

**Dredge 26 Empty**

**Dredge 27 Small cone west side of Vlinder guyot in Magellans smts.**

**Location: 16° 59.24/154°10.06E- 16°59.55N/154° 01.62'E**

**Small cone west side of Vlinder guyot in Magellans smts.**

**Summary:**

**Lots of Mn crusts, Mud, few basalts**

**Basalt Rock Groups:**

**Group I**

**Ol (2-6%), cpx (1-3%) phyric, vesicular basalts.**

**#s 3, 4, 5, 6, 8,**

**Group II**

**ol phyric, vesicular**

**1,2**

**Group III**

**aphyric, vesicular**

**#s 9, 10**

**Group IV**

**nearly picritic, ol (17%) and cpx (3%) phyric, vesicular basalt**

**# 7**

**Group V**

**volcaniclastics/clastics: # 11 phosphatiized pebble stone with well rounded pebbles**

**Group VI**

**Work Plans:**

**Thin sections: took 4, 7**

**Dating: 10A - MP?**

**Isotopes: 4, 7 cpx sep?**

**Alteration:**

Dredge Number	27	27	27	27	27	27	27
Sample Number	1	2	3	4	5	6	7
PETROGRAPHER	PEJ	PEJ	PEJ	PEJ	PEJ	PEJ	PEJ
Approximate Weight <g>	750	50	150	800	300	150	2500
Mn crust thickness	1-5 mm	2-4 mm	0-1	0-2	2-4 mm	0	0-4
Palagonite rind thickness	0	0	0	0	0	0	0
ROCK TYPE:(PHENO-ROCK)	ol/cpx	ol	ol/cpx	ol/cpx	same as #4	same as 4 & 5	ol/cpx
STRUCTURAL			porphyry	porphyry	porphyry	porphyry	porphyry
Mono-lithological?	Y	Y	Y	Y	Y	Y	Y
Fresh Glass?	N	N	N	N	N	N	N
Rock Color	dark gray	brown	green/gray	gray/brown	gray	same as 4 & 5	gray
Groundmass Texture	interxtln	hyaline	microxtln	aphanitic	same as #4	same as 4 & 5	holoxtn
Ave Grain Size (mm)	=0.1	?	<0.01	<0.01	same as #4	same as 4 & 5	=0.03
% alteration	<25	100	>90	>70	same as #4	same as 4 & 5	>40
Phenocryst Texture/Distr.	2	3	5	6	same as #4	same as 4 & 5	20
Clinopyroxene %	trace	0	1	2	same as #4	same as 4 & 5	3
size (mm)	=0.5		1-2 mm	1-2 mm	same as #4	same as 4 & 5	2-5 mm
shape	eu/sub		eu	sub	same as #4	same as 4 & 5	eu
alteration %	50-100		<25	<25	same as #4	same as 4 & 5	<20
alteration phase							
Olivine %	2	3	4	4	same as #4	same as 4 & 5	17
size (mm)	0.5-2	1-3 mm	1-4 mm	1-3 mm	same as #4	same as 4 & 5	1-5 mm
shape	eu	eu	eu	eu	same as #4	same as 4 & 5	eu
alteration %	100	100	100	100	same as #4	same as 4 & 5	100
alteration phase					same as #4	same as 4 & 5	
plagioclase %	in gm						in gm
size (mm)							
shape							
alteration %							
alteration phase							
amphibole %							
size (mm)							
shape							
alteration %							
alteration phase							
other %							
type							
size (mm)							
shape							
alteration %							
alteration phase							
Vesicles %	10	35	10	10	20	20	8
type							
size (mm)	0.5-1.5	1-2 mm	0.5-1.5	=1	=1		0.5-1
shape	rnd/irreg	round	round	round	round	round	round
total filling %	40	30-40	10	75	10	10	10
filling-type	cc/zeo	cc/zeo	clay	cc/zeo	clay	clay	clay
%	70	40	80	100	50	50	100
filling-type	clay	clay	MnO		MnO	cc/zeo	
%	30	35	20		50	50	
General appearance		MnO					
and/or other distinguishing		25					
characteristics							



## **Tunes Dredge 28 Summary**

**Location:** 17° 02.25' N/154°02.26E- 17°02.26N/154° 04.29'E

Vlinder Guyot

### **Summary:**

#### **Basalt Rock Groups:**

##### **Group I**

aphanitic/trace plag

A: trace plag 5, 6, 7, 9, 20

B more alkalic/haeaiite: 10, 11, 12-19

##### **Group II**

hbldc/ol (2%/1%)

##### **Group III**

pl phyric (5%)

# 2

##### **Group IV**

CPX (3-5%) pl-phyric (2%)

3'S 3, 4

##### **Group V**

PL (4%), CPX (2%)

# 15

##### **Group VI**

volcanic pebble coarse sand stone (well rounded, mostly basaltic clastics).

