FIGURES

Figure 1. Proposed drill sites (white circles with black rims) and alternates (solid circles) for ODP Leg 199. Site PAT-13C, however, will be drilled during Leg 200 if time becomes available. Arrows show the probable shiptrack of the *JOIDES Resolution* and light shaded rectangle boxes mark the approximate position of magnetic anomaly 25R, the crustal target age for the late Paleocene transect. Base map is by Mammerickx and Smith (1985).

Figure 2. Map of the Pacific equatorial sediment bulge and a schematic of ages of sediment within the bulge, from Mitchell (1998) and Mitchell (unpubl. data). The axis of the equatorial sediment bulge is displaced north of the equator because of the northward drift of the Pacific plate. Because of Pacific plate motion, Paleogene equatorial sediments are easily accessible by APC beneath a thin veneer of red clay and early Neogene sediments.

Figure 3. Position of the axis of the early Miocene equatorial bulge with respect to the hotspot-predicted position of the equatorial region, from Knappenberger (2000). The hotspot position is about 2° north of the equatorial position defined by the sediment bulge. The sediment mass accumulation rate was estimated from physical properties of sediments and the distance between seismic reflectors in profiles collected on the EW9709 site survey. The ages of reflectors (20-16.3 Ma) were dated using the Mayer et al. (1985) Neogene equatorial Pacific seismic stratigraphy.

Figure 4. A schematic of the equatorial sediment bulge from seismic lines taken during the Leg 199 site survey cruise (EW9709). Note how the early Eocene section thickens north of the predicted early Eocene equatorial position. The Miocene stratigraphy is based upon Mayer et al. (1985) constrained at the surface by sediment cores. The Eocene seismic stratigraphy is based upon our best estimates but with no real age control. Leg 199 drilling will test the model shown here and in Figure 5. TWTT = two-way traveltime.

Figure 5. Tentative seismic stratigraphy of the Leg 199 56-Ma transect, from Moore et al. (manuscript submitted to *Paleoceanography*). Horizons "G" through "O" are identified based on comparisons with the work of Mayer et al. (1985) in the equatorial Pacific. Horizons "M" through "E3" were identified by Moore et al. (manuscript submitted to *Paleoceanography*).

Arrows indicate the locations and ages of near-surface sediments recovered at the base of piston cores taken along the transect on EW9709. These ages were used to check our correlation with horizons identified in Mayer et al. (1985). Dashed vertical lines indicate the location of major fracture zones. TWT = two-way traveltime. FZ = fracture zone.

