135-840A-1H SMEAR SLIDE SUMMARY (%): 2,50 2,62 3,48 D D D TEXTURE: Sand Silt 30 20 50 4 9 87 30 15 55 Clay COMPOSITION: Accessory minerals 1 Tr 18 Aragonite Clay Feldspar Foraminiters 5 15 13 3 5 20 1 7 20 45 6 Glass 0 31 67 3 Nannolossils 40

S	TE 840	HOI	E	A CORI	E 1	Н		CORED 0.0 - 4.5 mbsf
Mator	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.1		2 3 8	Upper Pliccene		M	s S	5Y 51 2.5Y 62 5Y 61 5Y 3/1 5Y 3/1	NANNOFOSSIL OOZE WITH CLAY Major lithology: NANNOFOSSIL OOZE WITH CLAY, light brownish gray (2.5Y 6/2), frequently laminated and very thinly-bedded, with sand-sized bloclasts, pumice fragments and crystals. Minor lithologies: PUMICE LAPILLI, gray (5Y 5/1) occurs in Section 1, 1–21 and 26–31 am. Normally-graded VERY COARSE-GRAINED GRANULAR FELDSPAR SAND, very dark gray (5Y 3/2), occurs in Section 1, 92–101 cm. NANNOFOSSIL FORAM OOZE WITH CLAY, reddish brown (5YR 5/4), occurs in Section 2, 42–53 cm. SCORIACEOUS LAPILLI, CRYSTAL LAPILLI, CRYSTAL ASH, and NANNOFOSSIL MIXED SEDIMENT WITH FELDSPAR, CLAY, AND ACCESSORY MINERALS occur in a series of fining-upward, very thin- to thin-bedded sequences in Sections 3 and in CC.
SI	TE 840	HOL	E	B CORE	1	x		CORED 0.0 - 9.5 mbsf
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.6		1 1 1	mPle	♦ † F † C † F † F *** † F		s c	10YR 6/2	FORAM NANNOFOSSIL OOZE WITH CLAY Major lithology: FORAM NANNOFOSSIL OOZE WITH CLAY, light brownish gray (10YR 6/2).
-		-20		<u>}</u> ↑F ↓F	1	3	10YR 3/1	Volcaniclastic grains include subrounded, sand-sized basalt and pumice fragments and olivine and pyroxene crystals. Clasts include pumice pebbles up to 3 cm in diameter and a coral boundstone pebble 6 mm in diameter. Contains both fining- and coarsening-upward intervals. Faint lamination is present.

gray (10YR 5/1). Very poorly-sorted,

very coarse to medium sand-sized grains with fine fraction of forams and

nannofossils.

840B 2X NO RECOVERY

840A-1H 1 2 CC 840B-1X 1 CC 3 5-5-10-10-15-15-20-20-25-25-J 30-30-35-35-40-40-77 45-45-50-50-55-55-60-60-65— -70— 65-70-75-75-80-80--85-85-90---80-95-95-100----100--105-105--110--110-115-115--120-120--125--125-130-130---135--135-140-140---145-145----150-150-

	1,40	CC, 3
TEXTURE:	м	м
Sand		50
Silt	10	30
Clay	90	20
COMPOSITION:		
Accessory minerals	2	5
Aragonite	2	Tr
Calcite	1	
Clay	5	15
Feldspar	5	10
Foraminilors	25	20
Nannolossils	60	50

5111	E 840	HOL	E	B COR	E 3	X		CORED 18.9 - 28.4 mbsf
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
-1					15		<u>2.5Y 2/0</u>	VOLCANIC SAND WITH FORAMS Major lithology: VOLCANIC SAND WITH FORAMS. Core catcher contained five grams of very coarse, moderately well-sorted, black (2.5Y 2/0) subrounded sand, composed of olivine, volcanic glass, basalt, pumice, pyroxene crystals, and limestone. Minor lithology: None.
т	E 840	ноі	E	B COR	E 4	x		CORED 28.4 - 37.9 mbsf
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
	<u>::-191+</u>	CC	Idn		×	S	2.5Y 7/0	VITRIC NANNOFOSSIL OOZE WITH FORAMS Major lithology: VITRIC NANNOFOSSIL OOZE WITH FORAMS, firm, light gray (2.5Y 7/0) to dark gray (2.5Y 4/0). Generally structureless, with a parting at 11 cm. Clast of altered pumice at 17 cm. Minor lithology: VOLCANIC SAND, black (2.5Y 2/0), poorly-sorted, with subrounded grains. Occurs in Section CC. 0-2 cm above a sharm inclined

340B-3X	CC		840B-4X	CC	
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120-			120-		-
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125		_	125-		-
130		-	130		1
			-		
135		-	135-		-
140-		_	140-		-
			-		
145-			145-		
-			-		
150		-	150-		

## 135-840B-4X SMEAR SLIDE SUMMARY (%): CC, 14

TEXTURE:	D
Sand	-
Silt	20
Clay	80
COMPOSITION:	
Accessory minerals	1
Foraminilors	10
	1023

Foraminilers 10 Glass 25 Intraclasts 5 Nannolossils 58

SMEAR SLIDE SUM	WARY (9	6):
	CC,4	
	D	
TEXTURE:		
Sand	***	
Sill	30	
Clay	70	
COMPOSITION:		
Discoaster	Tr	
Foraminitors	Tr	
Glass	35	
Nannolossils	65	
135-840B-10X SMEAR SLIDE SUM	WARY (9	6):
	1,18	CC, 5
0.010.022310-0	D	D
TEXTURE:		
Sand		80
Sand Sill	43	80 20
Sand Sill Clay	43 57	80 20
Sand Sall Clay COMPOSITION:	43 57	80 20
Sand Sall Clay COMPOSITION: Accessory minerals	43 57	80 20 
Sand Sill Clay COMPOSITION: Accessory minerals Foraminilors	43 57	80 20 
Sand Sill Clay COMPOSITION: Accessory minerals Foraminilers Glass	43 57	80 20 

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
3	····	EC	ī			S	2.5Y 7/0	VITRIC NANNOFOSSIL OOZE Major lithology: VITRIC NANNOFOSSIL OOZE, light gray (2.5Y 7/0), firm and structureless. Minor lithology: None.
Meter	E 840 H Graphic Lith.	Section O	Age	B CORE Structure	Disturb	Sample X	Color	CORED 86.1 - 95.7 mbsf Description
			Pliocene	3	1	s s	2.5Y 8/0 2.5Y 6/0	VITRIC NANNOFOSSIL OOZE Major lithology: VITRIC NANNOFOSSIL OOZE, white (2.5Y 8/0) to gray (2.5Y 8/0).

840B-9X	CC		840B-10X	1	C	C
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90-			- 00			
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115-		-	115-		-	
120-		-	120-		-	-
125-		-	125-		_	-
130-		-	130-			_
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135-	1		135-		1.2	
140-			140-		-	-
145-		-	145			-
150-		-	150-	5	-	-
-	5		7	4		

	1,33 D	1,99 D	242
TEXTURE:			
Sand	53	100	0
Silt	40	***	13
Clay	7	***	87
COMPOSITION:			
Accessory minerals	Tr	1	Tr
Clay	5	Tr	15
Feldspar	8	3	Tr
Foraminiters	Tr	***	8
Glass	85	96	10
Nannolossils	2		67

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
111.6111		1				s	10YR 5/1 2.5Y 8/0	VITRIC SAND, VITRIC SILT, and NANNOFOSSIL OOZE WITH CLAY AND GLASS
1.0111			5Y 5/1	Major lithology: Section 1 contains repeated fining-upward intervals,				
mumun		2	Lower	♦    '   '		S	2.5Y 8/0	grating upward from a basal VITRIC SAND, gray (10Y 5/1), into VITRIC SILT, light gray (5Y 6/1), into NANNOFOSSIL OOZE WITH CLAY AND GLASS, white (2.5Y 8/0). The bases of these intervals occur in Section 1 at 2, 37, 93, 117, and 124
								cm. Minor lithology: A fining-upward bed o light gray (5Y 5/1) grading down into gray (5Y 5/1) COARSE VITRIC ASH



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ET.
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	1,83 D	2,21 D	4,95 D	5,54 M	5, 88 M	5, 106 D
TEXTURE:						
Sand	***	45	***	25	100	÷.,
Sill	2	25	15	65		17
Clay	98	30	85	10	***	83
COMPOSITION:						
Accessory minerals		Tr		1	1	Tr
Aragonite	Tr		-+++			+
Clay	15	5	15	3		15
Dolomite		Tr				
Feldspar	Tr	2	***	6	1	Tr
Foraminiters	2	5	5	1	35	4
Glass	Tr	63	10	84	63	з
Nannolossils	83	25	70	5	-	78

SIT	E 840 H	IOL	E	B CORE	Ξ 1	2X		CORED 105.4 - 115.1 mbsf
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.51110		1		\$		s		NANNOFOSSIL OOZE WITH CLAY, NANNOFOSSIL CHALK WITH CLAY and NANNOFOSSIL OOZE WITH GLASS AND CLAY
utur turutur		2		\$ † F		S	2.5Y 8/0	Major lithologies: NANNOFOSSIL OOZE WITH CLAY, white (2.5Y 8/0). NANNOFOSSIL CHALK WITH CLAY, light gray (5Y 7/1). NANNOFOSSIL OOZE WITH GLASS AND CLAY, white (2.5Y 8/0).
	1422	Н		٥	ł		_	Minor lithologies: VITRIC SAND WITH NANNOFOSSILS, white (2.5Y 8/0) to gray (10Y 6/1), occurs in Section 1.
dunlin	Void	3	liocene					20-22 cm. VERY COARSE-GRAINED VITRIC SANDSTONE, dark gray (2.5Y 4/0), occurs in Section 5, 44–54 cm. FORAMINIFER VITRIC SANDSTONE,
induation from		4	Lower P	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		s	2.5Y 8/0	light gray (2.5Y 1/2), occurs in Section 5, 86–90 cm. VOLCANIC SILTSTONE, gray (5Y 6/1), occurs in Section 5, 124–127 cm. In Section 6, 56–105 cm, and in Section CC there are fining-upward intervals, grading from VOLCANIC SANDSTONE, gray (5Y 5/1) to very dark gray (2.5Y 3/0), up
Induction from the state of the		5 6			1111111 - 1111111	S S S	5Y 7/1	into VOLCANIC SILTSTONE, gray (2.5Y 5/0), and in Section 6, into NANNOFOSSIL CHALK WITH CLAY, light gray (5Y 7/1).
- International		CO		# # # # # # # # # # # # # # # # # # #	111		2.5Y 3/0	

	2,91	3, 138 M	CC, 2
TEXTURE:	5		
Sand	0	25	15
Sill	10	66	81
Clay	90	9	4
COMPOSITION:			
Accessory minerals	Tr	1	1
Clay	15	5	4
Feldspar		4	1
Foraminiters	4	1	Tr
Glass	5	84	92
Nannolossils	76	4	Tr
Opaques		1	2

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
hui su		2	Lower Pleistocene	****		S I	5Y 5/1 To 5Y 6/1	NANNOFOSSIL CHALK WITH CLAY Major lithology: NANNOFOSSIL CHALK WITH CLAY, light gray (5Y 6/1) to gray (5Y 5/1). Heavily bioturbated, but traces of thin- and medium-bedding visible. Burrows up to 4 cm in diameter and 10–15 cm long. Both verticat and horizontal burrows common. Minor lithology: VITRIC SILT, dark gray (5Y 4/1), occurs in Section 3, 136–138 cm, and in Section CC, 9–11 and 24–33 cm. Vitric silt also occurs in other intervals, especially in the Section CC, but is strongly bioturbated.

