



***Lamont-Doherty
Earth Observatory
of Columbia University***

EW 9706 DATA REDUCTION CRUISE SUMMARY

August 18 - September 6, 1997

Chief Scientist: N/A

Science Party N/A

Science Crew *LDEO*:

Elizabeth Jackson
Tom Jackson
Ropate Maiwiriwiri
Greg Vsevolozhsky

Hydrosweep Processor
Electronic Tech
Core Bosun
Systems

R/V Ewing Crew

James O'Loughlin

Master
Chief Engineer

Science Overview

Transit

Data Collected During Cruise

All times are specified in GMT.

True Time Clock

Instrument Kinematic/TrueTime Division Model GPS-DC GPS Synchronized Clock
Logging 1 minute intervals

The True Time clock is used to adjust the CPU clock of the logging computer. The logging computer captures the continuous time records from the clock and provides these as a service to the rest of the network via a UDP broadcast. This enables the computers on the network to adjust their CPU times to UTC time.

| Day | Time | Comments |
|-----|------|----------------|
| 232 | 1200 | Start Logging |
| 248 | 0000 | End Processing |

Speed and Heading

Instrument: Furuno CI-30 2-axis Doppler speed log, Sperry MK-27 gyro
Logging: 3 second intervals
Processing: The raw Furuno data is processed by taking the mean of all values within the even minute range and outputting the speed and heading on the even minute. All values taken during the 30 seconds before and after the even minute are used to calculate the median.

| Day | Time | Comments |
|-----|------|----------------|
| 232 | 1200 | Start Logging |
| 248 | 0000 | End Processing |

GPS SATELLITE FIXES:

- (1) GPS Trimble NT200D. (*denoted by gp1 in the logs*)
 (2) Magnavox MX-4200 Global Positioning System receivers (*denoted by gp3 or gp4*)

Logging 10 second intervals on all three receivers
Checking

Minimum number of SATs: 3
 Dilution of precision maximum: north = 4.0, east = 4.0
 Speed maximum: 20.0
 Compared GPS speed and course with Furuno smooth speed and heading
 Reject fixes with high drifts in navigation
 Reject fixes producing Eotvos correction errors in gravity larger than 5 mGals

Interpolation interpolated positions at 00, 30 seconds of each minute

Smoothing smoothed interpolated positions with 9 point running average.

Note Continued troubles with the MX 4200s. Mx4200 #2 would not remain turned on for the first day. Eventually came back at ... and has been reliable since. MX4200 #1 regularly fails to track enough satellites for valid navigation.

| Day | Time | Comments |
|-----|------|--------------------|
| 232 | 1200 | Started Logging |
| 248 | 0000 | End Processing GPS |

The 10 second GPS points are interpolated to produce evenly spaced 30 second fixes, with gaps of 3 minutes or less filled in with linear interpolation. This data is smoothed with a running average of interpolated data points. The smoothing window size used was 9 points. Data is output only when the averaged value is made with a full window. Gaps of time greater than 30 seconds empty the window.

A *one-minute navigation* is produced from the GPS. The smooth speed and heading data from the **Furuno** is used to fill any gaps of 2 minutes or longer by computing *dead reckoned* positions corrected for set and drift. This data is used for the final navigation data.

Final Data 1 minute navigation.

Format: n.ddd

yy+ddd:hh:mm:ss.mmm N 12 12.1234 E 123 12.1234 id 123.1 12.1
 yr. day time lat. lon id set drift

where **id** is one of [gp1, gp3, gp4] or *dr*, if dead reckoning was necessary.

| Day | Time | Comments |
|-----|------|-----------------------------------|
| 232 | 1200 | Navigation data processing began |
| 248 | 0000 | End of navigation data processing |

BATHYMETRY:

Instrument: Krupp Atlas Hydrosweep Center Beam

Logging: Each Hydrosweep Ping is logged, and center beam data is extracted and logged separately.

Processing: Raw data is checked to process only good centerbeam records that were acquired in *survey* mode.
This data is then processed to produce a median value for each even minute. The median is the median of all records 30 seconds before and after the even minute.

Final Data: The median is merged with the one-minute navigation fixes to provide the final centerbeam data.

Notes: During the cruise, hydrosweep data was occasionally turned off when retrieving the OBS and OBH. There was also at least one equipment failure where the hydrosweep failed to pick up the rapid change in depth.

Format: hb.nddd
yy+ddd:hh:mm:ss:mmm N 12 12.1234 E 123 12.1234 2222.0
date/time lat lon depth/meters

| Day | Time | Comments |
|-----|------|---------------------|
| 232 | 1200 | Acquisition Started |
| 248 | 0000 | Acquisition Stopped |

SEA TEMPERATURE:

Instrument: Omega DP10 Series
Logging: 1 minute intervals
Checking: none
Smoothing: none

Chief scientist's final data: none.

Lamont database: one minute data, merged with navigation.

FORMAT: ct.nddd

yy+ddd:hh:mm:ss:mmm N 12 12.1234 E 123.1234 26.3

yr day time lat lon sea_temp (in °C)

| Day | Time | Comments |
|-----|------|---------------------|
| 232 | 1200 | Acquisition Started |
| 248 | 0000 | Acquisition Stopped |

WEATHER STATION:

Instrument: R.M./ Young Precision Meteorological Instruments 26700 Series
Logging: 1 minute interval
Final Data: none.
Notes: During this cruise, the starboard weather station was damaged and replaced with a new weather station in the center of the mast.

Format: wx.rddd

Port bird is bird #1; Center bird is bird #2.

| | | | | | | | | | | | | |
|---------------------|------|------|------|------|------|------|------|------|------|------|--------|------|
| 97+185:00:07:00.747 | 13.7 | 130 | 20.9 | 19.3 | 20.7 | 22.7 | 29 | 27 | 2 | 21.5 | 20.0 | 21.4 |
| date/time | tspd | tdir | ws1 | wss1 | wsm1 | wsx1 | wdc1 | wds1 | wdm1 | ws12 | wss2 | wsm2 |
| 232 | 36 | 33 | 2 | 22.4 | 22.6 | 22.4 | 22.5 | 47 | 47 | 47 | 1030.7 | |
| wsx2 | wdc2 | wds2 | wdm2 | tcur | tavg | tmin | tmax | rh | rh1 | rhx | baro | |

| | | | | | |
|--------|---|-----------------------------------|------|---|--------------------------------------|
| tspd | = | true speed | tcur | = | temperature, current |
| tdir | = | true wind direction | tavg | = | temperature, 60 minute average |
| ws1/2 | = | wind speed, instantaneous | tmin | = | temperature, 60 minute minimum |
| wss1/2 | = | wind speed, 60 second average | tmax | = | temperature, 60 minute maximum |
| wsm1/2 | = | wind speed, 60 minute average | rh | = | relative humidity |
| wsx1/2 | = | wind speed, 60 minute maximum | rh1 | = | relative humidity, 60 minute minimum |
| wdc1/2 | = | wind direction, current | rhx | = | relative humidity, 60 minute max |
| wds1/2 | = | wind direction, 60 second average | baro | = | barometric pressure |
| wdm1/2 | = | wind direction, 60 minute average | | | |

| Day | Time | Comments |
|-----|------|---------------------|
| 232 | 1200 | Acquisition Started |
| 248 | 0000 | Acquisition Stopped |