Site: SEPAC-9A

Priority: 1 (Note - SEPAC-10A is an alternate to Site SEPAC-9A)
Position: 39°53.28´S, 75°53.28´W
Water Depth: 4087 m
Sediment Thickness: 470 m
Target Drilling Depth: 470 mbsf
Approved Maximum Penetration: 500 mbsf
Seismic Coverage: Primary Line: 970308 (*Revelle*), Line CBA-3A-3, 0657z, SP686
Crossing Line: 970308 (*Revelle*), Line CBA-3A-1, 0100z, SP1288

Objectives: The objectives at Site SEPAC-9A are to provide a continuous sedimentary sequence to:

1. Assess variations in the character of Antarctic Circumpolar Deep Water (CDW), which enters the Chile Basin from the south as bottom water over Neogene time, including responses to opening of Drake Passage.

2. Assess variations in the southernmost reaches of the northward flowing Humboldt Current, based on planktonic fauna and flora, including responses of the southern subtropical South Pacific to opening of Drake Passage.

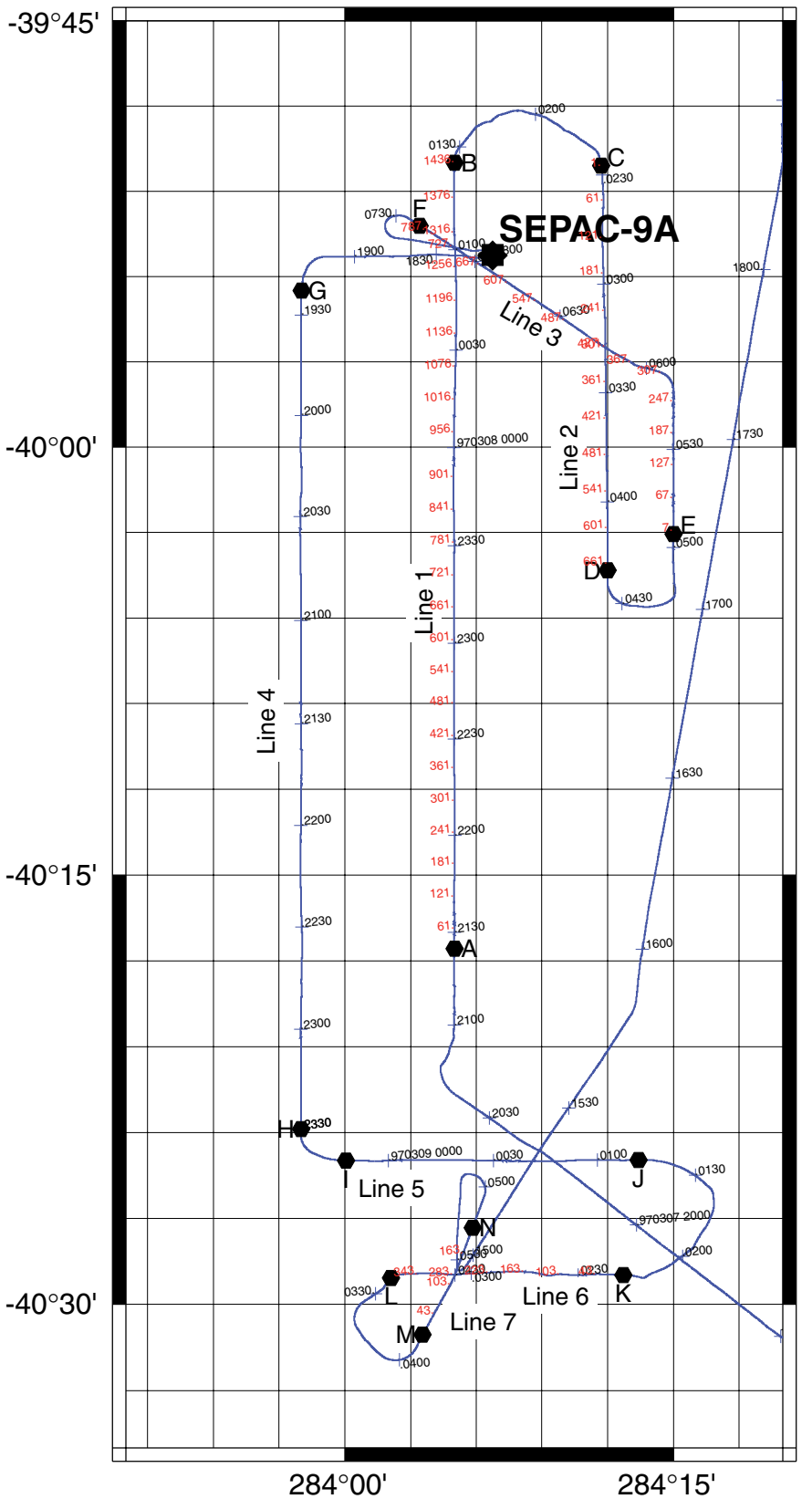
3. Assess biostratigraphic and paleomagnetic stratigraphies in the southeast Pacific, for comparison to similar data in the subtropical and tropical regions.

4. Date basal sediments. SEPAC-9A is between Valdivia and Mocha Fracture Zones. Crustal age here is not well characterized, but is probably older than 19 Ma and younger than 29 Ma.

Drilling Program: Triple APC to refusal. Tensor orientation on APC cores. Single XCB to basement or refusal (expected penetration ~470 mbsf).

Logging and Downhole: Triple combo, third-party Lamont MGT, FMS/sonic, GHMT

Nature of Rock Anticipated: Upper section is expected to be fossiliferous pelagic-to-hemipelagic clay. Some distal turbidites may be present. Based on sediment thickness and presumed basement age, the average Neogene sediment accumulation rate is near 20 m/m.y. Rates are likely higher in the Pleistocene and lower in older intervals when the site was far to the west of South America. Lower section is likely to contain more carbonates, gradually lithifying with greater meters below seafloor depth. Basement is likely oceanic basalt.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-40°00'
-40°15'
-40°30'
284°00'
284°15'
SEPAC-9A
A
B
C
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E
F
G
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I
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K
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M
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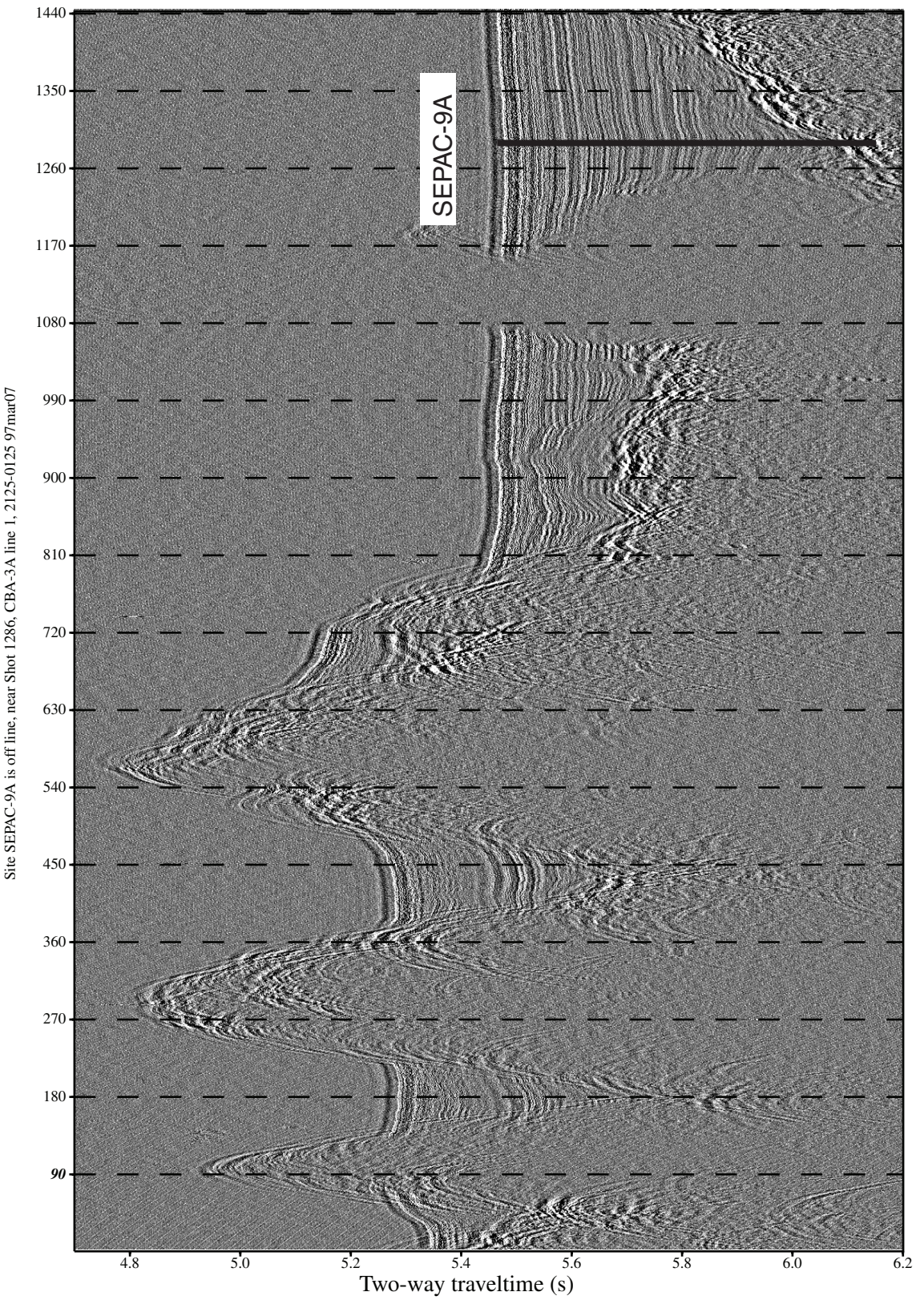
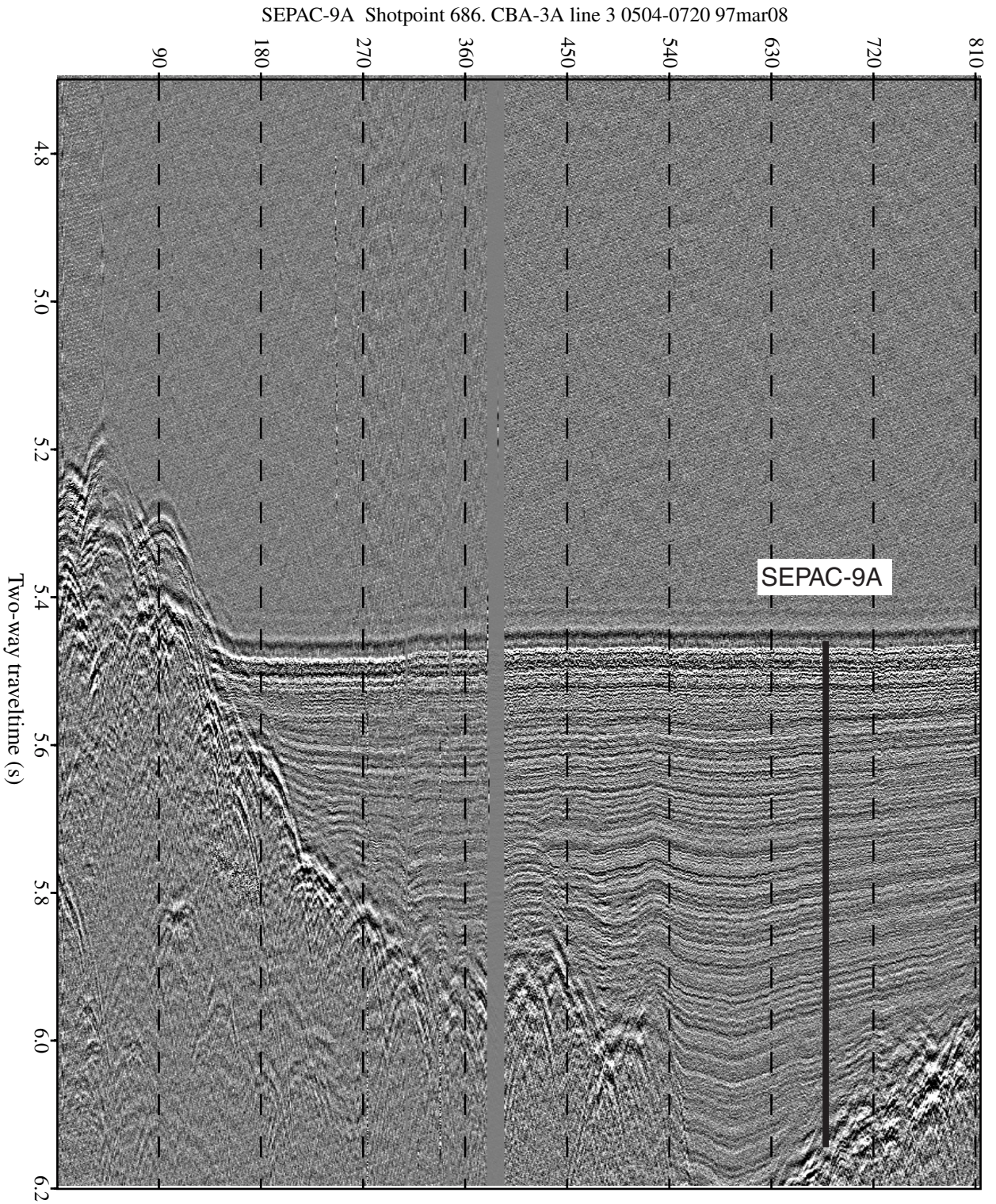
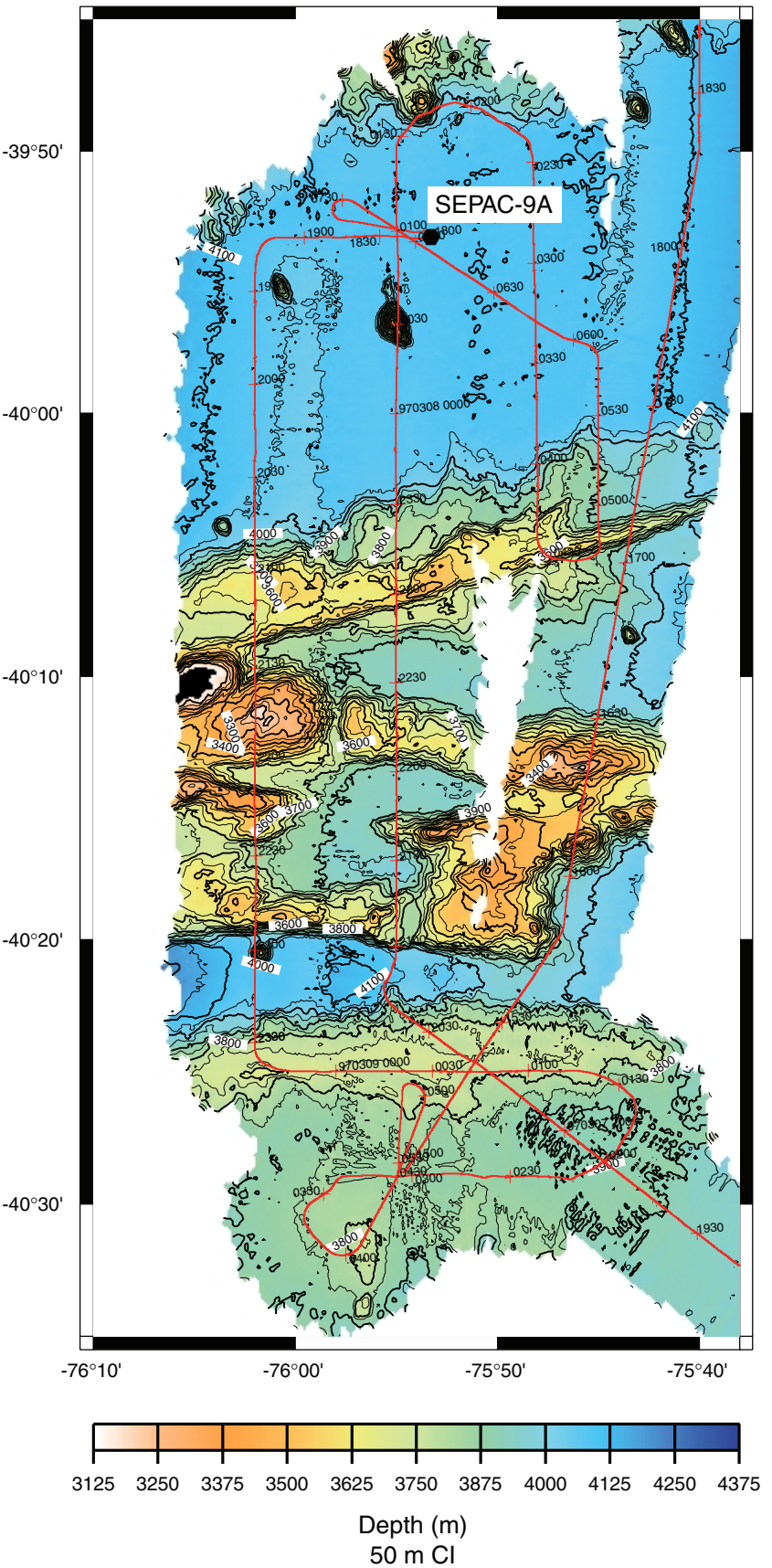
Line 1
Line 2
Line 3
Line 4
Line 5
Line 6
Line 7
970308 0000
970309 0000
970307 2000


