OCEAN DRILLING PROGRAM

LEG 101 SCIENTIFIC PROSPECTUS

BAHAMAS

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INTRODUCTION

The Bahamas carbonate platform represents one of the closest modern analogs of ancient carbonate deposits exposed in mountain belts around the world. The importance of the Bahamas in the interpretation of both the rock record on land and the history of the oceans has long been recognized, specifically regarding changes in eustatic sea level, paleogeography, sclerochronology and climatic changes, vertical tectonics, and three-dimensional facies models of platform flanks. Leg 101 of the Ocean Drilling Program will study the structural and stratigraphic evolution of the Bahamas carbonate platform.

Leg 101 is scheduled to commence from Miami, Florida on 31 January 1985. The ship will drill seven sites across Little Bahama Bank to investigate the development of an accretionary carbonate slope; a deep hole in the Straits of Florida to test theories regarding the origin of the present configuration of the Bahamas Platform; and finally, a three-site transect across Exuma Sound to examine a bypass carbonate slope and associated basin fill. Leg 101 will end in Miami, Florida on 14 March 1985.

PREVIOUS STUDIES

Both seismic studies and a few deep stratigraphic tests have been previously conducted in the Bahamas. However, most of the seismic work has been fragmented, consisting of isolated proprietary industry surveys on the banks, and academic single- and multichannel programs in the intervening deep embayments (Fig. 1). With the advent of high-quality multifold seismic profiles, reasonable attempts to develop coherent local seismic stratigraphic frameworks tied to available ground control have been made (Sheridan et al., 1981; Schlager et al., 1984), but inadequate regional data density has made long-range correlations difficult.

In 1983, when it became clear that a new scientific ocean drilling program would suceed DSDP, the academic community began to examine candidate areas for Atlantic drilling which combined important science with the logistical advantages of proximity to the U.S. mainland and favorable meterological conditions. The Bahamas became an obvious choice, but not without additional geophysical site surveys. Therefore, in response to an RFP generated by Joint Oceanographic Institutions, Inc., a consortium of universities led by the University of Texas Institute for Geophysics conducted high-resolution (multifold water gun) reflection/sonobuoy refraction surveys in three areas of the Bahamas during April, 1984 (Figs. 1-4).

To date, only four deep stratigraphic tests have been drilled (Andros-1, T.D. 4446 m, by Chevron-Gulf in 1947; Cay Sal IV-1, T.D. 5763 m, by Chevron-Gulf in 1959; Long Island-1, T.D. 5351 m, by Chevron-Gulf in 1970; Great Isaac-1, T.D. 5440 m, by Chevron, 1971; Paulus, 1972; Tator and Hatfield, 1975; Figure 1). Only the Great Isaac-1 penetrated Late Triassic (?) volcaniclastics beneath the carbonate section. All of the others bottomed in Late Jurassic-Early Cretaceous dolomite/limestone/anhydrite.

The only Deep Sea Drilling Project site on the Bahamas Platform is located near the axis of Northeast Providence Channel (Fig. 1). DSDP Site 98 sampled approximately 350 m of a deep-water carbonate section before bottoming out in bioclastic turbidites of early Campanian age (Hollister, Ewing, et al., 1972). Another detailed stratigraphic section is based on systematic sampling with DSRV ALVIN on the Bahama Escarpment north of Cat Island, which recovered Cretaceous and Tertiary carbonates (Freeman-Lynde et al., 1981).

These previous studies have aided in the identification of scientific objectives and location of drill sites for Leg 101.

SCIENTIFIC OBJECTIVES

Two major problems regarding the development of the Bahamas carbonate platform will be addressed on Leg 101. The deep holes are intended to investigate the complex arrangement of platforms and troughs that characterize the Bahamas, while the shallow holes are planned along transects to examine variations in carbonate slope sedimentation (Figure 5).

The problem of platform segmentation has been explained by two hypotheses, the graben hypothesis and the megabank hypothesis. The graben hypothesis (revived most recently by Mullins and Lynts, 1977) suggests that the present topographic configuration of the Bahamas reflects grabens and horsts developed during Late Triassic-Early Jurassic rifting of the North Atlantic passive margin. This implies that deep-water facies characterize the stratigraphic successions beneath troughs, while shallower-water facies persist beneath the intervening banks. Available well control on the banks supports the latter contention.

The megabank hypothesis (Sheridan et al., 1981) supposes that the modern troughs developed at some point during the he partial drowning of a larger, previously homogeneous carbonate platform. In this case, shallower-water facies should persist beneath both banks and troughs below the unconformity created by the drowning event.

Recently collected, multifold seismic profiles have identified a pronounced velocity discontinuity (from 4.2 to 5.2 km/sec) associated with a prominent seismic sequence boundary beneath the Straits of Florida (Sheridan et al., 1981; Fig. 6). By extrapolation of well control both in Florida and on Great Bahama Bank, Sheridan and his co-authors have correlated this acoustic horizon with the boundary between Albian-Aptian shallow-water limestones and Cenomanian, and younger, pelagic/hemipelagic carbonates. This correlation lends credence to a drowning event as all, or part, of the reason for the initial formation of Bahamian reentrants. Using stratigraphic evidence in the Bahamas and on Cuba, Schlager and Ginsberg (1981) also arrive at the conclusion that partial drowning of an Early Cretaceous "megabank" gave rise to the present pattern of platforms and troughs. In this way, the megabank hypothesis relates initiation of the present troughs to a global crisis of carbonate platforms in the mid-Cretaceous. The postulated timing also correlates neatly with a major unconformity in the deep Gulf of Mexico, which has been termed the "MCU," or "mid-Cretaceous unconformity" (Buffler et al., 1981). The MCU is a major stratigraphic turning point that coincides with the drowning of carbonate platforms rimming the Gulf (Schlager et al., 1984). The MCU can be interpreted as a response to a rapid fall in Cenomanian sea level (the 98 my BP lowstand of Vail et al., 1977) with erosion and backstepping of carbonate banks rimming the Gulf, and an ensuing sea level rise with associated initiation of deep-water clastic deposition (Buffler, 1984). It remains undetermined whether this feature is primarily shaped by a rapid fall of sea level (Buffler) or by platform drowning during sea level rise (Schlager).

Leg 101 intends to sample this marker horizon in at least one location (Straits of Florida, sites BAH-1A/1B), and hopefully at an additional site (either north of Little Bahama Bank, site BAH-9A; Exuma Sound, site BAH-11C; or Northeast Providence Channel near DSDP Site 98, sites BAH-3A, B or C).

The shallow transects planned for Leg 101 will investigate the development of different carbonate slope sedimentation regimes. Both single-channel seismic reflection profiles and piston core samples have demonstrated that modern slopes in the Bahamas steepen with height and are characterized by facies belts which generally parallel adjacent bank margins (Mullins and Neumann, 1979; Schlager and Chermak, 1979; Schlager and Ginsburg, 1981; Mullins et al., 1984). Commonly these belts include: 1) an upper, by-pass slope characterized by fine-grained periplatform carbonate ooze and frequent gullies floored by sand, 2) a middle-lower slope apron facies characterized by accretion of coarse-grained carbonates deposited primarily by slumps and debris flows, and 3) a lower slope apron facies composed of thinner, finer-grained turbidite deposits interbedded with periplatform ooze. The overall slope regime presumably evolves from accretionary to by-pass to erosional as slope angle steepens and turbidity currents increase in vigor (Fig. 7).

Leg 101 will drill two slope transects, one north of Little Bahama Bank on an accretionary slope, and the other in southeastern Exuma Sound on a bypass slope and associated basin floor. HPC cores will be taken at sites BAH-7A, BAH-8A, and BAH-9A north of Little Bahama Bank, and site BAH-11A (and possibly BAH-11B and BAH-11C) in Exuma Sound. In addition to sampling facies belts, the slope transects are designed to document the response of carbonate slopes to sea-level fluctuations. During the Quaternary sea-level changes, the response of carbonate continental margins was the opposite of that of siliciclastic ones. Carbonate sedimentation was rapid and turbidite flows frequent during high stands of sea level when the banks were flooded. On the other hand, sedimentation was slow and nearly devoid of turbidites during glacial low stands when the banks were exposed (Schlager and Ginsburg, 1981; Droxler, 1984).

Specific scientific objectives of Leg 101 include the following:

<u>Deep Objectives</u>

1. Date and define the nature of the velocity discontinuity observed on seismic lines in the Bahamas region. This surface separates deeper discontinuous, hummocky reflections with compressional wave velocities of 2.5-3.2 km/s from shallower, higher amplitude, more

continuous reflectors with compressional wave velocities of more than 5.0 km/s. It may represent the contact between younger, deep water, apron deposits and Cenomanian shallow-water carbonates. Sampling this horizon should date the drowning of the southern Blake Plateau, calibrate regional seismic stratigraphy, and provide insight into the causes of platform drowning.

2. Evaluate the tectonic vs. environmental controls of carbonate platform growth.

3. Correlate seismic stratigraphy between the deep Gulf of Mexico and the east coast of North America.

4. Document the history of the Gulf Stream, particularly the role of Cuban orogeny in the initiation of Gulf Stream flow.

Shallow Objectives

1. Document the history of interplatform basins.

2. Characterize variations in the development of upper, middle and lower accretionary- and bypass-type slopes, particularly in regard to contributions to the record by pelagic/hemipelagic deposition.

3. Document variations of platform sediment input from the in response to sea level fluctuations.

4. Study the diagenesis of periplatform ooze, especially regarding metastable aragonite and magnesian calcite.

LEG 101 OCEAN DRILLING PROGRAM

Bahamas Carbonate Platform

Location of Proposed Sites

Drill Sequence	Site Number	Latitude	Longitude	Water Depth	Locality	Hole Type
#1	BAH-7A	27° 22' N	78° 23' W	382 m	LBB	HPC/XCB-200 m
#2	BAH-8A	27° 32' N	78° 19' W	938 m	LBB	HPC/XCB-200 m
#3	BAH-9A	27° 38' N	78° 16.5'W	1000 m	LBB	[1]HPC/XCB-200 m [2]HPC/XCB and rotary coring to 600 m
#4	BAH-1A	25° 44' N	79° 42' W	750 m	FS	HPC/XCB-1500 m
	BAH-1B (alt)	25° 38' N	79° 39' W	788 m	FS	HPC/XCB-1500 m
#5	BAH-11A	23° 35' N	75° 44.5'W	1050 m	ExS	HPC/XCB-200 m
#6	BAH-11B	23° 42' N	75° 36.6'W	1725 m	ExS	HPC/XCB-200 m
#7	BAH-11C	23° 50' N	75° 26' W	1990 m	ExS	HPC/XCB-1300 m
	BAH-3A (alt)	25° 30.5'N	77° 19.5'W	3562 m	NE Prov. Channel	Rotary coring to 300 m
	BAH-3B (alt)	25° 31' N	77° 16' W	3525 m	NE Prov. Channel	Rotary coring to 300 m
	BAH-3C (alt)	25° 23.5'N	77° 22.5'W	3487 m	NE Prov. Channel	Rotary coring to 300 m
	BAH-5A (alt)	25° 13' N	76° 36' W	4770 m	S Blake Basin	1000 m coring

