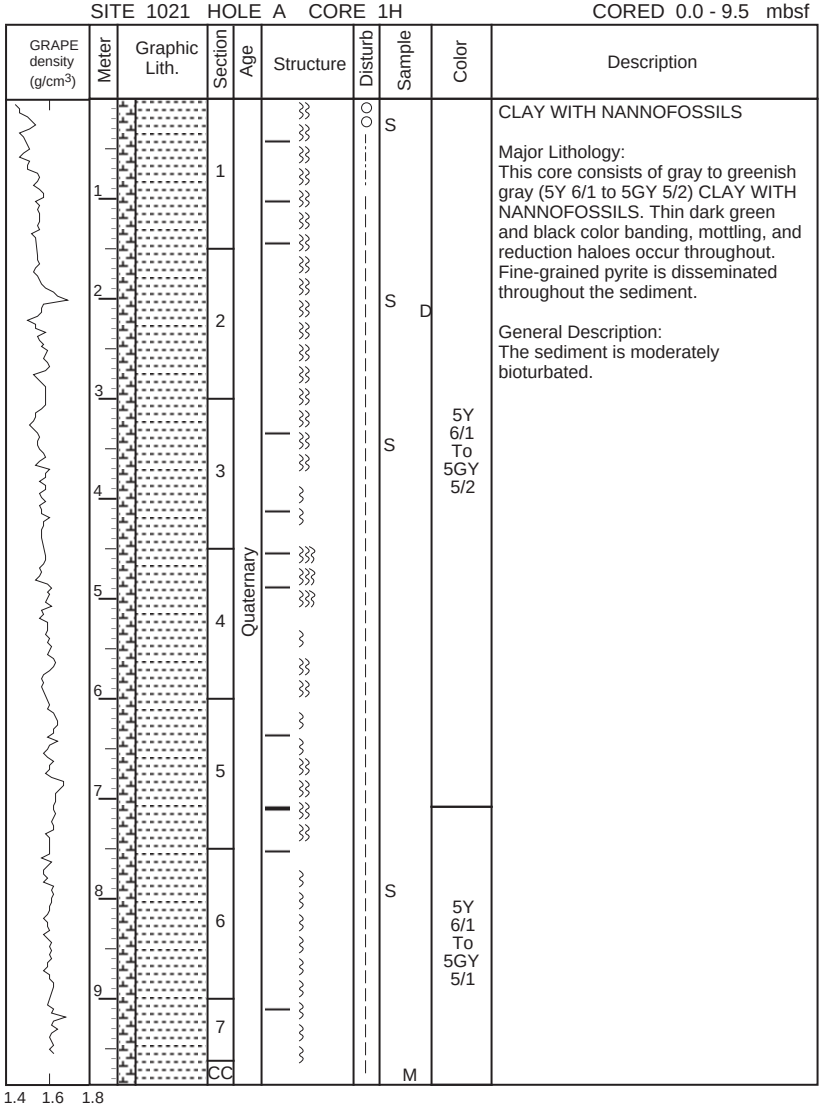
SITE 1021 HOLE A CORE 1H CORED 0.0 - 9.5 mbsf

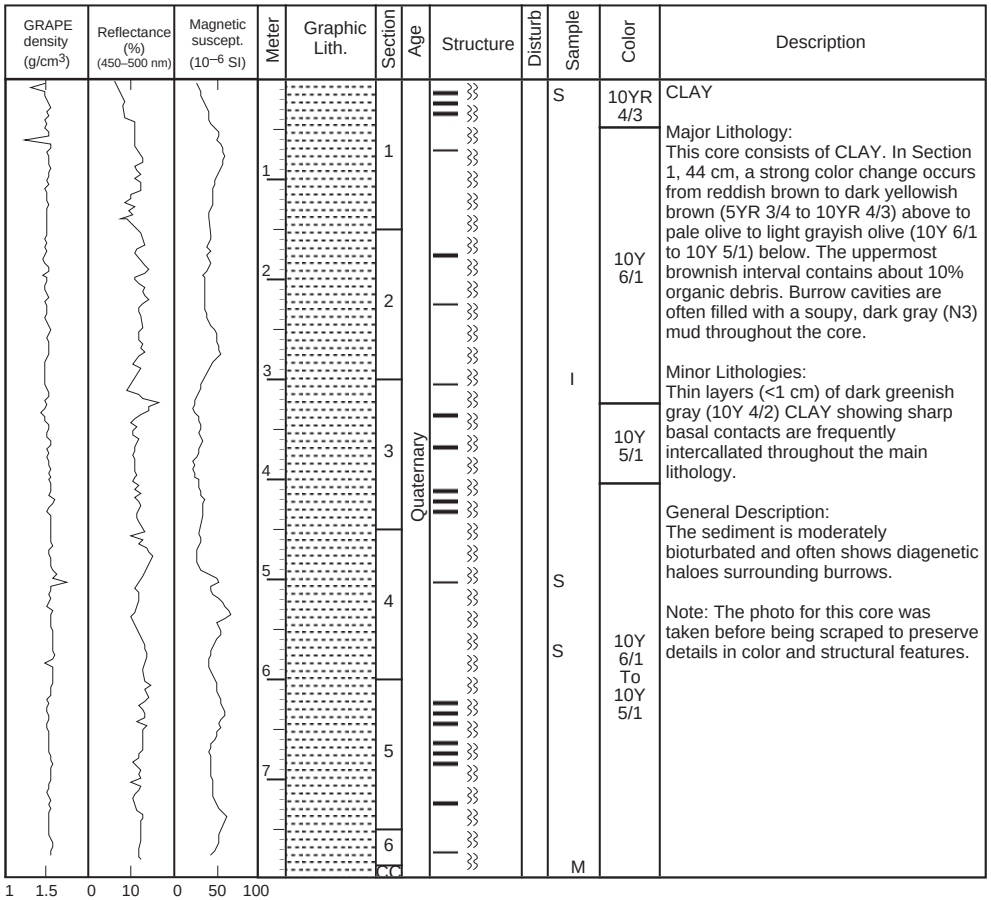


CLAY WITH NANNOFOSSILS

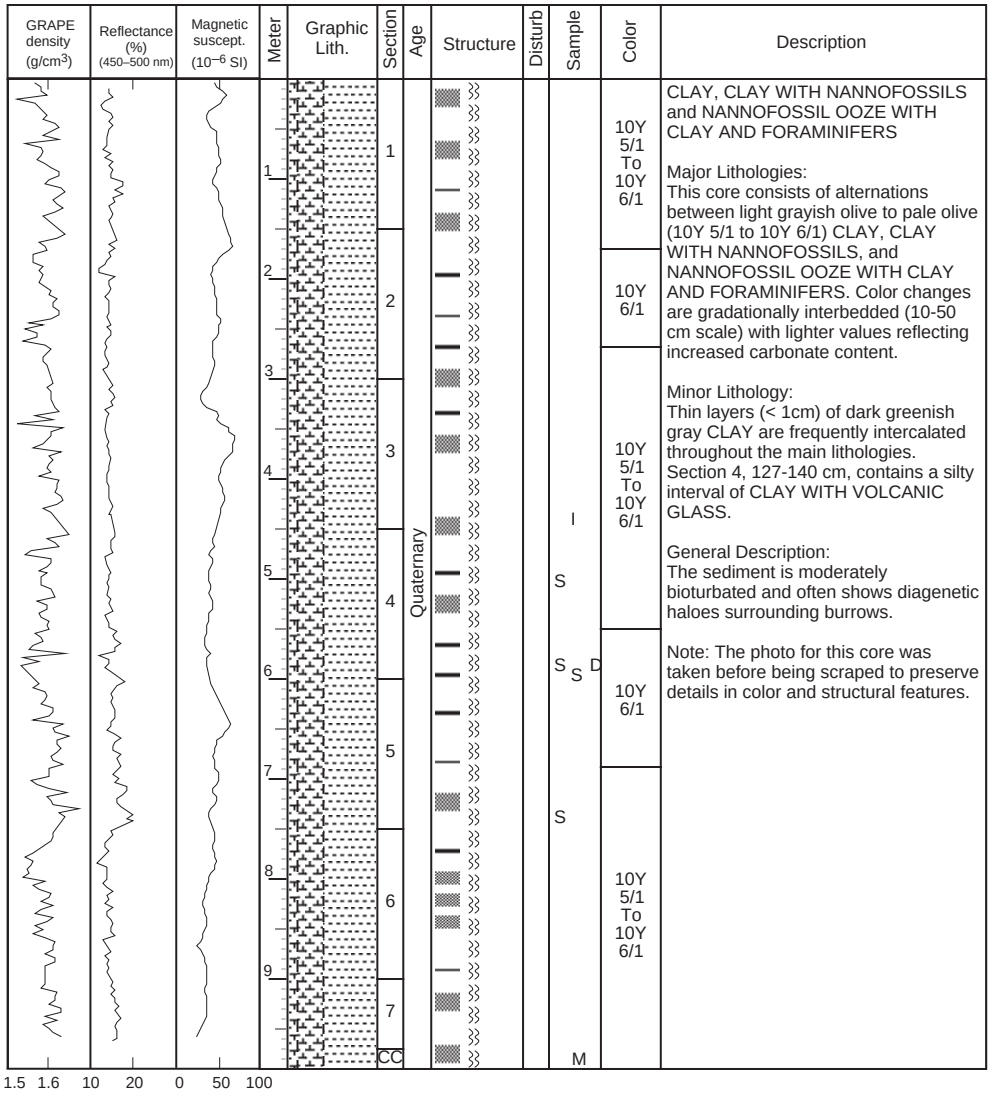
Major Lithology:
This core consists of gray to greenish gray (5Y 6/1 to 5GY 5/2) CLAY WITH NANNOFOSSILS. Thin dark green and black color banding, mottling, and reduction haloes occur throughout. Fine-grained pyrite is disseminated throughout the sediment.

General Description:
The sediment is moderately bioturbated.

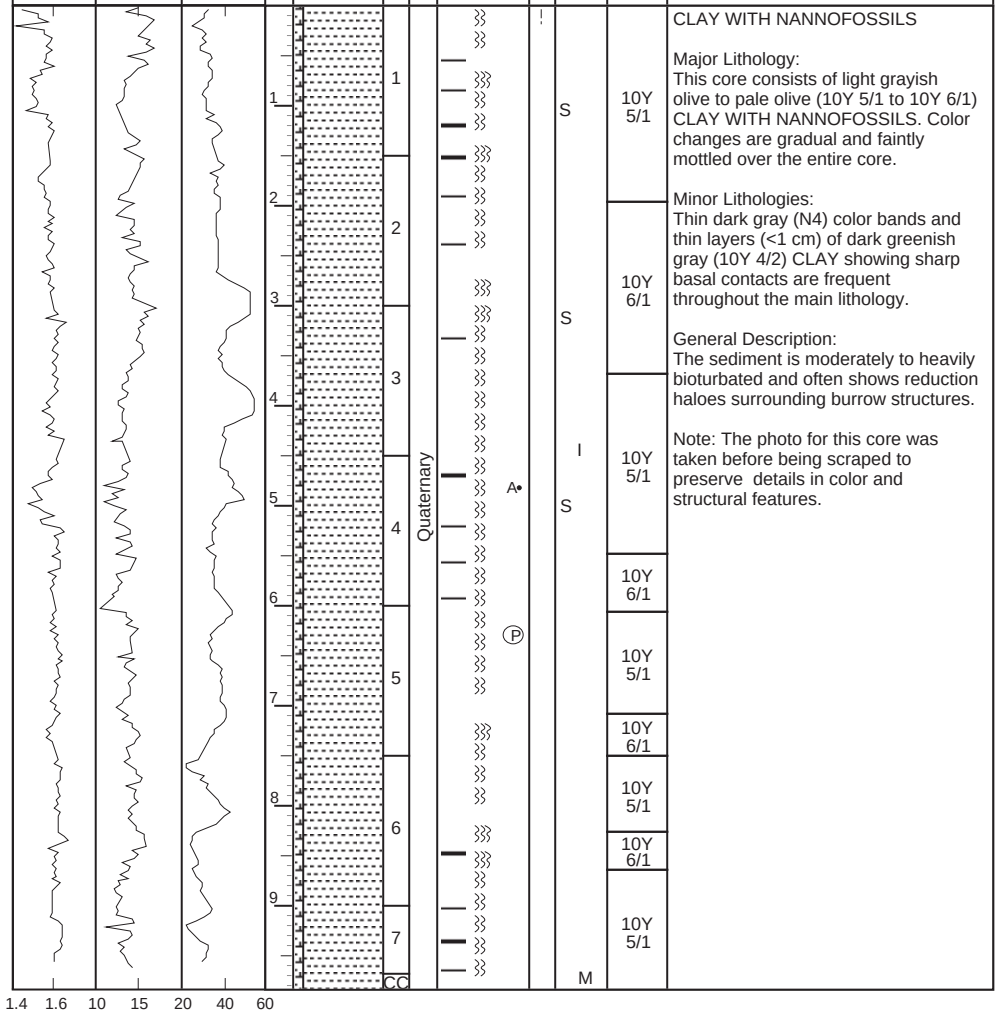
SITE 1021 HOLE B CORE 1H CORED 0.0 - 8.0 mbsf



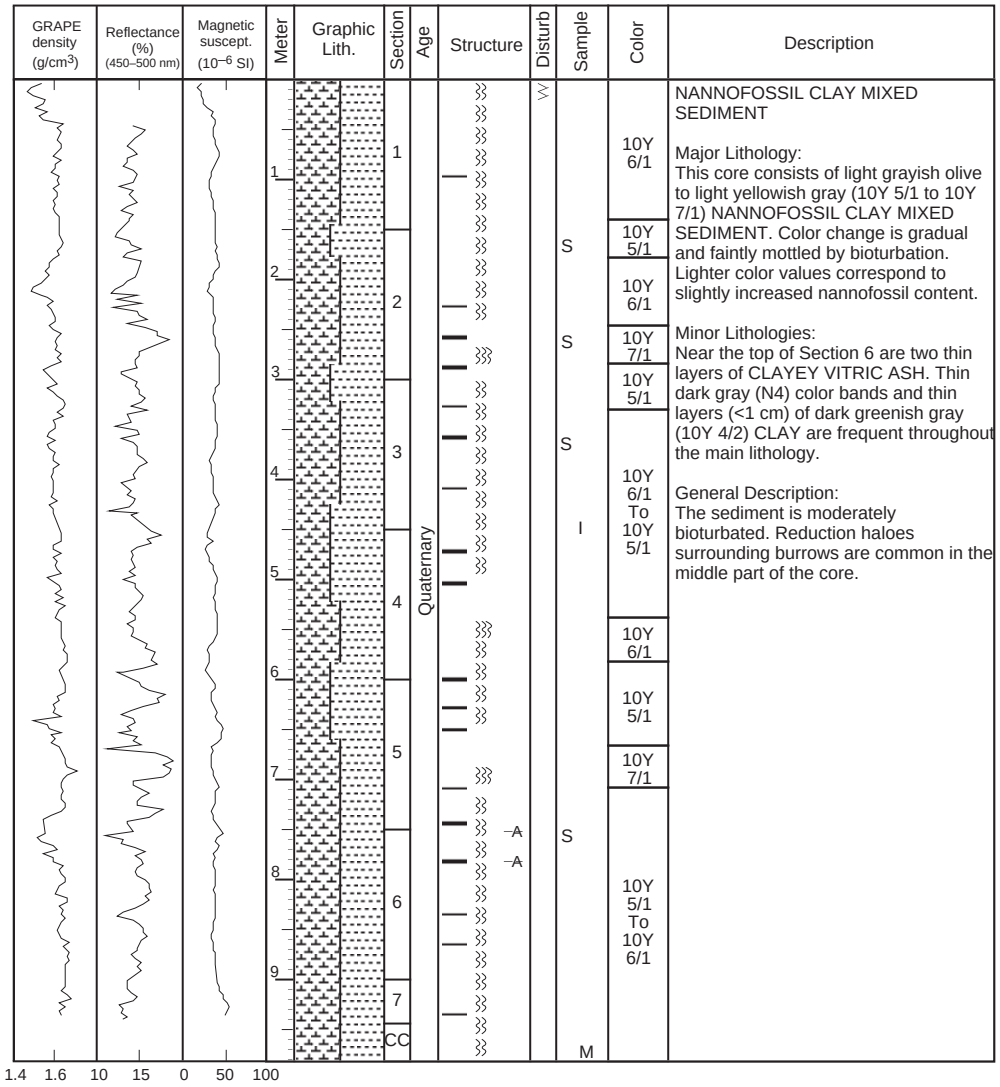
SITE 1021 HOLE B CORE 2H CORED 8.0 - 17.5 mbsf



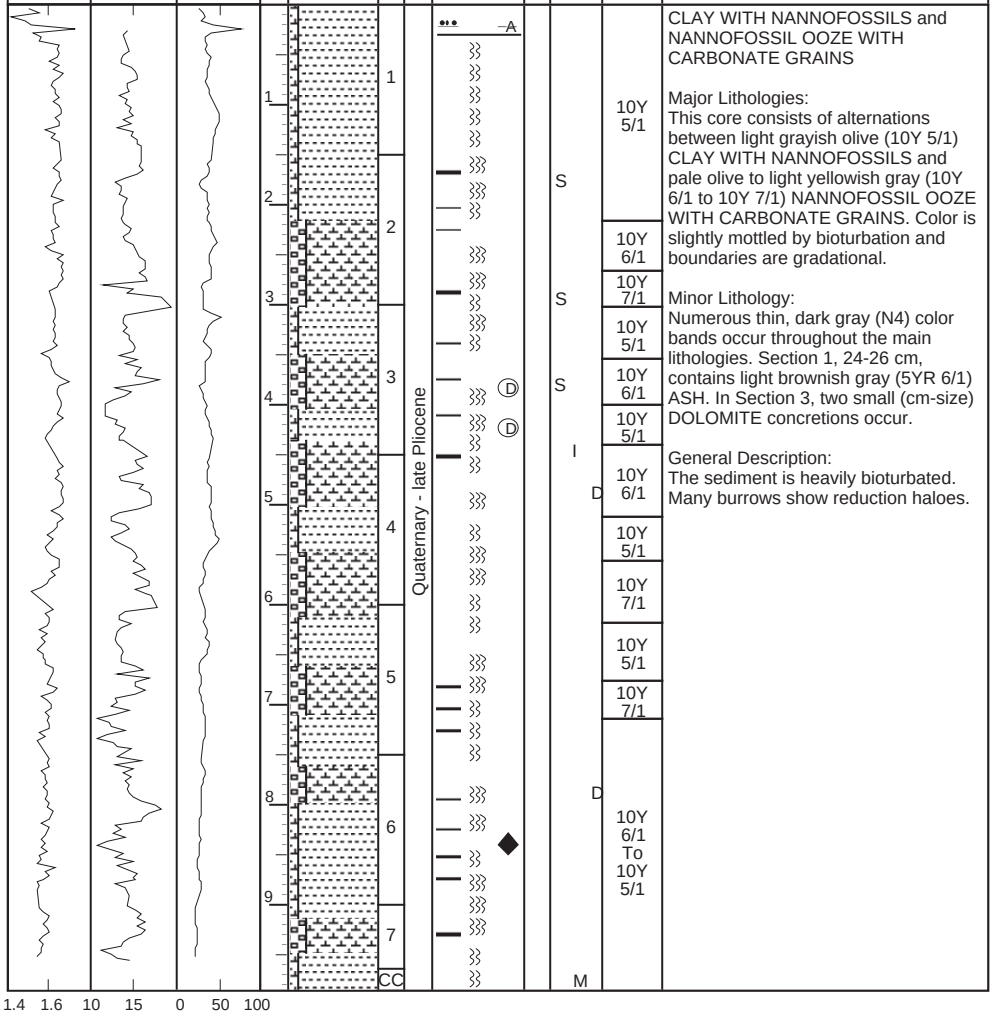
SITE 1021 HOLE B CORE 3H CORED 17.5 - 27.0 mbsf



SITE 1021 HOLE B CORE 4H CORED 27.0 - 36.5 mbsf



SITE 1021 HOLE B CORE 5H CORED 36.5 - 46.0 mbsf



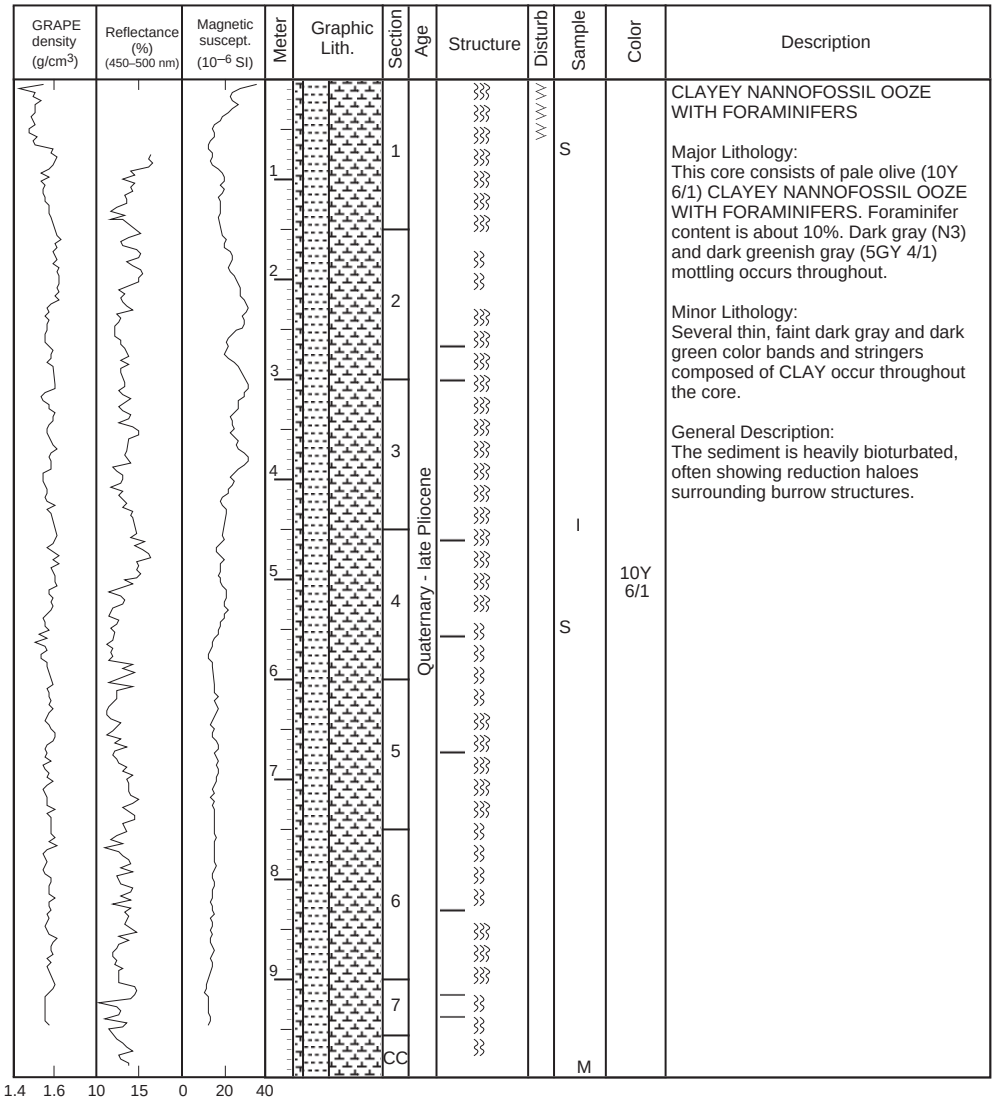
CLAY WITH NANNOFOSSILS and NANNOFOSSIL OOZE WITH CARBONATE GRAINS

Major Lithologies:
This core consists of alternations between light grayish olive (10Y 5/1) CLAY WITH NANNOFOSSILS and pale olive to light yellowish gray (10Y 6/1 to 10Y 7/1) NANNOFOSSIL OOZE WITH CARBONATE GRAINS. Color is slightly mottled by bioturbation and boundaries are gradational.

Minor Lithology:
Numerous thin, dark gray (N4) color bands occur throughout the main lithologies. Section 1, 24-26 cm, contains light brownish gray (5YR 6/1) ASH. In Section 3, two small (cm-size) DOLOMITE concretions occur.

General Description:
The sediment is heavily bioturbated. Many burrows show reduction haloes.

SITE 1021 HOLE B CORE 6H CORED 46.0 - 55.5 mbsf

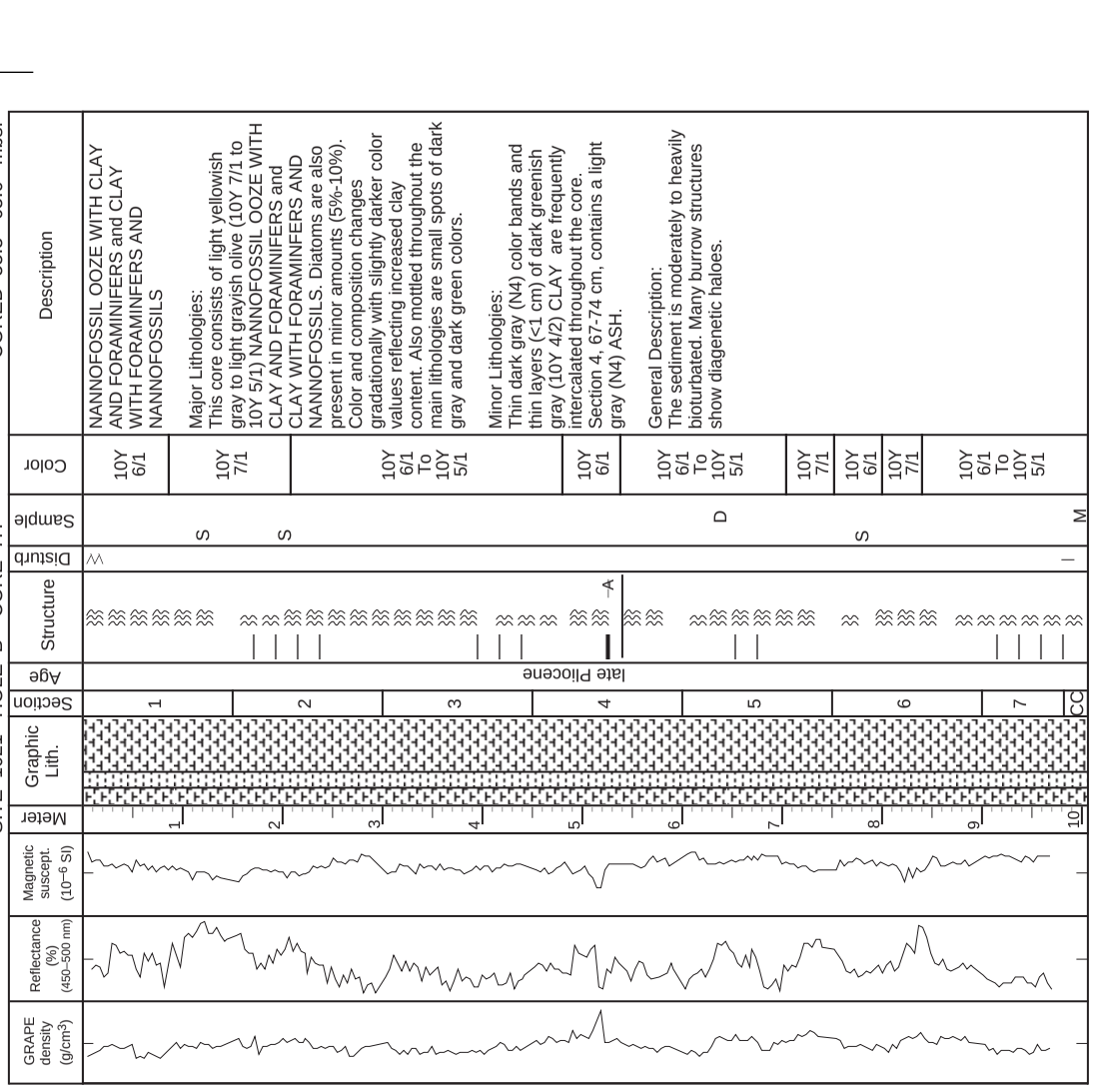


CLAYEY NANNOFOSSIL OOZE WITH FORAMINIFERS

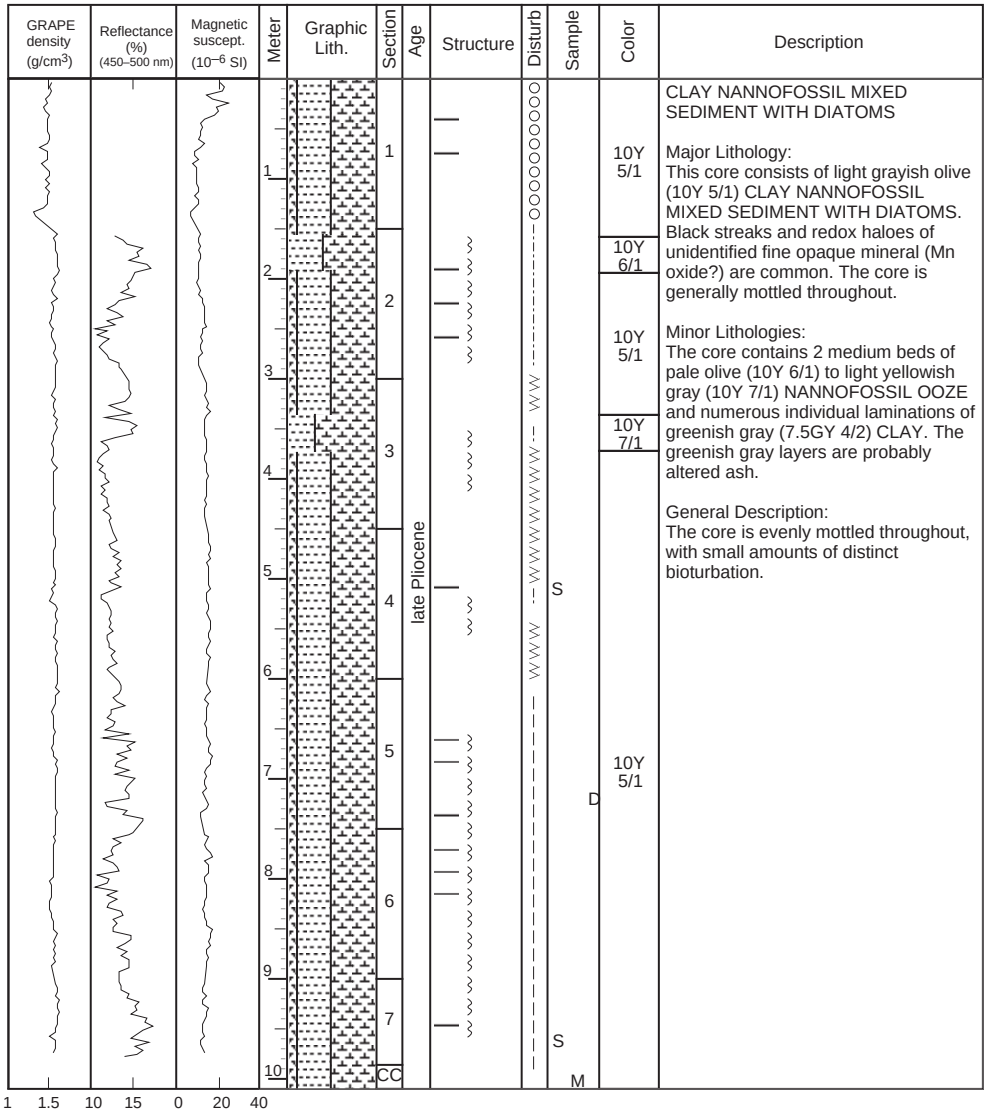
Major Lithology:
This core consists of pale olive (10Y 6/1) CLAYEY NANNOFOSSIL OOZE WITH FORAMINIFERS. Foraminifer content is about 10%. Dark gray (N3) and dark greenish gray (5GY 4/1) mottling occurs throughout.

Minor Lithology:
Several thin, faint dark gray and dark green color bands and stringers composed of CLAY occur throughout the core.

General Description:
The sediment is heavily bioturbated, often showing reduction haloes surrounding burrow structures.


