DREDGE 21
S. Johnston
Is Ridge

AMPLE ID	Mn CHEM	Pt & Au	REE	Si Chem	P.Sect.	35mm Pho	Archive	Paleo					
CD21-1													
21-2													
21-3													
21-4													
21-5													
21-6	✓	✓	Bulk						T.S. of substrate				
21-7	layers	layers	layers		✓				XRD phosphorite				

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 23 CD21-1 Location: S. Johnston Ridge

Size: 35 x 22 x 12 Weight: 20 kg

Mn crust thickness:

Total: min: 3.0 max: 6.0 ave: 4.5

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: smooth bulbous on undulatray w/ cracks separating bulbs; many encrusting forams

Internal structure:

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

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Volcanic Breccia

Description: Phosphorite parts crust + Breccia; basalt clasts up to 60mm, clasts are fairly fresh, Mn cement predominantly around clasts, seems to be diffusing in phosphorite. Phosphorite between breccia + crusts is laminated like an agate.

Part of a 300lb slab (photographed) taken by Bu Mines

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
Bu Mines has most of it	

Phosphorite parts crust + breccia; basalt clasts up to 60mm, clasts are fairly fresh, Mn cement predominantly around clasts, seems to be diffusing in phosphorite. Phosphorite between breccia + crusts is laminated like and agate

Part of a 300lb slab (photographed) taken by Bu Mines

CD21-1 TOP

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 23 CD21-2 Location: S. Johnston Ridge

Size: 30X18X12 Weight: 15 kg

Mn crust thickness:

Total: min: 2.8 / 1.3 max: 5.3 / 2.0 ave: 4.3 top / 1.6 sides bottom

Inner crust: min: — max: — ave: —

Outer crust: min: max: ave:

Surface texture: smooth to granular

Internal structure:

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

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Breccia - phosphorite

Description: Phosphorite cemented breccia w/ clasts of green basalt, phosphorite + brown basalt - Some basalt clasts were coated w/ phosphorite before cementation? Clasts are elongate w/ a preferred orientation.

Mineralogy (XRD):

CD21-2

Analyses and subsamples:

analysis:	analyst:
small end piece for Fe wipe	

CD21-2

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 23 CD21-3 Location: S. Johnston F. Ridge

Size: 26x25x16 Weight: 9 kg

Mn crust thickness:

Total: min: 23mm max: 33mm ave: 25mm

~~Inner~~ Side crust: min: 22mm max: 33mm ave: 25mm

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

Surface texture: Smooth; major granular porous area

Internal structure:

layered:
laminated:
massive:
porous: V. porous side crust
dendritic: top crust
other:

CD21-3

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Basalt w/ layers of phosphorite

Description: Slightly vesicular basalt w/ some vesicles filled by cream colored phosphorite. Phosphorite layer is max of 11mm thick has small basalt clasts floating in phosphorite

Slightly vesicular basalt w/ some vesicles filled by cream colored phosphorite. Phosphorie layer is max of 11mm thick, has small basalt clasts floating in phosphorite

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 23 CD21-4 Location: S. Johnston I Ridge

Size: 18x14x10 Weight: 3.5 kg

Mn crust thickness:

Total: min: 4.0 max: 4.7 ave: 4.5

Inner crust: min: — max: — ave: —

Outer crust: min: max: ave:

Surface texture: smooth; granular in places

Internal structure:

layered:
laminated:
massive: X
porous: in places - some large voids
dendritic:
other:

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Phosphorite; Breccia

Description: some gray volcanic Rx fragments floating in matrix of phosphorite, cream-colored & laced w/ Mn

Mineralogy (XRD):

CD21-4

Analyses and subsamples:

analysis:	analyst:

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 23 CD21-5 Location: S. Johnston I. Ridge

Size: 14.5 x 12 x 8 Weight: 1.5 kg

Mn crust thickness:

Total: min: 2.0 max: 3.1 ave: 2.8

Inner crust: min: — max: — ave: —

Outer crust: min: max: ave:

Surface texture: modified Botryoidal extensive encrusting, forams - many vugs

Internal structure:

layered:
laminated:
massive: X
porous: vugs in places
dendritic:
other:

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Basalt

Description: Gray Basalt, vesicular, phosphorite inclusions

Mineralogy (XRD):

CD21-5

Analyses and subsamples:

analysis:	analyst:
small piece to Bu mines	

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 23 CD21-6 Location: S. Johnston D Ridge

24 x 21 x 9

Size: _____ Weight: 6 kg

Mn crust thickness:

Total: min: 0.5 max: 0.7 ave: 0.6

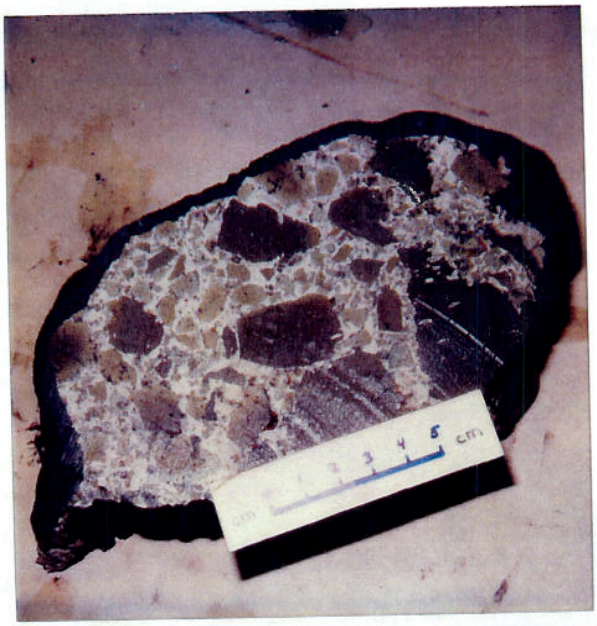
Inner crust: min: — max: — ave: —

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

Surface texture: Smoothed botryoidal

Internal structure:

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



Slab1

Front

CD21-6

Phos Study

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Volcanic Breccia

Description: Volcanic clasts float in cream-colored phosphorite cement - cement supported; 2 clast types (1) gray to pale brown vesicular basalt, plag phyric; (2) green to brownish green pyroxene phyric (amphi?) volcanic rx of some sort

Mineralogy (XRD):

Analyses and subsamples:

analysis:

End piece to Alice

CD21-6A CC, Pt, Au 6mm (28.1g)

" " REE " (5.7g)

T.S. - of substrate (see photo on back)

35mm slide G Smith

35mm

Slab 1

CD21-6 Back

Chemistry From Top of Slab 1 in center and top of slab 2 corner cut

Thin Section of Sample

CD21-6

Photo Study

SAMPLE DESCRIPTION

Cruise Id: F7-86-HW Size: 30 x 28 x 20 cm Location: S. Johnston I. R

Sample Id: CD21-7 Weight: 10.9 kg Depth:

Mn Crust Description

Surface Texture: smooth; smoothed botryoidal on side - microdots

Mn Crust Thickness: (cm)

Min: 7.5 Max: 8.4 Ave: 7.9

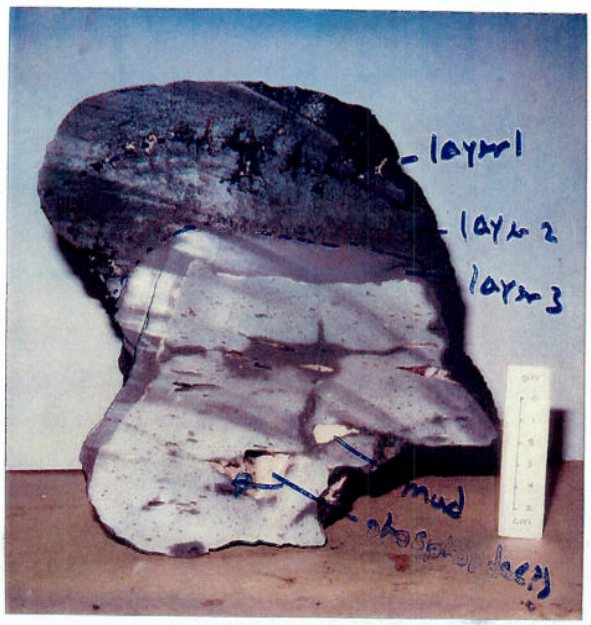
Layers (Outer to Inner): (cm)

	Min	Max	Ave	Texture
1.	2.3	3.4	2.9	massive. Jim sees 2 layers w/i this layer. Bounded by porous area on bottom
2.	3.5	4.3	4.0	massive bounded by v. porous area w/ layer 1. Pourous near bottom. Jim sees 2 layers w/i thin layer
3.	1.1	1.8	1.5	v. massive
4.				
5.				

massive. Jim sees 2 layers w/i this layer. Bounded by porous sila on bottom

massive bounded by v. porous area w/ layer 1. pourous near bottom. Jim sees 2 layers w/i thin layer

May 1998



CD21-7 Half 2 (slab 4) PTS + chems + XRD samples taken from slabs 2 + 3

F7-86-HW Dark areas on basalt are water

Comments and XRD Mineralogy:

Layers 1 + 2 have minute orange stains + pore filling. v. porous area bounding layer 1 w/ layer 2 filled w/ fresh green (calcareous) mud (clean out of chem sample). Layer 3 has areas w/ orange flakes.

