#81016

CRUISE REPORT: NE-81-2

by
D. R. Hutchinson

VESSEL: R/V NEECHO
CRUISE NO: NE-81-2
PROJECT: Mid Atlantic Resources (01830)

AREA OF OPERATIONS: LONG ISLAND SOUND
CRUISE DATES: 2-12 JUNE 1981
PORT STOPS:
- 2 June: Noank, Conn. (Univ. Conn. Marine Facility)
- 3 June: Branford, Conn. (Branford Marina)
- 4 June: Branford, Conn. (Branford Marina)
- 5 June: Milford, Conn. (Milford Yacht Club)
- 6 June: Milford, Conn. (Milford Yacht Club)
- 7 June: Milford, Conn. (Milford Yacht Club)
- 8 June: Stamford, Conn. (Halloween Yacht Club)
- 9 June: Stamford, Conn. (Halloween Yacht Club)
- 10 June: Port Jefferson, N.Y. (Town Dock)
- 11 June: Noank, Conn. (Univ. Conn. Marine Facility)
- 12 June: Woods Hole, Mass. (Kingman Marina)

CHIEF SCIENTISTS: John Grow and Deborah Hutchinson
PERSONNEL:
- Frank Jennings, Chief Technician
- Dave Nichols, DFS V Technician
- Paul Loud, Boat Operator
- Scott Chalker, Shore Coordinator

CRUISE OBJECTIVES: (1) To determine whether the Connecticut Valley Triassic grabens extends south of New Haven into Long Island Sound. (2) To determine whether subbasement reflectors can be identified especially in the vicinity of the gravity maximum which crosses western Long Island Sound and which is part of a major gravity anomaly extending from Georgia to Newfoundland.

NAVIGATION: LORAN C (Northstar 6000), recorded on DFS V header

EQUIPMENT:

<u>12 Channel Seismic System</u>

source	Bolt 40 in^3 airgun with waveshaper chamber Bolt 40 in^3 airgun without waveshaper chamber Seismic Systems, Inc. 15 in^3 water gun
receiver	Fairfield Industries 120-m 12 channel hydrophone.

	Fairfield Industries Interface box
	Syntron, Inc. Command Console CC-801 (bird control)
operating	DFS V Texas Instruments Control Module
and	DFS V Texas Instruments Analog Module
acquisition	Kinemetrics Model 468 DC Satellite Clock
system	Mountain Systems Extended Header Interface box
	2 Lamda LM G12 - RCS Power supply boxes
	BNC Digital Delay Generator Model 7010 (shot control)
	2 DFS V Texas Instruments Tape Transports
output	EPC 3200 graphic recorder (near trace monitor)
	SIE,INC oscillograph Model R-10A

Magnetometer:

Varian V-75 Proton magnetometer

Fathometer

Raytheon DE 719B

TABULATED DATA: see attached Table

STREAMER CONFIGURATION: see fig. 1.

TRACK CHART: see fig. 2.

COMMENTS

(i) Preliminary results:

General Geology: Our records are consistent with earlier studies in showing three main units: basement, which is a strong and generally smooth surface dipping to the south; Coastal Plain, which pinches out to the north and is carved into valleys or channels with up to 275 msec relief on both N/S and E/W lines; and unconsolidated recent sediments, which infill the valleys carved in the coastal Plain and form a transparent section. The unconsolidated section consists of two subunits and becomes less transparent towards the eastern sound. Many of the promonotories on the north shore of Long Island correlate with intra-valley highs in the coastal Plain section.

Triassic graben?: An erosional valley with 300 msec relief in the basement extends WSW from New Haven harbor. At least 2 fill episodes have occurred. If the earlier filling consists of Coastal Plain material, then this valley predates the Coastal Plain and may be related to the Connecticut graben.

Subbasement reflectors: No clear examples of subbasement reflectors occur on the near trace monitor record, but a faint subbasement event deepening from 300 to 700 msec occurs on Line 6 south of New Haven.

Magnetics: Eastern Long Island sound has anomalies up to 1000 gammas; the central sound has anomalies of only 20-50 gammas; and the western sound has anomalies of 150-300 gammas. The magnetic grain trends NE - SW. The quiet central zone is spatially the most likely to represent an extension of Connecticut Valley rocks.

