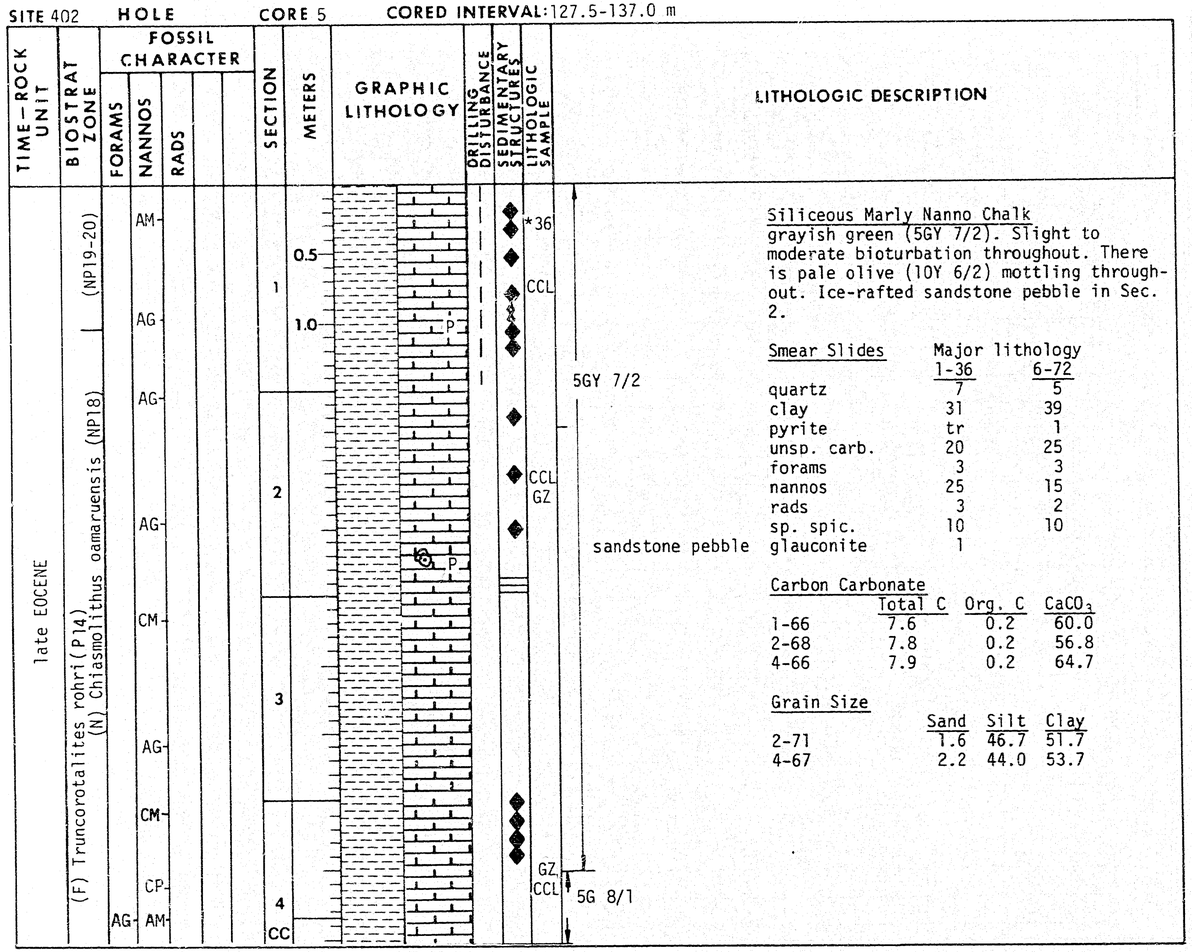
SITE 402 HOLE CORE 5 CORED INTERVAL:127.5-137.0 m



LITHOLOGIC DESCRIPTION

Siliceous Marly Nanno Chalk
grayish green (5GY 7/2). Slight to moderate bioturbation throughout. There is pale olive (10Y 6/2) mottling throughout. Ice-rafted sandstone pebble in Sec. 2.

Smear Slides	Major lithology 1-36	6-72
quartz	7	5
clay	31	39
pyrite	tr	1
unsp. carb.	20	25
forams	3	3
nannos	25	15
rads	3	2
sp. spic.	10	10
glauconite	1	

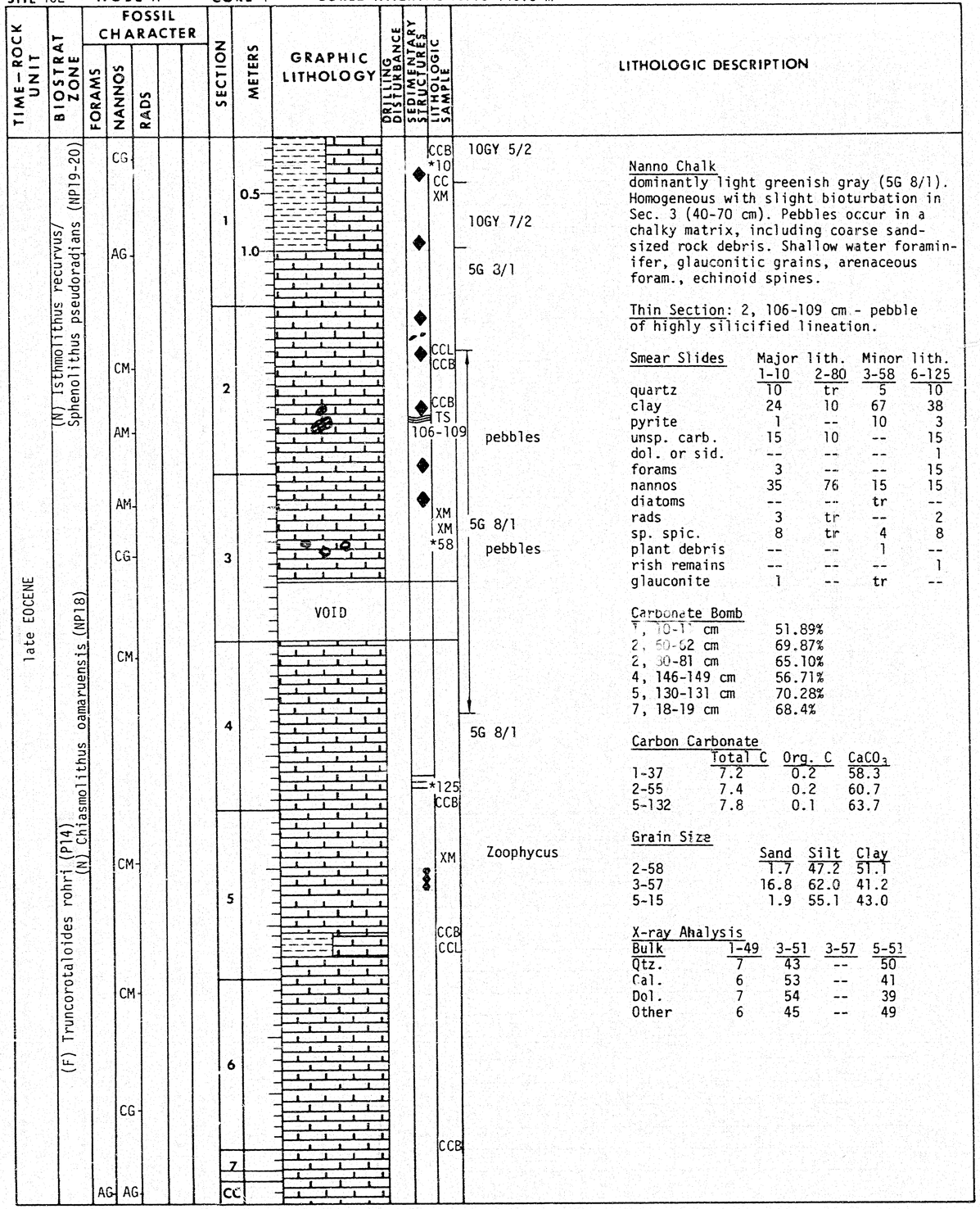
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-66	7.6	0.2	60.0
2-68	7.8	0.2	56.8
4-66	7.9	0.2	64.7

Grain Size

	Sand	Silt	Clay
2-71	1.6	46.7	51.7
4-67	2.2	44.0	53.7

SITE 402 HOLE A CORE 1 CORED INTERVAL:137.0-146.5 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
dominantly light greenish gray (5G 8/1). Homogeneous with slight bioturbation in Sec. 3 (40-70 cm). Pebbles occur in a chalky matrix, including coarse sand-sized rock debris. Shallow water foraminifer, glauconitic grains, arenaceous foram., echinoid spines.

Thin Section: 2, 106-109 cm - pebble of highly silicified lineation.

Smear Slides	Major lith. 1-10	2-80	Minor lith. 3-58	6-125
quartz	10	tr	5	10
clay	24	10	67	38
pyrite	1	--	10	3
unsp. carb.	15	10	--	15
dol. or sid.	--	--	--	1
forams	3	--	--	15
nannos	35	76	15	15
diatoms	--	--	tr	--
rads	3	tr	--	2
sp. spic.	8	tr	4	8
plant debris	--	--	1	--
rish remains	--	--	--	1
glauconite	1	--	tr	--

Carbonate Bomb

1, 10-11 cm	51.89%
2, 50-62 cm	69.87%
2, 80-81 cm	65.10%
4, 146-149 cm	56.71%
5, 130-131 cm	70.28%
7, 18-19 cm	68.4%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-37	7.2	0.2	58.3
2-55	7.4	0.2	60.7
5-132	7.8	0.1	63.7

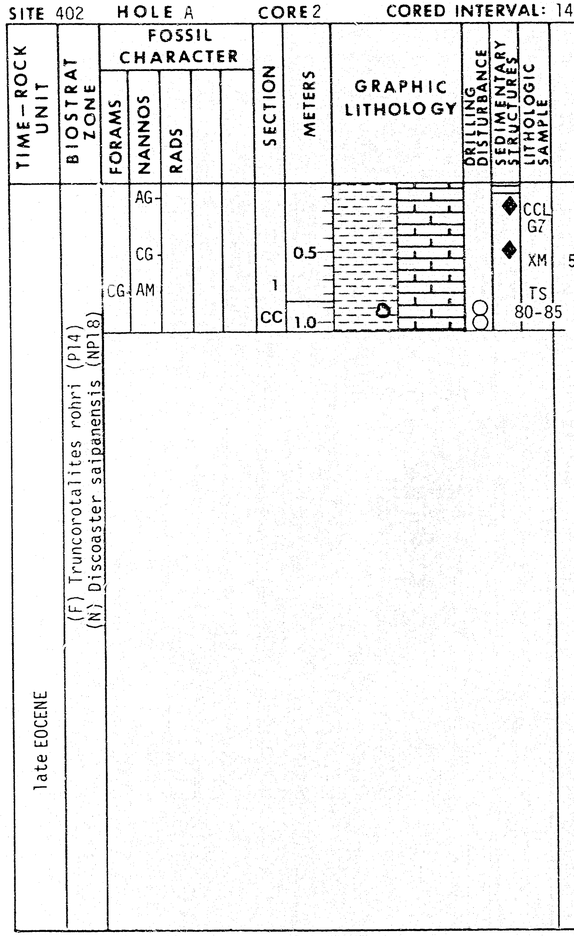
Grain Size

	Sand	Silt	Clay
2-58	1.7	47.2	51.1
3-57	16.8	62.0	41.2
5-15	1.9	55.1	43.0

X-ray Ahalysis

Bulk	1-49	3-51	3-57	5-51
Qtz.	7	43	--	50
Cal.	6	53	--	41
Dol.	7	54	--	39
Other	6	45	--	49

SITE 402 HOLE A CORE 2 CORED INTERVAL: 146.5-156.0 m



Marly Nanno Chalk
light greenish gray (5G 8/1). Mottling throughout. A sandy layer occurs in the top 10 cm, and a limestone pebble at bottom.

Thin Section: 1, 80-85 cm - siliceous limestone. Spone spicules, benthonic foraminifers and glauconite bearing; of upper Albian age and shallow water facies.

Smear Slides

	1-40 Major lithology
quartz	tr
clay	5
unsp. carb.	10
forams	tr
nannos	80
diatoms	tr
rads	tr
sp. spic.	5

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-26	7.3	0.1	59.9

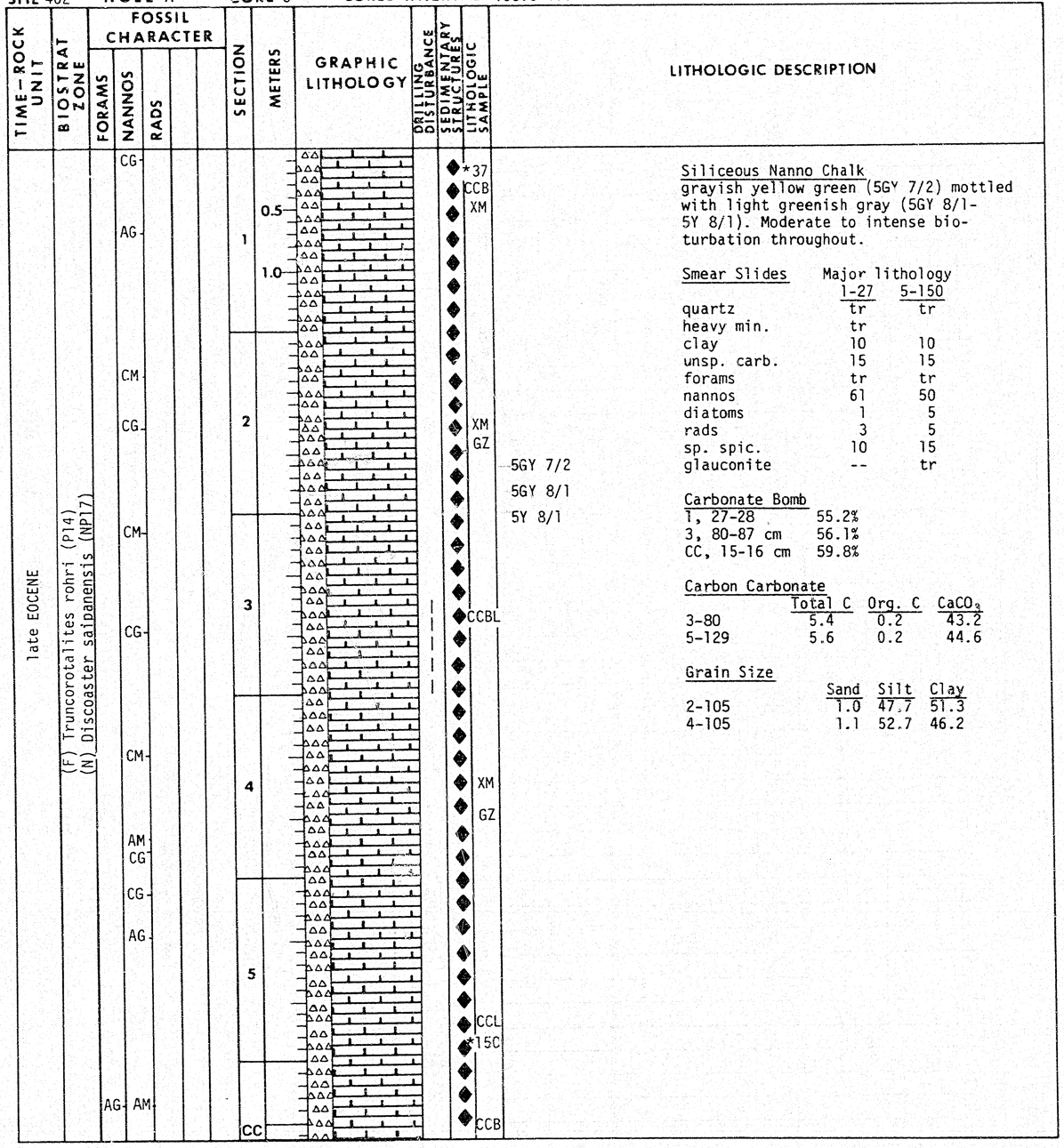
Grain Size

	Sand	Silt	Clay
1-30	1.5	47.8	50.8

X-ray Analysis

Bulk	1-61
Qtz.	7
Cal.	54
Dol.	--
Other	39

SITE 402 HOLE A CORE 3 CORED INTERVAL: 156.0-165.5 m



Siliceous Nanno Chalk
grayish yellow green (5GY 7/2) mottled with light greenish gray (5GY 8/1-5Y 8/1). Moderate to intense bioturbation throughout.

Smear Slides

	Major lithology 1-27	5-150
quartz	tr	tr
heavy min.	tr	
clay	10	10
unsp. carb.	15	15
forams	tr	tr
nannos	61	50
diatoms	1	5
rads	3	5
sp. spic.	10	15
glauconite	--	tr

Carbonate Bomb

1, 27-28	55.2%
3, 80-87 cm	56.1%
CC, 15-16 cm	59.8%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-80	5.4	0.2	43.2
5-129	5.6	0.2	44.6

Grain Size

	Sand	Silt	Clay
2-105	1.0	47.7	51.3
4-105	1.1	52.7	46.2

SITE 402 HOLE A CORE 4 CORED INTERVAL: 165.5-175.0 m

TIME-ROCK UNIT: late Eocene
BIOSTRAT ZONE: (F) Orbulinoides beckmanni (P13) (F) Truncorotalites rohri (P14) (N) Discoaster saipanensis (NP17)
FOSSIL CHARACTER: FORAMS CG CG AG CG CG AG CG AM; NANNOS CG AG CG CG AG AM; RADS
SECTION: 1 2 3 CC
METERS: 0.5 1.0
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: CCL TS60 *106 CCB CCB CCL XM XM CCB

5GY 7/2 pebbles 10GY 7/2 5GY 6/1 pebbles 10GY 7/2

LITHOLOGIC DESCRIPTION

Siliceous Marly Nanno Chalk
Siliceous Nanno Chalk
pale yellowish green (10GY 7/2) and light greenish gray (5GY 6/1). Slight bioturbation in upper part. Pebbles in Sec. 1 and Sec. 3 include breccia and glauconitic limestone.

Smear Slides	Major lithology 1-106	2-70
quartz	10	tr
clay	36	5
pyrite	1	--
unsp. carb.	20	5
nannos	15	67
diatoms	--	5
rads	3	3
sp. spic.	15	15
plant debris	--	tr
glauconite	--	tr

Carbonate Bomb

1, 106-107 cm	45.28%
2, 70-71 cm	45.28%
6, 10-11 cm	66.27%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-20	6.0	0.2	48.7
2-130	4.0	0.2	31.3

Grain Size

	Sand	Silt	Clay
1-16	0.9	49.2	49.9
2-133	2.3	65.2	52.5

X-ray Analysis

Bulk	2-130	3-57
Qtz.	11	8
Cal.	33	37
Dol.	--	--
Other	56	59

SITE 402 HOLE A CORE 5 CORED INTERVAL: 175.0-184.5 m

TIME-ROCK UNIT: upper ALBIAN to VRACONIAN
BIOSTRAT ZONE: (M) upper Albian Parhabdolithus angustus?
FOSSIL CHARACTER: FORAMS RG RG RG RG; NANNOS; RADS; microfacies
SECTION: 1 3
METERS: 0.5 1.0
GRAPHIC LITHOLOGY: VOID
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: TS 21-25 TS 34-37 TS 54-59 TS95 -101

5GY 6/1 N3 5Y 6/1 N3

LITHOLOGIC DESCRIPTION

Siliceous Limestone
light olive gray (5Y 6/1).

Thin Section:
1, 21-25 cm - varicolor bioclastic limestone with few small grains of quartz and glauconite - micritic to microsparitic cement. Bioclasts include mainly echinoidea fragments.

1, 34-37 cm - as above, bioclast including algae.

1, 54-59 cm - silicified limestone containing numerous large sponge spicules and few quartz and glauconite grains.

1, 99-101 cm - same facies exhibiting an echinoid spine.

X-ray Analysis

	1-111	2-8
Qtz.	9	6
Cal.	35	35
Others	56	59

SITE 402 HOLE A CORE 6 CORED INTERVAL: 184.5-194.0 m

TIME-ROCK UNIT: upper ALBIAN to VRACONIAN
BIOSTRAT ZONE: (M) upper Albian
FOSSIL CHARACTER: FORAMS; NANNOS; RADS; microfacies
SECTION: 1
METERS: 0.5
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: *10 TS *40 XM

5Y 6/1

LITHOLOGIC DESCRIPTION

Limestone
olive gray (5Y 6/1) to yellowish gray (5Y 8/1) with dark gray mottling (N3). generally micritic with numerous Pithonella ovalis and calcisphspaerula.

Smear Slides	Major lithology 1-10	1-40
quartz	3	tr
clay	51	20
zeolite	3	5
unsp. carb.	30	30
dol. or sid.	--	24
forams	tr	15
nannos	tr	--
rads	--	3
sp. spic.	--	3
glauconite	1	--
authigenic silica	10	--

X-ray Analysis

Bulk	1-43
Qtz.	1
Cal.	79
Dol.	
Other	20

SITE 402 HOLE A CORE 7 CORED INTERVAL: 194.0-203.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	microfacies	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
upper ALBIAN	(M) upper Albian				3							Limestone greenish gray (5GY 6/1) with dark green (5GY 4/1) streaks to dark gray (N3) with olive gray mottles.

SITE 402 HOLE A CORE 8 CORED INTERVAL: 203.5-213.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	microfacies	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
upper ALBIAN	(M) Albian				3 1 3		0.5				*26	5GY 4/1 light olive gray (5Y 6/1) streaks Calcareous Claystone greenish gray (5GY 6/1) with streaks of light olive gray (5Y 6/1). Variable hardness related to silica content.

Smear Slides	Major lithology 1-26
Quartz	3
clay	62
glauconite	tr
carb. unspec.	25
authigenic silica	10
nannos	tr
rads	tr
plant debris	tr

SITE 402 HOLE A CORE 9 CORED INTERVAL: 213.0-222.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	microfacies	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
upper ALBIAN	(M) Albian				3 1 1 3 3	1	0.5				*12	5GY 4/1 Calcareous Claystone dark greenish gray (5GY 4/1) with mottles of light olive gray (5Y 6/1).

Smear Slides	Minor lithology 1-12
quartz	tr
clay	13
unspec. carb.	70
dolomite	10
rads	5
sp. spic.	tr
plant debris	tr

SITE 402 HOLE A CORE 10 CORED INTERVAL: 222.5-232.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	microfacies	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
upper ALBIAN	(M) Albian				1 3 3 3	1	0.5 1.0					5Y 2/1 Siliceous Claystone olive black (5Y 2/1) with olive gray (5Y 6/1) mottles 2-3 mm thick, 1 cm long. Slightly calcareous, glauconitic, micaceous. Variable hardness.

SITE 402 HOLE A CORE 11 CORED INTERVAL: 232.0-241.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
upper ALBIAN	(N) Parhabdolithus angustus		FG CG FG CG FG RM CG RP	RG	1 2 3 4	0.5 1.0				CCL *20 GZ CCB *83 CCB CCB *43 CCB *132 CCB CCL GZ	5Y 4/1 pelecypod shells 5Y 2/1 mollusk shell 10GY 5/2 Zoophycus Halo burrow 5Y 2/1 Carbonaceous Marly Limestone Limestone Calcareous Mudstone Mudstone and limestone are olive gray (5Y 4/1); carbonaceous limestone is olive black (5Y 2/1). Thin lamination in Sec. 2 (0-20), occasional clean silt laminae below; Zoophycus and halo burrows; occasional mollusk shells.

Smear Slides	Major lith. 1-20	Major lith. 1-83	Minor lith. 3-43	Minor lith. 3-132
quartz	10	20	tr	15
mica	--	--	3	2
clay	73	58	54	37
zeolite	2	1	3	10
unsp. carb.	5	15	tr	20
dol. or sid.			2	5
forams	tr			
nannos	3	3	3	3
sp. spic.	5	4	tr	--
plant debris	2	3	3	7

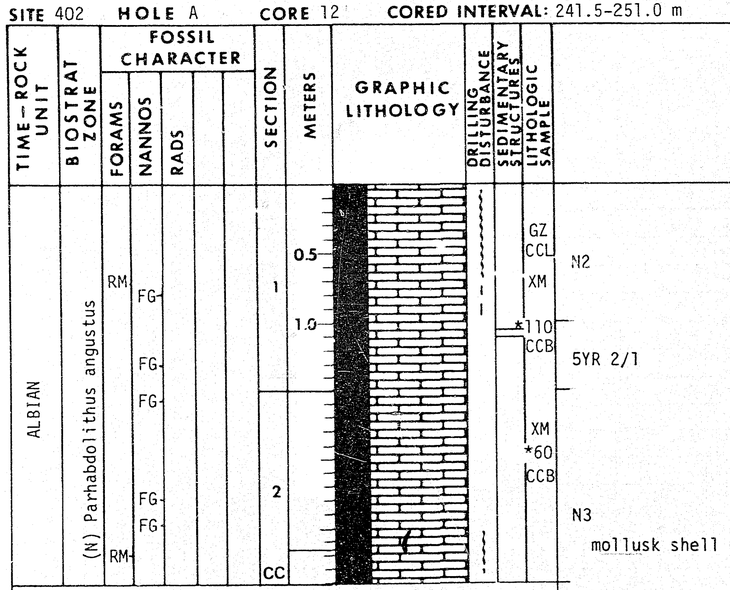
Carbonate Bomb	
1, 76-77 cm	35.24%
2, 110-111 cm	38.1%
3, 123-124 cm	33.33%
4, 68-69 cm	40.95%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-5	4.9	0.9	27.4
4-79	5.0	0.9	33.4

Grain Size	Sand	Silt	Clay
2-49	7.9	54.5	37.7
4-95	34.5	43.0	22.6

X-ray Analysis Bulk	1-41	3-91	4-57
Qtz.	5	17	78
Calc.	19	14	67
Dol.			
Other	13	19	66

SITE 402 HOLE A CORE 12 CORED INTERVAL: 241.5-251.0 m



N2

5YR 2/1

N3

mollusk shell

Carbonaceous Marly Limestone
medium dark gray (N4) to dark gray (N2). Same evidence of slight laminations, otherwise honogemeous and well indurated.

Smear Slides	Major lith. 2-60	Minor lith. 1-110
quartz	15	10
mica		1
heavy min.		1
clay	50	47
pyrite		1
zeolite		3
unsp. carb.	30	20
dol. or sid.		3
nannos	tr	5
sp. spic.		3
plant debris	5	2
glauconite		3
cristobalite?	--	1

Carbonate Bomb

1, 110-111 cm	42.86%
2, 70-71 cm	44.76%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-39	5.0	0.9	34.4

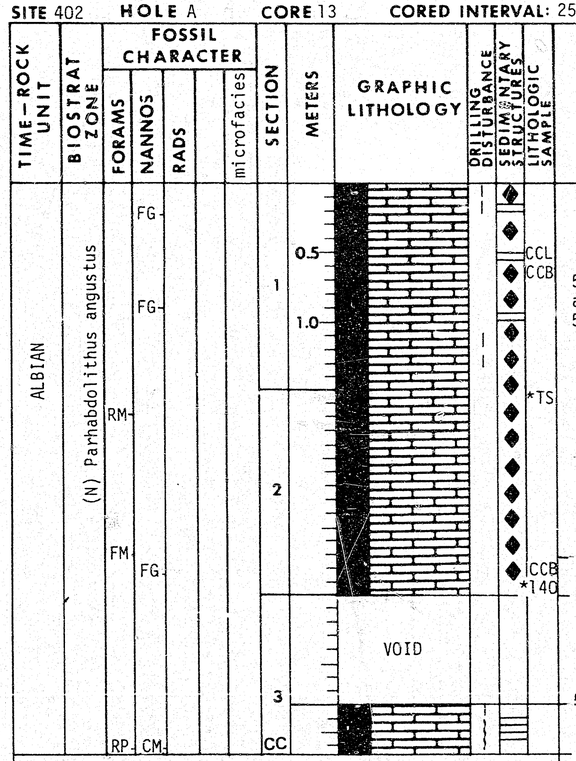
Grain Size

	Sand	Silt	Clay
1-38	15.4	54.9	29.7

X-ray Analysis

Bulk	1-75	2-45
Qtz.	11	9
Cal.	21	23
Dol.	--	--
Other	68	68

SITE 402 HOLE A CORE 13 CORED INTERVAL: 251.0-260.5 m



5Y 2/1 and 5Y 4/1

gritty softer layer

5Y 2/1

Carbonaceous Marly Limestone
olive gray (5Y 4/1) and olive black (5Y 2/1) with slight to moderate bioturbation throughout. Mottles are lighter colored than main shades: commonly light olive gray (5Y 6/1). 2-3 mm thick laminae dip of 15-20° in top of the core, these are due to textural sorting or could be flattened burrows.