Substrate Description

Rock Type: Basalt

Description:

Fairly fresh, gray, vesicular plag phyric basalt. Subtrachytic texture. Large vesicles. Some filled w/ white (calcareous?) mud. One filled w/ orange stain phosphorite (?) (sampled for XRD). Thin chert layer (diagenetic) below basalt frame.

Showed basalt to Alice. She said she has some basalts from this dredge that look better than these.

Described By: d. j. + Lisa G. Subsampled By: Lisa G.

ANALYSES

Subsample & Type	~~Analysis~~ Depth from surface	Thk. of layer	~~Weight~~ Analysis + weight
CD21-7A bulk crust	0-79	(10-18)	CC+Pt+Au (55.1g); REE (32.0g)
CD21-7B outer crust	0-28	(10-18)	CC, Pt, Au (139.6g); REE (12.1g); XRD
CD21-7C middle crust	28-65	(10-18)	CC, pt, Au (169.7g); REE (60.9g); XRD
CD21-7D inner crust	65-80	(11-18)	CC, Pt, Au (77.8g); REE (18.8g); XRD
CD21-7E phosphorite in basalt vesicle			XRD
DPTS (core photo on back)			
35 mm slide			G. Smith
DPTS Phos CD21-7-F vesicle			Contains (GHI) (layer 1, 2, 3)
DPTS Phos/crust	CD21-7E		(contains J+K)
See attached for [illegible]			
Kilinoch [illegible]			

Ze Won Chang took subsample 10/97

May 1998 Sent pc to Alice Halliday

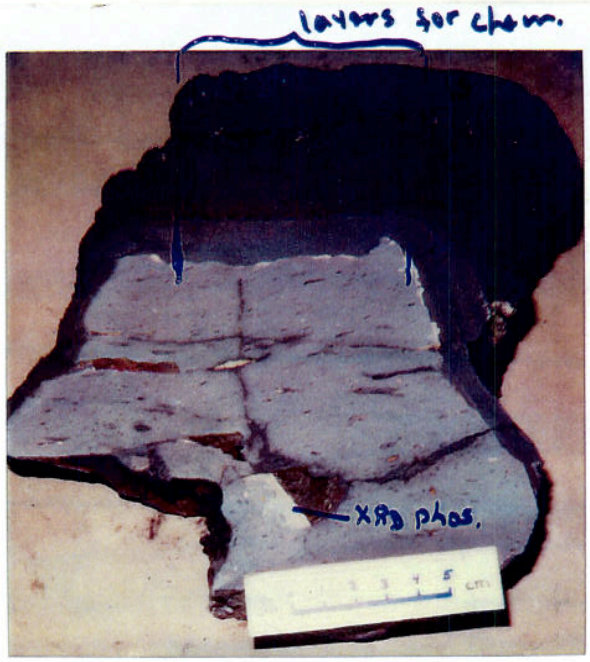
CD 21-7
F7-86-HW

Top surface of Half 1 (before slicing into slabs 1, 2, + 3)

CD 21-7
F7-86-HW

CD21-7
F7-86-HW

slab 2



CD21-7
F7-86-HW
slab 3

CD21-7 Half 2 (slab 4)
F7-86-HW

Shown in D21-7F

DPTS + Sr + O2 isotopes

D21-7G - lining of vesicle XRD O2 + Sr

D21-7H - Top layer of vesicle fill

XRD, Sr + O2 isot 0-1.5mm white fill

D21-7I - lower layer of vesicle fill

XRD, Sr + O2 isot 1.5mm - 3mm Dark tan

D21-7J - Part of D21-7E DPTS

XRD Sr + O2 isotopes on left side in boxed area at 2mm width of line on Ruler

(crust broken)

(Reddish brown)

D21-7K - phosphate vein in crust above D21-7J on the broken surface. (If it wasn't broken, then it would be at 11.5mm + D21-7J would be at 13.5mm) Reddish brown, possibly included in D21-7E DPTS, XRD Sr + O2 isot

(Vein was as thick as the line on the ruler)

D21-7L - phosphate between crust and basalt

	Top	Side
thickness of crust above layer	25.5mm	4mm
thickness of phosphate layer	3-0.5mm	~2mm

Combined both samples since there appeared to be a thin layer along the whole boundary between the crust + basalt connecting the 2 sampled areas.

Sr + O2 isotopes, XRD