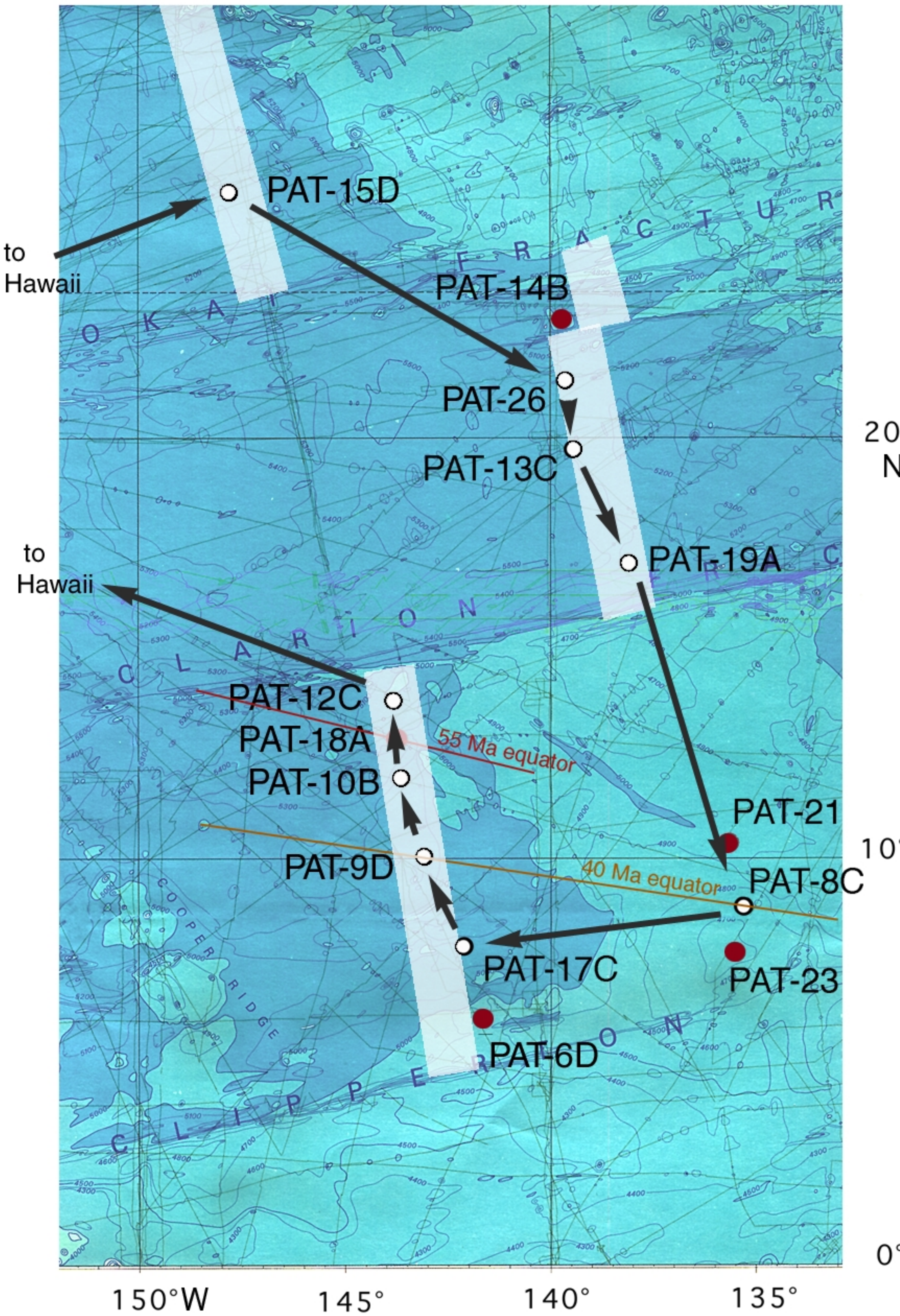

PAT-15D
to
Hawaii
PAT-14B
PAT-26
PAT-13C
PAT-19A
to
Hawaii
PAT-12C
PAT-18A
PAT-10B
PAT-9D
PAT-17C
PAT-6D
PAT-21
PAT-8C
PAT-23
55 Ma equator
40 Ma equator
20°
N
10°
0°
150°W
145°
140°
135°

