Chapter 4

Physical Properties of Sediment Obtained During the IMAGES VIII/PAGE 127 Gas Hydrate and Paleoclimate Cruise on the RV *Marion Dufresne* in the Gulf of Mexico, 2–18 July 2002

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Physical properties of sediment obtained during the IMAGES VIII/PAGE 127 gas hydrate and paleoclimate cruise on the RV Marion Dufresne *in the Gulf of Mexico, 2–18 July 2002; chapter 4* in *Winters, W.J., Lorenson, T.D., and Paull, C.K., eds., 2007, Initial report of the IMAGES VIII/PAGE 127 gas hydrate and paleoclimate cruise on the RV* Marion Dufresne *in the Gulf of Mexico, 2–18 July 2002: U.S. Geological Survey Open-File Report 2004–1358.*

Abstract

This chapter summarizes the physical property measurements performed on sediment samples obtained in the northern Gulf of Mexico during July 2002. During this cruise on the RV *Marion Dufresne*, 17 giant piston cores up to 38-meters long, 4 giant box cores up to 10-meters long, and 8 gravity (heat flow) cores up to 9-meters long were recovered in widely different geologic environments in water depths ranging from about 580 to 2,260 meters. Gas hydrate was recovered in three cores at subbottom depths of about 3 to 9 meters, and gas bubbles indicative of gas hydrate dissociation were noticed in a fourth core. Numerous shipboard measurements were performed, including shear strength (mini-vane, Torvane, and pocket penetrometer) and electrical resistivity. Water content, grain-density, grain-size, and carbon content measurements were performed in a shore-based laboratory on samples collected at sea. Bulk density, porosity, and unit weight were determined from phase relations.

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Introduction

Gas hydrate, an ice-like crystalline solid containing high concentrations of methane, is a potential energy resource. It is also a potential hazard to hydrocarbon exploration and production, and may influence global climate change. Although the amount of gas hydrate in the natural environment is inferred to be enormous, little is known about its distribution in shallow sediment or even exactly how it forms. Exploring these and other topics was among the goals of a July 2002 cruise conducted on board the research vessel (RV) *Marion Dufresne* within four continental slope regions of the northern Gulf of Mexico (Tunica Mound, Orca and Pigmy Basins, Bush Hill, and the Mississippi Canyon region) (fig. 1).

Determining physical properties of core sediment is a useful complement to sedimentologic studies (see Bout-Roumazeilles and Trentesaux, this volume, chapter 5), petrophysical analyses, and well-log interpretations. These measurements are important to relate the location of gas hydrate occurrences to the physical nature of the host material. These data also are used in a variety of modeling investigations, and similar data have been correlated with engineering behavior (Lambe and Whitman, 1969; Holtz and Kovacs, 1981).

Seventeen giant Calypso piston cores up to 38 meters (m) in length (500-m total recovery) and 2 box cores (designated either C2 or C^2) (14-m total recovery) were collected for gas hydrate-related studies (Winters and others, this volume, chapter 3) (figs. 2–4). Eight gravity cores, rigged to measure

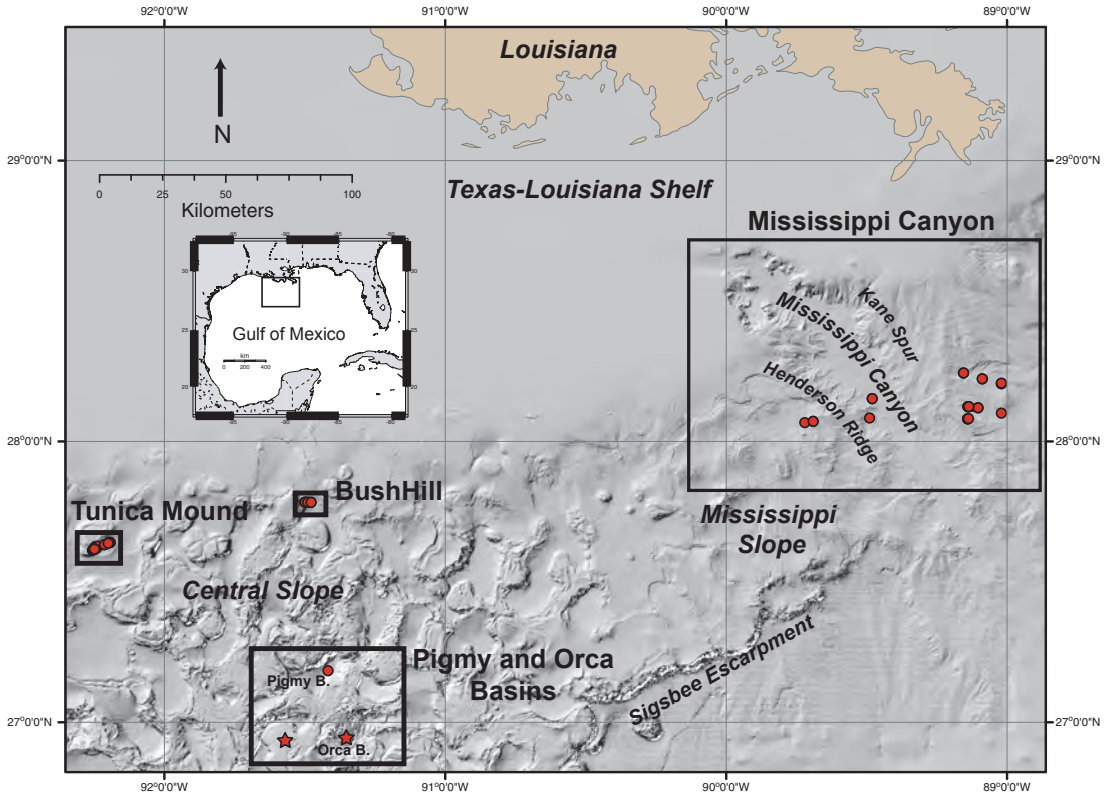

Figure 1. Northern Gulf of Mexico study areas.

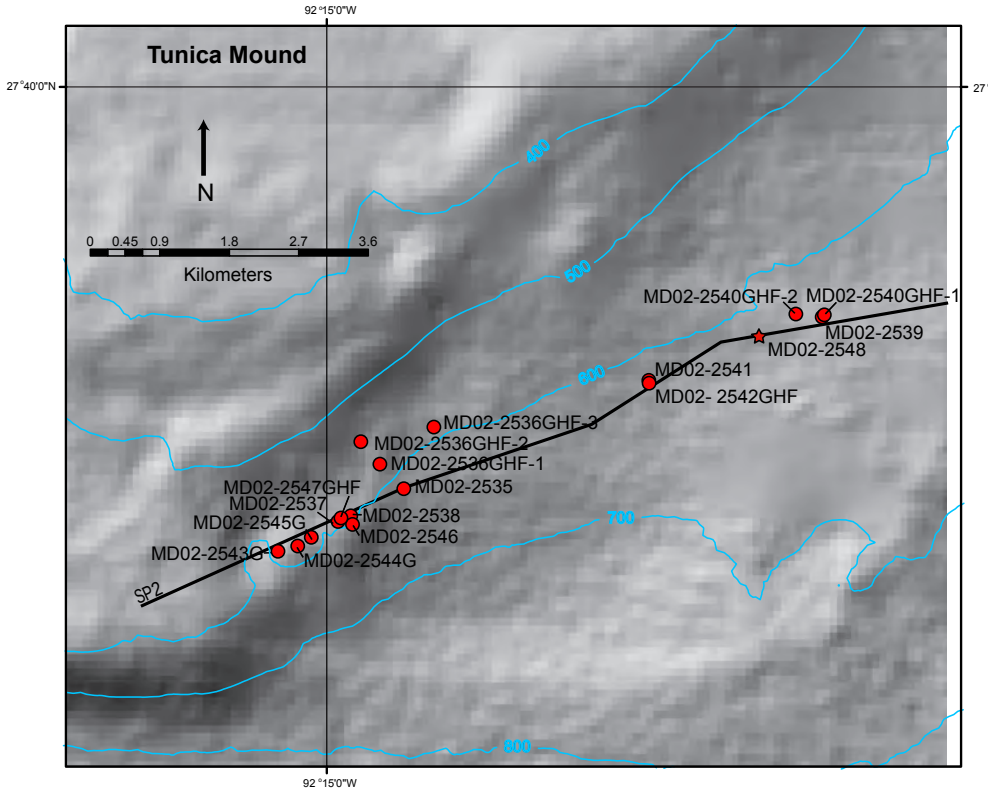

Figure 2. Core locations in Tunica Mound region.

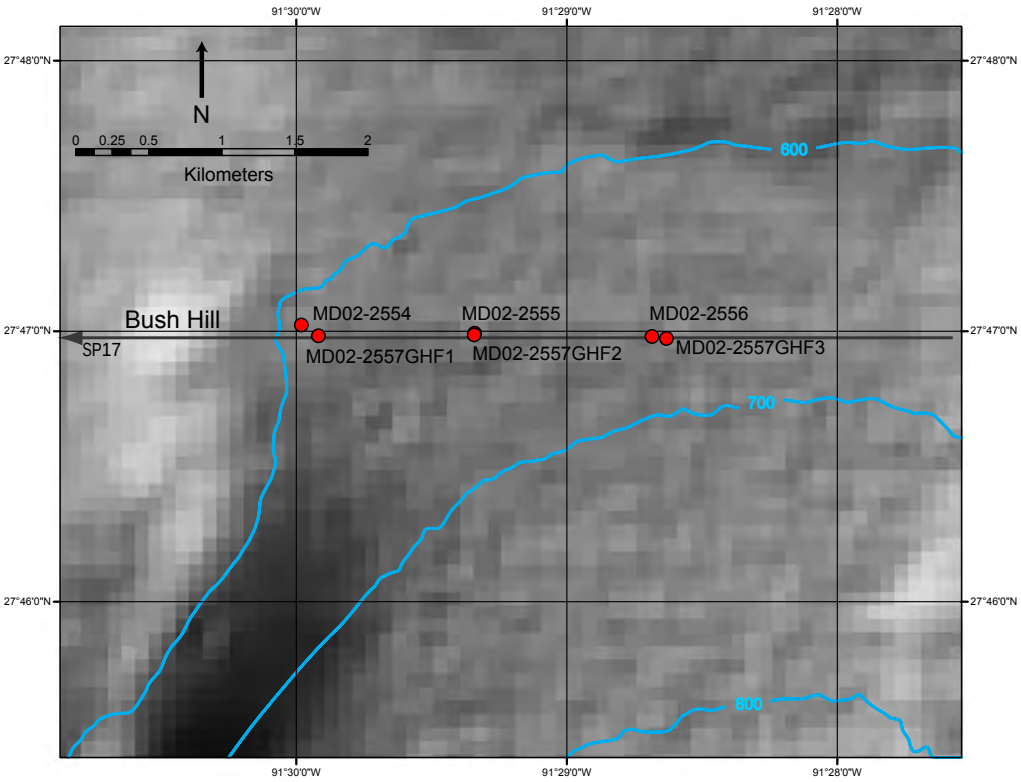

Figure 3. Core locations in Bush Hill region.

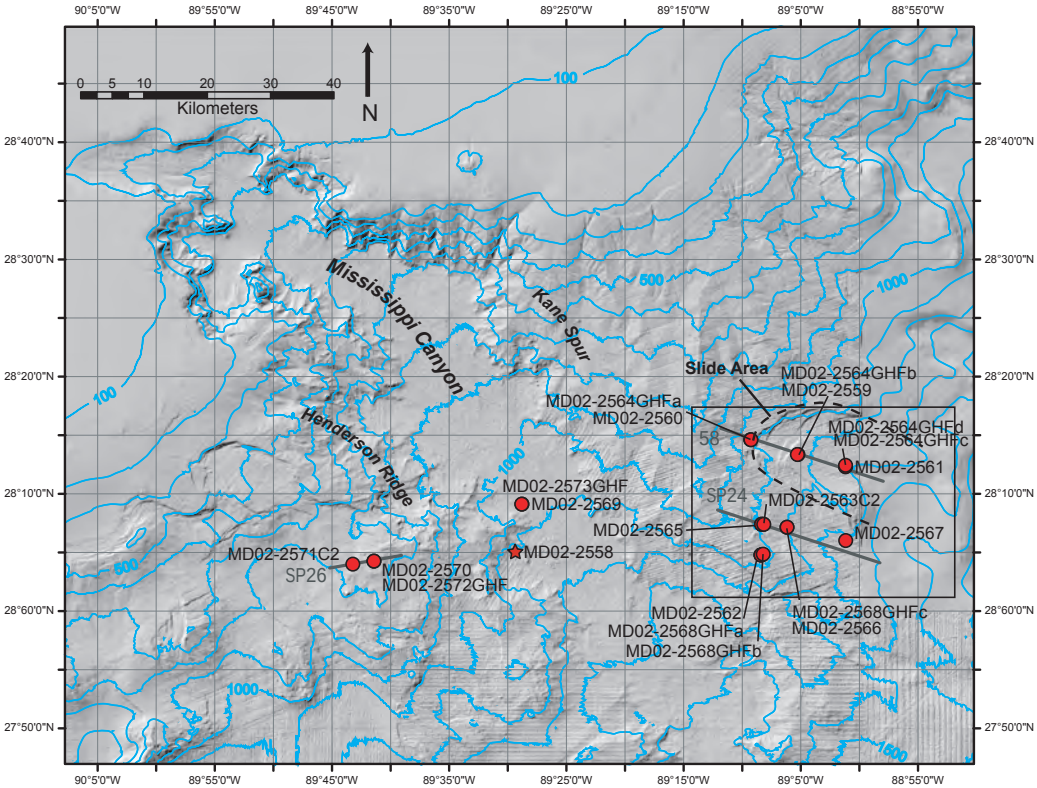

Figure 4. Core locations in Mississippi Canyon region.

in-place temperature, were also obtained as part of a heat-flow study (Labails and others, this volume, chapter 6). In addition, 9-m and 10-m-long box cores were taken from Orca and Pigmy Basins (fig. 5), respectively, for studies related to the International Marine Past Global Changes Study (IMAGES) program and Paleoceanography of the Atlantic and Geochemistry (PAGE) program, and for measuring anthropogenic contaminant input of Holocene age to the northern Gulf of Mexico from the Mississippi River (Flocks and Swarzenski, this volume, chapter 13).

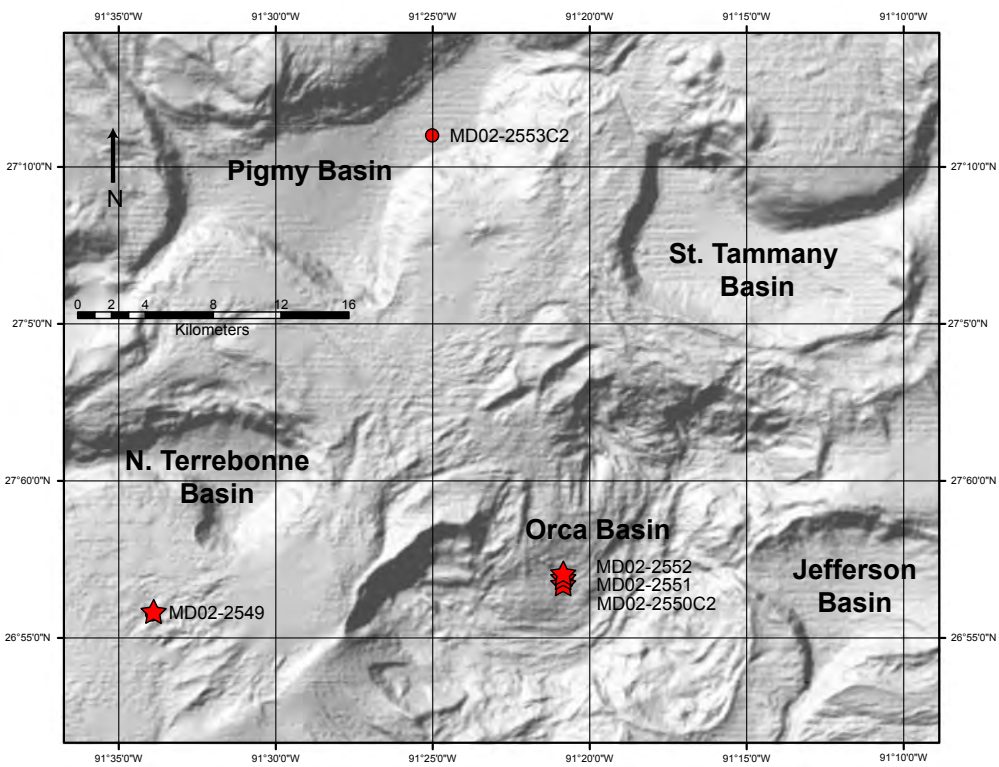

Figure 5. Core locations in Pigmy and Orca Basins region.

Numerous shipboard geotechnical measurements were performed on longitudinally split cores, including shear strength (mini-vane, Torvane, and pocket penetrometer) and electrical resistivity. Water content, grain-density, grain-size, and carbon content measurements were performed in shore-based laboratories on samples collected at sea. Bulk density, porosity, void ratio, and unit weight were determined from phase relations.

Geologic Setting and Gas Hydrate Presence

The northern Gulf of Mexico hosts numerous near-sea-floor (<7-m subbottom) occurrences of gas hydrate. The sea floor is dominated by salt-tectonic basin structures, high sedimentation rates, and complex stratigraphy with common sea-floor failures (Cooper and Hart, 2002). Natural oil and gas seeps are abundant, usually associated with fault conduits resulting in numerous hydrocarbon vents, often capped by gas hydrate when the seeps are within the hydrate stability zone. Whereas gas hydrate is relatively common at the sea floor, the lack of geophysical indicators on seismic records leaves the existence of deeper gas hydrates unresolved. Thus, it is unknown if there are significant gas hydrate accumulations in reservoir sediments away from structural conduits inferred to underlie the sea-floor mounds. Additional discussion of the geologic setting of the northern Gulf of Mexico is provided in Lorenson and others (this volume, chapter 2), and seismic reflection profiles for regional and core locations are presented in Appendix D.

Gas hydrate has been inferred from Bottom Simulating Reflections (BSR's) in many continental margins around the world (Kvenvolden and Lorenson, 2001). However, they are noticeably rare in the northern Gulf of Mexico. This may be in part because of the complicated geologic nature of the subsurface, including various geothermal gradients and hyper-saline pore waters that influence the formation of hydrate deposits.

Gas hydrate was recovered in three cores at subbottom depths of about 3 to 9 m, and gas bubbles indicative of gas hydrate dissociation were noticed in a fourth core. Because of safety concerns, however, entire cores containing gas hydrate typically were not split on board ship. Instead, subsectioned intervals surrounding gas hydrate occurrences in the cores were visually observed.

Methods and Equipment

Shipboard Measurements

Coring and procedures related to handling the giant piston cores, box cores, and gravity cores collected during this cruise are discussed in Winters and others (this volume, chapter 3). After thermal conductivity measurements were performed on whole-round core sections (Novosel and others, this volume, chapter 7), the cores were split longitudinally, and the working half-round cores were brought into the shipboard

physical properties laboratory for further analysis. After electrical resistivity measurements were completed, shear strength was determined using a mini-vane shear strength apparatus. Pocket penetrometer and Torvane shear strength measurements were then performed. Lastly, subsamples to be used for shore-based water content, grain-density, and grain-size measurements were obtained by removing sediment (typically with a spatula) from areas proximal to the previously performed shear strength measurements. The subsamples were placed into Whirl-Pak plastic bags and stored in a refrigerator at a temperature of approximately 4 degrees Celsius (°C) to minimize pore-water evaporation and biological effects.

Electrical Resistivity

To minimize evaporation and thereby preserve pore-water salinity, electrical resistivity measurements were performed on freshly split core sections. The measurements were typically performed every 1.5 m, in the vicinity of a thermal conductivity measurement. The measurements were omitted if the sediment was visibly altered during core recovery or if evidence of gas expansion was present.

The equipment was designed by D. Heffer, D. Mosher, and T. Hewitt of the Geological Survey of Canada (GSC). The measuring device consisted of a 4-pin Wenner array and a digital temperature probe. The pins were gold plated and approximately 3 millimeters (mm) in length, separated from each other by 2 mm. The outer two pins were connected to a circuit board with an AC voltage source acting through current-limiting resistors. The inner two pins were connected to a Fluke voltmeter. The entire instrument was connected to a PC through an RS-232 output, thus allowing all raw data processing and display to be automated.

Electrical resistivity, R, is defined by the following formula:

$$R = \frac{V}{I * C},$$

where

V is voltage,
I is current, and
C is a cell constant.

The cell constant was determined using seawater prior to each sediment measurement. Standard seawater has a known resistivity, R_w, which can be described by the following formula:

$$R_w = (2.8 + 0.1 * T)^{-1},$$

where T is the temperature, in degrees Celsius.

Measurement of the temperature, voltage, and current for a standard seawater sample allows the cell constant to be determined. The instrument is thus calibrated by adjusting the cell constant until R_w equals 0.209 ohm-meters for a temperature of 20 °C.

Sample resistivity, R_o, was derived using the following formula (Hewitt, 1998):

$$R_o = R * (1 + 0.025 * (T - 20)),$$

where

R is the measured sample resistivity, uncorrected for temperature; and
T is the temperature, in degrees Celsius.

A Labview data logging and processing program, written by T. Hewitt, calculated resistivity formation factor, F, using the following relation:

$$F = \frac{R_o}{R_w}.$$

Errors produced by small variations in the depth of the pin penetration into the sediment were assumed to be negligible.

Shear Strength

Shipboard miniature-vane shear tests were performed at approximately 1.5-m intervals down core with a 12.7-mm-diameter by 12.7-mm high four bladed vane. Vane shear strength tests were performed proximal to the sites of the thermal conductivity and electrical resistivity measurements. The vane was inserted so that the top of the vane was one vane height deep into the sediment and was turned by applying a constant rotation rate to the top of a calibrated spring. Because the sediment shear strengths throughout the study areas were similar, only one spring was used. Vane shear strength, Svs, was determined from:

$$Svs = \tau \gamma / K,$$

where

τ is a spring constant relating differential rotation across the spring to applied torque;
γ is the spring rotation required to reach maximum torque at failure, in degrees; and
K is the vane constant (Hewitt, 1998) relating shear strength to torque applied to the vane.

If cracking, which invalidates the measurement, was observed during shear, the measurement was not reported.

A pocket penetrometer (Hunt, 1984) was also used to determine shear strength. This device consists of a 6.35-mm diameter spring-loaded plunger that was pushed to a depth of 6.35 mm into the exposed sediment surface. A direct reading scale indicates the unconfined compressive strength (UCS) in kilograms per square centimeter. The maximum shear strength

that can be determined with this device is 220 kilopascals (kPa).

Pocket penetrometer shear strength, Spp, is determined from:

$$Spp\ (kPa) = UCS\ (kg/cm^2) * 49,$$

where UCS is the unconfined compressive strength reading from the pocket penetrometer strength scale.

If very soft sediment was tested, a 25.4-mm-diameter adapter was applied to the end of the plunger. The maximum shear strength that can be determined with the adapter is 13.8 kPa.

If this adapter was used, the shear strength, Spp, is determined from:

$$Spp\ (kPa) = UCS\ (kg/cm^2) * 3.1,$$

where UCS is the unconfined compressive strength reading from the pocket penetrometer strength scale.

A Torvane device (Hunt, 1984) was also used to measure the shear strength, Stv, near the exposed sediment surface of the longitudinally split cores. This device is operated by inserting a 25-mm-diameter eight-bladed adapter 5 mm into the exposed sediment surface. The top of the spring-loaded Torvane is rotated, thereby producing a torque that shears the sediment. A pointer records the maximum torque value, which is proportional to the shear strength. One full revolution of the Torvane top produces a shear strength value of approximately 100 kPa.

Shore-Based Measurements

Physical property index measurements, including water content, grain density, and grain size, were performed post-cruise at the U.S. Geological Survey, Woods Hole, MA. Other properties, such as porosity, wet and dry bulk density, void ratio, and unit weights, were calculated from the index properties. Carbon content of the sediment was also determined.

Water Content and Index Properties

Because sediment subsamples were irregular in shape, making volume difficult to measure, phase relations were back-calculated, assuming 100-percent water saturation of the pore voids. Visible drainage from the core sections at sea was not observed, primarily because of the fine-grained nature of the sediment.

The specimens were oven dried incrementally at temperatures between 50 and 110 °C for at least 24 hours at each temperature to obtain the amount of fresh water and solids present. Results for samples dried at the 110 °C temperature are presented in this report. The effect of drying at the lower temperatures will be made available in a subsequent report. After drying, the specimen was broken into finer-sized particles, and the volume of dried solids was determined with an automatic gas pycnometer, using helium as the purge and expansion gas (American Society for Testing and Materials, 1997). The grain density of the pycnometer specimen was calculated using the measured volume and the mass of solids that was determined immediately prior to insertion of the sample into the pycnometer. All mass determinations were made quickly and sealed containers were used to prevent moisture in the air from being adsorbed by clay minerals that may have been present.

All physical property calculations, except those specified, were corrected for the presence of residual salt left on the solid particles after driving off the pore fluid by oven drying. In the natural environment, salt and other particles that are dissolved in the pore fluid behave as part of the aqueous phase. The calculations remove the salt precipitate mass and volume from the solids and add it back to the fluid phase. A default 35 parts per thousand (ppt) value of pore-fluid salinity was assumed for samples without a nearby salinity measurement.

The following equations were used in calculating the physical property values:

$$\rho_d = M_s/V_t$$

where

ρ_d is the dry bulk density,
M_s is the mass of solid sediment grains, and
V_t is the calculated total specimen volume;

$$\rho_w = M_t/V_t$$

where

ρ_w is the wet bulk density,
M_t is the total mass of the specimen, and
V_t is the calculated total specimen volume;

$$\gamma_d = (M_s/ V_t)\ g$$

where

γ_d is the dry unit weight,
M_s is the mass of solid sediment grains,
V_t is the calculated total specimen volume, and
g is the constant of acceleration due to gravity;

$$\gamma_w = (M_t/ V_t)\ g$$

where

γ_w is the wet unit weight,
M_t is the total mass of the specimen,
V_t is the calculated total specimen volume, and
g is the constant of acceleration due to gravity;

$$\gamma_{sub} = [(M_t / V_t)\, g] - \gamma_{sw}$$

where
- γ_{sub} is the submerged unit weight,
- M_t is the total mass of the specimen,
- V_t is the calculated total specimen volume,
- g is the constant of acceleration due to gravity, and
- γ_{sw} is the unit weight of seawater;

$$\rho_s = M_{ss}/V_{ss}$$

where
- ρ_s is the uncorrected grain density,
- M_{ss} is the mass of solid sediment grains plus mass of salt, and
- V_{ss} is the volume of the sediment grains and salt measured with a gas pycnometer;

$$\rho_{sc} = M_s/V_s$$

where
- ρ_{sc} is the corrected grain density,
- M_s is the mass of solid sediment grains without salt, and
- V_s is the volume of the sediment grains without salt measured with a gas pycnometer;

$$n = V_{sw}/(V_s + V_{sw})$$

where
- n is the porosity based on calculated specimen volume,
- V_{sw} is the volume of seawater, and
- V_s is the volume of solid sediment grains;

$$e = V_v/V_s$$

where
- e is the void ratio,
- V_v is the volume of voids (assumed equal to volume of seawater), and
- V_s is the volume of solid sediment grains;

$$WC_t = M_{fw}/M_t$$

where
- WC_t is the uncorrected water content based on the total specimen mass,
- M_{fw} is the mass of fresh water in the pore space, and
- M_t is the total mass of the specimen;

$$WC_s = M_{fw}/M_{ss}$$

where
- WC_s is the uncorrected water content based on the solid grain mass,
- M_{fw} is the mass of fresh water in the pore space, and
- M_{ss} is the mass of the solid sediment grains and residual salt;

$$WC_{tc} = M_{sw}/M_t$$

where
- WC_{tc} is the corrected water content based on the total specimen mass,
- M_{sw} is the mass of seawater in the void space, and
- M_t is the total mass of the specimen;

$$WC_{sc} = M_{sw}/M_s$$

where
- WC_{sc} is the corrected water content based on the solid grain mass,
- M_{sw} is the mass of seawater in the void space, and
- M_s is the mass of the solid sediment grains without residual salt.

Grain Size

A sediment subsample was dried in a convection oven at 90 °C to obtain the dry mass and water content of the sample. The dry mass was corrected for the salinity of the pore water. The sample was then wet-sieved through a number 230 sieve (0.062-mm opening) to separate the sand fraction from the silt and clay fraction. Because of the potential damage to the equipment caused by contamination from hydrocarbons, the typical Coulter Counter (Syvitski, 1991) analysis was not performed on these samples. Rather, the fine-grained material was further classified using a hydrometer technique (Syvitski, 1991). Most of the tests included enough readings to define the silt-clay boundary; however, some tests included additional readings to better define the entire grain-size distribution curve.

Carbon Analysis

The Carbon-Hydrogen-Nitrogen (CHN) Analyzer (Verardo and others, 1990) uses a combustion method to convert sample elements to simple gases, such as CO^2, H_2O, and N_2. The resulting gases are homogenized, depressurized, and quantified as a function of their thermal conductivities.

In order to measure the amount of organic carbon in sediment samples, the samples were first acidified to remove all inorganic carbonate matter by the addition of sulfurous acid. Using this method, only the organic material was further analyzed by the CHN Analyzer.

Multi-Sensor Core Logger

The Multi-Sensor Core Logger (MSCL) system is an automated apparatus that measures various properties remotely as a core section is conveyed by or through different sensors. During this cruise, P-wave velocity and amplitude, wet bulk density by gamma-ray attenuation, and magnetic susceptibility were measured. The MSCL is further discussed in this report in chapters by Bout-Roumazeilles and Trentesaux (this volume, chapter 5), and Winters and others (this volume, chapter 3). The MSCL operating manual is supplied in Appendix H.

Results and Discussion

The sedimentologic history of marine sediment is partly recorded in its physical characteristics. Additionally, knowing the relative quantity of and relation among the various components making up that sediment enable us to predict how the sediment will react to internal processes and external stresses. Many physical property measurements define those relations between solid sediment grains and occupied non-grain void space.

Water Content and Index Properties

Water content and porosity values are fundamental characteristics of sediment. These values also describe how much water is available to form gas hydrate in the pore space. Although porosity is important to the formation of gas hydrate, absolute values of porosity are not as important as individual pore sizes to the formation of gas hydrate (Winters and others, 1999).

A total of 35 cores were recovered from four different study areas in the northern Gulf of Mexico (table 1; fig. 1), including two cores dedicated for the IMAGES/PAGE program. Statistical information (table 2) and regression equations relating measured properties to subbottom depth (table 3) indicate that most properties fall within several fairly well-defined groups, even though they are from study areas that are considerable distances from each other. Bryant and Trabant (1972) were able to develop statistical relations between water content, shear strength, and bulk density, and subbottom depth in cores within two major areas in the northern Gulf of Mexico. Therefore, it is reasonable that we also are able to present properties that indicate fairly uniform distribution with subbottom depth of physical properties across the northern Gulf of Mexico (except for sediments with hyper-saline pore fluids located in Orca Basin).

Salt-corrected water contents, WCsc, determined for 420 sediment samples ranged from 47.8 to 800.7 percent, with a mean of 94.9 percent, and a median of 75.6 percent (tables 2; 4, p. 29). The higher water content values are from Orca Basin and are related to the presence of dense hyper-saline pore water. Pore-water salinities range from 21.3 to 305.9 ppt for all cores. Values of salinity used in making salt corrections were determined by linearly interpolating between other sediment samples with known salinity (Paull and others, 2005; W. Ussler, Monterey Bay Aquarium Research Institute, oral commun., 2003). Therefore, the salinity values reported in this chapter are to be treated as approximations only.

Table 1. Core information including location, water depth, recovered core length, and core type.

