

SEABEAM CRUISE REPORT

CRUISE : RC-2607
SHIP : R/V Robert D. Conrad
CHIEF SCIENTISTS : R. Detrick (URI) and J. Mutter (L-DGO)
SEABEAM PERSONNEL : P. Lemmond
PORTS : Balboa, Panama to Manzanillo, Mexico.
DATES : May 21 (141) to June 21 (172), 1985

1. General Description

Cruise RC2607 was a geophysical exploration of the East Pacific Rise area at 13 and 9 degrees north. The primary objective was to carry out Expanded Spread Profile and Constant Depth Profile Multi-Channel Seismics. The ESP work was performed along with the R/V Thomas Washington. SeaBeam data was collected primarily to aid in precise navigation of seismic lines. Magnetics and gravity data were also collected.

2. SeaBeam Performance

Overall, the SeaBeam system performed as advertised. There were a few instances of system glitches, crashes, etc. that caused a loss of bathymetric data, but none were unexplained, necessitated repair to SeaBeam electronics, nor detrimental to scientific operations. The following were noted:

1. May 27 (147), 03:50z. The roll gyro on the BGM3 craps out. While this obviously played havoc with the synchros, no damage seen. Switched over to Aeroflex for vertical reference. Jim Smith replaced the defective gyro unit. Switched back to BGM3 at 05:30z. As this occurred during transit, no real concern.
2. June 14 (165), 23:05z. Entire SeaBeam system dies. Cause was the inadvertent flipping of the power switch on the Topaz Line Regulator. Oops. System brought back to life at 23:20z.
3. June 18 (169), 18:45z. Echo Processor hung up, assumed due to negative or very low ship's speed (in the process of rendezvousing with Atlantis II). Probably should have gone into Manual Speed mode. System back up at 19:20z. Reason for delay was that no one noticed the crash.

Might want to consider protective coverings for dangerous switches (line regulators, cabinet switches, etc.).

The VAXes performed well. No system crashes, hangups, or whatever. Have had continuous operation since departing from Panama. Errors logged on tape drive, a normal occurrence.

Also have been picking up errors (16 at present) on the terminal line (TXA5:) that is attached to the Magnavox Transit Navigator. Ran SYE utility on the SYS\$ERRORLOG file, but it did not show any errors for that device. Nothing indicated in data.

3. Equipment Problems

As noted, no equipment malfunctions occurred that seriously hampered scientific operations. Problems that occurred that will need addressing during the next port stop are:

1. Power supply module in the Tektronix 4105 terminal died, cause unknown. Replacement module expected.
2. Flaky operation of the keypad in the CalComp 965 plotter. The '8' digit key seems to be out, though it works when used in conjunction with the '5' digit key for fast movement. Failed the 'Keypad Test.' This resulted in plots being made with 179 degrees of rotation instead of the normal 180 degrees. Expect replacement module. In addition, pens heights were adjusted which seem to have been cause of pens not plotting as reported on previous legs.
3. Power supply module in the Magnavox GPS T-Set died, cause unknown. With coverage of about seven hours per day, this was a disappointment. An interesting note is that both the Tek 4105 and the T-Set were plugged into the same terminal strip.

4. Data Processing

The real-time VAX was used for all data collection. This included SeaBeam bathymetric data, Transit Satellite dead-reckoned navigation, GPS navigation and Furuno dopler course and speed data. Actual Transit Satellite fixes were logged on the Nova DataLogger and subsequently read from 9 track tape, at about 3 day intervals. For real-time displays, the DR positions were primarily used, with GPS navigation used as available. Real-time data files were changed on a daily basis, at about 00:00z, give or take a few minutes.

The first iteration of post-processing was completed for all data collected. The general flow went something like:

1. Original data files were copied from the real-time disk to the shared disk on a daily basis. Original data placed in directories [data.seabeam.rc2607.navigatel] and [...cbfiles].