[1]Option 1

[2]Option 2

SITE OCCUPATION SCHEDULE

LEG 101

Site	Location	Travel Time (Days)	Drilling Time (Days)	Departure Date (Approximate)
DEPART:	Miami, Florida			31 January 1985
Underway		0.75		
BAH-7A	27° 22' N 78° 23' W		1.0	2 February 1985
BAH-8A	27° 32' N 78° 19' W		1.0	3 February 1985
BAH-9A (opt. 2)	27° 38' N 78° 16.5' W		6.0	9 February 1985
Underway		1.0		
BAH-1A	25° 44' N 79° 42' W		18.0	28 February 1985
Underway		1.0		
BAH-11A	23° 35' N 75° 44.5' W		1.0	2 March 1985
BAH-11B	23° 42' N 75° 36.6' W		1.0	3 March 1985
BAH-11C	23° 50' N 75° 26' W		9.25	13 March 1985
Underway		1.0		
ARRIVE:	Miami, Florida			14 March 1985
		3.75 days	37.25 days	41 days

Alternates/Options:

	Location	Drilling Time (Days)
BAH-9A (opt. 1)	27° 38' N 78° 16.6' W	1.0
BAH-1B	25° 38' N 79° 39' W	18.0
BAH-3A	25° 30.5' N 77° 19.5' W	1.0
BAH-3B	25° 31' N 77° 16' W	1.0
BAH-3C	25° 23.5' N 77° 22.5 'W	1.0
BAH-5A	25° 13' N 76° 36' W	9.0

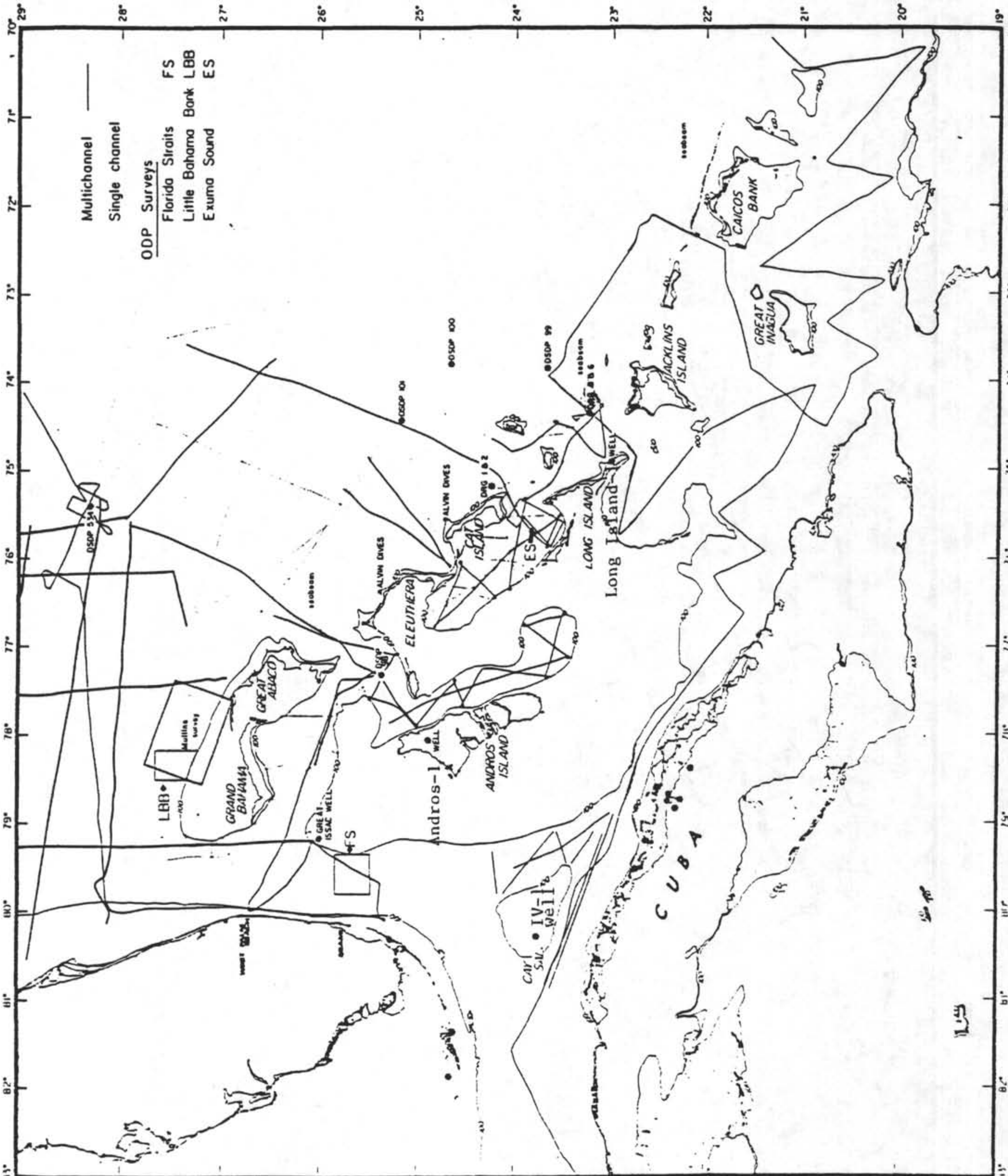


Figure 1. Map showing location of target areas for Leg 101: Little Bahama Bank (LBB), Straits of Florida (FS) and Exuma Sound (ES). Details of these areas are shown in the trackline maps in figures 2, 3, and 4. Previously drilled DSDP sites and deep stratigraphic tests are also indicated.

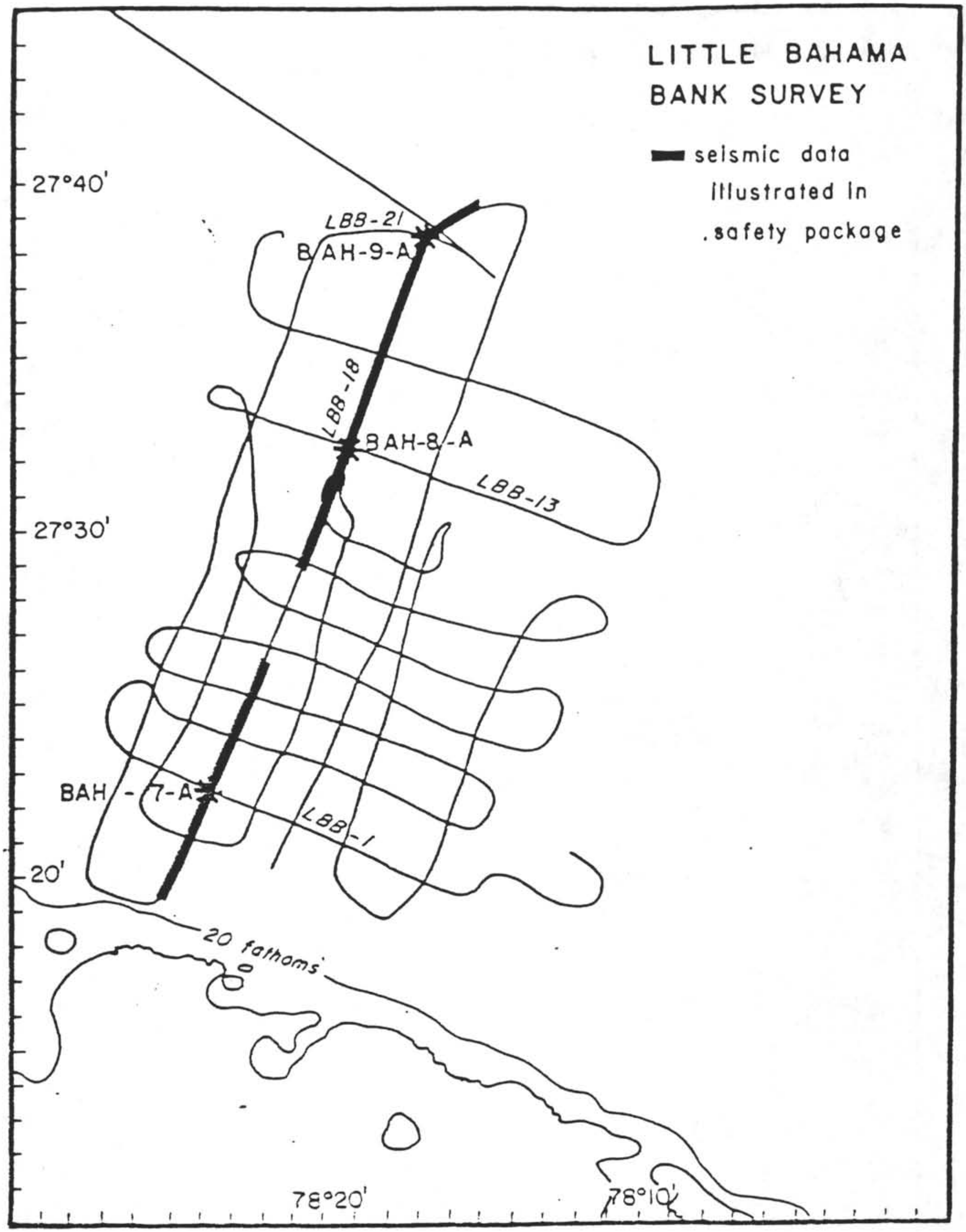


Figure 2. Trackline map for Little Bahama Bank (LBB) region. Seismic line LBB 18 is shown in figures 8, 9 and 10.

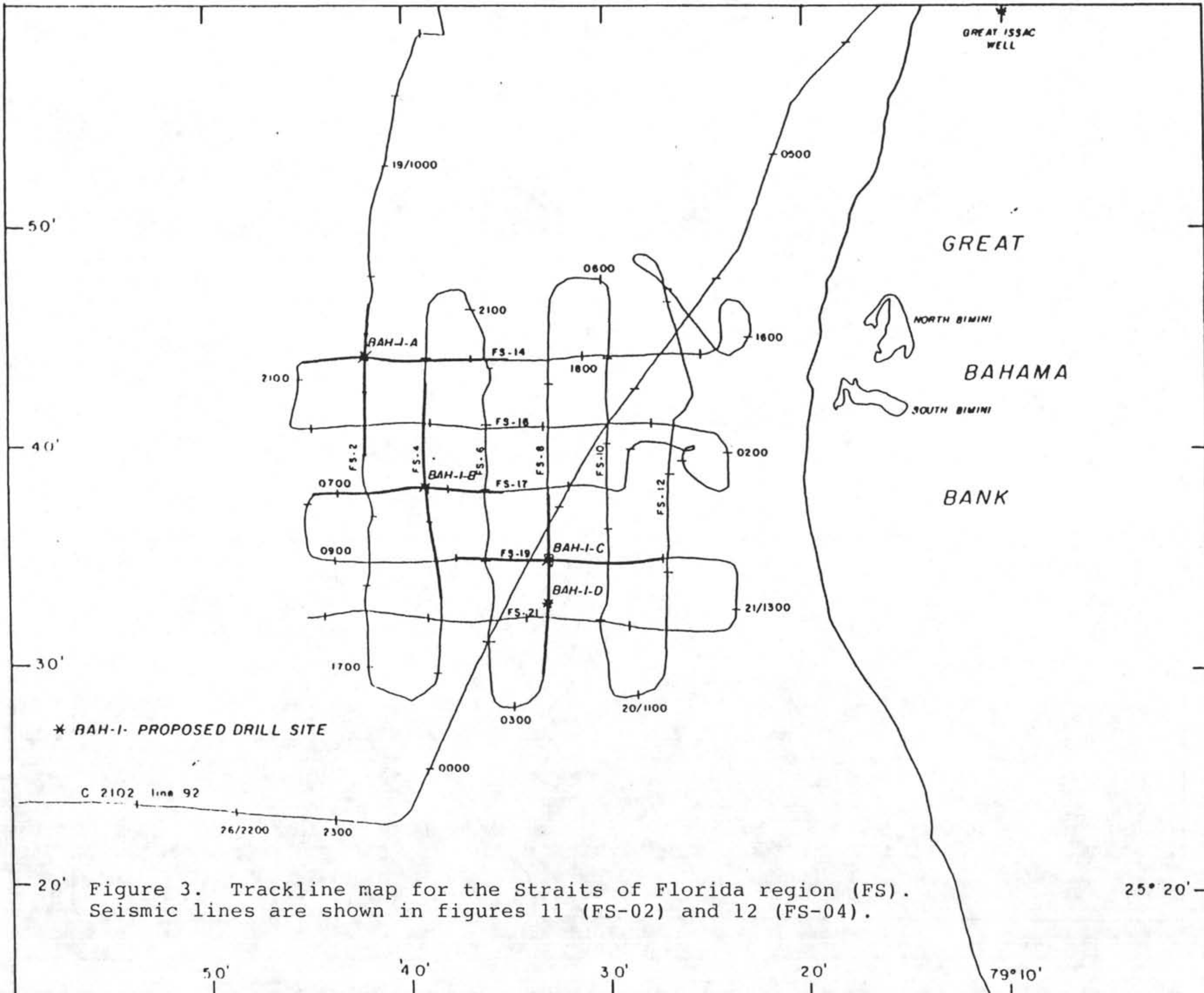


Figure 3. Trackline map for the Straits of Florida region (FS). Seismic lines are shown in figures 11 (FS-02) and 12 (FS-04).

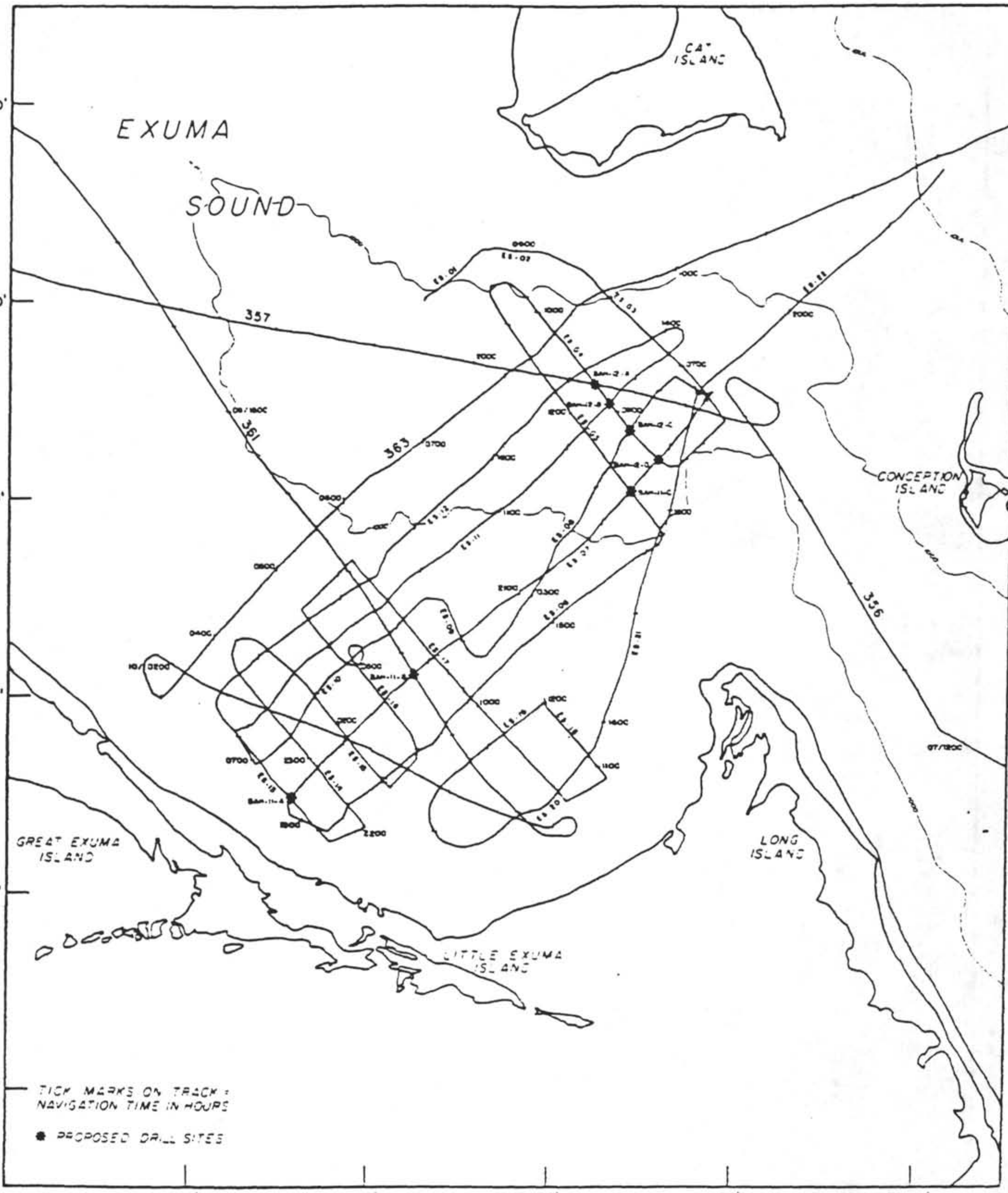


Figure 4. Trackline map for the Exuma Sound region (ES). Seismic line ES-07 appears in figures 13 and 14, line ES-04 in figure 15.

BAHAMAS LEG

OCEAN DRILLING PROJECT

OBJECTIVES	TARGET AREAS
1) PLATFORM SEGMENTATION (GRABENS VS. DROWNING)	STRAITS OF FLORIDA, EXUMA SOUND NORTHEAST PROVIDENCE CHANNEL
2) SLOPE SEDIMENTATION (ACCRETIONARY - BY-PASS - EROSIONAL)	LITTLE BAHAMA BANK, EXUMA SOUND
3) GULF STREAM HISTORY	STRAITS OF FLORIDA
4) ESCARPMENT RETREAT (SUBMARINE EROSION [MANY KM] VS. BACKSTEPPING [FEW KM]; TURBIDITES VS. CONTOURITES)	ELEUTHERA FAN

Figure 5. Objectives and target areas for the Bahamas region, Leg 101.

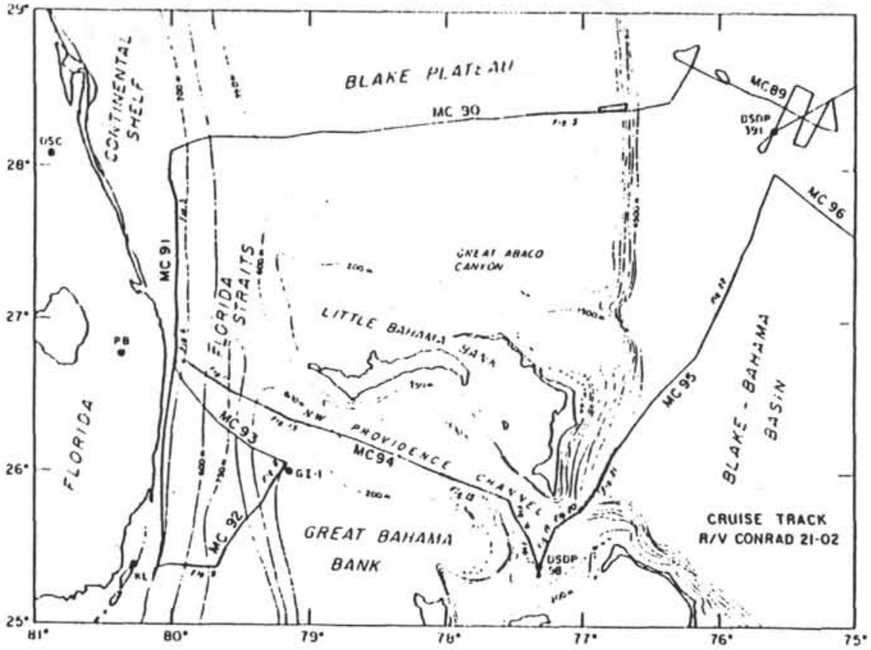


FIG. 1—Location map of 24-fold multichannel seismic reflection lines MC 89 through 96 made on cruise 2101 of R/V *Robert Conrad*. Also located are Osceola County (OSC), Palm Beach (PB), and Key Largo (KL) wells on Florida (Maher, 1965), Great Isaac Island well (GI-1) on Great Bahama Bank (Tator and Hatfield, 1975), and Deep Sea Drilling Project Sites 98 (Paulus, 1972) and 391 (Benson et al, 1978a). Locations of photograph figures of portions of lines are indicated.

Figure 6. Location map and seismic lines in the Straits of Florida (after Sheridan, 1981) illustrating the acoustic horizon interpreted as the boundary between Albian-Aptian shallow water limestones and Cenomanian and younger pelagic/hemipelagic carbonates.

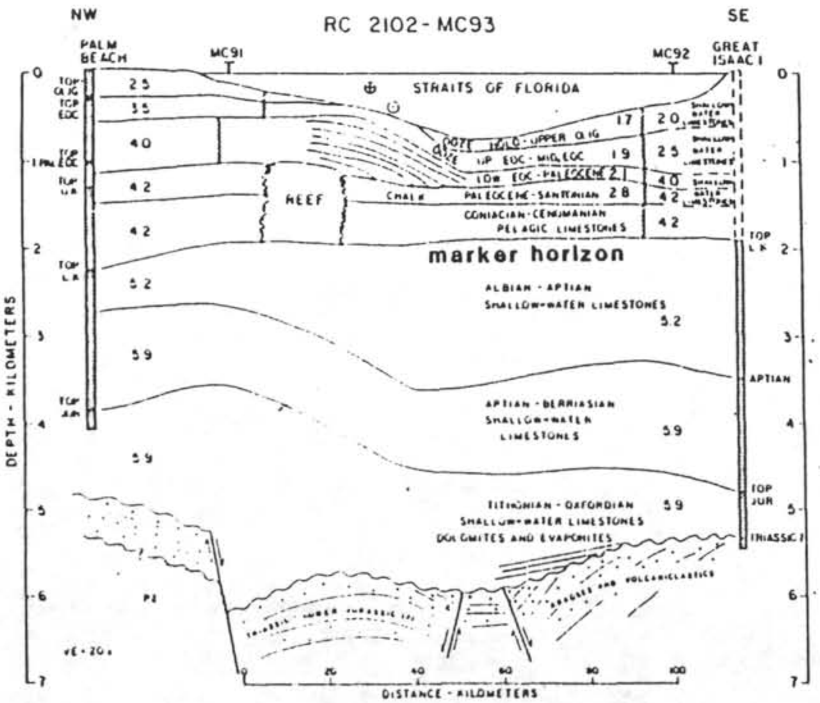


FIG. 11—Structure cross section of northern Florida Straits at Palm Beach, Florida, based on depth conversion of line MC 93. Velocities used for depth conversion are given in km/sec. Dashed part of Great Isaac Island well indicates that published accounts are only available for lower part of section (Tator and Hatfield, 1975).

