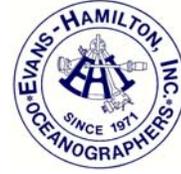


Brunswick Sediment Movement and Fate Study Vibracore sampling



Date: April 2, 2003

Personnel: Trap Puckette
Andy Ziegwied
Anton DuMars

Vessel: Seatow "Responder"
Captain Jamie

Summary

Seven vibratory cores were collected on April 2, 2003 for analysis in and around an offshore dredge disposal mound at site C, just to the south side of the shipping channel, approximately five miles from the inlet to Brunswick Harbor, Georgia. Dredged materials within the site consist of sediments removed from the adjacent shipping channel. The core samples were collected to characterize sediments to support a sediment tracer study now in progress within the region. Tide was in ebb during core sample collection. Seas were moderate, but became choppy as wind speed increased in the afternoon.

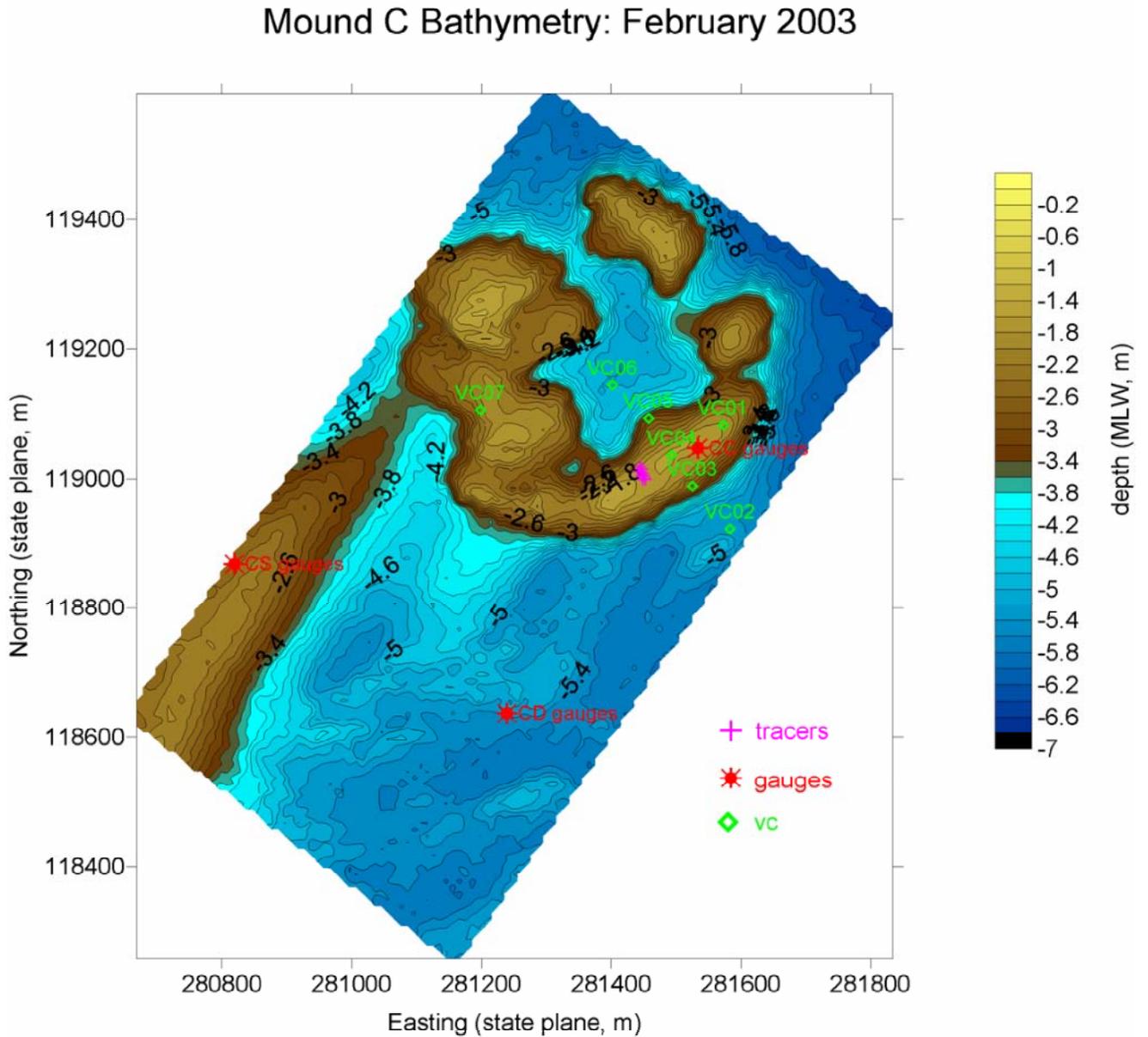
Setting

The Brunswick Harbor channel extends seaward between St Simons and Jekyll Island, two beach barrier complexes located at the apex of the South Atlantic Bight. Shoreward of the inlet, an estuary consisting of extensive salt marshes containing fine grained clastic and organic sediments, small "hammock" islands, and meandering tidal creeks stretches inward several miles. The region experiences periodic semidiurnal tides in the upper mesotidal range (mean- 7ft, extreme 10.5ft.). These tides generate strong flood and ebb currents, promoting significant sediment transport both into and out of the estuary, producing current-parallel elongate sand bars consistent with a tide-dominant regime. In addition to tidal flow, longshore transport from wave driven currents distributes sediments parallel to the shoreline. 12 miles north of Brunswick inlet, the Altamaha, a major piedmont river, supplies sediment to the region. Nearshore and offshore bioturbation is prevalent.

