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CRUISE REPORT

M/V FARNELLA - Leg 3A

2-22 October, 1985

USGS-IOS Gulf of Mexico EEZ Survey

by

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CRUISE REPORT

Vessel:

M/V FARNELLA

Area of Operation:

Eastern Gulf of Mexico

Dates:

Depart Tampa FL 1000 (EDT) 2 October, 1985
Arrive Key West, FL 0800 (EDT) 22 October, 1985

Personnel:

Roy Hadgraft, Captain
David Twichell, USGS (U.S. Geological Survey) Chief Scientist
Robert Commeau, USGS
Steve Mateus, USGS
Page Valentine, USGS
Charles Paull, Scripps Institute of Oceanography
Kim Benjamin, Woods Hole Oceanographic Institution
Derek Bishop, IOS (Institute of Oceanographic Sciences, U.K.)
Lindsay Parson, IOS
Robin Bonner, IOS
Jon Campbell, IOS
Andrew Harris, IOS
Collin Jacobs, IOS
Doriel Jones, RVS (Research Vessel Services, U.K.)
Derek Lewis, RVS

Equipment:

GLORIA long-range side-scan sonar
Airgun (160 and 80 cu in) single-channel seismic-reflection system
3.5 kHz profiler
10 kHz profiler
Magnetometer
Loran C
Satellite receiver
Global Positioning System

Objectives:

As part of the program to study the Exclusive Economic Zone (EEZ) of the Gulf of Mexico, the U.S. Geological Survey, in cooperation with the Institute of Oceanographic Sciences of the U.K., undertook a long-range side-scan sonar survey of the Gulf of Mexico. The EEZ seaward of approximately the 500 m isobath was mapped using GLORIA (Geologic LOng-Range Inclined Asdic), a system owned and operated by IOS. In addition to the GLORIA data, airgun, 3.5 kHz, 10 kHz, and magnetometer data were collected. During leg 3A, the final leg of the program in the Gulf of Mexico, the Florida Escarpment and the distal end of the Mississippi Fan were surveyed (Fig. 1). The cruise was 20 days long, and data were collected along 6,741 km (3,640 nm) of ship's track. The area mapped by GLORIA during this leg was approximately 50,586 square kilometers (27,314 square nautical miles).

Narrative:

Leg 3A was very successful. The weather was superb and imposed no restrictions on the operation of the equipment. The warm surface water temperatures, which imposed such severe restrictions on the line spacing during legs 1 and 2, were not as serious a problem during this leg because of the deep water depths in which we were working most of the time. The only area where the temperature affected the range was in the shallow water east of the Florida Escarpment, but even here we were able to get complete GLORIA coverage to depths of 400-1000 m. The Loop Current in the southeastern corner of the Gulf reached speeds of 7.4 km/hr (4kts) and was highly variable in its direction of flow. This current made it difficult to steer straight lines, and had an

effect on the orientation of the GLORIA vehicle. The greatest challenge to operations though were fishing boats and their long-line fishing gear. The lines were as long as 65 km (35 nm) and were 20 m below the surface; too shallow to go over with GLORIA. The fishing fleet was particularly abundant in the Desoto Canyon area, but some were also found near the edge of the escarpment at 25 N. The long-line gear is the reason for the peculiarities in the ship's track in these two areas (Fig. 1).

After the first two days, equipment down time was minimal and operations were very smooth. There were some logging problems with the GLORIA system and about 11 hours of data were lost at the beginning of the cruise. Initially the Muirhead camera (part of the system used to play back the data for building the at-sea mosaic) was not working properly, but it was fixed and caused only a slight delay in building the mosaic. The preamplifier in the Northstar Loran C antenna was damaged when we left Tampa and could not be fixed, but we managed very well using a combination of Loran C fixes from the ship's receiver, satellite fixes, and fixes from the Global Positioning System when available (6-7 hours a day). The seismic-reflection system was down for about 9 hours during the entire cruise. A 160 cu in airgun was used for the first three days, and after that we switched to an 80 cu in chamber. The smaller chamber resulted in much less wear on the airgun, yet still provided excellent subbottom penetration.