Fathometer: These records show many different bottom types (smooth, rough, undulating, irregular) which often correlate with bathymetric changes.

(ii) 120m streamer: This streamer operated with all 12 channels for most of the first two days, then up to 5 channels became intermittent. Trouble shooting by Jennings and Nichols in Stamford, CT., showed that a bad transistor in the Fairfield Industries interface box and the lack of interchangeability of the preamps and active sectons could explain the bad channels. From then, only channel 4 acted intermittent.

(iii) 240m streamer: This was deployed 5 June 1981 but not operated because the shackle joining the tail buoy to the streamer became caught in a lobster line. The entire streamer was hauled in and the 20m sections were not tested for damage during the rest of the cruise.

(iv) airgun - water gun comparison: Lines run over the same morphologic feature using the 40 inch airgun with the wave shaper chamber,the 40 inch airgun without the wave shaper, and the 15 inch water gun showed that the water gun signal produced a significantly cleaner record with little reverberation. The water gun was used for all lines except Line 1.

(v) Difficulties working in L.I. Sound: Buoys marking lobster pots were the principal hazard for gear towed behind NEECHO. Along the north side of the Sound, they reached greatest density, with spacings as close as 10m near islands and rocky bottoms. On the south shore, the densities are greatest near the harbors. Pleasure and commercial boats were not a problem on weekdays. The weekend boats altered course when we drew attention to the shapes, blew the horn (danger) or hailed them on the loudspeaker. We had no success making radio contract with approaching vessels to alert them of our limited maneuverability. A more serious problem related to towing the streamer is the tidal currents, which average 1-2 knots. These caused the NEECHO and streamer to crab on lines oriented obliquely to the current flow. There was no apparent problem on lines run parallel to the flow. One way to minimize the crabbing problem is to survey cross-current lines during slack water conditions.

(vi) Recommendations for future NEECHO work using the multichannel system: a) Digital acquisition of the magnetic data preferably on the DFSV tape. b) Underway hardcopy print out of LORAN fixes, such as on a silent 700 terminal. c) One large winch to accomodate the streamer rather than two small ones.