Smear Slides	2-140 Major lithology
quartz	10
clay	63
zeolite	tr
unsp. carb.	25
nannos	tr
sp. spic.	tr
plant debris	2

Carbonate Bomb

1, 60-61 cm	52.38%
2, 140-141 cm	52.38%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-59	6.5	0.5	50

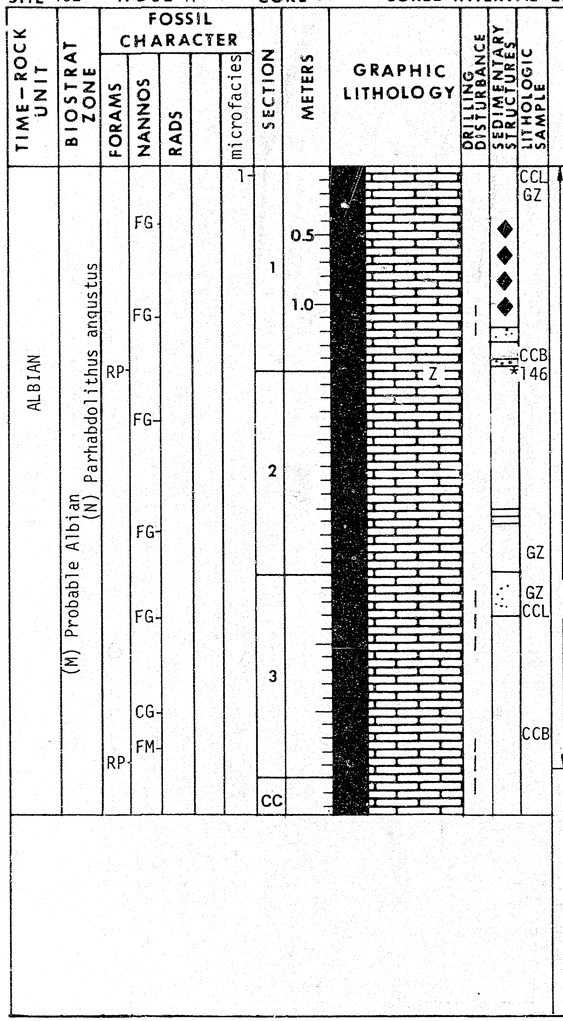
Grain Size

	Sand	Silt	Clay
2-74	32.1	36.8	33.1

X-ray Analysis

Bulk	1-16	3-9
Qtz.	6	6
Cal.	28	27
Dol.		
Other	66	67

SITE 402 HOLE A CORE 14 CORED INTERVAL: 260.5-270.0 m



LITHOLOGIC DESCRIPTION

Carbonaceous Marly Limestone
olive black (5Y 2/1) to olive gray (5Y 4/1). Some mottling in the upper part and few soft "gritty" layers (5 cm thick). Occasional well defined laminae, olive gray (5Y 4/1) Sec. 2, 110 to 120 cm.

Smear Slides

	1-146	Minor lithology
quartz	10	
mica	3	
clay	37	
zeolite	10	
unsp. carb.	15	
dol. or sid.	5	
nannos	5	
sp. spic.	5	
plant debris	5	
glauconite	5	

Carbonate Bomb

1, 166-167 cm	38.57%
3, 120-121 cm	38.57%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-9	4.6	0.9	37.1
3-36	3.5	0.9	31.6

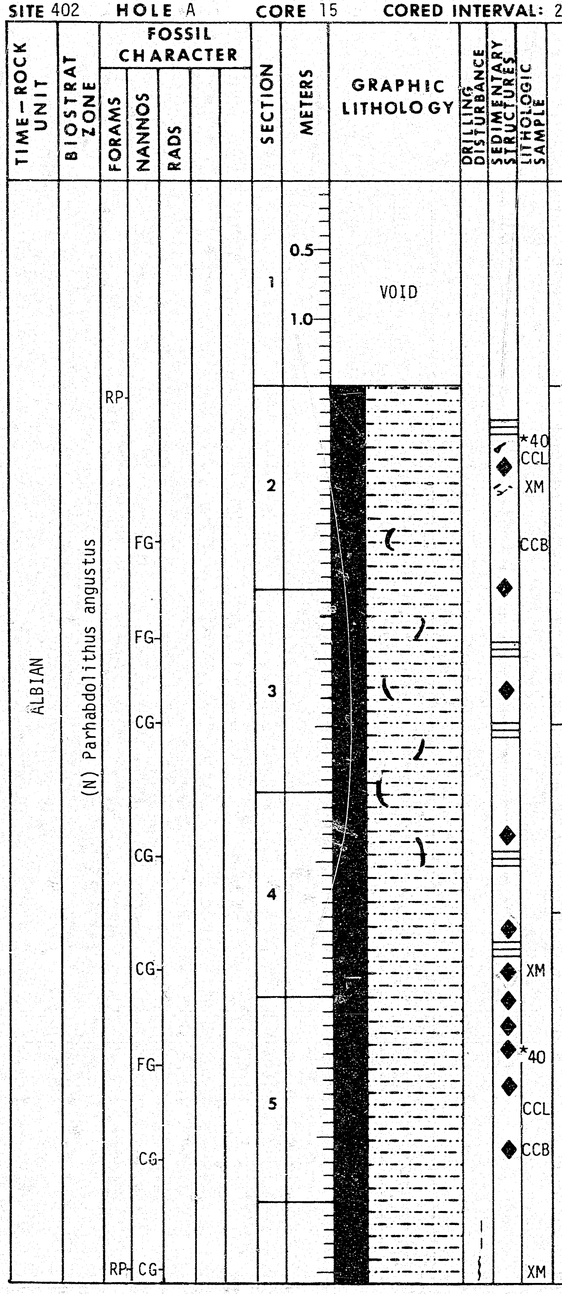
Grain Size

	Sand	Silt	Clay
2-20	17.0	64.9	38.1
2-142	17.9	48.7	33.4
3-20	10.9	47.6	41.5

X-ray Analysis

Bulk	1-62	3-42
Qtz.	8	16
Cal.	21	15
Dol.		
Other	71	69

SITE 402 HOLE A CORE 15 CORED INTERVAL: 270.0-279.5 m



LITHOLOGIC DESCRIPTION

frozen organic geochemistry sample

Carbonaceous Calcareous Mudstone
olive gray (5Y 4/1) to olive black (5Y 2/1). Slight to moderate bioturbation throughout. Well developed laminae in Sec. 3 and 4. Some scattered mollusk shells and solitary corals.

mollusk and coral remains.

Smear Slides	Major lithology 1-40	5-40
quartz	15	15
mica	2	2
clay	44	44
zeolite	3	3
unsp. carb.	20	20
nannos	5	5
rads	3	3
sp. spic.	2	2
plant debris	2	2
cristobalite	3	3
glauconite	1	1

Carbonate Bomb

2, 120-121 cm	33.33%
5, 120-121 cm	33.33%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-41	3.5	0.9	22.2
5-79	4.5	1.1	28.0

X-ray Analysis

Bulk	2-88	4-137	6-58
Qtz.	15	13	12
Cal.	15	12	14
Dol.			
Other	70	75	74

SITE 402 HOLE A CORE 16 CORED INTERVAL: 279.5-289.0 m

TIME-ROCK UNIT: ALBIAN
BIOSTRAT ZONE: (M) Probable Albian (N) Parhabdolithus angustus
FOSSIL CHARACTER: FORAMS RM RP; NANNOS FG CG FG CM CM; RADS; microfacies
SECTION: 1 1 2 CC
METERS: 0.5 1.0
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: GZ CCL XM 18-1 18-2 XM G CCB

5Y 2/1
5Y 4/1
5YR 2/1
5YR 2/1 + 5Y 4/2
5Y 2/1
5Y 4/1
5Y 6/1
5YR 2/1

Marly Calcareous Chalk
olive gray (5Y 4/1)
interbedded with
Carbonaceous Marly Limestone
olive black (5Y 2/1) to brownish black (5YR 2/1).

Marly cabonaceous chalk characterized by the occurrence of laminating and slight mottling. Occasional gastropod shells in Sec. 2.

Smear Slides	Minor lithology 2-18-1	2-18-2
quartz	10	10
mica	3	2
heavy min.	tr	--
clay	41	58
unsp. carb.	40	25
dol. or sid.	tr	tr
nannos	tr	1
plant debris	tr	4
apatite	tr	tr

Carbonate Bomb
2-110 36.4%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-117	3.9	1	24.8

Grain Size	Sand	Silt	Clay
2-61	1.0	51.1	47.9

X-ray Analysis Bulk	1-121	2-40
Qtz.	17	16
Cal.	11	7
Dol.		
Other	72	77

SITE 402 HOLE A CORE 17 CORED INTERVAL: 289.0-298.5 m

TIME-ROCK UNIT: ALBIAN
BIOSTRAT ZONE: (N) Parhabdolithus angustus
FOSSIL CHARACTER: FORAMS RM FP; NANNOS CM CM CM CM CM; RADS
SECTION: 1 2 CC
METERS: 0.5 1.0
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: GZ CCL XM XM CCB *145

N2
5Y 6/1

Carbonaceous Calcareous Mudstone and Carbonaceous Marly Limestone
light olive gray (5Y 6/1) to grayish black (N1). Dominantly homogeneous, with scattered layers of olive gray (5Y 4/1). Moderately biotu.bated throughout except for fine lamination at core bottom. Scattered fragments of mullusk shells.

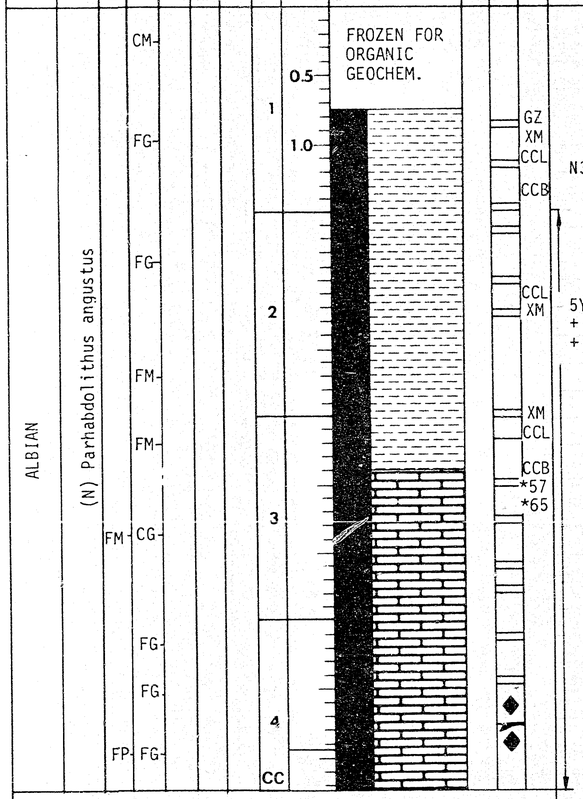
Smear Slides	2-145 Major lithology
quartz	10
mica	1
clay	39
pyrite	tr
zeolite	3
unsp. carb.	30
nannos	10
sp. spic.	3
plant debris	3
glauconite	1

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-89	3.4	1.6	14.4

Grain Size	Sand	Silt	Clay
1-78	3.7	44.1	52.1

X-ray Analysis Bulk	1-80	2-75
Qtz.	13	11
Cal.	13	17
Dol.		
Other	74	72

SITE 402 HOLE A CORE 18 CORED INTERVAL: 298.5-308.0 m



N3 to N2

5Y 4/1 + 5Y 2/1 + N2

Carbonaceous Marly Limestone and Carbonaceous Calcareous Mudstone olive gray (5Y 4/1) to dark gray (N3). Lamination throughout due to textural variation. Flaser structure in 2-130; some bioturbation near base.

Smear Slides	Major lithology 3-65	3-57
quartz	15	19
mica	2	2
heavy min.	1	0
clay	32	15
pyrite	0	1
zeolite	5	8
unsp. carb.	30	40
dol. or sid.	2	3
nannos	5	2
rads	0	3
sp. spic.	3	5
plant debris	5	3
glauconite	0	1

Carbonate Bomb

1-140	2.70%
3-57	37.3%
3-65	36.7%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-106	4.1	1.5	20.9
2-64	4.7	1.1	30.2
3-6	5.1	1.7	28.4

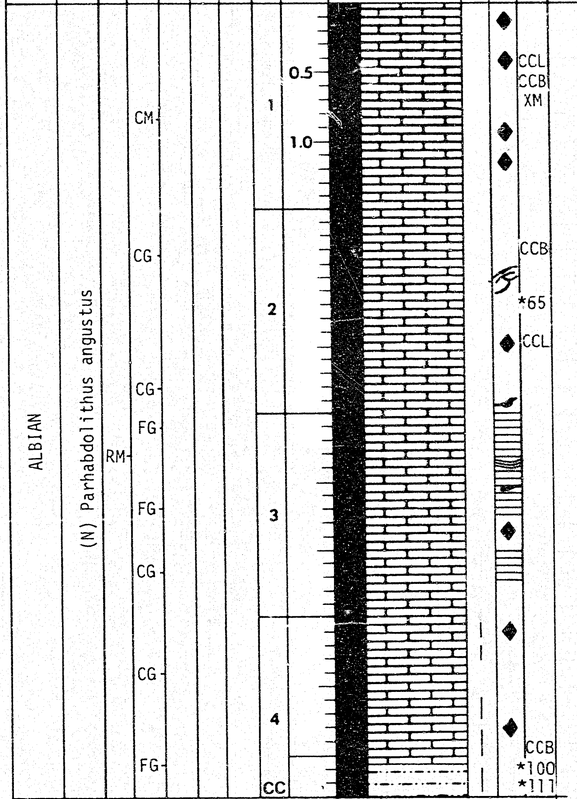
Grain Size

	Sand	Silt	Clay
1-62	2.0	41.2	56.8

X-ray Analysis

Bulk	1-91	2-73	3-36
Qtz.	15	15	16
Cal.	11	11	14
Dol.	--	--	--
Other	74	74	70

SITE 402 HOLE A CORE 19 CORED INTERVAL: 308.0-317.0 m (9.0 m)



Carbonaceous Marly Limestone exhibiting rythmic alternations of olive gray (5Y 4/1) olive black (5Y 2/1) and brownish black (5YR 2/1). Slight bioturbation evident throughout. Fine load casts and ripple(?). Drilled 9.0 meters core then drilled 0.5 meters for inclination test.

Smear Slides	Major lith. 2-65	Minor lith. 4-100	4-111
quartz	8	3	15
feldspar	tr		
mica	2	--	2
heavy min.	tr	--	--
clay	51	15	45
zeolite			5
unsp. carb.	30	82	18
dol. or sid.	1		5
nannos	5		tr
sp. spic.	tr	tr	
plant debris	3	tr	2
glauconite			3

Carbonate Bomb

1-65	30.7%
2-27	42.8%
4-80	38.1%

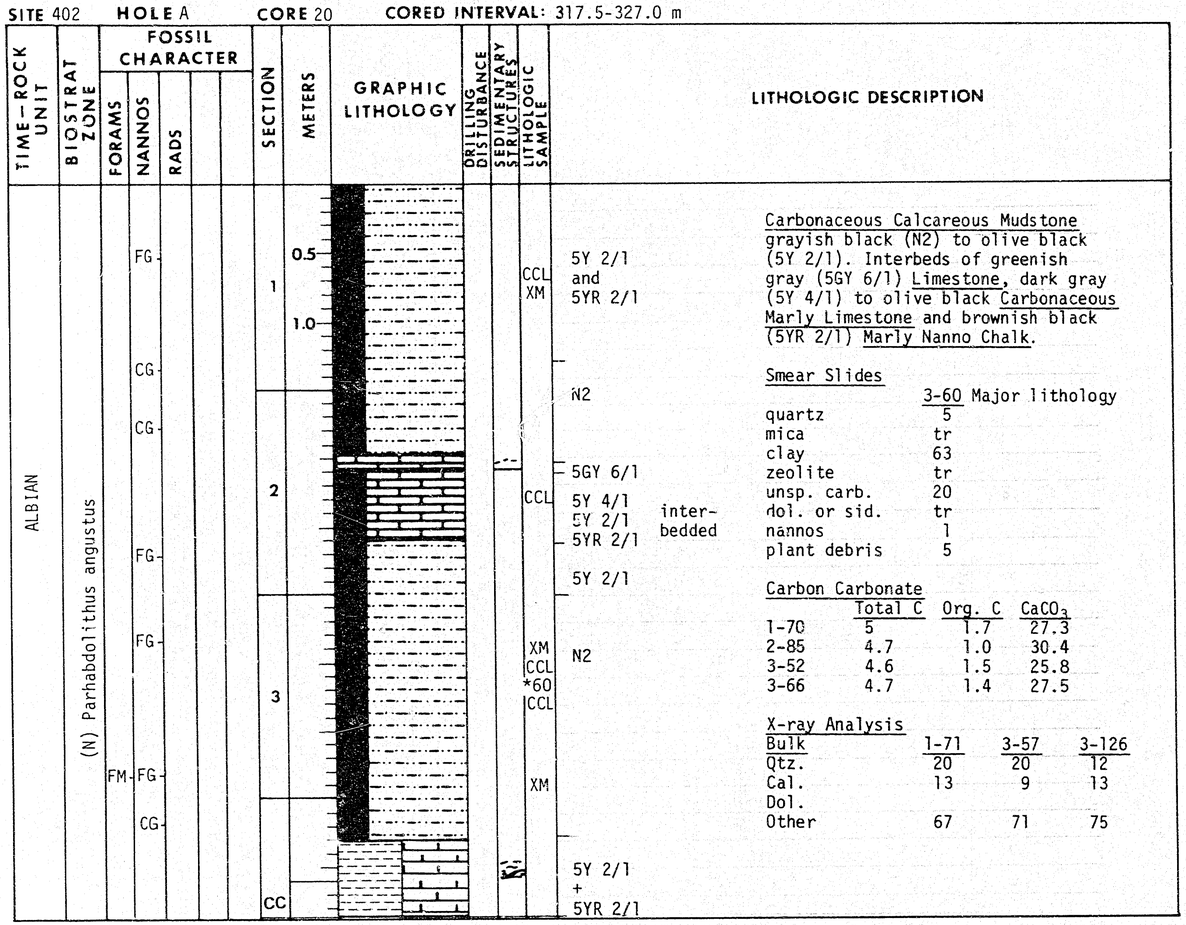
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-63	5.3	1.4	33
2-109	4.7	1.0	30.9

X-ray Analysis

Bulk	1-79	4-106
Qtz.	11	2
Cal.	14	0
Dol.		
Other	75	98

SITE 402 HOLE A CORE 20 CORED INTERVAL: 317.5-327.0 m



LITHOLOGIC DESCRIPTION

Carbonaceous Calcareous Mudstone grayish black (N2) to olive black (5Y 2/1). Interbeds of greenish gray (5GY 6/1) Limestone, dark gray (5Y 4/1) to olive black Carbonaceous Marly Limestone and brownish black (5YR 2/1) Marly Nanno Chalk.

Smear Slides

	3-60 Major lithology
quartz	5
mica	tr
clay	63
zeolite	tr
unsp. carb.	20
dol. or sid.	tr
nannos	1
plant debris	5

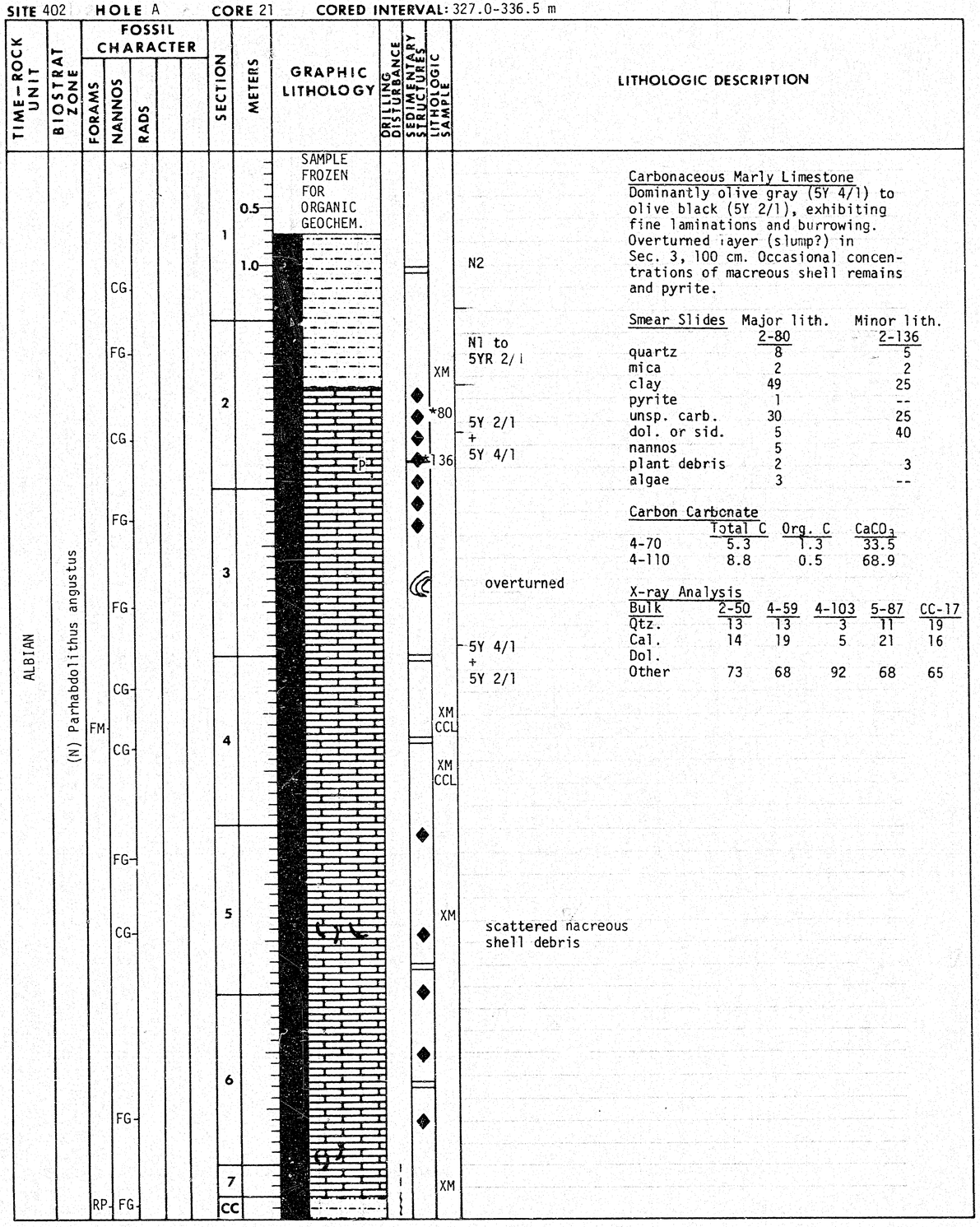
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-70	5	1.7	27.3
2-85	4.7	1.0	30.4
3-52	4.6	1.5	25.8
3-66	4.7	1.4	27.5

X-ray Analysis

Bulk	1-71	3-57	3-126
Qtz.	20	20	12
Cal.	13	9	13
Dol.			
Other	67	71	75

SITE 402 HOLE A CORE 21 CORED INTERVAL: 327.0-336.5 m



LITHOLOGIC DESCRIPTION

Carbonaceous Marly Limestone Dominantly olive gray (5Y 4/1) to olive black (5Y 2/1), exhibiting fine laminations and burrowing. Overturned layer (slump?) in Sec. 3, 100 cm. Occasional concentrations of macreous shell remains and pyrite.

Smear Slides

	Major lith. 2-80	Minor lith. 2-136
quartz	8	5
mica	2	2
clay	49	25
pyrite	1	--
unsp. carb.	30	25
dol. or sid.	5	40
nannos	5	
plant debris	2	3
algae	3	--

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
4-70	5.3	1.3	33.5
4-110	8.8	0.5	68.9

X-ray Analysis

Bulk	2-50	4-59	4-103	5-87	CC-17
Qtz.	13	13	3	11	19
Cal.	14	19	5	21	16
Dol.					
Other	73	68	92	68	65

scattered macreous shell debris

SITE 402 HOLE A CORE 22 CORED INTERVAL: 336.5-346.0 m

TIME-ROCK UNIT: ALBIAN
BIOSTRAT ZONE: (N) Parhabdolithus angustus
FOSSIL CHARACTER: FORAMS, NANNOS, RADS
SECTION: 1, 2, 3, 4, 5, 6
METERS: 0.5, 1.0
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE

NANNOS: FM, CG, RG, FG, FM, CM, FM, RG, RM, FG, CG, FG, FP, RG, FP

SEDIMENTARY STRUCTURES: XM, CCL, CCL, XM, *38 CCL, XM, CCL

LITHOLOGIC DESCRIPTION

Carbonaceous Marly Limestone
with interbedded
Carbonaceous Calcareous Mudstone
Dominantly olive gray (5Y 3/1) to grayish black (N2). Plane lamination common; some controted (slump) lamination. Shell fragments occur scattered throughout.

Smear Slides	Major lith. 5-123	Minor lith. 4-38	Minor lith. 6-4
quartz	10	0	5
mica	3	2	2
clay	33	24	15
pyrite	1	--	--
zeolite	0	5	5
unsp. carb.	50	30	65
dol. or sid.	2	35	5
nannos	tr	--	--
plant debris	--	1	--
iron (Mg?)	--	3	3

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-116	5.6	1.4	34.6
3-94	5.5	1.2	36.3
4-57	4.5	0.9	29.0

X-ray Analysis Bulk	1-68	3-95	5-75
Qtz.	11	13	16
Cal.	15	12	15
Dol.			
Other	70	70	69

5Y 6/1, 5Y 4/1
5Y 2/1

contorted lamination

tiny shells

shell fragments
N2

flow structure

5Y 3/2

SITE 402 HOLE A CORE 23 CORED INTERVAL: 346.0-355.5 m

TIME-ROCK UNIT: lower ALBIAN
BIOSTRAT ZONE: (N) Parhabdolithus angustus
FOSSIL CHARACTER: FORAMS, NANNOS, RADS
SECTION: 1, 2, 3, 4, 5, 6
METERS: 0.5, 1.0
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE

NANNOS: RG, RG, RG, FM, FM, CG, CM, RP CM

SEDIMENTARY STRUCTURES: XM, *80, CCL, CCL, XM, *114, CCL, XM, CCL *62

LITHOLOGIC DESCRIPTION

mm lamination

Zoophycus?
5Y 5/2

5Y 4/1
+
5Y 2/1

5YR 2/1
to
5Y 2/1

Marly Limestone
light olive gray (5Y 5/2), olive gray (5Y 4/1) and olive black (5Y 2/1) and
Carbonaceous Marly Limestone
brownish black (5YR 2/1) to olive black (5Y 2/1).
Slight bioturbation and mm-scale lamination in Sec. 1 and 2. Burrows of Zoophycus.

Smear Slides	Major lith. 1-80	Major lith. 6-62	Minor lith. 2-114
quartz	5	5	15
feldspar	tr		
mica	0	2	2
heavy min.	tr		
clay	16	52	15
zeolite	tr		5
unsp. carb.	58	25	53
dol. or sid.	tr	3	
nannos	tr	10	
sp. spic.	tr		
plant debris	tr	3	
glauconite	tr	--	10

Carbon Carbonate	Total C	Org. C	$CaCO_3$
2-61	6.0	0.5	45.7
2-63	6.1	0.4	47.3
4-57	5.8	1.6	33.1
6-67	4.8	1.2	29.8

X-ray Analysis Bulk	1-73	2-104
Qtz.	8	8
Cal.	45	97
Doi.		
Other	47	63

SITE 402 HOLE A CORE 24 CORED INTERVAL: 355.5-365.0 m

TIME-ROCK UNIT: lower ALBIAN

BIOSTRAT ZONE: (N) Parhabdolithus angustus

FOSSIL CHARACTER: FORAMS FM; NANNOS CM, CM, CM, CG, CG; RADS

SECTION: 1, 2, 3, 4, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY: FROZEN FOR GEOCHEM.

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES: XM, XM, XM

LITHOLOGIC SAMPLE: *120, CCL, CCL

5YR 2/1 to 5Y 2/1

5YR 2/1

XM 5YR 2/1 5Y 4/1

N2 + 5YR 2/1

5Y 2/1 5Y 4/1

FM FG

LITHOLOGIC DESCRIPTION

Carbonaceous Marly Limestone
Carbonaceous Calcareous Mudstone
dominantly brownish black (5YR 2/1), olive black (5Y 2/1) and olive gray (5Y 4/1). Common shell fragments; occasional bioturbation and common fine (mm scale) lamination, especially in mudstone.

Smear Slides	Major lith. 2-120	Minor lith. 5-36
quartz	10	5
mica	2	20
clay	17	53
zeolite	3	
unsp. carb.	25	tr
forams		tr
nannos	10	1
plant debris	3	
apatite		tr
glauconite	--	5

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-142	5.8	1.7	34.1
2-53	5.6	1.4	35.0

X-ray Analysis

Bulk	1-145	2-93	4-46
Qtz.	7	3	3
Cal.	92	19	21
Dol.			
Other	71	72	70

SITE 402 HOLE A CORE 25 CORED INTERVAL: 365.0-374.5 m

TIME-ROCK UNIT: upper APTIAN ? to lower ALBIAN

BIOSTRAT ZONE: (N) Parhabdolithus angustus

FOSSIL CHARACTER: FORAMS FP; NANNOS CG, CG, AG, CG, AG, CG, CG, CG; RADS

SECTION: 1, 2, 3, 4, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES: XM, XM

LITHOLOGIC SAMPLE: CCL, *20, *68, CCL

5Y 2/1 to 5Y 4/1

N2

5Y 2/1 + 5YR 2/1

N2

5Y 2/1

5Y 2/1 + 5Y 4/1 scattered shell debris

5YR 2/1

5Y 2/1 to 5Y 4/1

RM CG

LITHOLOGIC DESCRIPTION

Carbonaceous Marly Limestone
olive gray (5Y 4/1) to olive black (5Y 2/1). Slight to moderate bioturbation, scattered shell remains. Occasional interbeds of grayish black (N2).

Carbonaceous Calcareous Mudstone

Smear Slides	Major lith. 2-20	Minor lith. 2-68
quartz	1	tr
mica	2	--
clay	70	86
pyrite	tr	tr
zeolite	--	tr
unsp. carb.	20	10
dol. or sid.	tr	3
nannos	1	tr
sp. spic.	tr	--
plant debris	5	--

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-138	5.4	1.0	36.6
5-42	7.9	0.8	51.9

X-ray Analysis

Bulk	1-46	3-42
Qtz.	6	11
Cal.	24	23
Dol.		
Other	10	76

SITE 402 HOLE A CORE 26 CORED INTERVAL: 374.5-384.0 m

TIME-ROCK UNIT: upper APTIAN to lower ALBIAN
BIOSTRAT ZONE: (F) Ticinella bejaouaensis MCi23 (N) Parhabdolithus angustus
FOSSIL CHARACTER: FORAMS RM; NANNOS CG, Cg; RADS
SECTION: 1, CC
METERS: 0.5, 1.0
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: TS, XM

5YR 2/1

Carbonaceous Marly Limestone
brownish black (5YR 2/1), slight mottling. Pebble at 10 cm exhibuts algae and bryozoans in thin section.