### **Work Plans:**

Thin sections: 1, 2, 3, 5, 7, 11,

Dating: 15, all to - MP?

Isotopes: 15 cpx sep?

Alteration:

Dredge Number	28	28	28	28	28	28	28	28
Sample Number	1	2	3	4	5	6	7	8
PETROGRAPHER	PEJ	PEJ	PEJ	PEJ	PEJ	BML	BML	BML
Approximate Weight <g>	1000	750	1000	600	1500	3000	2000	700
Mn crust thickness	0-1	1-2 mm	0-1	0-1	0-2	0-3	0-5	0-8
Palagonite rind thickness	0					0	0	0
ROCK TYPE:(PHENO-ROCK)	amp/ol	plag	plag/ol	same as #3	aphyric	pl-cpx	pl cpx	pl ol cpx
STRUCTURAL	porhyry	porphyry	porphyry	same as #3	basalt	phyric	phyric	phyric
Mono-lithological?	Y	Y	Y	Y	Y	Y	Y	Y
Fresh Glass?	N	N	N	N	N	N	N	N
Rock Color	gray	lt. gray	gray-red	same as #3	gray-green	tan	tan	tan gray
Groundmass Texture	aphanitic	holoxtn	aphanitic	same as #3	microxtln	intersertal	intersertal	microxtln
Ave Grain Size (mm)	<0.01	0.1	<0.01	same as #3	0.01	0.3	0.3	0.5
% alteration	?	<20		same as #3	=30	55	55	50
Phenocryst Texture/Distr.	3	5	3	same as #3	0	1	1	1
Clinopyroxene %		0				trace	tr	tr
size (mm)							1	1
shape						sub	sub	sub
alteration %						20	60	60
alteration phase						?	?	?
Olivine %	1	0	1	same as #3		0	0	tr
size (mm)	1-4 mm		=1	same as #3				0.5
shape			eu	same as #3				euh
alteration %	eu		100	same as #3				100
alteration phase	100			same as #3				clay
plagioclase %		5	2	same as #3		1	1	tr
size (mm)		1-2 mm	1-3 mm	same as #3		0.5-3	0.5-3	5
shape		eu	eu	same as #3		sub	sub	euh
alteration %		<20	=25	same as #3		45	40	30
alteration phase						?	?	?
amphibole %	2							
size (mm)	0.5-3							
shape	eu							
alteration %	<35							
alteration phase								
other %								
type								
size (mm)								
shape								
alteration %								
alteration phase								
Vesicles %	30	2	2-5%	same as #3	3	1	tr	0
type				same as #3				
size (mm)	1-15 mm	0.5-1	1-5 mm	same as #3	1-3 mm	1-4		1
shape	round	rnd	rnd/irreg.	same as #3	rnd/irreg.	elong	rnd	
total filling %	zeo/cc	10	40	same as #3	90	95	5	
filling-type	65 clay	clay	clay	same as #3	cc/zeo	clay	cc	
%	clay	100	60	same as #3	80	100		
filling-type	35	cc/zeo	same as #3	clay		clay		
%			40	same as #3	20			
General appearance								
and/or other distinguishing characteristics								





**Dredge 29** SE corner of landslide scarp on northern slope of Vlinder Guyot,

17° 07.45' N/ 154° 20.15E- 17° 07.52' N/ 154° 20.43' E

**Summary:** Several different plag-phyric basalts, some sparsely cpx+plag±ol -phyric basalts. Some of the lithologies (espec. Group I C) are weathered red and show significant rounding of cobbles 4-8" in diameter suggesting subaerial exposure; these cobbles have Mn-crust up to 2cm thick. Another very abundant lithology (Group III) has many angular pieces with no or little Mn crust (<3mm thick), possibly from the cliff-face exposed by the landslide.

