

U. S. Geological Survey  
Office of Marine Geology  
Woods Hole, Mass.

Division of Mineral Resources  
Commonwealth of Massachusetts  
Boston, Mass.

Cruise Report and Extract of Field Log  
Buzzards Bay Vibrocores, 21-25 May 1975  
Alpine Geophysical Assoc./M.V. Atlantic Twin

75-807

Alpine was contracted by the Division of Mineral Resources, Commonwealth of Mass., to obtain 40, 15 foot, vibrocores in Buzzards Bay, Mass., and to perform size analyses on samples from those cores. U.S.G.S. provided advice in choosing core sites and supplied a Loran-C navigation unit. Core sites had been chosen from uniboom records navigated by Loran-C, and the Loran-C coordinates could be reoccupied.

Personnel included Michael Samson, Division of Mineral Resources, James Robb, U.S.G.S., John Dunlavey, U.S.G.S. (21-23 May), Charles Dill, Alpine, Bernard Katz, Alpine, and three crew members of the Atlantic Twin under Capt Walter Van Horn.

Procedure: Atlantic Twin was coned onto the core site by following one lane on the Loran-C and dropping a buoy at the site when the second Loran-C lane was crossed; then returning to the buoy and dropping anchor upwind/upcurrent. Then corer was put over the side and core taken. Loran-C readings on the anchor to attempt to read an average figure within the instrumental/atmospheric variations of several tenths of a microsecond (0.1 microsecond equals 70-100 feet).

Wake depth was measured either from the echo sounder on the boat, or by visual comparison with the 26 foot coring rig.

Core penetration was measured with a penetrometer gadget on the corer. A chain attached to the core barrel rotated a 360° potentiometer. A recorder on the ship then showed numbers of rotations of the potentiometer. Each rotation was one foot of penetration, and the penetration could be counted as a foot each time the pen snapped back to zero. Late in the operation, the potentiometer became rather noisy and division of a foot may be difficult to read accurately on the penetrometer record. Since the corer was 20' long, 20' cores were generally taken rather than 15' as called for in the contract.

On retrieval of the coring machine, the core was extracted, with its liner. Water was allowed to escape; the core was cut in two approximately equal pieces, capped and taped. Hand estimates were made of top, bottom and central cut samples; length to center cut was measured from bottom of the core, and any visible contracts or size gradations were measured and noted. It was difficult to estimate size changes visually through the core liner, and only gross changes could probably be seen.

Empty lengths of the core barrel were cut off either, or both, top and bottom of core, if some core were lost from bottom. Since there is no good place from

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ATLANTIC TWIN  
ROBB

which to measure the depth in core, we measured up from the bottom of the core and decided to depend on the penetrometer to tell us the depth to the core nose to the central cut, to give some place from which to locate samples.

These field notes were taken by J. Robb or J. Dunlavey. Other notes were taken by Mike Samson and Chuck Dill. The Atlantic Twin also kept a fairly detailed bridge log showing time on station etc. Chuck Dill's (Alpine's) records include the paper record from the penetrometer.

Sequence and dates of Vibrocoring

21 May 75

7-1  
30-1  
5-1  
6-1  
23-2  
3-3

22 May 75

29-1  
27-1  
24-1  
24-2  
25-1  
25-2  
22-1  
22-2

23 May 75

19-1  
10-2  
11-1  
22-2  
13-1  
12-1  
11-2  
23-1

24 May 75

16-3  
16-4  
17-3  
19-2  
22-4  
22-3  
17-2  
17-1  
16-2

25 May 75

16-1  
15-1  
12A-1  
14-1  
10-1  
1-1  
2-1  
3-1  
3-2

Field Log Extract

21-25 May 1975

21 May 75

Loran-C Coordinates

1210 LV WHOI dock

Dana Cape Race

WHOI dock

69855 37953

1352 AR Site 7-1

Site No.

