Chapter 8

Pore-Water Gradients in Giant Piston Cores from the Northern Gulf of Mexico

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Abstract

Chloride, sulfate, and methane concentration data for pore waters from 483 sediment samples obtained at Tunica Mound, Bush Hill, Kane Spur, and the Mississippi Canyon areas of the Gulf of Mexico indicate that wide ranges in these geochemical species occur in methane-rich and methane-gas-hydrate-bearing sediments. Chloride concentration gradients increase with depth and proximity to salt-cored diapirs and are inversely correlated with the depth to the sulfate-methane interface. Except for six cores from the Kane Spur area, the cores crossed the SMI at depths ranging from 0.4 to 13 meters below sea floor. The sulfate gradients for cores containing a shallow SMI were linear with respect to depth, and sulfate was not found in pore waters below the SMI.

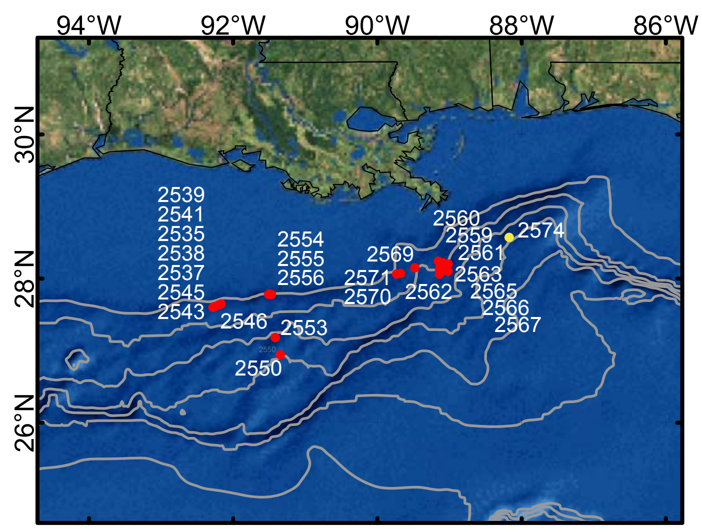

Figure 1. Map of the Gulf of Mexico showing locations of cores analyzed (red filled circles). Cores collected at Tunica Mound include 2535, 2537, 2538, 2539, 2541, 2543, 2545, and 2546; Orca Basin include 2550; Pygmy Basin 2553; Bush Hill include 2554, 2555, and 2556; Kane Spur include 2559, 2560, 2561, 2562, 2566, and 2567; MC-853 Diapir site include 2563 and 2565; West Mississippi Canyon include 2569, 2570, and 2571; and a background site 2574 (yellow filled circle). Contours start at 500 meters water depth, and the intervals are 500 meters. Refer to Appendix B of this report for large-scale station location maps.

Introduction

In July 2002, giant Calypso piston cores, gravity cores, and box cores were obtained aboard the research vessel (RV) *Marion Dufresne* from four study areas (Tunica Mound, Bush Hill, Kane Spur, and the Mississippi Canyon) and a few surrounding sites in the northern Gulf of Mexico as part of the International Marine Past Global Changes Study (IMAGES VIII)/Paleoceanography of the Atlantic and Geochemistry (PAGE 127) research programs (fig. 1). One of the primary goals of this coring effort was to characterize the pore-water geochemistry of sediments associated with gas hydrate. The target areas were chosen because they were known from previous investigations to contain gas hydrate at or near the sea floor, and high resolution seismic data previously collected by the U.S. Geological Survey (USGS) were available for these areas (Cooper and Hart, 2003).

This report summarizes the pore-water geochemical data collected shipboard during the cruise, including chloride, sulfate, and methane concentration measurements. Shore-based

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measurements of other chemical species are in progress at the time of publication of this report.

Methods

Sediment cores were sampled on deck, typically within 3 hours after recovery. Ten-cm-long whole-round sections of core were removed at regularly spaced (typically ~1.5 m) intervals down the core or at locations of special interest and taken immediately to the shipboard geochemistry laboratory. Pore waters were extracted using either Reeburgh-style (Reeburgh, 1967) or Manheim-style (Manheim, 1966) sediment squeezers. The Reeburgh-style squeezer was preferred because the pore-water extraction and collection process is essentially gas tight. The Manheim-style squeezer was used for firm sediments that could not be processed in the Reeburgh-style squeezer. Generally, sediment samples from greater than 25 meters below sea floor (mbsf) required use of the Manheim-style squeezer.

Sediment pore-water samples were collected in either 60-cubic centimeter (cc) (Reeburgh-style squeezer) or 10-cc (Manheim-style squeezer) plastic syringes. Pore-water subsamples for (1) sulfide concentration, (2) $\delta^{34}S$ measurements of sulfide, (3) $\delta^{34}S$ measurements of sulfate, (4) dissolved inorganic carbon (DIC) concentration and $\delta^{13}C$ measurements, and (5) pore water $\delta^{18}O$ and δD measurements were obtained from the 60-cc syringes prior to headspace gas extraction. The water for these subsamples was filtered through a 0.2-micrometer (μm) sterile syringe filter (Gelman Acrodisc) into a clean scintillation vial prior to sample splitting. From the above subsamples, two separate 2-milliliter (mL) aliquots were placed without chemical preservation in 5-mL glass ampoules and flame-sealed for DIC and water isotopic measurements. Three additional 2-mL aliquots were placed into clean scintillation vials. A 1-mL aliquot of saturated zinc acetate solution was added to two of the vials to precipitate sulfide for concentration and $\delta^{34}S$ measurements, and a 1-mL aliquot of saturated barium chloride solution was added to the third vial to precipitate sulfate for $\delta^{34}S$ measurements.

Headspace gases were extracted from the remaining pore water in the 60-cc syringe samples by adding an equivalent volume of ultra high-purity (UHP, 99.999%+) nitrogen gas to the pore water in the syringe and shaking for 2 minutes. The remaining pore water subsequently was filtered through a 0.2-μm sterile syringe filter (Gelman Acrodisc) and combined with the previously filtered pore samples stored in scintillation vials. These water samples were archived in flame-sealed 5-mL glass ampoules prior to the end of the coring cruise.

Methane concentrations in the headspace gas samples were measured in our shipboard chemical laboratory van using a Shimadzu mini-2 gas chromatograph equipped with a flame-ionization detector (FID). Methane was separated isothermally from other gases by using a 5-foot by 1/8-inch OD(outside diameter) stainless steel chromatographic column packed with 60/80 mesh Carbosieve G (Supelco, Bellefonte, PA). Gas samples were injected into the gas chromatograph by a small volume magnesium perchlorate drying trap in series with a 1-mL stainless steel sample loop. Retention time was approximately 1 minute. Methane samples were run in batches of approximately 50 samples. Primary methane gas standards (9.93 parts per million (ppm) and 98.6 ppm in nitrogen) were run in triplicate at the beginning, end, and nominally every 27th sample of each batch. Measurement time between each sample was approximately 1.5 minutes. High concentration methane samples were identified by their relatively low sulfate concentrations (<5 millimole (mM) sulfate) and segregated before analysis. Lab air was used to purge residual methane from the gas chromatographic sample loop between high concentration samples. The detection limit for methane using this method is 0.01 μm.

Sulfate and chloride concentrations in pore-water samples were measured shipboard using a Dionex DX-100 ion chromatograph equipped with a 4-millimeter (mm) AS-9HC column and an AS-40 autosampler. The eluent was 9-mM sodium bicarbonate and flowed at 1 milliliter per minute. Pore-water samples were diluted 1:100 by using deionized water so that sulfate and chloride could be resolved during one chromatographic run. A 1:100 bulk dilution of International Association for the Physical Sciences of the Oceans (IAPSO) standard seawater was run every sixth sample for calibration purposes. A deionized water blank and a seven-anion standard (Dionex, Sunnyvale, CA) were analyzed at the beginning and end of each nightly chromatographic run to detect contamination and peak center drift. Samples with significantly greater than seawater chloride concentrations were diluted up to 1:1,000 and run with more dilute IAPSO seawater calibration standards. Detection limits for chloride and sulfate measurements using this method are 0.05 mM.

Results and Discussion

A total of 483 sediment pore-water samples was obtained from 25 cores recovered during this cruise; 375 pore-water samples were extracted from sediment samples by using Reeburgh-style squeezers and the remaining 108 samples were extracted using Manheim-style squeezers. Sulfate, chloride, and methane concentration measurements of these pore waters are listed in table 1 (p. 11) and are summarized in figures 2 through 19 according to geographical area and chemical species.

