

Seq# 001		Line Name: MGL2315001MCN1		NAVIGATION		DATE: 2023-11-04		Lamont-Doherty Earth Observatory	
		Line Brg : 180 °		LINE LOGS		JULIAN DAY: 308		COLUMBIA UNIVERSITY EARTH INSTITUTE	
CLIENT:UTIG/WHOI/NSF				SURVEY: Puerto Rico MCS		AREA: Puerto Rico			
DC SOL: 5.0 m		DEPTH SOL : 5081.5 m		NAVIGATION SYSTEM USED: C-Nav3050 - Primary					
DC EOL: 1.6 m		DEPTH EOL : 8080.0 m		NAVIGATION SYSTEM USED: SeaPath 330					
BSP SOL: 2.8 kts		FEATHER SOL: 3.21 °		NAVIGATION SYSTEM USED: C-Nav3050-Stern Mounted					
BSP EOL: 4.2 kts		FEATHER EOL: -1.9 °							
WEATHER		MAX FEATHER: 3.21 °		GRAVITY METER: BMG-II: used, SN223					
WIND SOL: NE 11 kts				MAGNETOMETER: Geometrics 882					
WIND EOL: E kts									
SEAS SOL: 1.5 m									
SEAS EOL: 1 m									
		shift hours		Nav		shift hours		Acq	
		00:00-12:00		Koray Ergun		00:00-12:00		Gilles Guerin	
		12:00-24:00		Aaron Martin		12:00-24:00		Riley Lopez	
SP		Orca Ref		UTC		EVENT		COMMENTS	
1027		1027		5:10		SOL		MGL2315001MCN1 - 1 gun 40 in3 - start of ramp-up	
								Ramp up started at SOL with only 3 arrays active (1,2,4) while finishing to deploy array3	
1064		1064		5:31				Volume at end of ramp-up was only 1580in3 (14 guns), continuing ramp-up manually	
1082		1082		5:41				End of manual ramp-up - 25 guns 4410 in3 - Array3, S1G4 and S2G2 disabled	
								First SP	
								LSP	
1279		1279		7:29				Array 3 enabled - enabling first gun - 26 guns - 4530 in3	
1286		1286		7:33				Array 3 at full volume - 33 guns 6000 in3 - S1G4,S2G2,S3G7 disabled	
2235		2235		13:47				Array 3 disabled to replace broken tow rope - 25 guns, 4410 in3	
2295		2295		14:10				Array 3 back in position and enabled - 33 guns, 6000 in3	
								FSP	
								LSP	
2609		2609		16:11				Stopped recording in Seal to power cycle streamer due to trace failures	
								Streamer issues persist	
2800		2800		17:37				Slowing to 3knots through the water d/t streamer issues	
2920		2920		18:40				Back to 4.3kts BSP	
2956		2956		18:55				Down to 4 knots, losing shots d/t speed	
2969		2969		19:00				rGPS aft subarray 3 absent	
3006		3006		19:15				Vessel passing ahead, maintaining 4.0	
3050		3050		19:34				Vessel ahead has passed back to 4.3	
3132		3132		20:06		EOL		MGL2315001MCN1 - 33 guns - 6000 in3	
								stopped line, picking up guns and streamer	
						</			

[illegible]

[illegible]

