L9-84-CP

Marshall Islands

Dredge & Sample Logs

#6

Marshall Is. L9-84-cp (cont.)
Sampled for Au + Pt group

D18-11 Bulk sample

D6-6 Bulk sample

all of D15-2's taken from big slab.

D15-2a (outer) (0-0.5 cm)

Impregnated.

D15-2b (middle) (0.5-2.5 cm)

Impregnated. Brownish (Fe oxides) layer.

D15-2c (inner) (2.5-5.5 cm)

Impregnated. Appears to have phosphorite in it.

Marshall Is
L9-84-cp
Sampled for Au

D18-3a (outer) (0-6 mm)
shiny massive outer crust
Pure thickness 4 m (max 6 mm)

D18-3b (inner) (6-16 mm)
Porous, orange (iron oxide) inter mixed. Striated (vertically) appearance. 1 cm thick

D6-13a (outer) (0-0.5 cm)

A few large warm botryoids. Entire botryoids covered w/ tiny botryoids.

D6-13b (middle) (0.5-2.5 cm)
Brownish layer, more porous. Has Fe-oxide + maybe some sediment (to account for color). →

D6-13c (bottom) (2.5-4.5 cm)
uppermost part (≈8 mm) of this layer is hard + dense, becomes unfriable towards bottom. Friable part still brownish in color. Less so above + also for bottom 1-2 mm.

D13-3 Bulk sample

D15-9 Bulk sample. Taken from the small sampled for chem whirlpak bag inside the big sample bag.

D17-6 Bulk sample. Taken from piece that is taped w/ masking tape.

Sampled for Au + Pt group

D14-3 4 nodules for Pt group
Au

L9-84-CP Marshall Islands

SAMPLE #	CUT	PHOTO	MINERALOGY	CHEMISTRY	THIN SECTION
D1-1	X			bulk Mn & breccia	X A. Davis
D1-2			bulk Mn		X " "
D1-3				bulk Mn & breccia	" "
D1-5	X		bulk Mn & breccia		Doubly Polished
D1-8				bulk Mn	
D2-3A				bulk Mn & limestone	
D4-1	X		bulk Mn & breccia	" " & breccia	X
D4-2			bulk Mn		
D4-3			bulk Mn & breccia	bulk Mn & breccia	
D4-4				bulk Mn & breccia	
D6-1	X		bulk Mn	*Mn & bulk breccia	X A. Davis
D6-2			*Mn & breccia	*Mn	
D6-3					Doubly Polished
D6-4			bulk Mn & breccia	bulk Mn & breccia	
D6-6	X	X	*Mn	*Mn	Polished
D6-7			bulk Mn & breccia		
D6-8	X		*Mn & bulk breccia		Polished
D6-9			bulk Mn & breccia		
D6-10			Mn & bulk siltstone		
D6-11			Mn		
D6-12	X	X	Mn & bulk breccia		Doubly Polished
D6-13	X		Mn & bulk breccia	Mn	Polished
D6-14			bulk Mn & breccia		
D6-15			" " & limestn breccia		
D6-19			bulk Mn & breccia		
D6-20			Mn & bulk breccia		
D6-21			Mn & " "		
D6-22	X		bulk limestone		X
D6-23			bulk Mn & breccia		
D6-25			composite of Mn + breccia		
D10-1	X		composite of Mn + limestone	composite of Mn + lmstn & bulk lmstn	X
D12-1			Mn	Mn	
D13-1			bulk Mn	Mn	

* Mn indicates anything other than bulk i.e. homogenous, bottom, 3rd layer etc.