Chloride Concentrations and Gas Hydrate Occurrence

A wide range of chloride concentrations was observed in the sediment pore-water samples. At Tunica Mound, chloride concentrations increase systematically towards the mound and with depth, and reach values as high as about 2,200 mM in core MD02-2543G at the sea floor on top of the mound (fig. 2). In contrast, chloride concentrations remain near seawater-like values (~560 mM) across the coring transect at Bush Hill and do not increase significantly with depth (fig. 5). Except for three cores (MC-853 Diapir site—MD02-2563C2 and MD02-2565, and the Mississippi Canyon—MD02-2569; figs. 8, 9, and 13; table 2), Kane Spur and West Mississippi Canyon cores also have seawater-like chloride concentration profiles that do not increase significantly with depth. The core from the Orca Basin (MD02-2550) has very high chloride concentrations (up to 4,800 mM) that decrease with depth (fig. 16). These elevated concentrations are the result of chloride diffusing downward into the sediments from a dense brine ponded on the sea floor within the closed basin. In contrast, the Pigmy Basin core (MD02-2553C2) has seawater-like chloride values (fig. 16) as does the "background" core (MD02-2574) collected for paleoceanographic purposes by the PAGE 127 shipboard scientists (figs. 16 and 17).

Table 2. Summary of maximum chloride concentrations and depth to the SMI grouped by coring site in the Gulf of Mexico.

[mM, millimole; SMI, surfate-methane interface; m, meter; G, gravity core; C2, jumbo box core; <, less than]

Core number	Maximum chloride (mM)	Depth to SMI (m)
	Tunica Mound	
2535	625	12
2537	900	6
2538G	700	5
2539	560	12
2541	600	13
2543G	2,100	0.4
2545G	1,500	2
2546	850	9
	Bush Hill	
2554	600	5
2555	575	11
2556	575	9
	Kane Spur	
2559	560	no SMI
2560	560	no SMI
2561	560	no SMI
2562	560	no SMI
2566	560	no SMI
2567	560	no SMI
	MC-853 Diapir	
2563C2	1,200	1
2565	2,000	<1
	West Mississippi Canyon	
2569	750	2
2570	560	4
2571C2	600	3
	Orca Basin	
2550	4,000	~22
	Pigmy Basin	
2553C2	575	~62
	Background site	
2574	560	28

The primary control on the chloride gradients at Tunica Mound and the MC-853 Diapir site is in proximity to salt-cored diapirs that formed the mounds on the sea floor. The primary effect on the distribution of gas hydrate within these sedimentary sections is the reduction of the thickness of the gas hydrate stability zone caused by the presence of dissolved salts in the pore water.

Nodular pieces of gas hydrate were recovered in two cores from the MC-853 Diapir (MD02-2565) and Mississippi Canyon (MD02-2569) areas. Chloride concentration anomalies were not detected in the MD02-2565 core; however, core MD02-2569 from the floor of the Mississippi Canyon had chloride anomalies superimposed on a rapidly increasing chloride concentration gradient. These data indicate that gas hydrate can occur in sediments containing high salinity pore water (up to ~750-mM chloride).

Sulfate and Methane Concentrations

In methane-rich sedimentary sections on continental margins, sulfate gradients are controlled primarily by the upward flux of methane toward the sea floor rather than by sulfate reduction of sedimentary organic matter (for example, Borowski and others, 1999). Pore-water geochemical data, including sulfate, methane, bisulfide (HS^-), DIC concentrations, and methane and DIC $\delta^{13}C$ values, indicate that anaerobic oxidation of methane (AOM; Reeburgh, 1976) occurs at an interface between upward rising methane and downward diffusing sulfate that has been termed the sulfate-methane interface (SMI; Borowski and others, 1997). High rates of AOM focused at the SMI produce linear sulfate gradients within the overlying sediments. These linear gradients indicate that sulfate reduction of sedimentary organic matter is less important than AOM for producing sulfate depletion in methane-rich sediments with a well-defined SMI. Linear sulfate gradients are a reflection of the upward rate of methane transport by fluid advection and(or) diffusion. Steep sulfate gradients indicate relatively high fluxes, and shallower gradients indicate lower fluxes (Borowski and others, 1996).

Available data suggest that the zone of AOM at the SMI has a vertical thickness that is relatively thin (on the order of a few meters or less) and sharply defined. One core from the west side of the Mississippi Canyon (MD02-2571C2) was subsampled for high-resolution geochemical, microbiological, and genomic analysis. Preliminary results of this shore-based

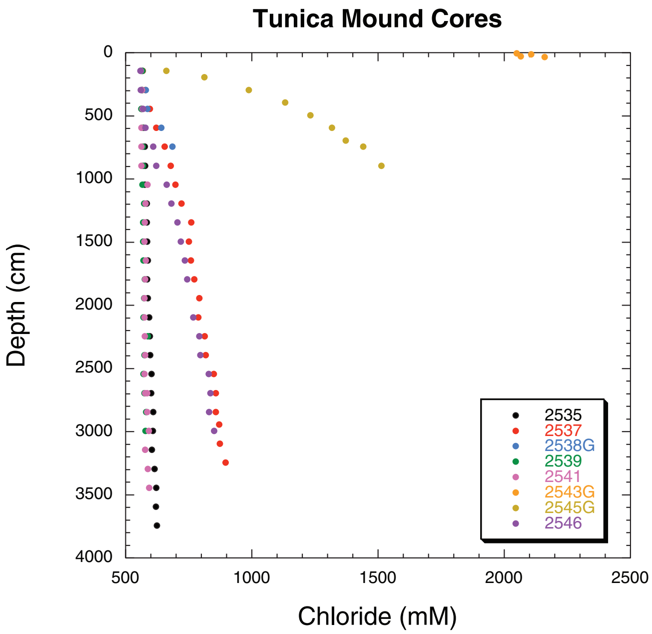

Figure 2. Chloride concentration in relation to depth for cores from Tunica Mound.

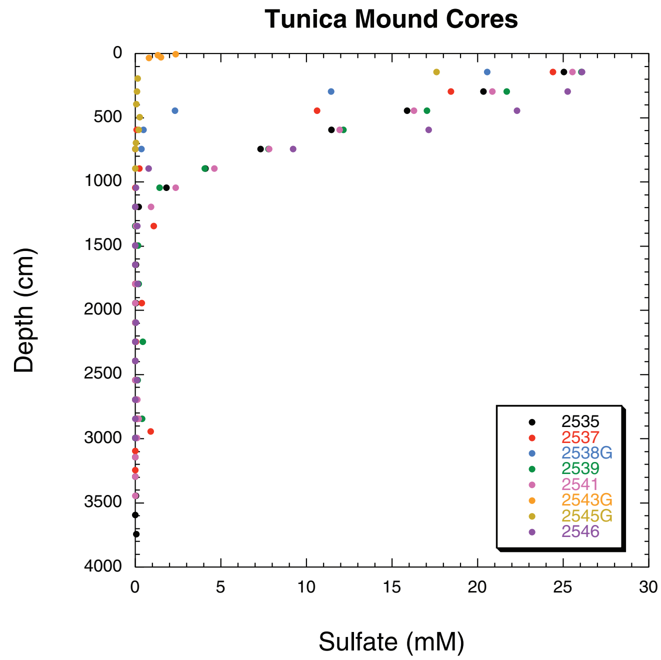

Figure 3. Sulfate concentration in relation to depth for cores from Tunica Mound.

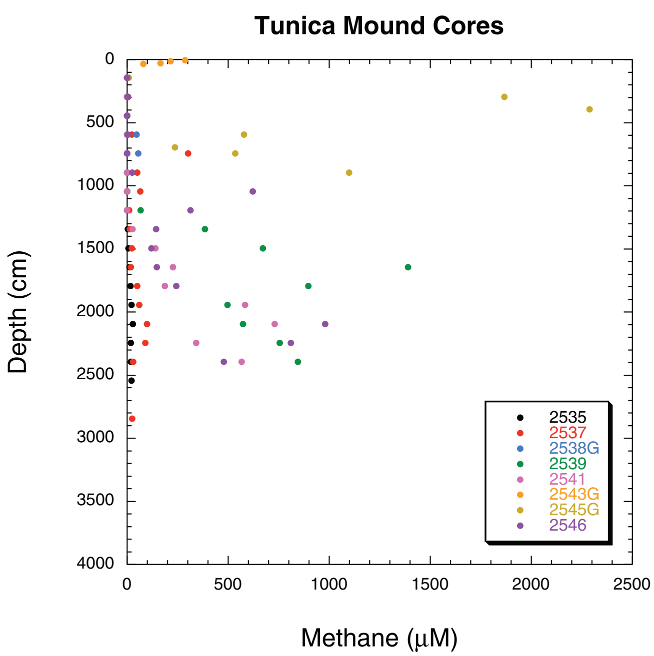

Figure 4. Methane concentration in relation to depth for cores from Tunica Mound.