69805.7 37889.9

Water depth: 15 feet  
Penetration: 19.5 feet  
Recovery: 14.5 feet

Top: shelly fine sand  
Middle: silt and coarse sand  
Bottom: v. cse. sand with granules

No contacts visible  
Penetrometer indicates interface at 19' below bottom

1525 69814.3 37911.4

Water depth: 26 feet  
Penetration: 20 feet  
Recovery: 19.5 feet  
From Top: 9'4" gray mud sand with organics

10' fine white clean sand  
Clean contact

1605 69820.1 37914.1

Water depth: 27 feet  
Penetration: 20 feet  
Recovery: 20 feet  
From Top: Coarse gray clean sand to about 5', then  
grayer  
Bottom: Stiff gray green clay with scallop shells

1658 69824.1 37892.2

Water depth: 32 feet  
Penetration: 20 feet  
Recovery: About 19 feet

Bottom of core to 6' from bottom: clean fine sand with  
pebbles (to 1")

1½' coarse sand with black organics  
2' very coarse sand with gravel  
8' med. sand to coarse at top

(21 May 75 Cont.)

1840 69830.1 37919.1

Water depth: 40 feet

Penetration: 18 feet

1.5 feet lost from core bottom - probably coarse sand  
and gravel

to 6.5 feet from bottom: color change darker  
above: dense brown cse. sand  
to 11 feet

to 13.5 feet: darker brown, probably shelly cse. sand

1940 69841.7 37938.3

Water depth: 50 feet

Run 1

Penetration: 19 feet

Recovery: 5 feet lost at bottom

Penetrometer shows 7' quick penetration, slow thereafter

Run 2

Top: Cse. sand with shells underlying sloppy mud

Middle: Med. to cse. sand

Bottom: Cse. sand with pebbles <1" diam.

2055

Tie up in Woods Hole. Loran-C closes 69855 37953

22 May 75

0620 LV dock at Woods Hole

29-1 0823 69844.0 38158.1

Penetration: 14 feet

Recovery: 18 feet (expanded with pounding)

Cut at 295 cm

Bottom: V. cse. sandy gravel (lowest meter lost)

180 cm from bottom: Color change red to tan

240 cm from bottom: Color change tan to red

Middle: Reddish med. to cse. sand with faceted pebbles

Top: Med. to fine sand with shells; gray

(22 May 75 Cont.)

	1032	69838.8	38114.7
	Water depth: 60 feet Penetration: 20 feet Recovery: 20 feet Cut at 307 cm. Bottom: Gray silty clay, coarsening upward Middle: Brown fine sand		
	Sharp color change at 330 cm. Gray fine sand - 30 cm coarsening to gray med. to v. cse. sand with no fines		
	1220	69843.1	38112.2
	Water depth: 60 feet Penetration: 16 feet Recovery: 15 feet Cut at 105 cm Bottom: Gray fine sand with abundant shell fragments coarsening upward to a gray med. to cse sand with abundant shell fragments		
	1259	69847.4	38111.9
	Water depth: 95 feet Penetration: 20 feet Recovery: 19 feet Cut at 290 cm from core nose Bottom: 100 cm cse. sand with gravel gradually fining out upwards to a gray med. to fine sand with some silt and shell fragments.		
25-1	1400	69840.4	38122.0
	Water depth: (Not recorded) Penetration: 20 feet Recovery: 19.5 feet Cut at 300 cm. 567 cm total length of core Bottom: Orange-brown fine sand, trace silt 332 cm: color and composition change to gray and brown coarse sand and fine gravel (~20 cm). This unit grades upward to a gray med. to fine sand (~50 cm). Then cse. sand (~50 cm) Becomes a coarse sand (~70 cm), followed by (in the top 95 cm) med. to fine sand with some gravel.		

(22 May 75 Cont.)

	1515	69835.3	38121.8
	Water depth: 50 feet Penetration: 20 feet Recovery: 18.5 feet Cut at 280 cm Gray very fine sand, trace silt Top 100 cm of core contains abundant shell fragments		
22-1	1615	69840.0	38098.8
	Water depth: 67 feet Penetration: 20 feet Recovery: About 20 feet Cut at 300 cm Bottom 330 cm: gray silty fine sand. Color change to light orange fine sand (~45 cm). Brown-orange med. to cse. sand (~55 cm). Top 190 cm of core is gray sand, fining toward top.		
	1710	69841.0	38098.9
	Water depth: ~110 feet Penetration: 20 feet Recovery: ~20 feet Cut at 340 cm Gray clayey silt, trace fine sand. Clay content seems to decrease from bottom to top		

