

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

Prepared By: Anthony Johnson
ajohnson@ldeo.columbia.edu
845 365- 8677

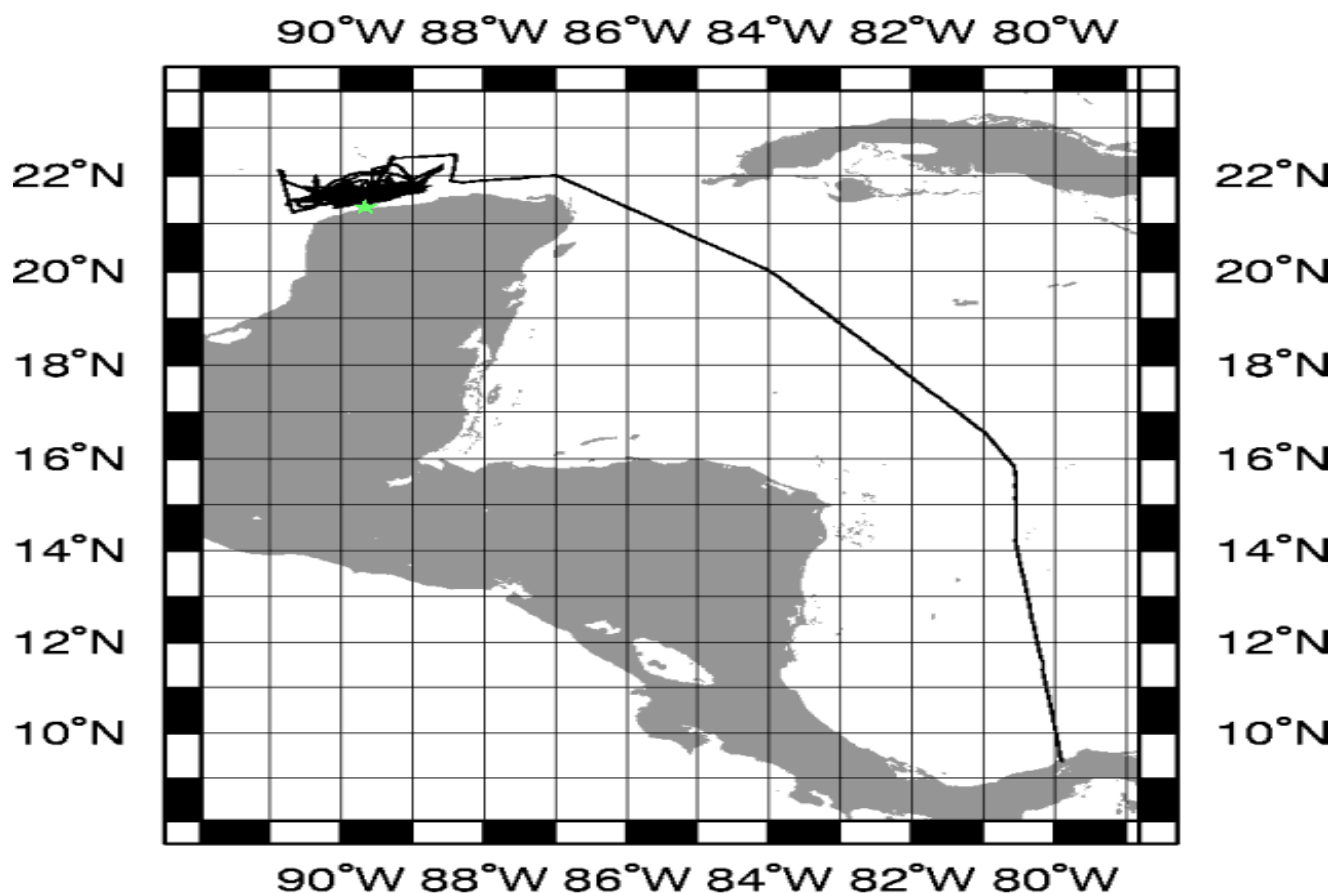
Prepared on: April 25, 2005



R/V Maurice Ewing Data Reduction Summary

EW0501 Colon, Panama - - Progreso, Mexico

Date	Julian Date	Time	Port
January 7, 2005	7	14:05:00	Colon, Panama
February	54	22:13:30	Progreso, Mexico



GMT 2005 Feb 23 00:54:31 **TO DATE**

Project Summary

DESCRIPTION

Background and Scientific Objectives

The cruise objective was to deploy OBSes and the MCS streamer to image the Chicxulub impact crater.

On JD 046, at 0206 UTC, the ship's main sonar pod impacted the ground at 21 24.670 N 90 20.477 W. The seismic equipment was recovered while damage was assessed and the hull was inspected. Operations were resumed on JD 048 at 0630 UTC, only to be halted again on 050 at 0730.

The only instruments affected by the impact were the hydrosweep and the Bathy2000. See the relevant section for details on data interruptions.

Note:

The cruise was summarily halted during an unexpected port stay in Progreso, Mexico. Previous, incomplete versions of this report exist.

Cruise Members

Science Party

Sean Gulick	Co- Chief Scientist	sean@ig.utexas.edu
Penny Barton	Co- Chief Scientist	barton@esc.cam.ac.uk
Peggy Vermeesch	Scientist	peggy.vermeesch@imperial.ac.uk
Anusha Surendra	Scientist	surendra@esc.cam.ac.uk
Matthew MacDonald	Scientist	mmcdonald24@yahoo.com
Alan Burchell	Scientist	a.c.burchell@durham.ac.uk
Tamara Goldin	Scientist	tgoldin@lpl.arizona.edu
Keren Mendoza	Scientist	
Oscar Martinez	Scientist	
James McIntosh	Technician	jsmc@soc.soton.ac.uk
Timothy Sears	Technician	sears@esc.cam.ac.uk
Meike Holst	MMO	
Howie Goldstein	MMO	
Claudio Fossati	MMO	
Maria Theresa Zapata	MMO	
Eduardo Coevas	Mexican Observer	
Diana Antochiw	Mexican Observer	
Ruben Romero Rojas	Mexican Observer	
Manuel Reyes	Mexican Observer	
Gabriella Portilla	Mexican Observer	
Ernesto Vasquez	Mexican Observer	
Gabriel Gonzalez	Mexican Observer	
Elizabeth Reyes	Mexican Observer	
Juan Carlos Salinas	Mexican Observer	

Ship's Science

Ted Koczynski	Science Officer	sci@ewing.ldeo.columbia.edu
Anthony Johnson	Data Reduction	ajohnson@ldeo.columbia.edu
Johnny DiBernardo	PSSO	honey@ewing.ldeo.columbia.edu
Dietmar Kathmann	Senior ET	kathmann@ldeo.columbia.edu

John Byrne	Gunner	
Justin Walsh	Gunner	cabinboy@ldeo.columbia.edu

Ship Crew

James O'Laughlin	Captain	captain@ewing.ldeo.columbia.edu
AL Karlyn	Chief Engineer	engine@ewing.ldeo.columbia.edu
Stan Zielger	1 st Mate	wolf@ewing.ldeo.columbia.edu
Rick Thomas	2 nd Mate	rickt@ewing.ldeo.columbia.edu
RJ Lyons	3 rd Mate	rjlyonsj@ewing.ldeo.columbia.edu
Miguel Flores	1 st A/Engineer	miguel@ewing.ldeo.columbia.edu
Garret ddams	2 nd A/Engineer	garret@ewing.ldeo.columbia.edu
Mike Ahn	3 rd A/Engineer	ahn@ewing.ldeo.columbia.edu
Gary Braddock	Steward	steward@ewing.ldeo.columbia.edu
Jim Syferd	Bosun	
Ricardo Rios	Cook	ricardo@ewing.ldeo.columbia.edu
Stanislaw Zet	A/B	
Michael Gaylord	Oiler	
Jack Davis	Oiler	
Montgomery, Victoria	Utility	victoria@ewing.ldeo.columbia.edu
Roger Strimback	O/S	
McBride, Brandon	O/S	mcbride@ewing.ldeo.columbia.edu
Mardones, George	Oiler	george@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.

Hydrosweep

The hydrosweep is designed for deeper water, and consistently dropped 75% of the beams while operating near Chicxulub.

Gravity

The gravimeter performed normally.

Magnetics

No magnetometer data was collected during the cruise.

Navigation

The POS/MV (gp4, gp04) exhibited a problem in which incorrect positions were reported. The reported track would veer off from actual, getting progressively worse, until the POS was restarted. The time and duration of these problems is noted below. POS/MV data is incorrect and should not be used for the times listed. This behavior did not affect spectra or the seismic data collection.

Days affected: 014, 020, 028, 035, 042, 049

The processed data directory uses the gps data from gp2 for the affected days.

Seismic

Seisnet was used throughout the cruise without problems.

Syntrak and the GCS90 operated normally.

The ts files do not reflect shottimes during OBS-only lines, and should not be used. Refer to the shotlog files for shottimes.

Timing

The ts files do not reflect shottimes during OBS-only lines, and should not be used. Refer to the shotlog files for shottimes.

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 to a UTC gps time clock.

GPStimes 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

Joetime

logging interval: 30 min
file id: tr2

Used as the CPU synchronization clock. This clock is polled once every thirty minutes 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
2005+007:19:35:00		Logging officially started
2005+053:23:59:59		Logging officially ends

GPS Receivers

GPS data is usually logged at 1-2 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 POS/MV with the CNAV GcGPS as an auxiliary input was the primary gps for this cruise.

Trimble Tasmon P/Y Code Receiver

logging interval: 2 seconds
file id: gp1

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

auxilliary GPSfor 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
2005+007:19:35:00		Logging officially started
2005+053:23:59:59		Logging officially ends

Trimble NT200D

logging interval: 2 seconds
file id: gp2

The Trimble is the secondary receiver for GPS data. Data is logged at 2 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
2005+007:19:35:00		Logging officially started
2005+053:23:59:59		Logging Ends

C-Nav

logging interval: 2 seconds
file id: gp3

The C-Nav is a global satellite- based differential receiver. This is the best individual receiver currently on the ship.

Interruptions greater than 10 minutes are displayed in the following table

Log Date	LogDate	Comment
2005+007:19:35:00		Logging officially started
2005+053:23:59:59		Logging Ends

POS/MV

logging interval: 1 second
file id: gp4

The POS/MV is a receiver which uses C-Nav input, its own antennae, an inertial sensor, and optional RTG, WTC, or WAAS corrections (when available) and a kalman filter to produce a smooth nav output and very accurate heading. As of June 2003 it is used as the primary GPSfor Hydrosweep, as an input to Spectra, and can be used as the gps for reduction processing. With the C-Nav auxiliary input, this is the most accurate receiver on the ship.

Interruptions greater than 10 minutes are displayed in the following table

Log Date	LogDate	Comment
2005+007:19:35:00		Logging officially started

Log Date	LogDate	Comment
2005+013:22:36:00	2005+014:00:10:00	Bad position
2005+020:22:36:32	2005+021:00:10:41	Bad position
2005+028:00:11:43	2005+028:01:03:50	Bad position
2005+035:01:04:48	2005+035:03:28:39.341	Bad position
2005+042:03:29:06	2005+042:04:20:21	Bad position
2005+049:04:20:48	2005+049:05:06:52	Bad position
2005+053:23:59:59		Logging Ends

Speed and Heading

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

logging interval: 3 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
2005+007:19:35:00		Official start date
2005+053:23:59:59		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: 0.018

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.

Interruptions greater than 10 minutes are displayed in the following table

Log Date	Log Date	Comment
2005+007:19:35:00		Official start date
2005+048:01:48:50	2005+048:01:59:15	Data Interruption

Log Date	Log Date	Comment
2005+053:23:59:59		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>.

MBSysstem, 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
2005+007:19:35:00		Official start logging
2005+046:04:16:18	2005+046:07:12:55	Shutdown after grounding
2005+046:14:03:59	2005+048:06:07:04	Shutdown for divers
2005+053:23:59:59		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
2005+007:19:35:00		Official start logging
2005+053:23:59:59		Official end logging

Seismic Line

There are several files for each line reflecting the line status:

File	Description
ts.n	Shot time is merged with Ewing navigation to determine shot location
nb2.r	Navigation is from Spectra, and includes tailbuoy, tailbuoy range and bearing

Gravity Ties

Location 1

EW0412 Balboa, Panama

Pier/Ship	Latitude	Longitude
	18 27.84N	66 06.36W
Pier 2		
Reference	Latitude	Longitude
	18 27.8N	66 05.5W
Cruise Ship terminal		

	Id	Julian	Date	Mistie	Drift/Day	Prev Mistie
Pre Cruise	EW0410	326	04. Nov 04	-5.53	0.15	8.99
Post Cruise	EW0412	357	22. Dec 04	-0.88	0.097	-5.53
Total Days			48.00	4.65		

Time	Entry	Value	
1446	CDeck Level BELOW Pier	2.00	
1446	Pier 1 L&R Value	2332.11	L&R
1446	Reference L&R Value	2334.21	L&R
	Pier 2 L&R Value	2332.11	L&R
	Reference Gravity	978680.69	mGals
	Gravity Meter Value (BGM Reading)	978691.80	mGals
	Potsdam Corrected	1	1 if corrected

Gravity meter is 5.5 meters below CDeck

Difference in meters between Gravity Meter and Pier	2.00	meters
Height Cor = Pier Height* FAA Constant	2.00	0.31
		0.62 mGals/min

Difference in mGals between Pier and Gravity Meter

Pier (avg) - Reference * 1.06 L&R/mGal	Delta L&R
2332.11 2334.21 1.06	-2.23 mGals

Gravity in mGals at Pierside

Reference + Delta mGals [+ Potsdam]	Pier Gravity
978680.69 -2.23 13.60	978692.06 mgals

Gravity in mGals at Meter

Pier Gravity+ Height Correction	Gravity@meter
978692.06 0.62	978692.68 mGals

Current Mistie

BGM Reading	Calculated Gravity	Current Mistie
978691.80	978692.68	-0.88 mGals

EW0502 Jacksonville, Florida

Pier/Ship	Latitude	Longitude
	30 23.3855	081 32.241
Reference	Latitude	Longitude
	30 23 20.6	081 27 39.9

	Id	Julian	Date	Mistie	Drift/Day	Prev Mistie
Pre Cruise	EW0412	357	22. Dec 04	-0.88	0.06	-5.53
Post Cruise	EW0502	64	05. Mar 05	7.47	0.114	-0.88
Total Days			73.00	8.35		

Time	Entry	Value	
1541	CDeck Level BELOW Pier	1.00	
1541	Pier 1 L&R Value	2987.61	L&R
2106	Reference L&R Value	2984.40	L&R
2200	Pier 2 L&R Value	2987.48	L&R
	Reference Gravity	978680.69	mGals
	Gravity Meter Value (BGM Reading)	978691.80	mGals
	Potsdam Corrected	0	1 if corrected

Gravity meter is 0.0 meters below CDeck

Difference in meters between Gravity Meter and Pier	1.00	meters
Height Cor = Pier Height* FAA Constant	1.00	0.31
		0.31 mGals/min

Difference in mGals between Pier and Gravity Meter

Pier (avg) -	Reference * 1.06 L&R/mGal	Delta L&R	
2987.55	2984.40	1.06	3.33 mGals

Gravity in mGals at Pierside

Reference + Delta mGals [+ Potsdam]	Pier Gravity	
978680.69	3.33	0.00
		978684.02 mGals

Gravity in mGals at Meter

Pier Gravity+ Height Correction	Gravity@meter	
978684.02	0.31	
		978684.33 mGals

Current Mistie

BGM Reading	Calculated Gravity	Current Mistie	
978691.80	978684.33		7.47 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.

<u>Shot Time</u>	<u>Line</u>	<u>Shot</u>	<u>Latitude</u>	<u>Longitude</u>
2000+079:00:08:40.085	strike1	000296	N 15 49.6217	W 060 19.8019
<u>2nd GPS Position</u>		<u>Tailbuoy Position</u>		
<u>Latitude</u>	<u>Longitude</u>	<u>Latitude</u>	<u>Longitude</u>	
N 15 49.6189	W 060 19.8101	N 15 47.1234	W 060 20.1901	
<u>Furuno Streamer</u>				
<u>Gyro</u>	<u>Compasses & Heading</u>			
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.

<u>Shot Time</u>	<u>Gun Depths</u>																		
	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.

<u>CPU Time Stamp</u>	<u>Track</u>	<u>Speed</u>	<u>Hdg</u>	<u>Gyro</u>
2000+166:00:01:53.091	-	4.4	140.5	148.3

Hydrosweep Centerbeam

hb.n

Hydrosweep data merged with navigation

<u>CPU Time Stamp</u>	<u>Centerbeam</u>		<u>Depth</u>
	<u>Latitude</u>	<u>Longitude</u>	
2000+074:09:55:00.000	N 13 6.6206	W 59 39.3908	134.9

Merged Data

m

<u>CPU Time Stamp</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Used</u>	<u>GPS Set</u>	<u>Drift</u>	<u>Depth</u>
2000+200:12:25:00.000	N 45 54.1583	W 42 47.1770		gp1	0.0	0.0
<u>Magnetic</u>		<u>Gravity</u>				
<u>Total Intensity</u>	<u>Anomaly</u>	<u>FAA</u>	<u>GRV</u>	<u>EOTVOS</u>	<u>Drift</u>	<u>Shift</u>
49464.7	55.5	22.2	980735.0	-8.4	-0.1	2.8
<u>Temperature Salinity Conductivity</u>						
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

Navigation Block

nb0

Navigation is a compendium of Ewing logged data at shot time. The shot position here is the shot position from the Spectra system.

Shot Time	Shot #	CPU Time	Shot Position
2001+088:00:00:00.606	016967	2001+088:00:00:03.031	N 30 11.8324 W 042 10.8162

Water	Sea	Wind	-----	Tailbuoy	-----	Line				
Depth	Temp	Spd	Dir	Latitude	Longitude	Range	Bearg	Name	Speed	Heading
2565.1	20.7	16.4	164	N 30 12.0427	W 042 14.7319	6296.3	93.5	MEG-10	4.2	101.1

Tailbuoy Navigation

tb1.c

Raw tailbuoy fixes

CPU Time Stamp	Latitude	Longitude	GPS Precision
2001+088:00:00:02.000	N 30 12.0424	W 042 14.7309	SA

GPS Precision is either SA, DIFF or PCODE

Ewing Processed Shot Times

ts.n

Shot times and positions based on the Ewing navigation data processing

CPU Time Stamp	Shot #	Latitude	Longitude	Line Name	Centerbeam	Depth
2000+079:00:08:01.507	000295	N 15 49.5703	W 060 19.7843	strikel		2345.6

Shot Data Status

ts.n.status

The ts.nxxx.status file describes the line information for that day, giving some basic statistics about the line: start, end times; missing shots; start and end shots.

LINE strikel: 98+079:00:00:15.568 : 000283 .. 002286
MISSING: 347, 410, 1727

LINE dip2: 98+079:23:05:22.899 : 000002 .. 000151

This example says that on Julian Day 079 of 1998, two lines (strikel and dip2) were run: the end of strike 1 (shots 000283 to 002286) and the start of dip2 (shots 000002 to 000151).

Line strikel had some missing shots in the data file (probably missing on the SEG-d

header as well).

Spectra Shot Times

nb2.r

The shot times and positions based on the Spectra positioning; with raw tailbuoy range and bearing.

CPU Time Stamp	Shot #	Latitude	Longitude	Line Name
----------------	--------	----------	-----------	-----------

2001+084:00:00:05.924	009245	N 23 31.2410	W 045 25.0894	
-----------------------	--------	--------------	---------------	--

Latitude	Longitude	Tailbuoy Range	Bearing	Line Name
N 23 30.4540	W 045 21.4338	6389.8	283.2	KANE-4

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	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

gp[12].d, tb1.d

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                                Bird 2
Direction                                Speed
Inst 60sA 60mA 60sM Inst 60sA 60mA      Inst 60sA 60mA 60sM Direction
Inst 60sA 60mA      Inst 60sA 60mA      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

mnet

```

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)
```

Shot Times from Spectra P1 Files

shots.p1

```

These files were created with the script: extract_shots_from_p1 -a 1
Epoch Time Shot# Source Lat/Lon TB Lat TB Lon
985788741.000 015570 30.283881 -41.854536 30.320144 -41.886642
```

<u>Vessel Ref</u>	<u>Lat/Lon</u>	<u>Antenna GPS</u>	<u>Lat/Lon</u>	<u>Water Depth</u>
30.283478	-41.854117	30.283531	-41.854078	2894.2

- Source is the Center of the Guns
- TB is the Tailbuoy, according to Spectra
- Vessel Ref is the location of the center of the Mast
- Antenna GPS is the location of Antenna 1 (-a 1 flag); in this case is the Tasmon GPS
- Water Depth is the HS Centerbeam depth

Shot Times from Spectra P2 Files

shots.p2

These files were created with the script: *extract_shots_from_p2 -o "V1 G1"*

<u>Epoch Time</u>	<u>Shot#</u>	<u>Vessel Ref</u>	<u>Lat/Lon</u>	<u>Source</u>	<u>Lat/Lon</u>
985716772.4	00015572	30.282803	-41.866136	30.283207	\41.866540

- Vessel Ref is the location of the center of the Mast
- Source is the Center of the Guns

Tape Contents

Tar #1 – EW0501

Bathy2000 data

Tar #2 – EW0501

Cruise_Report_EW0412.pdf	this document
ew0501.cdf	NetCDF database file of this cruise
ew0501.cdf.nav	NetCDF database file of this cruises
navigation	
configs/	Ewing Data System configuration files
docs /	File Formats, Spectra manuals
processed/	Processed datafiles merged with navigation
trackplots/	daily cruise track plots (<i>postscript</i>)
mbsystem/	Latest MBSsystem source code
raw/	Raw data directly from logger
reduction/	Reduced data files
clean/	daily processing directory,
includes daily	postscript plots of the
data.	