[ID, identification; deg, degrees; m, meters; PC, piston core; C2 (box), square box core; GHF, gravity core with heat-flow temperature sensors attached; Grav, gravity core without thermal sensors; **, denotes successful determination of geothermal gradient]

Core ID	Latitude (deg)	Longitude (deg)	Site name	Water depth (m)	Core length (m)	PC	C2 (box)	GHF	Grav	Comments
MD02-2535	27.6198	-92.2410	Tunica Mound	605	37.84	*				
MD02-2536GHF-1	27.6198	-92.2410	Tunica Mound	608	8.88			**		
MD02-2536GHF-2	27.6253	-92.2460	Tunica Mound	564	8.88			**		
MD02-2536GHF-3	27.6270	-92.2375	Tunica Mound	585	8.88			**		
MD02-2537	27.6160	-92.2487	Tunica Mound	600	33.58	*				
MD02-2538G	27.6167	-92.2472	Tunica Mound	599	7.76				*	
MD02-2539	27.6397	-92.1922	Tunica Mound	622	31.1	*				
MD02-2540GHF-1	27.6403	-92.1920	Tunica Mound	617	5.65			**		
MD02-2540GHF-2	27.6402	-92.1952	Tunica Mound	620	-			*		
MD02-2541	27.6325	-92.2123	Tunica Mound	615	35.34	*				
MD02-2542GHF	27.6322	-92.2120	Tunica Mound	617	7.7			**		
MD02-2543G	27.6123	-92.2555	Tunica Mound	579	0.15				*	
MD02-2544G	27.6130	-92.2535	Tunica Mound	584	0.1				*	
MD02-2545G	27.6140	-92.2517	Tunica Mound	588	9.27				*	

Table 1. Core information including location, water depth, recovered core length, and core type. — Continued

[ID, identification; deg, degrees; m, meters; PC, piston core; C2 (box), square box core; GHF, gravity core with heat-flow temperature sensors attached; Grav, gravity core without thermal sensors; **, denotes successful determination of geothermal gradient]

Core ID	Latitude (deg)	Longitude (deg)	Site name	Water depth (m)	Core length (m)	PC	C2 (box)	GHF	Grav	Comments
MD02-2546	27.6157	-92.2470	Tunica Mound	595	31.21	*				
MD02-2547GHF	27.6165	-92.2483	Tunica Mound	607	5.73			**		
MD02-2548	27.6375	-92.1995	Tunica Mound	610	32.92	*				
MD02-2550C2	26.9462	-91.3457	Orca Basin	2,249	9.09		*			
MD02-2553C2	27.1835	-91.4167	Pigmy Basin	2,259	10.03		*			
MD02-2554	27.7833	-91.4990	Bush Hill Basin	602	31.05	*				
MD02-2555	27.7832	-91.4892	Bush Hill Basin	636	35.68	*				
MD02-2556	27.7830	-91.4775	Bush Hill Basin	654	34.25	*				
MD02-2557GHF-1	27.7830	-91.4987	Bush Hill Basin	613	7.59			**		
MD02-2557GHF-2	27.7830	-91.4890	Bush Hill Basin	639	-			**		
MD02-2557GHF-3	27.7828	-91.4805	Bush Hill Basin	659	-			**		
MD02-2559	28.2225	-89.0882	Kane Spur	1,132	33.39	*				
MD02-2560	28.2433	-89.1550	Kane Spur	1,029	28.24	*				
MD02-2561	28.2052	-89.0202	Kane Spur	1,268	28.8	*				
MD02-2562	28.0798	-89.1402	Kane Spur	1,051	26.09	*				
MD02-2563C2	28.1233	-89.1363	MC853 Diapir	1,070	3.86		*			recovered hydrate (gas bubbles)
MD02-2564GHF-1	28.2433	-89.1545	Kane Spur	1,027	7.63			**		
MD02-2564GHF-2	28.2223	-89.0883	Kane Spur	1,261	-			**		
MD02-2564GHF-3	28.2052	-89.0200	Kane Spur	1,269	-			**		
MD02-2564GHF-4	28.2070	-89.0200	Kane Spur	1,269	-			**		
MD02-2565	28.1235	-89.1395	MC853 Diapir	1,068	22.5	*				recovered hydrate
MD02-2566	28.1192	-89.1032	Kane Spur	1,186	26.05	*				
MD02-2567	28.1002	-89.0198	Kane Spur	1,318	26.65	*				
MD02-2568GHF-1	28.0790	-89.1400	MC853 Diapir	1,049	6.96			**		
MD02-2568GHF-2	28.0810	-89.1370	MC853 Diapir	1,057	-			**		
MD02-2568GHF-3	28.1193	-89.1030	MC853 Diapir	1,190	-			**		
MD02-2568GHF-4	28.1233	-89.1395	MC853 Diapir	1,068	-			*		
MD02-2568GHF-5	28.1235	-89.1362	MC853 Diapir	1,049	-			*		
MD02-2569	28.1522	-89.4797	Mississippi Canyon	1,032	10.35	*				recovered hydrate
MD02-2570	28.0710	-89.6898	West Mississippi	631	28.35	*				
MD02-2571C2	28.0667	-89.7192	West Mississippi	664	10.38		*			
MD02-2572GHF	28.0710	-89.6897	West Mississippi	628	4.9			**		
MD02-2573GHF	28.1520	-89.4798	Mississippi Canyon	1,027	4.2			*		recovered hydrate
MD02-2574	28.6267	-88.2248	East Mississippi	1,963	32.28	*				

Note: Cores obtained during the cruise that are not listed in this table and cores MD02-2548 in Tunica Mound, MD02-2550C2 in Orca Basin, and MD02-2574 in East Mississippi region are IMAGES/PAGE cores, not dedicated USGS cores.

Table 2. Statistical information on sediment properties.

[ppt, parts per thousand; WCtc, water content based on total sample mass corrected for salinity; %, percent; WCsc, water content based on solids mass corrected for salinity; ρsc, grain density corrected for salinity; g/cm^3, grams per cubic centimeter; n, porosity; e, void ratio; ρw, wet bulk density; ρd, dry bulk density; γw, wet unit weight; kN/m^3, kiloNewton per cubic meter; γd, dry unit weight; γsub, submerged unit weight; min, minimum; max, maximum; stnd dev, standard deviation; Svs, vane shear strength; kPa, kilopascal; Spp, pocket penetrometer strength; Stv, Torvane strength; ER, electrical resistivity; FF, formation factor; TC, total carbon; H, hydrogen; N, nitrogen; OC, organic carbon; ON, organic nitrogen; IC, inorganic carbon; IN, inorganic nitrogen]

	Salinity (ppt)	WCtc (%)	WCsc (%)	ρsc (g/cm^3)	n (%)	e	ρw (g/cm^3)
min	21.3	32.4	47.8	2.36	55.7	1.26	1.31
max	305.9	88.9	800.7	3.52	95.7	22.34	1.77
range	284.6	56.6	752.9	1.16	40	21.08	0.46
mean	47.7	45.8	94.9	2.7	68.1	2.47	1.57
median	36.7	43.1	75.6	2.7	66.3	1.97	1.59
stnd dev	42.6	9.6	72.6	0.08	7.6	1.92	0.12

	ρd (g/cm^3)	γw (kN/m^3)	γd (kN/m^3)	γsub (kN/m^3)	Svs (kPa)	Spp (kPa)	Stv (kPa)
min	0.15	12.83	1.44	0.9	6.1	0	0
max	1.2	17.36	11.74	7.28	100	196	49
range	1.05	4.53	10.3	6.38	93.9	196	49
mean	0.86	15.37	8.43	5.2	34.5	15.1	17.1
median	0.91	15.63	8.91	5.5	30.2	8.2	15.7
stnd dev	0.21	1.2	2.03	1.28	19.4	23.9	10.9

	ER (ohm-m)	FF	Grain size				TC (%)
			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	
min	0.26	1.22	0	0.01	5.17	53.81	0.92
max	1.06	5.08	15.18	6.54	40.02	94.71	5.83
range	0.81	3.86	15.18	6.53	34.85	40.9	4.91
mean	0.59	2.8	0.13	0.73	22.32	76.81	2.58
median	0.59	2.83	0	0.24	22.1	76.7	2.61
stnd dev	0.14	0.65	1.24	1.15	7.75	7.76	0.69

	H (%)	N (%)	OC (%)	ON (%)	IC (%)	IN (%)
min	0.22	0.04	0.49	0	0.15	-0.06
max	0.89	0.17	2.19	0.12	4.08	0.08
range	0.67	0.13	1.7	0.12	3.93	0.14
mean	0.56	0.08	1.17	0.07	1.42	0.01
median	0.57	0.07	1.19	0.07	1.41	0.01
stnd dev	0.12	0.03	0.33	0.02	0.56	0.03

Table 3. Equations for physical properties.

[WCsc, water content related to solid grains corrected for pore-water salinity; SD, subbottom depth (mbsf, meters below sea floor); n, porosity; ρw, wet bulk density; Svs, vane-shear strength; Spp, pocket penetrometer strength; Stv, Torvane strength; ER, electrical resistivity; FF, formation factor]

Parameter(s)	Core(s)/Comments	R	Equation
WCsc (%)	SD<15 mbsf; WCsc < 200 %	0.79	SD (mbsf) = 98897 * WCsc ^(-2.1134)
n (%)	SD < 15 mbsf	0.741	SD (mbsf) = 8.859e + 15 * n ^(-8.2159)
ρw (g/cm^3)	SD < 15 mbsf	0.736	SD (mbsf) = 7.3719e-05 * e^(7.4019ρw)
Svs (kPa)	All	0.831	Svs (kPa) = [SD (mbsf) - 0.55]/0.41
Spp (kPa)	0<Spp<18 kPa	0.761	Spp (kPa) = [SD (mbsf) - 0.31]/1.75
Stv (kPa)	All	0.868	Stv (kPa) = [SD (mbsf) - 1.61]/0.77
ER (ohm-m)	All cores (SD > 5 mbsf)	0.611	SD (mbsf) = 52.769 * ER^(3.0051)
FF	All cores (SD > 5 mbsf)	0.612	SD (mbsf) = 0.49145 * FF^(2.9831)

Both water content and porosity decrease significantly between the sea floor and about 10 meters below sea floor (mbsf) (figs. 6–8). Below about 10 mbsf, both properties decrease at a lower rate. The high water content and porosity values near the sea floor may be related to electro-chemical effects between fine-grained particles (with high specific surface) at subbottom depths too shallow for normal compaction to occur (Francisca and others, 2005). This probably is a more accurate explanation for the non-linear sediment behavior as opposed to subbottom depth than disturbance caused by the piston-coring technique for a number of reasons: (1) the sediment characteristics are widespread even in sediment obtained with other coring methods, (2) the grain size is too fine to allow quick changes in water content, (3) strength measurements do not exhibit a similar asymptotic decrease in strength near the sea floor, and (4) the stratigraphic descriptions do not indicate a pervasive disturbed region of sediment in the tops of cores. An exponential curve fit (table 3) for samples shallower than 15 mbsf is in contrast with the linear fit of Bryant and Trabant (1972).

Derived index properties, such as void ratio (fig. 9) and wet bulk density (fig. 10), show trends related to the normal

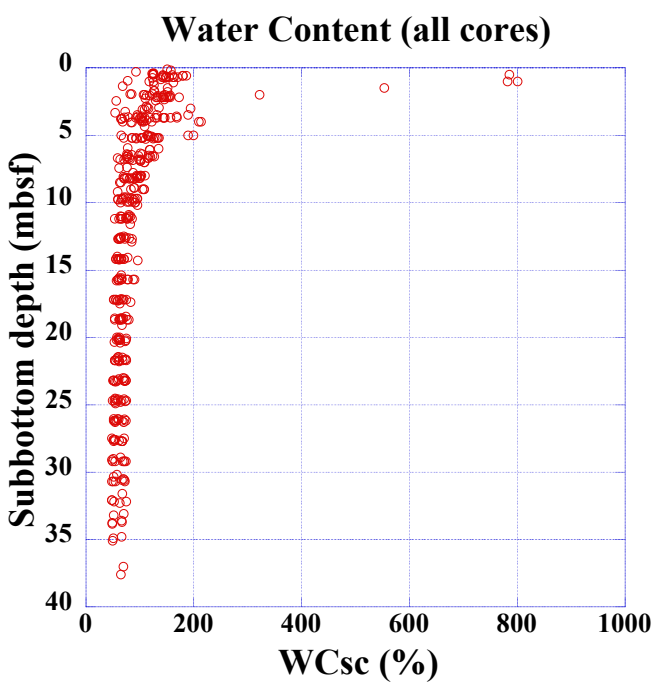

Figure 6. Water content, WCsc, for all cores in relation to subbottom depth.

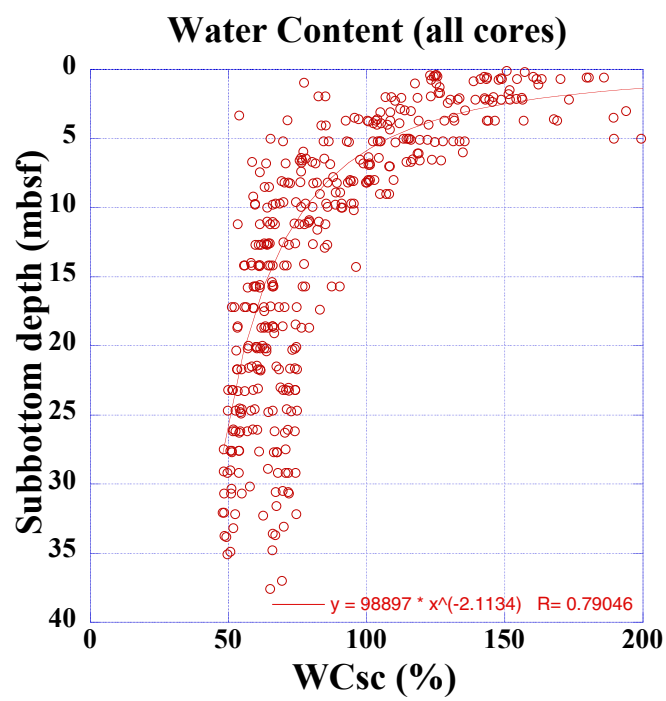

Figure 7. Water content, WCsc, (less than 200 percent) in relation to subbottom depth.

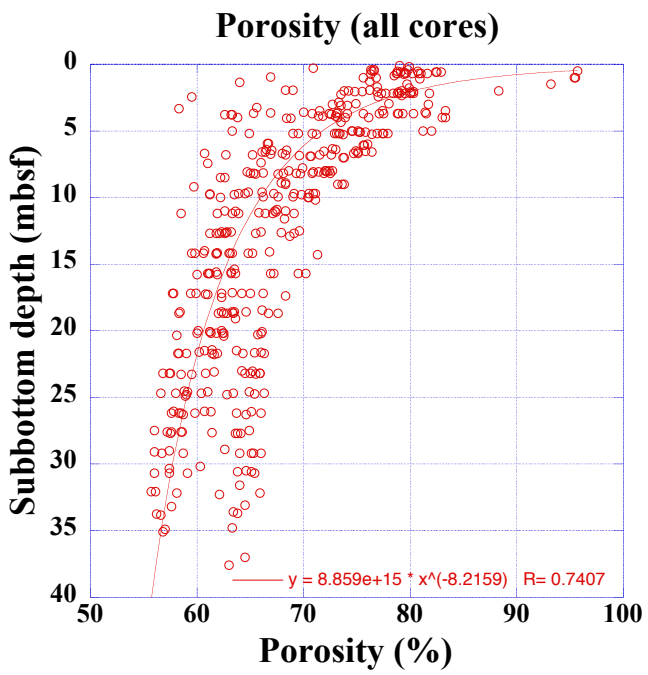

Figure 8. Porosity in relation to subbottom depth.

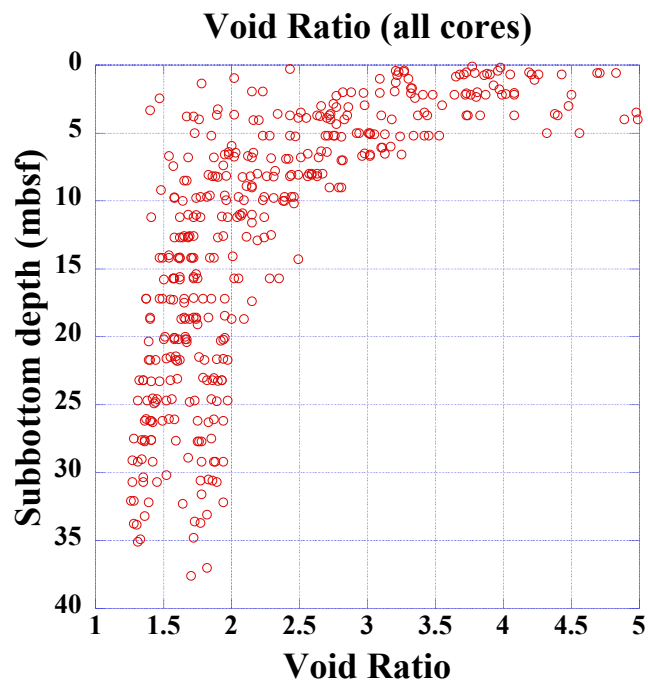

Figure 9. Void ratio in relation to subbottom depth.

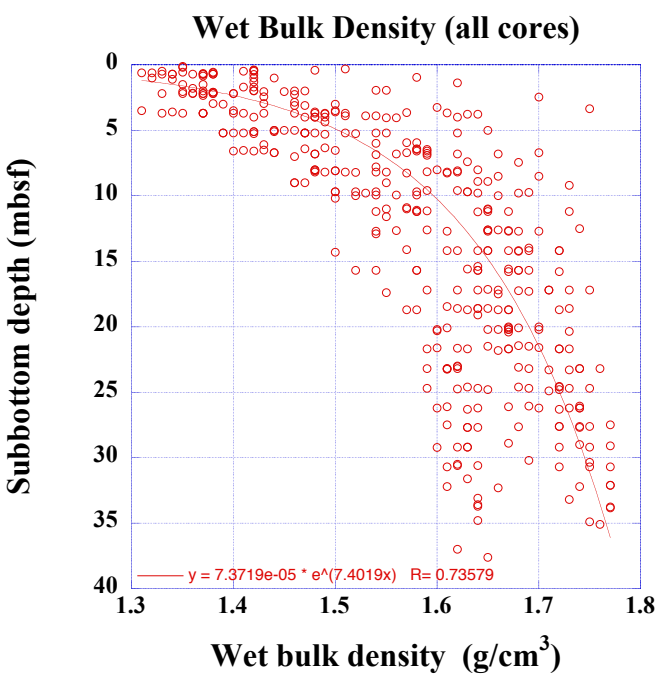

Figure 10. Wet bulk density in relation to subbottom depth.

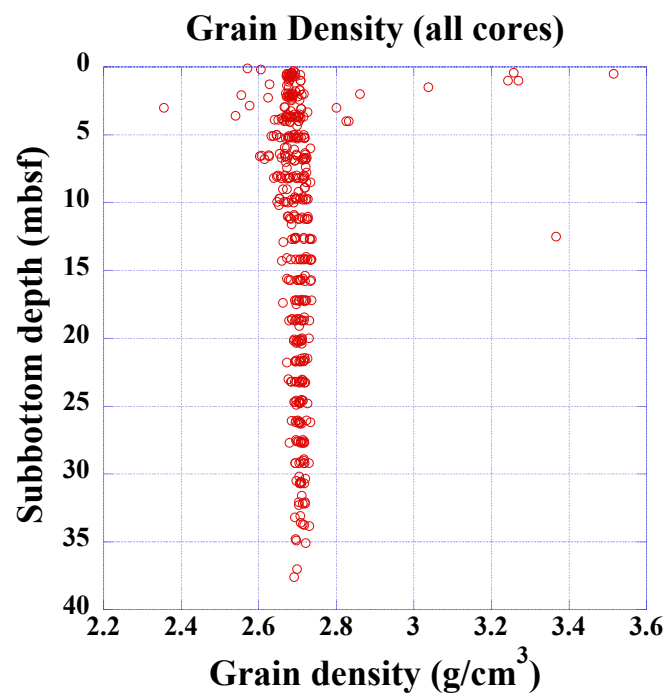

Figure 11. Grain density in relation to subbottom depth.

compaction process, as expected. Void ratio decreases and bulk density increases with depth below the sea floor. Grain density ranges from 2.36 to 3.53 grams per cubic centimeter (g/cm^3) (fig. 11), with a mean and median of 2.7 g/cm^3. Many of the outliers are related to the presence of hyper-saline pore water. At high salinity values, assumptions such as salt density (2.17 g/cm^3) have a much more pronounced effect and can produce considerable uncertainty in calculated values. These extreme values in grain density probably are not real, and caution should be exercised in using values from core MD02-2550C2 from Orca Basin. The values are only reported here because of the uniqueness of the environment from which the core was obtained.

To determine if regional variability occurs in physical properties, water content (figs. 12–17) and porosity (figs. 18–23) profiles from each study area were plotted individually. The change in slope of physical property profiles that occurs between 10 and 15 mbsf is nearly universal across the northern Gulf of Mexico and within each study area. Cores from Orca and Pigmy Basins were not long enough to determine if this sediment behavior is present at those locations. In the Mississippi Canyon, the effect of overburden removal is apparent in the low water content values of core MD02-2569 to a subbottom depth of 10 mbsf.

MSCL results (Appendix H) corroborate the same break in property slope between 10 and 15 mbsf in 9 of 13 of the longer cores. Magnetic susceptibility changes between 10 and 13 mbsf in 7 to 8 of the cores. However, because the indirectly measured values from the MSCL in most cases were not checked by independent physical tests, the data should be used with caution. For example, values of wet bulk density determined with the MSCL were routinely greater than 2.0 g/cm^3, whereas the maximum value determined by oven drying was 1.77 g/cm^3.

Shear Strength

Mini-vane shear strength values range from little or no strength close to the sea floor to as much as 100 kPa near the base of longer piston cores (tables 2; 5, p. 39). Each of the three methods—mini-vane, pocket penetrometer, and Torvane—produced strength values within fairly well-defined

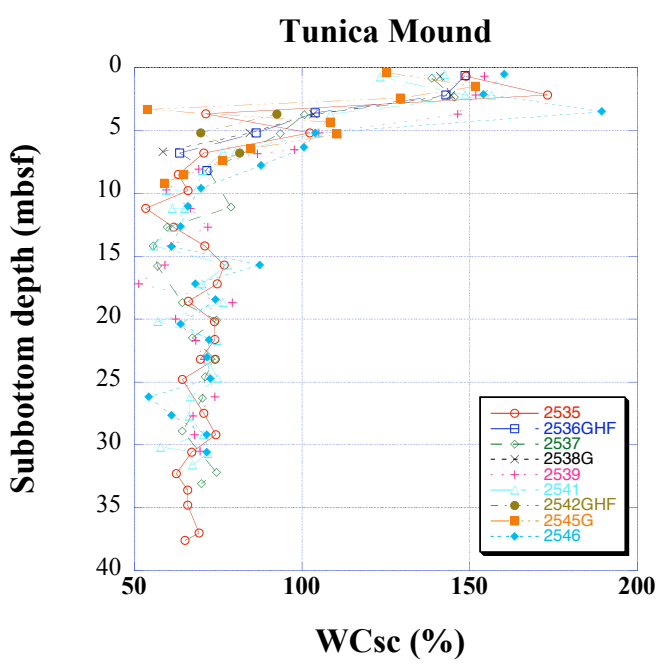

Figure 12. Water content, WCsc, in relation to subbottom depth in the Tunica Mound region.

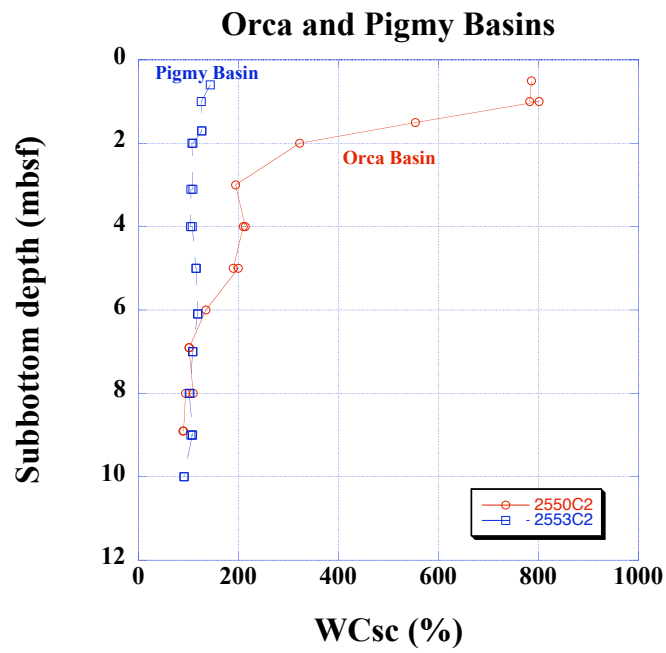

Figure 13. Water content, WCsc, in relation to subbottom depth in the Orca and Pigmy Basins region.

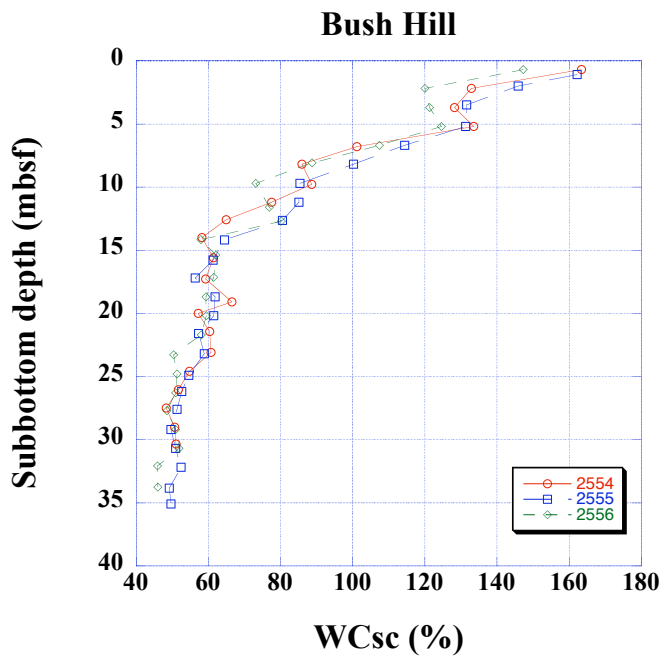

Figure 14. Water content, WCsc, in relation to subbottom depth in the Bush Hill region.

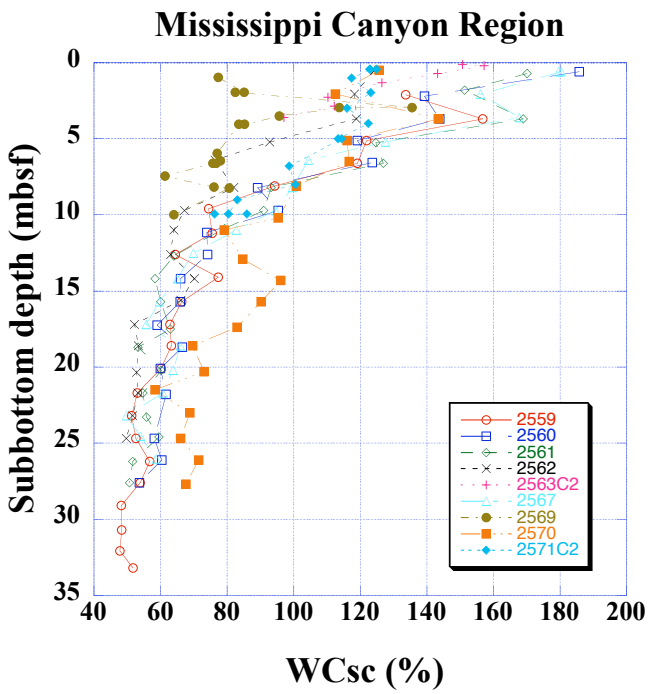

Figure 15. Water content, WCsc, in relation to subbottom depth in the overall Mississippi Canyon region.

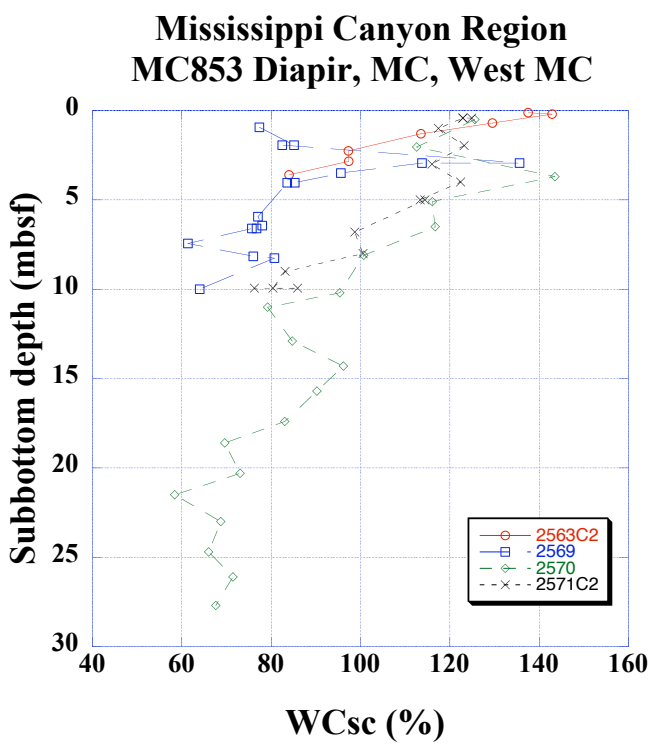

Figure 16. Water content, WCsc, in relation to subbottom depth in West of the Mississippi Canyon (MC), in the Mississippi Canyon, and at the MC853 diapir.

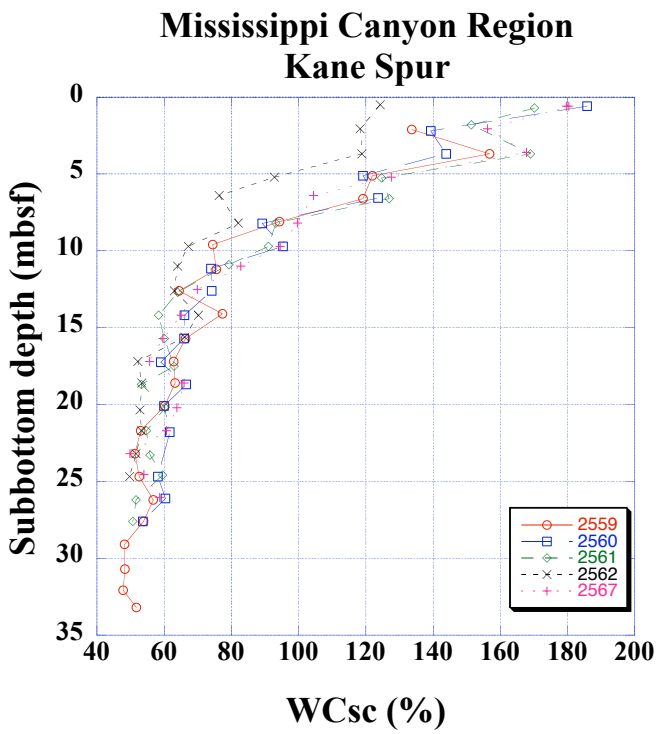

Figure 17. Water content, WCsc, in relation to subbottom depth in the Kane Spur region.

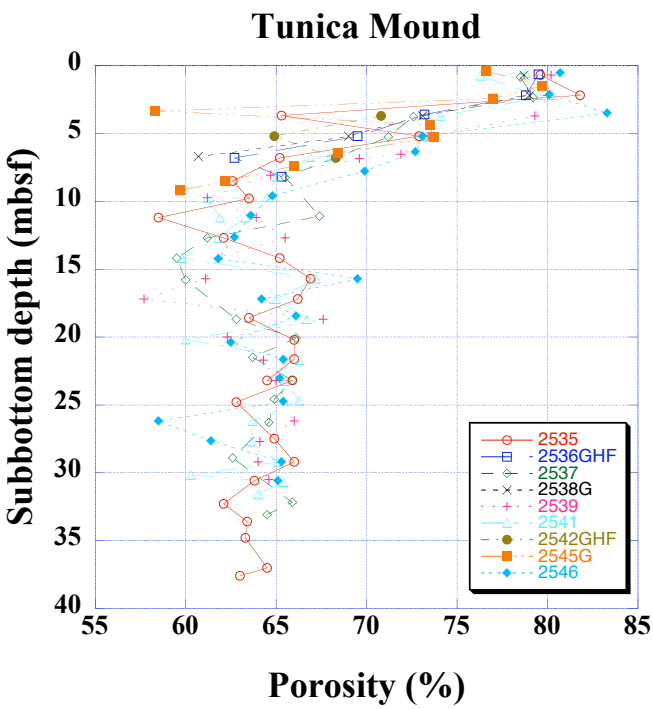

Figure 18. Porosity in relation to subbottom depth in the Tunica Mound region.