23 May 1975

0945 LV dock at WHOI

19-1	1030	69848.2	37986.1
	Water depth: 40 feet Penetration: 20 feet Recovery: 17 feet (33" cut off top of core liner) Cut at 280 cm Bottom: Gray fine sand, trace med. coarsening to a brown med. sand with some coarse sand. Color change at approx. 280 cm to rust brown med. sand (~100 cm thick):.. shell fragments near top		
10-2	1117	69839.5	37974.0
	Water depth: 44 feet Penetration: 20 feet (very soft: ~20 sec. total time) Recovery: About 15.5 feet Cut at 260 cm Bottom: gray clay with strong organic odor (some shell fragments). Toward top the clay becomes very loose with abundant shell fragments and small bits of organic material. (The upper part of the core has undoubtedly extended as the diameter of the section is less than the inside diameter of the plastic casing).		

(23 May 75 Cont.)

1200	69838.5	37986.0
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Water depth: 45 feet  
 Penetration: 16.5 feet (stopped vibrating)  
 Recovery: 15.5 feet  
 Cut at 250 cm  
 Bottom: very firmly compacted silty fine sand  
 (yellow-brown) showing fissility.  
 Some clean sand noted.  
 At core break (250 cm from bottom): dark gray  
 clayey fine sand.  
 Top: dark gray fine sandy clay (high organic  
 content).

1315	69840.6	37998.2
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Water depth: 45 feet  
 Penetration: 20 feet  
 Recovery: 17 feet  
 Cut at 245 cm  
 Bottom: yellow, fine sandy silt  
 Middle: yellow clean fine sand  
 Top: dark gray silty glop

1430	69832.8	38014.9
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Water depth: 30 feet

Run 1

Penetration not recorded  
 Recovery: 145 cm core retainer destroyed  
 Bottom: fine sand with gravel, brown sand with  
 coarse sand and fine gravel at top.

Run 2

Penetration: 16 feet  
 Recovery: 350 cm  
 Bottom: till (gravel sand, clay)  
 Top: fine gravel reworked

1542	69832.0	37997.7
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Water depth: 35 feet  
 Recovery 18 feet  
 Cut at 270 cm  
 Bottom: yellow, fine sandy silt to about 3.5 feet  
 from bottom, becoming dark gray fine  
 sandy clay. Shell fragments near top.



(24 May 75 Cont.)

1125 69847.5 38063.7

Water depth not recorded  
Penetration ?  
Cut at 240 cm (top section 251 cm)  
Top: gray, fine sandy, clayey silt  
Middle: gray, med. sand with shells  
Bottom: clean med. to cse sand with gravel

Sand to silt contact ~250 cm from bottom (?)

1230 69848.2 38078.8

Water depth: 58 feet

Run 1

2 attempts: 3' penetration; 1' penetration  
3rd attempt: 10' penetration

Corer not lifted to surface, but shifted on bottom  
between attempts.

Core cut at 230 cm

Bottom: 60 cm - compact till with pebbles, rounded and faceted  
60-120 cm - indistinct  
120-230 clean very coarse sand  
230 cm - cse. sand with shells  
Above this will be 1st two tries.  
Core catcher shows very compact coarse  
sandy till with 2-1/2" pebbles. Very dense.

Core cutter sample taken was dense clayey till with  
cobbles (overlain in core by cleaner  
coarse sand).

1335 69848.8 38098.8

Water depth: 56 feet  
Penetrometer indicates contacts at 2.5, 5, 6.5,  
9, 15 feet of penetration.  
Soft from 7-14 feet  
Penetration 19-3/4 feet

Bottom: gray clayey sand  
(core nose sample taken)

Cut at 302 cm

205 to 280 cm reddish color (peat layer ?)

Middle sample: cse. sand with shell

360-607 (top) grain size change

Top appears coarse, shelly through liner.

k. 57

(24 May 75 Cont.)