Figure 1

Pacific Equatorial Sediment Bulge

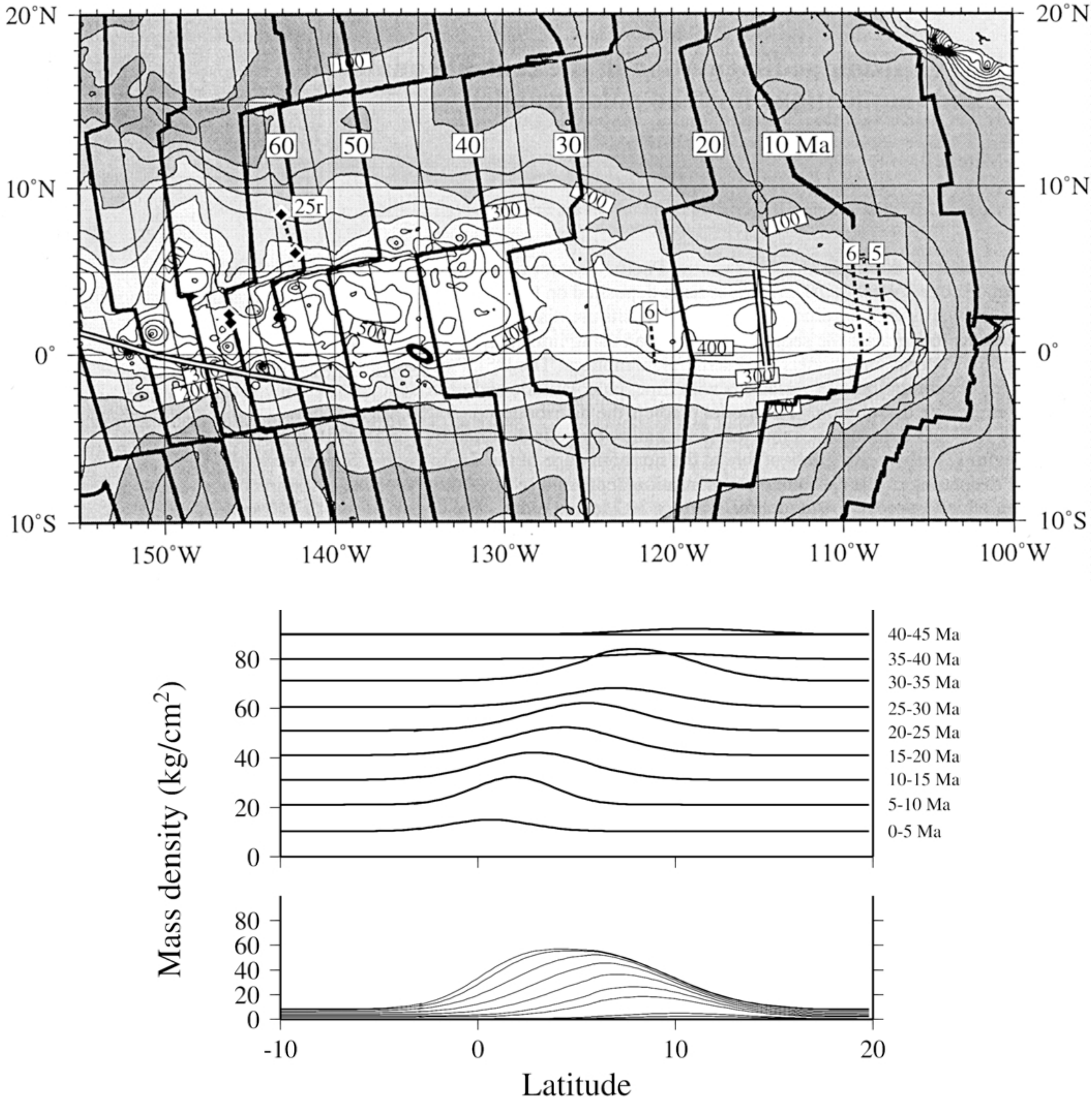


Figure 2

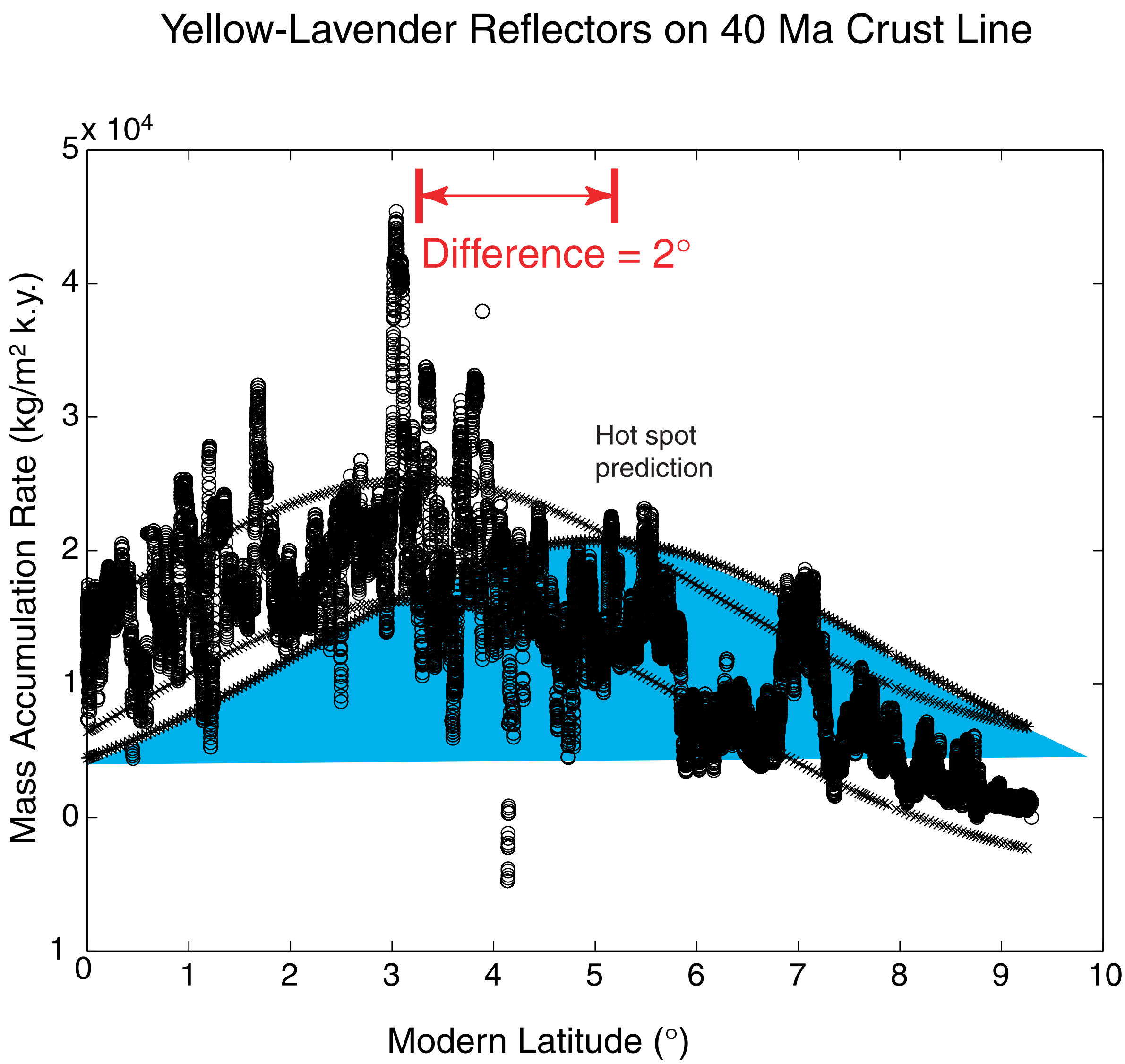

Yellow-Lavender Reflectors on 40 Ma Crust Line
x 10^4
5
4
3
2
1
0
1
0
1
2
3
4
5
6
7
8
9
10
Difference = 2°
Hot spot
prediction
Mass Accumulation Rate (kg/m² k.y.)
Modern Latitude (°)

Figure 3

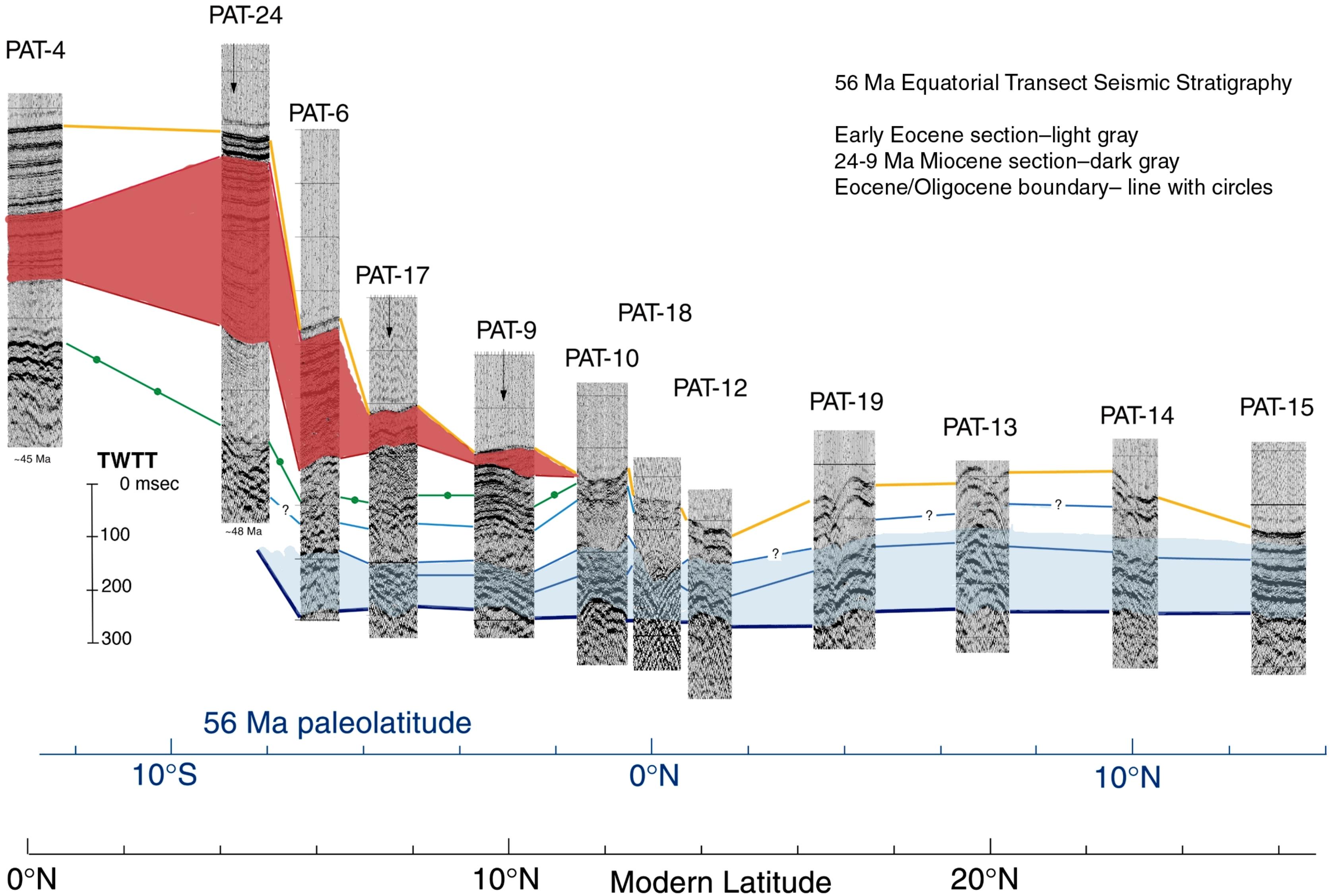

PAT-4
PAT-24
PAT-6
PAT-17
PAT-9
PAT-18
PAT-10
PAT-12
PAT-19
PAT-13
PAT-14
PAT-15
56 Ma Equatorial Transect Seismic Stratigraphy
Early Eocene section–light gray
24-9 Ma Miocene section–dark gray
Eocene/Oligocene boundary– line with circles
~45 Ma
~48 Ma
TWTT
0 msec
100
200
300
?
56 Ma paleolatitude
10°S
0°N
10°N
0°N
10°N
Modern Latitude
20°N

