DREDGE 6

W. Side
Karin Rdg.

AMPLE ID	Mn CHEM	Pt & Au	REE	Si Chem	DP.Sect.	35mm Pho	Archive	Paleo	H, C/S	U Th	XRDOC	O.Sr	
CD6-1						✓							
CD6-2													
CD6-3	inner 5mm & BULK	BULK	BULK	V. Breccia	D.P.S	✓							
CD6-4	inner 5mm & Layers			V. Conglom.	Thin Section Subsamples								
CD6-5													
CD6-6													
CD6-7	inner 5mm & Bulk	Bulk		V. Breccia	D.P.S.								
CD6-8	Bulk & inner 5mm			V. breccia prob. matrix									
CD6-9													
CD6-10	Layers	Layers		Siltstone		✓							
CD6-11													
CD6-12	inner 5mm & bulk		Siltstone	siltstone	D.P.S.	✓		✓	11/29/90				
CD6-13													
CD6-14						✓	Large Lab						
CD6-15	bulk			siltstone	D.P.S.								
CD6-16													
CD6-17													
CD6-18													
CD6-19													
CD6-20													
CD6-21	Breccia/Basalt Bulk/Bulk			Basalt / V. Breccia	2 D.P.T.S.	✓	SLAB III						

AMPLE ID	Mn CHEM	Pt & Au	REE	Si Chem	P.Sect.	35mm Pho	Archive	Paleo					
CD6-22	Bulk top & inner 5mm (Bulk bottom)			V. breccia of phos. cement			✓						
CD6-23	Bulk inner 5mm	Bulk	Bulk	Basalt									
CD6-24	inner 5mm & Bulk			V. Breccia									
CD6-25	inner 5mm & Bulk			V. Breccia				✓					
CD6-26													
~~CD6-12~~			~~Substrate~~			6/29/90							

General Notes On Dredge 6

Substrates - Bioturbated Mud-Siltstone

V. Breccia w/phosphorite cement both matrix supported clasts supported

V. Breccia w/very little cement

One mudstone from an area not as bioturbated

Basalt ? Flow

Phosphorite

Crust - Modified Botryoidal - High Relief Botryoidal is associated with the bioturbated siltstone, although CD 6-1 is bioturbated sandstone with both high relief and smooth crust.

Lisa suggests topographic botryoidal for these botryoids

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D:

Sample I.D: Sta: 08 ~~5~~ CD 6-1

Location: W Side Karin Ridge

Size: 56x40x5 cm **Weight:** ~18 Kg (± 0.523 kg complaints of Jim)

Mn crust thickness:

Total: min: 14mm max: 28mm ave: 21mm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: smooth on 1/3 of sample modified botryoidal

Internal structure:

layered: 1
laminated:
massive: X Fe stained
porous:
dendritic:
other: encrusting foraams and worm tubes

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: siltstone

Description: brown, poorly indurated with randomly oriented bedding plane parallel borings!

Mn oxides line boreholes and fill fractures

Mineralogy (XRD):

F7-86-HW
CD6-1

Analyses and subsamples:

analysis:	analyst:

J.W.

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: 26x15x6 **Sample I.D:** Sta: 08 CD6-2 **Location:** W. Karin Ridge

Size: _____ **Weight:** 2 Kg

Mn crust thickness:

Total: min: 3.0 max: 5.0 ave: 3.5

Inner crust: min: <1mm max: 5.0cm ave: 3mm

Outer crust: min: <1mm max: 1mm ave: 2.5mm

Surface texture: knobby to smooth + bulbous

Internal structure:

layered: 2 (one thin outer coating)
laminated:
massive: X
porous:
dendritic:
other:

Crust thickness - Varies greatly with bottom [illegible] thickness

Mineralogy (XRD): 99% δMnO2 1% Quartz

CD6-2

F7-86-HW
Karin Ridge
Johnston Is

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Siltstone

Description: Brown, poorly indurated w/ borings lined w/ Mn in places

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
CD6-2B (P. 1K Crust? anotated in this book)	XRD DONE BUT NOT

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: 24 x 16 x 8 **Sample I.D: Sta:** 08 CD6-3 **Location:** W side Karin Ridge

Size: _____ **Weight:** 2.5 Kg

Mn crust thickness:

Total: min: 30mm max: 50mm ave: 45mm

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

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

Surface texture: Smooth; v. small botry. on one edge granular on sides

Internal structure:

layered: 2
laminated:
massive: outer
porous: inner
dendritic:
other:

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

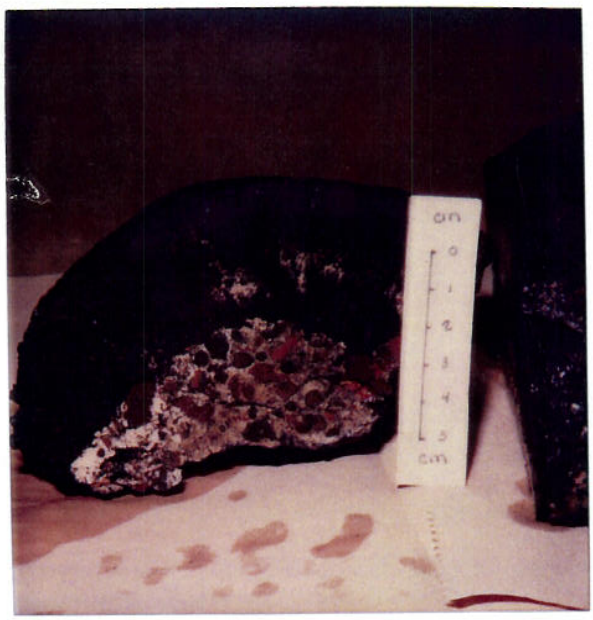
Rock type: Volcanic Breccia w/ phosphorite cement

Description:

CRUST - has large botryoidal pores w/ clay filling

Inner Mn layer has clay infillings; layer contacts not defined enough to differentiate [illegible] samples. See Photo [illegible]

Mineralogy (XRD):

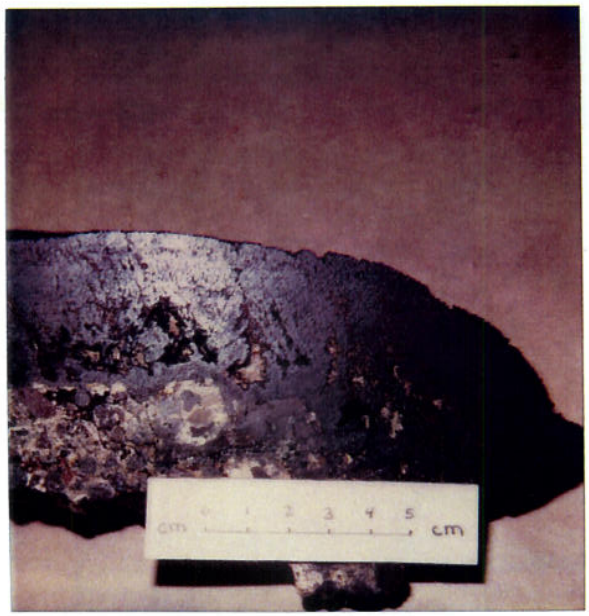


CD6-3

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:
Mn Crust - Chem / PLAu	
CD6-3A Bulk (w/ clay pore filling)	0-40 40mm
REE	
CD6-3C - Lower 5mm (difficult to get clean)	5.5gms
XRD	
CD6-3A BULK	Jorie
CD6-3C - Clay pore filling	
SILICATE CHM	
CD6-3D - SUBSTRATE	
Polished Section	Mann



Suggestion of layering.
Note the Pores; Interesting texture here

CD6-3

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: 20X15X11 **Sample I.D:** Sta: 08 ~~B~~ CD6-4 **Location:** W side Karin Ridge

Size: _____ **Weight:** 1 kg

Mn crust thickness:

Total: min: 2.0 max: 4.0 ave: 3.0

Inner crust: min: 1.5cm max: 3.5 ave: 2.5cm

Outer crust: min: 2mm max: 5mm ave: 3.5mm

Surface texture: Undulatory - smooth to granular granular on sides

Internal structure:

layered: 2 Thin outer layer, [illegible]
laminated:
massive: X ?
porous:
dendritic:
other:

CD6-4

F7-86-HW
Karin Ridge
Johnston Is

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Volcanic Breccia

Description: ~~Phosphorite Cement~~, NO hydroclastic mudst, lms, + Basalt Clasts poorly sorted. Many clast have [illegible] Very [illegible] backed, little matrix

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
Mn-Crust Chem	
CD6-4A Outer layer 2.5cm	14.6 gm sample
CD6-4B Inner layer 3cm	15.9 gm sample
Silicate Chem	
CD6-4C substrate	13.8 gm sample
CD6-4D inner 5mm	5.3 gm
Thin Section of Substrate; to look at Blue Rinds.	
Mn?	

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: 17 X 10.5 X 4 **Sample I.D:** Sta: 08 CD 6-5 **Location:** W. Side Karin Ridge

Size: _____ **Weight:** 0.2 kg

Mn crust thickness:

Total: min: 2.5 max: 3.0 ave: 2.8

Inner crust: min: — max: — ave: —

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

Surface texture: Modified Botryoidal

Internal structure:

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

Photo On Back

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Volcanic Breccia

Description: Only < 1 mm coating left - but color matches other Breccias in Dredge haul - Not the Basalt as mudst -

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:

CD6-5

F7-86-HW
Karin Ridge
Johnston Is

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: 11 x 8.5 x 4 ample I.D: Sta: 08 CD6-6 Location: W. Side Karin Ridge

Size: _____ Weight: 0.05 kg

Mn crust thickness:

Total: min: 0.4 max: 2.0 ave: 1.5

Inner crust: min: — max: — ave: —

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

Surface texture: Modified Botryoidal

Internal structure: _____

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

Mineralogy (XRD): _____

Associated alteration, phosphorite, or hydrothermal deposits: _____

Substratum:

Rock type: Volcanic Breccia

Description: Greenish to brown mudst, + basalt frags. in phosphorite? + altered fine-grained basaltic debris matrix.