L9-84-CP Marshall Islands

SAMPLE #	CUT	PHOTO	MINERALOGY	CHEMISTRY	THIN SECTION
D13-2	X		* Mn	Mn	Polished
D13-3			bulk Mn		
D13-4			bulk Mn		
D14-1			bulk Mn	Mn	
D14-2			" "		
D14-3			" "		
D15-1			bulk Mn & foraminiferous chalk	bulk Mn & chalk	
D15-2			Mn & bulk hyaloclastite	Mn & bulk hyaloclastite	
D15-3			Mn & bulk breccia	Mn & bulk breccia	
D15-4	X	X	bulk Mn & chalk	bulk Mn & chalk	Doubly Polished
D15-6			" " & breccia		
D15-9			bulk Mn	bulk Mn	
D17-2	X		bulk Mn & chalk	bulk Mn & chalk	Doubly Polished
D17-4				bulk chalk	
D17-5			bulk Mn		
D17-6	X		" "	bulk Mn	Doubly Polished
D18-1	X	X	Mn & bulk breccia	Mn	" "
D18-2			" " "		
D18-3	X	X	" " "	Mn & bulk breccia	Doubly Polished
D18-4	X	X	Mn		Polished
D18-6			bulk Mn		
D18-7	X		Mn	Mn	Polished
D18-9			bulk Mn & breccia		
D18-10			" " & chalk	bulk Mn & chalk	
D18-11			bulk Mn & basalt	bulk Mn	
D18-12			bulk Mn		
D20-1			bulk Mn & limestone		

* Mn indicates anything other than bulk ie. inner & outer layers, bottom, etc.

L9-84-CP Dredge Summary

Dredge no.	Location	Latitude °N	Longitude °E	Depth m	Description of recovery
1	west side of Majuro Atoll	on 07° 15.0' off 07° 14.4'	on bottom 171° 00.5' off bottom 171° 00.9'	2250 - 2230 (TDR)	< 10 kg Volcanic breccia with calcareous matrix, encrusted with thin Mn oxide crust.
2	upper flank west side of Majuro Atoll	on 07° 14.1' off 07° 14.2'	on bottom 171° 0.3' off bottom 171° 0.2'	1480 - 1500 (TDR)	~ 250 kg poorly indurated limestone with thin Mn oxide coating
3	Lower flank west side of Majuro Atoll	on 07° 15.5' off 07° 13.5'	on bottom 171° 59.1' off bottom 170° 59.7'	2000 - 3100 m (TDR)	~ 1 kg one angular piece of basalt and one rounded cobble of limestone coquina
4	South side of seamount 770 (SW of Erikub Atoll)	on 08° 44.8' off 08° 44.4'	on bottom 169° 44.3' off bottom 169° 43.8'	3550 (TDR)	≈ 4 kg volcanic breccia with phosphate limestone matrix and rounded basalt cobbles
5	South side of seamount 770	on 08° 45.9' off 08° 46.0'	on bottom 169° 44.3' off bottom 169° 44.5'	2500 (TDR)	no recovery (dredge bag was coated with Mn o
6	South side of seamount 770	on 08° 45.3' off 08° 46.9'	on bottom 169° 47.5' off bottom 169° 43.0'	2900 (TDR)	≈ 150 kg volcanic breccia in phosphatized* lime stone and in less well indurated s matrix, angular pieces of basalt and pieces of Mn crust without su stratum. Mn crust to 4 cm th