Seq# 004

Line Name: MGL23151004D4A2
Line Brg : 288.2 °

NAVIGATION
LINE LOGS

DATE: 2023-11-08
JULIAN DAY: 312

Lamont-Doherty Earth Observatory
COLUMBIA UNIVERSITY | EARTH INSTITUTE

CLIENT:UTIG/WHOI/NSF

SURVEY: Puerto Rico MCS

AREA: Puerto Rico

DC SOL: -3.9 m

DC EOL: 469.0 m

BSP SOL: 4.0 kts

BSP EOL: 4.5 kts

DEPTH SOL : 2102.5 m

DEPTH EOL : 4669.2 m

FEATHER SOL: -136.05 °

FEATHER EOL: 72.5 °

MAX FEATHER: -136.05 °

NAVIGATION SYSTEM USED: C-Nav3050 - Primary

NAVIGATION SYSTEM USED: SeaPath 330

NAVIGATION SYSTEM USED: C-Nav3050-Stern Mounted

WEATHER

WIND SOL: N 12 kts

WIND EOL: E 16 kts

SEAS SOL: 1 m

SEAS EOL: 1 m

shift hours
0:00-12:00

Nav
Koray Ergun

shift hours
0:00-12:00

Acq
Gilles Guerin

12:00 - 24:00

Aaron Martin

12:00 - 24:00

Riley Lopez

SP
10000

Orca Ref
1000

UTC
3:19

EVENT
SOL

COMMENTS

MGL2315004D4A2 - 35 Guns @ 6240cui

Streamer deployed by an additional 57m in order to prevent lead-in to GS entanglement

Continuing of Seq003 that was aborted after sources and lead-in entanglement

10292

1292

5:12

End of overlap SPs with Seq003

11870

2870

14:42

EOL

MGL2315004D4A2 - 35 Guns @ 6240cui

Posnet locations & remarks: good - none - intermittent

Forward

Center

Tailbuoy #1

ASBENT

Gun string #1

GOOD

NONE

Head Float #1

GOOD

Gun string #2

NONE

GOOD

Gun string #3

GOOD

GOOD

Gun string #4

GOOD

GOOD

Compasses

D.I.s

Some telemetry issues causing break in comms with some units

Some telemetry issues causing break in comms with some units

PROCESSING NOTES

- Streamer deployed by an additional 57m in order to prevent lead-in to GS entanglement; offsets updated

- Some depth deviation and cross-line instability in online solution dt telemetry issues with some compasses; interpolated and smoothed in post-processing

- TB error ellipses high dt absent rGPS data; created manual observations from last rcvr - TB to remediate missing TB rGPS data

VESSEL POSITION

FSP

Shotpoints

Latitude (N)

Longitude (W)

10000

18°44'10.91"

66°29'53.22"

LSP

11870

19°00'08.04"

67°20'25.27"

FSP

10000

18.736363

-66.498118

LSP

11870

19.002232

-67.340353

NRP – Stern

29.2m

NRP – COS

276.0m

NRP – CNG

447.20m

COS – CNG

171.20m

NRP – CMP

361.60m

SP spacing:

50m

line status:

Complete

Acronyms key

DC SOL

DC EOL

BSP

FEATHER

NRP

COS

CNG

CMP

Distance Crossed at Start of Line

Distance Crossed at End of Line

Bottom Speed, aka SOG: Speed Over Ground

The angle from the boat to the TB (Tail Buoy)

Navigation Reference Point

Center of Source

Center Near Group

Common Mid-point

Overall Comments

Some compass and depth data interpolated and smoothed. Higher EE at tail dt mising TB rGPS data.

[illegible]