840B 14X NO RECOVERY



SITE 840 HOLE E	CORE 15X	CORED 134.4 - 144.1 mbsf	840B-15X CC	840B-17X CC
Age	Structure Sample	Description	5-	5-
		NANNOFOSSIL CHALK WITH CLAY	10-0-0-	10-
		Major lithology: NANNOFOSSIL CHALK WITH CLAY, gray (2.5Y 6/1),	15	- 15
		CC, 0–11 cm.	20	20
		Minor lithology: None.	25	25-1
			30	30-
8	340B 16X NO	RECOVERY	35	35-
SITE 840 HOLE E	CORE 17X	CORED 153.8 - 163.4 mbsf		-
g Graphic U	Tote turb	Description	40	40
₩ Lith. 80 Å	Structure San Structure	3	45	45
		VOLCANIC GRAVEL	50	50-
		Major lithology: VOLCANIC GRAVEL,		-
		very dark gray (10YR 3/0). Contains subangular to subrounded purnice	~	
		lapilli, black volcanic lithic grains, and a	60	60-
		faint planar bedding.	65	65-
		Minor Lithology: None.	70	70-
		3,		-
ROUGH 20X I	Entire core wa	as given to paleontologists.	75	75—
c	AND 21 Y NO	RECOVERY	80	80—
c c	0400 21X NO	RECOVERI	85	85-
			-	-
			90	90-
			85	85—
			100	100-
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			110	110-
			115	115-
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				-021
			125	125-
			130	130-
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			140	140-
			145	145-
			-	-
			- 001	-
				100



840B 18X THROUGH 20X Entire

	CC.8
	D
TEXTURE:	
Sand	
Sill	20
Clay	80
COMPOSITION:	
Clay	10
Discoaster	5
Glass	25
Nannolossils	60

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		-00						VITRIC NANNOFOSSIL CHALK WITH CLAY
								Major lithology: VITRIC NANNOFOSSIL CHALK WITH CLAY, firm, gray (7.5YR 6/0), with no sedimentary structures preserved.
								Minor lithology: VITRIC NANNOFOSSIL CHALK WITH CLAY, hard, gray (7.5 YR 6/0) fragments distributed throughout Section CC.
1	840B :	23	X	Entire	CO	re v	vas (	given to paleontologists.
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
1111 SILL		1	liocene		1/1/1/V	s	7.5YR 5/0 7.5YR 8/0 To	VITRIC SILTSTONE, VITRIC SANDY SILT and NANNOFOSSIL CHALK WITH CLAY
Suntra		cc	Lower F	\$ †	11/1/1	s	7.5YR 7/0 7.5YR 5/0	Major lithologies: VITRIC SILTSTONE, gray (7.5YR 5/0), structureless, Section 1, 0–24 cm. VITRIC SANDY SILT, gray (7.5YR 5/0) from 24 to 41 cm. Wavy laminae in Section 1 from
								35–36 cm and in Section CC, 5–28 cm. Has alternating gray (7.5YR 5/0) and white (7.5YR 8/0), planar laminae from 36–41 cm. NANNOFOSSIL CHALK WITH CLAY, white (7.5YR
								8/0) to light gray (7.5 YR 7/0), moderately bloturbated in Section 1 from 49–54 and 100–130 cm. Highly bloturbated in Section 1 from 56–100 cm and 130–147 cm.
								ren en e



135-840B-26X SMEAR SLIDE SUMM	MARY (9	6):	
TEXTURE:	1.14 M	1,32 M	CC,6 M
Sand	60		10
Sitt	20	10	80
Clay	20	85	10
COMPOSITION:			
Accessory minerals	20	Tr	10
Clay	10	10	10
Discoaster	***	Tr	-
Foldspar		-	Tr
Foraminifors	***	7.	-
Glass	70	20	80
Nannolossils	Tr	70	Tr

E Graphic U B B B B B B B B B B B B B B B B B B	Structure	Sample	Color	Description	5-
2000 File		s s	7.5YR N 5/0 7.5YR N 3/0	NANNOFOSSIL CHALK WITH CLAY AND FORAMS, VITRIC SILTSTONE WITH FORAMS AND NANNOFOSSILS and VITRIC SANDSTONE WITH VOLCANICS	10
				AND ACCESSORY MINERALS General Description: Entire core shows varying degrees of induration, from firm, nannofossil coze to indurated vitric siltstone. The major lithologies are interbedded. Major lithologies: NANNOFOSSIL CHALK WITH CLAY AND FORAMS, white (7.5YR 8/0) to gray (7.5YR 5/0), commonly bioturbated. Occurs in Section 1, 16–26, 33–43, and 45–61 cm, and in Section CC, 0–4 cm. VITRIC SILTSTONE WITH FORAMS AND NANNOFOSSILS, gray (7.5YR 5/0) to very dark gray (7.5YR 3/0). Occurs in Section 1, 0-12 and 61–69 cm. Bioturbation increases toward the top of these intervals. Planar laminations in Section 1, 65–69 cm. VITRIC SAND STONE WITH VOLCANICS AND ACCESSORY MINERALS, dark gray (7.5YR 4/0) to very dark gray (7.5YR 3/0). planar-laminated with alternating, millimeter-scale dark and light bands.	
				cm. Bloturbation increases toward the top of these intervals. Planar laminations in Section 1, 65–69 cm. VITRIC SANDSTONE WITH VOLCANICS AND ACCESSORY MINERALS, dark gray (7.5YR 4/0) to very dark gray (7.5YR 3/0), planar-laminated with alternating, millimeter-scale dark and light bands. Minor lithology: NANNOFOSSIL OOZE WITH CLAY AND VOLCANIC GLASS, gray (7.5YR 5/0), firm, slightly bioturbated. Occurs in Section 1,	

## 840B 27X NO RECOVERY

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
maniguntuntuntunt		2	Lower Pliocene	ا   عميمه اللهميم مراجع     عميمه	XX HH XXXXHHHH VVV		5Y 7/1 To 7.5YR 8/0 7.5YR	VITRIC NANNOFOSSIL CHALK, NANNOFOSSIL CHALK, and VITRIC SILTSTONE Major lithology: Interbedded VITRIC NANNOFOSSIL CHALK and NANNOFOSSIL CHALK, light gray (5% 7/1), and VITRIC SILTSTONE, black (2.5Y 2/0) Minor lithology: Siltstones grade up into strongly bioturbated FORAM NANNOFOSSIL CHALK and NANNOFOSSIL CHALK WITH



E 840 HOLE B CORE 29X	CORED 269.4 - 279.1 mbsf
Graphic Lith. 200 Color	Description
	NANNOFOSSIL CHALK, VITRIC SILTSTONE, and VITRIC SANDSTONE
	General Description: The major lithologies are interbedded.
	Major lithologies: NANNOFOSSIL CHALK, light gray (7.5 YR 5/0) to dark
	bioturbated, occurs between 0-5 cm, 10-21 cm, 35-60 cm, and 62-84 cm.
	This lithology is interbedded with heavily bioturbated VITRIC
	4/1) to black (2.5Y 2/0), occuring at 5–10 cm, 32–35 cm, and 89–92 cm.
	Normally graded VITRIC SANDSTONE, very dark gray (5Y 3/1) to black (2.5Y 2/0), occurs at 21–32 or and 60, 82 or
	Minor lithology: None.
	CORED 279.1 - 288.8 mbsf
iraphic Up of the transfer to	Description
$\begin{array}{c} 1 \\ 1 \\ 2 \\ 3 \\ 3 \\ 3 \\ 3 \\ 3 \\ 3 \\ 3 \\ 3 \\ 3$	VITRIC SILTSTONE and NANNOFOSSIL CHALK WITH FORAMS
	General Description: The major lithologies are interbedded.
	Major Lithogogies: Bioturbated VITRIC SILTSTONE,
	gray (7.5YR 5/0) to black (7.5YR 2/0). Planar lamination and fining upwardd
	sequences occur in Section 1, 58–95 cm and 24–29 cm. Heavily bioturbated NANNOFOSSIL CHALK WITH
	FORAMS, light gray (7.5YR 7/0) to gray (7.5YR 5/0), occures in Section 1, 15-34 cm, 43-50 cm and 58-63 cm
	Minor lirhology: VITRIC SAND, gray (7.5YR 5/0) to black (7.5YR 2/0), fining-upward planar/aminated
	mmg-opward, planar-iarimated



	1,44 D	CC, 20
TEXTURE:	-	
Sand	***	***
Silt		85
Clay	***	15
COMPOSITION:		
Accessory minerals		Tr
Clay		15
Foldspar	1.49	10
Foraminitors	5	
Glass	2	75
Magnotite	Tr	
Nannolossils	85	***
Opaques	***	Tr
Plagioclase	7	
Pyroxene	1	

Graphic Lith.	Section	Structure Distort	Sample	Color	Description
			TS	7.5YR 7/0 5Y	NANNOFOSSIL CHALK WITH GLASS AND FORAMS and VITRIC SILTSTONE WITH FELDSPAR AND CLAY General Description: The major lithologies are interbedded. Major lithologies: NANNOFOSSIL CHALK WITH GLASS AND FORAMS, light gray (7.5YR 7/0), heavily bioturbated with very thin layers of vitric silt and sand. VITRIC SILTSTONE WITH FELDSPAR AND CLAY, gray (7.5YR 4/0), with alternating thickly- and thinly- laminated intervals and heavily bioturbated intervals. Chemically altered VITRIC SILT- STONE, dark gray (10YR 3/1), occurs in Section CC, 25–28 cm. Minor lithology: VITRIC SANDSTONE, gray (7.5YR 4/0), occurs in Section CC, 12–13 cm.

	1,18 D	1,31 D
TEXTURE:		
Sand	15	2
Sill	70	60
Clay	15	38
COMPOSITION:		
Accessory minerals	1	
Clay	10	18
Foldspar	5	***
Foraminitors	1	2
Glass	79	50
Nannolossils	4	20
Disciociase		10

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.111			PlioMio	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	>>>>	ş	10Y 5/1	VITRIC SILTSTONE WITH CLAY
								WITH CLAY, gray (10Y 5/1) to dark gray (10Y 4/1), heavily bioturbated throughout with thin planar lamination.