2. Furuno data collected at 3 second intervals were smoothed to 1 minute intervals. Input data from [...navisate]FU23MAY85.D01 and output data to [...Pprocess.finalnav]CS23MAY85.D01.
3. Fix data (GPS and Sat Fixes) were put together into daily files under [...Pprocess.finalnav]FX23MAY85.D01. These files were edited to remove obviously bad fixes.
4. The program CNAV was then run to produce daily navigation files, placed under [...Pprocess.finalnav]FN23MAY85.D01. The set drift informational file was kept under [...Pprocess.cnave]SD23MAY85.D01.
5. The original SeaBeam data was then remerged, with the new files being placed under [...Pprocess.remerge]CB23MAY85.RMG.
6. The remerged files were next averaged, based on ship's speed. For transit, a value of 5 was used. During survey at 5 knots, a value of 10. These files were placed under [...Pprocess.avscb]CB23MAY85.AVG.
7. Post-processed maps were then produced. The majority of maps were done as compilations within areas of interest.

All in all, post-processing was very routine, and, on this leg, performed by Nancy Adams of URI. With present programs and data collected, it may not be a full time job to process data to this first iteration and make a full set of re-navigated maps.

5. Software Development

The majority of software effort during the cruise was expended toward implementing the latest versions of real-time and post processing procedures now in use at URI and on the Atlantis II. This consisted of modifying the real-time programs to take advantage of system logicals to replace hard coded file names and the now obsolete FILES.INP. In addition, the GPS navigation logging program was rewritten so that only actual fixes at one minute intervals were logged; thus reducing disk space problems and reducing post processing time. All of the major post processing routines now operate as command driven programs, utilizing the interactive or batch methods.

A program that will average merged SeaBeam data based on distance along track instead of a fixed number of pings was written. This program still has a few bugs, but should be operational shortly.

A new program, ANALZMERG, was written to determine percentages of beam dropouts and null navigation points. This program is more of a diagnostic, written for the never

ending search of the real time gap problem.

Considerable time was spent sleuthing out the real time gap problem. During the testing of the new GPS program on the backup VAX, it was noted that no gaps occurred when using the Houston plotter for real time contouring. This led to the idea that there was a problem with the DUMP subroutine and the CalComp buffers. After much searching and frustration, it was decided that this was either not the problem, or that it was too confusing to fix.

The residdings program MISP was brought up on the VAX and an attempt was made to implement MISP with our data format. It was decided that one should first reduce the merged SeaBeam data files to files containing only decimal latitude, longitude, and depth (though there is no reason other values couldn't be used). A program was written that would take merged SeaBeam data and output these values through optional time and space windows was developed. This also led to a proposed binary data file format for such files. After this, the MISP routines were examined and this new data was put through. The results were confusing, since the complexity and terseness of the MISP source code were such that one never knew what parameters were doing what. Anticipate that a full examination of the MISP techniques will need to be made, with a subsequent rewriting of sections of code into a more readable format.

Minor corrections and updates were done at both the SeaBeam and System level. This will be propagated back to URI and the Atlantis II in the near future.

6. Supplies

All expendable supplies, with the exception of black Houston liquid ball points are stocked in sufficient quantity for the upcoming leg.

7. Miscellaneous

Probably the largest amount of time spent on any one task during this cruise went toward writing documentation. An on-line HELP SEABEAM library was written, such that all post processing routines now have some sort of help available. A SEABEAM-VAX manual was also started. This document should assist in bringing new personnel unfamiliar with VAX operation and SeaBeam software up to speed a tad quicker. This document is still in it's preliminary stages.

This leg also contained two unscheduled rendezvous with the R/V Atlantis II, for the purpose of transferring spare parts for the Eclipse from the Conrad to the AII and back. These parts were:

1. Multiplexer. SN A005 6821 R01 T005 3483 R03.
2. A/D Converter Board. SN E0740584 D4582 P A005 1497 R22
T0055056 R15 EE8835.

The A/D board was subsequently returned as the multiplexer was found to be their problem.

Two ship work resulted in the opportunity to compare SeaBeam results, though this will have to be done at a later time. During the leg, sound velocity profiles were calculated by both ships, with very favorable results.

Distribution: URI (2 copies)
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