USGS DREDGE LOG

SHIP/LEG F7-91-WP

STATION # 01

DREDGE # D1

DEPTH INTERVAL(m) 2145 - 1990

DEPTH(m)corrected 2140-2000

DATE JD 196 LOCAL 196 7/15

TIME GMT 0559-0837 LOCAL 1559-1859

LATITUDE 07°20.60' TO 07°20.95'

LONGITUDE 143°24.18' TO 143°24.17'

TOTAL WEIGHT: DREDGE 40 CRUST <1

20 % Thicker Crusts

PERCENTAGE OF ROCK COVERED BY CRUST 50% Patina

PERCENT BROKEN FROM: OUTCROP 30% TALUS 70%

THICKNESS OF MN CRUST: MAXIMUM 25 MINIMUM <1 AVERAGE 1

DOMINANT SURFACE TEXTURE granular

SUBSTRATE LITHOLOGY (1) ≥70% basalt (2) ≥30% green Sandstone (?) (3) <1% thin crust fragments + pumice

<1% weird rocks + gabbro

NODULES PRESENT 0

REMARKS: Green SS mostly broken from outcrop — some Talus — most basalt is Talus although some Thin chips shaved from outcrop

Crusts probably removed by dredging

USGS DREDGE LOG

Depth Interval 2145-1990 | Julian Date 196

Cruise I.D. F7-91-WP | Local Date (m/d/y) 7/15/91

Station No. 1 | Chief Scientist Hein/Ahn

Dredge No. D1 | Tech on Watch Walter

	On Station	Dredge on Btm	Dredge off btm	Off Station
GMT	196/0503	196/0559	196/0837	196/0915
LATITUDE	07° 20.59	07°20.60	07° 20.95	07° 20.92
LONGITUDE	143° 24.22	143°24.18	143° 24.17	143° 24.06
WATER DEPTH	2140	2145	1990	2065

Site Description and Target : Eastern end of Caroline Ridge
Dredging up south flank of Woleai Atoll

OPERATION*	GMT	DEPTH (m)	WIRE OUT (m)	TENSION	HDG/SPD	COMMENTS
On bottom	0559	2145	2770	—	—	starting to move upline &
Scope is out	0615	1990	2800	taking up slack		playing out scope
Bite	0639	1845		2.10		starting to dredge
Bite	0646	1839		2.62		
Bite	0654	1840		2.98		
Bite	0702	1835		4.34		
Bite	0715	1820		4.52		
	0716	1820		4.55		
Same bite	0717					Payed out slack !
						Max 6.9 tension
Bite	0720	1815		5.75		
Bite	0721	1815		3.4		
Bite	0722	1810		4.0		
Bite	0724	1810	2820	7.35		hung, 6.75
broke	0730	1813		6.19		broke off? may be slipped of
bite	0731	1813		4.7		
bite	0734	1810	2835	8.0		hung up
Still hung	0745	1820	2764	4.9		backing down/heaving in

*on/off bottom, bites, etc.

OTHER COMMENTS:

D1

Caroline Ridge Near Woleai Atoll

Dredge Sample Summary Sheet

Sample ID	Bulk CC	Layer CC	Pt & Au	Ree	OC	DPTS/TS	XRD	35mm Photo	Paleo	Archive
D1-1										
D1-2	✓		✓	✓						
D1-3					✓	✓				
D1-4										
D1-5						✓	C+O isotopes			
D1-6						✓				
D1-7					✓	✓				
D1-8						(2) ✓			✓	
D1-9						✓				
D1-10						✓				
D1-11						✓				
D1-12										

SAMPLE DESCRIPTION

Cruise Id: FT-91-CWP Size (cm): 2 Pebbles 2.3 x 3.1 cm 2.0 x 3.0 cm Location: Frank E. Caroline [redacted] Ridge

Sample Id: D1-1 Weight (kg): 0.01 kg Depth (m): 2145 - 1990 m

Mn Crust Description

Surface Texture: —

Mn Crust Thickness (mm):

Min:_____ Max:_____ Ave:_____

Outer to Inner Layers (mm)

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

No photo

Comments and XRD Mineralogy:

Substrate Description

Rock Type: Pumice

Description: Grey, Vesicular

Biology (?): —

Described by: G.S.

Analyses

Subsample No. Analysis Layer Thick. Wt.(g)

Subsampled by:

SAMPLE DESCRIPTION

Cruise Id: FT-91-WP Size (cm): 0.6cm – 3cm Pebbles ~50 Location: E. Flank Caroline Ridge [redacted]

Sample Id: D1-2 Weight (kg): 0.504 Depth (m): 2145-1990

Mn Crust Description

Surface Texture: Smooth – Granular

Botryoids

Pieces of Crust

Mn Crust Thickness (mm):

Min: 8 Max: 15 Ave: 10

Outer to Inner Layers (mm)

	Min	Max	Ave	Texture & Color
1				Black - Dense to Porous
2				
3				
4				
5				
6				

NO PHOTO

mostly small Crust Frags

Comments and XRD Mineralogy:

Maybe siderite? – broken from SS probably

Substrate Description

Rock Type: sandstone

Description: Fine grained, green with calcite cement

Biology (?): encrusting Forams

Described by: G.S.

Analyses

Subsample No.	Analysis	Layer Thick.	Wt.(g)
D1-2	CC, Pt,	0-12mm	73gm
D1-2	REE	0-12mm	5gm
	XRD		
	2/3 USGS		
	1/3 KORDI		

Subsampled by: HEIN

SAMPLE DESCRIPTION

Cruise Id: FT-91-WP Size (cm): 3 Cobble 3 Pebble Location: [redacted] E. Flank of Caroline Ridge

Sample Id: D1-3 Weight (kg): 4.5 Depth (m): ≈145-1PPbm

Mn Crust Description

Surface Texture: Petina

Mn Crust Thickness (mm):

Min:_____ Max: Petina Ave:_____

Outer to Inner Layers (mm)

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

D 1-3

Comments and XRD Mineralogy:

Subsam

D1-3-1 (2) TS, XRD, OC 15gm
1 KORDI
1 USGS

15% KORDI
85% USGS

May be datable (yes!)

Substrate Description

Rock Type: Basalt

Description: Gray to Black.
massive. fine-grained.
Partly fractured (some filled by Calcite)
Fresh(?) plags
olivine (pseudomorphs) + plag. phenos.

Biology (?):

Described by: J-B, Park

Subsampled by: HEIN

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP
Sample Id: D1-4
Size (cm): 8.1-15 cm largest; 2-3cm smallest
Weight (kg): 1.5
Location: E. Flank of Cordino Ridge
Depth (m): ~2145-1990

Mn Crust Description

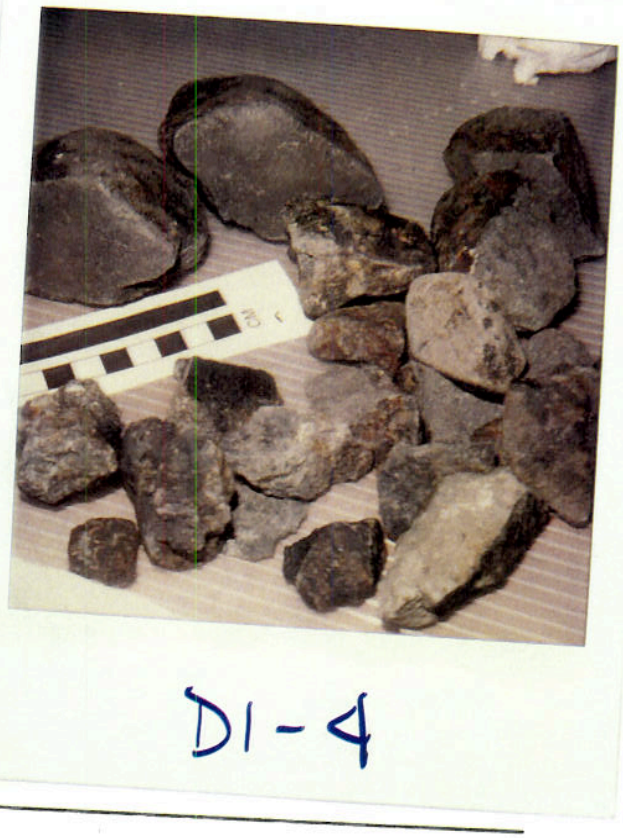
Surface Texture: Eroded Patina

Mn Crust Thickness (mm):

Min: _____ Max: Patina Ave: _____

Outer to Inner Layers (mm)

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



Comments and XRD Mineralogy:

Subsamp

Substrate Description

Rock Type: Basalt
Irreg. shaped vesicles, almost purple
Description: Reddish Brown, Felty looking with Plagioclase. Vesicles filled with soft! green/grey mineral. (Smectite? Chlorite?) Green schist minerals. Some calcite vesicle fill
Biology (?):

Described by: GS.

Subsampled by:

SAMPLE DESCRIPTION

Cruise Id: FM-91-WP Size (cm): 3 cobbles 5x8x15 8x11x20 Location: E. Flank of Caroline Ridge [redacted]

Sample Id: DI-5 Weight (kg): FL Depth (m): 2145 - 1990 M

Mn Crust Description

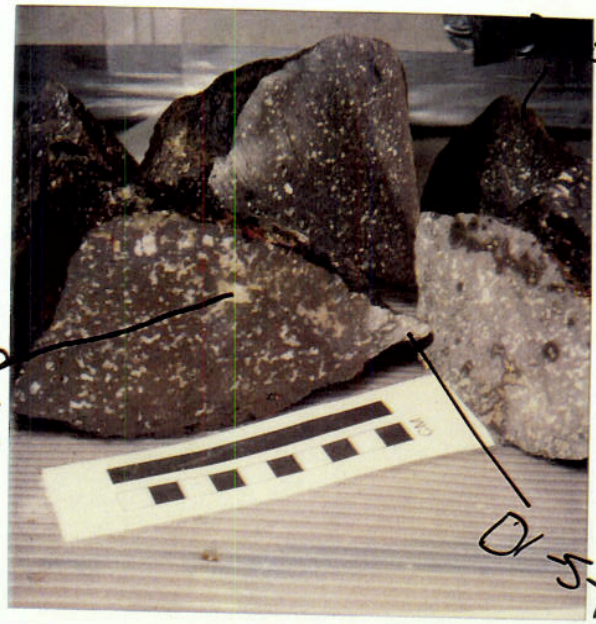
Surface Texture: Patina

Mn Crust Thickness (mm):

Min: _____ Max: Patina Ave: _____

Outer to Inner Layers (mm)

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



DI-5

Comments and XRD Mineralogy:

Subs

DI-5-1A XRD

C+O isotopes

DI-5-1 for TiS,

Substrate Description

Rock Type: Basalt

highly vesicular

(2) is altered to "Green schist minerals"

Description: Brownish Pink to Grey

Vesicles filled with Calcite

2 generations - (1) interior older is red + altered

(2) outer is white to green white-calcite green smectite? chlorite

Biology (?): —

Described by: GS

Subsampled by: GS

D1-5-1

SAMPLE DESCRIPTION

Cruise Id: F1-91-WP
Size (cm): boulder (30 x 15 x 6) cobble pebble
Location: E. Flank of [redacted] Caroline Ridge
Sample Id: D1-6
Weight (kg): 10
Depth (m): 2145-1990 m

Mn Crust Description

Surface Texture: Petina

Mn Crust Thickness (mm):

Min:_____ Max: Petina Ave:_____

Outer to Inner Layers (mm)

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

D1-6

Comments and XRD Mineralogy:

Subsam

D1-6 TS

30% KORDT
70% USGS

Substrate Description

Rock Type: Basalt - olivine phyric (replaced by clay + iron oxides) small, clean plagioclase microphenocrysts Reddish Black color

Description: massive, fine grained
- rarely vesicles (some filled by Qz)
- oxidized groundmass.
- partly fractured (some filled by Cc and 2nd. mineral(?))

Biology (?):

maybe Feldspars in matrix for Lating? yes!

Described by: J-B. Park

Subsampled by: HEIN

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP Size (cm): 18 cm Location: [redacted]

Sample Id: D1-7 Weight (kg): 3.0 Depth (m): 2145-1990

Mn Crust Description

Surface Texture:

Smooth & Granular

Mn Crust Thickness (mm):

Min: <1 Max: _____ Ave: _____

Photo on back

Outer to Inner Layers (mm)

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

Comments and XRD Mineralogy:

Analyses

Subsample No.	Analysis	Layer Thick.	Wt. (g)
D1-7	OC, XRD TS	26 gm	

another picture at the back

Substrate Description

Rock Type: Basalt (?) weird Rock

Check TS

Description: Coarse-grained Vesicles & vein are filled with calcite. Olivines altered to [illegible]. ~~[illegible]~~ + Analcite

maybe sulfides

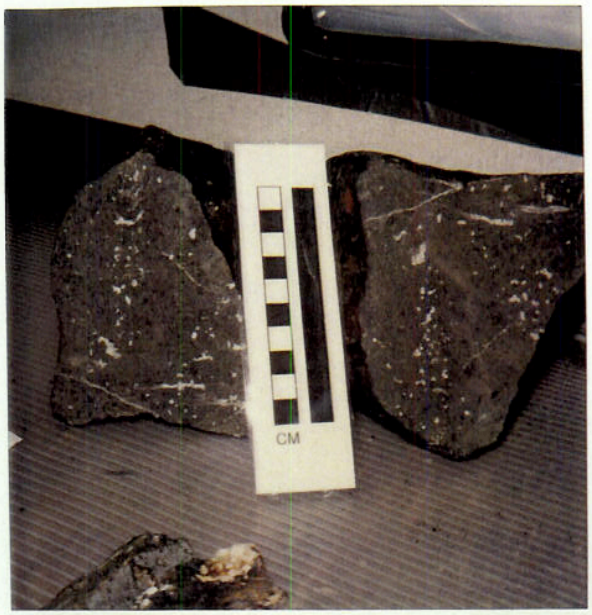
40% HORDI

60% USGS

Biology (?):

Described by: Ahn

Subsampled by: HEIN



D1-7

SAMPLE DESCRIPTION

Cruise Id: FM-91-WP Size (cm): ~35 Pebbles ~12 Cobbles Location: [redacted] E Flank Caroline Ridge

Sample Id: D1-8 Weight (kg): 7 kg Depth (m): 2145 – 1990

Mn Crust Description

Surface Texture: Granular – Only 7 or 8 rocks have crusts

Mn Crust Thickness (mm):

Min: <1 Max: 25 Ave: 5

Outer to Inner Layers (mm)

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

D1-8

Comments and XRD Mineralogy:

Subsample

D1-8-1 TS laminated Sample

D1-8-2 TS XRD massive, coarse-grained Paleo

Substrate Description

Rock Type: Volcaniclastic Sandstone

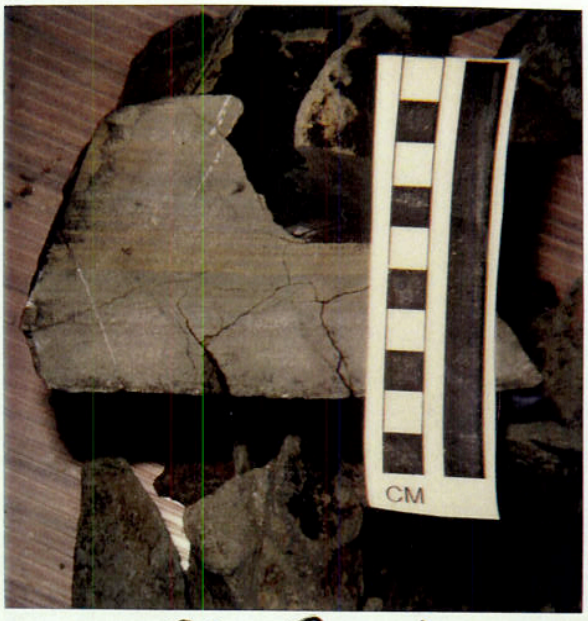
Description: Greenish, compact, massive to laminated; moderate to poor sorting; Calcite Cement, ← Compact fine-grained volcaniclastic matrix – rare calcite veins

Biology (?): hard-dense rocks –

40% KORDI
60% USGS

Described by: HEIN

Subsampled by: HEIN



DL-8-1

6 Pebbles

SAMPLE DESCRIPTION

Cruise Id: FG-91-WP Size (cm): 1.5 x 11.5 x 15 / 4.5 x 6.5 x 14 Location: W. Flank of Caroline Ridge

Sample Id: D1-9 Weight (kg): _____ Depth (m): 2145-1990

Mn Crust Description

Surface Texture: Smooth

Some current polish

Mn Crust Thickness (mm):

Min: 2 Max: 8 Ave: 3

Outer to Inner Layers (mm)

	Min	Max	Ave	Texture & Color
1	2	8	3	Black + Dense
2				
3				
4				
5				
6				

D1-9-2

addition to D1-9 on Back

D1-9-1 DPTS

D1-9

Comments and XRD Mineralogy:

Su

D1-9-1 TS. XRD DPTS

Substrate Description

Rock Type: Micro Gabbro ? contains xenoliths

Description: fine grained holocrystalline micro gabbro contains a variety of xenoliths — altered volcanic and intrusive clasts

1/3 KORDI

2/3 USGS

Biology (?): encrusting Forams

Described by: G.S.

Subsampled by: HEIN J.H

D1-9

SAMPLE DESCRIPTION

Cruise Id: FT-91-WP Size (cm): 5 x 14 x 20 Location: E. Flank Caroline Ridge

Sample Id: D1-10 Weight (kg): 2.5 Depth (m): 2145 - 1990 m

Mn Crust Description

Surface Texture: Patina

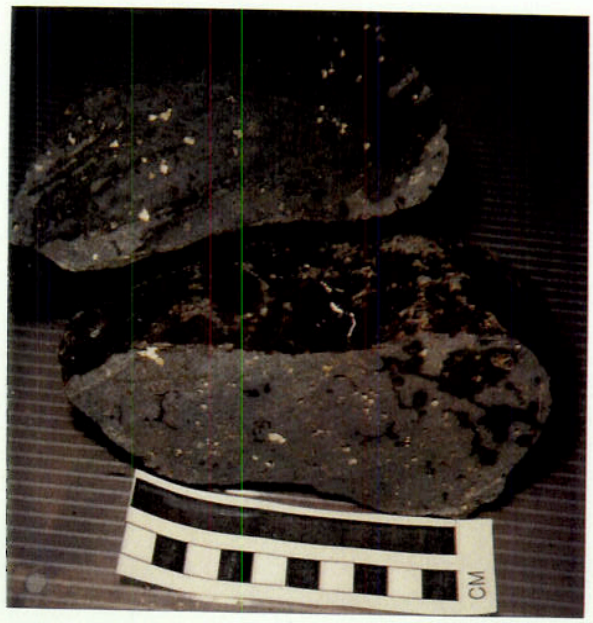
eroded

Mn Crust Thickness (mm):

Min: _____ Max: Patina Ave: _____

Outer to Inner Layers (mm)

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



D1-10

Comments and XRD Mineralogy:

Sub

D1-10 TS

USGS

Substrate Description

Rock Type: Basalt, Vesicular

Block → plag.

Description: felty, Vesicular Basalt with calcite + chlorite (or smectite) vesicle fil

much Feldspar

Datable ? yes

good clean plagioclase microphenocrysts

Biology (?): encrusting foram

Described by: G.S.