**Basalt Rock Groups:**

**Group I plag (5-10%) ± cpx ± ol basalts**

Group A: Smpls #1, 13. Relatively fresh, massive basalts with abundant plag phenocrysts up to 3 mm in diameter. Smpl #1 is large boulder, 18" x 12" x 8" broken/sawed into pieces. Chem: #1 TS: #1, 13

Group B: Smpls # 2,3,4. Somewhat vesicular, plag phenocrysts up to 10mm x 2mm. Chem: #3 TS: #3

Group C: Smpls # 18,19. Highly altered, highly plag-phyric massive basalt. 10% plag up to 10mm in diameter completely altered to white clays and/or analcite. Groundmass also highly altered to red clays. Check TS to see if any plag left.

Chem: #18 TS: #18

**Group II plag (1-5%) ± cpx ± ol massive basalts**

Smpls: #5, 6, 7, 24, 25 groundmass wathered grey  
#15, 16, 17, 20, 21, 22, 23 groundmass weathered red

note pillow-like texture on #20: oxidized, vesicular rim  
Chem: #5, 7, 15, 20 TS: #5, 7, 15, 16, 17, 20

**Group III sparsely cpx, plag ± ol phyric massive basalts**

Smpls: #9, 10, 11, 28-33, c. 1 dozen 500-1000g undescribed pieces  
Chem: #9, 10, 29 TS: #9, 10, 11, 28, 29, 30

**Group IV altered, somewhat vesicular, sparsely plag-phyric basalts**

Smpls: #8, 12

Sample #8 has a large, 12"x10"x8", boulder w/ euhedral analcite (?) xls in vugs and along veins.

Chem: #8, 12 TS: #8, 12

**Group V VCL's, HC's**

#14: highly altered basalt and/or HC

#26: ol (5%) - cpx (5%) (each > 2mm) - phyric basalt cobbles in pillow basalt breccia / HC. Lots of cpx for mineral separate. KMM wants groundmass for glass and palagonite.

#27: HC lapilli-stone -- angular basalt cobbles in altered (glassy?) matrix

**Work Plans:**

Thin sections: 1,3,5,7,8,9,10,11,12,13,15,16,17,18,20,28,29,30: took 1, 3, 9

Dating: #1 plag separate, WR IH?

+ plag separates of #2 (4), #15, #28 plag separate; #29 plag separate

Isotopes: plag from #1, 2; from #15, 28, and 29 if enough available  
cpx from #26



Dredge Number	29	29	29	29	29	29	29	29	29
Sample Number	1	2	3	4	5	6	7	8	9A
PETROGRAPHER	BML	BML	BML	BML	BML	BML	BML	BML	PEJ
Approximate Weight <g>	1800	800	500	100	1200	100	900	3000+	1000
Mn crust thickness	0	0	0		0		0	0	0 - 1
Palagonite rind thickness	0	0	0		0		0	0	
ROCK TYPE:(PHENO-ROCK)	pl ol	pl ol	same as 2	same as 2	pl ol cpx	same as 5	pl ol cpx	pl	ol
STRUCTURAL	phyric	phyric			phyric		phyric	phyric	phyric
Mono-lithological?	y	y			y		y	y	y
Fresh Glass?	n	n			n		n	n	n
Rock Color	lt gray	gray			gray		gray	lt gray	pink/gray
Groundmass Texture	intersertal	intersertal			intersertal		intersertal	intersertal	microxin
Ave Grain Size (mm)	0.05	0.01			0.2		0.1	0.05	0.01
% alteration	<40	55			50		60	40	?
Phenocryst Texture/Distr.	10	7			2		2	tr	1
Clinopyroxene %	tr				tr		tr		0
size (mm)	1				1		1		
shape	sub				eah		eah		
alteration %	40				20		20		
alteration phase?									
Olivine %	1?	tr			tr		tr		0
size (mm)	0.5-1	1 - 2			1		0.5-3		1 - 2
shape	sub	sub			sub		sub		eu/sub
alteration %	100	100			100		100		100
alteration phase?	?	?							
plagioclase %	9	7			1		1	tr	
size (mm)	0.5-3	1 - 5			0.5-3		0.5-7	2 - 7	
shape	eah	eah			eah		eah	sub	
alteration %	25	80+			80		85	25	
alteration phase?	?	?							
amphibole %									
size (mm)									
shape									
alteration %									
alteration phase									
other %									
type									
size (mm)									
shape									
alteration %									
alteration phase									
Vesicles %	10	10			15		20	5	3
type									
size (mm)	0.5-2	1 - 10+			0.5-1		1 - 2	10+	1 - 10
shape	rnd	rnd - irr			irr		rnd	irr	rnd/irr
total filling %	100	80			100		60	10	100
filling-type	clay	cc			clay		clay	analcite	zeo
%	100	60			100		80	100	100
filling-type	zeo	zeo					zeo		
%	tr	40					20		
General appearance									
and/or other distinguishing characteristics									







**Tunes Dredge 30 West slope of Oma Vlinder**

16° 31.7'N/154° 21.5'E -16°31.5'N/154° 22.0'E 2800-1600 m (platf. edge is @1600 m)

**Summary:**

Manganese crusts, phosphorite breccia, and Cretaceous reef limestone.  
Minor pelagic chalk.  
No basalts.

**Limestone Groups:**

**Group I**

Coarse bioclastic grainstone with abundant coral debris, and poorly preserved molluscan bioclasts. Extremely porous, mostly moldic porosity. Coral clasts tend to be large (several cm) and largely recrystallized.

**Group II**

Large Manganese crust with on the underside remnants of rudist bivalves. The rudists appear to have a massive rather than finely ridged or cellular shell wall, similar to those found on some of the Japanese guyots, which would indicate a Late Albian age

**Group III**

Phosphorite breccia

**Work Plans:**

Thin sections: S1, S2, S3,

Dating:

## **Dredge 31 Oma Vlinder**

**Location:** 16° 30.4'N / 154° 21.7'E - 16°30.7'N/154° 22.5'E

West slope of small guyot south of large guyot in Magellan seamounts  
Depth range: 2400-1800 m (platform edge is about 1600 m)

### **Summary:**

Cretaceous reef limestone.

Minor pelagic chalk and manganese crusts, some phosphorite breccia.

No basalts.

### **Limestone Groups:**

#### **Group I**

Coarse bioclastic grainstone with abundant coral debris, and poorly preserved molluscan bioclasts. Extremely porous, mostly moldic porosity. Coral clasts tend to be large (several cm) and largely recrystallized.

#### **Group II**

Manganese crust with rudist bivalve megafossils attached to the underside. Also many small pieces of rudist molluscs.

#### **Group III**

Large manganese crust with on the underside remnants of rudist bivalves. The rudists appear to have a massive rather than finely ridged or cellular shell wall, similar to those found on some of the Japanese guyots, which would make them Late Albian in age (extremely tentative).

### **Work Plans:**

Thin sections: D31-S1; D31-S3; D31-S4; D31-S6; D31-S7; D31-S8; D31-S10; D31-S11; D31-S12

Polished slabs: D31-S3; D31-S5; D31-S7

Geochemistry: D31-S1; D31-S8; D31-S10

### **Comments:**

The rudists are not very evolved in appearance. They lack cellular wall structure and show little by way of canals. They strongly resemble those found on some of the Japanese guyots, e.g. Isakov, which are thought to be Late Albian in age.

**Dredge 32 Oma Vlinder**

16° 23.8'N / 154° 20.8'E - 16°25.3'N/154° 21.1'E; 3350-3440 m

**Summary:**

Submarine rocks with glassy margins, deep dredge

**Group I:**

Ol-phyric, (1-5%) plag microphyric (appr 10%) finely vesicular: #'s 1, 6, 7, 8, 9

**Group II:**

Ol. phyric (< 3); cpx (3-5); pl fine gr. vesicular: #'s 3, 4, 5,

**Group III:**

aphanitic very vesicular: #s 10, 11, 12

**Group IV:**

massive, poikilitic plag, no ves. (# 14)

**Work Plans:**

Thin sections: # 4, no 14 amongst TS billets (MP?)

**Comments:**

Dredge Number	32	32	32	32	32	32	32
Sample Number	1	2	3	4	5	6	7
PETROGRAPHER	PEJ	KMM	KMM	KMM	KMM	PEJ	PEJ
Approximate Weight <g>	600	700	600	1500	800	500	400
Mn crust thickness	1	40	10	6	50	30	30
Palagonite rind thickness	4	18	10	0	10	0	5
ROCK TYPE:(PHENO-ROCK)	ol	cpx	ol?cpx,pl	ol, pl	ol?	ol	ol/plg
STRUCTURAL	porphyry	porphyry	porphyry	porphyry	porphyry	porphyry	porphyry
Mono-lithological?	Y	Y	Y	Y	Y	Y	Y
Fresh Glass?	N	N	N	N	N	N	N
Rock Color	brown/gray	brown/gray	m. gray	m. gray	dk. gray	dk. gray	dk. brown
Groundmass Texture	holoxln	microxln	intersert.	intersert.	aphanitic	holoxln	microxln
Ave Grain Size (mm)	0.05	<0.01	0.02	0.02	<<0.01	0.08	0.01
% alteration	20-40	40	40	50	>50	10-40%	>40
Phenocryst Texture/Distr.	2	1	5	5	3	<1	4
Clinopyroxene %		1	2	tr	tr ?	0	
size (mm)		<1	1.0	<0.5	<0.5		
shape		sub/eu	eu	eu	eu		
alteration %		50	60	?	80+		
alteration phase		zeo	zeo,ox	?	ox		
Olivine %	2		in gm	3	3	<1	1
size (mm)	0.5-2			0.2-2	0.0	0.1-1	0.5-1
shape	Youhedral/sub			an-eu	sub	eu/sub	eu
alteration %	100			100	100	100	100
alteration phase				ox	ox	ox	
plagioclase %			3	3	tr?	in gm	3
size (mm)			<0.5	<0.2	0.5		0.3-0.8
shape			eu	eu	eu		eu
alteration %			20?	?	100		=10-30
alteration phase					zeo		clay
amphibole %							
size (mm)							
shape							
alteration %							
alteration phase							
other %							
type							
size (mm)							
shape							
alteration %							
alteration phase							
Vesicles %	10	10	10	8	40	25	30
type							
size (mm)	0.1-1.5	0.1-3	0.2-2	0.1-1	0.1-1	0.5-2	0.5-1.5
shape	rnd/irreg	round	round	round	round	round	round
total filling %	40	20	50	30	25	15	100
filling-type	cc/zeo	zeo-50	smec	30	zeo	cc/zeo	zeo
%		smect-30	60	cc	80	30	100
filling-type		cc-10	zeo	50	cc	clay	
%		MnO-10	40	smec	?	70	
General appearance				50	MnO		
and/or other distinguishing characteristics					20		





**Dredge 33 South slope of Missy Guyot of Marcus-Wake seamounts:**  
20° 53.4'N / 154° 52.0'E - 20°53.3'N / 154° 53.3'E; 2700-2100 m

**Summary:**

Content comprised of 50 - 100 lbs of mostly orange/brown mudstone and fine grained yellow green volcanogenic clay/siltstone.

**Group I**

Two pieces of aphyric basalts (1, 2)

**Group II**

Celadonic/Glauconitic Mudstones with bioturbation (3, 4, 5, 6, 7)

**Group III**

brown mudstone (#s: 8, 9, 10)

No carbonates.

**Work Plans:**

Thin sections: selected # 1

Burrowed VCL's (in particular # 3): analyze coarse grained and fine grained bulk sediment plus cpx separate, and compare to burrow fillings: differences between primary volcanic material, bulk inorganically altered and biomediated altered!

**Comments:**

Extremely interesting set of bioturbated VCL's and mudstones with celadonic/glauconitic burrows. In particular:

# 3: Pink-brown vcl with alternating coarse (.25-.5) grained and fine grained (< .05mm) layering. Coarse grained: 3-5 % cpx, 1-2% (altered ol plus glass/lithics. Numerous (3%) cel/glauc. burrows (8-20 mm dia) and few (<1mm) burrows

#4: pink-brown alternating HC/sandstone (as in #3), at times discontinuous; 1% glauconite - filled burrows (10-15mm) and 3% mud-filled burrows (5-20 mm).

#5 tan-brown vcl with finely laminated layers with < 1% mudfilled (1-30mm) and 1 % glauconite filled (10-15 mm) burrows.

#6 finely laminated massive glauconite

#7 finely laminated glauconite and fine mud (< 25%)

#8: Fine grained mudstone with 30-40% tan mud filled burrows (burrows are slightly coarser than rock matrix)

#9: tan-pink fine grained mudstone with 1% (unfilled????) burrows and < 1% fine mud-filled burrows.

# 10 Yellowish-tan mudstone-breccia, with irregular alternating layers of hard, fine grained material.

### D33-3

(RvW)

Boulder of bedded sandstone/siltstone of volcanoclastic material. Alternating fine-grained/coarse grained beds. fine grained beds are reddish brown, coarser beds are greenish. Both bed-types show internal bedding structures such as cross-bedding! and wavy/undulatory flaser bedding. Moderate bioturbation, 2 main types: fine speckled "shotgun patterns" (chondrites), filled with light pink fine-grained mud. Also a larger irregular burrowing filled with fine grained green substance, could be glauconite. Some of the coarser beds show grading.

(PEJ)

Pink-brown volcanoclastic with alternating coarse (0.25-0.5mm) grained and fine grained (<0.05mm) layers. Mineralogy of coarse-grained layers includes ~3 - 5% cpx and 1 - 2% olivine (altered) plus lithic fragments. The rock contains numerous (3%) celadonite-glauconite filled burrows ranging from 8-20mm in size and less numerous (<1%) small (1-10mm) mud-filled burrows.

### D33-4

(RvW)

Brown mudstone, extensively bioturbated, by horizontally burrowing worms(?). Some burrows filled with green material (glauconite?) mudstone contains some angular volcanic fragments, coarse sandstone.

(PEJ)

Pink-brown volcanoclastic with alternating, discontinuous fine and coarse grained layers (same sizes as #3). Rock contains ~1% glauconite filled burrows (10-15mm) and ~3% mud-filled burrows (5-20mm).

### D33-5

(RvW)

Laminated silty mudstone. Interbedded dark brown and lighter greenish laminae. Brown laminae are thicker (~1cm), consist of fine-grained volcanic sandstone. Light green laminae contain larger volcanic fragments in a matrix of light green clayey material. Minor bioturbation, including burrows filled with green material (glauconite?)

(PEJ)

Tan-brown volcanoclastic of finely laminated layers (grains 0.05-0.5mm) with <1% mudfilled (10-30mm) and <1% glauconite filled (10-15mm) burrows.

### D33-6

(RvW)

Laminated mudstone. 1-4mm thick laminae of light brown and darker brownish green mud. Somewhat deformed laminae curve around. Minor bioturbation, burrows usually filled with lighter material.

(PEJ)

Finely laminated massive glauconite sample.

### D33-7

(RvW)

Laminated silty mudstone. 3-10 m thick layers of fine light green and slightly coarser light brown material. Light brown material is fine sandstone, volcanic grains. Green material is clay size: can't see grains. Minor bioturbation. Layering is imperfect: some bedding structures exist. >> coarser beds may be result of periods of increased current activity.

(PEJ)

Finely laminated glauconite and fine mud (<25%).

### D33-8

(RvW)

Brown mudstone with 3 mm thick Mn crust, moderate bioturbation, with excellent cross-section of a variety of trace fossils including chondrites, possibly planulites. Burrows are filled with lighter mud. No apparent lamination.

(PEJ)

Red-brown, fine-grained mudstone with 30-40% tan mud-filled burrows (burrow fillings are slightly coarser than the rock matrix.)

### D33-9

(RvW)

Light pink claystone, somewhat burrowed, moderately laminated: not entirely hard. 2 cm thick MnOx crust. Occasional patches of glauconite - may be burrows.

(PEJ)

Tan-pink fine-grained mudstone (or claystone) unlayered, with <1% unfilled burrows and <1% fine-mud filled burrows.

### D33-10

(RvW)

MnOx - phosphorite crust. Top is MnOx, over a breccia of 1-2 cm volcanic and phosphorite pebbles in a light tan pelagic ooze matrix. This grades into a darker tan/pink massive phosphorite. Probably phosphatized pelagic ooze. More MnOx on bottom of rock.

(PEJ)

Yellowish-tan mudstone breccia with irregular alternating layers of hard, fine grained material.