R/V FRED H. MOORE

FM-21

4 January 1984 - 9 January 1984

Sailing Roster

SCIENTIFIC PARTY

Dr. E. W. Behrens, Chief Scientist
Dr. C. R. Denham

TECHNICAL SUPPORT

Archie C. Roberts
Oscar Febres-Cordero
Stirling Gilfillan
Ken H. Griffiths
C. Eddie Nicol
George T. Pearcy

STUDENTS

Olufemi Babalola
Philip Duggan
Leo Erhard
Douglas Groh
Eric Hardenbol
Bridgette Jensen
Scotty Kelley
Cathy Mayes
Todd Reynolds
Paul Riherd
Chico Seay
Jene Thomas
Scott Underwood
Leigh Wood
John Worrall

SHIP'S CREW

Captain Bruce H. Collins
Mo H. M. Ali
S. Jean Hudspeth
James E.Johnson
Raymond L. Klinepeter
John P. Kriesa
Peter A. Kriesa
Sanzio C. Marchetti
Lewis R. Rosenboom, Jr.
Michael P. Wright

cc: Dr. A. E. Maxwell, Director

CRUISE REPORT FM21 - STUDENT CRUISE

Chronological Narrative 4-9 January 1984 (all times are local)

Students and Austin staff arrived Galveston 3 January 1984 partly by private auto and partly by Institute van.

Streamer repair work was done (supervised by A. Roberts) 3 Jan and until shortly after noon Wed. 4 Jan. This involved transferring the entire streamer to the dockside reel, replacing at least four damaged sections, at least two of which were ruptured by hard winding the streamer against the rope holding the carpet on the reel drum. The greatest damage was where ropes crossed or were knotted. On the cruise, while the streamer was out, half the rope was removed and replaced with duct tape. The other half of the rope lies mostly under the leader. While deploying the streamer two leaking boots were repaired with new straps and one section refilled. After retrieval there appeared to be no damaged sections. A total of 25 live traces were placed on the streamer winch with dead sections between each and one dead section on the tail buoy end and two on the inboard end. In addition to the extra one live and one dead section on the reel, 4 live and one dead sections were carried as spares on deck.

After streamer work at the dock was completed there was a slight delay to acquire ship's airconditioning parts. Departure from the dock was at 1435. At 1530 we passed end of jetties; and at 1600 fire and abandon ship drills went smoothly. 5 Jan 0420 stopped ship for about 15 minutes for a drift check. Began streamer party heading downwind about 0500 and continued until 1730 with crews rotating except for the chief scientist.

Most 2 pound lead weights that we put on with low tape supplies on FM20 were removed, replaced with 1 lb wts and retaped. A total of about 51 lbs of lead were added or one pound per section. Upon retrieval four more two pounders and one lb were removed so that these 25 channels now have 42 pounds more than on FM20. A streamer log is archived. Three depth transducers were included, the outboardmost one appeared dead; the other two worked smoothly. An EGG depressor was placed at the rope connection about 50' from the tail buoy and 250' from the streamer end. A v-fin depressor was placed on the leaded outer end of the leader. Guns were deployed at 1850 to shoot a line back to the scheduled starting point, because the bathymetric map showed an apparent head of slump perhaps analogous to a small scale Mississippi Trough on the front of the ancestral Brazos-Colorado Delta (East Breaks). However, shortly after shooting began, other seismic ships in the area began complaining bitterly about our interference with their time sharing plan. After some radio discussion with a Geiko ship we shut down our guns until we reached the planned beginning point for Line 1. It turned out one gun was leaking and the data may not have been of high quality.

The transit to Line 1 was about 5 hours which turned out to be the length of time slot the other seismic ships were exchanging. We began shooting Line 1 at 0107 6 Jan '84 and completed it 1023. At 0500 the Geiko ship complained again. I explained by radio that we were on a course out of the area and would complete our first line about 10 am. At 0640 both Loran C units blinked out. The bridge unit returned and stabilized by 0707, the lab unit kept blinking unstably until about 0720 then stabilized. At 1000 magnetometers were deployed. The starboard unit was erratic, but

the port unit was stable and was left on the remainder of the trip. Later the starboard unit was retrieved by hand turning the winch as the hydraulic motor seemed inoperative.