Seq# 006				Line Name: MGL2315006D4D31 Line Brg : 82 °		NAVIGATION LINE LOGS		DATE: 2023-11-09 JULIAN DAY: 313		Lamont-Doherty Earth Observatory COLUMBIA UNIVERSITY EARTH INSTITUTE	
CLIENT:UTIG/WHOI/NSF				SURVEY: Puerto Rico MCS				AREA: Puerto Rico			
DC SOL: 91.0 m				DEPTH SOL : 6067.2 m		NAVIGATION SYSTEM USED: C-Nav3050 - Primary					
DC EOL: 843.7 m				DEPTH EOL : 6426.8 m		NAVIGATION SYSTEM USED: SeaPath 330					
BSP SOL: 3.9 kts				FEATHER SOL: 146.16 °		NAVIGATION SYSTEM USED: C-Nav3050-Stern Mounted					
BSP EOL: 3.8 kts				FEATHER EOL: 46.96 °							
WEATHER				MAX FEATHER: 146.16 °							
WIND SOL: E 16 kts						GRAVITY METER: BMG-II: used, SN223					
WIND EOL: E 20 kts						MAGNETOMETER: Geometrics 882					
SEAS SOL: 1.5 m				shift hours		Nav		shift hours		Acq	
SEAS EOL: 1.5 m				0:00-12:00		Koray Ergun		0:00-12:00		Gilles Guerin	
				12:00 - 24:00		Aaron Martin		12:00 - 24:00		Riley Lopez	
SP		Orca Ref		UTC		EVENT		COMMENTS			
15027		1027		4:18		SOL		MGL2315006D4D31 - 35 Guns @ 6340			
								VESSEL POSITION			
15179		1179		5:25				Speeding up to shooting speed (streamer and guns aligned)			
								FSP 15027 20°00'15.79" 67°23'16.24"			
								LSP 17645 20°09'24.21" 66°08'48.26"			
16199		2199		12:20				GunString3 aft rGPS dropped out			
17150		3150		18:28				Power down on string 2, picking up to troubleshoot gun 2			
17446		3446		20:28				Array 2 deployed, power back on			
17645		3645		21:47		EOL		MGL2315006D4D31 - S2G2,S3G1 disabled - 34 Guns 5880 in3			

Seq# 007		Line Name: MGL2315007D31 Line Brg : 175.3 °		NAVIGATION LINE LOGS		DATE: 2023-11-09 JULIAN DAY: 313		Lamont-Doherty Earth Observatory COLUMBIA UNIVERSITY EARTH INSTITUTE												
CLIENT:UTIG/WHOI/NSF				SURVEY: Puerto Rico MCS		AREA: Puerto Rico														
DC SOL: 307.0 m		DEPTH SOL : 6448.7 m		NAVIGATION SYSTEM USED: C-Nav3050 - Primary																
DC EOL: #####		DEPTH EOL : 2637.4 m		NAVIGATION SYSTEM USED: SeaPath 330																
BSP SOL: 3.9 kts		FEATHER SOL: 129.37 °		NAVIGATION SYSTEM USED: C-Nav3050-Stern Mounted																
BSP EOL: 2.9 kts		FEATHER EOL: -44.15 °																		
WEATHER		MAX FEATHER: 168.5 °		GRAVITY METER: BMG-II: used, SN223																
WIND SOL: E 20 kts		shift hours 0:00-12:00		Nav Koray Ergun		shift hours 0:00-12:00		Acq Gilles Guerin												
WIND EOL: E 22 kts		12:00 - 24:00		Aaron Martin		12:00 - 24:00		Riley Lopez												
SEAS SOL: 1.5 m																				
SEAS EOL: 1.5 m																				
SP	Orca Ref	UTC	EVENT	COMMENTS																
18023	1024	21:53	SOL	MGL2315007D31 - 34 Guns @ 5880 in3			VESSEL POSITION													
18355	1356	0:59	LSP	Last SP of the day				Shotpoints	Latitude (N)	Longitude (W)										
18356	1357	0:00	FSP	First SP of the day			FSP	18023	20°09'07.57"	66°08'32.78"										
							LSP	20900	18°51'29.00"	66°00'58.87"										
19133	2134	4:43		33 Guns @ 5700 -G1GT29 seems to be not firing. Airleak also suspected dt reduced pressure.																
							FSP		Latitude (N)	Longitude (W)										
19858	2859	9:15		Front rGPS on GS1 dropped out			LSP	18023	20.152103	-66.14244										
								20900	18.858056	-66.016354										
20173	3174	11:14		Vessel slowing down; Problems maintaining high air pressure to the guns			<table><tr><td>NRP – Stern</td><td>29.2m</td></tr><tr><td>NRP – COS</td><td>276.0m</td></tr><tr><td>NRP – CNG</td><td>447.20m</td></tr><tr><td>COS – CNG</td><td>171.20m</td></tr><tr><td>NRP – CMP</td><td>361.60m</td></tr></table>				NRP – Stern	29.2m	NRP – COS	276.0m	NRP – CNG	447.20m	COS – CNG	171.20m	NRP – CMP	361.60m
NRP – Stern	29.2m																			
NRP – COS	276.0m																			
NRP – CNG	447.20m																			
COS – CNG	171.20m																			
NRP – CMP	361.60m																			
20187	3188	11:20		Airleak on GS4. Gunstring disabled. Pressure maintaining.																
20222	3223	11:35		Vessel speeding back up																
20618	3619	14:00		FF rGPS dropped out. Suspect interference from land dt data coming in on unknown channel																
				Vessel starts PORT turn to head onto next line																
20900	3901	15:58	EOL	MGL2315007D31 - S2G2,S3G1,S4 disabled, 25 guns 4230 in3																
Posnet locations & remarks: good - none - intermittent				Forward	Center															
Tailbuoy #1	ABSENT		Gun string #1	PARTIAL	ABSENT															
Head Float #1	GOOD		Gun string #2	ABSENT	GOOD															
			Gun string #3	GOOD	ABSENT															
			Gun string #4	GOOD	GOOD															
Compasses	Some telemetry issues causing break in comms with some units																			
D.I.s	Some telemetry issues causing break in comms with some units																			
PROCESSING NOTES						Acronyms key														
Depth deviation and cross-line instability in online solution dt telemetry issues with some compasses interpolated and smoothed in post processing						DC SOL Distance Crossed at Start of Line														
Higher error ellipse at tail dt missing TB rGPS data, created manual observatios from last rcvr to TB to remediate						DC EOL Distance Crossed at End of Line														
SP to 19858 to EOL rGPS G1R1 no data						BSP Bottom Speed, aka SOG: Speed Over Ground														
						FEATHER The angle from the boat to the TB (Tail Buoy)														
						NRP Navigation Reference Point														
						COS Center of Source														
						CNG Center Near Group														
						CMP Common Mid-point														
Overall Comments		Some compass/depth data interpolated/smoothed. High SMA's at tail dt missing TB rGPS data.																		