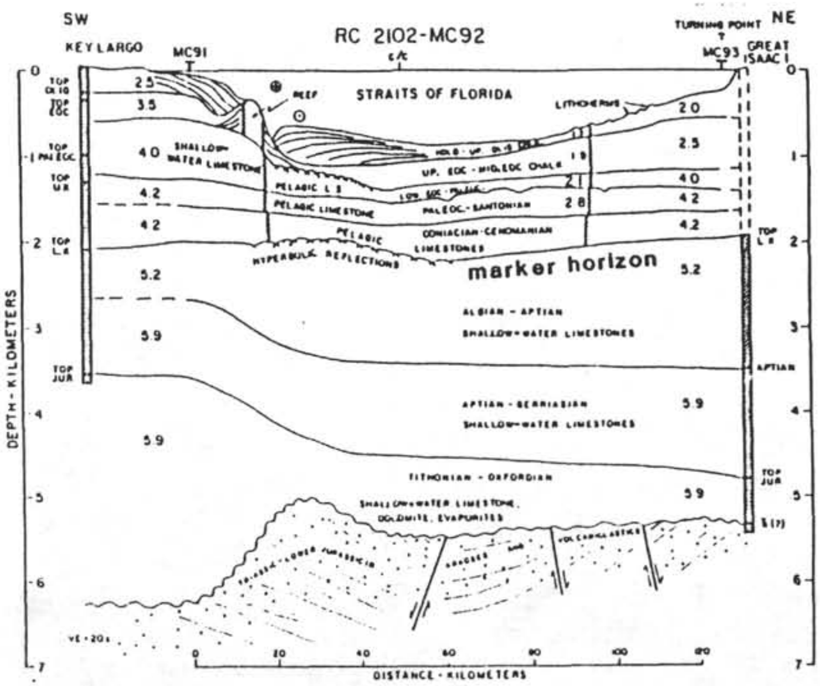


FIG. 10—Structural cross section of northern Florida Straits across Miami Terrace based on depth conversion of line MC 92. Current direction symbols indicate flow of Florida Current and deeper countercurrent. Dashed part of Great Isaac Island well indicates that published accounts are only available for lower part of section (Tator and Hatfield, 1975).

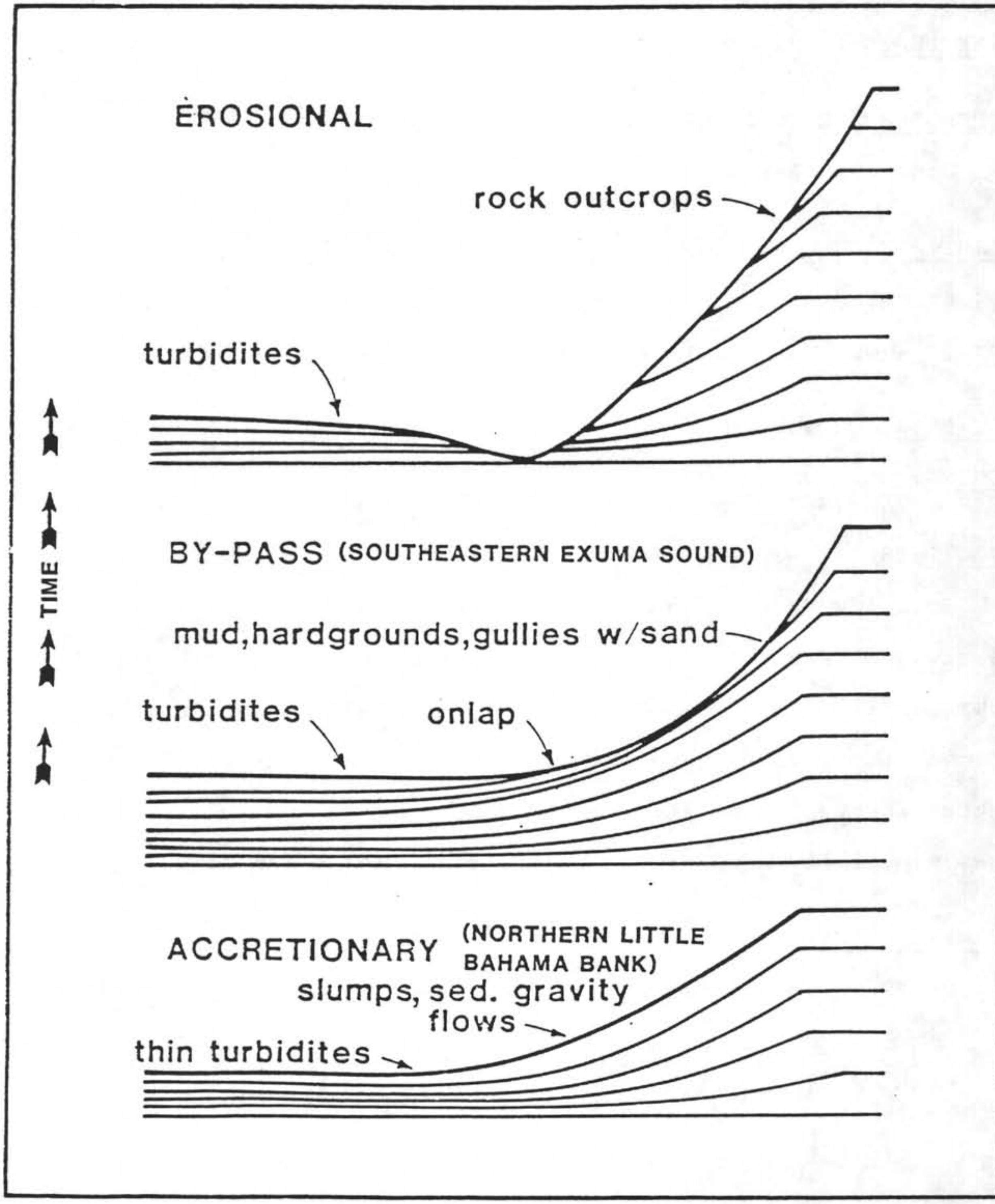


Figure 7. Postulated evolution of modern carbonate slopes (after Schlager and Ginsburg,1981).

SITE NUMBER: BAH-7A (Little Bahama Bank)

POSITION: 27° 22' N; 78° 23' W   SEDIMENT THICKNESS: >5 km

WATER DEPTH: 382 m   PRIORITY: 1

PROPOSED DRILLING PROGRAM

Continuous HPC/XCB coring to 200 m.

SEISMIC RECORD

Crossing of site survey lines LBB 18 and LBB 1, and on Profile 4 of Mullins et al., 1984.

HEAT FLOW: No

LOGGING: No

OBJECTIVES

To study the sedimentary record of an upper slope and relative contributions of pelagic/hemipelagic deposition and slump/debris flows in an accretionary setting. To investigate sediment input from the platform in response to sea level fluctuations. To investigate the diagenesis of periplatform ooze, especially metastable aragonite and magnesian calcite.

SEDIMENT TYPE

0-200 m: Periplatform ooze, some carbonate sand (channel lag deposits in gullies); hardgrounds of chalk and limestone.

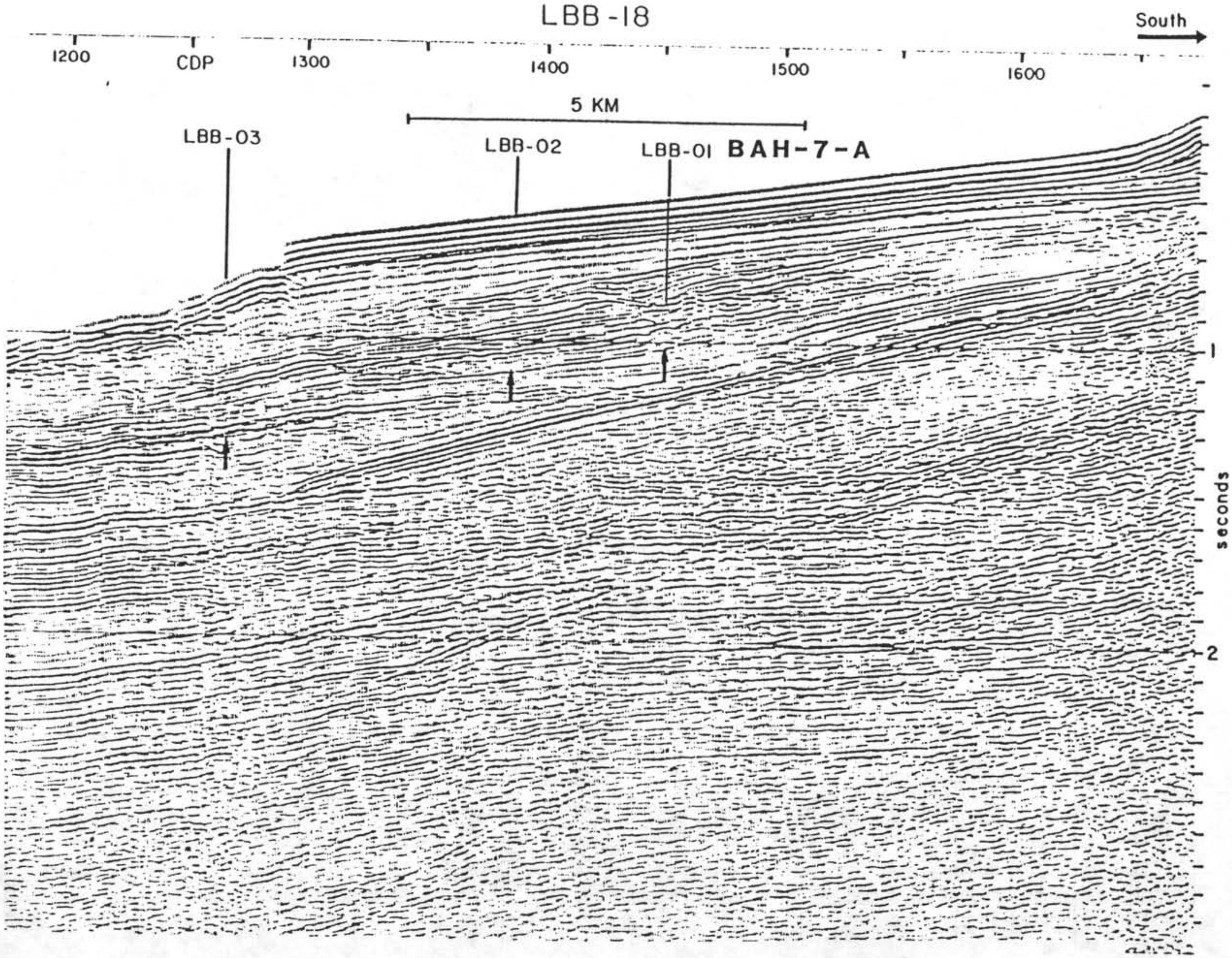


Figure 8. Southern portion of LBB-18 in the Little Bahama Bank area (trackline shown in figure 2). This and all subsequent profiles are 24-trace, 12-fold. The source was a 400 cu. in. water gun operated at 2000 p.s.i. with a repetition rate of 12 s.

SITE NUMBER: BAH-8A (Little Bahama Bank)

POSITION: 27° 32' N; 78° 19' W   SEDIMENT THICKNESS: >5 km

WATER DEPTH: 938 m   PRIORITY: 1

PROPOSED DRILLING PROGRAM

Continuous HPC/XCB coring to 200 m.

SEISMIC RECORD

Crossing of site survey lines LLB 18 and LLB 13.

HEAT FLOW: No

LOGGING: No

OBJECTIVES

To evaluate the sedimentary record of the lower slope (= basin margin) in an accretionary setting. To determine diagenetic vs. sea level effects.

SEDIMENT TYPE

0-200 m: Same as for BAH-7A, but increase in carbonate turbidites; hardgrounds of chalk and limestone.

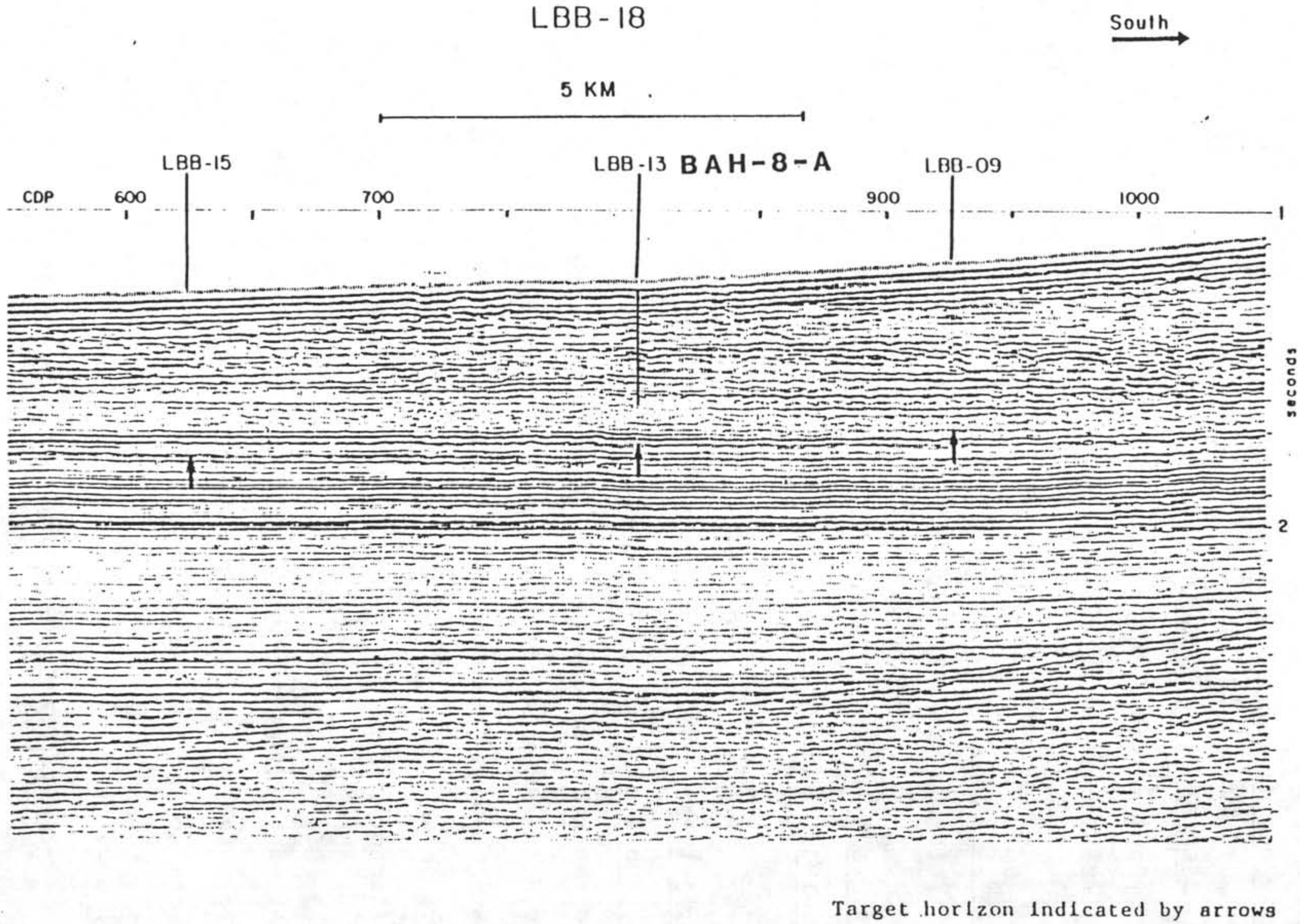


Figure 9. Middle portion of LBB-18 in the Little Bahama Bank area (trackline shown in figure 2). Details of site survey are in the caption to figure 8.

SITE NUMBER: BAH-9A (Little Bahama Bank)

POSITION: 27° 38' N; 78° 16.5' W SEDIMENT THICKNESS: >5 km

WATER DEPTH: 1000 m PRIORITY: 1 (option 1)

2 (option 2)

PROPOSED DRILLING PROGRAM

Option 1: HPC/XCB coring to 200 m.

Option 2: HPC/XCB and rotary drilling to 600 m, log entire hole.

SEISMIC RECORD

Crossing of site survey lines LBB 18 and LBB 21.

HEAT FLOW: No

LOGGING: Option 1: No

Option 2: Yes

OBJECTIVES

Option 1 and 2: to document the record of distal turbidites and the response to sea level fluctuations. Option 2: to date and define the nature of the seismic facies change from discontinuous, hummocky reflectors above 1.85 s (compressional wave velocities of 2.9-3.0 km/s) to high amplitude, continuous reflectors below 1.85 s (compressional velocities of 4.2 km/s; to correlate the regional seismic stratigraphic framework with that of the Gulf of Mexico and the east coast of North America; to examine the causes of platform drowning and date the drowning of the southern Blake Plateau.

SEDIMENT TYPE

0-200 m: Carbonate turbidites (coarse-grained) interbedded with periplatform ooze.

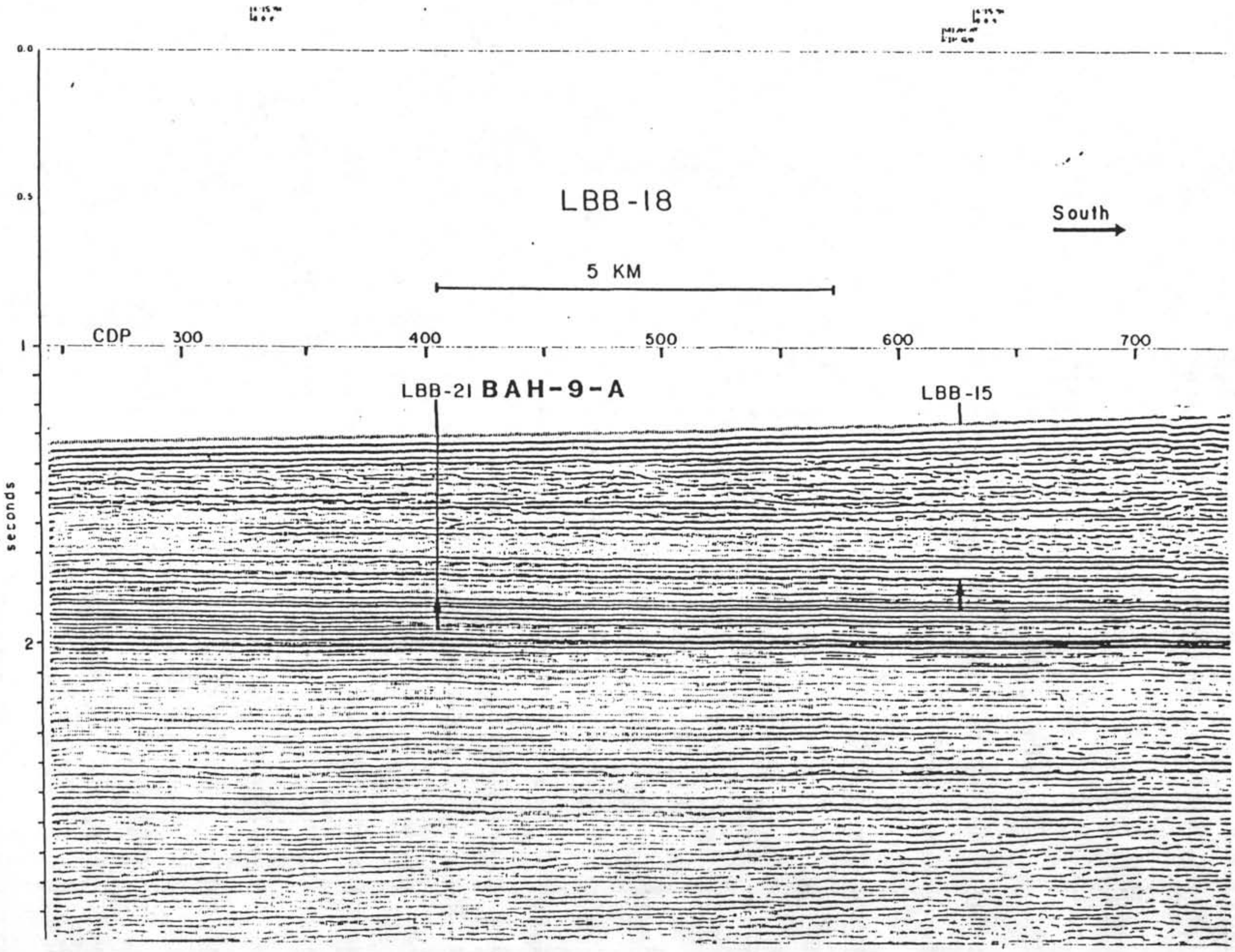


Figure 10. Northern portion of LBB-18 in the Little Bahama Bank area (trackline shown in figure 2). Details of site survey are in the caption to figure 8.

Target horizon indicated by arrows

SITE NUMBER: BAH-1A (Straits of Florida)

POSITION: 25° 44' N; 79° 42;' W SEDIMENT THICKNESS: >5 km

WATER DEPTH: 750 m PRIORITY: 1

PROPOSED DRILLING PROGRAM

Drill as re-entry site to depth of 1500 m (or 50-100 m beyond the velocity discontinuity surface at 2.1 sec. reflection time), log entire hole, conduct vertical seismic profiling experiment (VSP).

SEISMIC RECORD

Crossing of site survey lines FS-02 and FS-14.

HEAT FLOW: No

LOGGING: Yes

OBJECTIVES

To evaluate the tectonic vs. environmental controls on platform growth, particularly the nature of the velocity discontinuity at 2.1 sec. reflection time (a facies change would support the megabank hypothesis, while lack of a facies change would support the graben hypothesis). To correlate regional seismic stratigraphic framework to the Gulf of Mexico and east coast of North America. To document the history of the Gulf Stream and particularly the role of the Cuban orogeny in the history of Gulf Stream flow.