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-76	5.8	1.1	39

X-ray Analysis

Bulk	1-23
Qtz.	6
Cal.	18
Dol.	--
Other	76

SITE 402 HOLE A CORE 27 CORED INTERVAL: 384.0-393.5 m

TIME-ROCK UNIT: upper APTIAN (GARGASIAN)
BIOSTRAT ZONE: (F) Ticinella bejaouaensis MCi23 (N) Parhabdolithus angustus
FOSSIL CHARACTER: FORAMS FG; NANNOS CM; RADS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE

brownish black (5YR 2/1) + grayish black (N2)

Carbonaceous Marly Limestone

Site 402, Hole A, Core 28, 393.5-403.0 m: NO RECOVERY

SITE 402 HOLE A CORE 29 CORED INTERVAL: 403.0-412.5 m

TIME-ROCK UNIT: upper APTIAN (GARGASIAN)
BIOSTRAT ZONE: (F) Ticinella bejaouaensis MCi23 (N) Parhabdolithus angustus
FOSSIL CHARACTER: FORAMS FM; NANNOS CM; RADS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE

olive black (5Y 2/1)

Carbonaceous Marly Calcareous Chalk

Smear Slides

	1-3
quartz	3
feldspar	tr
mica	1
clay	52
unspec. carb.	40
nannos	1
sp. spic.	1
plant debris	3

SITE 402 HOLE A CORE 30 CORED INTERVAL: 412.5-422.0 m

TIME-ROCK UNIT: upper APTIAN (GARGASIAN)
BIOSTRAT ZONE: (F) Ticinella bejaouaensis MCi23 (N) Parhabdolithus angustus
FOSSIL CHARACTER: FORAMS CM, CM-CG; NANNOS AG, AG, AG; RADS
SECTION: 1, 2, 3, 4, 5, CC
METERS: 0.5, 1.0
GRAPHIC LITHOLOGY: FROZEN FOR ORGANIC GEOCHEM.
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES: CCL, XM, XM, CCL, XM, XM *70, XM
LITHOLOGIC SAMPLE

N2 | Zoophycus | 5Y 4/1 | N2 | 5Y 2/1 | Chondrites | 5YR 2/1

Carbonaceous Marly Chalk
Carbonaceous Calcareous Mudstone
olive gray (5Y 4/1), olive black (5Y 2/1), brownish black (5YR 2/1) and grayish black (N2). Dipping (60°) laminae of shell debris in Sec. 3. Common bioturbation and occasional burrows (Chondrites, Zoophycus).

Smear Slides

	4-70 Major lithology
quartz	10
mica	2
clay	56
pyrite	2
zeolite	5
unsp. carb.	10
nannos	10
plant debris	5

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-137	5.8	1.5	35.5
3-86	5.4	2.6	23.7

X-ray Analysis

Bulk	1-142	2-66	3-90	6-64	6-16
Qtz.	13	12	18	23	22
Cal.	20	31	15	9	14
Dol.					
Other	67	57	67	68	64

SITE 402 HOLE A CORE 31 CORED INTERVAL: 422.0-431.5 m

TIME-ROCK UNIT: upper APTIAN (GARGASIAN)

BIOSTRAT ZONE: (F) Ticinella bejaouaensis MCi23 / (N) Parhabdolithus angustus / (F) H. trochoides MCi22

FOSSIL CHARACTER: FORAMS, NANNOS, RADS

SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | LITHOLOGIC SAMPLE

FORAMS: CG, CM, AM
NANNOS: AG, CG, CM, AM, CG
RADS: CG

SECTION 1 (0.5 m), 2, 3, 4, 5, 6

LITHOLOGIC SAMPLE: XM, *50, CCL, XM, *60, XM, CCL, *138, XM, XM, *145

5YR 4/1 + 5Y 4/1

5YR 2/1 to N2

6Y 4/1 with 5Y 2/1 mottles
Chondrites
Zoophycus
shell fragments

5Y 4/1 to 5YR 2/1

5Y 4/1 5GY 6/1

5Y 6/1 to 5Y 4/1

5YR 2/1

5YR 2/1

LITHOLOGIC DESCRIPTION

Carbonaceous Calcareous Mudstone
Marly Calcareous Chalk

mudstone mainly borwnish black (5YR 2/1), grayish black (N2), and olive gray (5Y 4/1). Chalk is olive gray (5Y 4/1), greenish gray (5GY 6/1) and brownish gray (5YR 4/1). Some bioturbation and burrows of Zoophycus, Chondrites. Fragmental shell remains in Sec. 2; siderite filled burrows in Sec. 3.

Smear Slides	Major lithology 1-50	3-60	6-145	Minor lith. 4-138
quartz	3	2	20	3
mica	tr	--	tr	--
clay	67	46	47	26
pyrite	tr	tr	--	--
zeolite	--	--	5	--
unsp. carb.	20	20	15	20
dol. or sid.	tr	30		50
nannos	5	2	10	5
plant debris	5	tr	3	--

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-88	5.1	2.1	24.9
4-46	4.1	1.3	23.5

X-ray Analysis Bulk	1-20	2-68	5-60	6-77
Qtz.	25	8	15	18
Cal.	11	16	12	16
Dol.	--	--	--	--
Other	69	76	69	66

SITE 402 HOLE A CORE 32 CORED INTERVAL: 431.5-441.0 m

TIME-ROCK UNIT: upper APTIAN (GARGASIAN)

BIOSTRAT ZONE: (F) H. trochoides MCi22 / (N) Parhabdolithus angustus

FOSSIL CHARACTER: FORAMS, NANNOS, RADS

SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | LITHOLOGIC SAMPLE

FORAMS: CM, CM, AM, AM
NANNOS: CG, AG, CG, AG, CG, AG
RADS: CG

SECTION 1 (0.5 m), 2, 3, 4, 5, 6, 7, CC

LITHOLOGIC SAMPLE: XM, *115, CCL, XM, XM, *85, XM, XM

N2

5Y 4/1 and 5Y 2/1

5YR 2/1

5Y 4/1 Chondrites

N2

N1 Chondrites

N4 to N3

N4

5GY 6/1

N4

N2

5Y 4/1

LITHOLOGIC DESCRIPTION

Carbonaceous Calcareous Mudstone
Marly Limestone

Mudstone mainly grayish black (N2), to brownish black (5YR 2/1); shell fragments and plane lamination common. Chalk mainly olive gray (5Y 4/1), medium dark gray (N4) and olive black (5Y 2/1). Apparent microfaults separate different lithologies in Sec. 2.

Smear Slides	Major lithology 2-15	4-85
quartz	40	15
mica		2
clay	28	42
unsp. carb.	20	10
nannos	7	20
plant debris	5	1

Carbon Carbonate	Total C	Org. C	$CaCO_3$
2-120	4	2.0	16.60
3-63	4.3	1.5	23.6

X-ray Analysis Bulk	1-28	3-89	3-138	6-140	7-32
Qtz.	20	20	7	7	15
Cal.	13	12	10	22	24
Dol.					
Other	67	68	83	71	61

SITE 402 HOLE A CORE 33 CORED INTERVAL: 441.0-450.5 m

TIME-ROCK UNIT: upper APTIAN (GARGASIAN)

BIOSTRAT ZONE: (F) Schackoina cabri MCi19 / (N) Parhabdolithus angustus; (F) Hedbergella trochoides MCi22

FOSSIL CHARACTER: FORAMS, NANNOS, RADS

SECTION: 1, 2, 3, 4, 5, 6, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES

LITHOLOGIC SAMPLE

FROZEN FOR ORGRANIC GEOCHEM.

FORAMS: CM, AM, CM, CM, FP, CP, Ap, Cp

NANNOS: AG, AG, AP, FM, CP, FP, Cp

RADS:

XM, CCL, *54, P, 5Y 6/1 + N5 Chondrites, *130, CCL, XM, N7 to 5GY 6/1, XM, XM, CCL, *81, 5GY 4/1

5Y 4/1 to 5Y 2/1 Siderite in filled burrow

N2

composite burrow

LITHOLOGIC DESCRIPTION

Limestone

Marly Limestone

Limestone light gray (N7) to greenish gray; moderate bioturbation throughout. Concentration of organic material and pyrite clusters in Sec. 2, 80 cm. Marly limestone is olive gray to olive black (5Y 2/1); siderite filled burrow in Sec. 1. Interbeds of Carbonaceous Calcareous Mudstone, grayish black (N2) to dark greenish gray (5GY 4/1).

Smear Slides	Major lith. 2-54	Minor lith. 2-130	Minor lith. 6-87
quartz	3	--	10
mica	tr	2	5
clay	75	25	56
pyrite	--	2	1
unsp. carb.	10	30	10
dol. or sid.	tr	30	
forams	tr	--	--
nannos	tr	10	15
plant debris	7	1	3

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-30	4.4	0.9	28.9
3-11	8.6	0.2	69.4
6-75	3.6	0.7	24.8

X-ray Analysis

Bulk	1-78	3-38	4-61	6-35
Qtz.	9	3	4	3
Cal.	20	68	70	85
Dol.	--	--	--	--
Other	71	29	26	12

SITE 402 HOLE A CORE 34 CORED INTERVAL: 450.5-460.0 m

TIME-ROCK UNIT: lower APTIAN (BEDOULIAN)

BIOSTRAT ZONE: (F) Globigerinelloides gottisi/ G.duboisi MCi 17 to; (F) Globigerinelloides maridalensis/Globigerinelloides blowi MCi18 (N) Chiastozygus litterarius

FOSSIL CHARACTER: FORAMS, NANNOS, RADS

SECTION: 1, 2, 3

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES

LITHOLOGIC SAMPLE

FORAMS: FM, FM, RM, FM

NANNOS: CM, CM, CM, AM, CP, AM

RADS:

CCL, XM, *70, XM, CCL, *118, XM

5GY 4/1

5G 2/1

microfault

5GY 6/1

LITHOLOGIC DESCRIPTION

Limestone
greenish gray (5GY 6/1)

and

Marly Limestone

Smear Slides	1-70	3-118 Major lith.
quartz	tr	tr
mica	tr	tr
clay	15	30
pyrite	tr	tr
unsp. carb.	25	60
nannos	10	10
plant debris	tr	tr

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-44	9.0	0.3	72.9
3-93	6.1	0.5	46.6

X-ray Analysis

Bulk	1-51	1-82	3-105
Qtz.	4	3	7
Cal.	56	77	43
Dol.	--	--	--
Other	40	20	43

SITE 402 HOLE A CORE 35 CORED INTERVAL: 460.0-469.5 m

TIME-ROCK UNIT: lower APTIAN (BEDOULIAN)
(F) Globigerinelloides gottisi/ G. duboisi MCi 17 t.o
(F) Globigerinelloides maridalensis/Globigerinelloides blowi MCi18
(N) Chiastozygus litterarius

BIOSTRAT ZONE: CP, CG, FM, CG, AM, RM, AG

FOSSIL CHARACTER: FORAMS, NANNOS, RADS

SECTION: 1, 2, 3, 4, 5

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES

LITHOLOGIC SAMPLE: CCL, *88, XM, *40, CCL, CCL

LITHOLOGIC DESCRIPTION

N3
5GY 4/1

5GY 2/1

N7 mottled
5GY 4/1

5GY 4/1

5GY 6/1

5GY 4/1

5GY 6/1

5GY 4/1

5GY 6/1
to
5G 4/2

Marly Limestone
Dominantly dark greenish gray (5GY 4/1) with bed of limestone - 20 to 30 cm thick.

Smear Slides	Major lith. 4-40	Minor lith. 1-88
quartz	5	0
mica	2	1
clay	45	26
zeolite	5	3
unsp. carb.	15	60
dol. or sid.	5	5
forams	1	0
nannos	20	5
plant debris	<2	tr

X-ray Analysis Bulk	1-117
Qtz.	6
Cal.	64
Dol.	
Other	30

SITE 403 HOLE CORE 1 CORED INTERVAL: 0.0-4.5 m

TIME-ROCK UNIT: PLEISTOCENE
BIOSTRAT ZONE: (F) Globorotalia truncatulinoides (N23-N22) / (N) Emiliania huxleyi (NN21)
FOSSIL CHARACTER: FORAMS — NANNOS: FG / AG / AG / AG / AG / CG / Ag — RADS

SECTION 1: 0.5 — VOID; 1.0 — 10YR 6/2 / 10YR 5/4
SECTION 1: VOID
SECTION 2: CCL alternating pale yellowish brown & moderate yellowish brown (10YR 5/4); GZ; CCB; CCL * 135 10YR 8/2 & 10YR 7/4
SECTION 3: 10YR 5/4; interbedded 10YR 8/2 & 10YR 6/2; GZ * 110 10YR 5/4
SECTION 4: CCL 10YR 6/2; moderate yellowish brown (10YR 5/4) to pale yellowish brown (10YR 6/2) pebbles; GZ; CCB; CCL; XM; GZ
SECTION CC

Marly Foram Ooze
moderate yellowish brown (10YR 5/4) with interbeds of pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4) Nanno Ooze. Contacts between lithologies mostly transitional. Occasional ice-rafted pebbles in Sec. 4; volcanic glass noted in core catcher.

Smear Slides

	2-135	3-110
sand/silt/clay	10/5/90	25/20/55
forams	7	20
nannos	82	5
unsp. $CaCO_3$	--	25
rads	5	--
sp. spic.	3	0
clay	0	41
quartz	3	7
other: apatite, mica, glauconite		

Carbonate Bomb

2-129	58%
4-70	54%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-90	8.4	0.1	69.7
4-70	6.9	0.1	57.1

Grain Size

	Sand	Silt	Clay
2-90	44.9	20.3	34.8
3-105	42.2	17.4	40.4
4-69	26.7	31.5	41.8
4-117	34.3	27.4	38.3

X-ray Analysis

Bulk	4-83	<2μm (Partial)	4-83
Qtz.	6	Smec.	43
Cal.	63	Ill.	32
K-Feld.	--	Kaol.	13
Plag.	--	Chlor.	12
Other	31	Zeol.	--

SITE 403 HOLE CORE 2 CORED INTERVAL: 4.5-14.0 m

TIME-ROCK UNIT: PLEISTOCENE
BIOSTRAT ZONE: (F) Globorotalia truncatulinoides (N22) / (N) Emiliania huxleyi (NN21) / (N) Gephyrocapsa oceanica (NN20)
FOSSIL CHARACTER: FORAMS — NANNOS: AG / CG / AG / FG / CG / AG / AG / Ag / AG — RADS

SECTION 1: 0.5 — 10YR 8/2; 1.0 — moderate yellowish brown (10YR 5/4)
SECTION 2: GZ; CCL; CCB interbedded 10YR 7/4, 10YR 8/2 & 10YR 5/4; GZ * 10 sandy layer rock fragments limestone pebble; GZ; XM alternating grayish orange (10YR 7/4) and very pale orange (10YR 8/2) 10-20 cm intervals; 10YR 5/4 quartzite pebble 1.5 cm diameter; 10YR 7/4; bluish white (5B 9/1); GZ * 67; CCL; * 130 light gray (N7) sandy with pebbles of bluish gray mud; 5B 9/1 occasional interbeds of 10Y 4/2
SECTION 3
SECTION 4
SECTION 5 GEOCHEM. SAMPLE
SECTION 6
SECTION CC: X TS angular pebble of quartzite 10 cm diameter

Marl Foram Ooze
Nanno Ooze
interbedded. Foram ooze mainly dark yellowish brown (10YR 5/4); contains terrigenous silt, sand and ice-rafted pebbles in parts. Nanno ooze mainly grayish orange (10YR 7/4) to very pale orange (10YR 8/2). Sharp change to bluish white (5B 9/1) relatively pure nanno ooze in Sec. 5.

Smear Slides (main lithology)

	1-40	3-10
sand/silt/clay	10/10/80	20/50/30
nannos	69	5
forams	15	20
unsp. $CaCO_3$	10	38
diatoms	2	tr
sp. spic.	4	tr
clay	--	25
quartz	--	10
others		glauconite dolomite

	5-67	5-130
sand/silt/clay	0/5/95	3/20/77
nannos	95	55
forams	1	10
unsp. $CaCO_3$	2	5
diatoms	--	--
sp. spic.	--	--
clay	2	21
quartz	--	5
others		mica

Carbonate Bomb

1-19	65%
2-72	61%
5-72	92%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-70	8.4	0.1	69.6
5-60	11.1	0.0	92.7

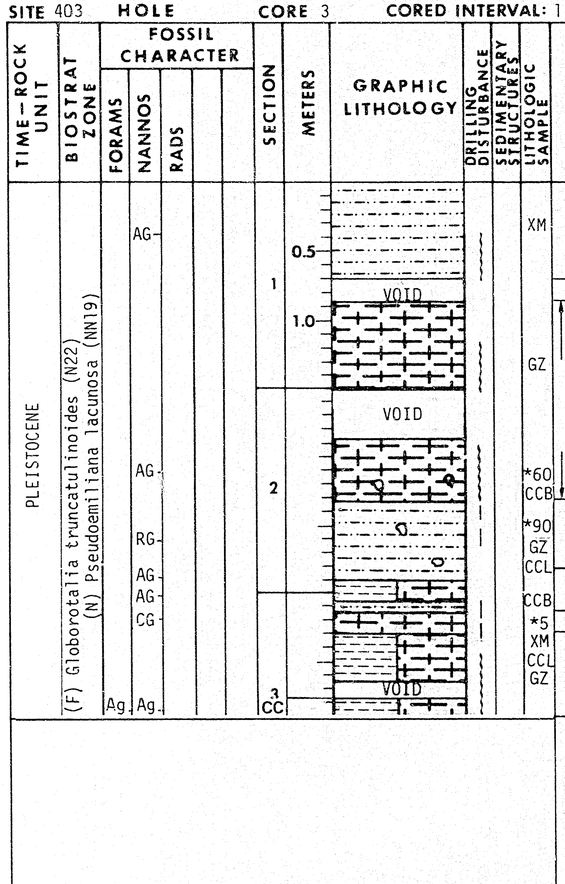
Grain Size

	Sand	Silt	Clay
1-64	15.4	31.5	53.1
2-74	36.8	25.9	37.3
3-12	25.8	36.6	37.6
3-63	22.1	27.2	50.7
5-60	16.6	24.8	58.6

X-ray Analysis

Bulk	3-66	<2μm (Partial)	3-66
Qtz.	3	Smec.	32
Cal.	61	Ill.	39
K-Feld.	--	Kaol.	11
Plag.	8	Chlor.	18
Other	28	Zeol.	--

SITE 403 HOLE CORE 3 CORED INTERVAL: 14.0-23.5 m



LITHOLOGIC DESCRIPTION

light gray (N7) to light olive gray (5Y 6/1)

very light gray (N8)

pebbles - metamorphic - subgraywacke

light olive gray (5Y 5/2)

greenish gray (5G 6/1)

N8

5G 6/1

Calcareous Mud
Foram Nanno Ooze

two lithologies interbedded at scale of 40-60 cm; some interlamination in Sec. 1. Calcareous mud mainly light olive gray (5Y 6/1, 5Y 5/2) to greenish gray (5G 6/1); foram nanno ooze is very light gray (N8). Occasional ice-rafted pebbles to 2 cm diameter; some admixture of terrigenous sand. Increased clay yields marly ooze in places.

Smear Slides

	2-60	2-90	3-5
sand/silt/clay	5/20/75	5/60/35	30/30/40
forams	15	10	30
nannos	50	--	30
clay	27	34	19
quartz	5	35	10
unspec. $CaCO_3$	--	15	10
mica	1	2	0

others: heavy minerals, apatite, volcanic glass, trace of rads, sp. spic. in 2-60.

Carbonate Bomb

2-60	74%
2-121	9%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-110	2.1	0.1	16.3
3-10	1.9	0.2	14.4
3-12	10.2	0.1	84.2

Grain Size

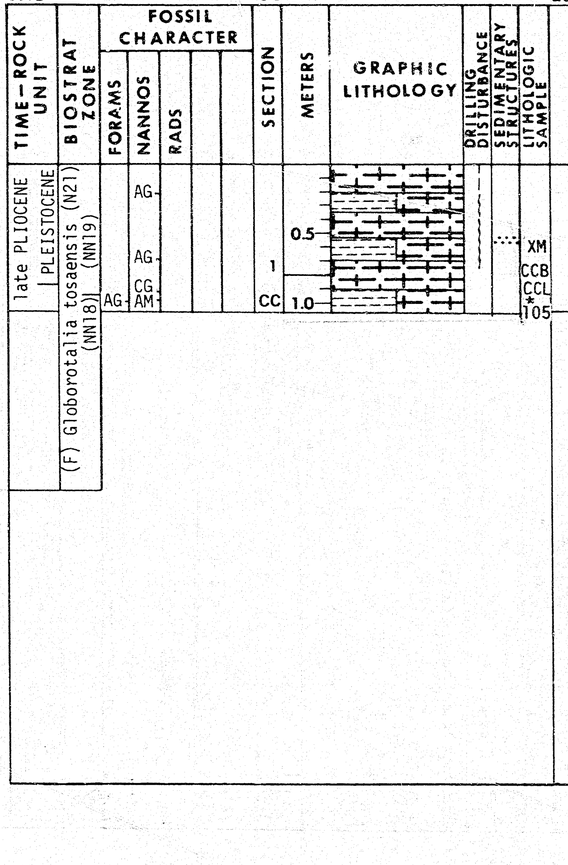
	Sand	Silt	Clay
1-131	33.2	19.1	47.7
2-111	14.2	41.5	44.3
3-24	54.1	23.3	22.6

X-ray Analysis

Bulk	1-33	3-23
Qtz.	5	1
Cal.	53	76
K-Feld.	--	--
Plag.	--	--
Other	42	23

<2μm (Partial)	1-33	3-23
Smec.	35	31
Ill.	30	39
Kaol.	15	12
Chlor.	20	18
Zeol.	tr	tr

SITE 403 HOLE CORE 4 CORED INTERVAL: 23.5-33.0 m



LITHOLOGIC DESCRIPTION

interbedded N8, 5GY 6/1

sandy zone

Foram Nanno Ooze

varies from very light gray (N8) to greenish gray (5GY 6/1). Colors interbedded at scale of 10-20 cm. Some greenish gray layers are marly ooze.

Smear Slides

	1-105
sand/silt/clay	10/10/80
nannos	60
forams	20
unspec. $CaCO_3$	5
clay	10
quartz	5
dolomite	tr

Carbonate Bomb

1-81	82%

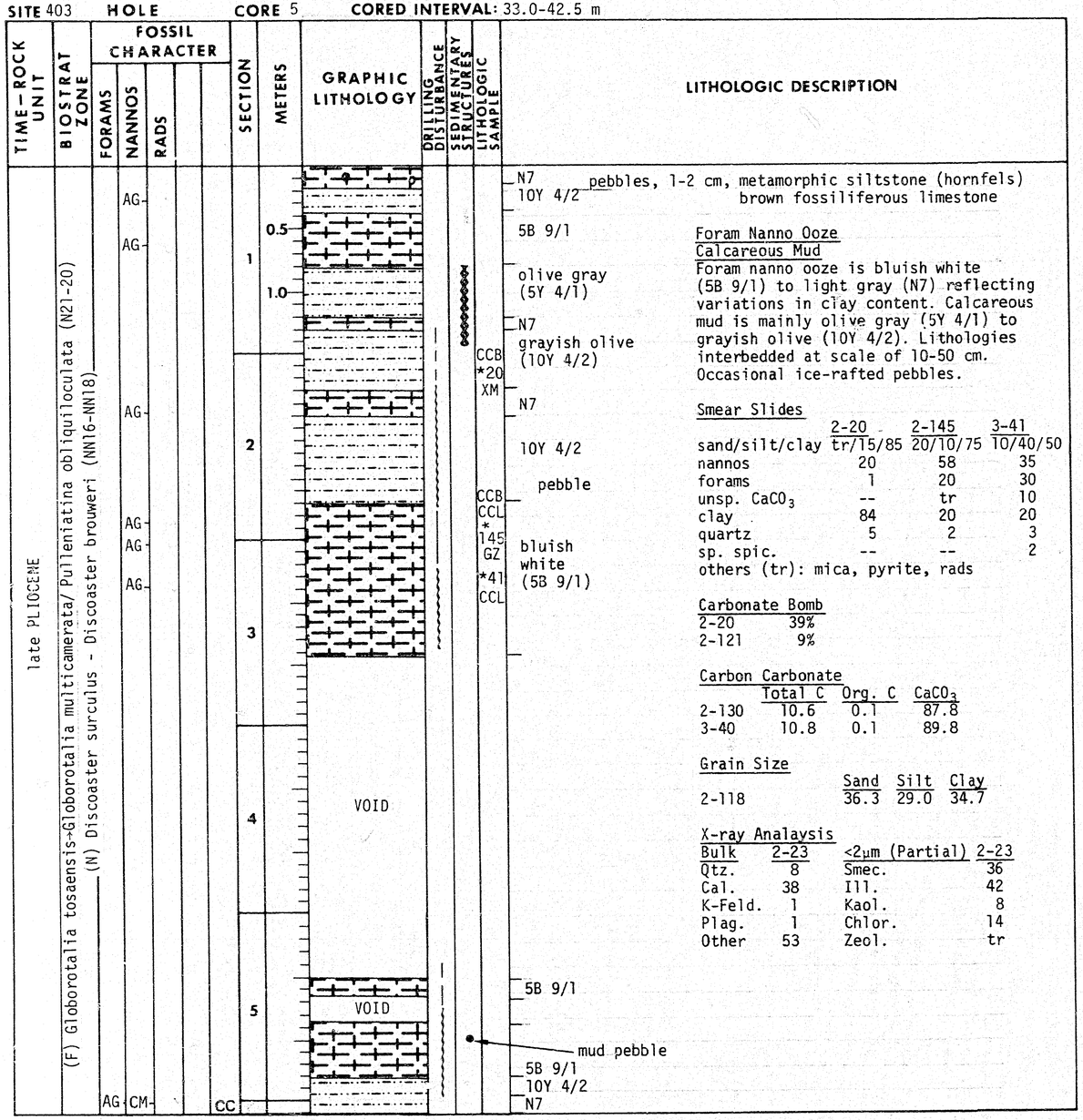
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1, CC	4.0	0.1	32

X-ray Analysis

Bulk	1-68	<2μm (Partial)	1-68
Qtz.	6		32
Cal.	35		42
K-Feld.	1		12
Plag.	3		14
Other	55		tr

SITE 403 HOLE CORE 5 CORED INTERVAL: 33.0-42.5 m



Foram Nanno Ooze
Calcareous Mud
Foram nanno ooze is bluish white (5B 9/1) to light gray (N7) reflecting variations in clay content. Calcareous mud is mainly olive gray (5Y 4/1) to grayish olive (10Y 4/2). Lithologies interbedded at scale of 10-50 cm. Occasional ice-rafted pebbles.

Smear Slides

	2-20	2-145	3-41
sand/silt/clay	tr/15/85	20/10/75	10/40/50
nannos	20	58	35
forams	1	20	30
unsp. $CaCO_3$	--	tr	10
clay	84	20	20
quartz	5	2	3
sp. spic.	--	--	2

others (tr): mica, pyrite, rads

Carbonate Bomb

2-20	39%
2-121	9%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-130	10.6	0.1	87.8
3-40	10.8	0.1	89.8

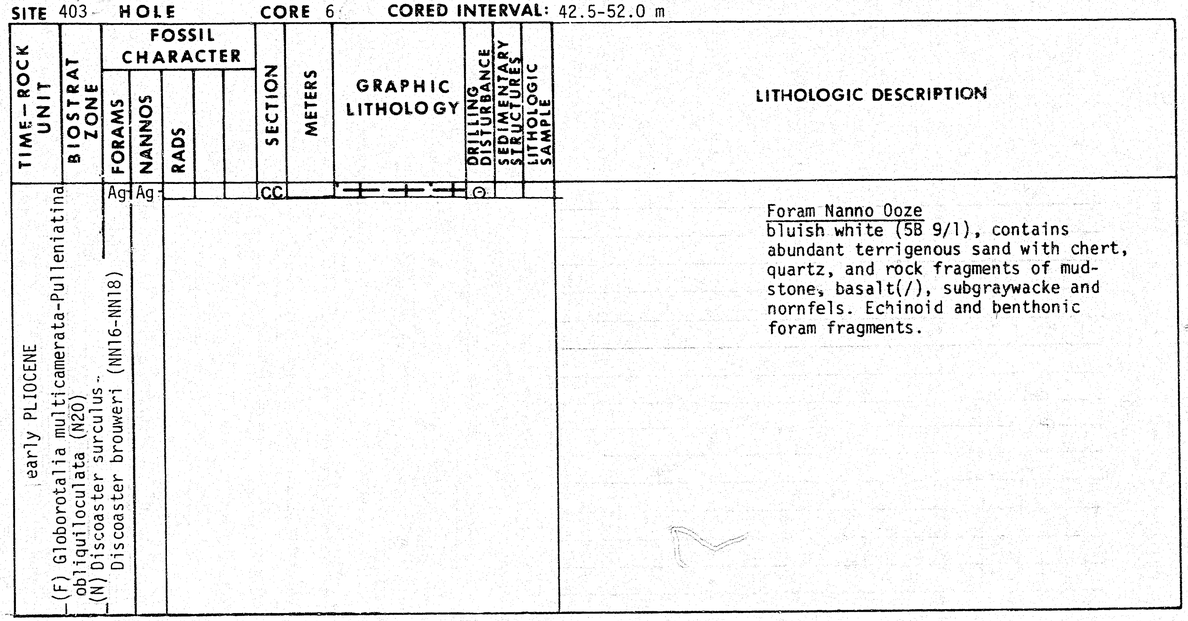
Grain Size

	Sand	Silt	Clay
2-118	36.3	29.0	34.7

X-ray Analaysis

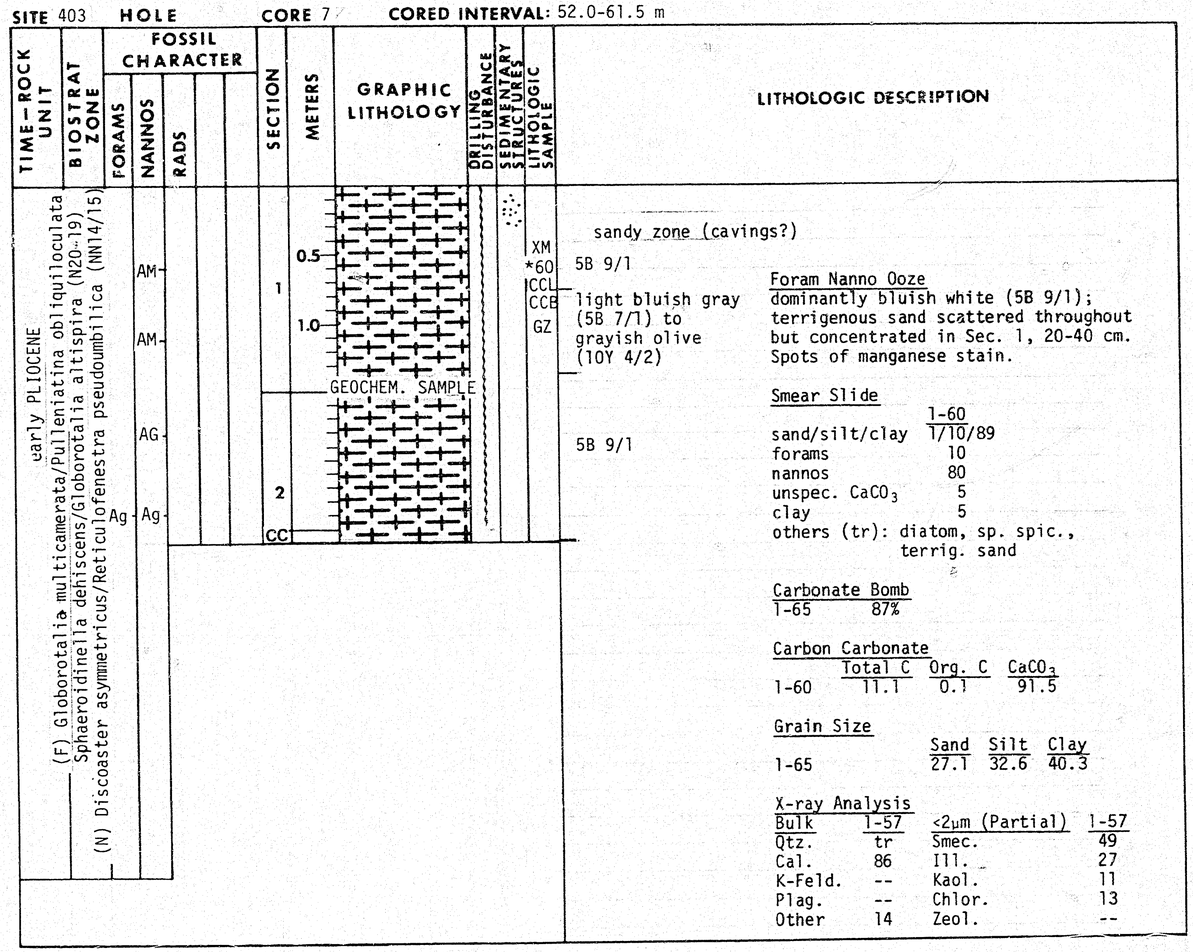
Bulk	2-23	<2μm (Partial)	2-23
Qtz.	8	Smec.	36
Cal.	38	Ill.	42
K-Feld.	1	Kaol.	8
Plag.	1	Chlor.	14
Other	53	Zeol.	tr

SITE 403 HOLE CORE 6 CORED INTERVAL: 42.5-52.0 m



Foram Nanno Ooze
bluish white (5B 9/1), contains abundant terrigenous sand with chert, quartz, and rock fragments of mudstone, basalt(/), subgraywacke and nornfels. Echinoid and benthonic foram fragments.

SITE 403 HOLE CORE 7 CORED INTERVAL: 52.0-61.5 m



Foram Nanno Ooze
dominantly bluish white (5B 9/1); terrigenous sand scattered throughout but concentrated in Sec. 1, 20-40 cm. Spots of manganese stain.

Smear Slide

	1-60
sand/silt/clay	1/10/89
forams	10
nannos	80
unspec. $CaCO_3$	5
clay	5

others (tr): diatom, sp. spic., terrig. sand

Carbonate Bomb

1-65	87%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-60	11.1	0.1	91.5

Grain Size

	Sand	Silt	Clay
1-65	27.1	32.6	40.3

X-ray Analysis

Bulk	1-57	<2μm (Partial)	1-57
Qtz.	tr	Smec.	49
Cal.	86	Ill.	27
K-Feld.	--	Kaol.	11
Plag.	--	Chlor.	13
Other	14	Zeol.	--

SITE 403 HOLE CORE 8 CORED INTERVAL: 61.5-71.0 m

TIME-ROCK UNIT: early PLIOCENE

BIOSTRAT ZONE: (F) Globorotalia tumida-Sphaeroidinella subdehiscens poenedehiscens (N18) / (N) Discoaster asymmetricus/Reticulofenestra pseudoumbilica (NN14/15) / Ceratalithus rugosus (NN13)

FOSSIL CHARACTER: FORAMS, NANNOS, RADS

SECTION 1: AG
SECTION 2: AG, AM, AG
SECTION 3: AG
SECTION 4: AG, CM
SECTION 5: CM, CM
SECTION 6: CG, AM
SECTION 7: AG, AM
CC

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE: ?

SEDIMENTARY STRUCTURES: ?

LITHOLOGIC SAMPLE: *90 CCB; XM GZ CCL; CCB; GZ XM CCL *131

LITHOLOGIC DESCRIPTION

Pebbles - sandstone, mudstone, granulite, amphibolite. Some are faceted.

pumice pebble

granite pebble

bluish white (5B 9/1) mudstone pebble

granite pebble

5B 9/1 to 5B 7/1 streaked with dark gray (N3)

5B 9/1

Nanno Ooze
mainly bluish white (5B 9/1) with dark gray (N3) pyrite streaks. Common ice-rafted pebbles, however, core is intensely disturbed and these may represent cavings.

Smear Slides

	1-90	6-131
sand/silt/clay	0/25/75	0/28/72
nannos	75	63
forams	8	7
clay	16	20
rads	1	0
sp. spic.	tr	3
diatoms	--	5
other	--	pyrite

Carbonate Bomb

1-90	85%
5-131	91%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-90	11.3	0.1	93.5
6-100	11.3	0.1	93.9

Grain Size

	Sand	Silt	Clay
2-85	12.9	39.5	47.6
6-76	7.9	44.0	48.1

X-ray Analysis

Bulk	2-88	6-87
Qtz.	--	--
Cal.	92	90
K-Feld.	--	--
Plag.	--	--
Other	8	10

<2µm (Partial)	2-88	6-87
Smec.	54	46
Ill.	30	33
Kaol.	5	11
Chlor.	11	10
Zeol.	--	--

SITE 403 HOLE CORE 9 CORED INTERVAL: 71.0-80.5 m

TIME-ROCK UNIT: late MIOCENE

BIOSTRAT ZONE: (F) Globorotalia tumida/Sphaeroidinella subdehiscens-Globorotalia pleisiotumida (N18+N17) / (N) Discoaster quinqueramus (NN11)

FOSSIL CHARACTER: FORAMS, NANNOS, RADS

SECTION 1: CM
SECTION 2: CM, AM, AG
SECTION 3: FP, FM
SECTION 4: AG, AM
SECTION 5: AM, AM
CC: AG AP

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES: G G

LITHOLOGIC SAMPLE: GZ; CCB; CCL; XM; CCB *90; CCL *110 GZ CCB

LITHOLOGIC DESCRIPTION

pebble of foram chalk

5B 9/1

very light gray (N8) with pods of pale green (10G 6/2)

5B 9/1

N8 with lense of 10G 6/2

5B 9/1 with streaks of olive gray (5Y 6/1) and pale purple (5P 6/1)

light greenish gray (5GY 8/1) to bluish white (5B 9/1)

Nanno Ooze
mainly bluish white (5B 9/1) to very light gray (N8). Occasional lenses (to 5 cm) of marly ooze which are varied colors. Black pyrite streaks common throughout. Sec. 5 - lithology changes to light greenish gray (5GY 8/1) Foram Nanno Ooze with specs of galuconite.

Smear Slides

	3-90	5-110
sand/silt/clay	0/15/85	20/40/60
nannos	70	40
forams	3	35
unsp. $CaCO_3$	5	0
sp. spic.	5	5
rads	1	2
diatoms	2	0
clay	13	16
other (<1)	pyrite	glauconite
	mica	opatite

Carbonate Bomb

1-80	89%
3-80	91%
5-130	87%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-10	10.9	0.1	90.0
5-60	11.0	0.1	90.9

Grain Size

	Sand	Silt	Clay
1-31	7.4	36.0	56.6
5-103	50.6	28.5	20.9

X-ray Analysis

Bulk	2-133	<2µm (Partial)	2-133
Qtz.	tr	Smec.	100
Cal.	76	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	24	Zeol.	--

SITE 403 HOLE CORE 10 CORED INTERVAL: 80.5-90.0 m

TIME-ROCK UNIT: late MIOCENE
(F) Globorotalia tumida/Sphaeroidinella subdehiscens-Globorotalia pleisiotumida (N18-17)
(N) Discoaster quinqueramus (NN11)

BIOSTRAT ZONE: FORAMS AG; NANNOS AG; RADS

SECTION: CC

METERS

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES

LITHOLOGIC SAMPLE: CCB

LITHOLOGIC DESCRIPTION

5GY 8/1 to 5B 9/1

Foram Nanno Ooze
light greenish gray (5GY 8/1) to bluish white (5B 9/1). Specs of glauconite.

Carbonate Bomb
CC - 5 cm 88%

SITE 403 HOLE CORE 11 CORED INTERVAL: 90.0-99.5 m

TIME-ROCK UNIT: late MIOCENE
(F) Globorotalia tumida/Sphaeroidinella subdehiscens-Globorotalia pleisiotumida (N18-17)
(N) Discoaster quinqueramus (NN11)

BIOSTRAT ZONE: FORAMS AG; NANNOS AG; RADS

NANNOS: CP; CM; CM; CM; CM; CM

SECTION: 1; 2; 3; 4; CC

METERS: 0.5; 1.0

GRAPHIC LITHOLOGY: VOID

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES

LITHOLOGIC SAMPLE: CCL; GZ; *56; CCL; *63; XM; CCB

LITHOLOGIC DESCRIPTION

very light gray (N8)

bluish white (5B 9/1) with bands of light gray (N7) and very light gray (N8)

N8

5B 9/1

N8

Nanno Ooze
Foram Nanno Ooze
nanno ooze bluish white (5B 9/1) and fine-grained; foram nanno ooze light gray (N7) to very light gray (N8) and coarser textured. Two lithologies interbedded at 5-10 cm. Scale in Sec. 2.

Smear Slides

	2-56	2-63
sand/silt/clay	15/15/70	10/15/75
nannos	65	62
forams	25	20
unsp. $CaCO_3$	tr	2
clay	10	15
other	--	rads, sp. spic., glauconite

Carbonate Bomb
2-79 92%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-30	10.6	0.1	87.9
2-70	11.3	0.1	93.3

Grain Size

	Sand	Silt	Clay
2-68	13.4	32.2	54.4

X-ray Analysis

Bulk	2-81	<2μm (Partial)	2-81
Qtz.	--	Smec.	60
Cal.	88	Ill.	28
K-Feld.	--	Kaol.	5
Plag.	--	Chlor.	7
Other	12	Zeol.	tr

SITE 403 HOLE CORE 12 CORED INTERVAL: 99.5-109.0 m

TIME-ROCK UNIT: late MIOCENE

BIOSTRAT ZONE: (F) Globorotalia pleisiotumida (N17) / (N) Discoaster quinqueramus (NN11)

FOSSIL CHARACTER: FORAMS; NANNOS: CG; RADS; AP; AG-AM

SECTION 1: 0.5 / 1.0

SECTION 2

SECTION 3

SECTION 4: CG

SECTION 5: VOID; VOID

SECTION 6: AP

SECTION 7

SECTION CC

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES

LITHOLOGIC SAMPLE: *88; *74; CCL; *65; GZ; XM; CCL; CF

clay pebble

very light gray (N8) with occasional 5 cm beds of moderate yellowish brown (10YR 5/4)

bluish white (5B 9/1)

alteranting N8 &5B 9/1

quartzite pebble (4x6 cm)

5B 9/1

5B 9/1

gneiss pebble

alternating N8 & 5B 9/1

LITHOLOGIC DESCRIPTION

interbedded:
Foram Nanno Ooze
Nanno Ooze
core intensely disturbed and probably contaminated by cavings. Sec. 6 & 7 moderately disturbed, shows two main lithologies interbedded at 10-50 cm scale. Occasional "ice-rafted" pebbles - cavings? Pyrite streaks common.

Smear Slides

	1-88	2-74	5-65
sand/silt/clay	10/20/70	25/20/55	0/40/60
nannos	63	45	50
forams	10	25	10
unspec. $CaCO_3$	3	5	25
quartz	3	--	--
feldsp.	tr	--	--
diatoms	1	--	tr
clay	20	24	15
sp. spic.	1	--	tr

Coarse Fraction (7 - CC)

forams	88
rads	10
sp. spic.	1
unidentified	1

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
4-90	11.4	0.1	94.2
7-30	11.3	0.1	93.8

Grain Size

	Sand	Silt	Clay
7-23	15.8	29.0	55.1

X-ray Analysis

Bulk	7-33	<2μm (Partial)	7-33
Qtz.	--	Smec.	80
Cal.	88	Ill.	20
K-Feld.	--	Kaol.	tr
Plag.	--	Chlor.	tr
Other	12	Zeol.	--

SITE 403 HOLE CORE 13 CORED INTERVAL: 109.0-11-.5 m

TIME-ROCK UNIT: late MIOCENE

BIOSTRAT ZONE: (F) Globorotalia pleisiotumida (N17) / (N) Discoaster quinqueramus (NN11)

FOSSIL CHARACTER: FORAMS: AG-AM; NANNOS: AM-CP-AM-AG; RADS

SECTION 1: 0.5 / 1.0

SECTION 2

GRAPHIC LITHOLOGY: cavings

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES

LITHOLOGIC SAMPLE: CCB; *20; CCL; GZ; XM

very light gray (N8) with inclusions of dark greenish gray (5G 4/1) and moderate yellowish brown (10YR 6/2)

very light gray (N8)

LITHOLOGIC DESCRIPTION

Foram Nanno Ooze
very light gray except black streaks of pyrite. Sec. 1 & 2 - mainly cavings.
Includes: Foram nanno ooze
Calcareous mudstone
Pebbles of limestone, basalt, granulite

Smear Slide

	3-20
sand/silt/clay	tr/15/85
nannos	70
forams	10
unspec. $CaCO_3$	3
clay	10
rads	tr
sp. spic.	tr

Carbonate Bomb

3-20	90%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-30	11.1	0.1	92.1

Grain Size

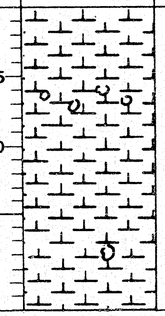
	Sand	Silt	Clay
3-27	11.7	38.2	50.1

X-ray Analysis

Bulk	3-42	<2μm (Partial)	3-42
Qtz.	--	Smec.	77
Cal.	86	Ill.	14
K-Feld.	--	Kaol.	5
Plag.	--	Chlor.	4
Other	14	Kaol.	--

SITE 403 HOLE CORE 14 CORED INTERVAL: 118.5-128.0 m

TIME-ROCK UNIT: late MIOCENE
BIOSTRAT ZONE: (F) Globorotalia pleisiotumida (N17) / (N) Discoaster quinqueramus (NN11)
FOSSIL CHARACTER: FORAMS Am-Am; NANNOS AG-CG; RADS
SECTION: 1
METERS: 0.5, 1.0



very light gray (N8)

pebbles (cavings?)

disturbed lamination color banding 5Y 8/1, 5G 8/1, & 5YR 6/1

pebble

Nanno Ooze
mainly very light gray (N8) but with color banding (lamination?) of yellowish gray (5Y 8/1), light brownish gray (5YR 6/1) and light greenish gray (5G 8/1) in lower part of Sec. 1. Core moderately to intensely disturbed. Ice-rafted pebbles of hornfels, siltstone, granite, red quartzite - probably cavings.

Smear Slides

	2-140
sand/silt/clay	tr/15/83
nannos	75
forams	7
unspec. $CaCO_3$	2
clay	15

other: diatoms, rads, sp. spic.

Carbonate Bomb

2-20	91%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-40	11.4	0.1	94.1

Grain Size

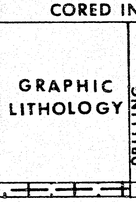
	Sand	Silt	Clay
2-46	3.9	31.5	64.6

X-ray Analysis

Bulk	2-53	<2μm (Partial)	2-53
Qtz.	--	Smec.	50
Cal.	84	Ill.	35
K-Feld.	--	Kaol.	4
Plag.	--	Chlor.	11
Other	16	Zeol.	--

SITE 403 HOLE CORE 15 CORED INTERVAL: 128.0-137.5 m

TIME-ROCK UNIT: late MIOCENE
BIOSTRAT ZONE: (F) Globorotalia pleisiotumida (N17) / (N) Discoaster quinqueramus (NN11)
FOSSIL CHARACTER: FORAMS AG; NANNOS AM; RADS
SECTION: CC

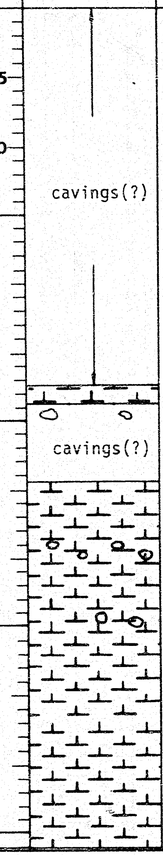


very light gray (N8)

Foram Nanno Ooze

SITE 403 HOLE CORE 16 CORED INTERVAL: 137.5-147.0 m

TIME-ROCK UNIT: late MIOCENE
BIOSTRAT ZONE: (F) Globorotalia pleisiotumida (N17) / (N) Discoaster quinqueramus (NN11)
FOSSIL CHARACTER: FORAMS Ag-Am; NANNOS CM; RADS
SECTION: 1, 2, 3, 4, CC
METERS: 0.5, 1.0



mixed

very light gray (N8), greenish gray (5G 6/1), dark greenish gray (5G 6/4), & mod. yellowish brown (10YR 5/4)

N8

pebbles: dark green mudstone gneiss as top

pebbles: granite granulite gneiss

very light gray (N8)

N8
5Y 6/1
laminated

N8

Nanno Ooze
very light gray (N8) with some interlamination of light olive gray (5Y 6/1) at a scale of 3-5 mm in Sec. 4. Most of core highly disturbed. Intervals marked cavings(?) are very sloppy, darker colored ooze.

Smear Slides

	4-115
sand/silt/clay	3/5/95
nannos	88
forams	7
clay	5

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
4-90	11.2	0.1	92.6

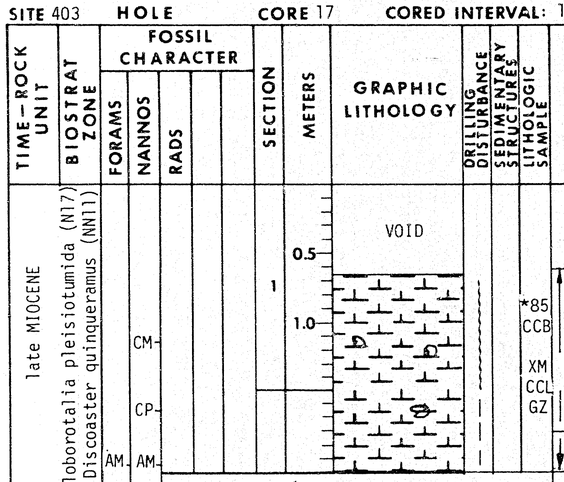
Grain Size

	Sand	Silt	Clay
4-145	6.5	34.4	59.1

X-ray Analysis

Bulk	4-144	<2μm (Partial)	4-144
Qtz.	--	Smec.	54
Cal.	84	Ill.	31
K-Feld.	--	Kaol.	9
Plag.	--	Chlor.	6
Other	16	Zeol.	tr

SITE 403 HOLE CORE 17 CORED INTERVAL: 147.0-156.5 m



Nanno Ooze
very light gray (N8) mixed with dark yellowish brown (10YR 4/2) and light gray (N7) in top 30 cm. Streaks of pyrite. Ice-rafted pebbles probably cavings.

Smear Slides

	1-84
sand/silt/clay	tr/10/90
clay	10
forams	5
nannos	84
diatoms	1

Carbonate Bomb
1-85 95%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-10	11.3	0.1	93.3

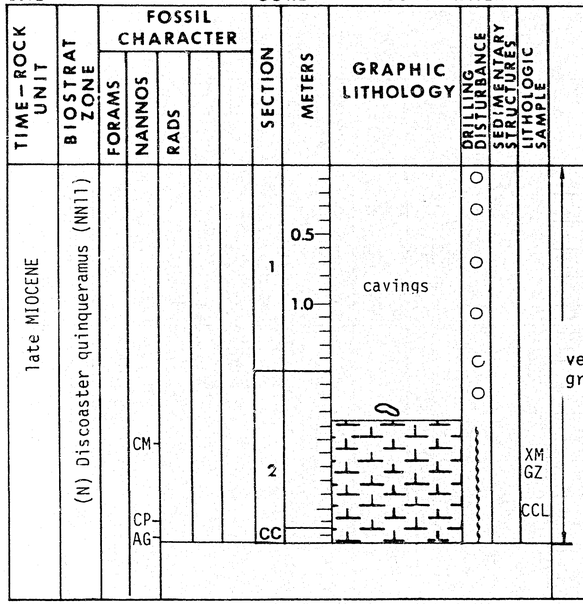
Grain Size

	Sand	Silt	Clay
2-10	2.5	36.9	60.6

X-ray Analysis

Bulk	1-136	<2µm (Partial)	1-136
Qtz.	--	Smec.	37
Cal.	90	Ill.	40
K-Feld.	--	Kaol.	14
Plag.	--	Chlor.	9
Other	10	Zeol.	--

SITE 403 HOLE CORE 18 CORED INTERVAL: 156.5-166.0 m



Nanno Ooze
very light gray (N8) with occasional patches of yellowish gray (10YR 5/4) in cavings. Most of core very sloppy and appears to represent cavings.

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-80	11.3	0.1	93.6

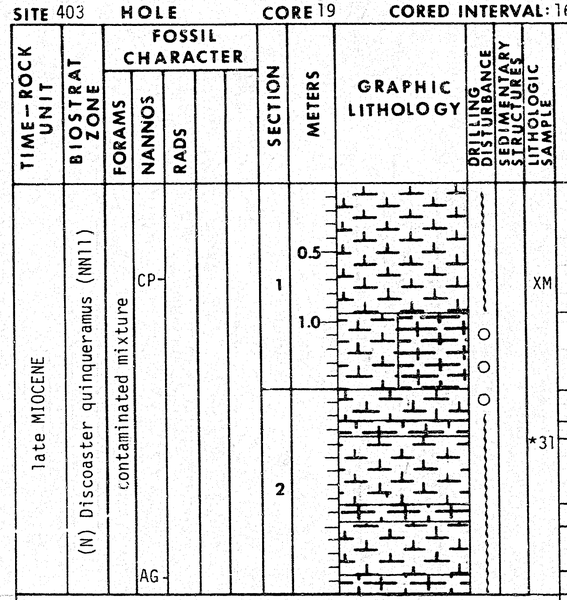
Grain Size

	Sand	Silt	Clay
2-70	4.3	30.6	65.1

X-ray Analysis

Bulk	2-66	<2µm (Partial)	2-66
Qtz.	--	Smec.	43
Cal.	90	Ill.	33
K-Feld.	--	Kaol.	12
Plag.	--	Chlor.	12
Other	10	Zeol.	--

SITE 403 HOLE CORE 19 CORED INTERVAL: 166.0-175.5 m



Nanno Ooze
bluish gray (5B 9/1) with interbeds of Foram Nanno Ooze, very light gray (N8) which is distinctly coarser. Drilling breccia in Sec. 1 (95-150 cm) is mixed nanno ooze, foram nanno ooze and marly foram ooze. Entire core highly disturbed.

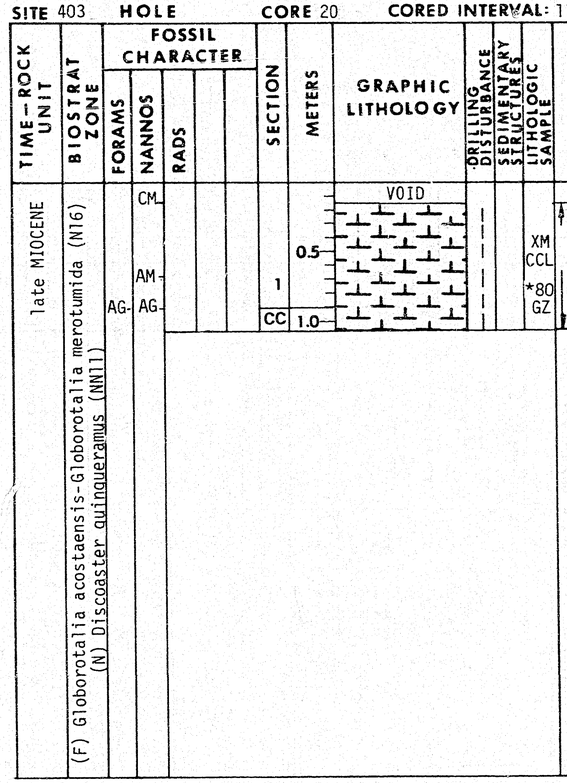
Smear Slides

	2-31
sand/silt/clay	10/20/70
nannos	55
forams	25
unspec. $CaCO_3$	5
diatoms	5

X-ray Analysis

Bulk	1-66	<2µm (Partial)	1-66
Qtz.	--	Smec.	57
Cal.	86	Ill.	27
K-Feld.	--	Kaol.	7
Plag.	--	Chlor.	9
Other	14	Zeol.	--

SITE 403 HOLE CORE 20 CORED INTERVAL: 175.5-185.0 m



Nanno Ooze
bluish white (5B 9/1), homogeneous

Smear Slides

	1-80
sand/silt/clay	0/10/90
clay	10
unsp. $CaCO_3$	24
forams	6
nannos	60

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-40	10.7	0.1	88.5

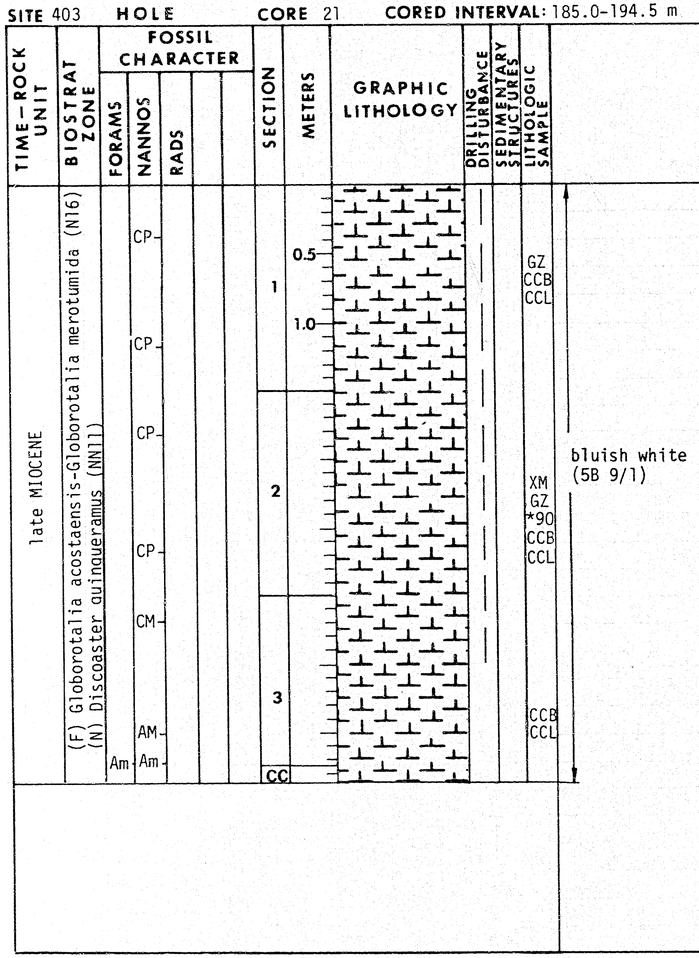
Grain Size

	Sand	Silt	Clay
1-90	3.3	38.4	58.3

X-ray Analysis

Bulk	1-48	<2µm (Partial)	1-48
Qtz.	tr	Smec.	64
Cal.	91	Ill.	23
K-Feld.	--	Kaol.	7
Plag.	--	Chlor.	6
Other	9	Zeol.	--

SITE 403 HOLE CORE 21 CORED INTERVAL: 185.0-194.5 m



LITHOLOGIC DESCRIPTION

Nanno Ooze
bluish white (5B 9/1), homogeneous, moderate disturbance.