[illegible]

Seq# 010		Line Name: MGL2315010D21		NAVIGATION		DATE: 2023-11-10		Lamont-Doherty Earth Observatory	
		Line Brg : 5.0 °		LINE LOGS		JULIAN DAY: 314		COLUMBIA UNIVERSITY EARTH INSTITUTE	
CLIENT:UTIG/WHOI/NSF				SURVEY: Puerto Rico MCS		AREA: Puerto Rico			
DC SOL: -2.2 m		DEPTH SOL : 2785.0 m		NAVIGATION SYSTEM USED: C-Nav3050 - Primary					
DC EOL: 181.1 m		DEPTH EOL : 6486.0 m		NAVIGATION SYSTEM USED: SeaPath 330					
BSP SOL: 4.2 kts		FEATHER SOL: -151.28 °		NAVIGATION SYSTEM USED: C-Nav3050-Stern Mounted					
BSP EOL: 3.3 kts		FEATHER EOL: 33.14 °							
WEATHER		MAX FEATHER: -151.28 °		GRAVITY METER: BMG-II: used, SN223					
WIND SOL: E 19 kts		shift hours		Nav		shift hours		Acq	
WIND EOL: E 21 kts		0:00-12:00		Koray Ergun		0:00-12:00		Gilles Guerin	
SEAS SOL: 1.5 m		12:00 - 24:00		Aaron Martin		12:00 - 24:00		Riley Lopez	
SEAS EOL: 1.5 m									
SP				Orca Ref				UTC	
24042				1042				21:55	
24158				1158				22:41	
24179				1179				22:48	
24252 - 24253				1252-1253				23:15	
24258				1258				23:17	
24275				1275				23:23	
24346				1346				23:49	
24374				1374				23:59	
24375				1375				0:00	
26980				3980				16:41	
27000				4000				16:52	
</									