840B-31X 1	CC	84	0B-32X 1	CC	
5-		-	5		
10-01			10-1		-
	- 5	_	15-		5_
-05			20-05	1	
25-			25-1-	1-1	1_
30-	_ ~	1	30-	-	-
35-			35-	-	-
40-		_	40-		-
			45-		-
			50-	1	-
			-		
-			-		00
					T
65-	-		65-	D	E
70—	-		70—	-	F
75—	-	-	75—		Γ
80—	-	-	eo— —	F	-
85—	-	-	85—	-	-
90-	-	-	80	-	-
95—	-	-	95-	-	-
-000	-	-	100-	-	-
105	-	-	105-	-	-
110-	-	-	110-	-	-
115-	-		115-	-	-
120-	-	-	120-	-	-
125-	-	-	125-	-	-
130-	-	-	130-	-	-
135-		-	135-	-	-
140-	-	-	140-	-	-
145-	-	-	145-	-	-
	-	-	150-	-	-+
-			-		

135-840B-33X SMEAR SLIDE	SUMMARY (%	G):
-2020/02/02/02/02	1, 18 D	1 N
TEVTIDE		

45 55

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Structure	SITE 840 H	DLE B CORE 3	зх		CORED 308.2 - 317.8 mbsf
32       3       T       ST       S	Graphic Lith.	Age Structure	Sample	Color	Description
10       10 <td< td=""><td>0.5</td><td></td><td>ST</td><td>5Y 3/1 To</td><td>VITRIC SANDSTONE, VITRIC SILTSTONE and NANNOFOSSIL CHALK</td></td<>	0.5		ST	5Y 3/1 To	VITRIC SANDSTONE, VITRIC SILTSTONE and NANNOFOSSIL CHALK
Major lithologies: VITRIC SILTSTONE, and VITRIC SANDSTONE, gray (5Y 5/1) to very dark gray (5Y 3/1), The upper parts of NANNOFOSSIL CHALK, and VITRIC SILTSTONE intervals are heavily bioturbated. The sandstones and siltstones are thinly to thickly, planar, wedge-planar, and trough- cross-laminated. Minor lithology: Heavily bioturbated Intervals of VITRIC CLAY WITH NANNOFOSSIL, very dark gray (5Y 3/1) occur within the NANNOFOSSIL CHALK. CORED 317.8 - 327.5 mbsf Graphic by the second state of the second state of the second by the second state of the second state of the second state intervals of VITRIC CLAY WITH NANNOFOSSIL S, very dark gray (5Y 3/1) occur within the NANNOFOSSIL CHALK. CORED 317.8 - 327.5 mbsf Description WITRIC SANDSTONE, VITRIC NANNOFOSSIL CHALK and NANNOFOSSIL CHALK and NANNOFOSSIL CHALK and NANNOFOSSIL CHALK and NANNOFOSSIL CHALK and NANNOFOSSIL CHALK General Description: The major lithologies are interbedded. Major lithologies: VITRIC SANDSTONE, black (5Y 2.5/1), VITRIC SILTSTONE, black (5Y 2.5/1), VITRIC SANDSTONE, black (5Y 2.5/1), VI	1.0		s	5Y 5/1	General Description: The major lithologies are interbedded.
Minor lithology: Heavily bioturbated Intervals of VITRIC CLAY WITH NANNOFOSSILS, very dark gray (5Y 3/1) occur within the NANNOFOSSIL CHALK.					Major lithologies: VITRIC SILTSTONE and VITRIC SANDSTONE, gray (5Y 5/1) to very dark gray (5Y 3/1) grading up into NANNOFOSSIL CHALK, very dark gray (5Y 3/1). The upper parts of NANNOFOSSIL CHALK and VITRIC SILTSTONE intervals are heavily bioturbated. The sandstones and siltstones are thinly to thickly, planar, wedge-planar, and trough- cross-larminated.
SITE 840 HOLE B CORE 34X       CORED 317.8 - 327.5 mbsf         Image: Structure B Core Structure B Structur					Minor lithology: Heavily bioturbated intervals of VITRIC CLAY WITH NANNOFOSSILS, very dark gray (5Y 3/1) occur within the NANNOFOSSIL CHALK.
graphic       Structure       Product       Structure       Product       Structure	SITE 840 HC	LE B CORE 34	x		CORED 317.8 - 327.5 mbsf
VITRIC SANDSTONE, VITRIC ST S S VITRIC SANDSTONE, VITRIC SILTSTONE, CLAYEY VITRIC SILTSTONE, CLAYEY VITRIC NANNOFOSSIL CHALK and NANNOFOSSIL CHALK General Description: The major lithologies are interbedded. Major lithologies: VITRIC SANDSTONE, black (5Y 2.5/1), VITRIC SILTSTONE, black (5Y 2.5/1), NANNOFOSSIL CHALK, sandstone, black (5Y 2.5/1), S S S S S S S S S S S S S	Graphic Lith.	Age Disturb	Sample	Color	Description
General Description: The major iithologies are interbedded. Major lithologies: VITRIC SANDSTONE, black (5Y 2.5/1), VITRIC SILTSTONE, black (5Y 2.5/1), VITRIC SILTSTONE, black (5Y 2.5/1), VITRIC SILTSTONE, black (5Y 2.5/1), to gray (5Y 5/1), CLAYEY VITRIC NANNOFOSSIL CHALK, gray (5Y 5/1), to light gray (5Y 7/1). NANNOFOSSIL CHALK is usually heavily bioturbated.Thin sand and silt layers are mixed with the chalks due to burrowing. A fining-upward gradation occurs from sandstone, into siltstone and into chalk. Sandstones and siltstones have very thin planar- wedge-planar, and trough cross-lamination. Minge libeleou: None		ene-Miccene → + + + + + + + + + + + + + + + + + + +	S 2	5Y 1.5/1 To 5Y 7/1	VITRIC SANDSTONE, VITRIC SILTSTONE, CLAYEY VITRIC NANNOFOSSIL CHALK and NANNOFOSSIL CHALK
Major lithologies: VITRIC SANDSTONE, black (5Y 2.5/1), VITRIC SILTSTONE, black (5Y 2.5/1) to gray (5Y 5/1), CLAYEY VITRIC NANNOFOSSIL CHALK, gray (5Y 5/1) to light gray (5Y 7/1). NANNOFOSSIL CHALK is usually heavily bioturbated. Thin sand and silt layers are mixed with the chalks due to burrowing. A fining-upward gradation occurs from sandstone, into siltstone and into chalk. Sandstones and siltstones have very thin planar- wedge-planar, and trough cross-larmination.			s	5Y 7/1	General Description: The major lithologies are interbedded.
cross-lamination.					Major lithologies: VITRIC SANDSTONE, black (5Y 2.5/1),
					VITRIC SILTSTONE, black (5Y 2.5/1) to gray (5Y 5/1), CLAYEY VITRIC NANNOFOSSIL CHALK, gray (5Y 5/1) to light gray (5Y 7/1). NANNOFOSSIL CHALK is usually heavily bloturbated.Thin sand and silt layers are mixed with the chaks due to burrowing. A fining-upward gradation occurs from sandstone, into siltstone and into chalk. Sandstones and siltstones have very thin planar- wedge-planar, and trough

0B-33X	1	CC	1.4	840B-34X	1		CC	
5-	-		_	5-	X			L
10-			-	10-	1	-	1	F
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20-				20-				-
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40	ALC: NO		-	40		-		-
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55			-	55		-		-
60			-	60-		-		-
65				65	-			-
70-	12		-	70-		-		-
75				75-		-		-
80-	-Hen			80-		-		-
85-				85—		-		
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95-			1	95-		-		-
100	-			100-		-		-
105	The second		٦	105-		-		-
-011	41		٦	110-		-		-
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135-				135-		-		-
140-			-	140-				-
145		-		145-		-		-
150-				150				-

SMEAR SLIDE SUM	WARY (	%):						SIT	E
	1,17	1,40 M	1,83	1,110	1, 113	2,70	2,90	Aeter	G
TEXTURE:	(VI	M	0	0				Ľ	-
Sand	30	25	***	5	-	***	10		5.
Silt	65	70	20	30	4.	12	80	0.5	f::
Clay	D	5	80	60	90	88	10	3	1::
COMPOSITION:								1.0	-{ · · ·
Accessory minerals	5	1	Tr		Tr	2		1.3	<u> </u>
Editsoar	35	15	44	28	20	48	5	13	4
Foraminitors	2	2		1	1			1.3	4.3
Glass	53	77	20	40	3	8	30	13	1
Goethite			***	Tr	-		Tr	13	1
Inorganic calcile				Tr		***	Tr	1 7	-10
Magnetite			-	Tr	70		1	13	
Planiorteco	2	2	35	1	76	40	60	11	40
Pore space				Ťr	-		-	14	Щ.
Pyroxene				Tr			3		1
Zeolite		-	+++			and .	Tr	13	+
SMEAR SLIDE SUM	WARY (1	6):						Р	
	3,28								
TEXTURE:	м								
Faund	2								
Sili	90								
Clay	5								
COMPOSITION:									
Accessory minerals	2								
Clay	3								
Foldspar	8								
Glass	85								
Nannolossiis	2								
135-840B-36X SMEAR SLIDE SUMM	ABY (3	a:						SIT	E
	1 18	1.46						ē	Gr
	M	M						Me.	L
TEXTURE:	1993							1	
Sand	5	55						13	-
Sill	85	40						1.7	-
Clay	10	5						0.S	-
COMPOSITION:								1.0	÷
Accessory minerals	2	5						1	÷
Clay	8	3							
Foldspar	15	20							
Foraminilors	75	69							
Nannolossils		Tr							
								1	

SITE 840	HOLE	B CORE	3	5X		CORED 327.5 - 332.4 mbsf
Graphic Lith.	Section	Structure	Disturb	Sample	Color	Description
HERTERCHTERTER BERERAR COMPANY	1 2 Biocene - Micco			S S T S S T S	2.5Y 60 To 2.5Y 3/0 5Y 6/1	VITRIC SILTSTONE and CLAYEY NANNOFOSSIL CHALK General Description: The major lithologies are interbedded. Major lithologies: VITRIC SILTSTONE, black (2.5Y 2/0) to gray (2.5Y 4/1), fines upward into CLAYEY NANNOFOSSIL CHALK, light gray (2.5Y 6/0) with thin planar- and trough cross-laminations and heavy bioturbation. Thin silt and sand layers have sediment mixing and deformation of laminae due to bioturbation. Minor lithology: VITRIC SANDSTONE, block (2 EV 20) occurs at the bear of
SITE 840 F	IOLE	B CORE	36	3X		CORED 332.4 - 337.4 mbsf
Graphic Lith.	Section	Structure	Disturb	Sample	Color	Description
	Upper Miocene	3 		s s	5Y 5/1 25Y 6/1 5GY 4/1	VITRIC SILT WITH FELDSPAR, NANNOFOSSIL CHALK WITH CLAY and CLAYEY NANNOFOSSIL CHALK General Description: The major lithologies are interbedded.
						Major lithology: VITRIC SILT WITH FELDSPAR, olive gray (5Y 5/2) to greenish gray (5GY 5/1), commonly bioturbated and faintly laminated. Silt grades up into heavily bioturbated NANNOFOSSIL CHALK WITH CLAY and CLAYEY NANNOFOSSIL CHALK, dark greenish gray (5GR 4/1).
						Minor lithology: Planar-, wavy-, and wedge planar-laminated FINE-GRAINED VITRIC SANDSTONE with alternating dark gray (2.5Y 3/1) and light gray (2.5Y 6/1) laminations occurs in Section 1, 106–116 cm.