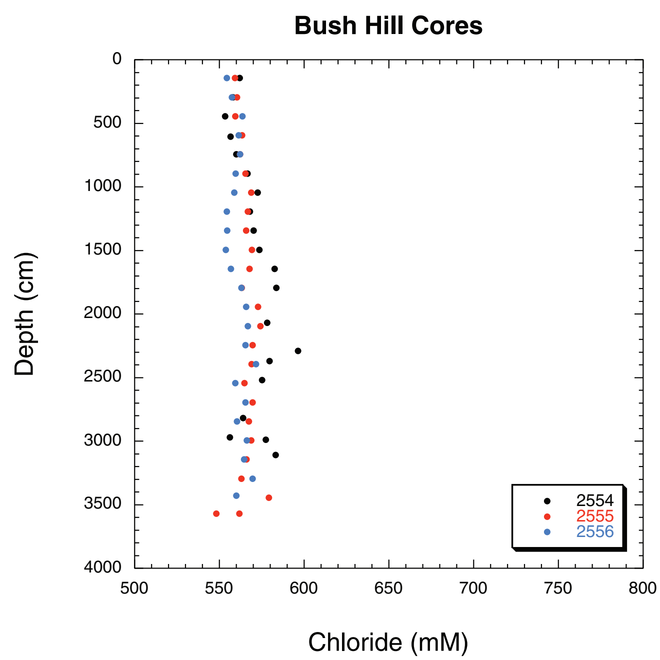

Figure 5. Chloride concentration in relation to depth for cores from Bush Hill.

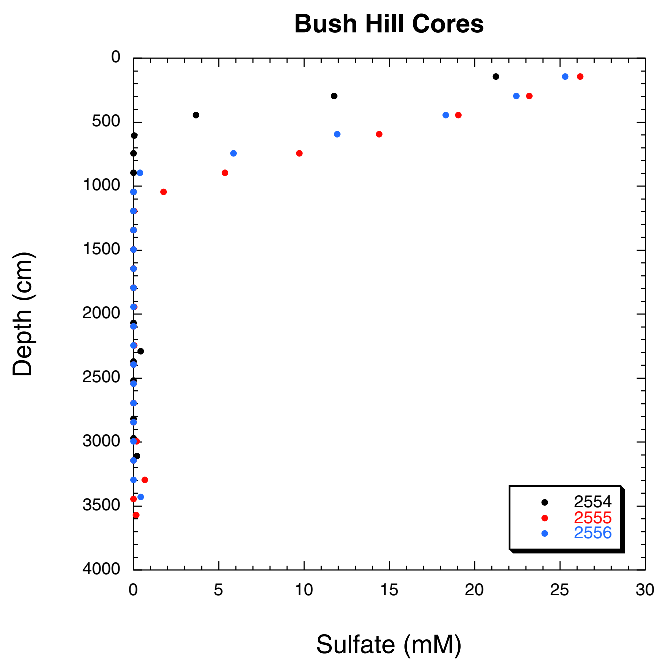

Figure 6. Sulfate concentration in relation to depth for cores from Bush Hill.

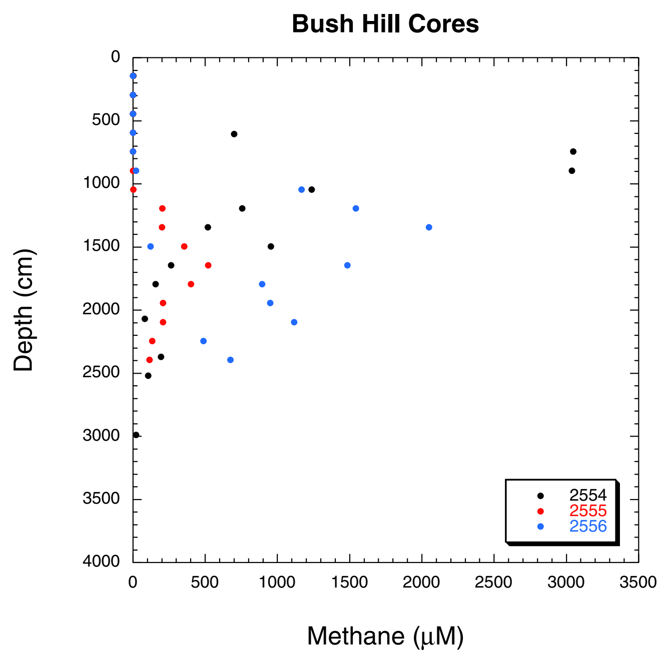

Figure 7. Methane concentration in relation to depth for cores from Bush Hill.

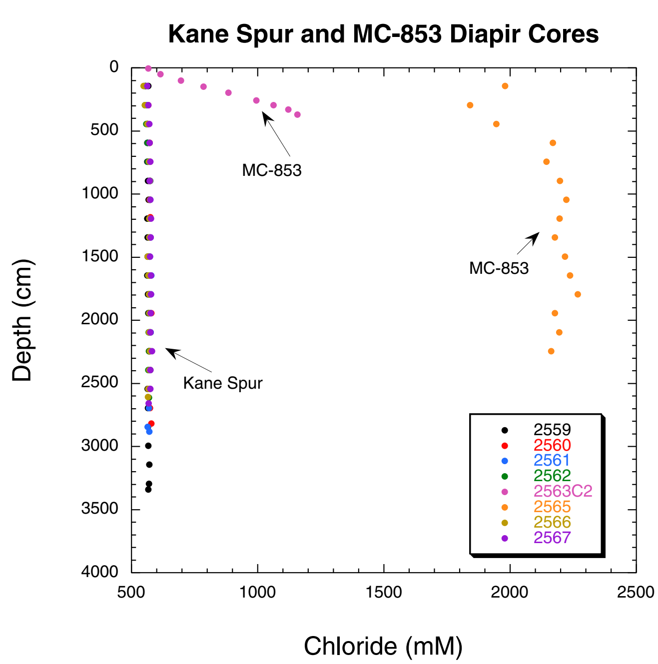

Figure 8. Chloride concentration in relation to depth for cores from Kane Spur and the MC-853 Diapir site.

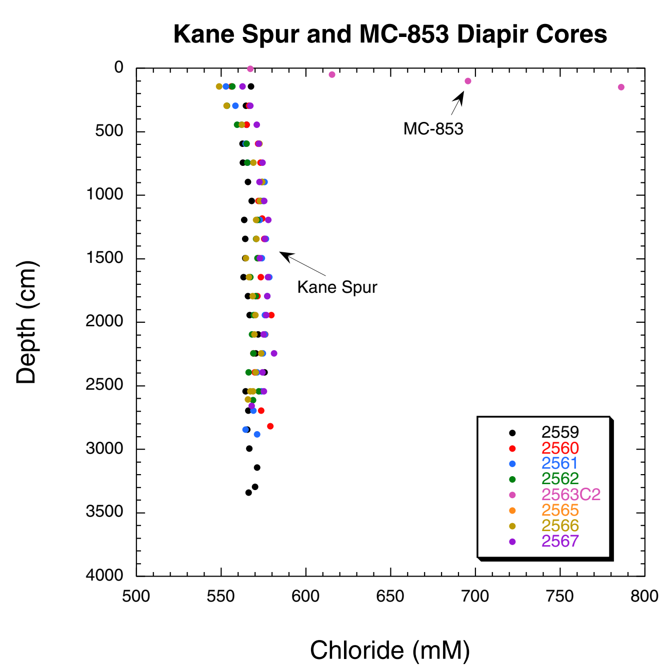

Figure 9. An expanded plot of chloride concentration in relation to depth for cores from Kane Spur and the MC-853 Diapir site.