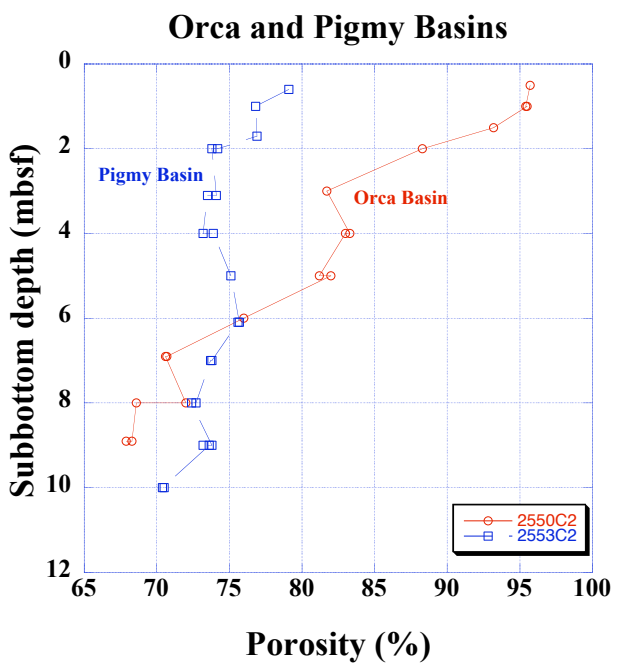

Figure 19. Porosity in relation to subbottom depth in the Orca and Pigmy Basins region.

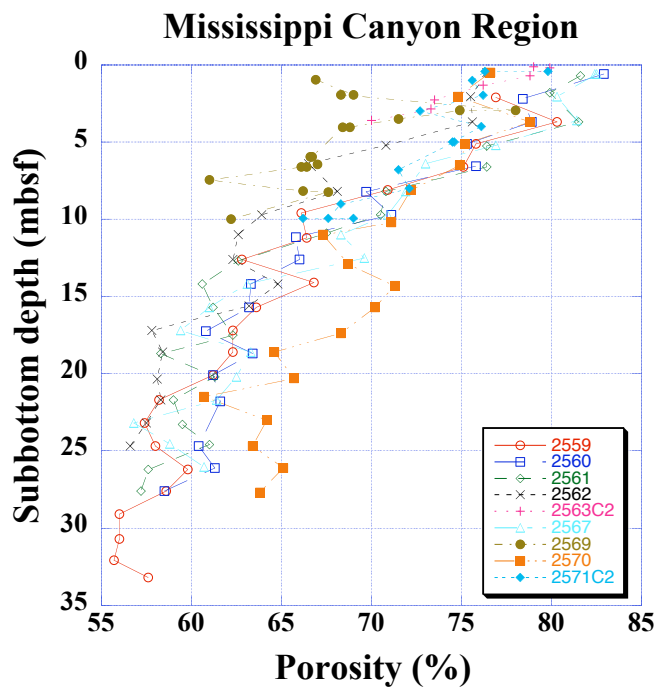

Figure 21. Porosity in relation to subbottom depth in the overall Mississippi Canyon region.

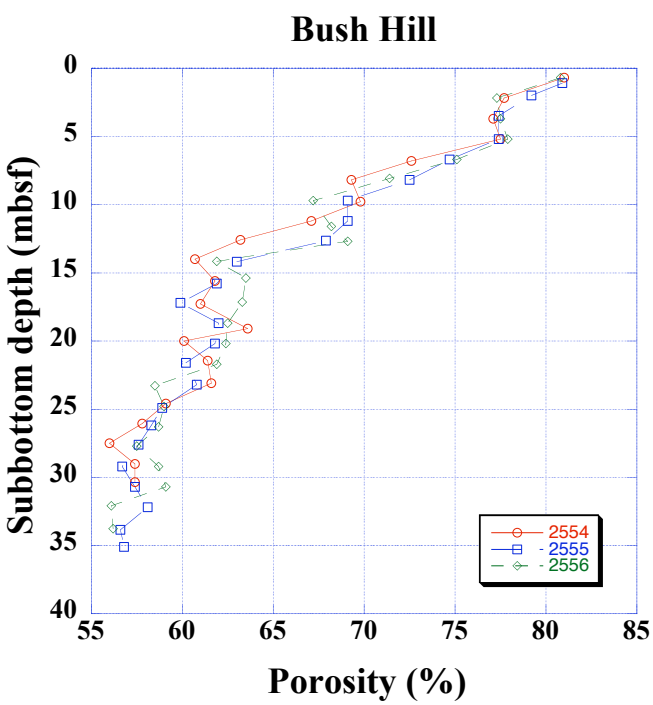

Figure 20. Porosity in relation to subbottom depth in the Bush Hill region.

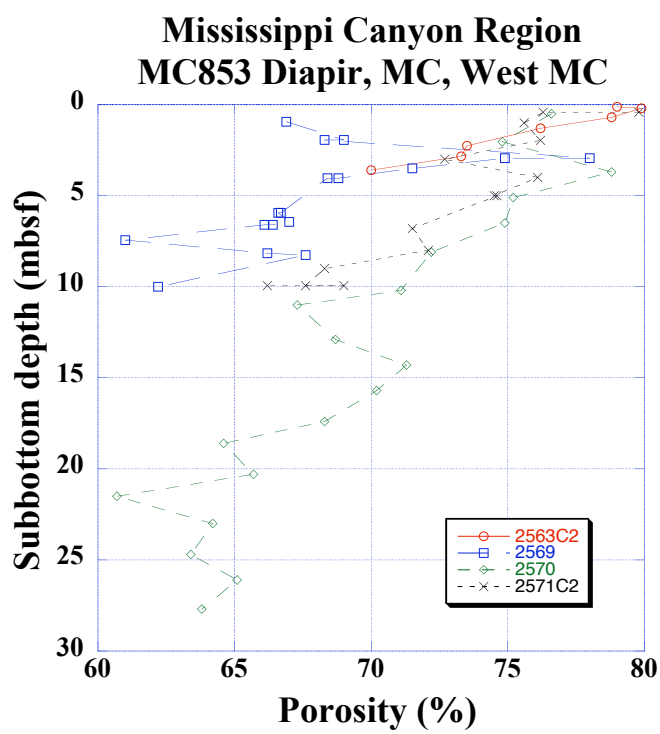

Figure 22. Porosity in relation to subbottom depth in West of the Mississippi Canyon (MC), in the Mississippi Canyon, and at the MC853 diapir.

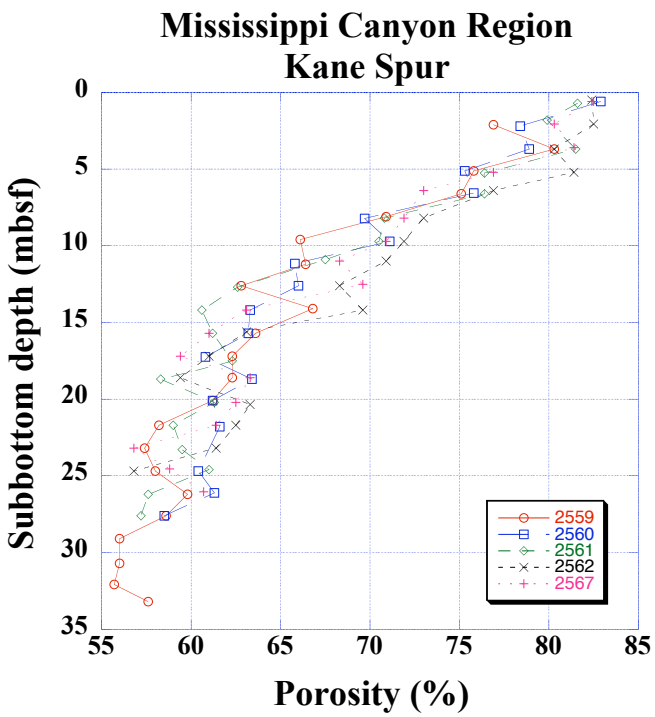

Figure 23. Porosity in relation to subbottom depth in the Kane Spur region.

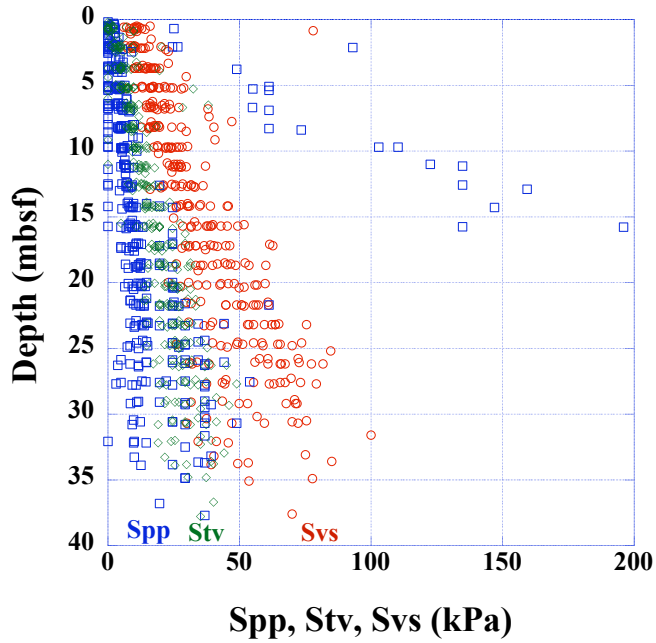

Figure 24. Shear strength results for all cores produced with a pocket penetrometer (Spp), Torvane (Stv), and a mini-vane (Svs), device in relation to subbottom depth.

zones related to subbottom depth (figs. 24–27). Except for some outlying values produced with the pocket penetrometer, the mini-vane strength test invariably produced higher strength results than the other methods. This may be due to its deeper penetration measuring the strength in zones away from the disturbed surface of the split core. We do not have any explanation for the occasional high strength values produced with the pocket penetrometer. Perhaps these values are related to the presence of carbonate or a diagenetic effect in the sediment. In some offshore areas, including the Gulf of Mexico, shear strength values can be related to sedimentation rate (Moore, 1964; Keller, 1974).

Linear regression analysis between the strength measurements and subbottom depth indicates that shear strength increases with subbottom depth likely are a result of the normal compaction process. Although we determined a linear fit for the strength data in a similar manner to Bryant and Trabant (1972), our strength values were lower near the sea floor and increased more rapidly with subbottom depth. The weaker zone near the sea floor may reflect the presence of higher water content.

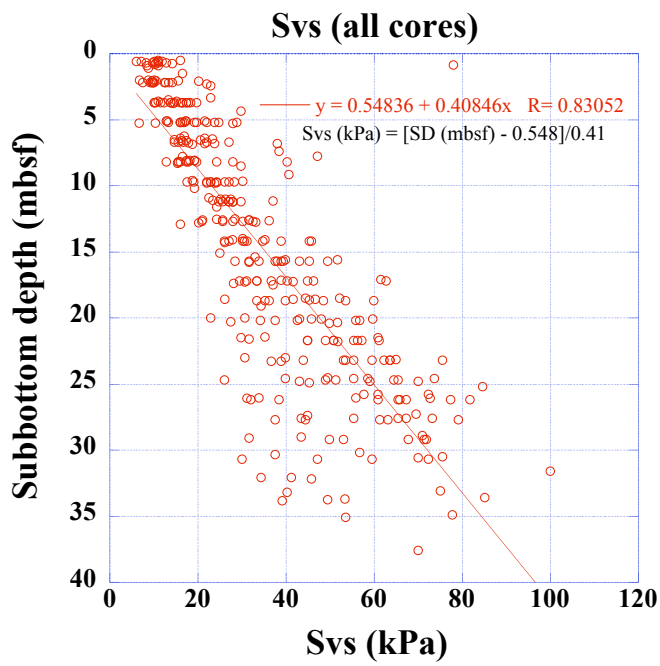

Figure 25. Vane-shear strength (Svs) in relation to subbottom depth for all cores.

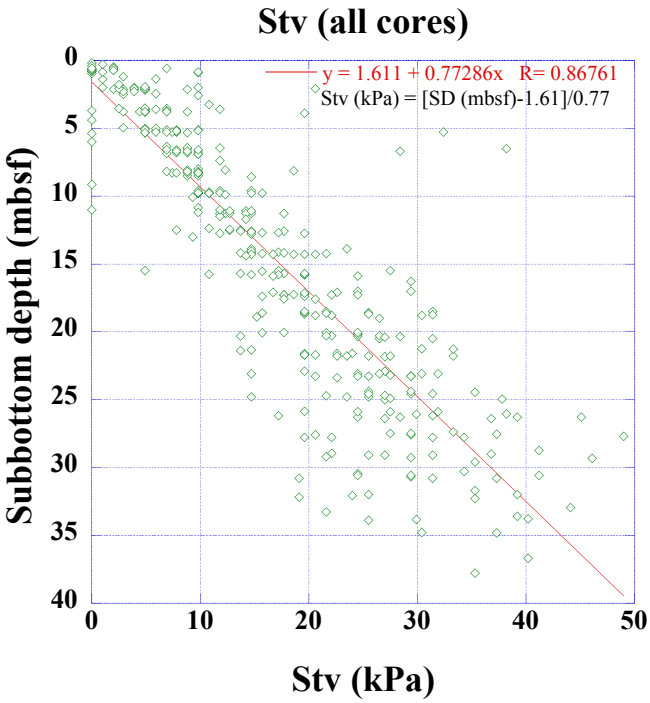

Figure 26. Torvane strength (Stv) in relation to subbottom depth for all cores.

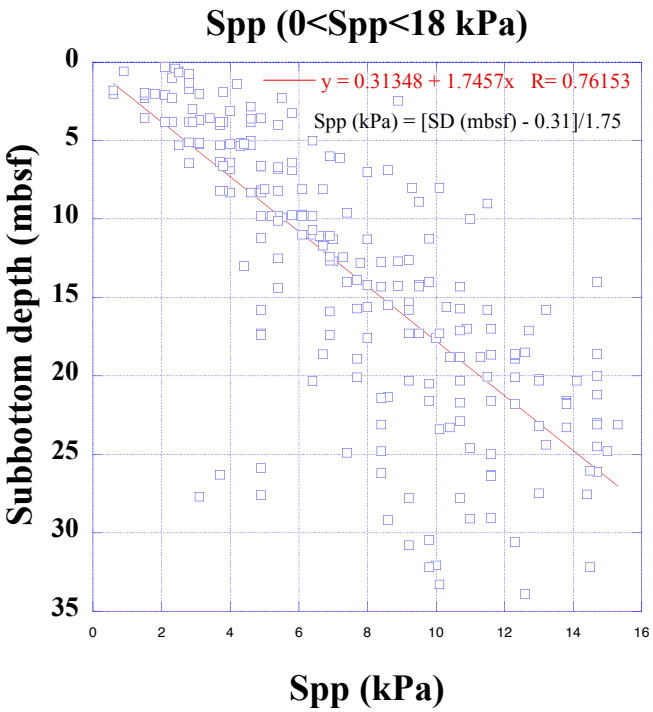

Figure 27. Pocket penetrometer strength (Spp) less than 18 kilopascals (kPa) in relation to subbottom depth.

Shear strength measurements were plotted for each of the main study areas (figs. 28–32). Because mini-vane tests were not possible with box cores, the pocket penetrometer strength was plotted for Orca Basin (fig. 29). The following shear strength characteristics were observed:

1. At Tunica Mound, the shear strength for core MD02-2545 (fig. 28), located near the crest of a mound at one end of the coring transect (fig. 2), is stronger than those of nearby cores.

2. Although Orca Basin has very high pore-water salinity, it does not appear to have pocket penetrometer strengths (fig. 29) significantly different from other cores (fig. 27).

3. Shear strengths are uniformly consistent at Bush Hill even though the cores were obtained at different water depths (fig. 3).

4. Core MD02-2570 on the western flank of the Mississippi Canyon is significantly weaker (fig. 31) than the uniform grouping of cores from Kane Spur located on the eastern side of the Mississippi Canyon (fig. 32).

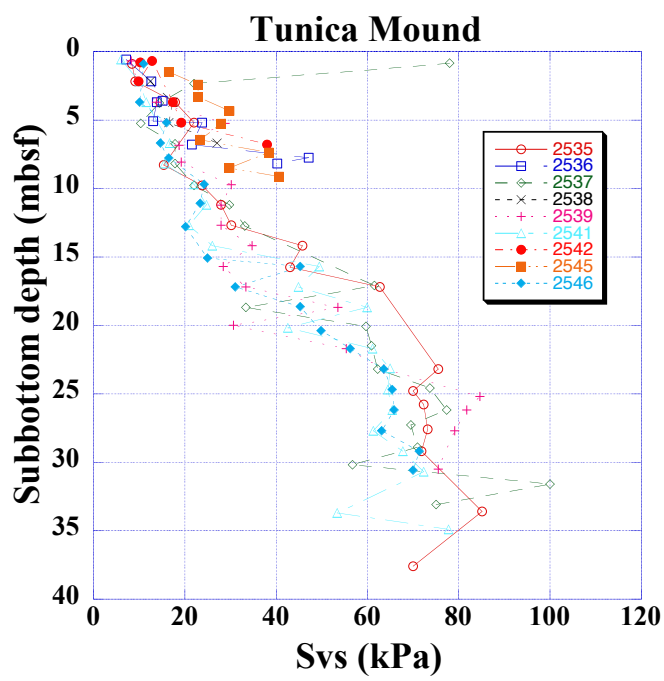

Figure 28. Vane-shear strength (Svs) in relation to subbottom depth for Tunica Mound.

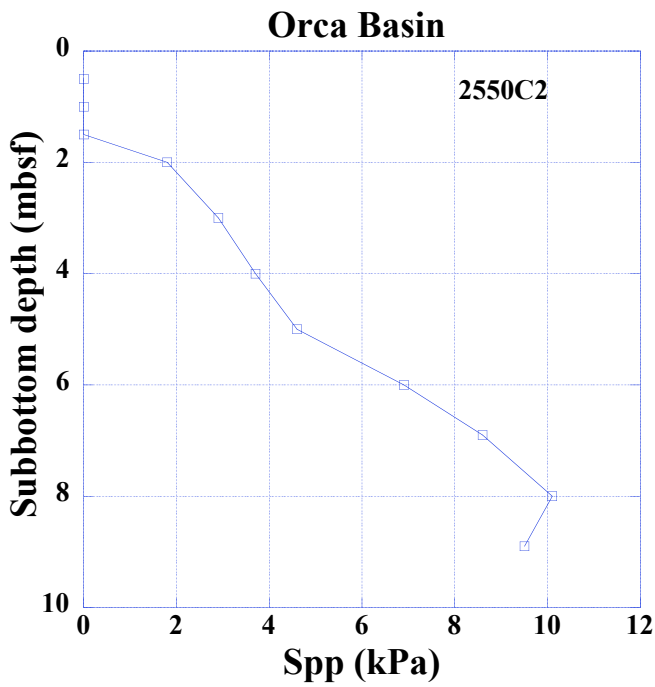

Figure 29. Pocket penetrometer strength (Spp) in relation to subbottom depth for Orca Basin.

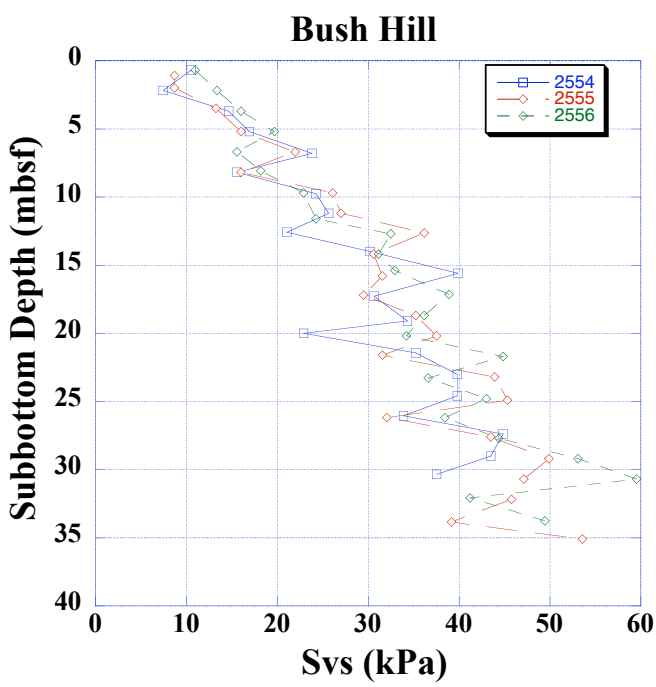

Figure 30. Vane-shear strength (Svs) in relation to subbottom depth for Bush Hill.

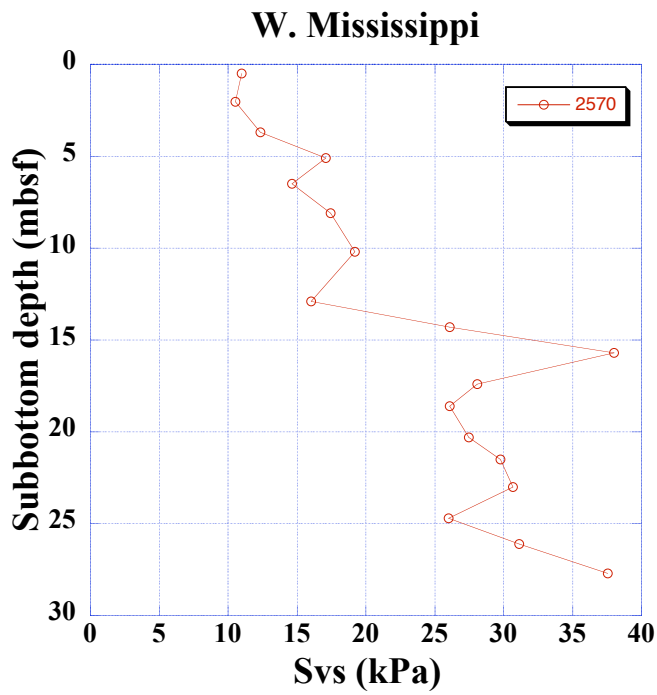

Figure 31. Vane-shear strength (Svs) in relation to subbottom depth for west of the Mississippi Canyon.

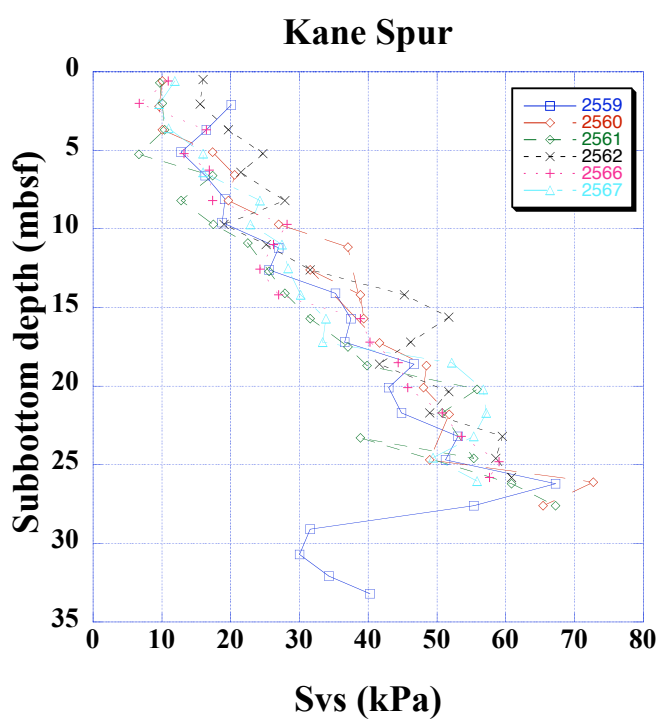

Figure 32. Vane-shear strength (Svs) in relation to subbottom depth for Kane Spur.

Electrical Resistivity

Although electrical resistivity for natural geologic materials ranges from close to that of seawater (0.18 to 0.24 ohm-m) to greater than 2,400 ohm-m (Hunt, 1984), the entire data set from the northern Gulf of Mexico only ranges from 0.26 to 1.06 ohm-m, with a mean value of 0.59 ohm-m (tables 2; 6, p. 49). As a result of higher water content, these values are somewhat lower than those reported for sediments rich in clay, which have resistivity values ranging from 3 to 100 ohm-m (Sharma, 1997) and from 3 to 15 ohm-m (Hunt, 1984). As anticipated, electrical resistivity and formation factor values increase with depth (figs. 33 and 34) because of the decrease in water content and porosity.

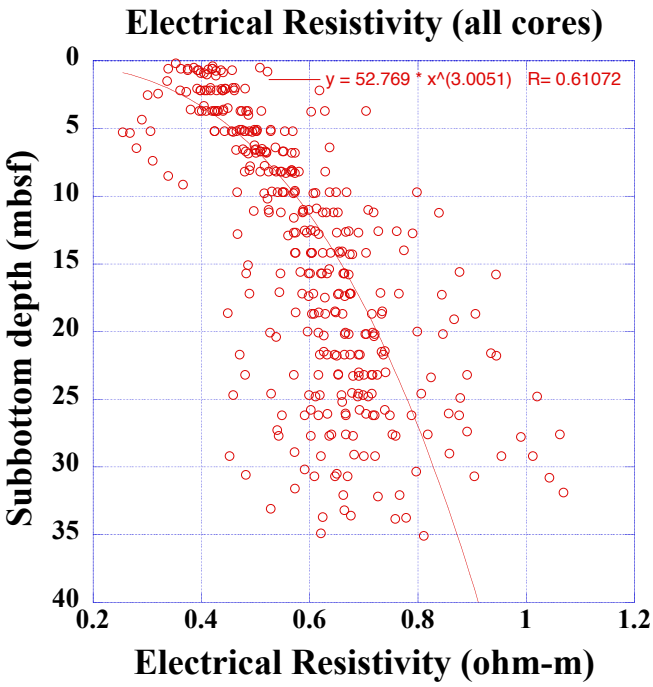

Figure 33. Electrical resistivity in relation to subbottom depth.

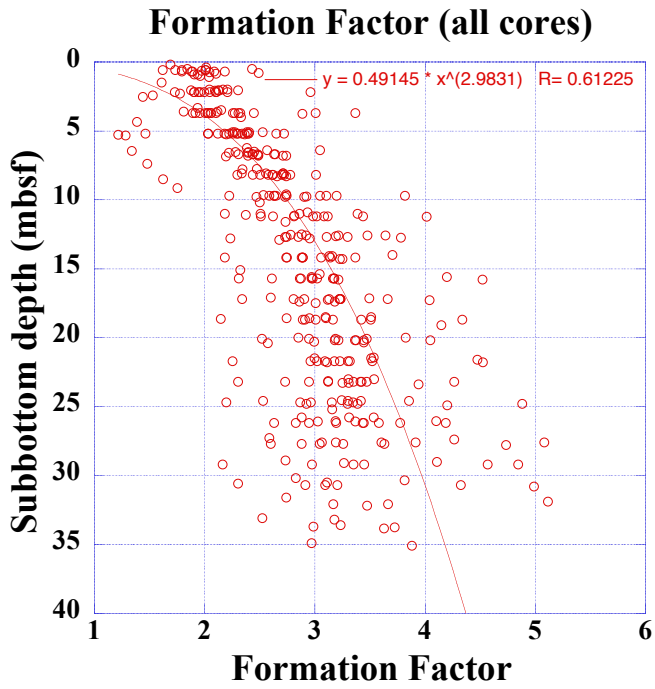

Figure 34. Formation factor in relation to subbottom depth.

Grain Size

Grain-size analyses were performed on 147 sediment samples from various subbottom depths in 29 cores (tables 7, p. 59, and 8). According to the Wentworth grade scale (Wentworth, 1929) and the Shepard classification scheme (Shepard, 1954), 56 percent of the samples classify as clay and the remaining classify as silty clay (figs. 35 and 36), with the exception of one sample that classifies as gravelly (Schlee, 1973). Full grain-size distribution curves are presented in figure 37 for six samples from throughout the northern Gulf of Mexico (table 8). Grain sizes (gravel, sand, silt, and clay) are distributed in wide, but uniform bands with subbottom depth (fig. 38) and are a byproduct of rapid sedimentation rates (Bouma and others, 1990). The uniform nature of the sediment texture is a contributing factor to the uniformity of physical properties across the northern Gulf of Mexico.

Visual observations indicate that the lithology of sediment containing gas hydrate was not substantially different from that of adjacent material. This is in contrast to other studies where hydrate was concentrated in coarser-grained sediment (for example, Winters and others (1999); Dallimore and others (2002); Matsumoto and others (2004)).

Table 8. Grain-size distributions.

[Values are in phi sizes. STDEV, standard deviation; SKEW, skewness; KURT, kurtosis; M1PHI, mode 1 phi size; M1FRQ, mode 1 frequency; Cfp3, cumulative frequency percent of 3 phi size class; Cfpm3, cumulative frequency percent of –3 phi size; Fp4, frequency percent of 4 phi size class; Fpm4, frequency percent of –4 phi size]

CORE	SUBBOT DEPTH (m)	WATER DEPTH (m)	GRVL (%)	SAND (%)	SILT (%)	CLAY (%)	SHEPARD CLASS	MEDIAN	MEAN	STDEV	SKEW
2537	5.2	600	0.00	0.50	15.89	83.60	CLAY	10.29	9.64	1.56	-1.14
2553	5.01	2,259	0.00	0.01	11.10	88.89	CLAY	10.28	9.80	1.24	-1.05
2554	5.18	602	0.00	0.16	5.17	94.67	CLAY	10.43	10.14	1.10	-2.01
2565	6.315	1,068	0.06	0.35	19.54	79.98	CLAY	10.2	9.47	1.58	-0.90
2569	4.215	1,032	0.00	1.57	24.96	73.49	SILTY CLAY	10.17	9.09	2.05	-0.63
2570	5.13	631	0.00	0.07	5.21	94.71	CLAY	10.31	9.99	0.96	-1.39

CORE	KURT	M1PHI	M1FRQ	M2PHI	M2FRQ	M3PHI	M3FRQ	Modes	Cfp11	Cfp10	Cfp9
2537	5.90	7.50	7.7	0.00	0.0	0.00	0.0	1.00	99.99	29.68	23.21
2553	3.62	0.00	0.0	0.00	0.0	0.00	0.0	0.00	100	30.45	20.17
2554	15.53	0.00	0.0	0.00	0.0	0.00	0.0	0.00	100	12.70	9.51
2565	4.03	6.50	8.8	0.00	0.0	0.00	0.0	1.00	100	37.40	28.30
2569	0.21	5.50	7.0	7.50	7.0	0.00	0.0	2.00	100.02	39.72	32.80
2570	9.35	0.00	0.0	0.00	0.0	0.00	0.0	0.00	100	27.01	16.07

CORE	Cfp8	Cfp7	Cfp6	Cfp5	Cfp4	Cfp3	Cfp2	Cfp1	Cfp0	Cfpm1	Cfpm2
2537	16.39	8.70	3.97	1.93	0.50	0.40	0.32	0.24	0.22	0.00	0.00
2553	11.11	5.24	2.17	0.59	0.01	0.01	0.01	0.00	0.00	0.00	0.00
2554	5.33	4.17	3.35	0.85	0.16	0.10	0.06	0.02	0.00	0.00	0.00
2565	20.02	11.67	2.89	0.55	0.48	0.42	0.39	0.26	0.09	0.06	0.00
2569	26.53	19.51	13.55	6.53	1.57	0.18	0.09	0.04	0.02	0.00	0.00
2570	5.29	1.34	0.99	0.33	0.08	0.05	0.03	0.02	0.00	0.00	0.00

CORE	Cfpm3	Cfpm4	Cfpm5	Fp11	Fp10	Fp9	Fp8	Fp7	Fp6	Fp5	Fp4
2537	0.00	0.00	0.00	70.31	6.47	6.82	7.69	4.73	2.04	1.43	0.10
2553	0.00	0.00	0.00	69.55	10.28	9.06	5.87	3.07	1.58	0.58	0.00
2554	0.00	0.00	0.00	87.30	3.19	4.18	1.16	0.82	2.50	0.69	0.06
2565	0.00	0.00	0.00	62.60	9.10	8.28	8.35	8.78	2.34	0.07	0.06
2569	0.00	0.00	0.00	60.30	6.92	6.27	7.02	5.96	7.02	4.96	1.39
2570	0.00	0.00	0.00	72.99	10.94	10.78	3.95	0.35	0.66	0.25	0.03

CORE	Fp3	Fp2	Fp1	Fp0	Fpm1	Fpm2	Fpm3	Fpm4	Fpm5
2537	0.08	0.08	0.02	0.22	0.00	0.00	0.00	0.00	0.00
2553	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2554	0.04	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00
2565	0.03	0.13	0.17	0.03	0.06	0.00	0.00	0.00	0.00
2569	0.09	0.05	0.02	0.02	0.00	0.00	0.00	0.00	0.00
2570	0.02	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00

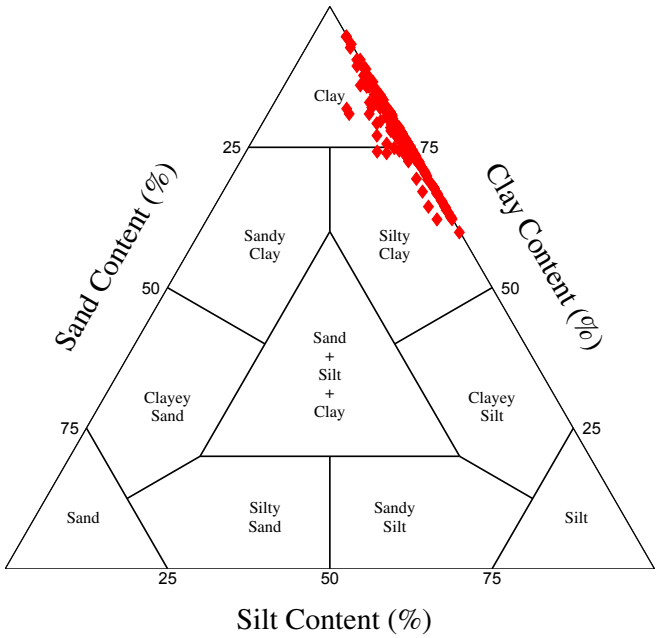

Figure 35. Grain sizes, including sand, silt, and clay.