SITE 1021 HOLE B CORE 7H CORED 55.5 - 65.0 mbsf
GRAPE density (g/cm³)
Reflectance (%) (450–500 nm)
Magnetic suscept. (10⁻⁶ SI)
Meter
Graphic Lith.
Section
Age
Structure
Disturb
Sample
Color
Description
late Pliocene
NANNOFOSSIL OOZE WITH CLAY AND FORAMINIFERS and CLAY WITH FORAMINFERS AND NANNOFOSSILS
Major Lithologies:
This core consists of light yellowish gray to light grayish olive (10Y 7/1 to 10Y 5/1) NANNOFOSSIL OOZE WITH CLAY AND FORAMINIFERS and CLAY WITH FORAMINFERS AND NANNOFOSSILS. Diatoms are also present in minor amounts (5%-10%). Color and composition changes gradationally with slightly darker color values reflecting increased clay content. Also mottled throughout the main lithologies are small spots of dark gray and dark green colors.
Minor Lithologies:
Thin dark gray (N4) color bands and thin layers (<1 cm) of dark greenish gray (10Y 4/2) CLAY are frequently intercalated throughout the core. Section 4, 67-74 cm, contains a light gray (N4) ASH.
General Description:
The sediment is moderately to heavily bioturbated. Many burrow structures show diagenetic haloes.
10Y 6/1
10Y 7/1
10Y 6/1 To 10Y 5/1
10Y 6/1
10Y 6/1 To 10Y 5/1
10Y 7/1
10Y 6/1
10Y 7/1
10Y 6/1 To 10Y 5/1
S
S
D
S
M
A
CC

SITE 1021 HOLE B CORE 8H CORED 65.0 - 74.5 mbsf



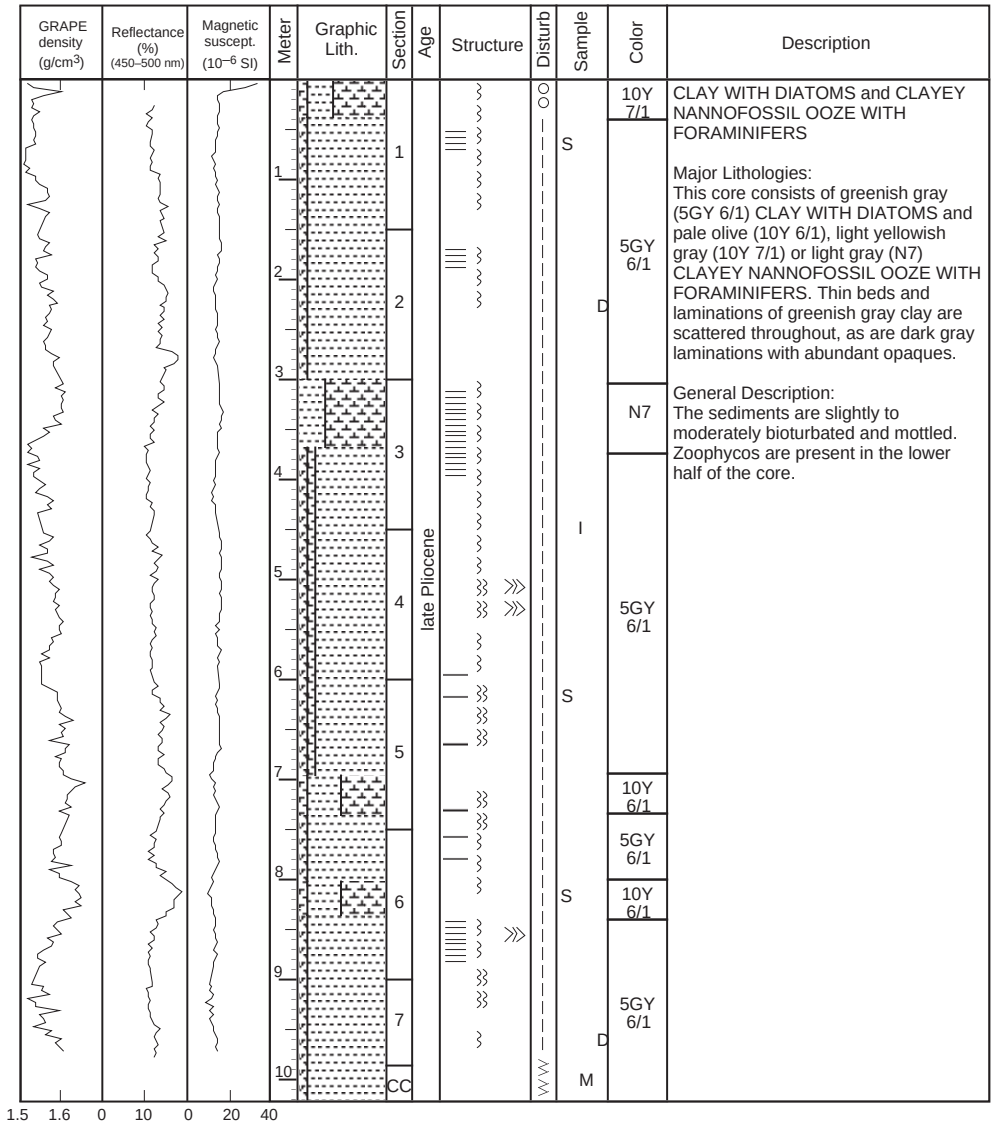
CLAY NANNOFOSSIL MIXED SEDIMENT WITH DIATOMS

Major Lithology:
This core consists of light grayish olive (10Y 5/1) CLAY NANNOFOSSIL MIXED SEDIMENT WITH DIATOMS. Black streaks and redox haloes of unidentified fine opaque mineral (Mn oxide?) are common. The core is generally mottled throughout.

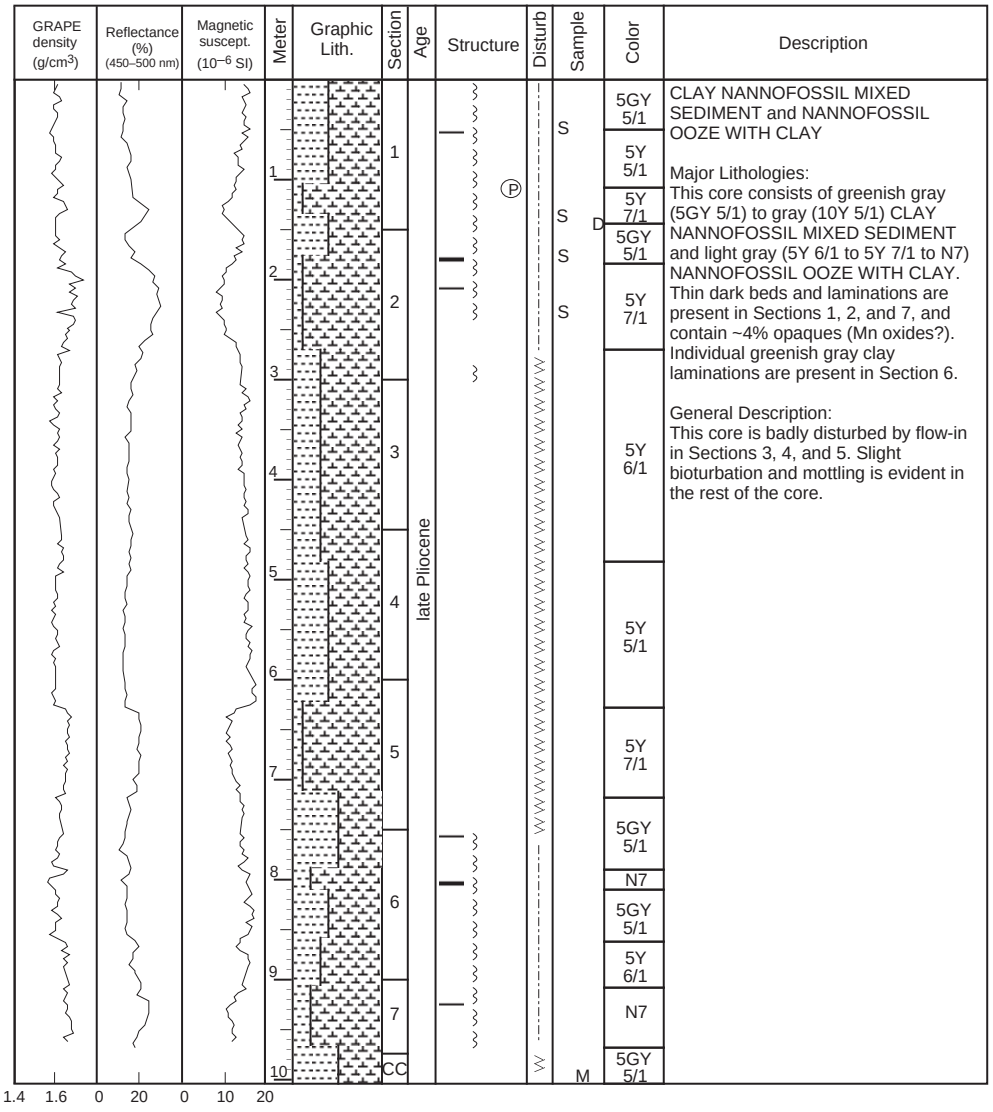
Minor Lithologies:
The core contains 2 medium beds of pale olive (10Y 6/1) to light yellowish gray (10Y 7/1) NANNOFOSSIL OOZE and numerous individual laminations of greenish gray (7.5GY 4/2) CLAY. The greenish gray layers are probably altered ash.

General Description:
The core is evenly mottled throughout, with small amounts of distinct bioturbation.

SITE 1021 HOLE B CORE 9H CORED 74.5 - 84.0 mbsf



SITE 1021 HOLE B CORE 10H CORED 84.0 - 93.5 mbsf

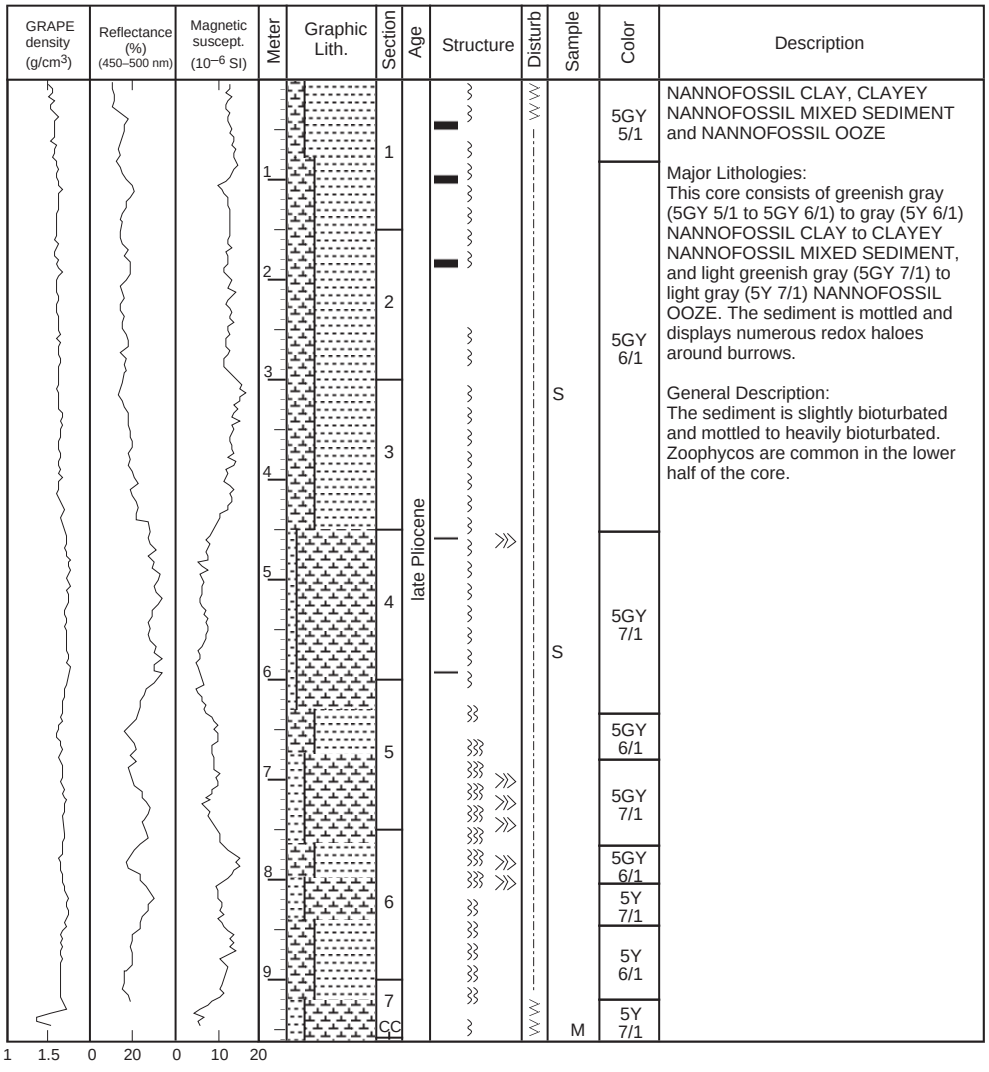


CLAY NANNOFOSSIL MIXED SEDIMENT and NANNOFOSSIL OOZE WITH CLAY

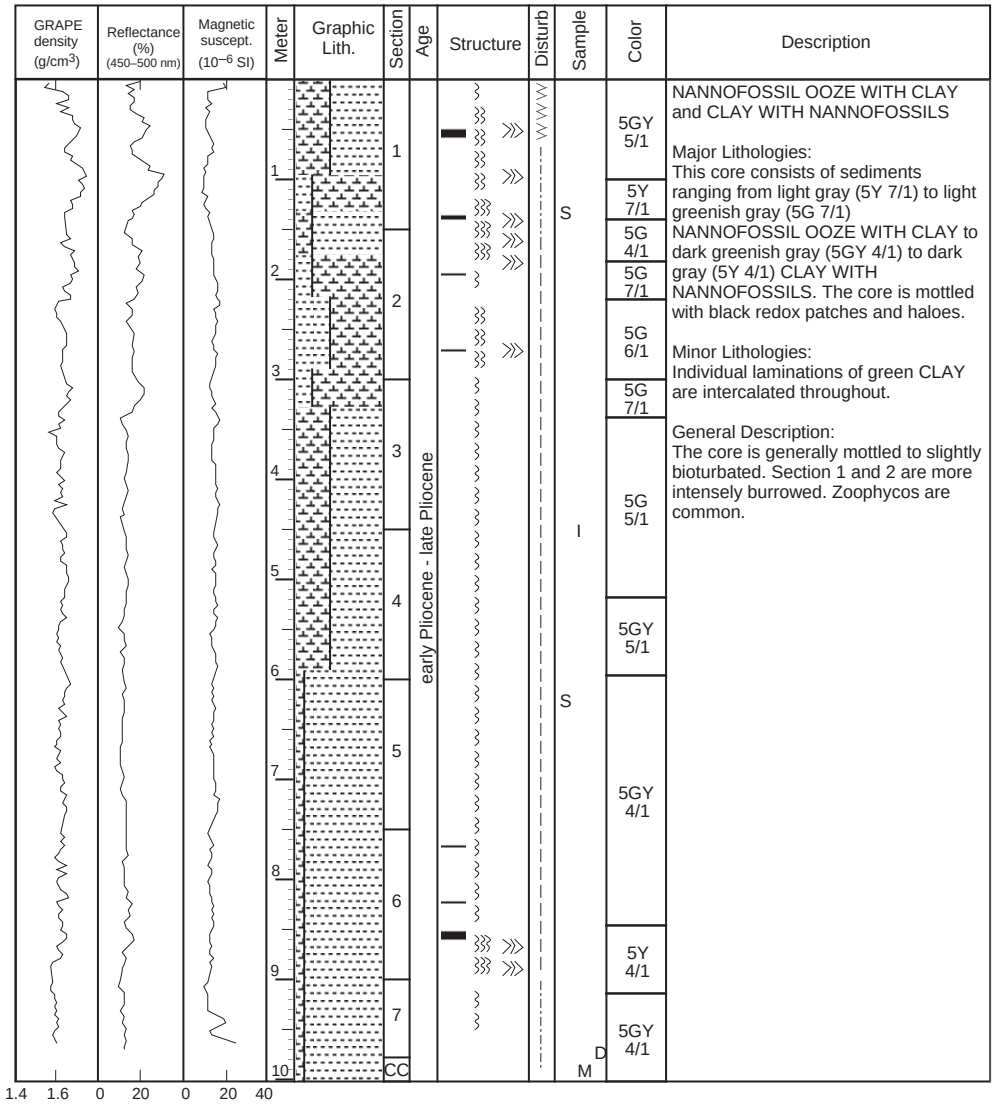
Major Lithologies:
This core consists of greenish gray (5GY 5/1) to gray (10Y 5/1) CLAY NANNOFOSSIL MIXED SEDIMENT and light gray (5Y 6/1 to 5Y 7/1 to N7) NANNOFOSSIL OOZE WITH CLAY. Thin dark beds and laminations are present in Sections 1, 2, and 7, and contain ~4% opaques (Mn oxides?). Individual greenish gray clay laminations are present in Section 6.

General Description:
This core is badly disturbed by flow-in in Sections 3, 4, and 5. Slight bioturbation and mottling is evident in the rest of the core.

SITE 1021 HOLE B CORE 11H CORED 93.5 - 103.0 mbsf



SITE 1021 HOLE B CORE 12H CORED 103.0 - 112.5 mbsf



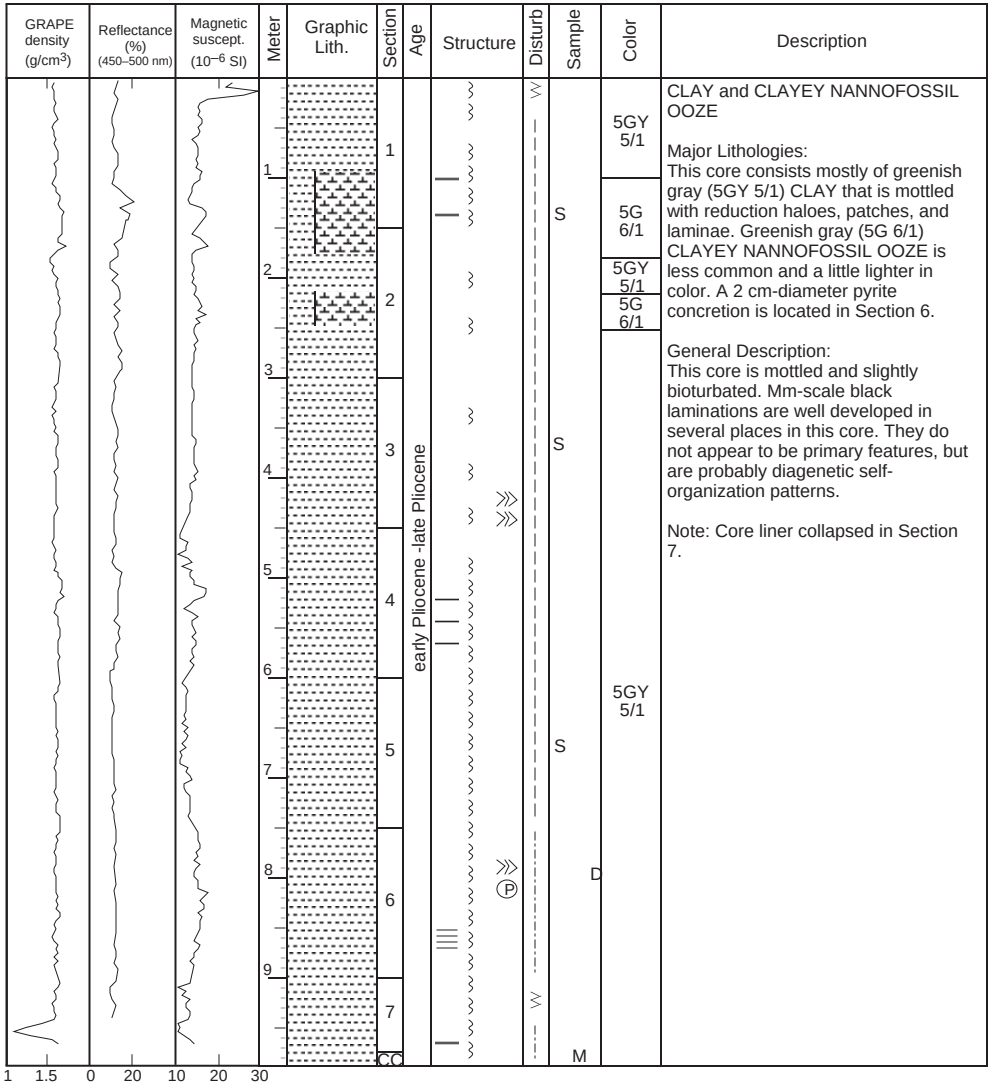
NANNOFOSSIL OOZE WITH CLAY and CLAY WITH NANNOFOSSILS

Major Lithologies:
This core consists of sediments ranging from light gray (5Y 7/1) to light greenish gray (5G 7/1) NANNOFOSSIL OOZE WITH CLAY to dark greenish gray (5GY 4/1) to dark gray (5Y 4/1) CLAY WITH NANNOFOSSILS. The core is mottled with black redox patches and haloes.

Minor Lithologies:
Individual laminations of green CLAY are intercalated throughout.

General Description:
The core is generally mottled to slightly bioturbated. Section 1 and 2 are more intensely burrowed. Zoophycos are common.

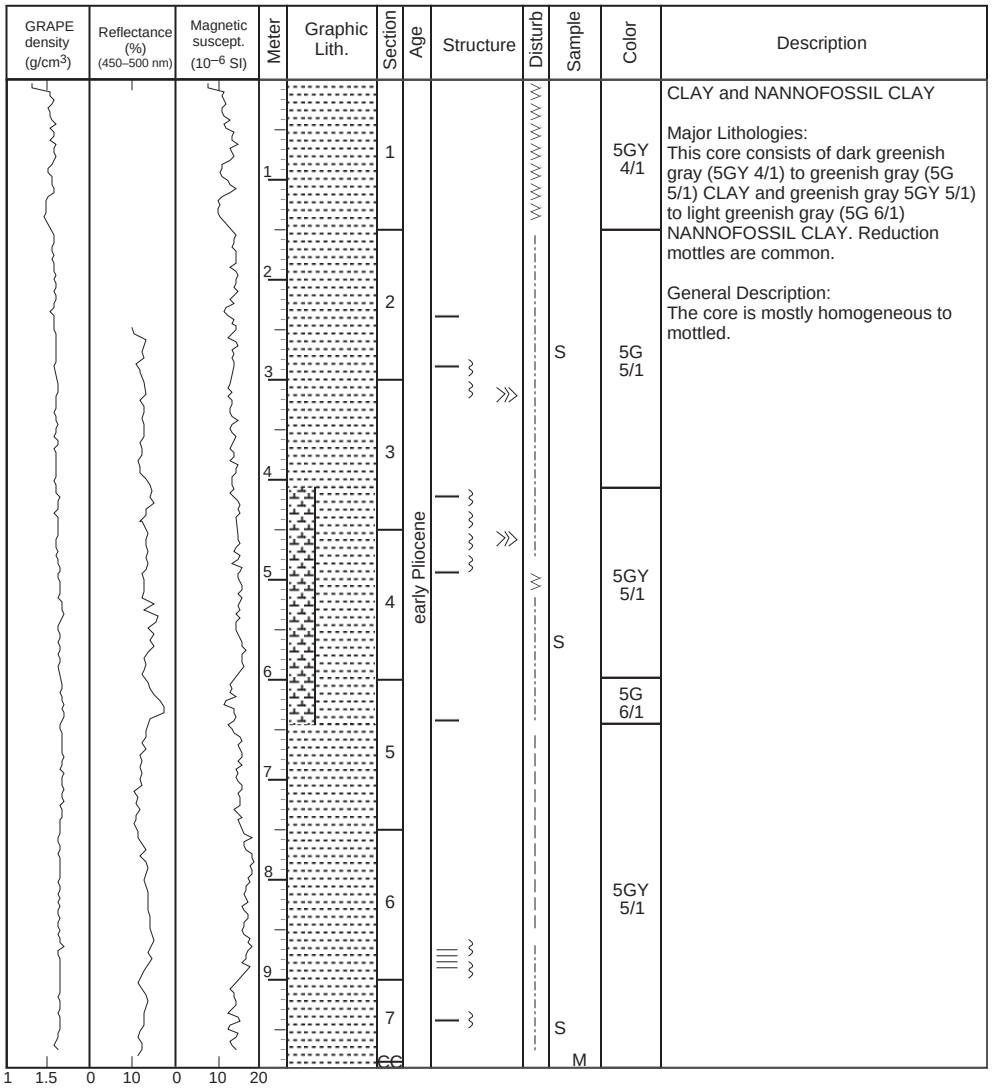
SITE 1021 HOLE B CORE 13H CORED 112.5 - 122.0 mbsf



Description
CLAY and CLAYEY NANNOFOSSIL OOZE Major Lithologies: This core consists mostly of greenish gray (5GY 5/1) CLAY that is mottled with reduction haloes, patches, and laminae. Greenish gray (5G 6/1) CLAYEY NANNOFOSSIL OOZE is less common and a little lighter in color. A 2 cm-diameter pyrite concretion is located in Section 6. General Description: This core is mottled and slightly bioturbated. Mm-scale black laminations are well developed in several places in this core. They do not appear to be primary features, but are probably diagenetic self-organization patterns. Note: Core liner collapsed in Section 7.

SITE 1021

SITE 1021 HOLE B CORE 14H CORED 122.0 - 131.5 mbsf

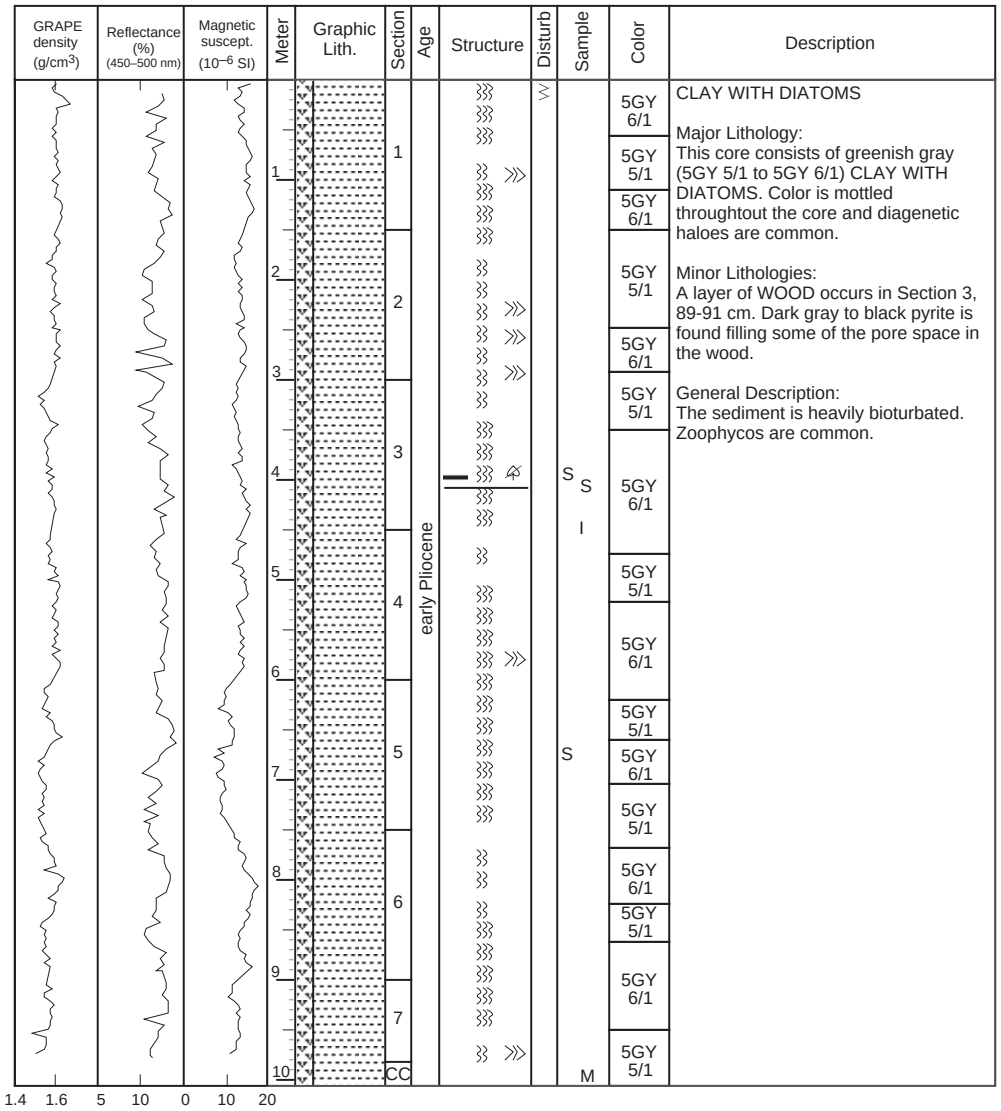


CLAY and NANNOFOSSIL CLAY

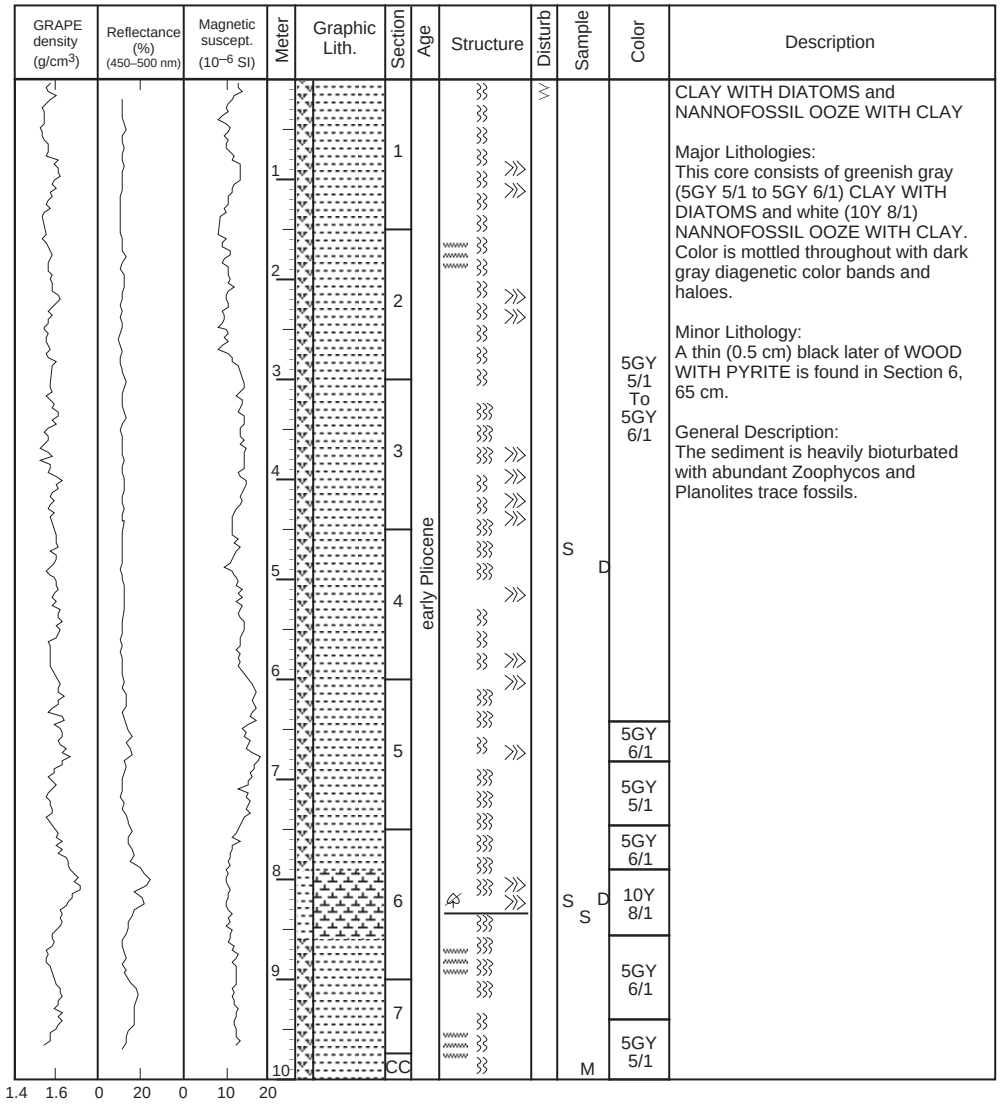
Major Lithologies:
This core consists of dark greenish gray (5GY 4/1) to greenish gray (5G 5/1) CLAY and greenish gray 5GY 5/1) to light greenish gray (5G 6/1) NANNOFOSSIL CLAY. Reduction mottles are common.

