DREDGE 52
Central
Hiyoshi
Knoll

AMPLE ID	Mn CHEM	Pt & Au	REE	Si Chem	P.Sect.	35mm Pho	Archive	Paleo					
D52-1													
D52-2													
D52-3													
D52-4	[illegible]												
D52-5	Bulk	Bulk	Bulk		DPTS								
D52-6													
D52-7													
D52-8													
[illegible]	Bulk & Dense												
[illegible]	Bulk												
[illegible]	Bulk												
[illegible]													
[illegible]					DPTS								

SAMPLE DESCRIPTION

uise Id: TT192 Size: 18x19x9.5 cm Location: Central Hiyoshi Knoll

Sample Id: D52-1 Weight: 5.25kg Depth: 647-1105

Mn Crust Description

Surface Texture: [illegible]

Mn Crust Thickness:

Min: Max: Ave:

Layers (Outer to Inner):

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

Mariana Islands

D52-1

Comments and XRD Mineralogy:

Entire sample is hydrothermal Mn
Dense lighter fragments (from 2mm to 20mm)
thick w/ darker porous layers.
Maybe detrital clasts within the layers.
A few large clasts (30mm) whose identity
is well disguised by Mn probably
Volcanic

Substrate Description

Rock Type: None

Description:

ANALYSES

D52-1-5-13 - Red mud scraped from bottom of [illegible]
OC, Sand (From 52-1-5-13)

JSM

Mariana Islands
D52-1

SAMPLE DESCRIPTION

Cruise Id: TT192 Size: 21 x 13 x 6 cm Location: Central Hiyoshi Knoll

Sample Id: D52-2 Weight: 2.15 Depth: 647-1105 m

Mn Crust Description

Surface Texture: [illegible]

Mn Crust Thickness:

Min:_____ Max:_____ Ave:_____

Layers (Outer to Inner):

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

Mariana Islands

D52-2

Comments and XRD Mineralogy:

Layers of hydrothermal Mn, dense [illegible] layers with major porous [illegible] layers and some sandy layers

Substrate Description

Rock Type: None

Description:

ANALYSES

Mariana Islands

D52-2

SAMPLE DESCRIPTION

Cruise Id: TT112 Size: 17.5x7.5x6cm Location: Central Hiyoshi Knoll

Sample Id: D52-3 Weight: 1kg Depth: 644-1105

Mn Crust Description

Surface Texture: Grainy w/ some smooth bulbous hydrothermal areas.

Mn Crust Thickness:

Min:_____ Max:_____ Ave:_____

Layers (Outer to Inner):

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

Replacement of clasts?

yellow ochre mud

light gray massive layer

Mariana Islands

D52-3

Comments and XRD Mineralogy:

Layered hydrothermal Mn. Some light gray massive layers but this sample has more of the porous layers than some of the other samples in this dredge. In some way the more porous layers suggest granules coalescing.

Substrate Description

Rock Type: None - some yellow ochre mud on outside of sample

Description:

ANALYSES

Piece to Dr Kevin Shelton Jr of Missouri

Sample Description

Cruise I.D: ~~L5-83-HW~~ mariana Is.

Sample I.D: Sta: D52-4

Location: Central Hiyoshi knoll

Size: 3 slab bed pieces

Weight: 840 gms (wet)

12x5.5x3cm to 8x2.8x3cm

Depth: 647-1105m

Mn crust thickness:

Total: min: 3.0cm max: 6.0cm ave: ~2.0cm

Inner crust: min: see back max: ave:

Outer crust: min: max: ave:

Surface texture:

Internal structure: dense central layer (B) w/ porous layer above (A) and lower layer (C) that is porous, like "A" but w/ dense layer like B running through it

layered:

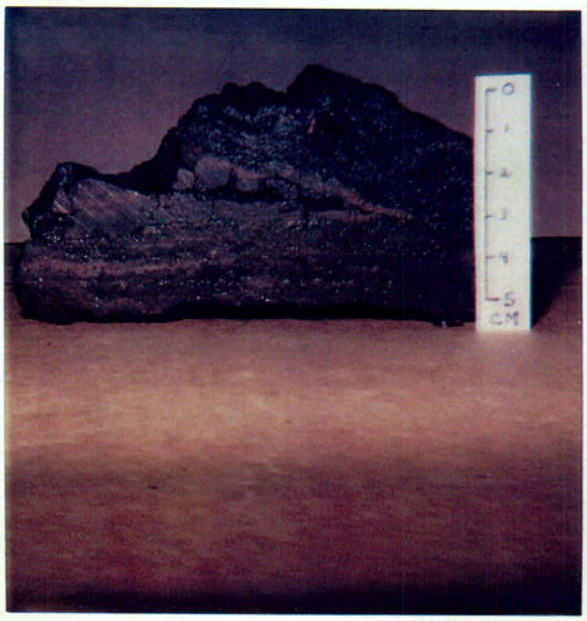
laminated:

massive:

porous:

dendritic:

other:



Mariana Islands

D52-4

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type:

Description:

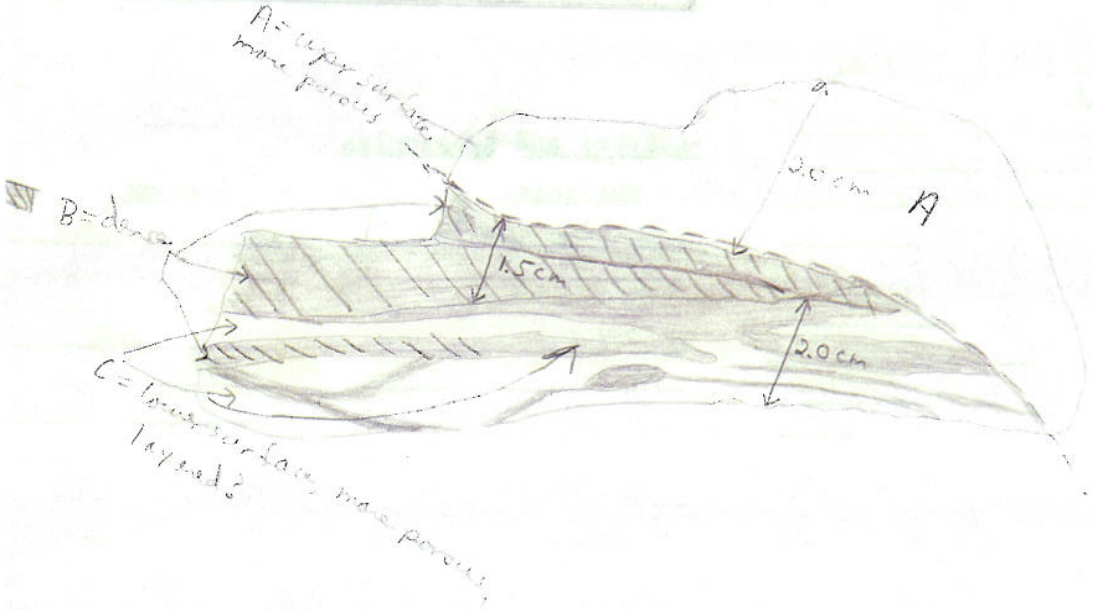
Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
Chemistry: "Mariana"	L. Morgenson
52-4-A	
52-4-B } see back (crust)	
52-4-C	
XRD:	
D52-4-I outer 0-20mm	
D52-4-II inner 20-35mm	
D52-4-III inner 35-55mm	
D52-4-B resubmitted for Hg chem	
75% of slab - laminated (not shown above)	Linda Godfrey

XRD chem sample taken from here

Mariana Is.
D52-4



slabbed this front piece off the rock photographed above (and on front) and took chem samples from that front piece.

Sample Description

Cruise I.D: ~~L5-83-HW~~ Mariana Is.