Methods

Seven vibracore sediment samples were collected at separate locations, both on and adjacent to the dredge spoil mound (fig 1). Core barrels (3 inch diameter aluminum) were vibrated into the sediment using a concrete vibrator, rigidly attached near the top of and oriented perpendicular to the length of the barrel. Sediment sample retention was aided by using a check valve, located at the top of the barrel to form a vacuum at the sediment-water interface. Additionally, a stainless steel core catcher was used to reduce sediment loss through the bottom of the sample barrel.

Figure 1: Vibracore locations



The coring device, consisting of the barrel, vibrator head, and check-valve assembly, was lifted from the deck then lowered to the seafloor using a stern-mounted A-frame. Once in contact with the bottom, the modified concrete vibrator was started, inducing core penetration downward into the sediment through liquifaction of sediment and force of gravity. When either target depth was achieved or refusal was encountered, the core was extracted from the sediment and brought on deck. Once on deck, the core was supported in a near vertical orientation to reduce nephloid layer disturbance. The core catcher was removed from the bottom of the barrel and replaced with a black plastic cap, secured in place with adhesive tape. Next, the check-valve apparatus was removed

and down-core distance to water-sediment interface was measured. The core barrel was cut just above this mark and sealed with a blue plastic cap and adhesive tape, then vertically stored on deck.

Back onshore, sediment cores barrels were split lengthwise for examination and sub-sampling. Core barrels were split using a circular saw, cutting each side lengthwise. Saw cut depth was adjusted to minimize core sample disturbance. Once cut, the sample was separated by running a stainless steel knife through the sediment along the length of the core. One half of each core was split into sub-samples and the other half was retained for archiving. Both core halves were digitally photographed.

Results

Sediment cores were described and sub sampled for further analysis. Core descriptions and digital photo mosaics are found below:

Note: digital photo merging created slight overlay and duplications in some sediment core photo mosaics

Core ID: VC 01
 Core location: 31° 04.286' 81° 18.710'
 Recovery length: 1.50'
 Water Depth: 5 ft (estimated)
 Time (local): 1020
 0



Down core (ft)	Sediment description
0-1.25	Medium to coarse sand with minor to sparse shell hash
1.25-1.5	Fine muddy sand with shell hash and whole shells (<0.5")

Core ID: VC 02
 Core location: 31° 04.199' 81° 18.704'
 Recovery length: 4.15'
 Water Depth: ft
 Time (local):



Down core (ft)	Sediment description
0-2.1	Thin mud veneer underlain by fine sand with occasional mud ball (<2") and coarser sandy shell-rich lens. Disturbed bedding
2.1-2.35	Fine sand-mud layers with shelly basal contact
2.35-4.15	Fine muddy sand with sparse shell hash and whole shells (<1")

Core ID: VC 03
 Core location: 31° 04.235' 81° 18.740'
 Recovery length: 2.86'
 Water Depth: 6-7 ft
 Time (local): 1345



Down core (ft)	Sediment description
0-1.8	Coarse to fine sand with minor shell hash overlain by a mud-sand veneer. (0.25- 0.5" clay ball)
1.8-2.25	Dark-brown clay layers within a muddy fine sand matrix – sparse shell hash
2.25-2.35	Muddy fine sand with minor shell hash
2.35-2.86	Fine silty sand fining up – sparse shell hash

Core ID: VC 04
 Core location: 31° 04.261' 81° 18.760'
 Recovery length: 3.85'
 Water Depth: 7 ft
 Time (local): 1115



Down core (ft)	Sediment description
0-1.0	Coarse sand with minor mud content and shell hash
1.0-3.85	Tight mud clasts with thin muddy medium coarse sand lenses. Occasional large shell fragments

Core ID: VC 05
 Core location: 31° 04.292' 81° 18.782'
 Recovery length: 2.35'
 Water Depth: 9 ft
 Time (local): 1215



Down core (ft)	Sediment description
0-0.2	Very thin mud veneer underlain by fine sand with sparse shell hash. One 3cm clay ball at base of unit.
0.2-1.45	Fine to medium sand with shell hash and occasional 1.0-1.5" clay ball – disturbed beds. Bottom 0.1 ft - medium to coarse sand with shell hash. Sharp basal contact.
1.45-1.75	Large (>3") clay ball within a fine muddy sand matrix
1.75-2.35	Fine sand with minor mud content- very sparse shell hash

Core ID: VC 06
 Core location: 31° 04.320' 81° 18.817
 Recovery length: 3.75'
 Water Depth: 14 ft
 Time (local): 1300



Down core (ft)	Sediment description
0.0-1.6	Fine sand with minor mud content- very sparse shell hash
1.6-1.85	Fine muddy sand with small (<0.25") whole shell basal contact
1.85-3.75	Fine muddy sand with very sparse shell hash and occasional small (<0.25") whole shells

Core ID: VC 07
 Core location: 31 04.30 81 18.945
 Recovery length: 1.73'
 Water Depth: 2ft (estimated)
 Time (local): 1345



Down core (ft)	Sediment description
0.0-1.3	Fine to medium sand with minor shell hash
1.3-1.5	Fine muddy sand
1.5-1.75	Fine to medium sand