Mineralogy (XRD): _____

CD6-6

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: 26 x 17 x 8

Sample I.D: Sta: 08 → CD6-7

Location: W Side Karin Ridge

Size: _____ **Weight:** 3 kg

Mn crust thickness:

Total: min: 2.8 max: 3.5 ave: 3.0

Inner crust: min: — max: — ave: —

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

Surface texture: Mod. Botry - grades to smooth

Internal structure:

layered:
laminated:
massive: X ?
porous:
dendritic:
other:

Nee

CD6-7

F7-86-HW
Karin Ridge
Johnston Is

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Volcanic Breccia

Description: Greenish to Brown, basalt + mudst clasts in clay + ~~phosphorite~~ (?) cement - poorly sorted - Basalt clasts to 5 cm -

Floating clasts in crust

Matrix, is clay ~~and phosphorite~~ (no XRD shows Phillipsite)

Inner 5mm - may not have seen and a void till the floating clasts

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
MN-CRUST-CHEM; Pt, Au	
CD6-7A 61 gm sample	0-30 mm
REE	Not submitted
CD6-7B 20 gm sample	0-30 mm
Silicate Chem	
CD6-7C 47.3 gm smpl	
CD6-7D inner 5mm CC.	6.6 gm
D. Section w/ Floating clasts	Mam
did not send	
CD6-7B submitted for Hadhem.	

Surface Texture Before Sliding

Lizard Skin Boundaries

CD6-7

F7-86-HW
Karin Ridge
Johnston Is

CD6-7

Floating Clasts

CD6-7

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: 18.5x15x4.5 **Sample I.D:** Sta: 08 CD6-8 **Location:** W. Side Karin Ridge

Size: _____ **Weight:** 0.5 kg

Mn crust thickness:

Total: min: _____ max: _____ ave: _____

TOP ~~Inner~~ crust: min: 0.4 cm max: 2.9 cm ave: _____

BOTTOM ~~Outer~~ crust: min: 4 mm max: 2 mm ave: 1 mm

Surface texture: Smooth; granular on bottom & sides

Internal structure:

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

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Volcanic Breccia (XRD shows Phillipsite) with ~~phosphorite~~ = cement!

Description: volcanic conglomerate w/ subrounded to subangular clasts. Ave clast diam. 2-3 mm. Beige colored ~~[illegible]~~ matrix

Inner 5mm: some floating clasts, able to avoid the light colored ones may not have avoided the dark clasts

Mineralogy (XRD):

CD6-8

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:
Chemistry	Lisa Brin
"Manganese plug"	
A = top crust	
B = bottom crust	
Silicate chem	
C = substrate (bulk)	
D = inner 5mm	5.6 cm s
XRD	
A = top crust	
B = bottom crust	
C = substrate	
D = inner 5mm	

CD6-8

F7-86-HW
Karin Ridge
Johnston Is

CD6-8
granular bottom

F7-86-HW
Karin Ridge
Johnston Is

CD6-8

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: 12X7X5.5

ample I.D: Sta: 08 CD6-9

Location: W. side Karin Ridge

Size: _____ Weight: 0.08 kg

Mn crust thickness:

Total: min: 3.0 max: 4.0 ave: 3.7

Inner crust: min: _____ max: _____ ave: 2.8

Outer crust: min: _____ max: _____ ave: 0.9

Surface texture: granular - smooth + on sides

Internal structure: _____

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

Mineralogy (XRD): _____

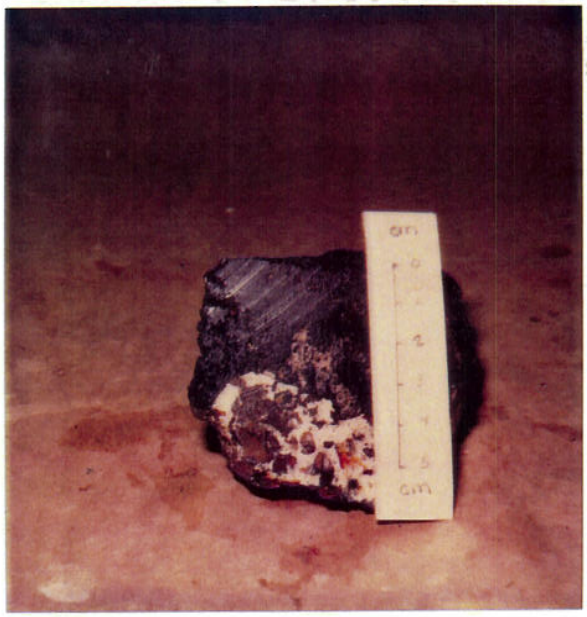
Associated alteration, phosphorite, or hydrothermal deposits: _____

Substratum:

Rock type: Volcanic Breccia

Description: much Phosphorite cement mud; Volc Rx Frags -, iron oxide stain -

Mineralogy (XRD): _____



CD6-9

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:

F7-86-HW
KarinRidge
Johnston Is

Sample Description

Cruise I.D: 24x22x4 **Sample I.D:** Sta: 08 CD6-10 **Location:** W. Side Karin Ridge

Size: _____ **Weight:** 2.5 kg

Mn crust thickness:

Total: min: 10 mm max: 30 mm ave: 10 mm

Inner crust: min: 8 mm max: 25 mm ave: 10 mm

Outer crust: min: 2 mm max: 5 mm ave: 3 mm

Surface texture: Modified Botryoidal

Internal structure:

layered: ✓ Thin outer layer
laminated:
massive:
porous:
dendritic:
other:

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Siltstone

Description: Bioturbated brown siltstone

Crust has pore fillings of Brown Clay. Chem Samples are probably contaminated with this clay. Outer Crust pulled off Fairly Clean. Because botryoids are so deep, the crust were more granular in the gulleys.

Mineralogy (XRD):

CD6-10

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:
Mn Crust Chem & Pt Au	
CD6-10A outer layer	3 mm
CD6-10C inner layer	8 mm
REE	
CD6-10B outer layer	3 mm } Not Submitted
CD6-10D inner layer	8 mm }
Silicate Chem	
CD6-10E	

CD6-10

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: 12x10x5

Sample I.D: Sta: OR CD6-11

Location: W. Side Karin Ridge

Size: _____ Weight: 0.1 kg

Mn crust thickness:

Total; min: 1.2 max: 3.0 ave: 2.0

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

Outer crust: min: ____ max: ____ ave: ____

Surface texture: Modified Botryoidal

Internal structure:

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

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: siltstone

Description: Brown - Thin layered -

Mineralogy(XRD):

CD6-11

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:

F7-86-HW
KarinRidge
Johnston Is

Sample Description

Cruise I.D:

Sample I.D: Sta: 08 CD6 - 13

Location: W Side Karin Ridge

Size: 13 x 9 x 4

Weight: 0.08 kg

Mn crust thickness:

Total: min: 0.3 max: 2.5 ave: 1.0

Inner crust: min: — max: — ave: —

Outer crust: min: max: ave:

Surface texture: irregular - smooth

Internal structure:

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

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: siltstone

Description: greenish brown thin layer - bored

Mineralogy (XRD):

CD6-13

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis: analyst:

Replace w paper & photo
- VLC
11-17-92

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: 19 x 9 x 6 **Sample I.D: Sta:** 08 CD6-14 **Location:** W. Side Karin Ridge

Size: _____ **Weight:** 1.2 kg

Mn crust thickness:

Total: min: 0.3 max: 4.5 ave: 2.5 ?
Thickness varies greatly because of bots.

Inner crust: min: — max: — ave: —

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

Surface texture: Bulbous + Mod. Bot.
high relief botryoidal surface texture

Internal structure:

layered:
laminated:
massive: X ?
porous:
dendritic:
other:

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: siltstone

Description: greenish brown, bored extensively. Borings lined w/ Mn. Tiny Mn dendrites, pepper siltstone.

Mineralogy (XRD):

CD6-14

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:
After sawing in two, large piece was archived.	Lisa Gein
XRD	
CD6-14A = bulk crust	Lisa Gein

CD6-14

F7-86-HW
Karin Ridge
Johnston Is

CD6-14
archived.

F7-86-HW
Karin Ridge
Johnston Is

archived
CD6-14

F7-86-HW
Karin Ridge
Johnston Is

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: 17X14X5.5 **Sample I.D:** Sta: 08 CD6-15 **Location:** W Side Karin Ridge

Size: _____ **Weight:** 1.2 kg

Mn crust thickness:

Total: min: 0-2 max: 3.5 ave: 2x0 ?

Inner crust: min: _____ max: _____ ave: Variable -

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

Surface texture: Modified Botryoidal

Internal structure:

layered:
laminated:
massive: x mostly
porous:
dendritic:
other:

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: siltstone

Description: greenish-brown, bored - pores infilled with mud. Burrows

Not crusty sample for inner 5mm

Mineralogy (XRD):

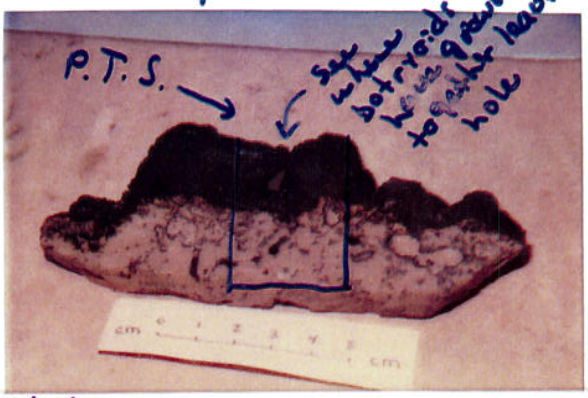
CD6-15 photo 1

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:
Chem chart:	Lisa Gein
A = bulk crust 5-22 mm	
manhelm pkg	
B = bulk substrate	
[illegible] chem	
XRD	Lisa Gein
A = bulk crust	
B = bulk substrate	
C = mud (cream-colored that	
infills burrows	
DFT [illegible] - did not send	Lisa Gein → [illegible]