SEDIMENT TYPE

Tertiary: Deep water limestone/foram-nanno ooze; possibly minor siliciclastic input from Cuban orogen (chert/porcellanite)

Cretaceous: Deep water limestone, shallow water bioclastic limestone below facies transition

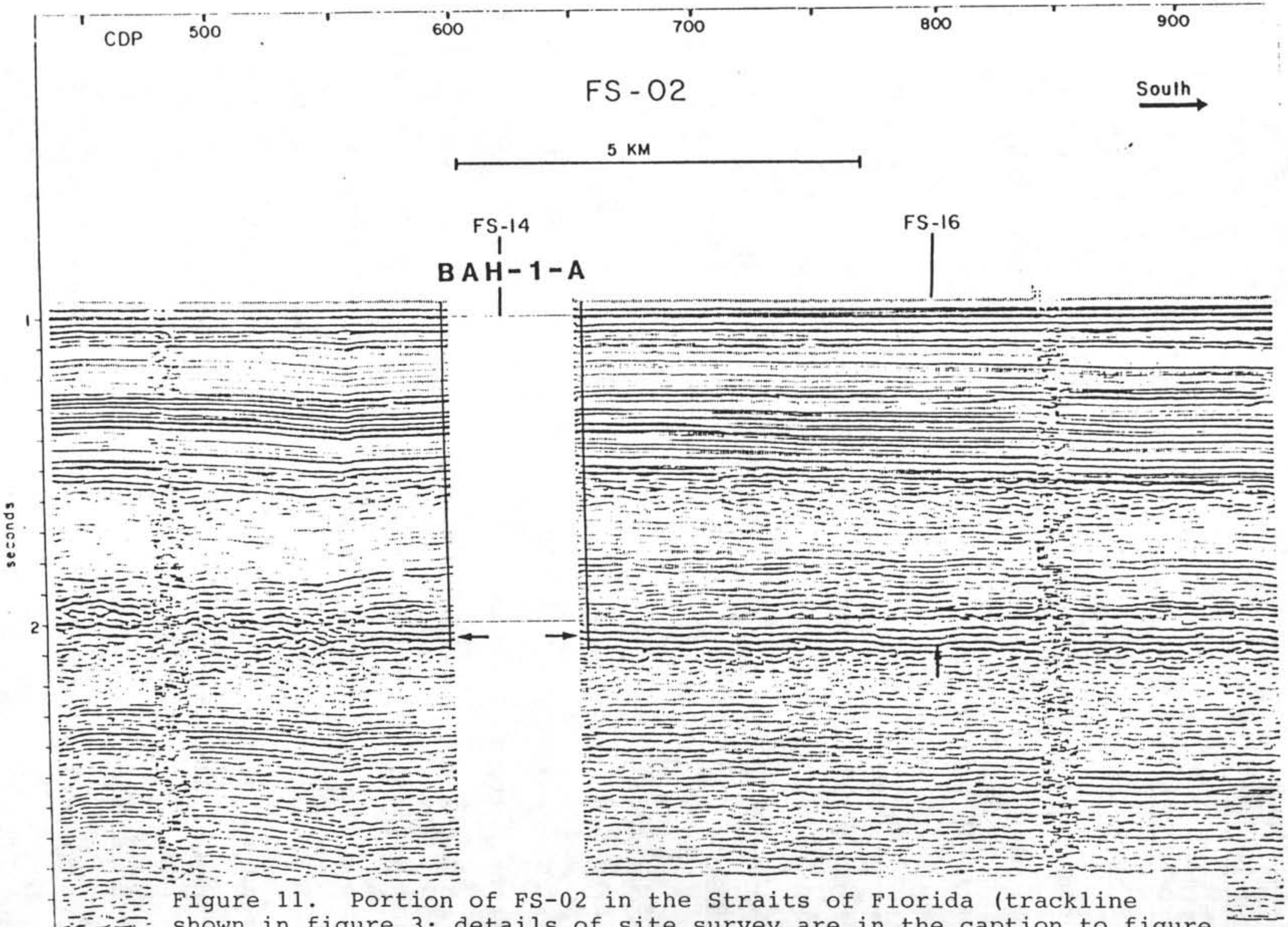


Figure 11. Portion of FS-02 in the Straits of Florida (trackline shown in figure 3; details of site survey are in the caption to figure 8. Both the site shown here (BAH-1A) and in figure 12 (BAH-1B) are intended to document Gulf Stream history and evaluate tectonic vs. environmental controls of carbonate platform growth. The pronounced seismic facies change north of BAH-1A may be karst or a drowned and buried bank. We hope to sample this facies at BAH-1A beneath high amplitude, flat-lying reflectors (lagoonal deposits?).

SITE NUMBER: BAH-1B (Straits of Florida)

POSITION: 25° 38' N; 79° 39' W SEDIMENT THICKNESS: >5 km

WATER DEPTH: 788 m PRIORITY: 1 (alternate)

PROPOSED DRILLING PROGRAM

Drill as re-entry site to depth of 1500 m (or 50-100 m beyond the velocity discontinuity surface at 2.1 sec. reflection time), log entire hole, conduct vertical seismic profiling experiment (VSP).

SEISMIC RECORD

Crossing of site survey lines FS-04 and FS-17.

HEAT FLOW: No

LOGGING: Yes

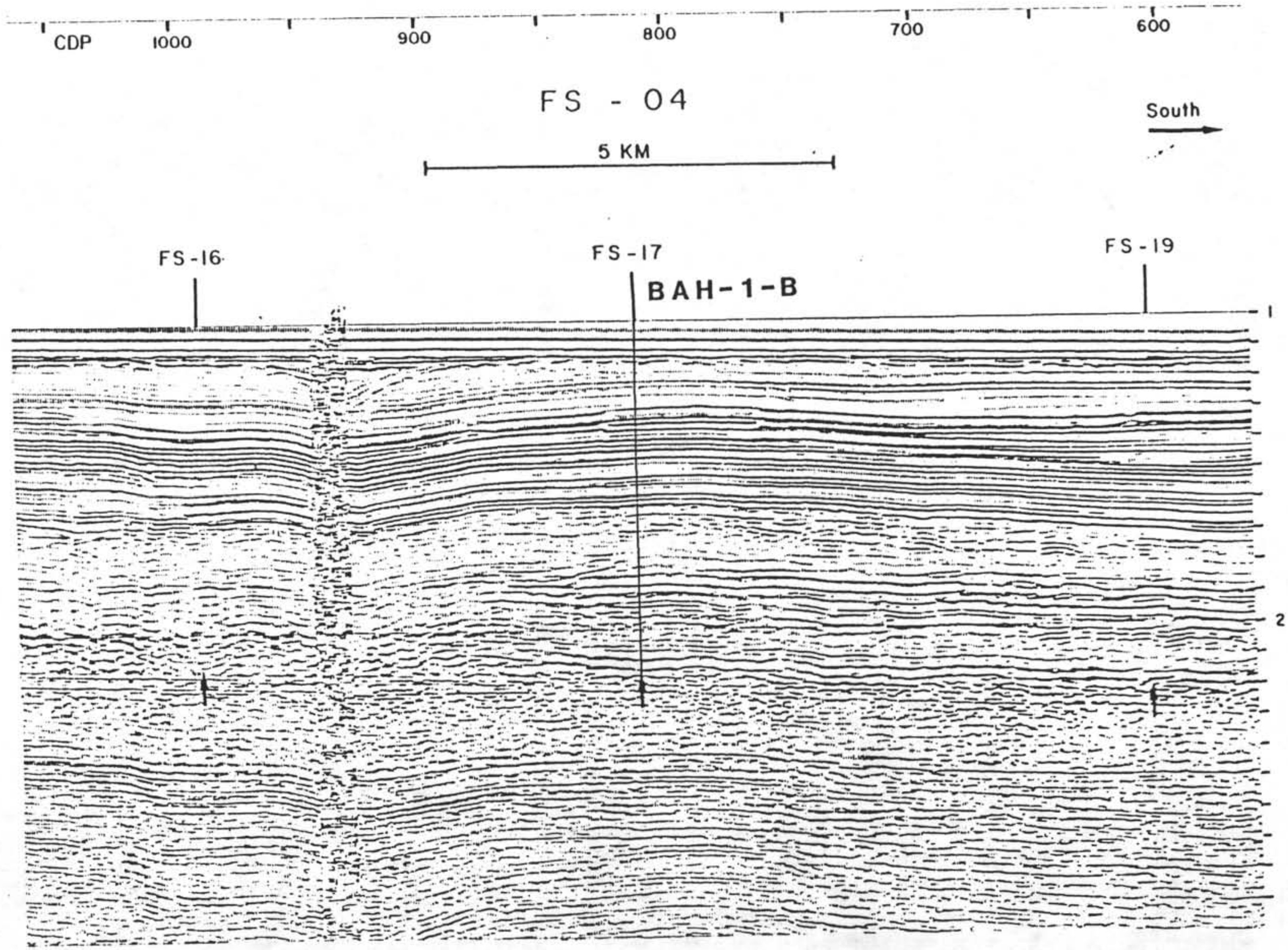
OBJECTIVES

To evaluate the tectonic vs. environmental controls on platform growth, particularly the nature of the velocity discontinuity at 2.1 sec. reflection time (a facies change would support the megabank hypothesis, while lack of a facies change would support the graben hypothesis). To correlate regional seismic stratigraphic framework to the Gulf of Mexico and east coast of North America. To document the history of the Gulf Stream and particularly the role of the Cuban orogeny in the history of Gulf Stream flow.

SEDIMENT TYPE

Tertiary: Deep water limestone/foram-nanno ooze; possibly minor siliciclastic input from Cuban orogen (chert/porcellanite)

Cretaceous: Deep water limestone, shallow water bioclastic limestone below facies transition



Target horizon indicated by arrows

Figure 12. Portion of FS-04 in the Straits of Florida (trackline shown in figure 3; details of site survey are in the caption to figure 8). Location of site BAH-1B (alternate to BAH-1A) is shown.

SITE NUMBER: BAH-11A (Exuma Sound)

POSITION: 23° 35' N; 75° 44.5' W

WATER DEPTH: 1050 m PRIORITY: 1

PROPOSED DRILLING PROGRAM

HPC/XCB to 200 m.

SEISMIC RECORD

Crossing of site survey lines ES 07 and ES 13.

HEAT FLOW: No

LOGGING: No

OBJECTIVES

To study the sedimentary record of a steep bypass slope, notably the relative contributions of pelagic/hemipelagic deposition and sediment gravity flows. To evaluate sediment input from the platform in response to sea level fluctuations. To investigate the diagenesis of periplatform ooze in a setting with numerous hiatuses.

SEDIMENT TYPE

0-200 m: Periplatform ooze, some carbonate sand (channel lag deposits in gullies); hardgrounds of chalk and limestone.

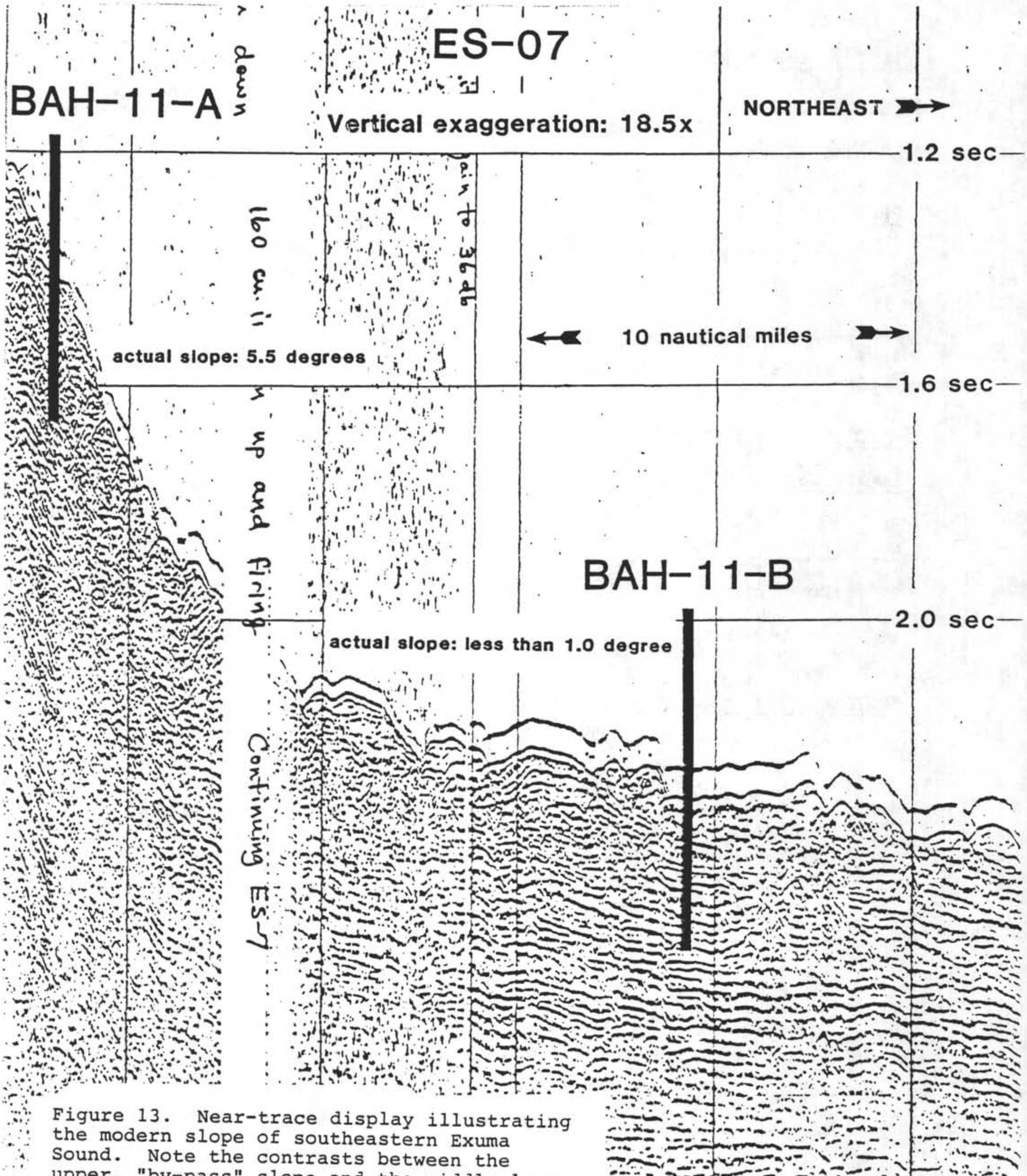


Figure 13. Near-trace display illustrating the modern slope of southeastern Exuma Sound. Note the contrasts between the upper, "by-pass" slope and the middle-lower slope apron. The vertical lines represent approx. 300 m of penetration at each site.

SITE NUMBER: BAH-11B

POSITION: 23° 42' N; 75° 36.6'W

WATER DEPTH: 1725 m PRIORITY: 1

PROPOSED DRILLING PROGRAM

HPC/XCB to 200 m.

SEISMIC RECORD

Crossing of site survey lines ES 07 and ES 17.

HEAT FLOW: No

LOGGING: No

OBJECTIVES

To evaluate the lower slope (= basin margin), and diagenetic vs. sea level effects in a bypass setting.

SEDIMENT TYPE

0-200 m: Same as for 11-A, but increase in carbonate turbidites; hardgrounds of chalk and limestones.

SITE NUMBER: BAH-11C

POSITION: 23° 50' N; 75° 26' W SEDIMENT THICKNESS: >5 km

WATER DEPTH: 1990 m PRIORITY: 1

PROPOSED DRILLING PROGRAM

Single-bit rotary drilling to 100 m beyond the velocity discontinuity at 3.65 s (c. 1300 m), or to bit destruction. Log entire hole.

SEISMIC RECORD

Crossing of site survey lines ES 07 and ES 05.

HEAT FLOW: No

LOGGING: Yes

OBJECTIVES

To sample the velocity discontinuity at 3.65 sec reflection time, in order to compare/contrast this surface with results obtained from the Straits of Florida. To document the Tertiary and Late Cretaceous history of an interplatform basin. To study the turbidite apron at the foot of a bypass slope and document variations in platform input in response to sea level.

SEDIMENT TYPE

Shallow facies: Periplatform ooze, debris flows, fine-grained calciturbidites

Tertiary: Same as Straits of Florida except no terrigenous component

Cretaceous: Same as Straits of Florida

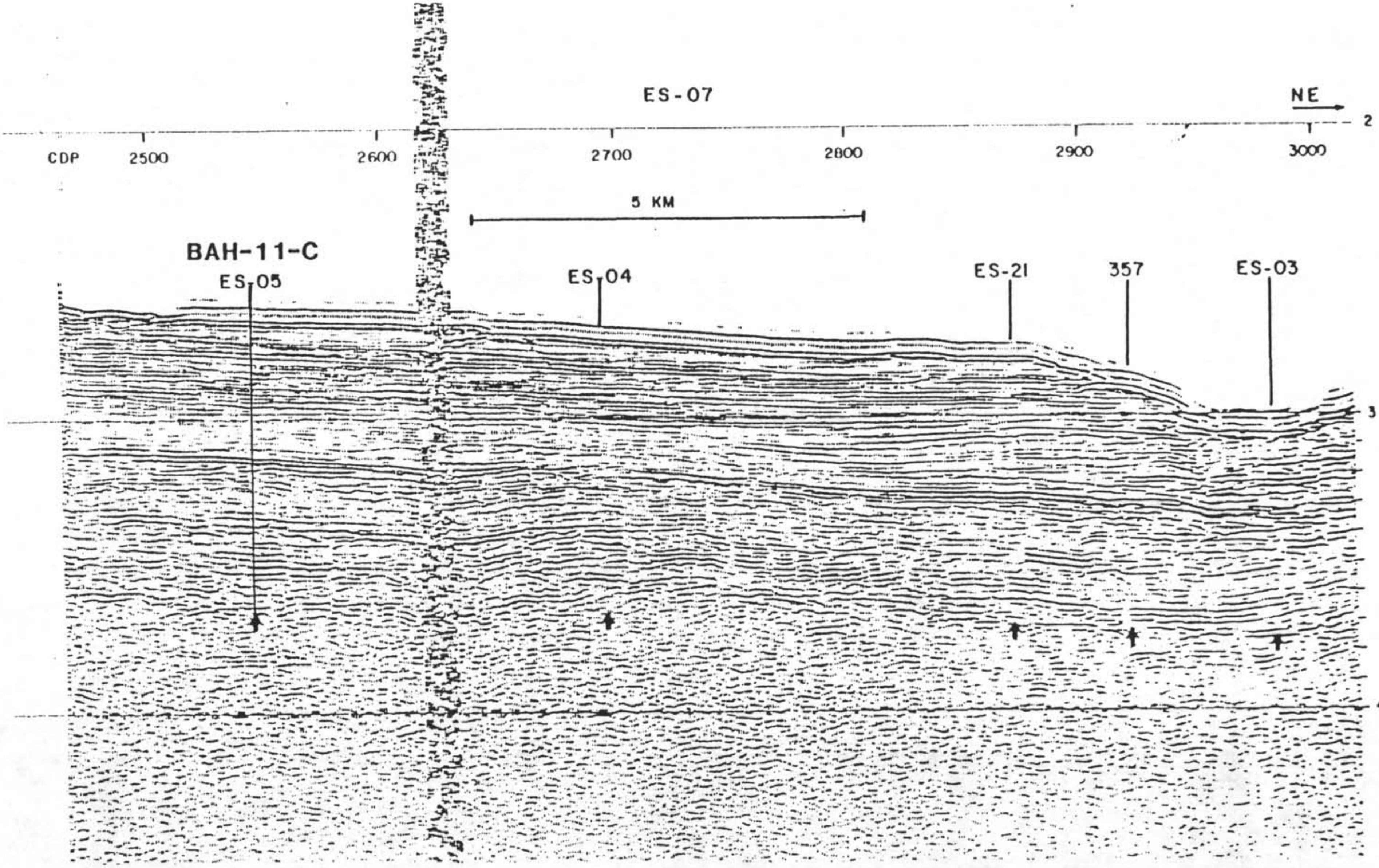


Figure 14. Portion of ES-07 in Exuma Sound (trackline in figure 4; details of site survey in caption to figure 8). Target horizon is indicated by arrows.

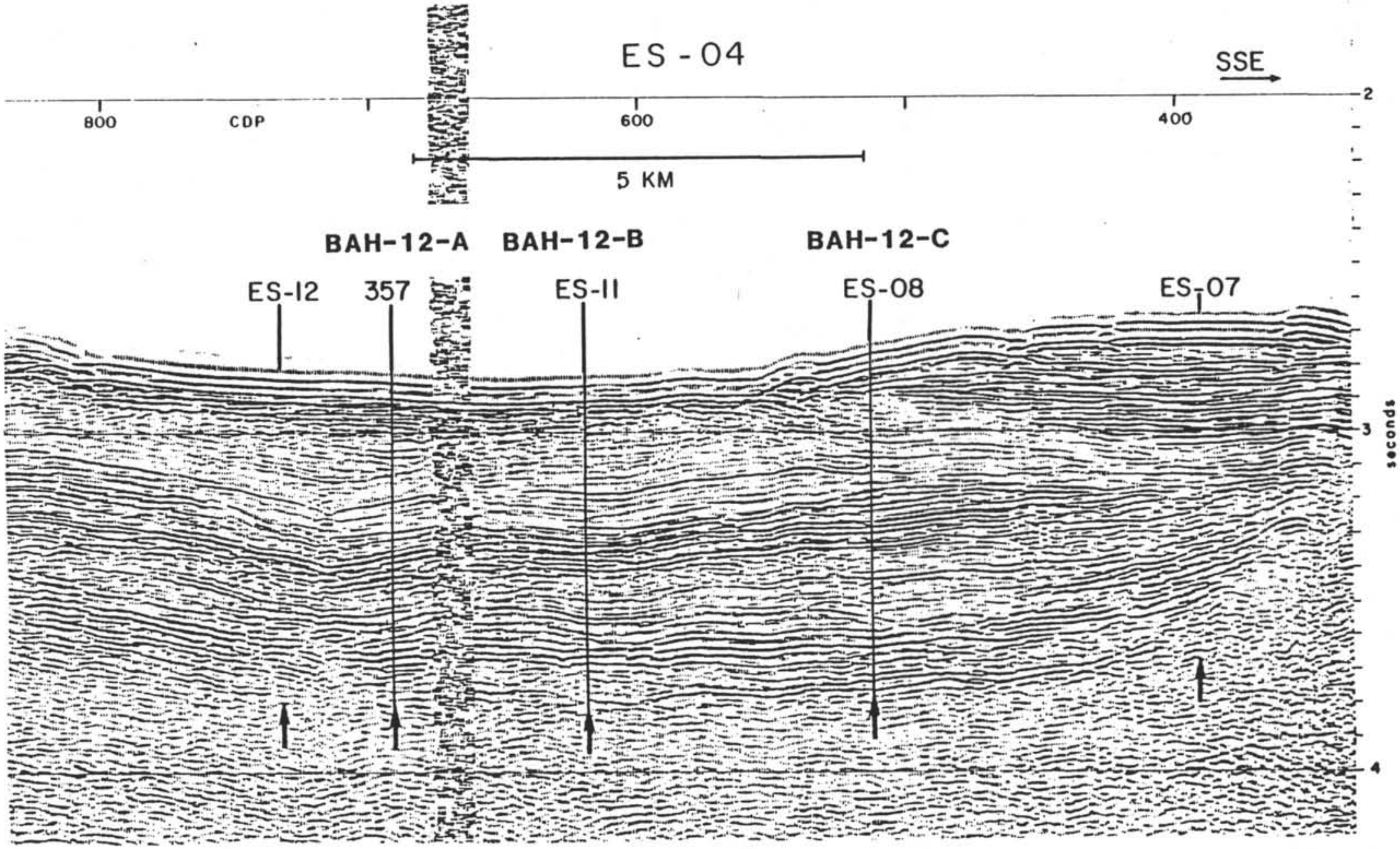


Figure 15. Portion of ES-04 in Exuma Sound (trackline shown in figure 4; details of site survey are in the caption to figure 8). Sites BAH-12 A, B and C were originally proposed to reach the target horizon indicated by arrows; this target will now be attempted at BAH-11C (figure 14) or BAH-3A, B or C (figure 16, 17).

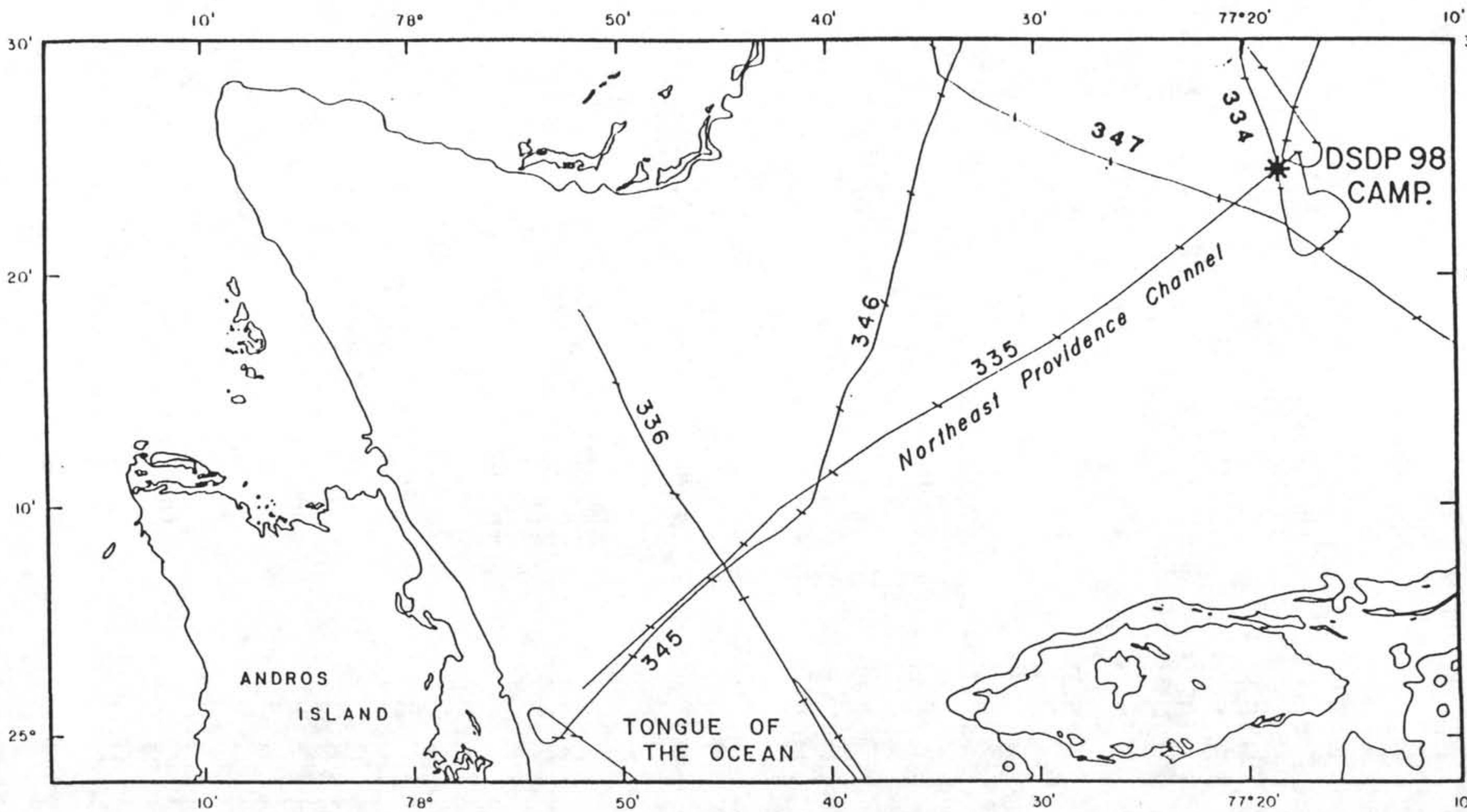


Figure 16. Trackline map illustrates the location of DSDP Site 98 in the Northeast Providence Channel. Sites BAH 3A, B and C are located on line 334, figure 17.

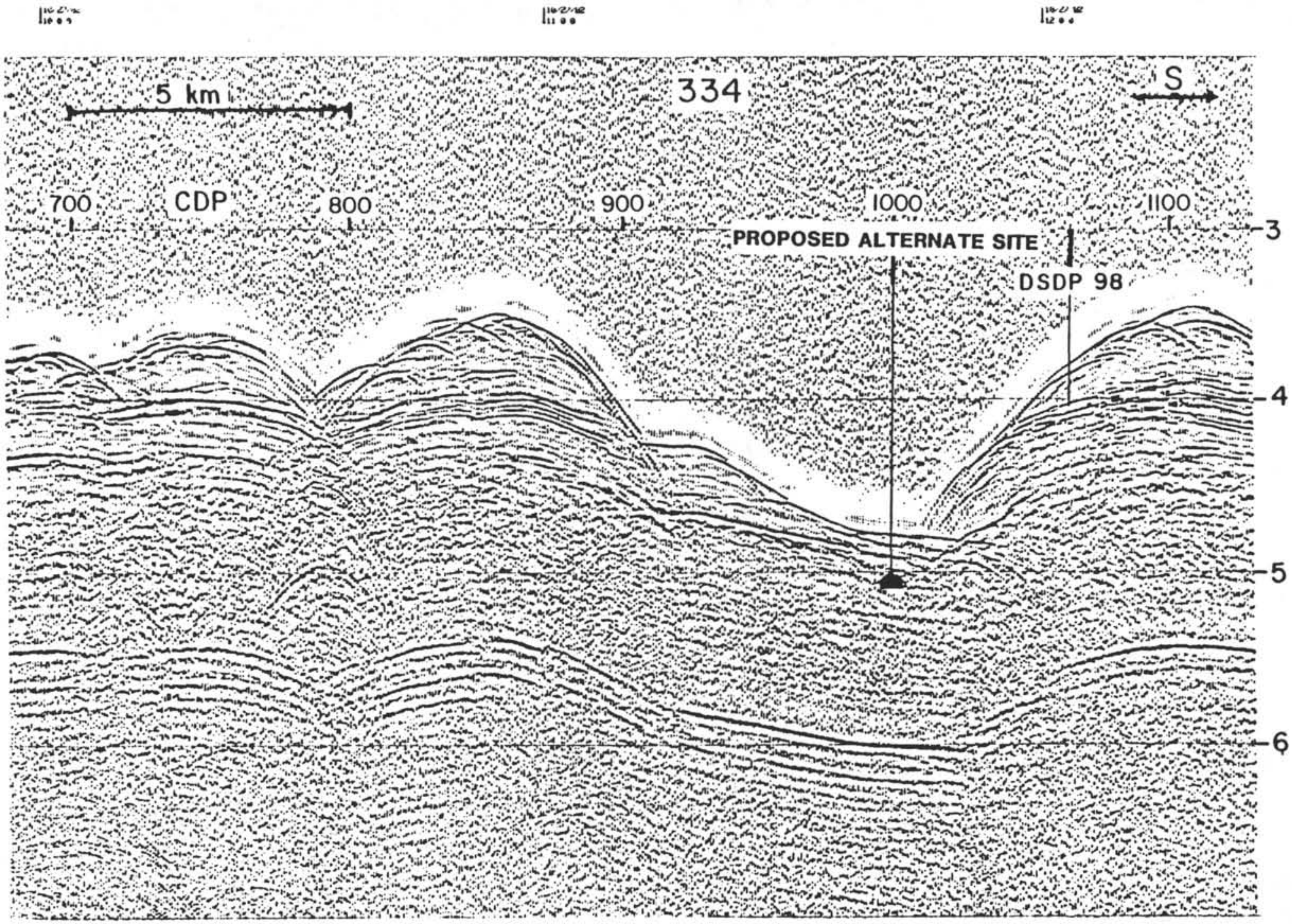


Figure 17. Portion of the 24-fold seismic profile shot across Northeast Providence Channel. The sound source consisted of four 466 cu. in. air guns fired at 2000 p.s.i. Alternate sites BAH-3A, B and C are located in the axis of the Channel, as indicated on the figure. Trackline map for line 334 is in figure 16.

SITE NUMBER: BAH-3A

POSITION: 25° 30.5' N; 77° 19.5' W   SEDIMENT THICKNESS: >5 km

WATER DEPTH: 3562 m   PRIORITY: 2

PROPOSED DRILLING PROGRAM

Rotary drilling to 200-300 m.

SEISMIC RECORD

Located at the crossing of Conrad MCS lines 94 and 334.

HEAT FLOW: No

LOGGING: No

OBJECTIVES

To sample the target horizon at BAH-11C where it is not deeply buried, should time/equipment not permit sampling it in Exuma Sound. To make inter-basin seismic stratigraphic correlations.

SEDIMENT TYPE

Above target: Foram/nanno ooze, some calciturbidites in the thalweg of NE Providence Channel likely

At/below target: Deep water/shallow water limestone

SITE NUMBER: BAH-3B

POSITION: 25° 31' N'; 77° 16' W

SEDIMENT THICKNESS: >5 km

WATER DEPTH: 3525 m

PRIORITY: 2 (alternate)

PROPOSED DRILLING PROGRAM

Rotary drilling to 200-300 m.

SEISMIC RECORD

Located on Conrad MCS line 334.

HEAT FLOW: No

LOGGING: No

OBJECTIVES

To sample the target horizon at BAH-11C where it is not deeply buried, should time/equipment not permit sampling it in Exuma Sound. To make inter-basin seismic stratigraphic correlations.

SEDIMENT TYPE

Above target: Foram/nanno ooze, some calciturbidites in the thalweg of NE Providence Channel likely

At/below target: Deep water/shallow water limestone

SITE NUMBER: BAH-3C

POSITION: 25° 23.5' N; 77° 22.5' W SEDIMENT THICKNESS: >5 km

WATER DEPTH: 3487 m PRIORITY: 2 (alternate)

PROPOSED DRILLING PROGRAM

Rotary drilling to a depth of 200-300m.

SEISMIC RECORD

Located on Conrad MCS line 347.

HEAT FLOW: No

LOGGING: No

OBJECTIVES

To sample the target horizon at BAH-11C where it is not deeply buried, should time/equipment not permit sampling it in Exuma Sound. To make inter-basin seismic stratigraphic correlations.

SEDIMENT TYPE

Above target: Foram/nanno ooze, some calciturbidites in the thalweg of NE Providence Channel likely

At/below target: Deep water/shallow water limestone

SITE NUMBER: BAH-5A

POSITION: 25° 13' N; 76° 36'W

WATER DEPTH: 4770 m PRIORITY: 3

PROPOSED DRILLING PROGRAM

HPC/XCB to refusal; rotary core to 1000 m (single bit). Log entire hole.

SEISMIC RECORD

IFP line BACAR E-12, near E-10.

HEAT FLOW: No

LOGGING: Yes

OBJECTIVES

To document the interplay of carbonate fan and contourite deposition with the effects of sea level fluctuation. To calibrate the well-established seismic stratigraphy of the area (Recent to Cretaceous).

SEDIMENT TYPE

Quaternary: Carbonate mud and sand, chalk

Miocene: Chalk and chalky limestone

Mid-Cretaceous: Shale

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