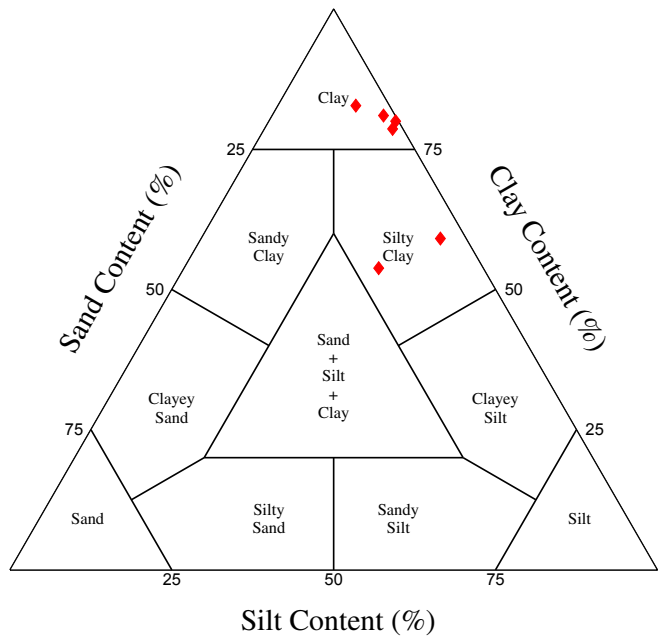

Figure 36. Grain sizes, including gravel, sand, silt, and clay. Gravel has been added to the sand quantity for these six samples (table 7).

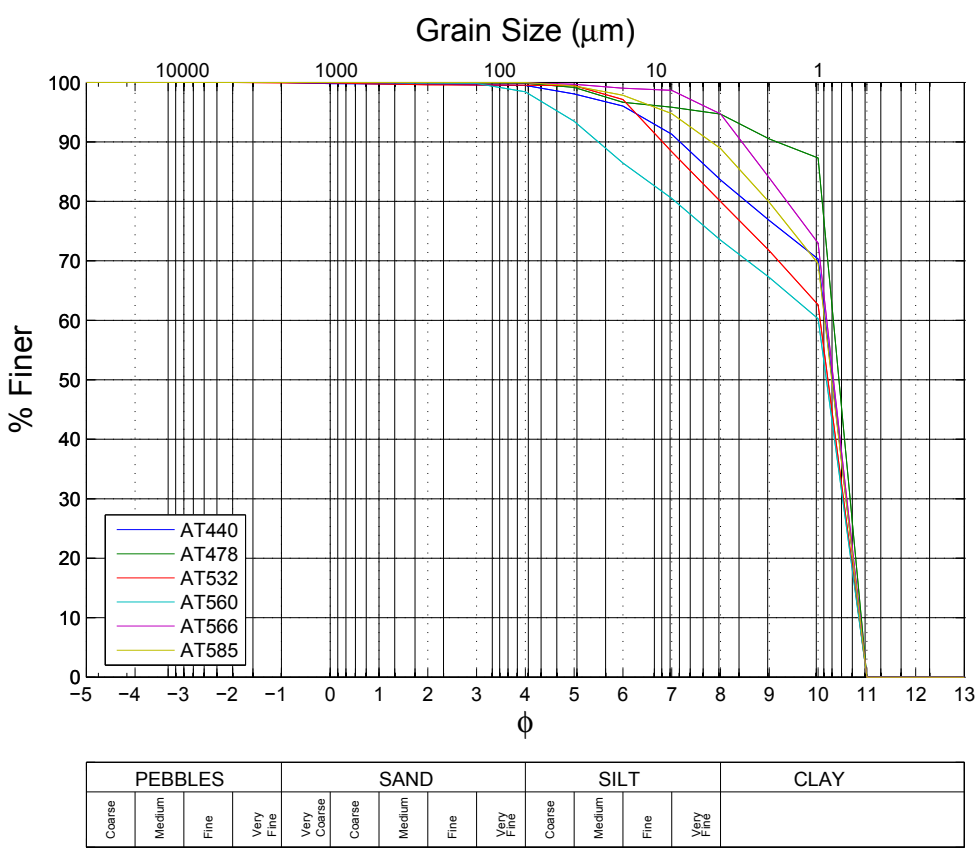

Figure 37. Grain-size distribution curves.

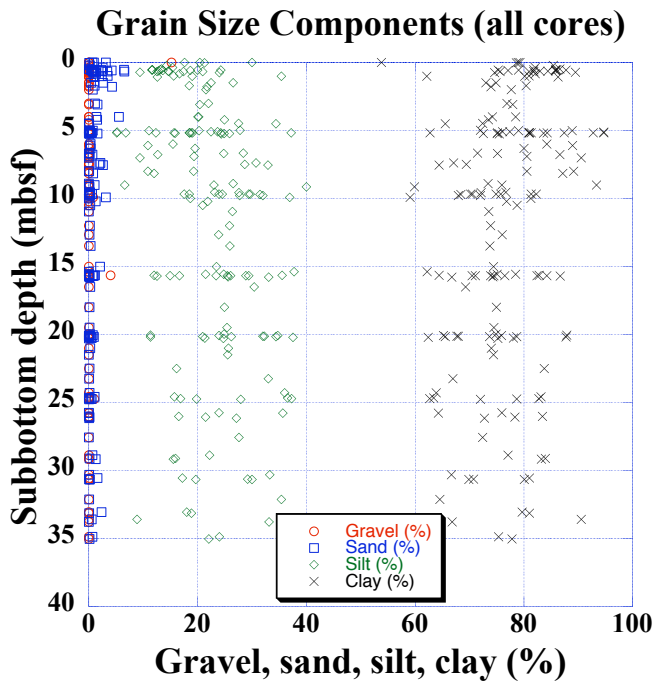

Figure 38. Grain size, including gravel, sand, silt, and clay in relation to subbottom depth.

Organic Carbon Content

Carbon and nitrogen content were determined in 144 sediment samples from 27 cores at various subbottom depths (table 9). All components are present in small quantities within the samples and are less than 5.8 percent of the total sample dry mass (table 2; fig. 39). Inorganic carbon, IC, (assumed to be carbonate) ranges from 0.15 to 2.8 percent (with a single measurement at 4.08 percent; fig. 40). The presence of carbonate must be geographically localized because unlike some samples retrieved from nearby MC852, which contained carbonate contents over 70 percent (Francisca and others, 2005), cores obtained during this cruise contained much smaller amounts. Organic carbon, OC, ranges from 0.5 to 2.2 percent (fig. 41). Considering the high sedimentation rates in the northern Gulf of Mexico (Bouma and others, 1990), this amount of organic carbon is sufficient to generate some biogenic methane gas (G. Claypool, oral commun., 2005). Of course, thermogenic gas seeps are responsible for many of the widely known gas hydrate outcrops that have been documented in the Gulf of Mexico (Brooks and others, 1984; MacDonald and others, 1994; Sassen, 2001).

Table 9. Geochemistry results.

[CHN ID, carbon, hydrogen, nitrogen identification number; TC, total carbon; %, percent; N, nitrogen; OC, organic carbon; IC, inorganic carbon]

CHN ID	Core	Subbottom depth (m)	TC (%)	N (%)	OC (%)	IC (%)
1	2535	0.67	3.7	0.08	1.28	2.42
4	2535	5.18	2.56	0.06	0.76	1.8
7	2535	9.78	3.51	0.05	1.76	1.75
11	2535	15.72	2.68	0.06	0.72	1.96
14	2535	20.19	1.81	0.06	0.54	1.27
17	2535	24.76	0.96	0.07	0.61	0.35
20	2535	29.19	1.99	0.08	0.63	1.36
23	2535	33.6	1.12	0.07	0.51	0.61
1	2536GHF	0.64	2.53	0.09	1	1.53
6	2536GHF	8.18	2.58	0.07	1.01	1.57
1	2537	0.83	2.46	0.09	0.55	1.91
4	2537	5.2	2.35	0.07	1.43	0.92
9	2537	12.67	3.21	0.05	0.87	2.34
11	2537	15.79	3.8	0.04	1.05	2.75
14	2537	20.07	2.55	0.07	1.14	1.41
17	2537	24.58	1.69	0.05	1.16	0.53
20	2537	28.87	1.04	0.07	0.89	0.15
23	2537	33.08	1.84	0.07	0.52	1.32
1	2538G	0.65	3.15	0.1	0.97	2.18
5	2538G	6.67	3.28	0.06	1.56	1.73

Table 9. Geochemistry results. — Continued

[CHN ID, carbon, hydrogen, nitrogen identification number; TC, total carbon; %, percent; N, nitrogen; OC, organic carbon; IC, inorganic carbon]

CHN ID	Core	Subbottom depth (m)	TC (%)	N (%)	OC (%)	IC (%)
1	2539	0.67	3.36	0.09	1.04	2.32
4	2539	5.17	2.69	0.07	1.06	1.63
7	2539	9.71	2.94	0.05	1.18	1.76
11	2539	15.68	3.51	0.05	1.31	2.2
14	2539	19.97	3.02	0.05	0.93	2.09
1	2540GHF	0.59	3.51	0.08	1	2.51
4	2540GHF	5.11	3.18	0.06	1.31	1.87
1	2541	0.55	3.7	0.08	1.02	2.68
4	2541	5.17	2.5	0.08	0.59	1.91
7	2541	9.67	2.92	0.07	1.17	1.76
11	2541	15.66	2.43	0.08	1.08	1.35
14	2541	20.18	2.93	0.07	0.75	2.18
20	2541	29.14	0.92	0.07	0.49	0.43
24	2541	34.88	1.06	0.08	0.57	0.49
5	2542GHF	6.77	2	0.07	0.61	1.39
1	2545G	0.37	3.68	0.1	0.99	2.69
6	2545G	5.27	2.02	0.07	0.86	1.16
10	2545G	9.16	3.2	0.06	1.8	1.4
1	2546	0.53	2.34	0.1	0.91	1.43
7	2546	9.58	2.79	0.07	0.52	2.27
11	2546	15.67	2.03	0.07	0.9	1.13
14	2546	20.28	3.31	0.05	1.49	1.82
17	2546	24.71	1.37	0.07	0.93	0.44
21	2546	30.57	1.79	0.08	0.49	1.3
1	2547GHF	0.72	2.24	0.1	0.83	1.41
4	2547GHF	4.98	2.74	0.07	1.09	1.65
1	2554	0.74	2.23	0.1	0.84	1.39
4	2554	5.18	2.34	0.12	1.54	0.8
7	2554	9.78	2.65	0.08	1.09	1.56
11	2554	15.58	2.32	0.07	0.83	1.49
14	2554	19.97	2.61	0.07	1.03	1.58
17	2554	24.29	2.6	0.07	1.12	1.48
21	2554	30.32	3.03	0.07	1.25	1.78
1	2555	1.08	2.54	0.1	1.42	1.12
4	2555	5.17	1.96	0.1	1.19	0.77
7	2555	9.67	2.65	0.08	1.52	1.13
11	2555	15.75	2.97	0.06	1.4	1.57
14	2555	20.21	2.52	0.06	1.55	0.97
18	2555	26.17	3.2	0.07	1.11	2.09
21	2555	30.67	3.09	0.07	1.24	1.85
22	2555	32.15	3.31	0.06	1.47	1.84
24	2555	35.05	3.22	0.06	1.3	1.92

Table 9. Geochemistry results. — Continued

[CHN ID, carbon, hydrogen, nitrogen identification number; TC, total carbon; %, percent; N, nitrogen; OC, organic carbon; IC, inorganic carbon]

CHN ID	Core	Subbottom depth (m)	TC (%)	N (%)	OC (%)	IC (%)
1	2556	0.67	2.61	0.1	0.94	1.67
4	2556	5.17	2.08	0.1	1.35	0.73
7	2556	9.68	3.14	0.07	1.5	1.64
11	2556	15.38	2.67	0.05	1.15	1.52
14	2556	20.18	2.82	0.06	1.34	1.48
16	2556	23.27	3	0.07	1.35	1.65
17	2556	24.78	3.01	0.06	1.19	1.82
21	2556	30.67	2.92	0.07	1.3	1.62
23	2556	33.78	3.26	0.06	1.27	1.99
1	2557GHF	0.6	1.74	0.08	0.76	0.98
1	2559	0.21	1.47	0.09	0.78	0.69
4	2559	5.11	2.52	0.08	1.65	0.87
7	2559	9.54	2.54	0.08	1.3	1.25
11	2559	15.68	2.55	0.06	1.14	1.41
14	2559	20.08	2.33	0.08	1.21	1.12
17	2559	24.67	2.8	0.07	1.25	1.55
21	2559	30.65	3.29	0.06	1.65	1.64
23	2559	33.15	3.28	0.06	1.64	1.64
1	2560	0.57	2.74	0.11	0.92	1.82
11	2560	15.67	2.68	0.07	1.22	1.46
14	2560	20.09	2.78	0.06	1.4	1.38
17	2560	24.72	2.71	0.07	1.28	1.43
1	2561	0.61	3.47	0.1	1.25	2.22
4	2561	5.23	2.03	0.07	1.15	0.88
7	2561	9.68	2.23	0.07	1.08	1.15
11	2561	15.66	2.87	0.07	1.34	1.53
14	2561	20.15	2.75	0.07	1.23	1.53
19	2561	27.57	2.74	0.06	1.28	1.46
1	2562	0.48	1.81	0.06	1.06	0.75
4	2562	5.18	2.34	0.07	1.21	1.13
8	2562	10.97	2.82	0.07	1.33	1.49
11	2562	15.58	2.59	0.07	1.18	1.41
14	2562	20.31	2.9	0.07	1.31	1.59
18	2562	25.77	2.93	0.06	1.35	1.58
1	2564GHF	0.99	3.63	0.17	1.38	2.25
5	2564GHF	6.69	2.78	0.07	1.33	1.45
1	2565	0.025	2.42	0.1	1.5	0.92
2	2565	1.51	2.83	0.1	1.68	1.15
3	2565	3.01	2.43	0.1	1.57	0.86
4	2565	4.525	2.97	0.08	1.77	1.2
5	2565	6.315	2.6	0.09	1.5	1.1
6	2565	7.515	2.59	0.08	1.45	1.14

Table 9. Geochemistry results. — Continued

[CHN ID, carbon, hydrogen, nitrogen identification number; TC, total carbon; %, percent; N, nitrogen; OC, organic carbon; IC, inorganic carbon]

CHN ID	Core	Subbottom depth (m)	TC (%)	N (%)	OC (%)	IC (%)
7	2565	9.015	2.47	0.1	1.37	1.1
8	2565	10.515	2.51	0.1	1.33	1.18
9	2565	12.015	2.59	0.09	1.45	1.14
10	2565	13.515	5.83	0.09	1.75	4.08
11	2565	15.015	2.46	0.1	1.44	1.02
12	2565	16.515	2.64	0.09	1.53	1.11
13	2565	18.015	2.75	0.08	1.41	1.34
14	2565	19.515	2.44	0.1	1.44	1
15	2565	21.015	2.54	0.09	1.4	1.14
16	2565	22.515	2.25	0.1	1.04	1.21
1	2566	0.57	2.79	0.14	1.01	1.79
4	2566	5.17	2	0.13	1.18	0.82
7	2566	9.68	2.81	0.14	1.61	1.2
11	2566	15.67	2.89	0.12	1.46	1.43
14	2566	20.15	3	0.12	1.48	1.52
18	2566	25.78	3.87	0.12	2.19	1.68
1	2567	0.53	3.09	0.14	1.03	2.06
4	2567	5.18	1.91	0.11	1.08	0.83
7	2567	9.68	2.3	0.11	1.16	1.14
11	2567	15.68	2.86	0.13	1.33	1.53
14	2567	20.18	2.5	0.12	1.33	1.17
18	2567	26.04	2.24	0.14	0.99	1.25
1	2568GHF	0.015	3.28	0.15	1.4	1.88
3	2568GHF	4.485	2.54	0.08	1.3	1.24
1	2569	0.015	1.46	0.1	0.9	0.56
2	2569	1.015	1.6	0.06	0.76	0.84
6	2569	4.215	1.22	0.07	0.74	0.48
7	2569	5.225	1.27	0.07	0.75	0.52
9	2569	7.385	1.39	0.07	0.84	0.55
10	2569	7.54	1.18	0.07	0.74	0.45
12	2569	9.935	1.25	0.07	0.71	0.54
1	2570	0.57	1.49	0.07	0.71	0.78
4	2570	5.13	2.2	0.07	1.15	1.05
7	2570	10.22	2.76	0.07	1.49	1.27
11	2570	15.69	2.17	0.08	1.3	0.87
15	2570	21.51	2.76	0.12	1.28	1.49
18	2570	26.1	2.64	0.14	1.21	1.43
1	2572GHF	0.015	2.27	0.17	0.92	1.35
2	2572GHF	1.515	3.25	0.16	1.4	1.85
3	2572GHF	1.805	3.35	0.16	1.98	1.37

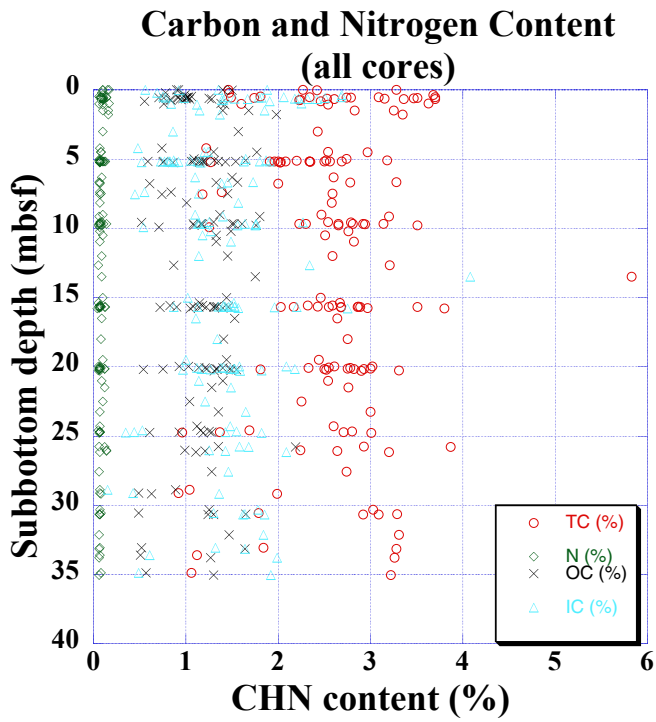

Figure 39. Carbon, hydrogen, and nitrogen content of sediment samples.

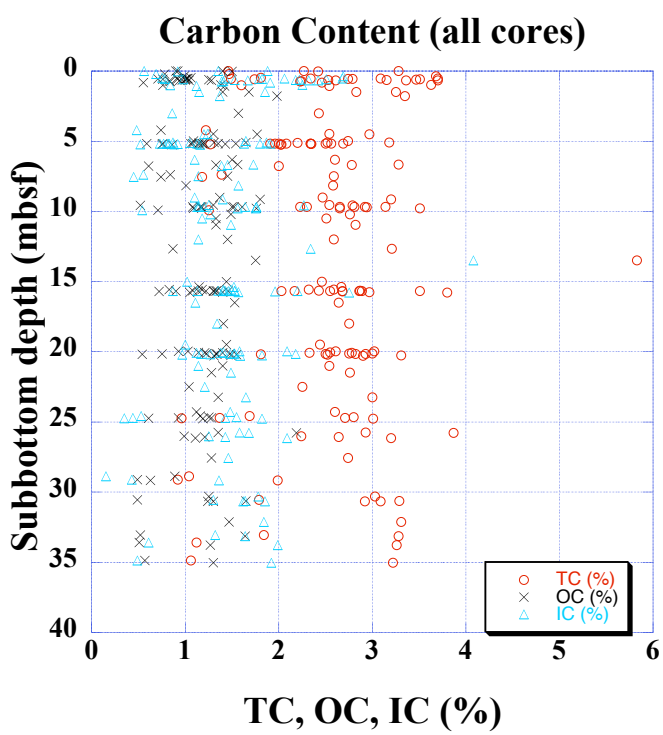

Figure 40. Carbon content of sediment samples.

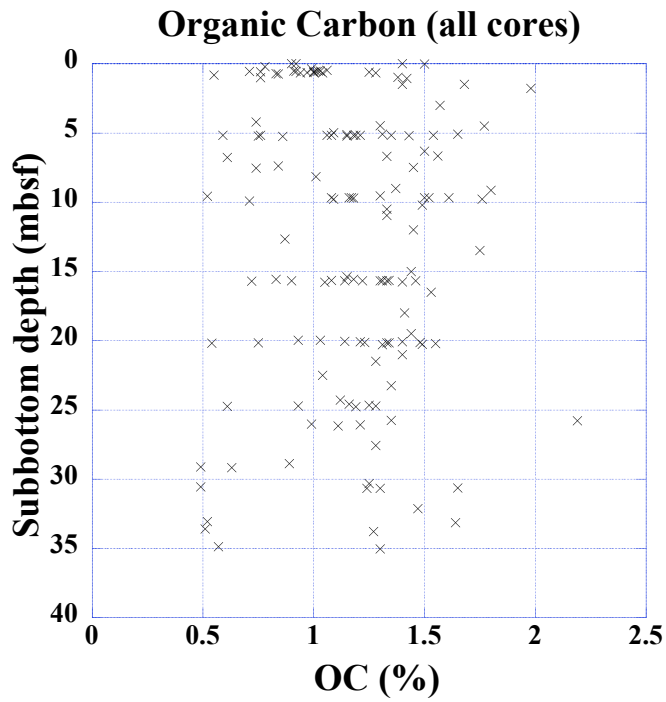

Figure 41. Organic carbon content of sediment samples.

Conclusions

Our results confirm that gas hydrates are present at discrete locations in the northern Gulf of Mexico, but they do not appear to be pervasive. In other terrestrial and marine regions, gas hydrate has been recovered in coarser-grained sediment. In the northern Gulf of Mexico, however, factors other than lithology, such as gas quantity and composition, pore-water salinity, and geothermal gradient, likely play a significant role in determining where and how much, if any, gas hydrate is present.

With the exception of a core from Orca Basin containing hyper-saline pore water, most cores possess physical properties that fall within wide, but predictable, bands. For example, almost all sediment classifies texturally as clay or silty clay. Such uniformity in properties is evidence of regionally pervasive depositional conditions. This is not to say that geologic conditions are currently uniform. Faulting, salt diapirs, directed fluid flow, and thermogenic gas seeps are all examples of localized processes occurring in the study region.

Nearly all texture samples were classified as clay or silty clay. In addition, the shipboard lithologic descriptions (Appendix F) indicate that few sandy layers were encountered during the cruise. Therefore, one of the challenges for developing gas hydrate in the Gulf of Mexico as a resource is to discover thick permeable coarse-grained layers containing substantial quantities of gas hydrate. However, from a hazards standpoint, the recovered pure hydrate layers would substantially increase pore pressure upon dissociation, thereby adversely affecting sea-floor stability.

Overall, physical properties show similar trends in the Tunica Mound, Bush Hill, and Mississippi Canyon regions. There is a pervasive break in slope of depth profiles of water content and related properties at 10 to 15 mbsf. This change in behavior is not believed to coincide with the last glacial maximum (Bout-Roumazeilles and Trentesaux, this volume, chapter 5) or with obvious textural changes.

The sedimentation rate, in conjunction with an ample amount of organic carbon, indicates that biogenic methane gas production is sufficient to form some gas hydrate at most locations. However, the fact that gas hydrate has not been pervasively observed indicates that other factors control hydrate formation and distribution.

Acknowledgments

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The U.S. Minerals Management Service provided information used to determine core locations and avoid existing sea-floor infrastructure.

The Integrated Ocean Drilling Program provided facilities to store and archive recovered cores.

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Table 4. Water content and index properties.

[m, meters; Sal Est, salinity estimated; ppt, parts per thousand; WCt, water content based on total sample mass not corrected for salinity; %, percent; WCs, water content based on solids mass not corrected for salinity; WCtc, water content based on total sample mass corrected for salinity; WCsc, water content based on solids mass corrected for salinity; ρs, grain density not corrected for salinity; g/cm^3, grams per cubic centimeter; ρsc, grain density corrected for salinity; n, porosity; e, void ratio; ρw, wet bulk density; ρd, dry bulk density; γw, wet unit weight; kN/m^3, kiloNewton per cubic meter; γd, dry unit weight; γsub, submerged unit weight]

Core no.	Section	Mid-depth (m)	Sal Est (ppt)	WCt (%)	WCs (%)	WCtc (%)	WCsc (%)	ρs (g/cm^3)	ρsc (g/cm^3)	n (%)	e	ρw (g/cm^3)	ρd (g/cm^3)	γw (kN/m^3)	γd (kN/m^3)	γsub (kN/m^3)
2535	1	0.7	36	57.7	136.3	59.8	149	2.66	2.69	79.6	3.9	1.37	0.55	13.4	5.38	3.33
2535	2	2.2	36.1	61.1	157.1	63.4	173.2	2.64	2.67	81.8	4.5	1.33	0.49	13.01	4.76	2.93
2535	3	3.68	36.1	40.1	67	41.6	71.3	2.7	2.72	65.3	1.89	1.61	0.94	15.81	9.23	5.74
2535	4	5.2	36.3	48.7	95.1	50.6	102.4	2.67	2.7	72.9	2.69	1.48	0.73	14.52	7.17	4.44
2535	5	6.8	36.8	39.9	66.4	41.4	70.7	2.71	2.72	65.2	1.87	1.62	0.95	15.87	9.29	5.78
2535	6	8.5	37	37.3	59.4	38.7	63.1	2.71	2.72	62.6	1.67	1.66	1.02	16.31	10	6.22
2535	7	9.8	36.9	38.3	62.1	39.8	66	2.7	2.71	63.5	1.74	1.64	0.99	16.11	9.71	6.03
2535	8	11.2	37.2	33.5	50.4	34.8	53.4	2.71	2.72	58.5	1.41	1.73	1.13	16.96	11.05	6.87
2535	8	11.2	37.2	33.5	50.4	34.8	53.4	2.71	2.72	58.5	1.41	1.73	1.13	16.96	11.05	6.87
2535	9	12.7	37.4	36.7	58.1	38.2	61.7	2.72	2.73	62.1	1.64	1.67	1.03	16.42	10.15	6.33
2535	10	14.2	37.5	40	66.6	41.5	71	2.7	2.71	65.2	1.87	1.61	0.94	15.84	9.26	5.75
2535	11	15.7	37.6	41.8	71.8	43.4	76.8	2.69	2.71	66.9	2.02	1.58	0.9	15.54	8.79	5.45
2535	12	17.2	37.6	41.1	69.9	42.8	74.7	2.68	2.69	66.2	1.95	1.59	0.91	15.61	8.94	5.52
2535	13	18.6	37.6	38.3	62	39.8	66.1	2.69	2.71	63.5	1.74	1.64	0.99	16.09	9.69	6.01
2535	14	20.22	37.9	40.9	69.2	42.5	74	2.68	2.7	66	1.94	1.6	0.92	15.66	9	5.57
2535	15	21.62	38.1	40.9	69.3	42.6	74.1	2.68	2.7	66	1.94	1.6	0.92	15.65	8.99	5.56
2535	16	23.2	38.2	39.5	65.4	41.1	69.8	2.67	2.68	64.5	1.82	1.62	0.95	15.85	9.33	5.75
2535	16	23.2	38.2	40.9	69.3	42.6	74.1	2.67	2.68	65.9	1.93	1.59	0.92	15.63	8.98	5.53
2535	17	24.8	38.4	37.7	60.4	39.2	64.4	2.69	2.71	62.8	1.69	1.65	1.01	16.2	9.86	6.11
2535	19	27.5	38.7	39.8	66.2	41.4	70.7	2.68	2.7	64.9	1.85	1.61	0.95	15.83	9.27	5.73
2535	19	27.5	38.7	39.8	66.2	41.4	70.7	2.68	2.7	64.9	1.85	1.61	0.95	15.83	9.27	5.73
2535	20	29.22	39	41	69.4	42.6	74.3	2.68	2.69	66	1.94	1.6	0.91	15.64	8.97	5.54
2535	21	30.6	38.8	38.6	62.9	40.2	67.1	2.69	2.71	63.8	1.77	1.64	0.98	16.05	9.6	5.95
2535	22	32.3	39.1	37	58.7	38.5	62.6	2.69	2.7	62.1	1.64	1.66	1.02	16.31	10.03	6.21
2535	23	33.6	39.6	38.2	61.8	39.8	66	2.69	2.71	63.4	1.73	1.64	0.99	16.12	9.71	6.02
2535	24	34.8	39.8	38.2	61.7	39.7	65.9	2.68	2.7	63.3	1.72	1.64	0.99	16.1	9.7	5.99
2535	25	37	39.9	39.3	64.8	40.9	69.3	2.68	2.7	64.5	1.82	1.62	0.96	15.92	9.4	5.81
2535	26	37.6	40.1	37.9	60.9	39.4	65.1	2.68	2.69	63	1.7	1.65	1	16.14	9.77	6.03
2536GHF	1	0.65	35	57.7	136.3	59.8	148.6	2.65	2.69	79.5	3.88	1.37	0.55	13.4	5.39	3.33
2536GHF	2	2.2	35	56.8	131.4	58.8	142.9	2.64	2.67	78.8	3.72	1.38	0.57	13.49	5.55	3.42
2536GHF	3	3.6	35	49.2	96.7	51	103.9	2.68	2.7	73.2	2.73	1.48	0.72	14.47	7.1	4.4
2536GHF	4	5.2	35	44.7	80.8	46.3	86.3	2.69	2.71	69.5	2.28	1.54	0.83	15.1	8.11	5.04
2536GHF	5	6.8	35	37.5	60	38.9	63.6	2.71	2.72	62.7	1.68	1.66	1.01	16.26	9.94	6.19
2536GHF	6	8.2	35	40.3	67.4	41.7	71.6	2.69	2.7	65.3	1.88	1.61	0.94	15.77	9.19	5.7
2537	1	0.85	21.3	56.9	131.9	58.1	138.7	2.66	2.68	78.5	3.65	1.37	0.58	13.46	5.64	3.5
2537	2	2.35	36.8	57.1	133	59.3	145.4	2.65	2.69	79.2	3.8	1.37	0.56	13.47	5.49	3.39
2537	3	3.75	37.7	48.3	93.4	50.2	100.7	2.68	2.71	72.6	2.65	1.49	0.74	14.6	7.27	4.51
2537	4	5.25	39.1	46.5	86.7	48.3	93.6	2.69	2.72	71.2	2.47	1.52	0.78	14.87	7.68	4.77
2537	6	8.25	42.8	40.1	67.1	41.9	72.2	2.69	2.71	65.5	1.9	1.61	0.94	15.81	9.18	5.69
2537	8	11.1	45.3	42.1	72.7	44.1	78.9	2.69	2.71	67.4	2.07	1.58	0.88	15.51	8.67	5.36
2537	9	12.7	47.4	35.7	55.4	37.4	59.8	2.72	2.74	61.2	1.58	1.7	1.06	16.63	10.4	6.46
2537	10	14.2	48.4	34	51.6	35.8	55.7	2.72	2.74	59.5	1.47	1.72	1.11	16.92	10.87	6.75
2537	11	15.8	48.3	34.5	52.7	36.3	56.9	2.72	2.73	60	1.5	1.72	1.09	16.82	10.72	6.65
2537	13	18.7	50.1	37.2	59.2	39.1	64.3	2.71	2.73	62.8	1.69	1.67	1.01	16.35	9.95	6.17
2537	14	20.1	50.6	40.6	68.2	42.7	74.6	2.69	2.71	66.1	1.95	1.61	0.92	15.75	9.02	5.57
2537	15	21.5	51.1	38.2	61.7	40.2	67.3	2.69	2.71	63.7	1.76	1.65	0.98	16.14	9.65	5.95
2537	16	23.2	52.2	40.4	67.7	42.6	74.2	2.69	2.71	65.9	1.93	1.61	0.92	15.79	9.06	5.59

