

## CRUISE REPORT

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FM32

## Student Cruise IX

May 1986

CHRONOLOGICAL NARRATIVE (all times are local: CDST + 5hr = UST(zulu))

23 May

0930 Departed Austin in UTIG van with 8 students

1410 Arrived Galveston UTIG dock

Assigned cabins; assigned watches; consulted with Archie Roberts concerning jobs to be done (e.g., harnessing gun floats); familiarized students with the ship and indicated reading and course plotting for watch duties. Three more students arrive by evening.

24 May Last five students arrived at various times. Mostly worked on rigging of new air gun array. Devised alternate plans (when's) for testing the array.

25 May On the first series of watches, instructed students in the details of navigation and bathymetry. On the second series of watches did same with the GUS system and multichannel data logging (except for the 4-8 watch - 20 hours was enough. Began instruction on computer processing of navigation data.

26 May Assisted final loading. Departed dock after IDA GREEN moved out.

1130 Data logger system up and running.

1225 Passed end of jetties.

Emergency drills completed smoothly by 1300.

1440 began experimental deployment of new gun array. Four guns were lifted down from their I-beam suspension with the big (2000") gun handling hydraulic gear, one was lifted down by hand (Oscar & Archie), and one slid off the end of the I-beam. All guns were in the water within one hour.

1525 First gun in the water.

1545 Power out - engine room smoke; first generator burned out.

1550 Speeding up with all guns in the water.

1618 Test firing begins. Towed and fired mostly at six knots.

1806 Stopped firing.

1838 New gun array retrieved and secured. ETA at OBS drop site 2300.

New Gun Array experiment delayed our schedule by only two hours which was within the 'flexibility tolerance' of the schedule. However, OBSs were not ready on schedule. Drop was delayed over three hours.

27 May

0213:04.7 OBS drop at 27° 48.82'N 94° 37.29'W

0221:30.7 OBS drop at 27° 48.84'N 94° 37.28'W

(Objective site 27° 48.84'N 94° 37.26'W)

Earthquake OBS primary release was off, only the backup was set; we decided to abort this experiment rather than risk loss of the OBS with only one release functioning or to take the couple of hours necessary to open it up and reset the primary release mechanism.

0230 Began one hour substitution of transit time for survey time to make up for lost time.

0330 Began streamer deployment party.  
0450 Electric motor to hydraulic pump to streamer winch burned out.  
Streamer party halted for repairs.  
1030 Electric motor replaced; streamer party resumed.  
1330 Streamer deployed, compressors started, and began gun deployment. Streamer was heavy and sank at dead stop; but the birds pulled it up to 40 to 60' depth at 4 kt, so we proceeded.  
1550 Various and assorted gun repairs completed; began testing GUS system. Earlier it was determined that only about 30 shots fitted on a tape at 1600 bpi (112 channels sampled at 2 ms). Thus our tape supply would last only about 30 hours. MW began writing a program (GUSDEL) that would condense tapes by copying only the 24 seismic channels with data and ignoring the 72 seismic channels with no data.  
1726 Recorded first real UTIG shot (shot 350, record 345) on the GUS system. One shot earlier the LORAN-C system went down and stayed off the air for five minutes.  
2100 Ken brought up the single channel monitoring system.  
2100 Deployed Maggie.  
2120 Line change (SC85 to SC86).  
2130 Ken had Maggie 'calibrated'.

28 May

0102 Line change (SC86 to SC87). Changed GUS recording to 6250 bpi. GUSDEL needed some debugging, and tape condensation had gotten very far behind; and we had gone through almost 1/4 of our tape supply. Tape changes went from every 10 min. to every 30 min. and watch standing became much less tense. GUSPLT produced quality check plots of original GUS tapes (@1600bpi) and later of condensed tapes.  
0807 line change (SC87 to SC88)  
1025 line change (SC88 to SC89)  
1234 line change (SC89 to SC90)  
1507 line change (SC90 to SC91)  
2145 line change (SC91 to SC92)

29 May

0430 line change (SC92 to SC93)  
0948 second generator caught fire and burned out. Ship switched to lab generator; all science and other non-essential operations (e.g., air conditioning) switched off.  
Lab shut down - Ken and Mark  
Maggie retrieved - Archie and Oscar  
Guns retrieved - Oscar, George, and others  
Streamer retrieved - 4 students & chief scientist.  
1100 All outboard scientific gear secured.  
Attempts to call Galveston via the marine operator were not successful until 1205, and then everyone was out to lunch.  
1300 Contacted Galveston via SAT radio. Decision was made to return to port with a 4 to 5 hour delay so as to dock after 0730. OBSs will be retrieved with another ship tomorrow.

30 May

0800 Completed docking.  
Resumed logger data processing after shore power was established, lab cooled down a little, and the PDP1134 could be booted up.  
1100 Completed processing & packing; departed in UTIG van with 6 students for Austin.  
1530 Arrived Austin.

## COMMENTS

The BAD news is that both ship's generators burned out, and, due to that, we failed a second time to acquire an extra long OBS refraction line that may have defined total crustal thickness at the shelf-slope break. The GOOD news is that the GUS system is up, running, and field tested, GUSPLT quality check is up and running, a six gun fire control box is up and running, a new data logger is up and running, a six gun array handling system is functioning, about 200 n.mi. of new multi-channel data has been acquired, and 16 more students have been inspired with the wonderfulness of it all.

### Generators

From the observation that brown-outs were common on several recent cruises, it seems that the ship's generators, through the years, had acquired loads approaching their limits. Their inactivity since the last cruise may have been the final contribution to their failures.