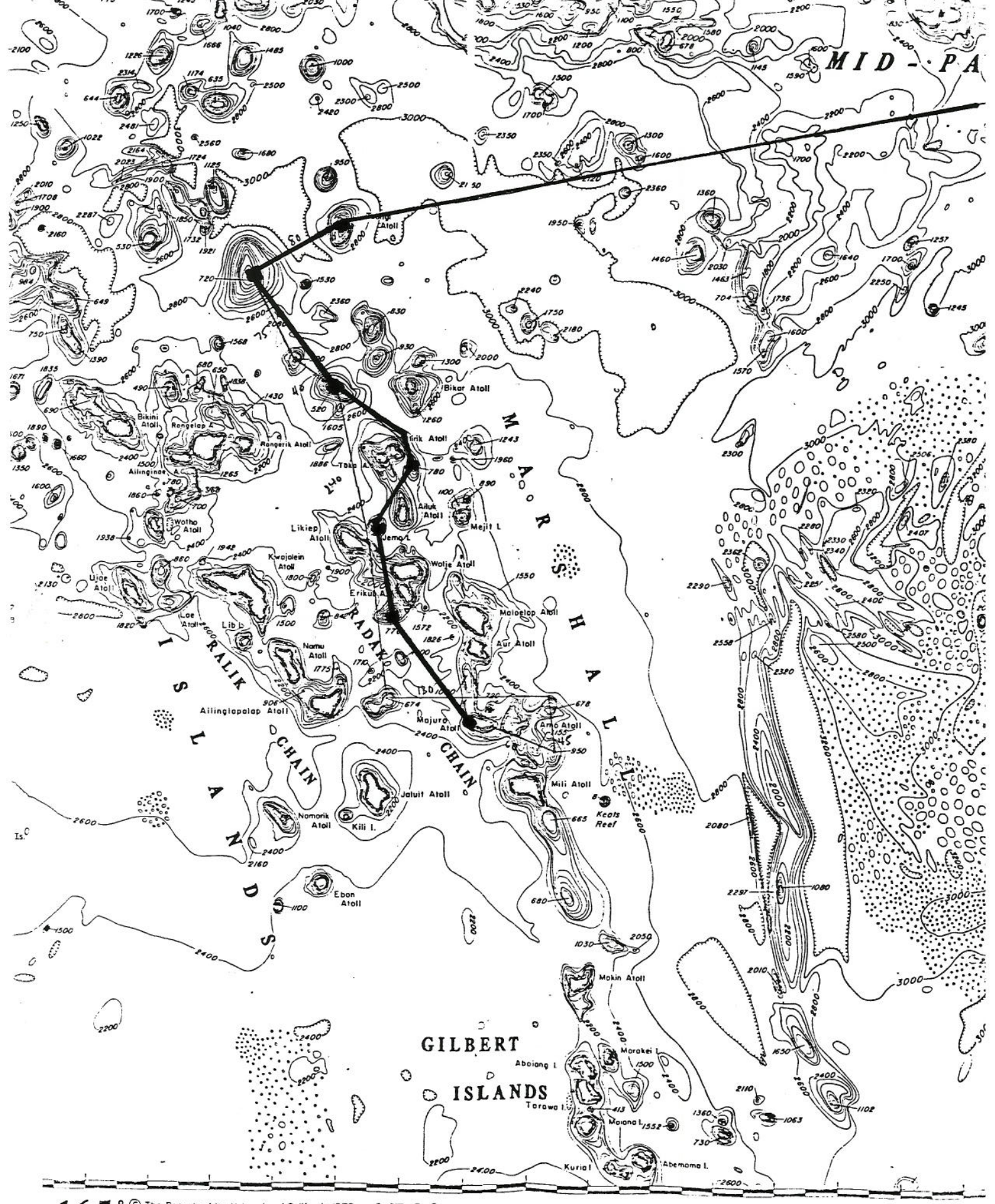
L9-84-CP Dredge Summary

Dredge no.	Location	Latitude °N	Longitude °E	Depth m	Description
7	South upper flank of seamount 770	08° 47.3 on off	bottom 169° 43.8' bottom	1500 ?	no recovery dredge bag and many ft. of cable
8	east upper flank of seamount 770	08° 48.1' on off	bottom 169° 46.3' bottom	1750 (TDR)	no recovery dredge bag lost
9	west flank of Jemo Island	10° 05.3' on off 10° 04.9'	bottom 169° 31.8' bottom 169° 30.3'	1000 m (est.)	no recovery dredge lost (TDR lost)
10	SE flank of Jemo Island	10° 05.1' on off 10° 05.4'	bottom 169° 36.6' bottom 169° 36.4'	1000 - 1680 (est.)	≈ 2kg three well-rounded limestone cobbles with thin Mn oxide coat
11	S flank of Jemo Island	10° 02.2'	169° 34.1'	—	no recovery pipe dredge never touched b
12	NE upper flank of seamount 780 SE of Utirik	11° 01.2' on off 11° 01.0'	bottom 170° 10.6' bottom 170° 10.0'	1575 - 2000 (est.)	≈ 0.25 kg one piece of Mn oxide crust w any substratum
13	E flank of seamount 780	11° 00.5' on off 11° 00.5'	bottom 170° 12.2' bottom 170° 11.9'	2000 (est.)	≈ 1kg. pieces of Mn oxide crust withou any substratum

