location: [illegible]

Size: 22x14x8cm Weight: 1 kg

Mn crust thickness:

Total: min: patina max: 5mm ave: 2mm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Botryoidal to granular porous

Internal structure:

layered:
laminated:
massive:
porous:
dendritic:
other:

L5-83-HW
D24-A3-9 & 10 & 11

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Limestone 2 types light pinkish brown that replaces

Description: bioturbated calcareous mud and cream colored that cements brecciated pieces of the other.
Similar to D24-A2

D24-A3-10 fits to a fractured side of this it is the same lithology. The fracture appears Fe stain however it is covered w/ Fe colored micro-crystals that react with HCl.

Mineralogy (XRD): D24-A3-11 same stuff
All 3 samples combined as one.

Analyses and subsamples:

analysis:	analyst:
XRD:	C. Daniel
I: substrate	

Desc. by J. Schulz

SAMPLE DESCRIPTION

Cruise Id: LS-83-HW Size: _____ Location: S. P. Lee Guyot

Sample Id: D24-A11 Weight: _____ Depth: _____

Mn Crust Description

Surface Texture: _____

Mn Crust Thickness:

Min: _____ Max: _____ Ave: _____

Layers (Outer to Inner):

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

Comments and XRD Mineralogy:

ANALYSES

Subsample & Type	Analysis	Weight
Bulk Mn crust	CC (Reston)	10g 6/88 Job#BZ89 (from subnodal shot)

Substrate Description

Rock Type: _____

Description:

Described By: Jung-Keuk Kang 6/88 Jung-Keuk Kang 6/88

SAMPLE DESCRIPTION

se Id: L5-83-HW Size: _____ Location: S.P Lee Guyots

Sample Id: D24-A3-12 Weight: 1kg Depth: 2400

Mn Crust Description

Surface Texture: granular to botryoidal; infills around some cobbles and is thickest there

Mn Crust Thickness:

Min: Patchy Max: 10cm Ave: 1mm

Layers (Outer to Inner):

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

nents and XRD Mineralogy:

L5-83-HW
D24-A3-12

ANALYSES

Subsample & Type	Analysis	Weight

Substrate Description

Rock Type: Limestone

Description:

Source Study as D24-A3-9,10

Described By: J Schultz Subsampled By:

SAMPLE DESCRIPTION

se Id: L5-83-HW Size: 23 x 13 x 5 cm Location: S.P. Lee Guyot

Sample Id: D24-A3-13 Weight: 1 kg Depth: 2400

Mn Crust Description

Surface Texture: Botryoidal to granular

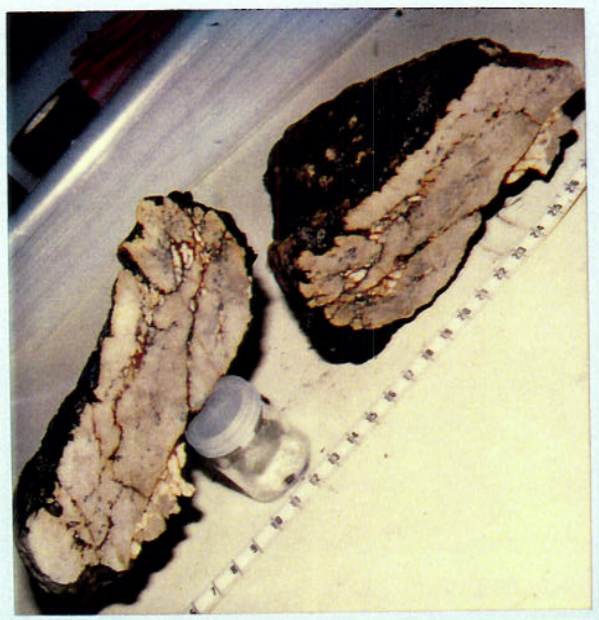
The thickest crust is porous and vitreous

Mn Crust Thickness:

Min: patina Max: 12 mm Ave:

Layers (Outer to Inner):

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



D24-A3-13
L5-83-HW

nents and XRD Mineralogy:

Substrate Description

Rock Type: Limestone

Description:

Mn staining along fracture planes
iron colored white along one fracture face

ANALYSES

Subsample & Type	Analysis	Weight

Described By: J. Schulz Subsampled By:

SAMPLE DESCRIPTION

.e Id: L5-83-HW Size: 10 x 17 x 12 cm Location: S.P. Lee Guyot

Sample Id: D24-A3-14 Weight: <1 kg Depth: 2400

Mn Crust Description

Surface Texture: Botryoidal [illegible]

Mn Crust Thickness:

Min: Patina Max: 2mm Ave:

Layers (Outer to Inner):

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

D24-A3-14

L5-83-HW

ıents and XRD Mineralogy:

Substrate Description

Rock Type: Limestone, with preserved bioturbation

Description:

ANALYSES

Subsample & Type	Analysis	Weight

Described By: J. Schulz Subsampled By:

SAMPLE DESCRIPTION

Cruise Id: L5-83-HW Size: 23 x 12 x 9 cm Location: S.P. [illegible] Guyot

Sample Id: D24-A3-15 Weight: 4 kg Depth: 2400

Mn Crust Description

Surface Texture: Botryoidal to smooth

Crust on top of sample is thicker (3mm) & smooth on bottom is thinner and very granular

Mn Crust Thickness:

Min: 1mm Max: 3mm Ave: 2mm

Layers (Outer to Inner):

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

L5-83-HW

D24-A3-15

Comments and XRD Mineralogy:

ANALYSES

Subsample & Type	Analysis	Weight

Substrate Description

Rock Type: Volcaniclastic breccia, altered clasts in a green clay matrix. The sample has some bedding w/ zones of little to

Description:

no clasts between clast laden zones. The upper clast laden bed has a waxy clay matrix in some spots (pinkish/brown)

Poorly indurated, very friable; if rewetted it falls apart

Described By: J. Schulz Subsampled By:

Sample Description

Cruise I.D: L5-83-HW

Sample I.D: Sta: D24-A3-16

Location: S.P. Lee Guyot

Size: 30x13x8.5cm Weight: 2 kg

Mn crust thickness:

Total: min: patina max: 1mm ave:

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: microbotryoidal

Internal structure:

layered:
laminated:
massive:
porous:
dendritic:
other:

L5-83-HW
D24-A3-16

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Limestone

Description: Fe and Mn staining in nooks and crannies and along fractures

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
XRD:	C. Daniel
T: substrate	