Table 4. Water content and index properties. — Continued

[m, meters; Sal Est, salinity estimated; ppt, parts per thousand; WCt, water content based on total sample mass not corrected for salinity; %, percent; WCs, water content based on solids mass not corrected for salinity; WCtc, water content based on total sample mass corrected for salinity; WCsc, water content based on solids mass corrected for salinity; ρs, grain density not corrected for salinity; g/cm^3, grams per cubic centimeter; ρsc, grain density corrected for salinity; n, porosity; e, void ratio; ρw, wet bulk density; ρd, dry bulk density; γw, wet unit weight; kN/m^3, kiloNewton per cubic meter; γd, dry unit weight; γsub, submerged unit weight]

Core no.	Section	Mid-depth (m)	Sal Est (ppt)	WCt (%)	WCs (%)	WCtc (%)	WCsc (%)	ρs (g/cm^3)	ρsc (g/cm^3)	n (%)	e	ρw (g/cm^3)	ρd (g/cm^3)	γw (kN/m^3)	γd (kN/m^3)	γsub (kN/m^3)
2537	17	24.6	53.2	39.3	64.9	41.6	71.1	2.69	2.71	64.9	1.85	1.63	0.95	15.95	9.32	5.75
2537	18	26.3	54.7	39	64.1	41.3	70.4	2.68	2.71	64.6	1.83	1.63	0.96	15.99	9.38	5.77
2537	20	28.9	55.3	37	58.7	39.1	64.3	2.69	2.72	62.6	1.68	1.67	1.01	16.36	9.95	6.13
2537	22	32.2	57.1	40.3	67.4	42.7	74.5	2.69	2.71	65.9	1.94	1.61	0.92	15.81	9.06	5.57
2537	23	33.1	58.5	38.8	63.4	41.2	70.1	2.68	2.71	64.5	1.82	1.64	0.96	16.04	9.43	5.79
2538G	1	0.7	36.2	56.4	129.4	58.5	141.2	2.65	2.68	78.7	3.68	1.38	0.57	13.54	5.61	3.46
2538G	2	2.2	36.7	56.9	132.1	59.1	144.4	2.65	2.68	79	3.76	1.37	0.56	13.48	5.52	3.4
2538G	3	3.7	37.4	48.9	95.9	50.8	103.4	2.68	2.7	73.1	2.72	1.48	0.73	14.5	7.13	4.41
2538G	4	5.2	39.3	44	78.4	45.8	84.4	2.7	2.72	69	2.23	1.55	0.84	15.23	8.26	5.13
2538G	5	6.7	42.5	35.3	54.7	36.9	58.5	2.71	2.72	60.7	1.54	1.7	1.07	16.65	10.5	6.52
2539	1	0.7	36.3	58.5	140.9	60.7	154.4	2.66	2.7	80.2	4.05	1.36	0.53	13.32	5.23	3.24
2539	2	2.2	36.3	58.1	138.7	60.3	151.9	2.67	2.7	80	3.99	1.36	0.54	13.36	5.31	3.29
2539	3	3.7	36.2	57.3	134	59.4	146.4	2.65	2.69	79.3	3.83	1.37	0.56	13.45	5.46	3.37
2539	4	5.2	36.2	49.4	97.5	51.2	105	2.68	2.7	73.4	2.76	1.47	0.72	14.44	7.04	4.36
2539	5	6.55	36.3	47.6	90.9	49.4	97.7	2.68	2.7	71.9	2.56	1.5	0.76	14.67	7.42	4.6
2539	5	6.85	36.4	44.8	81.1	46.5	86.8	2.69	2.71	69.6	2.29	1.54	0.82	15.1	8.09	5.02
2539	6	8.1	36.4	39.4	65.1	40.9	69.3	2.7	2.72	64.7	1.83	1.62	0.96	15.93	9.41	5.85
2539	7	9.73	36.4	36	56.2	37.3	59.6	2.71	2.73	61.2	1.58	1.69	1.06	16.54	10.36	6.46
2539	8	11.22	36.5	38.6	62.8	40	66.8	2.71	2.73	63.9	1.77	1.64	0.98	16.09	9.65	6.01
2539	9	12.7	36.6	40.3	67.5	41.9	72	2.7	2.72	65.5	1.9	1.61	0.94	15.79	9.18	5.71
2539	10	14.2	36.5	36.5	57.4	37.9	60.9	2.71	2.73	61.8	1.61	1.68	1.04	16.45	10.22	6.37
2539	11	15.7	36.5	35.8	55.8	37.2	59.1	2.72	2.74	61.1	1.57	1.69	1.06	16.59	10.42	6.51
2539	12	17.2	36.8	32.7	48.5	33.9	51.3	2.72	2.74	57.7	1.37	1.75	1.16	17.16	11.35	7.08
2539	13	18.7	36.8	42.6	74.2	44.2	79.2	2.69	2.71	67.6	2.09	1.57	0.88	15.42	8.6	5.34
2539	14	20	36.7	37	58.7	38.4	62.4	2.71	2.73	62.3	1.66	1.67	1.03	16.36	10.08	6.28
2539	15	21.7	37.2	39.1	64.1	40.6	68.3	2.7	2.72	64.3	1.8	1.63	0.97	15.99	9.5	5.9
2539	16	23.2	37.3	39.9	66.4	41.4	70.8	2.69	2.7	65	1.86	1.61	0.95	15.83	9.27	5.74
2539	18	26.2	36.7	41	69.4	42.5	74	2.69	2.7	66	1.94	1.6	0.92	15.66	9	5.57
2539	19	27.7	37	38.8	63.4	40.3	67.5	2.7	2.71	64.1	1.78	1.63	0.98	16.02	9.57	5.94
2539	20	29.2	37.2	38.9	63.8	40.4	67.9	2.68	2.69	64	1.78	1.63	0.97	15.96	9.51	5.88
2539	21	30.5	37.8	39.5	65.3	41.1	69.6	2.68	2.7	64.6	1.83	1.62	0.95	15.88	9.36	5.79
2541	1	0.55	35.8	56.7	130.7	58.8	142.5	2.66	2.69	78.8	3.73	1.38	0.57	13.52	5.57	3.44
2541	1	0.75	35.8	53.3	113.9	55.2	123.3	2.65	2.68	76.3	3.22	1.42	0.64	13.92	6.23	3.84
2541	2	2.2	36	57.6	136	59.8	148.7	2.65	2.68	79.5	3.87	1.37	0.55	13.4	5.39	3.32
2541	2	2.2	36	58.8	142.8	61	156.5	2.65	2.68	80.3	4.08	1.35	0.53	13.26	5.17	3.19
2541	3	3.7	36.2	50.2	100.6	52	108.5	2.68	2.7	74.1	2.85	1.46	0.7	14.34	6.88	4.26
2541	4	5.2	36.2	49.3	97.3	51.2	104.8	2.67	2.7	73.3	2.75	1.47	0.72	14.44	7.05	4.36
2541	5	6.75	36.1	41.8	71.7	43.3	76.4	2.7	2.72	66.9	2.02	1.59	0.9	15.56	8.82	5.48
2541	5	6.7	36.1	42.9	75.2	44.5	80.2	2.7	2.72	68	2.12	1.57	0.87	15.39	8.54	5.31
2541	6	8.2	36.1	39.8	66.1	41.3	70.3	2.7	2.72	65	1.86	1.62	0.95	15.87	9.32	5.79
2541	7	9.7	36.8	39.2	64.5	40.7	68.6	2.71	2.72	64.5	1.82	1.63	0.97	15.98	9.48	5.9
2541	7	9.8	36.8	36	56.2	37.4	59.7	2.71	2.72	61.2	1.58	1.68	1.06	16.52	10.35	6.44
2541	8	11.2	37.3	36.6	57.7	38	61.3	2.71	2.72	61.9	1.62	1.67	1.04	16.42	10.18	6.34
2541	8	11.2	37.3	37.9	61.1	39.4	65.1	2.71	2.73	63.3	1.72	1.65	1	16.19	9.81	6.11
2541	9	12.7	37	36.5	57.5	37.9	61	2.72	2.73	61.8	1.62	1.68	1.04	16.46	10.22	6.38
2541	10	14.2	36.9	34.5	52.7	35.8	55.8	2.72	2.74	59.8	1.49	1.72	1.1	16.82	10.79	6.74

Table 4. Water content and index properties. — Continued

[m, meters; Sal Est, salinity estimated; ppt, parts per thousand; WCt, water content based on total sample mass not corrected for salinity; %, percent; WCs, water content based on solids mass not corrected for salinity; WCtc, water content based on total sample mass corrected for salinity; WCsc, water content based on solids mass corrected for salinity; ρs, grain density not corrected for salinity; g/cm^3, grams per cubic centimeter; ρsc, grain density corrected for salinity; n, porosity; e, void ratio; ρw, wet bulk density; ρd, dry bulk density; γw, wet unit weight; kN/m^3, kiloNewton per cubic meter; γd, dry unit weight; γsub, submerged unit weight]

Core no.	Section	Mid-depth (m)	Sal Est (ppt)	WCt (%)	WCs (%)	WCtc (%)	WCsc (%)	ρs (g/cm^3)	ρsc (g/cm^3)	n (%)	e	ρw (g/cm^3)	ρd (g/cm^3)	γw (kN/m^3)	γd (kN/m^3)	γsub (kN/m^3)
2541	11	15.7	37	42.1	72.8	43.8	77.8	2.69	2.71	67.2	2.05	1.58	0.89	15.49	8.71	5.4
2541	12	17.2	37.1	39.7	65.9	41.3	70.2	2.7	2.72	65	1.85	1.62	0.95	15.88	9.33	5.8
2541	13	18.7	36.9	41.7	71.5	43.3	76.4	2.68	2.69	66.7	2	1.58	0.9	15.53	8.8	5.44
2541	14	20.2	36.8	35	53.8	36.3	57	2.7	2.71	60	1.5	1.7	1.08	16.68	10.63	6.6
2541	15	21.7	36.9	41.2	70.1	42.8	74.8	2.69	2.71	66.3	1.97	1.59	0.91	15.63	8.95	5.55
2541	16	23.25	37	40.3	67.4	41.8	71.9	2.7	2.72	65.5	1.9	1.61	0.94	15.8	9.19	5.72
2541	17	24.7	36.9	41.2	70.2	42.8	74.9	2.69	2.71	66.3	1.97	1.59	0.91	15.63	8.94	5.54
2541	18	26.2	36.9	38.5	62.7	40	66.7	2.69	2.7	63.7	1.75	1.64	0.98	16.05	9.63	5.96
2541	19	27.7	37.2	38.4	62.4	39.9	66.4	2.69	2.71	63.6	1.75	1.64	0.99	16.08	9.66	5.99
2541	20	29.2	37.7	39.8	66.2	41.4	70.7	2.7	2.72	65.1	1.87	1.62	0.95	15.87	9.3	5.78
2541	21	30.2	37.7	35.2	54.4	36.6	57.8	2.69	2.7	60.3	1.52	1.69	1.07	16.61	10.53	6.52
2541	21	30.7	37.4	40.3	67.4	41.8	71.9	2.69	2.71	65.4	1.89	1.61	0.94	15.77	9.18	5.69
2541	22	31.6	37.1	38.8	63.3	40.2	67.3	2.7	2.71	64	1.78	1.63	0.98	16.03	9.58	5.95
2541	23	33.7	37.8	38.6	62.8	40.1	66.9	2.7	2.71	63.8	1.77	1.64	0.98	16.06	9.62	5.97
2541	24	34.9	38.5	32.3	47.8	33.6	50.7	2.68	2.7	57	1.33	1.75	1.16	17.12	11.36	7.02
2542GHF	3	3.7	35	46.4	86.4	48	92.5	2.68	2.7	70.8	2.43	1.51	0.79	14.84	7.71	4.78
2542GHF	4	5.2	35	39.7	65.8	41.1	69.8	2.7	2.72	64.9	1.85	1.62	0.95	15.89	9.36	5.82
2542GHF	5	6.8	35	43.3	76.4	44.9	81.5	2.69	2.71	68.3	2.15	1.56	0.86	15.31	8.44	5.24
2545G	1	0.4	42.4	53.2	113.9	55.6	125.2	2.66	2.69	76.6	3.27	1.42	0.63	13.94	6.19	3.82
2545G	2	1.5	43.3	57.7	136.2	60.3	151.8	2.64	2.68	79.7	3.93	1.37	0.54	13.4	5.32	3.27
2545G	3	2.43	57.4	53.2	113.5	56.4	129.3	2.66	2.71	77	3.35	1.43	0.62	13.98	6.1	3.74
2545G	4	3.35	67	32.7	48.5	35	53.9	2.7	2.73	58.3	1.4	1.75	1.14	17.16	11.15	6.85
2545G	5	4.35	75.1	48.1	92.8	52	108.5	2.65	2.7	73.5	2.77	1.49	0.72	14.64	7.02	4.27
2545G	6	5.3	80.8	48.2	93.2	52.5	110.4	2.65	2.7	73.7	2.81	1.49	0.71	14.63	6.95	4.22
2545G	7	6.46	86.1	41.9	72.2	45.9	84.7	2.67	2.72	68.4	2.16	1.59	0.86	15.59	8.44	5.13
2545G	8	7.4	91.8	39.3	64.8	43.3	76.3	2.68	2.72	66	1.94	1.63	0.93	16	9.08	5.51
2545G	9	8.5	95.5	35.5	55.1	39.3	64.7	2.69	2.73	62.2	1.65	1.7	1.03	16.67	10.12	6.15
2545G	10	9.2	99.6	33.4	50.2	37.1	59	2.67	2.7	59.7	1.48	1.73	1.09	16.98	10.68	6.43
2546	1	0.55	35.8	59.4	146.2	61.6	160.3	2.65	2.69	80.7	4.19	1.35	0.52	13.21	5.07	3.13
2546	2	2.15	35.9	58.5	140.8	60.7	154.1	2.65	2.68	80.1	4.02	1.36	0.53	13.3	5.23	3.23
2546	3	3.5	36.1	63.1	170.9	65.4	189.4	2.66	2.71	83.3	4.98	1.31	0.45	12.83	4.43	2.75
2546	4	5.2	36.8	49.1	96.5	51	104	2.66	2.68	73.1	2.71	1.47	0.72	14.45	7.08	4.36
2546	5	6.35	37.6	48.3	93.4	50.2	100.7	2.7	2.72	72.7	2.66	1.49	0.74	14.62	7.28	4.53
2546	6	7.8	39.2	44.9	81.6	46.8	87.8	2.7	2.72	69.9	2.32	1.54	0.82	15.1	8.04	5
2546	7	9.6	40.2	39.5	65.3	41.2	69.9	2.7	2.71	64.8	1.84	1.62	0.96	15.92	9.37	5.81
2546	8	11.05	43	38.1	61.5	39.8	66.1	2.71	2.73	63.6	1.74	1.65	0.99	16.18	9.75	6.06
2546	9	12.65	44.4	37.2	59.3	38.9	63.8	2.71	2.73	62.7	1.68	1.67	1.02	16.34	9.98	6.2
2546	10	14.25	45.6	36.2	56.8	38	61.2	2.71	2.73	61.8	1.62	1.68	1.05	16.52	10.25	6.37
2546	11	15.7	46.5	44.5	80.1	46.6	87.4	2.68	2.71	69.5	2.28	1.54	0.82	15.14	8.08	4.99
2546	12	17.2	47.4	38.6	63	40.6	68.2	2.7	2.72	64.2	1.79	1.64	0.97	16.08	9.56	5.92
2546	13	18.45	47.9	40.6	68.3	42.6	74.3	2.69	2.72	66.1	1.95	1.61	0.92	15.76	9.04	5.59
2546	14	20.4	48.6	37	58.8	38.9	63.8	2.69	2.71	62.5	1.67	1.67	1.02	16.33	9.97	6.16
2546	15	21.65	50.6	39.9	66.3	42	72.4	2.69	2.72	65.4	1.89	1.62	0.94	15.87	9.21	5.69
2546	16	23.05	49.8	39.7	65.8	41.8	71.7	2.69	2.71	65.2	1.87	1.62	0.94	15.89	9.26	5.71
2546	17	24.75	52.9	39.9	66.3	42.1	72.7	2.68	2.71	65.4	1.89	1.62	0.94	15.85	9.18	5.65
2546	18	26.2	53.7	33.3	49.9	35.2	54.3	2.69	2.71	58.5	1.41	1.73	1.12	16.98	11.01	6.77

Table 4. Water content and index properties. — Continued

[m, meters; Sal Est, salinity estimated; ppt, parts per thousand; WCt, water content based on total sample mass not corrected for salinity; %, percent; WCs, water content based on solids mass not corrected for salinity; WCtc, water content based on total sample mass corrected for salinity; WCsc, water content based on solids mass corrected for salinity; ρs, grain density not corrected for salinity; g/cm^3, grams per cubic centimeter; ρsc, grain density corrected for salinity; n, porosity; e, void ratio; ρw, wet bulk density; ρd, dry bulk density; γw, wet unit weight; kN/m^3, kiloNewton per cubic meter; γd, dry unit weight; γsub, submerged unit weight]

Core no.	Section	Mid-depth (m)	Sal Est (ppt)	WCt (%)	WCs (%)	WCtc (%)	WCsc (%)	ρs (g/cm^3)	ρsc (g/cm^3)	n (%)	e	ρw (g/cm^3)	ρd (g/cm^3)	γw (kN/m^3)	γd (kN/m^3)	γsub (kN/m^3)
2546	19	27.65	52.5	36	56.2	38	61.2	2.69	2.71	61.4	1.59	1.68	1.05	16.52	10.25	6.31
2546	20	29.2	53.1	39.5	65.4	41.7	71.6	2.7	2.73	65.3	1.88	1.63	0.95	15.96	9.3	5.75
2546	21	30.6	54.4	39.5	65.2	41.7	71.6	2.68	2.71	65.1	1.86	1.62	0.95	15.93	9.28	5.71
2547GHF	1	0.74	35	57.5	135.5	59.6	147.7	2.65	2.69	79.4	3.86	1.37	0.55	13.41	5.41	3.34
2547GHF	2	2.1	35	56.8	131.2	58.8	142.7	2.66	2.69	78.9	3.73	1.38	0.57	13.51	5.56	3.44
2547GHF	3	3.7	35	48.3	93.4	50.1	100.2	2.67	2.69	72.4	2.63	1.49	0.74	14.57	7.28	4.5
2547GHF	4	5	35	38.1	61.6	39.5	65.3	2.7	2.72	63.3	1.73	1.65	1	16.14	9.77	6.08
2550C2	1	0.5	305.9	61.6	160.2	88.7	785.2	2.45	3.52	95.7	22.34	1.33	0.15	13.07	1.48	0.96
2550C2	2	1	299.8	62.1	163.8	88.7	782.2	2.41	3.24	95.4	20.61	1.32	0.15	12.98	1.47	0.91
2550C2	2	1	299.8	62.3	164.9	88.9	800.7	2.41	3.27	95.5	21.27	1.32	0.15	12.97	1.44	0.9
2550C2	3	1.5	297.1	59.5	147.1	84.7	553.6	2.43	3.04	93.2	13.69	1.35	0.21	13.26	2.03	1.21
2550C2	4	2	292.2	54	117.5	76.3	322.4	2.48	2.86	88.3	7.53	1.42	0.34	13.89	3.29	1.88
2550C2	5	3	275.5	47.8	91.6	66	193.9	2.54	2.8	81.7	4.48	1.5	0.51	14.73	5.01	2.84
2550C2	6	4	275.4	49.4	97.5	68.1	213.7	2.55	2.83	83.3	4.99	1.48	0.47	14.54	4.63	2.65
2550C2	6	4	275.4	49.1	96.3	67.7	209.6	2.55	2.83	83	4.89	1.49	0.48	14.57	4.71	2.69
2550C2	7	5	234.4	50.1	100.5	65.5	189.5	2.51	2.69	81.2	4.32	1.46	0.51	14.36	4.96	2.78
2550C2	7	5	234.4	51	104	66.6	199.4	2.51	2.7	82	4.56	1.45	0.49	14.26	4.76	2.68
2550C2	8	6	209.9	45.4	83	57.4	134.8	2.59	2.73	76	3.17	1.54	0.65	15.08	6.42	3.69
2550C2	9	6.9	167.8	41.9	72.1	50.3	101.3	2.6	2.69	70.7	2.42	1.59	0.79	15.56	7.73	4.49
2550C2	9	6.9	167.8	41.8	71.7	50.2	100.7	2.6	2.69	70.6	2.4	1.59	0.79	15.58	7.76	4.51
2550C2	10	8	207.8	41.5	70.8	52.3	109.8	2.6	2.72	72	2.57	1.6	0.76	15.65	7.46	4.27
2550C2	10	8	207.8	38.4	62.3	48.4	94	2.6	2.7	68.6	2.19	1.64	0.85	16.11	8.31	4.74
2550C2	11	8.9	183.9	38.8	63.3	47.5	90.4	2.63	2.72	68.3	2.15	1.64	0.86	16.1	8.46	4.91
2550C2	11	8.9	183.9	38.4	62.3	47	88.8	2.63	2.72	67.9	2.11	1.65	0.87	16.16	8.56	4.96
2553C2	1	0.6	35.7	56.9	131.8	59	143.7	2.67	2.71	79.1	3.79	1.38	0.57	13.52	5.55	3.44
2553C2	2	1	35.7	53.6	115.6	55.6	125.3	2.68	2.71	76.8	3.3	1.42	0.63	13.91	6.17	3.83
2553C2	2	1	35.7	53.6	115.6	55.6	125.2	2.68	2.71	76.8	3.3	1.42	0.63	13.91	6.17	3.83
2553C2	3	1.7	35.9	53.8	116.3	55.8	126.1	2.68	2.71	76.9	3.32	1.42	0.63	13.88	6.14	3.81
2553C2	3	1.7	35.9	53.9	116.7	55.9	126.6	2.68	2.71	76.9	3.33	1.41	0.62	13.87	6.12	3.8
2553C2	4	2	38	50.2	100.7	52.2	109	2.69	2.72	74.2	2.88	1.46	0.7	14.36	6.87	4.27
2553C2	4	2	38	49.7	98.8	51.7	106.8	2.69	2.72	73.8	2.82	1.47	0.71	14.42	6.97	4.33
2553C2	5	3.1	36.1	50.2	100.7	52.1	108.5	2.69	2.71	74.1	2.86	1.46	0.7	14.35	6.88	4.27
2553C2	5	3.1	36.1	49.4	97.5	51.2	105	2.69	2.71	73.5	2.77	1.47	0.72	14.45	7.05	4.38
2553C2	6	4	36.2	49.1	96.4	50.9	103.8	2.68	2.7	73.2	2.73	1.48	0.72	14.48	7.11	4.4
2553C2	6	4	36.2	49.9	99.8	51.8	107.5	2.68	2.7	73.9	2.83	1.47	0.71	14.37	6.92	4.29
2553C2	7	5	36.3	51.6	106.5	53.5	115.1	2.66	2.69	75.1	3.01	1.44	0.67	14.14	6.57	4.06
2553C2	7	5	36.3	51.7	106.9	53.6	115.5	2.66	2.69	75.1	3.02	1.44	0.67	14.13	6.56	4.05
2553C2	8	6.1	36.5	52.3	109.7	54.3	118.8	2.66	2.69	75.7	3.11	1.43	0.65	14.05	6.42	3.97
2553C2	8	6.1	36.5	52.2	109.3	54.2	118.4	2.66	2.69	75.6	3.1	1.43	0.66	14.06	6.44	3.98
2553C2	9	7	36.6	50.1	100.5	52	108.4	2.65	2.67	73.8	2.82	1.46	0.7	14.3	6.86	4.22
2553C2	9	7	36.6	50.1	100.2	52	108.1	2.65	2.67	73.7	2.81	1.46	0.7	14.31	6.88	4.23
2553C2	10	8	36.7	48.8	95.4	50.7	102.8	2.65	2.67	72.7	2.67	1.48	0.73	14.47	7.13	4.39
2553C2	10	8	36.7	48.5	94	50.3	101.2	2.65	2.67	72.4	2.63	1.48	0.74	14.52	7.21	4.43
2553C2	11	9	36.8	50	100.2	52	108.1	2.65	2.67	73.8	2.81	1.46	0.7	14.32	6.88	4.23
2553C2	11	9	36.8	49.3	97.2	51.2	104.8	2.65	2.67	73.2	2.72	1.47	0.72	14.41	7.04	4.33
2553C2	11	9	36.8	49.8	99.3	51.7	107.2	2.65	2.67	73.6	2.79	1.46	0.71	14.34	6.92	4.26

Table 4. Water content and index properties. — Continued

[m, meters; Sal Est, salinity estimated; ppt, parts per thousand; WCt, water content based on total sample mass not corrected for salinity; %, percent; WCs, water content based on solids mass not corrected for salinity; WCtc, water content based on total sample mass corrected for salinity; WCsc, water content based on solids mass corrected for salinity; ρs, grain density not corrected for salinity; g/cm^3, grams per cubic centimeter; ρsc, grain density corrected for salinity; n, porosity; e, void ratio; ρw, wet bulk density; ρd, dry bulk density; γw, wet unit weight; kN/m^3, kiloNewton per cubic meter; γd, dry unit weight; γsub, submerged unit weight]

Core no.	Section	Mid-depth (m)	Sal Est (ppt)	WCt (%)	WCs (%)	WCtc (%)	WCsc (%)	ρs (g/cm^3)	ρsc (g/cm^3)	n (%)	e	ρw (g/cm^3)	ρd (g/cm^3)	γw (kN/m^3)	γd (kN/m^3)	γsub (kN/m^3)
2553C2	12	10	36.8	45.9	84.7	47.6	90.9	2.67	2.69	70.4	2.38	1.52	0.8	14.91	7.81	4.82
2553C2	12	10	36.8	45.9	85	47.7	91.2	2.67	2.69	70.5	2.39	1.52	0.79	14.9	7.79	4.81
2554	1	0.7	36	59.8	148.8	62	163.4	2.64	2.68	81	4.26	1.34	0.51	13.16	4.99	3.08
2554	2	2.2	35.9	55	122.3	57.1	132.9	2.66	2.69	77.7	3.48	1.4	0.6	13.71	5.89	3.64
2554	3	3.7	35.6	54.2	118.2	56.2	128.2	2.67	2.7	77.1	3.37	1.41	0.62	13.82	6.06	3.75
2554	4	5.2	35.5	55.2	123	57.2	133.6	2.63	2.66	77.5	3.45	1.39	0.6	13.66	5.85	3.59
2554	5	6.8	35.8	48.5	94.1	50.3	101.1	2.66	2.69	72.6	2.64	1.48	0.74	14.54	7.23	4.46
2554	6	8.2	36.1	44.6	80.4	46.2	86	2.68	2.7	69.3	2.26	1.54	0.83	15.11	8.12	5.03
2554	7	9.8	36.5	45.3	82.7	47	88.6	2.66	2.68	69.8	2.31	1.53	0.81	14.98	7.94	4.9
2554	8	11.2	36.5	42.1	72.7	43.7	77.6	2.69	2.71	67.1	2.04	1.58	0.89	15.49	8.72	5.41
2554	9	12.6	36.4	37.9	61.1	39.4	65	2.7	2.72	63.2	1.72	1.65	1	16.17	9.81	6.09
2554	10	14	36.6	35.5	54.9	36.8	58.2	2.71	2.72	60.7	1.54	1.69	1.07	16.62	10.5	6.54
2554	11	15.6	37	36.6	57.8	38	61.4	2.7	2.71	61.8	1.62	1.67	1.04	16.39	10.15	6.31
2554	12	17.3	37.4	35.8	55.8	37.2	59.2	2.7	2.72	61	1.57	1.69	1.06	16.55	10.39	6.46
2554	13	19.1	37.2	38.5	62.5	40	66.5	2.69	2.7	63.6	1.75	1.64	0.98	16.06	9.64	5.98
2554	14	20	36.7	35.1	54	36.4	57.2	2.7	2.71	60.1	1.51	1.7	1.08	16.66	10.6	6.58
2554	15	21.45	40.2	36.1	56.6	37.6	60.3	2.7	2.72	61.4	1.59	1.68	1.05	16.49	10.29	6.39
2554	16	23.1	37.2	36.4	57.2	37.8	60.8	2.7	2.71	61.6	1.6	1.68	1.04	16.43	10.22	6.35
2554	17	24.6	37	34.1	51.7	35.4	54.8	2.7	2.71	59.1	1.45	1.72	1.11	16.84	10.88	6.76
2554	18	26.05	36.3	32.8	48.9	34.1	51.7	2.71	2.72	57.8	1.37	1.74	1.15	17.1	11.27	7.02
2554	19	27.5	36.7	31.4	45.7	32.6	48.3	2.7	2.71	56	1.28	1.77	1.19	17.35	11.69	7.26
2554	20	29	30.9	32.6	48.4	33.6	50.7	2.7	2.72	57.4	1.34	1.74	1.16	17.11	11.35	7.07
2554	21	30.35	37.1	32.5	48.2	33.8	51	2.71	2.72	57.4	1.35	1.75	1.16	17.14	11.35	7.06
2555	1	1.1	35.8	59.7	147.8	61.9	162.2	2.64	2.68	80.9	4.23	1.34	0.51	13.17	5.02	3.1
2555	2	2	35.8	57.2	133.6	59.3	145.8	2.65	2.68	79.2	3.81	1.37	0.56	13.45	5.47	3.38
2555	3	3.5	35.9	54.8	121.1	56.8	131.6	2.65	2.67	77.4	3.42	1.4	0.6	13.72	5.93	3.65
2555	4	5.2	36	54.7	120.9	56.8	131.3	2.65	2.68	77.4	3.42	1.4	0.61	13.73	5.94	3.66
2555	5	6.7	36.1	51.4	105.9	53.4	114.4	2.63	2.66	74.7	2.96	1.44	0.67	14.12	6.59	4.04
2555	6	8.2	36.1	48.2	93.2	50.1	100.2	2.67	2.7	72.5	2.63	1.49	0.74	14.59	7.29	4.51
2555	7	9.7	36.3	44.4	79.8	46.1	85.3	2.68	2.7	69.1	2.24	1.54	0.83	15.13	8.16	5.05
2555	8	11.2	36.4	44.3	79.6	46	85.1	2.68	2.7	69.1	2.24	1.54	0.83	15.15	8.18	5.07
2555	9	12.65	36.3	43	75.4	44.6	80.5	2.68	2.7	67.9	2.11	1.56	0.87	15.33	8.49	5.25
2555	10	14.2	36.4	37.8	60.7	39.2	64.4	2.7	2.72	63	1.7	1.65	1.01	16.21	9.86	6.13
2555	11	15.8	36.4	36.6	57.8	38	61.3	2.7	2.72	61.9	1.62	1.67	1.04	16.4	10.17	6.32
2555	12	17.2	36.2	34.8	53.3	36.1	56.4	2.71	2.72	59.9	1.49	1.71	1.09	16.74	10.7	6.66
2555	13	18.7	36.4	36.8	58.3	38.2	61.8	2.7	2.71	62	1.63	1.67	1.03	16.36	10.11	6.28
2555	14	20.2	36.7	36.7	57.9	38.1	61.5	2.69	2.7	61.8	1.61	1.67	1.03	16.36	10.13	6.28
2555	15	21.6	36.6	35.1	54.1	36.4	57.3	2.71	2.72	60.2	1.52	1.7	1.08	16.67	10.6	6.59
2555	16	23.2	36.5	35.7	55.6	37.1	58.9	2.69	2.71	60.8	1.55	1.69	1.06	16.54	10.41	6.46
2555	17	24.9	36.3	34	51.6	35.3	54.6	2.68	2.7	58.9	1.43	1.71	1.11	16.81	10.87	6.73
2555	18	26.2	36.3	33.2	49.8	34.5	52.6	2.72	2.73	58.3	1.4	1.74	1.14	17.05	11.17	6.97
2555	19	27.6	36.4	32.7	48.5	33.9	51.3	2.7	2.72	57.6	1.36	1.74	1.15	17.11	11.31	7.03
2555	20	29.2	36.4	32	47	33.2	49.7	2.69	2.7	56.7	1.31	1.75	1.17	17.2	11.49	7.12
2555	21	30.7	36.3	32.5	48.2	33.7	50.9	2.71	2.72	57.4	1.35	1.75	1.16	17.14	11.36	7.06
2555	22	32.2	36.2	33.1	49.6	34.4	52.4	2.71	2.72	58.1	1.39	1.74	1.14	17.03	11.17	6.95
2555	23	33.85	36.7	31.7	46.5	33	49.2	2.72	2.73	56.6	1.3	1.77	1.18	17.32	11.61	7.24
2555	24	35.1	36.1	32	47	33.2	49.6	2.71	2.72	56.8	1.31	1.76	1.18	17.25	11.53	7.18