The data from leg 3A were full of surprises. The Florida Escarpment was spectacular, and showed a lot of unexpected changes in morphology along its length. Mass wasting on the slope above the escarp-

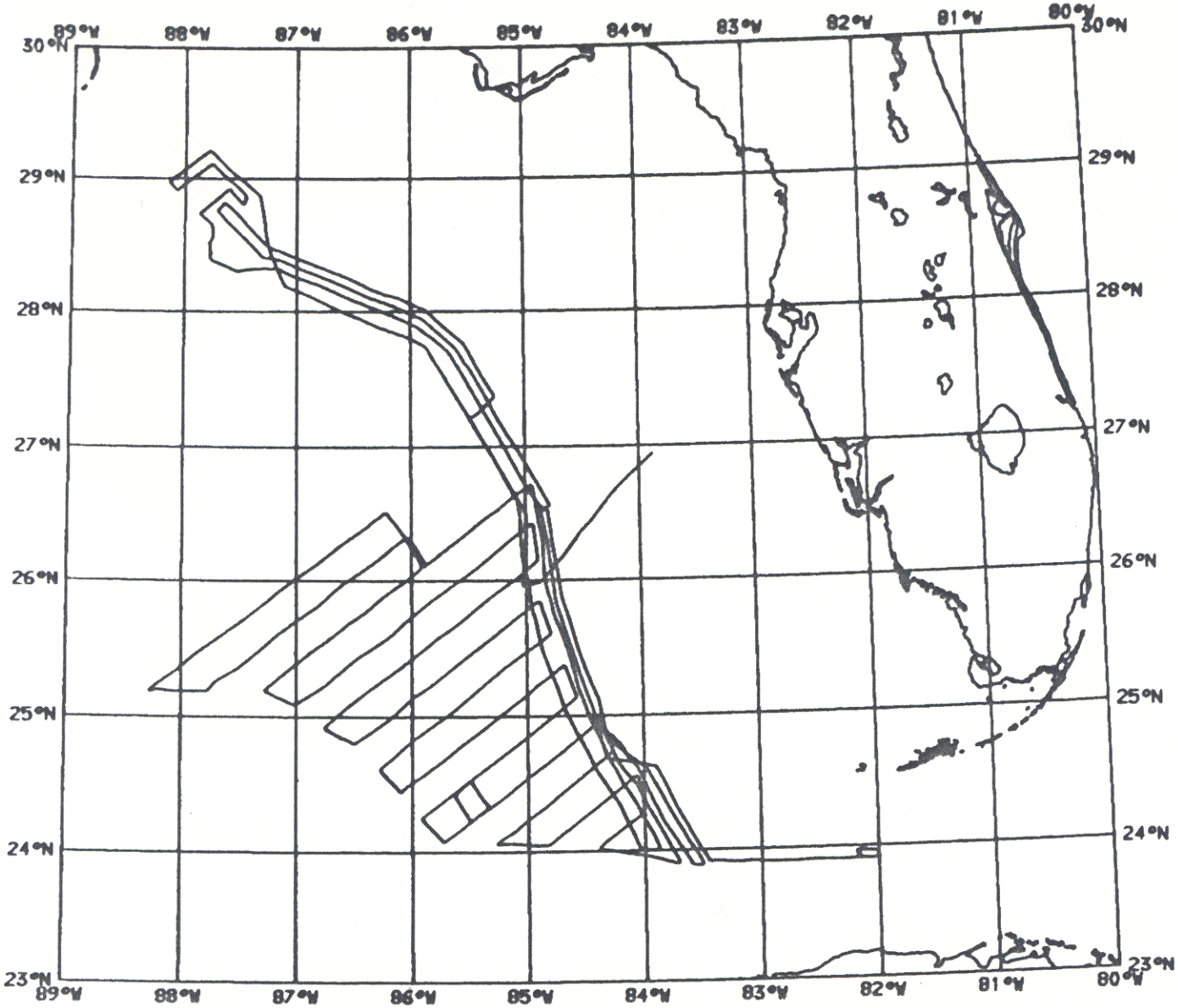
ment was more extensive than expected, especially south of about 26 N. The slide or slides on the Mississippi Fan that we started mapping on leg 2 extended to the southeastern corner of the Gulf (24 N). The distal end of the Mississippi Channel was found at about 25 30'N-86 W, but it was filled with slide deposits which extended much further to the south.