General Description:
The core is mostly homogeneous to mottled.

SITE 1021 HOLE B CORE 15H CORED 131.5 - 141.0 mbsf



SITE 1021 HOLE B CORE 16H CORED 141.0 - 150.5 mbsf



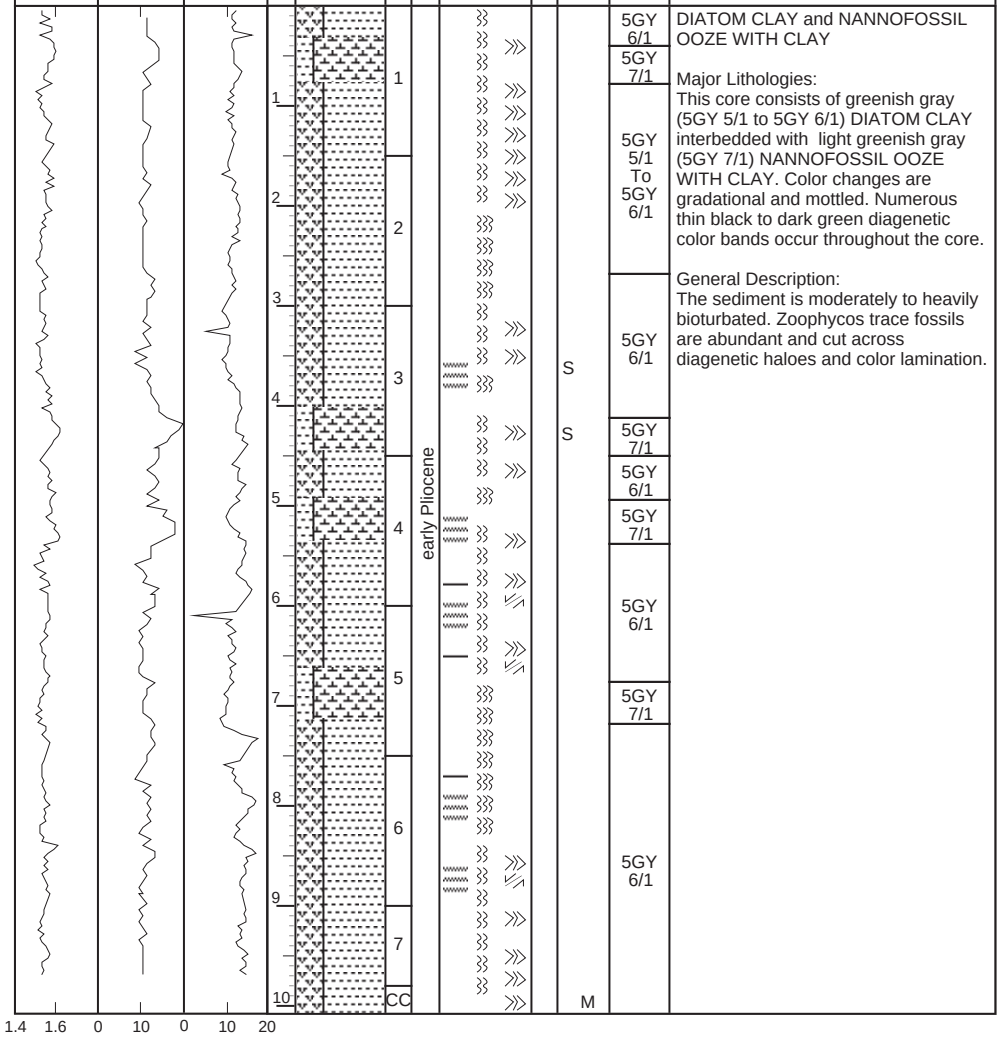
CLAY WITH DIATOMS and NANNOFOSSIL OOZE WITH CLAY

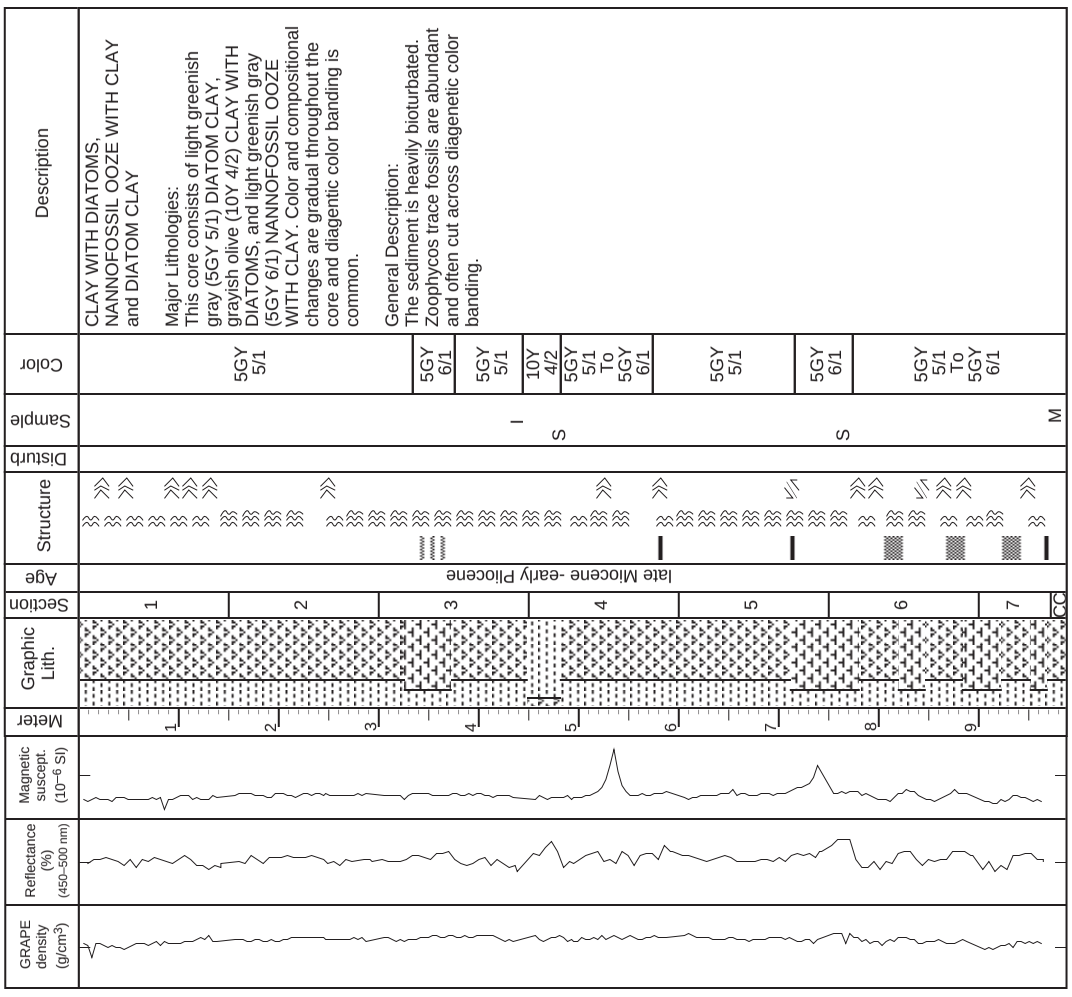
Major Lithologies:
This core consists of greenish gray (5GY 5/1 to 5GY 6/1) CLAY WITH DIATOMS and white (10Y 8/1) NANNOFOSSIL OOZE WITH CLAY. Color is mottled throughout with dark gray diagenetic color bands and haloes.

Minor Lithology:
A thin (0.5 cm) black later of WOOD WITH PYRITE is found in Section 6, 65 cm.

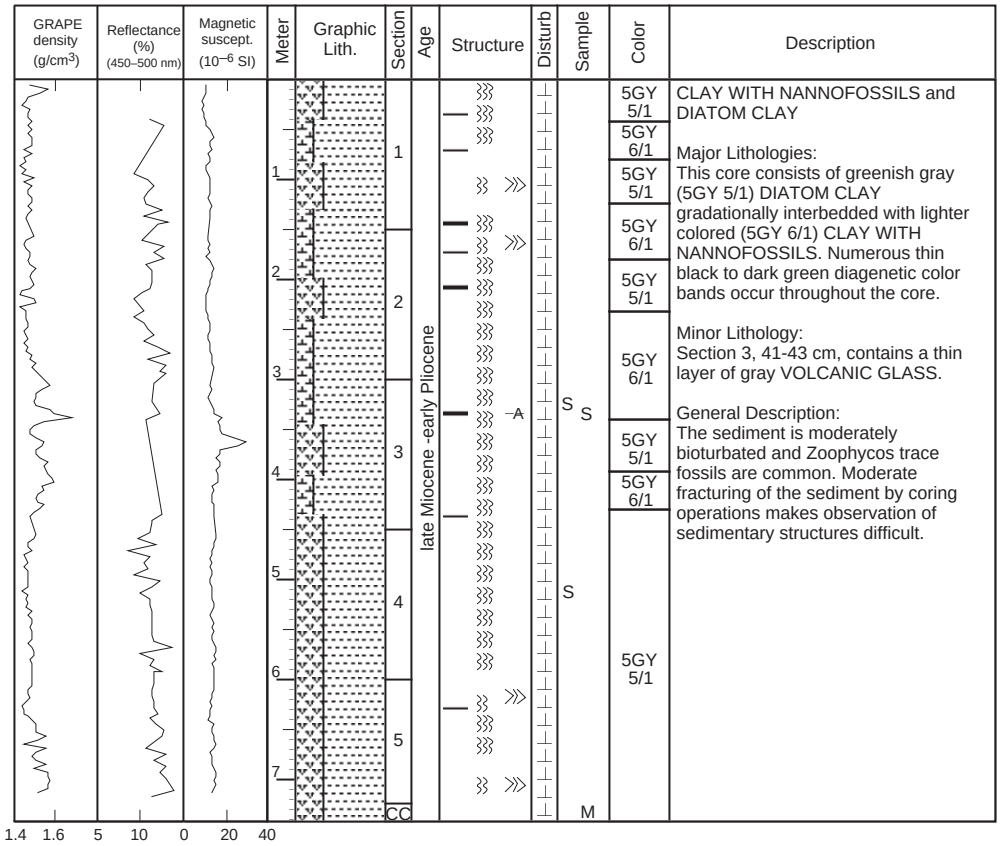
General Description:
The sediment is heavily bioturbated with abundant Zoophycos and Planolites trace fossils.

SITE 1021 HOLE B CORE 17H CORED 150.5 - 160.0 mbsf

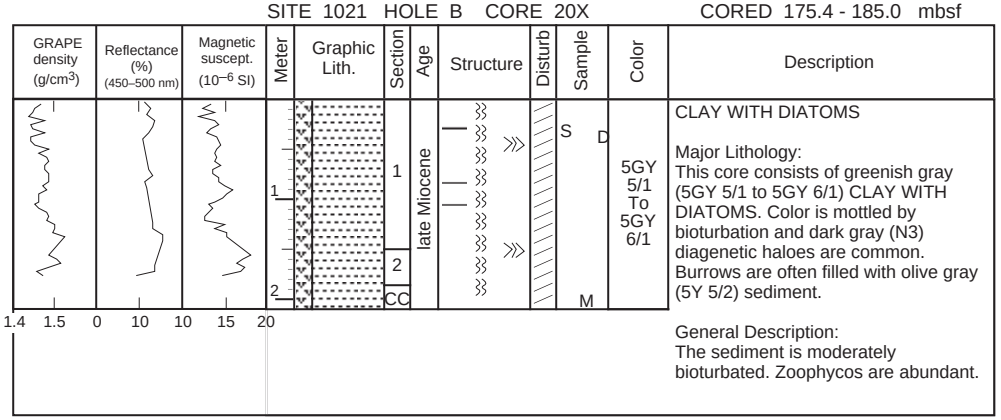



SITE 1021 HOLE B CORE 18H
CORED 160.0 - 169.5 mbsf
GRAPE density (g/cm3)
Reflectance (%) (450–500 nm)
Magnetic suscept. (10−6 SI)
Meter
Graphic Lith.
Section
Age
Structure
Disturb
Sample
Color
Description
late Miocene -early Pliocene
CLAY WITH DIATOMS, NANNOFOSSIL OOZE WITH CLAY and DIATOM CLAY
Major Lithologies:
This core consists of light greenish gray (5GY 5/1) DIATOM CLAY, grayish olive (10Y 4/2) CLAY WITH DIATOMS, and light greenish gray (5GY 6/1) NANNOFOSSIL OOZE WITH CLAY. Color and compositional changes are gradual throughout the core and diagentic color banding is common.
General Description:
The sediment is heavily bioturbated. Zoophycos trace fossils are abundant and often cut across diagenetic color banding.
5GY 5/1
5GY 6/1
5GY 5/1
10Y 4/2
5GY 5/1 To 5GY 6/1
5GY 5/1
5GY 6/1
5GY 5/1 To 5GY 6/1
I
S
S
M
1
2
3
4
5
6
7
CC

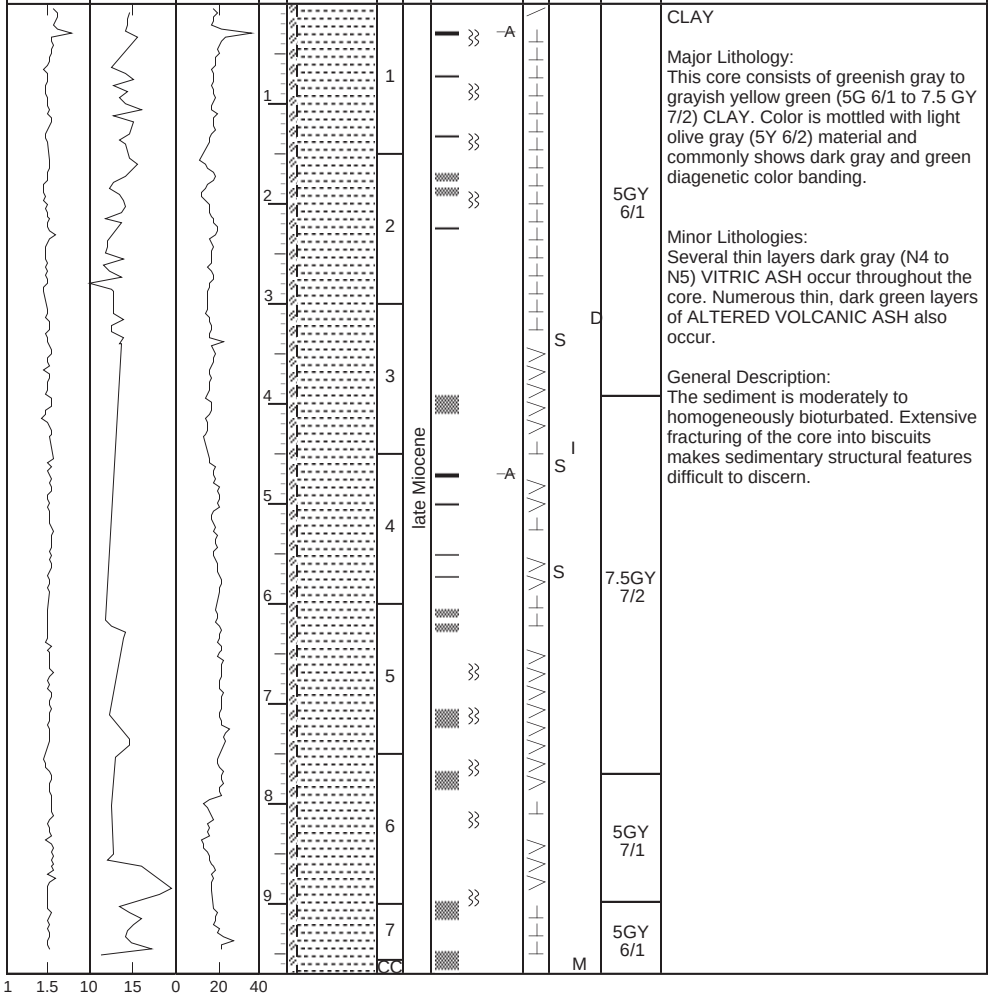
SITE 1021 HOLE B CORE 19X CORED 169.5 - 175.4 mbsf



SITE 1021 HOLE B CORE 20X CORED 175.4 - 185.0 mbsf



SITE 1021 HOLE B CORE 21X CORED 185.0 - 194.7 mbsf



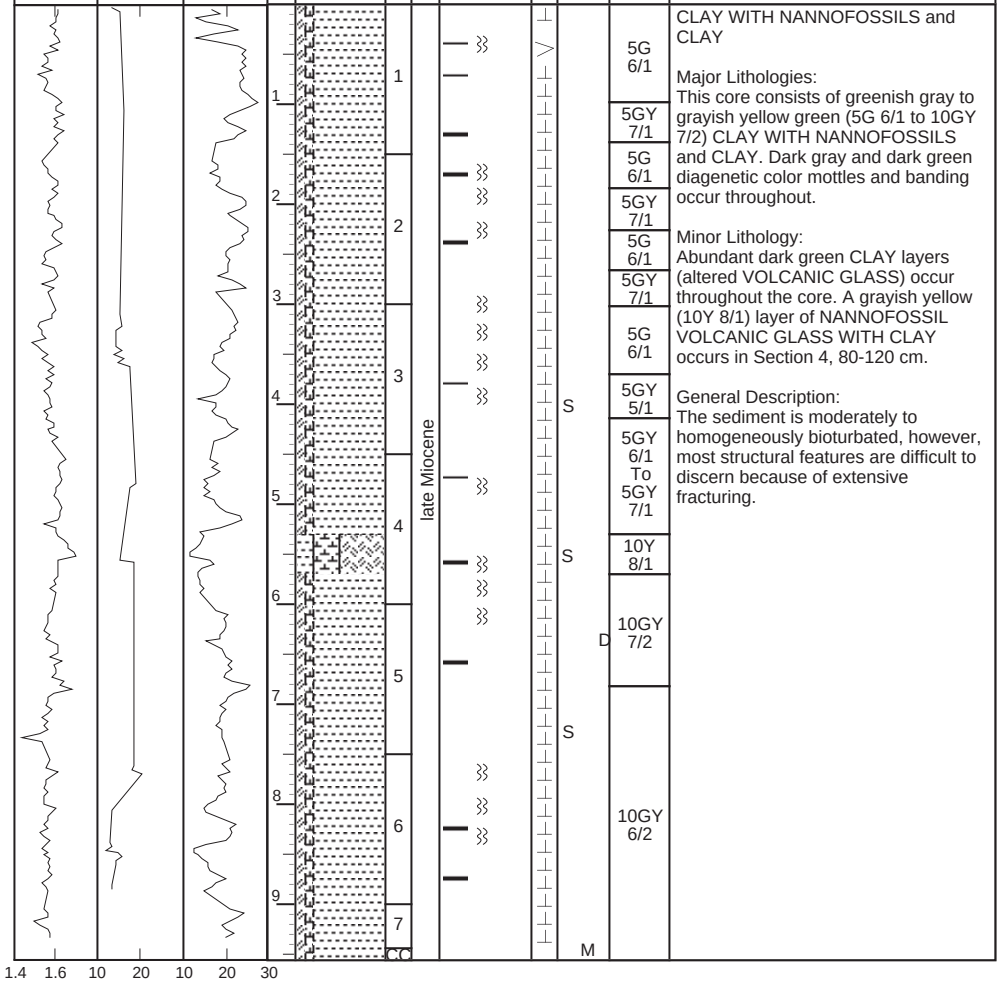
CLAY

Major Lithology:
This core consists of greenish gray to grayish yellow green (5G 6/1 to 7.5 GY 7/2) CLAY. Color is mottled with light olive gray (5Y 6/2) material and commonly shows dark gray and green diagenetic color banding.

Minor Lithologies:
Several thin layers dark gray (N4 to N5) VITRIC ASH occur throughout the core. Numerous thin, dark green layers of ALTERED VOLCANIC ASH also occur.

General Description:
The sediment is moderately to homogeneously bioturbated. Extensive fracturing of the core into biscuits makes sedimentary structural features difficult to discern.

SITE 1021 HOLE B CORE 22X CORED 194.7 - 204.3 mbsf



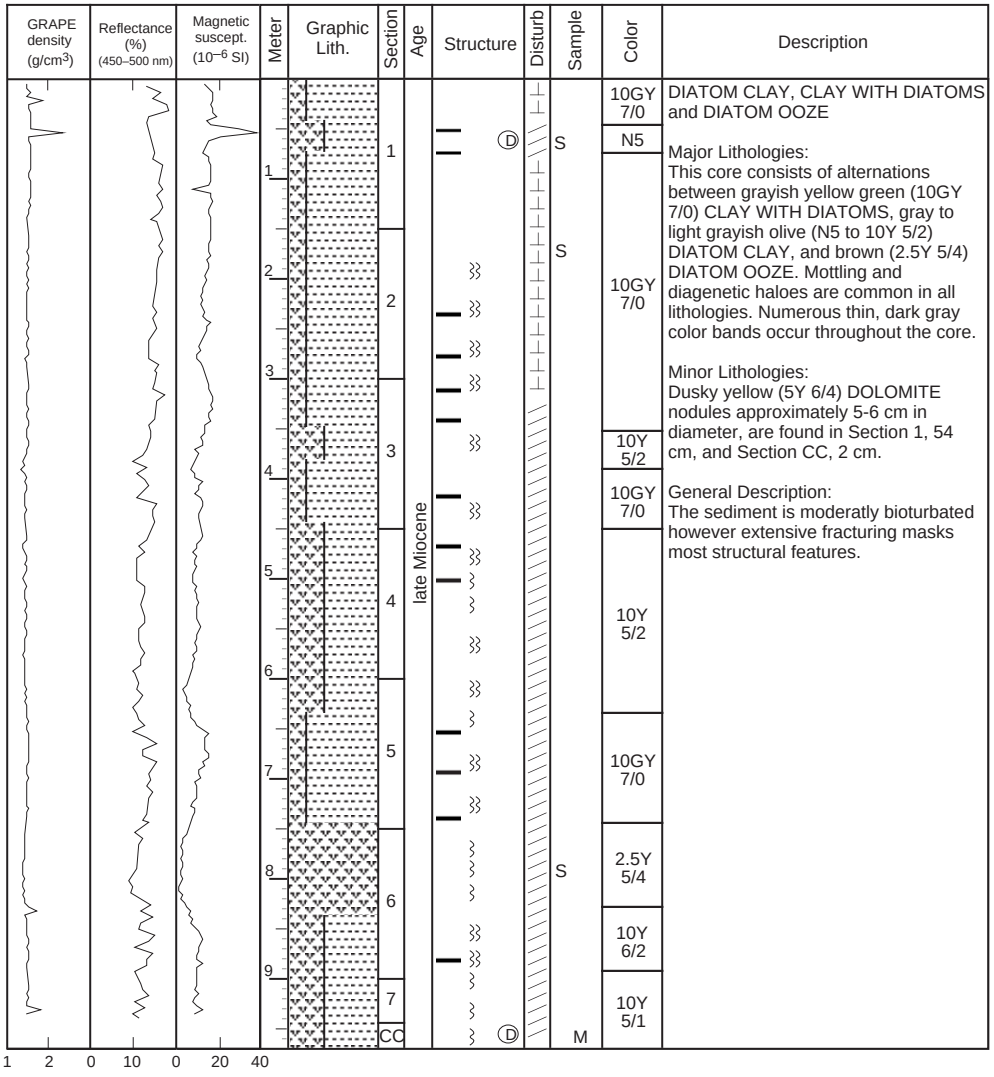
CLAY WITH NANNOFOSSILS and CLAY

Major Lithologies:
This core consists of greenish gray to grayish yellow green (5G 6/1 to 10GY 7/2) CLAY WITH NANNOFOSSILS and CLAY. Dark gray and dark green diagenetic color mottles and banding occur throughout.

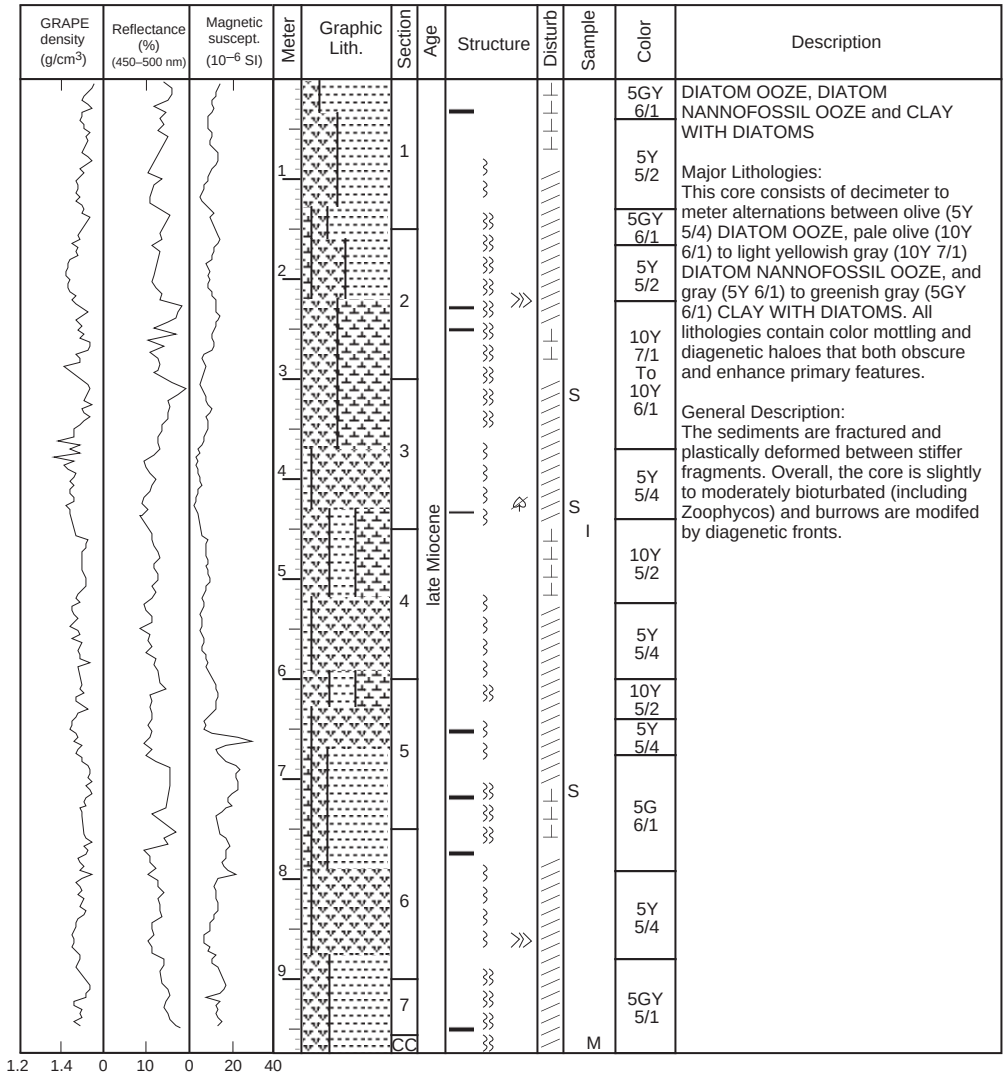
Minor Lithology:
Abundant dark green CLAY layers (altered VOLCANIC GLASS) occur throughout the core. A grayish yellow (10Y 8/1) layer of NANNOFOSSIL VOLCANIC GLASS WITH CLAY occurs in Section 4, 80-120 cm.

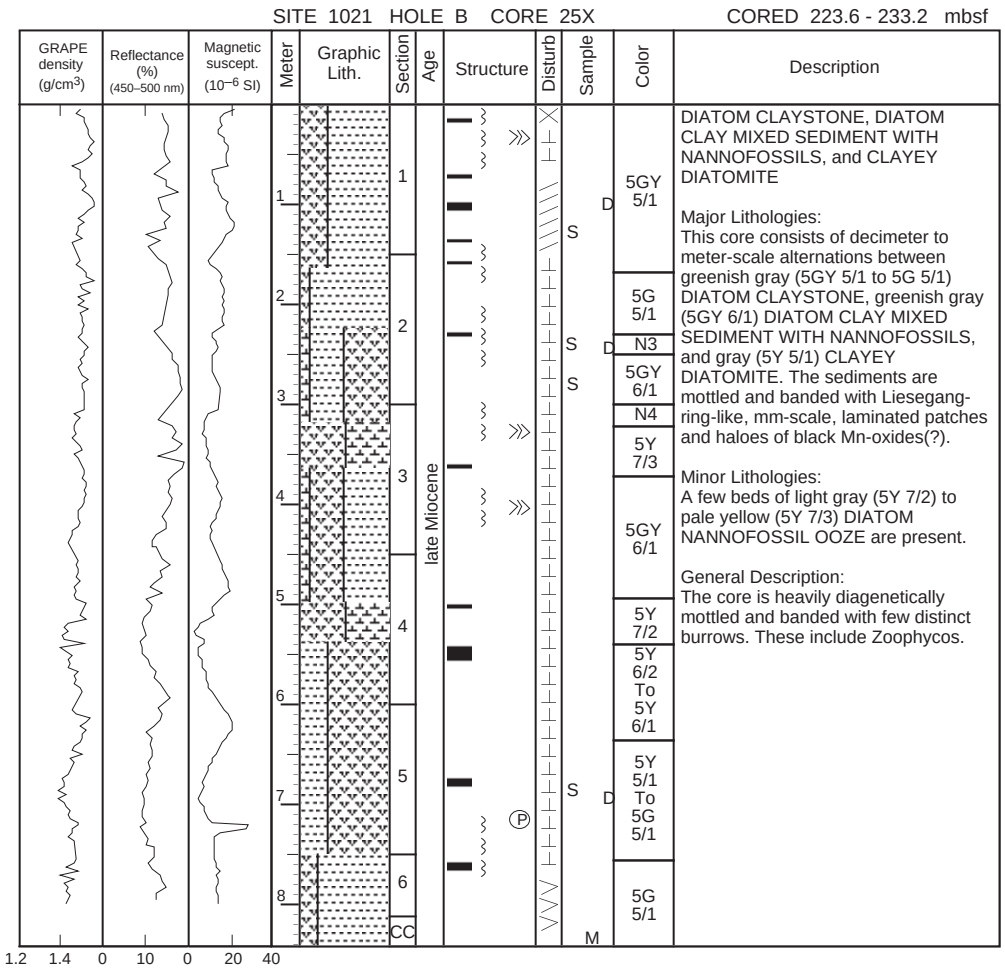
General Description:
The sediment is moderately to homogeneously bioturbated, however, most structural features are difficult to discern because of extensive fracturing.