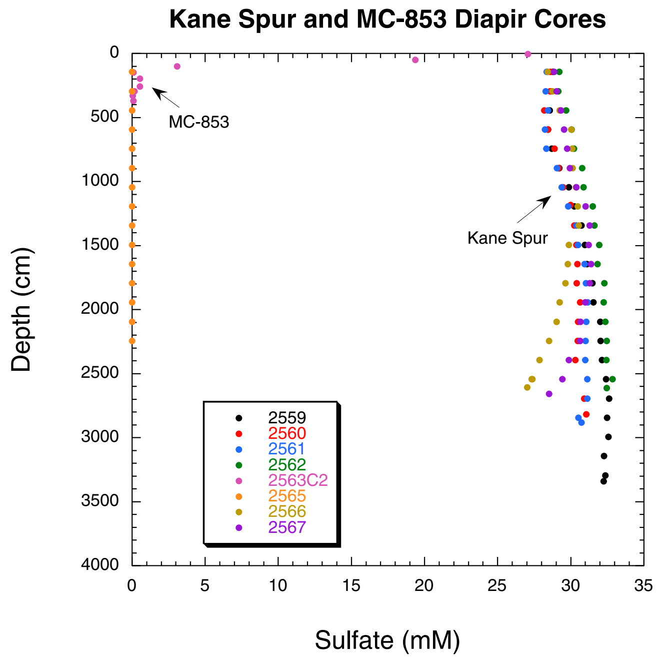

Figure 10. Sulfate concentration in relation to depth for cores from Kane Spur and the MC-853 Diapir site.

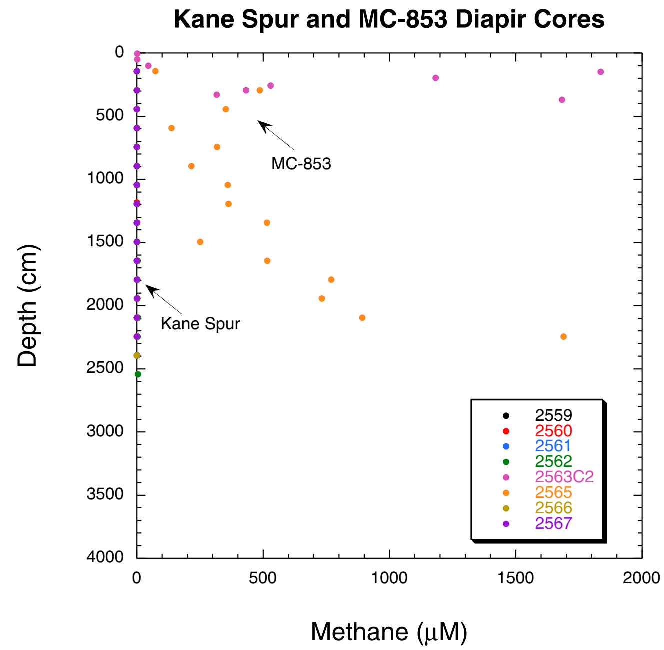

Figure 11. Methane concentration in relation to depth for cores from Kane Spur and the MC-853 Diapir site.

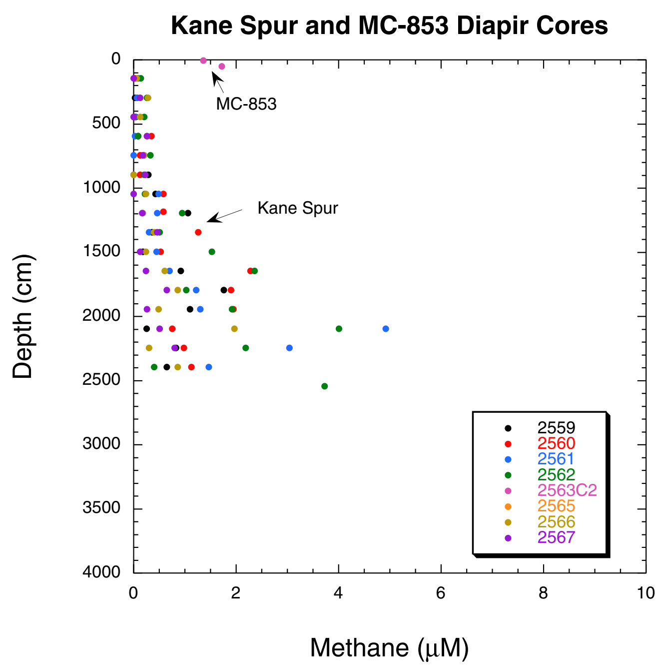

Figure 12. An expanded plot of methane concentration in relation to depth for cores from Kane Spur and the MC-853 Diapir site.

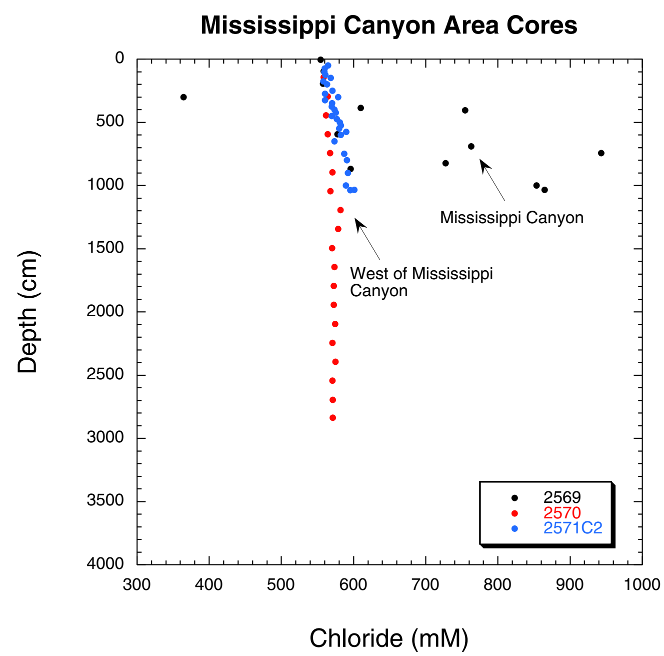

Figure 13. Plot of chloride concentration in relation to depth for cores from the Mississippi Canyon (MD02-2569) and west of the Mississippi Canyon.

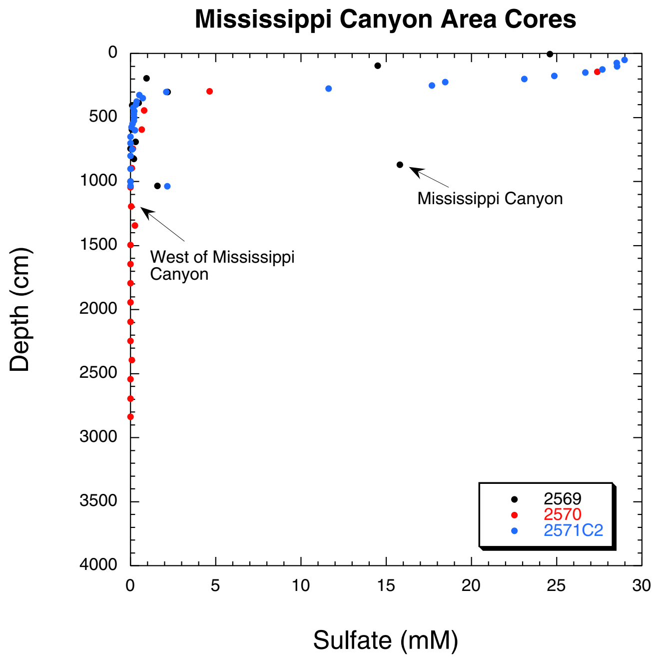

Figure 14. Sulfate concentration in relation to depth for cores from the Mississippi Canyon (MD02-2569) and west of the Mississippi Canyon.