L9-84-CP Dredge Summary

Dredge no.	Location	Latitude °N	Longitude °E	Depth m	Description
14	E flank of seamount 780	on 11° 0.3' off 11° 0.8'	on bottom 170° 13.8' bottom 170° 11.2'	1800 (est.)	≈ 0.6 kg pieces of Mn oxide crust without substratum, ranging from a few mm to 2 cm in thickness
15	E flank of seamount 520 (2nd. break in slope)	on 12° 11.0' off 12° 10.7'	bottom 168° 59.7' bottom 168° 58.3'	1300 - 1800 (est.)	≈ 50 kg volcanic breccia with phosphatized chalk matrix, loose basalt pebbles and Mn oxide crust without substra
16	top of guyot seamount 520	on 12° 11.0'	bottom 168° 57.2'	~945 (est.)	no recovery dredge bag lost
17	E upper flank of seamount 720	on 13° 54.3' off 13° 54.2'	bottom 167° 37.6' bottom 167° 38.3'	1600 (est.)	≈ 3 kg pieces of chalk with Mn oxide cr (ranging in thickness from 5mm to 4 some chalk pieces bear rare volcan clasts.
18	E upper flank Seamount 720	on 13° 54.0' off 13° 54.0'	bottom 167° 39.2' bottom 167° 38.5'	1600 (est.)	≈ 50 kg Volcanic breccia with phosphatized ch matrix, and well rounded, heavily bi turbated chalk clasts. Mn oxide f a thin coating on chalk, but thick (to 6cm) on breccia.
19	on top of guyot seamount 720	on 13° 55.3' off 13° 55.5'	bottom 167° 31.9' bottom 167° 31.1'	1400 (est.)	no recovery dredge empty
20	SE upper flank of Taongi Atoll	on 14° 32.5' off 14° 32.6'	bottom 169° 0.2' bottom 169° 0.0'	1700-2000 (est.)	≈ 1.5 kg limestone coquina with abndt. cora and shell debris — v. thin Mn coatin on some

* limestone that is beige to brown, well indurated, and will not fizz strongly when treated with HCL is considered phosphatized; could, however, be silicified as well.



— Approx. ship's track L9-84-CP

■ — indicates seamounts studied

chemical analysis (missing info) Crust

Dredge no.	Location	Ave. thickness	Water depths	Mn	Fe	Mn/Fe	Cu	Co	Ni
D1 (comp.)	Majuro	0.1 cm	2250–2300 m	24.4%	14.5%	1.7	.087%	1.22%	0.49%
D4-2	Seamount 770 SW Erikub	0.3 cm	3550 m	21.6%	17.0%	1.3	.084%	0.81%	0.309%
D6-1	Seamount 770 SW Erikub	2.0 cm	2900 m	26.5%	12.75%	2.1	0.11%	1.25%	0.625%
D12-1	Seamt. 780 SE Utirik	2.5 cm	1575 (max)	22.5%	15.8%	1.4	0.103%	0.66%	0.465%
D12-4	Seamt 780 SE Utirik	2.0 cm	≈2000 m	23.5%	15.5%	1.5	.092%	1.07%	0.48%
D14-3	Seamt. 780 SE Utirik	1.0 cm	1200 (max.)	25.5%	12.5%	2.0	.115%	0.99%	.585%
D[illegible]-2	Seamt. 520	3.0 cm	1000–1300	24.0%	13.5%	1.8	.184%	0.80%	0.59%
D17-5	Seamt 720	2.0 cm	1600 m	22.0%	15.5%	1.4	.11%	0.74%	0.44%
D18-7	Seamt 720	3.0 cm	1600 m	21.2%	17.0%	1.3	<.11%	0.675%	0.39%

Dredge	Ave Thickness	missing info	Fe	Cu	Co	Ni
	0.1 cm	24.4	14.5	.087	1.22	.47
+	0.3 cm	21.6	17.0	.084	.81	.309
	2.0 cm	26.5	12.75	.11	1.25	.625
2	2.5 cm	22.5	15.8	.103	.66	.465
3	2.0cm	23.5	15.5	.092	1.07	.48
+	1.0cm	25.5	12.5	.115	.99	.585
5	3.0cm	24.0	13.5	.184	.80	.59
7	2.0cm	22.0	15.5	.11	.74	.44
8	3.0cm	21.2	17.0	<.11	.675	.39

P.S.I Portaspec.
All samples run at 2ma
Fe Corrected for Mn interference
Co corrected for corrected Fe interference
Values based on averages from 30 second Counts