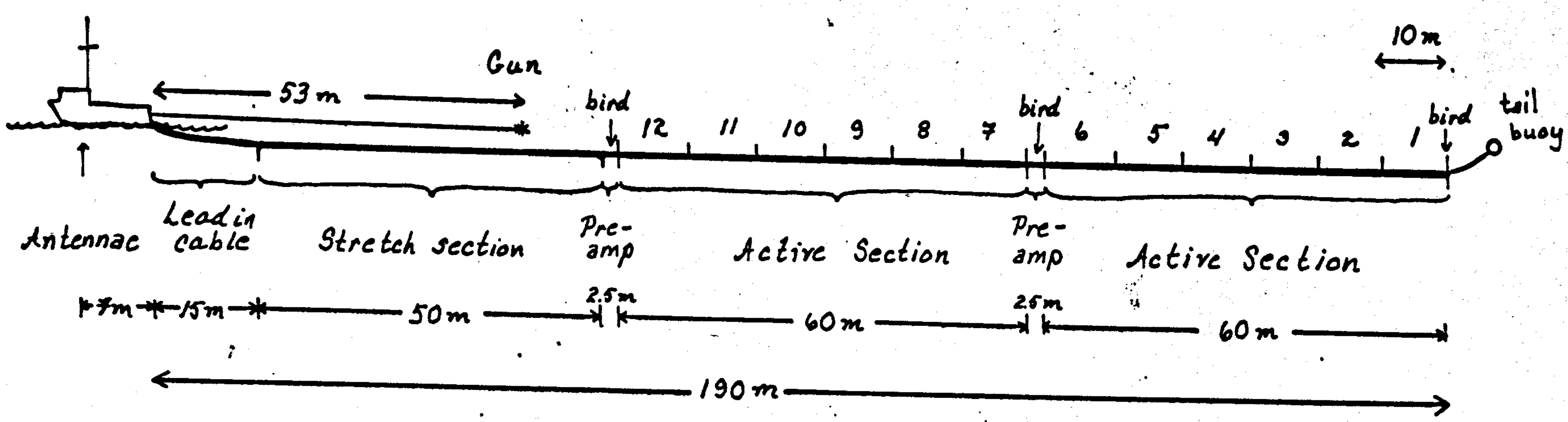
TABLE I: NE-81 - 2 TABULATED DATA

Line	Date	Time[1]		Shot Point		Tapes	Intermittent Channels	Other Data		Total Km[2]
		SOL	EOL	SOL	EOL			Mag.	Fathom.	
1	03-06-81	1050	1736	1	6100	1-16	5,10	✓		60.5
1	04-06-81	1112	1307	6101	7818	17-21	5,10	✓		18.3
1A	04-06-81	1412	1510	1	876	22-24	5,10	✓		8.0
1B	04-06-81	1549	1639	1	764	25-26	5,10,12	✓		8.3
2	05-06-81	1450	1732	1	1945	27-32	5,10,12	✓		21.5
3	06-06-81	1054	1313	1	1672	33-36	3,5,10,12	✓		17.0
4	06-06-81	1321	1435	1	893	37-39	3,10,12	✓		10.1
5	08-06-81	0956	1651	1	4970	40-52	3,5,6,10,12	✓	✓	54.1
6	10-06-81	1000	1600	1	4652	53-65	4	✓	✓	45.9
6A	11-06-81	0956	1558	4653	9938	66-78	4,11	✓	✓	57.3

[1] Time= local (eastern Daylight Time)