photo 4

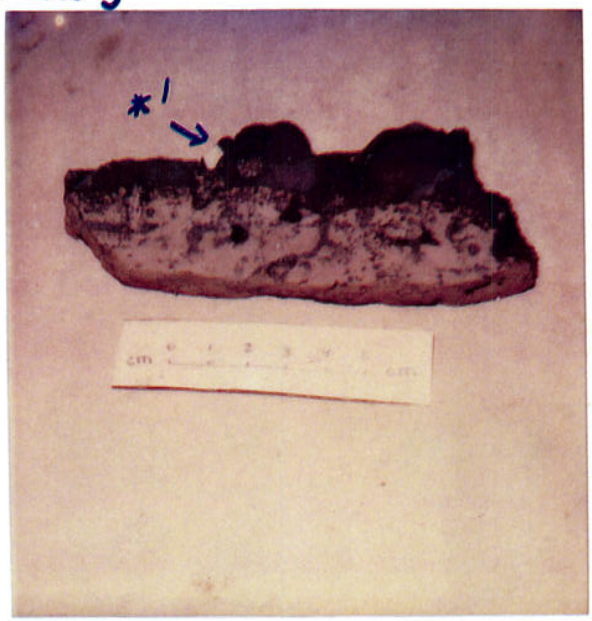


CD6-15

F7-86-HW
Karin Ridge
Johnston Is

photo 2

photo 5



CD 6-15
flip side of photo 4

F7-86-HW
Karin Ridge
Johnston Is

CD6-15

photo 3

good illustration of how the clay is still being napped.

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: **Sample I.D:** Sta: 08 D CD6-16 **Location:** West side of Karin Ridge

ize: 11x8x4cm **Weight:** ≈ 300g

Mn crust thickness: upper layer is spalling, in a few places

Total: min: 2 max: 4 ave: 3cm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Irregular botryoidal w/ deep depressions

Internal structure:

layered:
laminated:
massive:
porous: ✓ on bottom
dendritic:
other:

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

A few foraminifera & worm tubes on the surface

Substratum:

Rock type: Siltstone

Description: Bioturbated with bores filled by foram mud and older burrows indicated by Mn staining

Mineralogy (XRD):

CD6-16

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D:

Sample I.D: Sta: 08 D CD6-17

Location: Westside of Karin Ridge

Size: 19x10x6cm **Weight:** ≈ 1kg

Mn crust thickness:

Total: min: 4 max: 6 ave: 5cm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Large [illegible] botryoidal
deep depressions

Internal structure:

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

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

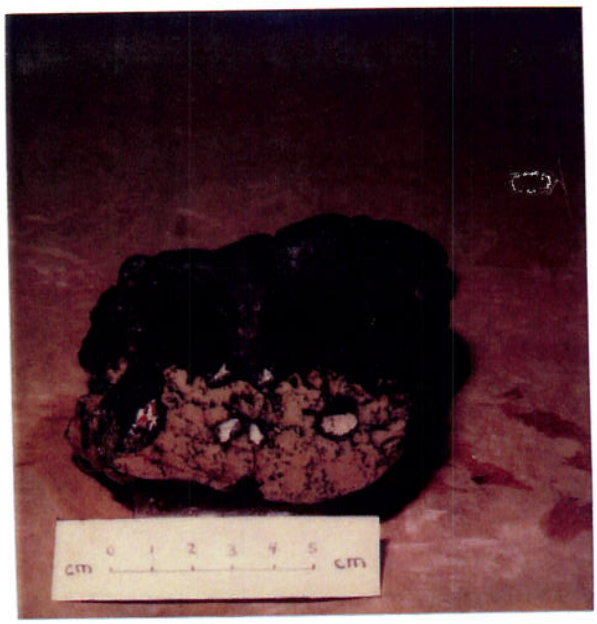
A few foram on the surface

Substratum:

Rock type: Siltstone

Description: Tan brown siltstone, bioturbated.
Borings filled with foram mud.
Siltstone manganese stained.

Mineralogy (XRD):



CD6-17

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D:

Sample I.D: Sta: 08 ~~D~~CD6-18

Location: West side of Karin Ridge

Size: 7.5x10x3.5cm **Weight:** ≈500g

Mn crust thickness:

Total: min: 2.5 max: 3.5 ave: 3cm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Smooth

Internal structure:

layered:
laminated:
massive: ✓
porous: ✓ on bottom
dendritic:
other:

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

a few cm in cavity on porous underside of crust

Substratum:

Rock type: Siltstone

Description: Very thin coating of brown siltstone on underside of crust

Mineralogy (XRD):

CD6-18

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: **Sample I.D:** Sta: 08 D CD6-19 **Location:** West side of Karin Ridge

Size: 14x10x6.5 cm **Weight:** ≈ 900g

Mn crust thickness:

Total: min: 5.5 max: 6.5 ave: 6cm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Very irregular, large bulbous botryoidal w/a lot of relief btw lows & highs

Internal structure:

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

CD6-19

F7-86-HW
Karin Ridge
Johnston Is

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Numerous forams on surface

Substratum:

Rock type: Siltstone

Description: Bioturbated siltstone borings filled with foram sand. Mn staining in siltstone

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D:

Sample I.D: Sta: 08 CD6-20

Location: West side of Karin Ridge

Size: 10x10x7cm **Weight:** ~2 kg

Mn crust thickness:

Total: min: 3 max: 5 ave: 4cm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Smooth to porous, some botryoids, & granular

Internal structure:

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

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

A few foraams in surface

Substratum:

Rock type: Volc. breccia

Description:

Mineralogy (XRD):

Very smooth black

CD6-20

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: **Sample I.D:** Sta: 08 CD6-21 **Location:** West side of Karin Ridge

Size: 29X22X11cm **Weight:** [illegible] Kg

Mn crust thickness:

Total: min: 1.5cm max: 3cm ave: 2.2cm

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

Outer crust: min: ____ max: ____ ave: ____

Surface texture: Botryoidal-abraded smooth to porous

Internal structure:

layered: Suggestion of layering
laminated:
massive:
porous:
dendritic: ✓
other:

CD6-21

F7-86-HW
Karin Ridge
Johnston Is

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Abundant foram on surface

Substratum:

Rock type: Volcaniclastic Breccia & Basalt

Description: Large Basalt boulder 13cm in a Volcaniclastic Breccia. Basaltic Brown & Porphyritic. Have Unique Opportunity to study 2 substrates in One Sample

Not enough crust for inner 5mm

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
Mn Crust Chem	
CD6-21B-I Bulk	
CD6-21 A-I Bulk	
Silicate Chem	
CD6-21 A	
CD6-21 B	
D. Polished Sections	
CD6-21 A	
CD6-21 B	
Archived Slab III	
Doubly Polished Thins	
CD6-21A	
CD6-21B	

* All "A" and [illegible] are [illegible]
* All "B" [illegible]

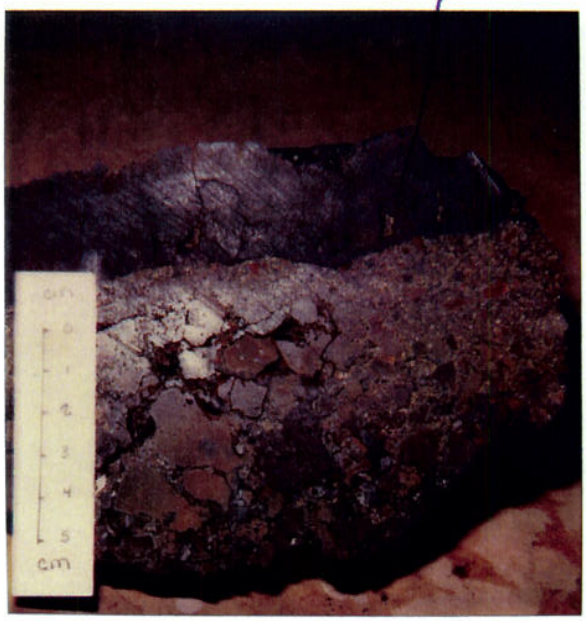
Slab II — Breccia [illegible] Sliced Section [illegible] from this Slab
Slab III - Breccia [illegible] Basalt Nodule on the other - Archived
Slab IV - Basalt Chemistry [illegible] from this Slab

CD6-21

Basalt cob is fractured (cooling fracture) Mn seems to [illegible] fractures.

CD6-21-III Back Side

There are some muddy pore fillings in crust.



CD6-21

phosphorite

CD6-21-III Front Side

Note Approx [illegible]

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D:

Sample I.D: Sta: 08 CD6-22

Location: West side of Karin Ridge

Size: 29X18X8cm **Weight:** ~6 Kg

Mn crust thickness:

Total: min: 1.6cm max: 3.0 ave: 2.3cm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Medium botryoidal - abraded smooth w/ large dimension in center

Internal structure:

layered:
laminated:
massive: ✓
porous:
dendritic:
other: granular bottom crust, 0-0.5cm

slab III cut from this rock. You're seeing one surface of slab III

CD6-22 photo 1

Phos Studying

F7-86-HW
Karin Ridge
Johnston Is

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Volc. Breccia

Description: Altered red sub-rounded, poorly sorted (.1-5cm) medium to closely packed volcanic clast in a white phosphorite. Bottom has layer of porous granular Mn.

XRD shows phillipsite & Apatite.

Basalt clast has amygdules filled with zeolites.