NRP – Stern	29.2m
NRP – COS	276.0m
NRP – CNG	447.20m
COS – CNG	171.20m
NRP – CMP	361.60m

Seq# 011		Line Name: MGL2315011D2D11		NAVIGATION		DATE: 2023-11-11		Lamont-Doherty Earth Observatory	
		Line Brg : 93 °		LINE LOGS		JULIAN DAY: 315		COLUMBIA UNIVERSITY EARTH INSTITUTE	
CLIENT:UTIG/WHOI/NSF				SURVEY: Puerto Rico MCS		AREA: Puerto Rico			
DC SOL: -0.3 m		DEPTH SOL : 6823.0 m		NAVIGATION SYSTEM USED: C-Nav3050 - Primary					
DC EOL: 912.1 m		DEPTH EOL : 5792.3 m		NAVIGATION SYSTEM USED: SeaPath 330					
BSP SOL: 3.5 kts		FEATHER SOL: 47.6 °		NAVIGATION SYSTEM USED: C-Nav3050-Stern Mounted					
BSP EOL: 3.0 kts		FEATHER EOL: 41.7 °							
WEATHER				GRAVITY METER: BMG-II: used, SN223					
WIND SOL: E 21 kts		shift hours		Nav		shift hours		Acq	
WIND EOL: E 17 kts		0:00-12:00		Koray Ergun		0:00-12:00		Gilles Guerin	
SEAS SOL: 1.5 m		12:00 - 24:00		Aaron Martin		12:00 - 24:00		Riley Lopez	
SEAS EOL: 1.5 m									
SP		Orca Ref		UTC		EVENT		COMMENTS	
28077		1077		17:34		SOL		MGL2315011D2D11 - 35 Guns @ 6240 in3	
28850		1850		22:48				Arrays 1 & 3 disabled for maintenance - 17 guns 2940cui	
28937		1937		23:25				Arrays 1 & 3 enabled - 35 Guns 6240cui	
								Retrieving arrays 1 & 2 for maintenance	
29000		2000		23:59		LSOD		Last shot of JD 315	
29001		2001		0:00		FSOD		First shot of JD 316	
29438		2438		3:49				Vessel steering to stbd for inside turn onto next line	
29476		2476		4:13		EOL		MGL2315011D2D11 - GS1 & GS2 disabled, 18 guns 3300cui	