Figure 4

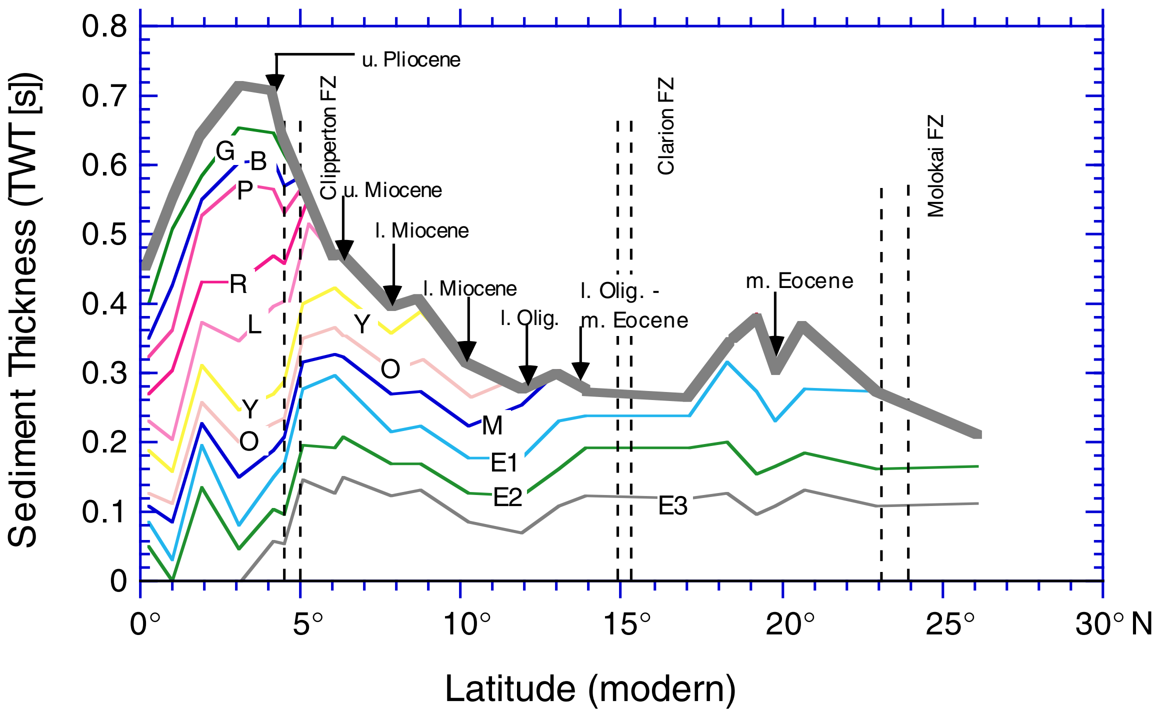

Sediment Thickness (TWT [s])
Latitude (modern)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0°
5°
10°
15°
20°
25°
30° N
u. Pliocene
Clipperton FZ
Clarion FZ
Molokai FZ
u. Miocene
l. Miocene
l. Miocene
l. Olig.
l. Olig. -
m. Eocene
m. Eocene
G
B
P
R
L
Y
O
Y
O
M
E1
E2
E3

Figure 5

Table 1. Summary table of primary and alternate drill sites.

Primary Drill Sites for Leg 199								
Approx. cruise order (Honolulu to Honolulu)	1	2	3	4	5	6	7	8
Drill site	**PAT-15D**	**PAT-26**	**PAT-19A**	**PAT-8C**	**PAT-17C**	**PAT-9D**	**Pat-10B**	**PAT-12C**
Latitude (°N)	26°02'	21°27'	16°52'	8°53'	7°48'	10°11'	12°02'	13°49'
Longitude (°W)	147° 5'	139°29'	138°06'	135°22'	142°01'	142°46'	143°45'	143°53'
Water depth (m)	5359	5081	5291	4817	5039	5184	5147	4965
Age below surficial red clay	Eocene?	Eocene?	Eocene??	middle lower Mio	upper lower Mio	lower Mio	mid-lower Olig	lower Olig ?
Estimated crustal age (Ma)	58	58	57	40	55	56	56	57
Sed thickness (m)	124	201	177	284	295	233	180	151
56-Ma paleolat (fixed hotspot)	11	9	5	*older than crust*	-5	-3	-1	1
40-Ma paleolat (fixed hotspot)	16	12	8	0	-2	0	2	4
34-Ma paleolat (fixed hotspot)	17	13	9	1	-1	1	3	5
20-Ma paleolat (fixed hotspot)	20	16	11	4	2	4	6	8

Alternate Drill Sites							
Drill site	**PAT-6D**	**PAT-23A**	**PAT-21**	**PAT-18A**	**PAT-14B**	**PAT-16A**	**PAT-13C**
Latitude (°N)	6°18'	7°42'	10°12'	12°57'	22°55'	32°33'	19°46'
Longitude (°W)	141°42'	135°33'	135°32'	143°49'	140°01'	141°12'	138°55'
Water depth (m)	4945	4699	4914	5058	4859	5123	5083
Age below surficial red clay	upper Mio	mid Mio	mid lower Mio	lower Olig?	Eocene?	Eocene?	middle Eocene
Estimated crustal age (Ma)	55	40	40	57	60	57	57
Sed thickness (m)	370	340	226	232	140	21	150
56-Ma paleolat (fixed hotspot)	-6	**	**	0	10	19	8
40-Ma paleolat (fixed hotspot)	-3	-1	1	3	13	23	10
34-Ma paleolat (fixed hotspot)	-2	0	2	4	14	24	11
20-Ma paleolat (fixed hotspot)	1	2	5	7	17	27	14

Table 2. Leg 199-Proposal No. 486 Add - Paleogene Equatorial Pacific

Operations Plan and Time Estimate

Site No.	Location Lat/Long	Water Depth	Operations Description	Transit (days)	Drilling (days)	Logging (days)	Total On-site
PRIMARY SITES							
Honolulu			Transit 629 nmi from Honolulu to Site PAT-15D @ 10.5 kt	2.5			
PAT-15D	26°01.77'N	5359m	Single APC to 123 mbsf, XCB core from 123 to 124 mbsf (basement)		2.2	0.0	2.2
	147°55.99'W		(Tensor core orientation. Four heat flow runs)				
			Transit 542 nmi from PAT-15D to PAT-26 @ 10.5 kt	2.2			
PAT-26A	21°27.24'N	5081m	2XAPC to 201 mbsf, 1-XCB from 201-201 mbsf (basement)		3.7	0.0	3.7
	139°28.71'W		(Tensor core orientation in one hole. Four heat flow runs)				
			Transit 286 nmi from PAT-26 to PAT-193A @ 10.5 kt	1.1			
PAT-19A	16°52.08'N	5291m	2XAPC to 177 mbsf, 1-XCB from 177-178 mbsf (basement)		3.6	0.0	3.6
	138°06.00'W		(Tensor core orientation in one hole. Four heat flow runs)				
			Transit 505 nmi from PAT-19A to PAT-8C @ 10.5 kt	2.0			
PAT-8C	08°53.09'N	4817m	3XAPC to 200 mbsf, 1-XCB from 200-284 mbsf (1 m into basement)		5.9	0.9	6.8
	135°21.99'W		(Tensor core orientation in one hole. Four heat flow runs)				
			Hole will be logged with Triple Combo, FMS sonic,& LDEO MGT tool				
			Transit 403 nmi from PAT-8C to PAT-17C @ 10.5 kt	1.6			
PAT-17C	07°48.01'N	5039m	3XAPC to 200 mbsf, 1-XCB from 200-295 mbsf (1 m into basement)		6.1	1.0	7.1
	142°00.94'W		(Tensor core orientation in one hole. Four heat flow runs)				
			Hole will be logged with Triple Combo, FMS sonic,& LDEO MGT tool				
			Transit 149 nmi from PAT-17C to PAT-9D @ 10.5 kt	0.6			
PAT-9D	10°10.60'N	5184m	2XAPC to 200 mbsf, 1-XCB from 200-233 mbsf (1 m into basement)		4.4	0.9	5.3
	142°45.49'W		(Tensor core orientation in one hole. Four heat flow runs)				
			Hole will be logged with Triple Combo, FMS sonic,& LDEO MGT tool				
			Transit 111 nmi from PAT-9D to PAT-10B @ 10.5 kt	0.4			
PAT-10B	12°02.00'N	5147m	Single APC to 180 mbsf, XCB core from 180 to 181 mbsf (basement)		2.3	0.0	2.3
	143°45.49'W		(Tensor core orientation. Four heat flow runs)				
			Transit 126 nmi from PAT-10B to PAT-12C @ 10.5 kt	0.5			
PAT-12C	13°48.98'N	4965m	2XAPC to 151 mbsf, 1-XCB from 151-152 mbsf (basement)		3.4	0.0	3.4
	143°53.35'W		(Tensor core orientation in one hole. Four heat flow runs)				
Honolulu			Transit 942 nmi from Site PAT-12C to Honolulu @ 10.5 kt	3.7			
				14.6	**31.6**	**2.8**	**34.4**

Total Days: 49.0

DATE: 11 December 2000 FILE: I:\ DATA \ DSD_INFO \ PROPOSAL \PRO486a.XLS

Table 3. Present Leg 199 drilling program and additional coring and logging programs to be used as an operational guide if time becomes available during the leg.

Proposed Site	Present Leg 199 Minimum Drilling Program	Better Drilling Program	Best Drilling Program	Priori-ty
PAT-8C	3APC/1XCB + Triple combo, MGT, + FMS-sonic logs	3APC/2XCB + Triple combo, MGT, + FMS-sonic logs	3APC/2XCB + Triple combo, MGT, FMS-sonic logs +WST logs	1
PAT-9D	2APC/1XCB Triple combo, MGT, + FMS-sonic logs	3APC/1XCB Triple combo, MGT, + FMS-sonic logs	3APC/1XCB + Triple combo, MGT, FMS-sonic logs, + WST logs	2
PAT-10B	1APC/1XCB	2APC	3APC + Triple combo, MGT, + FMS-sonic logs	
PAT-12C	2APC/1XCB	3APC/1XCB	3APC/1XCB	3
PAT-15D	1APC/1XCB	2APC/1XCB	3APC/1XCB	2
PAT-17C	3APC/1XCB + Triple combo, MGT, + FMS-sonic logs	3APC/1XCB + Triple combo, MGT, + FMS-sonic logs	3APC/2XCB + Triple combo, MGT, FMS-sonic + WST logs	1
PAT-19A	2APC/1XCB	3APC/1XCB	3APC/1XCB	3
PAT-26	2APC/1XCB	2APC/1XCB + Triple combo, MGT, + FMS-sonic logs	3APC/1XCB Triple combo, MGT, + FMS-sonic logs	1

SITE SUMMARIES

Site: PAT-6D

Priority: Alternate
Position: 6°17.963´N, 141°42.216´W
Water Depth: 4945 m (uncorrected)
Sediment Thickness: 370 m (0.456 s two-way traveltime [TWTT])
Target Drilling Depth: 370 m
Approved Maximum Penetration: 450 m
Seismic Coverage: EW9709 PAT-6 survey

Objectives: The objectives of Site PAT-6D are to:

1. Determine the nature of sediments in Eocene tropical Pacific in the south equatorial current (SEC)

2. Determine the paleolatitude of the drill site

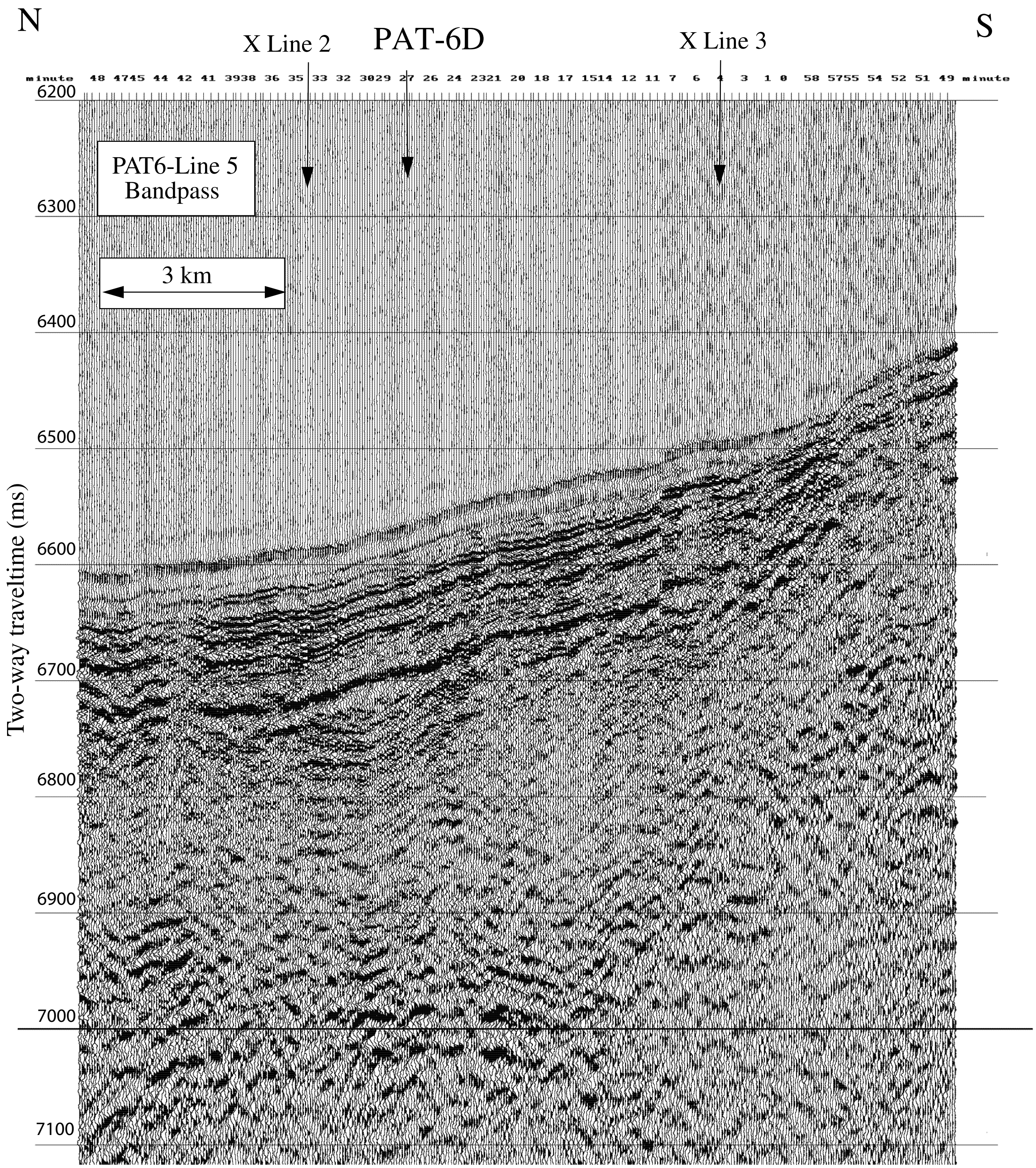
3. Determine the rate of accumulation and types of biogenic sediments

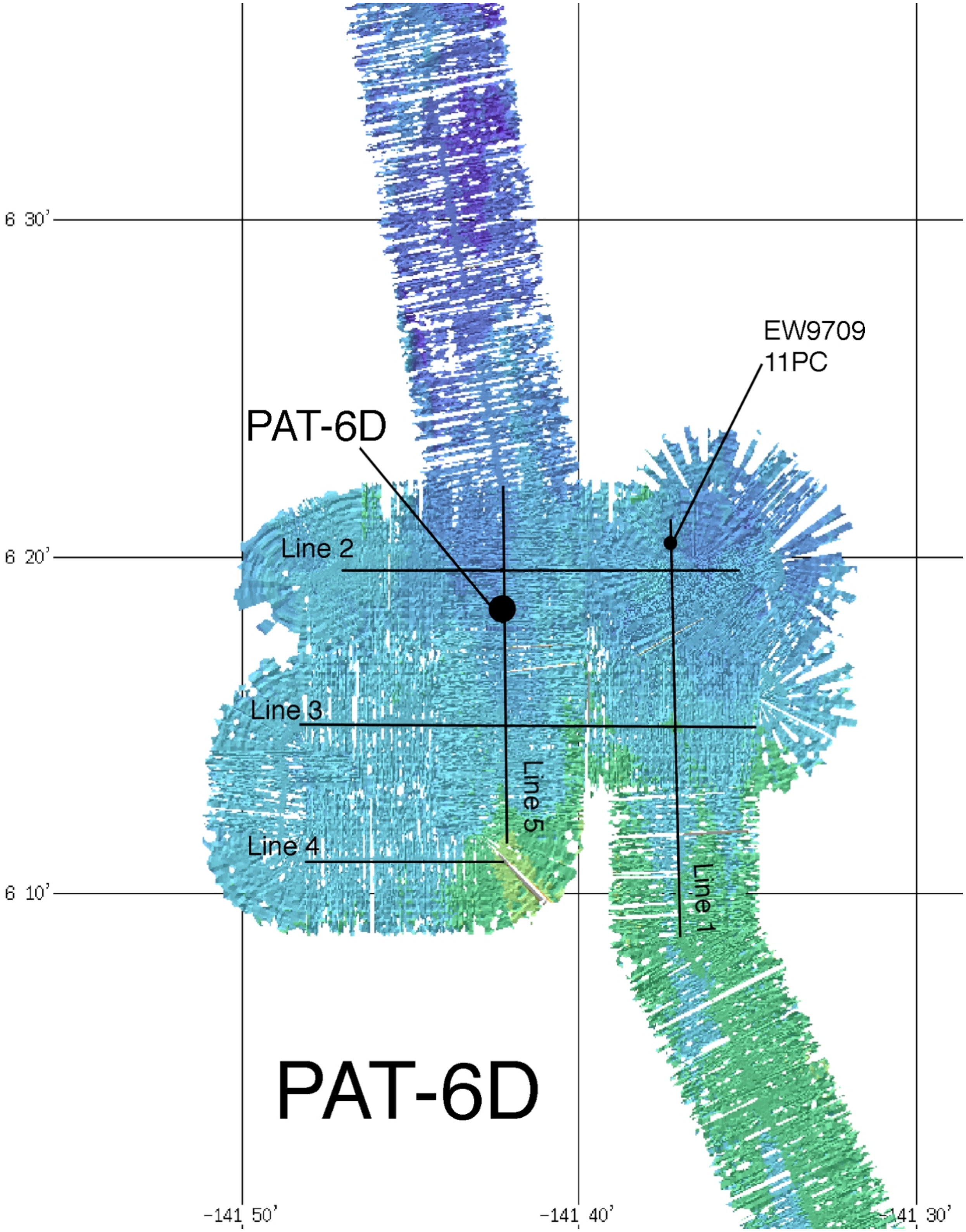
4. Collect an early Eocene section

Drilling Program: One APC/XCB to basement; second and third APC to refusal if time available.

Logging and Downhole: Triple combo, MGT, FMS-sonic. WSTP check shots if time is available.

Nature of Rock Anticipated: Soft sediments except perhaps some chert-chalk in basal layers. Basement is midocean ridge basalt.


N
PAT-6D
S
X Line 2
X Line 3
PAT6-Line 5
Bandpass
3 km
Two-way traveltime (ms)
6200
6300
6400
6500
6600
6700
6800
6900
7000
7100


6 30'
6 20'
6 10'
-141 50'
-141 40'
-141 30'
EW9709
11PC
PAT-6D
Line 2
Line 3
Line 4
Line 5
Line 1
PAT-6D