Table 4. Water content and index properties. — Continued

[m, meters; Sal Est, salinity estimated; ppt, parts per thousand; WCt, water content based on total sample mass not corrected for salinity; %, percent; WCs, water content based on solids mass not corrected for salinity; WCtc, water content based on total sample mass corrected for salinity; WCsc, water content based on solids mass corrected for salinity; ρs, grain density not corrected for salinity; g/cm^3, grams per cubic centimeter; ρsc, grain density corrected for salinity; n, porosity; e, void ratio; ρw, wet bulk density; ρd, dry bulk density; γw, wet unit weight; kN/m^3, kiloNewton per cubic meter; γd, dry unit weight; γsub, submerged unit weight]

Core no.	Section	Mid-depth (m)	Sal Est (ppt)	WCt (%)	WCs (%)	WCtc (%)	WCsc (%)	ρs (g/cm^3)	ρsc (g/cm^3)	n (%)	e	ρw (g/cm^3)	ρd (g/cm^3)	γw (kN/m^3)	γd (kN/m^3)	γsub (kN/m^3)
2556	1	0.7	35.5	59.6	147.3	61.8	161.5	2.65	2.68	80.8	4.21	1.34	0.51	13.18	5.04	3.11
2556	2	2.2	35.6	54.6	120	56.6	130.2	2.66	2.69	77.3	3.41	1.4	0.61	13.77	5.98	3.69
2556	3	3.7	35.9	54.8	121.3	56.9	131.8	2.66	2.69	77.5	3.44	1.4	0.6	13.73	5.93	3.66
2556	4	5.2	36	55.5	124.5	57.5	135.5	2.65	2.68	77.9	3.53	1.39	0.59	13.64	5.79	3.57
2556	5	6.7	36	51.8	107.4	53.7	116.1	2.65	2.67	75.1	3.02	1.44	0.67	14.09	6.52	4.02
2556	6	8.1	35.9	47	88.8	48.8	95.2	2.67	2.69	71.4	2.49	1.5	0.77	14.74	7.55	4.66
2556	7	9.7	35.8	42.2	73.1	43.8	77.9	2.68	2.7	67.2	2.05	1.58	0.89	15.45	8.69	5.38
2556	8	11.6	35.6	43.5	76.9	45.1	82.1	2.67	2.68	68.2	2.15	1.55	0.85	15.24	8.37	5.17
2556	9	12.7	35.5	44.5	80.2	46.2	85.7	2.67	2.69	69.1	2.24	1.54	0.83	15.09	8.13	5.02
2556	10	14.17	35.5	36.7	57.9	38	61.4	2.71	2.72	61.9	1.62	1.67	1.04	16.4	10.16	6.32
2556	11	15.4	35.5	38.3	62	39.7	65.8	2.7	2.72	63.5	1.74	1.64	0.99	16.12	9.73	6.05
2556	12	17.15	35.9	38.1	61.5	39.5	65.2	2.7	2.71	63.3	1.72	1.65	1	16.14	9.77	6.07
2556	13	18.7	36.1	37.2	59.3	38.6	62.9	2.7	2.72	62.5	1.66	1.66	1.02	16.29	10	6.22
2556	14	20.2	36.3	37.3	59.4	38.7	63	2.69	2.71	62.4	1.66	1.66	1.02	16.27	9.98	6.19
2556	15	21.7	36.3	36.7	58	38.1	61.6	2.69	2.71	61.9	1.62	1.67	1.03	16.36	10.13	6.28
2556	16	23.3	36.4	33.5	50.4	34.8	53.3	2.7	2.72	58.5	1.41	1.73	1.13	16.95	11.06	6.87
2556	17	24.8	36.2	33.9	51.3	35.2	54.3	2.71	2.73	59	1.44	1.72	1.12	16.9	10.96	6.83
2556	18	26.3	36.1	33.7	50.9	35	53.9	2.7	2.71	58.7	1.42	1.72	1.12	16.89	10.98	6.82
2556	19	27.7	36.1	32.7	48.5	33.9	51.3	2.7	2.72	57.5	1.36	1.74	1.15	17.11	11.31	7.03
2556	20	29.2	36.1	33.7	50.9	35	53.8	2.7	2.72	58.7	1.42	1.72	1.12	16.91	10.99	6.83
2556	21	30.7	36.2	34.1	51.8	35.4	54.8	2.7	2.71	59.1	1.45	1.72	1.11	16.82	10.86	6.74
2556	22	32.1	36.3	31.4	45.8	32.6	48.4	2.71	2.72	56.1	1.28	1.77	1.19	17.35	11.69	7.27
2556	23	33.75	36.1	31.5	46	32.7	48.6	2.71	2.72	56.2	1.28	1.77	1.19	17.33	11.67	7.25
2559	2	2.1	36.3	55.1	122.8	57.2	133.6	2.53	2.56	76.9	3.32	1.38	0.59	13.54	5.8	3.46
2559	3	3.7	36.2	58.9	143	61.1	156.8	2.64	2.67	80.3	4.08	1.35	0.53	13.25	5.16	3.18
2559	4	5.1	36.1	53	112.6	55	122	2.62	2.64	75.8	3.13	1.42	0.64	13.9	6.26	3.82
2559	5	6.6	36	52.4	110.2	54.4	119.2	2.58	2.6	75.1	3.02	1.42	0.65	13.92	6.35	3.84
2559	6	8.1	36.1	46.8	87.9	48.5	94.3	2.64	2.66	70.9	2.44	1.5	0.77	14.73	7.58	4.65
2559	7	9.6	36.3	41.1	69.9	42.7	74.5	2.68	2.69	66.1	1.95	1.59	0.91	15.61	8.95	5.53
2559	8	11.2	36.2	41.5	70.9	43	75.6	2.67	2.68	66.4	1.97	1.58	0.9	15.54	8.85	5.46
2559	9	12.6	36.1	37.8	60.7	39.2	64.5	2.68	2.7	62.8	1.69	1.65	1	16.16	9.83	6.08
2559	10	14.1	36.1	42	72.5	43.6	77.3	2.66	2.67	66.8	2.01	1.57	0.89	15.43	8.7	5.36
2559	11	15.7	36.1	38.4	62.4	39.9	66.3	2.69	2.71	63.6	1.75	1.64	0.99	16.07	9.66	5.99
2559	12	17.2	36.2	37.2	59.2	38.6	62.8	2.68	2.7	62.3	1.65	1.66	1.02	16.26	9.99	6.18
2559	13	18.6	36.3	37.4	59.6	38.8	63.3	2.67	2.69	62.3	1.65	1.65	1.01	16.2	9.92	6.13
2559	14	20.1	36.4	36.2	56.8	37.6	60.2	2.68	2.69	61.2	1.58	1.67	1.04	16.41	10.24	6.33
2559	15	21.7	36.6	33.4	50.2	34.7	53.1	2.68	2.7	58.2	1.39	1.73	1.13	16.92	11.05	6.84
2559	16	23.2	36.7	32.7	48.5	33.9	51.3	2.69	2.7	57.4	1.35	1.74	1.15	17.06	11.27	6.97
2559	17	24.7	36.5	33.2	49.7	34.5	52.6	2.69	2.71	58	1.38	1.73	1.13	16.98	11.13	6.9
2559	18	26.2	36.2	34.9	53.6	36.2	56.8	2.68	2.7	59.8	1.49	1.7	1.08	16.65	10.62	6.57
2559	19	27.6	36.2	33.7	50.9	35	53.9	2.69	2.7	58.6	1.41	1.72	1.12	16.86	10.96	6.79
2559	20	29.1	36.3	31.4	45.7	32.6	48.3	2.7	2.71	56	1.27	1.77	1.19	17.33	11.69	7.25
2559	21	30.7	36.4	31.4	45.8	32.6	48.3	2.7	2.71	56	1.27	1.77	1.19	17.32	11.68	7.24
2559	22	32.1	36.6	31.2	45.3	32.4	47.8	2.69	2.7	55.7	1.26	1.77	1.2	17.36	11.74	7.28
2559	23	33.2	36.4	32.9	48.9	34.1	51.8	2.68	2.69	57.6	1.36	1.73	1.14	17.01	11.21	6.93
2560	1	0.6	35.6	62.7	168.1	65	185.9	2.63	2.67	82.9	4.83	1.31	0.46	12.84	4.49	2.76

Table 4. Water content and index properties. — Continued

[m, meters; Sal Est, salinity estimated; ppt, parts per thousand; WCt, water content based on total sample mass not corrected for salinity; %, percent; WCs, water content based on solids mass not corrected for salinity; WCtc, water content based on total sample mass corrected for salinity; WCsc, water content based on solids mass corrected for salinity; ρs, grain density not corrected for salinity; g/cm^3, grams per cubic centimeter; ρsc, grain density corrected for salinity; n, porosity; e, void ratio; ρw, wet bulk density; ρd, dry bulk density; γw, wet unit weight; kN/m^3, kiloNewton per cubic meter; γd, dry unit weight; γsub, submerged unit weight]

Core no.	Sec-tion	Mid-depth (m)	Sal Est (ppt)	WCt (%)	WCs (%)	WCtc (%)	WCsc (%)	ρs (g/cm^3)	ρsc (g/cm^3)	n (%)	e	ρw (g/cm^3)	ρd (g/cm^3)	γw (kN/m^3)	γd (kN/m^3)	γsub (kN/m^3)
2560	2	2.2	35.9	56.1	128	58.2	139.4	2.65	2.68	78.4	3.64	1.38	0.58	13.57	5.67	3.5
2560	3	3.7	36.2	56.9	131.9	59	143.9	2.64	2.67	78.9	3.74	1.37	0.56	13.48	5.53	3.4
2560	4	5.1	36.4	52.4	110.1	54.4	119.2	2.61	2.63	75.3	3.05	1.42	0.65	13.96	6.37	3.88
2560	5	6.55	36.7	53.3	113.9	55.3	123.6	2.58	2.61	75.8	3.13	1.41	0.63	13.83	6.18	3.74
2560	6	8.22	36.7	45.4	83.2	47.1	89.2	2.64	2.66	69.7	2.31	1.52	0.8	14.92	7.88	4.83
2560	7	9.7	36.7	47	88.8	48.8	95.4	2.63	2.65	71.1	2.46	1.5	0.77	14.69	7.52	4.61
2560	8	11.15	36.7	40.9	69.3	42.5	73.9	2.66	2.68	65.8	1.93	1.59	0.92	15.62	8.98	5.53
2560	9	12.6	36.8	41	69.5	42.6	74.2	2.68	2.69	66	1.94	1.59	0.92	15.63	8.98	5.55
2560	10	14.2	36.7	38.3	62.1	39.8	66	2.67	2.68	63.3	1.72	1.64	0.99	16.04	9.66	5.96
2560	11	15.7	36.7	38.3	62	39.7	65.9	2.67	2.68	63.2	1.72	1.64	0.99	16.04	9.67	5.96
2560	12	17.25	36.7	35.7	55.6	37.1	59	2.69	2.7	60.8	1.55	1.68	1.06	16.52	10.39	6.44
2560	13	18.7	36.9	38.5	62.6	40	66.6	2.66	2.68	63.4	1.74	1.63	0.98	16	9.6	5.92
2560	14	20.1	37	36.1	56.5	37.5	59.9	2.69	2.71	61.2	1.58	1.68	1.05	16.47	10.3	6.38
2560	15	21.8	36.6	36.7	58.1	38.1	61.6	2.66	2.67	61.6	1.6	1.66	1.03	16.28	10.07	6.2
2560	17	24.7	36.6	35.4	54.9	36.8	58.2	2.68	2.69	60.4	1.52	1.69	1.07	16.55	10.46	6.47
2560	18	26.1	36.5	36.3	56.9	37.7	60.4	2.68	2.7	61.3	1.58	1.67	1.04	16.41	10.23	6.33
2560	19	27.6	36.3	33.7	50.8	34.9	53.7	2.69	2.7	58.5	1.41	1.72	1.12	16.89	10.99	6.81
2561	1	0.7	35.4	60.8	154.8	63	170.2	2.64	2.67	81.6	4.43	1.33	0.49	13.04	4.83	2.97
2561	2	1.8	35.5	58.1	138.6	60.2	151.4	2.66	2.69	79.9	3.97	1.36	0.54	13.36	5.31	3.29
2561	3	3.7	35.9	60.6	153.6	62.8	169	2.64	2.68	81.5	4.4	1.33	0.5	13.07	4.86	2.99
2561	4	5.25	36.1	53.5	115	55.5	124.7	2.64	2.67	76.4	3.24	1.42	0.63	13.88	6.18	3.8
2561	5	6.6	36.2	53.9	117	55.9	127	2.6	2.63	76.4	3.25	1.4	0.62	13.77	6.07	3.69
2561	6	8.2	36.6	46.5	86.9	48.3	93.3	2.66	2.68	70.8	2.43	1.51	0.78	14.8	7.66	4.71
2561	7	9.7	36.8	45.9	84.8	47.6	91	2.68	2.7	70.5	2.39	1.52	0.8	14.91	7.81	4.83
2561	8	10.9	36.8	42.6	74.2	44.2	79.3	2.67	2.69	67.5	2.08	1.57	0.87	15.38	8.58	5.3
2561	9	12.7	36.8	37.6	60.2	39	64	2.68	2.69	62.6	1.68	1.65	1.01	16.18	9.86	6.1
2561	10	14.2	36.8	35.5	55.1	36.9	58.4	2.69	2.71	60.6	1.54	1.69	1.07	16.57	10.46	6.49
2561	11	15.7	36.9	36.2	56.6	37.5	60.1	2.69	2.7	61.2	1.58	1.68	1.05	16.45	10.27	6.36
2561	12	17.5	37	37.2	59.2	38.6	62.9	2.68	2.7	62.3	1.65	1.66	1.02	16.26	9.98	6.17
2561	13	18.7	36.9	33.5	50.3	34.8	53.3	2.68	2.69	58.3	1.4	1.72	1.12	16.9	11.03	6.82
2561	14	20.2	36.9	36.2	56.8	37.6	60.3	2.68	2.7	61.3	1.58	1.67	1.04	16.42	10.25	6.34
2561	15	21.7	36.8	34.1	51.7	35.4	54.7	2.69	2.7	59	1.44	1.72	1.11	16.82	10.87	6.74
2561	16	23.3	36.7	34.5	52.7	35.8	55.8	2.69	2.71	59.5	1.47	1.71	1.1	16.74	10.75	6.66
2561	17	24.6	36.7	35.9	56.1	37.3	59.5	2.68	2.7	61	1.56	1.68	1.05	16.47	10.33	6.39
2561	18	26.2	36.6	32.8	48.8	34.1	51.6	2.7	2.71	57.6	1.36	1.74	1.15	17.06	11.25	6.98
2561	19	27.6	36.3	32.4	48	33.7	50.7	2.7	2.71	57.2	1.34	1.75	1.16	17.13	11.37	7.05
2562	1	0.5	35.7	53.4	114.7	55.4	124.3	2.65	2.67	76.4	3.23	1.42	0.63	13.88	6.19	3.81
2562	2	2.05	35.6	52.3	109.6	54.2	118.4	2.65	2.68	75.5	3.09	1.43	0.66	14.04	6.43	3.96
2562	3	3.7	35.6	52.4	109.9	54.3	118.8	2.66	2.68	75.6	3.1	1.43	0.65	14.03	6.41	3.95
2562	4	5.2	36	46.4	86.6	48.2	92.9	2.66	2.68	70.8	2.43	1.51	0.78	14.82	7.68	4.74
2562	5	6.4	36.2	41.7	71.6	43.3	76.3	2.65	2.67	66.5	1.98	1.58	0.89	15.47	8.77	5.39
2562	6	8.2	36.5	43.4	76.7	45.1	82	2.66	2.68	68.1	2.14	1.55	0.85	15.24	8.37	5.16
2562	7	9.7	36.7	38.7	63.1	40.2	67.2	2.69	2.71	63.9	1.77	1.63	0.98	16.03	9.59	5.95
2562	8	11	36.7	37.6	60.3	39	64.1	2.68	2.69	62.6	1.68	1.65	1.01	16.18	9.86	6.09
2562	9	12.6	36.6	37.2	59.3	38.7	63	2.68	2.7	62.3	1.65	1.66	1.02	16.25	9.97	6.17
2562	10	14.2	36.6	39.7	65.9	41.3	70.2	2.68	2.7	64.8	1.84	1.62	0.95	15.84	9.31	5.76
2562	11	15.6	36.5	38.4	62.2	39.8	66.2	2.66	2.67	63.2	1.72	1.63	0.98	16.01	9.64	5.93

Table 4. Water content and index properties. — Continued

[m, meters; Sal Est, salinity estimated; ppt, parts per thousand; WCt, water content based on total sample mass not corrected for salinity; %, percent; WCs, water content based on solids mass not corrected for salinity; WCtc, water content based on total sample mass corrected for salinity; WCsc, water content based on solids mass corrected for salinity; ρs, grain density not corrected for salinity; g/cm^3, grams per cubic centimeter; ρsc, grain density corrected for salinity; n, porosity; e, void ratio; ρw, wet bulk density; ρd, dry bulk density; γw, wet unit weight; kN/m^3, kiloNewton per cubic meter; γd, dry unit weight; γsub, submerged unit weight]

Core no.	Section	Mid-depth (m)	Sal Est (ppt)	WCt (%)	WCs (%)	WCtc (%)	WCsc (%)	ρs (g/cm^3)	ρsc (g/cm^3)	n (%)	e	ρw (g/cm^3)	ρd (g/cm^3)	γw (kN/m^3)	γd (kN/m^3)	γsub (kN/m^3)
2562	12	17.2	36.4	33	49.4	34.3	52.2	2.69	2.7	57.8	1.37	1.73	1.14	16.99	11.16	6.91
2562	13	18.6	36.5	33.5	50.4	34.8	53.3	2.69	2.7	58.4	1.4	1.73	1.13	16.92	11.03	6.84
2562	14	20.35	36.4	33.3	50	34.6	52.8	2.68	2.7	58.1	1.39	1.73	1.13	16.94	11.08	6.86
2562	15	21.7	36.4	33.5	50.4	34.8	53.3	2.68	2.69	58.3	1.4	1.72	1.12	16.89	11.02	6.82
2562	16	23.2	36.4	32.8	48.8	34	51.6	2.68	2.69	57.5	1.35	1.74	1.14	17.02	11.23	6.94
2562	17	24.7	36.5	32	47.1	33.2	49.7	2.69	2.7	56.6	1.31	1.75	1.17	17.2	11.49	7.12
2563C2	1	0.12	36.9	57.9	137.5	60.1	150.7	2.55	2.57	79	3.77	1.35	0.54	13.26	5.29	3.17
2563C2	1.5	0.2	37.6	58.8	142.9	61.1	157.2	2.58	2.61	79.9	3.98	1.35	0.52	13.19	5.13	3.1
2563C2	2	0.7	41.8	56.4	129.5	58.9	143.3	2.64	2.68	78.8	3.71	1.38	0.57	13.54	5.56	3.42
2563C2	3	1.3	48.1	53.2	113.5	55.9	126.5	2.6	2.63	76.2	3.21	1.42	0.62	13.88	6.13	3.71
2563C2	4	2.27	60.1	49.3	97.3	52.5	110.4	2.59	2.62	73.5	2.77	1.46	0.7	14.36	6.83	4.11
2563C2	5	2.85	66.8	49.3	97.4	52.9	112.2	2.54	2.58	73.3	2.75	1.46	0.69	14.3	6.74	3.99
2563C2	6	3.6	73.5	45.7	84	49.3	97.1	2.51	2.54	70	2.34	1.5	0.76	14.72	7.47	4.36
2565	3	3.9	122.1	46.4	86.4	52.8	111.9	2.57	2.64	73	2.7	1.51	0.71	14.83	7	4.1
2565	3.1	3.9	122.1	45	81.9	51.3	105.2	2.59	2.65	71.8	2.55	1.53	0.75	15.03	7.32	4.3
2565	3.2	3.9	122.1	44.4	80	50.6	102.5	2.6	2.66	71.4	2.49	1.54	0.76	15.13	7.47	4.4
2567	1	0.6	36	61.9	162.7	64.2	179.7	2.65	2.68	82.4	4.69	1.32	0.47	12.93	4.62	2.85
2567	1	0.6	36	62	163.3	64.3	180.4	2.65	2.68	82.5	4.71	1.32	0.47	12.92	4.61	2.84
2567	2	2.05	36.2	58.8	142.5	61	156.2	2.65	2.69	80.3	4.08	1.35	0.53	13.28	5.18	3.2
2567	3	3.6	36.4	60.4	152.4	62.7	167.8	2.65	2.68	81.4	4.38	1.34	0.5	13.1	4.89	3.02
2567	4	5.2	36.6	54	117.5	56.1	127.6	2.66	2.69	76.9	3.34	1.41	0.62	13.84	6.08	3.75
2567	5	6.4	36.7	49.2	96.9	51.1	104.5	2.63	2.65	73	2.7	1.47	0.72	14.39	7.04	4.31
2567	6	8.2	36.7	48.1	92.7	49.9	99.7	2.62	2.64	71.9	2.56	1.48	0.74	14.52	7.27	4.44
2567	7	9.7	36.8	46.8	88	48.6	94.5	2.63	2.65	70.9	2.44	1.5	0.77	14.72	7.57	4.63
2567	8	11	36.9	43.6	77.3	45.3	82.8	2.66	2.68	68.3	2.15	1.55	0.85	15.21	8.32	5.12
2567	9	12.5	37	39.6	65.6	41.1	69.9	3.32	3.37	69.6	2.29	1.74	1.02	17.06	10.04	6.97
2567	10	14.2	36.8	38	61.2	39.4	65.1	2.69	2.71	63.1	1.71	1.65	1	16.14	9.78	6.06
2567	11	15.7	36.8	36	56.2	37.4	59.7	2.69	2.7	61	1.57	1.68	1.05	16.47	10.31	6.39
2567	12	17.2	37	34.5	52.6	35.8	55.8	2.69	2.7	59.4	1.47	1.71	1.1	16.75	10.75	6.66
2567	13	18.6	37	38.3	62	39.7	65.9	2.67	2.69	63.3	1.72	1.64	0.99	16.06	9.68	5.97
2567	14	20.2	36.9	37.5	60	39	63.8	2.68	2.69	62.5	1.67	1.65	1.01	16.19	9.88	6.11
2567	15	21.7	37	36.4	57.2	37.8	60.7	2.68	2.7	61.4	1.59	1.67	1.04	16.39	10.2	6.31
2567	16	23.2	37	32	47.2	33.3	49.9	2.7	2.71	56.8	1.32	1.76	1.17	17.22	11.49	7.13
2567	17	24.55	36.8	33.8	51.1	35.1	54.1	2.7	2.71	58.8	1.42	1.72	1.12	16.88	10.96	6.8
2567	18	26.05	36.6	35.7	55.4	37	58.7	2.69	2.7	60.7	1.54	1.69	1.06	16.53	10.41	6.45
2569	1	0.95	35.8	42.1	72.6	43.6	77.4	2.66	2.68	66.9	2.02	1.58	0.89	15.45	8.71	5.37
2569	2	1.95	35.7	44.3	79.6	46	85.1	2.67	2.69	69	2.23	1.54	0.83	15.12	8.17	5.05
2569	2	1.95	35.7	43.6	77.3	45.2	82.5	2.66	2.68	68.3	2.15	1.55	0.85	15.21	8.33	5.13
2569	3	2.95	23.9	56.2	128.2	57.6	135.6	2.65	2.67	78	3.55	1.38	0.59	13.54	5.75	3.55
2569	3	2.95	23.9	51.9	108.1	53.2	113.7	2.65	2.67	74.9	2.98	1.43	0.67	14.05	6.57	4.06
2569	1?	3.5	32.4	47.3	89.8	48.9	95.7	2.67	2.69	71.5	2.51	1.5	0.77	14.7	7.52	4.65
2569	4	4.05	48.3	43.8	78	46	85.3	2.66	2.68	68.8	2.2	1.55	0.84	15.2	8.2	5.03
2569	4	4.05	48.3	43.3	76.5	45.5	83.6	2.66	2.68	68.4	2.16	1.56	0.85	15.27	8.32	5.1
2569	5	5.95	37	41.9	72.2	43.5	77.1	2.66	2.67	66.7	2	1.58	0.89	15.45	8.73	5.37
2569	5	5.95	37	41.9	72.1	43.5	77	2.65	2.67	66.6	2	1.57	0.89	15.45	8.72	5.36

Table 4. Water content and index properties. — Continued

[m, meters; Sal Est, salinity estimated; ppt, parts per thousand; WCt, water content based on total sample mass not corrected for salinity; %, percent; WCs, water content based on solids mass not corrected for salinity; WCtc, water content based on total sample mass corrected for salinity; WCsc, water content based on solids mass corrected for salinity; ρs, grain density not corrected for salinity; g/cm^3, grams per cubic centimeter; ρsc, grain density corrected for salinity; n, porosity; e, void ratio; ρw, wet bulk density; ρd, dry bulk density; γw, wet unit weight; kN/m^3, kiloNewton per cubic meter; γd, dry unit weight; γsub, submerged unit weight]

Core no.	Section	Mid-depth (m)	Sal Est (ppt)	WCt (%)	WCs (%)	WCtc (%)	WCsc (%)	ρs (g/cm^3)	ρsc (g/cm^3)	n (%)	e	ρw (g/cm^3)	ρd (g/cm^3)	γw (kN/m^3)	γd (kN/m^3)	γsub (kN/m^3)
2569	2?	6.45	44.8	41.9	72	43.8	78	2.68	2.7	67	2.03	1.58	0.89	15.52	8.72	5.38
2569	6	6.6	47.1	41.4	70.6	43.4	76.7	2.65	2.67	66.4	1.98	1.58	0.9	15.54	8.79	5.38
2569	6	6.6	47.1	41.1	69.7	43.1	75.7	2.65	2.67	66.1	1.95	1.59	0.9	15.59	8.87	5.43
2569	7	7.45	60.4	35.7	55.6	38	61.4	2.65	2.67	61	1.57	1.68	1.04	16.47	10.21	6.21
2569	3	8.16	49.5	41	69.6	43.2	76	2.66	2.68	66.2	1.96	1.59	0.9	15.61	8.87	5.44
2569	8	8.25	46.6	42.6	74.2	44.7	80.7	2.65	2.67	67.6	2.08	1.57	0.87	15.36	8.5	5.21
2569	9	10	54.6	36.9	58.4	39	64	2.65	2.68	62.2	1.64	1.66	1.01	16.28	9.93	6.06
2570	1	0.5	35.8	53.7	115.9	55.7	125.6	2.65	2.68	76.6	3.27	1.41	0.63	13.86	6.14	3.79
2570	2	2.05	35.9	51.1	104.3	53	112.6	2.69	2.71	74.8	2.97	1.45	0.68	14.23	6.7	4.16
2570	3	3.7	36.1	56.8	131.5	58.9	143.5	2.64	2.67	78.8	3.73	1.37	0.56	13.48	5.54	3.4
2570	4	5.1	36	51.8	107.4	53.7	116.1	2.65	2.68	75.2	3.02	1.44	0.67	14.1	6.52	4.02
2570	5	6.5	36.2	51.9	108	53.9	116.8	2.6	2.63	74.9	2.98	1.43	0.66	14.01	6.46	3.93
2570	6	8.1	36.4	48.4	93.7	50.2	100.8	2.63	2.65	72.2	2.59	1.48	0.74	14.49	7.22	4.41
2570	7	10.2	36.4	47	88.8	48.8	95.3	2.63	2.65	71.1	2.46	1.5	0.77	14.68	7.52	4.6
2570	8	11	36.7	42.6	74.2	44.2	79.2	2.66	2.67	67.3	2.06	1.57	0.87	15.36	8.57	5.27
2570	9	12.9	37.1	44.2	79.1	45.9	84.8	2.64	2.66	68.7	2.19	1.54	0.83	15.1	8.17	5.02
2570	10	14.3	36.8	47.2	89.4	49	96.1	2.64	2.66	71.3	2.49	1.5	0.76	14.67	7.48	4.59
2570	11	15.7	36.6	45.7	84.2	47.4	90.3	2.66	2.68	70.2	2.35	1.52	0.8	14.91	7.84	4.83
2570	12	17.4	36.7	43.7	77.6	45.4	83.1	2.64	2.66	68.3	2.15	1.55	0.84	15.17	8.29	5.09
2570	13	18.6	36.7	39.6	65.4	41.1	69.7	2.68	2.7	64.6	1.83	1.62	0.95	15.87	9.35	5.79
2570	14	20.3	36.7	40.7	68.5	42.2	73.1	2.68	2.7	65.7	1.92	1.6	0.93	15.7	9.07	5.62
2570	15	21.5	36.7	35.5	55.1	36.9	58.4	2.71	2.73	60.7	1.55	1.69	1.07	16.62	10.49	6.53
2570	16	23	36.7	39.3	64.6	40.8	68.8	2.66	2.68	64.2	1.79	1.62	0.96	15.87	9.4	5.79
2570	17	24.7	36.7	38.3	62.1	39.8	66.1	2.68	2.69	63.4	1.73	1.64	0.99	16.06	9.67	5.98
2570	18	26.1	36.6	40.2	67.1	41.7	71.5	2.67	2.69	65.1	1.87	1.61	0.94	15.75	9.18	5.67
2570	19	27.7	36.6	38.9	63.6	40.4	67.6	2.66	2.68	63.8	1.76	1.63	0.97	15.94	9.51	5.86
2571C2	1	0.42	36.2	53.5	115.2	55.5	124.9	3.19	3.26	79.8	3.96	1.48	0.66	14.49	6.44	4.41
2571C2	1	0.42	36.2	53.1	113.4	55.1	122.9	2.66	2.69	76.3	3.21	1.42	0.64	13.94	6.25	3.86
2571C2	1	0.42	36.2	53.2	113.5	55.2	123	2.66	2.69	76.3	3.21	1.42	0.64	13.93	6.25	3.86
2571C2	2	1	35.8	52.1	108.7	54	117.4	2.68	2.71	75.6	3.09	1.44	0.66	14.1	6.48	4.02
2571C2	3	1.96	36	53.2	113.8	55.2	123.2	2.64	2.67	76.2	3.2	1.42	0.64	13.91	6.23	3.83
2571C2	4	3	37.1	51.7	107.1	53.7	116.1	2.35	2.36	72.7	2.66	1.39	0.64	13.64	6.31	3.56
2571C2	5	5	37.2	51.2	104.7	53.1	113.4	2.62	2.65	74.5	2.92	1.44	0.68	14.13	6.62	4.05
2571C2	5	5	37.2	51.4	105.7	53.4	114.4	2.62	2.65	74.6	2.94	1.44	0.67	14.11	6.58	4.02
2571C2	6	4	36.7	53	112.9	55.1	122.5	2.64	2.67	76.1	3.18	1.42	0.64	13.93	6.26	3.85
2571C2	7	6.8	35.7	47.9	92	49.7	98.7	2.6	2.62	71.5	2.51	1.48	0.74	14.5	7.3	4.43
2571C2	8	8	37.8	48.3	93.2	50.1	100.6	2.63	2.65	72.1	2.59	1.48	0.74	14.52	7.24	4.43
2571C2	9	9.95	37.7	42.9	75.1	44.6	80.4	2.65	2.67	67.6	2.09	1.56	0.86	15.3	8.48	5.21
2571C2	9	9.95	37.7	44.5	80.1	46.2	86	2.65	2.67	69	2.23	1.54	0.83	15.06	8.1	4.97
2571C2	9	9.95	37.7	41.6	71.4	43.3	76.3	2.63	2.65	66.2	1.96	1.58	0.89	15.45	8.76	5.36
2571C2	9	9	37.9	43.7	77.5	45.4	83.1	2.64	2.66	68.3	2.15	1.55	0.84	15.17	8.29	5.08
2573GHF	2	0.3	35	46.5	86.8	48.2	92.9	2.67	2.69	70.9	2.43	1.51	0.78	14.82	7.68	4.75
2573GHF	5	1.37	35	39.2	64.5	40.6	68.4	2.66	2.67	64	1.78	1.62	0.96	15.87	9.42	5.8
2573GHF	3	2.45	35	34.7	53.2	36	56.2	2.67	2.68	59.5	1.47	1.7	1.09	16.65	10.66	6.58
2573GHF	4	3.25	35	40.7	68.6	42.2	72.9	2.67	2.68	65.6	1.9	1.6	0.92	15.66	9.06	5.59
2573GHF	6	3.65	35	42.2	73.1	43.8	77.8	2.65	2.67	66.9	2.02	1.57	0.88	15.4	8.66	5.33

Table 4. Water content and index properties. — Continued

[m, meters; Sal Est, salinity estimated; ppt, parts per thousand; WCt, water content based on total sample mass not corrected for salinity; %, percent; WCs, water content based on solids mass not corrected for salinity; WCtc, water content based on total sample mass corrected for salinity; WCsc, water content based on solids mass corrected for salinity; ρs, grain density not corrected for salinity; g/cm^3, grams per cubic centimeter; ρsc, grain density corrected for salinity; n, porosity; e, void ratio; ρw, wet bulk density; ρd, dry bulk density; γw, wet unit weight; kN/m^3, kiloNewton per cubic meter; γd, dry unit weight; γsub, submerged unit weight]

Core no.	Section	Mid-depth (m)	Sal Est (ppt)	WCt (%)	WCs (%)	WCtc (%)	WCsc (%)	ρs (g/cm^3)	ρsc (g/cm^3)	n (%)	e	ρw (g/cm^3)	ρd (g/cm^3)	γw (kN/m^3)	γd (kN/m^3)	γsub (kN/m^3)
2573GHF	9	3.78	35	38.6	62.7	40	66.5	2.65	2.66	63.3	1.72	1.63	0.98	15.95	9.58	5.88
2573GHF	9	3.78	35	38.5	62.5	39.9	66.3	2.65	2.66	63.2	1.72	1.63	0.98	15.96	9.6	5.89
2573GHF	9	3.78	35	37.9	60.9	39.2	64.5	2.65	2.66	62.6	1.67	1.64	1	16.06	9.76	5.99
2573GHF	7	4	35	39	63.9	40.4	67.8	2.65	2.67	63.8	1.76	1.62	0.97	15.89	9.48	5.83

Table 5. Shear strength results.