Seq# 012

Line Name: MGL2315012D11
Line Brg : 185 °

NAVIGATION
LINE LOGS

DATE: 2023-11-12
JULIAN DAY: 316

Lamont-Doherty Earth Observatory
COLUMBIA UNIVERSITY | EARTH INSTITUTE

CLIENT:UTIG/WHOI/NSF

SURVEY: Puerto Rico MCS

AREA: Puerto Rico

DC SOL: 34.0 m

DC EOL: 6.7 m

BSP SOL: 3.2 kts

BSP EOL: 4.6 kts

DEPTH SOL : 5653.9 m

DEPTH EOL : 4061.4 m

FEATHER SOL: 113.39 °

FEATHER EOL: -0.57 °

MAX FEATHER: 118.32 °

NAVIGATION SYSTEM USED: C-Nav3050 - Primary

NAVIGATION SYSTEM USED: SeaPath 330

NAVIGATION SYSTEM USED: C-Nav3050-Stern Mounted

WEATHER

WIND SOL: E 22 kts

WIND EOL: E 23 kts

SEAS SOL: 1.5 m

SEAS EOL: 1.5 m

shift hours

0:00-12:00

12:00 - 24:00

Nav

Koray Ergun

Aaron Martin

shift hours

0:00-12:00

12:00 - 24:00

Acq

Gilles Guerin

Riley Lopez

SP

Orca Ref

UTC

EVENT

COMMENTS

30039

1039

4:27

SOL

MGL2315012D11 - 18 Guns @ 3300 cui

30121

1121

5:07

Array 1 in position and enabled - 27 guns, 4950 in3

30272

1272

6:20

Array2 in position and enabled - 36 guns - 6600 in3

30325

1325

6:45

Speeding up to shooting speed

32351

3351

19:39

EOL

MGL2315012D11 - 35 guns @ 6240 cui

Seq# 013		Line Name: MGL2315013TEST1		NAVIGATION LINE LOGS		DATE: 2023-11-12		Lamont-Doherty Earth Observatory	
		Line Brg : 185 °				JULIAN DAY: 316		COLUMBIA UNIVERSITY EARTH INSTITUTE	
CLIENT:UTIG/WHOI/NSF				SURVEY: Puerto Rico MCS		AREA: Puerto Rico			
DC SOL: 1.9 m		DEPTH SOL : 3930.6 m		NAVIGATION SYSTEM USED: C-Nav3050 - Primary					
DC EOL: 16.9 m		DEPTH EOL : 3935.3 m		NAVIGATION SYSTEM USED: SeaPath 330					
BSP SOL: 4.6 kts		FEATHER SOL: -15.86 °		NAVIGATION SYSTEM USED: C-Nav3050-Stern Mounted					
BSP EOL: 4.6 kts		FEATHER EOL: -14.54 °							
WEATHER		MAX FEATHER: -15.86 °				GRAVITY METER: BMG-II: used, SN223			
WIND SOL: E 19 kts						MAGNETOMETER: Geometrics 882			
WIND EOL: E 19 kts									
SEAS SOL: 1.5 m		shift hours 0:00-12:00		Nav Koray Ergun		shift hours 0:00-12:00		Acq Gilles Guerin	
SEAS EOL: 1.5 m		12:00 - 24:00		Aaron Martin		12:00 - 24:00		Riley Lopez	
SP		Orca Ref	UTC	EVENT	COMMENTS				
33066		1066	19:45	SOL	MGL2315013TEST1				
					Test line firing various individual clusters				
33066		1066	19:59	EOL	MGL2315013TEST1				
33066		1066	19:45		Enabled S2G1, S2G2 2 Guns 720ci				
33098		1098	19:48		Disabled S2G1 Disabled 1 Guns 360 ci				
33099		1099	19:48		Disabled S2G1 Disabled 0 Guns 0 ci				
33102		1102	19:48		Enabled S2G5 - 1 Gun 90ci				
33127		1127	19:50		Disabled S2G5 - 0 Gun 0ci				
33128		1128	19:50		Enabled S2G8, S2G9 2 Guns 440ci				
33153		1153	19:53		Disabled S2G8, S2G9 0 Guns 0ci				
33158		1158	19:53		Enabled S4G1, S4G2 2 Guns 720ci				
33170		1170	19:54		Disabled S4G1, S4G2 Disabled 0 Guns 0 ci				
33173		1173	19:54		Enabled S4G5 - 1 Gun 90ci				
33194		1194	19:56		Disabled S4G5 - 0 Gun 0ci				
33197		1197	19:57		Enabled S4G8, 1 Gun 220ci				
33197		1197	19:57		Enabled S4G9, 2 Guns 440ci				
33225		1225	19:59		Disabled S4G8, S4G9 0 Guns 0ci				
33225		1225	19:59	EOL	MGL2315013TEST1				
Posnet locations & remarks: good - none - intermittent				Forward	Center				
Tailbuoy #1		ABSENT		Gun string #1	ABSENT	ABSENT			
Head Float #1		GOOD		Gun string #2	ABSENT	GOOD			
				Gun string #3	GOOD	GOOD			
				Gun string #4	GOOD	GOOD			
Compasses		Some telemetry issues causing break in comms with some units					SP spacing: 12.5m		
D.I.s		Some telemetry issues causing break in comms with some units					line status: Test for Offsets		
PROCESSING NOTES							Acronyms key		
DC SOL		Distance Crossed at Start of Line							
DC EOL		Distance Crossed at End of Line							
BSP		Bottom Speed, aka SOG: Speed Over Ground							
FEATHER		The angle from the boat to the TB (Tail Buoy)							
NRP		Navigation Reference Point							
COS		Center of Source							
CNG		Center Near Group							
CMP		Common Mid-point							
Overall Comments		TEST LINE TO INVESTIGATE NEAR ARRIVALS							