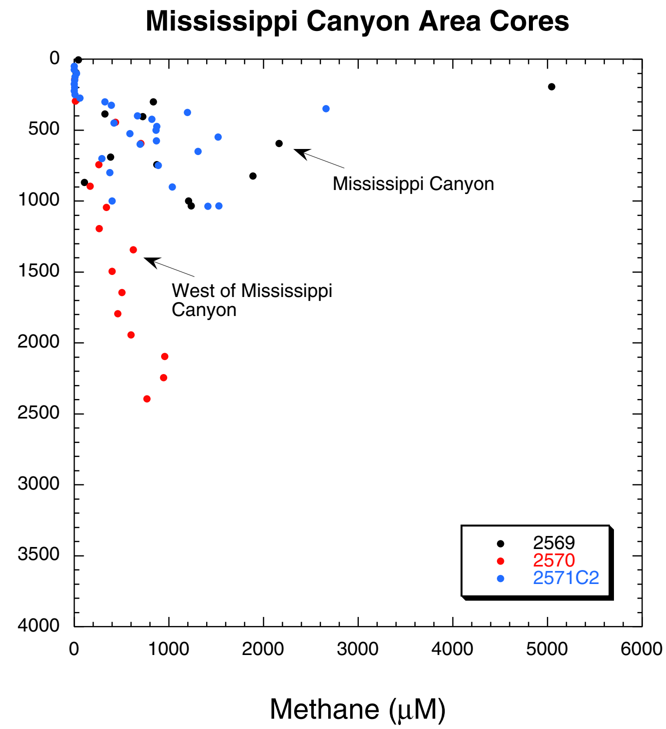

Figure 15. Methane concentration in relation to depth for cores from the Mississippi Canyon (MD02-2569) and west of the Mississippi Canyon.

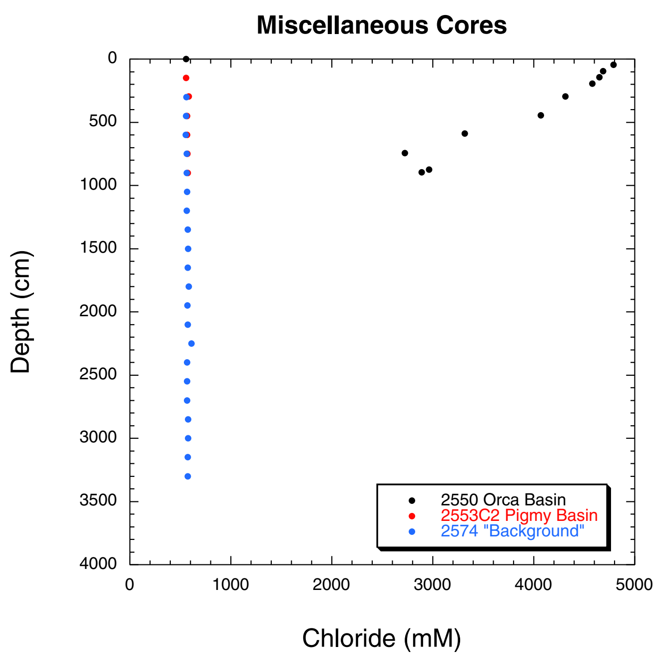

Figure 16. Chloride concentration in relation to depth for miscellaneous cores collected during the MD-02 cruise.

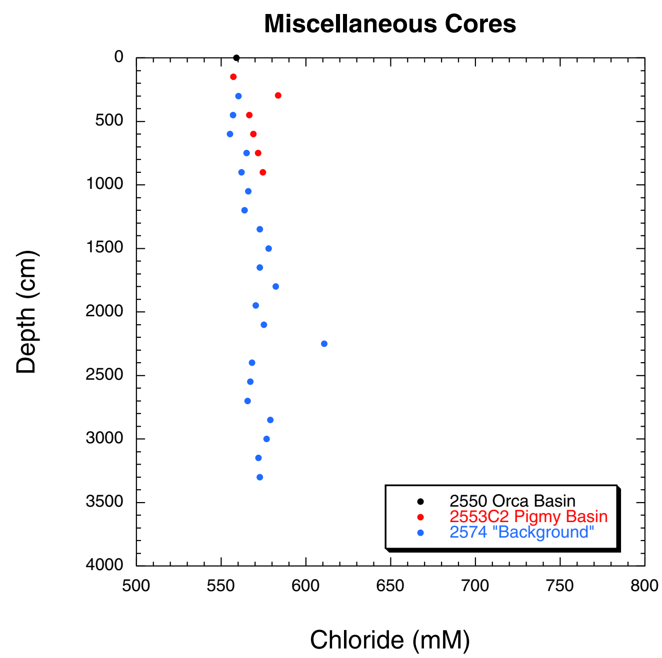

Figure 17. An expanded plot of chloride concentration in relation to depth for miscellaneous cores collected during the MD-02 cruise.

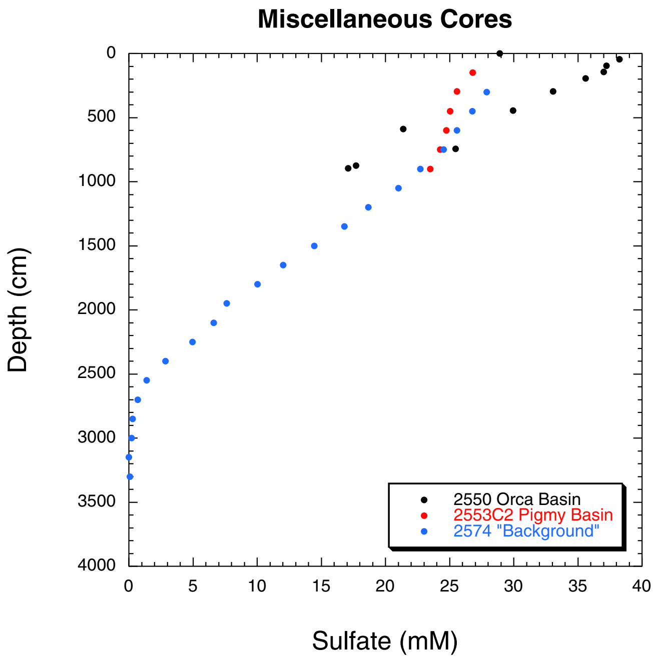

Figure 18. Sulfate concentration in relation to depth for miscellaneous cores collected during the MD-02 cruise.

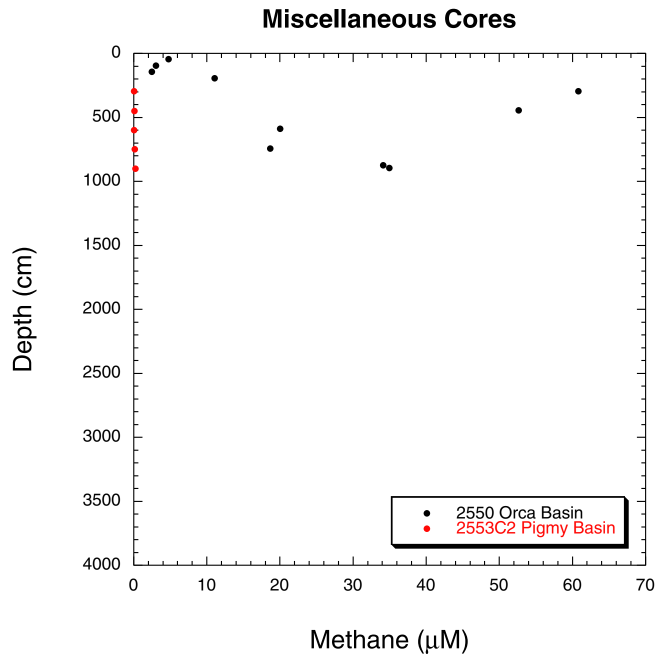

Figure 19. Methane concentration in relation to depth for miscellaneous cores collected during the MD-02 cruise.

work appear in an accompanying chapter (Hallam and others, this volume, chapter 10).

Well-defined linear sulfate gradients occur at Tunica Mound (fig. 3), Bush Hill (fig. 6), the MC-853 Diapir site (fig. 10), and west of the Mississippi Canyon (fig. 14) cores. These linear sulfate gradients indicate that substantial amounts of methane are present in the near subsurface either as dissolved methane and(or) methane gas hydrate (for example, Borowski and others, 1996).

The depth to the SMI for all cores is summarized in table 2. As with the chloride profiles obtained along the coring transect at Tunica Mound, the depth to the SMI systematically changes toward Tunica Mound and is shallowest on the top of the mound. An inverse correlation exists between maximum chloride concentrations and depth to the SMI at Tunica Mound (fig. 20). This indicates that the methane flux also increases toward the salt diapir, resulting in the observed shoaling of the SMI.