[mbsf, meters below sea floor; Svs, vane shear strength; kPa, kilopascal; Spp, pocket penetrometer strength; Stv, Torvane strength]

Core	Sub-bottom depth (mbsf)	Svs (kPa)	Core	Sub-bottom depth (mbsf)	Spp (kPa)	Core	Sub-bottom depth (mbsf)	Stv (kPa)
2535	0.9	8.41	2535	0.8	0	2535	0.9	9.8
2535	2.2	9.15	2535	2.1	24.5	2535	2	9.8
2535	3.7	17.85	2535	3.8	49	2535	3.9	19.6
2535	5.2	21.97	2535	5.4	61.3	2535	5.3	32.4
2535	8.3	15.41	2535	6.7	54.9	2535	6.5	38.2
2535	9.8	23.8	2535	8.4	73.5	2535	8.5	9.8
2535	11.2	27.92	2535	9.7	102.9	2535	9.6	9.8
2535	12.7	30.21	2535	11	122.5	2535	11.3	12.3
2535	14.2	45.77	2535	12.6	134.8	2535	12.5	13.7
2535	15.7	43.02	2535	14	14.7	2535	13.9	23.5
2535	17.2	62.7	2535	15.8	196	2535	15.9	24.5
2535	23.2	75.51	2535	17.1	24.5	2535	17	29.4
2535	24.8	70.02	2535	18.6	14.7	2535	18.5	31.4
2535	25.8	72.31	2535	20.4	25	2535	20.5	31.4
2535	27.6	73.23	2535	21.2	14.7	2535	21.25	30.4
2535	29.2	71.85	2535	21.5	25	2535	21.8	33.3
2535	33.6	85.13	2535	23	14.7	2535	22.9	27
2535	37.6	70.02	2535	24.6	24.5	2535	24.4	25.5
2536	0.6	7.15	2535	26.1	14.7	2535	26.2	31.4
2536	2.2	12.64	2535	27.5	29.4	2535	27.4	33.3
2536	3.6	15.18	2535	29.5	36.8	2535	29	36.8
2536	3.7	13.87	2535	30.7	36.8	2535	29.6	35.3
2536	5.1	13.04	2535	32.5	29.4	2535	30.8	31.4
2536	5.2	23.8	2535	33.7	36.8	2535	32	39.2
2536	6.8	21.51	2535	34.88	29.4	2535	33.8	40.2
2536	7.75	47.14	2535	36.8	19.6	2535	34.8	30.4
2536	8.2	40.27	2535	37.7	36.8	2535	36.7	40.2
2537	0.85	78.03	2536	0.67	0	2535	37.8	35.3
2537	2.3	21.97	2536	2.15	0	2536	0.69	2
2537	3.75	14.42	2536	3.55	0	2536	2.13	3.9
2537	5.25	10.35	2536	5.15	0	2536	3.55	6.9
2537	6.75	17.85	2536	6.75	0	2536	5.13	6.9
2537	8.2	17.87	2536	8.18	4.9	2536	6.75	9.8
2537	9.8	21.97	2537	0.8	0	2536	8.15	18.6
2537	11.2	29.75	2537	2.45	0	2537	0.95	0
2537	12.75	33.18	2537	5.1	61.3	2537	2.5	2.9
2537	17.1	61.56	2537	8.3	61.3	2537	3.6	4.9
2537	18.7	33.41	2537	12.9	159.3	2537	5	4.9
2537	20.1	59.72	2537	14.3	147	2537	12.6	13.7

Table 5. Shear strength results. — Continued

[mbsf, meters below sea floor; Svs, vane shear strength; kPa, kilopascal; Spp, pocket penetrometer strength; Stv, Torvane strength]

Core	Sub-bottom depth (mbsf)	Svs (kPa)	Core	Sub-bottom depth (mbsf)	Spp (kPa)	Core	Sub-bottom depth (mbsf)	Stv (kPa)
2537	21.5	60.87	2537	15.75	134.8	2537	14.15	17.2
2537	23.2	62.24	2537	17	24.5	2537	15.75	10.8
2537	24.6	73.68	2537	18.9	12.3	2537	17	24.5
2537	26.2	77.35	2537	20	24.5	2537	19	26.5
2537	27.3	69.57	2537	21.6	29.4	2537	20.2	24.5
2537	28.9	70.94	2537	23.1	24.5	2537	21.3	33.3
2537	30.2	56.75	2537	24.4	36.8	2537	23.1	31.9
2537	31.6	100	2537	26.2	36.8	2537	24.45	35.3
2537	33.1	75.06	2537	27.93	36.8	2537	26.4	36.8
2538	2.2	12.44	2537	29	36.8	2537	28.75	41.2
2538	3.7	17.39	2537	32.1	0	2537	32.3	35.3
2538	5.2	16.48	2537	33.2	39.2	2537	32.95	44.1
2538	6.7	27	2538	0.6	0	2538	0.75	0
2539	0.7	8.24	2538	2.15	0	2538	2.13	4.9
2539	2.2	9.61	2538	3.7	0	2538	3.7	6.9
2539	3.7	13.73	2538	5.15	0	2538	5.15	7.8
2539	5.2	28.83	2538	6.42	0	2538	6.45	11.8
2539	6.85	18.76	2539	0.6	0	2539	0.62	0
2539	8.1	19.22	2539	2.1	0	2539	2.15	2
2539	9.65	30.21	2539	5.3	0	2539	5.25	7.8
2539	11.23	27.92	2539	6.6	0	2539	6.5	8.8
2539	12.7	27.92	2539	6.8	0	2539	6.9	9.8
2539	14.2	34.78	2539	9.77	4.9	2539	8.5	8.8
2539	15.7	28.38	2539	11.25	9.8	2539	9.8	15.7
2539	17.2	33.41	2539	12.63	19.6	2539	11.3	17.7
2539	18.7	53.55	2539	14.2	19.6	2539	12.6	17.7
2539	20	30.66	2539	15.73	0	2539	14.26	21.6
2539	21.7	55.38	2539	17.2	19.6	2539	15.7	17.7
2539	23.2	63.62	2539	20	14.7	2539	17.25	19.6
2539	25.2	84.67	2539	21.6	9.8	2539	18.75	31.4
2539	26.2	81.79	2539	23.15	34.3	2539	20.05	17.7
2539	27.7	79.18	2539	26.3	36.8	2539	21.6	22.6
2539	30.5	75.51	2539	27.8	24.5	2539	23.25	29.4
2541	0.6	6.06	2539	29.3	39.2	2539	26.3	39.2
2541	2.2	10.03	2539	30.6	24.5	2539	27.8	31.4
2541	3.7	11.52	2541	0.53	0	2539	29.35	46.1
2541	6.7	16.61	2541	0.7	25	2539	30.6	41.2
2541	8.2	15.56	2541	2.15	93.1	2541	0.51	2
2541	9.7	21.97	2541	2.15	0	2541	0.85	9.8

Table 5. Shear strength results. — Continued

[mbsf, meters below sea floor; Svs, vane shear strength; kPa, kilopascal; Spp, pocket penetrometer strength; Stv, Torvane strength]

Core	Sub-bottom depth (mbsf)	Svs (kPa)	Core	Sub-bottom depth (mbsf)	Spp (kPa)	Core	Sub-bottom depth (mbsf)	Stv (kPa)
2541	11.2	24.7	2541	3.62	0	2541	2.1	20.6
2541	12.7	20.93	2541	3.8	2.3	2541	2.13	2.9
2541	14.2	26.02	2541	5.15	0	2541	3.65	4.9
2541	15.7	49.43	2541	5.3	55.1	2541	3.8	4.9
2541	17.2	44.85	2541	6.65	4.9	2541	5.15	7.8
2541	18.7	59.95	2541	6.8	4	2541	5.35	4.9
2541	20.2	42.56	2541	6.9	61.3	2541	6.7	28.4
2541	21.7	61.1	2541	8.3	4.6	2541	6.8	7.8
2541	23.15	64.99	2541	9.65	0	2541	6.85	6.9
2541	24.7	64.53	2541	9.7	110.3	2541	8.3	9.8
2541	26.2	65.45	2541	11.15	134.8	2541	9.6	14.7
2541	27.7	61.33	2541	11.3	6.7	2541	9.6	11.8
2541	29.2	67.73	2541	12.65	0	2541	11.1	14.2
2541	30.7	72.31	2541	14.3	24.5	2541	11.3	11.8
2541	33.7	53.4	2541	15.8	13.2	2541	12.75	11.8
2541	34.9	77.8	2541	17.3	4.9	2541	14.3	18.6
2542	0.8	10.26	2541	18.8	24.5	2541	15.8	19.6
2542	2.2	9.89	2541	20.3	24.5	2541	17.3	24.5
2542	0.7	12.81	2541	21.8	27	2541	18.8	30.4
2542	3.7	17.41	2541	23.15	24.5	2541	20.35	28.4
2542	5.2	19.22	2541	24.75	29.4	2541	21.85	27
2542	5.2	19.22	2541	26.15	29.4	2541	23.1	24.5
2542	6.8	37.99	2541	27.6	19.6	2541	24.8	25.5
2545	1.5	16.48	2541	29.3	29.4	2541	26.3	28.4
2545	2.43	22.88	2541	30.25	36.8	2541	27.6	29.4
2545	3.35	22.88	2541	30.8	29.4	2541	29.3	29.4
2545	4.35	29.75	2541	31.65	36.8	2541	30.3	34.3
2545	5.3	27.92	2541	33.65	34.3	2541	30.8	37.3
2545	6.45	23.3	2541	34.85	29.4	2541	31.7	35.3
2545	7.4	38.44	2545	0.5	0	2541	33.6	39.2
2545	8.5	29.75	2545	1.4	0	2541	34.83	37.3
2545	9.15	40.62	2545	2.27	0	2545	0.5	2
2546	0.9	10.98	2545	2.57	0	2545	1.4	1
2546	3.7	10.07	2545	4.4	0	2545	2.15	8.8
2546	5.2	16.02	2545	5.4	0	2545	2.6	9.8
2546	6.7	14.65	2545	6.6	0	2545	4.4	0
2546	7.8	16.48	2545	7.53	0	2545	5.4	0
2546	9.7	24.26	2545	8.57	0	2545	6	0
2546	11.1	23.34	2545	9.1	0	2545	7.4	11.8

Table 5. Shear strength results. — Continued

[mbsf, meters below sea floor; Svs, vane shear strength; kPa, kilopascal; Spp, pocket penetrometer strength; Stv, Torvane strength]

Core	Sub-bottom depth (mbsf)	Svs (kPa)	Core	Sub-bottom depth (mbsf)	Spp (kPa)	Core	Sub-bottom depth (mbsf)	Stv (kPa)
2546	12.8	20.14	2546	0.5	0	2545	8.6	14.7
2546	15.1	24.99	2546	2.24	0	2545	9.15	0
2546	15.7	45.31	2546	3.63	0	2546	0.6	2
2546	17.2	31.08	2546	5.1	0	2546	2.2	4.9
2546	18.65	45.31	2546	6.4	0	2546	3.63	4.9
2546	20.4	49.89	2546	8	0	2546	5.1	4.9
2546	21.7	56.29	2546	9.72	0	2546	6.42	8.8
2546	23.2	63.62	2546	11.4	0	2546	8	9.8
2546	24.7	65.45	2546	12.5	0	2546	9.75	11.8
2546	26.2	65.9	2546	14.23	0	2546	11.5	11.8
2546	27.7	63.16	2546	15.8	4.9	2546	12.55	12.7
2546	29.2	71.4	2546	16.3	24.5	2546	14.2	13.7
2546	30.6	70.02	2546	17.4	4.9	2546	15.8	14.7
2547	0.75	14.19	2546	18.55	19.6	2546	16.3	29.4
2547	2.2	14.19	2546	20.5	9.8	2546	17.4	19.6
2547	3.7	18.31	2546	21.7	24.5	2546	18.6	25.5
2547	5.1	21.51	2546	23.13	44.1	2546	20.5	26.5
2554	0.7	10.53	2546	24.5	34.3	2546	21.7	19.6
2554	2.2	7.43	2546	27.8	36.8	2546	23.1	30.4
2554	3.7	14.65	2546	29.16	29.4	2546	24.56	31.4
2554	5.2	16.93	2546	30.7	49	2546	27.8	34.3
2554	6.8	23.8	2547	0.8	0	2546	29.1	31.4
2554	8.2	15.56	2547	2.04	0	2546	30.7	29.4
2554	9.75	24.26	2547	3.84	0	2547	0.85	1
2554	11.2	25.63	2547	5.08	0	2547	2	3.9
2554	12.6	21.05	2550	0.5	0	2547	3.8	8.8
2554	14	30.21	2550	1	0	2547	5.14	9.8
2554	15.6	39.88	2550	1.5	0	2554	0.8	0
2554	17.3	30.66	2550	2	1.8	2554	2.3	2.9
2554	19.1	34.32	2550	3	2.9	2554	3.8	6.9
2554	20	22.88	2550	4	3.7	2554	5.3	7.8
2554	21.45	35.24	2550	5	4.6	2554	6.9	9.8
2554	23	39.82	2550	6	6.9	2554	8.3	7.4
2554	24.6	39.82	2550	6.9	8.6	2554	9.9	12.3
2554	26.05	33.87	2550	8	10.1	2554	11.3	14.7
2554	27.4	44.85	2550	8.9	9.5	2554	12.5	7.8
2554	29	43.48	2552	0.6	0.9	2554	13.9	14.7
2554	30.35	37.53	2552	1	2.3	2554	15.5	4.9
2555	1.1	8.7	2552	1.7	2.8	2554	17.4	15.7

Table 5. Shear strength results. — Continued

[mbsf, meters below sea floor; Svs, vane shear strength; kPa, kilopascal; Spp, pocket penetrometer strength; Stv, Torvane strength]

Core	Sub-bottom depth (mbsf)	Svs (kPa)	Core	Sub-bottom depth (mbsf)	Spp (kPa)	Core	Sub-bottom depth (mbsf)	Stv (kPa)
2555	2	8.7	2552	2	3.1	2554	18.9	15.2
2555	3.5	13.27	2552	3.1	4	2554	20.1	15.7
2555	5.2	16.02	2552	4	5.4	2554	21.35	14.7
2555	6.7	21.97	2552	5	6.4	2554	22.9	19.6
2555	8.2	16.02	2552	6.1	7.2	2554	24.73	21.6
2555	9.7	26.09	2552	7	8	2554	25.87	19.6
2555	11.2	27	2552	8	9.3	2554	27.6	20.6
2555	12.65	36.16	2552	9	11.5	2554	29.1	27
2555	14.2	30.6	2552	10	11	2554	30.45	24.5
2555	15.8	31.58	2554	0.8	0	2555	1.2	2.9
2555	17.2	29.48	2554	2.3	1.5	2555	2.1	3.9
2555	18.7	35.24	2554	3.8	4.6	2555	3.6	11.8
2555	20.2	37.53	2554	5.3	4.6	2555	5.3	7.4
2555	21.6	31.58	2554	6.9	5.8	2555	6.8	8.8
2555	23.2	43.94	2554	8.3	4.6	2555	8.3	7.8
2555	24.9	45.31	2554	9.9	5.5	2555	9.8	9.8
2555	26.2	32.04	2554	11.3	7	2555	11.3	14.2
2555	27.6	43.48	2554	12.5	5.4	2555	12.75	19.6
2555	29.2	49.89	2554	13.9	7.7	2555	14.2	14.7
2555	30.7	47.14	2554	15.5	8.6	2555	15.7	13.7
2555	32.2	45.77	2554	17.4	6.9	2555	17.3	17.7
2555	33.85	39.17	2554	18.9	7.7	2555	18.8	22.1
2555	35.1	53.55	2554	20.1	7.7	2555	20.3	22.1
2556	0.7	10.98	2554	21.35	8.6	2555	21.7	20.6
2556	2.2	13.38	2554	22.9	10.7	2555	23.3	20.6
2556	3.7	16	2554	24.5	14.7	2555	25	27
2556	5.2	19.68	2554	25.87	4.9	2555	26.3	24.5
2556	6.7	15.56	2554	27.6	4.9	2555	27.5	27.5
2556	8.1	18.18	2554	29.1	19.6	2555	29.1	25.5
2556	9.7	22.88	2554	30.45	9.8	2555	30.6	24.5
2556	11.6	24.26	2555	1.2	0	2555	32.1	24
2556	12.7	32.49	2555	2.1	2.1	2555	33.9	25.5
2556	14.2	31.15	2555	3.6	4.6	2556	0.8	0
2556	15.4	32.95	2555	5.3	4.6	2556	2.3	3.9
2556	17.15	38.9	2555	6.8	5.4	2556	3.8	4.9
2556	18.7	36.16	2555	8.3	4	2556	5.3	6.9
2556	20.2	34.19	2555	9.8	5.4	2556	6.6	7.8
2556	21.7	44.85	2555	11.3	8	2556	8.2	6.9
2556	23.3	36.61	2555	12.75	8.4	2556	9.8	10.8

Table 5. Shear strength results. — Continued

[mbsf, meters below sea floor; Svs, vane shear strength; kPa, kilopascal; Spp, pocket penetrometer strength; Stv, Torvane strength]

Core	Sub-bottom depth (mbsf)	Svs (kPa)	Core	Sub-bottom depth (mbsf)	Spp (kPa)	Core	Sub-bottom depth (mbsf)	Stv (kPa)
2556	24.8	43.02	2555	14.2	8	2556	11.7	14.2
2556	26.2	38.44	2555	15.7	7.7	2556	12.6	14.7
2556	27.7	44.39	2555	17.3	9.2	2556	14.3	20.6
2556	29.2	53.09	2555	18.8	10.4	2556	15.5	17.2
2556	30.7	59.5	2555	20.3	9.2	2556	17.25	18.6
2556	32.1	41.19	2555	21.7	10.7	2556	18.5	21.6
2556	33.75	49.43	2555	23.3	10.4	2556	20.35	24.5
2559	2.1	20.14	2555	25	11.6	2556	21.6	19.6
2559	3.7	16.48	2555	26.3	11.6	2556	23.4	22.6
2559	5.1	12.81	2555	27.5	13	2556	24.95	37.8
2559	6.6	16.32	2555	29.1	11	2556	26.4	27
2559	8.1	19.22	2555	30.6	12.3	2556	27.8	22.1
2559	9.6	18.76	2555	32.1	10	2556	28.95	22.1
2559	11.2	27	2555	33.9	12.6	2556	30.6	29.4
2559	12.6	25.63	2556	0.8	0	2556	32	25.5
2559	14.1	35.24	2556	2.3	0	2556	33.85	29.9
2559	15.7	37.52	2556	3.8	3.8	2559	0.2	0
2559	17.2	36.61	2556	5.3	3.7	2559	2	1
2559	18.6	46.68	2556	6.6	4.9	2559	3.8	4.4
2559	20.1	43.02	2556	8.2	3.8	2559	5.2	5.9
2559	21.7	44.85	2556	9.8	6.4	2559	6.7	7.8
2559	23.2	53.09	2556	11.7	6.7	2559	8.2	9.8
2559	24.7	51.26	2556	12.6	9.2	2559	9.7	10.8
2559	26.2	67.28	2556	14	7.4	2559	11.3	12.7
2559	27.6	55.38	2556	15.3	9.2	2559	12.7	15.7
2559	29.1	31.58	2556	17	10.9	2559	14.2	17.7
2559	30.7	30.04	2556	18.8	10.7	2559	15.8	19.6
2559	32.1	34.32	2556	20.3	10.7	2559	17.1	16.7
2559	33.2	40.27	2556	21.6	11.6	2559	18.7	19.6
2560	0.6	10.07	2556	23.4	10.1	2559	20.2	24.5
2560	2.2	9.61	2556	24.9	7.4	2559	21.6	24
2560	3.7	10.07	2556	26.4	11.6	2559	23.1	26.5
2560	5.1	17.39	2556	27.8	10.7	2559	24.6	29.4
2560	6.55	20.59	2556	29.05	11.6	2559	26.1	29.9
2560	8.2	19.68	2556	30.6	24.5	2559	27.5	29.4
2560	9.7	27	2556	32.2	14.5	2559	29.2	21.6
2560	11.15	37.07	2556	33.85	24.5	2559	30.8	19.1
2560	15.7	39.36	2559	0.2	0	2559	32.2	19.1
2560	14.2	38.9	2559	2	0.6	2559	33.3	21.6

Table 5. Shear strength results. — Continued

[mbsf, meters below sea floor; Svs, vane shear strength; kPa, kilopascal; Spp, pocket penetrometer strength; Stv, Torvane strength]

Core	Sub-bottom depth (mbsf)	Svs (kPa)	Core	Sub-bottom depth (mbsf)	Spp (kPa)	Core	Sub-bottom depth (mbsf)	Stv (kPa)
2560	12.6	31.58	2559	3.8	2.8	2560	0.7	0
2560	17.25	41.65	2559	5.2	3.1	2560	2	4.9
2560	18.7	48.51	2559	6.7	5.4	2560	3.6	5.9
2560	20.1	48.05	2559	8.2	5.4	2560	5	5.9
2560	21.8	51.78	2559	9.7	6.1	2560	6.6	9.8
2560	24.7	48.97	2559	11.3	7	2560	8.3	9.8
2560	26.1	72.77	2559	12.7	8.9	2560	9.8	14.7
2560	27.6	65.45	2559	14.2	9.5	2560	11.03	0
2561	0.7	9.7	2559	15.8	9.2	2560	12.45	12.7
2561	2	10.07	2559	17.1	10.7	2560	14.05	14.7
2561	3.7	10.43	2559	18.7	12.3	2560	15.5	27.5
2561	5.25	6.69	2559	20.2	13	2560	17.15	19.6
2561	6.6	17.39	2559	21.6	13.8	2560	18.65	21.6
2561	8.2	12.81	2559	23.1	14.7	2560	20.05	24.5
2561	9.7	17.53	2559	23.1	15.3	2560	21.7	19.6
2561	10.9	22.5	2559	24.6	24.5	2560	24.6	25.5
2561	12.7	25.63	2559	26.1	24.5	2560	26.05	38.2
2561	14.1	27.9	2559	27.5	22.1	2560	27.55	37.3
2561	15.7	31.58	2559	29.2	8.6	2561	0.6	6.9
2561	17.5	37.07	2559	30.8	9.2	2561	3.7	0
2561	18.7	39.82	2559	32.2	9.8	2561	5.35	4.9
2561	20.2	55.84	2559	33.3	10.1	2561	6.7	8.8
2561	21.7	50.8	2560	0.75	2.8	2561	8.3	8.8
2561	24.6	55.38	2560	2.3	2.3	2561	9.8	9.8
2561	23.3	38.9	2560	3.8	3.7	2561	11	11.8
2561	26.2	60.87	2560	5.2	4	2561	12.8	14.7
2561	27.6	67.28	2560	6.4	5.8	2561	14.3	14.7
2562	0.5	16.02	2560	8.1	6.1	2561	15.8	19.6
2562	2.05	15.56	2560	9.6	7.4	2561	17.6	20.6
2562	3.7	19.68	2560	11	6.4	2561	18.8	20.6
2562	5.2	24.71	2560	12.45	7.3	2561	20.3	26.5
2562	6.4	21.51	2560	14	9.8	2561	21.8	22.6
2562	8.2	27.92	2560	15.6	10.3	2561	23.2	27.5
2562	9.7	19.04	2560	17	11.6	2561	24.8	23.5
2562	11	25.17	2560	18.65	11.6	2561	26.3	45.1
2562	12.6	31.58	2560	20.05	11.5	2561	27.7	49
2562	14.2	45.31	2560	21.7	61.3	2562	0.4	0
2562	15.6	51.72	2560	21.7	13.8	2562	2.1	4.9
2562	17.2	46.22	2560	24.6	11	2562	3.53	4.9

Table 5. Shear strength results. — Continued

[mbsf, meters below sea floor; Svs, vane shear strength; kPa, kilopascal; Spp, pocket penetrometer strength; Stv, Torvane strength]

Core	Sub-bottom depth (mbsf)	Svs (kPa)	Core	Sub-bottom depth (mbsf)	Spp (kPa)	Core	Sub-bottom depth (mbsf)	Stv (kPa)
2562	18.6	41.65	2560	26.05	44.1	2562	5.17	9.8
2562	20.35	51.72	2560	26.05	14.5	2562	5.33	8.8
2562	21.7	48.97	2560	27.55	53.9	2562	8.1	12.3
2562	23.2	59.5	2560	27.55	14.4	2562	9.8	10.8
2562	24.6	58.58	2561	0.6	2.5	2562	11.1	12.7
2562	25.8	60.87	2561	1.9	3.8	2562	12.7	17.2
2566	0.6	10.95	2561	3.7	3.1	2562	14.3	19.6
2566	2	6.72	2561	5.15	3.1	2562	15.7	19.6
2566	3.7	16.48	2561	6.4	4	2562	17.1	22.6
2566	5.2	13.27	2561	8.3	4.9	2562	18.7	25.5
2566	6.25	16.93	2561	9.8	4.9	2562	20.4	27
2566	8.2	17.39	2561	11	6.1	2562	21.8	27.5
2566	9.7	28.22	2561	12.8	7.8	2562	23.3	29.4
2566	11	26.24	2561	14.3	9.5	2562	24.7	27
2566	12.55	24.26	2561	15.8	11.5	2562	25.9	31.9
2566	14.2	27	2561	17.6	10	2566	0.7	0
2566	15.7	38.9	2561	18.8	11.3	2566	2.1	2.5
2566	17.2	40.27	2561	20.3	13	2566	3.8	2.9
2566	18.5	44.39	2561	21.8	12.3	2566	5.3	5.9
2566	20.1	45.77	2561	23.2	13	2566	6.35	6.9
2566	21.7	50.8	2561	24.8	15	2566	8.3	9.8
2566	23.2	53.55	2561	26.3	3.7	2566	9.8	9.8
2566	24.8	59.04	2561	27.7	3.1	2566	11.1	14.7
2566	25.8	57.67	2562	0.4	2.4	2566	12.65	14.7
2567	0.6	11.9	2562	2.1	26.6	2566	14.3	16.7
2567	2.05	9.61	2562	3.57	3.4	2566	15.8	17.2
2567	3.6	10.98	2562	5.17	4.3	2566	17.3	17.7
2567	5.2	16.02	2562	5.35	4.3	2566	18.6	19.6
2567	6.4	16.02	2562	8.1	6.7	2566	20.1	21.6
2567	8.2	24.26	2562	9.8	5.2	2566	21.8	25.5
2567	9.7	22.88	2562	11.1	6.9	2566	23.3	25.5
2567	11	27.46	2562	12.7	7	2566	24.9	27.5
2567	12.5	28.38	2562	14.3	10.7	2566	25.9	24.5
2567	14.2	30.21	2562	15.7	10.7	2567	0.75	2
2567	15.7	33.87	2562	17.1	12.7	2567	1.8	2.5
2567	17.2	33.41	2562	18.7	19.6	2567	3.55	2.5
2567	18.5	52.17	2562	20.4	24.5	2567	4.95	2.9
2567	20.2	56.75	2562	21.8	24.5	2567	8.1	8.8
2567	21.7	57.21	2562	23.3	29.4	2567	9.75	9.8

Table 5. Shear strength results. — Continued

[mbsf, meters below sea floor; Svs, vane shear strength; kPa, kilopascal; Spp, pocket penetrometer strength; Stv, Torvane strength]

Core	Sub-bottom depth (mbsf)	Svs (kPa)
2567	23.2	55.38
2567	24.55	49.43
2567	26.05	55.84
2570	0.5	10.98
2570	2.05	10.53
2570	3.7	12.35
2570	5.1	17.1
2570	6.5	14.65
2570	8.1	17.44
2570	10.2	19.22
2570	12.9	16.04
2570	14.3	26.09
2570	15.7	37.99
2570	17.4	28.1
2570	18.6	26.09
2570	20.3	27.46
2570	21.5	29.75
2570	23	30.66
2570	24.7	26.02
2570	26.1	31.12
2570	27.7	37.54

Core	Sub-bottom depth (mbsf)	Spp (kPa)
2562	24.7	29.4
2562	25.9	29.4
2563	0.65	2.5
2563	1.3	2.8
2563	2.27	5.5
2563	2.82	4.6
2563	3.58	4.9
2566	0.7	0
2566	2.1	1.5
2566	3.8	2.1
2566	5.3	2.5
2566	6.35	3.7
2566	8.3	4.9
2566	9.8	6.1
2566	11.1	6.6
2566	12.65	6.9
2566	14.3	8.4
2566	15.8	9.2
2566	17.3	10.1
2566	18.6	12.3
2566	20.1	12.3
2566	21.8	19.6
2566	23.3	19.6
2566	24.9	27
2566	25.9	24.5
2567	0.75	0
2567	1.8	0.6
2567	3.55	1.5
2567	5.1	2.8
2567	6.45	2.8
2567	8.1	5
2567	9.75	5.8
2567	10.7	6.4
2567	12.4	6.9
2567	14.25	8.9
2567	15.6	8
2567	17.3	9.5
2567	18.5	12.6
2567	20.3	14.1

Core	Sub-bottom depth (mbsf)	Stv (kPa)
2567	10.85	9.8
2567	12.37	10.8
2567	14.25	15.7
2567	15.55	15.7
2567	17.3	22.1
2567	18.5	19.6
2567	20.3	21.6
2567	21.8	23.5
2567	23.3	24.5
2567	24.4	29.4
2567	25.9	27.5
2570	0.6	0
2570	1.95	4.9
2570	3.8	4.9
2570	5.2	7.8
2570	6.6	6.9
2570	8.2	8.8
2570	10.1	9.3
2570	11.2	9.8
2570	13	9.3
2570	14.4	14.2
2570	15.9	16.7
2570	17.58	17.7
2570	18.62	15.7
2570	20.33	13.7
2570	21.4	13.7
2570	23.1	14.7
2570	24.8	14.7
2570	26.2	17.2
2570	27.8	19.6
2573	0.3	1
2573	1.37	5.9
2573	2.45	5.9
2573	3.25	10.8

Table 5. Shear strength results. — Continued

[mbsf, meters below sea floor; Svs, vane shear strength; kPa, kilopascal; Spp, pocket penetrometer strength; Stv, Torvane strength]

Core	Sub-bottom depth (mbsf)	Svs (kPa)	Core	Sub-bottom depth (mbsf)	Spp (kPa)	Core	Sub-bottom depth (mbsf)	Stv (kPa)
			2567	21.8	13.8			
			2567	23.3	13.8			
			2567	24.4	13.2			
			2567	25.9	34.3			
			2570	0.6	0			
			2570	1.95	1.5			
			2570	3.8	2.9			
			2570	5.2	4.4			
			2570	6.6	3.8			
			2570	8.2	3.7			
			2570	10.1	5.4			
			2570	11.2	4.9			
			2570	13	4.4			
			2570	14.4	5.4			
			2570	15.9	6.9			
			2570	17.58	8			
			2570	18.62	6.7			
			2570	20.33	6.4			
			2570	21.4	8.4			
			2570	23.1	8.4			
			2570	24.8	8.4			
			2570	26.2	8.4			
			2570	27.8	9.2			
			2573	0.3	2.1			
			2573	1.37	4.2			
			2573	2.45	8.9			
			2573	3.25	5.8			

Table 6. Electrical resistivity and formation factor results.