Smear Slides

	2-90
sand/silt/clay	5/20/75
clay	20
unsp. $CaCO_3$	3
forams	7
nannos	65
diatoms	1
rads	1
sp. spic.	3

Carbonate Bomb

1-76	92%
2-91	90%
3-88	90%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-70	11.1	0.1	92.3
2-90	11.2	0.0	93.2
3-90	11.3	0.0	93.7

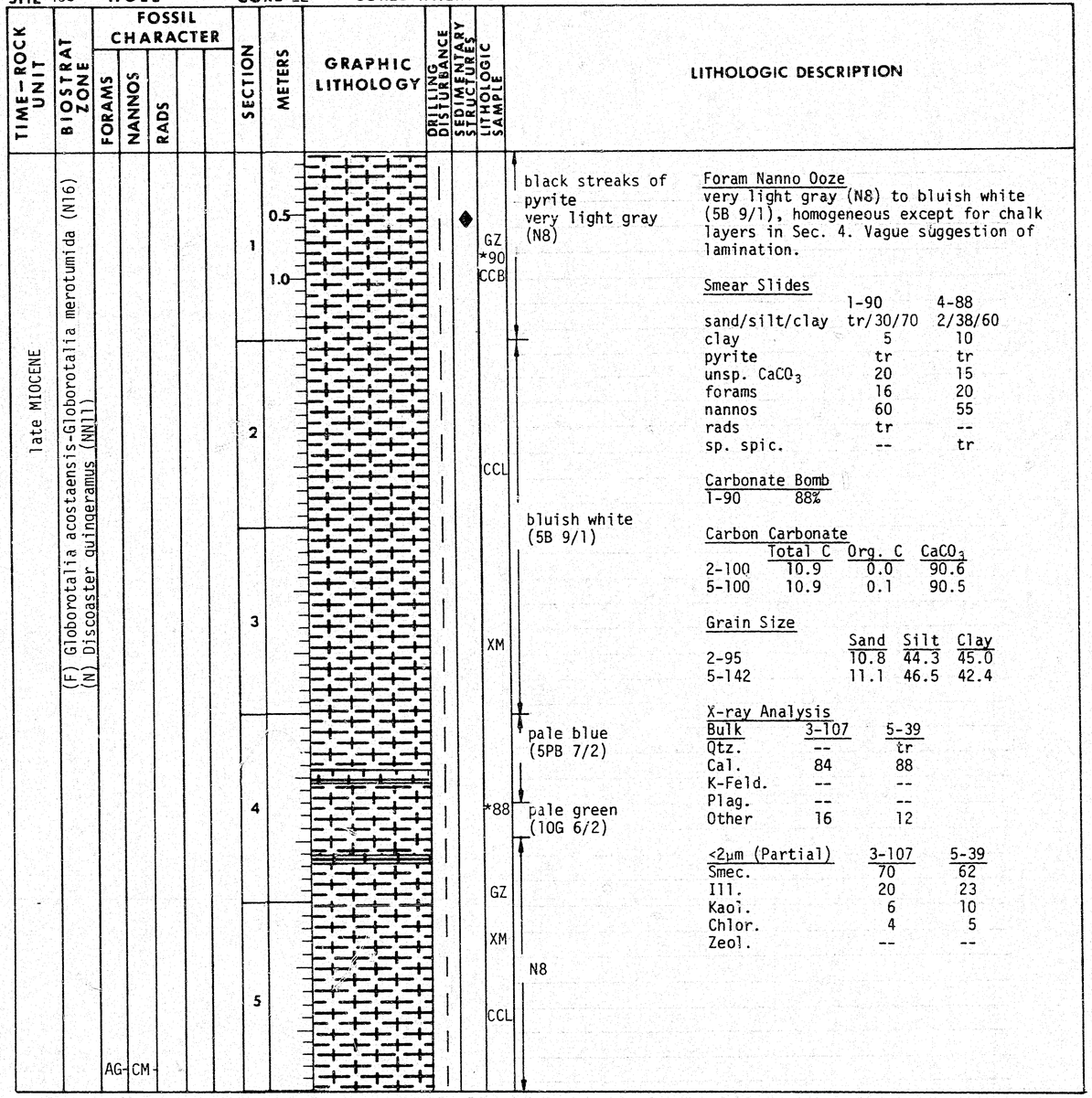
Grain Size

	Sand	Silt	Clay
1-74	2.7	33.7	63.5
2-90	3.2	36.3	60.5

X-ray Analysis

Bulk	2-88	<2μm (Partial)	2-88
Qtz.	--	Smec.	64
Cal.	86	Ill.	22
K-Feld.	--	Kaol.	6
Plag.	--	Chlor.	8
Other	14	Zeol.	--

SITE 403 HOLE CORE 22 CORED INTERVAL: 194.5-204.0 m



LITHOLOGIC DESCRIPTION

Foram Nanno Ooze
very light gray (N8) to bluish white (5B 9/1), homogeneous except for chalk layers in Sec. 4. Vague suggestion of lamination.

Smear Slides

	1-90	4-88
sand/silt/clay	tr/30/70	2/38/60
clay	5	10
pyrite	tr	tr
unsp. $CaCO_3$	20	15
forams	16	20
nannos	60	55
rads	tr	--
sp. spic.	--	tr

Carbonate Bomb

1-90	88%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-100	10.9	0.0	90.6
5-100	10.9	0.1	90.5

Grain Size

	Sand	Silt	Clay
2-95	10.8	44.3	45.0
5-142	11.1	46.5	42.4

X-ray Analysis

Bulk	3-107	5-39
Qtz.	--	tr
Cal.	84	88
K-Feld.	--	--
Plag.	--	--
Other	16	12

<2μm (Partial)	3-107	5-39
Smec.	70	62
Ill.	20	23
Kaol.	6	10
Chlor.	4	5
Zeol.	--	--

SITE 403 HOLE CORE 23 CORED INTERVAL: 204.0-213.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
late MIOCENE	(F) Globorotalia acostaensis-Globorotalia merotumida (N16) (N) Discoaster quinqueramus (NN11)	Am	CP		1	0.5	VOID			*78 *74

N8 5PB 7/2 very light gray (N8)

Foram Nanno Chalk
mainly very light gray (N8); homogeneous except 5 cm layer of pale blue (5PB 7/2).

Smear Slides

	1-28	1-74
sand/silt/clay	3/40/57	0/10/90
clay	10?	10
unsp. $CaCO_3$	20	45
forams	30	15
nannos	40	30

SITE 403 HOLE CORE 24 CORED INTERVAL: 213.5-223.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
late MIOCENE	(F) Globorotalia acostaensis-Globorotalia merotumida (N16) (N) Discoaster quinqueramus (NN11)?	AG	AM CG		CC	0.5				CCB XM *61

N8 N7 mottled with N4

Nanno Chalk
very light gray (N8) with occasional black pyrite streak. Light gray (N7) Nanno Foram Chalk at base which which contains medium dark gray (N4) mottles of volcanic glass.

Smear Slides

	1-61
sand/silt/clay	50/20/30
nannos	15
forams	35
clay	17
vol. glass	15
rads	3
sp. spic.	5
quartz	5

Carbonate Bomb
1-25 91%

X-ray Analysis

Bulk	1-31	<2µm (Partial)	1-31
Qtz.	--	Smec.	71
Cal.	90	Ill.	16
K-Feld.	--	Kaol.	3
Plag.	--	Chlor.	10
Other	10	Zeol.	--

SITE 403 HOLE CORE 25 CORED INTERVAL: 223.0-232.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
late OLIGOCENE	(F) Globigerina angulisuturalis-Globorotalia opima opima (P22-21) (N) Sphenolithus ciperoensis (NP24-25)	CM-AM	AM		CC	0.5	G VOID G			XM *13 *29 *50

N8 10GY 5/2 5GY 7/2

Nanno Chalk
Foram Nanno Chalk
Nanno chalk is very light gray (N8), homogeneous. Rests with sharp contact on grayish green (10GY 5/2) to grayish yellow green (5GY 7/2) foram nanno chalk which contains glauconite filled forams.

Smear Slides

	1-13	1-29	1-50 (CC)
sand/silt/clay	0/10/90	0/35/65	10/25/65
nannos	55	50	31
forams	5	15	30
unspec. $CaCO_3$	30	25	20
clay	10	10	15
glauconite	0	tr	3
other	--	--	sp. spic., pyrite

Carbonate Bomb
1-50 (CC) 91%

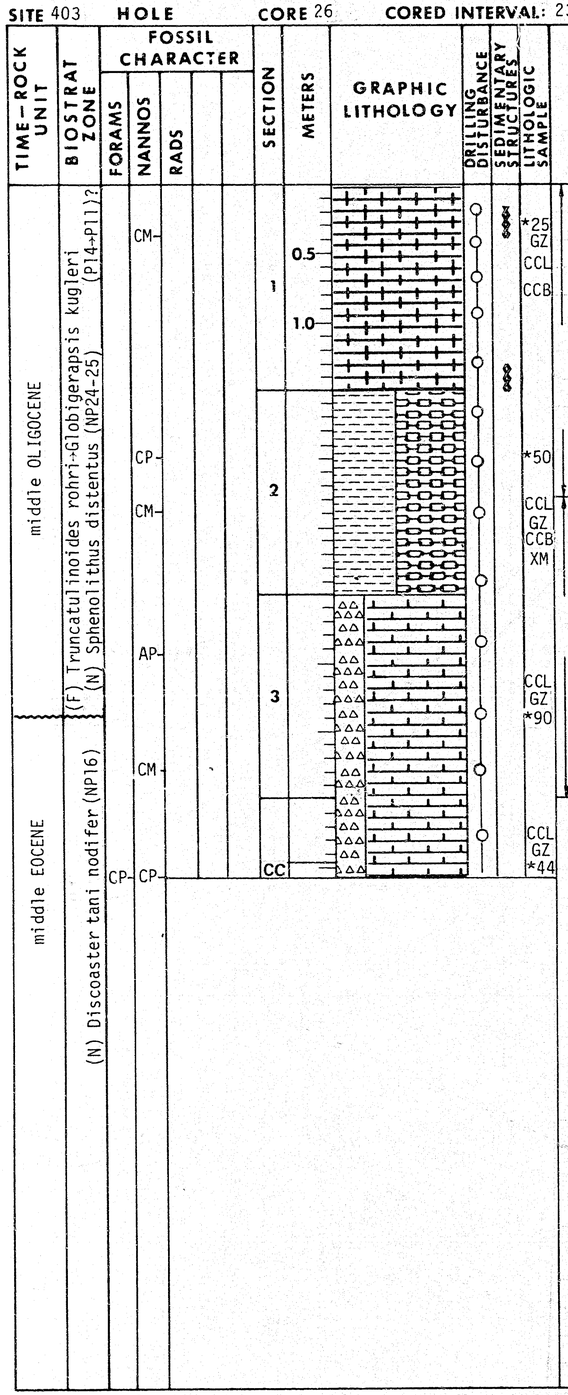
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-40 (CC)	9.1	0.1	75.4

X-ray Analysis

Bulk	1-12	<2µm (Partial)	1-12
Qtz.	--	Smec.	74
Cal.	92	Ill.	14
K-Feld.	--	Kaol.	3
Plag.	--	Chlor.	9
Other	8	Zeol.	tr

SITE 403 HOLE CORE 26 CORED INTERVAL: 232.5-242.0 m



LITHOLOGIC DESCRIPTION

Foram Nanno Chalk
Marly Calcareous Chalk
Siliceous Nanno Chalk
light greenish gray (5G 8/1) to yellowish gray (5Y 8/1); core extensively brecciated by drilling; top slightly sandy (forams, sponge spicules, glauconite); becomes increasingly siliceous downward. Some bioturbation in Sec. 1.

Smear Slides

	1-25	2-50
sand/silt/clay	10/15/75	5/25/70
nannos	48	15
forams	15	15
unspec. $CaCO_3$	25	35
rads	tr	--
sp. spic.	tr	5
diatoms	--	3
clay	10	25
quartz	--	5
glauconite	2	--

	3-90	4-44
sand/silt/clay	5/35/60	1/49/50
nannos	30	30
forams	7	5
unspec. $CaCO_3$	30	30
rads	5	15
sp. spic.	5	7
diatoms	--	3
clay	20	10
quartz	2	--
glauconite	1	--

Carbonate Bomb

1-75	74%
2-95	84%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-60	9.2	0.1	76.3
2-80	9.9	0.1	81.5
3-60	10.3	0.1	85.3
4-30	9.9	0.1	81.7

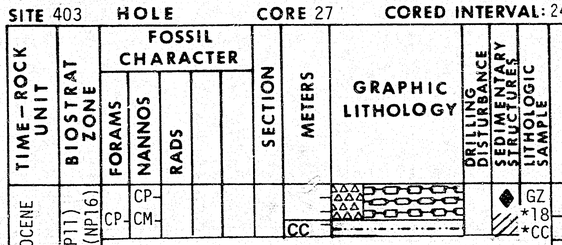
Grain Size

	Sand	Silt	Clay
1-59	20.0	45.9	34.1
2-78	28.8	41.3	29.9
3-68	5.9	59.0	35.0
4-27	10.6	47.8	41.6

X-ray Analysis

Bulk	2-109	<2μm (Partial)	2-109
Qtz.	tr	Smec.	79
Cal.	95	Ill.	14
K-Feld.	--	Kaol.	4
Plag.	--	Chlor.	3
Other	5	Zeol.	--

SITE 403 HOLE CORE 27 CORED INTERVAL: 242.0-251.5 m



LITHOLOGIC DESCRIPTION

Siliceous Calcareous Chalk
Tuffaceous Mudstone
Siliceous Chalk grades from very pale orange (10YR 8/2) downward to grayish orange (10YR 7/1) and is bioturbated. Tuffaceous mudstone is grayish brown (5YR 3/2), fairly well sorted, and characterized by well-developed foreset cross lamination at mm scale.

Smear Slides

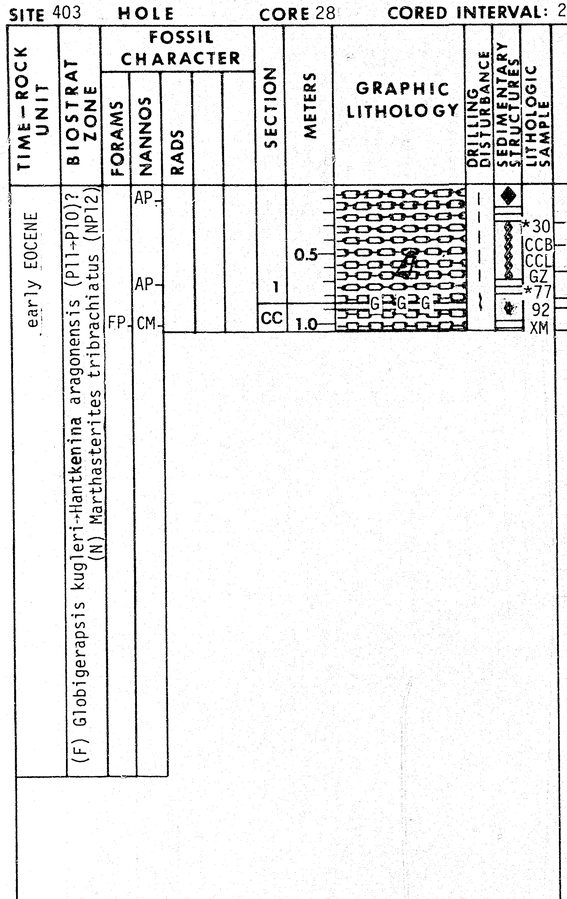
	1-18
sand/silt/clay	1/49/50
nannos	24
forams	1
unspec. $CaCO_3$	40
clay	10
rads	5
sp. spic.	20
diatoms	tr

	1-CC
sand/silt/clay	2/60/38
vol. glass (basic)	30
opaque	10
clay	28
sp. spic.	2
quartz, unspec. $CaCO_3$	tr

Grain Size

	Sand	Silt	Clay
1-10	3.6	47.1	49.2

SITE 403 HOLE CORE 28 CORED INTERVAL: 251.5-261.0 m



LITHOLOGIC DESCRIPTION

Calcareous Chalk
dominantly grayish yellow green (5GY 7/2) to dusky yellow green (5GY 5/2). Parts show moderate to intense bioturbation; parts laminated at scale 1-10 mm with inclinations of 5-15°. Lenses of calcarenite which contain glauconite, echinoid spines, chrinoid fragments. Concentration of glauconite 87-93 cm.

Smear Slides

	1-30	1-77	1-92 (minor)
sand/silt/clay	50/20/30	0/35/65	30/60/10
nannos	0	25	0
forams	3	5	5
unspec. $CaCO_3$	57	47	--
sp. spic.	3	3	5
clay	20	10	10
zeolite	5	2(?)	3
glauconite	5	tr	64
quartz	5	10	?0
other	mica	mica, rads	heavy min. dolomite

Carbonate Bomb
1-40 46%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-50	2.9	0.1	23.6

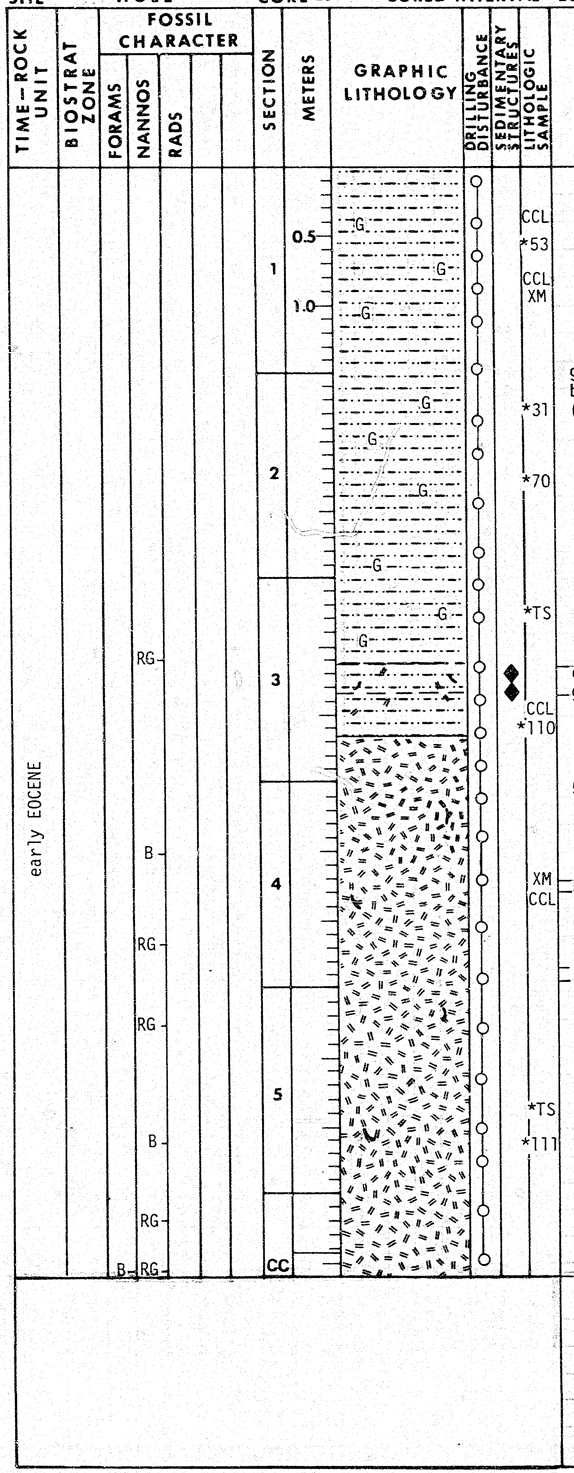
Grain Size

	Sand	Silt	Clay
1-60	6.3	42.3	51.4

X-ray Analysis

Bulk	1-95	<2μm (Partial)	1-95
Qtz.	--	Smec.	94
Cal.	10	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	7	Chlor.	--
Other	83	Zeol.	6

SITE 403 HOLE CORE 29 CORED INTERVAL: 261.0-270.5 m



LITHOLOGIC DESCRIPTION

sandy interval

Glauconitic Mudstone
greenish black (5GY 2/1) with occasional layers of dark greenish gray (5G 4/1). Core broken into cylindrical chunks which internally are undisturbed. Volcanic ash and lapilli are scattered throughout and in lower Sec. 3 grades down from tuffaceous mudstone to vitric tuff.

greenish black (5GY 2/1)

Smear Slides

	1-53	2-70	2-31 (minor)
sand/silt/clay	tr/30/70	15/35/50	20/50/30
clay	68	40	10
quartz	--	5	0
vol. glass	tr	--	60
glauconite	20	39	0
zeolite(?)	2	6	--
sp. spic.	10	5	20
nannos	tr	--	2
mica	1	5	--
forams	--	--	6

dark greenish gray (5G 4/1) concentration of ash and shell fragments

Volcanic Tuff
mainly greenish black (5GY 2/1) with layers of dark greenish gray (5G 4/1). Core brecciated as above. Tuff varies from vitric to lithic in composition, with lapilli scattered throughout. Matrix of mudstone. Shell fragments (pelecypod, chrinoid) are common.

Smear Slides

	3-110	5-111
sand/silt/clay	40/40/20	10/60/30
vol. glass	60	25
vol. RF	20	60
clay	20	7
zeolite	--	2
unspec. $CaCO_3$	tr	5

other: quartz, feldspar, mica, augite, palagonite.

Thin Section (5-83): Heterolithic Tuff.

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-40	0.6	0.1	4.0
1-80	0.3	0.1	1.8
3-100	0.3	0.1	1.3
4-70	0.3	0.1	1.9

Grain Size

	Sand	Silt	Clay
1-45	34.5	28.7	36.8
1-130	34.0	13.6	52.4
4-71	29.9	23.5	46.6

X-ray Analysis

Bulk	1-89	4-72	<2μm (Partial)	1-89	4-72
Qtz.	--	3	Smec.	100	73
Cal.	--	10	Ill.	--	27
K-Feld.	--	3	Kaol.	--	--
Plag.	3	5	Chlor.	--	--
Other	97	79	Zeol.	--	tr

SITE 403 HOLE CORE 30 CORED INTERVAL: 270.5-280.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
early EOCENE		B	RG			0.5				XM *TS

dark greenish gray (5G 4/1)

Lithic Tuff
dark greenish gray (5G 4/1); vague bedding at 3-5 cm scale related to textural variations in ash and lithic fragments; contains shell fragments (mainly chrinoids & pelecypods). Clasts principally of pumiceous lava.

Thin Section (1-34): Pumiceous lava particles predominate and attain 6 mm across, with irregular outlines. Vesicle show variable states of attenuation from perfect spheroids to flattened, and average about 0.1 mm diameter; they are mainly filled with chlorite, devitrified glass, ore, carbonate or perthitic needles. The groundmass is devitrified glass altered mainly to green chlorite or pale brown cryptocrystalline products. Other lava shows a highly fluxioned feldspar-microlitic texture.

Coarse Fraction (>44μm)

vol. rock frag.	10
vol. ash	15
glauconite	20
quartz	25
zeolite(?)	5
mica	10
calcite	20
heavy min.	5

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-40	2.4	0.1	19.4

X-ray Analysis

Bulk	1-34	<2μm (Partial)	1-34
Qtz.	3	Smec.	100
Cal.	--	Ill.	--
K-Feld.	2	Kaol.	--
Plag.	2	Chlor.	--
Other	93	Zeol.	--

SITE 403 HOLE CORE 31 CORED INTERVAL: 280.0-289.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
early EOCENE		B	RG		CC					*TS

grayish black (N2)

Mudstone
grayish black (N2), dominantly coarse silty-very fine sand, moderately well sorted.

Coarse Fraction (>44μm)

quartz	45	Heavy minerals include:
mica	15	hornblende
heavy min.	15	augite
opaque	8	zoisite
glauconite	5	epidote
vol. rock frag.	5	titanite
zeolite	5	
forams	2	

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-10	0.2	0.2	0.2

SITE 403 HOLE CORE 32 CORED INTERVAL: 289.5-299.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
early EOCENE		B	RG		CC					*15

grayish black (N2)

Mudstone
grayish black (N2); dominantly very fine sand-coarse silt, moderately well sorted.

Smear Slides

	CC
sand/silt/clay	60/20/20
quartz	25
feldspar	15
mica	5
altered + opaque	15
heavy min.	tr
glauconite	10
zeolite	10

Coarse Fraction (>44μm)

mica	30
quartz	30
glauconite	10
heavy min.	20 (See Core 31)
opaque plus altered	10

SITE 403 HOLE CORE 33 CORED INTERVAL: 299.0-308.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
early EOCENE			FG-RG			0.5				*TS, *48

N2

Tuffaceous Mudstone-Muddy Tuff
grayish black (N2) with two layers (3-5 cm thick) of tuffaceous calcareous chalk containing abundant shell fragments.

Thin Section (1-13): Closely packed fine sand-grade pyroclastic particles average about 0.15 mm and with conspicuous micas comprise the bulk of this very friable argillaceous and sandy tuff, which contains scattered pellets up to 4 mm across. The last-named are composed of clots of fine quartz and microcline particles in a clay base with rims of similar material and appear to be segregations of partly lithified pyroclastic dust, rather than discrete pyroclasts. Of the resistates, microcline is conspicuous with oligoclase and igenous quarts. Argillized shards are abundant with microlitic intermediate-basic lava, pumica and turbid, subopaque particles too altered to recognize. These also form much of the matrix with green-brown clay material, specks of hypersthene, clinopyroxene and fibrous zeolites. The micas are partly aligned and include conspicuous glauconite, biotite (slightly chloritized) and illite.

Smear Slides

	1-48 (minor)
sand/silt/clay	5/85/10
unspec. $CaCO_3$	72
vol. glass	17
vol. RF	5
clay	5

Coarse Fraction (>44μm)

quartz & feldspar	20
vol. glass	20
mica	20
opaque + altered	30
unspec. $CaCO_3$	5
zeolite	3

Carbonate Bomb

1-59 (CC)	<5%

SITE 403 HOLE CORE 34 CORED INTERVAL: 308.5-318.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
early EOCENE	(N) Marthasterites contortus (NP10)	B, FG, FG, FG, FG, B-FG			1, 2, 3, 4, 5, CC	0.5, 1.0				*63, GZ XM CCL, *80 *TS, *16 GZ CCL, *TS, *7 XM

N3

"slump" structure

Mudstone
dark gray (N3) to dark greenish gray (5GY 4/1). Dominantly coarse silt with some very fine sand. Plane, wavy and lenticular lamination reflects slight textural variations. Evidence of soft sediment deformation-contorted and disrupted laminae. Occasional evidence of bioturbation. Mica and finely divided plant remains are especially conspicuous oriented along laminae.

contorted bedding
wavy lamination
cross lamination

5GY 4/1

Smear Slides

	1-63	2-80
sand/silt/clay	5/40/55	2/58/40
quartz	15	33
mica	15	3
rock frag.(?)	--	36
clay	50	10
glauconite	3	--
heavy min.	2	10
zeolite	10	--
vol. glass	2	5
plant frag.	--	2
unspec. $CaCO_3$	2	1

	4-16	6-7
sand/silt/clay	7/35/58	10/70/20
quartz	25	42
mica	3	--
rock frag.(?)	--	30
clay	49	15
glauconite	5	--
heavy min.	3	7
zeolite	5	--
vol. glass	3	5
plant frag.	--	1
unspec. $CaCO_3$	--	--

Thin Sections (2-93 and 5-36):
Tuffaceous mudstone.

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-60	0.4	0.3	0.9
4-20	0.4	0.3	0.6

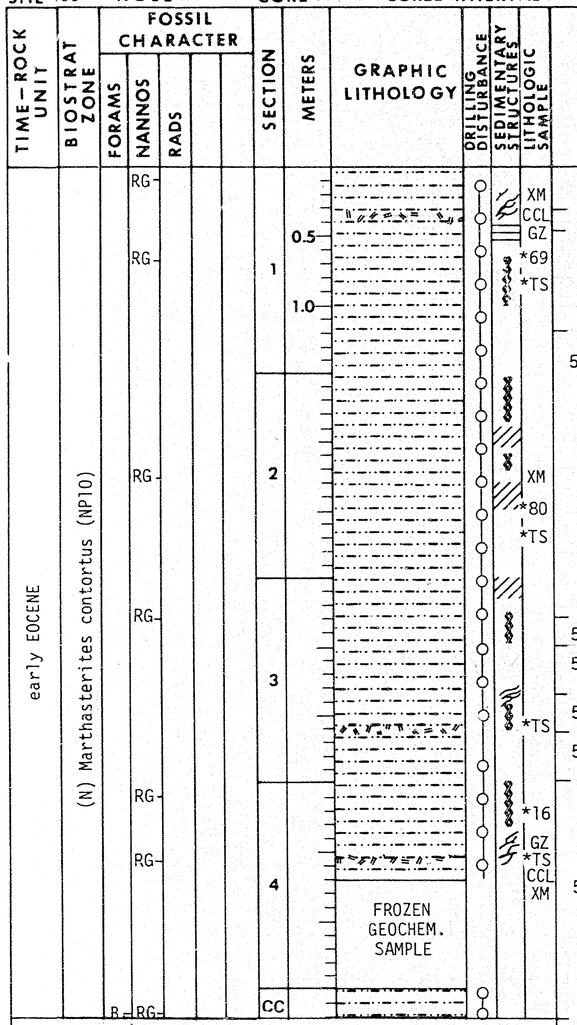
Grain Size

	Sand	Silt	Clay
2-48	33.4	38.6	28.0
4-13	23.3	41.8	34.9

X-ray Analysis

Bulk	2-61	6-30	<2μm (Partial)	2-61	6-30
Qtz.	11	--	Smec.	100	71
Cal.	--	--	Ill.	--	15
K-Feld.	5	--	Kaol.	--	--
Plag.	12	--	Chlor.	--	--
Other	72	100	Zeol.	tr	14

SITE 403 HOLE CORE 35 CORED INTERVAL: 318.0-327.5 m



tuffaceous

5GY 4/1

5G 4/1

5GY 4/1

5G 4/1 tuffaceous

5GY 4/1

tuffaceous

5G 4/1

LITHOLOGIC DESCRIPTION

Mudstone
dominantly dark greenish gray (5GY 4/1) but becoming darker (5G 4/1), finer and more organic rich from Sec. 3 to base. Lenses of tuffaceous material occur as indicated with scattering of volcanic particles throughout. Structures include wavy and cross lamination, contorted lamination (liquefaction?), and bioturbation.