SITE 1021 HOLE B CORE 23X CORED 204.3 - 214.0 mbsf

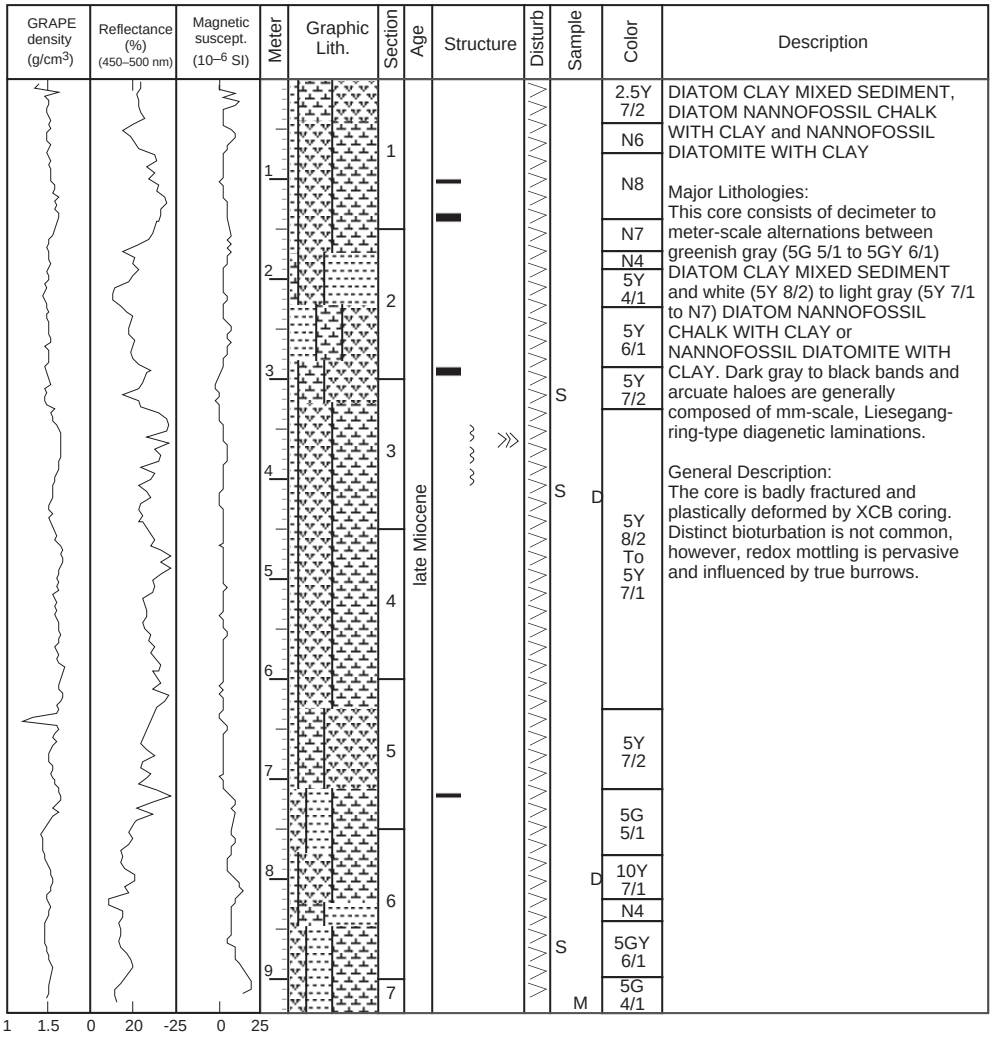


SITE 1021 HOLE B CORE 24X CORED 214.0 - 223.6 mbsf

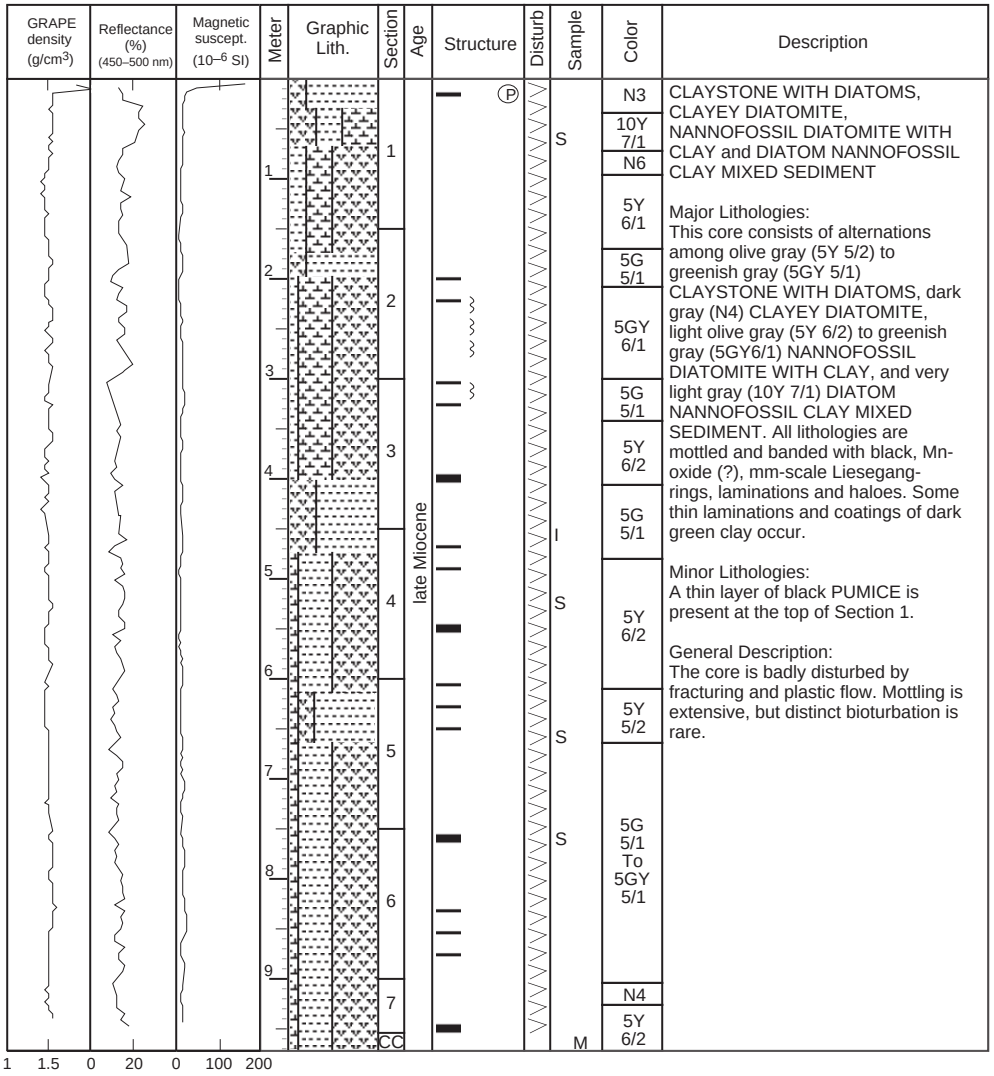



SITE 1021 HOLE B CORE 25X
CORED 223.6 - 233.2 mbsf
GRAPE density (g/cm3)
Reflectance (%) (450–500 nm)
Magnetic suscept. (10−6 SI)
Meter
Graphic Lith.
Section
Age
Structure
Disturb
Sample
Color
Description
late Miocene
5GY 5/1
5G 5/1
N3
5GY 6/1
N4
5Y 7/3
5GY 6/1
5Y 7/2
5Y 6/2 To 5Y 6/1
5Y 5/1 To 5G 5/1
5G 5/1
DIATOM CLAYSTONE, DIATOM CLAY MIXED SEDIMENT WITH NANNOFOSSILS, and CLAYEY DIATOMITE
Major Lithologies:
This core consists of decimeter to meter-scale alternations between greenish gray (5GY 5/1 to 5G 5/1) DIATOM CLAYSTONE, greenish gray (5GY 6/1) DIATOM CLAY MIXED SEDIMENT WITH NANNOFOSSILS, and gray (5Y 5/1) CLAYEY DIATOMITE. The sediments are mottled and banded with Liesegang-ring-like, mm-scale, laminated patches and haloes of black Mn-oxides(?).
Minor Lithologies:
A few beds of light gray (5Y 7/2) to pale yellow (5Y 7/3) DIATOM NANNOFOSSIL OOZE are present.
General Description:
The core is heavily diagenetically mottled and banded with few distinct burrows. These include Zoophycos.
1.2 1.4 0 10 0 20 40

SITE 1021 HOLE B CORE 26X CORED 233.2 - 242.8 mbsf

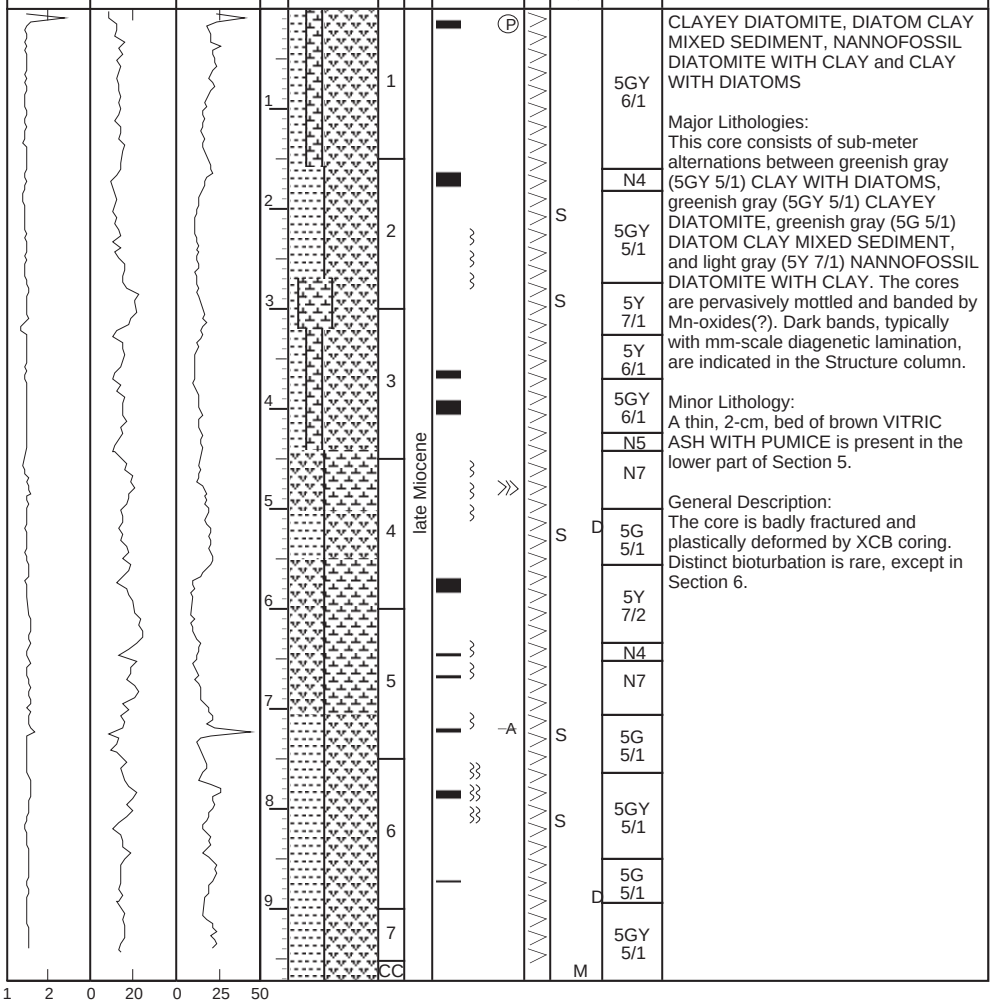


SITE 1021 HOLE B CORE 27X CORED 242.8 - 252.4 mbsf



Color	Description
N3	CLAYSTONE WITH DIATOMS, CLAYEY DIATOMITE, NANNOFOSSIL DIATOMITE WITH CLAY and DIATOM NANNOFOSSIL CLAY MIXED SEDIMENT
10Y 7/1	
N6	
5Y 6/1	Major Lithologies: This core consists of alternations among olive gray (5Y 5/2) to greenish gray (5GY 5/1) CLAYSTONE WITH DIATOMS, dark gray (N4) CLAYEY DIATOMITE, light olive gray (5Y 6/2) to greenish gray (5GY6/1) NANNOFOSSIL DIATOMITE WITH CLAY, and very light gray (10Y 7/1) DIATOM NANNOFOSSIL CLAY MIXED SEDIMENT. All lithologies are mottled and banded with black, Mn-oxide (?), mm-scale Liesegang-rings, laminations and haloes. Some thin laminations and coatings of dark green clay occur.
5G 5/1	
5GY 6/1	
5G 5/1	
5Y 6/2	
5G 5/1	
5Y 6/2	Minor Lithologies: A thin layer of black PUMICE is present at the top of Section 1.
5Y 5/2	General Description: The core is badly disturbed by fracturing and plastic flow. Mottling is extensive, but distinct bioturbation is rare.
5G 5/1 To 5GY 5/1	
N4	
5Y 6/2	

SITE 1021 HOLE B CORE 28X CORED 252.4 - 262.1 mbsf

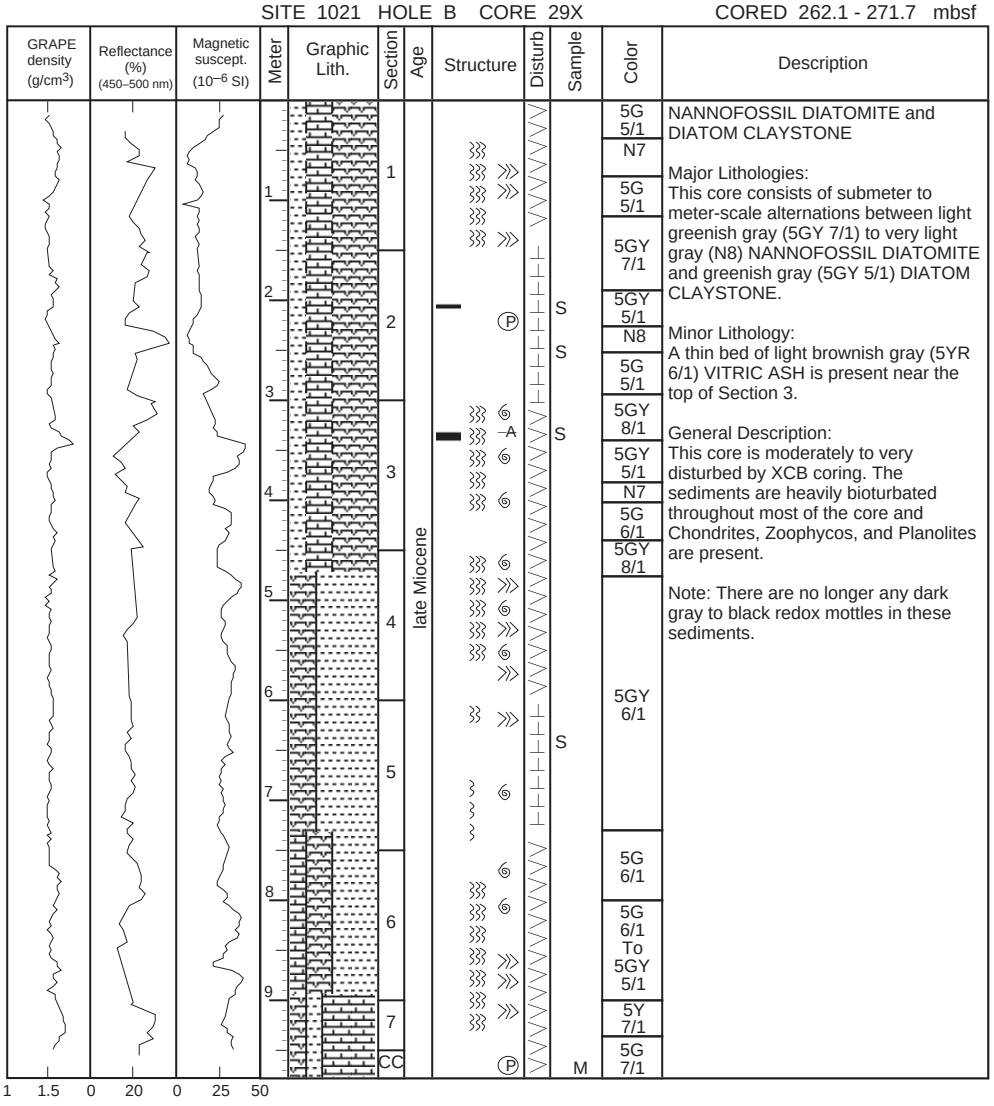


CLAYEY DIATOMITE, DIATOM CLAY MIXED SEDIMENT, NANNOFOSSIL DIATOMITE WITH CLAY and CLAY WITH DIATOMS

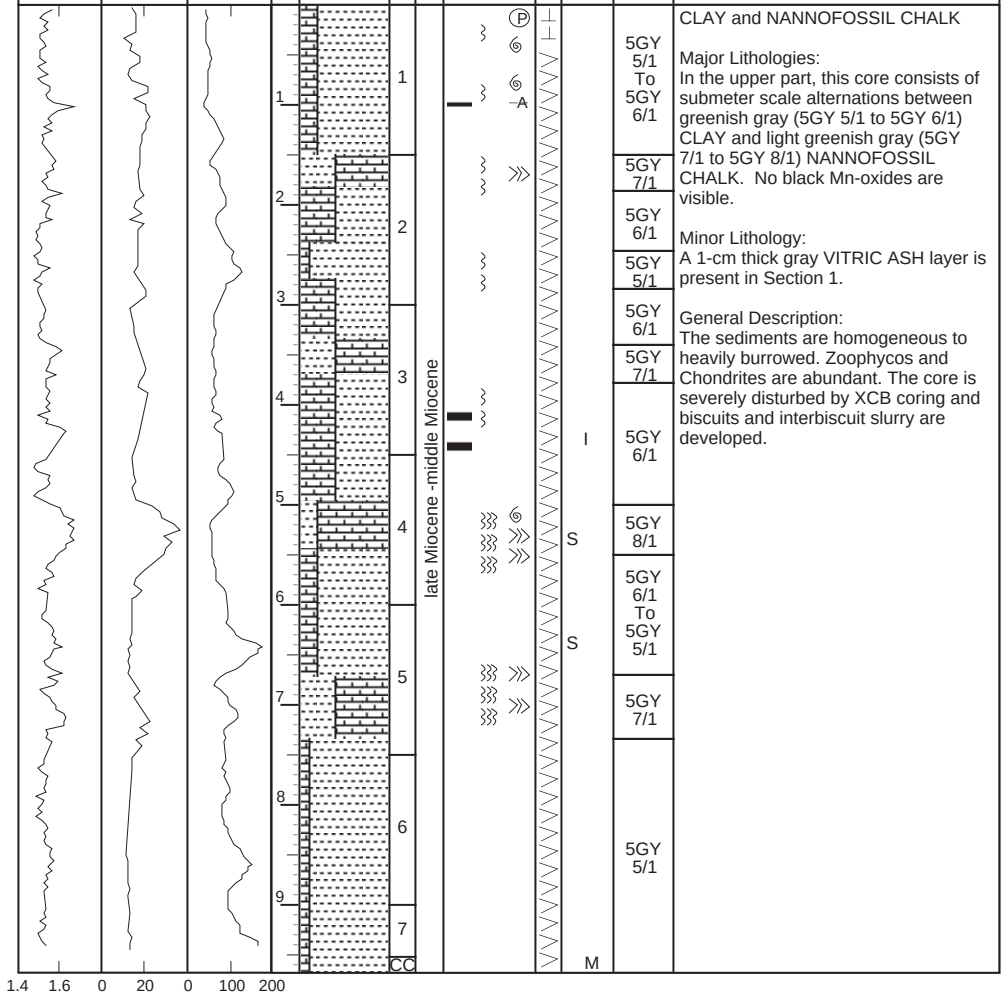
Major Lithologies:
This core consists of sub-meter alternations between greenish gray (5GY 5/1) CLAY WITH DIATOMS, greenish gray (5GY 5/1) CLAYEY DIATOMITE, greenish gray (5G 5/1) DIATOM CLAY MIXED SEDIMENT, and light gray (5Y 7/1) NANNOFOSSIL DIATOMITE WITH CLAY. The cores are pervasively mottled and banded by Mn-oxides(?). Dark bands, typically with mm-scale diagenetic lamination, are indicated in the Structure column.

Minor Lithology:
A thin, 2-cm, bed of brown VITRIC ASH WITH PUMICE is present in the lower part of Section 5.

General Description:
The core is badly fractured and plastically deformed by XCB coring. Distinct bioturbation is rare, except in Section 6.


SITE 1021 HOLE B CORE 29X
CORED 262.1 - 271.7 mbsf
GRAPE density (g/cm3)
Reflectance (%) (450–500 nm)
Magnetic suscept. (10−6 SI)
Meter
Graphic Lith.
Section
Age
Structure
Disturb
Sample
Color
Description
late Miocene
5G 5/1
N7
5G 5/1
5GY 7/1
5GY 5/1
N8
5G 5/1
5GY 8/1
5GY 5/1
N7
5G 6/1
5GY 8/1
5GY 6/1
5G 6/1
5G 6/1 To 5GY 5/1
5Y 7/1
5G 7/1
NANNOFOSSIL DIATOMITE and DIATOM CLAYSTONE
Major Lithologies:
This core consists of submeter to meter-scale alternations between light greenish gray (5GY 7/1) to very light gray (N8) NANNOFOSSIL DIATOMITE and greenish gray (5GY 5/1) DIATOM CLAYSTONE.
Minor Lithology:
A thin bed of light brownish gray (5YR 6/1) VITRIC ASH is present near the top of Section 3.
General Description:
This core is moderately to very disturbed by XCB coring. The sediments are heavily bioturbated throughout most of the core and Chondrites, Zoophycos, and Planolites are present.
Note: There are no longer any dark gray to black redox mottles in these sediments.

SITE 1021 HOLE B CORE 30X CORED 271.7 - 281.3 mbsf



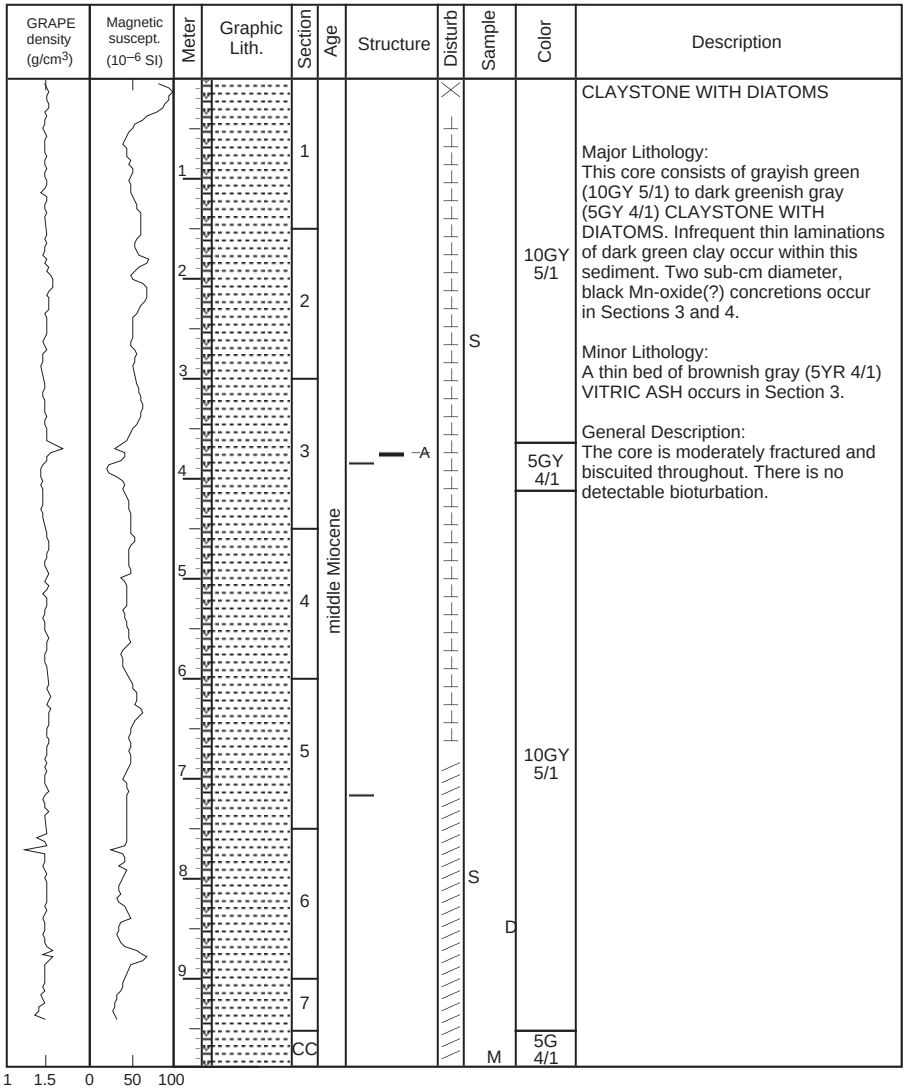
CLAY and NANNOFOSSIL CHALK

Major Lithologies:
In the upper part, this core consists of submeter scale alternations between greenish gray (5GY 5/1 to 5GY 6/1) CLAY and light greenish gray (5GY 7/1 to 5GY 8/1) NANNOFOSSIL CHALK. No black Mn-oxides are visible.

Minor Lithology:
A 1-cm thick gray VITRIC ASH layer is present in Section 1.

General Description:
The sediments are homogeneous to heavily burrowed. Zoophycos and Chondrites are abundant. The core is severely disturbed by XCB coring and biscuits and interbiscuit slurry are developed.

SITE 1021 HOLE B CORE 31X CORED 281.3 - 290.9 mbsf



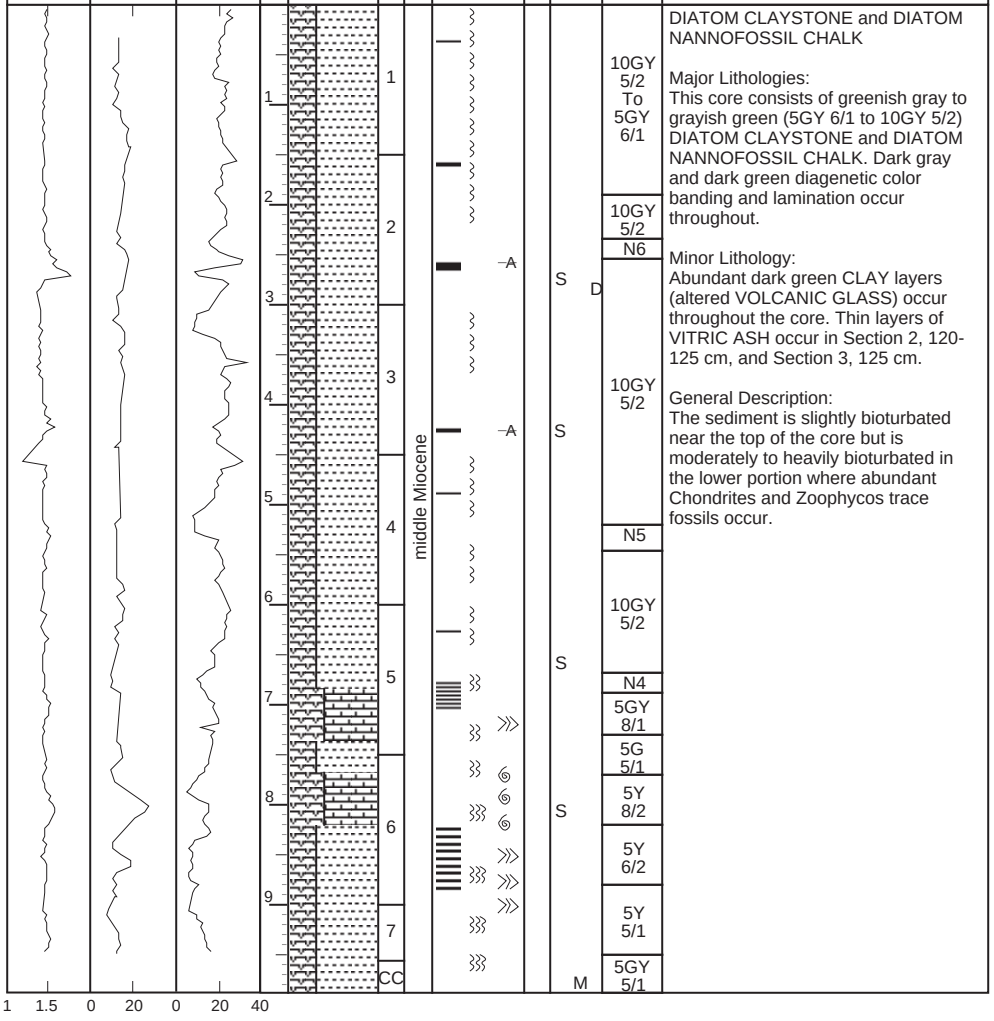
CLAYSTONE WITH DIATOMS

Major Lithology:
This core consists of grayish green (10GY 5/1) to dark greenish gray (5GY 4/1) CLAYSTONE WITH DIATOMS. Infrequent thin laminations of dark green clay occur within this sediment. Two sub-cm diameter, black Mn-oxide(?) concretions occur in Sections 3 and 4.

Minor Lithology:
A thin bed of brownish gray (5YR 4/1) VITRIC ASH occurs in Section 3.

General Description:
The core is moderately fractured and biscuited throughout. There is no detectable bioturbation.

SITE 1021 HOLE B CORE 32X CORED 290.9 - 300.5 mbsf



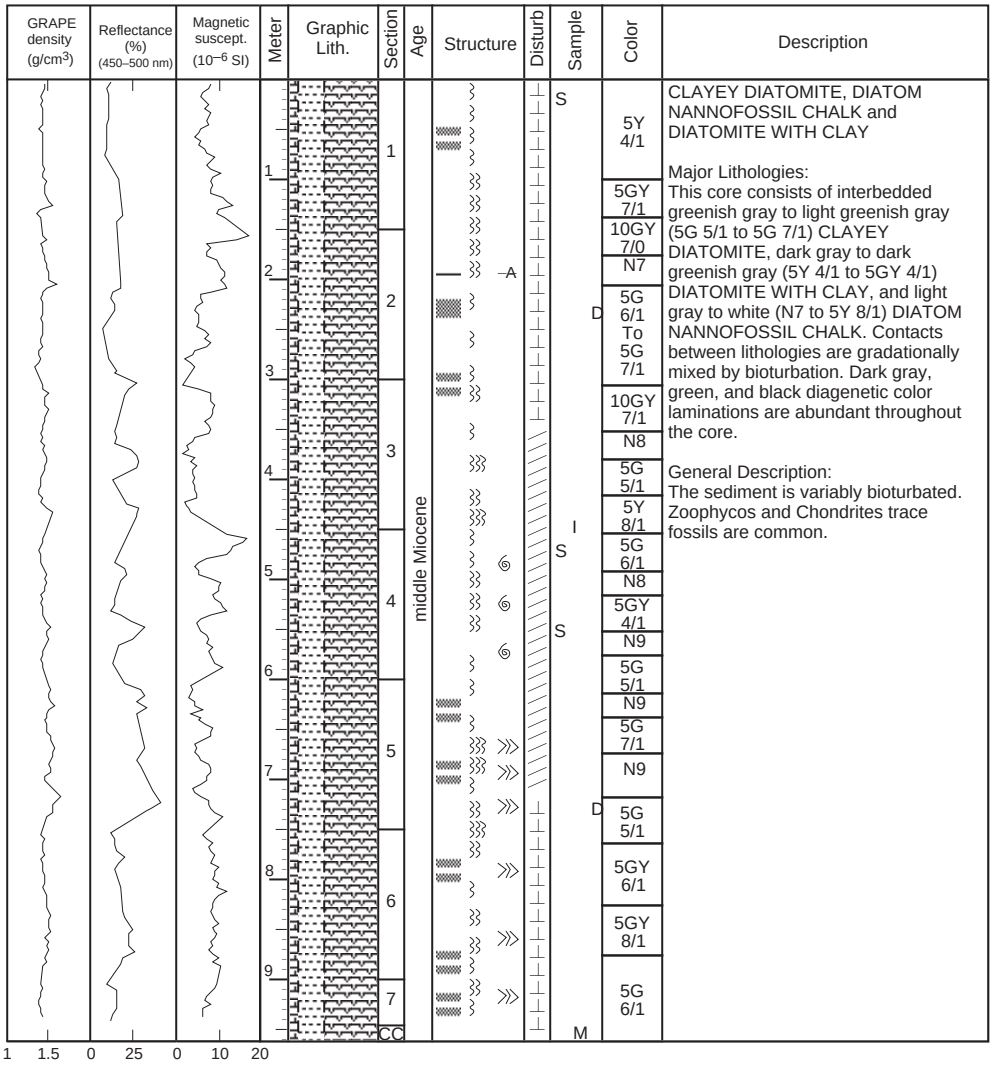
DIATOM CLAYSTONE and DIATOM NANNOFOSSIL CHALK

Major Lithologies:
This core consists of greenish gray to grayish green (5GY 6/1 to 10GY 5/2) DIATOM CLAYSTONE and DIATOM NANNOFOSSIL CHALK. Dark gray and dark green diagenetic color banding and lamination occur throughout.

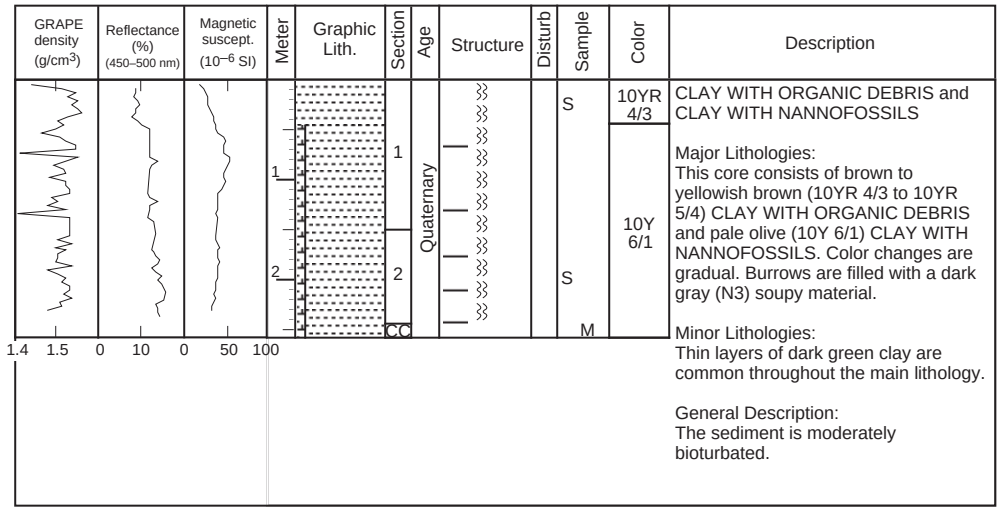
Minor Lithology:
Abundant dark green CLAY layers (altered VOLCANIC GLASS) occur throughout the core. Thin layers of VITRIC ASH occur in Section 2, 120-125 cm, and Section 3, 125 cm.

General Description:
The sediment is slightly bioturbated near the top of the core but is moderately to heavily bioturbated in the lower portion where abundant Chondrites and Zoophycos trace fossils occur.

SITE 1021 HOLE B CORE 33X CORED 300.5 - 310.2 mbsf



SITE 1021 HOLE C CORE 1H CORED 0.0 - 2.6 mbsf



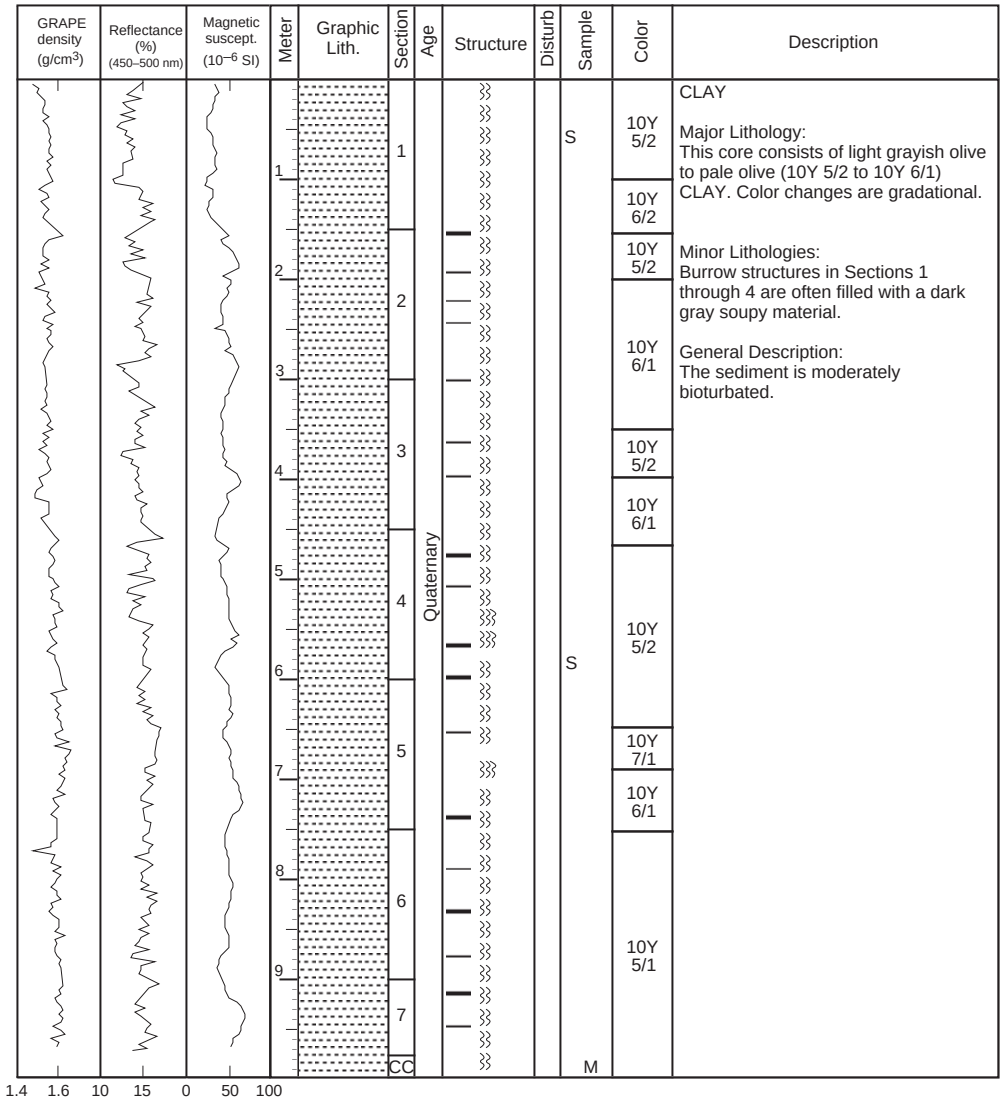
CLAY WITH ORGANIC DEBRIS and CLAY WITH NANNOFOSSILS

Major Lithologies:
This core consists of brown to yellowish brown (10YR 4/3 to 10YR 5/4) CLAY WITH ORGANIC DEBRIS and pale olive (10Y 6/1) CLAY WITH NANNOFOSSILS. Color changes are gradual. Burrows are filled with a dark gray (N3) soupy material.

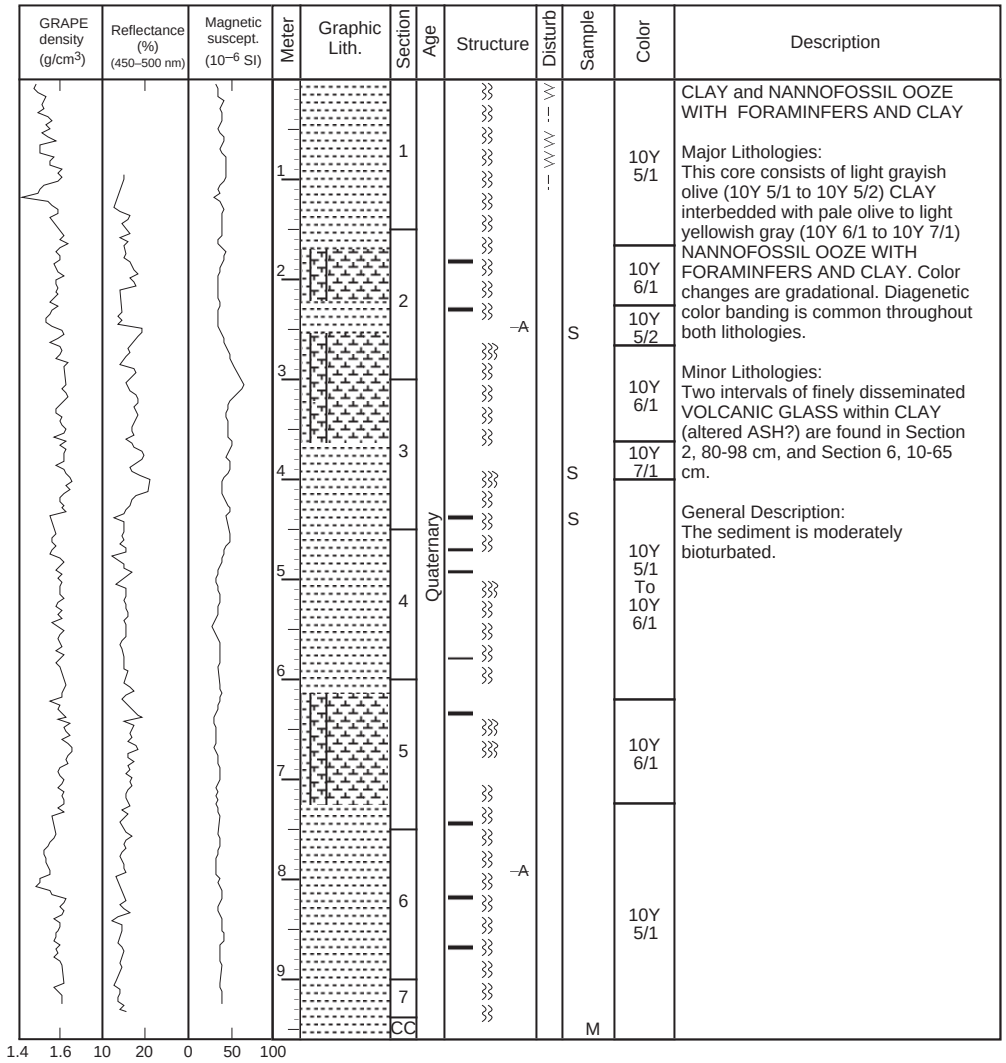
Minor Lithologies:
Thin layers of dark green clay are common throughout the main lithology.

General Description:
The sediment is moderately bioturbated.

SITE 1021 HOLE C CORE 2H CORED 2.6 - 12.1 mbsf



SITE 1021 HOLE C CORE 3H CORED 12.1 - 21.6 mbsf



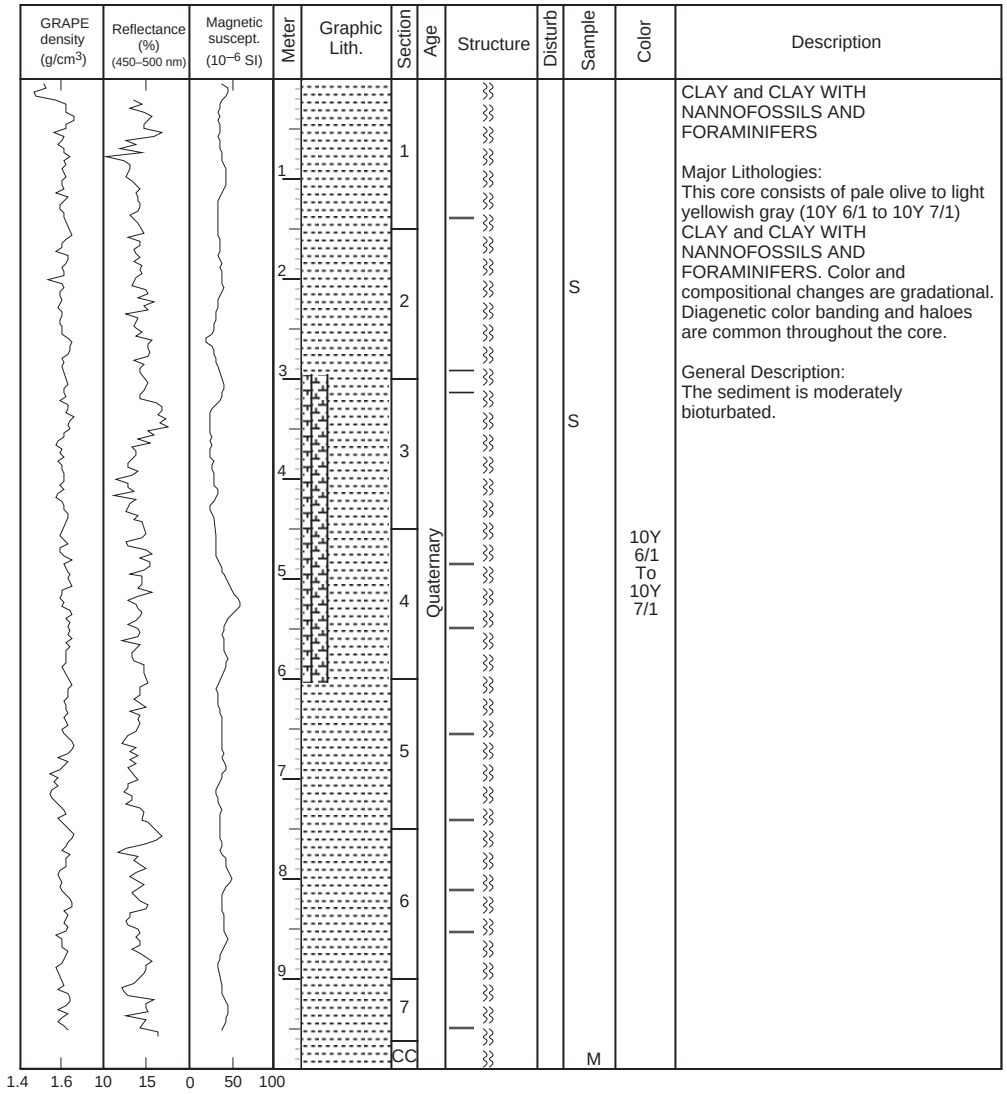
CLAY and NANNOFOSSIL OOZE WITH FORAMINFERS AND CLAY

Major Lithologies:
This core consists of light grayish olive (10Y 5/1 to 10Y 5/2) CLAY interbedded with pale olive to light yellowish gray (10Y 6/1 to 10Y 7/1) NANNOFOSSIL OOZE WITH FORAMINFERS AND CLAY. Color changes are gradational. Diagenetic color banding is common throughout both lithologies.

Minor Lithologies:
Two intervals of finely disseminated VOLCANIC GLASS within CLAY (altered ASH?) are found in Section 2, 80-98 cm, and Section 6, 10-65 cm.

General Description:
The sediment is moderately bioturbated.

SITE 1021 HOLE C CORE 4H CORED 21.6 - 31.1 mbsf

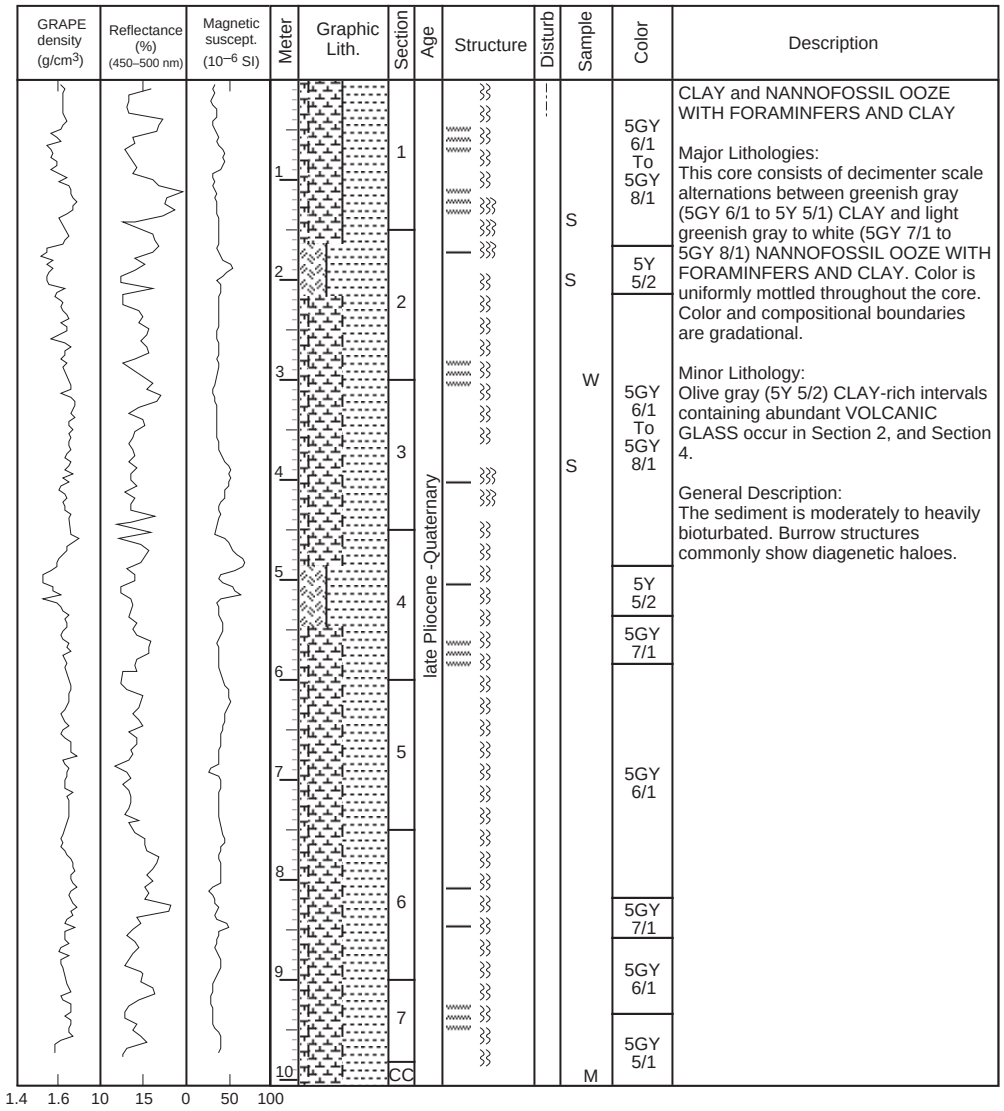


CLAY and CLAY WITH NANNOFOSSILS AND FORAMINIFERS

Major Lithologies:
This core consists of pale olive to light yellowish gray (10Y 6/1 to 10Y 7/1) CLAY and CLAY WITH NANNOFOSSILS AND FORAMINIFERS. Color and compositional changes are gradational. Diagenetic color banding and haloes are common throughout the core.

General Description:
The sediment is moderately bioturbated.

SITE 1021 HOLE C CORE 5H CORED 31.1 - 40.6 mbsf



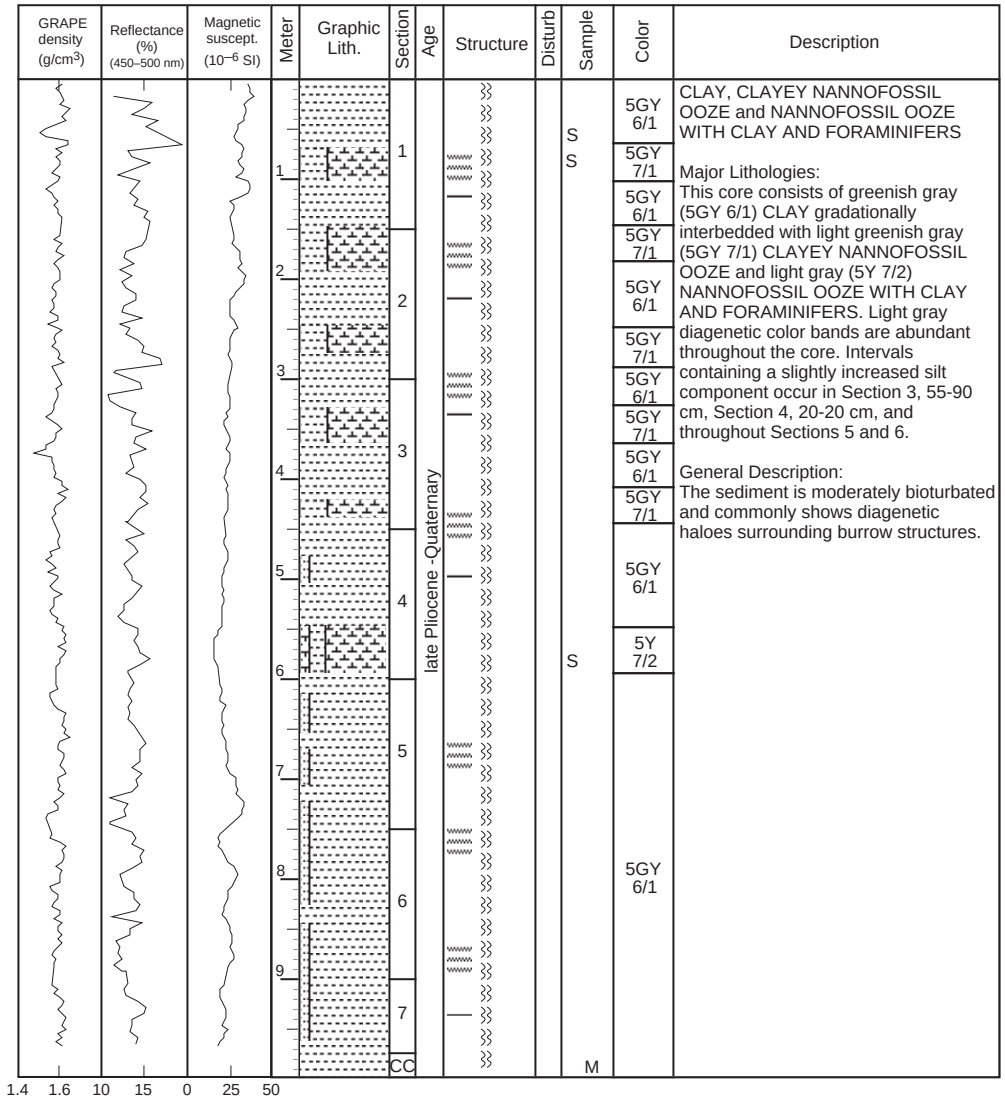
CLAY and NANNOFOSSIL OOZE WITH FORAMINFERS AND CLAY

Major Lithologies:
This core consists of decimenter scale alternations between greenish gray (5GY 6/1 to 5Y 5/1) CLAY and light greenish gray to white (5GY 7/1 to 5GY 8/1) NANNOFOSSIL OOZE WITH FORAMINFERS AND CLAY. Color is uniformly mottled throughout the core. Color and compositional boundaries are gradational.

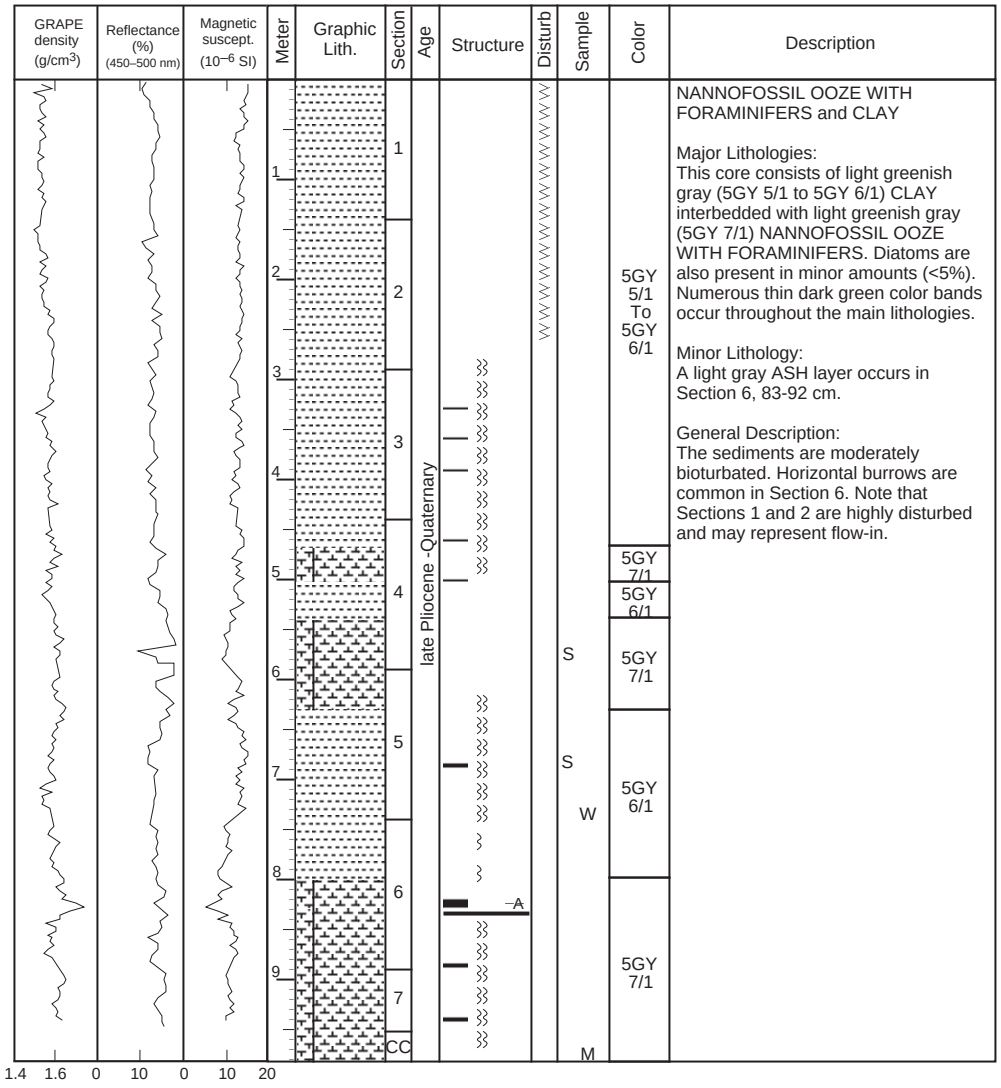
Minor Lithology:
Olive gray (5Y 5/2) CLAY-rich intervals containing abundant VOLCANIC GLASS occur in Section 2, and Section 4.

General Description:
The sediment is moderately to heavily bioturbated. Burrow structures commonly show diagenetic haloes.

SITE 1021 HOLE C CORE 6H CORED 40.6 - 50.1 mbsf



SITE 1021 HOLE C CORE 7H CORED 50.1 - 59.6 mbsf



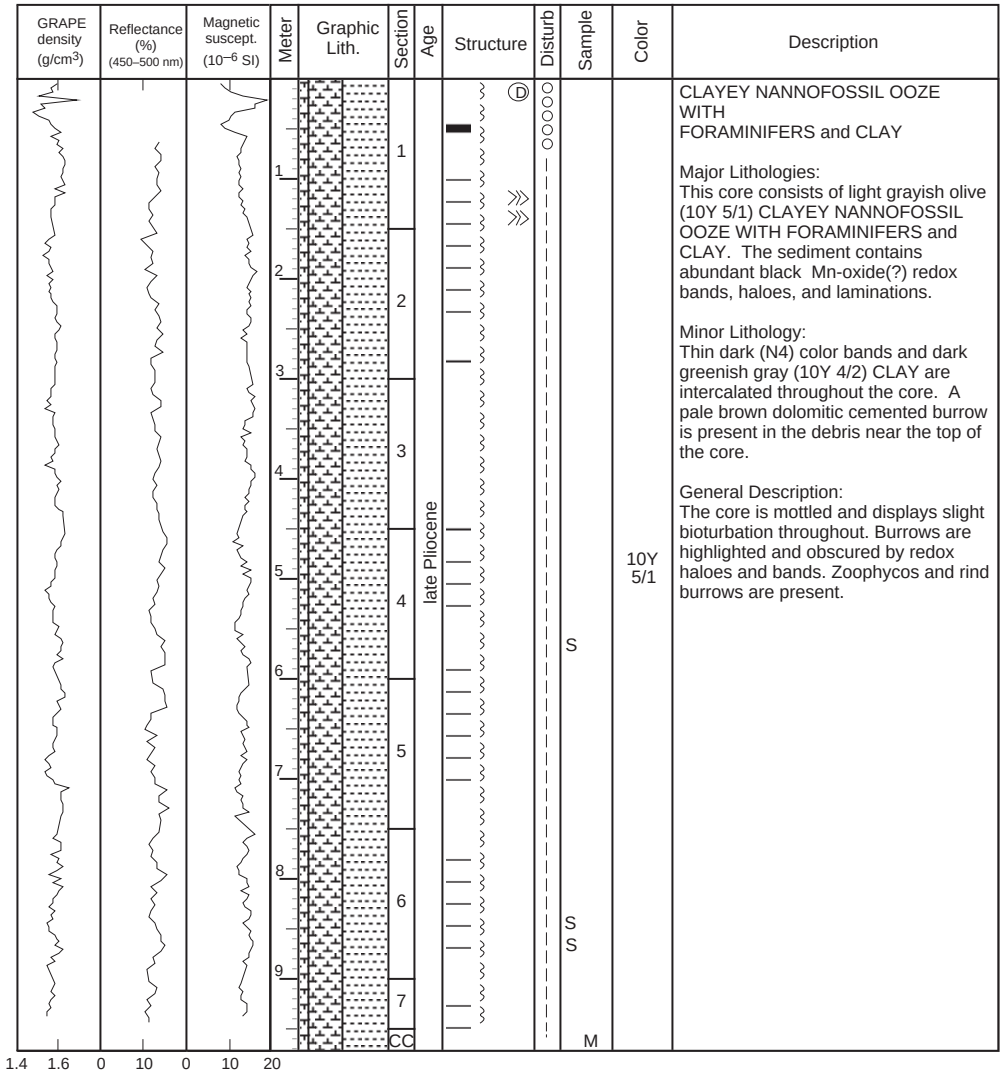
NANNOFOSSIL OOZE WITH FORAMINIFERS and CLAY

Major Lithologies:
This core consists of light greenish gray (5GY 5/1 to 5GY 6/1) CLAY interbedded with light greenish gray (5GY 7/1) NANNOFOSSIL OOZE WITH FORAMINIFERS. Diatoms are also present in minor amounts (<5%). Numerous thin dark green color bands occur throughout the main lithologies.

Minor Lithology:
A light gray ASH layer occurs in Section 6, 83-92 cm.

General Description:
The sediments are moderately bioturbated. Horizontal burrows are common in Section 6. Note that Sections 1 and 2 are highly disturbed and may represent flow-in.

SITE 1021 HOLE C CORE 8H CORED 59.6 - 69.1 mbsf



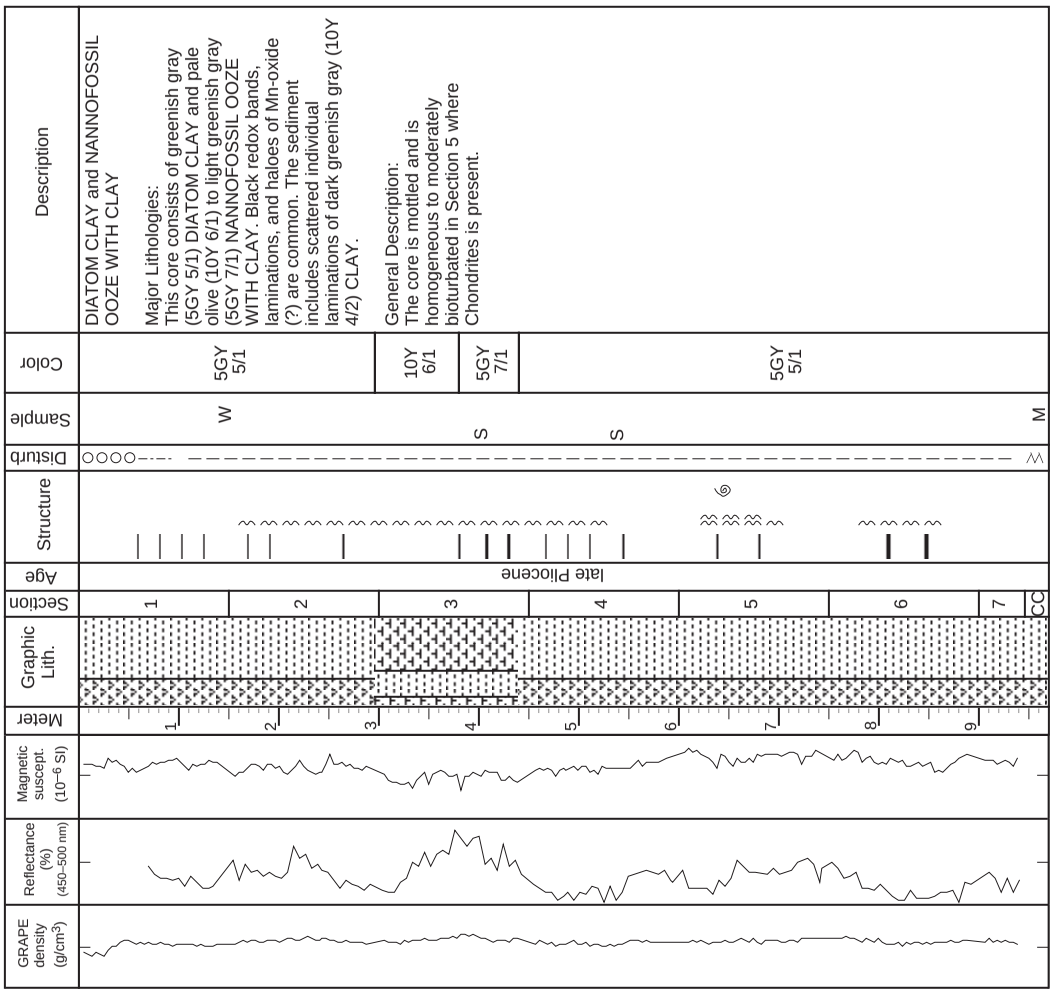
CLAYEY NANNOFOSSIL OOZE WITH FORAMINIFERS and CLAY

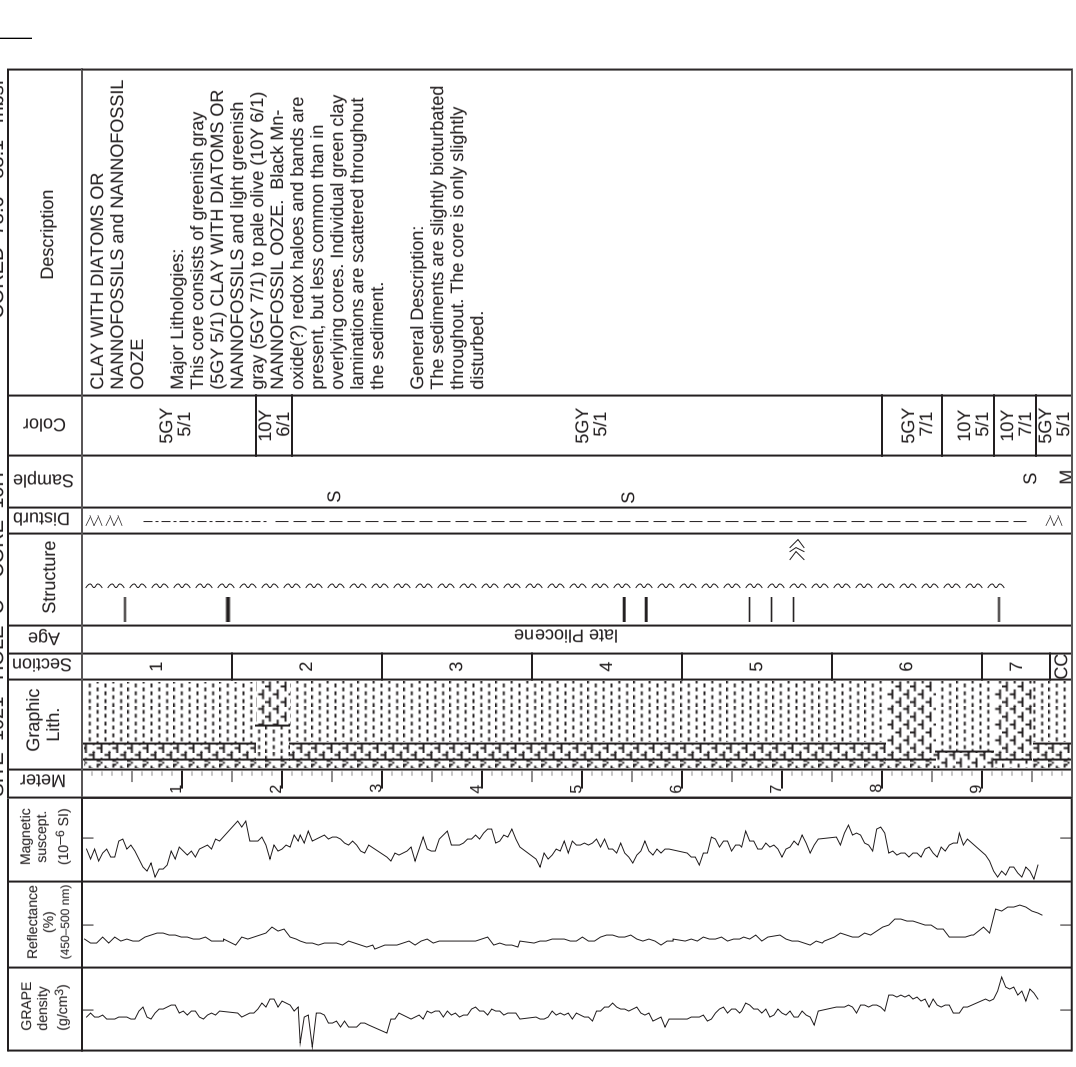
Major Lithologies:
This core consists of light grayish olive (10Y 5/1) CLAYEY NANNOFOSSIL OOZE WITH FORAMINIFERS and CLAY. The sediment contains abundant black Mn-oxide(?) redox bands, haloes, and laminations.

Minor Lithology:
Thin dark (N4) color bands and dark greenish gray (10Y 4/2) CLAY are intercalated throughout the core. A pale brown dolomitic cemented burrow is present in the debris near the top of the core.

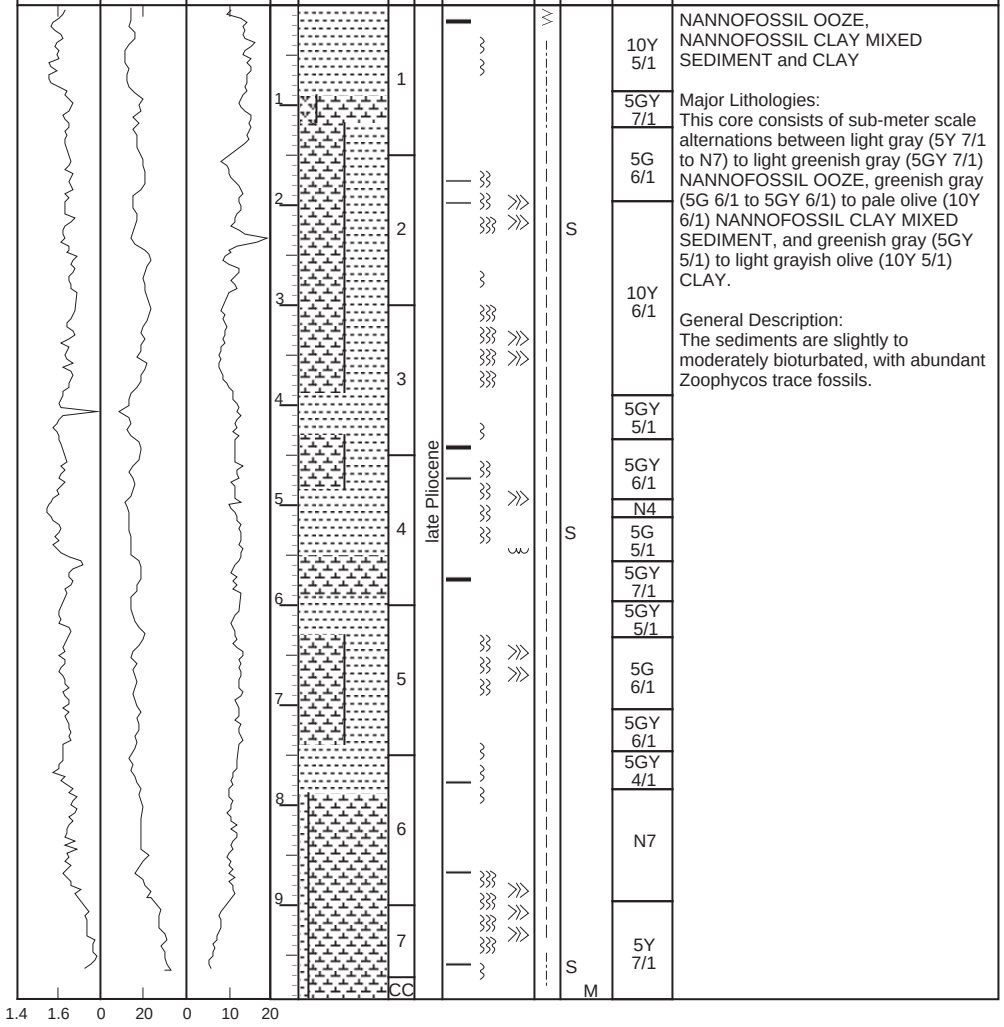
General Description:
The core is mottled and displays slight bioturbation throughout. Burrows are highlighted and obscured by redox haloes and bands. Zoophycos and rind burrows are present.

Color: 10Y 5/1


SITE 1021 HOLE C CORE 9H
CORED 69.1 - 78.6 mbsf
GRAPE density (g/cm3)
Reflectance (%) (450–500 nm)
Magnetic suscept. (10−6 SI)
Meter
Graphic Lith.
Section
Age
Structure
Disturb
Sample
Color
Description
late Pliocene
5GY 5/1
10Y 6/1
5GY 7/1
5GY 5/1
DIATOM CLAY and NANNOFOSSIL OOZE WITH CLAY
Major Lithologies:
This core consists of greenish gray (5GY 5/1) DIATOM CLAY and pale olive (10Y 6/1) to light greenish gray (5GY 7/1) NANNOFOSSIL OOZE WITH CLAY. Black redox bands, laminations, and haloes of Mn-oxide (?) are common. The sediment includes scattered individual laminations of dark greenish gray (10Y 4/2) CLAY.
General Description:
The core is mottled and is homogeneous to moderately bioturbated in Section 5 where Chondrites is present.


SITE 1021 HOLE C CORE 10H CORED 78.6 - 88.1 mbsf
GRAPE density (g/cm³)
Reflectance (%) (450–500 nm)
Magnetic suscept. (10⁻⁶ SI)
Meter
Graphic Lith.
Section
Age
Structure
Disturb
Sample
Color
Description
late Pliocene
5GY 5/1
10Y 6/1
5GY 5/1
5GY 7/1
10Y 5/1
10Y 7/1
5GY 5/1
CLAY WITH DIATOMS OR NANNOFOSSILS and NANNOFOSSIL OOZE
Major Lithologies:
This core consists of greenish gray (5GY 5/1) CLAY WITH DIATOMS OR NANNOFOSSILS and light greenish gray (5GY 7/1) to pale olive (10Y 6/1) NANNOFOSSIL OOZE. Black Mn-oxide(?) redox haloes and bands are present, but less common than in overlying cores. Individual green clay laminations are scattered throughout the sediment.
General Description:
The sediments are slightly bioturbated throughout. The core is only slightly disturbed.

SITE 1021 HOLE C CORE 11H CORED 88.1 - 97.6 mbsf

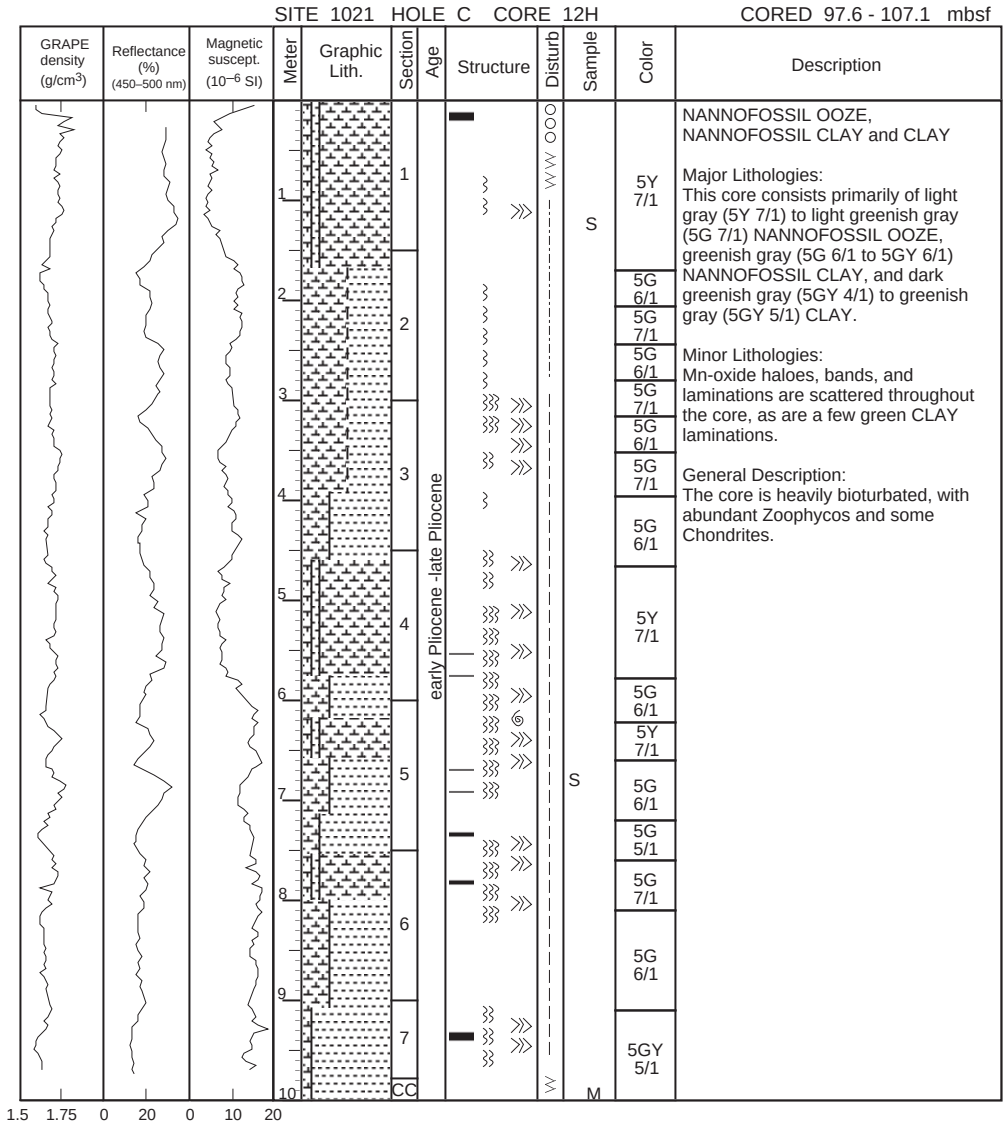


NANNOFOSSIL OOZE, NANNOFOSSIL CLAY MIXED SEDIMENT and CLAY

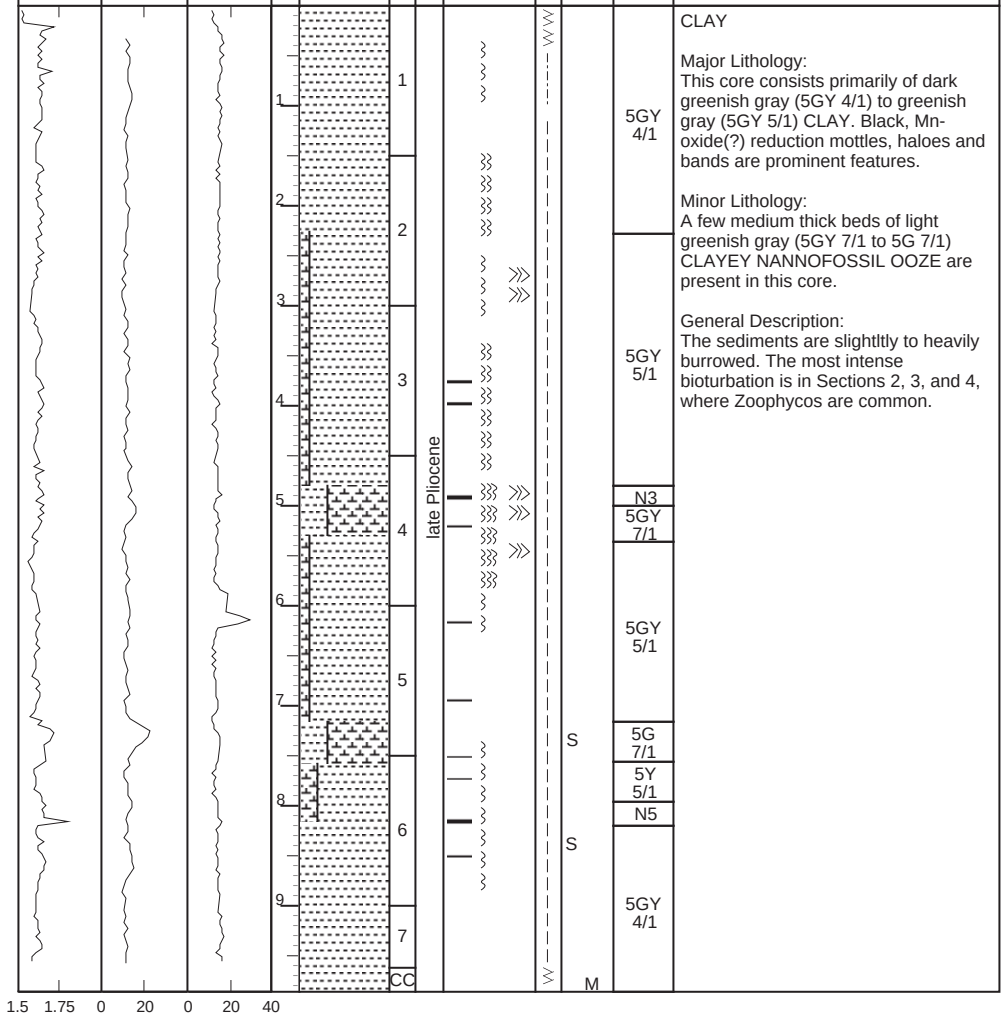
Major Lithologies:
This core consists of sub-meter scale alternations between light gray (5Y 7/1 to N7) to light greenish gray (5GY 7/1) NANNOFOSSIL OOZE, greenish gray (5G 6/1 to 5GY 6/1) to pale olive (10Y 6/1) NANNOFOSSIL CLAY MIXED SEDIMENT, and greenish gray (5GY 5/1) to light grayish olive (10Y 5/1) CLAY.

General Description:
The sediments are slightly to moderately bioturbated, with abundant Zoophycos trace fossils.

SITE 1021


SITE 1021 HOLE C CORE 12H
CORED 97.6 - 107.1 mbsf
GRAPE density (g/cm3)
Reflectance (%) (450–500 nm)
Magnetic suscept. (10–6 SI)
Meter
Graphic Lith.
Section
Age
Structure
Disturb
Sample
Color
Description
early Pliocene - late Pliocene
1.5 1.75 0 20 0 10 20
CC
S
S
M
5Y 7/1
5G 6/1
5G 7/1
5G 6/1
5G 7/1
5G 6/1
5G 7/1
5G 6/1
5Y 7/1
5G 6/1
5Y 7/1
5G 6/1
5G 5/1
5G 7/1
5G 6/1
5GY 5/1
NANNOFOSSIL OOZE, NANNOFOSSIL CLAY and CLAY
Major Lithologies:
This core consists primarily of light gray (5Y 7/1) to light greenish gray (5G 7/1) NANNOFOSSIL OOZE, greenish gray (5G 6/1 to 5GY 6/1) NANNOFOSSIL CLAY, and dark greenish gray (5GY 4/1) to greenish gray (5GY 5/1) CLAY.
Minor Lithologies:
Mn-oxide haloes, bands, and laminations are scattered throughout the core, as are a few green CLAY laminations.
General Description:
The core is heavily bioturbated, with abundant Zoophycos and some Chondrites.

SITE 1021 HOLE C CORE 13H CORED 107.1 - 116.6 mbsf



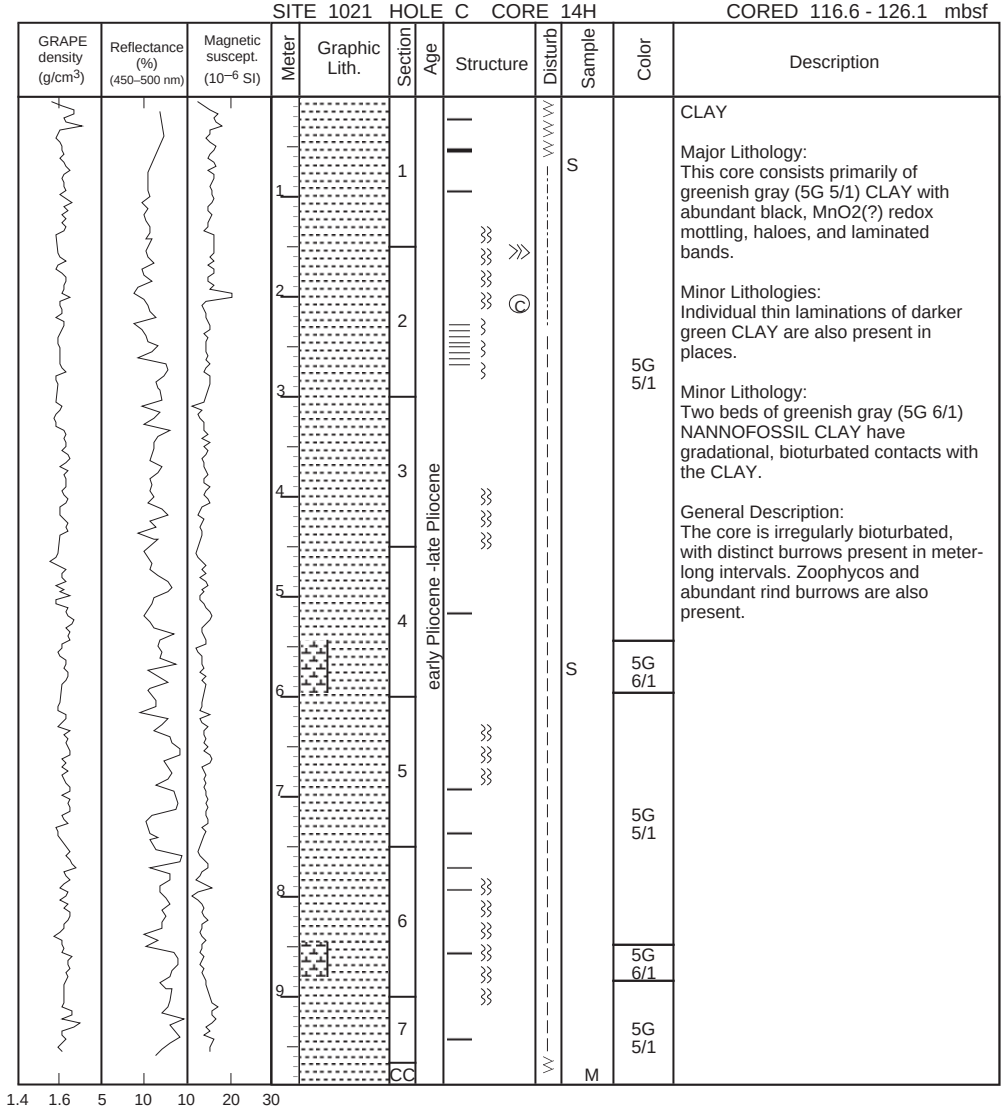
CLAY

Major Lithology:
This core consists primarily of dark greenish gray (5GY 4/1) to greenish gray (5GY 5/1) CLAY. Black, Mn-oxide(?) reduction mottles, haloes and bands are prominent features.

Minor Lithology:
A few medium thick beds of light greenish gray (5GY 7/1 to 5G 7/1) CLAYEY NANNOFOSSIL OOZE are present in this core.

General Description:
The sediments are slightltly to heavily burrowed. The most intense bioturbation is in Sections 2, 3, and 4, where Zoophycos are common.

SITE 1021 HOLE C CORE 14H CORED 116.6 - 126.1 mbsf



CLAY

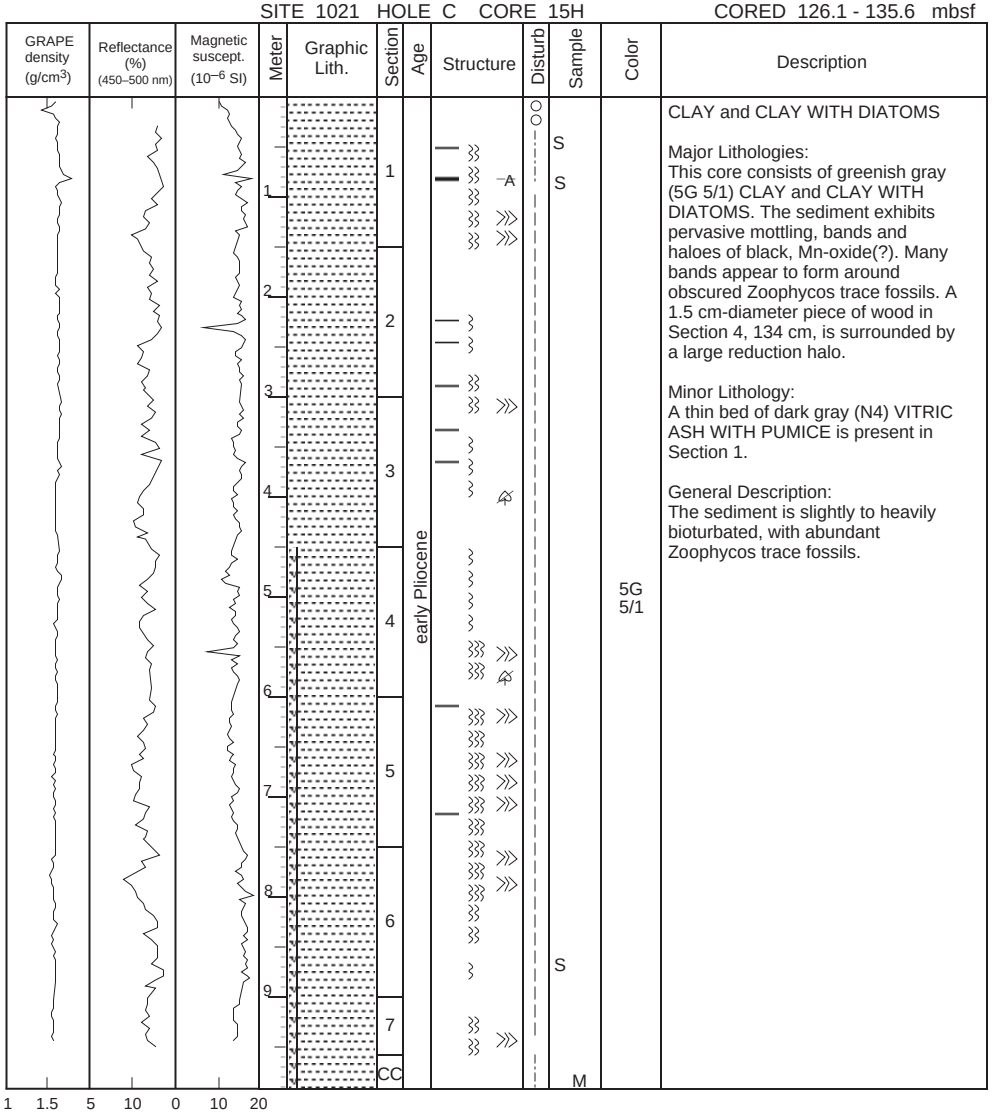
Major Lithology:
This core consists primarily of greenish gray (5G 5/1) CLAY with abundant black, MnO2(?) redox mottling, haloes, and laminated bands.

Minor Lithologies:
Individual thin laminations of darker green CLAY are also present in places.

Minor Lithology:
Two beds of greenish gray (5G 6/1) NANNOFOSSIL CLAY have gradational, bioturbated contacts with the CLAY.

General Description:
The core is irregularly bioturbated, with distinct burrows present in meter-long intervals. Zoophycos and abundant rind burrows are also present.

SITE 1021 HOLE C CORE 15H CORED 126.1 - 135.6 mbsf

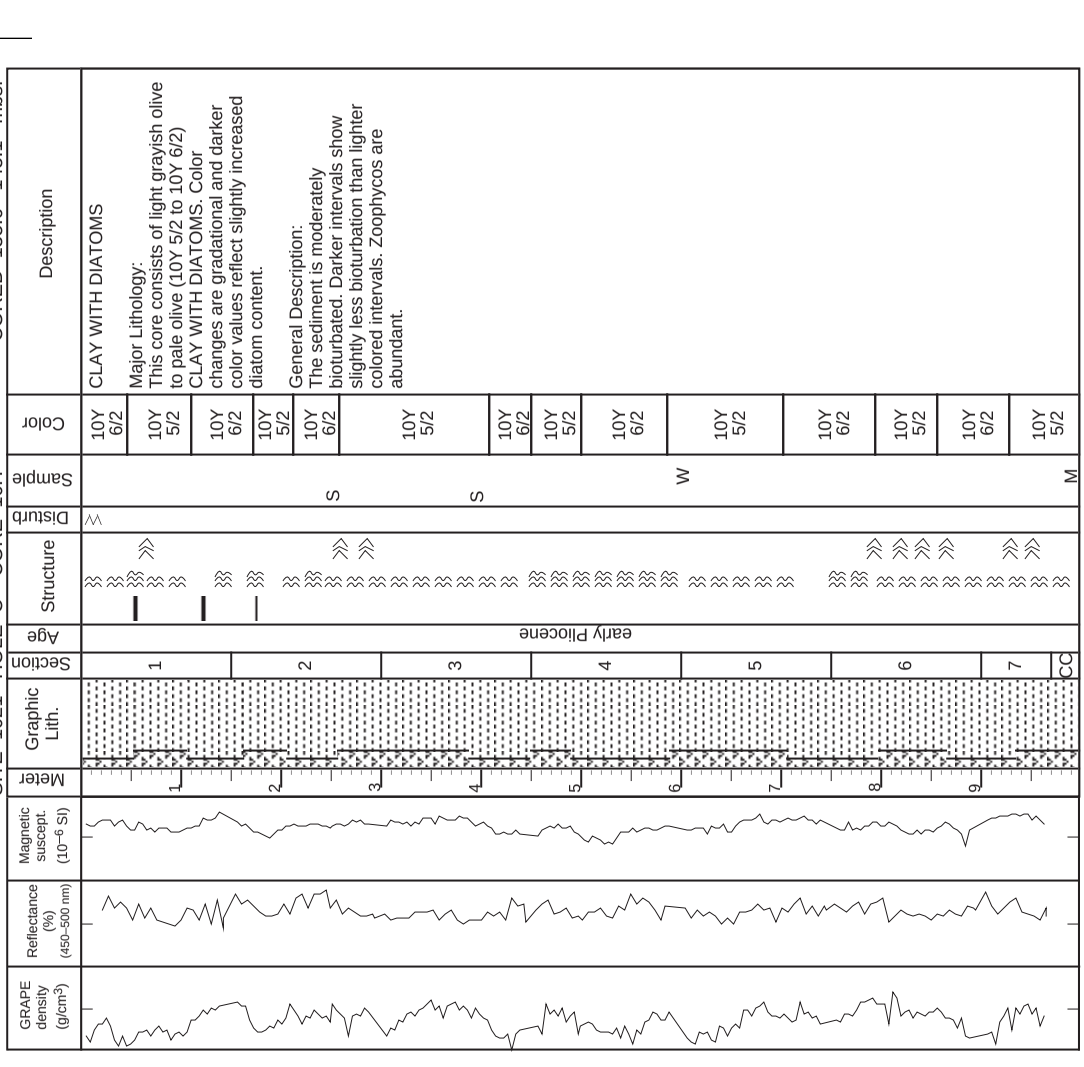


CLAY and CLAY WITH DIATOMS

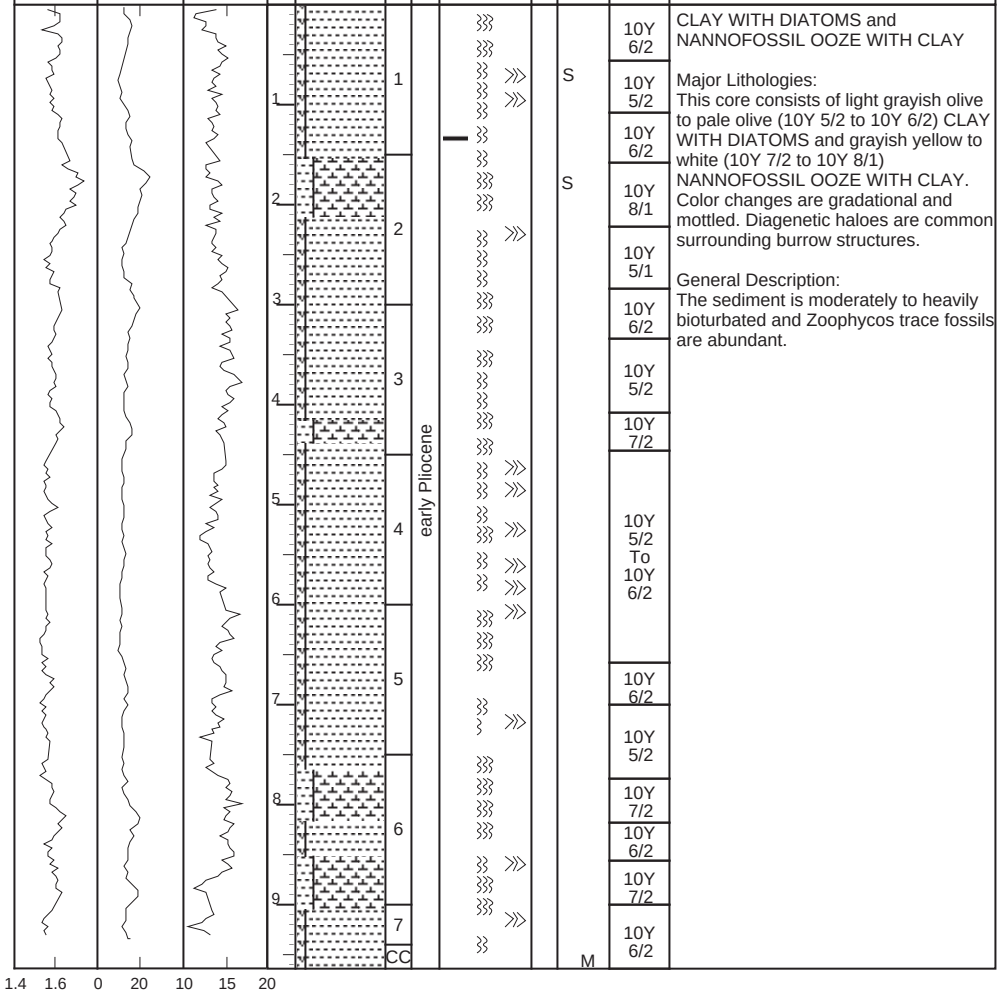
Major Lithologies:
This core consists of greenish gray (5G 5/1) CLAY and CLAY WITH DIATOMS. The sediment exhibits pervasive mottling, bands and haloes of black, Mn-oxide(?). Many bands appear to form around obscured Zoophycos trace fossils. A 1.5 cm-diameter piece of wood in Section 4, 134 cm, is surrounded by a large reduction halo.

Minor Lithology:
A thin bed of dark gray (N4) VITRIC ASH WITH PUMICE is present in Section 1.

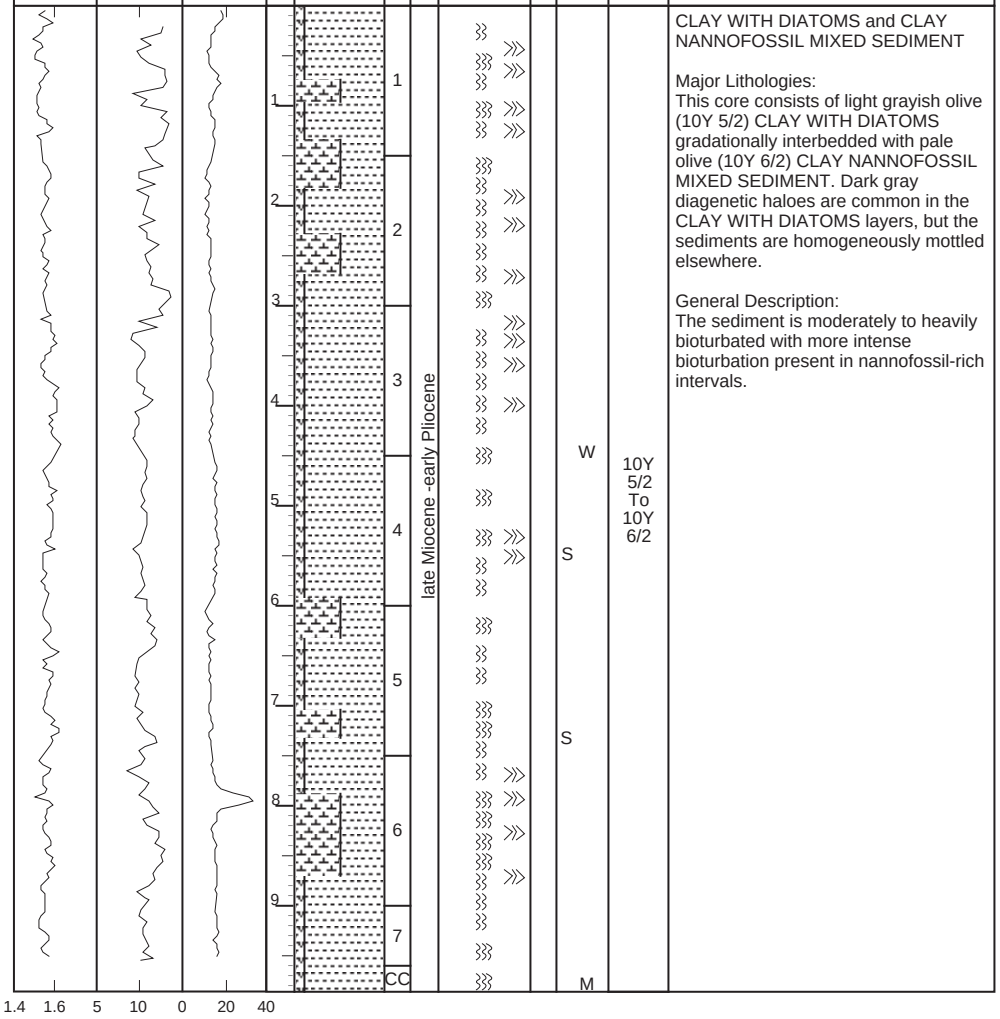
General Description:
The sediment is slightly to heavily bioturbated, with abundant Zoophycos trace fossils.


SITE 1021 HOLE C CORE 16H CORED 135.6 - 145.1 mbsf
GRAPE density (g/cm3)
Reflectance (%) (450–500 nm)
Magnetic suscept. (10−6 SI)
Meter
Graphic Lith.
Section
Age
Structure
Disturb
Sample
Color
Description
early Pliocene
CLAY WITH DIATOMS
Major Lithology:
This core consists of light grayish olive to pale olive (10Y 5/2 to 10Y 6/2) CLAY WITH DIATOMS. Color changes are gradational and darker color values reflect slightly increased diatom content.
General Description:
The sediment is moderately bioturbated. Darker intervals show slightly less bioturbation than lighter colored intervals. Zoophycos are abundant.

SITE 1021 HOLE C CORE 17H CORED 145.1 - 154.6 mbsf



SITE 1021 HOLE C CORE 18H CORED 154.6 - 164.1 mbsf

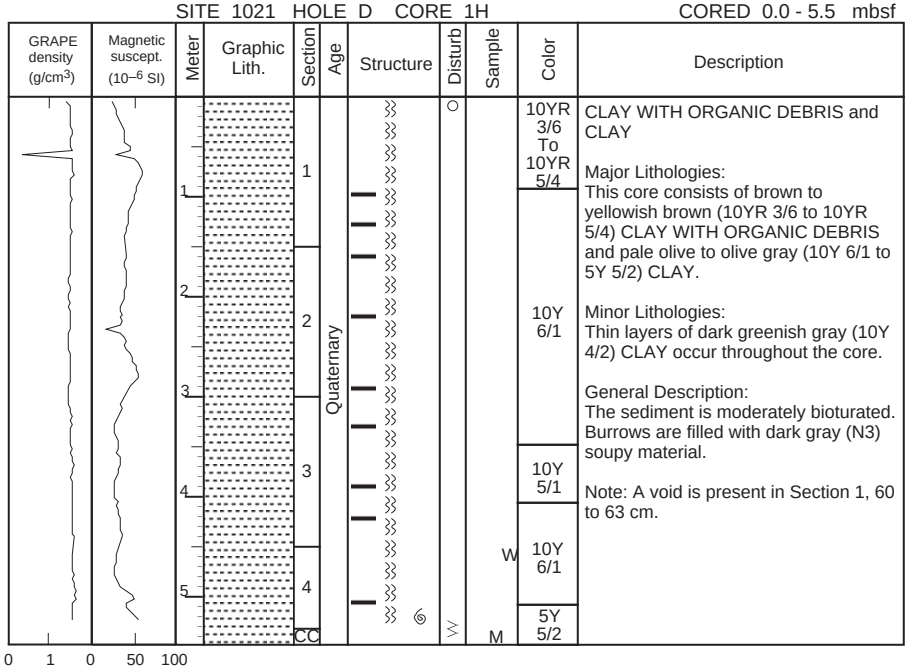


CLAY WITH DIATOMS and CLAY NANNOFOSSIL MIXED SEDIMENT

Major Lithologies:
This core consists of light grayish olive (10Y 5/2) CLAY WITH DIATOMS gradationally interbedded with pale olive (10Y 6/2) CLAY NANNOFOSSIL MIXED SEDIMENT. Dark gray diagenetic haloes are common in the CLAY WITH DIATOMS layers, but the sediments are homogeneously mottled elsewhere.

General Description:
The sediment is moderately to heavily bioturbated with more intense bioturbation present in nannofossil-rich intervals.

SITE 1021 HOLE D CORE 1H CORED 0.0 - 5.5 mbsf



CLAY WITH ORGANIC DEBRIS and CLAY

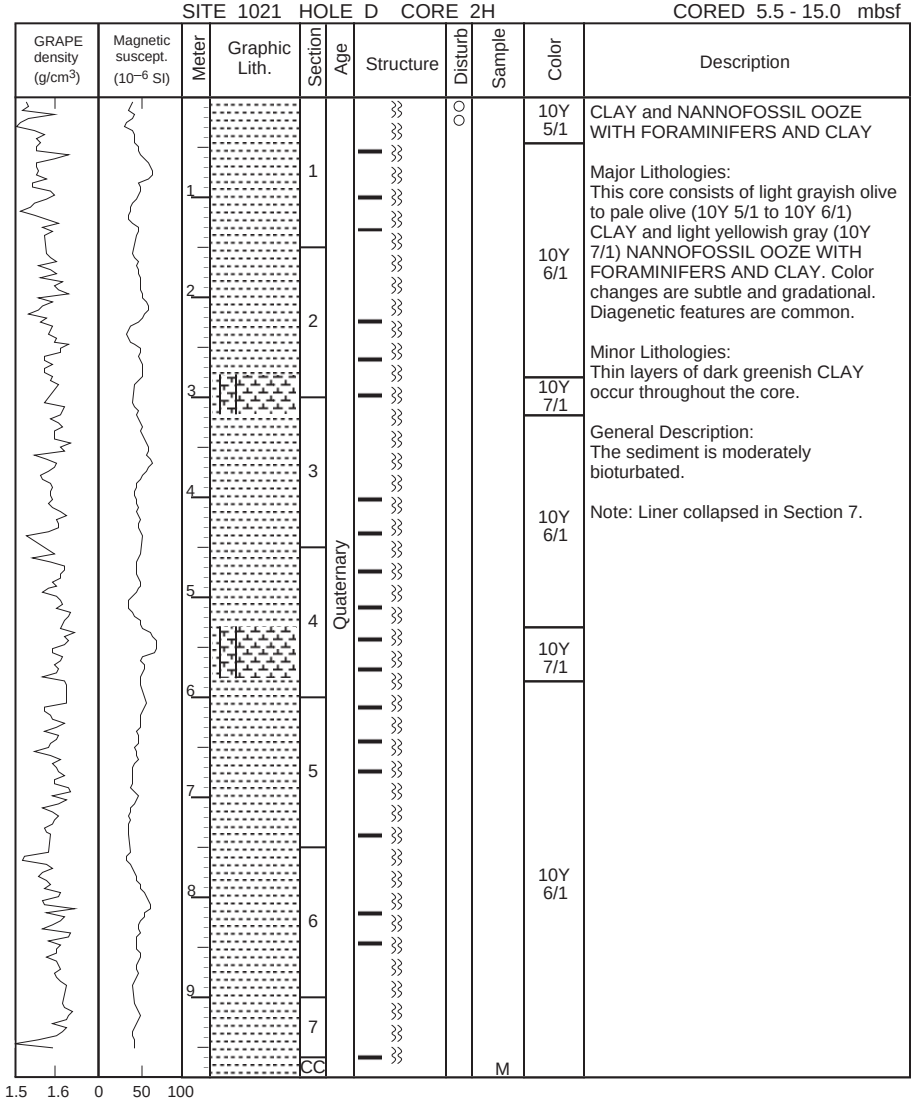
Major Lithologies:
This core consists of brown to yellowish brown (10YR 3/6 to 10YR 5/4) CLAY WITH ORGANIC DEBRIS and pale olive to olive gray (10Y 6/1 to 5Y 5/2) CLAY.

Minor Lithologies:
Thin layers of dark greenish gray (10Y 4/2) CLAY occur throughout the core.

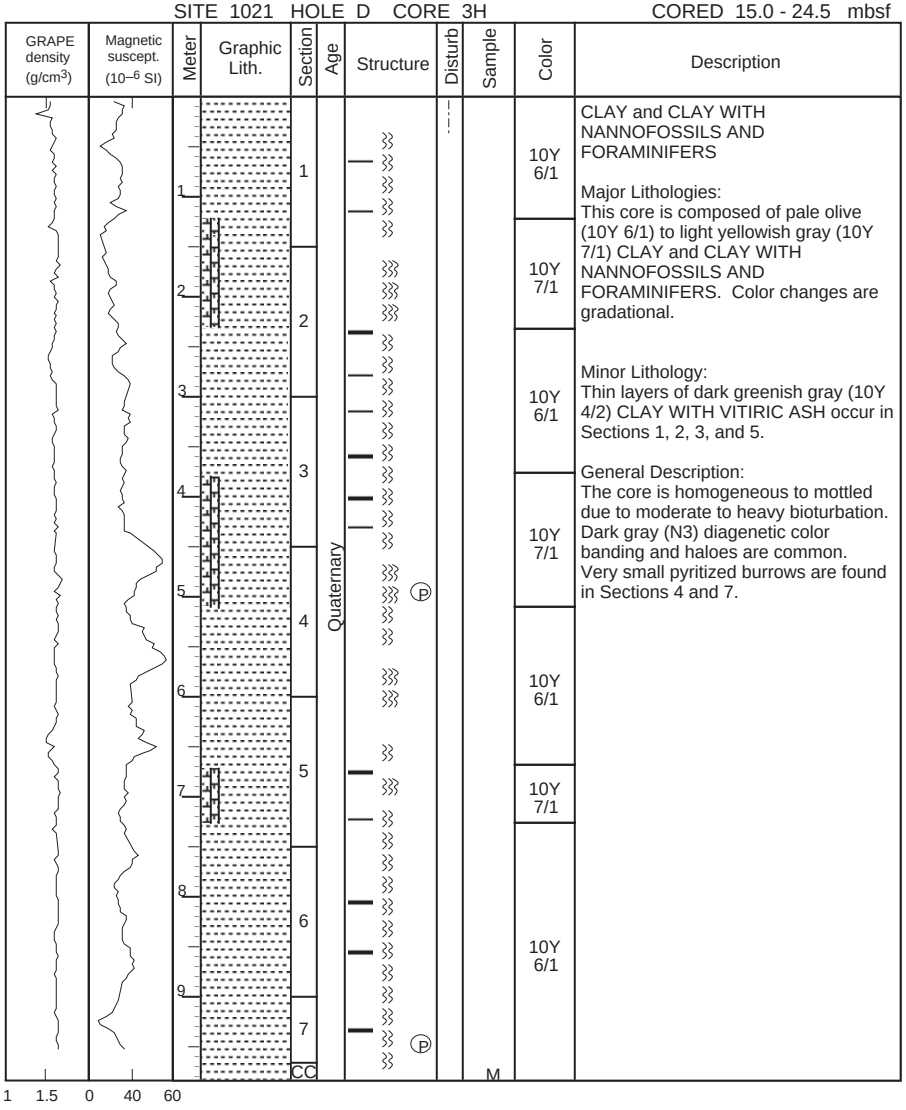
General Description:
The sediment is moderately bioturated. Burrows are filled with dark gray (N3) soupy material.

Note: A void is present in Section 1, 60 to 63 cm.

SITE 1021 HOLE D CORE 2H CORED 5.5 - 15.0 mbsf



SITE 1021 HOLE D CORE 3H CORED 15.0 - 24.5 mbsf



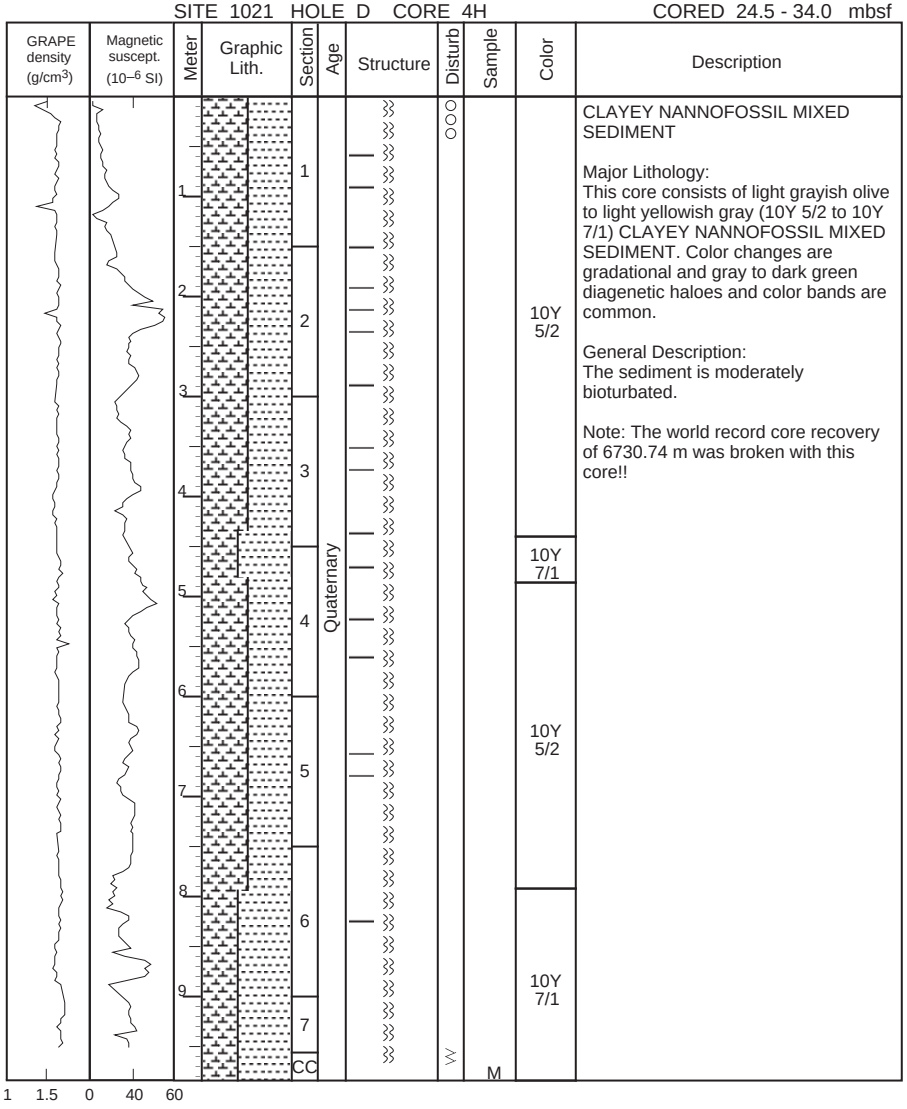
CLAY and CLAY WITH NANNOFOSSILS AND FORAMINIFERS

Major Lithologies:
This core is composed of pale olive (10Y 6/1) to light yellowish gray (10Y 7/1) CLAY and CLAY WITH NANNOFOSSILS AND FORAMINIFERS. Color changes are gradational.

Minor Lithology:
Thin layers of dark greenish gray (10Y 4/2) CLAY WITH VITIRIC ASH occur in Sections 1, 2, 3, and 5.

General Description:
The core is homogeneous to mottled due to moderate to heavy bioturbation. Dark gray (N3) diagenetic color banding and haloes are common. Very small pyritized burrows are found in Sections 4 and 7.

SITE 1021 HOLE D CORE 4H CORED 24.5 - 34.0 mbsf



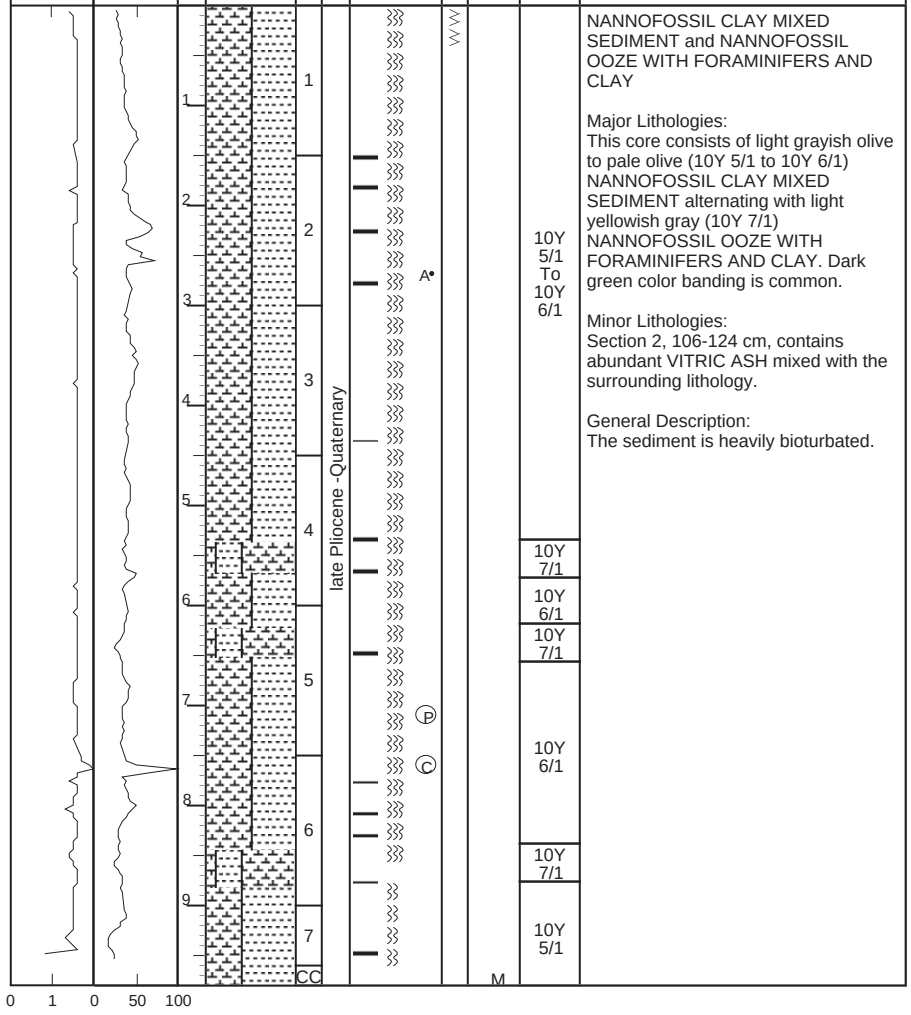
CLAYEY NANNOFOSSIL MIXED SEDIMENT

Major Lithology:
This core consists of light grayish olive to light yellowish gray (10Y 5/2 to 10Y 7/1) CLAYEY NANNOFOSSIL MIXED SEDIMENT. Color changes are gradational and gray to dark green diagenetic haloes and color bands are common.

General Description:
The sediment is moderately bioturbated.

Note: The world record core recovery of 6730.74 m was broken with this core!!

SITE 1021 HOLE D CORE 5H CORED 34.0 - 43.5 mbsf



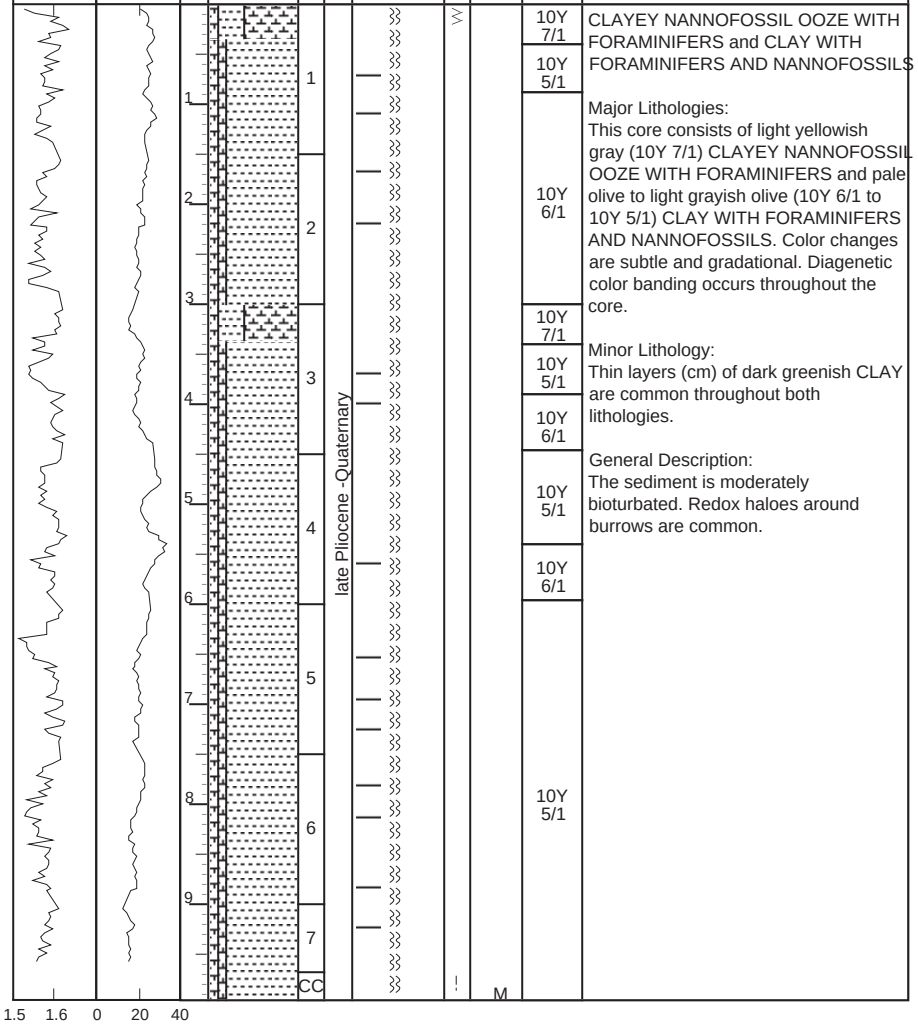
NANNOFOSSIL CLAY MIXED SEDIMENT and NANNOFOSSIL OOZE WITH FORAMINIFERS AND CLAY

Major Lithologies:
This core consists of light grayish olive to pale olive (10Y 5/1 to 10Y 6/1) NANNOFOSSIL CLAY MIXED SEDIMENT alternating with light yellowish gray (10Y 7/1) NANNOFOSSIL OOZE WITH FORAMINIFERS AND CLAY. Dark green color banding is common.

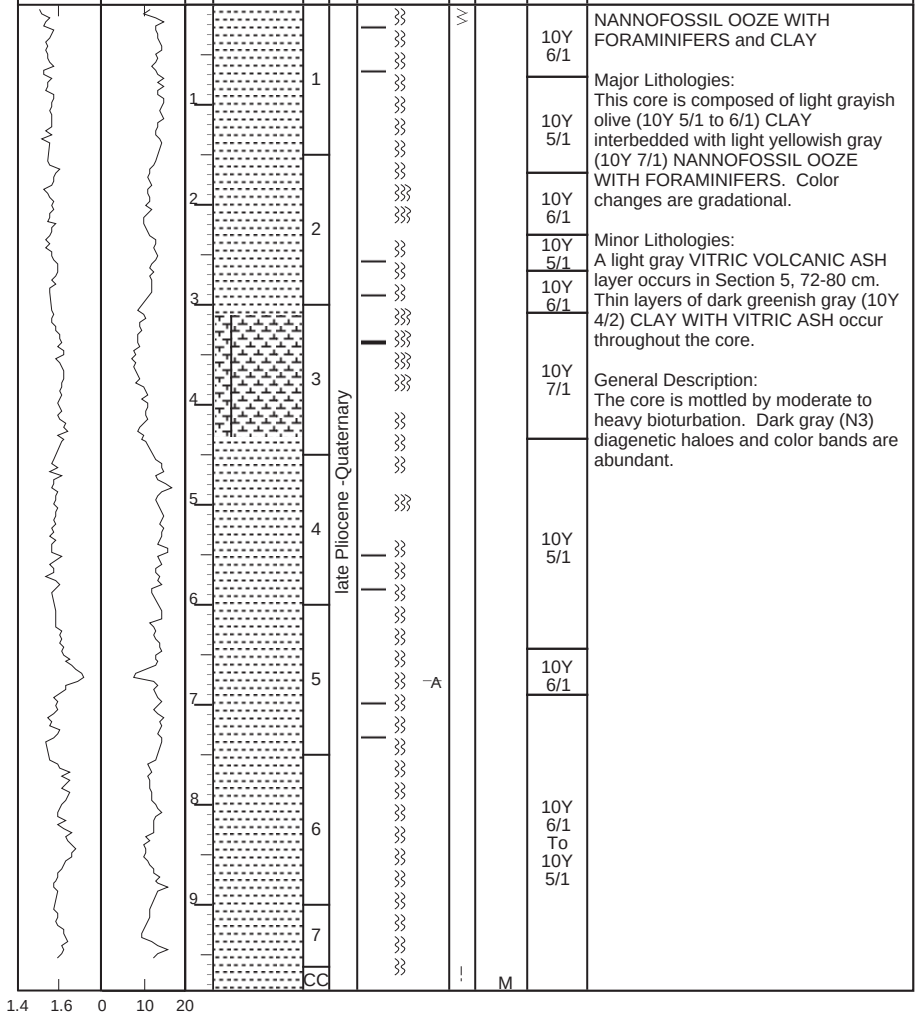
Minor Lithologies:
Section 2, 106-124 cm, contains abundant VITRIC ASH mixed with the surrounding lithology.

General Description:
The sediment is heavily bioturbated.

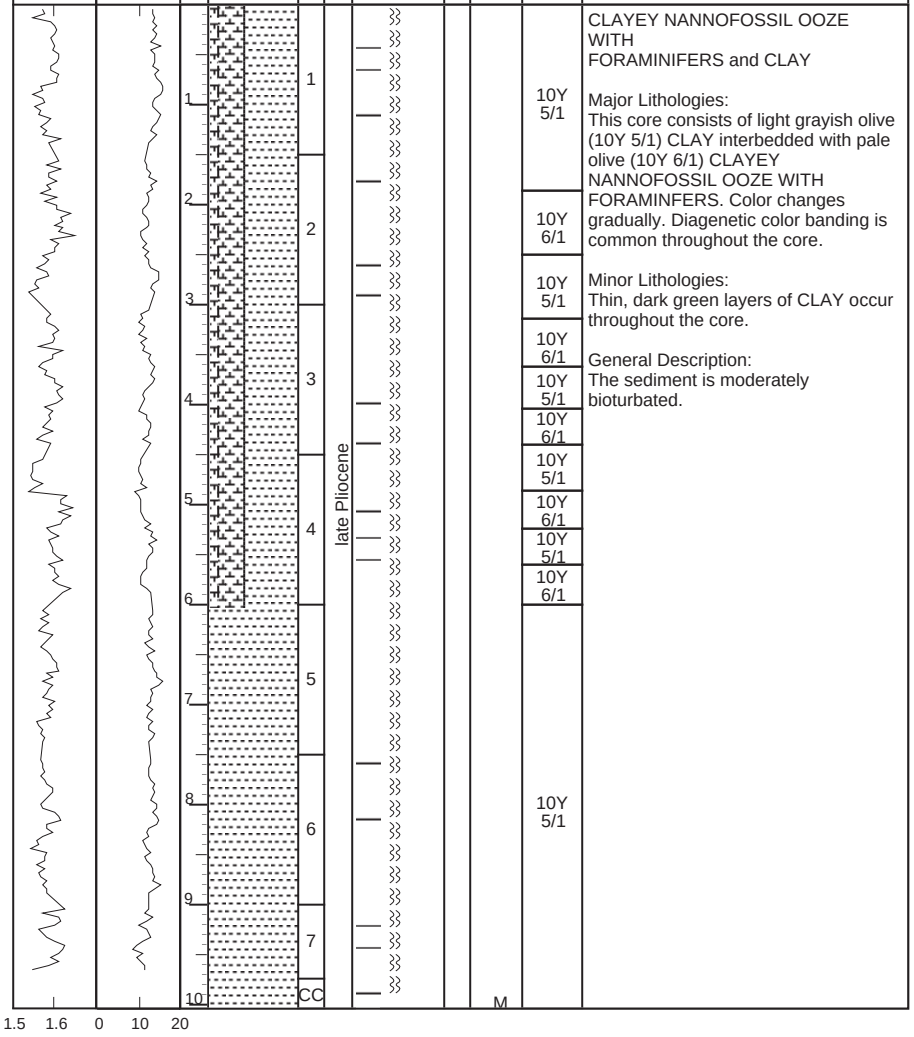
SITE 1021 HOLE D CORE 6H CORED 43.5 - 53.0 mbsf



SITE 1021 HOLE D CORE 7H CORED 53.0 - 62.5 mbsf



SITE 1021 HOLE D CORE 8H CORED 62.5 - 72.0 mbsf



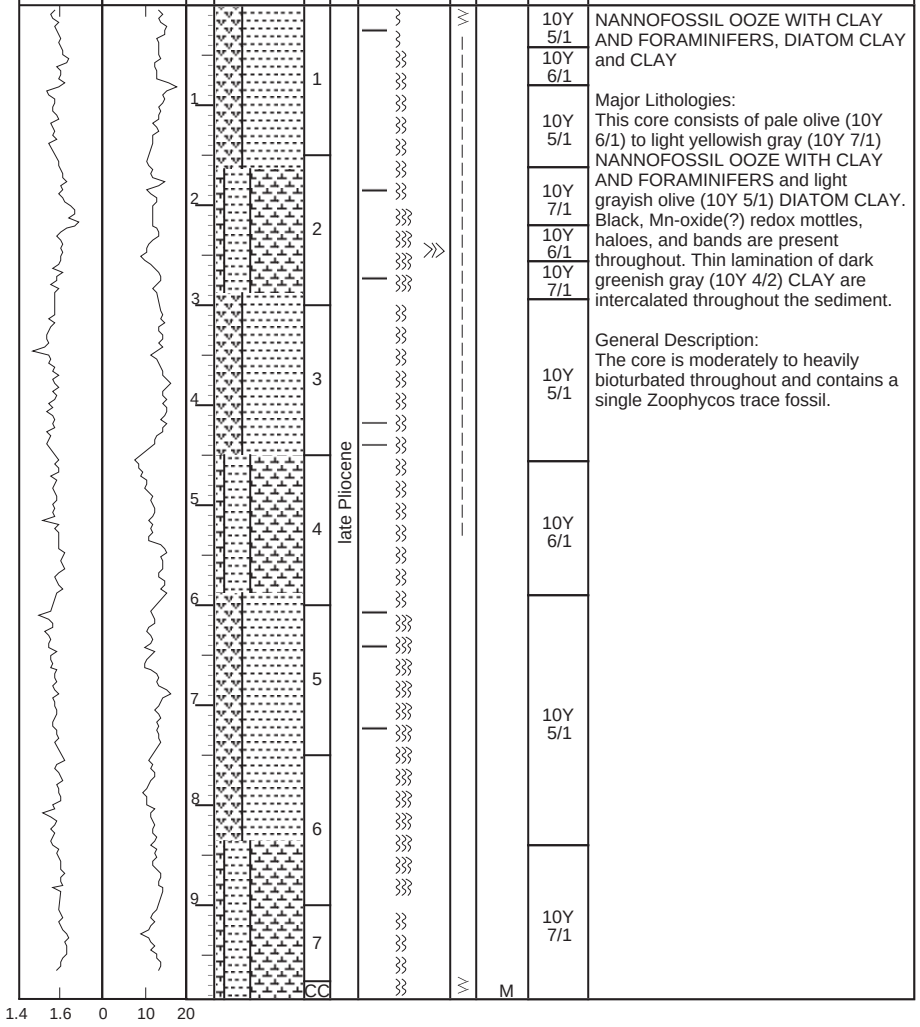
CLAYEY NANNOFOSSIL OOZE WITH FORAMINIFERS and CLAY

Major Lithologies:
This core consists of light grayish olive (10Y 5/1) CLAY interbedded with pale olive (10Y 6/1) CLAYEY NANNOFOSSIL OOZE WITH FORAMINFERS. Color changes gradually. Diagenetic color banding is common throughout the core.

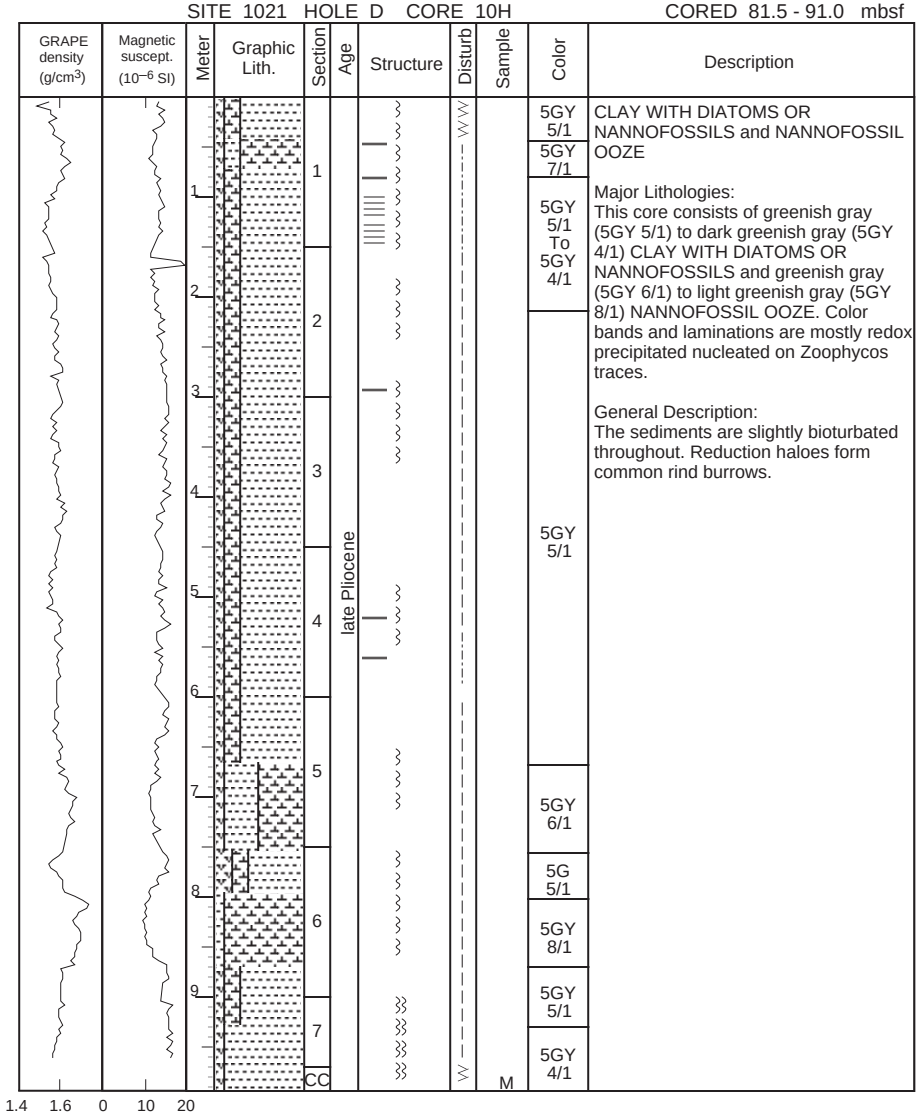
Minor Lithologies:
Thin, dark green layers of CLAY occur throughout the core.

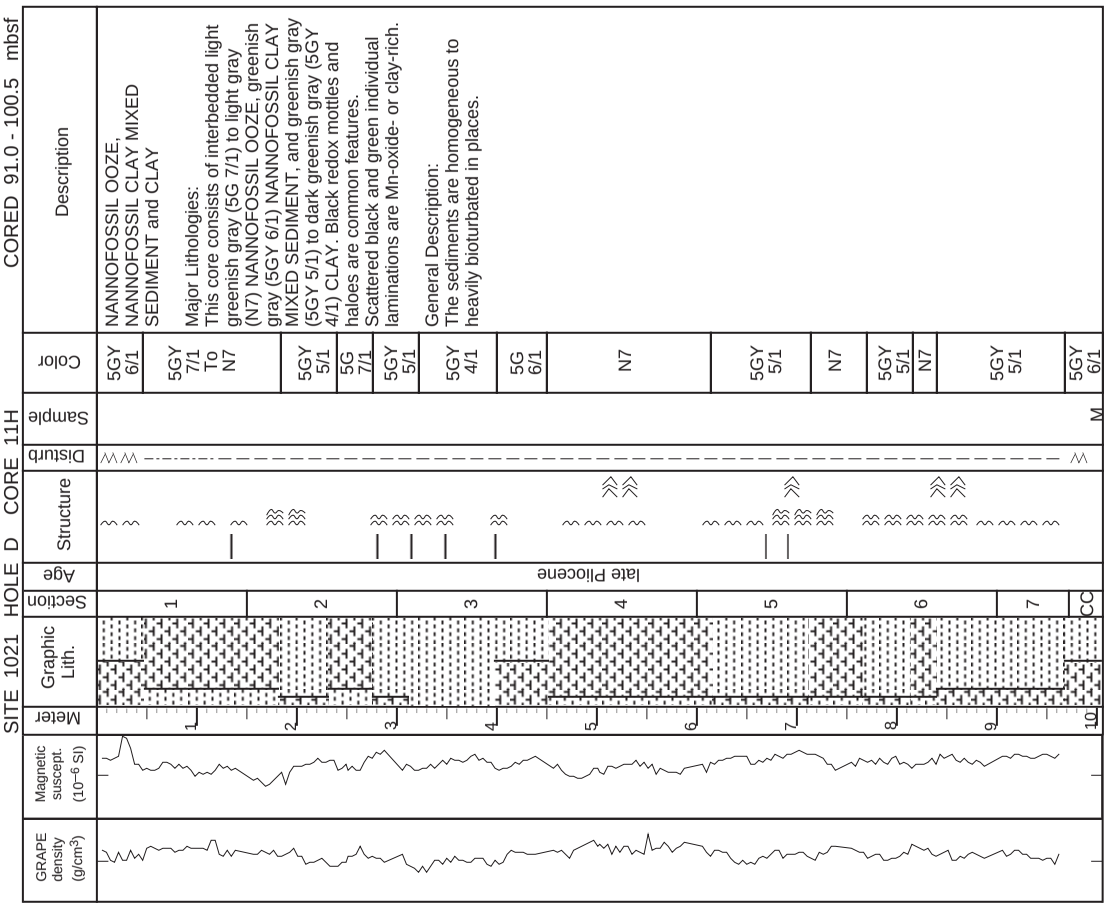
General Description:
The sediment is moderately bioturbated.

SITE 1021 HOLE D CORE 9H CORED 72.0 - 81.5 mbsf

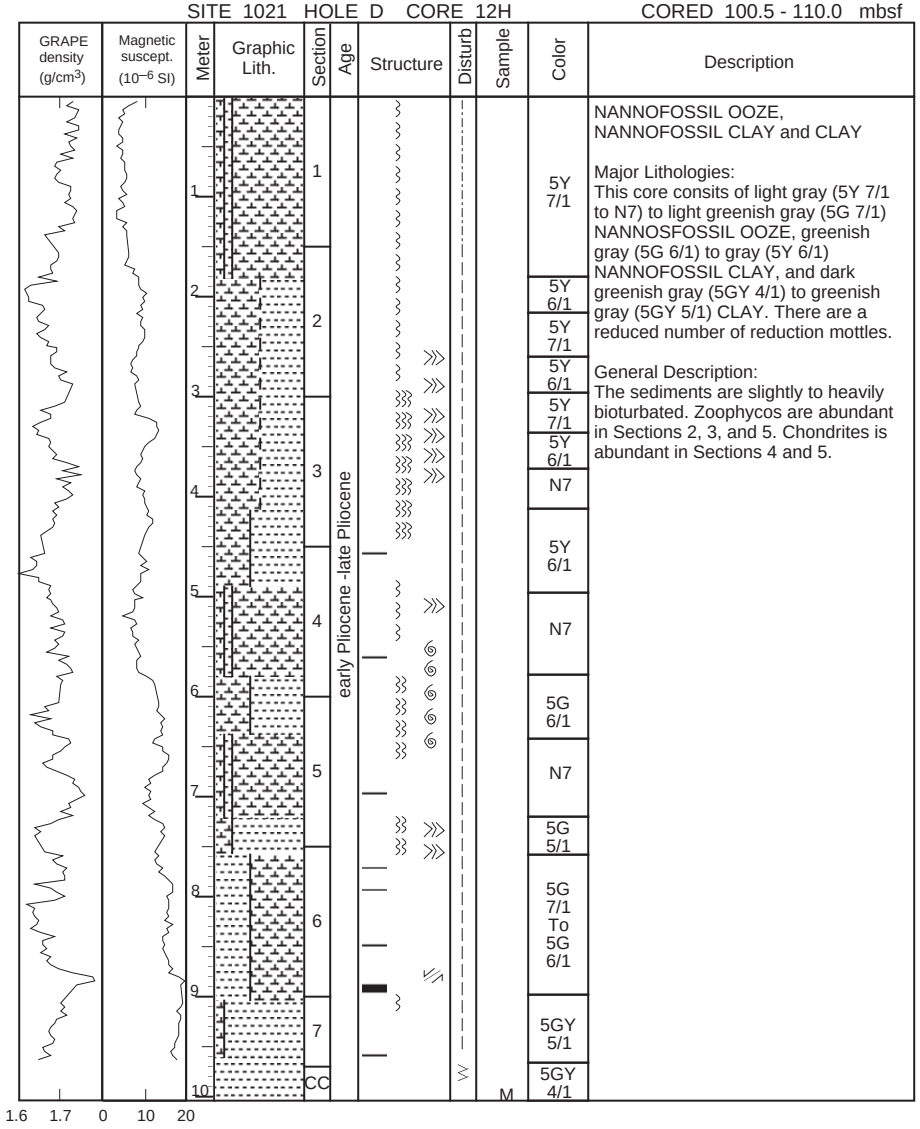


SITE 1021 HOLE D CORE 10H CORED 81.5 - 91.0 mbsf

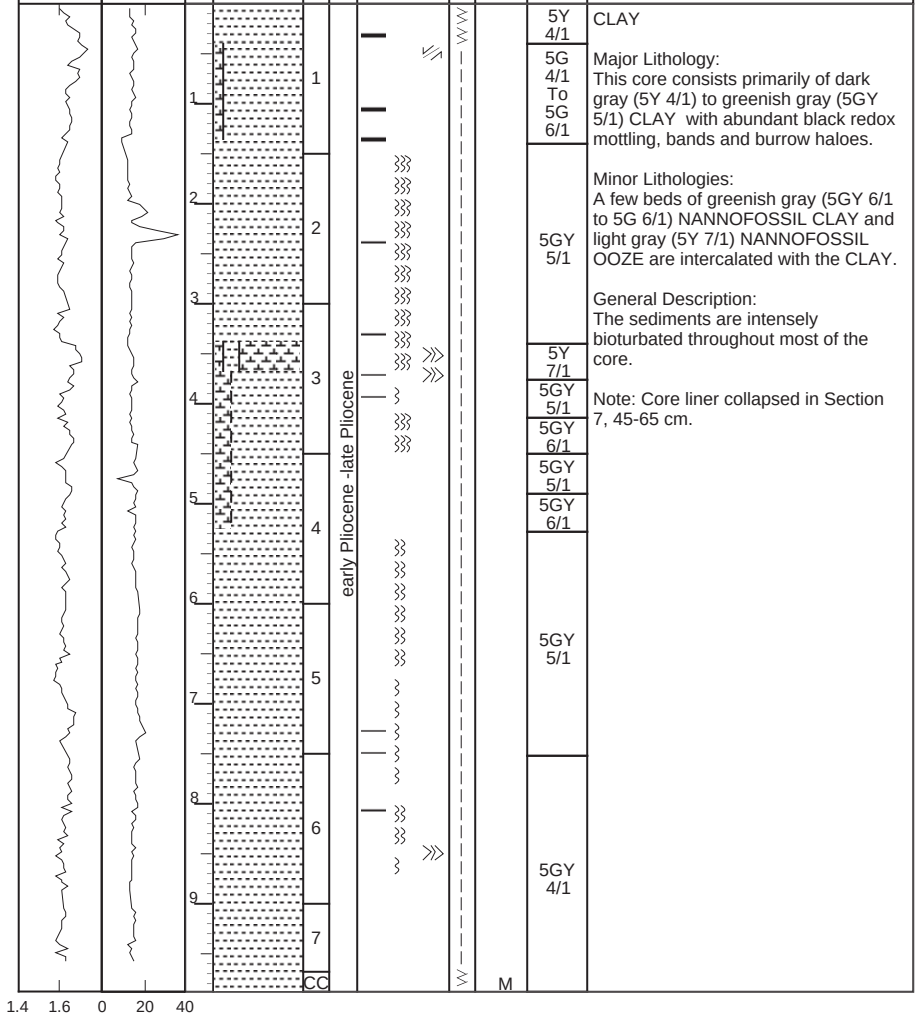



SITE 1021 HOLE D CORE 11H CORED 91.0 - 100.5 mbsf
GRAPE density (g/cm3)
Magnetic suscept. (10−6 SI)
Meter
Graphic Lith.
Section
Age
Structure
Disturb
Sample
Color
Description
late Pliocene
5GY 6/1
NANNOFOSSIL OOZE, NANNOFOSSIL CLAY MIXED SEDIMENT and CLAY
5GY 7/1 To N7
Major Lithologies:
This core consists of interbedded light greenish gray (5G 7/1) to light gray (N7) NANNOFOSSIL OOZE, greenish gray (5GY 6/1) NANNOFOSSIL CLAY MIXED SEDIMENT, and greenish gray (5GY 5/1) to dark greenish gray (5GY 4/1) CLAY. Black redox mottles and haloes are common features.
5GY 5/1
5G 7/1
5GY 5/1
Scattered black and green individual laminations are Mn-oxide- or clay-rich.
5GY 4/1
General Description:
The sediments are homogeneous to heavily bioturbated in places.
5G 6/1
N7
5GY 5/1
N7
5GY 5/1
N7
5GY 5/1
5GY 6/1
1.4 1.6 0 10 20

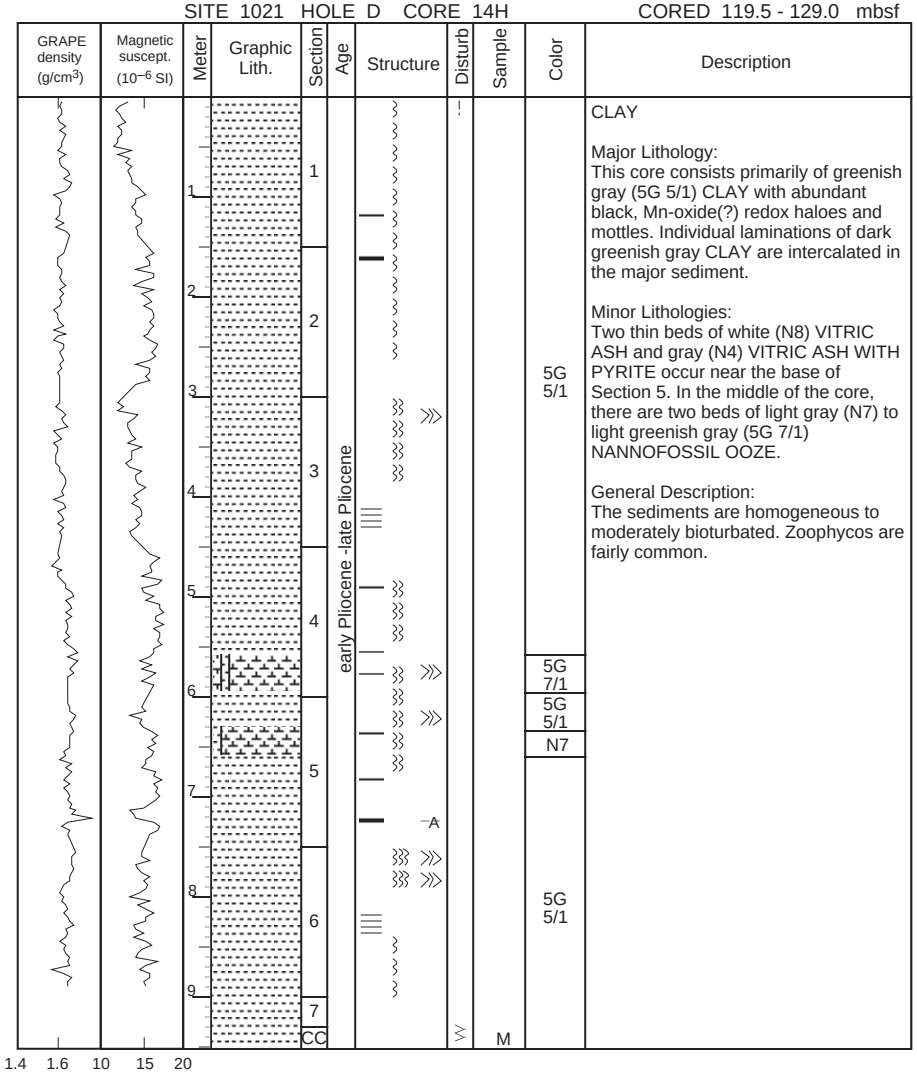
SITE 1021 HOLE D CORE 12H CORED 100.5 - 110.0 mbsf



SITE 1021 HOLE D CORE 13H CORED 110.0 - 119.5 mbsf



SITE 1021 HOLE D CORE 14H CORED 119.5 - 129.0 mbsf

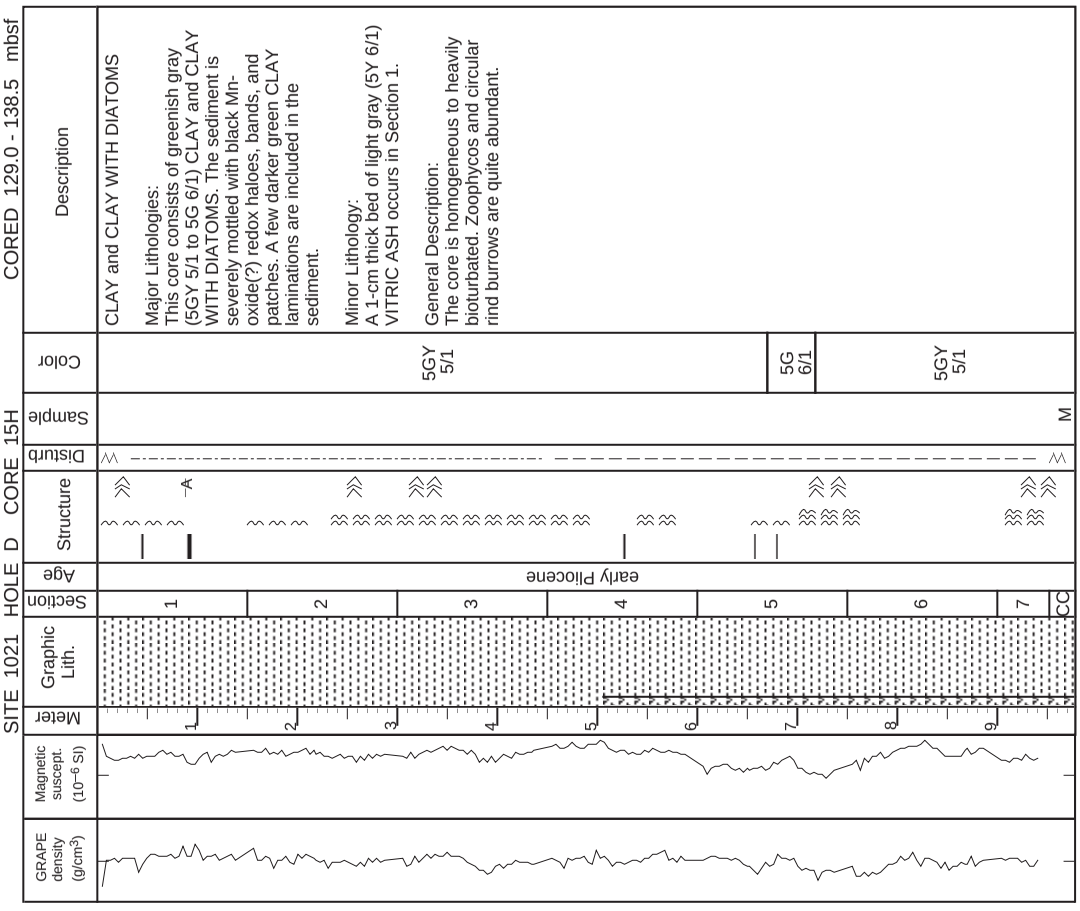


CLAY

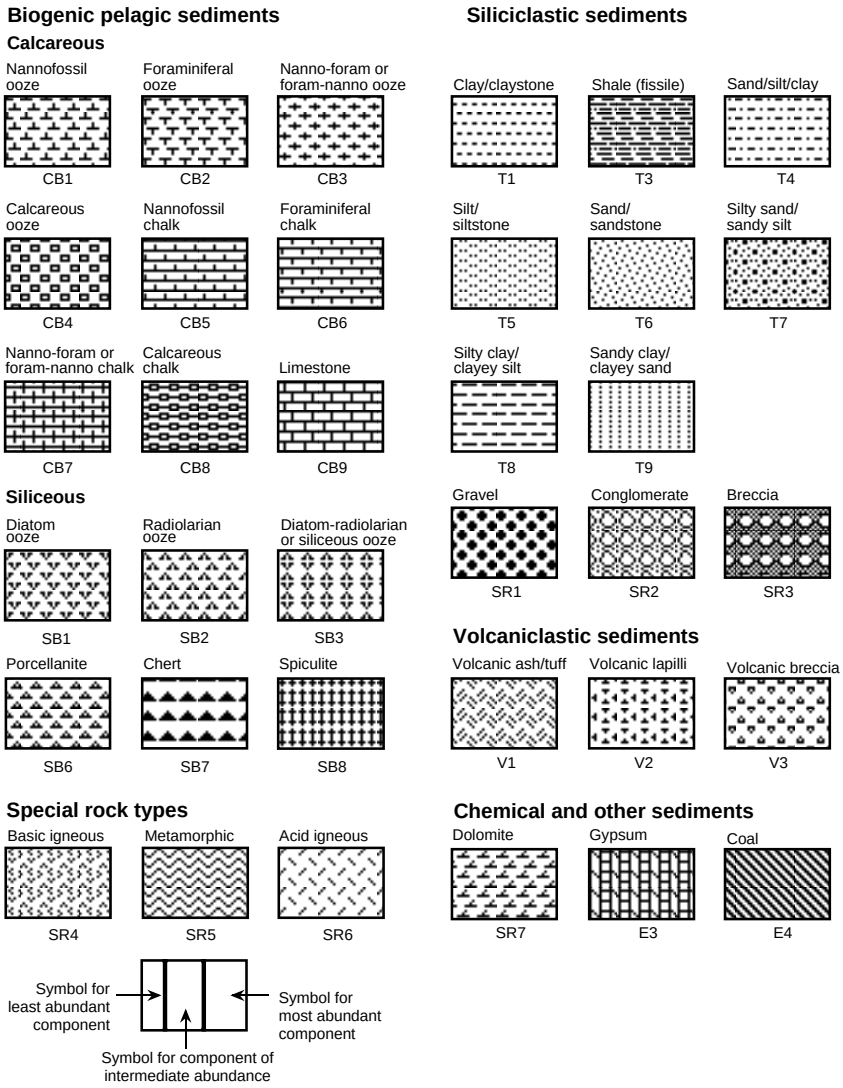
Major Lithology:
This core consists primarily of greenish gray (5G 5/1) CLAY with abundant black, Mn-oxide(?) redox haloes and mottles. Individual laminations of dark greenish gray CLAY are intercalated in the major sediment.

Minor Lithologies:
Two thin beds of white (N8) VITRIC ASH and gray (N4) VITRIC ASH WITH PYRITE occur near the base of Section 5. In the middle of the core, there are two beds of light gray (N7) to light greenish gray (5G 7/1) NANNOFOSSIL OOZE.

General Description:
The sediments are homogeneous to moderately bioturbated. Zoophycos are fairly common.

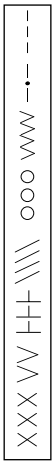

SITE 1021 HOLE D CORE 15H CORED 129.0 - 138.5 mbsf
GRAPE density (g/cm3)
Magnetic suscept. (10−6 SI)
Meter
Graphic Lith.
Section
Age
Structure
Disturb
Sample
Color
Description
early Pliocene
CLAY and CLAY WITH DIATOMS
Major Lithologies:
This core consists of greenish gray (5GY 5/1 to 5G 6/1) CLAY and CLAY WITH DIATOMS. The sediment is severely mottled with black Mn-oxide(?) redox haloes, bands, and patches. A few darker green CLAY laminations are included in the sediment.
Minor Lithology:
A 1-cm thick bed of light gray (5Y 6/1) VITRIC ASH occurs in Section 1.
General Description:
The core is homogeneous to heavily bioturbated. Zoophycos and circular rind burrows are quite abundant.
5GY 5/1
5G 6/1
5GY 5/1
M
1.4 1.6 0 10 20

Key to symbols used in the “Graphic Lithology” column on the core description sheets.



Key to symbols used in the "Structures" column on the core description sheets.

Drilling disturbance symbols



Soft sediments

- Slightly disturbed
- Moderately disturbed
- Highly disturbed
- Soupy

Hard sediments

- Slightly fractured
- Moderately fractured
- Highly fragmented
- Drilling breccia

Sedimentary structures

- Burrows, rare (<30% surface area)
- Burrows, common (30%–60% surface area)
- Burrows, abundant (>60% surface area)
- Discrete *Zoophycos* trace fossil
- Discrete *Chondrites* trace fossil
- *Sagarites* sponge
- Gastropods
- Other bivalves
- Shell fragments
- Wood framents
- Fish debris

Sedimentary structures cont.

- Fining-upward sequence
- Interval over which primary sedimentary structure occur
- Planar laminae
- Wedge-planar laminae/beds
- Graded bedding (normal)
- Graded bedding (reversed)
- Sharp contact
- Gradational contact
- Scoured, sharp contact
- Scoured contact with graded bed
- Thick color bands (sharp contact)
- Thick color bands (gradational contact)
- Medium color bands (sharp contact)
- Medium color bands (gradational contact)
- Thin color bands (sharp contact)
- Thin color bands (gradational contact)
- Laminations (mm scale)
- Individual thick color band
- Individual medium color band
- Individual thin color band
- Individual lamination
- Wavy lamination
- Cross laminae
- Cross stratification
- Cross bedding
- Convoluted/contorted bedding
- Flaser bedding
- Graded interval, normal
- Veins
- Water escape structure
- Scour

- Isolated pebbles/cobbles
- Isolated mud clasts
- Slump blocks or slump folds
- Contorted slump
- Probable compaction fracture
- Microfault (normal)
- Microfault (thrust)
- Macrofault
- Fracture
- Totally fractured
- Vein structures
- Color mottles
- Dolomite nodule/concretion
- D — Disseminated dolomite
- P — Pyrite nodule/concretion
- P — Disseminated pyrite
- G — Glauconite
- Concretions/nodules
- Ba — Barite nodule/concretion
- Ba — Disseminated barite
- Ca — Calcite nodule/concretion
- C — Carbonate nodule/concretion
- Ch — Chert nodule/concretion
- A — Ash/pumice pods
- A — Ash layer