1000-1030 distressful complaints of other seismic ships (chiefly Geiko) were accomodated by gun shut-down for 5 hours. This caused a loss of about 60% of Line 2. Line 2 is ESP 3 of cruise FM20 and is the most continuous, undeformed sedimentary basin in the area. Thus covering 40% of it displayed the essential geologic features that were the objectives of this line. We turned onto Line 3 about 2310 and crossed a large, intraslope basin.

Between Lines 3 & 4 the guns were pulled for a maintenance check (which solved a slightly erratic firing time for the starboard gun) while doing a 245° outside turn. Whereas gun retrieval required slowing to dead slow on one engine and only one gun was pulled at a time, and both compressors kept running, I took the opportunity to demonstrate fullfold data acquisition by increasing the rep. rate to 16 sec while one gun remained firing. When both guns were ready we began Line 4 returning to either 24 sec rep. rate at 5.7 knots or 25 sec rep. rate at 5.4 knots, both designed for 70 m shot spacing or 12 fold stacking.

7 Jan 0907 turned onto Line 5. 8 Jan 0322 turned onto Line 6.

Three sonobuoys were deployed on Line 6. The second stopped sending after about 15 min. which is about the time it would have taken to reach the tail buoy, thus it probably fouled theron. The other two were recorded on a flatbed recorder only, because floating point channels are not available through the DFS in 24 channel configuration.

About 1700 a retrieval cable broke on the port airgun. The gun was retrieved stepwise with chain hooks in a very smooth and skillful (safe and efficient) manner by Oscar, George, and Stirling. The cable apparently parted due to wear at the spring-line pulley. Repairs were made and the gun was back on line by 1845.

I then estimated return transit time based on a speed of 9 knots and a 4 hour streamer retrieval party and agonizingly decided we had to cease firing immediately (1922). The retrieval streamer party ran from 1930 to 2200 at the end of which the SATNAV gave an ETA for the sea buoy of 1158 9 Jan '84. Due to the short streamer party and an average transit speed of 10.7 knots we arrived at the dock at 1148 9 January 84.

Discussion and Summary

The cruise took place during excellent weather (seas less than 3' until the last day) and all shipboard systems seemed to take their cue from the weather.

The 3.5kHz system worked normally, producing the excellent records characteristic of it since the new hull transducer mounting was installed. Maintenance of uniform horizontal scale on the recordings is hampered by the systems apparent inability to paper advance (and perhaps print) on two consecutive sweeps while the recorder is in channel A delayed by B mode. Whether this is inherent in the equipment or a repairable defect needs to be determined. The ARL variable frequency transceiver was tested during the last few hours of the cruise. Operation was not achieved. Stirling is familiarizing himself with the system.

The streamer towed smoothly and quietly at the bird depth setting (40-45') except for a pull-up of about 6 feet at the shipboard end which was slightly noisier than the rest of the streamer (but much less than that at depths of less than 10') probably due to depressor strumming. This noise might be changed to a frequency above the filtered range recorded by using

a 3/16" cable rather than the more massive chain with which we attached the v-fin. Standard deviation of towing depths was only 3 to 4 feet and was much less on any single line.

The Doppler Sonar system did not seem to work well. Initially, while in bottom-lock the speeds agreed with LORAN C speeds; but in water-lock speed readings increased to unreasonable values (> 16 knots) . Reasonable speeds could be forced on the system with recalibration, but the system then seemed unresponsive to speed changes. Upon return transit and return to bottom lock there was the same effect, i.e., recalibration was necessary but no apparent response to speed changes (it showed 9 kts even after we had returned to the dock).

All satellite fixes were recorded for future calibration with LORAN. The set showed ERR 8 messages most of the time the first day or two but seemed totally happy with itself by the end of the trip. The SATNAV time display differed from the Systron Donner (WWV calibrated) time display by exactly one minute throughout the trip.

With the experience of one leg in November and the DEMUXR instruction manual I was able to bring the system up and keep it running smoothly throughout the cruise. Thus it worked and the manual instructs very well. The manual is in conflict with itself concerning the setting of dip switch 4 for enabling or disenabling changes of number of channels. This seems to be possible at either setting. The DEMUXR log printer lagged 5-10 minutes and 10-25 shots behind current events but seemed to record them accurately when it got around to printing them. The DATA LOGGER ran smoothly the entire trip perhaps in response to its father's attentive care.