Smear Slides

	2-80	4-16
sand/silt/clay	50/30/20	7/35/58
quartz & feldspar	50	25
mica	5	3
clay	20	49
vol. rock frag.	15	--
vol. glass	tr	3
heavy min.	tr	3
glauconite(?)	5	5
pyrite	1	2
zeolite	3	5
plant frag.	tr	2
unspec. $CaCO_3$	tr	3

Heavy min. consist of: hornblende, epidote, titanite

Thin Sections:
1-83: Micaceous Mudstone
2-119: Micaceous Mudstone
3-99: Micaceous-Tuffaceous Mudstone
4-51: Pumiceous Tuff

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-30	0.4	0.4	0.3
4-70	0.4	0.4	0.3

Grain Size

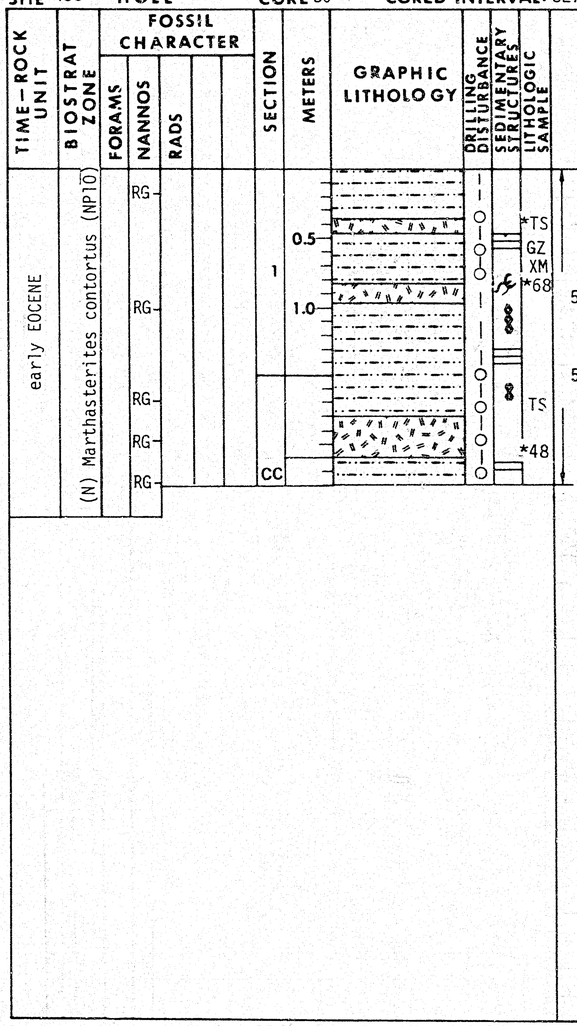
	Sand	Silt	Clay
1-30	15.7	41.6	42.7
4-69	7.1	45.4	47.5

X-ray Analysis

Bulk	1-28	2-75	4-72
Qtz.	4	14	3
Cal.	--	--	--
K-Feld.	5	5	tr
Plag.	50	18	11
Other	41	63	86

<2μm (Partial)	1-28	2-75	4-72
Smec.	100	100	100
Ill.	--	--	--
Kaol.	--	--	--
Chlor.	--	--	--
Zeol.	tr	--	tr

SITE 403 HOLE CORE 36 CORED INTERVAL: 327.5-337.0 m



5G 4/1 to 5GY 2/1

LITHOLOGIC DESCRIPTION

Mudstone
dark greenish gray (5G 4/1) to greenish black (5GY 2/1) with interbeds of Volcanic Tuff. Plane lamination common with occasional cross lamination and bioturbation. Fine plant fragments common.

Smear Slides

	1-68	2-48 (minor)
sand/silt/clay	1/74/25	0/76/30
quartz & feldspar	38	3
mica	2	--
clay	10	10
vol. glass	25	30
vol.(?) RF	14	55
heavy min.	7	--
pyrite	2	
unspec. $CaCO_3$	2	2
plant frag.	tr	tr

Heavy min. consist of: hornblende, tourmaline, zircon, titanite.

Thin Sections:
1-37: Mudstone
2-9: Tuffaceous Mudstone

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-60	0.7	0.7	0.7

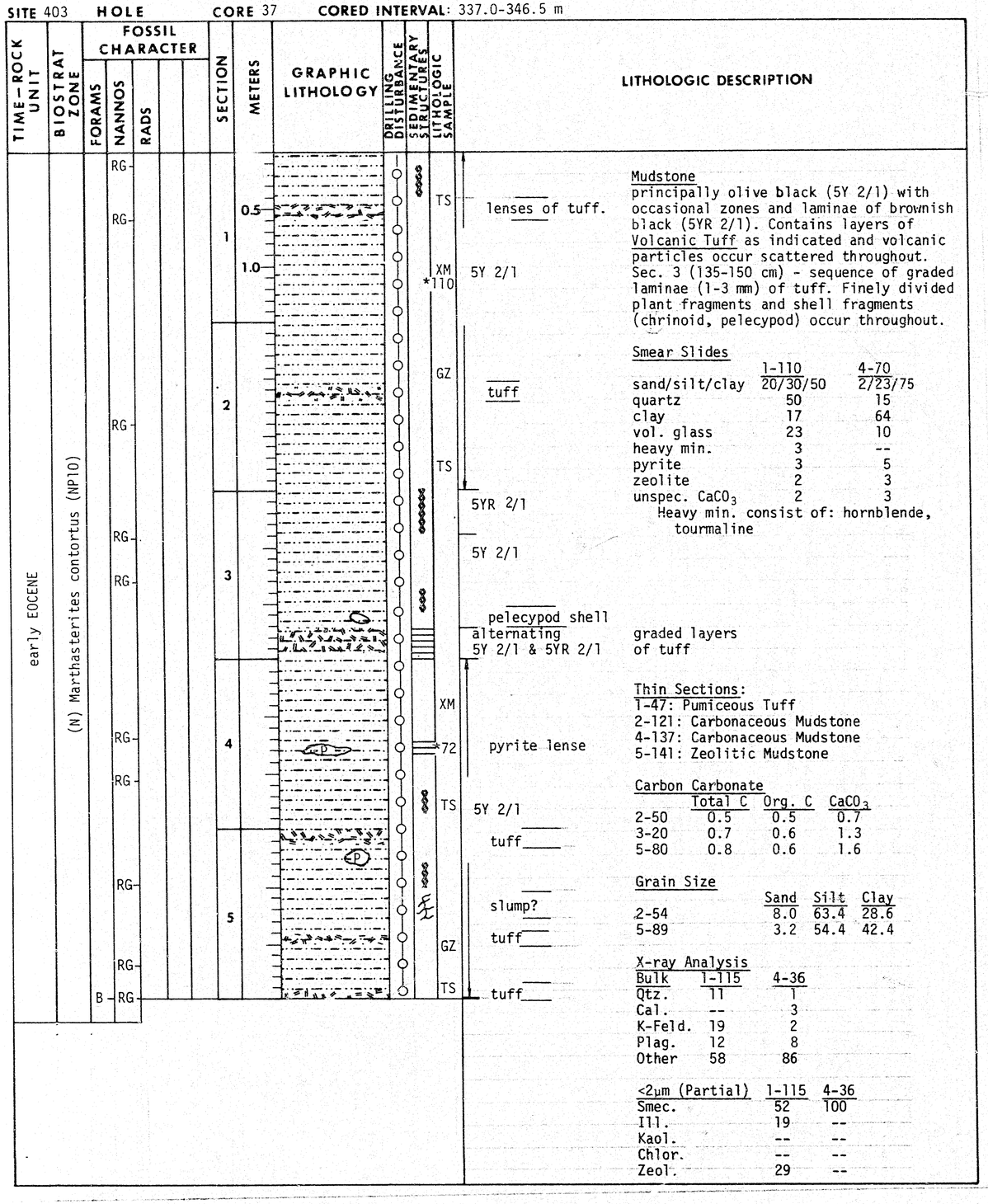
Grain Size

	Sand	Silt	Clay
1-69	3.0	59.8	37.3

X-ray Analysis

Bulk	1-66	<2μm (Partial)	1-66
Qtz.	22	Smec.	81
Cal.	--	Ill.	10
K-Feld.	10	Kaol.	--
Plag.	20	Chlor.	--
Other	48	Kaol.	9

SITE 403 HOLE CORE 37 CORED INTERVAL: 337.0-346.5 m



Mudstone
principally olive black (5Y 2/1) with occasional zones and laminae of brownish black (5YR 2/1). Contains layers of Volcanic Tuff as indicated and volcanic particles occur scattered throughout. Sec. 3 (135-150 cm) - sequence of graded laminae (1-3 mm) of tuff. Finely divided plant fragments and shell fragments (chrinoid, pelecypod) occur throughout.

Smear Slides

	1-110	4-70
sand/silt/clay	20/30/50	2/23/75
quartz	50	15
clay	17	64
vol. glass	23	10
heavy min.	3	--
pyrite	3	5
zeolite	2	3
unspec. $CaCO_3$	2	3

Heavy min. consist of: hornblende, tourmaline

Thin Sections:
1-47: Pumiceous Tuff
2-121: Carbonaceous Mudstone
4-137: Carbonaceous Mudstone
5-141: Zeolitic Mudstone

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-50	0.5	0.5	0.7
3-20	0.7	0.6	1.3
5-80	0.8	0.6	1.6

Grain Size

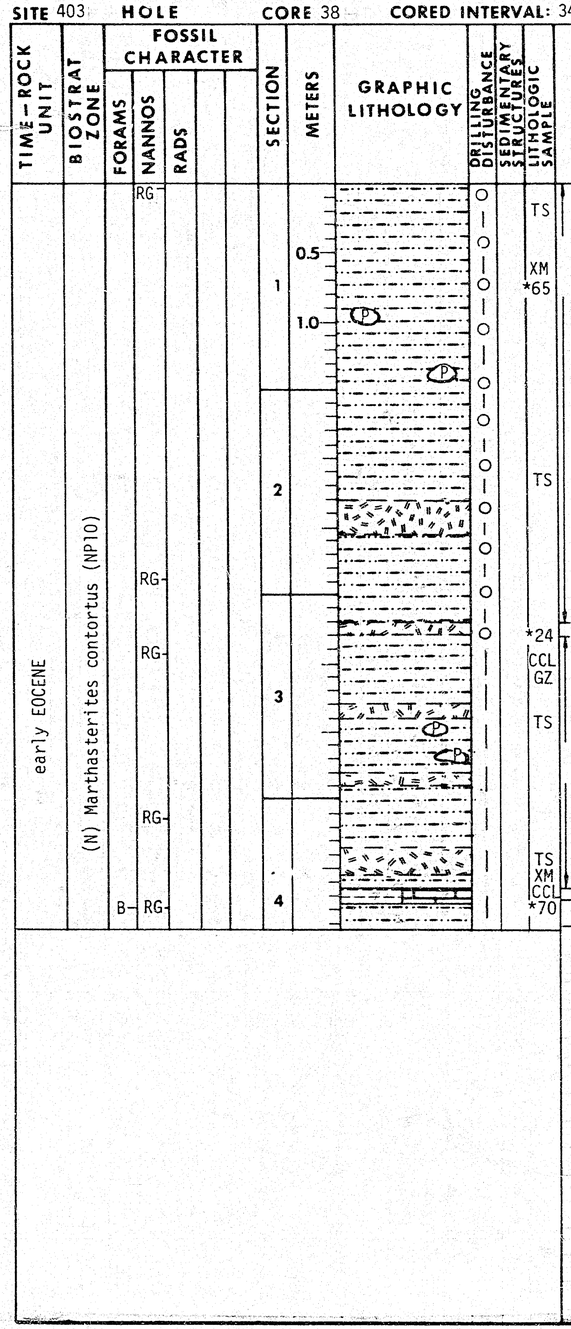
	Sand	Silt	Clay
2-54	8.0	63.4	28.6
5-89	3.2	54.4	42.4

X-ray Analysis

Bulk	1-115	4-36
Qtz.	11	1
Cal.	--	3
K-Feld.	19	2
Plag.	12	8
Other	58	86

<2μm (Partial)	1-115	4-36
Smec.	52	100
Ill.	19	--
Kaol.	--	--
Chlor.	--	--
Zeol.	29	--

SITE 403 HOLE CORE 38 CORED INTERVAL: 346.5-356.0 m



Tuffaceous Mudstone
dominantly olive black (5Y 2/1) with dark gray (N3) to grayish black (N2) tuff layers in Sec. 3. Vitric and lithic volcanic material occurs throughout but is concentrated in Volcanic Tuff layers as shown. Finely divided plant fragments and traces of megafossils are evident throughout the core. Pyrite nodules occur in Sec. 1 & 3 and a thin greenish gray (5G 6/1) Marly Limestone bed occurs in Sec. 4.

Smear Slides

	1-65	3-24	4-70 (minor)
sand/silt/clay	tr/30/70	15/65/20	--/--/--
quartz	18	25	3
feldspar	--	2	--
mica	--	2	--
clay	50	12	35
(?) vol. glass & RF	30	47	--
opaque	--	5	--
pyrite	tr	--	tr
zeolite	1	2	--
plant frag.	1	--	tr
unspec. $CaCO_3$	tr	2	72

Thin Sections:
1-26: Tuffaceous Mudstone
2-59: Carbonaceous Mudstone
3-91: Tuffaceous(?) Mudstone
4-43: Tuffaceous Mudstone - Muddy Tuff

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-60	1.0	0.8	1.1
4-65	7.9	0.3	63.2

Grain Size

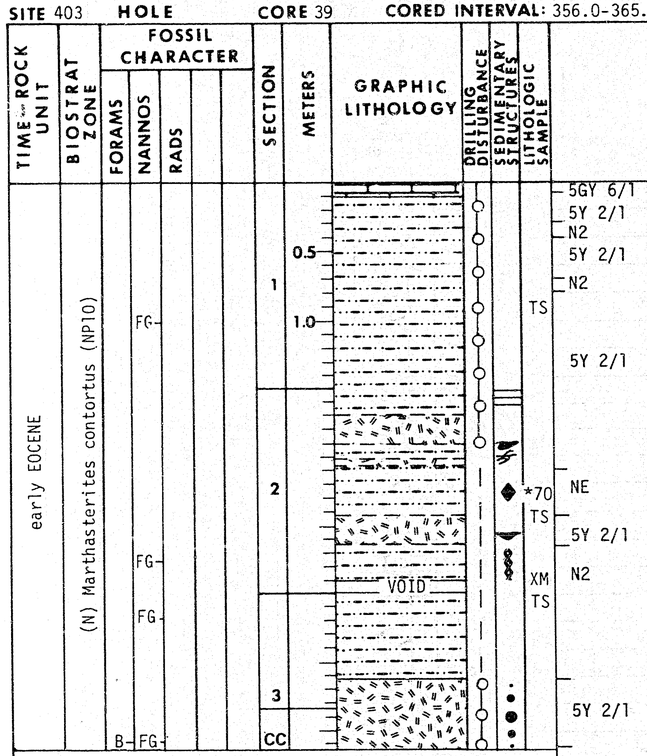
	Sand	Silt	Clay
3-59	3.2	62.1	40.7

X-ray Analysis

Bulk	1-67	4-67
Qtz.	5	4
Cal.	--	7
K-Feld.	7	6
Plag.	31	8
Other	57	75

<2μm (Partial)	1-67	4-67
Smec.	77	52
Ill.	11	15
Kaol.	--	--
Chlor.	--	--
Zeol.	12	33

SITE 403 HOLE CORE 39 CORED INTERVAL: 356.0-365.5 m



Tuffaceous Mudstone
Muddy Tuff

Tuffaceous Mudstone mainly olive black (5Y 2/1) to grayish black (N2); common bioturbation and some lamination; load casts, flame structure, contorted lamination common in association with tuff beds. Pyrite and megafossil fragments scattered throughout.
Muddy Tuff is complexly intertongued with mudstone; mainly medium-coarse sand sized; where occurs in distinct beds, commonly graded, both normal and reverse.

Smear Slides

	2-70	
sand/silt/clay	0/30/70	
quartz	15	
mica	3	
clay	57	
vol. glass	10	
zeolite	5	
sp. spic.	3	
nannos	3	
plant frag.	1	
other	3	Pyrite, unspec. $CaCO_3$, heavy min.

Thin Sections (1-90, 2-89, 3-11): Tuffaceous Mudstone

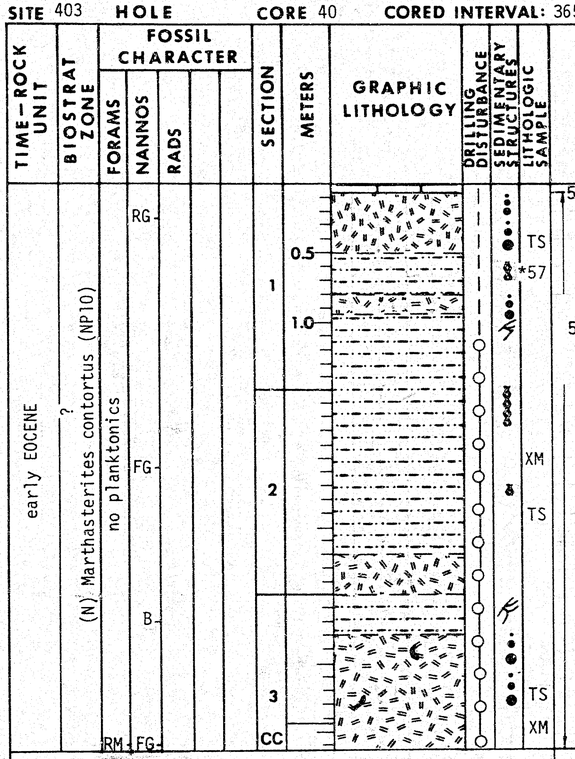
Carbonate Bomb

	Total C	Org. C	$CaCO_3$
2-140	0.8	0.4	2.7
3-50	0.7	0.2	3.7

X-ray Analysis

Bulk	2-138	<2μm (Partial)	2-138
Qtz.	2	Smec.	100
Cal.	--	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	6	Chlor.	--
Other	92	Zeol.	--

SITE 403 HOLE CORE 40 CORED INTERVAL: 365.5-375.0 m



Tuffaceous Mudstone
Muddy Tuff
greenish black (5G 2/1); bioturbation and contorted lamination are common in mudstone; graded bedding common in tuffs. Shell fragments scattered throughout. Thin Limestone bed at top of Sec. 1.

Smear Slides

	1-57
sand/silt/clay	25/15/60
quartz	20
vol. rock frag. and glass (altered)	23
clay	57
others (tr): pyrite, nannos, plant fragments, glauconite	

Thin Sections:
1-46: Muddy (vitric-lithic) Tuff
2-48: Tuffaceous Mudstone
3-78: Muddy Tuff: An argillized, poorly sorted tuff, this is formed of closely packed, unabraded pumice, shards and lesser crystals, with clayey vitroclastic matrix. Considerable lithological variety of parental material is shown by the pyroclasts in this thin section: range of pumice textures with chlorite-filled vesicles in an oxidized base of brown smectitized glass, microlitic lava composed of andesine laths (0.1 x 0.02 mm) indicating basaltic andesite or basalt, brown devitrified glass shards and crystals of K-Feldspar. The clayey matrix contains calcitic nannofossils, glauconite, chlorite, a little quartz silt and zeolites.

Carbon Carbonate

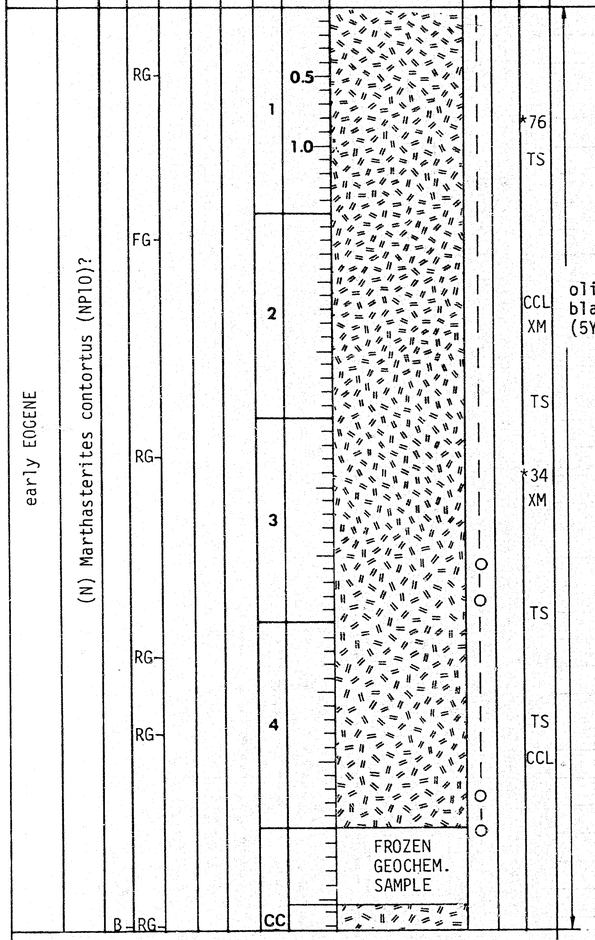
	Total C	Org. C	$CaCO_3$
1-70	0-9	0.4	4.3

X-ray Analysis

Bulk	1-39	2-47	3-101
Qtz.	--	5	--
Cal.	--	--	--
K-Feld.	--	4	tr
Plag.	--	6	7
Other	13	85	93

<2μm (Partial)	1-39	2-47	3-101
Smec.	100	76	100
Ill.	--	--	--
Kaol.	--	--	--
Chlor.	--	--	--
Zeol.	--	24	--

SITE 403 HOLE CORE 41 CORED INTERVAL: 375.0-384.5 m



Muddy Volcanic Tuff
olive black (5Y 2/1); composed mainly of volcanic glass but volcanic rock fragments are common also; most is silt to sand sized with occasional lapilli; matrix of olive black mud (mainly clayey silt); scattering of megafossils (gastropod, pelecypod) throughout core. Parts of Sec. 1 - Tuffaceous Mudstone.

Smear Slides

	1-76 (matrix)	3-34
sand/silt/clay	0/40/60	5/50/45
quartz	10	0
feldspar	0	5
mica	0	5
clay	57	19
vol. glass	20	40
vol. RF		20
chlorite(?)	5	5
unspec. $CaCO_3$	3	5
nannos	3	--
plant frag.	1	--
glauconite	tr	

Thin Sections:
1-111: Tuffaceous Mudstone
2-142: Muddy (vitric-lithic) Tuff
3-147: Muddy (bitric-lithic) Tuff
4-70: Muddy (crystal) Tuff

Carbon Carbonate

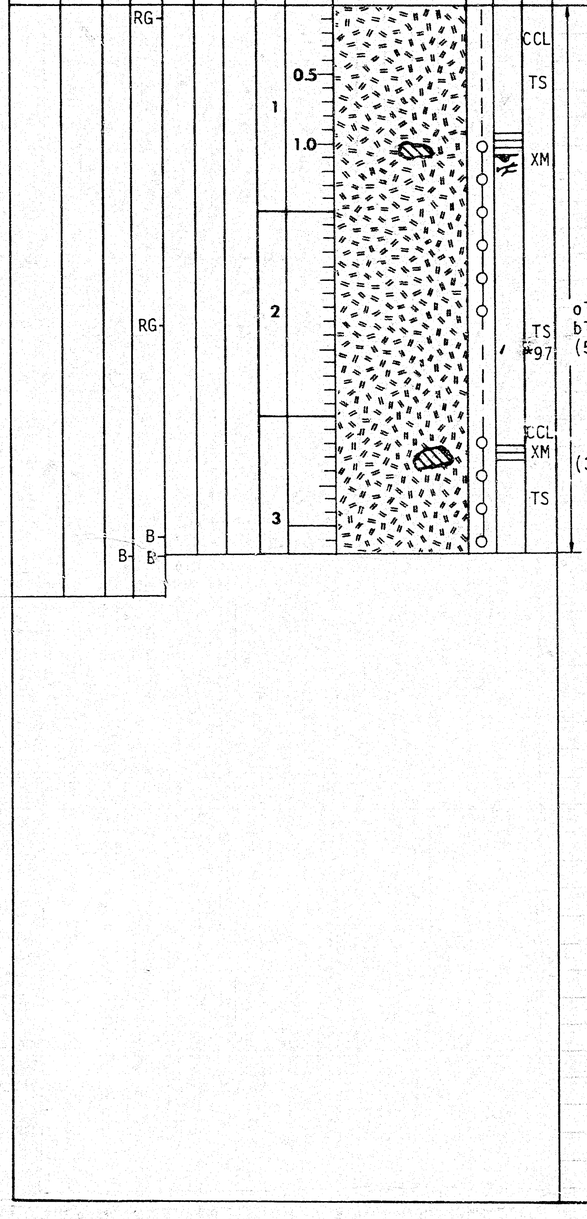
	Total C	Org. C	$CaCO_3$
2-70	0.4	0.1	2.8
4-100	0.4	0.1	2.9

X-Ray Analysis

Bulk	2-77	3-60
Qtz.	4	--
Cal.	3	tr
K-Feld.	--	--
Plag.	--	--
Other	93	100

<2μm (Partial)	2-77	3-60
Smec.	100	--
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Zeol.	--	--

SITE 403 HOLE CORE 42 CORED INTERVAL: 384.5-394.0 m



Muddy Tuff
olive black (5Y 2/1); dominantly silt to very fine sand sized glass and lithic particles; occasional lapilli and clasts to 3 cm diameter. Megafossils (pelecypods, gastropods) and plant debris are common. Matrix of olive black mud (clayey silt).

Smear Slides

	2-97
sand/silt/clay	10/40/50
clay	45 (largely
vol. glass	30 chlorit?)
vol. RF	20
unsp. $CaCO_3$	5
other	tr (pyrite, plant frag.)

Thin Sections:
1-56: Muddy (lithic-crystal) Tuff. Poorly sorted heterolithic pyroclasts attain 2 mm across and include chloritized pumice, abundant glass shards, some apparently unaltered, oxidized microlitic lava, and crystals of feldspar (microcline) set in a matrix of closely packed chloritized shards, patches of mudstone, with sparse glauconite pellets (0.3 mm), micas and microfauna, chiefly foraminifera.
2-91: Muddy Tuff
3-64: Lithic Lapilli-Tuff. Lapilli of altered pumice occur sparsely up to 1 cm long, with vesicles averaging 0.15 mm diameter. Compared to the previous tuffaceous samples, this is thus very poorly sorted. Pumice is conspicuous among the matrix vesicles ranging in shape and filling which includes chlorite and zeolite. The altered glass base of pumice appears to be mainly chlorite. Glass shards are also conspicuous and are altered to brown clay material. The finer matrix includes much fine sand- and silt-grade angular resistates (averaging 0.1 mm), microcline, soda plagioclase, quartz, with glauconite and biotite flakes.

Carbon Carbonate

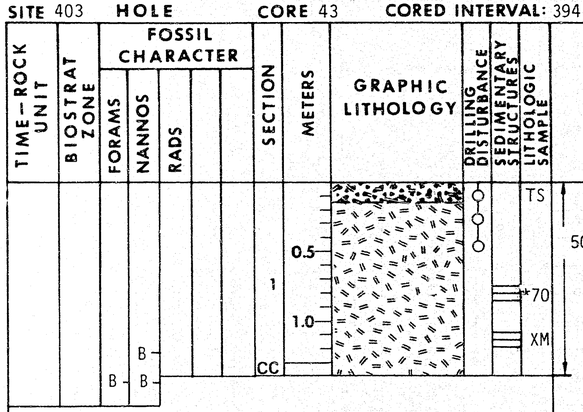
	Total C	Org. C	$CaCO_3$
1-20	0.1	0.1	0.2
3-10	0.3	0.1	1.3

X-ray Analysis

Bulk	1-117	3-15
Qtz.	tr	1
Cal.	5	--
K-Feld.	--	--
Plag.	--	3
Other	95	96

<2μm (Partial)	1-117	3-15
Smec.	100	100
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Zeol.	--	--

SITE 403 HOLE CORE 43 CORED INTERVAL: 394.0-403.5 m



Volcanic Tuff
greenish black (5G 2/1); composed mainly of sand-silt sized lithic fragments; top 15 cm - mixed ash and lapilli, very porous; scattered megafossils (gastropod, pelecypod). Vague plane lamination.

Smear Slides

quartz	8
feldspar	2
clay	8
vol. RF	70
vol. glass	10
hornblende	1
zeolite	1

Thin Section 1-5: Sand-grade heterolithic pyroclasts and resistates averaging 0.3 mm, and ranging up to fine granules (3 mm) characterize this tuff. All are angular and closely packed. They include green-brown altered pumice with zeolite-infilled vesicles, pale olive green argillized glass, feldspar-microlitic oxidized lava, particles of microcline, andesine, ? anorthoclase, quartz. The matrix includes much clay with comminuted pyroclastic dust, chloritized glass shards, micas, and specks of angular amphibole with X = green, Z = blue green.

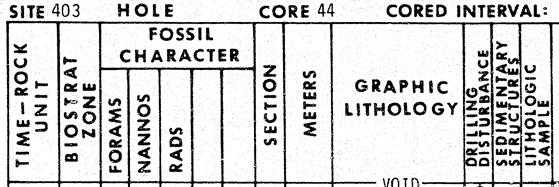
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-100	0.1	0.0	0.1

X-ray Analysis

Bulk	1-104	<2μm (Partial)	1-104
Qtz.	5	Smec.	70
Cal.	--	Ill.	30
K-Feld.	6	Kaol.	--
Plag.	9	Chlor.	--
Other	80	Zeol.	--

SITE 403 HOLE CORE 44 CORED INTERVAL: 403.5-413.0 m

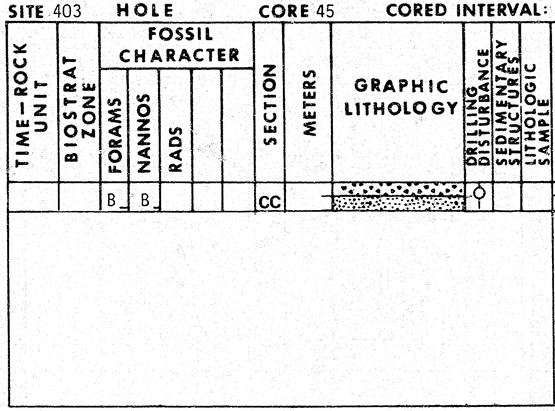


Lapilli Tuff
Tuffaceous Mudstone
Tuff is dark gray (N3), carbonate cemented, with clasts from few mm to 8 mm, poorly sorted. Mudstone is dark greenish gray (5GY 4/2), very soft, micaceous. Contains fragments of coaly material; vague cross lamination.