In contrast with the linear sulfate gradients mentioned above, cores at Kane Spur have sulfate concentration profiles that increase slightly with depth, reaching values of 33 mM (fig. 10) before decreasing to values of 26 mM. This increase in sulfate concentration above seawater-like values (~28 mM) cannot be explained by proximity to dissolving salt deposits because the corresponding chloride concentration profiles (fig. 9) do not vary with depth from seawater concentrations (~560 mM). Alternative explanations include (1) advection of seawater down into the sedimentary section or (2) the addition of sulfate to the pore water by dissolution of barite or gypsum. Shore-based geochemical measurements, especially strontium isotopes, may provide a better understanding of the processes controlling pore-water gradients in the Kane Spur sediments.

In all cores with linear sulfate gradients, methane concentrations remain low (typically <2 µm) until below the SMI and then increase sharply to values commonly about 1 mM (see fig. 21 for an illustration of this relation). Because most of the methane dissolved in methane-rich sediments is lost by degassing during core recovery (Paull and Ussler, 2001), methane concentrations in pore-water samples obtained from below the SMI (figs. 4, 7, 11, 15, and 19) generally are less than Earth surface saturation concentrations (~1.2 mM; Yamamoto and others, 1976). In contrast, in situ methane saturation concentrations calculated using the methane solubility model of Duan and others (1992) range from 81 mM on the top of Tunica Mound (~580-m water depth) to 150 mM in the Kane Spur area for core MD02-2567 (~1,320-m water depth).

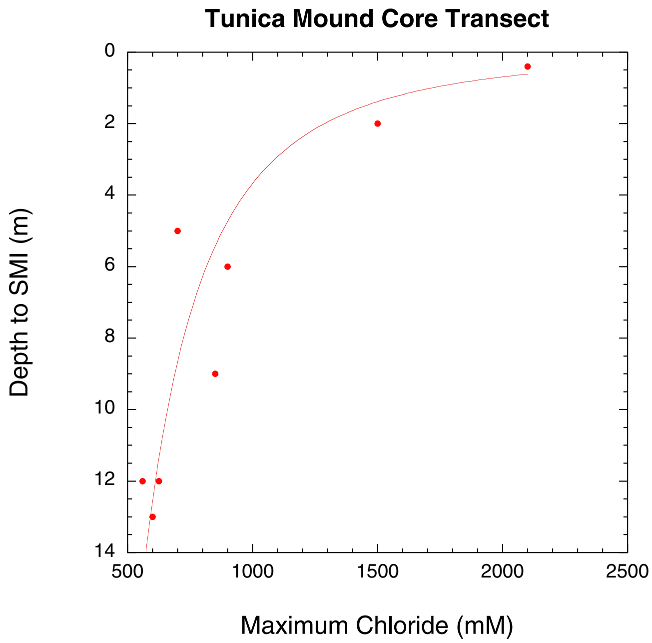

Figure 20. Maximum chloride concentration and an inverse correlation with depth to the SMI for cores collected along the Tunica Mound transect.

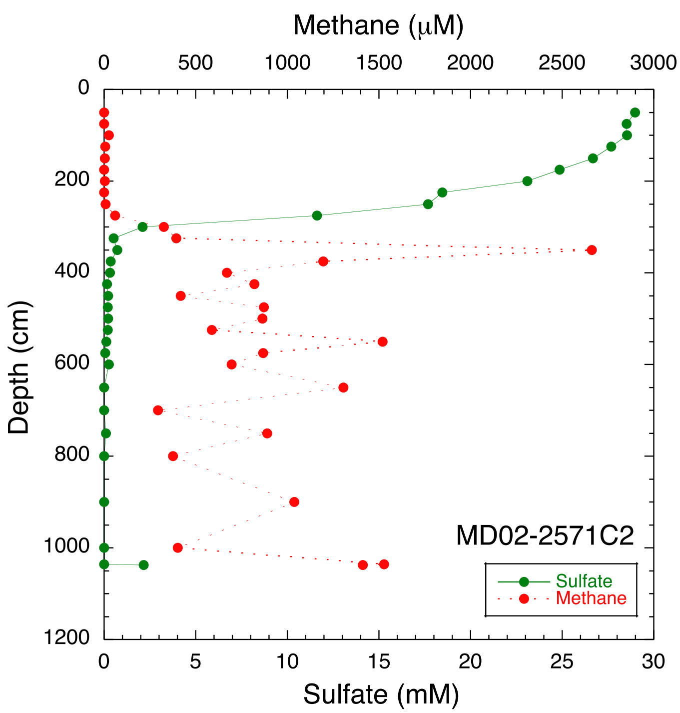

Figure 21. Sulfate and methane concentrations in relation to depth for MD02-2571C2. The SMI is centered at about 300 centimeters below the sea floor.

Conclusions

Pore-water geochemical profiles collected during shipboard operations indicate the following:

1. Chloride concentrations span a wide range of values (360 mM to more than 4,800 mM).
2. Chloride concentrations increase with depth and proximity to salt-cored diapirs at Tunica Mound and the MC-853 Diapir site.
3. The depth to the SMI decreases in proximity to diapiric structures forming Tunica Mound, Bush Hill, and the MC-853 Diapir site. This suggests that methane fluxes are higher over and around these diapiric structures.
4. Chloride concentration and the depth to the SMI are inversely correlated.

Acknowledgments

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Table 1. Summary of shipboard pore-water geochemical measurements.

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2535	140–150	145	1	28	562.5	25.05	0.03
MDD2-2535	290–300	295	2	26	565.6	20.34	0.02
MD02-2535	440–450	445	3	24	563.4	15.88	0.00
MD02-2535	590–600	595	4	19	571.2	11.46	0.00
MDD2-2535	740–750	745	5	18	576.6	7.33	0.00
MD02-2535	890–900	895	6	14	577.3	4.10	0.00
MD02-2535	1,040–1,050	1,045	7	15	576.6	1.82	0.00
MD02-2535	1,190–1,200	1,195	8	15	583.8	0.20	0.38
MD02-2535	1,340–1,350	1,345	9	12	583.6	0.00	3.77
MD02-2535	1,490–1,500	1,495	10	12	585.9	0.00	7.02
MD02-2535	1,640–1,650	1,645	12	13	587.5	0.05	16.75
MD02-2535	1,790–1,800	1,795	11	10	585.4	0.00	12.04
MD02-2535	1,940–1,950	1,945	13	10	588.7	0.04	21.68
MD02-2535	2,090–2,100	2,095	14	10	594.1	0.00	29.64
MD02-2535	2,240–2,250	2,245	16	7	596.0	0.00	19.25
MD02-2535	2,390–2,400	2,395	17	8	597.6	0.00	21.35
MD02-2535	2,540–2,550	2,545	15	7	602.3	0.00	19.54
MD02-2535	2,690–2,700	2,695	M1	4.6	601.7	0.08	gas not collected
MD02-2535	2,840–2,850	2,845	M2	5.9	609.4	0.10	gas not collected
MD02-2535	2,990–3,000	2,995	M3	8	608.3	0.00	gas not collected
MD02-2535	3,140–3,150	3,145	M4	8	604.2	0.00	gas not collected
MD02-2535	3,290–3,300	3,295	M5	6	614.6	0.00	gas not collected
MD02-2535	3,440–3,450	3,445	M6	8.2	622.2	0.05	gas not collected
MD02-2535	3,590–3,600	3,595	M7	8.1	620.1	0.00	gas not collected
MD02-2535	3,740–3,750	3,745	M8	8.7	623.8	0.06	gas not collected
MD02-2537	140–150	145	18	38	567.7	24.41	0.78
MD02-2537	290–300	295	19	31	579.2	18.45	6.06
MD02-2537	440–450	445	20	27	596.3	10.62	0.23
MD02-2537	590–600	595	21	21	622.1	0.09	22.73
MD02-2537	740–750	745	22	25	654.3	0.00	301.94
MD02-2537	890–900	895	23	21	679.3	0.24	49.53
MD02-2537	1,040–1,050	1,045	24	18	697.9	0.00	65.08
MD02-2537	1,190–1,200	1,195	25	15	720.9	0.00	10.79
MD02-2537	1,340–1,350	1,345	26	16	760.3	1.09	13.52
MD02-2537	1,490–1,500	1,495	27	17	750.8	0.06	23.33
MD02-2537	1640–1650	1,645	28	16	758.3	0.00	17.95
MD02-2537	1,790–1,800	1,795	29	14	772.4	0.00	50.52
MD02-2537	1,940–1,950	1,945	30	17	791.8	0.38	61.13
MD02-2537	2,090–2,100	2,095	31	18	787.9	0.00	98.87

