

**EW-0203**

# **Crustal structure of the Marianas island arc**

**OBS deployments, MCS profiling and Hydrosweep profiling;  
with additional Reftek deployment and recovery,  
OBEM recovery, and coring.**

**Cruise report**

***R/V Maurice Ewing***  
**28 March – 25 April, 2002**  
**Apra, Guam – Apra, Guam**

**Simon Klemperer, Chief Scientist**  
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## Crew of the Ewing:

O'Loughlin, James E.	Captain
Zeigler, Stanley P. Jr.	Chief Mate
Wolford, David H.	2 <sup>nd</sup> Mate
Mecketsy, Meredith J.	3 <sup>rd</sup> Mate
Tomas, Kelly F.	Boatswain
Walker, Wakefield B.	A/B
Greenberg, Jacob H.	A/B
Branniff, Marcella C.	A/B
Sypongco, Arnold A.	O/S
Doughty, Daniel L.	O/S
Pica, Stephen M.	Chief Engineer
Tucke, Matthew S.	First Engineer
Schroeder, Henry L. 3 <sup>rd</sup>	2 <sup>nd</sup> Engineer
Loque, Gregory L.	3 <sup>rd</sup> Engineer
Uribe, Guillermo F.	Oiler
Florendo, Rodolfo A.	Oiler
Keller, Tom	Oiler
Taylor, Kelly L.	Steward
Batchelor, John A.	Cook
McNeal, Frederick L.	Utility

## Watch Schedule

During the deployment and recovery periods for the 53 OBS instruments and the MCS streamer, the science team maintained 12 hour watches. For the MCS profiling, coring, and OBEM recovery, the science team kept an 8-on, 16-off schedule.

### OBS and MCS deployment/recovery

0000 – 1200	Bryan		
0400 – 1600		Fujie–San	Yoshida–san
0800 – 2000	Simon	Adrienne	
1200 – 0000		Tawni	Roland
1600 – 0400	Andrew	Rigobert	
2000 – 0800		Nori	Tanaka–san

### MCS profiling, coring:

0400 – 1200	Bryan	Fujie–san	Yoshida–san	
1200 – 2000	Simon	Adrienne	Tawni	Roland
2000 – 0400	Andy	Rigobert	Nori	Tanaka–san

## Cruise Log

Thursday 3/28 R/V Ewing at Hotel Wharf, Commercial Port  
 OBSIP personnel brought 54 OBS on board  
 Friday 3/29 Science team begins to move aboard; miscellaneous cruise preparations.  
 R/V Ewing moved out to anchor in Apra Harbour (a Japanese cruise ship took our wharf)  
 Saturday 3/30 Geological field excursion for Science Team, led by Prof. John Jeavons, University of Guam, to view Paleogene volcanic basement, and Neogene carbonates.  
 Sunday 3/31 (Easter) Intended sail date delayed by late arrival of emergency batteries that had been shipped from Halifax via Japan.  
 Monday 4/01 Emergency batteries arrived at Guam airport at 0230; clear customs and brought out to R/V Ewing by the launch the Patriot. Laundry closed to lack of freshwater.

4/01 0730 JD090 2130Z Cleared Apra Harbor. Transit NE between Guam and Rota.  
 Mon Fire and boat drills.

1400 JD091 0400Z At waypoint#1 for pressure test of releases.  
 1415 0415 Rack#1 over the side; down–winching at 50m/minute  
 1450 0450 At 1750m, begin testing communications; units 31, 42, 43, 45, 46, 47, 49, 50, 54, 55, 57, 58 all responding  
 1510 0510 Up–winching at 70 m/min  
 1540 0540 Rack#1 on deck  
 1550 0550 Rack#2 down–winching  
 1645 0645 At 3000m (on the winch; 2900m slant range by pinging, calculated at 1490m/s); testing units 06, 10, 11, 12, 18, 19, 23, 24, 30, 36, 38, 39, all OK  
 1720 0720 Up–winching at 70 m/min  
 1800 0800 Rack#2 on deck  
 1810 0810 Rack#3 down–winching  
 1835 0835 At 1750m; testing units 05, 13, 17, 27, 28, 32, 41, 44, 48, 52, 56, 60; all OK  
 1855 0855 Up–winching at 70 m/min  
 1910 0910 Rack#3 on deck  
 1920 0920 Rack#4 down–winching  
 1945 0945 At 1750m; testing units 07, 14, 20, 21, 25, 26, 29, 34, 35, 51, 53, 59; all OK  
 2020 1020 Up–winching at 70 m/min  
 2045 1045 Rack#4 on deck  
 2050 1050 Rack#5 down–winching  
 At 1750m; testing units 02, 03, 09, 15, 33, 37; all OK  
 2140 1140 Up–winching at 70 m/min  
 2205 1205 Rack#5 on deck; begin transit to Aguijan and OBS drop #1. Central line #1 (fore–arc high line)

## OBS Deployments (53, of 54 shipped)

4/2	0222	1622	OBS site#1, Delaware, unit #57, south of Aguijan
Tue	0323	1723	OBS site#2, Pennsylvania, unit #58, east of Aguijan
	0510	1910	OBS site#3, New Jersey, unit #49. Taglines fouled the release; ship circled to return to drop point. Between Saipan and Tinian.
	0748	2148	OBS site#4, Georgia, unit #46. Taglines fouled the release; ship circled to return to drop point. North of Saipan
	0826	2226	Deployed expendable bathy-thermograph (XBT) type T5 #EW-02031.
	0851	2251	Given the calm weather, we stopped using taglines. OBS site#5, Connecticut, unit #50
	0952	2352	OBS site#6, Massachusetts, unit #47
	1054	JD092 0054	OBS site#7, Maryland, unit #43
	1118	0118	Noticed inconsistency between CBD and 3.5kHz – CBD reading multiple instead of sea floor bottom. This occurs when we climb up onto the Farallon de Mendenilla plateau 154D59.947N, 145d59.947, depth 95.21 (read from CBD).
	1130	0130	Hydrosweep locked onto sub-sedimentary basement, not seafloor, read 50m too deep, near OBS site#3, New Jersey.
	1151	0151	OBS site#8, South Carolina, unit #45; southwest of Farallon de Mendenilla.
	1215	0215	Ship-track passes 2 nm west of Farallon de Mendenilla (island is located about 1 nm west of its charted position). OBS sites #8 and #9 are both outside the US Navy 3 nm exclusion zone; but we will probably need to dog-leg west of our desired straight line when shooting MCS.
	1248	0248	OBS site#9, New Hampshire, unit #42, northwest of Farallon de Mendenilla. Anatahan clearly visible on the port beam. Hydrosweep reading multiple (50m deeper than 3.5kHz).
	1348	0348	OBS site#10, Virginia, unit #31
	1446	0446	OBS site #11, New York, unit #55
	1500	0500	Hydrosweep locked on second peak – depth recorded at 936.31m.
	1517	0517	Hydrosweep and 3.5kHz now reading same depth.
	1546	0546	OBS site #12, North Carolina, unit #54
	1636	0636	OBS site #13, Rhode Island, unit #05
	1732	0732	OBS site #14, Vermont, unit #27
	1829	0829	OBS site #15, Kentucky, unit #32
	1923	0923	OBS site #16, Tennessee, unit #02
	2020	1020	OBS site #17, Ohio, unit #33
	2113	1113	OBS site #18, Louisiana, unit #37
	2207	1207	OBS site #19, Indiana, unit #36
	2304	1304	OBS site #20, Mississippi, unit #30 End of Central line #1 (fore-arc high line) Transit to north end of line #2 Start East line#2 (outer fore-arc)

4/3	0138	1538	OBS site #21, Illinois, unit #39
Wed	0242	1642	OBS site #22, Alabama, unit #18
	0350	1750	OBS site #23, Maine, unit #19
	0457	1857	OBS site #24, Missouri, unit #11
	0605	2005	OBS site #25, Arkansas, unit #38
	0709	2109	OBS site #26, Michigan, unit #24
	0813	2213	OBS site #27, Florida, unit #40
	0915	2315	Deployed an XBT-T5 #EW-02032
	0918	2318	OBS site #28, Texas, unit #12
			End of East line #2 (outer fore-arc line)
			Transit to south end of line #3
			Start West line#3 (volcanic arc)
	1220	JD093 0220	CBD started recording water-bottom multiple on ridge NW of Farallon DM about UT 0215 to 0240.
	1404	0404	OBS site #29, Iowa, unit #28
	1448	0448	OBS site #30, Wisconsin, unit #17
	1531	0531	OBS site #31, California, unit #06
	1616	0616	OBS site #32, Minnesota, unit #23
	1702	0702	OBS site #33, Oregon, unit #13
			Anatahan 0.6 nm to port: i.e. 0.4 nm east of its charted position
			Rigged rental zodiac for landing on Alamagan at sunrise;
			we lashed all the equipment onboard prior to lowering the boat.
	1749	0749	OBS site #34, Kansas, unit #09
	1834	0834	OBS site #35, WestVirginia, unit #22
	1920	0920	OBS site #36, Nevada, unit #03
	2011	1011	OBS site #37, Nebraska, unit #44
	2101	1101	OBS site #38, Colorado, unit #41
	2146	1146	OBS site #39, NorthDakota, unit #48
	2232	1232	OBS site #40, SouthDakota, unit #29
	2315	1315	OBS site #41, Montana, unit #21
4/4	0001	1401	OBS site #42, Washington, unit #07
Thur	0042	1442	OBS site #43, Idaho, unit #35
	0122	1522	OBS site #44, Wyoming, unit #20
	0203	1603	OBS site #45, Utah, unit #34
	0245	1645	OBS site #46, Oklahoma, unit #26
	0324	1724	OBS site #47, NewMexico, unit #14
	0404	1804	OBS site #48, Arizona, unit #25
	0444	1844	OBS site #49, Alaska, unit #56
	0529	1929	OBS site #50, Hawaii, #52
			Transitting back to Alamagan for Reftek deployment.
	0630	2030	1 mile off Alamagan, trying to spot the beaches mapped by the USGS on their 1:12500 map Misc. Investigations I-2408. The beach below the village site on the NW side looked unappealing, so we moved to the SW side to land at the left-hand (northern) of two small boulder beaches.

0730	2130	Lowered the zodiac off the port crane with 2 <sup>nd</sup> Mate Dave; then Simon, Bryan Rigo and A/B Wake boarded from the starboard waist deck.
0800	2200	We landed on the northwestern of two small boulder beaches, both are NW of the village site. a pronounced gully, and a cleared area with a round manmade structure about 30m above the beach. Small rocks 10m offshore forced us to paddle the last bit. With a major effort we got the zodiac out of the water onto the boulder beach; we could perhaps have landed more easily on a small patch of sand at the extreme right (SE) end of this beach. Beach is at 17d35.161N 145d49.362E by handheld GPS, set to use WGS-84. We walked 50 m to the right (SE) end of the beach, onto rocky ledges forming a small promontory at the base of the first small cliff; then zigzagged up a muddy trail about 20 m up the cliff to a grassy area with coconut palms below the next steep section. Waypoints on trail: 17d35.137N 145d49.368E; 17d35.122N 145d49.374E. We located station Alamagan#1 on the left (NW) side of the grassy area; and Alamagan#2 10m distant on the right side. Handheld GPS locations were recorded at each site: Alamagan#1: 17d35.119N 145d49.397E Alamagan#2: 17d35.111N 145d49.393E NB. These GPS positions plot SW (offshore) of the island in our bathymetry database, also nominally prepared wrt WGS-84.
1000	JD094 0000	Alongside R/V Ewing.
1204	0204	OBS site #51, DistrictofColumbia, unit #60
1243	0243	OBS site #52, PuertoRico, unit #51
1323	0323	OBS site #53, VirginIslands, unit #53 OBS site #54, AmericanSamoa, unit #59 was not deployed: we had lost two sealing screws; had blown one Li battery pack; and had a dodgy seismometer. I.e. Unit #59 was cannibalized to complete the other 53 instruments.

### **Airgun shooting and MCS profiling (12,557 shots; 2603 km)**

Transit towards Agrigan, start of MCS line 10.  
Line numbers that are multiples of 10 are "North-south" "arc-parallel" lines; line numbers ending in 5 will be "East-west" "arc-crossing" lines.

1420	0420	Tail buoy of streamer deployed, and total of 25 birds successively deployed thereafter. Bird #15 experienced difficulties in responding to depth instructions, and therefore, replaced it by bird #23. Bird #15 was thereafter fixed and deployed after bird #22. Lost the last 4 meters of the last channel of the streamer (each channel 25 meters long), and replaced one full channel in the mid-section of the streamer.
1820	0820	Finished streamer deployment.

	1807	0807	Gun booms deployed.
	1820	0820	Magnetometer deployed and begins recording data.
	1829	0829	Airguns begin deployment.
	1930	0930	All gear deployed. Begin turning onto line; test gun-firing at 97 secs. Because we did not deploy OBS#54 we will not bother going to the "official" waypoint 50 km north of OBS#54.
	1933	0933	Airgun shooting begins
	2043	1043	Guns 5 (850 cu.in) and 4 (520 cu.in) pulled
	2136	1146	All guns working
	2300	1300	We have found that the first 3490 reel was unreadable (by either ProMAX or SIOSEIS). The Syntrak system was rebooted and the record length changed to 16sec. The resultant tape could be read by ProMAX. A 69 sec. record length was tried once more, but the resultant tape could not be read. Record lengths of 40 sec (successful), 60 sec (successful) and 66 sec (failure) were tried. A record length of 60 sec was hence selected. Conclusion: There is a record length limit (by samples or time?) to SEG-D data.
4/5 Fri	0011	1411	Start of reel 113. Record length = 60 sec (actually 61440 ms). Problems with speed. Bridge have been instructed to keep speed though the water below 4.5 knots (by Joe). Andrew contacted Joe and was told that this was because Simon requested that the guns not be allowed to ride up. This problem will be re-visited in the morning when Simon gets up.
	0024	1424	Recording shots on reel 113 at record length of 61440 ms. Starting shot = 200.
	0230	1630	Reaching the turning point near Pagan and going toward south.
	0336	1736	Passing over OBS 53 (VI).
	0425	1825	Andy mentioned that P1 logs (streamer data) are being recorded. He wasn't sure for how long, but said P1 logs began working before successful recording of MCS data on reel 113.
	0502	1902	Passing over OBS 52 (PR).
	0538	1938	Gun #5 (850 c.i.) continues to show 2 broad, low-amplitude peaks (first peak centered at t=0) instead of the nominal single impulsive peak. Joe said this has nothing to do with the signal being output by the gun. As long as the first peak is aligned at t=0, the gun timing is fine.
	0620	2020	Passing over OBS 51 (DC).
	0623	2023	Re-estimated streamer position. 3 compasses had incorrect locations.
	0734	2134	Passing over OBS 50 (HI).
	0851	2251	Passing over OBS 49 (AK).
	1005	JD095 0005	Passing over OBS 48 (AZ).
	1056	0056	Hydrosweep/EPC lost water bottom.
	1104	0104	Recovered water bottom depth. Streamer is very level at 93 rpm, typically 4.5 kts through the water, but 4.3 kts over the ground.

	1118	0118	Passing over OBS 47 (NM).
	1313	0313	Passing over OBS 46 (OK) closest shot is # 654
	1347	0347	Passing over OBS 45 (UT) closest shot is # 704
	1430	0430	Passing Guguan, 1.2 miles to port. Lack of trees and unvegetated lava flows on the north half of the island speak of a younger volcanic history than Alamagan. No obvious landing sites for a zodiac visible through binoculars.
	1502	0502	Passing over OBS 44 (WY) closest shot is # 753.5
	1615	0615	Passing over OBS 43 (ID) closest shot is # 803
	1728	0728	Passing over OBS 42 (WA) closest shot is # 853
	1841	0841	Passing over OBS 41 (MT) closest shot is # 903
	2000	1000	Passing over OBS 40 (SD) closest shot is # 953
	2112	1112	Passing over OBS 39 (ND) closest shot is # 1003
	2225	1225	Course change while passing over OBS 38 (CO) closest shot is # 1052
	2335	1335	Course change while passing over OBS 37 (NB) closest shot is # 1102
4/6	0046	1446	Passing over OBS 36 (NV) closest shot is # 1152
Sat	0155	1555	Passing over OBS 35 (WV) closest shot is # 1201
	0306	1706	Passing over OBS 34 (KS) closest shot is # 1251
	0418	1818	Passing over OBS 33 (OR) closest shot is # 1301
	0529	1929	Passing over OBS 32 (MN) closest shot is # 1351
	0640	2040	Passing over OBS 31 (CA) closest shot is # 1401
	0753	2153	Passing over OBS 30 (WI) closest shot is # 1450
	0904	2304	Passing over OBS 29 (IO) closest shot is #1500
	0945	2345	Port gun #5 has frequently shot late the last couple days. Port gun #4 sometimes misses shots or has a large offset as well.
	1035	JD096 0038	Nearest 3 birds were above 10.5 m for the previous 5–10 minutes, but have quickly returned to the nominal depth. The seas have been rougher for the last few hours. The swells are coming from the north–northeast, they are roughly heading in the same direction as the ship. Winds are about 20 kts out of the northeast.
	1222	0222	Waypoint #58, shot #1636, changing course 10d to starboard. Ruby seamount.
	1625	0625	Hydrosweep display crashes.
	1828	0828	Waypoint #59, shot #1889. Unnamed seamount between Ruby and Esmeralda.
	2327	1327	Waypoint #60, shot #2096. Esameralda seamount.
4/7	0542	1942	Guns 11 (235 c.i.) and 12 (170 c.i.) (A–frame guns 3 & 4) off in preparation for turn.
Sun	0553	1953	EOL #10, sp #2358.
	--	--	Channels 31 to 36 on line#10 (presumably on all data recorded so far) has bad data (large values, c. 1000 times normal) starting at 46.05 seconds. We need to apply a standard tailmute to these 6 channels. Joe S. speculates that this portion of the record maps onto a bad portion of the mass memory on board ship when the

data is stored multiplexed, prior to demultiplex. We discovered this problem near the beginning of line#20. On our next turn (in two days or so!) we may try recording a different record length to see if the bad data maps into a different place, to test whether the problem is due to local memory in the streamer can, or memory onboard ship.

0604	2004	The turn towards line klemp#15 induced a large wave to propagate through the streamer with the near birds diving down to 17 m.
0610	2010	BOL klemp#15 sp #001; with the first shot ~200 m to the southwest of its intended location (i.e. we were 200 m offline, to the southwest).
0629	2029	Guns 11 (235 c.i.) and 12 (170 c.i.) (A-frame guns 3 & 4) back out and on following completion of turn.
0634	2034	More than half (near part of the streamer) of the birds are at ~ 9m depth. Ship pitch has decreased, but the roll has increased dramatically. Boom occasionally dip into the water.
0900	2300	Front end of streamer is high; first 5 or even 6 birds above 10.5 m. Not clear why: mean speed thro' water remains low despite occasional surges; ship rolling occasionally to +/-10d, dipping boom ends in water; rarely to 15d.
1147	JD097 0147	Aframe guns 3, 4 off at shot#211 in preparation for turn
1154	0154	EOL #15, sp#208. Rota 8 miles to SE. Turn to N.
--	--	Reel 162 (4th of 5 3490 reels recorded along line #15) is good to file 171; we are unable to read files 172 to 193 that are nominally on the tape. The last tape, files 194 to 211, is normal.
1215	0215	BOL klemp#20, sp#001.
1233	0233	Aframe guns 3, 4 back on, sp#13
1822	0822	Passing over OBS 01 (DE); closest shot is #255, 256
1855	0825	Gun 20 (385 c.i.) off at sp #280.
2008	1008	Passing over OBS 02 (PA); closest shot is 331
2142	1142	Gun 20 (385 c.i.) turned back on
2142	1142	Gun 18 (760 c.i.) pulled out
2154	1154	All guns back in the water and operational
2335	1335	Passing OBS #3 (NJ); closest shot is 460
2358	1358	Spectra navigation system hung. Shooting stopped at shot 479. Ethan/Joe summoned. Runts (RTNU – real-time navigation unit) and Spectra rebooted.
4/8 Mon	0047	1447 Shooting restarted at shot 502 and continued to sp#515, EOL#20. i.e. Line klemp#20 has shots 1 to 479 and 502 to 515. We circled back to a point 1 nm north (along line 20) of OBS #3 (NJ). After 180 degree turn (out to east of Saipan), we will shoot for 1 hour (no MCS, line name 20a) while getting back to new start point. After next 180 degree turn, the new line will be named 21, and shooting will continue along the original line 20.
	0224	1624 EOL klemp#20a, shotpoints 1 to 43. MCS not saved.
	0256	1656 BOL klemp#21, sp#1 (streamer still badly feathered in turn); at approximately klemp#20 sp 460.

	0325	1725	Returned to line#20 sp#479 – the last shotpoint before shooting stopped during Line 20. Lost ~3.5 hours of time.
	0825	2205	Passing over OBS #04 (GA); closest shot is line#21, sp#220–221
	0958	2358	Passing over OBS #05 (CT); closest shot is sp#293
	1157	JD098 0157	Passing over OBS #06 (MA); closest shot is sp#372
	1355	0355	Passing over OBS #07 (MD); closest shot is #448
	1430	0430	(UT 0430 to 0625) Hydrosweep is tracking multiple at 182.21m depth (actual depth is half this amount)
	1552	0552	Passing over OBS #08 (SC) ; closest shot is #524; changing course to avoid Farallon
	1756	0756	Passing over OBS #09 (NH) ; closest shot is #603; changing course to follow OBS line to north.
	1956	0956	Passing over OBS #10 (VA); closest shot is #679
	2205	1205	Passing over OBS #11 (NY); closest shot is #755
	2311	1311	Big difference between hydrosweep (176m) and 3.5kHz(80m). This occurs until UT1418.
4/9	0018	1418	Passing over OBS #12 (NE); closest shot is #830
Tue	0240	1640	Passing over OBS #13 (RI); closest shot is #906
	0459	1859	Passing over OBS #14 (VT); closest shot is #981
	0711	2111	Passing over OBS #15 (KY); closest shot is #1055
	0920	2320	Passing over OBS #16 (TN); closest shot is #1128 Strong 1.2 kt current against us, thro' mid–afternoon. Current swinging to NE and cable feather up to 1 km.
	1126	JD099 0126	Passing over OBS #17 (OH); closest shot is #1203 Short tape Reel 197, shot 1046–1066. Last file is far 63 traces only, channels 1–63.
	1322	0322	Passing over OBS #18 (LA); closest shot is #1276
	1508	0508	Passing over OBS #19 (IN); near shot #1351
	1654	0654	Passing over OBS #20 (MS); near shot #1424
	2247	1247	Guns 9 (350 c.i.) and 10 (145 c.i.) pulled for turn.
	2303	1303	EOL 21. Joe is testing the gun controller to see if he can resolve the problem with gun 11 (working OK, but display is not OK).
	2317	1317	SOL 25. New shot distance of 250 m. Gun display is not working. Joe is working on it.
4/10	0025	1425	Missed shots 38 and 39 while Joe is replacing gun boards.
Wed	0030	1430	Gun display is working.
	0429	1819	Guns 9 (350 c.i.) and 10 (145 c.i.) pulled for turn.
	0429	1829	EOL 25.
	0436	1836	Bird 17 appears to have lost comm with the streamer for at least the last 20 minutes. Streamer display shows the bird's wing to be vertical. Depth readings appear to be nominal and Joe says not to worry as long as the rest of the streamer looks OK.
	0447	1847	SOL 30 (shot #1). Began about 400 m east of planned line.
	0515	1915	Noticed that guns 9 and 10 were back in the water, but not sure for how long.

	0640	2040	Re-estimated streamer depth later than usual (before shot 64) in the line (got sidetracked). Streamer was probably on the line by shot 30.
	1038	JD100 0038	Passing over OBS #21 (IL); closest shot is #197
	1043	0043	Crossed line Klemp#45 at shot #200.
	1253	0253	Passing over OBS #22 (AL); closest shot is #278
	1400	0400	Crossing line #55; closest shot is #328.7
	1509	0509	Passing over OBS #23 (ME); closest shot is #359.5
	0648	0648	Reel 223 ejected early. Channels 156-240 missing from last shot (417)
	1725	0725	Crossing line #65 and passing OBS #24 (MO); shot is #440.8
	1943	0943	Passing over OBS #25 (AR); closest shot is #522
	1946	0946	<del>Crossing line #75 (IF we shoot it); closest shot is #524</del> (locations and numbering of cross lines 75 through 105 were changed after this log entry. Deletion from this entry through 0300 JD 102)
	2114	1114	RTNmu Failure. Shots 573-575 missed.
	2207	1207	Passing over OBS #26 (MI); closest shot is 603
	2321	1321	<del>Line 85 crossing near shot 642</del>
4/11	0027	1427	Passing over OBS #27 (FL); closest shot is 684
Thur	0305	1705	Passing over OBS #28 (TX); closest shot is 765 Altering course to 190.2
	0314	1714	<del>Crossing line #95; closest shot is #771</del>
	0705	2105	<del>Crossing line #105; closest shot is #899</del>
	0805	2205	Reel 234 ejected early. Channels 177-240 missing from last shot (933).
	0850	2250	Guns #9, #10 in in preparation for turn.
	0900	2300	EOL klemp#30, shot 967. Turn to west.
	0923	2323	BOL klemp#35, shot 1. Shot interval still 250 m. Stern current, so aiming for 4.5 kts thru' water, max 4.9 kts made good.
	1223	JD101 0242	We apparently missed shot #107, not sure why.
	1512	0512	Crossing line #20/21; closest shot is #196
	1935	0935	Crossing line #10; closest shot is #344.5
	2315	1315	EOL Klemp#35
	2335	1335	BOL Klemp#40
4/12	0234	1634	<del>Crossing line Klemp#105; closest shot is #130</del>
Fri	0642	2042	<del>Crossing line Klemp#95; closest shot is #292</del>
	0957	2357	<del>Crossing line Klemp#85; closest shot is #418</del>
	1005	JD102 0005	Pull in gun #11 for 20deg turn to port
	1028	0028	Gun #11 back in
	1300	0300	<del>Crossing line Klemp#75; closest shot is #558</del>
	1406	0406	Crossing line Klemp#65, closest shot is #592
	17..	07..	Crossing line Klemp#55, closest shot is #739
	1920	0920	Guns #13 and #14 pulled in
	2000	1000	Guns #13 and #14 firing again
	2121	1121	Crossing line Klemp#45, closest shot is #894

4/13	0330	1730	EOL Klemp#40,sp#1144. End of reel 270
Sat	0352	1752	SOL Klemp#24, sp#1
	0400	1800	Gun #10 back in the water.
	0627	2027	Gun #11 (235 c.i.) pulled in for repair, about sp#105 Passing under southern cliffs of Pagan
	0742	2142	Gun #11 back online at sp#158
	0758	2158	Crossing line klemp#10, closest shot is #170
	0839	2239	Gun #4 pulled in for repair
	1035	JD103 0035	Gun #4 back on-line at sp#283
	1148	0148	Gun #10 pulled in for turn
	1159	0159	EOL klemp#24, sp#341
	1209	0209	SOL klemp#28, sp#1
	1800	0800	Crossing klemp#30, sp#252
	2135	1135	Gun 18 out of water for repairs
	2230	1230	Gun 18 back in the water. Guns 9 and 10 pulled for turn.
	2233	1233	EOL klemp28. Last shot = 431
	2252	1252	SOL klemp 45. First shot = 3
	2303	1303	Finished turn (problems with current).
	2325	1325	New directions to bridge: Target speed is 4.6 knots over the ground With a following current max speed over the ground is 4.9 knots With an opposing current max speed through water is 4.8 knots
Sun	0211	1611	Crossing klemp30 at shot 151.
4/14	0736	2136	Crossing klemp#21, shot 383
	0833	2233	Reel 296 had channels 178-240 missing from last shot (296)
	0844	2244	Guns #13, 14 pulled in for maintenance
	0930	2330	Gun #13 back online
	0945	2345	Gun #14 back online
	1045	JD104 0045	Reel 298 has last shot (500) missing
	1220	0220	Crossing klemp#10, shot 551/552
	1620	0620	Crossing klemp#40, shot 690
	1904	0904	Guns #11, #12 and #13 pulled in for turn. EOL klemp#45, last shot=796
	1925	0925	BOL klemp#50, shot #1. First shots are 200m west of line; cable is unusually badly feathered during the turn due to current from the north.
	2006	1006	All guns back in the water
	2218	1218	Guns #11, #12 in in preparation for turn
	2234	1234	EOL klemp#50 shot 137 Gun #13 in.
	2253	1253	SOL klemp#55, shot 1, heading east.
Mon	0134	1534	Crossing klemp#40, shot #122
4/15	0433	1833	Crossing klemp#10, shot #255 Passed Guguan between dawn and sunrise
	0833	2223	Crossing klemp#21, shot #414
		JD105	Crossing klemp#30, shot #648

	1748	0748	Guns #9 and #10 in for turn
	1757	0757	EOL klemp#55, shot #798
	1816	0816	SOL klemp#60, shot #1, heading south
	1844	0844	All guns firing.
	2117	1117	Guns 9 and 10 pulled for turn.
	2126	1126	EOL klemp60. Last shot was 122
	2146	1146	BOL klemp65. First shot was 2 (Forgot to enable spectra).
	2200	1200	Compressor trouble. Shot 14 lost
Tue	0116	1516	Passing OBS 24 (MO) and crossing line 30 (shot 151–152)
4/16	0623	2023	Crossing klemp21, closest shot #386
	0700	2100	Making 4.9 kts over the ground; shot repeat time as low as 80 secs;
	0730	2130	guns firing at 1980 psi (instead of 2000 – 2020 psi)
	1006	JD106 0006	Crossing klemp10, closest shot #540
	1200	0200	1kt current against us; birds #25–#19 (front of streamer) out of spec.
	1335	0335	Crossing klemp#40, shot #664
	1700	0700	Guns #11 and #12 pulled in for turn
	1709	0709	EOL klemp#65, shot #799. Turn to south.
	1727	0727	BOL klemp#70, shot #1
	1747	0747	Streamer is high. Birds 23, 24, 25 above 10.5m. Estimated streamer position in Spectra.
	1752	0752	Guns 11 and 12 back in the water.
	1800	0800	Gun 5 may have a small leak (850 c.i.).
	2022	1022	Guns 11 and 12 pulled for turn.
	2034	1034	EOL klemp70. Last shot = 136
	2049	1049	Gun 20 out of water.
	2053	1053	BOL klemp75. First shot = 1. Gun 20 back in water.
	2100	1100	All guns back in water.
Wed	0015	1415	Crossing klemp40. Closest shot = 148.
4/17	0015	1415	Guns 9 and 10 out of water.
	0030	1430	Guns 9 and 10 back in water.
	0117	1517	Tape drive problems. 3490 ejected and drives would not come back online. Shots 194–195 not recorded. Reel 353 has not data.
	0246	1646	Crossing klemp 10 and close to OBS 37 (NB). Closest shot is 254.
	0649	2049	Crossing klemp#21 after shot #410
	1323	JD107 0323	Crossing klemp30 after shot #658
	1330	0330	Tangle in gun 9; guns 9 and 10 pulled
	1345	0345	All guns back in water
	1600	0600	Streamer rising to surface; slowing to sink streamer
	1640	0640	Streamer at 12 meters
	1719	0719	EOL klemp 75; guns 9 and 10 pulled for turn
	1738	0738	BOL klemp 80.
	2123	1123	EOL klemp #80, last shot #126
	2200	1200	Guns 9,10 back in water.

4/18	0107	1507	Crossing klemp#30, closest shot #154, near OBS#28(TX)
Thu	0719	2119	Crossing klemp#21, closest shot #419
	1059	JD108 0059	Magnetometer OFF.
	1111	0111	Crossing klemp#10; closest shot #586, near OBS#34(KS)
	1120	0120	Gun 9,10,11,12 OFF, shot #592
	1130	0130	EOL klemp85, shot #599 turned into wind, 080
	1345	0345	Gun and booms secured, begin retrieving streamer
	1630	0630	Tailbuoy on deck

### OBS recoveries

	1814	0814	OBS 35 (WV) out of water (16°29.082' N, 145°45.932' E)
	1830	0830	OBS 34 (KS) expected at 1034
	1924	0924	OBS 34 (KS) out of water (16°23.846' N, 145°44.856' E)
	2004	1004	OBS 33 (OR) expected at 1034
	2036	1036	OBS 33 (OR) out of water (16°18.471' N, 145°43.666' E)
	2113	1113	OBS 32 (MN) expected at 1200
	2212	1212	OBS 32 (MN) out of water (16°13.213' N, 145°42.758' E)
	2243	1243	OBS 21 (CA) expected at 1325
	2342	1342	OBS 31 (CA) out of water (16°07.829' N, 145°41.720' E)
	2349	1349	OBS 30 (WI) expected at 1455
4/19	0106	1506	OBS 30 (WI) out of water (16°02.541' N, 145°40.593' E)
Fri	0143	1543	OBS 29 (IO) expected at 15:55
	0204	1604	OBS 29 (IO) out of water (15°57.303' N, 145° 39.587' E)
	0400	1800	Hydrosweep restarted because of lock on multiple.
	0800	2200	Rescue boat launched with Dave, Wake, Adrienne and Mark— boat will travel ahead of Ewing and release OBS units from the seafloor
	0844	2244	OBS 28 (TX) out of water (16°16.931'N, 146°32.690'E)
	0930	2330	Rescue boat to OBS 27 (FL), (Manually recorded position: 16 28.181N, 146 32.797E, GPS averaged position: 16 28.316N, 146 32.645E) range: 3496
	1037	JD109 0037	Rescue boat to OBS MIW (1.5 miles W of OBS site), (Manually recorded position: 16 39.085N, 146 31.416E, GPS averaged position: 16 39.354N, 146 31.103E) attempted to ping MI, no response. Strong current moved the boat over 2 miles from site in minutes. Seas began to pick up. Moved against current closer to the lat/long of actual OBS site, attempted to range instrument at (Manually recorded position: 16 39.345N, 146 31.882E, GPS averaged position: 16 39.388N, 146 31.771E)— still no response from OBS unit. Mark sent release command before the boat moved on to the next site. Ewing arrived on site and realized that the instrument had responded and was off the seafloor. Decision was made to travel directly to the actual OBS location due to swift currents forcing the boat to drift off site.
	1048	0048	OBS 27 (FL) out of water (16 28.020 N. 146 32.662 E)

1228	0228	OBS 26 (MI) out of water (16°39.098'N, 146°32.657'E)
1230	0230	Rescue boat arrived at OBS 25 (AR), (Manually recorded position: 16 50.081N, 146 32.888E, GPS averaged position: 16 50.086N, 146 32.883E) enabled unit at 1231: range 3415, release cmd sent at 1238
1400	0400	OBS 25 (AR) out of water (16°50.155'N, 146°32.812'E)
1403	0403	Rescue boat arrived at OBS 24 (MO), (Manually recorded position: 17 01.080N, 146 32.939E, GPS averaged position: 17 01.111N, 146 32.915E) enabled unit at 1406: range 3400, burn cmd sent at 1407, unit released from seafloor at 1415. Decided that due to deteriorating weather conditions the rescue boat would wait for the Ewing at MO and not proceed to OBS 23 (ME)
1505	0505	Rescue boat onboard Ewing
1523	0523	OBS 24 (MO) on surface
1529	0529	OBS 24 (MO) out of water (17°01.153'N, 146°32.873'E)
1648	0648	OBS 23 (ME) expected at 0735
1738	0738	OBS 23 on surface
1751	0751	OBS 23 (ME) out of water (17°12.295'N, 146°32.957'E)
2022	1022	OBS 22 (AL) alongside ship
2024	1024	OBS 22 (AL) out of water (17°23.000'N, 146°32.982'E)
2251	1251	OBS 21 (IL) out of water (17°34.029'N, 146°32.873'E)
4/20	0110	1510 OBS 20 (MS) expected at 1550
Sat	0212	1612 OBS 20 (MS) on surface – took a while to find it as light did not work
	0219	1619 OBS 20 (MS) out of water (17°33.22'N, 146°06.662'E) The strobe on MS was flooded and failed. The instrument was found using the ships searchlight.
	0315	1715 OBS 19 (IN) expected at 1800
	0408	1808 OBS 19 (IN) out of water (17 25.110'N, 146 06.652'E)
	0541	1941 OBS 18 (LA) out of water (17 17.030'N, 146 06.558'E)
	0636	2036 OBS 17 (OH) expected at 0710
	0720	2120 OBS 17 (OH) out of water (17 08.995'N, 146 06.433'E)
	0810	2210 OBS 16 (TN) expected at 0845
	0853	2253 OBS 16 (TN) out of water (17 00.938'N, 146 06.355'E)
	1044	JD110 0044 OBS 15 (KY) out of water (16 52.902'N, 146 06.350'E), required two burn commands. Burn wire #1 did not burn.
	1121	0121 1.5 miles from OBS 14 (VT) (16 46.535' N, 146 06.508' E)
	1154	0154 OBS 14 (VT) on surface (16 45.050' N, 146 06.295' E)
	1201	0201 OBS 14 (VT) out of water (16 44.901' N, 146 06.412' E)
	1332	0332 OBS 13 (RI) alongside ship (16 36.753' an, 146 05.463' E); on deck at 0334
	1430	0430 OBS 12 (NC) on surface (16 28.713' N, 146 04.339' E)
	1438	0438 OBS 12 (NC) alongside ship (16 28.565' N, 146 04.496' E); on deck at 0439
	1549	0549 OBS 11 (NY) alongside ship (16 20.478' N, 146 03.406' E); on deck at 0550
	1640	0640 OBS 10 (VA) expected at 0658

1655	0655	OBS 10 (VA) on surface (16 12.583' N, 146 02.303' E)		
1706	0706	OBS 10 (VA) alongside ship (16 12.336' N, 146 02.575' E); on deck at 0707		
1715	0715	ETA for 09 (NH) 0750		
1807	0807	OBS 09 (NH) on surface (16 04.297' N, 146 01.316' E)		
1812	0812	OBS 09 (NH) alongside ship (16 04.264' N, 146 01.452' E); on deck at 0813		
1824	0824	ETA for 08 (SC) at 0853		
1902	0902	ETA for 08 (SC) at 0912		
1928	0928	OBS 08 (SC) alongside ship (15 56.128' N, 146 00.322' E); on deck at 0929		
2018	1018	ETA for OBS 07 (MD) at 1025		
2057	1057	OBS 07 (MD) on surface (15 47.949' N, 145 59.502' E)		
2103	1103	OBS 07 (MD) out of water (15 47.924' N, 145 59.562' E)		
No time indicated	15 41.000	145 56.902	767 m OBS ranging for OBS 06 (MA)	
	15 40.992	145 56.897	2374	
	15 40.973	145 56.885	2359	
	15 40.958	145 56.875	1811	
	15 40.943	145 56.866	1094	
	15 40.935	145 56.860	3304	
	15 40.922	145 56.852	2311	
	15 40.908	145 56.844	2316	
	15 40.896	145 56.836	320	
	15 40.886	145 56.828	2281	
	15 40.875	145 56.822	2272	
	15 40.865	145 56.816	2265	
	15 40.856	145 56.809	1085	
	15 40.846	145 56.802	2253	
	15 40.837	145 56.795	2246	
	15 40.829	145 56.789	2240	
	15 40.823	145 56.784	1194	
	15 40.815	145 56.778	2232	
2229	1229	OBS 06 (MA) on surface (15 40.159' N, 145 57.314' E)		
2237	1237	OBS 06 (MA) out of water (15 40.042' N, 145 57.351' E)		
2321	1321	15 33.239	145 54.847	1246 m start of ranging for OBS 05 (CT)
		15 33.193	145 54.830	2549
		15 33.153	145 54.816	1160
		15 33.117	145 54.799	2447
		15 33.080	145 54.787	2007
		15 33.049	145 54.773	2368
		15 33.023	145 54.762	728
		15 32.996	145 54.750	2308
		15 32.974	145 54.739	315
		15 32.952	145 54.726	2009
		15 32.935	145 54.718	2244
		15 32.917	145 54.712	1807

		15 32.905	145 54.707	302	
		15 32.890	145 54.701	2197	
		15 32.878	145 54.698	2184	
		15 32.868	145 54.698	949	
		15 32.857	145 54.695	2162	
		15 32.847	145 54.691	2152	
4/21	0006	1406	OBS 05 (CT) out of water (15 32.088' N, 145 55.247' E)		
Sun	0052	1452	15 25.102	145 52.792	1142 m start of ranging for OBS 04 (GA)
			15 25.068	145 52.780	1987
			15 25.017	145 52.764	861
			15 24.968	145 52.745	92
			15 24.891	145 52.720	1989
			15 24.851	145 52.700	637
			15 24.802	145 52.686	247
			15 24.744	145 52.665	459
			15 24.690	145 52.645	1534
			15 24.634	145 52.626	1902
			15 24.583	145 52.605	1723
			15 24.540	145 52.586	366
			15 24.489	145 52.579	1664
			15 24.449	145 52.579	1771
			15 24.406	145 52.592	563
			15 24.379	145 52.605	1671
			15 24.357	145 52.630	1615
			15 24.337	145 52.662	1559
			15 24.326	145 52.688	1509
			15 24.316	145 52.719	1461
0138		1538	OBS 04 (GA) on the surface (15 23.996' N, 145 53.217' E)		
0147		1547	OBS 04 (GA) out of water (15 24.097' N, 145 53.390' E)		
0421		1821	OBS 03 (NJ) on surface (15 01.953' N, 145 44.802' E)		
0430		1830	OBS 03 (NJ) out of water (15 01.741' N, 145 44.919' E)		
0504		1904	3.5 kHz Paper Out. (recovered about 10 min. later)		
055325		195325	14 50.589	145 36.426	2582 m start of ranging for OBS 02 (PA) (sampling interval 20 sec.)
			14 50.550	145 36.421	1439
			14 50.503	145 36.413	279
			14 50.440	145 36.401	3390
			14 50.415	145 36.396	1834
			14 50.381	145 36.371	77
			14 50.375	145 36.350	3285
			14 50.376	145 36.331	1066
			14 50.375	145 36.294	3836
			14 50.372	145 36.271	2172
			14 50.369	145 36.247	559
			14 50.365	145 36.209	3280
			14 50.362	145 36.182	1513

		14 50.356	145 36.142	4095
		14 50.354	145 36.112	2424
		14 50.349	145 36.085	696
	195832	14 50.346	145 36.035	2347
		14 50.346	145 36.009	1453
		14 50.339	145 35.961	3764
		14 50.330	145 35.914	5658
	200000	14 50.330	145 35.888	3206
		14 50.331	145 35.852	922
		14 50.327	145 35.805	2730
		14 50.321	145 35.770	519
		14 50.318	145 35.722	2456
		14 50.317	145 35.690	312
		14 50.311	145 35.644	2179
		14 50.309	145 35.602	306
		14 50.307	145 35.553	1632
		14 50.304	145 35.512	3702
		14 50.301	145 35.483	1408
		14 50.298	145 35.438	2494
		14 50.297	145 35.403	1749
		14 50.294	145 35.367	3884
		14 50.293	145 35.338	1776
		14 50.291	145 35.307	104
		14 50.291	145 35.283	578
		14 50.289	145 35.258	2576
0623	2023	OBS 02 (PA) on surface (14 50.456' N, 145 35.210' E)		
0629	2029	OBS 02 (PA) alongside ship (14 50.309' N, 145 35.323' E)		
0630	2030	OBS 02 (PA) on deck (14 50.297' N, 145 35.330' E)		
????	????	14 44.331	145 ??.???	2634m start of ranging for OBS 01 (DE)
		?? ??.???	??? ??.???	2587
		14 44.290	145 31.252	2077
		14 44.267	145 31.238	1492
		14 44.244	145 31.222	729
0715	2115	14 44.220	145 31.205	152
		14 44.193	145 31.187	2394
		14 44.169	145 31.173	2781
		14 44.146	145 31.155	2326
		14 44.120	145 31.140	2293
		14 44.100	145 31.119	2252
		14 44.096	145 31.092	2211
		14 44.095	145 31.064	1149
		14 44.092	145 31.036	2122
		14 44.090	145 31.003	2070
		14 44.089	145 30.971	2021
		14 44.087	145 30.940	1970
		14 44.081	145 30.905	1918
		14 44.078	145 30.867	79

		14 44.080	145 30.837	1841
		14 44.079	145 30.814	1794
		14 44.074	145 30.773	1764
0721	2121	14 44.072	145 30.744	1703
		14 44.071	145 30.727	1658
0722	2122	14 44.070	145 30.703	1614
0750	2150	OBS 01 (DE) on surface (14° 44.163' N, 145° 29.818' E)		
0758	2158	OBS 01 (DE) alongside ship (14° 43.957' N, 145° 29.966' E)		
0759	2159	OBS 01 (DE) on deck (14° 43.953' N, 145° 29.967' E)		
		Transitting to OBS 36 (NV)		
1839	JD111 0839	OBS 36 (NV) on surface (16° 34.744' N, 145° 46.980' E)		
1845	0845	OBS 36 (NV) alongside ship (16° 34.572' N, 145° 47.089' E)		
		deck at 0849, ETA for OBS 37 (NE) at 1917		
1956	0956	OBS 37 (NE) on surface (16° 40.011' N, 145° 47.962' E)		
2011	1011	OBS 37 (NE) alongside ship (16° 39.881' N, 145° 48.085' E)		
		deck at 1012, ETA for OBS 38 at 1040		
2050	1050	OBS 38 (CO) expected at 1115		
2114	1114	OBS 38 (CO) on surface		
2122	1122	OBS 38 (CO) alongside ship (16° 45.209' N, 145° 49.107' E)		
		deck at 1123, ETA for OBS 39 at 1208		
2224	1224	OBS 39 (ND) on surface		
2243	1243	OBS 39 (ND) alongside ship (16° 50.612' N, 145° 49.179' E)		
		deck at 1244, ETA for OBS 40 at 1312		
2348	1348	OBS 40 (SD) on surface		
2356	1356	OBS 40 (SD) alongside ship (16° 55.962' N, 145° 49.094' E)		
		deck at 1357		
4/22	0044	1444 OBS 41 (MT) expected on surface at 1507		
Mon	0125	1525 OBS 41 (MT) alongside ship (17° 01.428' N, 145° 49.047' E)		
		deck at 1527, ETA for OBS 42 at 1557		
	0208	1608 OBS 42 (WA) expected on surface at 1700		
	0300	1700 OBS 42 (WA) on surface		
	0310	1710 OBS 42 (WA) alongside ship (17° 06.794' N, 145° 49.060' E)		
		deck at 1711		
	0355	1755 OBS 43 (ID) expected on surface at 1840		
	0442	1842 OBS 43 (ID) on surface		
	0451	1851 OBS 43 (ID) alongside ship (17° 12.299' N, 145° 48.882' E)		
	0452	1852 OBS 43 (ID) on deck (17° 12.226' N, 145° 48.882' E)		
	0534	1934 OBS 44 (WY) expected on surface at 1947		
	0550	1950 OBS 44 (WY) on surface		
	0556	1956 OBS 44 (WY) alongside ship (17° 17.582' N, 145° 48.674' E)		
		on deck at 1958		
	0638	2038 OBS 45 (UT) expected on surface at 2118		
	0719	2119 OBS 45 (UT) on surface		
	0728	2128 OBS 45 (UT) alongside ship (17° 23.046' N, 145° 48.432' E)		
		on deck at 2129		
	0806	2206 OBS 46 (OK) expected on surface at 2253		
	0854	2254 OBS 46 (OK) on surface		

0900		2300	OBS 46 (OK) Captured (17°28.454' N, 145°48.059' E)
1012	JD112	0012	Zodiac departure for Alamagan.
1039		0039	Zodiac return from Alamagan. We were unable to land because of an apparently low tide. We were at dead low water, with the tide tables reporting a 1.5ft low tide at Guam; at Pagan the corrections are 5 mins or less, and tide heights *0.75 + 0.4 ft. When we landed successfully on 4/4 0800 the tide table reported a 1.6ft low tide at 0700, and a 2.1ft high tide at 1130. So perhaps more significant was the wind/wave conditions: on 4/4 the bridge logged a 2ft swell and 2 kts wind; on 4/22 a 5ft swell and 20kts wind.
1100		0100	1 mile from NM #47, surface expected at 0129
1135		0135	OBS 47 (NM) out of water (17 33.815' N, 145 47.639' E)
1253		0253	OBS 48 (AZ) out of water (17 39.264' N, 145 47.770' E)
1417		0417	OBS 49 (AK) alongside ship (17 44.787' N, 145 48.145' E); on deck at 0419
1548		0548	OBS 50 (HI) on surface
1554		0554	OBS 50 (HI) alongside ship (17 50.157' N, 145 48.678' E); on deck at 0555
1732		0732	OBS 51 (DC) on deck (17 55.522' N, 145 49.161 E)
1900		0900	OBS 52 (PR) on deck (18 00.919' N, 145 49.747' E)
2009		1000	OBS 53 (VI) alongside ship (18 06.240' N, 145 50.130' E); on deck at 1011

**OBEM recoveries; Reftek recovery; Coring**

	2030	1030	In transit to Japanese OBEM8. ETA 1155 (shiptime)
4/23 Tue	0002	1402	Engine stopped and hydrophone in water for first OBEM retrieval; hydrophone out of water at 1425
	0111	1511	Second call for OBEM; hydrophone out of water at 1521
	0150	1550	Third call for OBEM
	0403	1603	OBEM #8 surface
	0422	1622	OBEM #8 alongside ship (18 13.338' N, 145 12.437' E); out of water at 1624
	0557	1957	hydrophone in water for OBEM #9; hydrophone out of water 2022
	0718	2118	OBEM #9 on surface (not yet sighted); sighted at 2124
	0730	2130	OBEM #9 alongside ship (18 21.832' N, 145 45.099' E); waisted and captured 2134. Begin transit to first core site.
	1811	JD113 0811	Switch 3.5 kHz to 12 kHz, receive only
	1831	0831	First core in water (16 45.056' N, 146 32.974' E) between AR and MO on outer-forearc line.
	1845	0845	Pinger attached; start of core descent.
	1902	0902	Pinger at 1 sec
	1936	0936	Winch stopped for repairs
	2005	1005	Winch started
	2007	1007	Winch stopped 90 m off bottom (from 12 kHz)
	2011	1011	Winch started

	2013	1013	Corehead and pinger both at ocean bottom (depth 3362.5 m)
	2017	1017	Start up at 20 m/min until corehead off bottom; then proceed up at 50 m/min
	2029	1029	Pinger is 1500 m off bottom; 3000 m off bottom at 1059
	2103	1103	Core out of water; on deck at 1113. Zero core material retrieved; nomud, no sand, no damage to core barrel. Proceeding to WV core site.
4/24	0158	1558	Core in water at second site (16 29.301' N, 145 46.047' E) (WV)
Wed	0219	1619	750 m off bottom
	0230	1630	75 m off bottom
	0310	1710	Core out of water. Zero core material retrieved; a possible trace of grey mud, no sand. One possible new knick in the tip of the corebarrel; possibly new scratches on the pinger. Proceeding to third site.
	0536	1936	Core in water at third site (146 09.433' N, 145 42.172' E), between CA and MN. We placed a layer of mastic over the core barrel to see if any material would adhere, even if nothing entered the barrel.
	0619	2019	Corehead in bottom; out of bottom at 2022
	0700	2100	Pinger off
	0702	2102	Core out of water; on deck at 2106. Zero recovery. The mastic was apparently cut by the impact, but nothing adhered, and nothing was collected by the core catcher.
	0717	2117	3.5 kHz on. Proceed to Anatahan.
	0845	2245	The Ewing hove to at 16d19.858N, 145d38.254E (WGS-84) Departure for Anatahan in Zodiac. Four locals in a Klamath aluminum skiff caused the Captain concern re. piracy, and required our brief return to the Ewing; then we talked to them and they were simply curious about us. Personnel: Simon, Bryan, Mark Gibaud; Dave W, Marcy, Jack. Landed on a fairly low tide on a steep boulder beach, 200m ESE of the most obvious landing site, in accord with Allan Sauter's notes (beach at 16d20.204N, 145d38.727E). Allan Sauter's field notes allowed us to easily locate the Reftek installation: a single Reftek, with L-28 sensor, GPS, solar panel and battery. 16D20.192N, 145d38.785E. All GPS locations are referred to WGS-84. Note that NOAA chart 81086 is referred to WGS-72. Reftek apparently has data through JD107 (EOL#70). Miscellaneous basalts collected for Ernie Matson, University of Guam.
	1025	JD114 0025	Zodiac returns to Ewing from Anatahan with RefTek and several samples of basalt.
	1100	0100	In transit to Guam, via waypoints west of the arc to supplement existing hydrosweep coverage. Continuing data reduction for OBSs. 51 of 53 OBSs have recorded the full data-set (12,557 shots).

Station 08–SC recorded through line#40, then stopped, for unknown causes (?mechanical or electrical failure?).

Station 53–VI was deployed with the seismometer and hydrophone disconnected from the data–logger (operator error!).

During 53 recoveries, 52 releases burned as designed; one release failed to burn the first wire but successfully burned the second wire.

During 53 recoveries, we lost one flag; all other gear successfully retrieved.

4/25 0730  
Thur

Due at pilot buoy, Apra Harbor, Guam,