Davis

LS-84-CP Marshall Islands

Transit (Line 0): 210 JD 0030-0230 Z ESE to WNW (E → W)

airgun 2-40 in^3, 3.5 and 12 kHz

transit from port to west side of Majuro Atoll

RD-1: JD 210 0425-0541 Z N → S

07° 15.008'N, 171° 00.534'E ; 07° 14.431'N, 171° 00.939'E

2250-2300 m (TDR)

recovery

West side of Majuro Atoll

RD-2: JD 210 0731-0852 Z , NE → SW

07° 14.139'N, 171° 0.2497'E ; 7° 14.165'N, 171° 0.2223'E

1480-1500 m (TDR)

recovery

Upper flank west side of Majuro

RD-3: JD 210 1120 Z - 1236 Z NW → SE

7° 15.5'N, 171° 59.1'E ; 7° 13.5'N, 170° 59.7'E

2000-3100 m (TDR)

recovery

Lower flank west side of Majuro

0100 Z - 0230 Z : Closest part of Line 0 to RD 1, 2, + 3.

Line 1: JD 210 1425 Z - JD 271 0035 Z SSE → NNW

3.5 + 12 kHz, no airgun

transit from Majuro to Seamount 770

L9-84-CP

Marshall Islands

Line 2: JD 211 0039-0535Z SE → NW

airgun 2-40 in^3, 3.5-12 kHz

profile of Seamount 770 (SW of Eikub Atoll)

RD-4: JD 211 1504-1558Z E → W

8°44.8'N 169°44.3'E, 8°44.4'N 169°43.8'E

3550 m (TDR)

recovery

South side of Seamount 770

RD-5: JD 211 2018-2046Z

8°45.9'N 169°44.3'E, 8°46.0'N 169°44.5'E

target 2400 m

no recovery

South side of Seamount 770

RD-6: JD 211 2233Z - JD 212 0022Z ESE-WNW

8°45.3'N 169°47.5'E, 8°46.9'N 169°43.0'E

2900 m (TDR)

recovery

South side of Seamount 770

RD-7: JD 212 0316-0516Z

8°47.3'N 169°43.8'E

1500 m

lost dredge + 4100 m cable

South upper flank of Seamount 770

L9-84-CP

Marshall Islands

Line 2: cont.

RD-8: JD212 1150-1246Z, spot

8° 48.0'N 169° 46.3'E

1750 m (TDR)

lost dredge

East upper flank of Seamount 770

0100Z - 0300Z: Closest part of Line 2 to RD-4-16.

Line 3: JD212 1320-2130Z, ~ S → N

3.5 + 12 kHz, no airgun

transit from Seamount 770 to Jemo Island

Line 4: JD212 2153Z - JD 213 0235Z, W → E; WSW → ENE

airgun 148 in^3, 3.5 + 12 kHz

profile over northern flank of Jemo Island.

RD-9: JD213 0500-0730Z E → W?

10°05.3'N, 169°31.8'E, 10°04.9'N 169°30.3'E

~ 1000 m

- lost chain dredge, TDR, and 1168 m cable

West flank of Jemo Island

RD-10: JD213 1323-1355Z E → W

10°05.1'N 169°36.6'E, 10°05.4'N 169°36.4'E

1000 - 1680 m (est.)

recovery

Southern flank of Jemo Island

RD10 is near Line 4 or Line 5

L9-84-CP

Line 5: JD 213 0915 - 1145 Z, W → E
airgun 2 - 40 in^3, 3.5 + 12 kHz
profile of the southern flank of Jemo Island (~3 miles away)

RD11: JD 213 1515 - 1800 Z E → W
10° 02.2' N 169° 34.1' E, 10° 03.0' N 169° 30.0' E
pipe dredge never hit bottom (~2000 m)
no recovery
South flank of Jemo Island

1030 - 1145 Z of Line 5 could be used for RD-10.
or
1845 - 2015 Z of Line 6 could also be used for RD-10.

Line 6: JD 213 1845 - 2015 Z, W → E
airgun 148 in^3, 3.5 + 12 kHz
extends further E on South flank of Jemo Island than Line 5.

Line 7: JD 213 2025 - 2155 Z, S → N
airgun 148 in^3, 3.5 + 12 kHz
profile along base of eastern flank of Jemo Island.

Line 8: JD 213 2200 Z - JD 214 0056 Z SSW → NNE
airgun 148 in^3, 3.5 + 12 kHz
profile along base of western flank of Ailuk Atoll.

L9-84-CP

Line 9: JD 214 0056 - 0548Z, SW → NE
airgun 148 in^3, 3.5 + 12 kHz
profile between Ailuk Atoll and Seamount 780

Line 10: JD 214 0600 - 0930 Z SE → NW
airgun 148 in^3, 3.5 + 12 kHz
profile over Seamount 780, SE of Utirik Atoll

RD12: JD 214 1724 - 1800Z, spot
11°01.2'N 170° 10.6'E, 11°01.0'N 170° 10.0'E
1575 - 2000 m (est. w/ 2000 m as maximum)
one small piece of Mn crust in pipe dredge
Northeast upper flank of Seamount 780

RD-13: JD 214 2111 - 2220 Z, E → W
11°0.5'N 170°12.2'E, 11° 0.5'N 170° 11.9'E
2000 m (est.)
Mn crust recovered in chain dredge
East flank of Seamount 780

RD-14: JD 215 0012 - 0100 Z, NE → SW
11°0.3'N 170° 13.8'E, 11°0.8'N 170° 11.2E
1800 m (est)
Mn crust recovered
Eastern flank of Seamount 780

0600 - 0830 Z of Line 10 is closest for RD-12, 13, + 14.

L9-84-CP

Marshall Islands

Line 11: JD 215 0125-0448Z, SE → NW
3.5 + 12 kHz, no airgun
profile along eastern base of platform
between Seamount 780 and Utirik Atoll

Line 12: JD 215 0450-1200Z, ESE → WNW
3.5 + 12 kHz, no airgun
northern base of Utirik Atoll to
NW base of Seamount 520.

Line 13: JD 215 1423Z - JD 216 0115Z, W → E
airguns 2-40 in³ → 148 in³ (@ 1556Z JD 215), 3.5 + 12 kHz
profile over Seamount 520

RD-15: JD 216 0450-0610Z, E → W
12° 11.0'N 168° 59.7'E, 12° 10.7'N 168° 58.3'E
1300-1800 m (est.)
recovery good
Eastern flank of Seamount 520
near 2nd break in slope

GC-1: JD 216 0752Z
12° 10.9'N 168° 52.4'E
941 m
no recovery, turned over
top of guyot

L9-84-CP

Marshall Islands

Line 13: cont.

RD16: JD 216 0842Z

12°11.0'N 168°57.1'E

~945 m

lost chain dredge

on top of guyot: Seamount 520

215/1930Z - 216/0100Z: flank covering RD-15 (215/2100 - 2130)

Line 14: JD 216 1010Z - JD 217 0100Z, SE → NW

3.5 + 12 kHz, no airgun

North upper flank of Seamount 520

to NW base of Seamount 720

Line 15: JD 217 0107 - 1230Z, W → E

airgun 2-40 in³, 3.5 + 12 kHz

profile over Seamount 720

RD-17: JD 217 1530 - 1706Z, E → W

13°54.3'N 167°37.6'E, 13°54.2'N 167°38.3'E

1600 m (est.)

recovery

East upper flank of Seamount 720

RD-18: JD 217 1830 - 2014Z, E → W

13°54.0'N 167°39.2'E, 13°54.0'N 167°38.5'E

1600 m (est.)

recovery excellent

same as RD-17, Eastern Shelf Break

L9-84-CP

Marshall Islands

Line 15: cont.

RD-19: JD 217 2212-2330Z , E → W

13°55.3'N 167°31.9'E , 13°55.5'N 167°31.1'E

1400 m (est.)

no recovery

along flat top of the guyot, Seamount 720

BC-1: JD 217 0448Z

13°55.6'N 167°27.7'E

1380 m

no recovery

in pelagic cap on E top of guyot, Seamount 720

BC-2: JD 217 0640Z

13°55.8'N 167°26.8'E

1380 m

good recovery

in pelagic cap on E top of guyot, Seamount 720

BC-3: JD 218 0858Z

13°54.8'N 167°35.6'E

1395 m

good recovery

in pelagic cap on W top of guyot, Seamount 720

0500-0830Z of Line 15: display of pelagic cap for BC-2+3

0800-1230Z of Line 15: E flank for RD 17+18, + includes pelagic cap for BC 2+3

0800-0900Z of Line 15: for just RD 17+18 of E flank

all of Line 15: excellent

L9-84-CP

Marshall Islands

Line 16: JD 218 0920 - 1825 Z WSW → ENE

3.5 and 12 kHz; no airguns

Mid-Eastern flank of Seamount 720

to Mid-Southern flank of Taongi Atoll

RD-20: JD 218 2105 - 2158 Z, Spot

14° 32.5'N 169° 0.2E, 14° 32.6'N 169° 0.0'E

1700 - 2000 m (est.)

recovery

Southeast upper flank of Taongi Atoll

no seismic line for documentation, insufficient time

Line 17: JD 218 2310 Z - JD 219 1947 Z, WSW → ENE

3.5 + 12 kHz, no airguns

Eastern flank of Taongi Atoll

to Western portion of

Mid-Pacific Mountains

15° 34.8'N
172° 14.0'E

Sample List

BOX 1: D1-1, -2, -3, -4, -5, -6, -7, -8, -9;
D3-1, -2; D4-1, -2, -3, -4, -5;

BOX 2: D2-1

BOX 3: D2-3a, D2-3b

BOX 4: D2-4, D2-15

BOX 5: D2-2, D2-8, D2-9, D2-5, D2-6,
D2-7, D2-10;

BOX 6: D2-12, D2-11;

BOX 7: D2-13, D2-14b;

BOX 8: D2-14a, D2-3e;

BOX 9: D6-1;

BOX 10: D6-2;
(big box)

Sample List (cont.)

BOX 11: D6-3, D6-9;

BOX 12: D6-4, -5, -6, -7, -8

BOX 13: D6-11, -12, -10, -16, -17, -18, -19, -20, -23

BOX 14: D6-12, D6-13;

BOX 15: D6-14, -15, -23, -24, -25

BOX 16: D10-1, -2, -3; D12-1; D13-1, -2, -3, -4;
D14-1, -2, -3;

BOX 17: D15-1 &

BOX 18: D15-2

BOX 19: D15-3, D15-4;

BOX 20: D15-1a (fish teeth), D15-1b, D15-5, -6, -7, -8, -9;

BOX 21: D17-1, -2, -3, -4, -5, -6; D20-1, -2, -3;
D20-4, -5, -6, -7;

Sample List (cont.)

BOX 22: D18-1;

BOX 23: D18-2, -3, -4;

BOX 24: D18-5, -6, -7;

BOX 25: D18-8, -9, -10, -11, -12;

BOX 26: D20-1, D18-7, D17-5, D15-9, D14-2, D13-1, D12-1, D10-1, D6-2, D2-3, D1-6;
crust in formaldehyde
also Bibl. specimen in alcohol: D4 = fish; D18 = jelly fish; D15 = sponge (?), Box (Horizon) Core 2 = worm;

Samples for chemistry and age dating

D1-1
D1-7
D3-1
} Majuro — basalt clasts only — (not composite substrate)

D4-2
D6-18
D6-24
} seamount 700 SW of Enikub atoll

D15-5 } seamount 520 (small sample)

D18-1
D18-5
D18-8
} seamount 720

(10 Total)

Mn crust samples taken for XRD

D1-5
D4-2
D6-1
D12-1
D13-4
D14-2
D15-2
D17-5
D18-9

Samples that need to be cut on big saw

D15-3 (try to keep contact intact) sample to J.H.

D15-1
D15-2

D6-1
D6-2
D6-3
} check samples if suitable for J.H.

D18-1
D18-2
D18-3
} samples to J.H.

cut slab (~ 2" thick) for Frank Manheim
of D15 and D18 — crust with substratum
check D15 + D17 for basalt pebbles

L9-84-CP

Mn crust samples taken for XRD

	IS
D1-5	
D4-2	X
D6-1	X
D12-1	
D13-4	
D14-2	
D15-2	X
D17-5	
D18-9	

Samples that need to be cut on big saw

D15-3 (try to keep contact intact) sample to J. H.

D15-1
D15-2

D6-1
D6-2
D6-3
} check samples if suitable for J. H.

D18-1
D18-2
D18-3
} samples to J. H.

cut slab (~2" thick) for Frank Manheim of D15 and D18 — crust with substratum
check D15 + D17 for basalt pebbles

Samples taken for thin sections

D1-1
D1-7
D1-2
D3-1
D3-2 (?)
D1-3
D4-2
D4-3
D4-4
D4-1
D6-2
D6-1
D6-3
D6-7
D6-15
D6-16
D6-17
D6-18
D6-14
D6-15 ?
D6-13a
D6-20
D6-22 ?

D6-2.4
D15-2
D15-3
D15-6a ?
D15-5
D15-7
D15-8
D17-6
D18-1
D18-5
D18-8
D18-9a

35 total