

Lamont– Doherty Earth Observatory
 Office of Marine Affairs
 61 Route 9W
 Palisades, NY 10969

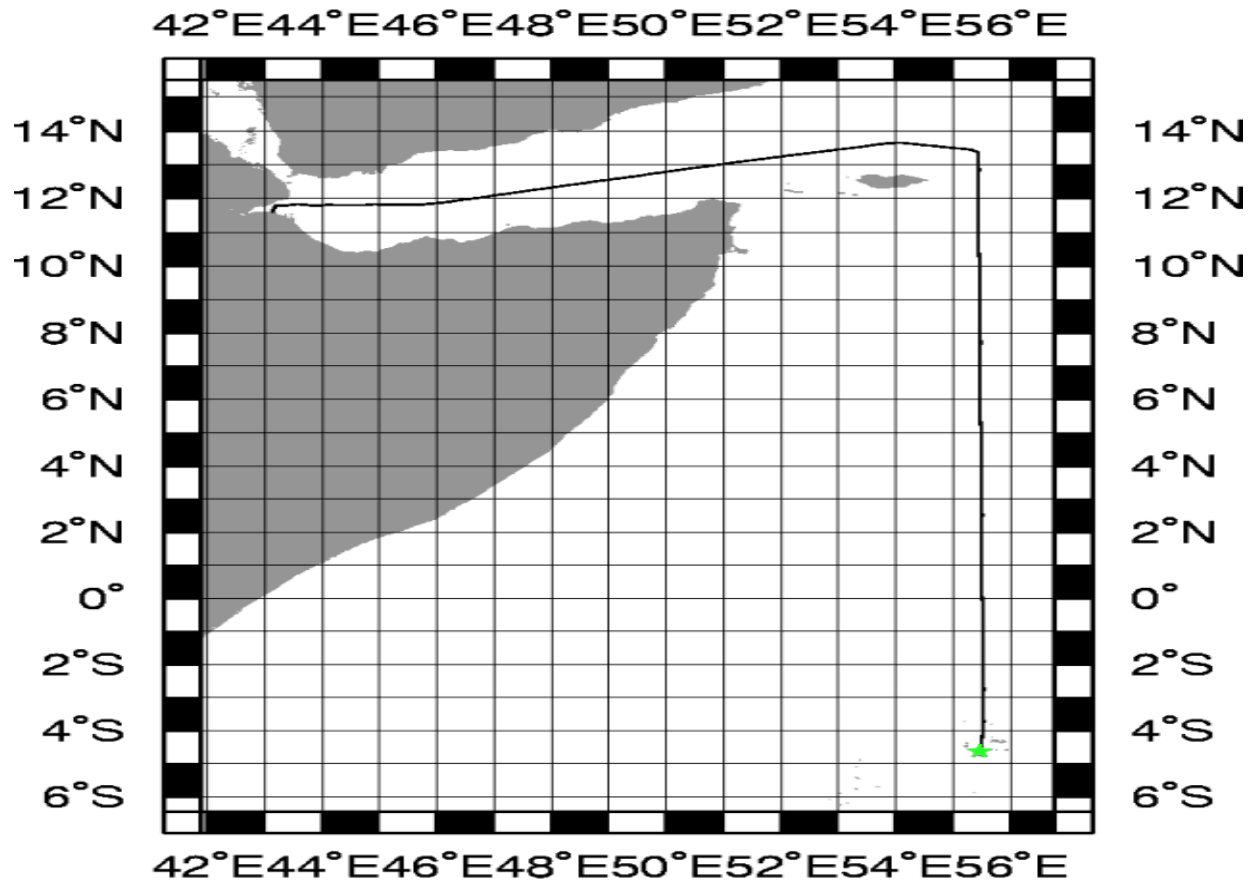


Prepared By: Ethan Gold
 etgold@ldeo.columbia.edu
 845 365-8677

R/V Maurice Ewing Data Reduction Summary

EW-0111 Djibouti – Seychelles

Date	Julian Date	Time	Port
September 13, 2001	232	15:30 UTC	Djibouti
September 20, 2001	263	04:44 UTC	Victoria, Seychelles



GMT 2001 Sep 23 17:49:51 TO DATE

Project Summary

DESCRIPTION

Background and Scientific Objectives

This cruise was a transit. Maggie and Gravity were logged. No MCS, no CTD.

Cruise Members

Science Party

Brian Taylor	Chief Scientist	taylor@soest.hawaii.edu
Andrew Goodliffe	Co-chief Scientist	andrew@soest.hawaii.edu
Masako Sugimoto	Scientist	masako@soest.hawaii.edu
Tony Rudge	Scientist	trudge@mail.earth.monash.edu.au
Pilar Estrada	Scientist	
Alison Walker	Scientist	awalker@mit.edu
Erica Key	Scientist	ekey@rsmas.miami.edu

Ship's Science

Chris Leidhold	Science Officer	sci@ewing.ldeo.columbia.edu
Ted Koczynski	ET	Tedski@ldeo.columbia.edu
Ethan Gold	Systems Manager	etgold@ldeo.columbia.edu
Ropate Maiwiriri	Technician	
Hamish Gordon	Technician	gordon@ewing.ldeo.columbia.edu

Ship Crew

James O'Loughlin	Captain	captain@ewing.ldeo.columbia.edu
Steven Pica	Chief Engineer	engine@ewing.ldeo.columbia.edu
Stanley Zeigler	Chief Mate	deck@ewing.ldeo.columbia.edu
David Wolford	2 nd Mate	wolf@ewing.ldeo.columbia.edu
Meredith Mecketsy	3 rd Mate	mecketsy@ewing.ldeo.columbia.edu
Paul Morris	1 st A/Engineer	morris@ewing.ldeo.columbia.edu
Anthony Lanzillotti	2 nd A/Engineer	tonylanz@ewing.ldeo.columbia.edu
Michael Spruill	3 rd A/Engineer	mikes@ewing.ldeo.columbia.edu
Ryan Dennis	Steward	ryan@ewing.ldeo.columbia.edu
David Philbrick	Bosun	davidp@ewing.ldeo.columbia.edu
Wakefield Walker	A/B	walker@ewing.ldeo.columbia.edu
Bryan Ruegg	A/B	ruegg@ewing.ldeo.columbia.edu
David Duca	A/B	duca@ewing.ldeo.columbia.edu
Elizabeth Scanland	A/B	escan@ewing.ldeo.columbia.edu
Frederick McNeal	O/S	tbear@ewing.ldeo.columbia.edu
Kenneth Bascom	Oiler	
Thomas Dulan	Utility	dulan@ewing.ldeo.columbia.edu
Calvin Lawson	Oiler	calvin@ewing.ldeo.columbia.edu
Hakeem Herndon	Oiler	herndon@ewing.ldeo.columbia.edu
Jack Schwartz	Electrician	jack@ewing.ldeo.columbia.edu

Cruise Notes

All data in this report is logged using GMT time and Julian days in order to avoid confusion with local time changes.

The ship lost all power the night before pulling into port (day 262), and the logging was restarted several times as things were coming back up.

Hydrosweep

The Hydrosweep online workstation had its hard drive replaced. It seems to be functioning as before, except the scsi controller driver doesn't load automatically. The code in the IPS for this cruise was NOT patched to fix the stair-stepping problem.

Thermosalinograph

The TSG was off for the first couple days of the cruise.

Gravity

The power failure killed the gravity's gyro. Chris will fix it in port.

Data Logging

The R/V Maurice Ewing data logging system is run on a Sparc Ultra Enterprise Server. Attached are 48 serial ports via 3 16-port Digi International SCSI Terminal Servers. Generally, all data logged by the Ewing Data Acquisition System (DAS) is time stamped with the CPU time of the server, and broadcast to the Ewing network using UDP packet broadcasts. The CPU time of the server is synchronized once every half hour to a Datum UTC gps time clock.

GPS times are also time-tagged with cpu time, although the time of the GPS position is from the GPS fix itself.