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2537	2,240–2,250	2,245	32	10	813.9	0.05	89.86
MD02-2537	2,390–2,400	2,395	34	9	816.7	0.00	30.70
MD02-2537	2,540–2,550	2,545	M13	9.2	849.7	0.07	gas not collected
MD02-2537	2,690–2,700	2,695	M12	9	858.1	0.00	gas not collected
MD02-2537	2,840–2,850	2,845	33	8	857.8	0.10	25.33
MD02-2537	2,940–2,950	2,945	M11	10	870.7	0.90	gas not collected
MD02-2537	3,090–3,100	3,095	M10	7.5	873.6	0.00	gas not collected
MD02-2537	3,240–3,250	3,245	M9	6.9	896.0	0.00	gas not collected
MD02-2538G	140–150	145	35	34	565.9	20.57	0.02
MD02-2538G	290–300	295	36	31	579.9	11.45	0.06
MD02-2538G	440–450	445	37	26	587.3	2.33	0.19
MD02-2538G	590–600	595	38	21	641.2	0.48	46.76
MD02-2538G	740–750	745	39	14	685.8	0.36	55.85
MD02-2539	140–150	145	40	33	567.1	26.06	0.07
MD02-2539	290–300	295	41	26	566.0	21.70	0.19
MD02-2539	440–450	445	42	30	563.3	17.05	0.17
MD02-2539	590–600	595	43	26	565.6	12.17	0.15
MD02-2539	740–750	745	44	25	568.1	7.79	0.15
MD02-2539	890–900	895	45	23	569.2	4.06	0.60
MD02-2539	1,040–1,050	1,045	46	22	567.3	1.43	0.20
MD02-2539	1,190–1,200	1,195	47	22	573.2	0.00	67.54
MD02-2539	1,340–1,350	1,345	48	21	569.8	0.00	384.88
MD02-2539	1,490–1,500	1,495	49	20	569.9	0.16	671.33
MD02-2539	1,640–1,650	1,645	50	21	571.3	0.00	1,390.38
MD02-2539	1,790–1,800	1,795	51	23	576.8	0.21	897.27
MD02-2539	1,940–1,950	1,945	52	20	573.8	0.00	497.86
MD02-2539	2,090–2,100	2,095	53	22	571.6	0.00	572.86
MD02-2539	2,240–2,250	2,245	54	19	588.8	0.44	755.16
MD02-2539	2,390–2,400	2,395	55	19	575.7	0.00	845.63
MD02-2539	2,540–2,550	2,545	M14	7.8	570.8	0.15	gas not collected
MD02-2539	2,690–2,700	2,695	M15	8.7	574.7	0.00	gas not collected
MD02-2539	2,840–2,850	2,845	M16	9.7	580.9	0.41	gas not collected
MD02-2539	2,990–3,000	2,995	M17	8.8	579.6	0.00	gas not collected
MD02-2541	130–140	135	M19	C-14 sample			gas not collected
MD02-2541	140–150	145	56	38	559.7	25.55	0.51
MD02-2541	290–300	295	57	35	565.4	20.86	0.29
MD02-2541	440–450	445	58	30	566.5	16.29	0.32

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2541	580–590	585	M20	C-14 sample			gas not collected
MD02-2541	590–600	595	59	29	563.6	11.94	0.37
MD02-2541	740–750	745	60	26	563.0	7.82	0.40
MD02-2541	890–900	895	61	30	563.3	4.63	0.33
MD02-2541	1,030–1,040	1,035	M21	C-14 sample			gas not collected
MD02-2541	1,040–1,050	1,045	62	23	587.0	2.37	0.50
MD02-2541	1,190–1,200	1,195	63	24	578.6	0.93	0.36
MD02-2541	1,340–1,350	1,345	64	29	575.8	0.05	26.62
MD02-2541	1,480–1,490	1,485	M22	C-14 sample			gas not collected
MD02-2541	1,490–1,500	1,495	65	25	575.6	0.00	140.96
MD02-2541	1,640–1,650	1,645	66	28	580.6	0.00	227.82
MD02-2541	1,790–1,800	1,795	67	20	577.3	0.00	187.04
MD02-2541	1,940–1,950	1,945	68	25	574.9	0.00	584.40
MD02-2541	2,090–2,100	2,095	69	20	575.0	0.00	729.21
MD02-2541	2,240–2,250	2,245	70	17	575.9	0.00	341.32
MD02-2541	2,390–2,400	2,395	71	14	578.0	0.00	566.74
MD02-2541	2,540–2,550	2,545	M22	8.5	574.5	0.00	gas not collected
MD02-2541	2,690–2,700	2,695	M23+M24	7.2	577.0	0.00	gas not collected
MD02-2541	2,840–2,850	2,845	M25	>10.0	586.0	0.20	gas not collected
MD02-2541	2,990–3,000	2,995	M26	8.5	591.5	0.10	gas not collected
MD02-2541	3,140–3,150	3,145	M27	9	577.6	0.00	gas not collected
MD02-2541	3,290–3,300	3,295	M28	8.8	587.4	0.00	gas not collected
MD02-2541	3,440–3,450	3,445	M29	8.8	593.0	0.00	gas not collected
MD02-2543G	C.C.TOP	5	72	20	2,050	2.61	286.34
MD02-2543G	C.C.TOP	15	73	18	2,107	1.40	214.87
MD02-2543G	C.C.BOTTOM	35	74	12	2,161	0.81	80.92
MD02-2543G	C.C.BOTTOM	30	75	18	2,066	1.50	165.70
MD02-2545G	140-150	145	76	25	661.8	17.60	9.32
MD02-2545G	190-200	195	77	24	812.7	0.15	
MD02-2545G	200-210	205	M30	25			gas not collected
MD02-2545G	290-300	295	78	25	988.4	0.11	1,866.61
MD02-2545G	390-400	395	79	23	1,133	0.06	2,287.89
MD02-2545G	490-500	495	80	20	1,232	0.26	
MD02-2545G	500–510	505	M31	30			gas not collected
MD02-2545G	590–600	595	81	23	1,318	0.21	578.72
MD02-2545G	690–700	695	82	22	1,372	0.05	237.52
MD02-2545G	740–750	745	83	20	1,441	0.00	535.61
MD02-2545G	890–900	895	84	14	1,514	0.00	1,099.70

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2546	140–150	145	87	30	559.1	26.11	1.12
MD02-2546	150–160	155	M32	20			gas not collected
MD02-2546	290–300	295	88	28	560.8	25.25	3.60
MD02-2546	440–450	445	89	23	569.2	22.30	0.87
MD02-2546	590–600	595	90	30	579.0	17.14	3.26
MD02-2546	740–750	745	91	25	610.0	9.22	1.07
MD02-2546	890–900	895	92	24	621.6	0.78	25.45
MD02-2546	1,040–1,050	1,045	93	24	663.0	0.04	622.87
MD02-2546	1,190–1,200	1,195	94	24	682.3	0.00	312.99
MD02-2546	1,340–1,350	1,345	95	19	705.8	0.13	143.31
MD02-2546	1,490–1,500	1,495	96	19	718.9	0.00	120.95
MD02-2546	1,640–1,650	1,645	97	14	734.4	0.00	146.51
MD02-2546	1,790–1,800	1,795	98	18	744.6	0.15	243.49
MD02-2546	2,090–2,100	2,095	99	19	768.5	0.05	980.93
MD02-2546	2,240–2,250	2,245	100	19	792.4	0.00	810.05
MD02-2546	2,390–2,400	2,395	101	17	796.9	0.00	478.75
MD02-2546	2,540–2,550	2,545	M34	8.5	829.8	0.11	gas not collected
MD02-2546	2,690–2,700	2,695	M35	7.8	835.9	0.00	gas not collected
MD02-2546	2,840–2,850	2,845	M36	8.2	830.4	0.00	gas not collected
MD02-2546	2,990–3,000	2,995	M37	9	850.1	0.00	gas not collected
MD02-2550	40–50	45	102	55	4,790	38.25	4.74
MD02-2550	90–100	95	103	50	4,688	37.23	3.04
MD02-2550	140–150	145	104	57	4,650	37.00	2.51
MD02-2550	190–200	195	105	35	4,580	35.61	11.08
MD02-2550	290–300	295	106	26	4,313	33.08	60.84
MD02-2550	440–450	445	107	23	4,070	29.96	52.65
MD02-2550	590–600	590	109	28	3,318	21.39	18.69
MD02-2550	740–750	745	108	16	2,724	25.47	20.04
MD02-2550	870–880	875	111	22	2,965	17.71	34.12
MD02-2550	890–900	895	110	26	2,890	17.10	34.96
MD02-2553C2	145–155	150	112	30	557.3	26.81	LOST
MD02-2553C2	290–300	295	113	26	583.6	25.59	0.06
MD02-2553C2	445–455	450	114	21	566.6	25.06	0.10
MD02-2553C2	595–605	600	115	21	569.1	24.74	0.07
MD02-2553C2	745–755	750	116	13	571.8	24.28	0.14
MD02-2553C2	895–905	900	117	12	574.8	23.49	0.24