SEPAC-9A
Site SEPAC-9A is off line, near Shot 1286, CBA-3A line 1, 2125-0125 97mar07
1440
1350
1260
1170
1080
990
900
810
720
630
540
450
360
270
180
90
4.8
5.0
5.2
5.4
5.6
5.8
6.0
6.2
Two-way traveltime (s)


SEPAC-9A Shotpoint 686. CBA-3A line 3 0504-0720 97mar08
90
180
270
360
450
540
630
720
810
4.8
5.0
5.2
5.4
5.6
5.8
6.0
6.2
Two-way traveltime (s)
SEPAC-9A


SEPAC-9A
-39°50'
-40°00'
-40°10'
-40°20'
-40°30'
-76°10'
-76°00'
-75°50'
-75°40'
3125 3250 3375 3500 3625 3750 3875 4000 4125 4250 4375
Depth (m)
50 m CI

Site: SEPAC-10A

Priority: 3 (alternate to SEPAC-9A)
Position: 40°28.98´S, 75°54.96´W
Water Depth: 3858 m
Sediment Thickness: 300 m
Target Drilling Depth: 300 mbsf
Approved Maximum Penetration: 350 mbsf
Seismic Coverage: Sediment Cover TWTT = 0.40 s (300 m).
Primary Line: 970309 (*Revelle*), Line CBA-3A-7, 0430z, SP126
Crossing Line: 970309 (*Revelle*), Line CBA-3A-6, 0308z, SP276

Objectives: The objectives at Site SEPAC-10A are to provide a continuous sedimentary sequence to:

1. Assess variations in the character of Antarctic CPDW, which enters the Chile Basin from the south as bottom water, over the past 19 Ma (estimated crust age south of Valdivia Fracture Zone).

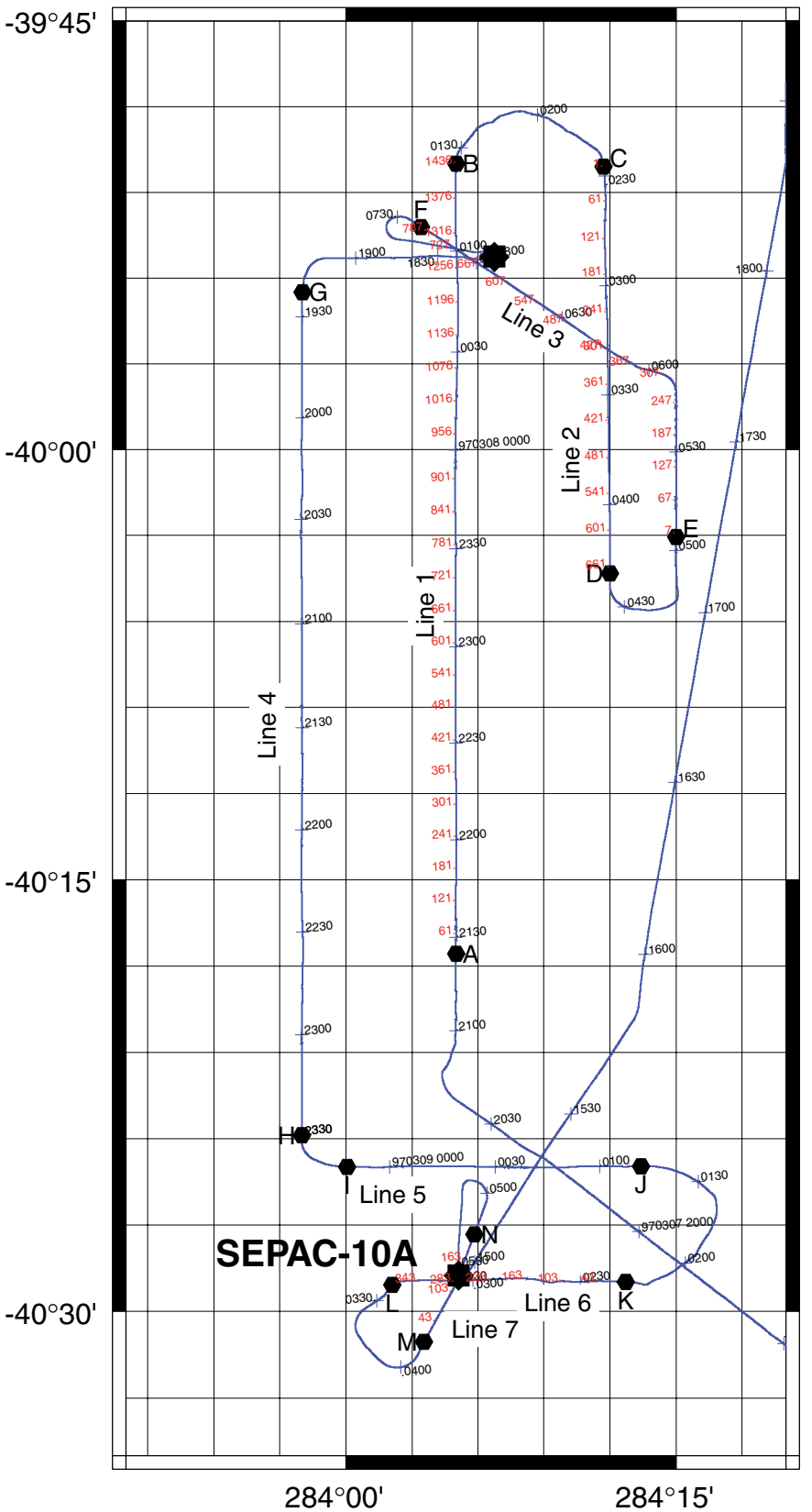
2. Assess variations in the southernmost reaches of the northward flowing Humboldt Current, based on planktonic fauna and flora, including responses of the southern subtropical South Pacific. Crustal age suggests that this site may be suitable for examining climatic response to Miocene growth of ice in Antarctica.

3. Assess biostratigraphic and paleomagnetic stratigraphies in the southeast Pacific, for comparison to similar data in the subtropical and tropical regions.

Drilling Program: Triple APC to refusal. Tensor orientation on APC cores. Single XCB to basement or refusal (expected penetration ~300 mbsf).

Logging and Downhole: Triple Combo, third-party Lamont MGT, FMS/sonic, GHMT

Nature of Rock Anticipated: Upper section is expected to be fossiliferous pelagic clay. Site SEPAC-10A is in an area of rough basement topography, filled by sediment that drapes the bathymetry. The bathymetric highs appear to have shielded the area from turbidites. Average (0-19 Ma) sediment accumulation rate is near 15 m/m.y. Rates are likely higher in the Pleistocene, and lower in older intervals when the site was far to the west of South America. Lower section likely to contain more carbonates, gradually lithifying with greater meters below seafloor depth. Basement is likely oceanic basalt.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-40°15'
-40°30'
284°00'
284°15'
Line 1
Line 2
Line 3
Line 4
Line 5
Line 6
Line 7
SEPAC-10A
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970308 0000
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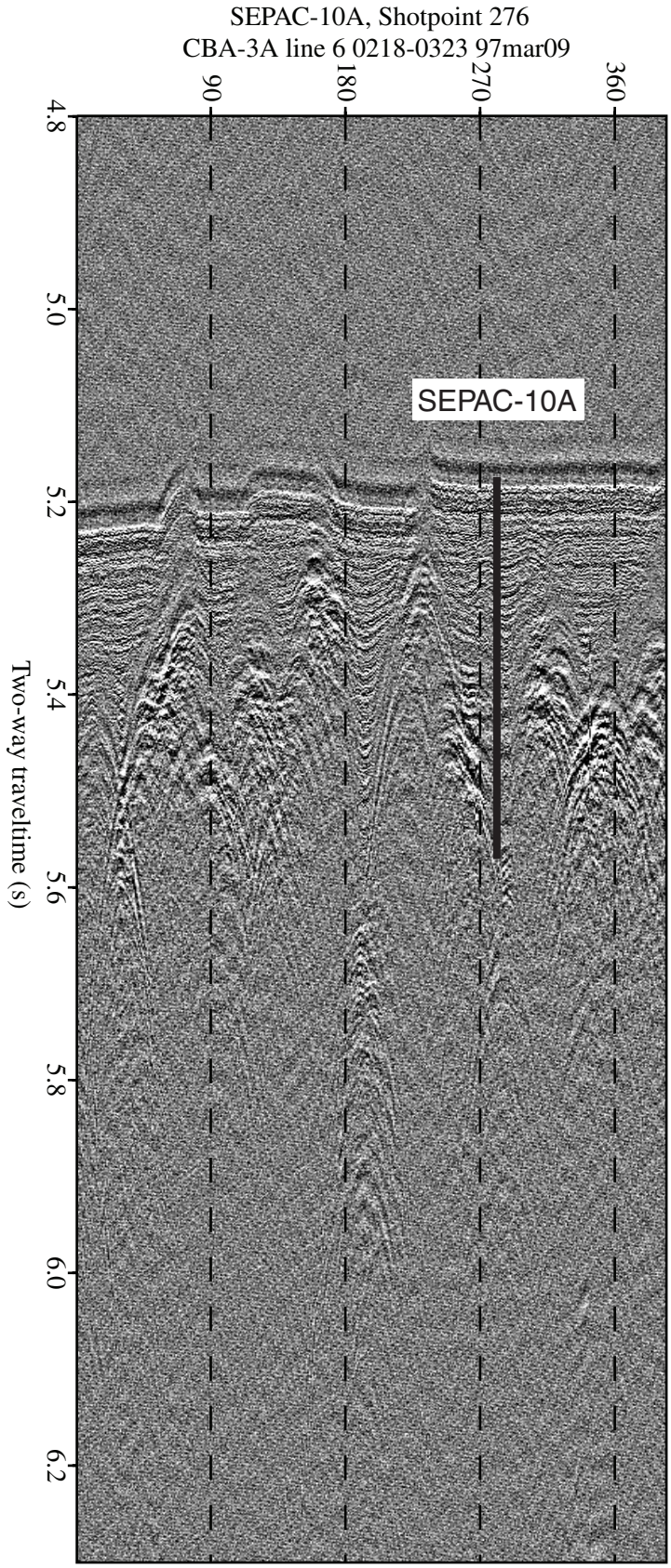
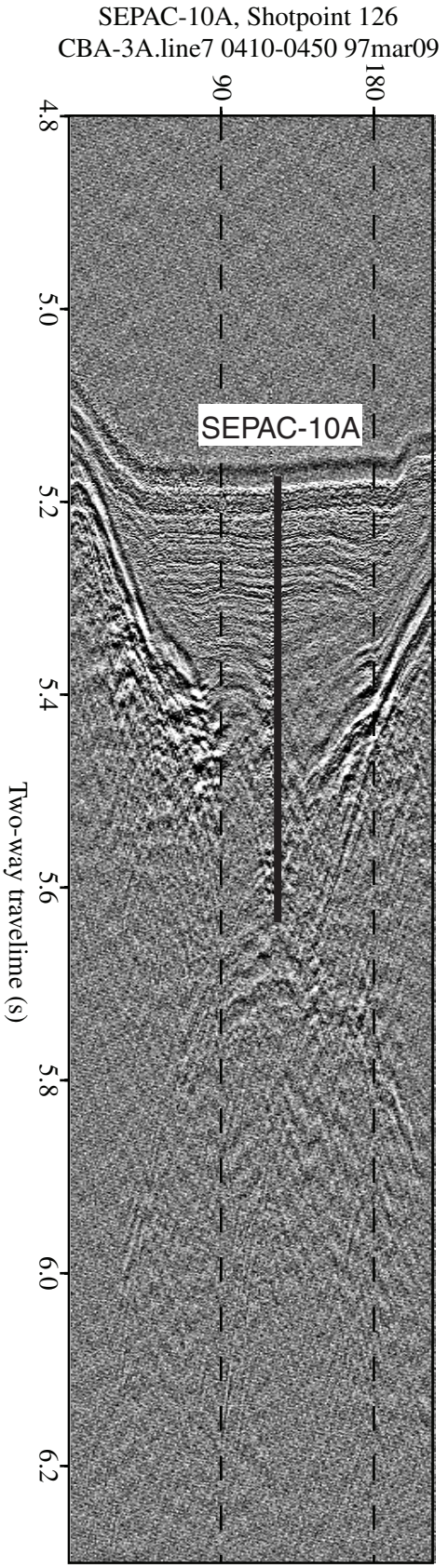
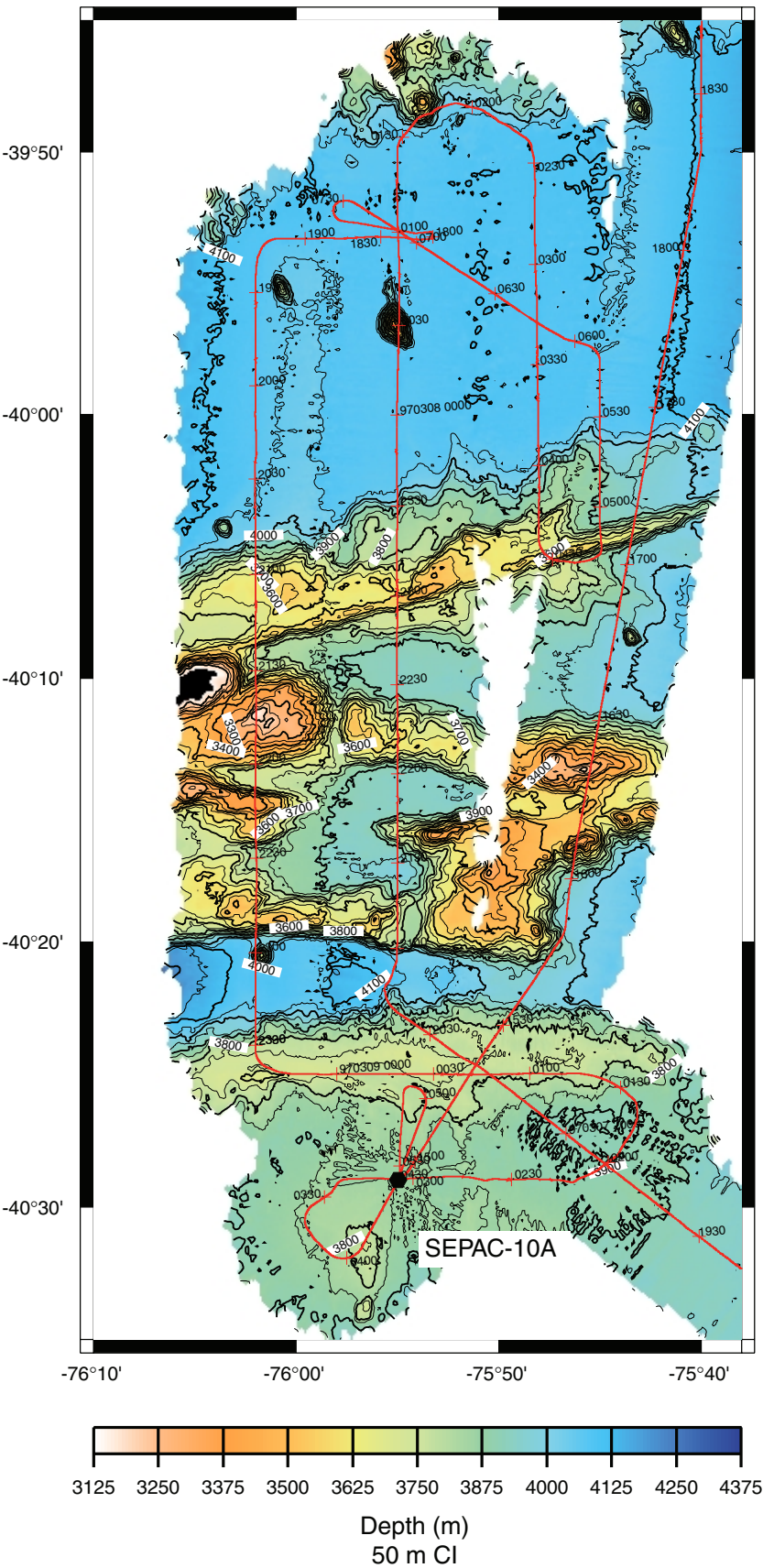
970307 2000


SEPAC-10A, Shotpoint 276
CBA-3A line 6 0218-0323 97mar09
90
180
270
360
4.8
5.0
5.2
5.4
5.6
5.8
6.0
6.2
SEPAC-10A
Two-way traveltime (s)


SEPAC-10A, Shotpoint 126
CBA-3A.line7 0410-0450 97mar09
90
180
SEPAC-10A
4.8
5.0
5.2
5.4
5.6
5.8
6.0
6.2
Two-way travelime (s)


-39°50'
-40°00'
-40°10'
-40°20'
-40°30'
-76°10'
-76°00'
-75°50'
-75°40'
SEPAC-10A
3125 3250 3375 3500 3625 3750 3875 4000 4125 4250 4375
Depth (m)
50 m CI

Site: SEPAC-13B

Priority: 1
Position: 36°13.15´S, 73°40.91´W
Water Depth: 1040 m
Sediment Thickness: >300 m
Target Drilling Depth: 200 mbsf
Approved Maximum Penetration: 200 mbsf
Seismic Coverage: Survey 970312 (*Revelle*), Line CBA-3D-4, Shotpoint 585 (2248 on analog seismic). Note that no crossing line exists at this location. Although the site is approved for drilling as is, a short seismic survey will be done on approach to this site (crossing both SEPAC-13B and SEPAC-14A) using the *JOIDES Resolution* 80 in^3 airgun.

Objectives: The objectives of Site SEPAC-13B are to provide a continuous sedimentary sequence to:

1. Assess Pleistocene history of a biological production in a coastal upwelling center near Concepción, Chile, which is sensitive to regional winds, with millennial-scale resolution.

2. Assess Pleistocene history of terrigenous sedimentation off central Chile to assess climate variability on land, with millennial-scale resolution.

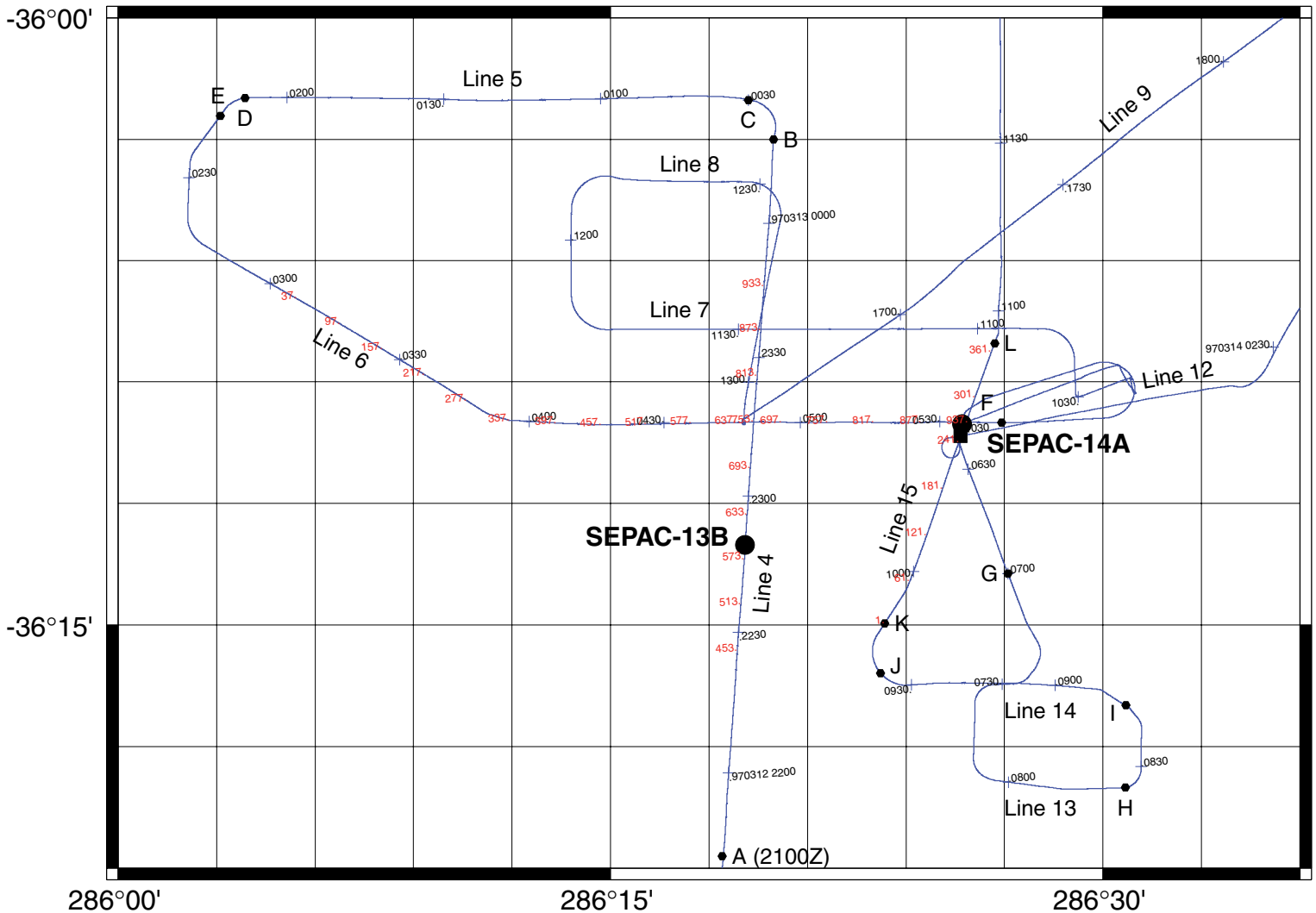
3. Assess variations in the boundary between oxygen-rich AAIW (which is strongly developed near 700 m depth) and PCW (which is strongly developed deeper than 1200 m depth), using tracers of paleo-oxygen and paleonutrients.

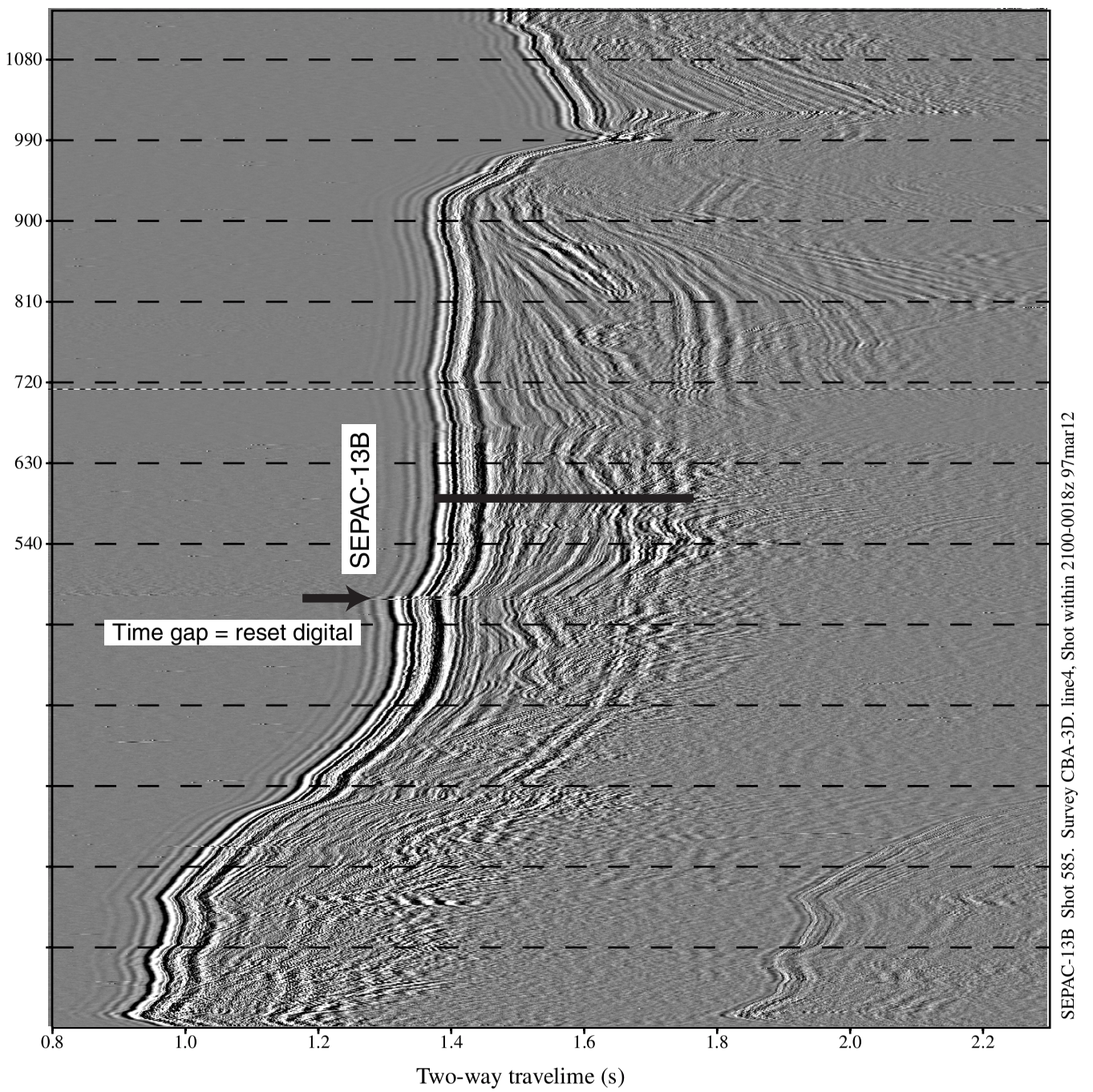
4. If time is available, provide a dedicated hole for pore water measurements in the upper 100 m of the sediment column.

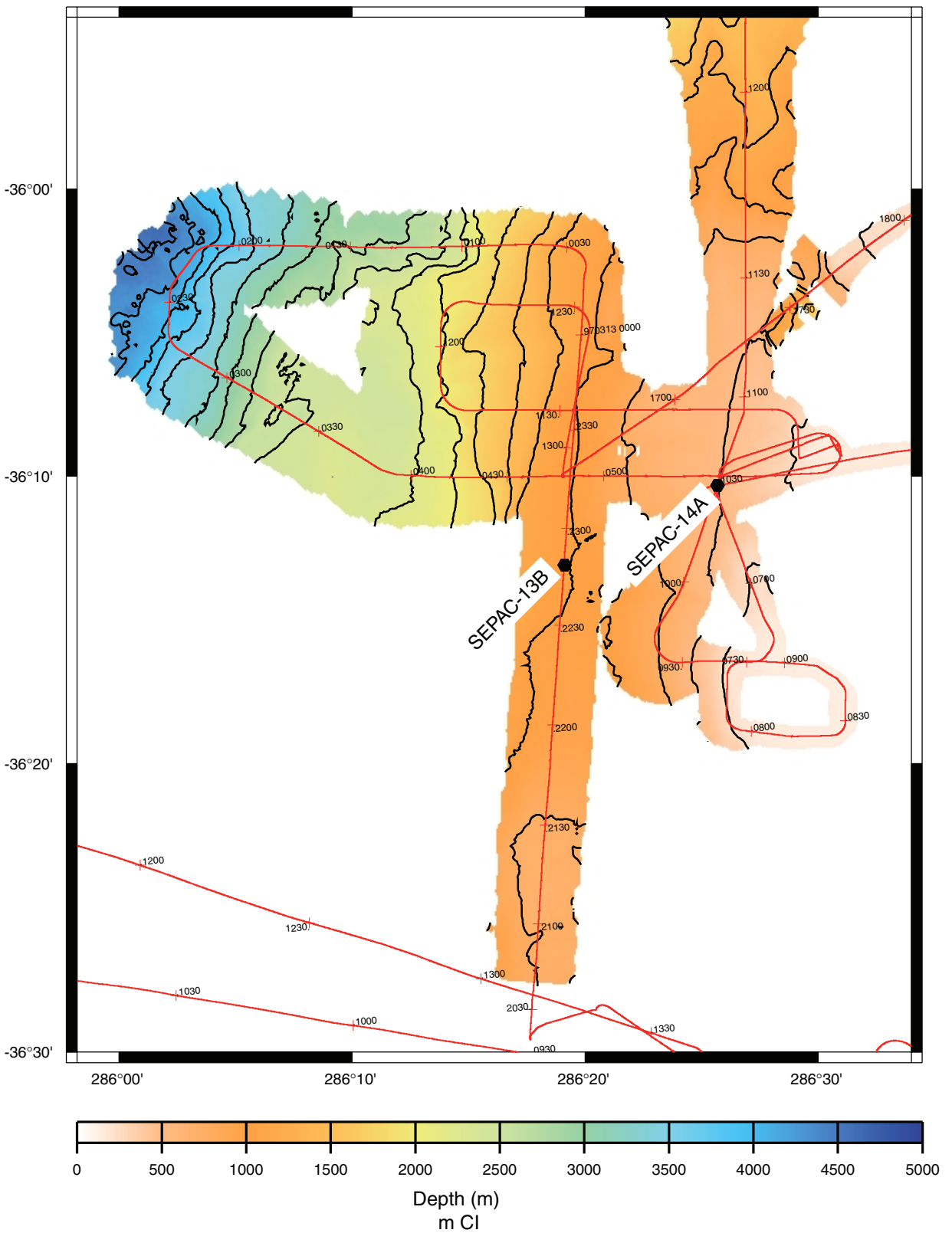
Drilling Program: Triple APC to refusal. Tensor orientation on APC cores. On a time-available basis, provide a fourth APC hole for purposes of sampling pore waters and other ephemeral properties and for reconnaissance-level sampling at the discretion of the SAC.

Logging and Downhole: None.

Nature of Rock Anticipated: Site SEPAC-13B is the thickest apparent accumulation of a slope basin in an active margin setting. A sediment core nearby recovered organic-rich muds. Sedimentation rates are probably high, expected to be >200 m/m.y. Seismic survey suggested widely varying sedimentation in the region, including some areas of net erosion.


-36°00'
-36°15'
286°00'
286°15'
286°30'
Line 5
Line 6
Line 7
Line 8
Line 9
Line 12
Line 13
Line 14
Line 15
Line 4
SEPAC-13B
SEPAC-14A
A (2100Z)
B
C
D
E
F
G
H
I
J
K
L
970312 2200
970313 0000
970314 0230


1080
990
900
810
720
630
540
SEPAC-13B
Time gap = reset digital
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
Two-way travelime (s)
SEPAC-13B Shot 585. Survey CBA-3D. line4, Shot within 2100-0018z 97mar12


-36°00'
-36°10'
-36°20'
-36°30'
286°00'
286°10'
286°20'
286°30'
SEPAC-13B
SEPAC-14A
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Depth (m)
m CI

Site: SEPAC-14A

Priority: 1
Position: 36°10.32´S, 73°34.32´W
Water Depth: 509 m
Sediment Thickness: >300 m
Target Drilling Depth: 200 mbsf (or APC refusal)
Approved Maximum Penetration: 200 mbsf
Seismic Coverage: Primary Line: 970313 (*Revelle*), Line CBA-3D-06, 0536z, SP930. Crossing Line: 970314 (*Revelle*), Line CBA-3D-15, 1040z, SP317. Although the site is approved for drilling as is, a short seismic survey will be done prior to drilling this site (crossing both Sites SEPAC-13B and SEPAC-14A) using the *JOIDES Resolution* 80 in^3 airgun.

Objectives: The objectives at Site SEPAC-14A are to provide a continuous sedimentary sequence to:

1. Assess Pleistocene history of a biological production in a coastal upwelling center near Concepción, Chile, which is sensitive to regional winds, with millennial-scale resolution.

2. Assess Pleistocene history of terrigenous sedimentation off central Chile to assess climate variability on land, with millennial-scale resolution

3. Assess variations in the boundary between oxygen-rich AAIW (which is strongly developed near 700 m depth) and the oxygen-poor GU (which is strongly developed near 300 m depth), using tracers of paleo-oxygen and paleonutrients. Site SEPAC-14A, which monitors the upper boundary of AAIW, complements Site SEPAC-13B, which monitors the lower boundary of AAIW. Because the two sites are very close to each other, histories of changing paleoproduction should be quite similar, whereas seafloor oxygen histories may be quite different.

4. If time is available, provide a dedicated hole for pore water measurements in the upper 100 m of the sediment column.

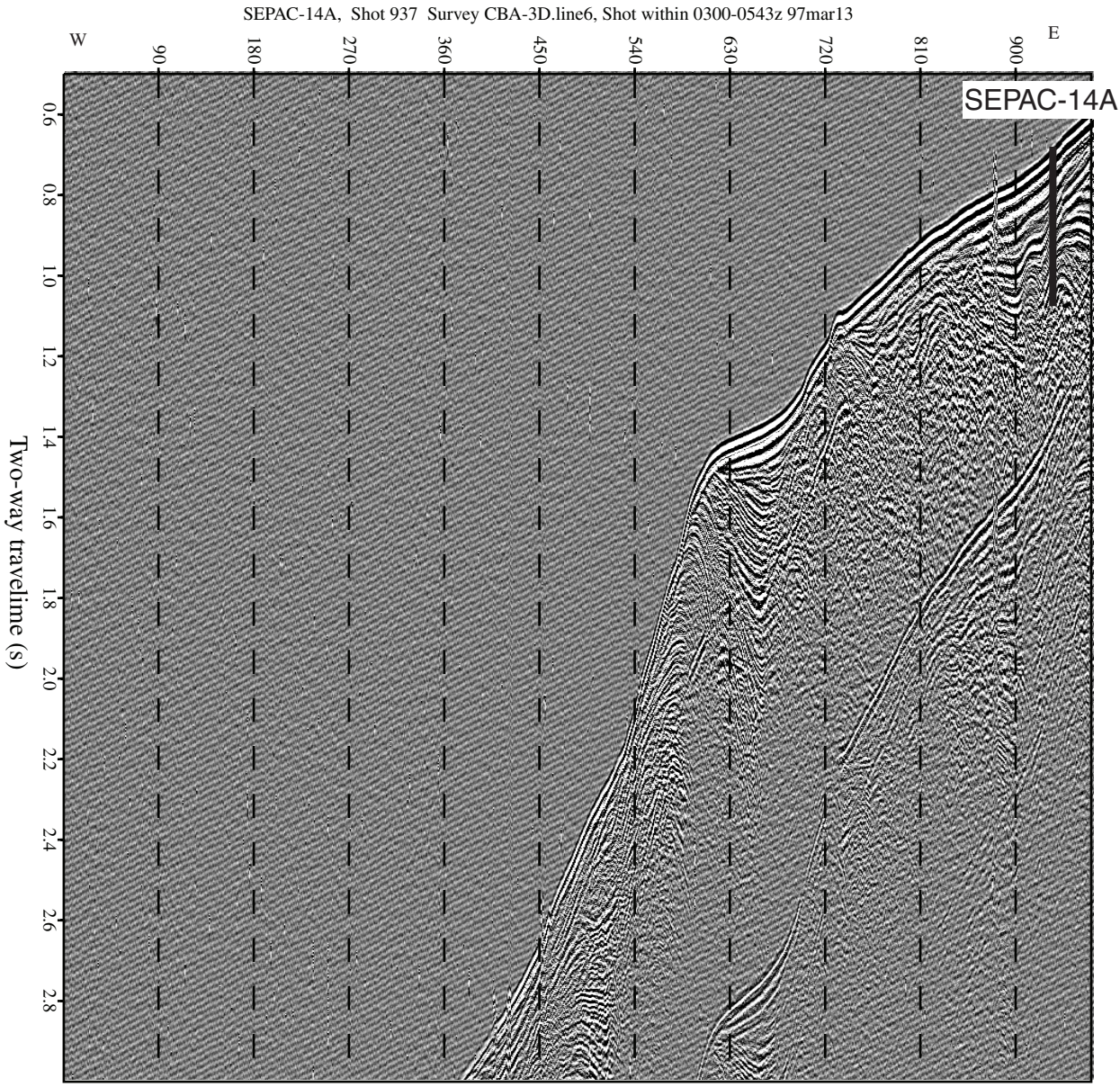
Drilling Program: Triple APC to refusal or maximum approved penetration. Tensor orientation on APC cores. On a time-available basis, provide a fourth APC hole for purposes of sampling pore waters and other ephemeral properties, and for reconnaissance-level sampling at the discretion of the SAC.

Logging and Downhole: None.

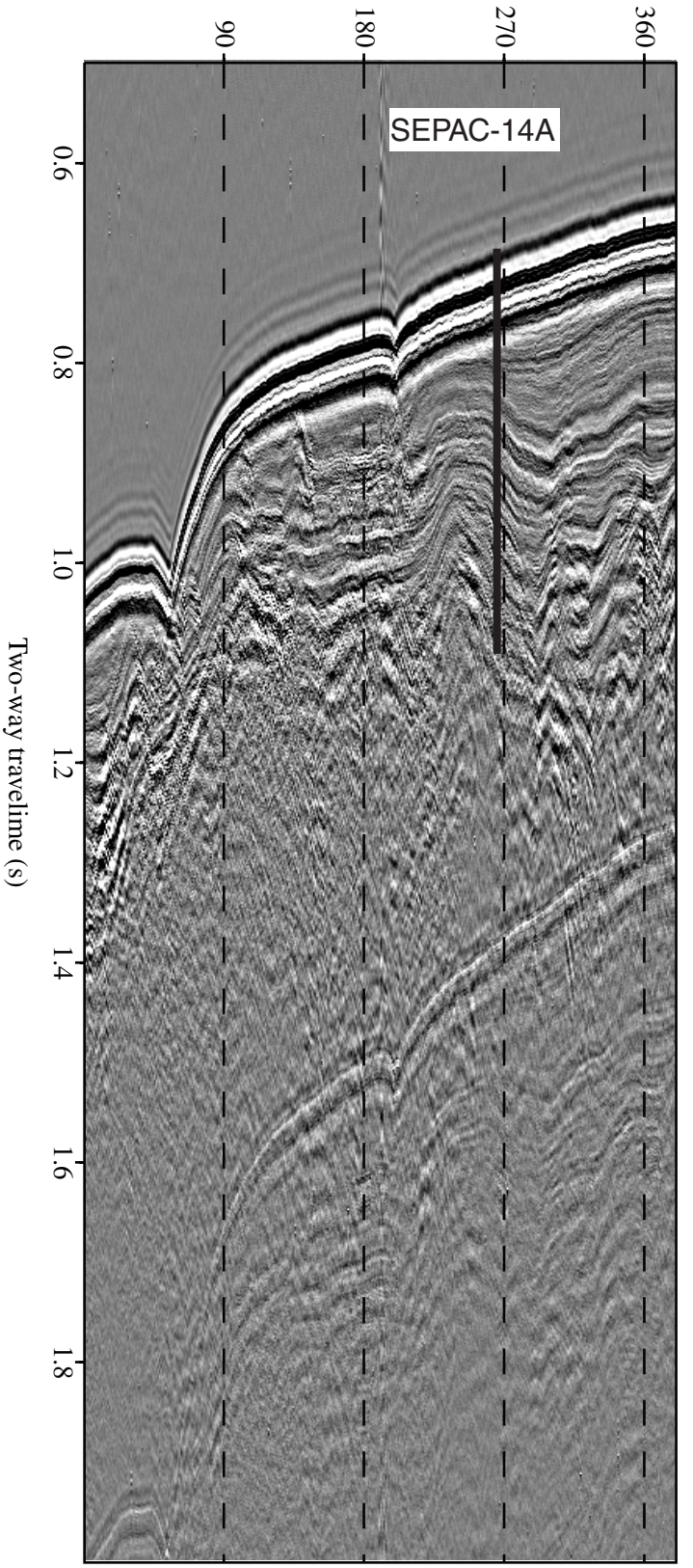
Nature of Rock Anticipated: Site SEPAC-14A is in a small slope basin in an active margin setting. It appears to be sheltered from downslope turbidite flows by phosphate-rich reefs on the continental shelf. A sediment core recovered organic-rich muds and clayey silts, including some fragments of mollusk shells, suggesting some downslope transport. Sedimentation rates are probably high, expected to be >200 m/m.y.

Note: Some H_2S may be present, and appropriate shipboard precautions should be taken.

*See trackline and bathymetry line for SEPAC-13B


SEPAC-14A, Shot 937 Survey CBA-3D.line6, Shot within 0300-0543z 97mar13
W
E
90
180
270
360
450
540
630
720
810
900
SEPAC-14A
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6
2.8
Two-way travelime (s)

SEPAC-14A, Shot 268 (note preferred site at Shot 295).
Survey CBA-3D.line15 0948-1051z 97mar14



Site: SEPAC-19A

Priority: 2 (to be drilled if time is available, based on results at SEPAC 13B and SEPAC-14A. This site is considered an alternate to SEPAC-13B)
Position: 41°00.0´S, 74°27.0´W
Water Depth: 851 m
Sediment Thickness: imaged to 80 m
Target Drilling Depth: 80 mbsf
Approved Maximum Penetration: 80 mbsf (PPSP requests review of additional crossing lines)
Seismic Coverage: *Sonne* 1995, Parasound Line GeoB41/43 (Hebbeln et al., 1995, penetration of 0.11 s = >80 m). No seismic reflection data exists for this site other than Parasound. No crossing line exists for this site. Although the site is approved for drilling as is, a short survey will be done prior to drilling this site using the *JOIDES Resolution* 3.5 kHz profiler.

Objectives: The objectives of Site SEPAC-19A are to provide a continuous sedimentary sequence to:

1. Monitor changes in the coastal upwelling center near Valdivia, Chile, which is sensitive to regional winds. The site is poleward of the strongest upwelling zone, within the transition zone between poleward-flowing Cape Horn Current (associated with net downwelling) and the equatorward-flowing Humboldt Current (associated with net upwelling). Thus, variations in upwelling here may reflect the latitudinal position of the Westerly Winds, which control the position of the transition zone.

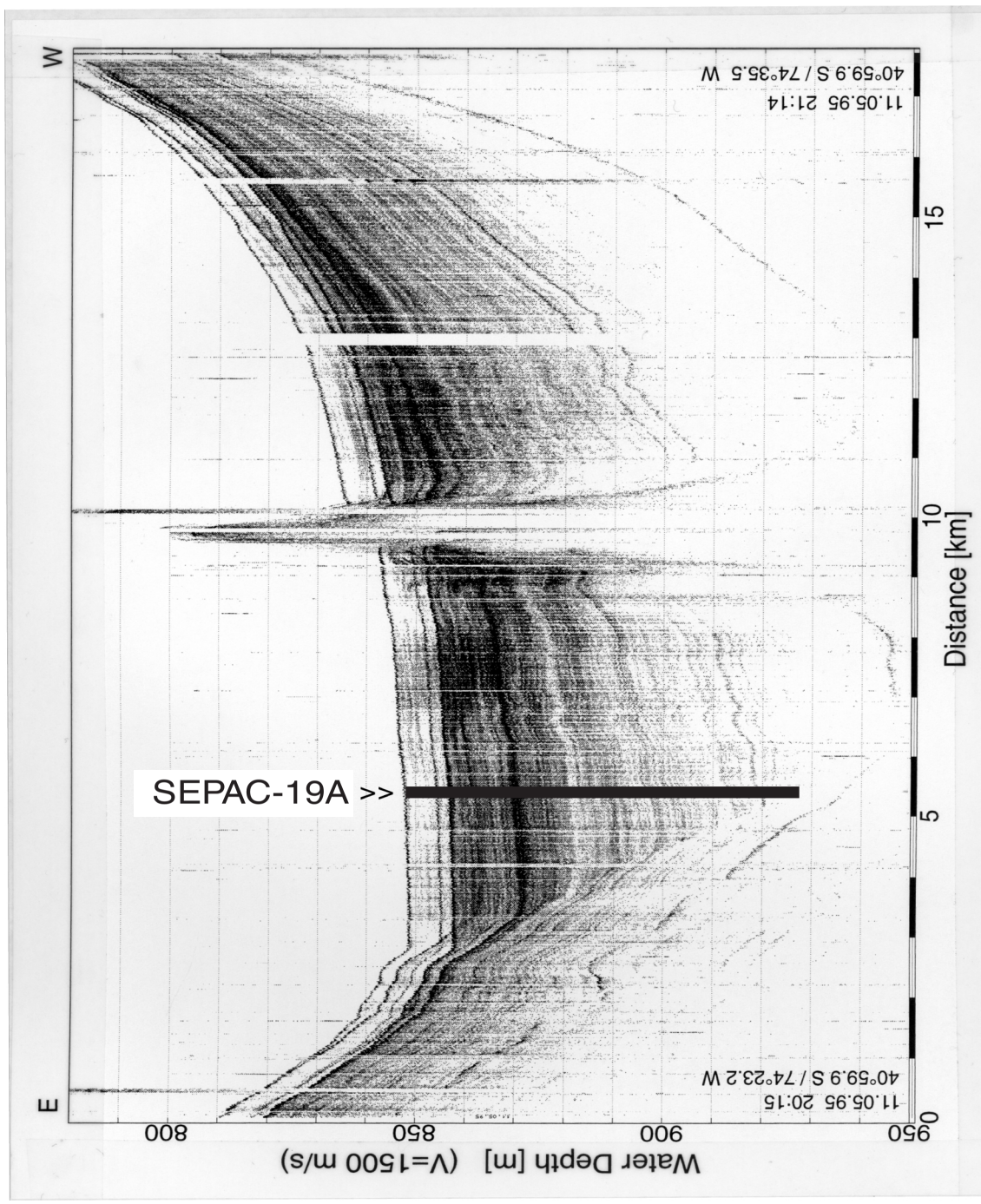
2. Assess variations in terrigenous sedimentation that respond to climate changes near the northern boundary of the Chilean fjords.

3. Monitor water mass properties within the relatively oxygen-rich AAIW (strongly developed near 700 m depth).

Drilling Program: Triple APC to refusal or maximum approved penetration. Tensor orientation on APC cores.

Logging and Downhole: None.

Nature of Rock Anticipated: SEPAC-19A is at 851 m depth in a sediment-filled tectonic slope basin. Sediments are likely rapidly accumulating organic-rich clays dominated by a terrigenous component. Basement is likely continental crust.



SEPAC-19A (Site of GeoB3313-3) 41°00'S, 74°27'W

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Fax: (979) 845-0876

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