RIDGE 29

S Karin Ridge

AMPLE ID	Mn CHEM	Pt & Au	REE	Si Chem	◎P.Sect.	35mm Pho	Archive	Paleo					
CD29-1													
CD29-2	[illegible]	[illegible]	[illegible]	✓	✓		✓		[illegible]	Slab to [illegible]	Si [illegible]		
CD29-3								✓					
CD29-4													
CD29-5													
CD29-6													
CD29-7	[illegible]				✓								
CD29-8													
CD29-9													
CD29-10													
CD29-11	[illegible]												
CD29-12													

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 31 CD 29-1 Location: S. Kasin Ridge

Size: 53 x 60 x 13 cm Weight: 55 Kg

Mn crust thickness:

Total: min: 75mm max: 130mm ave: 90mm

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

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

Surface texture: subdued botriodal to rippled.

Internal structure:

layered: 4+
laminated:
massive: 4
porous:
dendritic:
other:

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Volc. Breccia

Description: Red brown to yellow brown altered volc. clasts (5x3cm - 5mm. diam) w/in cream colored Mn rich tuff. matrix, phosphorite in fractures and as a cement

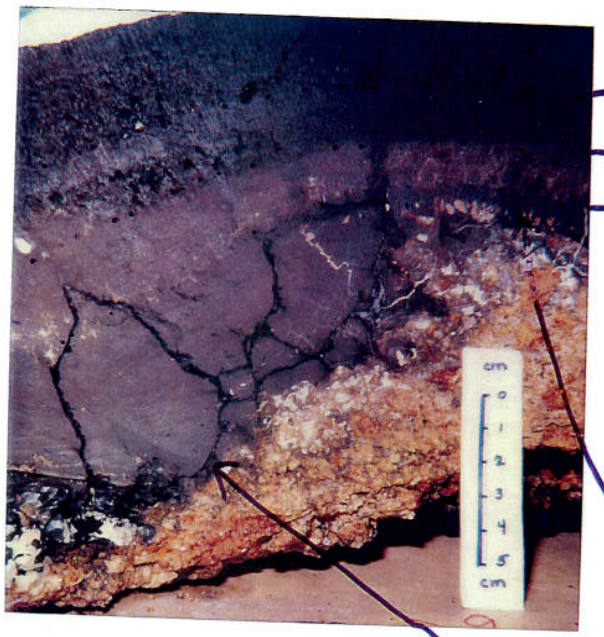
Mineralogy (XRD):

CD 29-1

Analyses and subsamples:

analysis:	analyst:
Kollman monument shop cut in half	1/6/88

	Max	Min	Ave	Texture.
layer 1	33	24 mm	28 mm	large pores at bottom of layer and very porous grades up the massive some of the pores are filled with clay
layer 2	25 mm	15 mm	20 mm	massive in center and complete; on either edge it is porous at bottom of layer
layer 3	30 mm	12 mm	20 mm	[illegible]
layer 4	50 mm	10 mm	20 mm	dense very fractured layer



Layer 1

Layer 2

Layer 3

Layer 4

Thinest part

Thickest part

CD29-1

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 31 CD 29-2 Location: S

Size: [illegible] Weight: 55kg Broken out in 4 parts A-D for photo — one piece sliced into 3 slabs

Mn crust thickness:

Total: min: 100 max: 130 ave: 115

	min:	max:	ave:
Inner crust:		1 - 10 2A	ave: 15
Outer crust:		2B 25 3	ave: 30
		4	30

Surface texture: botryoidal w/ pelletoid [illegible]

Internal structure:

layered: 4; 1 w/ 2 sub layers
laminated: 4 dense, fractured
massive: 3 micro-fractured
porous: 2A, pillar structure
dendritic:
other: 2B Dense, pillar structure
1 crudely laminated w/ rock frag. inclusions

Mineralogy (XRD): 1, 2A, +3 have Fe-oxide staining

Associated alteration, phosphorite, or hydrothermal deposits: + fracture fill
Brown phosphorite (Burrows Hill?) in host Rx — also vein + Fracture fill in Crust layer 4

Substratum:

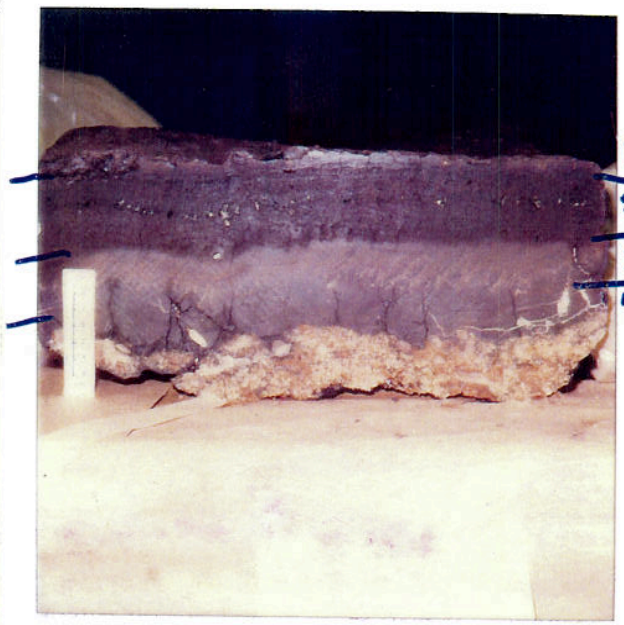
Rock type: Volc. Breccia - hyaloclastite

Description: see CD29-1
pale yellowish-brown - w/ phosphate filling veins & replacing carbonate layers

Carbonate rock mixed in w/ hyaloclastite

Mineralogy (XRD): Three small slabs cut for PTS if no one else wants them

Layers 1+2 and 3+3 split easily along vertical discontinuities — layers 3+4 [illegible]



CD29-2

Analyses and subsamples:

analysis:	analyst:
Kollman monument shape cut in half	1/6/88
CD29-2A Bulk (CC) PTS Pt, Au	0-110 mm 110 mm (105g)
CD29-2B outer CC, Pt, Au REE	0-9 mm 9 mm (6g REE) (43g rest)
CD29-2C - layer 2A+B CC, Pt Au, REE	9-47 mm 40 mm (21g REE) (102g rest)
CD29-2D - layer 3 CC, Pt Au, REE	47-76 mm 27 mm (10g REE) (91g rest)
CD29-2E - Bulk (31g) CC	Substrate - hyal-phos
Various Layers Sr, Pb isotopes	Hein
Piece coated for display	
1 Slab, Be, Pb, Sr, Nd, U isotopes	Hein, O'Nions
Slab 5 sent to Lalocui	
2 other slabs archived	
CD29-2A Pt, Ir - Hz	
CD29-2E - layer 4 CC, Pt Au, REE	75-105 mm 30 mm (15g REE) (90g rest)
1 Slab - Godfrey - Hf isotopes	
1 Slab - Chan? Li isotopes	Slab to Gallic

CD29-2

CD29-2 All pieces from #2

Sample Description

Cruise I.D: F7-86-HW **Sample I.D: Sta:** Sta 31 CD 29-3 **Location:** S Karin Ridge

Size: 38 x 49 x 13 cm **Weight:** 35 Kg

Mn crust thickness:

Total: min: 80 mm max: 120 mm ave: 100 mm

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

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

Surface texture: Subdued botryoidal, rippled; granular sides (bottom) many forams in [illegible]

Internal structure:

layered: 5 ?
laminated: uppermost, 3rd & 4th
massive:
porous: 6th inner most
dendritic:
other:

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

minor phosphate veining in inner most Mn layer

Substratum:

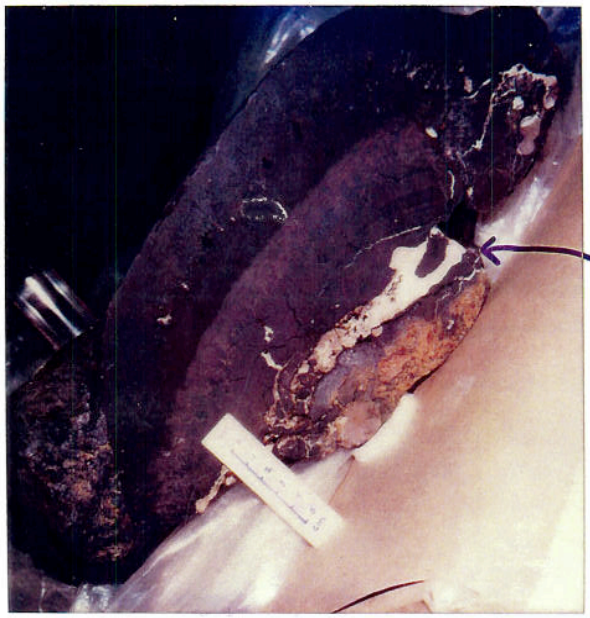
Rock type: Volc Breccia

Description: Orange-red angular altered palagonite(?) clasts 1mm² - 1cm² diam in Mn-rich altered yellow-cream fine grained [illegible]

Phosphorite clasts (?) [illegible] crust

A layer (or maybe just a pod) of white foraminiferal [illegible] between crusts [illegible] Recent(?) sand maybe a [illegible]

Mineralogy (XRD):



white layer of foraminiferal

CD29-3

Analyses and subsamples:

analysis:	analyst:
Paleo on foram sand	

	Max	Min	Ave	
Layer 1	10	8 mm	10 mm	Massive
Layer 2	22.	15 mm	20 mm	large [illegible] at bottom of layer, porous dense [illegible]
Layer 3	40 mm	30 mm	35 mm	Porous, restrained, denser and [illegible] top of layer.
Layer 4	43 mm	30 mm	35 mm	massive dense highly fractured, growth laminae are visible [illegible] sample

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: Sta 31 LD 29-4 Location: S Karin Ridge

Size: 41x31x15cm Weight: 23 Kg

Mn crust thickness:

Total: min: 110mm max: 140mm ave: 120mm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Subdued botryoidal w/preferred orientation, granular sheen and pollen

Internal structure:

layered: 4(+)
laminated: upper, 2nd, inner most
massive:
porous: 3rd
dendritic:
other:

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Volc Breccia

Description: Yellow orange stained clasts in yellow black Mn-rich matrix. Almost no substrate - really just a surface "coat"

Mineralogy (XRD):

CD 29-4

Analyses and subsamples:

analysis:	analyst:

	Max	Min	Ave	
Layer 1	12mm	10mm	[illegible]	massive
Layer 2	45mm	40mm	45mm	porous [illegible] large [illegible] separating sublayers, above is more porous [illegible] below
Layer 3	25mm	15mm	18mm	[illegible]
Layer 4	70mm	30mm	[illegible]	Massive [illegible] fractures growth [illegible]

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: Sta 31 CD 29-5 Location: S Karin Ridge

Size: 23x33x15 cm Weight: 40 Kg

Mn crust thickness:

Total: min: 9 max: 16 ave: 12 cm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Subdued botrioidal w/preferred [illegible] [illegible] botrioidal [illegible]

Internal structure:

layered: [illegible]
laminated:
massive: ✓
porous:
dendritic:
other:

CD29-5

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: None

Description:

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:

	Max	Min	Ave	Texture
Layer 1	55mm	50mm	55mm	Porous, [illegible] Row of large pores (Non Filled) in roughly the middle of layer
Layer 2	35mm	30mm	30mm	Fe stained
Layer 3	50mm	broken		Dense Massive, Fractured with granules, laminae visible

Layer one = layer two of other sample

CD29-5

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 31-CD29-6 Location: C. Karin Ridge

Size: 31x29x6 Weight: 2.5 kg

Mn crust thickness:

Total: min: ____ max: 115 ave: ____

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

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

Surface texture: Rippled to [illegible]

Internal structure:

layered:
laminated:
massive: ✓
porous: ✓ to a few places
dendritic:
other:

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

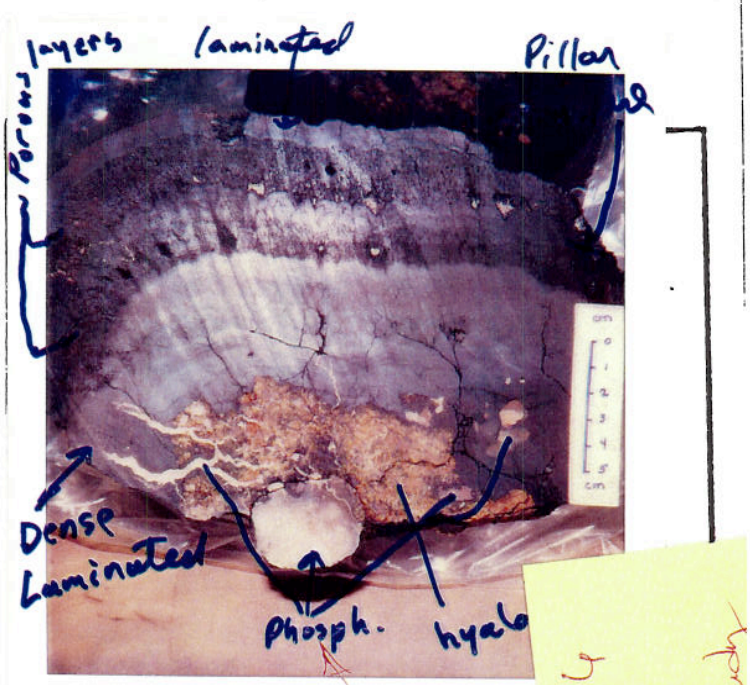
phosphorite [illegible]

Substratum: Very little

Rock type: [illegible]

Description: [illegible] altered yellow to red, [illegible] oxidized [illegible]

Mineralogy (XRD):



CD29-6

CD29-6 Phos Study

Analyses and subsamples:

analysis:	analyst:
38mm Slide (missing Phos bleb)	Smith

	Max	Min	Ave	Texture
Layer 1	10mm	[illegible]	[illegible]	Massive, laminated
Layer 2	25mm	20mm	[illegible]	Dendritic w/ large pores at bottom of layer (clay filled)
Layer 3	25mm	20mm	25mm	pillar structures, laminated [illegible] at the bottom of the layer a few larger clay filled pores at bottom of layer
Layer 4	28mm	25mm	25mm	Fe stained, dendritic
Layer 5	35mm	20mm	35mm	Massive, Dense, Fractured layer; laminated

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 31-CD29-7 Location:

Size: 31x20x16 cm Weight: 10 kg

Mn crust thickness:

Total: min: 110 mm max: 150 mm ave: 130 mm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Smooth to botryoidal (nodular)

Internal structure:

layered: 4
laminated:
massive: innermost, outermost
porous: 2 & 3
dendritic: 4th
other: 2 is pillar structure

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Phosphatic veins in crust 1 & 2 to Mn crust - mostly in innermost massive-Dense layer

Substratum: very little

Rock type: Vole Breccia - hyaloclastite

Description: Yellowish hyaloclastite

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
CD29-7A (cc) 0-80	80 mm (layers 1-4 (103 g)
CD29-7B (cc) 80-138	58 mm (layer 5 (48 g)
layer 5 - Dense, vitreous	Subconcoidal fracture
DPTS 0 - 130 mm (3 or 4 CD29-7C	sections)
layer 3 has recent mud in it - most removed	

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 31 CD29-8 Location: [illegible]

Size: 31x18x14cm Weight: ≈ 10 kg

Mn crust thickness:

Total: min: 80mm max: 90mm ave: 80mm

Inner crust: min: ____ max: ____ ave: 3.5cm

Outer crust: min: ____ max: ____ ave: 6 cm

Surface texture: Slightly botryoidal

Internal structure:

layered:
laminated: 2
massive:
porous: √ layer 2
dendritic:
other:

CD29-8

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: Volc. Breccia

Description: Very altered yellow to red [illegible] along fracture

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:

	Max	Min	Ave	
Layer 1				
Layer 2	35mm	20mm	30mm	Porous
Layer 3	15mm	15mm	15mm	Fe-Stained
Layer 4	35mm	25mm	30mm	Dense, Massive, Fractured

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 31 CD 29-9 Location: [illegible]

Size: [illegible] Weight: [illegible] nodules

Mn crust thickness:

Total: min: 2 mm (sides/bottom) max: 15 mm ave: 8 mm

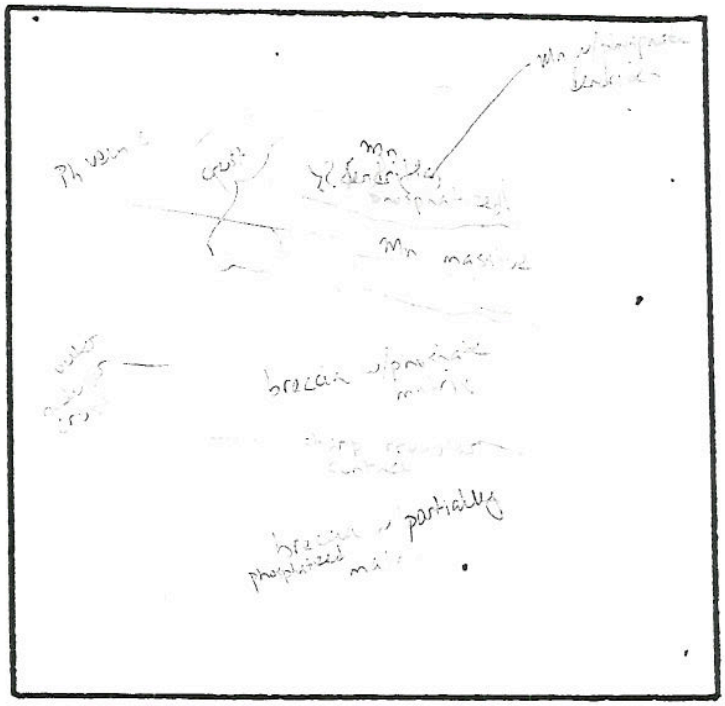
Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: perfectly smooth

Internal structure:

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



Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

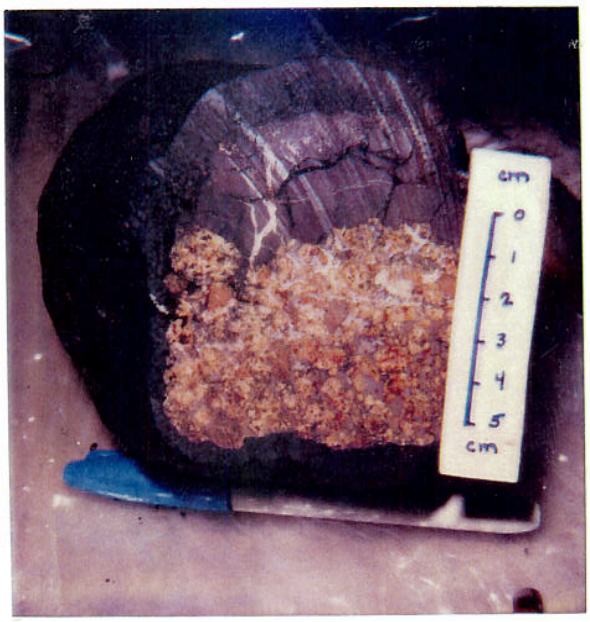
Rock type: Phosphatized Volcanic Breccia w/Mn crust

Description: Red brown & yellow white altered angular volcanic clasts with cream colored phosphatic cement (upper 2 cm) and beige brown calcite cement (lower 2 cm). Fragment is topped by Mn crust as follows: 30 mm thick [illegible] 2 layers: upper - dendritic phosphatized lower - massive w/phosphate veins partings

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:



CD 29-9

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 31 CD 29-10 Location: S Kavin Ridge

Size: 26 x 22 x 9 cm Weight: 8 Kg

Mn crust thickness:

Total: min: 6cm max: 9cm ave: 7.5 cm

Inner crust: min: max: ave:

Outer crust: min: max: ave:

Surface texture: Subdued Botrioidal

Internal structure:

massive
discontinuous
massive
dendritic
massive
bottom

layered: 5
laminated:
massive: 3
porous:
dendritic: 1
other: phosphatic, discontinuous, porous, weird

CD29-10

Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:

Substratum:

Rock type: NONE

Description:

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
half given to Halbach	

Sample Description

Cruise I.D: F7-86-HW **Sample I.D: Sta:** 31 CD 29-11 **Location:** S Kasin Ridge

Size: 24x13x13 cm **Weight:** 4 Kg

Mn crust thickness:

Total: min: 30 mm max: 40 mm ave: 35 mm

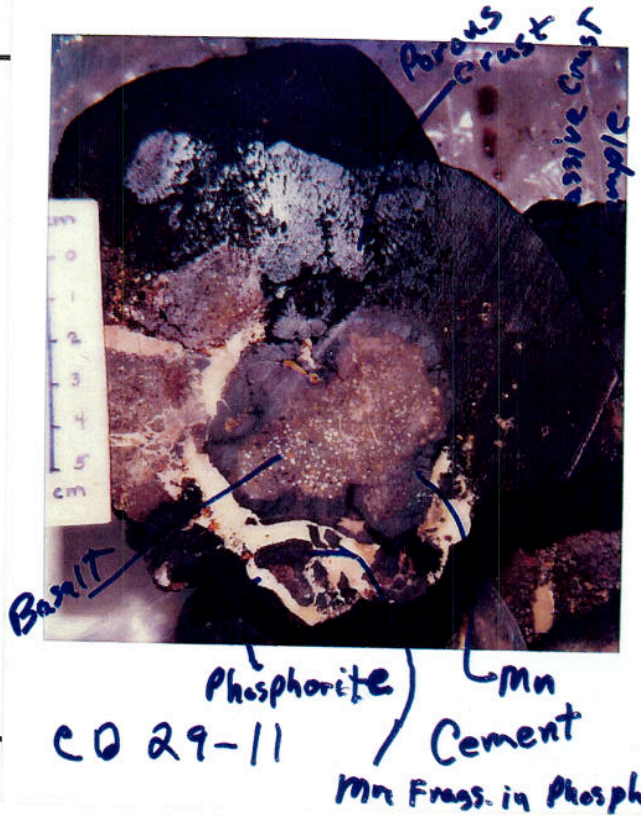
Inner crust: min: — max: — ave: —

Outer crust: min: max: ave:

Surface texture: perfectly smooth, granular in recesses.

Internal structure: massive + highly fractured in areas, highly porous in other areas -

layered:
laminated:
massive: 1
porous:
dendritic:
other:



Mineralogy (XRD):

Associated alteration, phosphorite, or hydrothermal deposits:
phosph- Cement + veins, Mn-oxide cement + fragments in the phosphorite -

Substratum:

Rock type: Phosphatized basalt breccia

Description: Vern poorly sorted (1mm² - 1x3 cm) angular lithic fragments loosely packed in phosphatized ~~[illegible]~~ Carbonate mud. Clasts are primarily vesicular basalt (red brown) and [illegible] Tip ups in phosph. -

Mineralogy (XRD):

Analyses and subsamples:

analysis:	analyst:
CD 29-11, Bulk (CC)	0-35 mm, 35 mm

one layer has lot recent mud, may not have gotten it all?

Sample Description

Cruise I.D: F7-86-HW Sample I.D: Sta: 31 CD-29-12 Location: [illegible]

Size: 19x12x12 cm Weight: 4kg

Mn crust thickness:

Total: min: <1mm max: 1mm ave: 1mm

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

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

Surface texture: patchy dusting

Internal structure: ____

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

CD29-12

Mineralogy (XRD): ____

Associated alteration, phosphorite, or hydrothermal deposits: ____

Substratum:

Rock type: Volcanic Breccia

Description: Red brown angular altered volcanic fragments 75-½ mm diam and [illegible] green altered volc. fragments (small fragments 5mm diam [illegible] and rims of some red brown fragments) with phosphate or calcite cement. Breccia is largely grain supported.

Mineralogy (XRD): ____

Analyses and subsamples:

analysis:	analyst:

Cruise Id: EW-86-HW Size _____ (cm) Location: Karin Ridge

Sample Id: CD29-12 Weight: _____ (kg) Depth: _____ (m)

Mn Crust Description

Surface Texture: _____

Mn Crust Thickness (mm):

Min: _____ Max: _____ Ave: _____

Layers (Outer to Inner)(mm):

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

* Alicé has this sample. She has numbered it CD29-A4

Comments and XRD Mineralogy:

ANALYSES

Subsample Number	Analysis	LayerThickness

Substrate Description

Rock Type: Basalt (Alkalic)

Description:

Biology ?: _____

Described By: Alicé Davis

Subsampled By: