Dredge 21

USGS DREDGE LOG

SHIP/LEG F7 91-WP

STATION # 29

DREDGE # 21

DEPTH INTERVAL(m) 2430 - 1728

DEPTH(m)corrected 2400 - 1800

DATE JD 212 LOCAL 7/31/91

TIME GMT 0126 - 0528 LOCAL 1126 - 1728

LATITUDE 5°39.50' TO 5°40.19

LONGITUDE 133°50.45' TO 133° 58.22'

TOTAL WEIGHT: DREDGE 350 CRUST <10?

PERCENTAGE OF ROCK COVERED BY CRUST 100 Patina

PERCENT BROKEN FROM: OUTCROP 70 TALUS 30

THICKNESS OF MN CRUST: MAXIMUM 2 MINIMUM <1 AVERAGE <1

DOMINANT SURFACE TEXTURE Smooth, granular

SUBSTRATE LITHOLOGY (1) Limestone - reefal 70 %
(2) Basalt, several Types 30 %

NODULES PRESENT 0

REMARKS: Limestone from outcrop
most basalt is Talus
Crust Thicker on Lms -

USGS DREDGE LOG

Depth Interval 2500-2000

Cruise I.D. F7-91-WP

Station No. 29

Dredge No. 21

Julian Date 212

Local Date (m/d/y) 31 JULY '91

Chief Scientist HEIN / AHN

Tech on Watch JON / WALT

	On Station	Dredge on Btm	Dredge off btm	Off Station
GMT	0025	0126	0528	0558
LATITUDE	05° 39.24' N	05° 39.50'	5° 40.19'	5° 39.7
LONGITUDE	133° 59.41' E	133° 50.45'	133° 58.22'	133 58.1
WATER DEPTH	2610	2430	1728	—

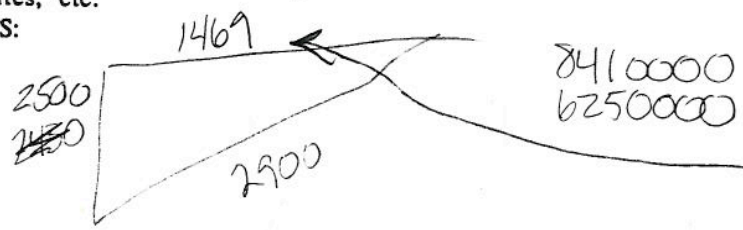
Site Description and Target : PALAU G

Scope 1.2 = 2900

OPERATION*	GMT	DEPTH (m)	WIRE OUT (m)	TENSION	HDG/SPD	COMMENTS
On Bottom	0126	2430	2572			
Scope Out	0136	2380	2900			
Pulling dredge	0151	2260	2900	1.64 (up to)		Seems way too early
Starting to dredge	232	2260		>2T		
On a Bite	0307	2050?		2.6		Broke
Bite	308			2.32		
Bite	309			2.48		
Bite	311	1910?		2.55		Broke
Bite	313			2.70		
Bite	314			2.97		
Bite	315			2.57		
Bite	318	1900?		2.58		
Bite	320			2.56		
Bite	321			2.48		
Bite	322			2.46		
"	0323			2.46		
"	0324	1840?		2.65		
"	0326	1820?		2.70		

*on/off bottom, bites, etc.

OTHER COMMENTS:



84100000
62500000

D21

Palau G

Dredge Sample Summary Sheet

Sample ID	Bulk CC	Layer CC	Pt & Au	Ree	OC	DPTS/TS	XRD	35mm Photo	Paleo	Archive
D21-1									2x	
2										
3										
4										
5						X	X			
6										
7							2x		X	
8						X	X			
9							X			
10										
11										
12										
13					X	X	X			
14						X	X			
15										
16							X			
17						X	3X			
18										
19						X	X			
20						X	X			
21					X	X	X			

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP Size (cm): — Location: ~~V3-91-NP~~

Sample Id: D21-1 Weight (kg): ~30g Depth (m): 2400-1800

Mn Crust Description

Surface Texture: None

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:

Analyses

Subsample No.	Analysis	Layer Thick.	Wt.(g)
D24-1	Paleo w/ R/B		~30g
	Paleo		

Substrate Description

Rock Type: Foraminiferal mud

Description: runny, Pyellow brown ~10YR 4/4
Rock fragments included
~limestone &
Basalt

Biology (?): —

Described by: G.S.

Subsampled by: G.S.

SAMPLE DESCRIPTION

Palau G

Cruise Id: FY-91-WP Size (cm): ~100 Pebbles Location: [redacted]

Sample Id: D21-2 Weight (kg): ~ 2.0 Depth (m): 2400 - 1800

Mn Crust Description

Surface Texture: Pathing

Smooth

Mn Crust Thickness (mm):

Min:_____ Max: P Ave:_____

Outer to Inner Layers (mm)

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

D21-2

Comments and XRD Mineralogy:

Su

40% HORDI

60% USGS

Substrate Description

Rock Type: Cobbles + Pebbles

Andesites, conglomerates, sandstones mudstones

Description: limestones

Dacites?

Biology (?): —

Described by: A.S.

Subsampled by:

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP Size (cm): 10 pebbles Location: Polar G ~~V2-91-CP~~

Sample Id: D21-3 Weight (kg): ~1-5 Depth (m): 2400-1800

Mn Crust Description

Surface Texture: V. Patchy Patina

Mn Crust Thickness (mm):

Min: <1 Max: <1 Ave: <1

Outer to Inner Layers (mm)

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

D21-3

Comments and XRD Mineralogy:

Subsam

Substrate Description

Rock Type: Sandstone-siltstone-mudstone

50% KORDI
50% USGS

Description: medium brown to green brown SS beds alternating w/ Finer-grained Clastic Beds beds are deformed & microfaulted - NONCalcareous - some red-argillaceous

Biology (?): micritic Lms beds Like 21-7. Some w/ qtz veins

Described by:

HEIN

Subsampled by:

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP Size (cm): 7 × 7.5 × 8.5 4.4 × 5.5 × 8 Location: [redacted] Palau G

Sample Id: D21-4 Weight (kg): ~0.25 Depth (m): 2400 - 1800

Mn Crust Description

Surface Texture: Granular

Mn Crust Thickness (mm):

Min: 1 Max: 2 Ave: 2

Outer to Inner Layers (mm)

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

D21-4

Comments and XRD Mineralogy:

S

Substrate Description

Rock Type: Breccia

50% KORDI
50% USGS

Description: Clast supported sedimentary breccia.
Basalts - massive + crystalline ~Red - predominantly grey Diabases + basalt secondary
Sandstone? in
~~Biology (?):~~ Calcite cement

Described by: G.S.

Subsampled by:

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP Size (cm): 4 small Cobbles Location: ~~V8-91-CP~~ Polau G

Sample Id: D21-5 Weight (kg): 1 Depth (m): 2400 - 1800

Mn Crust Description

Surface Texture: Patchy Patina

Mn Crust Thickness (mm):

Min: <1 Max: 1 Ave: <1

Outer to Inner Layers (mm)

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

D21-5

Comments and XRD Mineralogy:

Subsamp

D21-5-1 TS XRD

Substrate Description

Rock Type: Sandstone 50% TORDI

Calcareous + noncalcareous 50% USGS

Description: Massive, medium to Coarse-grained, shell Fragments + Ig. Rx Frags - in Calcite? Cement, or just Ig Rx + mineral grains in unknown cement

Biology (?):

Described by: HEIN

Subsampled by: HEIN

D21-5

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP
Sample Id: D21-7
Size (cm): 1 large cobble, 2 small cobbles, 5 pebbles
Weight (kg): ~4 kg
Location: ~~[illegible]~~ Palau G
Depth (m): 2400-1800

Mn Crust Description

Surface Texture: V. Patchy Patina

Mn Crust Thickness (mm):

Min:_____ Max:_____ Ave:_____

Outer to Inner Layers (mm)

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

Comments and XRD Mineralogy:

Substrate Description

Rock Type: Argillaceous micritic limestone

Description: dark reddish brown massive, V.FG - some pieces have Quartz veins others, detrital lenses

Biology (?):

Subsample

D21-7-1 Paleo, XRD large massive piec
-7-2 XRD veins + matrix

50% HORDI
50% USGS

Described by: HEIN

Subsampled by: HEIN

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP Size (cm): 3 cobbles Location: [redacted] Plan 4

Sample Id: D21-8 Weight (kg): 6.0 Kg Depth (m): 2400 - 1800

Mn Crust Description

Surface Texture: current polished lizard skin?

Mn Crust Thickness (mm):

Min: 1 Max: 1 Ave: 1

Outer to Inner Layers (mm)

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

D21-8

Comments and XRD Mineralogy:

Subsa

D21-8-1 TS, XRD

50% KORDI
50% 45.6 S

Substrate Description

Rock Type: Basalt, ankaramitic

Description: aphanitic reddish orange-mass with 1-3cm phenocrysts of plagioclase + clino-pryoxenes and amigdaulas with clino-pryoxene + magnetite.

Biology (?): encrusting forams,

Described by: A.S.

Subsampled by:

SAMPLE DESCRIPTION

Cruise Id: FZ-91-WP Size (cm): 3 small cobbles Location: Palau G [redacted]

Sample Id: D21-9 Weight (kg): 1 kg Depth (m): 2400-1800

Mn Crust Description

Surface Texture: Patchy patina

Mn Crust Thickness (mm):

Min: <1 Max: 1 Ave: <1

Outer to Inner Layers (mm)

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

Comments and XRD Mineralogy:

Subsample

D21-9-1 XRD

50% FORDI
50% USGS

Substrate Description

Rock Type: strongly altered basalt (?) volcanic Rock

Description: dark purple-brown to dark red. brown, VFG

Biology (?):

Described by: HEIN

Subsampled by: HEIN

Close To right Color

D21-9

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP Size (cm): 4.2 x 5 x 8.2 Location: [redacted] Palau G

Sample Id: D21-10 Weight (kg): 0.2 ~ Depth (m): 2400 - 1800

Mn Crust Description

Surface Texture: eroded - patina
lizard

Mn Crust Thickness (mm):

Min: Max: P Ave:

Outer to Inner Layers (mm)

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

D21-10

Comments and XRD Mineralogy:

Subsa

Substrate Description

Rock Type: Diabase

50% HORDI
50% USGS

Description: Med grained
plagioclase w magnetite,
alteration rim? at surface

Strongly magnetic

Biology (?): No

Described by: J.S.

Subsampled by:

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP Size (cm): 7.3 x 9.2 x 14 Location: Palau G [redacted]

Sample Id: D21-11 Weight (kg): ~1 Depth (m): 2400 - 1800

Mn Crust Description

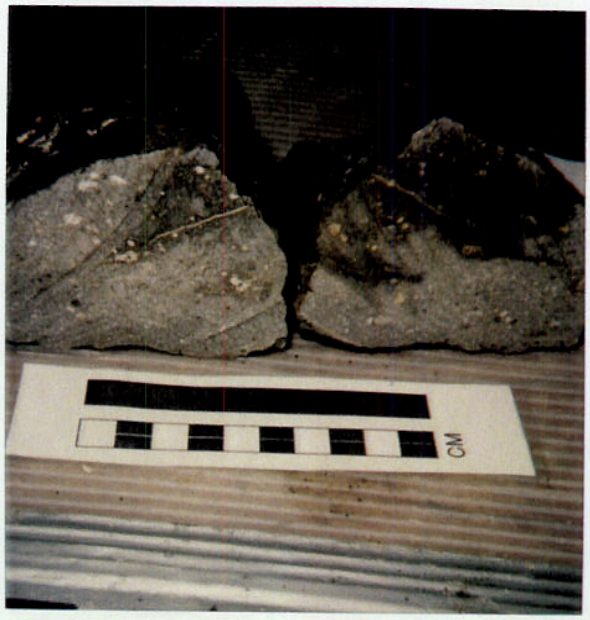
Surface Texture: Current smoothed + granular

Mn Crust Thickness (mm):

Min: 1 Max: 2 Ave: 2

Outer to Inner Layers (mm)

	Min	Max	Ave	Texture & Color
1	1	2	2	Black porous w/ red and fill
2				
3				
4				
5				
6				



D21-11

Comments and XRD Mineralogy:

Subs

Substrate Description

Rock Type: Ankaramite ?

60% [illegible]
43% [illegible]

Description: aphanetic red groundmass
>1 ~2mm with phenocrysts of amphiboles ? or cpx
that have a white alteration
Rim - Rectangular
anygduals of green + white radiating crystals

Biology (?): encrusting forams
badly altered

Described by: G.S.

Subsampled by:

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP Size (cm): Small Boulders Location: Palau G [redacted]

Sample Id: D21-12 Weight (kg): ~50 Depth (m): 2400-1800

D21-12 uncut

Mn Crust Description

Surface Texture: Patina - Smooth to granular

Mn Crust Thickness (mm):

Min: <1 Max: 2 Ave: <1

Outer to Inner Layers (mm)

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

Comments and XRD Mineralogy:

Subsa

Substrate Description

Rock Type: 50% Framework + 50% Clastic limestone

Description: light cream reefal limestone, coral gastropods

Biology (?): None

50% USGS
50% HORDI

Described by: D.S.

Subsampled by:

D21-12 cut

SAMPLE DESCRIPTION

Cruise Id: F7-91WP Size (cm): 23x12x14 Location: Palau G [redacted]

Sample Id: D21-13 Weight (kg): ~3 kg Depth (m): 2400-1800

Mn Crust Description

Surface Texture: None

Mn Crust Thickness (mm):

Min:_____ Max:_____ Ave:_____

Outer to Inner Layers (mm)

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

D21-13

Comments and XRD Mineralogy:

Sub

D21-13 TS, XRD
OC 70gm

Substrate Description

Rock Type: Diabase ?

30% HOPDI
70% USGS

Description: Gray, fine-grained holocrystalline, with anhedral "felsic" inclusions could have been glomerocrysts of primarily feldspar but

Biology (?): looks altered, zeolite? groundmass also mod. altered

Described by: ASD,

Subsampled by:

SAMPLE DESCRIPTION

Cruise Id: F7-91WP Size (cm): 20x13x10 Location: Palau G [redacted]

Sample Id: D21-14 Weight (kg): ~5 Kg Depth (m): 2400 - 1800

Mn Crust Description

Surface Texture: Patina to ~1mm
smooth to eroded

Mn Crust Thickness (mm):

Min: P Max: 2mm Ave: P

Outer to Inner Layers (mm)

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

D21-14

Comments and XRD Mineralogy:

Subs

D21-14. TS, XRD

Substrate Description

Rock Type: sandstone-siltstone or mudstone
gray-brown current bedded SS grading into
// bedded mudstone - red-brown

Description: Gray-brown, medium grained sandstone

55% USGS
45% HORDT

Biology (?): encrusting forams

Described by: ASD

Subsampled by:

SAMPLE DESCRIPTION

Cruise Id: F7-91-WP Size (cm): 5.5 x 10.6 x 10.8 Location: [redacted]

Sample Id: D21-15 Weight (kg): ~1.5 Depth (m): 2400 - 1800

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				

D21-15

Comments and XRD Mineralogy:

Sub

Substrate Description

Rock Type: Sandstone

50% HORDI
50% YSGS

Description: greenish grey sandstone, alternating green layers w/ white layers fine grained - magnetic
Mn Carbonate

Biology (?): —

Described by: D.S

Subsampled by:

4

SAMPLE DESCRIPTION

Palau G

Cruise Id: F7-91 WP Size (cm): 15x10x7 Location: [redacted]

Sample Id: D21-16 Weight (kg): ~ 0.5 Depth (m): 2400-1800

Mn Crust Description

Surface Texture: Patina — mostly eroded

Mn Crust Thickness (mm):

Min:_____ Max: P Ave:_____

Outer to Inner Layers (mm)

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

D 21-16

Comments and XRD Mineralogy:

Subsa

D21-16 XRD

30% GORDI

70% USGS

DPTS, OC, HHEL, XRD (again

17.3kg 1.73g

Te, Au

Substrate Description

Rock Type: Highly altered Tuff?

Description: Greenish, hard (silicified?) tuff? vitrophyre? has strange concentric round features — could have been lithophysae??

Biology (?):

Described by: *SD, + Hein

Subsampled by:

HEIN

SAMPLE DESCRIPTION

Palau G

Cruise Id: F7-91-WP Size (cm): ~8 Cobbles Location: [redacted]

Sample Id: D21-17 Weight (kg): ~6 Depth (m): 2400 - 1800

D21-17

Mn Crust Description

Surface Texture: granular

Mn Crust Thickness (mm):

Min: 1 Max: 2 Ave: 1

Outer to Inner Layers (mm)

	Min	Max	Ave	Texture & Color
1	1	2	1	Reddish Brown to Black porous
2				
3				
4				
5				
6				

Comments and XRD Mineralogy:

Subs

D21-17-1 TS
17-1A Coarse grained layer
XRD 17-1B Fine-clay w/ abrupt margins
XRD 17-1C mottled layer

55% USGS
45% HORDT

Substrate Description

Rock Type: Sandstone

greenish gray

Description: Normally graded with coarse to very fine grained - gradational then a sharp boundry from the very fine grained to another sequence (coarse grained)

Biology (?): None

Described by: G.S.

Subsampled by: Hein

very fine grained some times with boundries of a different color

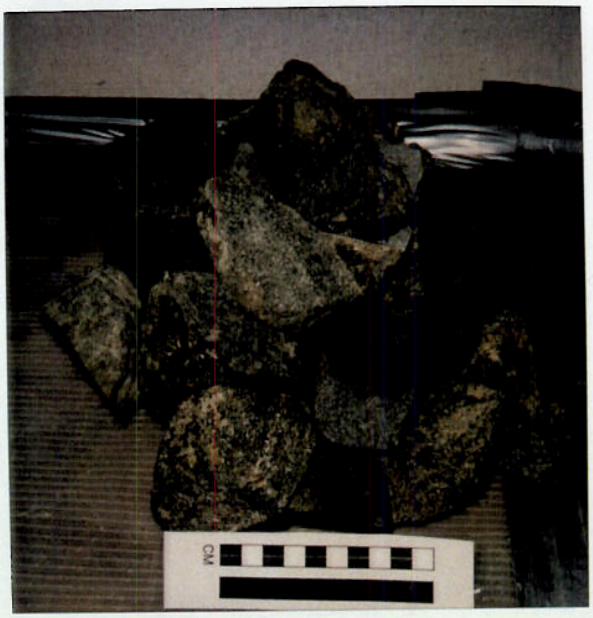
Some are bioturbated or dewatered.

Some cross bedded

SAMPLE DESCRIPTION

Cruise Id: F7-91WP Size (cm): many pieces Location: Palau G [redacted]

Sample Id: D21-18 Weight (kg): ~ 5kg Depth (m): 2400 - 1800



D21-18

Mn Crust Description

Surface Texture: None

Mn Crust Thickness (mm):

Min:_____ Max:_____ Ave:_____

Outer to Inner Layers (mm)

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

Comments and XRD Mineralogy:

Subsa

Substrate Description

Rock Type: Volcaniclastic breccia to coarse-grained sandstone

Description: similar to D21-19 but clasts generally more altered and rock less well indurated

50% HARDR
50% USGS

Biology (?):

Described by: ASD

Subsampled by:

SAMPLE DESCRIPTION

Cruise Id: F7-91 WP Size (cm): several cobbles to >15 cm max. Location: Palau G [redacted]

Sample Id: D21-19 Weight (kg): ~6 kg Depth (m): 2400-1800

D21-19

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				

Comments and XRD Mineralogy:

Subsa

D21-19-1 TS, XRD

50% HORDI
50% USGS

Substrate Description

Rock Type: Volcaniclastic breccia (?)

Description: clast supported, many different kinds of clasts ranging from red-brown volcanic (andesite) to plutonic rocks and individual subhedral crystals of pyroxene + feldspars

Biology (?):

Described by: ASD

Subsampled by: HEIN

SAMPLE DESCRIPTION

Cruise Id: F7-91 WP Size (cm): 1 Cobble Location: Palau G [redacted]

Sample Id: D21-20 Weight (kg): ~0.5 kg Depth (m): 2400-1800

Mn Crust Description

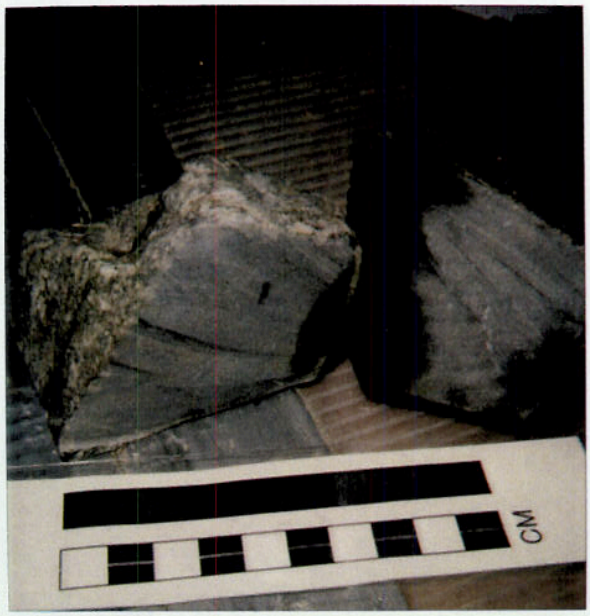
Surface Texture: NONE

Mn Crust Thickness (mm):

Min:_____ Max:_____ Ave:_____

Outer to Inner Layers (mm)

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



D21-20

Comments and XRD Mineralogy:

Subsa

D21-20 XRD.TS

Substrate Description

Rock Type: Basalt or Andesite?

50% KORDI
50% UBRS

Description: Gray, aphanitic phanaritic, fine grained some iron oxide alteration and traces of zeolites(?) in veinlets

Biology (?):

Described by: ASD

Subsampled by: Hein

SAMPLE DESCRIPTION

Cruise Id: F7-91 WP Size (cm): many pebbles + cobbles Location: ~~V[illegible]~~ Palau G

Sample Id: D21-21 Weight (kg): ~5 kg Depth (m): 2400-1800

Mn Crust Description

Surface Texture: Patina — in a few places

Mn Crust Thickness (mm):

Min:_____ Max: P Ave:_____

Outer to Inner Layers (mm)

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

D21-~~22~~ 21

Comments and XRD Mineralogy:

Subsa

D21-21-1 TS

D21-21-2 OC, XRD

~94gm

50% HORD?

50% USGS

Substrate Description

Rock Type: Ankaramite

Description: Large (1cm-size), euhedral clinopyroxene phenocrysts and lesser amounts of feldspar or feldspathoid in red-brown (or in rare samples in greenish)

~~Biology~~ (?): matrix, also contains cm-size, rounded xenoliths

Described by: mod. altered, ASD,

Subsampled by: Heim