[2] Total Km 12 channel data: 301
Magnetometer:301
Fathometer: 157.3

Figure 1: Streamer Configuration

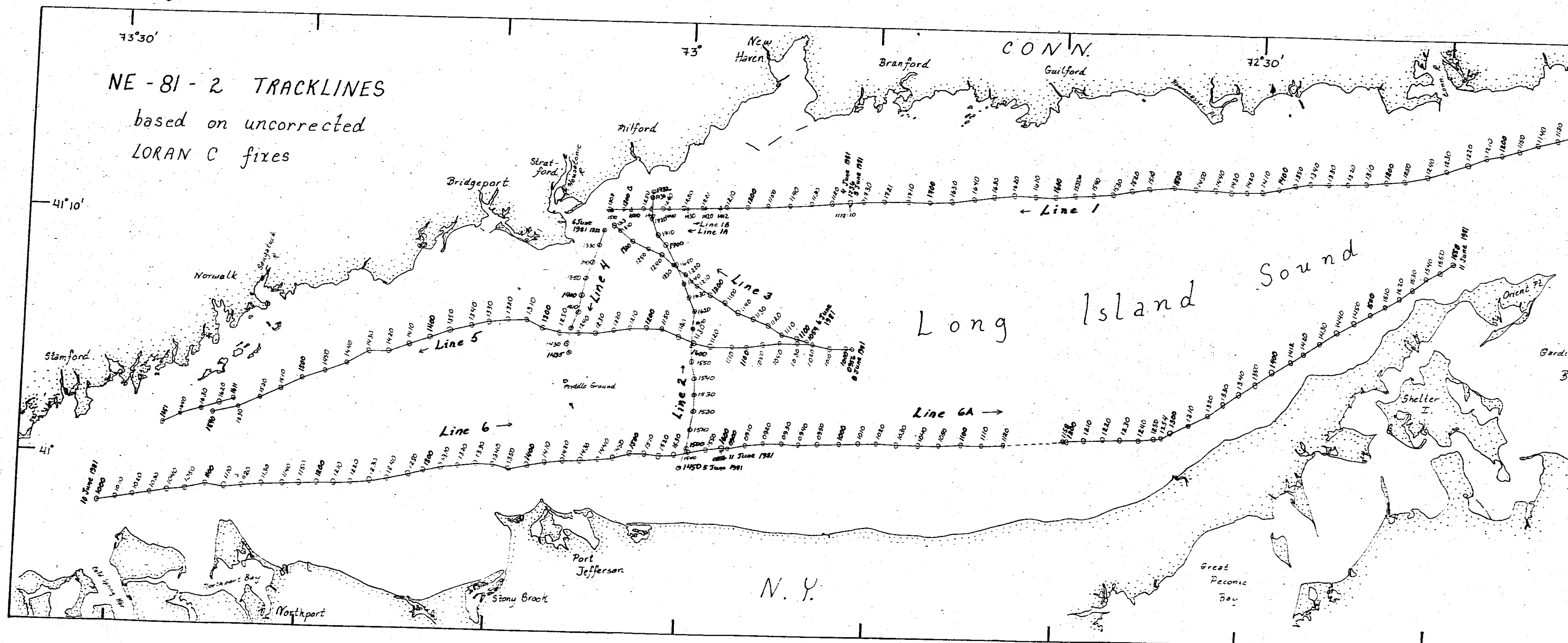


Hydrophone depth: 3.05 m (10 ft)

Offset distance: 19.5 m (Gun to center of trace 12)

Shot interval: by time, as close as possible to 10 m spacing using the LORAN C speed-over-bottom readout to adjust the shooting interval. Shot intervals ranged from 4-5 sec (3.6-5.0 kts).

Figure 2


NE - 81 - 2 TRACKLINES
based on uncorrected
LORAN C fixes
73°30'
73°
72°30'
41°10'
41°
CONN.
N.Y.
Long Island Sound
Stamford
Norwalk
Bridgeport
Strat-ford
Milford
New Haven
Branford
Guilford
Northport
Northport Bay
Stony Brook
Port Jefferson
Great Peconic Bay
Shelter I.
Orient Pt.
Middle Ground
← Line 1
Line 2 →
Line 3
← Line 4
← Line 5
Line 6 →
Line 6A →
← Line 1B
← Line 1A
10 June 1981
11 June 1981
4 June 1981
6 June 1981
8 June 1981
5 June 1981

birds

120 m
streamer

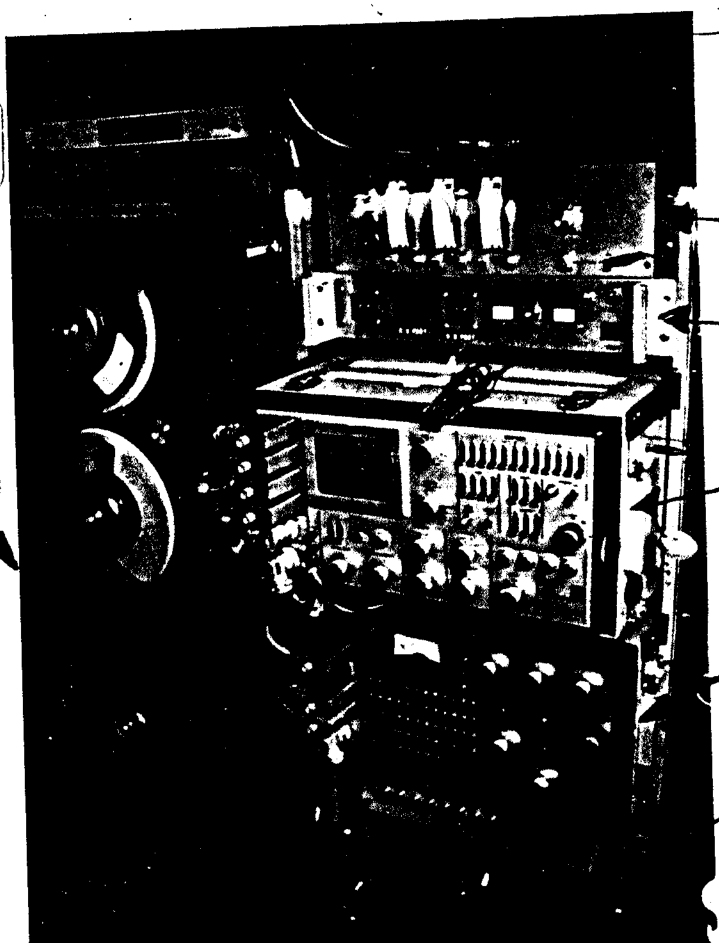
20m sections for
240 m streamer

Water gun

BNC box

Satellite
Clock

Fairfield Industries
Interface box



Bird control

DFS V Tape
Transports

DFS V Control
module

DFS V Analog
Module

Mountain Systems
Extended Header box