Sample I.D: Sta: D52-5

Location: Central Hybrid Knoll

Depth: 647-1105m

1 slabbed piece

Size: 13x3x6cm Weight: 845 gm (cut)

Mn crust thickness:

Total: min: 5.5cm max: 6cm ave: 6cm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: sculpted botryoidal to porous

Internal structure:

layered: ✓

laminated:

massive: ✓ (dense layers)

porous: ✓ (porous layers)

dendritic:

other:

MARIANA IS
D-52-5

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: none

Description:

Clasts or pockets of dark gray greenish sediment within the Mn layers

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
Chemistry: "manheim" + pt group + Au + REE on bulk crust sample slabbed off back of rock	L. Morgenson
XRD:	
D52-5-I bulk Mn crust	
Red Mud Sampled For Silicate Chem (only .7 grms). may have to do only XRD	M. Morrison 10-6-87 (Not enough sample XRD only)
D52-1-5-13 more Mud from other samples added together	
DPTS	

TT192
D52-5

TT192
D52-5
Back Side of Sample

SAMPLE DESCRIPTION

Cruise Id: TT192 Size: 9.5 x 10 x 5.5 cm Location: Central Hiyoshi Knoll

Sample Id: D52-6 Weight: <1 kg Depth: 647-1105 m

Mn Crust Description

Surface Texture: Granular smooth matter fibrous (matter) porous

Mn Crust Thickness:

Min:_____ Max:_____ Ave:_____

Layers (Outer to Inner):

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

Mariana Islands

D52-6

Comments and XRD Mineralogy:

Layers of Hydrothermal Mn light gray dense and darker porous; some mud interlayered on one side. Some sand grains apparent in layers.

ANALYSES

Substrate Description

Rock Type: None - Yellow ochre mud on outside and later layered with some Mn layers

Description:

TSM

SAMPLE DESCRIPTION

Cruise Id: TT192 Size: 5.5x6x7cm (Out) Location: Central Hiyoshi Knoll

Sample Id: CD52-7 Weight: <1kg Depth: 647-1105m

Mn Crust Description

Surface Texture: grainy smooth molten

Mn Crust Thickness:

Min:_____ Max:_____ Ave:_____

Layers (Outer to Inner):

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

Mariana Islands

CD52-7

Comments and XRD Mineralogy:

Layered hydrothermal Mn. Light massive and darker porous layers. Layers are thinner in this sample than some of the others in this dredge. Again a porous layer which suggests coalescing granules.

Substrate Description

Rock Type: None. Yellow-Ochre mud along one side and interlayered w/ Mn

Description:

ANALYSES

Paleo one Mn sand

TSN

SAMPLE DESCRIPTION

Cruise Id: FT192 Size: _____ Location: [illegible]

Sample Id: D52-8 Weight: 15 kg Depth: 647-1105 m

Mn Crust Description

Surface Texture: [illegible] and yellowish mud

Mn Crust Thickness:

Min: _____ Max: _____ Ave: _____

Layers (Outer to Inner):

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

Mariana Islands

D52-8

Comments and XRD Mineralogy:

Layers of hydrothermal Mn, [illegible] and porous. Several [illegible] [illegible]. Main difference from other samples in this dredge is that the layers are more jumbled up.

Substrate Description

Rock Type: _____

Description:

None

ANALYSES

Sample Description

Cruise I.D: ~~L5-83-MW~~ Mariana Is.

Sample I.D: Sta: D52-9

Location: Central Hiyoshi Knoll

Depth: 642-1105 m

Size: 8 pieces from as tiny to 15 x 10 x 4 cm

Weight: 2.75 kg total (wet)

Mn crust thickness:

Total: min: max: ave:

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: porous/grainy

Internal structure:

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

Mariana Islands TT192

D52-9

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: None

Description: Various pieces of crust with at least one dense layer of Mn

D52-9-A - layered crust with incorporated clasts. In place layer outer layer is very porous. Clasts are fine-grained sediments - iron rich crust colored & gray greenish colored. One sample has incorporated sediment

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
Chemistry: sent bulk crust sample (slab from smallest crust) for "manheim"	L. Morgenson
XRD: bulk crust sample from smallest sample from the slab sent for chem	
Dense Mn layer from several PTS. for Mn/Chem Phys & XRD	M. Morrison 10-6-87

Mariana Islands

Cruise I.D: TT-192

Sample Description

Sample I.D: Sta: D52-10

Location: Center of Hayashi [illegible]

Depth 647-1105

Size: 4 pieces Weight: _____

Mn crust thickness:

Total: min: _____ max: _____ ave: _____

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

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

Surface texture: misc pieces of mn sandstones. all with "glassy" layer of mn

Internal structure: _____

layered: ✓

laminated: _____

massive: ✓ layers

porous: ✓ layers

dendritic: _____

other: _____

Mineralogy (XRD): _____

Associated alteration, phosphorite, or hydrothermal deposits: _____

Substratum:

Rock type: _____

Description:

small piece layered Mn with porous crust on D52-10-A out side of crust - this piece has impression of a bivalve with a biota. Other pieces are layered "hydrothermal" Mn with incorporated clasts and shadows of clasts that look as if they have been replaced by Mn. Dense/glassy layers in all pieces layers of dense material will often pull off easily; Outside of these samples coated in grainy Mn.

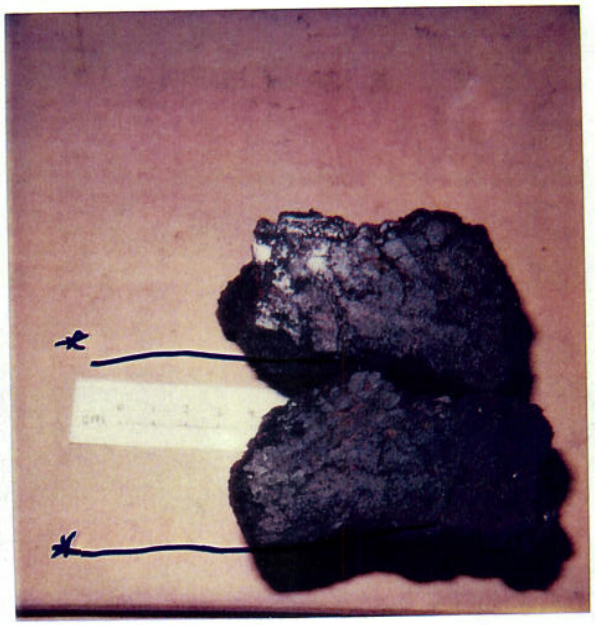
Mineralogy (XRD): _____

MARIANA ISLAND

D52-10

Analyses and subsamples:

analysis:	analyst:
XRD:	M. Morrison 10-87
TOP LAYER OF CLASTS D-52-10-A1	10-87
BULK SAMPLE OF CLASTS D-52-10-A2	
Bulk Sample of "glassy/dense" layer from several samples	M. Morrison 10-8-87
Mn-Chem-Dog	



Mariana Is TT192

D52-10-B

Mariana Islands

Cruise I.D: TT-192

Sample Description

Sample I.D: Sta: D52-11

Location: Central Hiyoshi Knoll

Depth 647-1105 m

Size: [illegible] Weight: [illegible]

Mn crust thickness:

Total: min: max: ave:

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Mariana Islands D52-11

Surface texture:

Internal structure:

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

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Several pieces of Mn with massive Mn layers (2 pieces [illegible] on

Description: Mn sandstone. All pieces have intercalculated clasts, and "[illegible]" of clasts replaced with Mn (?). One piece with layered dense Mn looks like the layers were rolled back on themselves in a [illegible] state? Some have a [illegible] layers. Some have black granular Mn outside

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
Mn Chem. Pkg. on the massive/dense layer. Bulk sample of [illegible] several [illegible]	M Morrison

SAMPLE DESCRIPTION

uise Id: TT192 Size: _____ Location: Central Hiyoshi Knoll

Sample Id: D52-13 Weight: <1kg Depth: 6'17-11 05

Mn Crust Description

Surface Texture: Porous granular bottom has Fe-colored mud

Mn Crust Thickness:

Min: _____ Max: _____ Ave: _____

Layers (Outer to Inner):

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

Mariana Islands

D52-13

Comments and XRD Mineralogy:

Hydrothermal Mn, cementing very altered portions of (?). Backside of ½ has a layer (7mm thick), but it is + contiguous thru and doesn't show up on cut face.

ANALYSES

D52-1-5-13 Red mud from 5 samples combined for OC chem

Substrate Description

Rock Type: Fe - red mud

Description:

JSM