Seq# 014		Line Name: MGL2315014S21		NAVIGATION LINE LOGS		DATE: 2023-11-12		Lamont-Doherty Earth Observatory	
		Line Brg : 278.6 °				JULIAN DAY: 316		COLUMBIA UNIVERSITY EARTH INSTITUTE	
CLIENT:UTIG/WHOI/NSF				SURVEY: Puerto Rico MCS		AREA: Puerto Rico			
DC SOL: 228.4 m		DEPTH SOL : 4094.3 m		NAVIGATION SYSTEM USED: C-Nav3050 - Primary					
DC EOL: 801.7 m		DEPTH EOL : 6688.7 m		NAVIGATION SYSTEM USED: SeaPath 330					
BSP SOL: 4.1 kts		FEATHER SOL: -141.3 °		NAVIGATION SYSTEM USED: C-Nav3050-Stern Mounted					
BSP EOL: 3.5 kts		FEATHER EOL: 47.42 °							
WEATHER		MAX FEATHER: -141.3 °		GRAVITY METER: BMG-II: used, SN223					
WIND SOL: E 20 kts				MAGNETOMETER: Geometrics 882					
WIND EOL: E 14.3 kts									
SEAS SOL: 1.5 m									
SEAS EOL: 1.5 m									
		shift hours		Nav		shift hours		Acq	
		0:00-12:00		Koray Ergun		0:00-12:00		Gilles Guerin	
		12:00 - 24:00		Aaron Martin		12:00 - 24:00		Riley Lopez	
SP		Orca Ref		UTC		EVENT		COMMENTS	
33731		731		23:53		SOL		MGL2315014S21 - S1G2 disabled, 35 guns 6240 in3	
33747		747		23:59		LSOD		Last shot of JD 316	
33748		748		0:00		FSOD		First shot of JD 317	
36958		3958		19:20				End of leg 1 S2A	
36959		3959		19:20				Start of leg 2 S2B	
37752		4752		23:59				Last shot of JD 317	
37753		4753		0:00				First shot of JD 318	
38781		5781		6:09				End of leg 2 S2B	
38782		5782		6:09				Start of leg 3 S2C	
40903		7903		18:49		EOL		MGL2315014S21- S1G2 disabled, 35 guns 6240 in3	
		</							

Seq# 015		Line Name: MGL2315015S2S11		NAVIGATION		DATE: 2023-11-14		Lamont-Doherty Earth Observatory	
		Line Brg : 2.6 °		LINE LOGS		JULIAN DAY: 318		COLUMBIA UNIVERSITY EARTH INSTITUTE	
CLIENT:UTIG/WHOI/NSF				SURVEY: Puerto Rico MCS		AREA: Puerto Rico			
DC SOL: 327.5 m		DEPTH SOL : 6649.0 m		NAVIGATION SYSTEM USED: C-Nav3050 - Primary					
DC EOL: 537.9 m		DEPTH EOL : 6551.7 m		NAVIGATION SYSTEM USED: SeaPath 330					
BSP SOL: 3.6 kts		FEATHER SOL: 142.69 °		NAVIGATION SYSTEM USED: C-Nav3050-Stern Mounted					
BSP EOL: 4.0 kts		FEATHER EOL: 64.65 °							
WEATHER		MAX FEATHER: 152.7 °		GRAVITY METER: BMG-II: used, SN223					
WIND SOL: E 14.3 kts				MAGNETOMETER: Geometrics 882					
WIND EOL: E 10 kts									
SEAS SOL: 1.5 m									
SEAS EOL: 1.5 m									

Seq# 016		Line Name: MGL2315016S11		NAVIGATION		DATE: 2023-11-14		Lamont-Doherty Earth Observatory	
		Line Brg : 86 °		LINE LOGS		JULIAN DAY: 318		COLUMBIA UNIVERSITY EARTH INSTITUTE	
CLIENT:UTIG/WHOI/NSF				SURVEY: Puerto Rico MCS		AREA: Puerto Rico			
DC SOL: 242.9 m		DEPTH SOL : 6615.0 m		NAVIGATION SYSTEM USED: C-Nav3050 - Primary					
DC EOL: -906.4 m		DEPTH EOL : 6089.0 m		NAVIGATION SYSTEM USED: SeaPath 330					
BSP SOL: 4.0 kts		FEATHER SOL: 160.1 °		NAVIGATION SYSTEM USED: C-Nav3050-Stern Mounted					
BSP EOL: 4.0 kts		FEATHER EOL: -58.65 °							
WEATHER		MAX FEATHER: 160.1 °		GRAVITY METER: BMG-II: used, SN223					
WIND SOL: E 14.3 kts				MAGNETOMETER: Geometrics 882					
WIND EOL: E 20 kts									
SEAS SOL: 1.5 m									
SEAS EOL: 1.5 m									

Seq# 017				Line Name: MGL2315017S1EA1 Line Brg : 7.5 °		NAVIGATION LINE LOGS		DATE: 2023-11-17 JULIAN DAY: 321		Lamont-Doherty Earth Observatory COLUMBIA UNIVERSITY EARTH INSTITUTE	
CLIENT:UTIG/WHOI/NSF				SURVEY: Puerto Rico MCS				AREA: Puerto Rico			
DC SOL: -122.1 m				DEPTH SOL : 6138.8 m		NAVIGATION SYSTEM USED: C-Nav3050 - Primary					
DC EOL: #####				DEPTH EOL : 5581.9 m		NAVIGATION SYSTEM USED: SeaPath 330					
BSP SOL: 4.1 kts				FEATHER SOL: -142.65 °		NAVIGATION SYSTEM USED: C-Nav3050-Stern Mounted					
BSP EOL: 4.5 kts				FEATHER EOL: -69.19 °							
WEATHER											
WIND SOL: E 17 kts				shift hours		Nav		shift hours		Acq	
WIND EOL: SE 19 kts				0:00-12:00		Koray Ergun		0:00-12:00		Gilles Guerin	
SEAS SOL: 1.5 m				12:00 - 24:00		Aaron Martin		12:00 - 24:00		Riley Lopez	
SEAS EOL: 1.5 m											
SP		Orca Ref		UTC		EVENT		COMMENTS			
51029		1029		1:21		SOL		MGL2315017S1EA1 - gunstrings 1 & 2 disabled			
51030		1030		1:21		FGSP		Gunstrings 1 & 2 recovered for maintenance			
51330		1330		3:17				Streamer dropped out, no power on streamer			
51370		1370		3:32				Streamer power restored			
				3:39				Turning 15° to port at 3° per minute to reduce crab to deploy gunstring 2			
51411		1411		3:48				Missed SP dt high speed for source deployment			
51417		1417		3:50				Missed SP dt high speed for source deployment			
51419		1419		3:50				Missed SP dt high speed for source deployment			
51434		1434		3:56				String 1 deployed and enabled			
51443		1443		3:59				String 2 deployed			
51448		1448		4:01				String 2 enabled			
52041		2041		7:37				String 2 disabled dt airleak			
52270		2270		8:58				Some guns on String2 enabled			
52268		2268		8:57				Vessel starting to deviate from line to turn on to next line			
52286		2286		9:07		EOL		MGL2315017S1EA1 - 31 guns, 4800cui			

[illegible]