Serial #90026

CRUISE REPORT, OCEANUS 222

(August 2-7, 1990)

Program Title: LEO 2500

MARINE LONG-TERM ECOSYSTEMS OBSERVATORY SITES OFF THE COAST OF NEW JERSEY: A POTENTIALLY IMPACTED DEEP-SEA AREA AT THE 2500-M DEPTH MUNICIPAL SEWAGE DISPOSAL SITE.

Dr. J. Fredrick Grassle
Program Coordinator and Chief Scientist
August 10, 1990

CRUISE REPORT, OCEANUS 222

Vessel: R/V Oceanus

Cruise number: OC222

Project name: Marine long-term ecosystems observatory sites off the coast of New Jersey: a potentially impacted deep-sea area at the 2500-m 106-mile sewage disposal site.

Funding Agency: NOAA/NURP and USGS

Area of operation: Continental Slope off New Jersey, Deep water dump site 106, and (one day) the southern flank of Georges Bank (Figures 1-3).

Cruise dates: 0700 hrs. August 2, - 2030 hrs. August 7, 1990

Ports: Woods Hole - Woods Hole

Chief Scientist: Dr. J. Frederick Grassle, Director, Institute of Marine and Coastal Sciences, Old Blake Hall, P.O.Box 231, Cook College, Rutgers University, New Brunswick, NJ 08903.

Scientific personnel and affiliation:

From Rutgers: Fred Grassle, Rose Petrecca, Mike DeLuca

From USGS: Mike Bothner, Adam Brown, Marinna Martini, and Carol Parmenter.

From WHOI: Peter Mills, Carla Curran.

From U. Maryland: Russell Hill, Ivor Knight

From Ocean Taxonomic Services: Russell Winchell

Ships's crew: Michael Palmieri, Captain; Larry Bearse 1st Mate; Doug Mayer, 2nd Mate; Rick Simpkin, Bostwain; Steve Murphy, Alberto Collasius, and Ed Graham, A.B,; Buzz McLaughlin; Ch. Engineer; Kevin Kay and Patrick Mone, Jr. Engineer; Mitchell Barros, Steward; Chris Blank, Messman.

Purpose of cruise: Recover two subsurface moorings from the dump site which were deployed in September, 1989. Collect sediment samples for studies of benthic infauna, microbiology, heavy metal and organic geochemistry. Overall objective of the sampling is to extend our study (initial survey on Atlantis cruise 122) of the sea floor to determine where particles from sewage sludge are being deposited as a result of discharge in the dump site (2250 - 2750 m water depth). Samples were also taken in "control" sites to the northeast of Hudson Canyon at about 2500 m water depth.

A second objective of the cruise, at the end of work at DWD-106, was to reoccupy two sites on the southern flank of Georges Bank for coring and grab sampling. These samples will be analyzed to determine changes in the concentration of barium and other metals since the completion of drilling in September 1982.

Major equipment and systems:

USGS equipment mooring recovery instruments. MK3 box corer with 25 sub-core dividers in the boxes, teflon coated Van Veen grab samplers, hydraulically damped gravity corer, piston corer (system provided by J. Broda and Peter Mills, WHOI).

Summary of data collected:

The full complement of recorded data from two subsurface moorings which included 4 current meters and sediment from 11 sediment traps.

14 sediment sampling stations were occupied.

Samples collected: 15 box cores, 6 Van Veen grab samples, 6 hydraulically damped gravity cores, and 3 piston cores. Details of the subsamples collected are presented on the individual sample data sheets attached.

Approximately 10 nm of bathymetric data at two depressions outlined by the SEABEAM survey conducted aboard Atlantis 122, September, 1989.

SAMPLE/STATION DATA SHEETS FOR CRUISE: OCEANUS #222 (LEO-2500)

DEPARTED WHOI DOCK AT 0700 2 AUG 1990.

ENROUTE TO FIRST STATION WHICH WILL BE A CONTROL SITE ALONG THE SEEP TRANSECT.

Arrive at station approx.1600 but spent a lot of time working on the box core and getting the damn thing to work properly.So after a lot of grinding and filing the thrust bolt slid through nicely.

Some metal fragments were found on the screens above sub cores. Box was removed and areas cleaned with methanol followed by a vigorous hose down with filtered sea water.
Screens were rinsed off from both directions.

At 2030 8/2/90 Virgin box core in the water for its first mudbusting experience.

depth approx. 2515 m. (la-la-la-ho-hum waitingwaitingwaiting)

Station: 1 Control site
Sample: B.C.1
TDs: 25747.2 ; 42989.6 l/l: 39° 18.83'N 71° 12.38'W
Time: 2131
Depth: 2560 m
pullout: 8800 lb
Comments: First hit nfg. no shift. second hit ok. Speed approx. 30m/min. hauled back a little bit faster than the first time.
CORE WAS OK AND SAMPLED FOR GEOCHEM AND MICRO.

GEOCHEMISTRY:

SUBCORES:19,12,9,8,and 3.
COMMENTS:19& 12 frozen. #3 hydrocarbon 0-2 cm.#8&9 fluff.

MICROBIOLOGY:

SUBCORES: 7,13,19
COMMENTS: All 3 sampled for CP; #19 for HPC; Also #8 sampled for fluff.

BIOLOGY:

SUBCORES:
COMMENTS: A nonbiology core.

STATION: 2 Control Site
SAMPLE: B.C.2
TD 25855.4; 42960.5
L/L:39° 15.16'N; 71° 30.07'W
DATE: August 3, 1990
TIME:0129
DEPTH:2548m
PULLOUT: 10,000 lb
GENERAL COMMENTS: 3603mwo. This second station went smoother thank goodness. Hit the bottom at 25-27 m/min.and payed out rather quickly, approx.5-6 extra meters of wire.A beautiful core with clear undisturbed water on top!!!

GEOCHEMISTRY:

SUBCORES:# 19, 7, 11 and 8
COMMENTS:#19&7 frozen. #11 hydrocarbon 0-2 cm. #14&8 fluff.

MICROBIOLOGY:

SUBCORES: 12, 13, 18, for CP, 8 (fluff)
COMMENTS:

BIOLOGY:

SUBCORES:
COMMENTS: A nonbiology core!!

STATION:CM 337
SAMPLE: RECOVERY OF CURRENT METER
T D:42662.8,26098.3,59610.8,15018.5
L/L: 38° 41.5'N, 72° 06.99'W
DATE: August 3, 1990
TIME: RELEASE APPROX. 1029GMT
DEPTH: 2719m
PULLOUT:
GENERAL COMMENTS:

ON MOORING RECOVERY:

- CONTACTED AND RANGED TO RLS #7015 ON FIRST ATTEMPT
- RECORDED SLANT RANGE AS 2646m WHEN ON SITE OVER MOORING
- DID NOT RECEIVE EXPECTED PING RATE SHIFT FROM 2s TO 1s AFTER RLS COMMAND WAS GIVEN, BUT MOORING CAME UP NORMALLY.
- SEDIMENT TRAPS LOOK VERY GOOD.

STATION:CM 337 (Sta. 3)
SAMPLE:B.C.3
TD 26097.2; 42660.0
L/L:38° 41.17'N ; 72° 06.78'W
DATE: August 3, 1990
TIME: 0914
DEPTH: 2712 m
PULLOUT:8,000 LBS
GENERAL COMMENTS:RAMMING SPEED WAS 25 m/min. AFTER HITTING THE BOTTOM, QUICKLY PAYED OUT 8-10 METERS OF WIRE AND THEN HAULED BACK AT APPROX. 15 m/min. THE PURPOSE OF THIS BOX CORE IS TO HELP MIKE BOTHNER TO DOCUMENT WHAT HE GOT IN THE SEDIMENT TRAPS MOUNTED ON THE MOORING ARRAY. 2773 mwo.

GEOCHEMISTRY:

SUBCORES: # 14,19, 6 and 9
COMMENTS: # 14&19-GeoChem; #6 bulk density; #9 hydrocarbon 0-2cm. #7&8- Fluff

MICROBIOLOGY:

SUBCORES: 12, 13, 18 (for CP) and 8 (for fluff)
COMMENTS: Excellent surfaces on all subcores.

BIOLOGY: ANOTHER NONBIOLOGY CORE

SUBCORES:
COMMENTS: Most of the subcores had salp segments in them.

STATION:CM 336 (Sta 4)
SAMPLE:RECOVERY OF MOORING ARRAY
TD: 42803.8; 14993.5; 26092.0
L/L: 38° 57.30'N, 72° 05.62'W
DATE: August 3, 1990
TIME: 1645 GMT
DEPTH: 2408m
PULLOUT:
GENERAL COMMENTS:

ON MOORING RECOVERY:

- COULD NOT RANGE TO RLS #6024, BUT USED IT TO RELEASE MOORING. ENABLED RLS #5016 FOR RANGING DURING ASCENT.
- EVERYTHING ELSE ROUTINE.
- SEDIMENT TRAPS LOOK VERY GOOD.

STATION: CM 336 (Sta.4)
SAMPLE: B.C. 4
TD 26081.0; 42800.4
L/L: 38° 56.92'N ; 72° 05.43'W
DATE: August 3, 1990
TIME:1440
DEPTH:2410 M
PULLOUT: 10,000 lbs. OHH OHHH BABY!!!
GENERAL COMMENTS: 2457 mwo. Sea conditions have been perfect for box coring. This is another core for Mike to document what he has gotten in the sediment traps on the mooring.
This was a very nice core, quite undisturbed with clear water on top.
GEOCHEMISTRY:

SUBCORES:# 8,9, 19,14,& 7
COMMENTS: #8&9-FLUFF; #19(tef)&14(al.)- GeoChem. #7-hydrocar.

MICROBIOLOGY:

SUBCORES: 12, 13, 18 (CP) and 8 (fluff)
COMMENTS: none

BIOLOGY: And another nonbiology core.

SUBCORES:
COMMENTS:

STATION: Bathymetric survey of the Sludge Basin.(Sta.5)
SAMPLE:
TD
L/L:
DATE: August 3, 1990
TIME: start: 1600 ; end:1740
DEPTH:
PULLOUT:
GENERAL COMMENTS: Several North/South transect lines were done. The deepest depths with lat/long are the following:

2500m	38° 54.59'N	72° 07.23'W
2500m	54.55'N	07.77'W
2500m	54.64'N	08.04'W
2483m	54.72'N	08.62'W
2478m	54.57'N	09.54'W

west/east transect with deepest depths lat/long:

2500m	54.55'N	07.20'W
2500m	54.55'N	07.40'W

survey was done at a ships speed of 5kts.

Position of Sludge Basin Deep: 38° 54.55'N 72° 07.40'N
54.60'N (the trough is between these two latitudes)

time: 1600 piston core is being rigged.

STATION:sludge basin (Sta. 5)
SAMPLE: piston core 1
TD 26094.0 ; 42778.8
L/L: 38° 54.54'N ; 72° 07.4.'W
DATE: August 3, 1990
TIME: 1937
DEPTH: 2495m
PULLOUT: 7000 lbs
GENERAL COMMENTS: 2533mwo. Pinger was located 25m above the core head. Core looked good all the way down. Approx. 23' of penetration. A little section of mud (perhaps 10 cm) was lost from the bottom of one section as the core tubes were cut.

STATION: Sludge Basin (Sta. 5)
SAMPLE: B.C. 5
TD 26093.9 ; 42778.9
L/L: 38° 54.56'N ; 72° 07.39'W
DATE: August 3, 1990
TIME: 2250
DEPTH: 2495 m
PULLOUT: 5000 lbs
GENERAL COMMENTS: 2531mwo. The pullout was a little disappointing but I'm sure we got a good core.

GEOCHEMISTRY:

SUBCORES:19,20 for chemistry;sub core 3 (0-2 cm) for hydrocarbons; 4 and 15 for fluff
COMMENTS:only 20 cm recovery

MICROBIOLOGY:

SUBCORES:14,9,10 CP 15 for fluff.
COMMENTS:Very firm clay below about 3cm. Surfaces looked good.

BIOLOGY:

SUBCORES: 9 subcores were finally taken!! These cores were shifted over to the left in order to accommodate the geochem and microbio. cores needed from the inner nine.
COMMENTS: This was terrible mud to sieve. Soft 0-2cm and then just hard packed mud with a lot of dead forams. Cores were split 0-4cm and 4-10cm. The 0-4cm frac.was not sieved. The 4-10 frac. was sieved through a 300 micron sieve.

STATION: Sludge Basin (Sta. 5)
SAMPLE: B.C. 6
TD 26093.8; 42779.2
L/L: 38° 54.58'N; 72° 07.39'W
DATE: August 4, 1990
TIME:0055
DEPTH:2493m
PULLOUT: 9000 lb
GENERAL COMMENTS:

GEOCHEMISTRY:

SUBCORES:4 and 19 for chemical profiles, core length 26-28 cm.
15 and 3 used for fluff. subcore 20 hydrocarbon (0-2 cm)
COMMENTS:

MICROBIOLOGY:

SUBCORES:14,9,10 CP. 15 fluff
COMMENTS:Good surface, very soft.

BIOLOGY:

SUBCORES: 9 subcores. Once again shifted to the left.
COMMENTS: nice core, great mud very easy to sieve.Cores split 0-4(unsieved) and 4-10cm.

STATION:Sludge Basin (Sta. 5)
SAMPLE: B.C. 7
TD 26093.9; 42778.6
L/L: 38° 54.52'N; 72° 07.38'W
DATE: August 4, 1990
TIME: 0305
DEPTH: 2492m
PULLOUT:11,00 lbs
GENERAL COMMENTS: an 11,000 lb pullout-- WOW ole TITO has the touch!!

GEOCHEMISTRY:

SUBCORES: 3 and 19 for chemical profiles (23.9-22.7 cm length for 3, 25 cm for 19). Subcores 20 and 2 for fluff. 15 (0-2 cm) for hydrocarbons
COMMENTS:

MICRBIOLOGY

SUBCORES: 14, 9 AND 10 CP 20 FLUFF
COMMENTS: Another good surface!

BIOLOGY:

SUBCORES: 9 subcores. Shifted to the left.
COMMENTS: a good core. Hard packed mud deeper that 10cm. Cores split 0-4(unsieved) and 4-10cm.

STATION: Sludge Basin (Sta. 5)
SAMPLE: slow poker (hydraulically damped gravity core)
TD 26093.9, 42778.9, 59657.1, 15005.4
L/L:38° 54.56'N; 72° 07.39'W
DATE: August 4, 1990
TIME:0841
DEPTH:2495 m
PULLOUT:
GENERAL COMMENTS: excellent sample: clear water over sediment on recovery. core length 62 cm on low side, 82.8 on high sice

GEOCHEMISTRY:

SUBCORES: This core was 62-62.8 cm long. Excellent sample, clear overlying water.
COMMENTS:

STATION: 6
SAMPLE:piston core 2
TD 26130.5; 42764.7
L/L: 38° 53.14'N 72° 13.43'W
DATE: August 4, 1990
TIME:1047
DEPTH: 2458 m
PULLOUT: 6,000
GENERAL COMMENTS:

Two sections of mud were recovered-- 0-33 and 33-40. Material was hard and white and looks like the chalk from boulders observed from ALVIN. Grey material represents most of the 33-40 cm section. Weld on top of pilot core gave out (90% of it was rusted out) and pilot was lost. Core cutter was lost, core catcher sheared all fins which moved up the barrel and remained with the sediment.

STATION: Station 7 (nondepression)
SAMPLE: B.C. 8
TD 42778.2; 26082.1
L/L: 38° 54.43'N; 72° 05.40'W
DATE: August 4, 1990
TIME: 1445
DEPTH: 2492 m
PULLOUT: 10,000
GENERAL COMMENTS: Hit bottom at 25m/min.

GEOCHEMISTRY:

SUBCORES:19 (29.5 cm long), 4 (25 cm long) for chemical profiles. 15 (0-2 cm) for hydrocarbons. Subcores 2 and 20 for fluff.
COMMENTS:

MICROBIOLOGY:

SUBCORES: 14, 9 and 10 CP. 20 Fluff.
COMMENTS: Good surface

BIOLOGY:

SUBCORES: nine cores taken once again they were shifted to the left in order to accommodate the geochem and microbio samples.
COMMENTS:very nice mud. Cores split 0-4(unsieved) and 4-10cm.

STATION: Station 7
SAMPLE: B.C. 9
TD 42778.4; 26082.0
L/L: 38° 54.44'N; 72° 05.38'W
DATE: August 4, 1990
TIME: 1655
DEPTH: 2490m
PULLOUT: 9,000 lb
GENERAL COMMENTS: 2566mwo. Disco Ed's first box core!!

GEOCHEMISTRY:

SUBCORES: 19 (28.7 cm), 15 (31.2 cm) for chemical profiles. 20 (0-2) for hydrocarbons. 3 and 4 for fluff.

COMMENTS: In core 19 at least 4 SALPS were dragged 5-9 cm below the sediment surface in the process of pushing in sub cores. These may have been trapped by the screens of the box corer as the instrument traversed the water column. A number of salps have been observed on the sediment surface at various stations. Bothner saved two specimens in ethanol for Larry Madin to look at. If their stomachs are intact, they probably were collected from the water column. If not, they may have been dead and on the sediment surface. It's important to know that such organisms can be dragged into the sediment as the subcores are collected.

No salps were observed on the surface or at depth in core 15

MICROBIOLOGY:

SUBCORES: 14, 9 and 10 CP. 4 Fluff.
COMMENTS: Good surface.

BIOLOGY:

SUBCORES: nine cores shifted to the left.
COMMENTS: Beautiful soft mud, easy to sieve.

STATION: Station 7
SAMPLE: B.C.10
TD 42778.4; 26082.3
L/L: 38° 54.45'N; 72° 05.43'W
DATE: August 4, 1990
TIME:1925
DEPTH:2490 m
PULLOUT:6,000 lb
GENERAL COMMENTS: Hit bottom at 25m/min.

GEOCHEMISTRY:

SUBCORES:4 (23.5-24.5 cm) and 19 for chemical profiles. 3 (0-2 cm) for hydrocarbons. 2 and 15 for fluff.
COMMENTS:

MICROBIOLOGY:

SUBCORES: 14, 9 and 10 CP. 15 Fluff.
COMMENTS: Another good surface.

BIOLOGY:

SUBCORES:nine cores shifted to the left once again.
COMMENTS: Beautiful soft mud, polychaetes and tubes were even seen. Cores split 0-4(unsieved) and 4-10cm.

STATION: Station 8 (Base of Slope)
SAMPLE: B.C. 11
TD 42824.3; 26108.5
L/L: 38° 59.71'N ; 72° 10.2'W
DATE: August 4, 1990
TIME:2000
DEPTH:2207m
PULLOUT:9,000 lb
GENERAL COMMENTS: 2260mwo. Looks like it will be a good core.

GEOCHEMISTRY:

SUBCORES:19 (26 cm) and 14 (27 cm) for chemical profiles. 8 (0-2 cm) for hydrocarbons. 3 and 9 for fluff.
COMMENTS:

MICROBIOLOGY:

SUBCORES: 18, 13, 12 (CP); 3 (Fluff)
COMMENTS: Water above cores was more turbid than I've seen with others.

BIOLOGY:

SUBCORES: ooooooohhhhh-- a nonbiology core!!
COMMENTS:

STATION: Station 9 (Base of Slope)
SAMPLE: no sample--3 box core attempts
TD
L/L: 39° 03.77'N 72° 02.95'W
DATE: August 5, 1990
TIME:0100
DEPTH:
PULLOUT:5.5- 6000 lb
GENERAL COMMENTS: 3 attempts made all were NFG. 1st. hit bottom at 25m/min. hauled in at 15m/min- no shift low pullout. Brought b.c. up 100m and tried again. 2nd attempt-- hit bottom at 30-35m/min, hauled back at 20-25m/min. no shift, low pullout of 5.5-6000 lb pullout. same as above. Attempted a third time with the same results. Decided to bring it back and check it out. #@*$#!
The problem here was that the wire was wrapped around the pinger bracket so that it was impossible for the box core to trip. Used the bull rope to haul the box core back on deck.
GEOCHEMISTRY:

SUBCORES:
COMMENTS:

MICROBIOLOGY:

SUBCORES:
COMMENTS:

BIOLOGY:

SUBCORES:
COMMENTS:

STATION:9
SAMPLE:B.C.12
TD 42863.2, 26062.5
L/L: 39° 03.94'N, 72° 02.95'W
DATE: August 5, 1990
TIME:0330
DEPTH:2178
PULLOUT:10,000 lbs
GENERAL COMMENTS: excellent core. overlying water perfectly clear

GEOCHEMISTRY:

SUBCORES:14 (24 cm length) and 19 (28.5 cm) for chemical profiles. 17 (0-2 cm) for hydrocarbons. 8 and 9 for fluff samples (micro layer at the water sediment interface.
COMMENTS:

MICROBIOLOGY:

SUBCORES: 18, 13 and 12 CP. 9 Fluff
COMMENTS: No comment.

BIOLOGY:

SUBCORES: a nonbiology core
COMMENTS:

STATION: Battelle's buoy (A BOTHNER FANTASY)
SAMPLE: Dolphin fish
TD
L/L:38° 48.68'N, 72° 06.47'W
DATE: August 5, 1990
TIME:0530
DEPTH: on the surface, 20 m from buoy
PULLOUT: 30 lbs for 20 minutes. NObody would stop the ship travelling 5 kts.

GENERAL COMMENTS: The fish hit cut squid which was artfully cast by M. Bothner as Oceanus passed the buoy during a bathymetric survey. The fish jumped to a height of 1.5 meters as soon as it was hooked displaying a beautiful bright blue back in the first rays of the morning sun. It fought with its head broadside and little line could be retrieved until the ship was finally slowed.

The first attempts at gaffing the fish failed. The dorsal fin was cut in the process which stimulated the fish to dive under the ship and strip out about 30 meters of line. Following this turn of events, a great deal of advice was presented by all onlookers regarding the proper fighting and boating techniques. On the next pass near the ship Patrick Moan gaffed the fish and hauled it aboard. Everybody cheered.

Peter Mills thoughtfully quieted the fish with accurate blows to the head with the 12 lb coring sledge hammer.

The fish measured 1.11 m (43.75 in) and weighed 21.5 lbs.

GEOCHEMISTRY: The entire fish was frozen for various chemical analysis much to the chagrin of the microbiologist on board (Ivor Knight) and others.

SUBCORES:
COMMENTS:

MICROBIOLOGY:

SUBCORES:
COMMENTS:

BIOLOGY:

SUBCORES:
COMMENTS:

STATION: Station 10
SAMPLE: Piston Core 3
TD 42731.0; 26092.6
L/L: 38° 49.17'N 72° 06.72'W
DATE: August 5, 1990
TIME: 0959
DEPTH: 2642m
PULLOUT:8,000 lb
GENERAL COMMENTS: A beautiful core -- 25' core

STATION: STATION 10
SAMPLE: Slow Poker-2 (HGC)
TD 43731.1 26092.6
L/L: 38° 49.18'N; 72° 06.70'W
DATE: August 5, 1990
TIME: 1200
DEPTH:2640m
PULLOUT:4500 lb
GENERAL COMMENTS: The instrument was set on the sea floor twice. Neither time did the pinger shift. There was very low pullout. The good news is that when it did get back on deck it had taken a sample.

Our best guess as to why the pinger didn't change is that the lanyard nicropress got caught in the tie wrap "pulley" causing the string to break before pulling the magnet. If the core was taken on the first hit though, why didn't the ball get pushed off on the second attempt?

GEOCHEMISTRY:

SUBCORES: core length, 63.5-64 cm. somewhat blocky on the surface. a few large hard pieces on the interface. Box core from this location showed similar sediment.

STATION: Station 10
SAMPLE: B.C. 13 NFGNFGNFGNFGNFG
TD 42731.2; 26092.5
L/L: 38° 49.18'N; 72° 06.71'W
DATE: August 5, 1990
TIME: 1640
DEPTH: 2635m
PULLOUT: approx. 4.5-5,000 lbs
GENERAL COMMENTS: Two attempts were made both with the same results. Hit bottom at 25m/min. no shift of the pinger and an extremely low pullout. So we tried the same thing again with similar results. It could be that we did get a sample and it was just the pinger magnet string which hung up. Only time will tell. The ole gremlins are starting to come out of the bottom ooze to attack us. Well I do stand corrected!! The wire was wrapped once again around the column, #@*$#!! And the Bull Rope comes gracefully dancing on deck for a repeat performance and does its job well.

GEOCHEMISTRY:

SUBCORES:
COMMENTS:

MICROBIOLOGY:

SUBCORES:
COMMENTS:

BIOLOGY:

SUBCORES:
COMMENTS:

STATION:Station 10
SAMPLE: B.C.13 (third attempt)
TD 42731.0; 26092.6
L/L:38° 49.16'N; 72° 06.70'W
DATE: August 5, 1990
TIME:1854
DEPTH:2639 m
PULLOUT: 6,000 lb
GENERAL COMMENTS: The core was not as good as we all hoped. We did get a core thanks to Robin's glasses which broke the gremlin curse.The sediment type was blocky hard packed clay with a small amount of soft recent sedimentation on top. Mike said that this could be a slump deposit area.

GEOCHEMISTRY:

SUBCORES: 14 (18.6-19.5 cm length) and 15 (15.4-16 cm) for chemical profiles.3 (0-2 cm) for hydrocarbons (in plastic ? out of glass jars). 4 and 5 for fluff.
COMMENTS:

MICROBIOLOGY:

SUBCORES: 14, 9 and 10 CP. 4 fluff.
COMMENTS: None.

BIOLOGY:

SUBCORES: This stuff was impossible to sieve. But Mike found a burrow in his slow poker core at 16cm - it was Old and it was Deep.Could it be Hemingway's Old Worm of the sea?? Mike convinced Fred that we should search for its cousin in the above box core. No wall too thick no tube too thin would hinder our search. And search we did. But to no avail!! Our method consisted of slicing by our delicate hands the upper soft surface (0-2cm) of these cores and then sieving. We did find a few brittle stars which would be a good bioturbator and two polychaetes. THE END.
COMMENTS:

STATION: Station 11 (Nondepression depression)
SAMPLE: Bathymetric survey
TD
L/L:
DATE: August 5, 1990
TIME:
DEPTH:
PULLOUT:
GENERAL COMMENTS: Entered site on heading of 095° at 11 knots coming from Station 10. The target site of 38° 49.25' and 72° 02.80 was reached on a slight plateau and then the depth continued to drop after we passed through the site--
no depression... We then went north and returned to south of the site on 250° then due north on 02.00 line then 250° then 270° the 180°...No Depression!!! track on end of second stack of depth sounder records.

STATION: Station 11
SAMPLE: B.C. 14
TD 42733.3; 26069.6
L/L: 38° 49.29'N; 72° 02.77'W
DATE: August 5, 1990
TIME:2040
DEPTH: 2625m
PULLOUT: 10,000 lbs
GENERAL COMMENTS: 2685mwo. Looks like it was a good core. We realized that we need to rely on the tension drop in order to determine bottom and not the PDR.

GEOCHEMISTRY:

SUBCORES:14 (34.3 cm long) and 19 (38 cm long) for chemical profiles. 8 (0-2 cm) hydrocarbon sample in plastic jar. 7 and 15 for fluff.
COMMENTS:

MICROBIOLOGY:

SUBCORES: 18, 13, 12 (CP) 8 (Fluff)
COMMENTS: Very soft mud. Deep cores. Slightly turbid water.

BIOLOGY:

SUBCORES:
COMMENTS: a nonbiology core. TOOOOOO Badddddddd cause it was BBBeautiful Mudddd!!!

STATION: Station 7 (nondepression)
SAMPLE: slow poker- 3 failed attempts!!
TD 42778.4; 26082.3
L/L: 38° 54.45'N; 72° 05.43'W
DEPTH:2490 m
DATE: August 6, 1990
TIME:0029-0630
PULLOUT:

GENERAL COMMENTS: We did not get a change in ping rate on any of the three attempts. On the first one the ball tripped, but the piston did not travel far enough to pull the magnet. Magnet lanyard was changed to the ball holdback wire and bottom bearing plates were loosened. Following second failure, core was reloaded with blocks under the forward legs to level the corer. Third cast had same result - no trip. On return however, the corer had mud on two sides and feet as if it had been dragged. Questions is whether it was dragged over or whether it tumbled on descent which was routinely 50 m/min, starting out at 25 m/min for the first 100 m.

The instrument tripped as designed on deck at the end of the third cast.???

STATION: Station 12 (Control Station 3)
SAMPLE: Box Core 15
TD 43054.4; 25554.3
L/L: 39° 27.52'N; 70° 40.12'W
DATE: August 6, 1990
TIME: 1330
DEPTH: 2498m
PULLOUT:10,000 lbs
GENERAL COMMENTS: 2575mwo. Looks as though it will be a good core. The last one for this cruise. And the new box core now deserves to be called a true MUDBUSTER!!
It is a Great core with wonderful soft mud. Thus ends our box coring mania.
GEOCHEMISTRY:

SUBCORES: 7 (37.9 cm), 19(34.3cm teflon) for Chem. profiles Frozen. Extra cores: 15(35.5cm), 12 (32.2-33.7cm) refrig. Subcores 8 and 9 for Fluff. HC sample in plastic- subcore # ???.
COMMENTS:

MICROBIOLOGY:

SUBCORES: 18, 13, 14 (CP); ? (Fluff)
COMMENTS:

BIOLOGY:

SUBCORES: a nonbiology core
COMMENTS:

STATION: Station 13 (GB-16)
SAMPLE:HGC -3 (slow core)
TD 43406.8, 13328.5
L/L: 40° 34.31'N; 67° 12.62'W
DATE: August 7, 1990
TIME:0423
DEPTH: about 130 ? pdr not working
PULLOUT:
GENERAL COMMENTS: Excellent core. Clear overlying water. 40 cm long. Some organisms on the surface, shrimp like. One that looks like a worm, pink.

STATION: 13 (GB-16)
SAMPLE:van veen 1
TD 43406.8, 13328.5
L/L: 40° 34.31'N, 67° 12.64'W
DATE: August 7, 1990
TIME: 0440
DEPTH: 130m
PULLOUT:
GENERAL COMMENTS: good surface

GEOCHEMISTRY:

SUBCORES: 1 push core, 1 scoop, 0-2 cm
COMMENTS:

MICROBIOLOGY:

SUBCORES: syringe sample for CP.
COMMENTS:

STATION: 13 (GB - 16)
SAMPLE: van veen 2
TD 43406.9, 13328.3
L/L: 40° 34.33'N; 67° 12.63'W
DATE: August 7, 1990
TIME: 0458
DEPTH:130m
PULLOUT:
GENERAL COMMENTS: good sample, washed area in the middle due to a cerianthid tube (sea snot) in the jaws - this area avoided in sampling. A cerianthid is a borrowing anemone.

GEOCHEMISTRY:

SUBCORES: 1 push core, 1 surface scoop, 0-2 cm
COMMENTS:

MICROBIOLOGY:

SUBCORES: syringe for CP
COMMENTS:

STATION: 13 (GB-16)
SAMPLE:HGC 4 (slow core)
TD 43406.9, 13328.4
L/L: 40°34.32'N; 67° 12.62'W
DATE: August 7, 1990
TIME: 0511
DEPTH: 130m
PULLOUT:
GENERAL COMMENTS: good core, water overlying was somewhat cloudy. Surface looked finer than previous core. Length 29 cm.

STATION: 13 (GB-16)
SAMPLE: van veen 3
TD 43407.0, 13328.2
L/L: 40° 34.34'N; 67° 12.62'W
DATE: August 7, 1990
TIME:
DEPTH: 130m
PULLOUT:
GENERAL COMMENTS: Perfect grab. Full recovery.

GEOCHEMISTRY:

SUBCORES:1 push core, 1 scoop (plastic) 0-2 cm.
COMMENTS:

MICROBIOLOGY:

SUBCORES:1 syringe for CP
COMMENTS:

STATION:14 (GB 5-1)
SAMPLE: HGC 5 (SLOW CORE)
TD 13447.7, 43455.1
L/L: 40° 39.47'N; 67° 46.00'W
DATE: August 7, 1990
TIME: 0748
DEPTH:79 m
PULLOUT:
GENERAL COMMENTS: 39-40 cm length. possible shell at the surface. Clear overlying water.

STATION: 14 (GB 5-1)
SAMPLE: Van Veen 4
TD 13447.9, 43455.1
L/L: 40° 39.46'N; 67° 46.04'W
DATE: August 7, 1990
TIME:0817
DEPTH:79m
PULLOUT:
GENERAL COMMENTS: First grab at this station washed out due to shells in jaws. This sample was excellent.

GEOCHEMISTRY:

SUBCORES: 1 push core and one scoop sample 0-2cm.
COMMENTS:

MICROBIOLOGY:

SUBCORES: syringe for Clostridium perfringens
COMMENTS:

STATION: 14 (GB 5-1)
SAMPLE: HGC 6 (SLOW CORE)
TD 13447.8, 43455.0
L/L: 40° 39.46'N; 67° 46.04'W
DATE: August 7, 1990
TIME: 0817
DEPTH:79 M
PULLOUT:
GENERAL COMMENTS: CORE LENGTH; 52.9-54.3 cm. Perfectly clear overlying water. Uniform texture at the surface, but lots of amphipods and tubes. About three gastropod shells 2 mm long at the surface. Little drainage as the core sat on deck.

STATION: 14 (GB 5-1)
SAMPLE: Van Veen 5
TD 13447.8, 43455.1
L/L: 40° 39.47'N; 67° 46.02'W
DATE: August 7, 1990
TIME: 0826
DEPTH: 79 M
PULLOUT:
GENERAL COMMENTS: Slightly washed in one part of the grab, sampling was avoided in this area.

GEOCHEMISTRY:

SUBCORES: 1 push core, one scoop sample 0-2 cm.
COMMENTS:

MICROBIOLOGY:

SUBCORES: 1 syringe for CP
COMMENTS:

STATION: 14 (GB 5-1)
SAMPLE: Van Veen 6
TD 13447.7, 43455.1
L/L: 40° 39.47'N; 67° 46.02'W
DATE: August 7, 1990
TIME: 0838
DEPTH: 79 M
PULLOUT:
GENERAL COMMENTS: Perfect grab. Shell material and coarse sand made it difficult to push in the sub core.

GEOCHEMISTRY:

SUBCORES: 1 push core , one scoop 0-2 cm.
COMMENTS:

MICROBIOLOGY:

SUBCORES: 1 syringe for CP
COMMENTS:

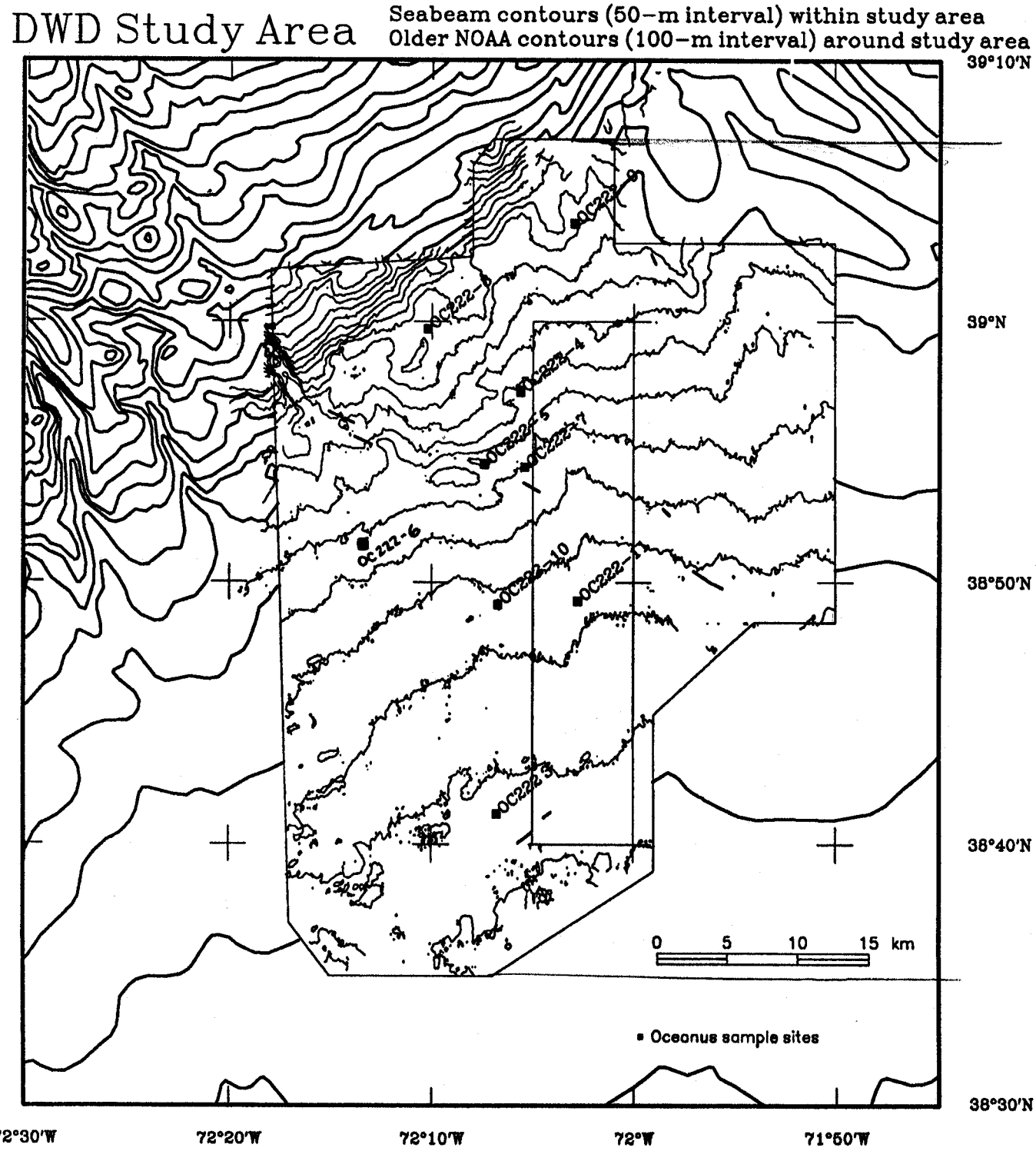

Figure 1. Sediment sampling station locations: Oceanus 222

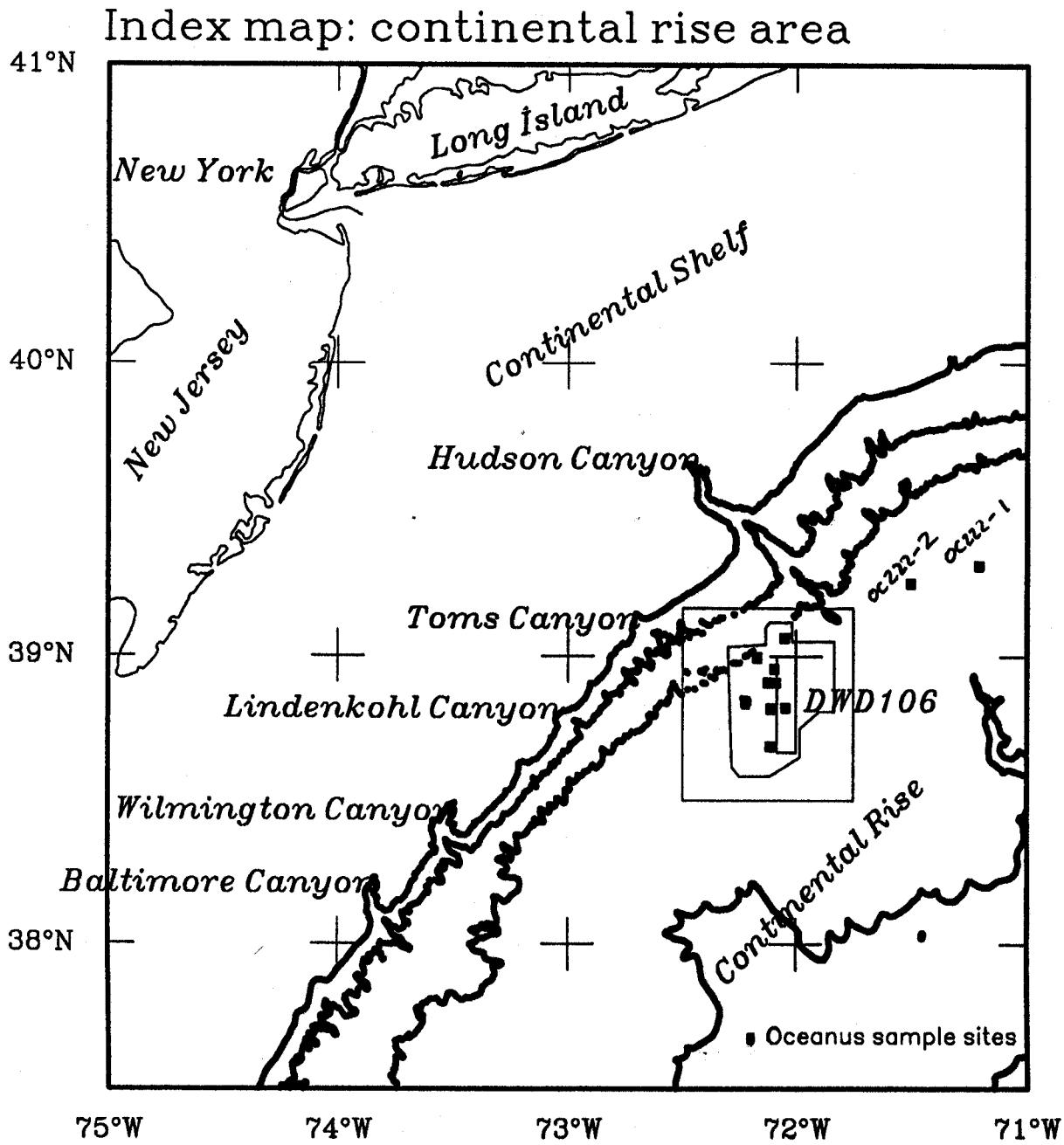

Figure 2. Sediment sampling station locations: Oceanus 222

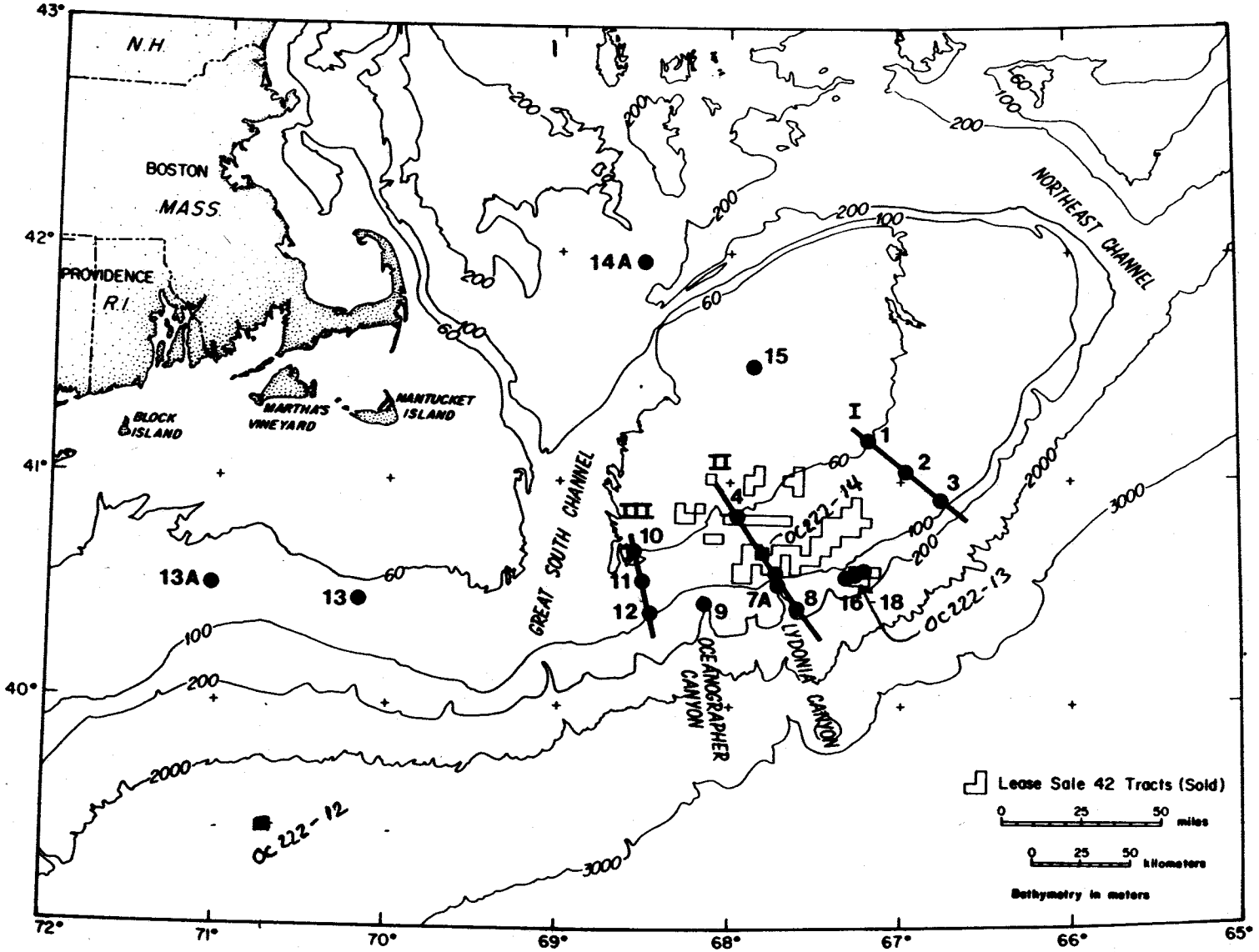

Figure 3. Sediment sampling station locations: Oceanus 222. Base map shows location of stations sampled during the Georges Bank Monitoring Program.

[redacted]

Date Thursday August 2, 1990 Cruise III Page 1

#90026

Date	Time #4	GMT	Type	Reading	Lat: N	Lon: W	Remarks
	0709	1109	BOUYS #1 + #2 ⊖			DEPART	WOODS HOLE
	0722		BUOY #		25 ⊖		
	0746	1146	L-7 VIS		41-26.40	70-46.70	ROBINSON'S # 28 ⊖ CLOSE
	0818	1218	RA		41-22.1	70-52.1	C/C 183°T obm #29
			Loran C set on 9960			X+Y (25-43)	
	0900	1300	LC		41-43.75	70-53.81	
	1000	1400	LC		41-02.01	70-56.38	C/C 189°T
	1100	1500	LC		40-50.00	70-58.98	
	1200	1600	GPS		40-37.31	71-01.78	1229 C/C 183°G
	1300	1700	L-7		40-24.34	71-03.93	C/C 185
	1400	1800	"		40-11.40	71-05.72	
	1500	1900	"		39-58.26	71-07.53	
	1600	2000	"		39-45.29	71-09.43	
	1700	2100	"		39-32.28	71-11.28	
	1758	2158	L-7		39-20.02	71-12.02	H.T ON STA # 1
	2013	0013			39-19.52	71-12.22	Cmc. Box Core #1
	2121	0121	X Y	25747.1 42990.1	39-18.88	71-12.38	Core on bottom
	2130	0130	X Y	25747.3 42989.6	39-18.82	71-12.40	2nd hit
	2228	0228			39-18.47	71-12.59	core #1 on deck
	2255						VYs to reposition
	2307	0307			39-18.93	71-12.66	Fin sta S/C 258°T
							F.A

[redacted]

Date Friday, August 3, 1990 Cruise 222 Page 2

Date	Time +4	GMT	Type	Reading	Lat: N	Lon: W	Remarks
8/3	0000	0400	L-7		39-16.45	71-26.75	
	0015	0415	"		39-15.93	71-30.08	H.T. STA #2
	0028	0428	"		39-15.76	71-30.10	CMC Box Core #2
	0128	0528	"	25855.4 42960.5	39-15.16	71-30.07	Core on Bottom
	0225	0625	"		39-14.70	71-30.08	Box Core ABD
	0242	0642	"		39-14.56	71-30.11	F/W STA C/S 221G-190RPM
	0300	0700	"		39-12.47	71-32.46	
	0400	0800	L-8		39-02.91	71-43.76	
	0500	0900	"		38-53.16	71-54.42	
	0611	1011	L-7		38-41.48	72-06.97	H.T. MOORING SITE STA #3 # 337
	0712	1112	"	26099.0 42662.0	38-41.41	72-07.12	CMC RECOVERY MOORING # 337
	0744	1144	"		38-41.15	72-07.04	F/W RECOVERY
	0810	1212	"		38-41.65	72-07.01	CMC Box core #3
	0910	1310	"	26097.2 42660.0	38-41.17	72-06.78	on bottom
	1018	1418	"		38-40.53	72-06.55	Core on deck
	[illegible]	1434	"				[illegible]
	1100	1500	"		38-45.13	72-06.14	
	1116	1516	"		38-48.65	72-06.59	along side Batelle buoy
	1200	1600	"		38-57.29	72-05.61	H.T. MOORING SITE STA #4 #336
	1237-1320		"	26082.8 42797.4	38-56.58	72-05.70	RECOVER MOORING #336
	1346	1746	"		38-57.50	72-05.67	CMC BOX CORE #4
	1438	1838	"	[illegible] 42800.4	38-56.92	72-05.43	Box Core on Bottom
	1523	1923	"		38-56.46	72-05.34	Core on Deck
	1535	1935	"		38-56.02	72-05.42	F/W STA V C/S to Survey
	1554	1954	"		38-55.4	72-07.7	CMC Survey C/S 180 @ 5k
	1610	2010			38-54.12	72-07.58	S/C 030 (T)
	1619	2018			38-54.59	72-07.23	AXIS

R/V Oceanus Position Log

Date FRIDAY AUG 3 1990 Cruise 222 Page 3

Date	+4 Time	GMT	Type	Reading	Lat: N	Lon: W	Remarks
8/3	1626	2026	L-7		38-55.00	72-07.05	S/C 270(T)
	1634	2034	"		38-54.90	72-07.82	S/C 180 (T)
	1636	2036	"		38-54 73	72-07 87	S/C 230 (T)
	1645	2045	"		38-54.38	72-08.58	S/C 000 g
	1700	2100	"		38-55.22	72-08.80	S/C 225 g
	1711	2111	"		38-55 55	72-09.46	S/C 090(T)
	1739	2139	"		38-55.55	72-06 91	F/W SURVEY H.T.
	1818	2218	"		38-54.49	72-07.03	V/S CMC PISTON CORE OPS
	1937	2337		26094.0 42778.8	38-54.54	72-07.40	CORE HIT
	2052	0052			38-54.50	72-07.66	core on board.
	2153	0153			38-55.10	72-07.58	Cue box core # 5
	2246	0246	LC	26093.9 42778.9	38-54.56	72-07.39	Core on bottom
	2332	0332			-54.54	-07.09	Core on deck

[redacted]

Date SATURDAY, August 4, 1990 Cruise 22C Page 9

Date	Time	GMT	Type	Reading	Lat: N	Lon: W	Remarks
	0000	0400	L-7		38-55.15	72-07.41	0004 CMC Box Core #6
	0057	0457	L-7	26093.8 42779.2	38-54.58	72-07.39	Core on Bottom
	0142	0542	"		38-54.34	72-07.13	Core on Dock
	0204	0604	"		38-54.54	72-07.27	Box Core #7
	0306	0706	"	26093.9 42778.6	38-54.52	72-07.38	Core on Bottom
	0358	0758	L-7		38-54.20	72-07.43	Box Core #7 ABD
	0425	0825	"		38-54.02	72-07.40	CMC NET TOW
	0513	0913	"		38-53.48	72-07.39	NET TOW ABD
	0642	1042	"		38-53.96	72-07.38	CMC SLOW V C/S POKER CORE CAST
	0736	1136	L-7	26093.9 42778.9	38-54.56	72-07.39	HIT BOTTOM
	0829	1229			38-54.88	72-07.77	Poker on deck
	0847	1247					S/C 254°T, FA
	0912	1312			- 53.47	- 13.52	H.T.
	0957	1357	"		- 53.21	- 13.42	piston CMC Core #2
	1049	1449	"	26130.5 42764.7	38-53.14	72-13.43	Core on bottom
	1150	1550					[illegible]
	1200	1600	"		38 52.89	72-13.66	Pozit.
	1357	1757			38-54.41	72-05.86	CMC Box Core #8
	1447	1847	"	26082.1 42778.2	38-54.43	72-05.40	Core on Bottom
	1535	1935	"		38-54.14	72-05.11	Core on Board
	1558	1958	L-7		38-55.02	72-05.71	CMC Box Core #9
	1652	2052	"	26082.0 42778.4	38-54.44	72-05.38	HIT Bottom
	1750	2150	L-7		38-53.91	72-05.59	Core ABD
	1826	2226	"		38-54.55	72-06.17	CMC box core #10
	1919	2319	L-7	26082.3 42778.4	38-54.45	72-05.43	HIT Bottom
	2023	0023			38-54.7	72-05.67	Fin star S/C 330°T, FA
	2055	0055			38 39.5	72-09.24	HIT, CMC Box core #11

[redacted]

Date SATURDAY, AUGUST 4 1990 Cruise 222 Page 5

Date	+4 Time	GMT	Type	Reading	Lat: N	Lon: W	Remarks
	2159	0159	LC	26 108.5 42 824.3	38-59.71	72-10.21	core on bottom
	2241	0241	"		38-59.84	72-10.54	
	2310	0310	"		38-59.82	72-10.83	FIN STA S/C 056°, Fo-
	2349	0349	"		39-03.97	72-03.50	H.T. Cue Box core # 12
	2355	0355	"		"	"	" " " "
	~~2329~~	~~0329~~	"				S/C [redacted]

Date SUNDAY, AUGUST 5, 1990 Cruise 22 Page 6

Date	Time (+4)	GMT	Type	Reading	Lat: N	Lon: W	Remarks
	0000	0400	L-7		39-04.01	72-03.40	Posit.
	0054	0454	"	26062.4 42863.4	39-03.97	72-02.95	NO Core 3 Trys
	0145	0545	"	—	39-04.21	72-02.92	NO TRIP. ON DECK
	0239	0639	"		39-03.98	72-03.16	CMC BOX CORE # 12(A)
	0326	0726	"	26062.5 42863.2	39-03.95	72-02.96	CORE IN BOTTOM (Good)
	0409	0809	L-7		39-04 09	72-02 86	CORE # 12A ABD
	0420	0820	"		39-04.14	72-02.77	F/W STA S/C 192 F/A
	0500	0900	L-7		38-57.08	72-05.38	POSIT
	0537	0937	"		38-49.61	72-06.72	S. TRANSECT ARRIVE STA V C/S SURVEY
	0758						Fin survey
	0810	1210			38-49.18	72-06.71	On core sta
	0845	1245			-46.16	-06.73	Cmc piston core # 3
	0959	1359		26092.6 42731.0	-49.17	-06.72	core on bottom
	1118	1518	"		-49.18	-06.72	core on board.
	1200	1600	"		38.49.20	72 06.73	Posit. NOUSTON TOW
	/						12.2 N. TOW ABD
	1228	1628	"		38-49.21	72-06.80	Cmc. SLOW POKER
	1330	1730	"	26092.6 42731.1	38-49.18	72-06.70	S.P. on Bottom (2 Hit
	1450-1525						1431 S.P. ABD NOUSTON TOW
	1530				38-49.27	72-07.03	Cmc BOX CORE # 13
	1630	2030	L-7		38-49.17	72-06 70	HIT N/G
	1640	2040	"	26092.5 42731.2	38-49.18	72-06.71	HIT #2 NO PULL OUT
	1745	2145	"		38-49.56	72-07.00	#13 ABD FOULED ON WIRE
	1758	2158	L-7		38-49.49	72-06.93	Cmc Box CORE # 13 RETAKE
	1853	2253	"	26 092.6 42-731.1	38-49.17	72-06.71	Core on bottom
	1944	2344	L-7		38-49.52	72-07.01	#13 ABD
	2016	0010					Fin sta S/C 095°T, F/A

[illegible]

Date SUNDAY, AUGUST 5 1990 Cruise 222 Page 7

Date	Time +4	GMT	Type	Reading	Lat: N	Lon: W	Remarks
	2025	0025			38-49.25	72-02.8	V/C on survey
	2110	0110	LC		38-49.29	72-02.76	H.T.
	2123	0123	LC		38-49.33	72-02.75	Core Box Core #14
	2219	0219	LC	26 069.6 42 733.4	38-49.30	72-02.78	1st Rit
	2228	0228	LC	26069.6 42 733.3	38-49.28	72-02.77	2nd Rit
	2317	0317	LC		38-49.11	72-02.82	Core onboard
	2329						S/C 34.0T 12K

Date MONDAY, AUGUST 6, 1990 Cruise 222 Page 8

Date	Time (+4)	GMT	Type	Reading	Lat: N	Lon: W	Remarks
	0000	0400	L-7		38-54.69	72-05.54	
	0029	0429	"		38-54.59	72-05.53	CMC. SLO-POKER
	0124	0524	"	26082.1 42778.3	38-54.44	72 05.39	ON BOTTOM (2 HITS)
	0215	0615	"		38-54.29	72-05.61	ON BOARD
	0236	0636	"		38-54.58	72-05.57	CMC. SLO-POKER
	0330	0730	"	26082.1 42778.4	38-54.44	72-05.39	ON BOTTOM
	0416	0816	L-7		38-54.60	72-05.50	SLO POKER ABD
	0436	0836	"		38-54 86	72-05 85	CMC SLO POKER
	0532	0932	L-7	26082.2 42778.3	38-54.43	72-05.40	HIT BOTTOM HIT # 1
	0536	0936	"	26082.2 42778.6	38-54.46	72-05.40	HIT RETAKE HIT # 2
	0539	0939	"	26082.0 42778.4	38-54.45	72-05.38	HIT RETAKE #3
	0543	0943	L-7	26082.0 42778.4	38-54.45	72-05.37	HIT RETAKE #4
	0627	1027	"		38-54.53	72-05.27	SLO POKER ABD
	0630	1030	"		38-54.50	72-05.24	F/W STA S/C 056 F/A
	0700	1100	L-7		38-57.47	71-59.50	S/C 054
	0730	1130					S/C 052
	0800	1200	"		39-04.58	71-45.94	
	0900	1300	"		39-11.73	71-33.12	
	0955	1355	"		39-18.01	71-20.92	STOP
	1000	1400	"		"	"	Resume C+S
	1100	1500	"		39-21.49	71-05.16	
	1200	1600	"		39-24.95	70-49.01	Posit. C/C 074T
	1230	1630	"		39-27.62	70-40.00	CMC BOX CORE #15
	1334	1734	"	25554.3 43054.4	39-27.52	70-40.12	CORE ON BOTTOM
	1424	1824	"		39-27.99	70-40.34	CORE ON DECK
	1432	1832	"		39-28.05	70-40.25	F/W STA C/S 069°T-190M
	1500	1900	"		39-29.84	70-33.89	C/C 067°G

Date: MONDAY, August 6, 1990 Cruise: 222 Page: 1

Date	Time (+4)	GMT	Type	Reading	Lat: N	Lon: W	Remarks
	1600	2000	L-7		39-34.23	70-18.36	S/C 069 @ 1630
	1700	2100	"		39-38.65	70-02.81	
	1800	2200	L-7		39-42.76	69-47.10	
	1900	2300	"		39-47.00	69-31.14	
	2000	2400	"		39-51.69	69-14.62	
	2100	0100	"		39-56.62	68-57.34	
	2200	0200	"		40-00.99	68-39.95	
	2300	0300	"		40-04.74	68-23.59	
	shift loran c to w+y (13+43) 9960 chain						

Date: TUESDAY, AUGUST 7, 1990 Cruiser: 222 Page: 10

Date	Time +4	GMT	Type	Reading	Lat: N	Lon: W	Remarks
	0000	0400	L-7		40-09.44	68.07.30	
	0100	0500	"		40-12.71	67-51.54	
	0200	0600	"		40-17.77	67-36.31	
	0227	0627	"		40-19.98	67-30.02	C/C 041°T
	0300	0700	"		40-25.19	67-22.97	
	0400	0800	L-7		40-34.31	67-12.71	ARRIVE G.B STA #16
	0415	0815	"		40-34.32	67-12.63	CMC CASTS / JITTER 0.10
	0423	0823	"	13328.2 43407.0	40-34.39	67-12.62	SLO POKER HIT 1ST CAST
	0440	0840	"	13328.5 43406.8	40 34.31	67 12.64	V.V. HIT #1
	0458	0858	"	13328.3 43406.9	40-34.33	67-12.63	V.V. HIT #2
	0511	0911	L-7	13328.4 43406.9	40-34.32	67-12.64	SLO POKER HIT 2nd CAST
	0526	0926	"	13328.2 43407.0	40-34.34	67-12.62	V.V. HIT #3
	0532	0932	"		40-34.39	67-12.63	F/U STA S/C 281 @ 190 RPM.
	0600	1000	L-7		40-35.62	67-20.41	
	0625				—	—	UIS KEPLER - 1 3/4 CMC SICKS + PRECAUTIONS
	0702	1102	L-7		40-39.28	67-38.42	
	0728	1128	"		40-39.44	67-46.00	ARRIVE STA S-1 V C/S
	0743	1143	"				CMC MUD GRABS
	0748	1148	"	13447.7 43455.1	40-39.47	67-46.00	SLO POKER CAST #2 HIT
	0758	1158	"	13447.8 43455.1	40-39.47	67-46.03	mud grab #1
	0804	1204	"	13447.9 43455.1	-39.46	-46.04	" " #2 WASH OUT
	0817	1217	"	13447.8 43455.0	-39.46	-46.02	slo poker cast #2
	0826	1226	"	13447.8 43455.1	-39.47	-46.02	mud grab #3
	0838	1238		13447.7 43455.1	-39.47	-46.02	mud grab #4
	0844	1244			"	"	Fin sta S/C 304°T, F.A.
	0900	1300	"		40-41.43	67-49.80	
	1000	1400			40-50.23	68-05.83	

[illegible]

Date TUESDAY AUG. 7, 1990 Cruise #222 Page 11

Date	+4 Time	GMT	Type	Reading	Lat: N	Lon: W	Remarks
	1100	1500	LC		40-58.41	68-20.39	
	1200	1600	L-7		41-05.34	68-35.23	
	1300	1700	"		41-11.77	68-49.16	
	1400	1800	"		41-19.82	69-01.94	
	1500	1900	"		41-25.47	69-16.29	
	1509	1909	"		41-26.57	69-18.12	C/C 270°T V C/S TRAFFIC
	1600	2000	"		41-26.21	69-31.94	1555-1610 V C/S TRAFFIC
	1642	2042	L-7		41-26.09	69-43.29	GRS OFF STA S/C 260 (T)
	1722	2122	"		41-24 43	69-54 89	"CRC" ⊖ 1/10 mi
	1737	2137	" RA		41-26 .35	69-58 .70	S/C 275 (T) BUOY #"13" ⊖ 4/10
	1759	2159	" RA		41-26.54	70-05.01	# 15 ⊖ 3/10
	1820	2220	L-7 V/RA		41-26.85	70-11.00	#17 ⊖ 3/10
	1906	2306	L-7		41-27 .87	70-23 .58	.27mi "NS" ⊖
	1924	2324	"		41-28 24	70-28 87	# 22 ⊖ 1/10 mi S/C 287
	1943	2343	"		41-29 48	70-34 09	# "NW" ⊖ CLOSE S/C 280 (T)
	2000				41-30.70	70-[illegible]	BUOY # 26 ⊖
	2008	BUOYS #1 & #2 ⊖ ARRIVE WOODS HOLE					