[mbsf, meters below sea floor; cm, centimeters]

Core	Section	Sub-bottom depth (mbsf)	Resistivity (ohm-m)	Formation factor	Comments
2535	1	0.9	0.399	1.908	soupy sediments
2535	2	2.2	0.399	1.907	
2535	3	3.7	0.704	3.367	
2535	4	5.2	0.306	1.463	
2535	5	6.8	0.567	2.711	
2535	6	8.3	0.573	2.741	
2535	7	9.8	0.57	2.729	
2535	8	11.2	0.718	3.437	
2535	9	12.7	0.595	2.849	
2535	10	14.2	0.573	2.74	
2535	11	15.7	0.664	3.175	vane shear measurement taken @ 1575
2535	12	17.2	0.654	3.13	
2535	16	23.2	0.616	2.946	
2535	17	24.8	0.611	2.923	
2535	18	25.8	0.602	2.88	
2535	19	27.6	0.818	3.915	
2535	20	29.2	0.621	2.973	
2535	23	33.6	0.676	3.236	
2535	26	37.6	?		
2536	1	0.6	0.375	1.795	soupy
2536	2	2.2	0.398	1.904	
2536	3	3.6	0.441	2.117	
2536	3	3.7	0.44	2.103	
2536	4	5.1	0.471	2.255	
2536	4	5.2	0.481	2.302	
2536	5	6.8	0.52	2.488	
2536	6	7.75	0.517	2.475	light brown
2536	6	8.2	0.548	2.622	dark brown
2537	1	0.85	0.44	2.105	
2537	2	2.3	0.372	1.779	vane shear at 235 cm, soupy
2537	3	3.75	0.603	2.887	
2537	4	5.25	0.459	2.198	fairly soupy for this depth
2537	5	6.75	0.52	2.488	
2537	6	8.2	0.48	2.298	fairly soupy for this depth
2537	7	9.8	0.516	2.469	
2537	8	11.2	0.525	2.512	
2537	9	12.75	0.79	3.781	

Table 6. Electrical resistivity and formation factor results. — Continued

[mbsf, meters below sea floor; cm, centimeters]

Core	Section	Sub-bottom depth (mbsf)	Resistivity (ohm-m)	Formation factor	Comments
2537	12	17.1	0.544	2.602	
2537	13	18.7	0.715	3.421	gas crack 10 cm away on each side
2537	14	20.1	0.527	2.519	gas crack 10 cm away from thermal conductivity
2537	15	21.5	0.626	2.998	gas crack @ 2166 close to thermal conductivity measurement
2537	16	23.2	0.571	2.73	
2537	17	24.6	0.529	2.532	
2537	18	26.2	0.591	2.829	
2537	19	27.3	0.54	2.586	
2537	20	28.9	0.572	2.735	
2537	21	30.2	0.591	2.827	small gas cracks
2537	22	31.6	0.573	2.741	too large for spring
2537	23	33.1	0.528	2.525	
2538	2	2.2	0.417	1.997	
2538	3	3.7	0.483	2.309	
2538	4	5.2	0.502	2.402	TO DATE: no significant sediment drying observed (IN) (July 08, 04:30)
2538	5	6.7	0.55	2.63	
2539	1	0.65	0.413	1.976	
2539	1	0.7	0.436	2.087	
2539	2	2.2	0.406	1.942	
2539	3	3.7	0.424	2.029	
2539	4	5.2	0.479	2.29	vane shear @ 525 cm
2539	5	6.55	0.501	2.397	
2539	5	6.85	0.487	2.193	
2539	6	8.1	0.567	2.715	
2539	7	9.65	0.53	2.535	vane shear @ 973 cm
2539	7	9.7	0.668	3.198	
2539	8	11.23	0.839	4.013	
2539	9	12.7	0.69	3.299	
2539	10	14.2	0.604	2.889	
2539	11	15.7	0.598	2.863	
2539	12	17.2	0.674	3.223	
2539	13	18.7	0.608	2.91	
2539	14	20	0.596	2.852	
2539	15	21.7	0.736	3.521	
2539	16	23.2	0.653	3.122	
2539	17	25.2	0.66	3.158	
2539	18	26.2	0.616	2.946	

Table 6. Electrical resistivity and formation factor results. — Continued

[mbsf, meters below sea floor; cm, centimeters]

Core	Section	Sub-bottom depth (mbsf)	Resistivity (ohm-m)	Formation factor	Comments
2539	19	27.7	0.636	3.044	
2539	21	30.5	0.65	3.111	
2541	1	0.6	0.42	2.01	
2541	2	2.2	0.361	1.73	
2541	3	3.7	0.472	2.258	
2541	4	5.2	0.489	2.34	
2541	5	6.7	0.518	2.48	
2541	6	8.2	0.568	2.719	
2541	7	9.7	0.637	3.046	
2541	8	11.2	0.652	3.118	
2541	9	12.7	0.571	2.731	
2541	10	14.2	0.574	2.747	
2541	11	15.7	0.601	2.873	
2541	12	17.2	0.586	2.806	
2541	13	18.7	0.604	2.889	
2541	14	20.2	0.72	3.444	
2541	15	21.7	0.664	3.177	
2541	16	23.15	0.653	3.122	
2541	17	24.7	0.599	2.868	
2541	18	26.2	0.72	3.445	
2541	19	27.7	0.602	2.881	
2541	20	29.2	0.721	3.448	
2541	21	30.7	0.609	2.915	
2541	23	33.7	0.624	2.988	
2541	24	34.9	0.621	2.97	
2542	1	0.8	0.522	2.49	
2542	2	2.2	0.618	2.959	
2542	1	0.7	0.457	2.185	
2542	3	3.7	0.511	2.447	
2542	4	5.2	0.528	2.256	repeated resistivity
2542	4	5.2	0.554	2.65	
2542	5	6.8	0.573	2.74	
2545	1	0.4	0.421	2.013	
2545	2	1.5	0.337	1.612	
2545	2	2.43	0.32	1.53	
2545	2	2.53	0.301	1.44	

Table 6. Electrical resistivity and formation factor results. — Continued

[mbsf, meters below sea floor; cm, centimeters]

Core	Section	Sub-bottom depth (mbsf)	Resistivity (ohm-m)	Formation factor	Comments
2545	4	3.35	0.405	1.938	
2545	5	4.35	0.29	1.388	gas cracks - not sure if resistivity is meaningful
2545	6	5.3	0.255	1.218	
2545	6	5.35	0.268	1.283	strong smell of H2S; lots of large gas cracks throughout the core
2545	7	6.45	0.28	1.341	small air pockets
2545	8	7.4	0.31	1.482	
2545	9	8.5	0.339	1.623	
2545	10	9.15	0.366	1.753	
2546	1	0.9	0.405	1.938	
2546	2	2.2	0.428	2.047	
2546	3	3.7	0.401	1.918	
2546	4	5.2	0.424	2.03	
2546	5	6.7	0.509	2.437	
2546	6	7.8	0.49	2.343	
2546	7	9.7	0.541	2.588	
2546	8	11.1	0.497	2.374	
2546	9	12.8	0.467	2.235	gas cracks on each side
2546	10	15.1	0.486	2.325	
2546	11	15.7	0.483	2.31	
2546	12	17.2	0.489	2.34	
2546	13	18.65	0.449	2.147	gas crack next to thermal conductivity measurement, many small gas cracks
2546	14	20.4	0.538	2.574	
2546	15	21.7	0.471	2.253	gas cracks on each side
2546	16	23.2	0.481	2.302	
2546	17	24.7	0.459	2.196	
2546	18	26.2	0.549	2.629	
2546	19	27.7	0.543	2.6	
2546	20	29.2	0.452	2.164	
2546	21	30.6	0.482	2.305	
2547	1	0.75	0.427	2.043	
2547	2	2.2	0.44	2.105	
2547	3	3.7	0.486	2.324	
2547	4	5.1	0.528	2.526	
2554	1	0.7	0.393	1.88	
2554	2	2.2	0.41	1.962	
2554	3	3.7	0.425	2.033	

Table 6. Electrical resistivity and formation factor results. — Continued

[mbsf, meters below sea floor; cm, centimeters]

Core	Section	Sub-bottom depth (mbsf)	Resistivity (ohm-m)	Formation factor	Comments
2554	4	5.2	0.443	2.122	
2554	5	6.8	0.501	2.395	
2554	6	8.2	0.546	2.615	
2554	7	9.75	0.611	2.924	
2554	8	11.2	0.644	3.083	
2554	9	12.6	0.761	3.64	
2554	10	14	0.774	3.704	
2554	11	15.6	0.877	4.198	
2554	12	17.3	0.844	4.04	
2554	13	19.1	0.867	4.148	large gas crack @ ~1720
2554	14	20	0.799	3.823	
2554	15	21.45	0.739	3.534	
2554	16	23	0.74	3.539	
2554	17	24.6	0.806	3.856	banding pull downs 2340–2432 cm?
2554	18	26.05	0.857	4.099	
2554	19	27.4	0.891	4.264	
2554	20	29	0.858	4.107	
2554	21	30.35	0.797	3.814	
2555	1	1.1	0.427	2.041	
2555	2	2	0.462	2.208	
2555	3	3.5	0.449	2.149	
2555	4	5.2	0.5	2.391	
2555	5	6.7	0.552	2.64	
2555	6	8.2	0.565	2.702	
2555	7	9.7	0.649	3.104	
2555	8	11.2	0.624	2.983	
2555	9	12.65	0.667	3.19	
2555	10	14.2	0.704	3.367	
2555	11	15.8	0.944	4.519	
2555	12	17.2	0.765	3.661	
2555	13	18.7	0.906	4.336	
2555	14	20.2	0.846	4.047	
2555	15	21.6	0.935	4.476	
2555	16	23.2	0.891	4.265	
2555	17	24.9	0.878	4.201	
2555	18	26.2	0.876	4.189	
2555	19	27.6	1.062	5.081	
2555	20	29.2	0.954	4.566	

Table 6. Electrical resistivity and formation factor results. — Continued

[mbsf, meters below sea floor; cm, centimeters]

Core	Section	Sub-bottom depth (mbsf)	Resistivity (ohm-m)	Formation factor	Comments
2555	21	30.7	0.904	4.324	
2555	22	32.2	0.726	3.476	
2555	23	33.85	0.758	3.628	
2555	24	35.1	0.811	3.879	
2556	1	0.7	0.375	1.792	
2556	2	2.2	0.461	2.207	
2556	3	3.7	0.429	2.054	
2556	4	5.2	0.456	2.18	
2556	5	6.7	0.482	2.307	
2556	6	8.1	0.534	2.556	
2556	7	9.7	0.573	2.743	
2556	8	11.6	0.571	2.733	
2556	9	12.7	0.574	2.746	
2556	10	14.2	0.624	2.184	
2556	11	15.4	0.636	3.045	
2556	12	17.15	0.731	3.496	
2556	13	18.7	0.661	3.164	
2556	14	20.2	0.672	3.213	
2556	15	21.7	0.646	3.089	
2556	16	23.3	0.68	3.252	
2556	17	24.8	0.689	3.297	
2556	18	26.2	0.717	3.432	
2556	19	27.7	0.759	3.629	
2556	20	29.2	0.7	3.349	
2556	21	30.7	0.67	3.204	
2556	22	32.1	0.766	3.665	
2556	23	33.75	0.778	3.725	
2559	1	0.2	0.353	1.69	
2559	2	2.1	0.445	2.129	
2559	3	3.7	0.431	2.06	
2559	4	5.1	0.475	2.274	
2559	5	6.6	0.499	2.39	
2559	6	8.1	0.489	2.338	
2559	7	9.6	0.573	2.742	
2559	8	11.2	0.631	3.018	
2559	9	12.6	0.672	3.214	
2559	10	14.1	0.654	3.13	

Table 6. Electrical resistivity and formation factor results. — Continued

[mbsf, meters below sea floor; cm, centimeters]

Core	Section	Sub-bottom depth (mbsf)	Resistivity (ohm-m)	Formation factor	Comments
2559	11	15.7	0.546	2.612	
2559	12	17.2	0.607	2.903	
2559	13	18.6	0.574	2.746	
2559	14	20.1	0.616	2.948	
2559	15	21.7	0.632	3.022	
2559	16	23.2	0.716	3.425	
2559	17	24.7	0.619	2.963	
2559	18	26.2	0.667	3.193	
2559	19	27.6	0.667	3.191	
2559	20	29.1	0.682	3.264	
2559	21	30.7	0.647	3.093	
2559	22	32.1	0.662	3.167	
2559	23	33.2	0.664	3.178	
2560	1	0.6	0.42	2.008	
2560	2	2.2	0.439	2.103	
2560	3	3.7	0.409	1.957	
2560	4	5.1	0.498	2.383	
2560	5	6.55	0.477	2.282	
2560	6	8.2	0.538	2.576	
2560	7	9.7	0.55	2.629	
2560	8	11.15	0.588	2.815	
2560	11	15.7	0.662	3.165	
2560	10	14.2	0.639	3.059	
2560	9	12.6	0.61	2.92	
2560	12	17.25	0.652	3.118	
2560	13	18.7	0.629	3.008	
2560	14	20.1	0.666	3.186	
2560	15	21.8	0.65	3.109	
2560	17	24.7	0.659	3.154	
2560	18	26.1	0.633	3.027	
2560	19	27.6	0.64	3.062	
2561	1	0.7	0.395	1.892	
2561	2	2	0.458	2.168	
2561	3	3.7	0.42	2.008	
2561	4	5.25	0.494	2.364	
2561	5	6.6	0.464	2.219	
2561	6	8.2	0.524	2.505	

Table 6. Electrical resistivity and formation factor results. — Continued

[mbsf, meters below sea floor; cm, centimeters]

Core	Section	Sub-bottom depth (mbsf)	Resistivity (ohm-m)	Formation factor	Comments
2561	7	9.7	0.553	2.646	
2561	8	10.9	0.613	2.933	
2561	9	12.7	0.65	3.108	
2561	10	14.1	0.66	3.159	
2561	11	15.7	0.664	3.177	
2561	12	17.5	0.628	3.006	
2561	13	18.7	0.733	3.507	
2561	14	20.2	0.705	3.374	
2561	15	21.7	0.693	3.316	
2561	16	24.6	0.69	3.3	
2561	17	23.3	0.691	3.307	
2561	18	26.2	0.748	3.581	
2561	19	27.6	0.753	3.603	
2562	1	0.5	0.508	2.43	
2562	2	2.05	0.481	2.303	
2562	3	3.7	0.628	3.006	
2562	4	5.2	0.569	2.721	
2562	5	6.4	0.637	3.049	
2562	6	8.2	0.629	3.011	
2562	7	9.7	0.798	3.817	
2562	8	11	0.708	3.387	
2562	9	12.6	0.727	3.478	
2562	10	14.2	0.656	3.14	
2562	11	15.6	0.583	2.97	
2562	12	17.2	0.676	3.233	
2562	13	18.6	0.648	3.1	
2562	14	20.35	0.719	3.442	
2562	15	21.7	0.675	3.228	
2562	16	23.2	0.714	3.415	
2562	17	24.6	0.715	3.419	
2562	18	25.8	0.692	3.311	
2566	1	0.6	0.362	1.734	
2566	2	2	0.417	2.045	
2566	3	3.7	0.396	1.894	
2566	4	5.2	0.425	2.033	
2566	5	6.25	0.498	2.384	
2566	6	8.2	0.58	2.776	

Table 6. Electrical resistivity and formation factor results. — Continued

[mbsf, meters below sea floor; cm, centimeters]

Core	Section	Sub-bottom depth (mbsf)	Resistivity (ohm-m)	Formation factor	Comments
2566	7	9.7	0.466	2.223	
2566	8	11	0.598	2.859	
2566	9	12.55	0.591	2.78	
2566	10	14.2	0.602	2.879	
2566	11	15.7	0.623	2.981	
2566	12	17.2	0.675	3.23	
2566	13	18.5	0.647	3.096	
2566	14	20.1	0.716	3.472	
2566	15	21.7	0.69	3.301	
2566	16	23.2	0.7	3.35	
2566	17	24.8	0.708	3.387	
2566	18	25.8	0.739	3.534	
2567	1	0.6	0.339	1.621	
2567	2	2.05	0.392	1.875	
2567	3	3.6	0.38	1.81	
2567	4	5.2	0.465	2.224	
2567	5	6.4	0.537	2.569	
2567	6	8.2	0.509	2.436	
2567	7	9.7	0.55	2.632	
2567	8	11	0.524	2.506	
2567	9	12.5	0.602	2.882	
2567	10	14.2	0.604	2.891	
2567	11	15.7	0.621	2.97	
2567	12	17.2	0.674	3.224	
2567	13	18.5	0.734	3.511	
2567	14	20.2	0.703	3.365	
2567	15	21.7	0.619	2.961	
2567	16	23.2	0.725	3.469	
2567	17	24.55	0.678	3.246	
2567	18	26.05	0.666	3.187	
2570	1	0.5	0.386	1.845	
2570	2	2.05	0.444	2.123	
2570	3	3.7	0.475	2.274	highly gas cracked sediment throughout the core
2570	4	5.1	0.503	2.405	
2570	5	6.5	0.512	2.452	
2570	6	8.1	0.567	2.712	
2570	7	10.2	0.522	2.499	

Table 6. Electrical resistivity and formation factor results. — Continued

[mbsf, meters below sea floor; cm, centimeters]

Core	Section	Sub-bottom depth (mbsf)	Resistivity (ohm-m)	Formation factor	Comments
2570	8	11	0.588	2.184	
2570	9	12.9	0.56	2.679	
2570	10	14.3	0.679	3.251	
2570	11	15.7	0.632	3.022	
2570	12	17.4	0.598	2.862	
2570	13	18.6	0.617	2.951	
2570	14	20.3	0.626	2.996	
2570	15	21.5	0.733	3.509	
2570	16	23	0.691	3.304	
2570	17	24.7	0.699	3.346	
2570	18	26.1	0.704	3.368	
2570	19	27.7	0.68	3.256	
2574	1	1	0.41	1.962	French core - no vane shear measurements
2574	2	2.1	0.437	2.093	
2574	3	4	0.487	2.332	
2574	5	6.7	0.509	2.435	
2574	6	8.3	0.556	2.659	
2574	7	9.8	0.607	2.904	
2574	8	11.2	0.587	2.81	
2574	8	11.2	0.547	2.619	
2574	9	12.8	0.617	2.953	
2574	10	14.3	0.674	3.227	
2574	11	15.8	0.672	3.214	
2574	12	17.4	0.665	3.18	
2574	13	20.2	0.665	3.181	
2574	15	21.8	0.945	4.523	
2574	16	23.4	0.824	3.941	
2574	17	24.8	1.02	4.879	
2574	18	26.2	0.788	3.773	
2574	19	27.8	0.99	4.736	
2574	20	29.2	1.012	4.843	
2574	21	30.8	1.043	4.987	
2574	22	31.9	1.069	5.115	

Table 7. Grain size results.

[m, meters; %, percent]

Core	Section	Sub-bottom depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Gravel notes	SHEPARD CLASS	Comments
2535	1	0.67	0	6.54	12.51	80.95		CLAY	
2535	4	5.18	0	0.56	18.44	81		CLAY	
2535	7	9.78	0	0.1	31.98	67.92		SILTY CLAY	
2535	11	15.72	0	0.75	12.55	86.7		CLAY	
2535	14	20.19	0	0.92	11.32	87.76		CLAY	
2535	17	24.76	1.03	0.53	19.78	78.66	wood fragments	CLAY	
2535	20	29.19	0	1.25	15.55	83.2		CLAY	
2535	23	33.6	0	0.57	8.86	90.57		CLAY	
2536	1	0.64	0	0.95	14.67	84.39		CLAY	
2536	6	8.18	0	0.82	12.03	87.15		CLAY	
2537	1	0.83	0	1.25	16.7	82.05		CLAY	
2537	4	5.2	0	0.5	15.89	83.6		CLAY	full pipette analysis performed
2537	9	12.67	0	0.11	23.87	76.02		CLAY	
2537	11	15.79	0	0.15	33.09	66.76		SILTY CLAY	
2537	14	20.07	0	0.76	11.38	87.86		CLAY	
2537	17	24.58	0	1.06	15.78	83.16		CLAY	
2537	20	28.87	0	0.69	22.23	77.08		CLAY	
2537	23	33.08	0	2.34	17.99	79.67		CLAY	
2538	1	0.65	0	2.4	14.63	82.97		CLAY	
2538	5	6.67	0	0.13	28.42	71.45		SILTY CLAY	
2539	1	0.67	0	3.43	20.95	75.61		CLAY	
2539	4	5.17	0	0.56	24.28	75.16		CLAY	
2539	7	9.71	0	0.09	31.49	68.42		SILTY CLAY	
2539	11	15.68	0	0.09	29.43	70.48		SILTY CLAY	
2539	14	19.97	0	0.18	24.91	74.91		SILTY CLAY	
2540	1	0.59	0	4.21	18.7	77.09		CLAY	
2540	4	5.11	0	0.24	23.69	76.06		CLAY	
2541	1	0.55	0	6.49	11.67	81.84		CLAY	
2541	4	5.17	0	0.21	18.79	80.99		CLAY	
2541	7	9.67	0	0.24	23.98	75.78		CLAY	
2541	11	15.66	4	1.18	12.01	82.8	nodules	CLAY	

Table 7. Grain size results. — Continued

[m, meters; %, percent]

Core	Section	Sub-bottom depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Gravel notes	SHEPARD CLASS	Comments
2541	14	20.18	0	0.38	20.96	78.66		CLAY	
2541	20	29.14	0	0.13	15.91	83.95		CLAY	
2541	24	34.88	0	0.66	24.03	75.31		CLAY	
2542	5	6.77	0	0.69	12.7	86.62		CLAY	
2545	1	0.37	0	2.5	15.44	82.07		CLAY	
2545	6	5.27	0	0.17	24.35	75.48		CLAY	
2545	10	9.16	0	0.11	40.02	59.87		SILTY CLAY	
2546	1	0.53	0	1.05	13.15	85.8		CLAY	
2546	7	9.58	0	0.25	27.63	72.13		SILTY CLAY	
2546	11	15.67	0	0.78	14.97	84.24		CLAY	
2546	14	20.28	0	0.57	21.34	78.09		CLAY	
2546	17	24.71	0	0.35	16.9	82.74		CLAY	
2546	21	30.57	0.17	1.61	17.19	81.03	shell fragments	CLAY	
2547	1	0.72	0	1.1	9.43	89.47		CLAY	
2547	4	4.98	0	0.19	27.82	71.99		SILTY CLAY	
2550	1	4.01	0	1.42	20.08	78.5		CLAY	
2550	2	5.01	0	0.74	20.28	78.99		CLAY	
2550	3	6.01	0	0.34	15.47	84.19		CLAY	
2550	4	6.91	0	0.12	19.33	80.56		CLAY	
2550	5	8.01	0	0.1	19.31	80.58		CLAY	
2550	6	8.91	0	0.04	26.53	73.42		SILTY CLAY	
2553	1	1.01	0	0.85	19.01	80.14		CLAY	
2553	2	1.71	0	1.07	18.51	80.43		CLAY	
2553	3	2.01	0	0.72	21.58	77.7		CLAY	
2553	4	3.11	0	1.64	20.43	77.92		CLAY	
2553	5	4.01	0	5.58	20.19	74.23		SILTY CLAY	
2553	6	5.01	0	0.01	11.1	88.89		CLAY	full pipette analysis performed
2553	7	6.11	0	0.19	10.89	88.92		CLAY	
2553	8	7.01	0	0.03	9.41	90.56		CLAY	
2553	9	8.01	0	0.03	10.84	89.13		CLAY	
2553	10	9.01	0	0.03	6.63	93.34		CLAY	

Table 7. Grain size results. — Continued

[m, meters; %, percent]

Core	Section	Sub-bottom depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Gravel notes	SHEPARD CLASS	Comments
2553	11	10.01	0	0.03	18.71	81.26		CLAY	
2554	1	0.74	0	1.38	24.04	74.58		SILTY CLAY	
2554	4	5.18	0	0.16	5.17	94.67		CLAY	full pipette analysis performed
2554	14	5.18	0	0.09	37.19	62.72		SILTY CLAY	
2554	7	9.78	0	0.26	27.74	72		SILTY CLAY	
2554	11	15.58	0	0.08	24.84	75.07		CLAY	
2554	17	24.29	0	0.15	36.01	63.84		SILTY CLAY	
2554	21	30.32	0	0.07	33.28	66.65		SILTY CLAY	
2555	1	1.08	0	1.07	12.65	86.28		CLAY	
2555	4	5.17	0	0.48	6.78	92.74		CLAY	
2555	7	9.67	0	0.59	24.53	74.88		SILTY CLAY	
2555	11	15.75	0	0.08	25.64	74.28		SILTY CLAY	
2555	14	20.21	0	0.07	37.52	62.41		SILTY CLAY	
2555	18	26.17	0	0.08	27.16	72.76		SILTY CLAY	
2555	21	30.67	0	0.1	30.01	69.89		SILTY CLAY	
2555	22	32.15	0	0.06	35.4	64.54		SILTY CLAY	
2555	24	35.05	0	0.11	22.1	77.79		CLAY	
2556	1	0.67	0	0.77	17.42	81.81		CLAY	
2556	4	5.17	0	0.21	12.35	87.43		CLAY	
2556	7	9.68	0	0.14	29.68	70.18		SILTY CLAY	
2556	11	15.38	0	0.05	37.73	62.22		SILTY CLAY	
2556	14	20.18	0	0.09	26.21	73.7		SILTY CLAY	
2556	16	23.27	0	0.08	33	66.92		SILTY CLAY	
2556	17	24.78	0	0.09	27.93	71.98		SILTY CLAY	
2556	21	30.67	0	0.24	19.7	80.06		CLAY	
2556	23	33.78	0	0.05	33.15	66.8		SILTY CLAY	
2557	1	0.6	0	0.52	13.59	85.89		CLAY	
2559	1	0.21	0	0.25	14.36	85.39		CLAY	
2559	4	5.11	0	0.08	22.49	77.43		CLAY	
2559	7	9.54	0	0.18	23.13	76.7		CLAY	
2559	11	15.68	0	0.06	23.43	76.51		CLAY	
2559	14	20.08	0	0.15	23.95	75.89		CLAY	
2559	17	24.67	0	0.04	36.57	63.39		SILTY CLAY	

Table 7. Grain size results. — Continued

[m, meters; %, percent]

Core	Section	Sub-bottom depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Gravel notes	SHEPARD CLASS	Comments
2559	21	30.65	0	0.07	29.18	70.75		SILTY CLAY	
2559	23	33.15	0	0.08	18.9	81.01		CLAY	
2560	1	0.57	0	0.61	11.63	87.75		CLAY	
2560	11	15.67	0	0.07	28.87	71.06		SILTY CLAY	
2560	14	20.09	0	0.04	34.77	65.19		SILTY CLAY	
2560	17	24.72	0	0.03	37.31	62.66		SILTY CLAY	
2561	1	0.61	0	1.42	12.8	85.79		CLAY	
2561	4	5.23	0	0.05	24.88	75.08		CLAY	
2561	7	9.68	0	0.19	17.53	82.28		CLAY	
2561	11	15.66	0	0.04	35.52	64.43		SILTY CLAY	
2561	14	20.15	0	0.05	32.03	67.91		SILTY CLAY	
2561	19	27.57	0	0.03	27.58	72.38		SILTY CLAY	
2562	1	0.48	0	0.04	13.33	86.63		CLAY	
2562	4	5.18	0	0.03	19.09	80.87		CLAY	
2562	8	10.97	0	0.04	26.39	73.56		SILTY CLAY	
2562	11	15.58	0	0.06	21.48	78.46		CLAY	
2562	14	20.31	0	0.04	24.77	75.19		CLAY	
2562	18	25.77	0	0.05	23.97	75.97		CLAY	
2564	1	0.99	0	3.46	15.59	80.95		CLAY	
2564	5	6.69	0	0.04	24.79	75.16		CLAY	
2565	1	0.025	0	0.09	21.31	78.6		CLAY	
2565	2	1.51	0	0.43	26.58	73		SILTY CLAY	
2565	3	3.01	0	1.16	21.98	76.86		CLAY	
2565	4	4.51	0	0.06	34.4	65.53		SILTY CLAY	
2565	5	6.315	0.06	0.35	19.54	79.98		CLAY	full pipette analysis performed
2565	6	7.515	0	1.95	28.65	69.4		SILTY CLAY	
2565	7	9.015	0	1.07	23	75.93		CLAY	
2565	8	10.515	0	0.3	20.94	78.76		CLAY	
2565	9	12.015	0	0.24	25.86	73.9		SILTY CLAY	
2565	10	13.515	0	0.31	25.97	73.72		SILTY CLAY	
2565	11	15.015	0	2.1	23.5	74.4		SILTY CLAY	
2565	12	16.515	0	0.3	30.43	69.27		SILTY CLAY	
2565	13	18.015	0	0.12	24.94	74.94		SILTY CLAY	

Table 7. Grain size results. — Continued

[m, meters; %, percent]

Core	Section	Sub-bottom depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Gravel notes	SHEPARD CLASS	Comments
2565	14	19.515	0	0.13	25.42	74.45		SILTY CLAY	
2565	15	21.015	0	0.27	25.7	74.03		SILTY CLAY	
2565	16	22.515	0	0.11	16.15	83.73		CLAY	
2566	1	0.57	0	1.02	19.99	78.99		CLAY	
2566	4	5.17	0	0.06	18.58	81.36		CLAY	
2566	7	9.68	0	0.2	18.47	81.33		CLAY	
2566	11	15.67	0	0.06	26.1	73.84		SILTY CLAY	
2566	14	20.15	0	0.04	32.28	67.68		SILTY CLAY	
2566	18	25.78	0	0.04	35.7	64.26		SILTY CLAY	
2567	1	0.53	0	2.29	11.68	86.03		CLAY	
2567	4	5.18	0	0.05	15.66	84.28		CLAY	
2567	7	9.68	0	0.04	29.38	70.58		SILTY CLAY	
2567	11	15.68	0	0.06	25.46	74.49		SILTY CLAY	
2567	14	20.18	0	0.05	34.43	65.52		SILTY CLAY	
2567	18	26.04	0	0.03	16.54	83.43		CLAY	
2568	1	0.015	0	3.15	17.6	79.25		CLAY	
2568	3	4.485	0	0.03	27.53	72.43		SILTY CLAY	
2569	1	0.015	15.18	0.97	30.05	53.81	bricks/ nodules?	GRAVELLY SEDIMENT	
2569	2	1.015	0	2.41	35.42	62.17		SILTY CLAY	
2569	6	4.215	0	1.57	24.96	73.49		SILTY CLAY	full pipette analysis performed
2569	7	5.225	0	1.63	25.86	72.5		SILTY CLAY	
2569	9	7.385	0	2.17	30.73	67.1		SILTY CLAY	
2569	10	7.54	0	2.59	32.97	64.44		SILTY CLAY	
2569	12	9.935	0.8	3.15	36.94	59.11	coral/nodule?	SILTY CLAY	
2570	1	0.57	0	0.43	24.31	75.27		CLAY	
2570	4	5.13	0	0.07	5.21	94.71		CLAY	full pipette analysis performed
2570	7	10.22	0	1.27	21.9	76.82		CLAY	
2570	11	15.69	0	0.91	16.71	82.38		CLAY	
2570	15	21.51	0	0.03	25.56	74.41		SILTY CLAY	
2570	18	26.1	0	0.15	21.47	78.38		CLAY	

Table 7. Grain size results. — Continued

[m, meters; %, percent]

Core	Sec-tion	Sub-bottom depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Gravel notes	SHEPARD CLASS	Comments
2572	1	0.015	0	0.68	20.38	78.94		CLAY	
2572	2	1.515	0	2.64	22.48	74.88		SILTY CLAY	
2572	3	1.805	0	4.27	21.76	73.97		SILTY CLAY	