The following tables describe the data instruments which performed logging during this cruise. The tables associated with the instruments describe logging periods and data losses for that instrument.

Time Reference

Datum StarTime 9390-1000

logging interval: 30 minutes
file id: tr2

Used as the CPU synchronization clock. This clock is polled once every half hour to synchronize the CPU clock of the data logger to UTC time. The logger (octopus) is responsible for updating the times of the other CPUs.

This clock was running and synchronizing the system the entire cruise.

Interruptions greater than 30 minutes are displayed in the following table

Log Date	LogDate	Comment
2001+256:00:23:29.733		Logging officially started
2001+256:12:23:29.812	2001+262:22:00:30.089	
2001+263:04:30:30.011		Logging officially ends

GPS Receivers

GPS data is usually logged at 10 second intervals. The NMEA strings GPGGA and GPVTG are logged for position, speed, and heading fixes. This data was logged constantly throughout the cruise.

The Tasmon GPS was the primary GPS for this cruise.

Trimble Tasmon P/Y Code Receiver

logging interval: 10 seconds
file id: gp1

The Tasmon is the primary GPS receiver for the Ewing Logging system and the primary GPS

for Spectra fixes. The accuracy is around 15 meters. There were no interruptions during this cruise.

Interruptions greater than 10 minutes are displayed in the following table

Log Date	LogDate	Comment
2001+256:00:00:01.652		Logging officially started
2001+256:09:38:41.734	2001+256:13:51:13.496	
2001+262:20:13:52.638	2001+262:22:01:37.224	
2001+263:09:27:56.425		Logging officially ends

Trimble NT200D

logging interval: 10 seconds
file id: gp2

The Trimble is the secondary receiver for GPS data. Data is logged at 10 second intervals and is also used as an input to Spectra, although it is weighed at a lower value than the Tasmon receiver.

Interruptions greater than 10 minutes are displayed in the following table

Log Date	LogDate	Comment
2001+256:00:00:03.994		Logging officially started
2001+256:00:17:13.755	2001+256:14:07:09.013	
2001+257:07:45:03.008	2001+257:08:02:15.176	
2001+260:10:43:37.162	2001+260:14:37:55.830	
2001+262:20:13:42.965	2001+262:22:17:41.610	
2001+263:09:28:00.217		Logging Ends

Tailbuoy Garmin GP8

logging interval: 10 seconds
file id: tb1

The tailbuoy was not used.

Interruptions greater than 30 minutes are displayed in the following table

Log Date	Log Date	Comment
		Tailbuoy logging starts
		Tailbuoy logging officially ends

Speed and Heading

Furuno CI-30 Dual Axis Speed Log Sperry MK-27 Gyro

logging interval: 6 seconds

file id: fu

The Furuno and Gyro are combined to output speed, heading and course information to a raw Furuno file, as well as an NMEA VDVHW signal used as an input to various systems including steering and Spectra.

Interruptions greater than 30 minutes are displayed in the following table

Log Date	Log Date	Comment
2001+256:00:00:02.752		Official start date
2001+256:09:38:41.754	2001+256:13:52:10.472	
2001+262:20:13:45.316	2001+262:22:01:56.388	
2001+263:09:27:59.005		Official end date

Gravity

Bell Aerospace BGM-3 Marine Gravity Meter System

logging interval: 1 second
file id: vc. (raw), vt. (processed)
drift per day: 0.035

The BGM consists of a forced feedback accelerometer mounted on a gyro stabilized platform. The gravity meter outputs raw counts approximately once per second which are logged and processed to provide real-time gravity displays during the course of the cruise as well as adjusted gravity data at the end of the cruise.

The gravimeter did not come back up after the power failure on J262.

Interruptions greater than 10 minutes are displayed in the following table

Log Date	Log Date	Comment
2001+256:00:00:00.391		Official start date
2001+256:09:38:41.514	2001+256:13:52:58.382	
2001+262:22:27:41.547		Official end time

Bathymetry

Krupp Atlas Hydrosweep-DS2

logging interval: variable based on water depth
file id: hb (centerbeam), hs (swath)

The hydrosweep full swath data is continuously logged for every cruise, and centerbeam data is extracted and processed separately. The centerbeam operates at a logging frequency dependent on the water depth.

The full swath data is not routinely processed, but can be processed with the MB-System software which can be downloaded for free. For instructions, use the website:

<http://www.ldeo.columbia.edu/MB-System>.

MBSystem, version 5.0beta3 is necessary to process data after June 1, 2001.

Interruptions greater than 10 minutes are displayed in the following table

Log Date	LogDate	Comment
2001+256:00:00:01.000		Official start logging
2001+256:09:38:37.000	2001+256:13:54:50.000	
2001+257:07:42:10.000	2001+257:07:57:11.000	
2001+262:20:13:29.000	2001+262:22:28:33.000	
2001+263:09:27:47.000		Official end logging

Weather Station

RM Young Precision Meteorological Instruments, 26700 series

logging interval: 1 minute
file id: wx

The weather station is used to log wind speed, direction, air temperature, and barometric pressure. We log this information at 1-minute intervals.

Log Date	LogDate	Comment
2001+256:00:00:00.920		Official start logging
2001+256:09:38:00.017	2001+256:13:54:42.401	
2001+257:07:42:00.604	2001+257:07:57:53.813	
2001+262:20:13:00.506	2001+262:22:05:12.303	
2001+263:09:28:00.306		Official end logging

Magnetics

Varian Magnetometer

logging interval: 12 seconds
file id: mg

The following table shows the times the magnetometer was logging

Start Log Date	End LogDate	Comment
2001+257:05:41:00.070		Instrument deployed
2001+262:03:43:22.428		Instrument recovered

Gravity Ties

Location 1

EW0108 Piraeus, Greece

Pier/Ship	Latitude	Longitude
	37 56.297N	23 38.160E

At the east corner of the pier in front of the Piraeus Port Authority building

Reference	Latitude	Longitude
	37 56.46N	23 38.40E

At the Lat/Lon reported by Andrew's handheld GPS, near the customs gate exit

	Id	Julian	Date	Mistie	Drift/Day	Prev Mistie
Pre Cruise	EW0104	104	04/14/2001	8.99	0.08	8.25
Post Cruise	EW0108	213	08/01/2001	22.69	0.126	8.99
Total Days			109.00	13.70		

Time	Entry	Value	
09:25	CDeck Level BELOW Pier	0.00	
10:13	Pier 1 L&R Value	3636.55	L&R
10:45	Reference L&R Value	3637.11	L&R
11:08	Pier 2 L&R Value	3636.55	L&R
	Reference Gravity	980048.20	mGals
	Gravity Meter Value (BGM Reading)	980072.00	mGals
	Potsdam Corrected	0	1 if corrected

Gravity meter is 5.5 meters below CDeck

Difference in meters between Gravity Meter and Pier	5.50	meters		
Height Cor = Pier Height* FAA Constant	5.50	0.31	1.71	mGals/min

Difference in mGals between Pier and Gravity Meter

Pier (avg) - Reference * 1.06 L&R/mGal	Delta L&R			
3636.55	3637.11	1.06	-0.60	mGals

Gravity in mGals at Pierside

Reference + Delta mGals [+ Potsdam]	Pier Gravity			
980048.20	-0.60	0.00	980047.60	mGals

Gravity in mGals at Meter

Pier Gravity+ Height Correction	Gravity@meter		
980047.60	1.71	980049.31	mGals

Current Mistie

BGM Reading	Calculated Gravity	Current Mistie	
980072.00	980049.31	22.69	mGals

EW0111 Victoria, Seychelles

Pier/Ship	Latitude	Longitude
	04 37.503S	55 27.732E
At the north corner of the pier near the bow of the Ewing		
Reference	Latitude	Longitude
	4 37.5360S	27.2520E
Seychelles National Archives, left corner of the top step at the main entrance		

	Id	Julian	Date	Mistie	Drift/Day	Prev Mistie
Pre Cruise	EW0108	213	08/01/2001	22.69	0.13	8.25
Post Cruise	EW0111	264	09/21/2001	27.73	0.099	22.69
Total Days			51.00	5.04		

Time	Entry	Value	
09:25	CDeck Level BELOW Pier	0.00	
09:30	Pier 1 L&R Value	18160.00	L&R
11:10	Reference L&R Value	18156.50	L&R
11:28	Pier 2 L&R Value	18148.00	L&R
	Reference Gravity	978116.41	mGals
	Gravity Meter Value (BGM Reading)	978143.20	mGals
	Potsdam Corrected	0	if corrected

Gravity meter is 5.5 meters below CDeck

Difference in meters between Gravity Meter and Pier	5.50	meters
Height Cor = Pier Height* FAA Constant	5.50	0.31
		1.71
		mGals/min

Difference in mGals between Pier and Gravity Meter

Pier (avg) - Reference * 1.06 L&R/mGal	Delta L&R
18154.00 18156.50 1.06	-2.65
	mGals

Gravity in mGals at Pierside

Reference + Delta mGals [+ Potsdam]	Pier Gravity
978116.41 -2.65 0.00	978113.76
	mgals

Gravity in mGals at Meter

Pier Gravity+ Height Correction	Gravity@meter
978113.76 1.71	978115.47
	mGals

Current Mistie

BGM Reading	Calculated Gravity	Current Mistie
978143.20	978115.47	27.73
		mGals

File Formats

For all formats, a – in the time field means an invalid value for some reason.

Streamer Compass/Bird Data

cb.r

This data is not processed, but can still be found in the "processed" data directory.

```
Shot Time      Line   Shot   Latitude   Longitude
2000+079:00:08:40.085 strike1 000296  N 15 49.6217 W 060 19.8019

2nd GPS Position                               Tailbuoy Position
Latitude   Longitude                               Latitude   Longitude
N 15 49.6189 W 060 19.8101   N 15 47.1234 W 060 20.1901

Furuno Streamer
Gyro      Compasses & Heading
344.1      C01 2.3 C02 1.7 ...
```

Gun Depths

dg

Gun depths in tenths of meters. There will always be 20 gundepths even if only one gun was configured and shooting.

```
Shot Time      Gun Depths
                   1  2  3  4  5  6  7  8  9  ... 20
2001+089:06:47:05.909 189 068 005 005 096 005 060 054 005 ... 6
```

Raw Furuno Log

fu.s

This data has been smoothed and output 1 fix per minute.

```
CPU Time Stamp   Track Speed Hdg  Gyro
2000+166:00:01:53.091 -    4.4   140.5 148.3
```

Hydrosweep Centerbeam

hb.n

Hydrosweep data merged with navigation

```
CPU Time Stamp   Latitude Longitude   Depth
2000+074:09:55:00.000 N 13 6.6206   W 59 39.3908  134.9
```

Merged Data

m

```
CPU Time Stamp   Latitude   Longitude   GPS
                   Used  Set  Drift Depth
2000+200:12:25:00.000 N 45 54.1583 W 42 47.1770   gp1  0.0  0.0

Magnetic                               Gravity
Total Intensity Anomaly   FAA GRV   EOTVOS Drift Shift
49464.7          55.5          22.2 980735.0  -8.4   -0.1   2.8

Temperature Salinity Conductivity
0.0           0.0       0.0
```

The gravity drift and shift are values that have been added to the raw gravity to make up for drift in the meter that has been lost in accordance with a gravity check at each port stop.

Temperature, Salinity and Conductivity will only be valid while logging a Thermosalinograph, which is not usually the case.

Magnetics Data

mg.n

- A minus sign in the time stamp is flagged as a spike point, probably noise...
- Anomaly is based on the International Geomagnetic Reference Field revision 2000

CPU Time Stamp	Latitude	Longitude	Raw Value	Anomaly
200+077:00:23:00.000	N 16 11.2918	W 59 47.8258	36752.2	-166.8

Navigation File

n

CPU Time Stamp	Latitude	Longitude	Used	Set	Drift
2000+074:00:03:00.000	N 13 6.2214	W 59 37.9399	gpl	0.0	0.0

Raw Gravity Counts

vc.r

sample BGM-3 gravity count record (without time tag):
 pp:dddddd ss
 | | | _____ status: 00 = No DNV error; 01 = Platform DNV
 | | | _____ 02 = Sensor DNV; 03 = Both DNV's
 | | | _____ count typically 025000 or 250000
 | _____ counting interval, 01 or 10

 The input of data can be at 1 or 10 seconds.

Gravity Data

vt.n

- * A minus sign in the time stamp is flagged as a spike point
- * m_grv3 calculates the Eotvos correction as:

$$\text{eotvos_corr} = 7.5038 * \text{vel_east} * \cos(\text{lat}) + .004154 * \text{vel} * \text{vel}$$
- * The theoretical gravity value is based upon different models for the earth's shape.
 1930 = 1930 International Gravity Formula
 1967 = 1967 Geodetic Reference System Formula
 1980 = 1980 Gravity Formula
- * The FAA is computed as:

$$\text{faa} = \text{corrected_grv} - \text{theoretical_grv}$$
- * Velocity smoothing is performed w/ a 5 point window

CPU Time Stamp	Latitude	Longitude	Model	FAA	RAW
2000+148:00:10:00.000	N 09 34.7255	W 085 38.5826	1980	9.48	978264.16

Eotvos	Drift	DC	Raw Velocity	Smooth Velocity
Smooth	Total	Shift	North	East
-74.78	0.06	4.16	1.875 -10.373	1.927 \10.166

Datum Time

ts2.r

CPU Time	Datum Time	Time Reference
2001+069:00:15:29.727	069 00 15 29.378	datum

Raw GPS is in NMEA Format.

Meteorological Data

WX

```

                                True
CPU Time Stamp      Spd Dir
2001+045:00:00:00.967  7.8  22

Bird1:
Speed              Direction          Bird 2
Inst 60sA  60mA  60sM  Inst 60sA  60mA          Speed              Direction
Inst 60sA  60mA  60sM  Inst 60sA  60mA          Inst 60sA  60mA  60sM  Inst 60sA  60mA
7.8  6.6   8.5  16.8  277  291  5          0.0  0.0  0.0  0.0  0  0  0

Temperature          Humidity
Inst 60mA  60mm  60mM          Inst 60mm  60mM          Barometer
15.0  14.2  14.3  15.1          92  90  93          1027.5

Inst:      Current
60sA:      60 second average
60mA:      60 minute average
60sM:      60 second maximum
60mm:      60 minute minimum
60mM:      60 minute maximum

```

Merged Meteorological Data

mmet

```

TSG, WX, CT merged with Nav at 1 minute fixes
date      time      lat      lon      gpu head spd
2001+244:00:00:00.000  12.14071  44.98469  gp1 10.2 83.0

tws twd  temp hum  press  cti  cte  con sal  ct
26.5 228.0 30.6 87.0 1000.8 28.8 28.8 5.9 36.3 28.8

gpu = gps unit in use
head = ship's heading
spd = ship's speed in knots
tws = true wind speed
twd = true wind direction
temp = air temp (celcius)
hum = relative humidity (%)
press= pressure in mb
cti = sea temp from the internal TSG sensor
cte = sea temp from the external TSG sensor
con = conductivity, Siemens/meter
sal = salinity, practical salinity units
ct = sea temp from the C-keel sensor (to tenths of a degree)

```

Tape Contents

EW0111/	
CruiseReport_EW0111.pdf	this document
ew0111cdf	NetCDF database file of this cruise
ew0111cdf_nav	NetCDF database file of this cruise' navigation
docs/	File Formats, etc.
configs/	reduction (0111) and Spectra (0108) config files
processed/	Processed datafiles merged with navigation
trackplots/	daily cruise track plots (<i>postscript</i>)
raw/	Raw data directly from logger
0111s2.d*	Hydrosweep Bathymetry in mb183 format
reduction/	Reduced data files
clean/	daily processing directory, includes daily postscript plots of the data.
mbsystem-5.0beta7/	Mbsystem 5.0b7SPARC + source