24 Tr

135-840B-37X SMEAR SLIDE SUMMARY (%):

sr	TE 840	HO	LE	B CORI	E 3	7X		CORED 337.4 - 347.1 mbsf
Meter	Graphi Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5			Upper Miocene			т	5Y 5/1 To 5GY 4/1	VITRIC SANDSTONE, CLAYEY NANNOFOSSIL CHALK WITH GLASS and VITRIC SILTSTONE Major lithologies: NANNOFOSSIL CHALK WITH CLAY and CLAYEY NANNOFOSSIL CHALK WITH GLASS, gray (5Y 5/1) to greenish gray (5GR 4/1). VITRIC SILTSTONE, very dark gray (2.5Y 3/0), with abundant thin planar, trough cross, wavy, and wedge-planar larrinations. Climbing ripples occur in Section 2, 49–50 cm, and in Section 1, 136–137 cm. This lithology grades upward into heavily bioturbated NANNOFOSSIL CHALK WITH CLAY. Minor lithologies: NANNOFOSSIL CHALK WITH CLAY and CLAYEY NANNOFOSSIL CHALK WITH GLASS grade into NANNOFOSSIL CLAY and NANNOFOSSIL CLAY WITH GLASS, gray (5Y 5/1) to greenish gray (2.5Y 3/0).
SI	E 840	HOI	LE	B CORE	3	BX		CORED 347.1 - 356.8 mbsf
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5		1	Alocene		111111	S	5Y 4/1	VITRIC SILTSTONE and NANNOFOSSIL CLAYSTONE WITH GLASS
1.0			Upper N		X	s	5Y 5/1	Major lithologies: Dark gray (5Y 4/1) thin beds of planar-, wavy-, lenticular, and trough cross-laminated VITRIC

	1,47 M	1,111 D
TEXTURE:		
Sand	10	
Sill	67	20
Clay	23	80
COMPOSITION:		
Accessory minerals	1	1
Clay	8	45
Foldspar	2	2
Foraminilers	1	1
Glass	73	15
Nannolossils	15	35

Miocene 8	s	5Y 4/1	NANNOFOSSIL CLAYSTONE WITH GLASS
	s	5Y 5/1	Major lithologies: Dark gray (5Y 4/1) thin beds of planar-, wavy-, lenticular, and trough cross-laminated VITRIC
			SIL IS IONE grades into heavily bioturbated, gray (SY 5/1) NANNOFOSSIL CLAYSTONE WITH GLASS. In Section 1, 76–145 cm, there is an alternating sequence of these two lithologies, with each bed being 8–10 cm thick.
			Minor lithology: Thin planar-, lenticular-, and wavy laminated VITRIC SANDSTONE, black (5Y 2.5/1) to very dark gray (5Y 3/1), occurs in Section 1, 12–31 cm.

## 840B-37X 1 2 CC 840B-38X 1 CC 5-5-10-10-15-15-20-20---25-25---30-30-85---35-40-40-----45-45---50-50--55-55-1 60---60--65-65--70-70-75-75-80-80--85-85-90-90---95-85-100-100-105-105--110-110--115-115-120-120--125-125-1 -130-130--135-135--140-140--145-145---150-150-----

	1,100 D	2,64 D
TEXTURE:	5	57
Sand		5
Silt	36	55
Clay	64	40
COMPOSITION:		
Accessory minerals	Tr	1
Clay	8	25
Feldspar	Tr	4
Foraminiters	4	Tr
Glass	32	55
Nannolossils	56	15
135-840B-40X SMEAR SLIDE SUMM	1, 114 D	d:
135-840B-40X SMEAR SLIDE SUMM TEXTURE:	MARY (% 1, 114 D	4:
135-840B-40X SMEAR SLIDE SUMM TEXTURE: Sand	MARY (% 1,114 D 50	4:
135-840B-40X SMEAR SLIDE SUMM TEXTURE: Sand Sill	MARY (% 1,114 D 50 40	4:
135-8408-40X SMEAR SLIDE SUMM TEXTURE: Sand Sill Clay	MRY (% 1,114 D 50 40 10	4:
135-8408-40X SMEAR SLIDE SUMM TEXTURE: Sand Sill Clay COMPOSITION:	44RY (% 1,114 D 50 40 10	4:
135-8408-40X SMEAR SLIDE SUMM TEXTURE: Sand Silt Clay COMPOSITION: Fe oxide	MARY (% 1, 114 D 50 40 10 Tr	9:
135-8408-40X SMEAR SLIDE SUMM TEXTURE: Sand Sill Clay COMPOSITION: Fo oxide Foraminilers	44RY (% 1, 114 D 50 40 10 Tr Tr	J:
135-8408-40X SMEAR SLIDE SUMM TEXTURE: Sand Silt Clay COMPOSITION: Fe oxide Foraminilers Gaminilers	AARY (% 1,114 D 50 40 10 Tr Tr 50	J:
135-8408-40X SMEAR SLIDE SUMM TEXTURE: Sand Silt Clay COMPOSITION: Fe oxide Foraminifers Glass Inorganic calcite	MARY (% 1, 114 D 50 40 10 Tr Tr Tr 80 Tr	ð:
135-8408-40X SMEAR SLIDE SUMM TEXTURE: Sand Silt Clay COMPOSITION: Fe oxide Foraminilers Glass Inorganic calcile Magnetice	MRY (% 1, 114 D 50 40 10 Tr Tr 80 Tr Tr Tr	ų:
135-840B-40X SMEAR SLIDE SUMM TEXTURE: Sand Sill ComPOSITION: Fo oxide Foraminilers Glass Inorganic calcile Magnotile Plagicclase	MRY (% 1, 114 D 50 40 10 Tr Tr 80 Tr 5	9:
135-8408-40X SMEAR SLIDE SUMM TEXTURE: Sand Sill Clay COMPOSITION: Fe oxide Foraminilers Glass Inorganic calcile Magnetile Plagicclase Pore space	44RY (% 1,114 D 50 40 10 Tr Tr Tr 50 40 10 Tr Tr 51 12	9:
135-840B-40X SMEAR SLIDE SUMM TEXTURE: Sand Sill ComPOSITION: Fe oxide Foraminifors Glass Inorganic calcile Magnotile Plagicclase Pore space Pore space	MARY (% 1, 114 D 50 40 10 Tr Tr 80 Tr 5 12 1	a:
135-8408-40X SMEAR SLIDE SUMM TEXTURE: Sand Sill Clay COMPOSITION: Fe oxide Foraminilers Glass Inorganic calcile Magnetile Plagicclase Pyrosene Smocile	4ARY (%) 1,114 D 50 40 10 Tr 75 512 1 Tr 75	ə:

SIT	E 840 H	101	E	B CORE	3	9X		CORED 356.8 - 366.5 mbsf
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		1 2 00	Upper Miccene		$\neg \neg \land$	s	N6 2.5Y 3/0 N6 To 2.5Y 4/0 2.5Y 4/0 5Y 2.5Y 2.5Y 2.5Y 2.5Y 2.5Y 2.5Y 2.5Y 2	VITRIC SILTSTONE and VITRIC NANNOFOSSIL CHALK Major lithologies: Thin planar-, wedge-planar, and trough cross laminated very dark gray (2.5Y 3/0) to dark gray (5Y 4/1) VITRIC SILTSTONE with some convoluted laminae. Grades into heavily bioturbated, light gray (N7) to gray (N6) VITRIC NANNOFOSSIL CHALK. Minor lithology: VITRIC SANDSTONE, black (2.5Y 2/0), occurs in Section 1, 70-84 cm, and in Section 2, 104–110
Meter	E 840 I Graphic Lith.	Section O	Age m	B CORE Structure	Disturb A	Sample X	Color	CORED 366.5 - 376.2 mbsf Description
111 Sun Sun		1	Upper Miocene	III ₩≈ ≈1+F ====================================	1/1/1/	т	5Y 4/1 50 105 250 N7	NANNOFOSSIL CHALK WITH CLAY, VITRIC SILTSTONE and VITRIC SANDSTONE Major lithologies: Heavily bioturbated, medium light gray to olive gray (N6 to 5Y 6'1) NANNOFOSSIL CHALK WITH CLAY interbedded with black (2.5Y 30) to dark greenish gray (5Y 4/1) wavy laminated VITRIC SILTSTONE.
								Wedge-planar-, wavy, and lenticular- laminated. VITRIC SANDSTONE, black (2.5Y 2/0) occurs in Section 1, 0–5 and 105–109 cm. Minor lithology: Black (2.5Y 2/0)

840B-39X 1	2	CC	84	0B-40X	1	C	C
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25-	-	-11	-	25-	A	-	-
30-	8.82	_	_	30-			-
85-	-	-	_	35-		_	_
	1			40-	1		1
40-				-			
45		-		45-			1
50	-	-	-	50-			-
55-	-	- 1	-	55-	1		-
60-	-	-	-	60-		-	-
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80-	and a			- 00	-		
85-	12	-	-	85-		-	-
90—		-	-	90-		-	-
85-		-	-	85-		-	-
100-	-	-	-	100-		-	-
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140-	-	-	-	140-		-	-
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-				-			

SMEAR SLIDE SUM	WARY (S	6):
	1,30 D	CC, 10 D
TEXTURE:		
Sand	***	20
Sill	7	60
Clay	93	20
COMPOSITION:		
Accessory minerals	Tr	
Clay	20	12
Feldspar	1	Tr
Foraminilers	4	Tr
Glass	2	80
Nannolossils	73	8

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
			Γ		Ŧ	s	N6	VITRIC SILTSTONE and
5111		1	909	- î <sup>*</sup> -	Ŧ		5GY 4/1	Major lithologies: Dark greenish grav
1.11	Void		Mioce					(5GY 2/1) to greenish black (5GY 2/1) VITRIC SILTSTONE with planar
1		2	lpper	- »	±		N5	laminae in Section 1, 83–87 cm, and wavy- and planar-laminae in Section 2
3		ſ	Γ	= " ** ***	I		N6	33-44 cm. Fines upward into heavily
		cc			×	S	5GY 4/1	bioturbated, light gray (N7) to light greenish gray (5GY 8/1)
								Minor lithology: Black (2.5Y 2/0) VITRIC SANDSTONE, occurs in Section 1, 14–19 cm.



SIT	E 840 H	101	E	B COR	= 4	2X	_	CORED 385.8 - 395.5 mbsf
Meter	Graphic Lith,	Section	Age	Structure	Disturb	Sample	Color	Description
0.5				= 33 ↑F = 33	1111		2.5Y 4/0	NANNOFOSSIL CHALK and VITRIC SILTSTONE
unigun		1			-11/1/1/1-		2.5Y 2/0 To 2.5Y 6/0	Major lithologies: Moderately to heavily bioturbated NANNOFOSSIL CHALK, dark gray (2.5YR 4/0) to gray (2.5YR 6/0). Planar, wedge-planar, wavy-, and benjcular-laminated VTRIC
munu		2	pper Miocene		444444		2.5Y 5/0 To 2.5Y 2/0	SILTSTONE, black (2.5YR 2/0). Convoluted bedding occurs in Section 3, 40–45 cm. VITRIC SILTSTONE usually fines upward and grades into bioturbated NANNOFOSSIL CHALK.
Indution		3	5	8 M 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	+++++++++++++++++++++++++++++++++++++++		2.5Y 2/0 To 2.5Y 7/0	Minor lithology: None.
ulu	H	4		33	Ϋ́Τ		2.5Y	



135-8408-43X SMEAR SLIDE SUI	MMARY (%):
	2, 23 D
TEXTURE:	2.
Sand	10
Sill	70
Clay	20
COMPOSITION:	
Clay	10
Foraminilers	Tr
Glass	65
Goethite	Tr
Inorganic calcite	Tr
Magnotile	1
Plagioclase	20
Pyroxene	2
Smectite	Tr
Volcanic ash	2

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
memoryment		1	Upper Miocene	$ \begin{array}{c}                                     $		0         0           0         0           2.5Y         NANNOFOSSIL CHALK           3/0         Najor lithologies: VITRIC           SANDSTONE, dark gray         2.5Y           1         5           1         0           2.5Y         5           3/0         10           1         10           2.5Y         5           1         10           1         10           2.5Y         10           1         10           1         10           2.5Y         10           1         10           2.5Y         10           1         10           1         10           2.5Y         10           1         10           1         10           1         10           1         10           1         10           1         10           1         10           1         10           1         10           1         10           1         10           1         10	VITRIC SANDSTONE and NANNOFOSSIL CHALK Major lithologies: VITRIC SANDSTONE, dark gray (2.5YR 4/0) to very dark gray (2.5YR 3/0). Occurs in fining-upward intervals with sharp, commonly eroded basal contacts. Planar lamination is common near the base of each interval with bicturbation increasing toward the top. Burrows, including Chondrites and Thalassi- noides, occur in Section 3, 0–33 cm. The basal centimeter of a graded bed in Section 1, 29–30 cm, contains	
lul.		3		= <u>*</u>			2.5Y 5/0	granule-sized, subrounded grains. Minor lithologies: NANNOFOSSIL CHALK, dark gray (2.5YR 4/0), bioturbated, occurs in Section 1, 119–140 cm. VITRIC SILTSTONE, dark gray (2.5Y 4/0), occurs in Section 1, 140–150 cm and in Section 3, 70–75



SITE 840 HOLE B CORE 44X	CORED 404.9 - 414.2 mbsf	840B-44X 1 CC	840B-45X 1	2
Graphic Lith. Structure Structure and Structure Structur	Description	5-0-0		
	VITRIC SILTSTONE, VITRIC	10	- 10	
	CHALK and VOLCANICLASTIC	15	- 15	-
	Major lithologies: VITRIC SILTSTONE	20	- 20	
	Interbedded with VITRIC SANDSTONE and NANNOFOSSIL CHALK, gray (2.5	25	- 25	
E	Bioturbated with wavy laminae and enticular laminae. A discrete bed of	30	- 30	
	vitric siltstone occurs in Section 1, 103–115 cm, showing planar laminae	85	85-	
a F	and bioturbation. Section CC contains planar-laminated VITRIC SILTSTONE.	45-	40	
	VOLCANICLASTIC CONGLOMERATE, very dark gray (2.5	50		and a
s	subrounded grains up to 1 cm in			
	Minor lithology: Bioturbated VITRIC	- 60		135
P t	NANNOFOSSIL CHALK, medium bluish gray (5B 5/1) to very dark gray	65		
( )	(2.5 Y 3/0), occurs in Section 1, 93-103 cm, and in the Section CC,	70		
		75—	75	
	COHED 414.2 - 423.9 mbst	80	80	-
	Description	80-	85	- 63
	VITRIC SANDSTONE, VITRIC SILTSTONE, and NANNOFOSSIL		_ 80	
	General Description: Core contains	100-00-	_ 85	
	nterbedded intervals of the major ithologies, with a basal vitric	105	_ 100	1029
	sandstone grading up through vitric siltstone and into vitric nannofossil		_ 105	
	Major lithologies: VITRIC	115	- ""-	1-
	SANDSTONE, black (2.5YR 2/0) to very dark gray (2.5YR 3/0), with		- 115	HOT .
s	subrounded grains. Generally planar-laminated and fining upward	125 — —	- 120	L
ir V	nto planar-laminated, bloturbated VITRIC SILTSTONE. Contact with	130 — — — —	125-	
6	5/0), bioturbated NANNOFOSSIL	135	130	man 1
	Vinor Lithology: None.		135-	
, in the second s			140-	
		-	145	
			150	

SMEAR SLIDE SUN	IMARY (%):
	1.4 D
TEXTURE:	11023
Sand	80
Silt	20
Clay	
COMPOSITION:	
Glass	68
Inorganic calcile	Tr
Magnetilo	1
Plagioclase	4
Pyroxene	1
Smectita	25
Volcanic ash	1

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SITE 840 HOLE B CORE 46X CORED 423.9 - 433.5 mbsf	840B-46X 1	2	CC
be be W     Graphic Lith.     Do Do S     Be V     Quantum S     Do S     Do S     Do S     Do S     Do S     Do S     Do S     Do S     Do S	5		
VITRIC SANDSTONE, VITRIC SILTSTONE, and NANNOFOSSIL CHALK Major lithologies: Structureless VITRIC SANDSTONE, very dark gray (2.5Y 3/0). This lithology fines upward into very dark gray (2.5Y 3/0), bioturbated VITRIC SILTSTONE, wery dark gray (2.5Y 3/0). This lithology fines upward into very dark gray (2.5Y 3/0), bioturbated VITRIC SILTSTONE, medium bluish gray (6B 5/1) to very dark gray (2.5Y 3/0). This lithology is commonly bioturbated and shows planar- and trough cross-lamination in Section 1, 28–54 cm, and fining-upward intervals in Section 1, 82–150 cm, and Section 2, 48–52 cm. VITRIC SILTSTONE is Interbedded with heavily bioturbated NANNOFOSSIL CHALK, light gray (2.5Y 6/0) to medium bluish gray (5B 5/1). Minor lithology: None.			q



SIT	TE 840 H	101	LE	B CORE	4	7X		CORED 433.5 - 442.8 mbsf
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
1115111		1			111111		2.5Y 6/0	NANNOFOSSIL CHALK, VITRIC SILTSTONE, and VITRIC SANDSTONE
Suntuntin		2	Miocene	<u>↑ F 33</u> <u>↓ F 33</u> <u>↓ F 73</u> <u>↓ ↑ F 33</u> <u>↓ ↑ F 33</u> <u>↓ ↑ F</u>			2.5Y 5/0 To 2.5Y 3/0	Major lithologies: Heavily bioturbated NANNOFOSSIL CHALK, light gray to gray (2.5Y 6/0), interbedded with VITRIC SILTSTONE, gray (2.5Y 4/) to very dark gray (2.5Y 3/0) with graded bedding and planar lamination. Section 1 is heavily bioturbated between 0 and
Inni			Upper	= -38	1111		2.5Y 6/0	29 cm. VITRIC SANDSTONE medium bluish gray (5B 5/1) to very dark gray
lund				ZZ F	1/1/		2.5Y 3/0	(2.5Y 3/0), with fining-upward intervals, planar- and trough cross-laminations, and rare convolute bedding.
munuh		3			11111111		2.5Y 3/0 To 2.5Y 6/0	Minor lithology: A 13 cm thick granule-sized, very dark gray (2.5Y 3/0) VOLCANICLASTIC BRECCIA occurs in Section CC.



	3,10 D	3,49 D
TEXTURE:		
Sand	90	÷
Sill	10	6
Clay		94
COMPOSITION:		
Accessory minorals		1
Clay		34
Feldspar		2
Foraminitors	Tr	1
Glass	72	2
Goelhite	Tr	
inorganic calcite	Tr	
Magnetite	Tr	
Nannolossils	***	60
Plagioclase	5	-
Pore space	20	-
Pyroxone	1	22 I
Volcanic ach	2	

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
1111Sunsu		1		<u>}</u> - ↓ F 		2.5Y 3/0 To 2.5Y 6/0	VITRIC SILTSTONE, NANNOFOSSIL CHALK and VITRIC SANDSTONE General Description: The major lithologies are interbedded.	
T				- +F 3	1111		6/0	Major lithologies: VITRIC SILTSTONE
munuh		2	Upper Miocene		<u>111111111 + s</u>	т	2.5Y 3/0 To 2.5Y 2/0	medium dark gray (N4) to very dark gray (2.5Y 3/0), with common trough cross-lamination and wavy- and wedge-planar lamination. Beds are bioturbated in the upper parts and grade upward into heavily bioturbated NANNOFOSSIL CHALK, light gray
utu		3	1			N5	(2.5Y 6/0) to medium gray (N5). Planar-laminated, medium grained, black (2.5Y 2/0) VITRIC SANDSTONI	
Juntuli		4			111111111		N4 To N7	occurs in lower part of fining-upward intervals. Minor lithology: VOLCANICLASTIC BRECCIA, black (2.5Y 2/0) occurs in Section 3, 100–112 cm.



1062

Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
				11111		N5	VITRIC SILTSTONE and NANNOFOSSIL CHALK
	2	Upper Miocene	+- ' +- +- +- +- +- +- +- +- +- +- +- +- +-	1-1111111111111111		5Y 2/0 To 5Y 6/0	General Description: The major lithologies are interbedded. Major lithology: VITRIC SILTSTONE, dark gray (5Y 4/1) to gray (5Y 5/1), with abundant trough cross-, planar- and wedge-planar larnination. Convoluted bedding horizons are also common. NANNOFOSSIL CHALK, gray (5Y 6/1) to light gray (5Y 7/1),
	3					5Y 2/0 10 7/1	heavily bioturbated and intermixed with vitric silt and vitric sand. The NANNOFOSSIL CHALK grades down into VITRIC SILTSTONE. Minor lithology: Black (5Y 2/0) to very dark gray (5Y 3/1), usually normally graded and planar-laminated VITRIC



SITE 840	HO	LE	B CORE 5	ox		CORED 462.1 - 471.7 mbsf	840B-50X
Graphic Lith,	Section	Age	Structure Dist	Sample	Color	Description	s_
	3	Upper Miocene	Image: State		N4 To N6 N4 5Y 2.5/1 N6	NANNOFOSSIL CHALK, NANNOFOSSIL CHALK, NANNOFOSSIL CHALK WITH VITRIC SILT, VITRIC SILTSTONE, and VITRIC SANDSTONE General Description: The major lithologies are interbedded. Major lithologies: Heavily bioturbated NANNOFOSSIL CHALK and NANNOFOSSIL CHALK and NANNOFOSSIL CHALK WITH VITRIC SILT, gray to medium gray (N5 to N6), interbedded with medium dark gray (N4) to medium gray (N5) VITRIC SILTSTONE. VITRIC SILTSTONE has fining-upward intervals with convoluted beds, trough cross-, planar-, wedge planar-, and wavy-laminated beds. Lenticular laminae occur in Section 1, 55 cm, Section 2, 85 cm, Section 3, 113 cm, and Section 4, 15 cm. VITRIC SANDSTONE, medium gray (N5) to very dark gray (N2), grades up into VITRIC SILTSTONE. Convoluted bedding occurs in this lithology in Section 4, 18–58 cm.	10
						Minor lithology: A 3 cm thick bed of PUMICEOUS GRAVEL, very dark gray (5Y 2.5/1), occurs in Section 4, 104-107 cm	75



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120 cm	70-	and Balan
29 cm.	75-	2
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	85-	
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	90-	
		100 B
	95-	-
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	100	
	-	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	105	
	110	
	115-	

120-125-130-135-

140-145

150-

3 4 5 CC

TO

SITE 840	HO	LE	B CORE	5	1X		CORED 471.7 - 481.4 mbsf	840B-51X	1	2
Graph Lith.	Section	Age	Structure	Disturb	Sample	Color	Description	5-		
		Upper Miccene	1313     1		S	6Y 2.5/1 N7 5Y51 5Y 300 5Y 60 5Y 5Y 5Y 5Y 5Y 5Y 5Y 5Y 5Y 5Y 5Y 5Y 5Y	NANNOFOSSIL CHALK WITH FORAMS and VITRIC SILTSTONE General Description: The major lithologies are interbedded. Major lithologies: Heavily bioturbated NANNOFOSSIL CHALK WITH FORAMS, gray (5Y 5/1) to light gray (5Y 7/1). VITRIC SILTSTONE, very dark gray (5Y 3/1) to gray (5Y 5/1), with convoluted bedding and common trough cross, planar, wedge-planar, and wavy laminae. This lithology grades up into NANNOFOSSIL CHALK WITH FORAMS. Minor lithologies: GRANULAR VITRIC SANDSTONE and VERY FINE-GRAINED VITRIC SANDSTONE black (5Y 2.5/1), frequently planar-laminated, occurs at the base of lining-upward intervals. PUMICE BRECCIA, very dark gray (5Y 3/1), with clasts up to 15 mm in diameter occurs in Section 1, 35–44 cm, and in Section 5, 9–13 and 123–129 cm.	10		
								90		-10015

135-840B-51X SMEAR SLIDE SUMMARY (%): 2, 113 D TEXTURE: Sand Sill Clay 17 83 COMPOSITION: Accessory mineralsTrClay30Feldspar2Foraminilors10Glass5Nannolossils53

135-840B-52X SMEAR SLIDE SUN	IMARY (%):
	2, 12 D
TEXTURE:	
Sand	15
Sill	75
Clay	10
COMPOSITION:	
Clay	5
Glass	68
Goothite	Tr
Inorganic calcito	Tr
Magnetite	1
Plagioclase	3
Pore space	20
Pyroxene	1
Volcanic ash	2

SI	TE 840 H	IO	E	B CORE	5	2X		CORED 481.4 - 491.0 mbsf
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
				ALL T JOR	111		5GY 4/1	VITRIC SANDSTONE, VITRIC
0.5		1		***	11111		5Y 5/1	CHALK WITH FORAMS
in line					111/1	т	5Y 2.5/0	lithologies are interbedded. Major lithologies: VITRIC
hund		2			11111		N5	SANDSTONE, black (5Y 2.5/1) to very dark gray (5Y 3/1), commonly planar-laminated, grades up into
nulu				33 <b>*</b> F	11111		5Y 2.5/1	VITRIC SILTSTONE, dark gray (5Y 4/1) to gray (5Y 6/1), which is trough-, cross-, planar-, wedge-planar-, and
1	Ш.			Go +F	1111		5Y 4/1	are common. Overlying the siltstone is
minn		3	ene		1111111		5Y 3/1 To 5Y	heavily bloturbated NANNOFOSSIL CHALK WITH FORAMS, gray (5Y 6/1) to light gray (5Y 7/1).
			Mioo	≣Î⁵	111		2.5/0	MInor lithology: None.
Inni		4	Upper		11111		N5	
- Inter					11111		5Y 2.5/0	
		5			1111111111	<b>†</b> F	N5 To N2	
lund					111111		5Y 2.5/1	
and and and a		6			1111111111		5Y 2.5/1 TO 5Y 7/1	-
-		cc		- US	1		N4	



Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
111 Sungin		1			1111/1/11/11		N4 To 5Y 2.5/0	VITRIC SANDSTONE, VITRIC SILTSTONE and NANNOFOSSIL CHALK General Description: The major lithologies are interbedded.
Internet		2		אד אד גער די גער די גער גער גער גער גער גער גער גער גער גער	1111/1/		5Y 2.5/1	Major lithologies: VITRIC SILTSTONE, black (5Y 2.5/1) to gray (N5), with trough-, cross-, planar-, and
1111			eue	33	111		N5	convoluted; contains water escape pillars and thin sand dikes. Tops of
1111			er Mix	靈 <sup>作</sup> 》 ※	1111		N6	beds are often bioturbated. NANNOFOSSIL CHALK, light gray
1111		3	ddn	° Í <sup>F</sup> ⇔	444		5Y 3/1	SANDSTONE, black (5Y 2.5/0) to dark gray (N4), frequently conglomeratic,
111				 Î	111		5GY 4/1	with clasts up to 1 cm in diameter, occurs at the base of fining-upward
1111				≋‡ <sup>r</sup> ≡	1111		N7	intervals.
11111		4		/L	111111		N5	Minor innologies: Planar- and cross-stratified PUMICEOUS GRAVEL, dark gray (10YR 4/0), alternating with VITRIC SAND layers
	8	5		☆↑☞≣	11111		N4	occurs in Section 5 and in Section CC.



· ·
VITRIC SANDSTONE, VITRIC 5/1 5/1 To 2.5Y 2/0 Major lithologies: VITRIC SANDSTONE, black (2.5Y 2/0), with
planar-, wedge planar-, 5YR wavy-laminated and frequently 4/1 convoluted bedding. VITRIC 2.5Y SILTSTONE, black (2.5Y 2/0) to dark greenish gray (5G 4/1) to dark gray (5YR 4/1), with frequent planar-, wedge planar-, and trough
cross-laminae, and convoluted beds. 5YR Bioturbation occurs at the tops of the 4/2 beds. NANNOFOSSIL CHALK, gray 70 2/0 (5Y 5/1).

beds. NANNOFOSSIL CHALK, gray (5Y 5/1). Minor lithology: VOLCANICLASTIC BRECCIA, dark reddish brown (5YR 3/2) occurs in Section 2, 40–45 cm, interbedded with SANDSTONE in Section 1, 136 cm, through Section 2, 21 cm, where it is black (2.5Y 2/0) to dark reddish gray (5YR 4/2).



135-840B-55X SMEAR SLIDE SUMMARY (%): 2,58 D TEXTURE: Sand --Sand --Clay --Clay --COMPOSITION: Clay 2 Glass 95 Magnetile Tr Plagicolase 1 Poro spaco 2 Pyrozena Tr

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
TUNTU		1		33 * F 27 33	1111111		7.5YR 3/0 5GY 5/1	VITRIC SILTSTONE, VITRIC SANDSTONE, NANNOFOSSIL CHALK and VOLCANICLASTIC BRECCIA
SILLI				<u>北</u> 三			N5	General Description: The major
Innhultur		2	ene		ーーーーー	т	7.5YR 6/0 To 7.5YR 3/0	Ithologies are interbedded. Major lithologies: VITRIC SILTSTONE very dark gray (7.5YR 3/0) to greenish gray (5GY 5/1), and VITRIC SANDSTONE, dark gray (7.5YR 4/0), with bedding frequently planar-laminated, wedge planar-laminated, wedge planar-laminated, wedge planar-laminated, wedge planar-laminated, wedge planar-laminated, wedge planar-laminated, wedge planar-stabular, and trough cross-stratification. NANNOFOSSIL CHALK, light gray (5Y 6/1), heavily bloturbated. Structureless, polymict
and and and a second		3	Upper Mioo	● 「「」」 「「」 「」 「」 「」 「」 「」 「」 「」 「	1111111111111		7.5YR N 2/0 7.5YR N 6/0 To 7.5YR N 3/0	
Innimitation		4					N7 To N3	VOLCANICLASTIC BRECCIA, very dark gray (7.5YR 3/0) to gray (7.5YR 6/0), with clasts up to 1 cm in diameter Minor lithology: Stratified GRAVELY VITRIC SANDSTONE, dark gray (N3), with clasts up to 1 cm in diameter.



SILE	840 F			B CONL	1	04		CONED 520.2 - 529.0 11031
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
in straight		1 = ↑ <sup>F</sup> × 2.5Y 600 F × 2.5Y 600 70 2.5Y 400	2.5Y 6\0 To 2.5Y 4\0	VITRIC SANDSTONE, VITRIC SILTSTONE, NANNOFOSSIL CHALK and VOLCANICLASTIC BRECCIA				
					General Description: The major lithologies are interbedded from			
		2		1 ≫    1 ≫    ↑ F ≫    1 F ≫	>+++++++-	2.5Y 3\0 To 2.5Y 6\0	Section 1, 0 cm, through Section 3, 115 cm. Major lithologies: VITRIC SANDSTONE, gray (2.5Y 6/0) to ver dark gray (2.5Y 3/0), in fining-upwar	
Ududududududududu		3	Upper Miccene	IIII	11/1/1/1/1/1/1/1/1/		2.5Y 3\0	planar- and cross-larninated intervals, occasionally with convoluted bedding. Fines upward into VITRIC SILTSTONE, gray (2.5Y 6/0) to very dark gray (2.5Y 3/0), with planar- or cross-larnination near the base of each interval. Bioturbation increases toward the top of each interval. This lithology fines upward into the overlying, bioturbated NANNOFOSSIL CHALK, light gray (2.5Y 7/0) to gray (2.5Y 5/0). Poorly-sorted, very dark gray (2.5YR 3/0), clast-supported VOLCANICLASTIC BRECCIA with

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2.5Y 5\0

115 cm, through Section 4, 130 cm. Maximum clast diameter is 28 mm.

Minor lithology: None.



SIT	E 840 H	101	E	B CORE	5	7X		CORED 529.6 - 539.3 mbs	
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description	
nnginin 8		1		== 	111111		2.5Y 3\0	VITRIC SANDSTONE, VITRIC SILTSTONE and NANNOFOSSIL CHALK	
قبيبابا					111111		2.5Y 6\0	Major lithologies: VITRIC SANDSTONE, gray (2.5Y 6/0) to very dark gray (2.5Y 3/0), in fining-upward	
<b>u</b> turi		2		≫ 2888年 二			2.5Y 3\0	sequences with scoured lower contacts, showing planar lamination, trough cross-stratification, convoluted bedding and water escape structures.	
httpii	田	_		い語を書いていた。	1111111		2.5Y 6\0 To 2.5Y 4\0	This lithology commonly fines upward into VITRIC SILTSTONE, gray (2.5Y 6/0) to very dark gray (2.5Y 3/0), with planar- or cross-laminae near the bas	
hund	<u>_</u>	3			<b>→</b> <b>→</b> <b>F</b> <b>→</b> <b>F</b> <b>→</b> <b>F</b> <b>→</b> <b>F</b> <b>→</b> <b>F</b> <b>→</b> <b>F</b> <b>→</b> <b>F</b> <b>→</b> <b>F</b> <b>→</b> <b>→</b> <b>→</b> <b>→</b> <b>→</b> <b>→</b> <b>→</b> <b>→</b>			2.5Y 3\0	of each interval and bioturbation increasing upward. This lithology fines upward and grades into strongly
Hilling		-			2.5Y 6\0 To 2.5Y 3\0	light gray (2.5Y 7/0). Minor lithology: VOLCANICLASTIC			
Hitti		4					2.5Y 5\0 2.5Y	BHECCIA, dark gray (2.5YR 4/0), with normally- graded base occurs in Section 5, 112–117 cm.	
		5			11111		2.5Y 3\0		
ATT I		Ĭ			1111		2.5Y 5\0		



SITE 840

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Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
Mention and and and and and and and and and an		1 2 3 4 5	Upper Miocene Ac			Sarr	OD         A39         A590         A59         A59         A590         A590	VITRIC SANDSTONE, VITRIC SILTSTONE and NANNOFOSSIL CHALK General Description: The major lithologies are interbedded. Major lithologies: VITRIC SANDSTONE, gray (2.5Y 60) to very dark gray (2.5Y 30), occurs in fining-upward sequences with sharp basal contacts, showing both planar- and cross-lamination. Fines upward into VITRIC SILTSTONE, gray (2.5Y 60) to very dark gray (2.5Y 30), with planar-laminae and onvoluted bedding. Fines upward and grades into strongly bioturbated NANNOFOSSIL CHALK, light gray (2.5Y 60). Minor lithology: VOLCANICLASTIC BRECCIA, dark gray (2.5YR 4/0), occurs in Section 4, 140–144 cm.
		6			1		N4 N6	
킛		co		- 1092.51 	5		2.5Y	



SITE 840	HOI	LE	B COR	E 5	ЭX		CORED 549.0 - 558.7 mbsf	840B-59X
Graphic Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description	5-
	1 2 3 000	Upper Miocene	+ f f f 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	XX VVVVV XXXXX VVVVVX		2.5Y 4\0 2.5Y 5\0 10YR 4/1	VITRIC SANDSTONE, VITRIC SILTSTONE and NANNOFOSSIL CHALK Major lithologies: VITRIC SANDSTONE, dark gray (2.5Y 4/0) to dark greenish gray (10Y 4/1), in planar laminated fining-upward intervals with sharp basal contacts. Convoluted bedding occurs in Sections 1 and 3, at 65–92 cm and 0–20 cm respectively. This lithology lines upwards into VITRIC SILTSTONE, dark gray (2.5Y 4/0) to dark greenish gray (10Y 4/1), Planar laminae and slight bioturbation occur throughout. Convoluted bedding	10     15     20     25     30     35     40     45
							preserved in Section 2, 60–70 cm. Fines upwards into heavily bioturbated NANNO-FOSSIL CHALK, light gray (2.5Y 7/0) to gray (2.5Y 5/0). Minor lithology: Poorly-sorted, structureless VOLCANICLASTIC BRECCIA, dark greenish gray (10Y CH) procure in Section CC 18–20 cm	



135-840B-60X	BRIADY IN 1	SIT	E 840 H	HOI	LE	B COR	E 6	ox		CORED 558.7 - 568.3 mbsf
TEXTURE:	1,92 D	Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
Sand Sili Clay COMPOSITION: Clay Foraminilaris Goothile Magnetile Plagioclase	20 7r Tr Tr 1 Tr 2 75 2			1	Miocene			т	5G 2/1 5G 4/1 5G 4/1 5G 5/1 5G 2/5 2/0	VOLCANICLASTIC BRECCIA, VOLCANIC SILTSTONE, VOLCANIC SANDSTONE, and CALCAREOUS CLAYSTONE. Major lithologies: VOLCANICLASTIC BRECCIA, very dark greenish gray (5G 2/1) to greenish gray (5G 4/1), heterogenous assemblage of subangular to subrounded, heavily altered volcanic clasts, with average clast size approximately 1 cm. Maximum clast diameter is 3 cm. VOLCANIC SILTSTONE, very dark gray (2.5Y 3/0) to light gray (5Y 6/1), and greenish gray (5G 5/1) to greenish black (5GY 2/1), occurs in fining-upward sequences, frequently with convoluted- and cross-bedding,

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and planar- and cross- laminations.

planar-laminated, graded beds of VOLCANIC SANDSTONE, very dark

gray (2.5Y 3/0) to dark greenish gray

CLAYSTONE, black (2.5Y 3/0) to

greenish gray (5G 5/1), in heavily

bioturbated beds of very fine, altered,

This lithology overlies

(5G 4/1). CALCAREOUS

Minor lithology: None.

volcanic glass.

5Y 6/1

N3

5G 5/1

N2

5G 5/1



SIT	E 840 H	101	E	B CORE	6	1X		CORED 568.3 - 578.0 mbsf
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
mann		1		Î <sup>F</sup> ◊	111111		5G 6/1	VOLCANIC SANDSTONE, VOLCANIC SILTSTONE and NANNOFOSSIL CHALK.
12 milin				≡ , ≡ , f <sup>8</sup>	1111111		N2	Major lithologies: VOLCANIC SANDSTONE, greenish black (5GY 4/1) to grayish black (N2), in fining- upward intervals with sharp basal
The second second	HI.	2			111111111		N4 To N2	contacts, containing bioturbated intervals above cross- or planar- laminated intervals. Grain diameters are up to 1 mm. This lithology fines upward into VOLCANIC SILTSTONE,
Internet		3	ocene				58G 4/1	greenish gray (5G 2/1), with planar laminae, convoluted bedding, water escape structures and sparse bioturbation. This lithology fines upward and grades into strongly bioturbated NANNOFCOSSIL CHALK.
- manual and a second s		4	Upper Mi	二 当 本 手 彩 3 3 3 3 3 3 3 3 3 3 3 3 3	111111111		5G 5/1 To 5GY 5/1	light gray (2.5Y 7/0) to gray (2.5Y 5/0) Minor lithology: CALCAREOUS SILTSTONE occurs in Section 2, 0–5 cm. Concentrically-laminated nodules
Turturt		100		● ● ●	1111111111			occur in Section 4, 116 cm and Sectio 5, 92 cm.
minute		5		≣   3 ⊙ 20 ↑F	11111111		5BG 4/1	
multin		6		<u></u> лаа. лаа.	11111111			



X E SUMMARY (%):	SITE 840 HOLE B CORE 62X	CORED 578.0 - 587.7 mbsf	840B-62X 1 2	3 4 5	6 7
7,43 D	Graphic Lith. Survey Age Age Structure Structure Structure	Description	5		
100		N4 VOLCANIC SANDSTONE, VOLCANIC SILTSTONE, NANNOFOSSIL CHALK and VOLCANICLASTIC BRECCIA			
DN: 93 cite 97 Tr 1 Tr		5BG 4/1       SILTSTONE, NANNOFOSSIL CHALK and VOLCANICLASTIC BRECCIA         2.5Y       VOLCANIC SANDSTONE, very dark gray (2.5Y 3/0) to dark gray (N4), fining upward, plaan-laminated and cross-laminated intervals. Convoluted bedding occurs in Sections 4, 0–20 and 105–123 cm, and in Section 6, 89–97 cm. Cross bedding is present in Section 1, 34–38 cm, and in Section 4, 125 cm. This lithology grades up into planar-laminated VOLCANIC SILTSTONE, dark gray (N4). Thin to medium thick beds of heavily bioturbated NANNOFOSSIL CHALK, light gray (2.5Y 60) to gray (2.5Y 5/0) occur in Sections 6, 36–150 cm, and Section 7, 22–50 cm.         2.5Y       Minor lithology: None.         2.5Y       Si0         2.5Y       Si0			
					<b>3-6</b> -
			125-	TI LOT	
			ICC CONTRACTOR OF THE REAL OF	and the second s	And a second sec

135-8408-62X SMEAR SLIDE SUMM TEXTURE: Sand Clay COMPOSITION: Foldspar Glass Inorganic cakite Magnotile Pyroxene Ouantz

1076

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
11112					1111		2.5Y 2\0	VOLCANIC SILTSTONE, VOLCANIC SANDSTONE, SILTY CHALK WITH
manninn		1					2.5Y 6\0 To 2.5Y 4\0	FORAMS, NANNOFOSSIL CHALK and CALCAREOUS CLAYSTONE Major lithologies: VOLCANIC SILTSTONE, very dark gray (2.5Y 3/0) to gray (2.5Y 6/0), frequently planar- laminated, normally-graded and bioturbated. VOLCANIC
untrut		2	r Miocene		111111		2.5Y 4\0	SANDSTONE, black (2.5Y 2/0) to dark gray (2.5Y 4/0), frequently planar- laminated, normally-graded, with
muninini		3	Uppel			т	2.5Y 5\0 To 2.5Y 3\0	SILTY CHALK WITH FORAMS gray (2.5Y 5/0 to 2.5Y 6/0) grades with NANNOFOSSIL CHALK and CALCAREOUS CLAYSTONE. Minor lithology: VOLCANICLASTIC BRECCIA with subrounded clasts up to 1 cm across occurs in Section 1, 45–49 cm, and in Section 6, at
=		cc		= " } ↑F	1111		2.5Y 3\0	125–128 and 6–54 cm.



## WASHED 0.0-38.0 mbsf





2

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4

CC

SIT	E 840 H	101	E.	C CORE	Ξ 2	H	_	CORED 47.5 - 57.0 mbsf	840C-2H
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description	5-
0.511		1		+ E } + E } + E + E	1		2.5Y 4/2	VITRIC SILT, VITRIC SAND and VITRIC GRAVEL	10
								Major ittnoiogies: VI FIIC SiLT, dark grayish brown (2.55 ¥/2), occurs in Section CC at 3–14 and 21–28 cm. VITRIC SAND, dark grayish brown (2.55 ¥/2) occurs in Section 1, 16–44 cm. VITRIC GRAVEL, very dark grayish brown (2.5Y 3/2).	20
								Minor lithology: NANNOFOSSIL OOZE, light gray (5Y 7/1), occurs in Section 1, 44–52 cm, and in Section	35— — 40—

840C-2H	1	CC	127
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65—	4	-	-
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75-			
85-			
- 90-		_	_
- 85—		-	
100-			
105-		-	-
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115-		<u> </u>	
125-		_	_
			_
140-		-	-
145-		-	-
150-		T	-

.0 - 66.5 mbsf	840C-3H 1	2	3	4	5	6	CC	
ion	5-	eter o	12.			2.5		_
IC SILT WITH	10-01	- 680-	1.3				-	-
SAND WITH CESSORY	15-	-	-			-	-0	-
	20-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-	-10220-			20		-	-
INOFOSSIL LAY, light gray RSE-GRAINED	25-	-			E.		-	-
sh gray (5Y 6/1). t gray (5Y 7/1) to	30-		100					Ξ
ID ACCESSORY black (5G 2/1).	40-		5			_	_	_
C SILT, greenish	45-		5			_	_	_
ction 1, 0-9 cm.	50-					-	_	_
	55-	-				_	_	-
	60-	- 381-				-	-	-
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	145				3.1		_	
		1.1	1					

	1,45 D	2, 120 D	3,80 D
TEXTURE:	1.54		
Sand	15	2022	100
Silt	36	70	-
Clay	49	30	-
COMPOSITION:			
Accessory minerals	Tr	Tt	15
Aragonile	Tr	111	-
Clay	20	15	
Feldspar	1	Tr	20
Foraminiters	5	10	-
Glass	45	60	65
Nannolossils	29	15	-
Opaques	Tr		

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
21112111	44	1		22 m †F		s	5Y 7/1 To 5Y 6/1	NANNOFOSSIL VITRIC SILT WITH CLAY, VITRIC SAND, VITRIC GRAVEL and VITRIC SAND WITH FELDSPAR AND ACCESSORY
	-10-11 -14-01	2				s-	5Y 7/1 To 5Y 4/1	MINERALS. Major lithologies: NANNOFOSSIL VITRIC SILT WITH CLAY, light gray (SY 7/1), VERY COARSE-GRAINED VITRIC SAND, greenish gray (SY 6/1). VITRIC GRAVEL, light gray (SY 7/1) to dark gray ( (SY 4/1), VITRIC SAND WITH FELDSPAR AND ACCESSORY
Indudud		3	Upper Pliocene		wwwwwww	s		MINERALS, greenish black (5G 2/1). Minor lithology: VITRIC SILT, greenish gray (5GY 5/1), in Section 1, 0-9 cm.
multin		4			wwwww		5G 2/1	
Introduction		5			wwwwwww		51	
minn		6			wwww			

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WASHED 76.0-124.0 mbsf

135-840C-4H SMEAR SLIDE SUM	WARY (?	6):	
	2,95 D	4,110 D	5,73 D
TEXTURE:			
Sand	***	0	100
SRI	16	95	-
Clay	84	5	-
COMPOSITION:			
Accessory minerals	***	2	4
Clay	25	5	-
Feldspar	***	6	6
Foraminiters	10		-
Glass	6	87	90
Nannolossils	59		

135-840C-5H	A DM (MA)	SI	TE 840 H	IOL	.E	¢
SMEAN SLIDE SUM	1, 103 D	Meter	Graphic Lith.	Section	Age	
TEXTURE:				~	-	ł
Sand	0	13	XXXX			l
Sill	30	0.5				L
Clay	70	0.5		1		ŀ
COMPOSITION:		1.0	1.2			
Accessory minerals	Tr		-1:1-1			Ľ
Clay	15	1 -				ľ
Feldspar	1	1 -				l
Foraminilers	5					l
Glass	25	1-3			ĕ	Ł
Nannolossils	54		****	2	olioce	
		13			er	l

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
111121				F			5Y 2.5/1	PUMICEOUS GRAVEL, VITRIC SAND and VITRIC NANNOFOSSIL MIXED SEDIMENT WITH CLAY
1112111		1		*	i	s	N7	Major lithologies: PUMICEOUS GRAVEL, very dark gray (5Y 2/1) to
Innimitation		2	Jpper Pliocene	↓ F S	wwwwwww	1	5Y 4/1	gray (SY 5/1), VITRIC SAND, black (SY 2/0) to dark gray (SY 4/1), VITRIC NANNOFOSSIL MIXED SEDIMENT WITH CLAY, light gray (N7) to gray (N5). Minor lithology: None.
industriality of the second se		3		<b>↑</b> F	·		5Y 3/1	



135-840C-6H SMEAR SLIDE SUMMARY (%):

TEXTURE:	3, 90 D	4, 120 M
Sand	***	100
Sill	62	
Clay	38	***
COMPOSITION:		
Feldspar	1	2
Foraminitors	6	
Glass	55	98
Nannolossils	38	

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
männämtmutmutmutmutm		1 2 3	Lower Pliocene	<b>~</b> 3	WWWWWWWWWWWWWW	S	5Y 4/1 N8	PUMICEOUS GRAVEL, NANNOFOSSIL VITRIC MIXED SEDIMENT and VITRIC SAND Major lithology: Poorly sorted, matrix-supported, homogenous PUMICEOUS GRAVEL, dark gray (5Y 4/1), with angular to subangular pebbles up to 4 cm in diameter. NANNOFOSSIL VITRIC MIXED SEDIMENT, light gray (N7). VITRIC SAND, greenish gray (5GY 5/1). Minor lithology: None.
	īŀ	4		≣…∱	000		5Y 5/1	
	- #F			***	>	s	N7	



135-840C-7H SMEAR SLIDE SUMM	ARY (5	<b>6):</b>
	2,28 M	2,55 D
TEXTURE:		
Sand	5	15
Sill	90	54
Clay	5	31
COMPOSITION:		
Accessory minerals	1	Tr
Calcite		4
Clay	5	
Foldspar	2	1
Foraminifers	***	4
Glass	92	60
Nannolossils		31

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
The surger	Void	1		<sup>₩4</sup> ↑F	×		N4	PUMICEOUS GRAVEL, VITRIC SANE and NANNOFOSSIL VITRIC SILT Major lithologies: Poorly sorted PUMICEOUS GRAVEL, dark gray (5Y 4/1) to gray (5Y 5/1), with angular to
Transferring to the second		2		}		s s	5Y 4/1 To 5Y 7/1	subrounded clasts up to 2 cm in diameter. VITRIC SAND, light olive gray (5Y 6/1) to dark gray (5Y 4/1). NANNOFOSSIL VITRIC SILT, light gray (5Y 7/1 and N7) to gray (5Y 5/1) and medium gray (N5). Planar-isminated vitric sand common)
- hundred		3			00	1	N7	grades upward into motiled nannofossil vitric sit. Minor lithologies: VITRIC SILT, dark grav (N4), in Section 1, 19–34 cm, and
minini	Void	4		Ť,	0000000000		5Y 6/1	in Section 2, 67–82 cm, and dark grayish brown (10YR 4/2) in Section 2 26–30 cm. POLYMICT VOLCANIC GRAVEL, dark gray (N4), in Section 1 0–19 cm.
Jurunnunnun		5		≡ <sup>↑</sup> F			5Y 4/1 To 5Y 5/1	-
uhuhu		7	5.7					



Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
111191119111		1			wwwwww		5Y 4/1 To 5Y 3/1	PUMICEOUS GRAVEL AND VITRIC SAND Major lithologies: Normally-graded, medium to thickly bedded PUMICEOUS GRAVEL, very dark
Inni		Γ			www		5Y 6/1	gray (5Y 3/1) to dark gray (5Y 4/1), with clasts up to 5 cm in diameter. VITRIC SAND, light gray(5Y 6/1) is
and and	Void	2						very coarse-grained to fine-grained. The lower part of the core contains basalt clasts.
Indunt		3			00000		5Y 6/1	Minor lithology: None.
111111	Void	L	Pliocene					
11111		4	Lower	<b>Î</b> <sup>₽</sup>	000			
1111					00			
1111				Ĩ				
111		5		Ĵ <sup>™</sup>			5Y	
un				4 F 4 F			To 5Y	
dantanta		6		+ F			-4/1	
11111		7						



135-840C-9H		8	SIT	E 840 H	101	E	c cc
SMEAR SLIDE SUM	WOHY (%	):	5	Granhic	5		
	1, 102	1,120	te l	Lab	5	ğ	Structu
	M	M	Σ	LRn.	8	≪	0.0000000000000000000000000000000000000
TEXTURE:			H				
Sand	0	0	13				
Silt	34	70	0.5				
Clay	66	30	Ē		1		
COMPOSITION:			1.0				
Accessory minerals	Tr	2	1	-11	bo		m
Clay	20	29					
Feldspar	1	4					
Foraminitors	8	Tr					
Glass	25	65					
Nannolossils	46	Tr					

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
111SII		1		<b>↑</b> F			2.5Y 2/0 To 5Y 6/1	VITRIC SAND, CLAYEY VITRIC SILT and VITRIC NANNOFOSSIL MIXED SEDIMENT WITH CLAY
2011	-r-f	CC		<u></u> "		s s	5GY 4/1	Major lithologies: VITRIC SAND, black (2.5Y 2/0), fining upward from very
								coarse- to fine-grained sand. CLAYEY VITRIC SILT, dark greenish gray (5G 4/1 to 4GY 4/1), in Section 1, 5–13 and 113–128 cm, and in Section CC, 0–11 cm, VITRIC NANNOFOSSIL MIXED SEDIMENT WITH CLAY, gray (5Y 6/1), in Section 1, 0–5 and 100–113 cm.
								Minor lithology: None.

840C-9H   1	CC	
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135-840C-10H SMEAR SLIDE SUMMARY (%): 1,54 M TEXTURE: Sand ..... 40 60 Sill Clay COMPOSITION: Accessory minerals 10 Clay T Feldspar Tr Foraminitors Tr 30 60 Glass Nannolossils





Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description	0
119111		1		<b>↑</b> F	www		N6 To N5	COARSE VITRIC SAND and PUMICEOUS GRAVEL	
191		20		<u> </u>	×	6719 23	5YH 4/1	General Description: Entire core highly disturbed by drilling and handling procedures. Sedimentary structures, grain fabric, and texture destroyed or altered. Major lithologies: COARSE VITRIC SAND, medium light gray (N6), poorly-sorted, with subangular grains. Ungraded PUMICEOUS GRAVEL, medium gray (N5), with rounded grains. Minor lithology: VERY COARSE VITRIC SAND WITH PUMICE PEBBLES, brownish gray (5YR 4/1), with subrounded volcaniclastic grains and large (up to 4 cm diameter) purrice pebbles.	



SITE 840	HO	LE	C COR	E 1	2H		CORED 190.5 - 200.0 mbsf	840C-12H 1	2	3
ğ Graphi ₩ Lith.	Section	Age	Structure	Disturb	Sample	Color	Description	5		
	1		- +* •	N W N		5Y 4/1	VERY COARSE VITRIC SAND and VERY COARSE PUMICEOUS SAND	10		
	1	locene	<u>†</u> <sup>₽</sup>	www		N5	General Description: Entire core highly disturbed by drilling and handling	20	100	
1	L	per M		ww		_	procedures. Sedimentary structures, grain fabric, and texture destroyed or	25-0-		
1		dU- e		~~~		5Y	altered.	30-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-		
	2	liocen	~	~~~		4/1	VITRIC SAND, medium dark gray	35-	1837	
		wer P	^ ^	ww		N3	light-colored (pumiceous), dark	40		
	3	Ľ	- X	222		To N4	angular olivine grains. Occurs in Section 1, 0–13 cm, Section 2,	45		
	-		×	Š			112–150 cm, Section 3, 0–20 cm and in Section CC. VERY COARSE	50-		
							PUMICEOUS SAND, medium gray (N5), with subrounded light (pumice	55		
							grains) and few dark volcaniclastic grains. Occurs in from Section 1, 60	60-		
							cm, through Section 2, 112 cm.	65-		
							gray (5Y 4/1), firm, structureless.	70		
							VITRIC NANNOFOSSIL OOZE, very light gray (N8), firm, structureless,	75		
							Occurs in Section 1, 13–25 cm. VERY COARSE VITRIC SAND WITH	80		
							PUMICE, medium dark gray (N4) is similar to the pumiceous sand of the			
							major lithology but with more pumice pebbles. Occurs in Section 3, 20-81	90-		-
	-	_		_			cm.		1257	

WASHED 200.0-250.0 mbsf



Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
manigun				0.5	00 0WWW		N2	VERY COARSE VITRIC SAND and COARSE VITRIC SAND
	Void	1		~ 3				General Description: Entire core highly disturbed by drilling and handling procedures. Sedimentary structures,
	7.XXXXX						N2	grain fabric, and texture destroyed or altered.
1111111	Void	d 2 eueoo				Major lithologies: VERY COARSE VITRIC SAND, GRAYISH BLACK (N2), with subrounded to angular, dark volcanicidatic and vitric silictone grains		
II			Upper M		000		N3	and isolated, peoble-sized purnice clasts. Occurs in Section 1, 0-60 cm and in Section 2. COARSE VITRIC
mhadminiteriteriteriterite	Void	3	ver Pliocene -					SAND, dark gray (N2) to grayish black (N3), with subrounded, poorly-sorted light-colored (pumice) and dark volcaniclastic grains. Occurs in Section 1, 60–77 cm and from Section 3, 0 cm,
			Po					to Section CC, 16 cm.
		4 5		\$			N2 To N3	Minor lithology: Large clast in Section 1, 29 cm, is a bioturbated CALCAREOUS VITRIC SILTSTON Other clasts are black, planar-laminated VITRIC SANDSTONE with well-sorted, subrounded grains.

