

**Surface and Intermediate Water hydrography, planktonic and benthic biota in the Caribbean Sea – Climate, Bio and Geosphere linkages (OPOKA)**

Cruise No. 78, Leg 1

February 22 – March 28, 2009,  
Colón (Panama) – Port of Spain (Trinidad and Tobago)

**- Supplementary Material -**

**Part 3**

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Editorial Assistance:

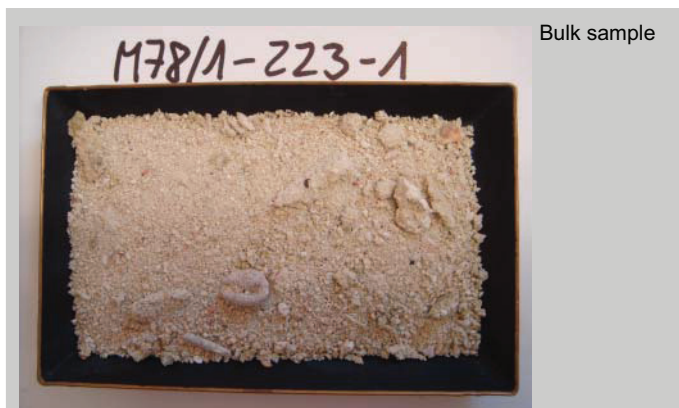
Senatskommission für Ozeanographie der Deutschen Forschungsgemeinschaft  
MARUM – Zentrum für Marine Umweltwissenschaften der Universität Bremen

Leitstelle Deutsche Forschungsschiffe  
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# Mini box core

M78/1-223-1

Latitude	Longitude	Depth [m]	Date	Time
11° 48.90'	-64° 35.84'	14.5	19.03.2009	18:13:00



## ***Sediment surface***

<b>Sediment</b>	Carbonate sand
<b>Colour</b>	
<b>Structure</b>	
<b>Constituents</b>	
<b>Living organisms</b>	
<b>Morphology</b>	

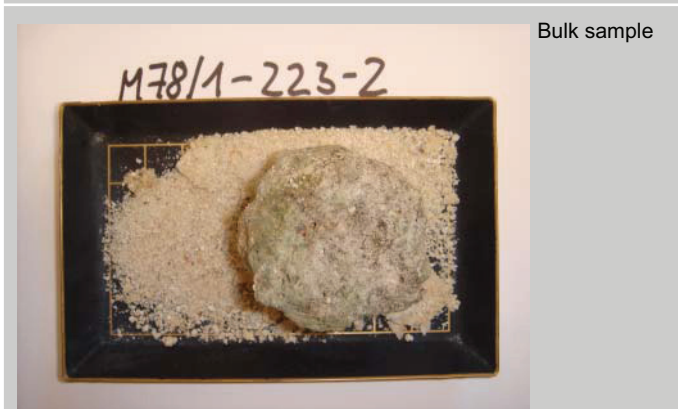
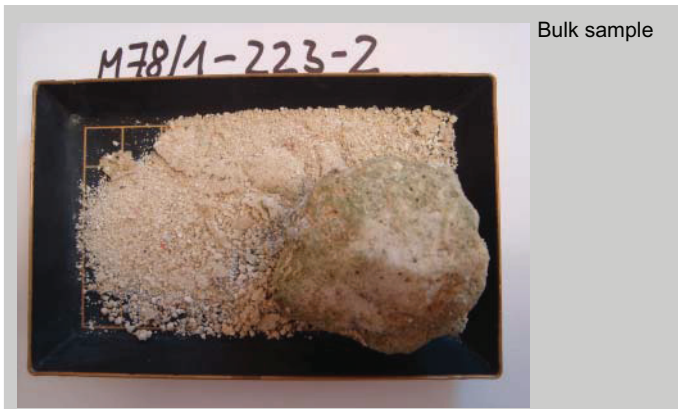
## ***Sediment succession***

<b>Sediment</b>	
<b>Colour</b>	
<b>Structure</b>	
<b>Constituents</b>	
<b>Bioturbation</b>	
<b>Subsamples</b>	Titschack
<b>Operator</b>	Schönfeld

# Mini box core

M78/1-223-2

Latitude	Longitude	Depth [m]	Date	Time
11° 48.90'	-64° 35.84'	14.5	19.03.2009	18:15:00



### Sediment surface

<b>Sediment</b>	Carbonate sand with rhodolits
<b>Colour</b>	
<b>Structure</b>	
<b>Constituents</b>	
<b>Living organisms</b>	
<b>Morphology</b>	

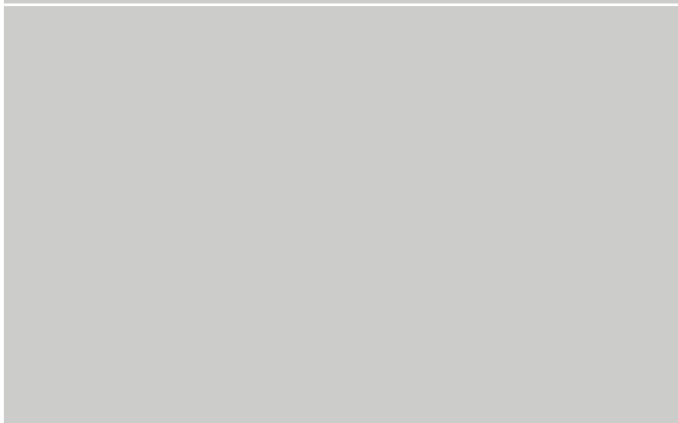
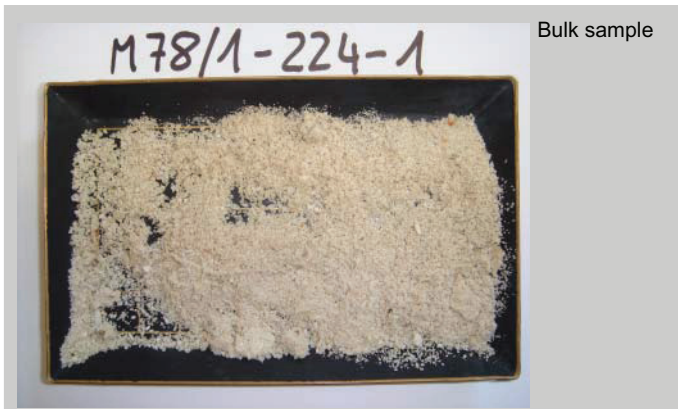
### Sediment succession

<b>Sediment</b>	
<b>Colour</b>	
<b>Structure</b>	
<b>Constituents</b>	
<b>Bioturbation</b>	
<b>Subsamples</b>	Titschack
<b>Operator</b>	Schönfeld

# Mini box core

M78/1-224-1

Latitude	Longitude	Depth [m]	Date	Time
11°49,057'	-64°35,941'	4,8	19.03.2009	18:27:00



## Sediment surface

<b>Sediment</b>	Medium carbonate sand with coral debris
<b>Colour</b>	
<b>Structure</b>	
<b>Constituents</b>	
<b>Living organisms</b>	
<b>Morphology</b>	

## Sediment succession

<b>Sediment</b>	
<b>Colour</b>	
<b>Structure</b>	
<b>Constituents</b>	
<b>Bioturbation</b>	
<b>Subsamples</b>	Titschack
<b>Operator</b>	Schönfeld

# Mini box core

M78/1-226-1

Latitude	Longitude	Depth [m]	Date	Time
11°48,947'	-64°35,953'	27	19.03.2009	19:10:00



## Sediment surface

<b>Sediment</b>	Three coral fragments
<b>Colour</b>	
<b>Structure</b>	
<b>Constituents</b>	
<b>Living organisms</b>	
<b>Morphology</b>	

## Sediment succession

<b>Sediment</b>	
<b>Colour</b>	
<b>Structure</b>	
<b>Constituents</b>	
<b>Bioturbation</b>	
<b>Subsamples</b>	Titschack
<b>Operator</b>	Schönfeld

# Mini box core

M78/1-226-2

Latitude	Longitude	Depth [m]	Date	Time
11°48,905'	-64°35,965'	40	19.03.2009	19:13:00



Rhodolits

## Sediment surface

Sediment Two rhodolits

Colour

Structure

Constituents

Living organisms

Morphology

## Sediment succession

Sediment

Colour

Structure

Constituents

Bioturbation

Subsamples Titschack

Operator Schönfeld

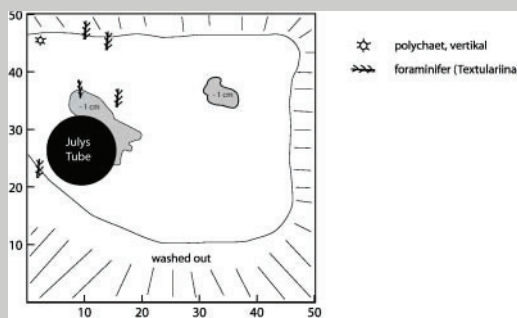
# Box core

## M78/1-230-1

Latitude	Longitude	Depth [m]	Date	Time
11°1.84'	-62°5.61'	100.7	21.03.2009	07:17:00



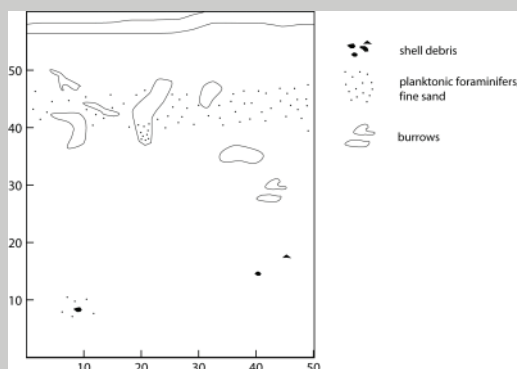
Sediment surface



Schematic sketch of the surface



Sediment section



Schematic sketch of the section

### ***Sediment surface***

**Sediment** Clay, very soft, crumpy structure

**Colour** Olive, 5Y4/3

**Structure** Surface washed out

**Constituents** Tree-like textulariids, polychaets

**Living organisms**

**Morphology** Small depressions with a depth of 1 cm

### ***Sediment succession***

**Sediment** Homogenous clay, very soft

**Colour** 0 - 2 cm olive, 5Y4/3  
2 - 67 cm dark gray, 5Y4/1

**Structure**

**Constituents**

**Bioturbation** Burrows filled with foraminifers and shell fragments

**Subsamples** Titschack

Schönfeld

Richey

Troccoli

Nürnberg

**Operator** Titschack, Richey

# Box core

M78/1-230-1

Latitude	Longitude	Depth [m]	Date	Time
11°1.84'	-62°5.61'	100.7	21.03.2009	07:17:00



Grain size fraction &gt; 2 mm

Close-up of grain size fraction > 500  $\mu$ m

Grain size fraction &gt; 1mm

Grain size fraction > 500  $\mu$ m



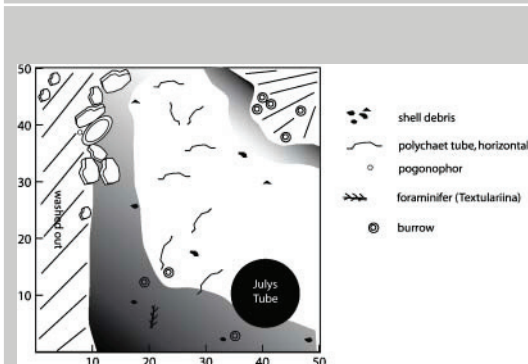
## Box core

M78/1-232-1

Latitude	Longitude	Depth [m]	Date	Time
10°59.0'	-61°31.495'	126	21.03.2009	17:47:00



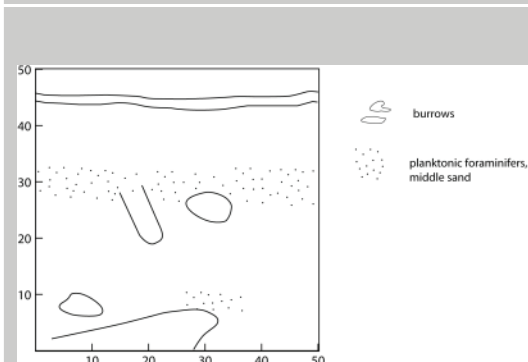
Sediment surface



Schematic sketch of the surface



Sediment section



Schematic sketch of the section

**Sediment surface**

<b>Sediment</b>	Clay, soft, crumpy structure
<b>Colour</b>	Olive, 5Y4/3
<b>Structure</b>	Large burrows, 3 - 4 cm in diameter, dpressions, burrows, partly filled with sediment
<b>Constituents</b>	Pogonophors (up to 20 cm long), fine shell fragments, seaurchin burrows ( <i>Bichordites</i> isp.), tree-shaped textulariids
<b>Living organisms</b>	
<b>Morphology</b>	Mud ripples, 40 cm long, 3 cm high

**Sediment succession**

<b>Sediment</b>	Clay, soft
<b>Colour</b>	Dark gray, 5Y4/1
<b>Structure</b>	
<b>Constituents</b>	
<b>Bioturbation</b>	With Seaurchin burrows ( <i>Bichordites</i> isp.)
<b>Subsamples</b>	Titschack
	Richey
	Schönfeld
	Troccoli
	Dullo
<b>Operator</b>	Titschack, Richey

## Box core

M78/1-232-1

Latitude	Longitude	Depth [m]	Date	Time
10°59.0'	-61°31.495'	126	21.03.2009	17:47:00



Grain size fraction &gt; 2 mm



Close-up of grain size fraction &gt; 500 µm



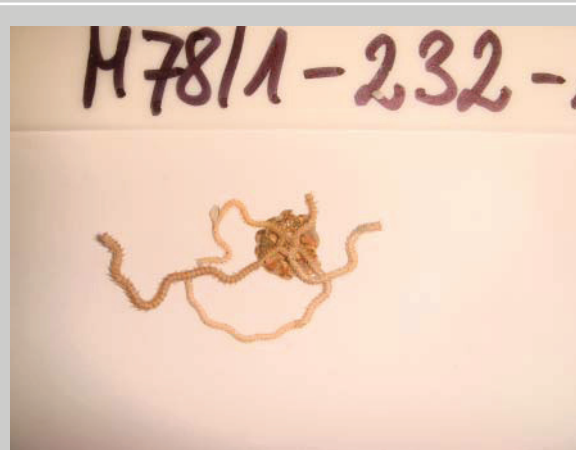
Grain size fraction &gt; 1 mm



Irregular echinoid



Grain size fraction &gt; 500 µm

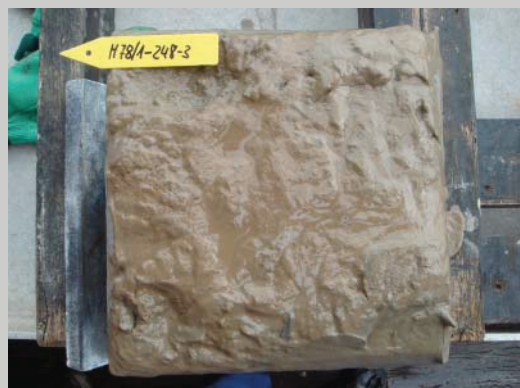


Ophiurid

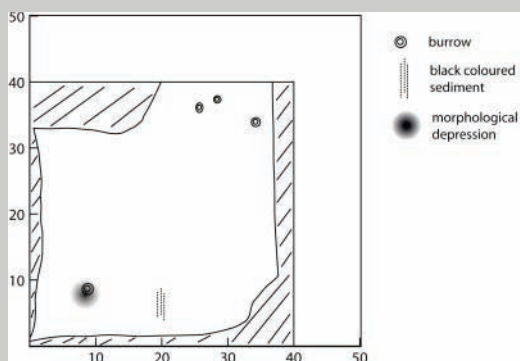
# Reineck box core

M78/1-248-3

Latitude	Longitude	Depth [m]	Date	Time
08°58.000'	-60°4.998'	50.6	25.03.2009	18:19:00



Sediment surface



Schematic sketch of the surface

## Sediment surface

**Sediment** Very soft clay

**Colour** Dark greyish brown, 2.5Y4/2

**Structure** Flat, slightly irregular, disturbed due to overpenetration

**Constituents**

**Living organisms**

**Morphology** Irregular disturbed (box core overpenetrated)

## Sediment succession

**Sediment** Clay

**Colour** Olive grey 5Y4/2

**Structure**

**Constituents**

**Bioturbation**

**Subsamples** Titschack

Troccoli

**Operator** Schönfeld

# Reineck box core

M78/1-248-3

Latitude	Longitude	Depth [m]	Date	Time
08°58.000'	-60°4.998'	50.6	25.03.2009	18:19:00



Grain size fraction &gt; 2 mm



Close-up of grain size fraction &gt; 500 µm



Grain size fraction &gt; 1 mm



Grain size fraction &gt; 500 µm

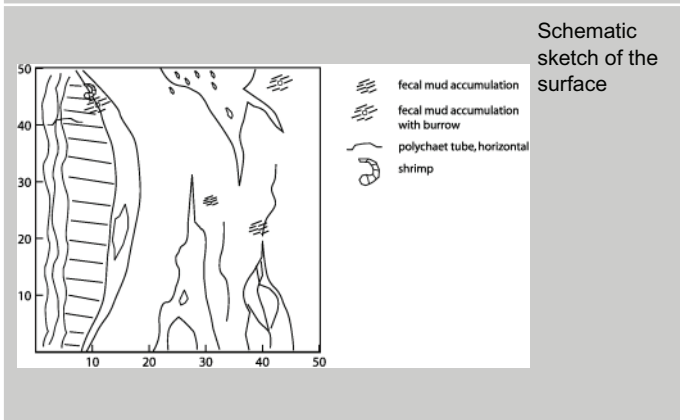
# Reineck box core

M78/1-250-3

Latitude	Longitude	Depth [m]	Date	Time
08°57,372'	-60°13,949'	9,4	25.03.2009	20:55:00



Sediment surface



## Sediment surface

<b>Sediment</b>	Thin layer of silt, below clay
<b>Colour</b>	Very dark grey, 5Y 3/1
<b>Structure</b>	Fractures, developed during sampling
<b>Constituents</b>	Polychaets, crab
<b>Living organisms</b>	
<b>Morphology</b>	Flat

## Sediment succession

<b>Sediment</b>	
<b>Colour</b>	
<b>Structure</b>	
<b>Constituents</b>	
<b>Bioturbation</b>	
<b>Subsamples</b>	Titschack
<b>Operator</b>	Schönfeld

# Reineck box core

M78/1-250-3

Latitude	Longitude	Depth [m]	Date	Time
08°57,372'	-60°13,949'	9,4	25.03.2009	20:55:00



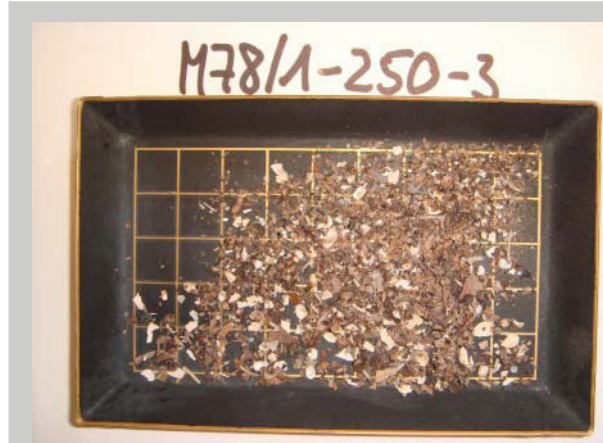
Grain size fraction &gt; 2 mm



Close-up of grain size fraction &gt; 500 µm



Grain size fraction &gt; 1mm

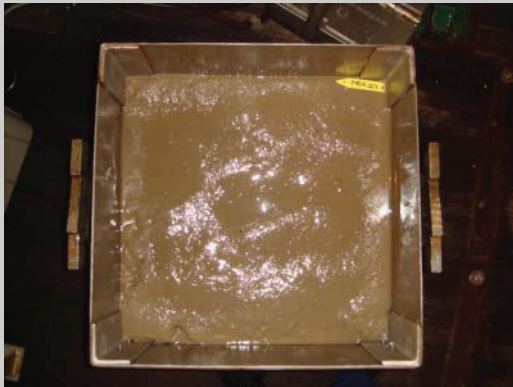


Grain size fraction &gt; 500 µm

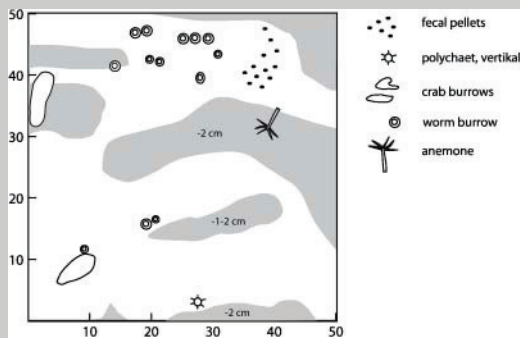
# Box core

## M78/1-251-1

Latitude	Longitude	Depth [m]	Date	Time
09°21,997'	-60°2,977'	78,9	26.03.2009	00:06:00



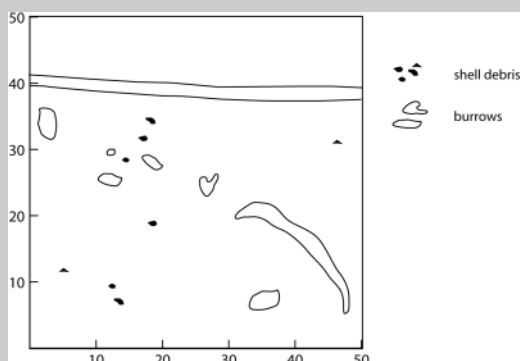
Sediment surface



Schematic sketch of the surface



Sediment section



Schematic sketch of the section

### Sediment surface

**Sediment** Slightly sandy clay

**Colour** Dark greyish brown, 2.5Y 4/2

**Structure**

**Constituents** Fecal pellets, burrows of worms and crabs, Anemone

**Living organisms** Crustaceans, Actiniaria

**Morphology** Mud ripple (about 2 cm high)

### Sediment succession

**Sediment** Fine sandy clay

**Colour** Dark grey, 5Y 4/1

**Structure**

**Constituents**

**Bioturbation** Burrows

**Subsamples** Titschack

Schönfeld

Troccoli

Nürnberg

Richey

**Operator** Schönfeld

## Box core

M78/1-251-1

Latitude	Longitude	Depth [m]	Date	Time
09°21,997'	-60°2,977'	78,9	26.03.2009	00:06:00



Grain size fraction &gt; 2 mm



Crustacea



Grain size fraction &gt; 1mm



Crustacea



Grain size fraction &gt; 500 µm



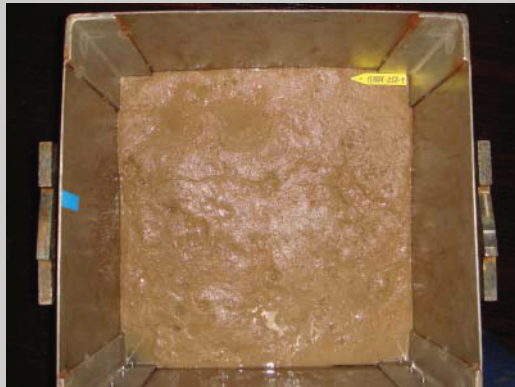
Actinaria



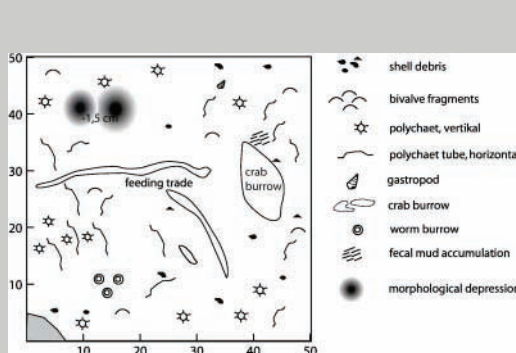
# Box core

## M78/1-252-1

Latitude	Longitude	Depth [m]	Date	Time
09°42,998'	-60°4,008'	80,5	26.03.2009	02:33:00



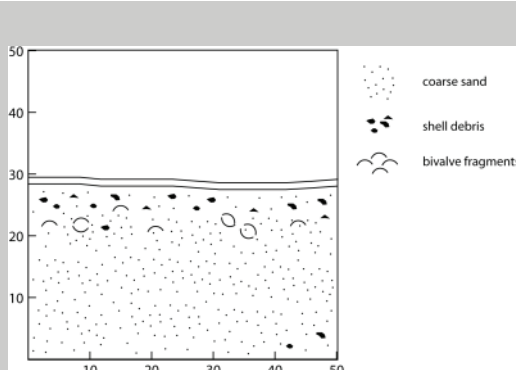
Sediment surface



Schematic sketch of the surface



Sediment section



Schematic sketch of the section

### *Sediment surface*

**Sediment** Silty, shill containing coarse sand

**Colour** Olive brown, 2.5Y 4/3

**Structure** Burrows, graze tracks, bright worm burrows

**Constituents** Polychaet nests, shill, gastropods, bivalve shells

**Living organisms**

**Morphology** Inclined, undulated

### *Sediment succession*

**Sediment** Coarse sand with shill

**Colour** Olive, 5Y 4/2

**Structure** No bedding

**Constituents**

**Bioturbation** Burrows

**Subsamples** Richey

Nürnberg

Schönfeld

Titschack

**Operator** Schönfeld

# Box core

M78/1-252-1

Latitude	Longitude	Depth [m]	Date	Time
09°42,998'	-60°4,008'	80,5	26.03.2009	02:33:00



Grain size fraction &gt; 2 mm

Close-up of grain size fraction > 500  $\mu\text{m}$ 

Grain size fraction &gt; 1 mm

Grain size fraction > 500  $\mu\text{m}$

## 5.5.2 Appendix items: Multicorer fractions

**Multicorer**

M78/1-182-2

Latitude	Longitude	Depth [m]	Date	Time
29°00.000'	-87°49.999'	1508	04.03.2009	17:55:00



Grain size fraction &gt; 1mm

Grain size fraction > 500  $\mu\text{m}$ Close-up of grain size fraction > 500  $\mu\text{m}$

# Multicorer

M78/1-183-1

Latitude	Longitude	Depth [m]	Date	Time
29°00.000'	-87°20.000'	1250	04.03.2009	21:48:00



Solitary coral, front



Solitary coral, side



Solitary coral, back

# Multicorer

M78/1-184-1

Latitude	Longitude	Depth [m]	Date	Time
29°00.007'	-86°49.997'	545.8	05.03.2009	01:12:00



Grain size fraction &gt; 2 mm

Close-up of grain size fraction > 500  $\mu$ m

Grain size fraction &gt; 1 mm

Grain size fraction > 500  $\mu$ m

# Multicorer

M78/1-185-1

Latitude	Longitude	Depth [m]	Date	Time
28°59.934'	-86°20.164'	337	05.03.2009	04:23:00



Grain size fraction &gt; 2 mm

Close-up of grain size fraction > 500  $\mu$ m

Grain size fraction &gt; 1 mm



Solitary coral

Grain size fraction > 500  $\mu$ m

Foraminifera

# Multicorer

M78/1-228-1

Latitude	Longitude	Depth [m]	Date	Time
11°37.784'	-62°39.51'	452	20.03.2009	18:14:00



Grain size fraction &gt; 2 mm



Close-up of grain size fraction 500 µm



Grain size fraction &gt; 1 mm



Grain size fraction &lt; 500 µm

# Multicorer

M78/1-228-2

Latitude	Longitude	Depth [m]	Date	Time
11°37.784'	-62°39.510'	446	20.03.2009	19:10:00



Grain size fraction &gt; 2 mm



Grain size fraction &gt; 500 µm



Grain size fraction &gt; 1 mm



Close-up of grain size fraction &gt; 500 µm



# Multicorer

M78/1-229-1

Latitude	Longitude	Depth [m]	Date	Time
11°47.539'	-62°38.601'	877	20.03.2009	23:30:00



Grain size fraction &gt; 2 mm



Close-up of grain size fraction &gt; 500 µm



Grain size fraction &gt; 1 mm



Grain size fraction &gt; 500 µm

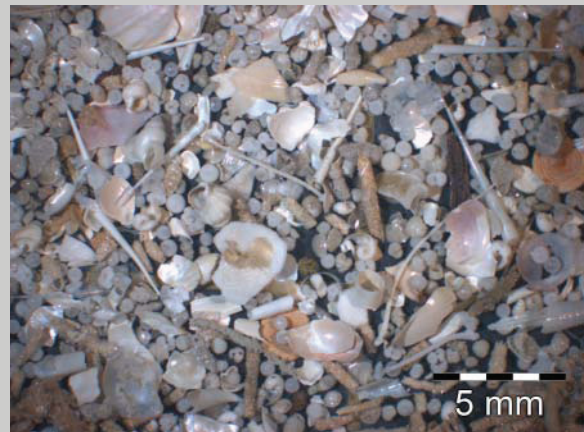
# Multicorer

M78/1-234-1

Latitude	Longitude	Depth [m]	Date	Time
11°24.317'	-61°2.956'	201	22.03.2009	10:01:00



Grain size fraction &gt; 2 mm



Close-up of grain size fraction &gt; 500 µm



Grain size fraction &gt; 1 mm



Grain size fraction &gt; 500 µm

# Multicorer

M78/1-235-2

Latitude	Longitude	Depth [m]	Date	Time
11°36.529'	-60°57.849'	853	22.03.2009	16:31:00



Grain size fraction &gt; 2 mm



Grain size fraction &gt; 1 mm

Grain size fraction > 500  $\mu\text{m}$

# Multicorer

M78/1-240-1

Latitude	Longitude	Depth [m]	Date	Time
10°08,882'	-59°2,345'	1673	23.03.2009	21:24:00



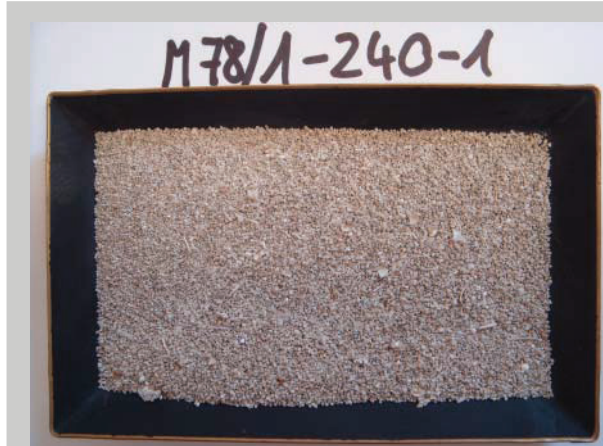
Grain size fraction &gt; 2 mm



Close-up of grain size fraction &gt; 500 µm



Grain size fraction &gt; 1 mm



Grain size fraction &gt; 500 µm

# Multicorer

M78/1-243-2

Latitude	Longitude	Depth [m]	Date	Time
09°59,502'	-59°56,94'	34,9	24.03.2009	18:58:00



Grain size fraction &gt; 2 mm



Close-up of grain size fraction &gt; 500 µm



Grain size fraction &gt; 1 mm



Solitary coral, front



Grain size fraction &gt; 500 µm



Solitary coral, back

# Multicorer

M78/1-244-1

Latitude	Longitude	Depth [m]	Date	Time
09°56,930'	-59°56,106'	278	24.03.2009	20:54:00



Solitary coral, front



Solitary coral, side



Close-up of solitary coral



Solitary coral, back

# Multicorer

M78/1-246-2

Latitude	Longitude	Depth [m]	Date	Time
09°9,996'	-59°54,000'	65	25.03.2009	12:58:00



Bivalve with borehole



Close-up of bivalve

# Multicorer

## M78/1-247-3

Latitude	Longitude	Depth [m]	Date	Time
09°06,008'	-59°56,997'	60	25.03.2009	15:32:00



Grain size fraction > 2 mm



Close-up of grain size fraction > 500  $\mu$ m



Grain size fraction > 1 mm



Bivalve



Grain size fraction > 500  $\mu$ m



Bivalve

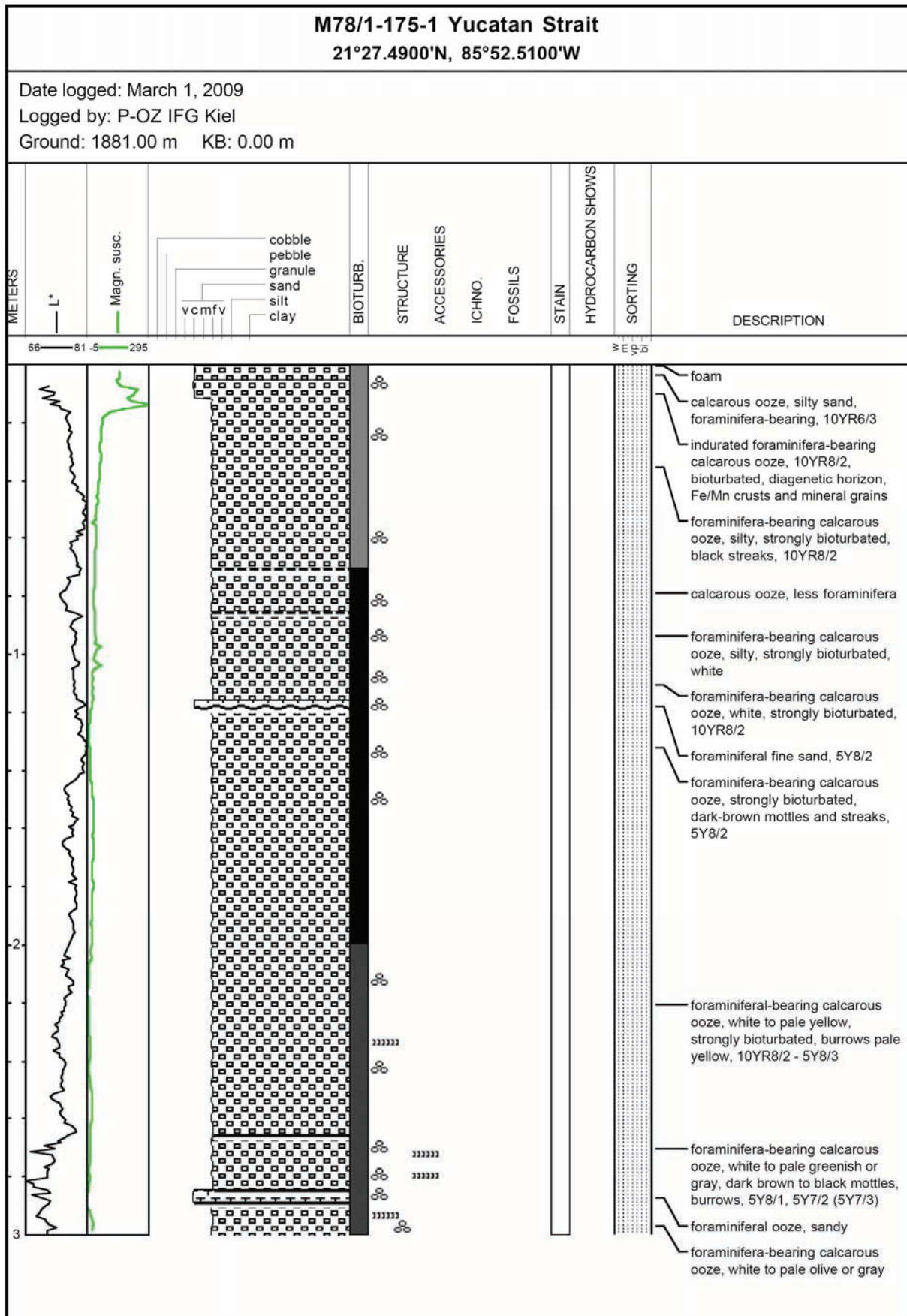


### 5.6.1. Appendix items: Sediment coring

**Appendix Table 5.6.1:** List of gravity (GC) and piston (PC) cores retrieved during R/V METEOR cruise M78/1.

Station M78/1-	Device	Latitude	Longitude	Depth (m)	Recovery (cm)	Opened, described	Sampled	Remarks
175-1	GC	21° 27.49' N	85° 52.51' W	1881	529	yes	yes	
177-1	GC	22° 53.86' N	86° 32.94' W	676	---	---	---	liner empty
180-1	GC	23° 49.63' N	87° 4.03' W	695	515	yes	yes	
181-3	PC	29° 0.00' N	88° 20.00' W	804	1233	yes	yes	
186-2	GC	26° 36.30' N	84° 51.81' W	778	555	yes	yes	
212-2	PC	24° 10.92' N	81° 15.84' W	729	---	---	---	liner broken, core discarded
212-3	PC	24° 11.06' N	81° 15.89' W	722	1365	yes	yes	
218-1	PC	24° 14.21' N	81° 14.82' W	547	626	yes	yes	tube bent
222-9	GC	12° 1.49' N	64° 28.50' W	1018	479	yes	yes	
228-3	PC	11° 37.79' N	62° 39.51' W	447	1123	yes	yes	
229-2	GC	11° 47.54' N	62° 38.60' W	881	43	yes	yes	
234-2	PC	11° 24.32' N	61° 2.96' W	201	1174	yes	yes	
235-1	PC	11° 36.53' N	60° 57.86' W	852	1230	yes	yes	
240-2	GC	10° 8.88' N	59° 2.32' W	1672	505	no	no	
242-2	PC	9° 57.35' N	59° 48.11' W	596	1178	yes	no	
243-1	PC	9° 59.49' N	59° 56.93' W	341	1113	yes	no	
244-2	GC	9° 56.93' N	59° 56.11' W	278	484	no	no	
255-1	GC	10° 31.95' N	61° 52.84' W	19	461	no	no	

### 5.6.2. Appendix items: Core descriptions



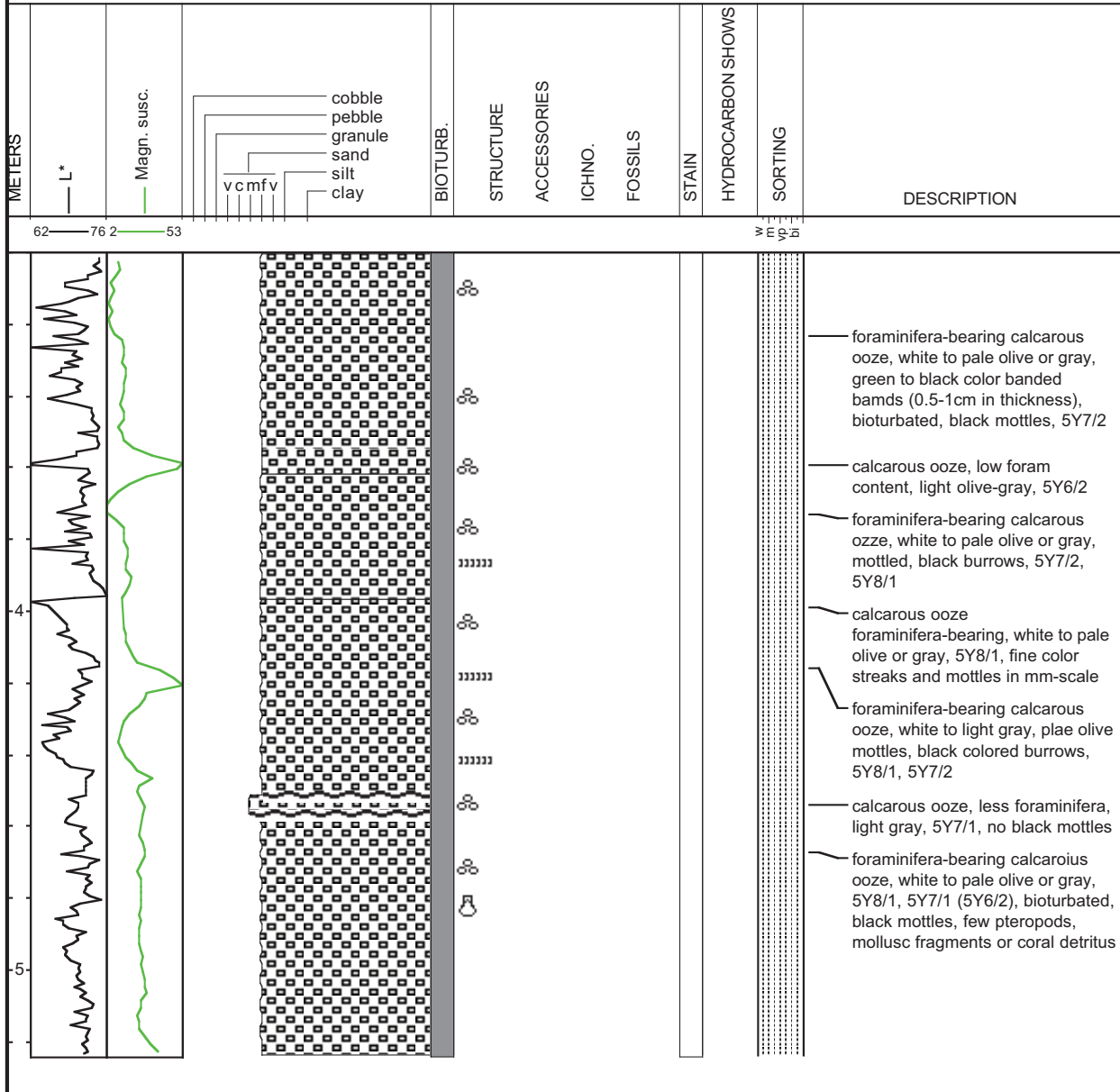
**M78/1-175-1 Yucatan Strait**

21°27.4900'N, 85°52.5100'W

Date logged: March 1, 2009

Logged by: P-OZ IFG Kiel

Ground: 1881.00 m KB: 0.00 m



**LEGEND**

LITHOLOGY

Calcareous Ooze (CB4)

CONTACTS

Undulating

ICHOFOSSILS

- Taenidium

FOSSILS

- Foraminifera (pelagic)

- Pelecypods



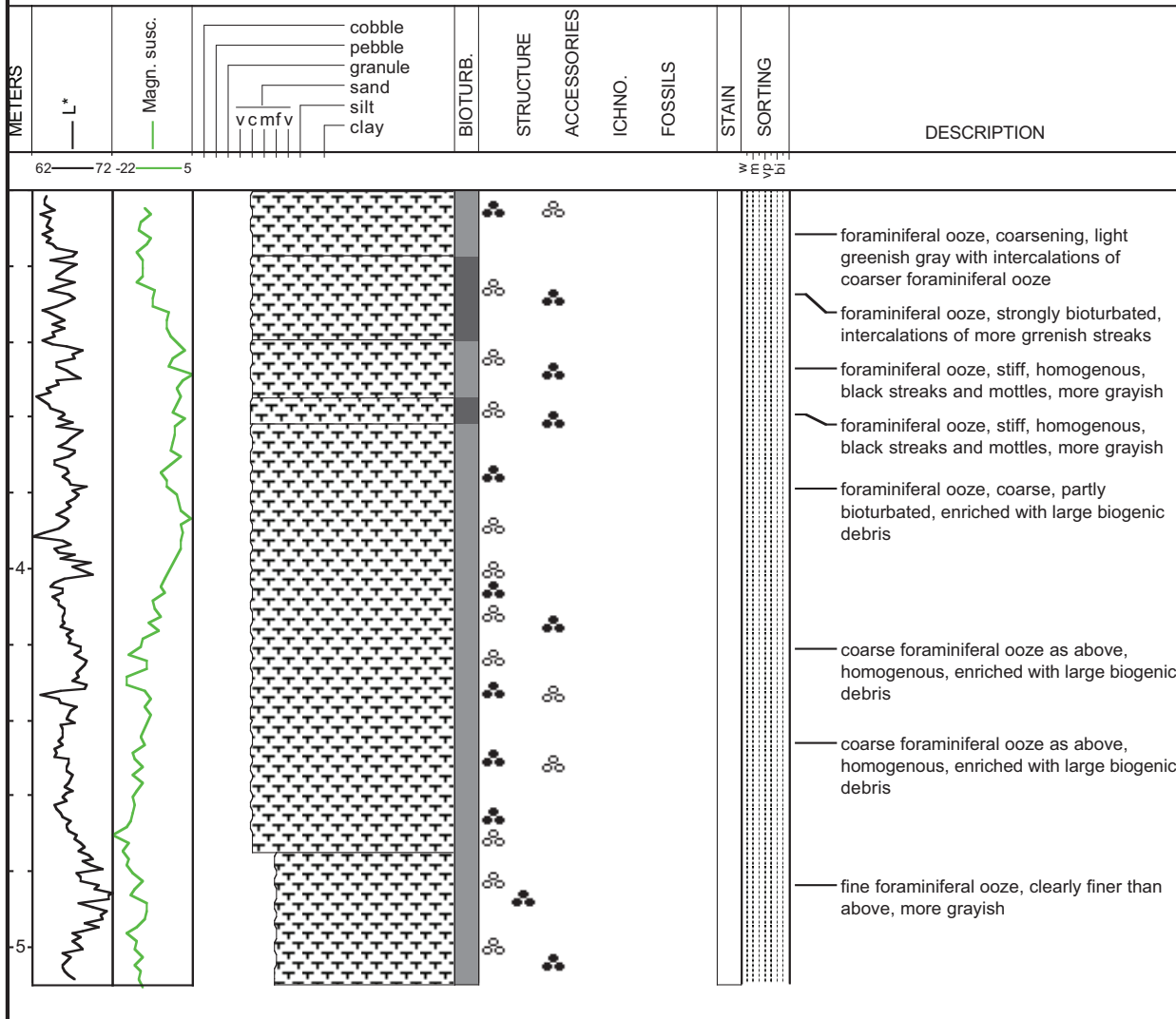
**M78/1-180-1 GC N-Campeche Bank**

**23°49.6300'N, 87°4.0300'W**

Date logged: March 3, 2009

Logged by: P-Oz IFM-GEOMAR

Ground: 695.00 m KB: 0.00 m





**LEGEND**

LITHOLOGY

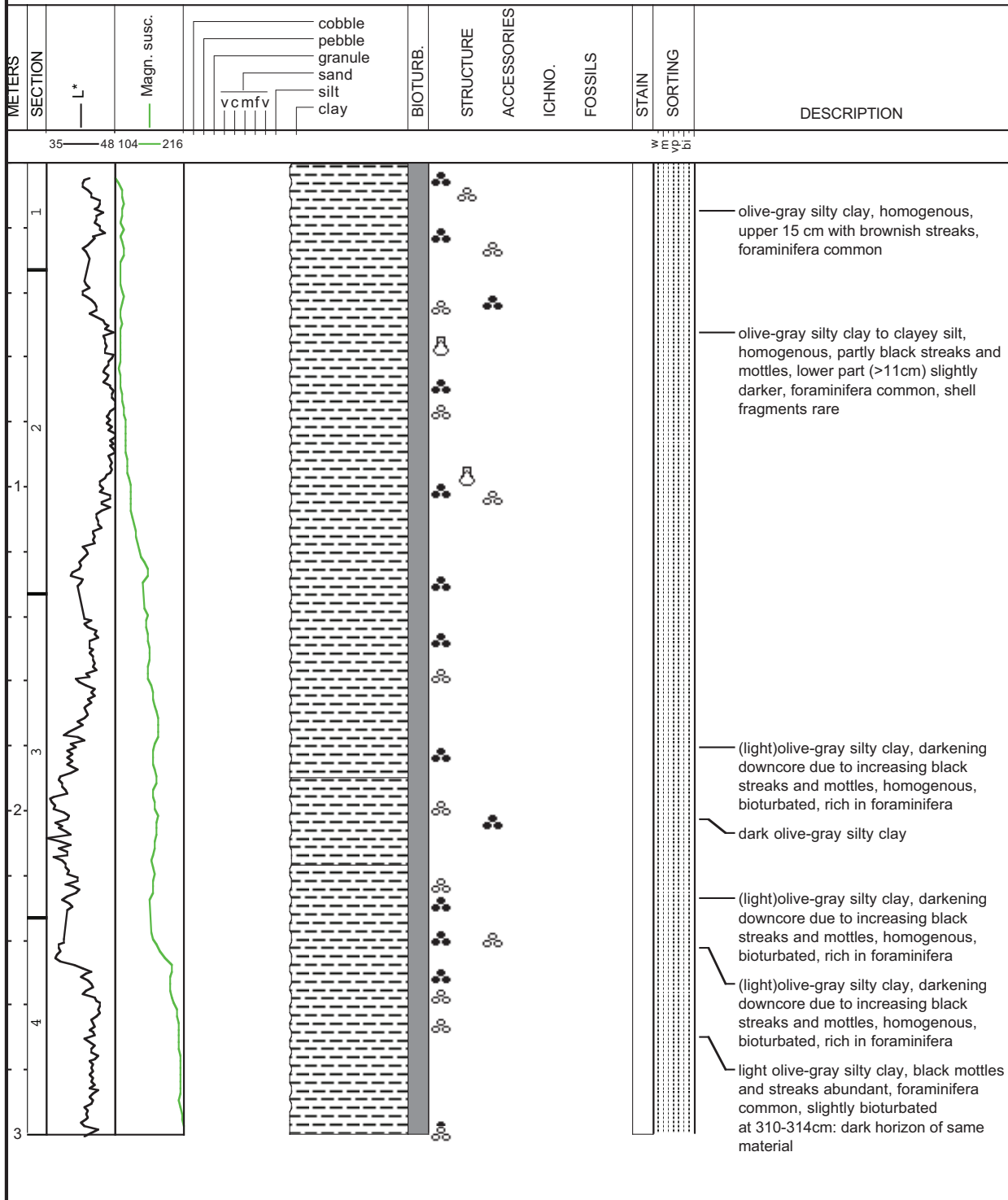
 Foraminiferal Ooze (CB2)

FOSSILS

 - Foraminifera (undifferentiated)       - Foraminifera (pelagic)

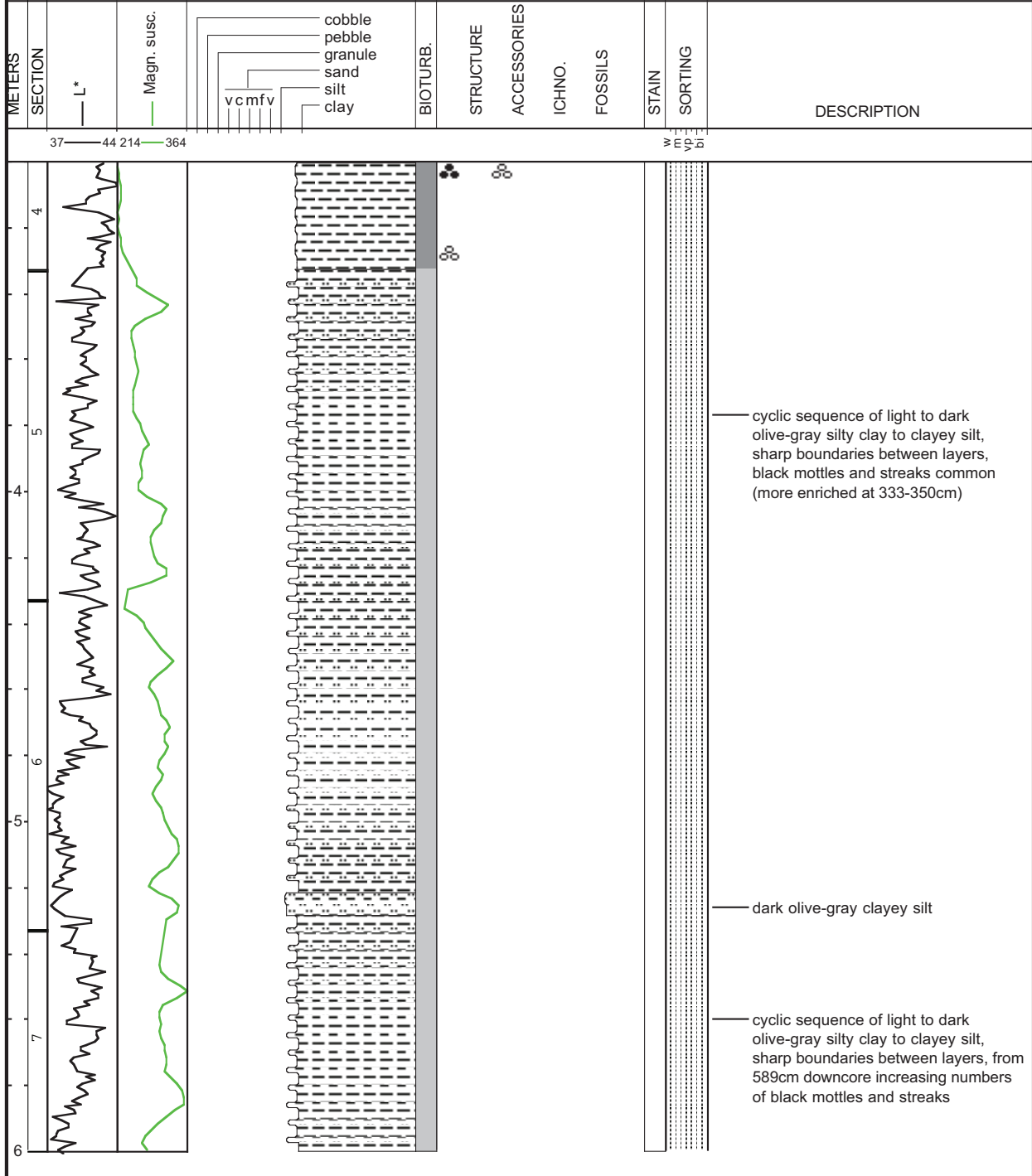
**M78/1-181-3 PC Mississippi Delta**  
**29°0.0000'N, 88°20.0000'W**

Date logged: March 6, 2009  
 Logged by: P-Oz IFM-GEOMAR  
 Ground: 804.00 m KB: 0.00 m



**M78/1-181-3 PC Mississippi Delta**  
**29°0.0000'N, 88°20.0000'W**

Date logged: March 6, 2009  
 Logged by: P-Oz IFM-GEOMAR  
 Ground: 804.00 m KB: 0.00 m







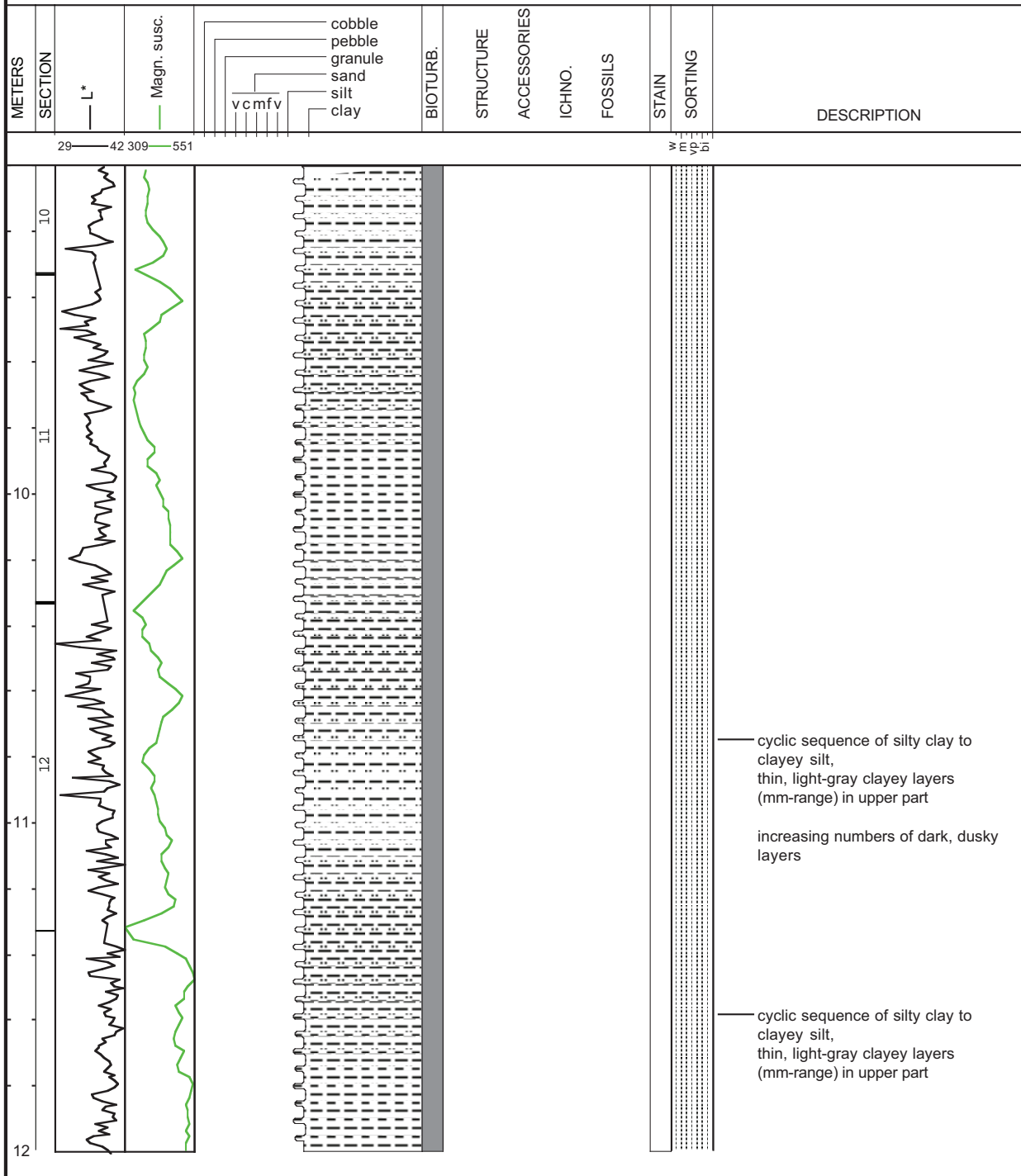
**M78/1-181-3 PC Mississippi Delta**

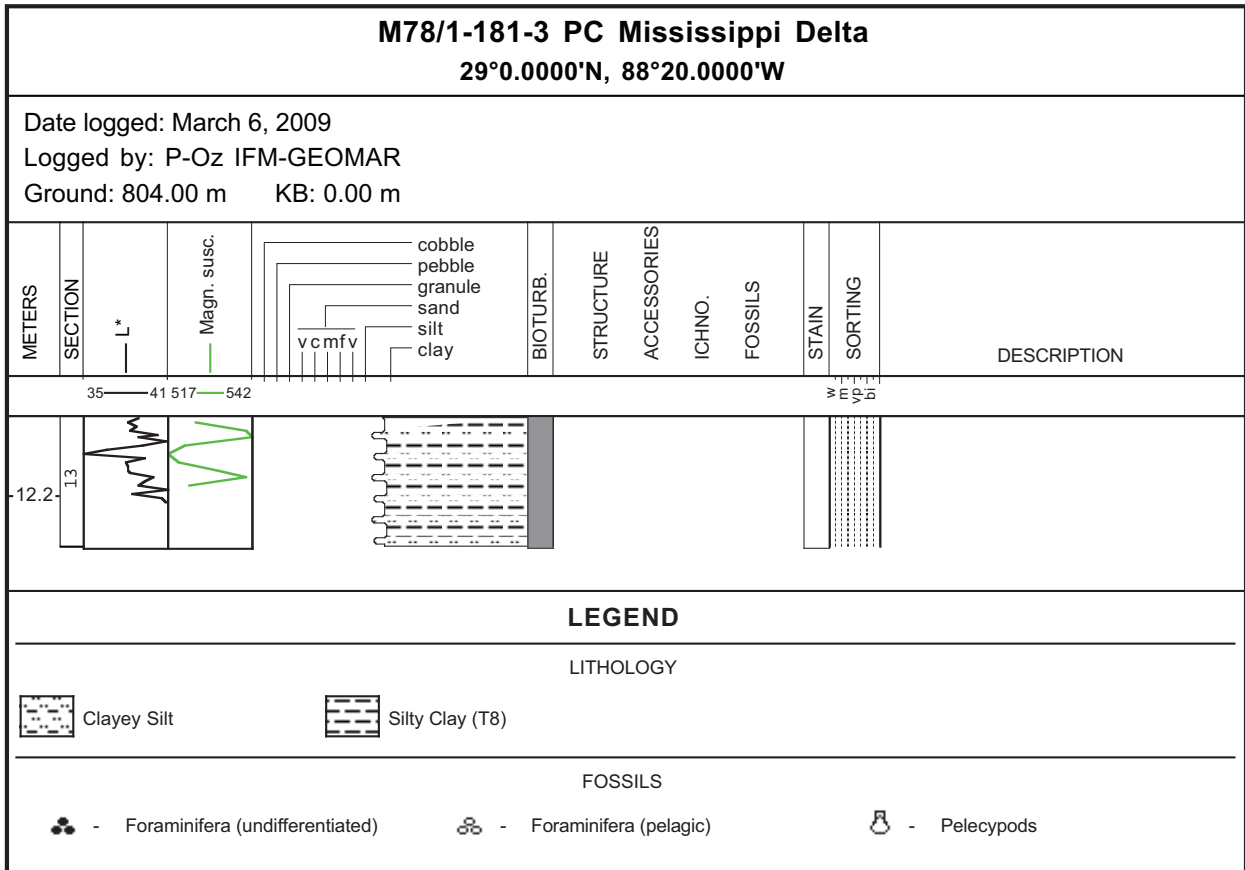
**29°0.0000'N, 88°20.0000'W**

Date logged: March 6, 2009

Logged by: P-Oz IFM-GEOMAR

Ground: 804.00 m KB: 0.00 m





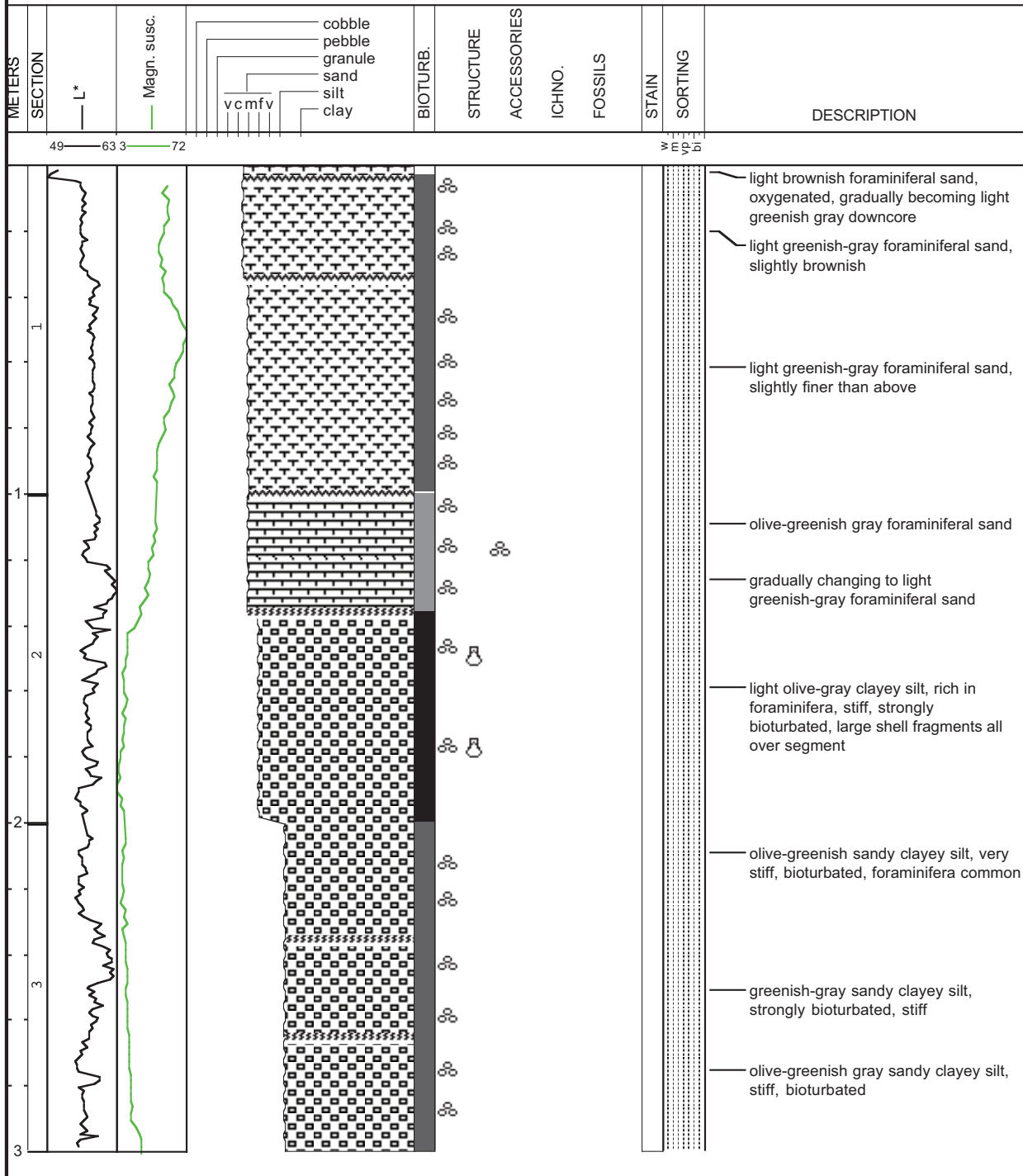
M78-1-186-2 GC W-Florida Shelf

26°36.3000'N, 84°51.8100'W

Date logged: March 7, 2009

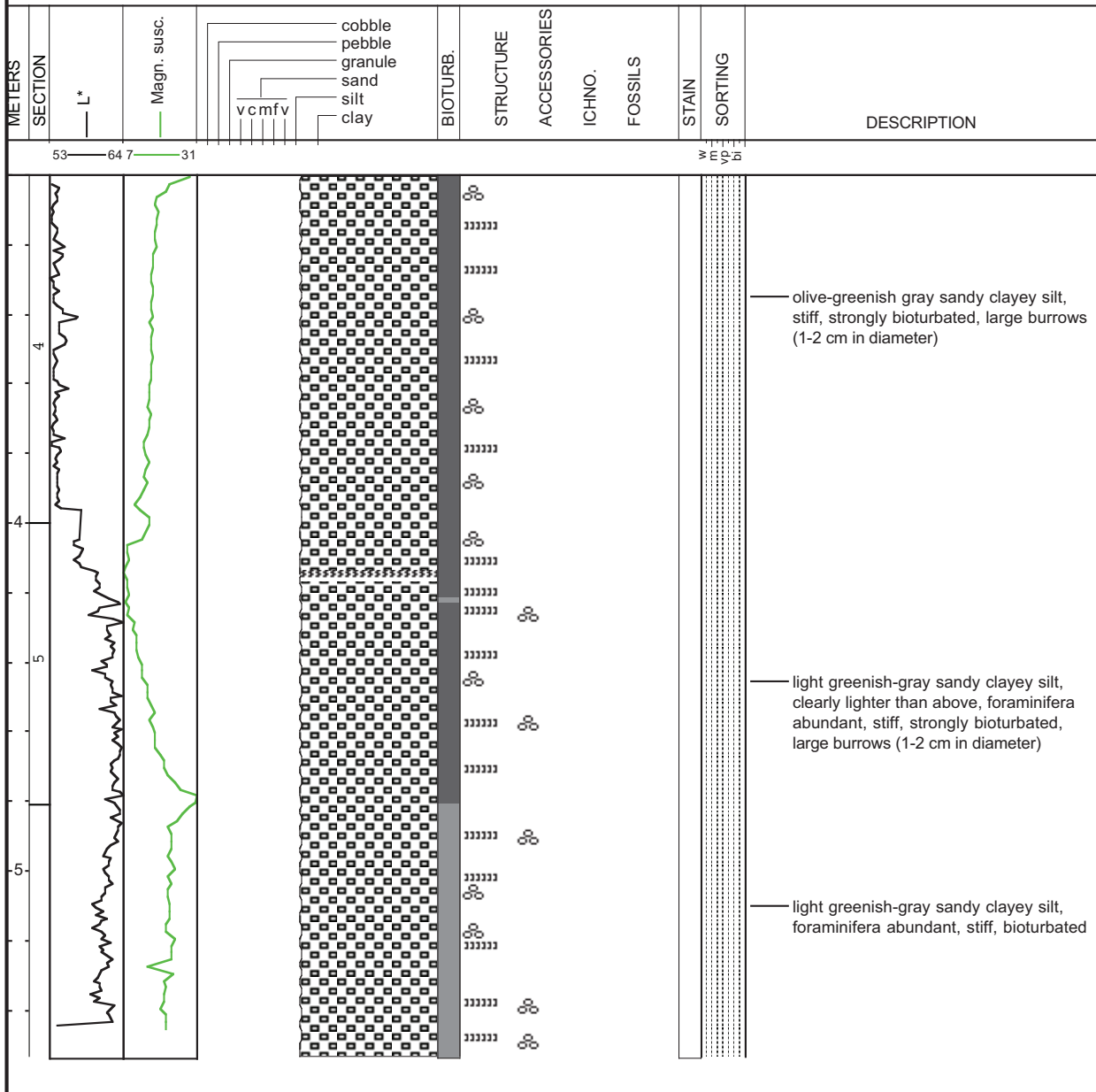
Logged by: P-Oz IFM-GEOMAR

Ground: 778.00 m KB: 0.00 m




**M78-1-186-2 GC W-Florida Shelf**  
**26°36.3000'N, 84°51.8100'W**

Date logged: March 7, 2009  
 Logged by: P-Oz IFM-GEOMAR  
 Ground: 778.00 m KB: 0.00 m



**LEGEND**

LITHOLOGY

 Calcareous Ooze (CB4)

CONTACTS

 Bioturbated

ICHNOFOSSILS

 - Taenidium

FOSSILS

 - Foraminifera (pelagic)

 - Pelecypods

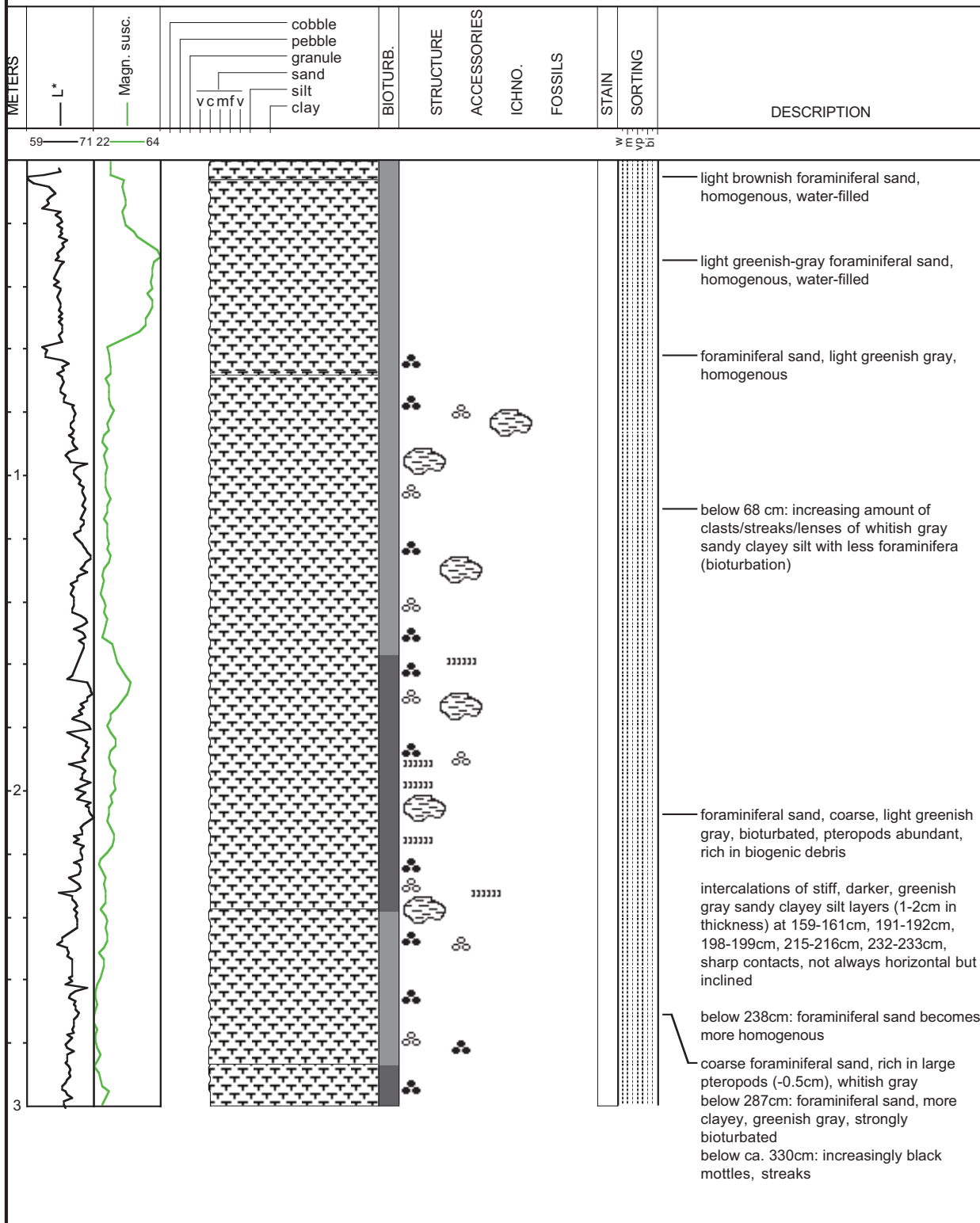
**M78/1-212-3 PC Florida Strait**

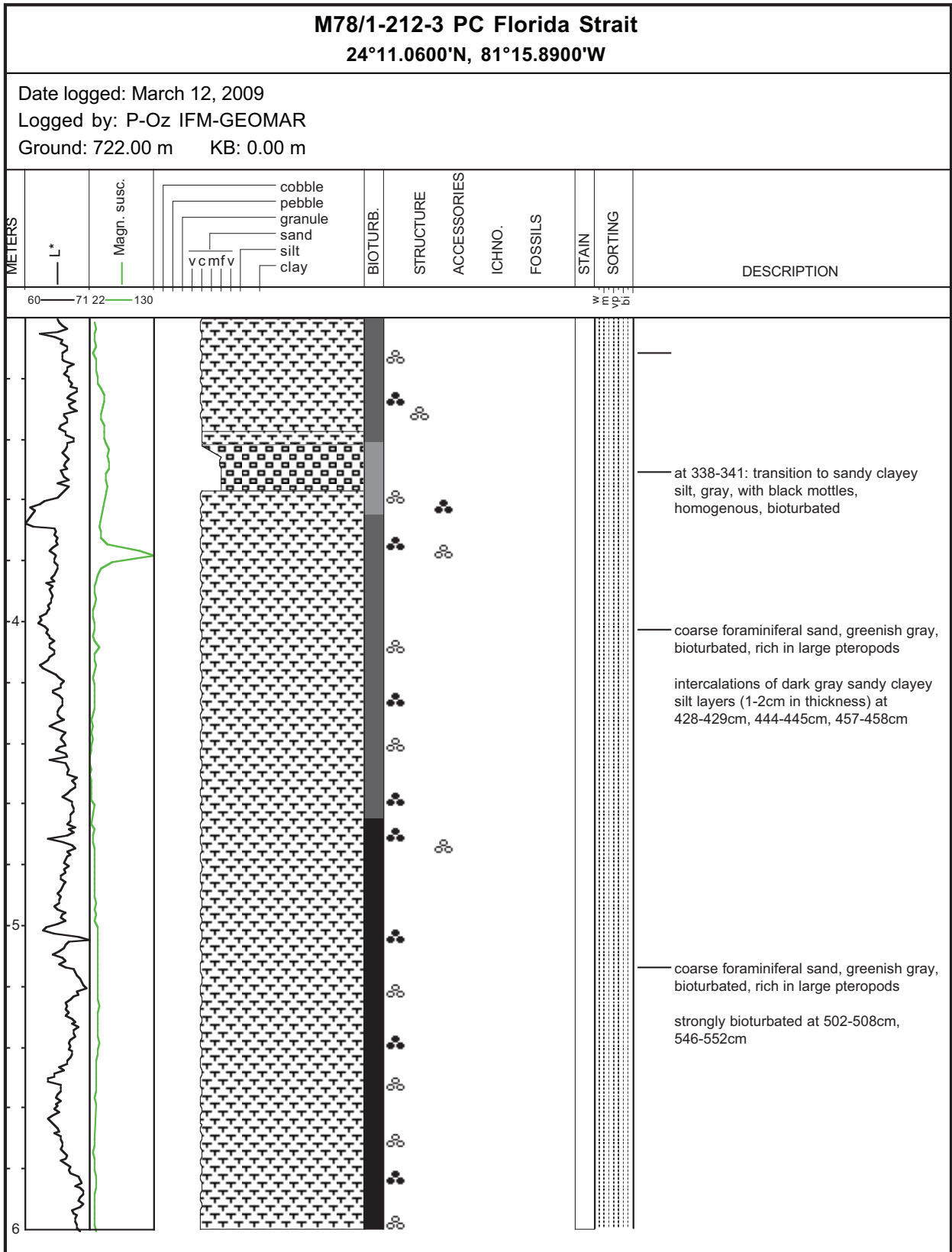
**24°11.0600'N, 81°15.8900'W**

Date logged: March 12, 2009

Logged by: P-Oz IFM-GEOMAR

Ground: 722.00 m KB: 0.00 m





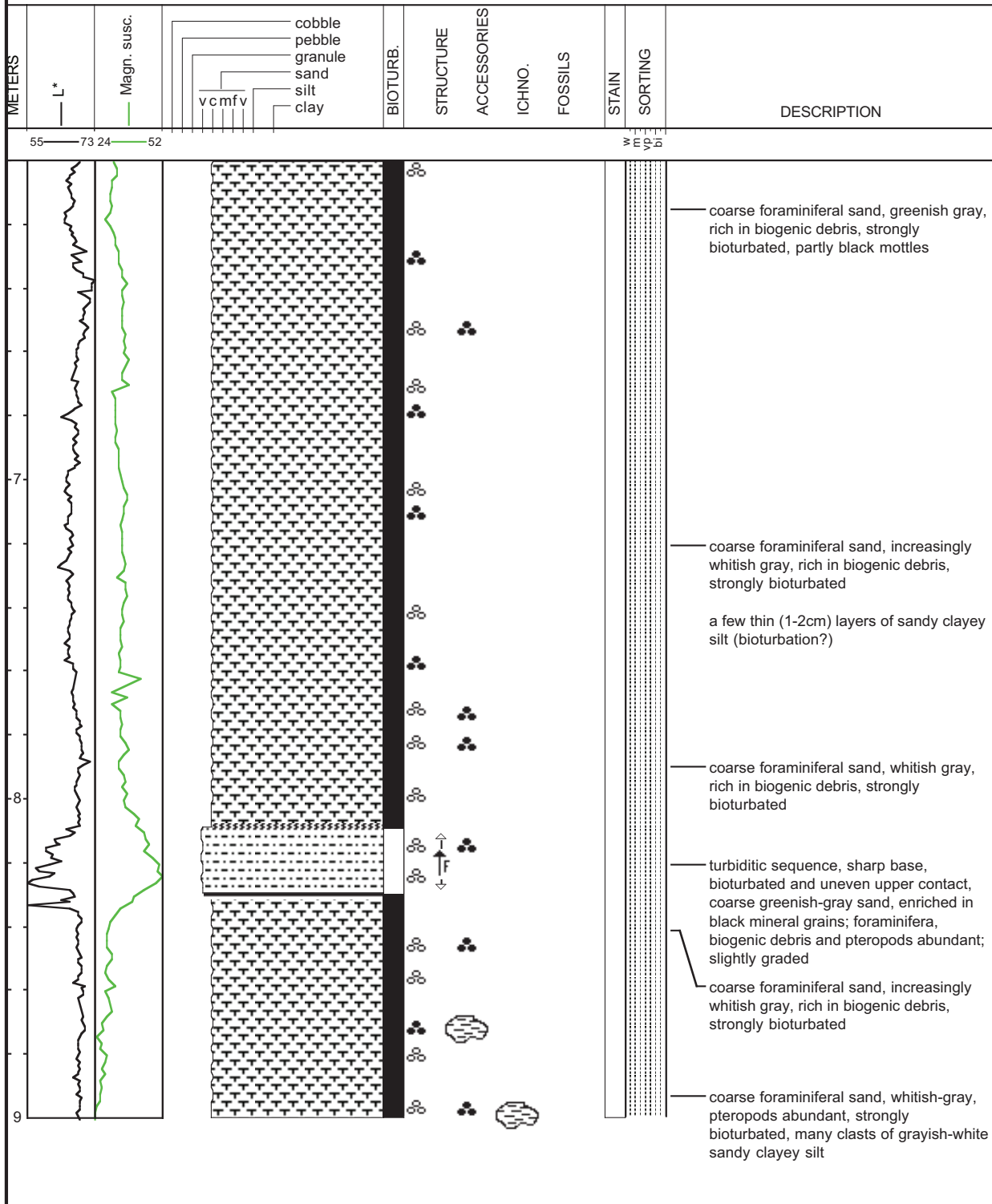
**M78/1-212-3 PC Florida Strait**

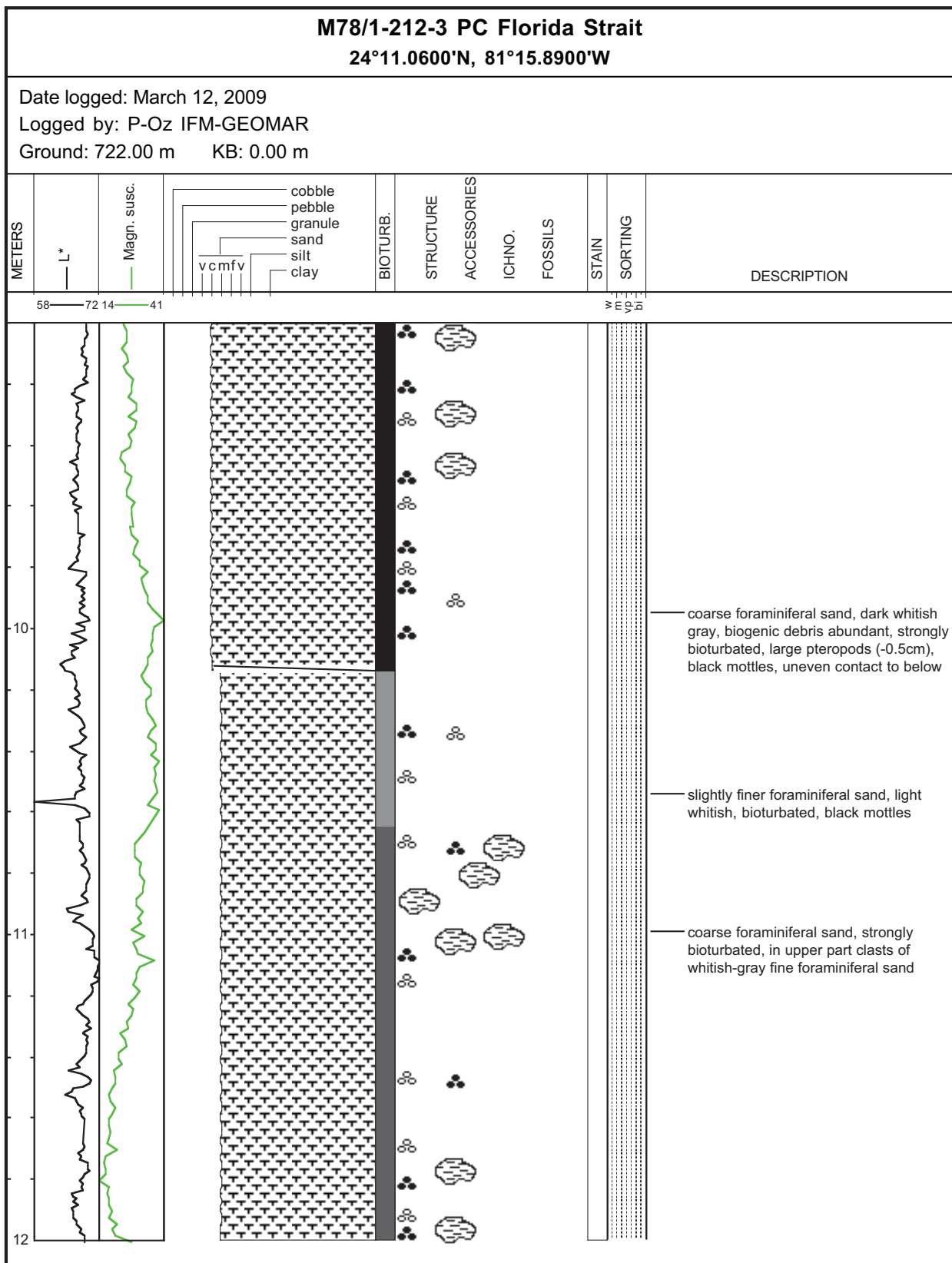
24°11.0600'N, 81°15.8900'W

Date logged: March 12, 2009

Logged by: P-Oz IFM-GEOMAR

Ground: 722.00 m KB: 0.00 m









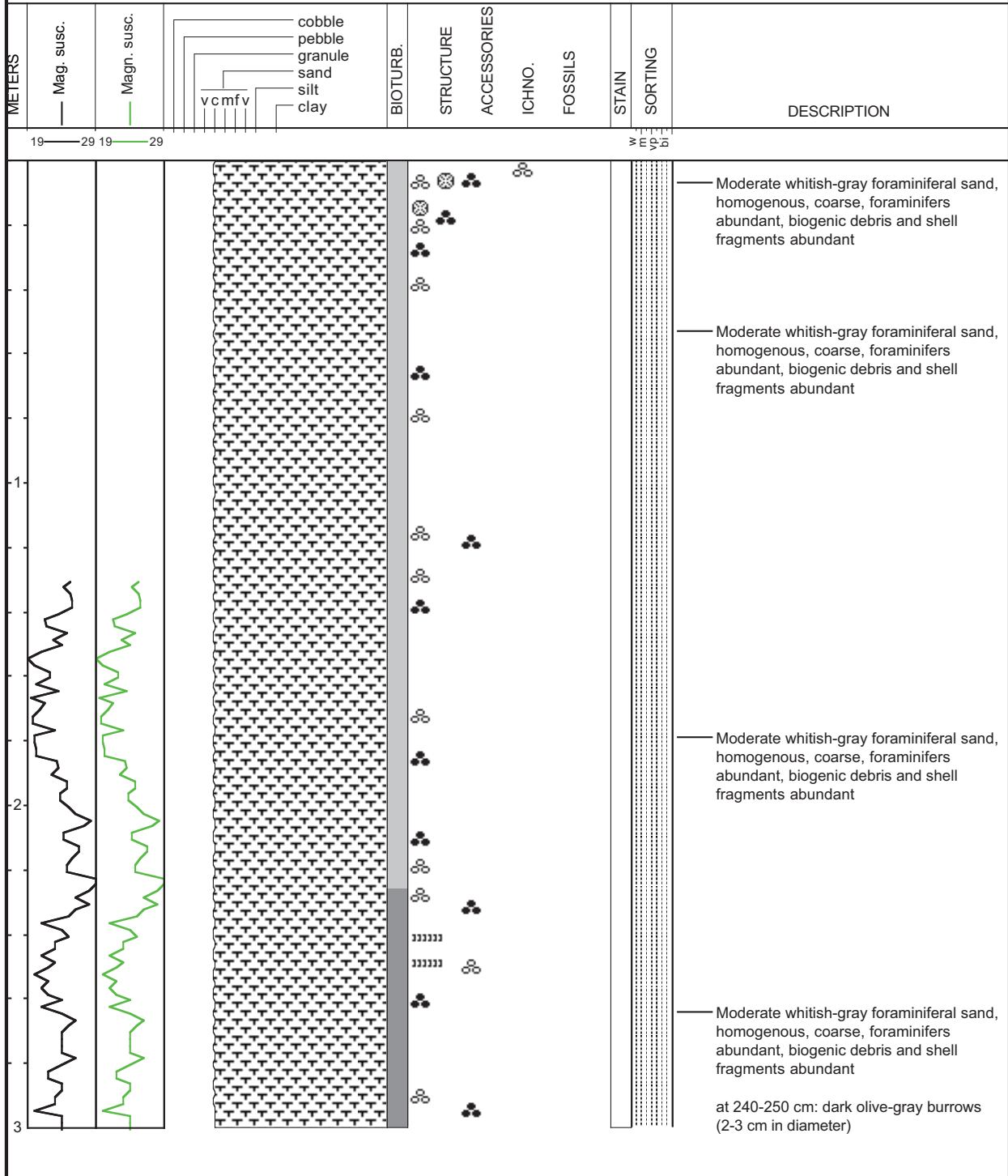
**M78/1-218-1 PC Florida Strait**

**24°14.2100'N, 81°14.8200'W**

Date logged: March 14, 2009

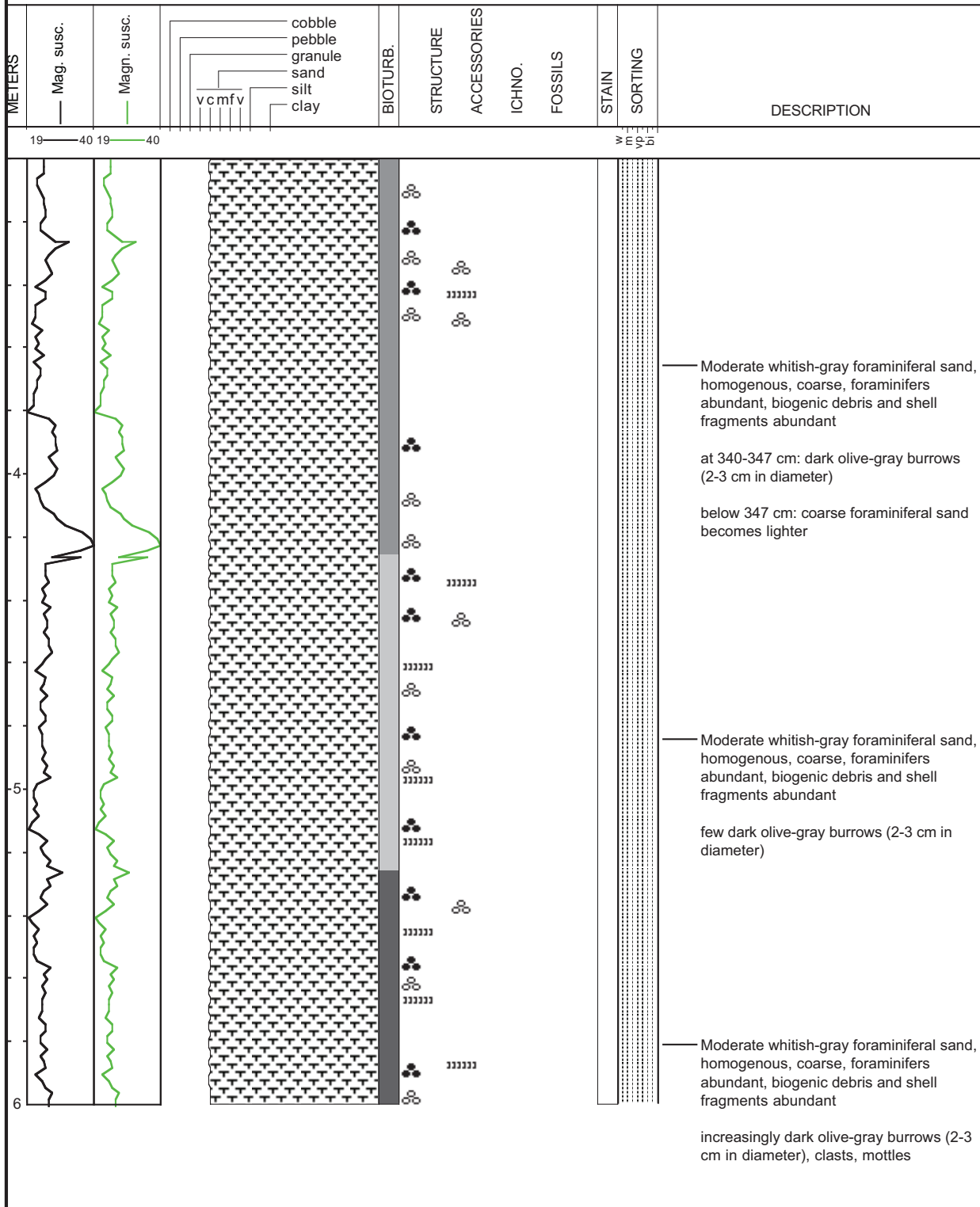
Logged by: P-Oz IFM-GEOMAR

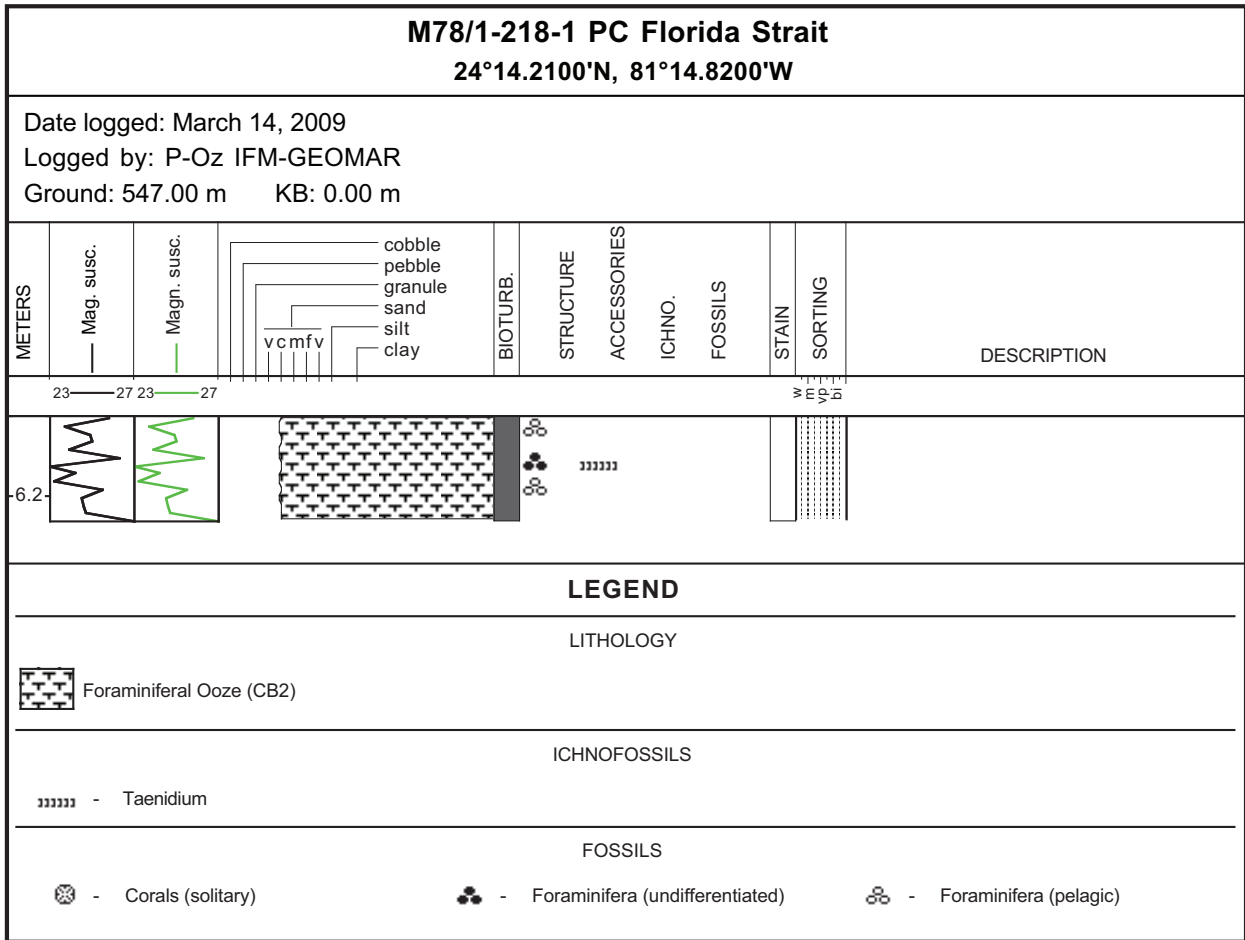
Ground: 547.00 m KB: 0.00 m



**M78/1-218-1 PC Florida Strait**  
**24°14.2100'N, 81°14.8200'W**

Date logged: March 14, 2009  
 Logged by: P-Oz IFM-GEOMAR  
 Ground: 547.00 m KB: 0.00 m





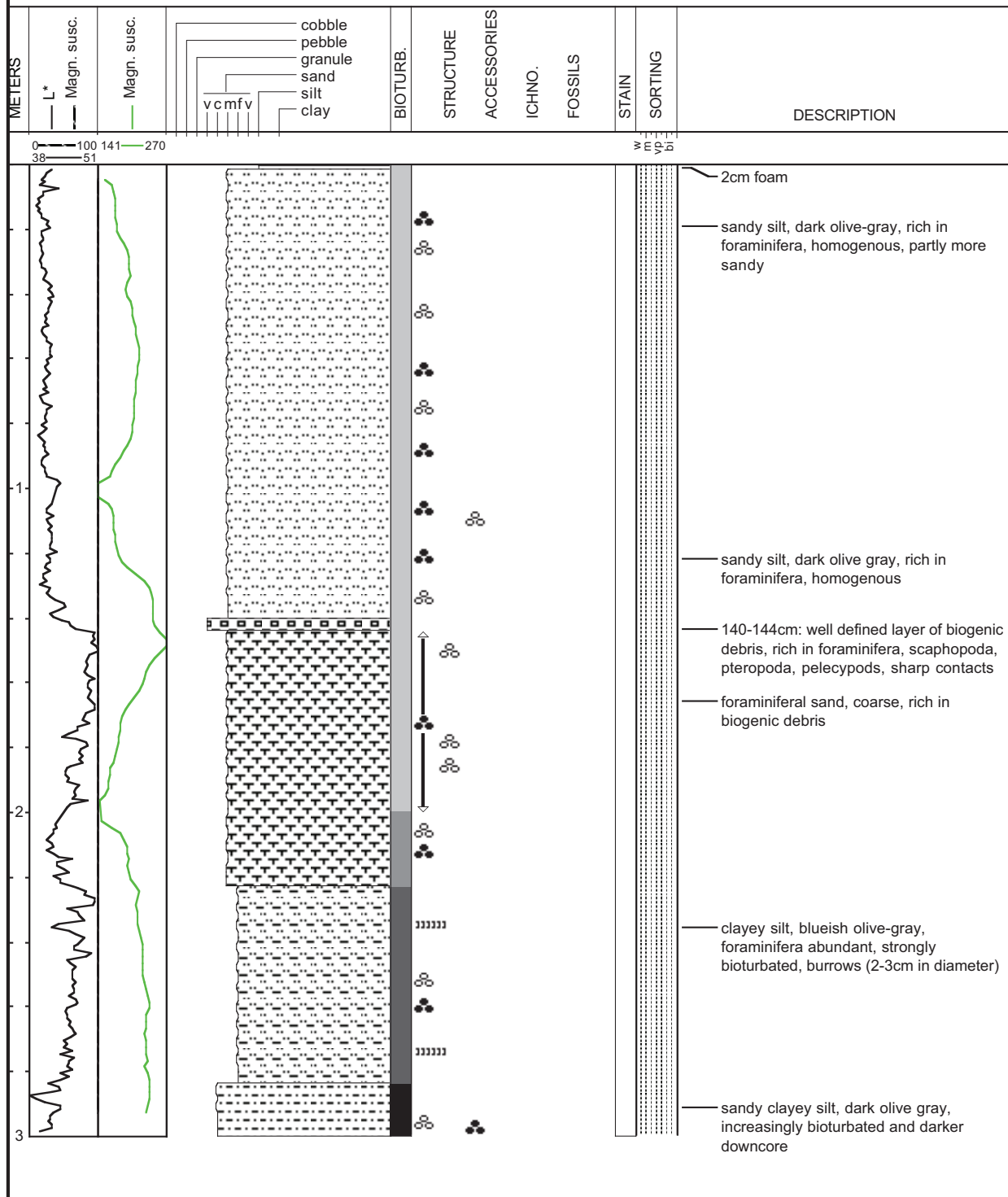
### M78/1-222-9 GC Blanquilla

12°1.4900'N, 64°28.5000'W

Date logged: March 20, 2009

Logged by: POZ-IFM GEOMAR

Ground: 1018.00 m KB: 0.00 m



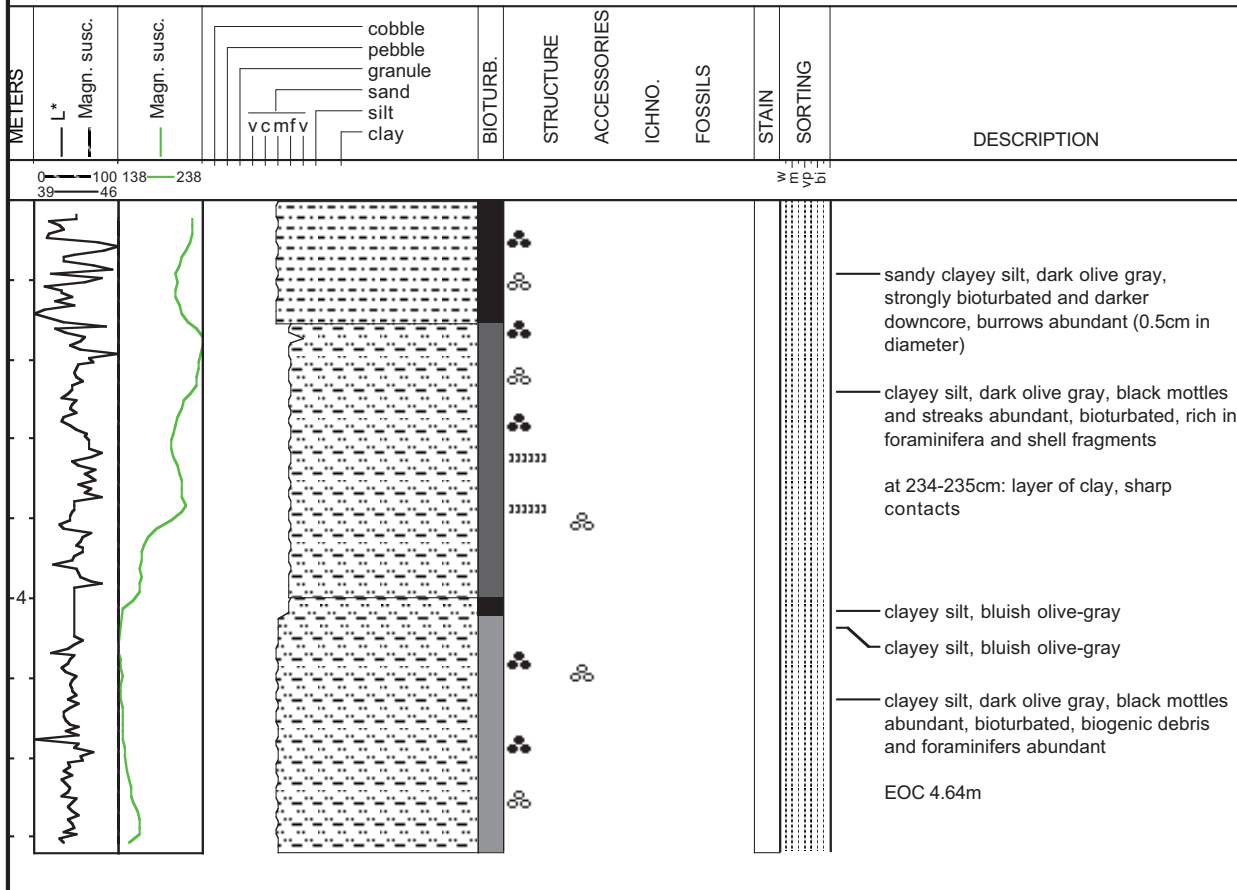
**M78/1-222-9 GC Blanquilla**

**12°1.4900'N, 64°28.5000'W**

Date logged: March 20, 2009

Logged by: POZ-IFM GEOMAR

Ground: 1018.00 m KB: 0.00 m



**LEGEND**

LITHOLOGY

Clayey Silt

Sand-Silt-Clay (T4)

ICHTNOFOSSILS

- Taenidium

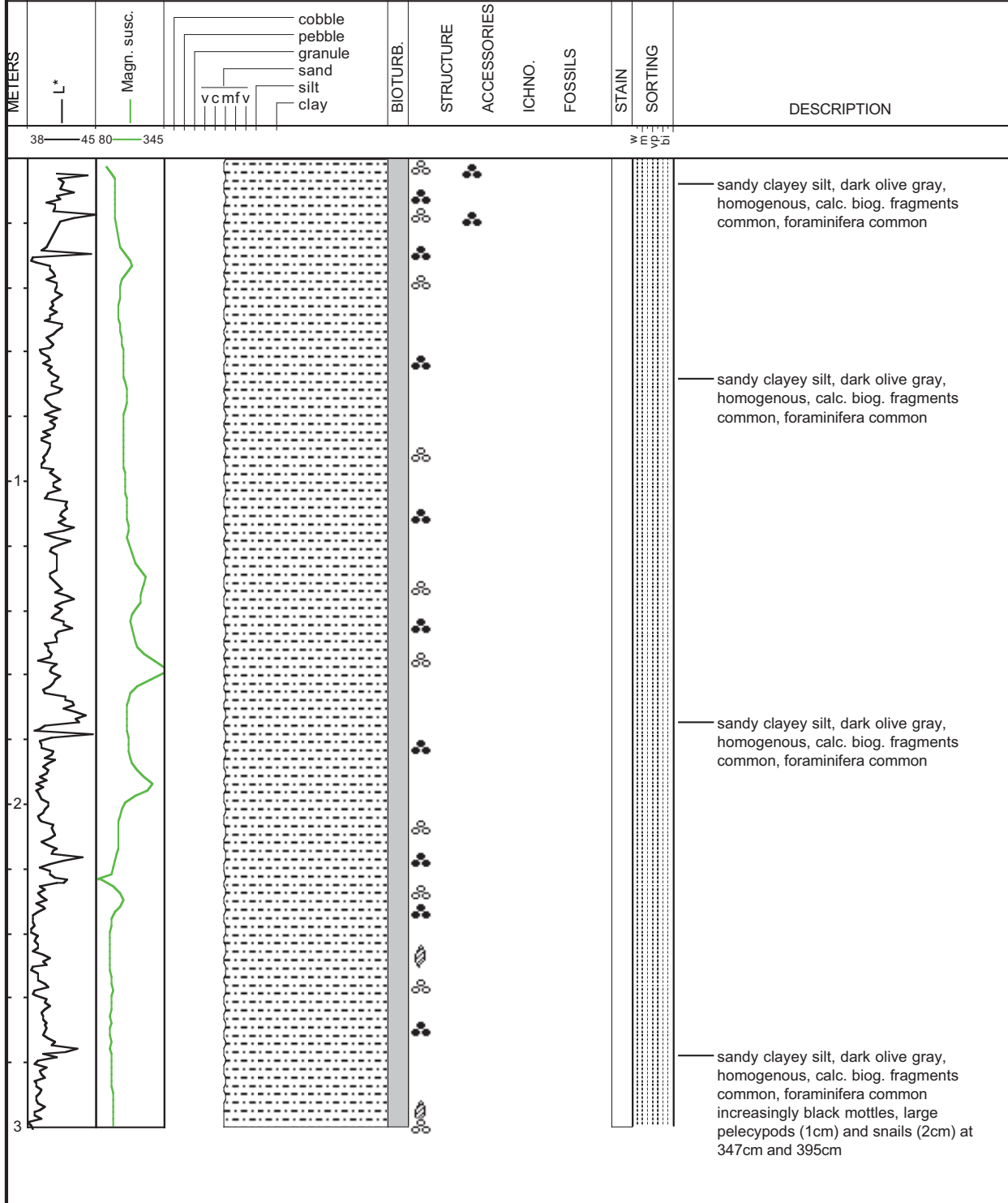
FOSSILS

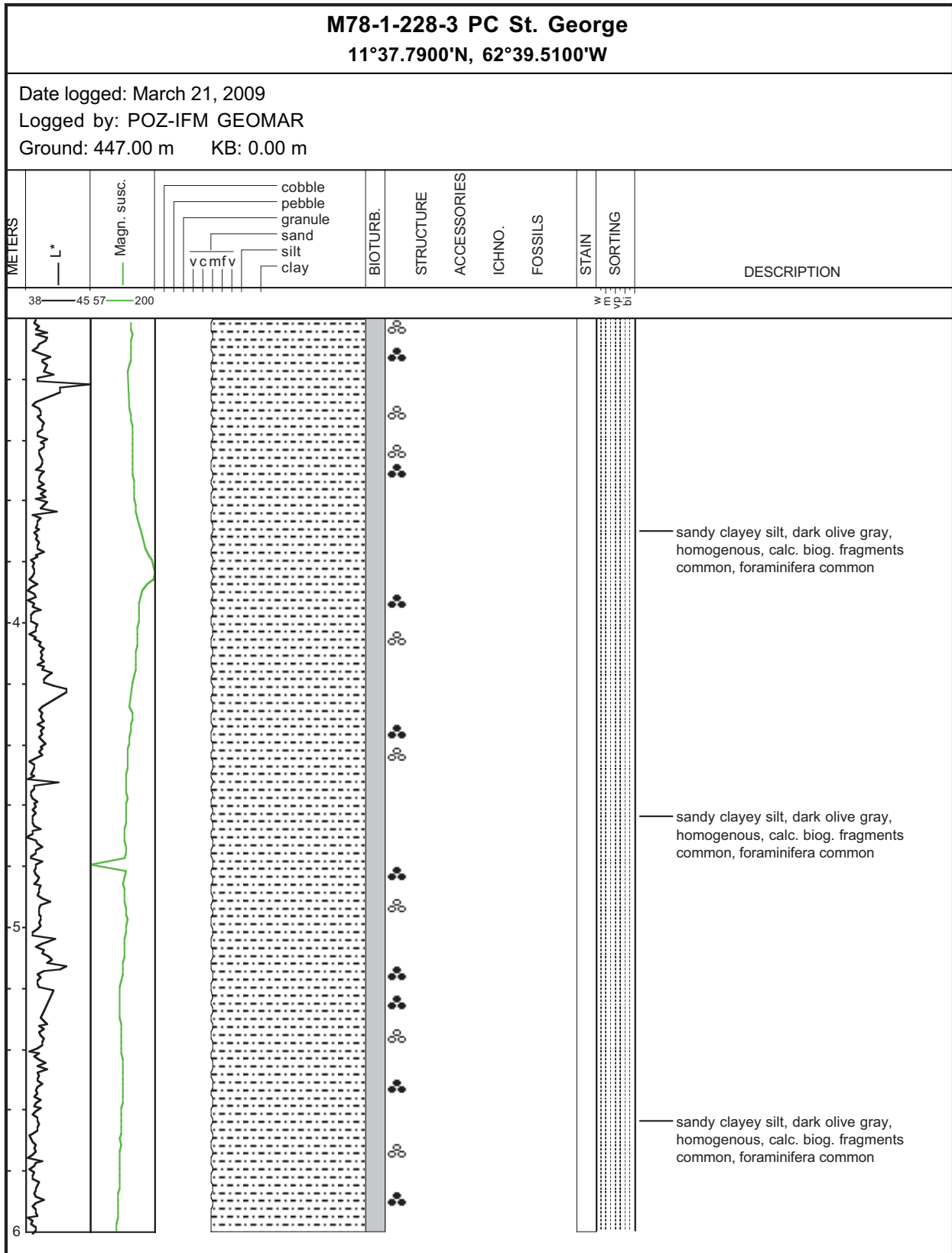
- Foraminifera (undifferentiated)

- Foraminifera (pelagic)

**M78-1-228-3 PC St. George**  
**11°37.7900'N, 62°39.5100'W**

Date logged: March 21, 2009  
 Logged by: POZ-IFM GEOMAR  
 Ground: 447.00 m KB: 0.00 m

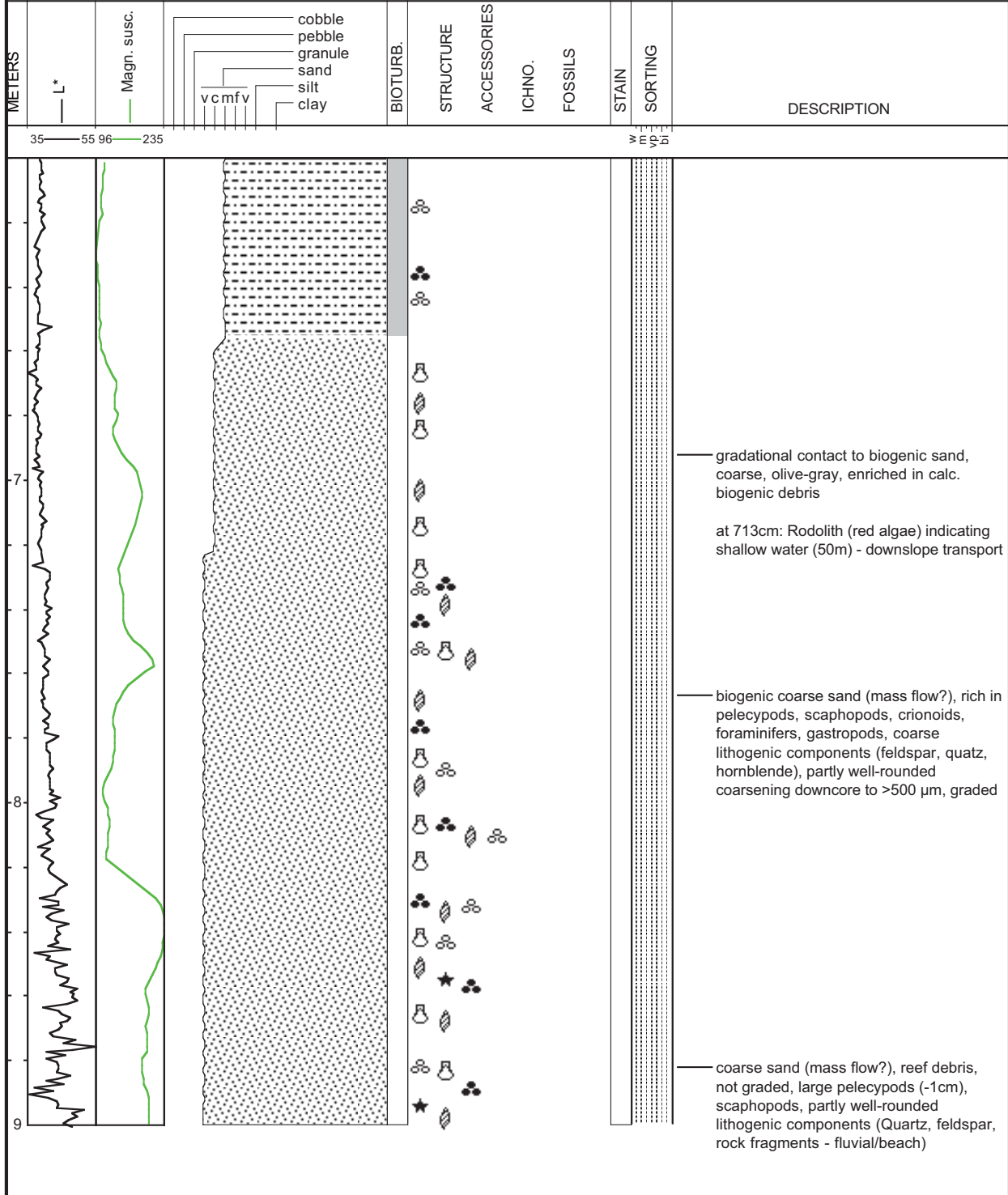






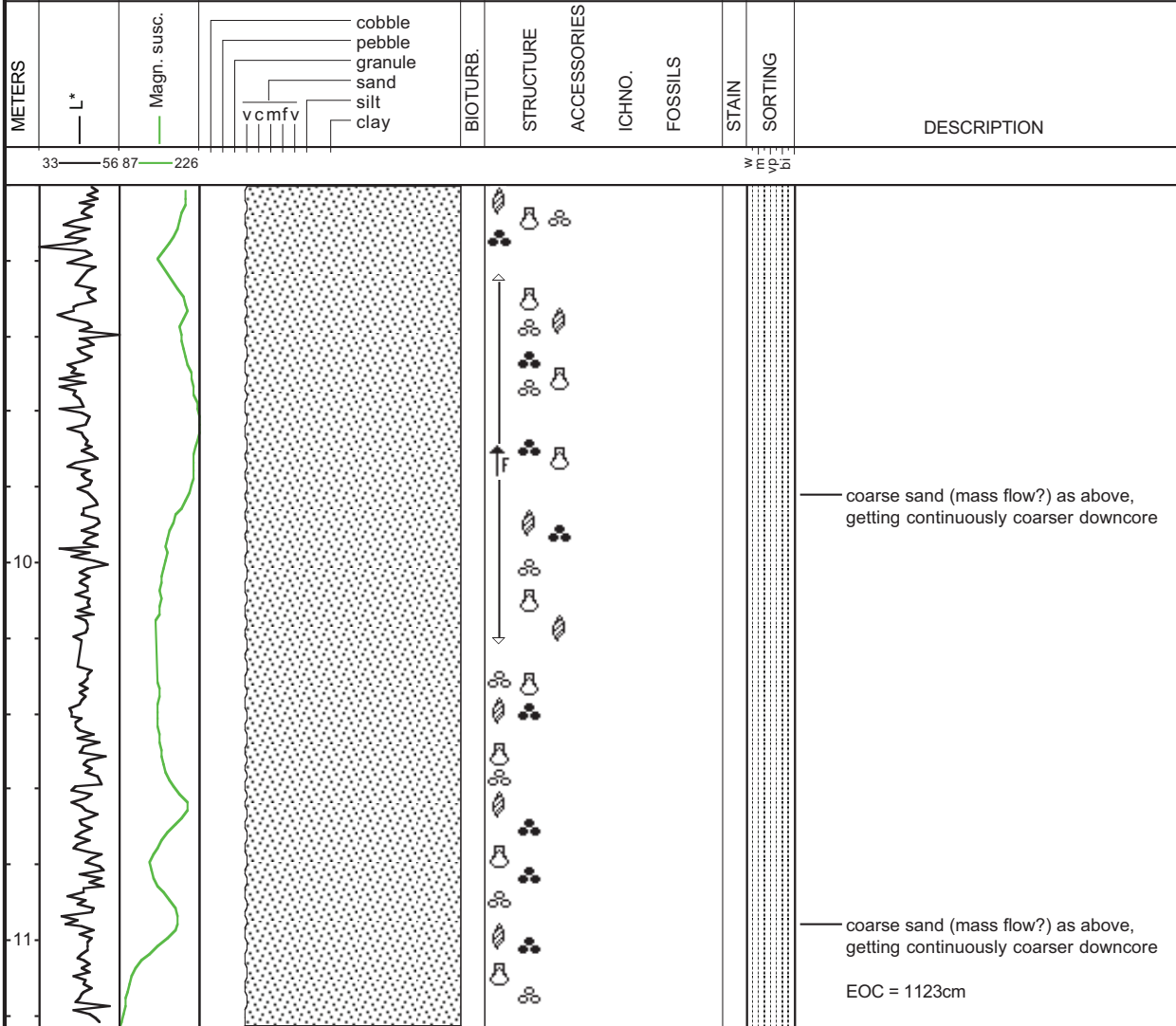
**M78-1-228-3 PC St. George**  
**11°37.7900'N, 62°39.5100'W**

Date logged: March 21, 2009  
 Logged by: POZ-IFM GEOMAR  
 Ground: 447.00 m KB: 0.00 m




**M78-1-228-3 PC St. George**  
**11°37.7900'N, 62°39.5100'W**

Date logged: March 21, 2009  
 Logged by: POZ-IFM GEOMAR  
 Ground: 447.00 m KB: 0.00 m



**LEGEND**



LITHOLOGY



 Sand or Sandstone (T6)


PHYSICAL STRUCTURES

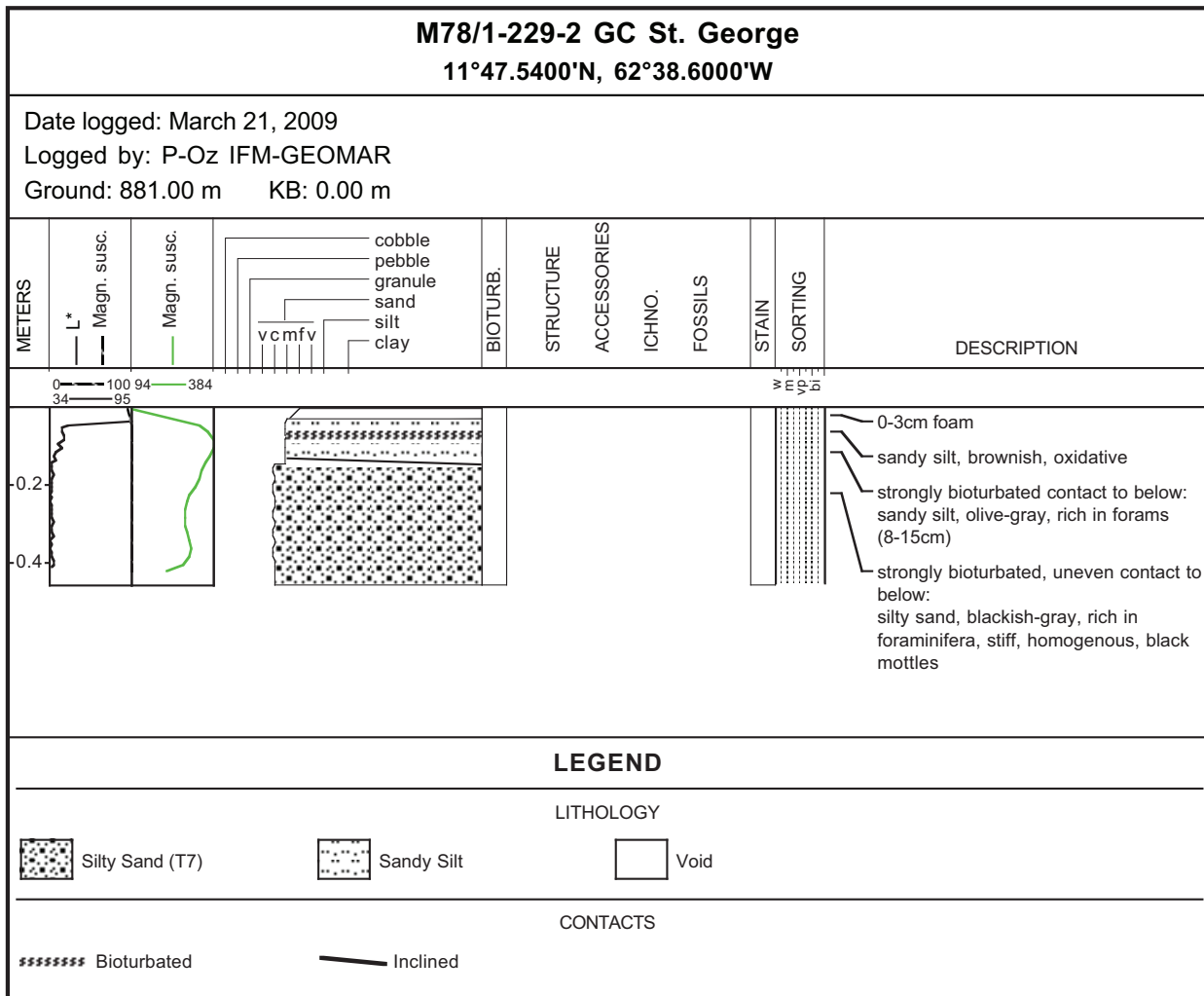
 - Fining upwards

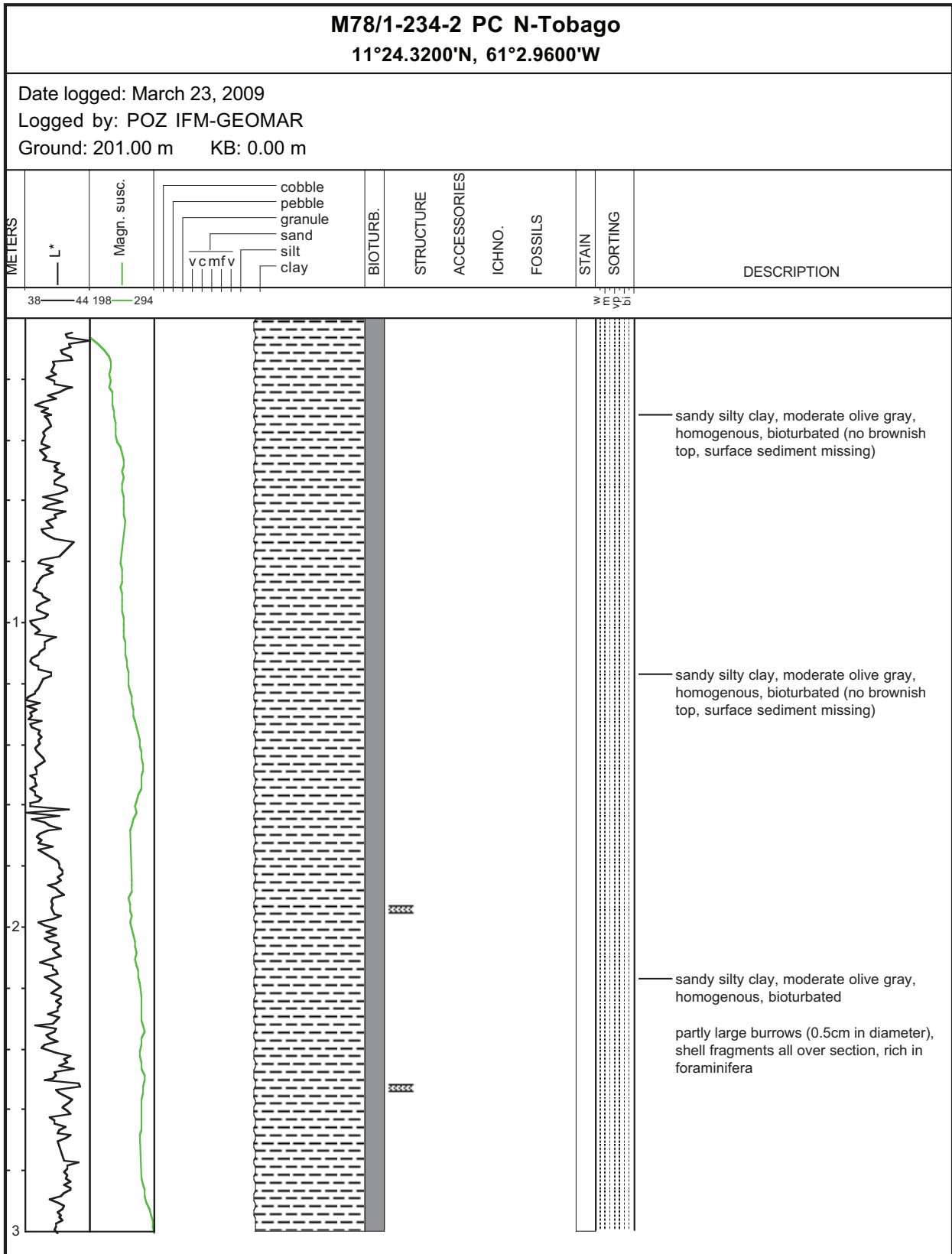
FOSSILS

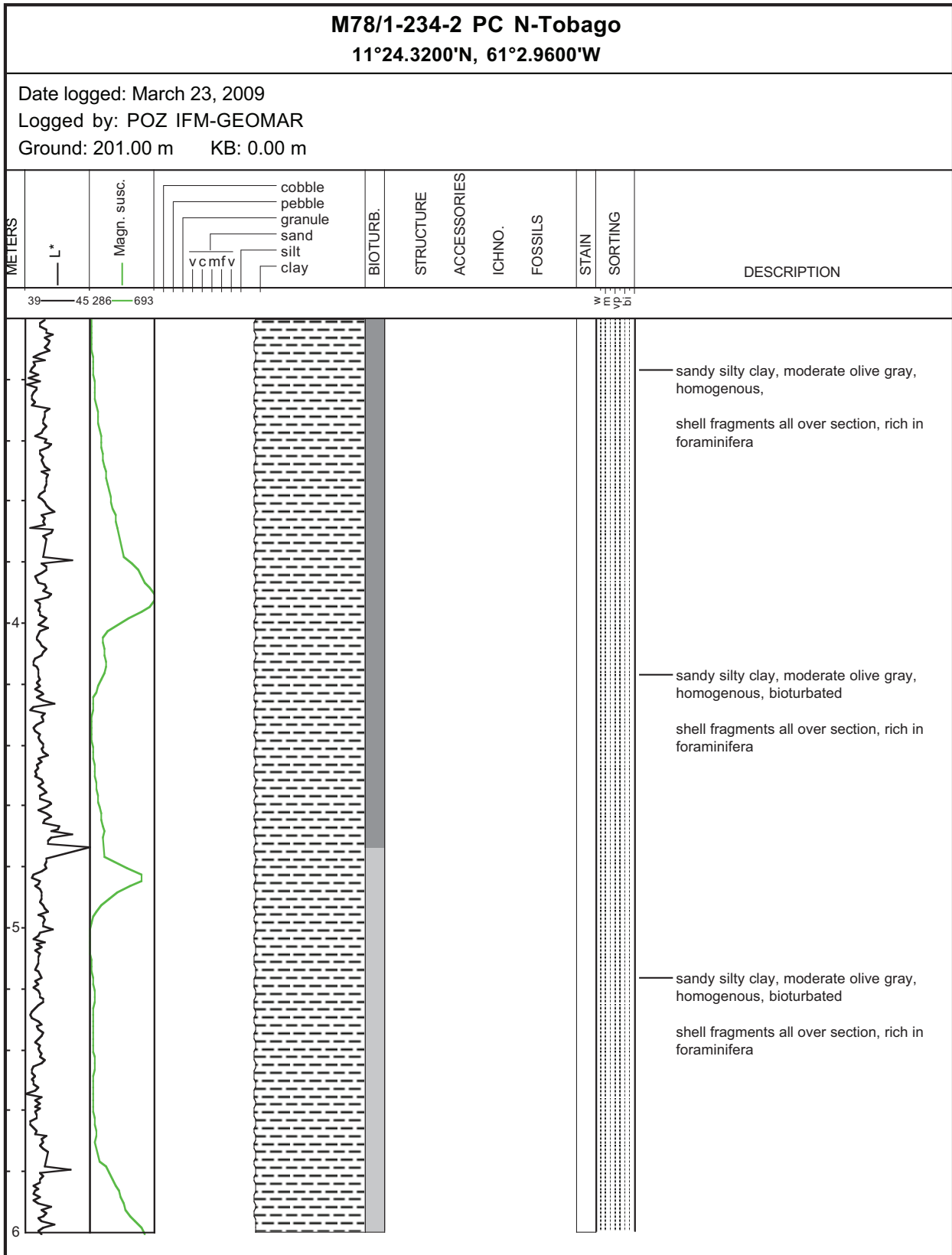
 - Crinoids  
 - Gastropods

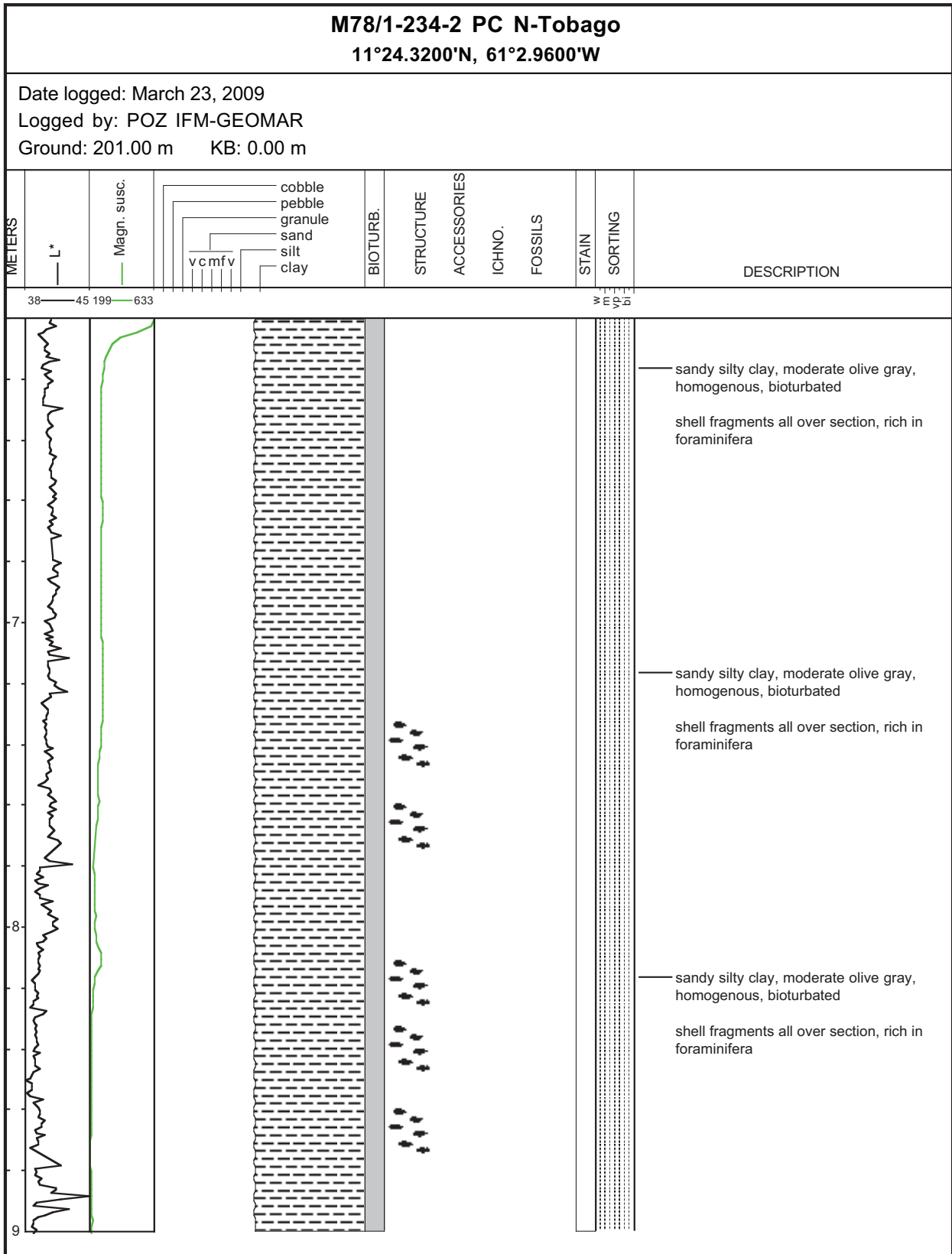
 - Foraminifera (undifferentiated)  
 - Pelecypods

 - Foraminifera (pelagic)









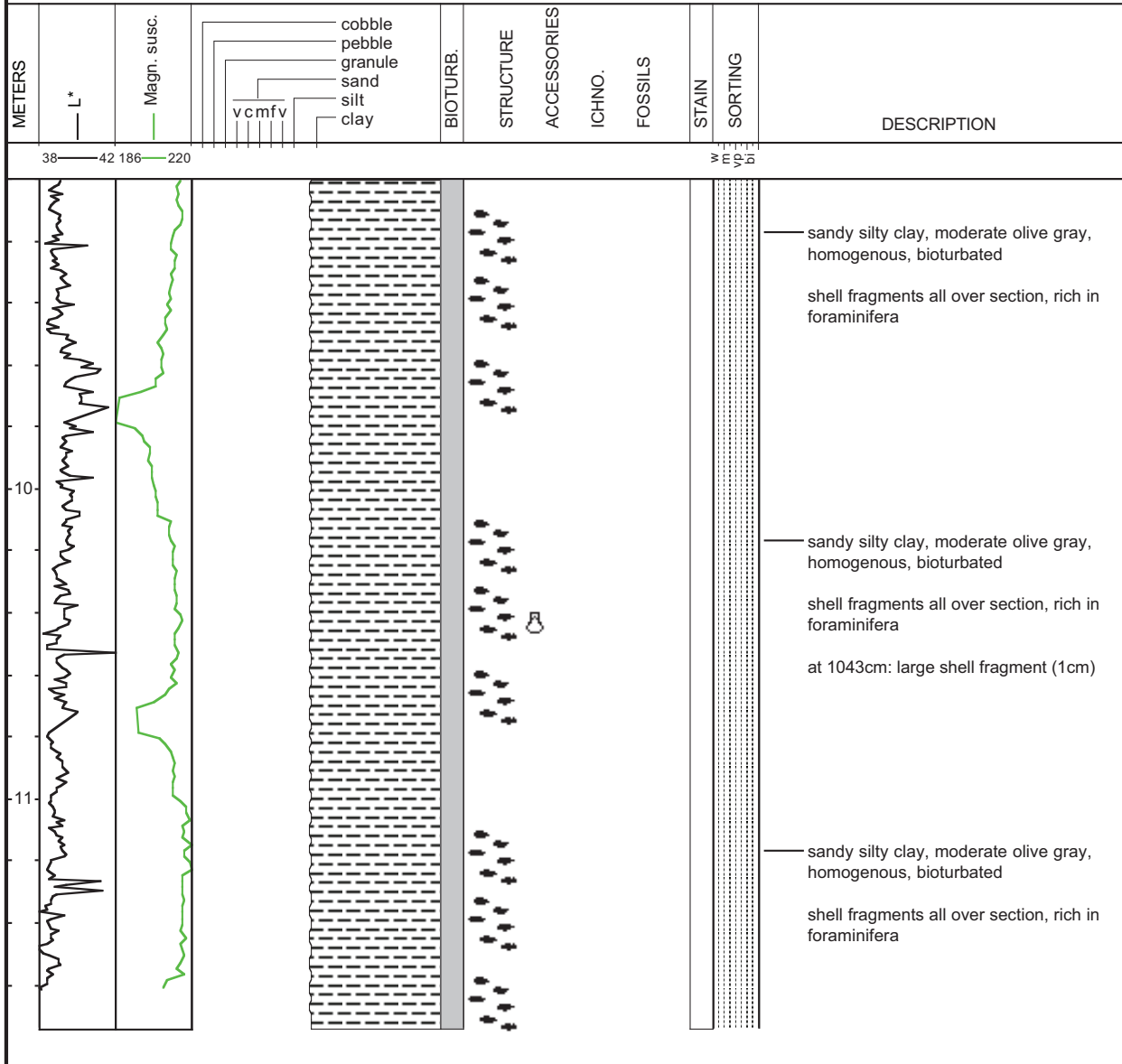
**M78/1-234-2 PC N-Tobago**

11°24.3200'N, 61°2.9600'W

Date logged: March 23, 2009

Logged by: POZ IFM-GEOMAR

Ground: 201.00 m KB: 0.00 m




**LEGEND**

LITHOLOGY

 Silty Clay (T8)

PHYSICAL STRUCTURES

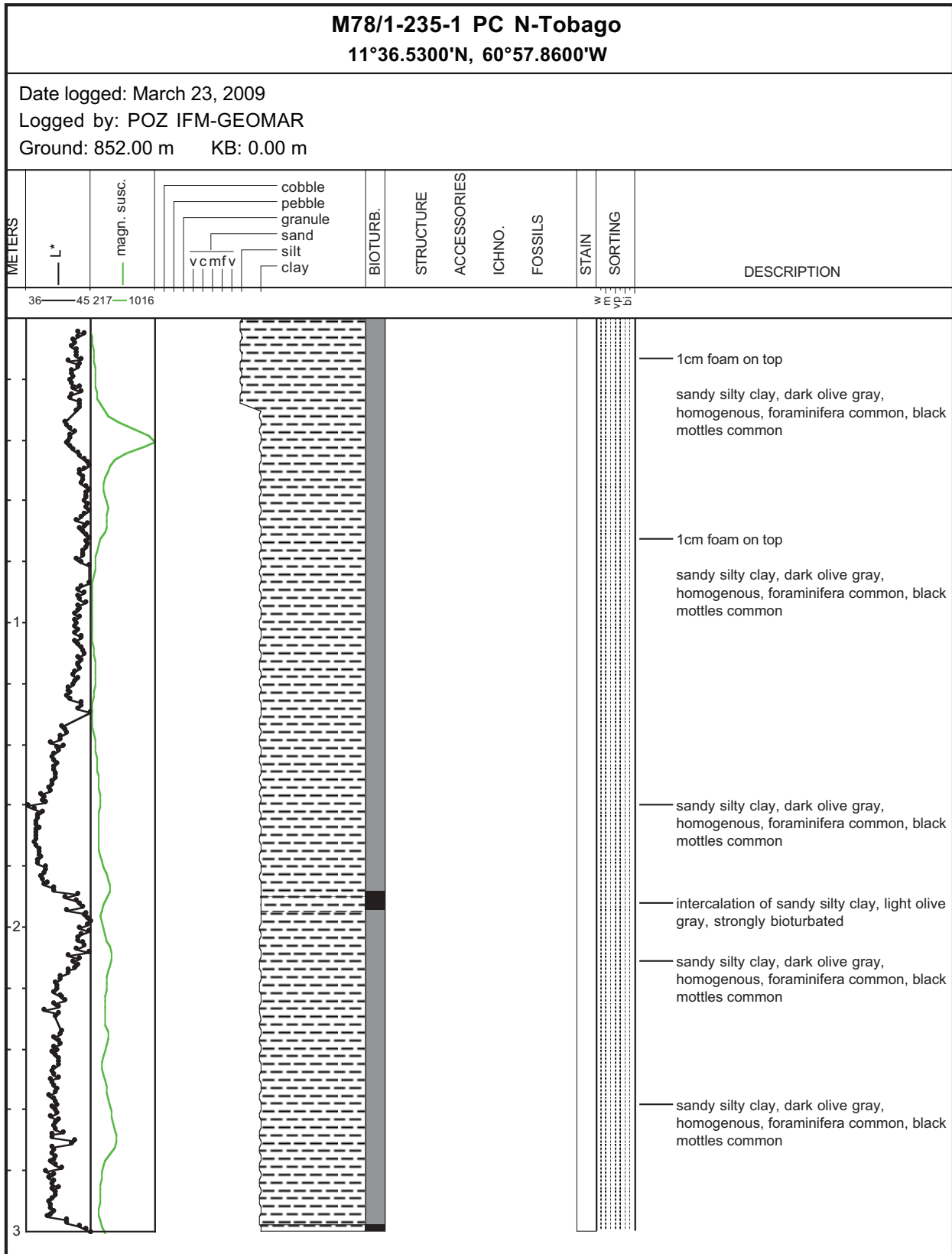
 - Mottles

ICHTNOFOSSILS

 - Zoophycos

FOSSILS

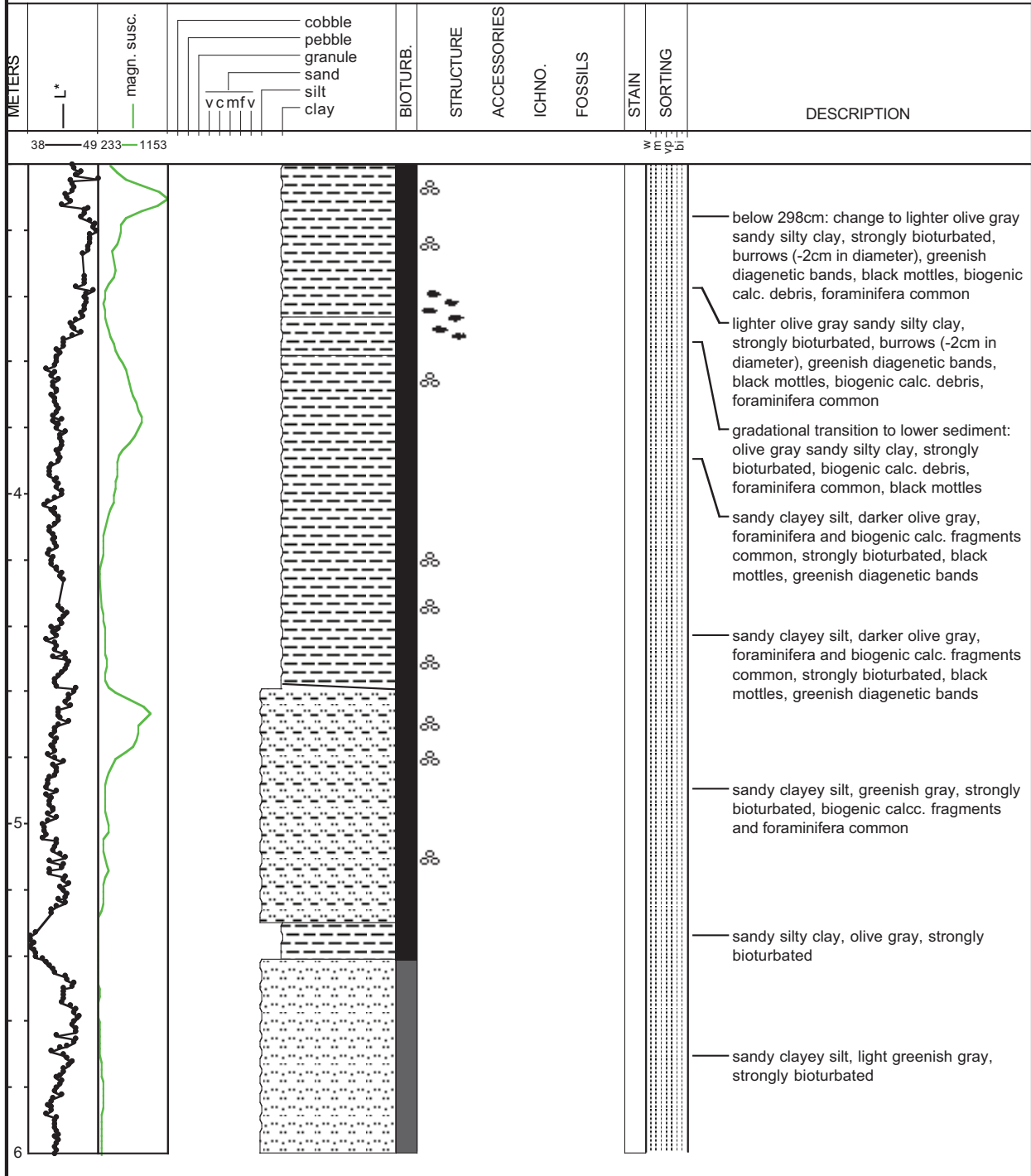
 - Pelecypods

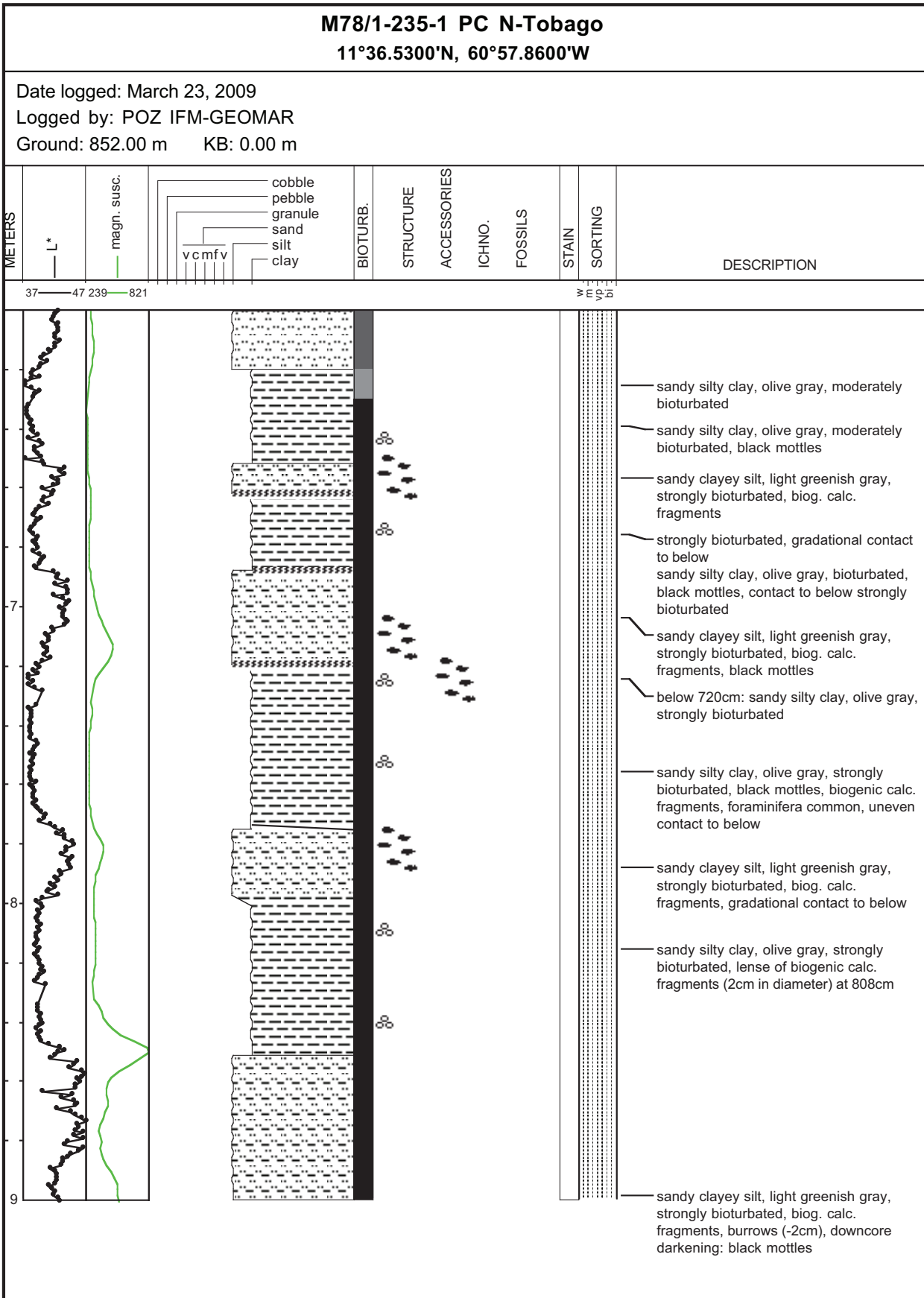




**M78/1-235-1 PC N-Tobago**  
**11°36.5300'N, 60°57.8600'W**

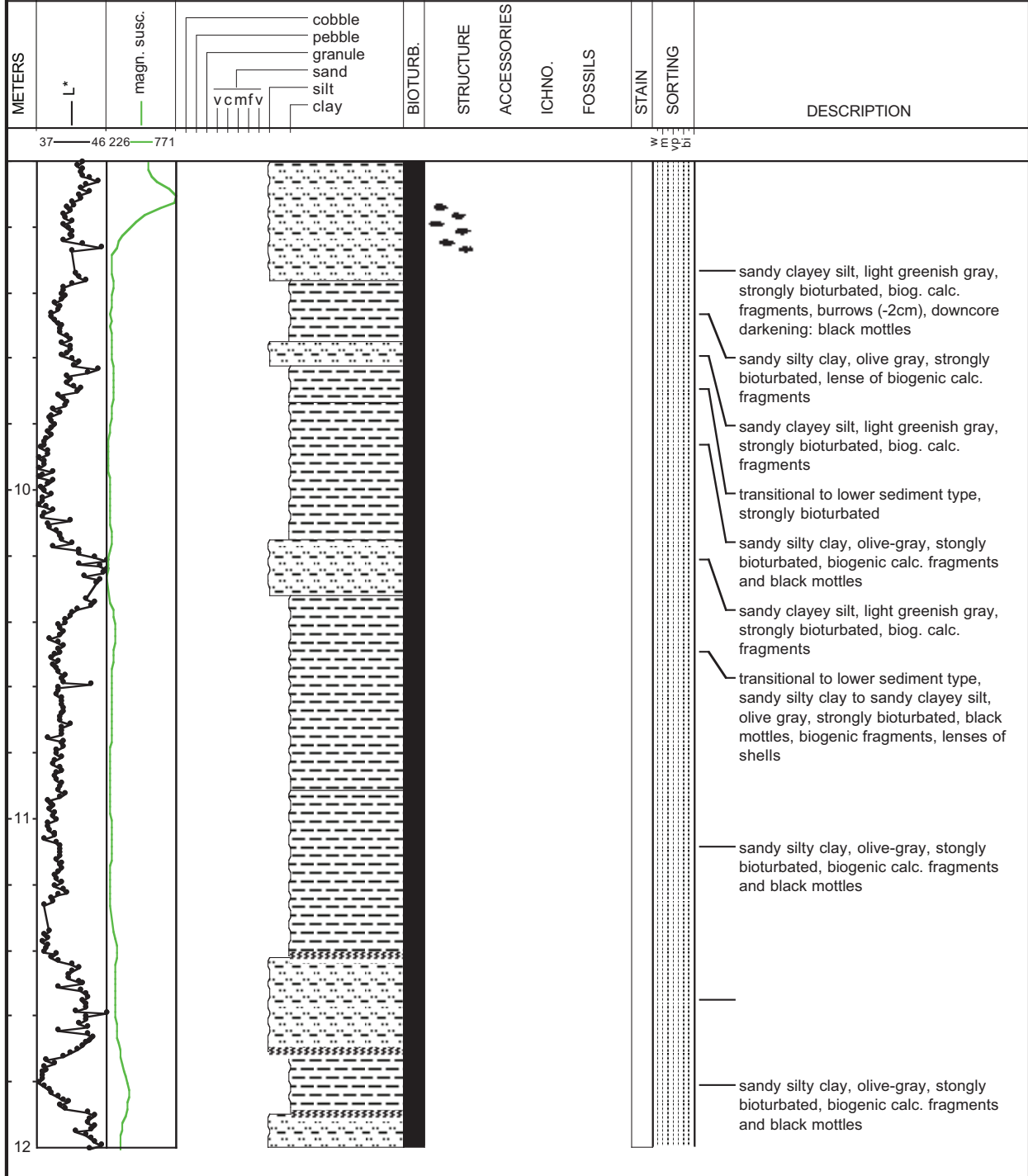
Date logged: March 23, 2009  
 Logged by: POZ IFM-GEOMAR  
 Ground: 852.00 m KB: 0.00 m

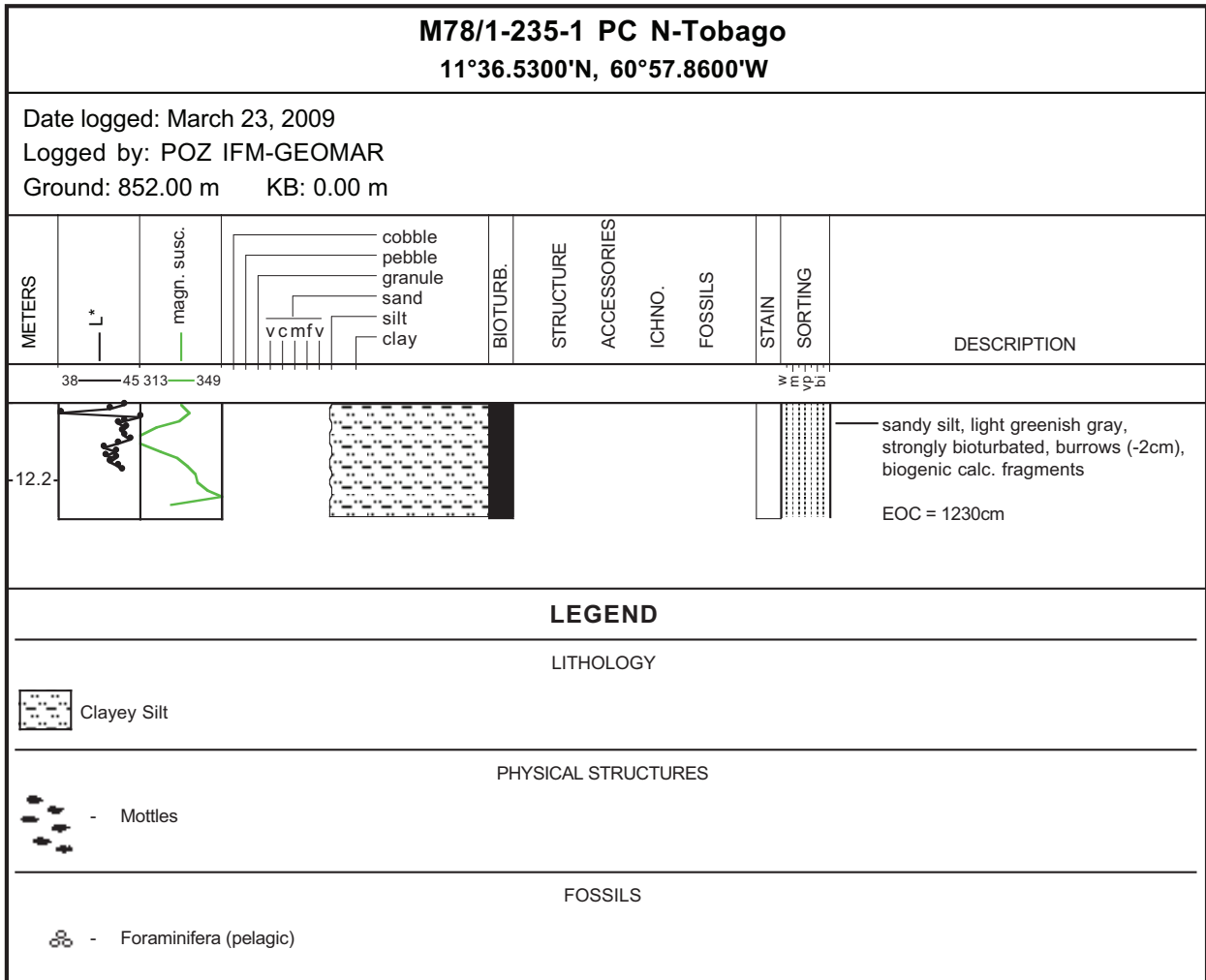




**M78/1-235-1 PC N-Tobago**  
**11°36.5300'N, 60°57.8600'W**

Date logged: March 23, 2009  
 Logged by: POZ IFM-GEOMAR  
 Ground: 852.00 m KB: 0.00 m







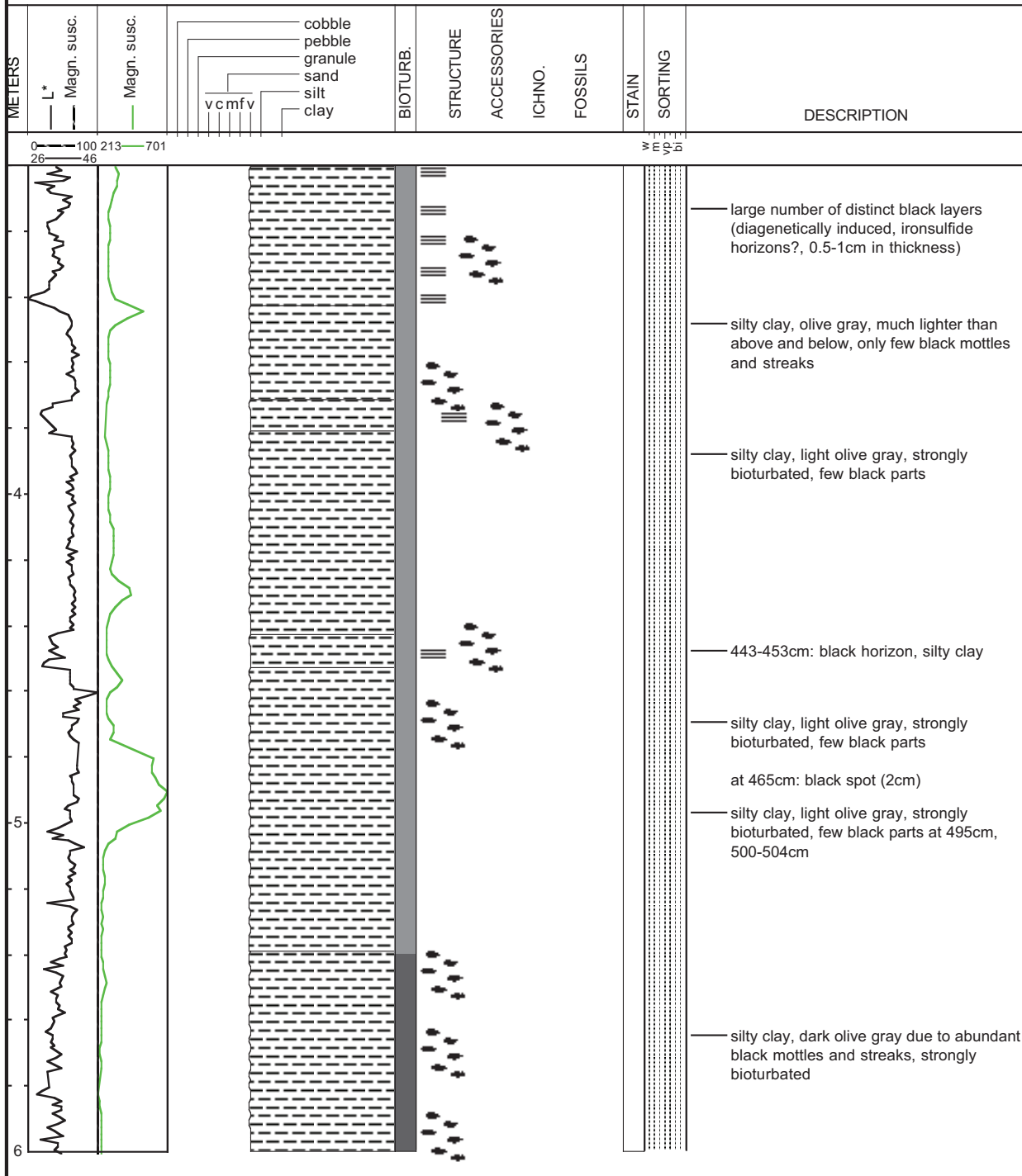
**M78/1-242-2 PC Orinoco coring station 2**

9°57.3500'N, 59°48.1100'W

Date logged: March 25, 2009

Logged by: POZ IFM-GEOMAR

Ground: 596.00 m KB: 0.00 m



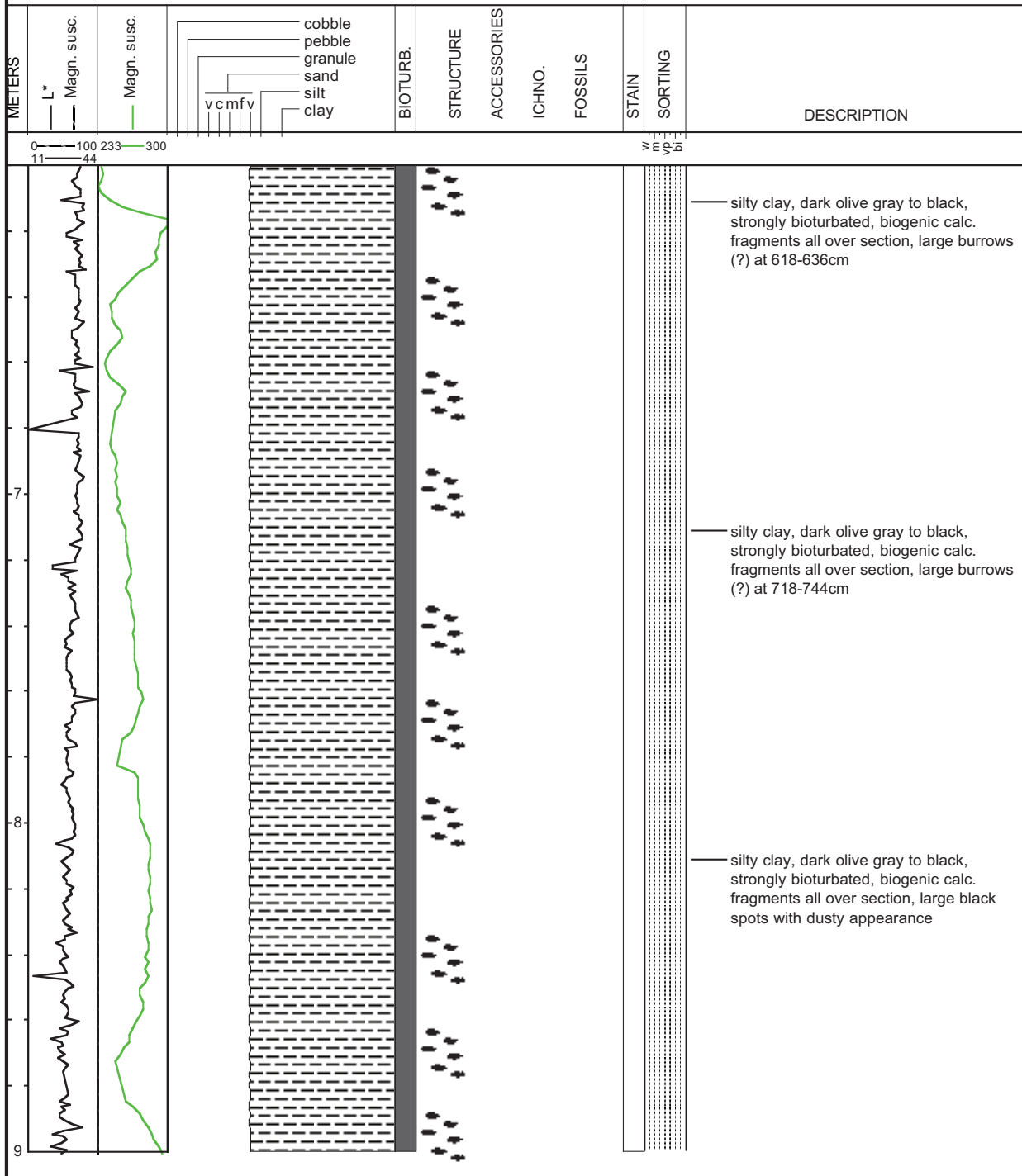
**M78/1-242-2 PC Orinoco coring station 2**

9°57.3500'N, 59°48.1100'W

Date logged: March 25, 2009

Logged by: POZ IFM-GEOMAR

Ground: 596.00 m KB: 0.00 m



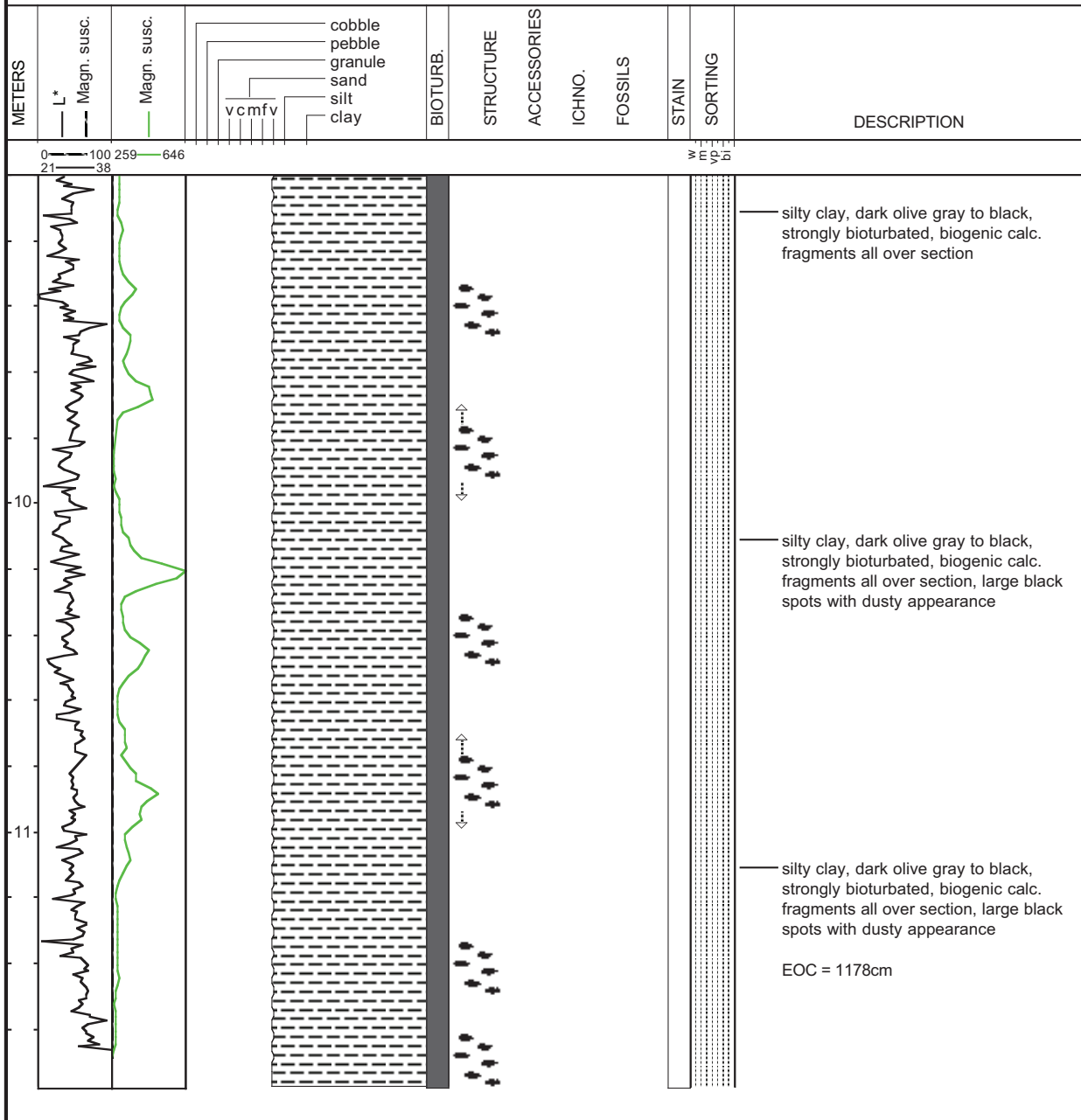
**M78/1-242-2 PC Orinoco coring station 2**

9°57.3500'N, 59°48.1100'W

Date logged: March 25, 2009

Logged by: POZ IFM-GEOMAR

Ground: 596.00 m KB: 0.00 m




**LEGEND**

LITHOLOGY

 Silty Clay (T8)

PHYSICAL STRUCTURES

 - Planar lamination

 - Mottles

ICHNOFOSSILS

 - Taenidium



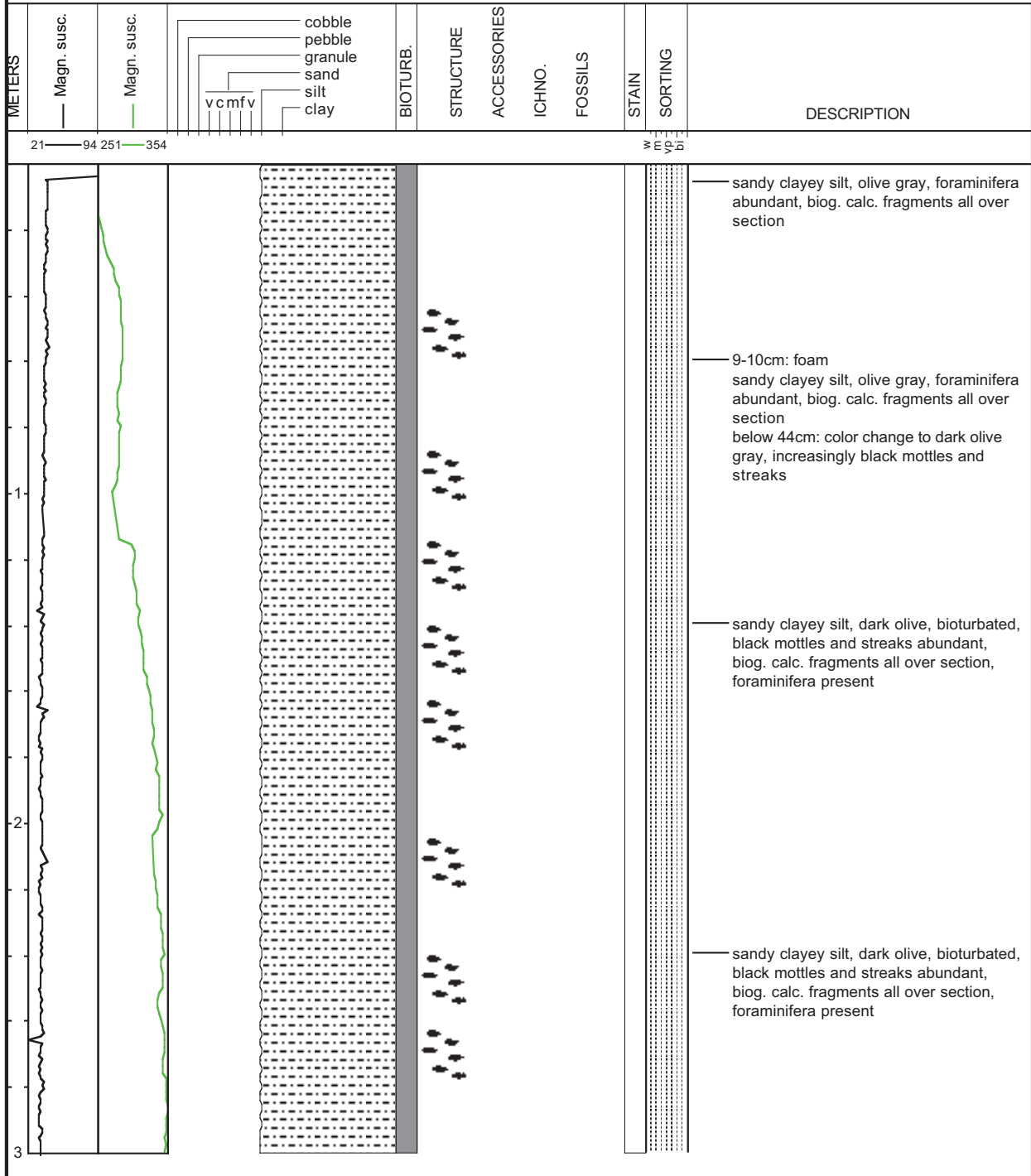
**M78/1-243-1 PC Orinoco coring station 3**

9°59.4900'N, 59°56.9300'W

Date logged: March 26, 2009

Logged by: POZ IFM-GEOMAR

Ground: 341.00 m KB: 0.00 m



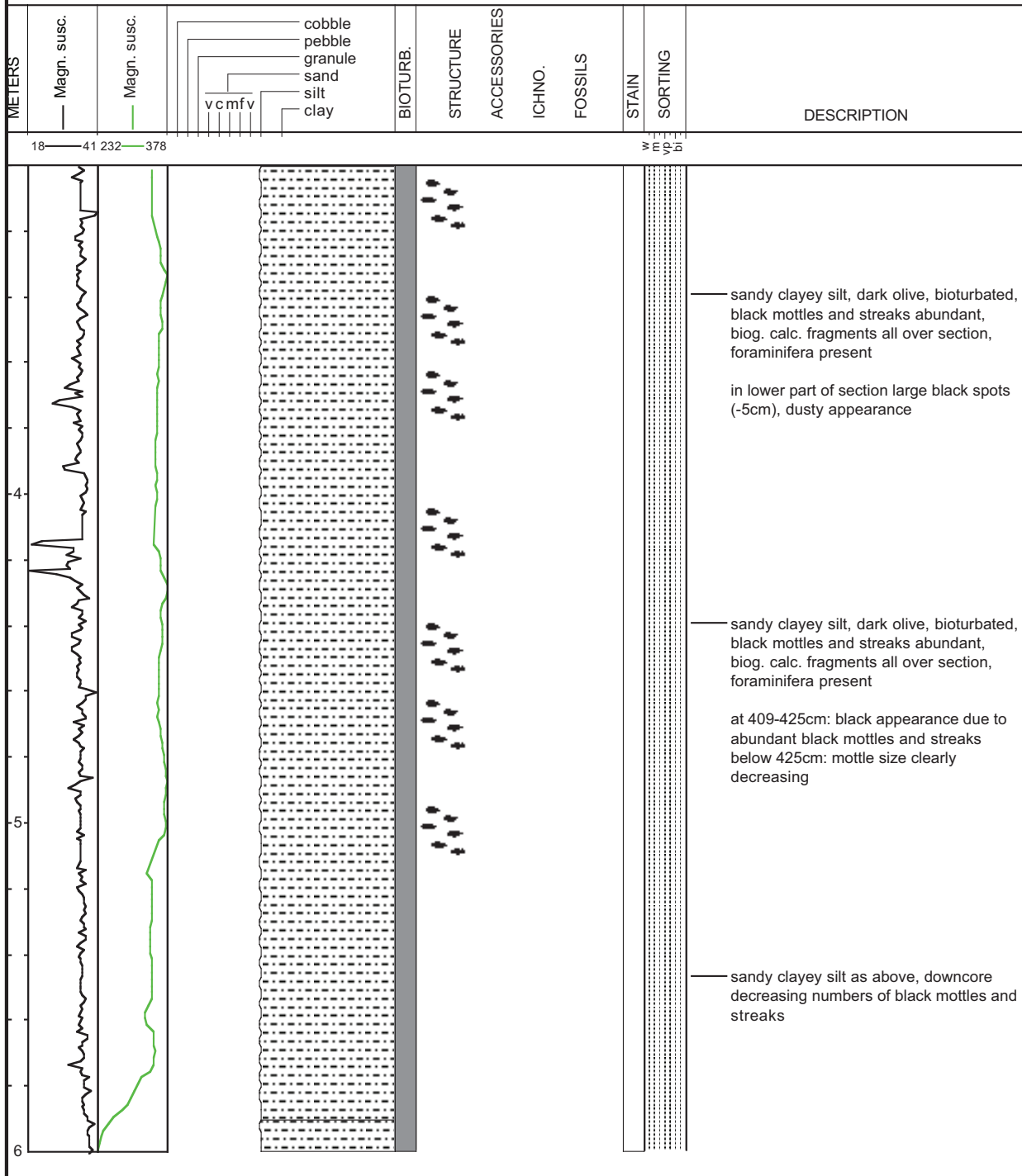
**M78/1-243-1 PC Orinoco coring station 3**

9°59.4900'N, 59°56.9300'W

Date logged: March 26, 2009

Logged by: POZ IFM-GEOMAR

Ground: 341.00 m KB: 0.00 m



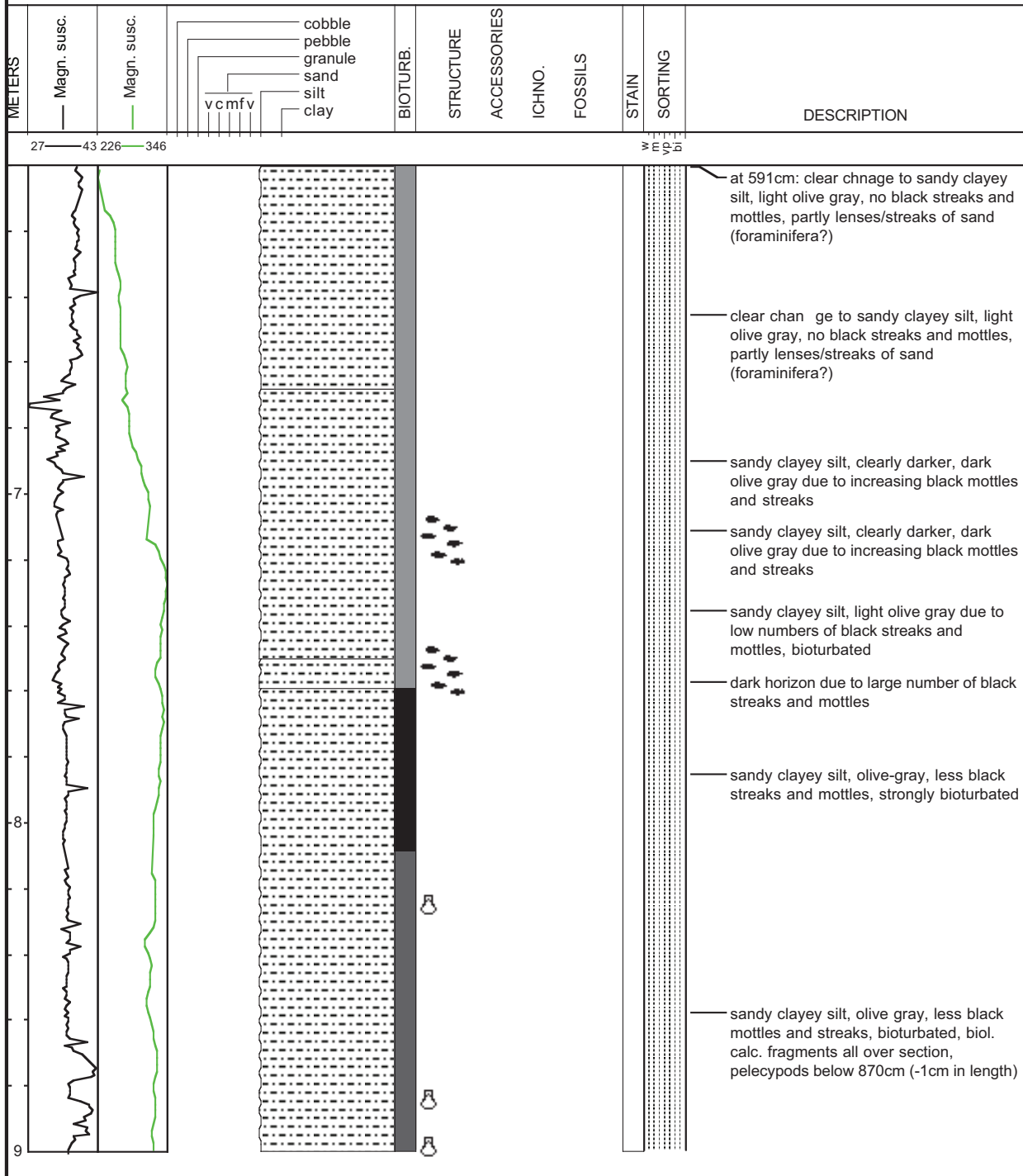
**M78/1-243-1 PC Orinoco coring station 3**

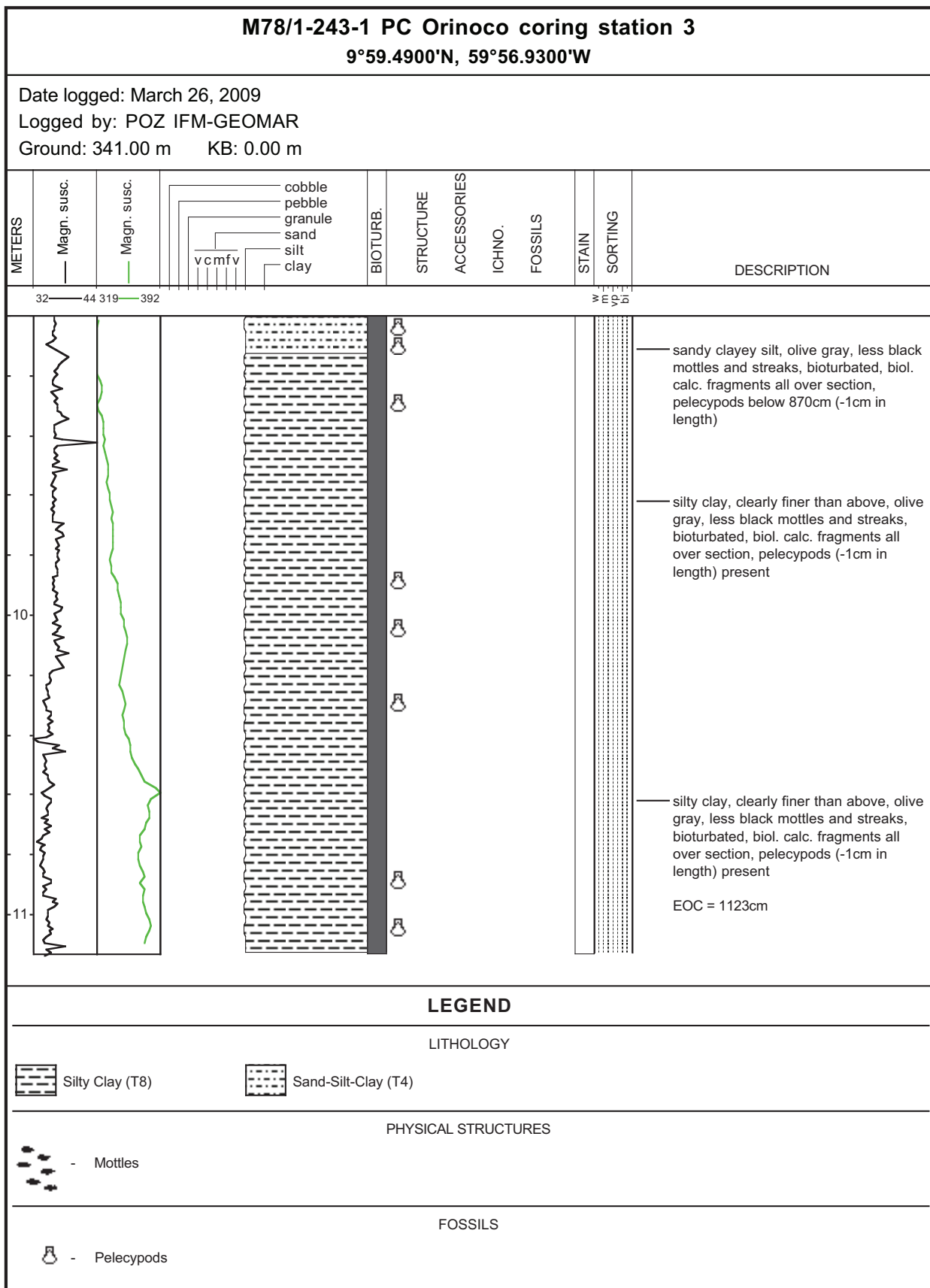
9°59.4900'N, 59°56.9300'W

Date logged: March 26, 2009

Logged by: POZ IFM-GEOMAR

Ground: 341.00 m KB: 0.00 m





## 5.7 Appendix items: Shipboard Analyses

**Appendix Table 5.7.1:** Depth, bottle volume, standards, and oxygen concentration of WINKLER titrations from M78/1 water samples. The readings of CTD Oxygen sensors no. 1 and 2 are given for comparison. Note that sensor no. 1 values were noted up to Station M78/1-182-1 only.

Station M78/1-	Depth [db]	Bottle volume [ml]	Consumption of thiosulfate solution [ml]	Standard	Oxygen concentration [ml/l]	Average oxygen concentration [ml/l]	CTD sensor 1 [ml/l]	CTD sensor 2 [ml/l]
162-1	35	118.18	4.764	0.9769	4.448	4.456	4.125	4.177
162-1	35	117.66	4.760	0.9769	4.464			
162-1	71	117.68	4.763	0.9769	4.466	4.470	4.082	4.141
162-1	71	117.57	4.766	0.9769	4.473			
162-1	664	117.67	3.265	0.9769	3.062	3.070	2.475	2.746
162-1	664	117.34	3.272	0.9769	3.077			
162-1	3024	117.84	5.322	0.9769	4.984	4.996	4.087	4.751
162-1	3024	117.89	5.351	0.9769	5.009			
162-1	4104	117.97	5.151	0.9769	4.818	4.843	4.015	4.776
162-1	4104	117.66	5.191	0.9769	4.869			
164-1	40	117.79	4.806	0.9681	4.462	4.451	4.133	4.342
164-1	40	117.37	4.782	0.9681	4.440			
164-1	80	117.69	4.699	0.9681	4.366	4.368	4.055	4.276
164-1	80	117.67	4.702	0.9681	4.370			
164-1	150	117.62	4.008	0.9681	3.725	3.745	3.457	3.649
164-1	150	117.82	4.056	0.9681	3.765			
164-1	249	117.57	3.485	0.9681	3.242	3.243	2.938	3.127
164-1	249	117.68	3.491	0.9681	3.244			
164-1	551	117.78	3.014	0.9681	2.798	2.789	2.496	2.684
164-1	551	117.68	2.991	0.9681	2.779			
164-1	702	117.94	3.137	0.9681	2.909	2.897	2.622	2.825
164-1	702	117.69	3.106	0.9681	2.886			
164-1	1173	117.75	4.846	0.9681	4.501	4.516	4.166	4.532
164-1	1173	118.04	4.891	0.9681	4.531			
166-1	40	117.66	4.781	0.9752	4.476	4.473	4.122	4.358
166-1	40	117.34	4.762	0.9752	4.471			
166-1	80	117.87	4.228	0.9752	3.951	3.959	3.660	3.885
166-1	80	117.63	4.235	0.9752	3.966			
166-1	111	118.07	3.542	0.9752	3.305	3.311	2.998	3.194
166-1	111	117.83	3.548	0.9752	3.317			
166-1	200	117.86	3.611	0.9752	3.375	3.375	3.030	3.222
166-1	200	117.9	3.612	0.9752	3.375			
166-1	506	117.57	3.019	0.9752	2.829	2.823	2.509	2.702
166-1	506	117.26	2.998	0.9752	2.817			

Station M78/1-	Depth [db]	Bottle volume [ml]	Consumption of thiosulfate solution [ml]	Standard	Oxygen concentration [ml/l]	Average oxygen concentration [ml/l]	CTD sensor 1 [ml/l]	CTD sensor 2 [ml/l]
166-1	751	117.67	3.354	0.9752	3.140	3.122	2.806	3.038
166-1	751	117.91	3.323	0.9752	3.105			
166-1	1470	118.18	5.067	0.9752	4.723	4.717	4.253	4.669
166-1	1470	117.66	5.035	0.9752	4.712			
182-1	30	117.67	5.140	0.9775	4.823	4.844		4.671
182-1	30	117.34	5.170	0.9775	4.865			
182-1	60	117.84	5.130	0.9775	4.807	4.803	4.435	4.685
182-1	60	117.89	5.121	0.9775	4.798			
182-1	120	117.97	3.487	0.9775	3.217	3.217	2.894	3.067
182-1	120	117.66	3.428	0.9775	3.217			
182-1	158	117.73	3.154	0.9775	2.958	2.977	2.582	2.756
182-1	158	117.72	3.195	0.9775	2.997			
182-1	199	117.79	3.305	0.9775	3.098	3.100	2.814	2.995
182-1	199	117.37	3.296	0.9775	3.101			
182-1	320	117.69	2.862	0.9775	2.685	2.684	2.366	2.544
182-1	320	117.67	2.860	0.9775	2.684			
182-1	602	117.62	3.105	0.9775	2.915	2.918	2.613	2.811
182-1	602	117.82	3.116	0.9775	2.920			
182-1	752	117.57	3.546	0.9775	3.330	3.319	2.967	3.205
182-1	752	117.68	3.526	0.9775	3.308			
182-1	1515	117.78	5.043	0.9775	4.728	4.738	4.310	4.715
182-1	1515	117.68	5.060	0.9775	4.748			
194-2	99	117.26	5.024	0.9701	4.695	4.695		4.724
194-2	99	117.57	5.036	0.9701	4.694			
194-2	109	117.9	3.926	0.9701	3.649	3.664		3.651
194-2	109	117.86	3.958	0.9701	3.680			
194-2	199	117.83	2.938	0.9701	2.732	2.741		2.665
194-2	199	118.07	2.962	0.9701	2.749			
194-2	299	117.63	2.901	0.9701	2.703	2.698		2.631
194-2	299	117.87	2.898	0.9701	2.694			
194-2	402	117.34	2.890	0.9701	2.699	2.682		2.629
194-2	402	117.66	2.862	0.9701	2.666			
194-2	501	117.74	2.923	0.9701	2.720	2.724		2.689
194-2	501	117.83	2.932	0.9701	2.727			
194-2	534	118.04	3.002	0.9701	2.787	2.775		2.750
194-2	534	117.75	2.970	0.9701	2.764			
194-8	64	118.18	5.194	0.9701	4.816	4.799		4.781
194-8	64	117.66	5.134	0.9701	4.782			
194-8	114	117.68	3.114	0.9701	2.900	2.904		2.988
194-8	114	117.57	3.120	0.9701	2.908			

Station M78/1-	Depth [db]	Bottle volume [ml]	Consumption of thiosulfate solution [ml]	Standard	Oxygen concentration [ml/l]	Average oxygen concentration [ml/l]	CTD sensor 1 [ml/l]	CTD sensor 2 [ml/l]
194-8	204	117.67	2.898	0.9701	2.699	2.699		2.672
194-8	204	117.34	2.890	0.9701	2.699			
194-8	304	117.84	2.863	0.9701	2.662	2.651		2.637
194-8	304	117.89	2.840	0.9701	2.640			
194-8	405	117.97	2.828	0.9701	2.627	2.645		2.634
194-8	405	117.66	2.860	0.9701	2.664			
194-8	505	117.73	2.909	0.9701	2.708	2.706		2.677
194-8	505	117.72	2.906	0.9701	2.705			
194-8	534	117.79	2.922	0.9701	2.718	2.732		2.724
194-8	534	117.37	2.940	0.9701	2.745			
194-12	79	117.94	5.142	0.9743	4.798	4.815		4.771
194-12	79	117.69	5.167	0.9743	4.832			
194-12	119	117.75	4.170	0.9743	3.898	3.892		3.871
194-12	119	118.04	4.169	0.9743	3.887			
194-12	129	117.83	3.197	0.9743	2.986	2.983		3.010
194-12	129	117.74	3.188	0.9743	2.980			
194-12	220	117.66	2.980	0.9743	2.787	2.774		2.678
194-12	220	117.34	2.943	0.9743	2.760			
194-12	320	117.87	2.807	0.9743	2.621	2.632		2.628
194-12	320	117.63	2.824	0.9743	2.642			
194-12	420	118.07	2.811	0.9743	2.620	2.635		2.618
194-12	420	117.83	2.837	0.9743	2.650			
194-12	521	117.86	2.878	0.9743	2.687	2.681		2.672
194-12	521	117.9	2.865	0.9743	2.674			
194-12	532	117.57	2.994	0.9743	2.803	2.773		2.752
194-12	532	117.26	2.922	0.9743	2.743			
210-2	39	117.67	4.888	0.9726	4.564	4.562		4.452
210-2	39	117.91	4.895	0.9726	4.561			
210-2	98	118.18	3.852	0.9726	3.581	3.582		3.472
210-2	98	117.66	3.838	0.9726	3.584			
210-2	149	117.68	4.895	0.9726	4.570	4.574		4.536
210-2	149	117.57	4.900	0.9726	4.579			
210-2	190	117.67	3.589	0.9726	3.351	3.347		3.366
210-2	190	117.34	3.571	0.9726	3.344			
210-2	275	117.84	3.367	0.9726	3.139	3.153		2.990
210-2	275	117.89	3.398	0.9726	3.167			
210-2	401	117.97	2.856	0.9726	2.660	2.670		2.652
210-2	401	117.66	2.870	0.9726	2.680			
210-2	450	117.73	2.944	0.9726	2.747	2.744		2.684
210-2	450	117.72	2.936	0.9726	2.740			

Station M78/1-	Depth [db]	Bottle volume [ml]	Consumption of thiosulfate solution [ml]	Standard	Oxygen concentration [ml/l]	Average oxygen concentration [ml/l]	CTD sensor 1 [ml/l]	CTD sensor 2 [ml/l]
210-7	43	117.79	4.859	0.9714	4.526	4.517		4.420
210-7	43	117.37	4.822	0.9714	4.508			
210-7	103	117.69	3.722	0.9714	3.470	3.481		3.471
210-7	103	117.67	3.745	0.9714	3.492			
210-7	153	117.62	3.583	0.9714	3.343	3.327		3.206
210-7	153	117.82	3.555	0.9714	3.311			
210-7	193	117.57	3.245	0.9714	3.029	3.048		2.968
210-7	193	117.68	3.289	0.9714	3.067			
210-7	278	117.78	3.107	0.9714	2.895	2.910		2.816
210-7	278	117.68	3.137	0.9714	2.925			
210-7	403	117.94	3.024	0.9714	2.813	2.798		2.628
210-7	403	117.69	2.985	0.9714	2.783			
210-7	455	117.75	3.055	0.9714	2.847	2.835		2.694
210-7	454	118.04	3.038	0.9714	2.824			
210-12	40	117.83	5.028	0.9667	4.660	4.652		4.460
210-12	40	117.74	5.008	0.9667	4.645			
210-12	100	117.66	5.053	0.9667	4.690	4.685		4.513
210-12	100	117.34	5.029	0.9667	4.680			
210-12	120	117.87	4.684	0.9667	4.339	4.322		4.305
210-12	120	117.63	4.638	0.9667	4.306			
210-12	190	118.07	3.093	0.9667	2.861	2.874		2.862
210-12	190	117.83	3.115	0.9667	2.887			
210-12	273	117.86	3.347	0.9667	3.101	3.107		3.002
210-12	273	117.9	3.361	0.9667	3.113			
210-12	400	117.57	2.894	0.9667	2.688	2.686		2.631
210-12	400	117.26	2.883	0.9667	2.685			
210-12	454	117.67	2.840	0.9667	2.636	2.631		2.618
210-12	454	117.91	2.836	0.9667	2.626			
220-2	137	117.67	3.853	0.9723	3.596	3.588		3.480
220-2	137	117.91	3.843	0.9723	3.580			
220-2	197	118.18	3.791	0.9723	3.523	3.504		3.476
220-2	197	117.66	3.734	0.9723	3.486			
220-2	488	117.68	3.028	0.9723	2.826	2.841		2.708
220-2	488	117.57	3.057	0.9723	2.856			
220-2	691	117.67	3.128	0.9723	2.920	2.942		2.865
220-2	691	117.34	3.166	0.9723	2.963			
220-2	2004	117.84	5.192	0.9723	4.839	4.821		4.882
220-2	2004	117.89	5.155	0.9723	4.803			
220-2	2713	117.97	5.161	0.9723	4.805	4.814		4.865
220-2	2713	117.66	5.168	0.9723	4.824			



Station M78/1-	Depth [db]	Bottle volume [ml]	Consumption of thiosulfate solution [ml]	Standard	Oxygen concentration [ml/l]	Average oxygen concentration [ml/l]	CTD sensor 1 [ml/l]	CTD sensor 2 [ml/l]
220-2	3537	117.73	5.157	0.9723	4.811	4.605		4.893
220-2	3537	117.72	4.715	0.9723	4.399			
220-2	4557	117.79	5.273	0.9723	4.917	4.892		4.984
220-2	4557	117.37	5.202	0.9723	4.868			
236-1	10	117.67	5.039	0.969	4.687	4.584		4.633
236-1	10	117.91	4.827	0.969	4.481			
236-1	30	118.18	4.482	0.969	4.151	4.172		4.143
236-1	30	117.66	4.507	0.969	4.193			
236-1	39	117.68	4.162	0.969	3.871	3.775		3.886
236-1	39	117.57	3.951	0.969	3.678			
236-1	112	117.67	3.808	0.969	3.542	3.563		3.485
236-1	112	117.34	3.842	0.969	3.584			
236-1	444	117.84	2.891	0.969	2.685	2.721		2.648
236-1	444	117.89	2.968	0.969	2.756			
236-1	756	117.97	3.337	0.969	3.096	3.099		3.015
236-1	756	117.66	3.334	0.969	3.102			
236-1	1007	117.73	4.139	0.969	3.848	3.836		3.793
236-1	1007	117.72	4.113	0.969	3.824			
236-1	1541	117.79	5.946	0.969	5.525	5.533		5.598
236-1	1541	117.37	5.942	0.969	5.542			

**Appendix Table 5.7.2:** Standard measurements of pure CaCO<sub>3</sub>

Datum	Weight [mg]	Reading [%]
15.03.2009	731.8	100
15.03.2009	731.8	101
16.03.2009	731.8	98.5
16.03.2009	731.8	100
17.03.2009	731.8	99.5
17.03.2009	731.8	100
17.03.2009	731.8	100
17.03.2009	731.8	99
17.03.2009	731.8	99.5
17.03.2009	731.8	100
Mean value:		99,8
Standard deviation:		0,7

**Appendix Table 5.7.3:** Carbonate measurements of surface and core samples.

M78/1-	Depth [cm]	Weight [mg]	Reading [%]	CaCO <sub>3</sub> [%]
164-8	Surface	732	78.5	78.7
168-1	Surface	732	94	94.2
169-1	Surface	732	91	91.2
170-1	Surface	732	92	92.2
171-4	Surface	732	89	89.2
172-2	Surface	732	90	90.2
173-1	Surface	732	86.5	86.7
174-1	Surface	732	80	80.2
175-1	5	732	81	81.2
175-1	25	732	79	79.2
175-1	45	732	84	84.2
175-1	65	732	81	81.2
175-1	85	732	82	82.2
175-1	105	732	82	82.2
175-1	125	732	84	84.2
175-1	145	732	76	76.2
175-1	165	732	75.5	75.7
175-1	185	732	81	81.2
175-1	305	732	82	82.2
175-1	325	732	76.5	76.7
175-1	345	732	81.5	81.7
175-1	365	732	81.5	81.7
175-1	385	732	82	82.2
175-1	405	732	78.5	78.7
175-1	425	732	82	82.2
175-1	445	732	78	78.2
175-1	465	732	81	81.2
175-1	485	732	81	81.2
175-1	505	732	81	81.2
175-1	525	732	78.5	78.7
180-1	5	732	82	82.2
180-1	25	732	84	84.2
180-1	45	732	82.5	82.7
180-1	65	732	84.5	84.7
180-1	85	732	82	82.2
180-1	105	732	82	82.2
180-1	125	732	80	80.2

M78/1-	Depth [cm]	Weight [mg]	Reading [%]	CaCO <sub>3</sub> [%]
180-1	145	732	82	82.2
180-1	165	732	82	82.2
180-1	185	732	82.5	82.7
180-1	205	732	85	85.2
180-1	225	732	82	82.2
180-1	245	732	81.5	81.7
180-1	265	732	85	85.2
180-1	285	732	84	84.2
180-1	305	732	83	83.2
180-1	325	732	83	83.2
180-1	345	732	81	81.2
180-1	365	732	81	81.2
180-1	385	732	78.5	78.7
180-1	405	732	82	82.2
180-1	425	732	86	86.2
180-1	445	732	84	84.2
180-1	465	732	85	85.2
180-1	485	732	86	86.2
180-1	505	732	86	86.2
181-3	5	732	15	15.0
181-3	25	732	23	23.1
181-3	45	732	23.5	23.6
181-3	65	732	33.5	33.6
181-3	85	732	23.5	23.6
181-3	105	732	33.5	33.6
181-3	125	732	27	27.1
181-3	145	732	21	21.1
181-3	165	732	15	15.0
181-3	185	732	11	11.0
181-3	205	1500	25	12.2
181-3	225	1500	39	19.1
181-3	245	1500	24.5	12.0
181-3	265	1500	25	12.2
181-3	285	1500	23	11.2
181-3	305	1500	23	11.2
181-3	325	1500	25	12.2
181-3	345	1500	17	8.3

M78/1-	Depth [cm]	Weight [mg]	Reading [%]	CaCO3 [%]
181-3	365	1500	18	8.8
181-3	385	1500	19.5	9.5
181-3	405	1500	16.5	8.1
181-3	425	1500	17	8.3
181-3	445	1500	24	11.7
181-3	465	1500	17	8.3
181-3	485	1500	22	10.8
181-3	505	1500	13	6.4
181-3	525	1500	10	4.9
181-3	545	1500	20	9.8
181-3	565	1500	21	10.3
181-3	585	1500	21	10.3
181-3	605	1500	19	9.3
181-3	625	1500	22	10.8
181-3	645	1500	17	8.3
181-3	665	1500	19	9.3
181-3	685	1500	19.5	9.5
181-3	705	1500	20	9.8
181-3	725	1500	17	8.3
181-3	745	1500	14	6.8
181-3	765	1500	17	8.3
181-3	785	1500	20	9.8
181-3	805	1500	15	7.3
181-3	825	1500	16	7.8
181-3	845	1500	18.5	9.0
181-3	865	1500	17	8.3
181-3	885	1500	14	6.8
181-3	905	1500	16	7.8
181-3	925	1500	16	7.8
181-3	945	1500	14	6.8
181-3	965	1500	14	6.8
181-3	985	1500	13	6.4
181-3	1005	1500	13	6.4
181-3	1025	1500	14	6.8
181-3	1045	1500	14.5	7.1
181-3	1065	1000	10	7.3
181-3	1085	1000	11	8.1
181-3	1105	1000	11	8.1
181-3	1125	1000	11	8.1
181-3	1145	1000	11	8.1

M78/1-	Depth [cm]	Weight [mg]	Reading [%]	CaCO3 [%]
181-3	1165	1000	11	8.1
181-3	1185	1000	10	7.3
181-3	1205	732	9.5	9.5
181-3	1225	732	9	9.0
186-2	5	732	79	79.2
186-2	25	732	81.5	81.7
186-2	45	732	76	76.2
186-2	65	732	76	76.2
186-2	85	732	79	79.2
186-2	105	732	78	78.2
186-2	125	732	81	81.2
186-2	145	732	82	82.2
186-2	165	732	88	88.2
186-2	185	732	86	86.2
186-2	205	732	86.5	86.7
186-2	225	732	83	83.2
186-2	245	732	86.5	86.7
186-2	265	732	89	89.2
186-2	285	732	85.5	85.7
186-2	305	732	84.5	84.7
186-2	325	732	84	84.2
186-2	345	732	88	88.2
186-2	365	732	86	86.2
186-2	385	732	85	85.2
186-2	405	732	84	84.2
186-2	425	732	85	85.2
186-2	445	732	85	85.2
186-2	465	732	87	87.2
186-2	485	732	85.5	85.7
186-2	505	732	83	83.2
186-2	525	732	85	85.2
186-2	545	732	86	86.2
212-3	5	732	83	83.2
212-3	25	732	84	84.2
212-3	45	732	85	85.2
212-3	65	732	81.5	81.7
212-3	85	732	91	91.2
212-3	105	732	88	88.2
212-3	125	732	82.5	82.7

M78/1-	Depth [cm]	Weight [mg]	Reading [%]	CaCO3 [%]
212-3	145	732	85	85.2
212-3	165	732	85	85.2
212-3	185	732	85.5	85.7
212-3	205	732	86	86.2
212-3	225	732	83.5	83.7
212-3	245	732	82	82.2
212-3	265	732	85	85.2
212-3	285	732	84	84.2
212-3	305	732	81.5	81.7
212-3	325	732	75	75.2
212-3	345	732	81.5	81.7
212-3	365	732	81	81.2
212-3	385	732	82	82.2
212-3	405	732	81	81.2
212-3	425	732	80	80.2
212-3	445	732	85	85.2
212-3	465	732	84	84.2
212-3	485	732	79	79.2
212-3	505	732	79	79.2
212-3	525	732	84	84.2
212-3	545	732	82	82.2
212-3	585	732	80	80.2
212-3	605	732	82	82.2
212-3	625	732	83	83.2
212-3	645	732	82	82.2
212-3	665	732	84	84.2
212-3	685	732	85	85.2
212-3	705	732	82	82.2
212-3	725	732	82	82.2
212-3	745	732	82	82.2

M78/1-	Depth [cm]	Weight [mg]	Reading [%]	CaCO3 [%]
212-3	765	732	83	83.2
212-3	785	732	80	80.2
212-3	805	732	80	80.2
212-3	825	732	85	85.2
212-3	845	732	88	88.2
212-3	865	732	85.5	85.7
212-3	885	732	86.5	86.7
212-3	905	732	85.5	85.7
212-3	925	732	85	85.2
212-3	945	732	85	85.2
212-3	965	732	83	83.2
212-3	985	732	85	85.2
212-3	1005	732	81	81.2
212-3	1025	732	86	86.2
212-3	1045	732	86.5	86.7
212-3	1065	732	86.5	86.7
212-3	1085	732	84	84.2
212-3	1105	732	83	83.2
212-3	1125	732	85.5	85.7
212-3	1145	732	83	83.2
212-3	1165	732	85	85.2
212-3	1185	732	86	86.2
212-3	1205	732	85	85.2
212-3	1225	732	87.5	87.7
212-3	1245	732	84	84.2
212-3	1265	732	84	84.2
212-3	1285	732	86	86.2
212-3	1305	732	86	86.2
212-3	1325	732	86	86.2
212-3	1345	732	85	85.2