Although apparently sufficiently familiar with DFS and DEMUXR to operate it, I have not had time to be more than vaguely aware of the operations of the DATA LOGGER and the processing of its data. Thus Eddie Nicol was an invaluable asset to the cruise. His skills are exceeded only by his cooperative, self-motivated, and self-directed attention to supporting cruise success to his maximum ability. Evidence of this is his accompanying report.

The support staff of George Pearcy, Stirling Gilfilan, and Oscar Febres-Cordoba was the smallest I've ever had or heard of on a multichannel cruise, but their performance and the results were excellent. Thus Griffiths' and Roberts' decisions that they weren't necessary for this cruise is supported. My only criticism is that the chief scientist should be advised of such decisions more than two hours before departure time.

The most unpleasant experience of the cruise was the inablilty to collect the second half of the data from the last sonobuoy and stopping Line 6 an hour before it could have been tied back into Line 1. These shortcomings were due to the necessity of conforming to the policy of returning to port by noon or spending another $8,000 for a ship-day. Any number of arguements could be made against this policy such as it forces streamer parties to be held in the middle of the night to - the front end of the trip was delayled because of the ship not being ready (airconditioner parts) - but the end result is that science suffers from administration policy, and this is a galling frustration to scientists.

Some data collection was missed due to shutting down for other seismic ships. This was done as a one-way courtesy as their operation would not have hampered us. As a chief scientist I would welcome policy guidelines in this area.

The smooth operation of the ship has become so standard that mention of the crew's skills and cooperation could easily be neglected, but they will not be forgotten.

The students' experience was enhanced immeasurably by the availability of more than one scientist for questioning. Even further enhancement derives from having an interested, enthusiastic, broadly knowledgeable source and Chuck Denham was at least that.

Two students were returnees and many more would like to be on future training cruises. Me too.

Respectfully Submitted,

E W B E. William Behrens

Computer Summary from Student Cruise

1.0

DATA LOGGER

1. The floppy disk drives are getting in bad shape. The controller and other functions check out, but the motor is beginning to sound like a rock polisher. I feel that the motor should be checked and probably replaced before we are unable to boot the logger. The floppy drive on the 11/34 is not compatible with the one on the logger so it is important that we keep the floppy drive on the logger running.

2. The satellite clock was down again during the student cruise. If time is needed in milliseconds, then we must get the clock fixed. Sterling recommends that we buy a new clock because of the increasing cost of repairing the old one.

2.0

11/34 Hardware Problems

1. The small Versatec was down during the student cruise. The large Versatec is usable for plotting and printing, but it is a gross waste of paper. This needs to be fixed as soon as possible.

2. Another Act V bites the dust. We are now down to one Act V from the original five bought for the ship. Overall, we have only two CRT's hooked to the 11/34. With this number of terminals, the 11/34 has became a single user system. It would be a good idea to purchase new(lasting) terminals to again enable the use of the 11/34 for proccessing data at sea.

3. Line 7 (TT7:) of the DZ11 terminal multiplexer is not working anymore. All of the other lines seem to be working, but the DZ11 card should be replaced before any other lines go down.

4. The Houston Instruments plotter is skipping and loosing track of its position. It needs to be checked and fixed if possible.

3.0

Changes to the 11/34 System

1. I have installed TT4: as the default print spooling device. It is set at 300 baud and attached to an Epson printer behind the computer racks. If and when the small Versatec comes up, the printer can be removed from the print que by deleting the command @TQUE from the startup command file. It might be best to make it permanent because the Versatecs are normally not queued to allow the to do plotting.

2. The Houston Instruments plotter is back at 1200 baud. It was originally built into the system using TT7:. Because line 7 is down, it is now attched to TT6: with all output to TT7: redirected to go to TT6:.

4.0

RSX-11M System Needs

1. We still cannot back up the large CDC disk on the 11/34. Someone needs to buy or convince PLESSEY to give us a DCS standalone utility tape that will write to a 160MB CDC disk drive. They have the doccumentation on how to use their version of DSC, but we never recieved it when we recieved the information on how to install the disk drive into a RSX-11M system. It also was not included in our last system distrubution kit that we purchased from them.

2. It would be very useful to have a RT-11 emulator for the 11/34 computer. The emulator would allow changing of the data logger and DEMUXER on the 11/34 while at sea. This is not possible now if the systems are being used for data aquisition. It would also be usable on the VAX in compatability mode and allow the programs to be worked on in Austin.