Tabulated Information:

A. Days at sea: 20

B. Amount of data collected:

System	Time Spent	Km Data Collected
GLORIA	424 hr 45 min	6,557
10 kHz profiler	435 hr	6,734
3.5 kHz profiler	435 hr 15 min	6,738
Airgun	428 hr	6,578
Magnetometer	433 hr 30 min	6,712



FARNELLA LEG 3A 2-22 OCT, 1985

National Oceanic and Atmospheric Administration
Environmental Data Service
National Geophysical and Solar Terrestrial Data Center

MARINE GEOPHYSICAL DATA DOCUMENTATION CODING FORM

LONGER IN DATA RECORD

CRUISE IDENTIFIER (as in data record)	FORMAT ACRONYM	DATA CENTER FILE NUMBER	NO. OF HEADERS: TYPE "1"	NO. OF HEADERS: TYPE "2"	NUMBER OF PARAMETERS	PARAMETERS SURVEYED: BATHYMETRY	MAGNETICS	GRAVITY	H.R. SEIS.	D.P. SEIS.	FILE CREATION DATE (Y Y M M D D)	CONTRIBUTING INSTITUTION	SEQ. NO.
FRNL85-3	MGD77		00	29	55	1	3	3	8	9	033	U.S. GEOLOGICAL SURVEY-WOODS HOLE	01

USGS MERGED-MERGED 3 DATA

COUNTRY	PLATFORM NAME	PLATFORM TYPE CODE	PLATFORM TYPE plain language	CHIEF SCIENTIST(S)	SEQ. NO.
USA	FARNELLA	1	SHIP	DAVID TWICHELL	02

PROJECT, CRUISE & LEG	FUNDING	SEQ. NO.
EEZ-SCAN, FRNL85-3 OR FARN 3A/85	USGS	03

DEPARTURE DATE (Y Y M M D D)	DEPARTURE PORT (CITY, COUNTRY)	ARRIVAL DATE (Y Y M M D D)	ARRIVAL PORT (CITY, COUNTRY)	SEQ. NO.
851002	TAMPA, USA	851022	KEY WEST, USA	04

NAVIGATION INSTRUMENTATION	POSITION DETERMINATION METHOD	SEQ. NO.
LORAN-C / SAT / GPS	PRIM-LORAN-C, SEC-SAT + GPS	05

BATHYMETRY INSTRUMENTATION	ADDITIONAL FORMS OF BATHYMETRY DATA	SEQ. NO.
10 KHZ ECHOSOUNDER, 1 SEC SWEEP	ANALOG RECORDS	06

MAGNETICS INSTRUMENTATION	ADDITIONAL FORMS OF MAGNETICS DATA	SEQ. NO.
PROTON PRECESSION MAGNETOMETER	ANALOG RECORDS + ANALOG TAPE?	07

GRAVITY INSTRUMENTATION	ADDITIONAL FORMS OF GRAVITY DATA	SEQ. NO.
		08

SEISMIC INSTRUMENTATION	FORMATS OF SEISMIC DATA	SEQ. NO.
AIRGUN (160+80CU IN) SINGLE CHANNEL REFLT	ANALOG RECORDS + ANALOG TAPE	09

FORMAT TYPE	DATA FORMAT DESCRIPTION (IN FORTRAN)	SEQ. NO.
A	(I1,A8,F5.2,4I2,F5.3,F8.5,F9.5,I1,F6.4,F6.1,I2,I1,3F6.1,I1,F5.1,F6.0,F7.1,	10
	F6.1,F5.1,A8,4I1)	11

BATHYMETRY

DIGITIZING RATE (MIN)	SAMPLING RATE	SOUND VELOCITY (METERS/SEC)	BATHY. DATUM CODE	INTERPOLATION SCHEME	SEQ. NO.
02	10 KHZ	15000	06	-MIN INTERVALS + PEAKS AND TROUGHS	12

MAGNETICS

DIGITIZING RATE (MIN)	SAMPLING RATE (SEC)	SENSOR TOW DIST. (METERS)	SENSOR DEPTH (METERS)	HORIZONTAL SENSOR SEPARATION (METERS)	REFERENCE FIELD	REFERENCE FIELD	METHOD OF DERIVING RESIDUAL FIELD	SEQ. NO.
02		0200			12			13

GRAVITY

DIGITIZING RATE (MIN)	SAMPLING RATE (SEC)	CODE	THEORETICAL GRAV. FORMULA in plain language	CODE	REFERENCE SYSTEM in plain language	CORRECTIONS APPLIED	SEQ. NO.
							14

BASE STATION GRAVITY (MGAL)	DEPARTURE BASE STATION DESCRIPTION	BASE STATION GRAVITY (MGAL)	ARRIVAL BASE STATION DESCRIPTION	SEQ. NO.
				15

NO. OF AREA IDENTIFIERS	10-DEGREE AREA IDENTIFIERS	SEQ. NO.
		16
		17

ADDITIONAL DOCUMENTATION

SEQ. NO.
18
19
20
21
22
23
24