Smear Slides (Tuff)

vol. glass	40
vol. RF	20
quartz	10
clay	10
opaque	4
zeolite	2
unspec. $CaCO_3$	14

SITE 403 HOLE CORE 45 CORED INTERVAL: 413.0-422.5 m



Lapilli Conglomerate
Silty Sandstone
Conglomerate is greenish black (5GY 2/1), carbonate cemented and contains granules of quartz and shell fragments as well as volcanic lapilli. Sandstone is dark gray (N3), quartzose, micaceous, moderately sorted, carbonate cemented. Evidence of limonite staining.

SITE 403 HOLE CORE 46 CORED INTERVAL: 422.5-432.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
		B–B–	B–		CC	0.5, 1, 1.0				TS *

5Y 2/1
10YR 2/2
5Y 2/1

LITHOLOGIC DESCRIPTION

Tuffaceous Siltstone
Lignitic Mudstone
Silty Sand

Siltstone is olive black (5Y 2/1), well-laminated to cross-laminated on scale of 1-3 mm.
Mudstone is dusky yellow brown (10YR 2/2), and contains up to 6% organic carbon.
Silty sand is olive black (5Y 2/1), soft. From 65-100 cm: sand is chiefly poorly sorted medium to coarse quartz with admixture of volcanic ash and lapilli. From 100-115, sand is fine-medium, moderately sorted, but interlaminated with sandy mud.

Smear Slides (Siltstone)

quartz	30
vol. glass	25 (pale brown)
mica	20
vol. RF	10
feldspar	5
clay	10
hornblende	tr

Thin Section 1-28: This is composed of closely packed, oriented well-sorted clastic grains and plentiful micas (biotite, chlorite) giving rise to a marked lamination. Resistates average 0.04 mm and comprise very elongated slivers of quartz, oligoclase, andesine, microperthite, microcline, ?anorthe-clase. Pyroclasts include altered pumice (0.3 mm) microlitic lava particles, interstitial brown argillized shards. The clay matrix includes carbonate bioclasts, and specks of angular, fresh green horn-blende, possible riebeckite and a trace of brown tourmaline.

Site 403, Core 47, 432.0-441.5 m: NO RECOVERY

SITE 403 HOLE CORE 48 CORED INTERVAL: 441.5-451.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
			B–		CC					

N5

LITHOLOGIC DESCRIPTION

Sandstone
medium gray (N5); chiefly subrounded quartz and feldspar, medium to coarse, moderate sorting. Scattered volcanic ash.

Site 403, Core 49, 451.0-460.5 m: NO RECOVERY

SITE 403 HOLE CORE 50 CORED INTERVAL: 460.5-470.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
			B–		CC					

5GY 4/1

LITHOLOGIC DESCRIPTION

Sandstone
dark greenish gray (5GY 4/1), arkosic, medium to well-sorted, subrounded, calcite cemented.

Thin Section:

quartz	38
feldspar	15
mica	12
vol. RF	5
calcite cemented	30
heavy min.	tr (includes: green hornblende, epidote, zoisite, pyrite

SITE 403 HOLE CORE 51 CORED INTERVAL: 470.0-479.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
			B–		CC					

LITHOLOGIC DESCRIPTION

Sandstone
dark greenish gray (5G 4/1), arkosic, fine-medium, moderate-well sorted, carbonate cemented. Pyrite inclusions. Approximately 5-10% volcanic rock frag-ments.

SITE 403 HOLE CORE 52 CORED INTERVAL: 479.5-489.0 m ?

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
?		RP– No Planktonics	B–							*3

olive black (5Y 2/1)

LITHOLOGIC DESCRIPTION

Mud
one teaspoonful in core catcher. May be cavings. Olive black (5Y 2/1), soft.

Smear Slides

	CC
sand/silt/clay	40/40/20
quartz	60
feldspar	10
clay	20
mica	5
heavy min.	tr
vol. rock frag.?	5
pyrite	tr
plant debris	1

SITE 404 HOLE CORE 1 CORED INTERVAL: 0.0-9.0 m

TIME-ROCK UNIT: PLEISTOCENE
BIOSTRAT ZONE: (F) Globorotalia truncatulinoides (N22) / (N) Emiliania huxleyi (NN21)
FOSSIL CHARACTER: FORAMS; NANNOS: AG, CG, AM, AG, RG, AG, AG, Ag-AG; RADS
SECTION: 1, 2, 3, 4, 5, 6, CC
METERS: 0.5, 1.0
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: *20 CCB; CCL; GZ XM; CCB; CCL; CCB; CCB; *60 CCL; GZ; CCB; CCB; *120 CCB XM; CCB; GZ; CCL; CCB; CCL; CCB

LITHOLOGIC DESCRIPTION

5YR 6/4

5YR 7/2

alternating 5YR 6/4, 5YR 7/2, 5YR 5/6

5YR 7/2 sandstone pebble

5YR 5/6 to 5YR 6/4

10YR 8/2

foram rich layer, pale yellowish brown (10YR 6/2)

5YR 6/4

calcareous mud

5YR 5/6

foram rich layer: sandstone pebble

moderate yellowish brown (10YR 5/4)

5YR 6/4

5YR 8/1

grayish orange pink (5YR 7/2) mottles of (5YR 8/1)

Marly Foram Nanno Ooze with Foram Nanno Ooze and Calcareous Sandy Mud

two lithologies interbedded. Principal occasional bioturbation and layers of concentrated forams occur as indicated. Ice-rafted(?) pebbles noted.

Carbonate Bomb

1-20	28%	3-50	52%	5-80	61%
1-80	48%	4-70	12%	6-115	23%
1-132	74%	4-120	29%		
2-60	24%	5-40	37%		

Smear Slides

	minor cal. sandy mud 1-20	foram nanno ooze 2-60	major marly foram nanno ooze 4-120
nannos	44	64	3
forams	15	10	10
clay	20	15	40
quartz	10	5	15
mica	1		
unspec. $CaCO_3$	10	5	7
other	--	--	7
sand/silt/clay	10/15/75	10/30/60	30/30/40

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-55	5.9	0.1	48.4
1-107	8.5	0.1	69.9
2-69	9.9	0.1	82.0
4-77	3.1	0.1	25.1
5-58	8.6	0.1	71.0
6-7	4.8	0.1	39.5
6-77	4.7	0.1	38.3

Grain Size

	Sand	Silt	Clay
1-66	29.9	29.4	40.7
2-78	45.4	18.7	35.9
4-78	19.3	39.2	41.4
5-46	30.5	27.1	42.4

X-ray Analysis

Bulk	1-70	4-133
Qtz.	14	5
Cal.	32	33
K-Feld.	1	4
Plag.	2	8
Other	51	50

<2μ (Partial)	1-70	4-133
Smec.	17	21
Ill.	49	46
Kaol.	17	25
Chlor.	17	8
Silica	--	--
Zeol.	--	--

SITE 404 HOLE CORE 2 CORED INTERVAL: 21.5-28.0 m

TIME-ROCK UNIT: late PLIOCENE
BIOSTRAT ZONE: (F) Globorotalia tosaensis (N20-N21) / (N) Pseudoemiliania lacunosa (NN19)
FOSSIL CHARACTER: FORAMS; NANNOS: AG, AG, AG, AG, AM, CG, AG, Aq-AM; RADS
SECTION: 1, 2, 3, 4, 5, 6, 7, CC
METERS: 0.5, 1.0
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: *25 CCB; CCL; GZ XM; GZ CCB; *140; GZ; CCB TS; CCB; *82 GZ; CCL; CCL; GZ

LITHOLOGIC DESCRIPTION

5YR 5/2 + 5Y 4/1

5YR 8/1 angular 4 cm pebble of hornfels

pinkish gray (5YR 8/1)

5YR 5/2 pebbles 5YR 8/1

10YR 6/2

5YR 8/1

5Y 6/1

5YR 8/1

light olive gray (5Y 6/1)

mottle of 5YR 8/1

10YR 6/2

mottles of Vitric Tuff, dark greenish gray (5GY 4/1) to black (N1)

5YR 8/1

10YR 6/2

5YR 8/1

5Y 6/1 with streaks of N1

GEOCHEM. SAMPLE

Marly Nanno Foram Ooze with Foram Nanno Ooze

two main lithologies interbedded.
Colors include:
marly ooze - pale brown (5YR 5/2)
- olive gray (5Y 4/1)
- light olive gray (5Y 6/1)
- pale yellowish brown (10YR 6/2)

foram nanno ooze - pinkish gray (5YR 8/1)

Occasional slight bioturbation, ice-rafted pebbles - mainly metamorphic. Inclusions of vitric tuff in Sec. 6 & 7. All contacts approximate due to intense drilling disturbance.

Smear Slides

	major 1-25	major 2-140	minor 6-82
sand/silt/clay	1/29/70	5/35/65	60/35/5
nannos	15	20	--
forams	20	25	1
unspec. $CaCO_3$	5	5	1
clay	48	39	5
quartz	12	10	10
other:	--	1	83
plant frag.		1	
vol. glass		--	81
feldspar		--	2

Carbonate Bomb

1-25	32%	5-110	70%
2-140	35%	6-82	5%

Coarse Fraction (>44μ) Sec. 7, CC

mica	1	heavy min.	3
vol. glass	5	echinoid sp.	1
quartz	10	rads	1
feldspar	3	forams	76

Carbon Carbonate

	1-54	5-122	6-101	6-127
Total C	3.3	8.4	8.6	5.9
Org. C	0.1	0.1	0.1	0.1
$CaCO_3$	26.8	69.4	70.5	48.2

Grain Size

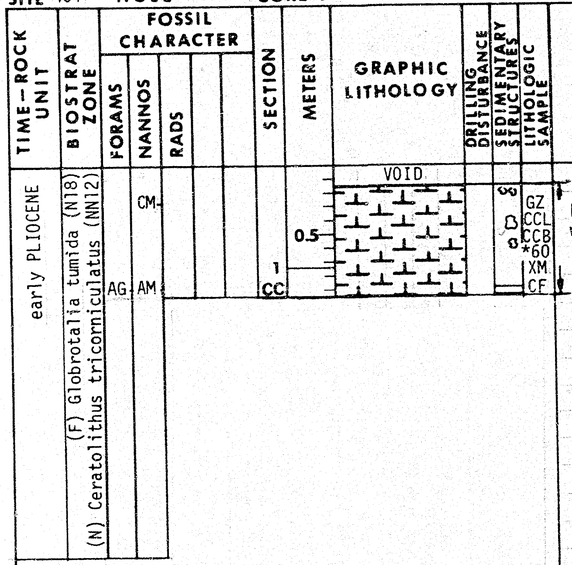
	Sand	Silt	Clay
1-51	46.3	29.3	24.4
2-93	24.1	42.9	33.0
4-74	41.1	31.2	27.7
5-124	39.8	31.9	28.4
6-98	47.8	26.7	25.5
6-130	39.4	31.4	29.2

X-ray Analysis

Bulk	1-47	5-134
Qtz.	10	4
Cal.	35	53
K-Feld.	6	21
Plag.	39	tr
Others		22

<2μ (Partial)	1-47	5-134
Smec.	23	--
Ill.	49	62
Kaol.	9	18
Chlor.	19	20
Silica	--	--
Zeol.	--	--

SITE 404 HOLE CORE 3 CORED INTERVAL: 104.0-135.0 m



pebbles (5-10 mm)
bluish white (5B 9/1)
pebble (3 cm) mica schist
tuff lamination

Nanno Ooze
bluish white, homogeneous except for ice-rafted pebbles and tuff lamination at 70 cm.

Smear Slides

	60 cm
sand/silt/clay	0/5/95
nannos	57
forams	5
unspec. $CaCO_3$	20
clay	10
rads	5
sp. spic.	3

Coarse Fraction (>44μ) 2cc

forams	97
fish debris	1
sp. spic.	1
quartz	1

Carbonate Bomb (45 cm)- 81%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-59	11.1	0.1	92.0

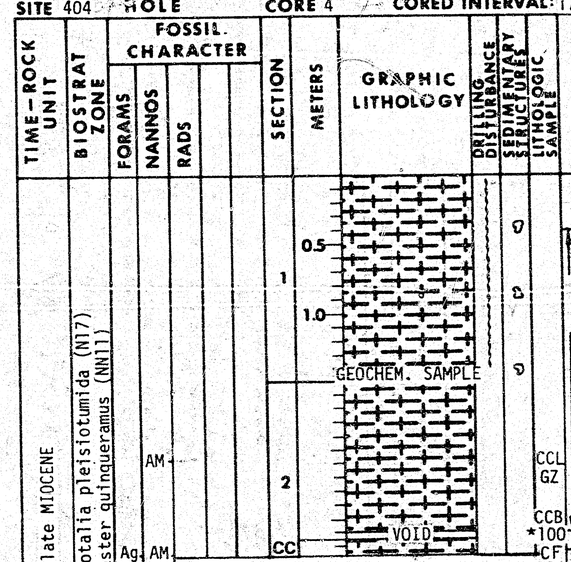
Grain Size

	Sand	Silt	Clay
1-55	8.9	35.4	55.7

X-ray Analysis

Bulk	1-73	<2μ (Partial)	1-73
Qtz.	--	Smect.	28
Cal.	90	Ill.	46
K-Feld.	--	Kaol.	13
Plag.	--	Chlor.	13
Others	10	Silica	--
		Zeol.	--

SITE 404 HOLE CORE 4 CORED INTERVAL: 170.5-180.0 m



pebble
bluish white (5B 9/1)
light bluish gray (5B 7/1)

Foram Nanno Ooze
dominantly bluish white and homogeneous except for occasional "ice-rafted" pebbles (to 4 mm) and black pyrite streaks in Sec. 2, 105-110 cm.

Smear Slides

	2-100
sand/silt/clay	3/17/80
nannos	40
forams	12
unspec. $CaCO_3$	37
clay	10
sp. spic.	1

Coarse Fraction 2cc

forams	97
fish debris	1
sp. spic.	1
quartz	1

Carbonate Bomb

2-100	42%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-56	11.0	0.1	91.3

Grain Size

	Sand	Silt	Clay
2-64	9.1	33.9	56.9

SITE 404 HOLE CORE 5 CORED INTERVAL: 180.0-189.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
late MIOCENE	(F) Globorotalia acostaensis (N16) (N) Discoaster calcaris (NN10)?		CP		1	0.5				*70
						1.0				CCB GZ CCL
										CCB
					2					CCB
			AP							CCL GZ XM
		Cm	CM		CC					*146 CF

gritty zones-increased forams

very light gray (N8)

pinkish gray (5YR 8/1) with mottles of dark greenish gray (5G 4/1)

Foram Nanno Ooze
very light gray, homogeneous except for occasional "gritty" zones of increased forams. Near base (Sec. 2, 120-150) indurated to Nanno Chalk containing disseminated glauconite, pyrite and plant fragments.

Smear Slides

	1-70	2-146
sand/silt/clay	5/30/65	15/75/10
nannos	40	64
forams	25	10
unspec. $CaCO_3$	10	15
clay	25	10
plant frag.	--	1

Coarse Fraction (>44μ) 2cc

forams	95
glauconite	1
sp. spic.	1
fish debris	1
vol. glass	1
mica	1

Carbonate Bomb

1-70	86%
1-130	93%
2-10	87%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-90	10.8	0.1	89.3
2-134	10.7	0.1	88.8

Grain Size

	Sand	Silt	Clay
1-86	35.3	35.5	29.2
2-135	24.7	33.8	41.4

X-ray Analysis

Bulk	2-141	<2μ (Partial)	2-141
Qtz.	--	Smec.	100
Cal.	78	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	22	Silica	--
		Zeol.	--

SITE 404 HOLE CORE 6 CORED INTERVAL: 189.5-199.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
late MIOCENE	(F) Globorotalia acostaensis (N16)	AG	AM		1	0.5				CCB
						1.0				*140 CCL CF GZ
					CC					

very light gray (N8)

Nanno Ooze
very light gray, homogeneous.

Smear Slides

	1-140
nannos	73
forams	7
unspec. $CaCO_3$	15
clay	5

Coarse Fraction 2cc

forams	95
fish debris	1
sp. spic.	1
glauconite	1
vol. glass	2

Carbonate Bomb
1-125 65%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
CC-5	11.0	0.0	90.9

Grain Size

	Sand	Silt	Clay
CC-6	13.9	34.8	51.3

SITE 404 HOLE CORE 7 CORED INTERVAL: 199.0-208.5 m

TIME-ROCK UNIT: middle EOCENE / early EOCENE
BIOSTRAT ZONE: (F) Truncorotaloides rohri-Globorotalia howei→ Globigerapsis kugleri (P14+11) / (N) Discoaster lodoensis (NP13)
FOSSIL CHARACTER: FORAMS RP; NANNOS FM, CM, CM, FP, FP, FG, CG; RADS
SECTION: 1, 2, CC
METERS: 0.5, 1.0
GRAPHIC LITHOLOGY: CAVINGS; VOID
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: *29, *39, CCB, GZ, CCL, *117, XM, CCB, GZ, CCL, CCB, *79, CF

5Y 6/3
Zoophycus
5Y 6/6
↓
5Y 6/4
olive yellow (5Y 6/6)
pale olive (5Y 6/3)
5Y 6/4
↓
olive gray (5Y 4/2)
5Y 6/4
5Y 6/6
pale olive (5Y 6/4)
5Y 4/2

Calcareous Porcellanite
Spiculiferous Mudstone
two lithologies interbedded and include occasional interbeds of Tuffaceous Porcellanite
Principal lithologies are mainly pale olive (5Y 6/3, 5Y 6/4) to olive yellow (5Y 6/6). Contain glauconite rich interbeds. Cross lamination, plane lamination and burrowing are common. Tuffaceous beds mainly olive gray (5Y 4/2), vary from well-laminated to moderately bioturbated. Core disturbed by disking throughout.

Smear Slides

	1-29	1-39
sand/silt/clay	30/40/30	20/70/10
rads	20	54
sp. spic.	30	--
forams	8	--
nannos	5	5
unspec. $CaCO_3$	10	10
clay	16	20
quartz	3	1
glauconite	8	10
vol. glass	--	--

	1-117	3-79
sand/silt/clay	40/30/30	30/60/10
rads	5	20
sp. spic.	40	20
forams	1	15
nannos	10	5
unspec. $CaCO_3$	10	--
clay	30	5
quartz	2	2
glauconite	1	--
vol. glass	--	28

Coarse Fraction (<44μ) 3cc

sp. spic.	47
vol. glass	47
rads	1
forams	4
glauconite	tr

Carbonate Bomb

1-40	25%
2-80	6%
3-40	5%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-111	1.0	0.1	7.7
2-114	1.5	0.1	12.1

Grain Size

	Sand	Silt	Clay
1-115	47.8	31.7	20.5
2-116	45.1	38.0	16.9

X-ray Analysis

Bulk	2-25		
Qtz.	--	Plag.	tr
Cal.	12	Other	88
K-Feld.	tr		

<2μ (Partial)	2-25
Smec.	100
Ill., Kaol., Chlor., Silica, Zeol.	--

SITE 404 HOLE CORE 8 CORED INTERVAL: 208.5-218.0 m

TIME-ROCK UNIT: early EOCENE
BIOSTRAT ZONE: (N) Discoaster lodoensis (NP13)
FOSSIL CHARACTER: NANNOS CG, CG, FM, B; RADS
SECTION: 1, CC
METERS: 0.5, 1.0
GRAPHIC LITHOLOGY: VOID
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: CCB, *33, CCB, CCL, XM, GZ, CCB, *142, CF

light olive brown (5Y 5/6)
as above with mottles of dusky green (5G 3/2)
olive gray (5Y 4/2) Tuffaceous Mudstone

Porcellanite
dominantly light olive gray (5Y 5/6) with dusky green patches of organic matter concentration. Evidence of lamination and burrowing throughout. Wood fragment in mudstone at base.

Smear Slides

	1-33	1-142
sand/silt/clay	30/50/20	35/20/45
rads	29	--
sp. spic.	25	50
diatoms	3	0
forams	10	0
nannos	4	10
unspec. $CaCO_3$		10
clay	25	30
quartz	3	0
plant frag.	0	1
glauconite	1	0

Coarse Fraction (>44μ) 2cc

vol. glass	97
sp. spic.	2
glauconite	1

Carbonate Bomb

1-32	5%
1-141	5%
1-22	5%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-96	1.2	0.1	9.4

Grain Size

	Sand	Silt	Clay
1-100	40.5	45.9	13.6

X-ray Analysis

Bulk	1-98	<2μ (Partial)	1-98
Qtz.	--	Smec.	100
Cal.	7	Ill.	--
K-Feld.	6	Kaol.	--
Plag.	6	Chlor.	--
Other	81	Silica	--
		Zeol.	--

SITE 404 HOLE CORE 9 CORED INTERVAL: 218.0-227.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
early EOCENE	(F) Globigerapsis kugleri-Hantkenina aragonensis (P11-P10) (N) Discoaster lodoensis (NP13)	FP-FG			CC					*5 CCB CF

LITHOLOGIC DESCRIPTION

Procellanite
dusky green (5G 3/2).

Smear Slides

	1-5
sand/silt/clay	60/20/20
rads	2
sp. spic.	61
diatoms	1
nannos	15
unspec. $CaCO_3$	10
clay	10
plant frag.	1

Coarse Fraction (>44μ)

sp. spic.	63
glauconite	10
forams	24
mica	1
feldspar	1
quartz	tr

Carbonate Bomb - 5%

SITE 404 HOLE CORE 10 CORED INTERVAL: 227.5-237.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
early EOCENE	(F) Globorotalia aragonensis-Globorotalia pseudomenardii (P8-P4) (N) Marthasterites tribrachiatus (NP12)	FM-CP	FG		1 CC	0.5	VOID			CCB *34 CCL GZ *90 CCB CF

dusky green (5G 3/2)
dusky yellow green (5GY 5/2)
grayish olive green (5GY 3/2)

LITHOLOGIC DESCRIPTION

Siliceous Tuff
bioturbation throughout including rind burrows.

Smear Slides

	1-34	1-90
sand/silt/clay	90/10/0	90/10/0
vol. glass	69	57
sp. spic.	13	15
rads	2	5
forams	3	5
nannos	3	3
clay	10	10
quartz	0	5

Coarse Fraction (<44μ) 1cc

sp. spic.	35
vol. glass	30
forams	35
rads	tr

Carbonate Bomb

1-35	6%
1-90	5%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-80	2.2	0.1	17.3

Grain Size

	Sand	Silt	Clay
1-85	39.4	46.0	14.5

SITE 404 HOLE CORE 11 CORED INTERVAL: 237.0-246.5 m

TIME-ROCK UNIT: early EOCENE
BIOSTRAT ZONE: (F) Globorotalia aragonensis→Globorotalia pseudomenardii (P8→P4)
(N) Marthasterites tribrachiatus (NP12)
FOSSIL CHARACTER: FORAMS FG–FP; NANNOS CM–; RADS
SECTION: CC
METERS: 0.5
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: CCB, TS, XM, *TS 72, *CCB 63, GZ, CCL, CF

olive (5Y 5/3) grayish blue green (5BG 5/2) Glauconitic Mudstone

Calcareous Porcellanite burrowed in part; abundant glauconite both scattered through rock and in concentrated patches of glauconitic mudstone.

Smear Slides

	1-30	1-63 90/10/0
sand/silt/clay		
glauconite	5	48
quartz	--	1
heavy min.	--	1
sp. spic.	30	tr
rads	20	
forams	15	
vol. glass	5	
clay	25	

Coarse Fraction (>44μ) 1cc

glauconite	30
sp. spic.	20
rads	10
forams	13
mica	8
zeolite	8
feldspar	5
vol. glass	3
quartz	3

Thin Section

	1-72
glauconite	30
sp. spic.	15
rads	
unspec. $CaCO_3$	25
clay	30

Carbonate Bomb

1-25	5%	1-62	5%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-60	1.0	0.1	7.4

Grain Size

	Sand	Silt	Clay
1-55	28.7	45.0	26.3

X-ray Analysis

Bulk	1-57	<2μ (Partial)	1-57
Qtz.	--	Smec.	32
Cal.	5	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	95	Silica	--
		Zeol.	68

SITE 404 HOLE CORE 12 CORED INTERVAL: 246.5-256.0 m

TIME-ROCK UNIT: early EOCENE
BIOSTRAT ZONE
FOSSIL CHARACTER: FORAMS, NANNOS, RADS
SECTION
METERS: 0.5
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: *TS-16, *TS-50, CCL

dark greenish gray (5G 4/1)

Glauconitic Siliceous Mudstone with marly layers of medium bluish gray (5B 5/1).

Thin Sections

	1-16	1-50
clay	30	45
glauconite	10	20
forams	25	10
siliceous org.	35	25

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-62	0.4	0.2	2.1

SITE 404 HOLE CORE 13 CORED INTERVAL: 256.0-265.5 m

TIME-ROCK UNIT: early EOCENE
BIOSTRAT ZONE: (N) Marthasterites tribrachiatus (NP12)
FOSSIL CHARACTER: FORAMS; NANNOS CP–AP; RADS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: *10, CCL, *23, *34, CCB, CF

medium bluish gray (5B 5/1)

Siliceous Marly Limestone with interbeds(?) of marly nanno chalk, greenish gray (5G 6/1).

Smear Slides

	1-10	1-23	Thin Section 1-33
nannos	15	10	5
unspec. $CaCO_3$	20	40	25
clay	35	25	20
zeolite	10	5	10
plant frag.	1	--	--
sp. spic.	15	15	30
glauconite	4	4	10
quartz	--	1	--

Coarse Fraction - cc

glauconite	38
zeolite	10
sp. spic.	15
rads	10
forams	15
feldspar	5
mica	3

Carbonate Bomb

1-25	47%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-11	3.6	0.1	29.2

SITE 404 HOLE CORE 14 CORED INTERVAL: 265.5-275.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
early EOCENE	(N) Marthasterites tribrachiatus (NP12)?		CP AP			0.5				*TS-14 CCB CCL *45 CF XM	greenish gray (5G 6/1) dark greenish gray (5GY 4/1)

Tuffaceous Porcellanite
Calcareous Sandy Mudstone
porcellanite greenish gray, massive except for fine laminations of tuffaceous material at base.

Smear Slides

	1-45	1-2	Thin Section 1-14
sp. spic.	35	5	15
rads	18	5	15
unspec. $CaCO_3$	8	25	15
clay	10	29	55
nannos	2	15	--
other	2	6	5
forams	--	15	10
vol. glass	25	--	--

Coarse Fraction (>44μ)

	1-55 to 60
vol. glass	80
sp. spic.	10
rads	5
pyrite	3
feldspar	1
forams	1

Carbonate Bomb
1-20 88%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-35	0.6	0.1	3.8

X-ray Analysis

Bulk	1-40	<2μ (Partial)	1-40
Qtz.	--	Smec.	100
Cal.	--	Ill.	--
K-Feld.	tr	Kaol.	--
Plag.	5	Chlor.	--
Other	95	Silica	--
		Zeol.	--

SITE 404 HOLE CORE 15 CORED INTERVAL: 275.0-284.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
early EOCENE	(N) Marthasterites tribrachiatus (NP12)		AP							*1 CCL CCB TS-14 CF	greenish gray (5G 6/1) medium bluish gray (5B 5/1)

Calcareous Mudstone
medium bluish gray (5B 5/1). Lamination of dark gray (N3) Tuff at the top.

Smear Slides

	1-1
vol. glass	45
apatite	2
heavy min.	3

Thin Section

	1-14
clay	55
carb. unspec.	14
forams	15
siliceous org.	16

Coarse Fraction

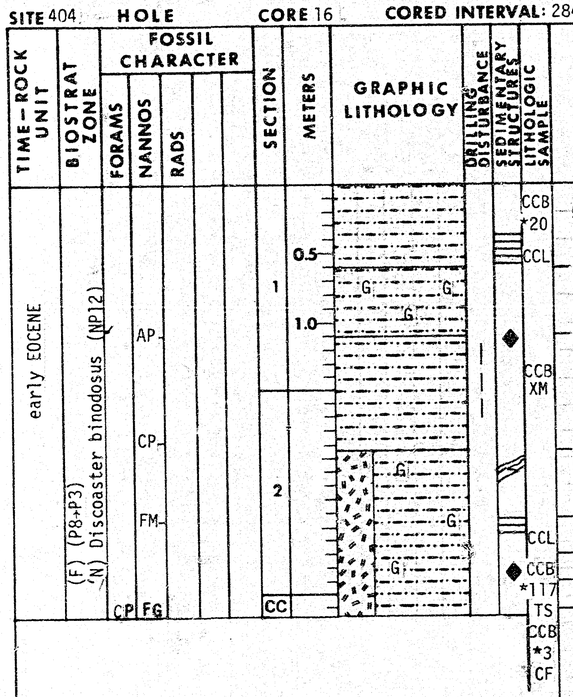
forams	40
sp. spic.	20
rads	15
glauconite	15
quartz	5
mica	3
zeolite	2
glass	tr

Carbonate Bomb
1-20 11%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-3	1.8	0.1	14.2

SITE 404 HOLE CORE 16 CORED INTERVAL: 284.5-294.0 m



LITHOLOGIC DESCRIPTION

Calcareous Mudstone
Glauconitic Mudstone
interbedded. Calcareous mudstone, greenish gray (5GY 6/1) to gray olive (10Y 4/2), laminated to bioturbated. Glauconitic mudstone, medium bluish gray (5B 5/1) to medium dark gray (N4). Dusky blue green tuffaceous glauconitic mudstone in Sec. 3.

Smear Slides

	1-20	2-117	3-3
sand/silt/clay	0/20/80	35/10/55	20/60/20
sp. spic.	15	5	--
clay	50	55	10
unspec. $CaCO_3$	20	8	16
nannos	10	2	4
glauconite	5	20	50
vol. glass	--	10	20

TS 2-147: Rounded pellets and fragmental (?) glauconite (up to 1 mm across): averaging 0.3 mm diam.) which is microcrystalline with botryoidal structure. Microfossils are predominant with sponge spic. (axial canals filled with glauconite), forams, rads and collophane scraps. Fine sand and silt consist of fresh angular plagioclase grains, and quartz. Pyroclasts are feldspar-microlitic lava particles (0.1 mm). The matrix is microcrystalline calcite with some clay, and interstitial bioclasts, and granular opaque oxides.