1448 69844.2(.1) 38098.8(.7)

Water depth not recorded  
Penetration: 19.5 feet  
Recovery: 530 cm (17.4 feet)  
Cut at 300 cm  
Top and middle: coarse sand, shell hash.  
Bottom: gray sandy silt with shell fragments,  
organic  
No contacts visible

1540 69839.8 38062.9(.8)

Water depth: 60 feet  
Fast penetration to 20 feet  
Recovery: 435 cm (14.3 feet)  
Cut at 210 cm  
Top: soupy, silt, fine sand w/shell, organic  
Middle: highly organic dark gray silty clay  
No contacts visible

(Time not recorded) 69843.3 38062.9

Penetration: 20 feet  
Cut at 294 cm from bottom  
Soft gray silty clay with shell fragments, organic,  
appears same throughout core.

1745 69832.4(.3) 38050.7(.8)

Water depth: 50 feet  
Penetration: 19 feet  
Recovery: 555 cm (18.2 feet)  
Cut at 250 cm  
Bottom section seems uniform brown micaceous  
fine sand.  
430 cm - change to very cse. sand with pebbles.  
Topmost 20 cm - cse. sand with shell.

2000 AR Woods Hole dock 69855.8 37953.3

25 May 75

LV Woods Hole

16-1 0735 69829.5 38051.1(.2)

Water depth: 22 feet  
Penetration: 15.5 feet  
Cut at 300 cm  
Bottom to 210 cm: very cse. sand and gravel  
210 - top cse. sand and gravel.

(25 May 75 Cont.)

15-1	0845	69829.2(.3)	38041.0(40.9)
	Water depth: 32 feet Two attempts: ~3.9 foot penetration Third attempt: no penetration fragment of gneissic cobble in nose (sample retained).		
12A-1	(No hour)	69825.3	38037.1(.0)
	Water depth: 35 feet Penetration: 20 feet Cut at 300 cm 500 cm color change: tan to dark gray. Top is cse sand with shell. Bottom: tan, silty, very fine sand appears uniform from bottom of core to the color change at 500 cm		
14-1	1010	69818.5	38027.3(.2)
	Water depth: 26 feet Penetration: 17 feet (harder at 13-14 feet) Cut at 250 cm Recovery: 465 cm (15.3 feet)  Core appears to be uniform gray, brown fine micaceous sand, except for top 6 (?) cm of organic matl. with shell fragments. Contacts probably liquified by vibration. No damage to core nose although penetration ceased at 17'. No different core nose sample.		
	(no hour)	69818.2	37973.9
	Water depth: 23 feet Penetration: 19.5 feet Cut at 250 cm. Nose: gray, silty, very fine sand Middle: gray med. sand Top 10-20 cm (mixed?) coarse to med. sand with shell and organic fines.		
	(no hour)	69822.1	37962.1
	Water depth: 30 feet Penetration: 20 feet Recovery: 20 feet Cut at 300 cm Nose: gray brown fine to med. sand 350-450 cm: peat layer (?) Middle: med. sand Top 100 cm ±: appears to be cse. to med. sand		

(25 May 75 Cont.)

(no hour) 69826.3 37950.2

Water depth: 45 feet

Run 1

Penetrometer slow at 6'  
Vibrator stopped, pulled out at 7.5'

3 samples taken: Top - cse. sand  
Middle: cse. sand  
Bottom: med. sand

Run 2

Penetration: 18.5 feet  
Recovery: 460 cm (15.1 feet)  
Cut at 250 cm  
Bottom: very coarse gravel;  
very coarse sand with gravel throughout;  
some shell and organic mud about 4 cm  
at top.

(no hour) 69826.6(.5) 37938.1

(Water depth not recorded)  
(Penetration not recorded)  
Recovery: 470 cm (15.4')  
Cut at 315 cm  
Bottom: gravel  
Change at 50 cm to sand(?)  
grays at 320 cm  
Top: cse. sand

(no hour) 69834.4 37938.0

Run 1

Penetrated to 7', vibrator failed: cse. sand

Run 2

Penetration: 445 cm, full length recovered.  
Top surface (i.e. bay bottom) visible.

Measured from surface down:

0-0.5 cm organic clay  
0.5-30 cm med. sand  
30-40 cm cse. sand  
40-100 cm med. sand  
100 cm to bottom (nose) darker and finer  
mid cut is gray med-cse. sand

1710 AR Woods Hole

69855.5

37953.4