Mineralogy (XRD):

Analyses and subsamples:

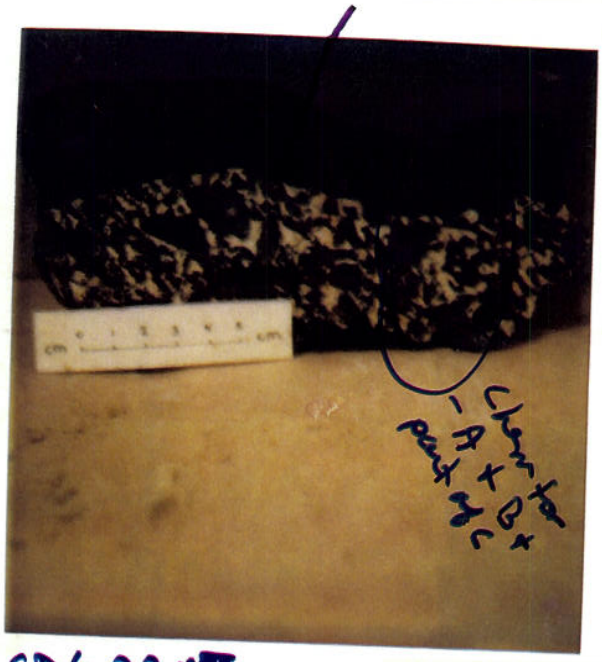
analysis:	analyst:
	0-25
D = inner 5mm 7.6gm (From slab III)	
35mm slide	G. Smith
Li Isotopes → 33gm	To Yeh Chan

NOTE: CD6-28B [illegible]

CD6-22

F7-86-HW
Karin Ridge
Johnston Is

photo 2



CD6-22
(slab II)

F7-86-HW
Karin Ridge
Johnston Is

photo 3

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: F7-86-HW Karin Ridge Johnston Is

Sample I.D: Sta: DR ~~D~~ CD6-23

Location: West side of Karin Ridge

Size: 15x10cm **Weight:** ~2kg

Mn crust thickness:

Total: min: 5 max: 20mm ave: 12mm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Slightly botryoidal but abraded with to porous under on the sides

Internal structure:

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

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

A few fos on the surface

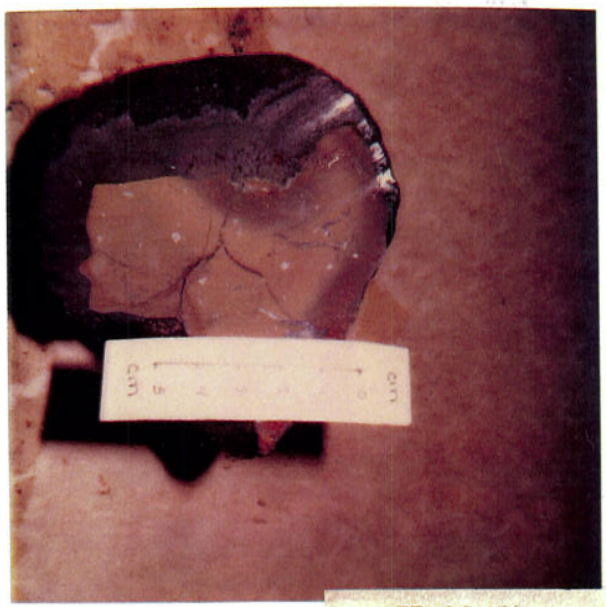
Substratum:

Rock type: Basalt

Description: Altered red to yellow brown angular fractured aphanitic basalt w/a few plag?? phenocrysts

Mineralogy(XRD):

CD6-23



F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples;

analysis:	analyst:
Mn Crust Chem & Pb	
CD6-23A Bulk	0-15mm
CD6-23B surface	5.5gms
REE	
CD6-23A Bulk	
Silicate Chem	
CD6-23C	
Polished Section - did not	

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D:

Sample I.D: Sta: 68 D CD6-24

Location: West Side Karin Ridge

Size: 32x20x13 cm **Weight:** ≈14 Kg

Mn crust thickness:

Total: min: 4 max: 9cm ave: 6cm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Smooth to slightly botryoidal

Internal structure:

layered: ?
laminated:
massive:
porous: ✓
dendritic:
other:

CD6-24

F7-86-HW
Karin Ridge
Johnston Is

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Volcaniclastic Breccia

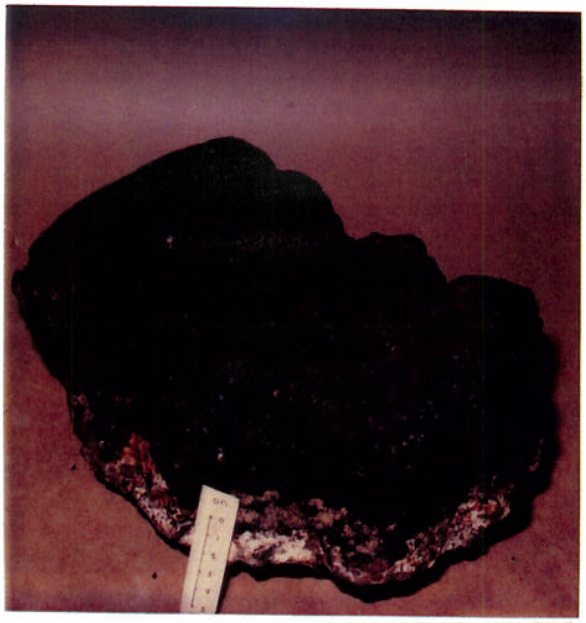
Description: Large subrounded altered volcanic clasts on 1/2 rock. The other 1/2 is a poorly sorted sub-rounded somewhat closely packed volc. breccia in a white carbonate mud matrix