Subsampled by:

HEIN

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP Size (cm): 2 cobbles, 2 pebbles Location: ~~VS-91-ND~~ E. Flank of Caroline Ridge

Sample Id: D1-11 Weight (kg): 2 Depth (m): 2145-1990 m

Mn Crust Description

Surface Texture:

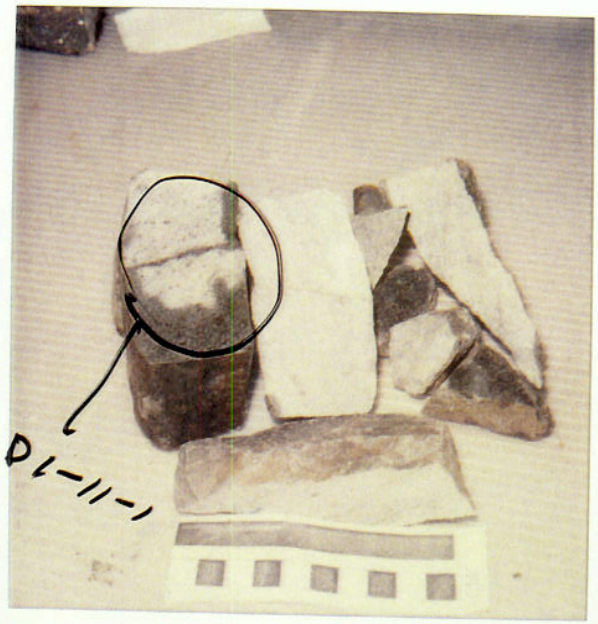
Smooth to Granular

Mn Crust Thickness (mm):

Min: <1 Max: 2 Ave:

Outer to Inner Layers (mm)

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



D1-11

Comments and XRD Mineralogy:

Subsa

T.S. chip
D1-11 (2) TS
1 USGS
1 HORDI

1/3 HORDI
2/3 USGS

Substrate Description

Rock Type: Gabbroic rock(?)

Description: Gray to Black, medium-grained, intergranular pyroxene-pheno. (large to 1 cm) fractured layer filled by chlorite(?) cpx. phenos. in equigranular groundmass

Biology (?): —

Described by: J-B. Park

Subsampled by: HEIN

SAMPLE DESCRIPTION

Cruise Id: EW-91-WF Size (cm): 4 pebbles 3.3 x 5 x 7 - largest Location: E. Manic Caroline Ridge

Sample Id: DI-12 Weight (kg): 0.37 Depth (m): 2145 - 1990

Mn Crust Description

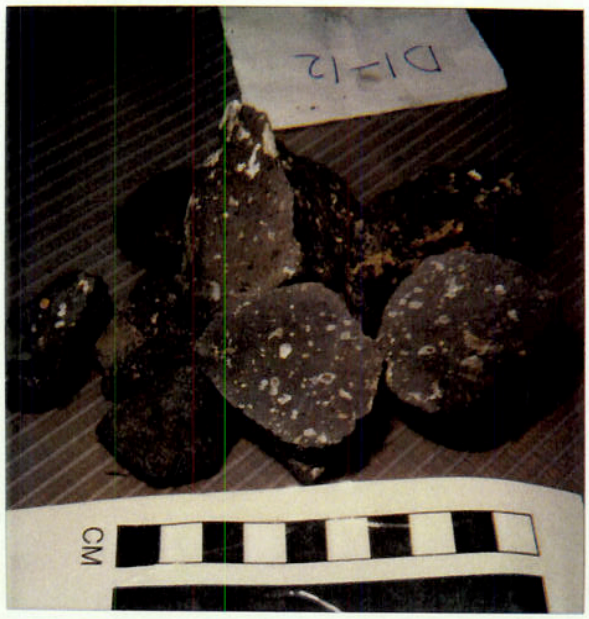
Surface Texture: Pitting eroded to eroded botryoids

Mn Crust Thickness (mm):

Min: 2 Max: 10 Ave: 8

Outer to Inner Layers (mm)

	Min	Max	Ave	Texture & Color
1	2	10	8	Black w/ phosphorite (?) Botryoid fill.
2				
3				
4				
5				
6				



DI-12

Comments and XRD Mineralogy:

Subsa

50% todorokite
40% USGS

Substrate Description

Rock Type: Basalt badly altered

Description: Red, vesicular with calcite and chlorite or smectite

Biology (?): encrusting forams

Described by: JS

Subsampled by: