

105009
EWING 98051



COASTAL AND MARINE GEOLOGY PROGRAM
WOODS HOLE FIELD CENTER (WHFC)



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SEISMIC/GEOPHYSICS LOG
DATA REDUCTION
SUMMARY
LDEO

SHIP AND CRUISE: Maurice Ewing EWING 98051

AREA: Chesapeake Bay + offshore

DATES: October 15 - 16, 1998

CHIEF SCIENTIST: C. Wylie Peag

R/V Maurice Ewing

Data Reduction Summary

EW9809 – Chesapeake Bay, Virginia

October 15 – 16, 1998

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Data Reduction Summary

Summary of Data Processing for
Chesapeake Bay Survey

Lamont-Doherty Science Crew List

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Cruise Notes

All times specified within this report are GMT.

After several startup problems, mostly due to using a new UTC clock for the cruise, the shooting began at 14:14:49, and was interrupted once on the turn between lines Bay2 and Bay3 due to a software problem that was quickly resolved.

However, this software problem had gone unnoticed for several hours. Although it didn't interrupt the shooting process, it did cause incorrect shot positions to be put on the tape. This problem was corrected in post-processing for shot positions, but the 3490 tapes have incorrect shotpoint positions.

After switching from shore to ship power, the Truetime clock had trouble starting up. Due to this, shooting was based on the the Datum clock. There were troubles using the Datum for synchronizing CPU time and shooting at the same time, so until the Truetime clock came back on October 15, 21:36:59.

Due to the extreme difference in gravity between Halifax and Norfolk, and the fact that the BGM gravity was extremely close to the reference gravity, I did not reprocess the gravity using the previous tie. However, I did reprocess by subtracting 0.34 from all gravity fixes.

Cruise Data

See *Data Instruments* for more precise definitions of these fields.

Data Type	File	Description	Log Interval	Days Collected
UTC time	tr2	Datum UTC time clock	60 seconds	288 - 289
UTC time	tr1	Truetime UTC time clock	60 seconds	288 - 289
Furuno	fu	Furuno speed and heading	3 second	288 - 289
Y Code GPS	gp1	Tasman Ycode receiver	10 second	288 - 289
Trimble GPS	gp2	Differential GPS	10 second	288 - 289
Magnavox GPS	gp3	Selective availability GPS	10 second	288 - 289
Gravity	vc	Bell gravimeter data	1 second	288 - 289
Sea Temp	ct		60 second	288 - 289
Meteorology	wx	Weather Station	60 second	288 - 289
Gun Depths	dg	Depths of each gun at shot	shot	288 - 289
Navblock	nb	Time/Position/Shotpoint	120	288 - 289

Logging

All logged data (*except GPS and Shot data*) is synchronized to the CPU time of the logging computer, which in turn is synchronized to the UTC time.

GPS time is extracted from the GPS fix data.

Shot times are from the UTC synchronized time.

Data Instruments

The following times are specified in GMT time.

Datum UTC Time Clock

The Datum 9390-1000 Startime GPS clock is logged at 60 second intervals. CPU time is synchronized every 60 seconds to this clock.

Date	Comment
288:0000	Start UTC Sync
288:14:00	Start shooting, end Datum Sync

Truetime UTC Time Clock

The Truetime GPS clock is logged at 60 second intervals. CPU time is synchronized every 60 seconds to this clock.

Date	Comment
288:21:36:59	Start UTC Sync
289:13:53:00	End EW9809

Furuno Speed and Heading

The Furuno CI-30 2 axes doppler speed log and Sperry MK-27 gyro are logged at 3 second intervals.

Date	Comment
288:21:36:59	Truetime clock online
289:13:53:00	End Ew9809

GPS Receivers

- gp1 = Tasman Ycode
- gp2 = Trimble Differential
- gp3 = Magnavox 4200

are logged at 10 second intervals. Navigation is processed and reduced to 1 minute intervals, which is later applied to hydrosweep bathymetry and gravity. All data has been processed using gp4: differential navigation. When differential navigation is not available, Ycode is used.

Date	Comment
288:15:24:36	YCode GPS GP1 online
288:11:10:34	Differential GP2 logging Ew9809
288:00:00:00	GP3 Logging on
289:13:53:01	End Ew9809

Bell Gravimeter

Date	Comment
288:00:00:00	Start Gravity logging
288:13:53:02	EW9809

Weather Station

R.M. Young Precision Meteorological Instruments 26700 Series is used to log a variety of meteorological events at 60 second intervals.

Date	Comment
288:00:00:00	Start weather logging
289:13:53:00	End EW9809

Omega DP-10 Sea Temperature

Date	Comment
288:00:00:00	Start sea temp logging
289:13:53:00	End EW9809

Line Information

Line Name	Julian Date	FSP	SOL Time	LSP	EOL Time
Bay1	288	1	14:14:49	919	17:22:59
Bay2	288/289	920	17:23:11	3761	02:51:23
Bay3	289	0	02:54:19	2956	12:45:32

Gravity Ties

EW 9809 Norfolk, Virginia

Pier/Ship	Latitude	Longitude	Reference	Latitude	Longitude
	36 51.193 N	76 17.896W		36 51.193 N	76 17.896W
NOAA Atlantic Marine Center 439 West York Street Dock 3 Shipped docked directly at reference point!			NOAA Atlantic Marine Center 439 West York Street Dock 3, 150' South of SW corner of Warehouse Bollard 2, Brass Plate		

	Id	Julian	Date	Mistie	Drift/Day	DC Shift
Pre Cruise	None	289	10/16/98	0.00	0.00	0.00
Post Cruise	EW 9809	289	10/16/98	-0.34	#DIV/0!	0.00
Total Days			0.00	-0.34		

Time	Entry	Value	
17:30	CDeck Level BELOW Pier	0.75	meters
17:30	Pier 1 L&R Value	3459.98	L&R
17:30	Reference L&R Value	3459.98	L&R
17:30	Pier 2 L&R Value	3459.98	L&R
7/1/73 0:00	Reference Gravity	979859.40	mGals
17:30	Gravity Meter Value (BGM Reading)	979874.60	mGals
	Potsdam Corrected	1	1 if corrected

Gravity meter is 5.5 meters below CDeck

Difference in meters between Gravity Meter and Pier	6.25	meters
Height Cor = Pier Height* FAA Constant	6.25	0.31
	1.94	mGals/min

Difference in mGals between Pier and Gravity Meter

Pier (avg) - Reference * 1.06 L&R/mGal	Delta L&R
3459.98 3459.98 1.06	0.00 mGals

Gravity in mGals at Pierside

Reference + Delta mGals (+ Potsdam)	Pier Gravity
979859.40 0.00 13.60	979873.00 mgals

Gravity in mGals at Meter

Pier Gravity+ Height Correction	Gravity@meter
979873.00 1.94	979874.94 mGals

Current Mistie

BGM Reading: Calculated Gravity	Current Mistie
979874.60 979874.94	-0.34 mGals

Data Processing

GPS Data Reduction/Processing

Navigation data is post-processed in order to accurately determine the position due to GPS accuracy errors. We perform slightly different processing depending on the type of receiver.

GPS Processing Steps

1. Check data for mutant records and non-sequential times.
2. If we have speed and/or DOP information, remove records that have excessive speed or too high of a DOP¹
3. Convert from NMEA or proprietary format to a standard format
 █ *98+240:00:28:50.091 N 42 14.1536 W 063 25.5897 P-trimble*
4. If we are processing known differential data, remove non-differential fixes from the file.
5. Interpolate and reduce data. Fixes are reduced to 30 second fixes and any minor gaps (< 3 minutes) are linearly interpolated.
6. Smooth data using a 9 point running average algorithm and further reduce data to 60 second fixes.
7. Perform dead reckoning using the smoothed Furuno speed and heading to fill in major gaps (> 3 minutes) and to insure the accuracy of the GPS data. By performing dead reckoning, we can determine the drift of the GPS vs. the speed and heading. Any huge distances will alert us to a problem.

Furuno Processing

Furuno speed and heading is processed by smoothing the data using a vector summing algorithm. Data is reduced and output at 1 minute intervals by taking the smoothed values and calculating the mean value for the 30 seconds before and after the whole minute.

Hydrosweep Processing

Centerbeam Processing steps

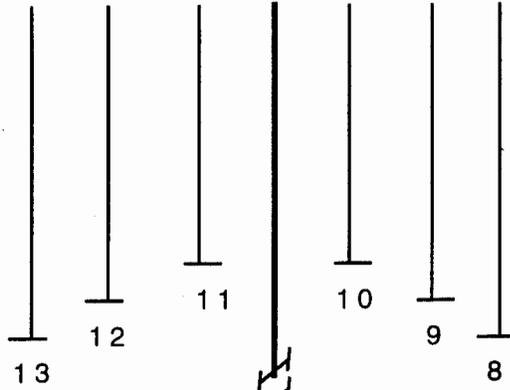
1. Remove all survey and calibration records from the raw data and all 0 level depths.

1.2m 1.5m 1.2m

00 (stern)



FWD



35m
40m
45m

Gun No.	Vol(cu in)
8	500
9	305
10	200
11	145
12	120
13	80

100m tow

100m

25m str.

125m

*GUN TOWING
DEPTH 812m*

13m act.

ch 1

138m

12.5m act

AIR-200PSI

25m act.

ch 4 (no signal)

6 SEC RECORDING

163m

12 SEC SHOOTING INTERVAL

STREAMER DEPTH 4.5m

50m act

ch 2

213m

50m act.

ch 3

263m

Bay Crater Survey
Streamer and Gun Layout
R/V Ewing 16 Oct 1998