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
Mn Crust Chem	
CD6-24A Bulk	0-5.5cm
CD6-24D inner 5mm -10gm	
Silicate Chem	
CD6-24B Substrate	
Sta XRD	
CD-24C - clay fraction	

* [illegible] Only [illegible] May have been [illegible]

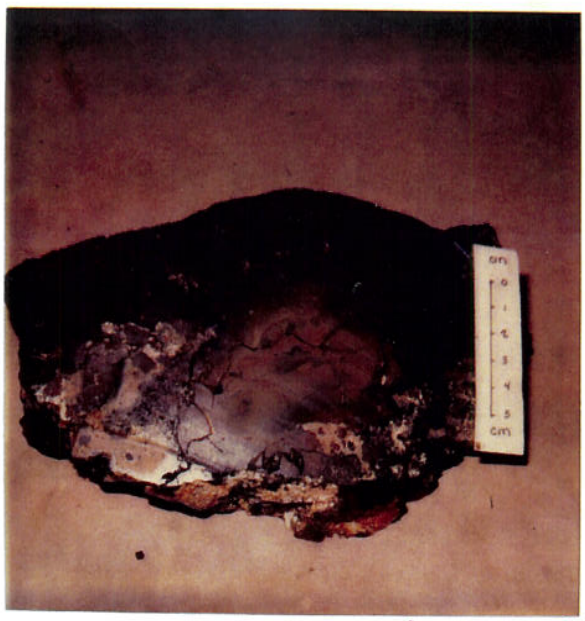


F7-86-HW
Karin Ridge
Johnston Is

CD6-24

Very interesting botryoidal surface, like waves or ripples of large botryoids separated by smooth or ridged small botryoids

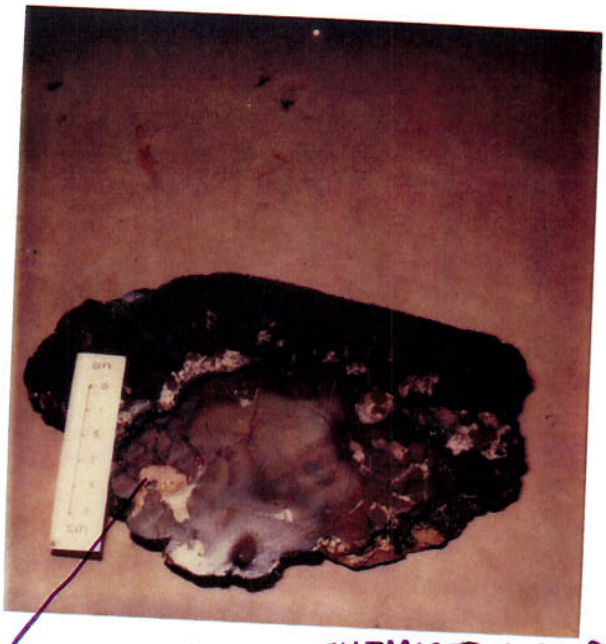
CD6-24



CHEMISTRY SLAB

CD6-24-IV

CD6-24



X-RAY ON CLAY
IN PORE

CHEMISTRY SLAB

CD6-24-IV

F7-86-HW
Karin Ridge
Johnston Is

Sample Description

Cruise I.D: **Sample I.D:** Sta: 08 CD6-25 **Location:** west side Karin Ridge

Size: 20x18x15 cm **Weight:** ~7 Kg

Mn crust thickness:

Total: min: 1.7 max: 3.0 ave: 2.4 cm

Inner crust: min: — max: ave:

Outer crust: min: — max: ave:

Surface texture: Smooth

Internal structure:

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

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Basalt Cobble (Breccia)

Description: Strange texture - interconnecting vesicles? give the appearance of separate basalt clasts. Some are more altered (brown) then others (gray) both are aphanitic w/ numerous med. size plag?? phenocrysts

I think it is a Volcaniclastic Breccia

Mineralogy (XRD):

CD6-25

Analyses and subsamples:

analysis:	analyst:
2 end pieces to	Bar Mines
Mn Crust Chem	
CD6-25A Bulk	0-2? mm
CD6-25C inner 5 mm	5 gms
Silicate Chem	
CD6-25B	

F7-86-HW
Karin Ridge
Johnston Is

Cruise I.D:

Sample Description

Sample I.D: Sta: 08 CD6-26

Location: West Side Karin Ridge

Size: 8.5x5x2cm Weight: ≈ 300g

Mn crust thickness: very thin patchy coating

Total: min: 0 max: .5mm ave: ?

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Granular

Internal structure:

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

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Volcanic-rich bioclastic limestone

Description: White, well-indurated carbonate mudstone? w/ abundant tiny, subrounded volcanic fragments

Mineralogy (XRD):

CD6-26

F7-86-HW
Karin Ridge
Johnston Is

Analyses and subsamples:

analysis:	analyst:
Paleo -	