Failure of the electric motor for the streamer winch hydraulic pump may have been a similar scenario.

### Multi(6)gun Array

Gun array deployment and retrieval went quite smoothly for a 'first-time' operation in almost calm seas. Rougher seas would make this operation problematical. It seems that more control farther aft is necessary, i.e., an extension of the I-beam from which the guns are suspended. The near-alignment of the large gun handling system and the gun-array system provides power, convenience, controllability, and consequent safety for using the former for lifting and lowering the latter. The only alternative that comes to mind is to bend the I-beam extension downward so that when a gun reached the end of the I-beam it would be resting on the sternmost part of the deck and not need lifting. Securing pad-eyes should be welded in appropriate places for securing each gun in the array when it reaches its inboardmost position. We tied them off to whatever was within reasonable reach this time.

### Compressors

A shot repetition rate of 20 seconds was used throughout the cruise. Two 2,000 cu.in. guns were on line most of the time. This was distinctly better air delivery than available on previous cruises (21 or 22 seconds at less than 2,000 psi was the previous limit). A greater demand (full pressure at faster than 20 sec.) was not made and, thus, may have been possible.

### DATA LOGGER

Navigation (and various other item) data logging is now done with a dedicated PDP1134. The software developed from 'new' (buggy, a few falls (crashes) while learning to walk) to a rather smoothly jogging along system. Printout is conveniently condensed with lat. & long. displayed farthest right on each line (making them easiest to read and use for manual course plotting. Tape recording format is compatible for use with the data processing software that we have been using (and did, indeed, use on this cruise) to produce merged, NGSDC-formatted data files.

### GUS

Tape recording at 1600 bpi is a tape-burning, three-ring, chinese fire drill; but recording at 6250 bpi makes operating the GUS seem like a reasonable, watch-standing task. A tape condensation program

(GUSDEL - brought from a new thought to an operational program during the cruise [just one of Mark Wiederspahn's Herculean tasks]) saves much tape when collecting fewer than 96 real-data channels. A much better solution would be for GUS to record only those channels with real data. It would seem reasonable that GUS could do that and that we could learn how to command it to do so.

The mysteries of GUS's functionings seem to require that touching the hardware should be restricted to the priesthood for now; but watching the priests in action suggests that mere scientists might be able to accomplish data acquisition in some routine fashion, after a reasonable time for further learning and documentation of the system. This assumes no significant changes in data acquisition parameters.

There is clearly more hardware aboard; and one of the consequences of this is more of a heat load in the lab. The temperature in the forward lab remained near 85 F.

All GUS tapes drives did NOT function all the time. MT1 was non-functional before and throughout the cruise. MT0 stopped loading tape but was fixed by Paul and Phil (ultimately without replacing boards). MT2 stopped working at 1600 bpi but worked when we switched to 6250 bpi recording density. The tape drives seemed particularly sensitive to working at 1600 bpi. They had trouble with (repeatedly backing up and restarting during recording) several tapes, even rejecting a few that had been certified at 6250 bpi. Unexpectedly, there seemed to be less of a problem when recording at 6250 bpi.

Although GUS tape changes are, ostensibly, instigated by reaching a preset limit for number of files on a tape, I observed one change that occurred when an end of tape was encountered before that limit had been reached. It proceeded apparently without an adverse incident, much like DEMUXR at its best.

#### Personnel

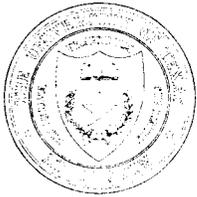
Complete and full support of every phase of the cruise was provided by every participant. If I had to give each a course grade, I would be highly frustrated that available grades went up to only A. I shall be frustrated with student grading, because this was a truly exceptional group of fast learning, cooperating, responsibility assuming students.

I believe that it should be noted that although the excellent support for the cruise was 'normal' by Institute historical standards, the preparation for the cruise was abnormally demanding. Thus the support provided was abnormally excellent.

Respectfully submitted,



E. William Behrens  
Chief Scientist/  
Principal Investigator/  
Associate Professor



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MEMORANDUM

June 2, 1986

TO: Dr. Arthur E. Maxwell  
FROM: Yosio Nakamura *YN*  
SUBJECT: FM-32 (Student Cruise IX) Cruise Report Supplement

The R/V *Ida Green* cruise to retrieve the two OBS's deployed earlier during the R/V *Fred H. Moore* cruise FM-32 took place on May 30-31, 1986. Both OBS's surfaced at the expected time and place, and were recovered successfully. The approximate site of recovery for both of them was 27°48.8'N, 94°37.3'W.

The experiment had two objectives: 1) to field-test a new OBS software for air-gun data acquisition and 2) to extend one of our earlier seismic lines, 90-km long GMT-2, to about 120 km in an attempt to detect Moho refractions. We originally planned this experiment for the last student cruise (FM-31), but were unable to perform because of bad weather. This time, we accomplished only the first objective. The software worked, recording seismic data as programmed. Unfortunately, no shots were fired and thus the second objective was not achieved.

The scientific party included Paul MacPherson and myself. A chronological list of events follows:

May 30	11:35	Sailed from Galveston
	22:30 (approximate)	Arrived at the OBS site
	23:01	OBS 1 surfaced
	23:17	OBS 1 recovered on board
	23:29	OBS 2 surfaced
	23:32	OBS 2 recovered on board
May 31	10:55	Returned to Galveston