Coarse Fraction 3cc

forams	18
glauconite	39
(?) zeolite	20
cristobalite	10
sp. spic.	5
mica	3
quartz	5

Carbonate Bomb

1-20	29%
1-131	13%
2-117	12%
2-149	23%

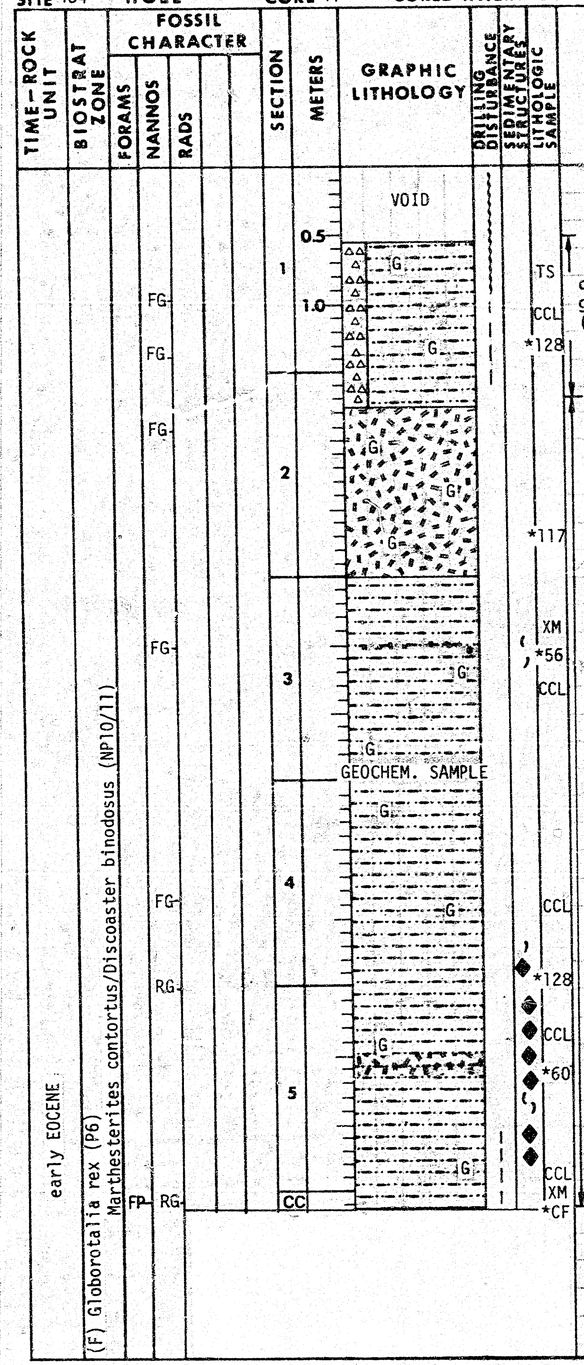
Carbon-Carbonate

	Total C	Org. C	$CaCO_3$
1-37	2.8	0.1	22.4
2-93	1.8	0.1	14.0

X-ray Analysis

Bulk	1-127	<2μ (Partial)	1-127
Qtz.	--	Smec.	8
Cal.	10	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	8	Chlor.	--
Other	82	Silica	--
		Zeol.	92

SITE 404 HOLE CORE 17 CORED INTERVAL: 294.0-303.5 m



LITHOLOGIC DESCRIPTION

Glauconitic Mudstone
Siliceous Mudstone
dark gray to greenish black, fragments of megafaunal remains, intense bioturbation in parts. Occasional tuffaceous layers. Interbed of Glauconitic Tuff in Sec. 2.

dark gray (N3)

matrix of grayish brown (2.5Y 5/2)

shell fragments

greenish black (5GY 2/1)

Smear Slides

	major lithology 1-128	3-56	4-128
sand/silt/clay	50/25/25	40/20/40	
glauconite	15	30	20
clay	44	40	37
quartz	1	5	10
nannos	10	5	3
zeolite	5	5	5
siliceous org.	25	15	25

	minor lithology 2-117	5-60
sand/silt/clay	30/50/20	
vol. glass	30	15
glauconite	25	15
clay	10	32
zeolite	5	5
nannos	5	--
quartz	10	25
siliceous org.	15	5
mica	--	3

TS 1-71: The predominant clay base is charged with fine angular sandy resistates (which are poorly sorted, and average about 0.09 mm) and prominent rounded glauconite pellets up to 1.5 mm across. Quartz and alkali feldspars (oligoclase, microcline, orthoclase) are the main resistates with conspicuous micas (glauconite, and biotite) and sponge spicules. The matrix contains specks of zeolite (0.1 mm across), hornblende and much chloritic material.

Coarse Fraction - 6cc

glauconite	33	heavy min.	5
quartz	25	forams	6
feldspar	5	other	15
mica	11		

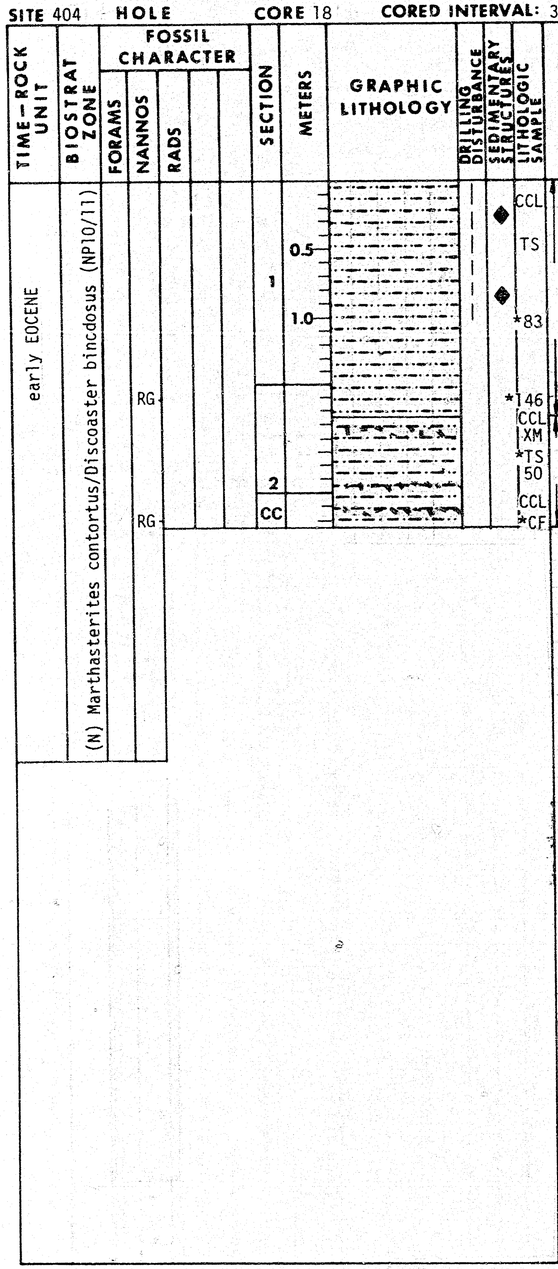
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-111	0.7	0.1	5.0
3-90	0.8	0.1	5.8
4-90	0.3	0.1	1.9
5-23	0.4	0.1	1.9
CC-10	0.6	0.2	4.0

X-ray Analysis

Bulk	3-52	6-12	<2μ (Partial)	3-52	6-12
Qtz.	6	tr	Smec.	40	75
Cal.	--	5	Ill.	--	tr
K-Feld.	--	2	Kaol.	--	--
Plag.	7	17	Chlor.	--	--
Other	87	76	Silica	--	--
			Zeol.	60	25

SITE 404 HOLE CORE 18 CORED INTERVAL: 303.5-313.0 m



LITHOLOGIC DESCRIPTION

Tuffaceous Glauconitic Mudstone dominantly grayish black, slight bioturbation. Occasional shell fragments and scattering of tuffaceous material. Bed of Tuffaceous Sandy Mudstone (Sec. 2, 30-100 cm).

Smear Slides

	1-83	1-146
sand/silt/clay	50/30/20	0/30/70
quartz	15	15
clay	20	45
vol. glass	20	15
glauconite	30	10
zeolite	5	--
unspec. $CaCO_3$	5	4
nannos	--	1
opaque	--	3
siliceous	5	2
mica	--	5

Coarse Fraction (<44μ) 2-cc

mica	15
quartz	15
feldspar	15
heavy min.	5
sp. spic.	10
rads	5
forams	5
unspec. $CaCO_3$	5
glauconite	10
cristobalite	10
zeolite	5

TS 2-50

pyroclastic grain	30
mudstone grain	10
oolitic grain	20
calcareous grain	10
siliceous grain	10
zeolitic grain	10
glauconite grain	10

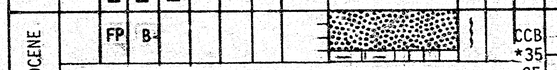
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-13	0.8	0.2	5.0
2-12	0.6	0.2	3.5
2-94	0.2	0.1	1.1

X-ray Analysis

Bulk	2-15	<2μ (Partial)	2-15
Qtz.	4	Smec.	100
Cal.	3	Ill.	--
K-Feld.	tr	Kaol.	--
Plag.	12	Chlor.	--
Other	81	Silica	--
		Zeol.	tr

SITE 404 HOLE CORE 19 CORED INTERVAL: 313.0-322.5 m



LITHOLOGIC DESCRIPTION

Sandstone medium bluish gray (5B 7/1), fine, moderate sorting, calcite cemented. Black specs of glauconite near base. Marly Limestone at base.

Smear Slides

	1-35
sand/silt/clay	15/55/30
quartz	10
mica	5
clay	28
glauconite	2
zeolite	5
unspec. $CaCO_3$	50

Coarse Fraction

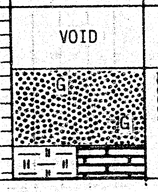
quartz	90
feldspar	5
mica	3
heavy min.	2

Carbonate Bomb

1, 20-21 cm 5%

SITE 404 HOLE CORE 20 CORED INTERVAL: 322.5-332.0 m

TIME-ROCK UNIT: early EOCENE
BIOSTRAT ZONE:
FOSSIL CHARACTER: FORAMS B B; NANNOS B; RADS
SECTION: 1
METERS: 0.5, 1.0



DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: *91, *115, TS, CF, CCL

greenish black (5GY 2/1)
dark greenish gray (5G 4/1)

Glauconitic Sandstone
fine, poorly sorted. Tuffaceous and well-lithified, 100 to 123 cm. Cristobalite? replacement of siliceous, biogenous remains. Marly Limestone at base.

Smear Slides

	1-91
sand/silt/clay	70/20/10
quartz	40
feldspar	10
mica	10
glauconite	15
clay	10
heavy min.	5
zeolite	5
cristobalite	3

Thin Section

	1-115
quartz	10
mica	5
heavy min.	3
clay	35
glauconite	2
unspec. $CaCO_3$	45

Coarse Fraction

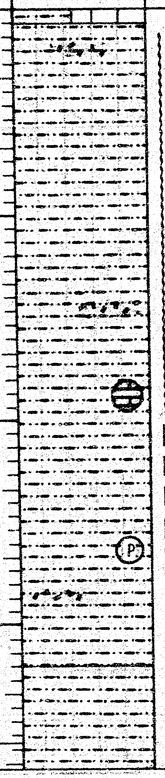
	1-120
quartz	39
glauconite	39
feldspar	20
mica	2

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-111	5.3	0.1	43.5

SITE 404 HOLE CORE 21 CORED INTERVAL: 332.0-341.5 m

TIME-ROCK UNIT: early EOCENE
BIOSTRAT ZONE: (N) Marthasterites contortus (NP10)
FOSSIL CHARACTER: FORAMS B B B; NANNOS B B RG B; RADS
SECTION: 1, 2, 3, 4, CC
METERS: 0.5, 1.0



DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
LITHOLOGIC SAMPLE: CCL, *10, XM, *44, TS, *130, *50, CCL, CCL, *73, *CF

dark gray (N3)
limestone concretion greenish gray (5G 6/1)
pyrite nodule
dark greenish gray (5G 4/1)

Tuffaceous Mudstone
dominantly dark gray with occasional greenish gray interbeds and nodules of Marly Limestone. Sec. 3 - pyrite nodule (95 cm) and streaks of plant debris. Sec. 4 (30-107 cm) - Micaceous Mudstone.

Smear Slides	major lithology 1-44	3-50	4-73
sand/silt/clay	55/5/40	60/30/10	3/40/57
quartz	5	50	25
clay	40	3	51
vol. glass	45	20	--
zeolite	10	--	--
feldspar	--	5	--
mica	--	17	15
heavy min.	--	1	--
pyrite	--	--	3

Smear Slides	minor lithology 1-10	2-130
sand/silt/clay	30/60/10	0/50/50
quartz	16	2
mica	14	1
clay	15	--
unspec. $CaCO_3$	53	66
pyrite	--	30
heavy min.	2	--

Coarse Fraction (>44μ)

	4-105
quartz	50
feldspar	
mica	48
vol. glass	2

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-6	4.6	0.1	37.2
3-106	0.3	0.1	1.3
4-42	0.3	0.1	1.1

X-ray Analysis

Bulk	1-7	<2μ (Partial)	1-7
Qtz.	2	Smec.	100
Cal.	30	Ill.	--
K-Feld.	1	Kaol.	--
Plag.	3	Chlor.	--
Other	64	Silica	--
		Zeol.	--

SITE 404 HOLE CORE 22 CORED INTERVAL: 341.5-351.0 m

TIME-ROCK UNIT: early EOCENE?

BIOSTRAT ZONE: B, B, B, B, RG, B

FOSSIL CHARACTER: FORAMS, NANNOS, RADS

SECTION: 1, 2, 3, 4, 5, 6, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES

LITHOLOGIC SAMPLE: XM, CCL, *34, *140, *42, *119, CCL, TS, CCL, XM, *122, CCL, XM, *16, CF

GEOCHEM. SAMPLE

5G 2/1

dark greenish gray (5G 4/1)

glauconitic

tuff-aceous

greenish black (5G 2/1)

5G 4/1

LITHOLOGIC DESCRIPTION

Mudstone
generally greenish black (5G 2/1) to dark greenish gray (5G 4/1). Most of core is carbonaceous and zeolitic. Parts are tuffaceous (Sec. 2: 80-150 cm). Pyrite common in streaks and occasional nodules. Structure includes lamination, cross lamination and slight to moderate bioturbation. Sandy zone near base (Sec. 7: 0-20 cm).

Smear Slides

	dark greenish gray (5G 4/1)	greenish black (5G 2/1)
sand/silt/clay		
quartz		
mica		
clay		
zeolite		
glauconite?		
pyrite		
plant remains		
vol. glass		
siliceous org.		

Smear Slides, 1-140 (minor lith.)

quartz	5
mica	10
clay	50
zeolite	5
pyrite	7
glauconite	25

Coarse Fraction 7, CC

quartz	49
feldspar	35
heavy min.	6
mica	10

TS 3-66: Evenly grained (0.09 mm avg.) angular qtz. K-feld. and oligoclase, form much of this sample, together with micas (botite, muscovite, glauconite), bioclasts & possible pyroclasts (argillized shards). Grains are individually coated by clay films, and the clay matrix contrains much zeolite in places & microframboidal pyrite.

Carbon Garbonate	1-6	2-147	3-129	4-137	5-108
Total C	0.3	0.6	0.3	0.3	0.5
Org. C	0.1	0.4	0.1	0.2	0.3
$CaCO_3$	1.2	2.1	1.3	0.8	1.0

X-ray Analysis

Bulk	1-8	3-131	4-131	<2μ (Partial)	1-8	3-131	4-131
Qtz.	17	tr	4	Smec.	44	60	28
Cal.	--	3	--	Ill.	--	20	--
K-Feld.	8	1	17	Kaol.	--	--	--
Plag.	34	13	17	Chlor.	--	--	--
Other	41	83	62	Silica	--	--	--
				Zeol.	56	20	78

SITE 404 HOLE CORE 23 CORED INTERVAL: 351.0-360.5 m

TIME-ROCK UNIT: early EOCENE?

BIOSTRAT ZONE: B, B, B, B, RG, B

FOSSIL CHARACTER: FORAMS, NANNOS, RADS

SECTION: 1, 2, 3, 4, 5, 6, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE

SEDIMENTARY STRUCTURES

LITHOLOGIC SAMPLE: *48, XM, CCL, *133, TS, CCL, *149, *27, CCL, *123, CCL, XM, *49, CCL, *95, *CF

dark greenish gray (5G 4/1)

5G 2/1

5G 4/1

5G 2/1

5G 4/1

5G 2/1

LITHOLOGIC DESCRIPTION

Mudstone
greenish black (5G 2/1) to dark greenish gray (5G 4/1). Generally zeolitic with parts which care carbonaceous, tuffaceous and parts glauconitic. Occasional pyrite nodules (P) and shell fragments of megafaunal (?). Two glauconitic sandy beds in Sec. 6. Bioturbation slight to intense but spasmodic.

Smear Slides		major lithology 1-48	2-133	3-149	5-123
greenish black (5G 2/1)	sand/silt/clay	30/50/20	40/50/10	20/40/40	40/40/10
	quartz	30	54	15	52
	mica	10	10	6	10
	clay	30	10	35	10
	zeolite	9	10	1	5
	pyrite	3	3	--	2
	unspec. $CaCO_3$	2	2	--	--
	plant frag.	1	1	1	2
	glauconite	5	5	20	10
	vol. glass	5	5	20	5

		minor lithology 6-49	4-27
	sand/silt/clay	60/30/10	
	quartz	45	--
	glauconite	14	40
	clay	20	10
shell fragments	mica	10	--
	glass	10	--
	unspec. $CaCO_3$	--	50

TS 3-67: Coarser groups of sandy particles are set in a silty matrix of qtz. microcline, oligoclase (avg. 0.06 mm), plentiful micas (biotite, chlorite, glauconite, muscovite), bioclasts (mainly foraminifera), and brownish clay particles representing pyroclasts. The interstitial clay contains microframboidal pyrite, carbonaceous filaments, leucoxene dust, zeolites, and traces of hornblende & tremolite.

Coarse Fraction 6cc

mica	82	feldspar	1
glauconite	10	forams	tr
cristobalite	5	heavy min.	2

alternating hard & soft (more clayey) zones

Carbon Carbonate	2-20	3-147	4-139	5-145	6-78
Total C	0.5	0.3	0.6	0.4	0.2
Org. C	0.4	0.2	0.5	0.3	0.1
$CaCO_3$	0.8	1.0	0.9	0.6	0.9

X-ray Analysis

	Bulk	1-115	5-147	<2μ (Partial)	1-115	5-147
sandy layers	Qtz.	6	5	Smec.	47	100
	Cal.	33	--	Ill.	18	tr
	K-Feld.	2	5	Kaol.	--	--
	Plag.	14	22	Chlor.	--	--
	Other	45	68	Silica	--	--
				Zeol.	35	tr

SIT404 HOLE CORE 24 CORED INTERVAL: 360.5-370.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
		B	B							*16 CF

Sandstone
greenish black (5G 2/1); sand is medium size.

Smear Slides

	1-16
sand/silt/clay	70/25/5
quartz	55
mica	10
clay	5
aggregates	10
opaque	5
heavy min.?	15

Coarse Fraction

quartz	40
feldspar	5
mica	6
zeolite	3
glauconite	15
unidentified	30

SITE 404 HOLE CORE 25 CORED INTERVAL: 370.0-379.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
		B			1	0.5 1.0				TS2 CCL XM *93 CF

5G 2/1
dark gray (N3)

Sandstone
dark gray (N3), fine, quartzose. Top 15 cm granule-sized rock fragments and shell.
Calcareous Conglomerate at top.

Smear Slides

	1-93
quartz	89
heavy min.?	10
mica	1

Thin Section

	1-2
quartzite & sandstone	20
basaltic rocks	40
schist & hornfels	20
calcite	20

Coarse Fraction

mica	35
quartz	30
feldspar	3
zeolite	3
unidentified heavy min. & stained	29

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-7	2.6	0.1	20.6

X-ray Analysis

Bulk	1-5	<2μ (Partial)	1-5
Qtz.	2	Smec.	100
Cal.	17	Ill.	tr
K-Feld.	16	Kaol.	--
Plag.	--	Chlor.	--
Other	65	Silica	--
		Zeol.	--

SITE 404 HOLE CORE 26 CORED INTERVAL: 379.5-389.0

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
			B							3 *TS XM CF

5G 2/1 greenish black

Glauconite Mudstone (top)
Tuffaceous Conglomerate (base)
both contain volcanic lapilli and shell fragments. Large oyster shell fragment at bottom of core.

Smear Slides

	1-3
quartz	15
clay	10
glauconite	74
pyrite	1

Thin Section (18-20 cm)

basaltic rocks	30
sandstone	10
matrix	60

Coarse Fraction

mica	15
quartz	15
vol. glass?	39
feldspar	5
calcite	3
Fe-stained & heavy min.	20

X-ray Analysis

Bulk	1-14	<2μ (Partial)	1-14
Qtz.	tr	Smec.	100
Cal.	--	Ill.	tr
K-Feld.	tr	Kaol.	--
Plag.	tr	Chlor.	--
Other	100	Silica	--
		Zeol.	--

SITE 405 HOLE CORE 1 / CORED INTERVAL: 0.0-8.0 m

TIME-ROCK UNIT: PLEISTOCENE
BIOSTRAT ZONE: (F) Globorotalia truncatulinoides (N22); (N) Gephyrocapsa oceanica (NN20); (N) Emiliania huxleyi (NN21)
FOSSIL CHARACTER: FORAMS, NANNOS, RADS

SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
1	0.5				GZ
					*CCL
	1.0				CCB *80
2					*CCB
					*CCL
					XR GZ
3					*CCB
					*CCL
4					CCB *55
					GZ
5					CCB
					*136
6					CCL GZ
CC					*90 *CCB

FORAMS: CG, FG, FG, FG, AG, CG, AG
NANNOS: AG

LITHOLOGIC DESCRIPTION

Marly Foram Nanno Ooze
moderate yellow brown (10YR 5/4), dark yellowish brown (10YR 4/2), and light brown (5YR 6/4). Consistency of soup throughout. Large forams visible. No structures visible except for vertical streaks of gray (pyrite?). General intervals grading coarser downwards.

Mud
slightly calcareous, moderate brown.

Calcareous mud in moderate brown (10YR 4/4) and **Nanno Ooze** in very pale orange (10YR 8/2). **Foram Nanno Ooze** is very pale orange (10YR 8/2).

moderate yellow brown (10YR 5/4)

dark yellowish brown (10YR 4/2)

moderate yellow brown (10YR 5/4)

moderate brown (5YR 4/4)

light brown (5YR 6/4)

very pale orange (10YR 8/2)

moderate yellow brown (10YR 5/4)

very pale orange (10YR 8/2)

Smear Slides

	1-80	4-55	5-136	6-90
quartz	10	25		
clay	20	58	10	
feldspar		tr		
heavy min.		tr		
pyrite	1	--	tr	
carb. unspec.	10	15		
forams	20	2	7	40
nannos	39	tr	83	59
rads	tr	--		tr
sp. spic.	--	--		1
plant frag.	--	tr		

Carbonate Bomb

1-80	68%	4-55	14%
2-80	37%	5-90	15%
3-80	37%	6-95	92%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-17	8.4	0.1	69.1
2-89	5.7	0.1	46.6
3-136	2.3	0.1	18.7
6-62	0.7	0.1	88.9

Grain Size

	Sand	Silt	Clay
1-18	76.9	11.1	12.0
2-98	84.3	8.9	6.8
4-133	21.0	40.0	38.4
6-63	15.4	18.1	66.6

X-ray Analysis

Bulk	2-95	6-68	<2μ (Partial)	2-95	6-68
Qtz.	13	tr	Smec.	tr	44
Cal.	40	82	Ill.	54	29
K-Feld.	tr	--	Kaol.	19	11
Plag.	1	--	Chlor.	27	14
Other	46	18	Zeol.	tr	--

SITE 405 HOLE CORE 2 CORED INTERVAL: 8.0-17.5 m

TIME-ROCK UNIT: PLEISTOCENE
BIOSTRAT ZONE: (F) Globorotalia truncatulinoides (N22); (N) Gephyrocapsa oceanica (NN20); (F) Globorotalia truncatulinoides (N19); (N) Pseudoemiliania lacunosa (NN19)
FOSSIL CHARACTER: FORAMS, NANNOS, RADS

SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
1	0.5				CCB *54
	1.0				XM CCL *62 CCB GZ
2					GZ CCL XM
3					
4					*29 CCB GZ CCL
5					CCB *123 XM
6					CCL GZ CCB
CC					

FORAMS: AG, FG, FG, AM, AG, AG, FG, AG, CG
NANNOS: AG

LITHOLOGIC DESCRIPTION

very light gray (N8)

greenish gray (5GY 6/1)

dark yellowish brown (10YR 4/2)

light olive gray (5Y 5/2)

N8

pale brown (5YR 5/2)

Pebble of basalt

N8

dark yellowish brown (10YR 4/2)

Zoophycus

light gray (N7)

Zoophycus

5GY 4/1

light gray (N7)

dark yellow brown (10YR 4/2)

10YR 6/2

light gray (N7)

dark yellowish brown (10YR 4/2)

Foram Nanno Ooze
very light gray (N8), greenish gray (5GY 6/1) with light gray (N7) patches due to coring disturbance. Basalt pebble at 3-40.

Marly Foram Nanno Ooze
light gray (N7), and dark yellowish brown (10YR 4/2). Faint indication of graded beds (2) with burrows at top of each.

Calcareous Mudstone
dark yellowish brown (10YR 4/2).

Smear Slides

	1-54	2-62	4-29	4-122
quartz		15	3	56
heavy min.		tr		
clay		25	30	40
glauconite		tr		3
pyrite		tr	tr	
carb. unspec.		5	2	
forams	20	25	10	
nannos	80	30	58	tr
sp. spic.		tr		
plant frag.		tr		2

Carbonate Bomb

1-54	91%	4-120	0%
2-61	7%	6-120	31%
4-30	29%		

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-69	1.9	0.1	14.5
2-139	9.9	0.1	81.6
4-72	9.7	0.1	80.0
6-13	5.5	0.1	44.6

Grain Size

	Sand	Silt	Clay
2-67	12.5	49.7	37.8
2-140	32.1	11.4	56.6
4-74	47.4	23.6	29.0
6-107	48.6	28.2	23.2

X-ray Analysis

Bulk	2-65	2-143	5-77
Qtz.	7	tr	12
Cal.	13	83	20
K-Feld.	11	--	2
Plag.	5	--	11
Other	64	17	55
<2μ (Partial)	2-65	2-143	5-77
Smec.	42	42	29
Ill.	32	34	42
Kaol.	13	14	15
Chlor.	13	10	14

SITE 405 HOLE CORE 3 CORED INTERVAL: 17.5-27.0 m

TIME-ROCK UNIT: PLEISTOCENE
BIOSTRAT ZONE: (F) Globorotalia truncatulinoides (N22) / (N) Pseudoemiliania lacunosa (NN19)
FOSSIL CHARACTER: FORAMS: AG-FG; NANNOS: AM, FG, CG; RADS:
SECTION: 1, 2, 3
METERS: 0.5, 1.0

GRAPHIC LITHOLOGY: VOID

DRILLING DISTURBANCE:
SEDIMENTARY STRUCTURES:
LITHOLOGIC SAMPLE: CCB, CCL, *100, CCB, CCL, XM, CCB

LITHOLOGIC DESCRIPTION

dark yellowish brown (10YR 4/2)

light gray (N7)

dark yellowish brown (10YR 4/2)

Marly Foram Nanno Ooze
dark yellowish brown (10YR 4/2), very disrupted toward top, less so at bottom of core.
Foram Nanno Ooze
light gray (N7).

Smear Slides

	1-100
quartz	2
heavy min.	tr
clay	20
vol. glass	tr
carb. unspec.	3
forams	20
nannos	55

Carbonate Bomb

1-30	29%
1-100	66%
3-70	33%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-96	9.3	0.1	76.9
3-67	5.0	0.1	40.4

Grain Size

	Sand	Silt	Clay
1-86	54.0	10.8	35.3
3-74	42.1	29.3	28.7

X-ray Analysis

Bulk	3-72	<2μ (Partial)	3-72
Qtz.	7	Smec.	23
Cal.	35	Ill.	47
K-Feld.	4	Kaol.	11
Plag.	4	Chlor.	19
Other	50		

SITE 405 HOLE CORE 4 CORED INTERVAL: 27.0-36.5 m

TIME-ROCK UNIT: PLEISTOCENE
BIOSTRAT ZONE: (F) Globorotalia truncatulinoides (N22) / (N) Pseudoemiliania lacunosa (NN19)
FOSSIL CHARACTER: FORAMS: AG-FG; NANNOS: FG, CG; RADS:
SECTION: 1, 2, CC
METERS: 0.5, 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURBANCE:
SEDIMENTARY STRUCTURES:
LITHOLOGIC SAMPLE: XM, CCL, GZ, CCB, CCB, *80

LITHOLOGIC DESCRIPTION

dark yellowish brown (10YR 4/2)
light gray (N7)
pinkish gray (5YR 8/1)
N7
laminated
pebble of glauconite mudstone
pebble of sandstone
dark yellowish brown (10YR 4/2)

Marly Foram Nanno Ooze
dark yellowish brown (10YR 4/2) somewhat gritty due to presence of forams.
Foram Nanno Ooze
light gray (N7) to pinkish gray (5YR 8/1).

Smear Slides

	2-80
quartz	10
clay	20
glauconite	1
pyrite	tr
carb. unspec.	5
forams	15
nannos	49

Carbonate Bomb

1-80	68%
2-80	32%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-59	8.4	0.1	69.2

Grain Size

	Sand	Silt	Clay
1-62	39.9	19.9	40.2

X-ray Analysis

Bulk	1-57	<2μ (Partial)	1-57
Qtz.	7	Smec.	35
Cal.	61	Ill.	40
K-Feld.	--	Kaol.	9
Plag.	8	Chlor.	16
Other	24		