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2554	140–150	145	120	28	562.1	21.24	2.54
MD02-2554	280–290	285	M38	C-14 sample			gas not collected
MD02-2554	290–300	295	121	21	558.0	11.77	0.97
MD02-2554	440–450	445	122	23	553.4	3.67	0.24
MD02-2554	600–610	605	123	20	556.7	0.05	700.25
MD02-2554	740–750	745	124	24	560.1	0.00	3,048.58
MD02-2554	890–900	895	125	28	566.6	0.00	3,037.65
MD02-2554	910–920	915	M40	C-14 sample			gas not collected
MD02-2554	1,040–1,050	1,045	126	17	572.6	0.00	1,237.80
MD02-2554	1,190–1,200	1,195	127	19	568.0	0.00	755.83
MD02-2554	1,340–1,350	1,345	128	19	570.3	0.00	518.47
MD02-2554	1,490–1,500	1,495	129	19	573.6	0.00	955.72
MD02-2554	1,640–1,650	1,645	130	18	582.6	0.00	265.05
MD02-2554	1,790–1,800	1,795	131	21	583.7	0.00	157.68
MD02-2554	2,065–2,075	2,070	132	17	578.1	0.00	82.93
MD02-2554	2,285–2,295	2,290	133	17	596.5	0.43	LOST
MD02-2554	2,365–2,375	2,370	134	13	579.7	0.00	194.76
MD02-2554	2,515–2,525	2,520	135	15	575.2	0.00	106.70
MD02-2554	2,665–2,675	2,670	M41	7.8	567.5	0.00	gas not collected
MD02-2554	2,815–2,825	2,820	M42+M43	9.6+10	567.5	0.00	gas not collected
MD02-2554	2,965–2,975	2,970	M44	~11.5	556.2	0.00	gas not collected
MD02-2554	0–7 FROM BOTTOM	2,990	118	7	577.5	0.06	21.79
MD02-2554	C.C.TOP	3,109	119	0.5	583.2	0.20	LOST
MD02-2555	140–150	145	136	24	559.3	26.19	0.10
MD02-2555	280–290	285	M47	C-14 sample			gas not collected
MD02-2555	290–300	295	137	23	560.4	23.21	0.14
MD02-2555	440–450	445	138	24	559.4	19.05	0.98
MD02-2555	580–590	585	M48	C-14 sample			gas not collected
MD02-2555	590–600	595	139	17	563.6	14.40	0.15
MD02-2555	740–750	745	140	20	562.3	9.72	0.35
MD02-2555	880–890	885	M49	C-14 sample			gas not collected
MD02-2555	890–900	895	141	17	565.4	5.37	0.16
MD02-2555	1,040–1,050	1,045	142	15	568.9	1.75	3.52
MD02-2555	1,190–1,200	1,195	143	16	566.8	0.05	203.45
MD02-2555	1,340–1,350	1,345	144	16	565.8	0.00	201.58
MD02-2555	1,490–1,500	1,495	145	14	569.3	0.00	355.23
MD02-2555	1,640–1,650	1,645	146	11	567.8	0.00	522.00
MD02-2555	1,790–1,800	1,795	147	13	563.2	0.00	401.01

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2555	1,940–1,950	1,945	148	13	572.9	0.04	208.22
MD02-2555	2,090–2,100	2,095	149	12	574.2	0.00	209.17
MD02-2555	2,240–2,250	2,245	150	13	569.6	0.04	132.59
MD02-2555	2,390–2,400	2,395	151	9	569.1	0.00	115.29
MD02-2555	2,540–2,550	2,545	M50	9	564.9	0.00	gas not collected
MD02-2555	2,690–2,700	2,695	M51	8.2	569.6	0.00	gas not collected
MD02-2555	2,840–2,850	2,845	M52	7.2	567.5	0.00	gas not collected
MD02-2555	2,990–3,000	2,995	M53	8.1	568.9	0.18	gas not collected
MD02-2555	3,140–3,150	3,145	M54	9.2	565.9	0.00	gas not collected
MD02-2555	3,290–3,300	3,295	M55	8.2	563.0	0.67	gas not collected
MD02-2555	3,440–3,450	3,445	M56	8	579.3	0.00	gas not collected
MD02-2555	C.C.	3,572	M45+M46	9.8	548.3	0.15	gas not collected
MD02-2556	140–150	145	152	23	554.4	25.31	0.19
MD02-2556	290–300	295	153	22	557.5	22.45	0.57
MD02-2556	440–450	445	154	23	563.6	18.30	0.59
MD02-2556	590–600	595	155	24	561.5	11.95	0.68
MD02-2556	740–750	745	156	21	562.2	5.87	0.54
MD02-2556	890–900	895	157	21	559.7	0.39	22.53
MD02-2556	1,040–1,050	1,045	158	22	558.9	0.00	1,167.46
MD02-2556	1,190–1,200	1,195	159	22	554.3	0.00	1,542.92
MD02-2556	1,340–1,350	1,345	160	24	554.6	0.00	2,048.93
MD02-2556	1,490–1,500	1,495	161	22	553.7	0.00	121.01
MD02-2556	1,640–1,650	1,645	162	22	557.0	0.00	1,484.94
MD02-2556	1,790–1,800	1,795	163	22	563.0	0.00	893.87
MD02-2556	1,940–1,950	1,945	164	21	565.8	0.00	950.55
MD02-2556	2,090–2,100	2,095	165	23	566.8	0.00	1,116.74
MD02-2556	2,240–2,250	2,245	166	21	565.4	0.00	487.75
MD02-2556	2,390–2,400	2,395	167	19	571.6	0.00	674.42
MD02-2556	2,540–2,550	2,545	M58	8	559.5	0.00	gas not collected
MD02-2556	2,690–2,700	2,695	M59	8	565.5	0.00	gas not collected
MD02-2556	2,840–2,850	2,845	M60	9.4	560.5	0.00	gas not collected
MD02-2556	2,990–3,000	2,995	M61	10	566.2	0.00	gas not collected
MD02-2556	3,140–3,150	3,145	M62	>10	564.6	0.00	gas not collected
MD02-2556	3,290–3,300	3,295	M63	>10	569.6	0.00	gas not collected
MD02-2556	C.C. TOP	3,429	M57	9.4	560.0	0.43	gas not collected
MD02-2559	140–150	145	168	30	567.6	28.80	0.05
MD02-2559	280–290	285	M65	C-14 sample			gas not collected
MD02-2559	290–300	295	169	27	564.7	28.65	0.03

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2559	440–450	445	170	22	564.9	28.57	0.04
MD02-2559	580–590	585	M66	C-14 sample			gas not collected
MD02-2559	590–600	595	171	29	562.6	28.44	0.09
MD02-2559	740–750	745	172	19	562.9	28.71	0.20
MD02-2559	880–890	885	M67	C-14 sample			gas not collected
MD02-2559	890–900	895	173	22	565.9	29.21	0.29
MD02-2559	1,040–1,050	1,045	174	19	568.1	29.87	0.43
MD02-2559	1,190–1,200	1,195	175	14	563.6	30.25	1.06
MD02-2559	1,340–1,350	1,345	176	14	564.2	30.74	0.36
MD02-2559	1,490–1,500	1,495	177	13	564.3	30.96	0.18
MD02-2559	1,640–1,650	1,645	178	14	563.2	31.11	0.92
MD02-2559	1,790–1,800	1,795	179	16	565.8	31.49	1.76
MD02-2559	1,940–1,950	1,945	180	13	566.8	31.54	1.10
MD02-2559	2,090–2,100	2,095	181	14	571.9	32.02	0.25
MD02-2559	2,240–2,250	2,245	182	13	570.4	32.04	0.83
MD02-2559	2,390–2,400	2,395	183	12	575.6	32.13	0.65
MD02-2559	2,540–2,550	2,545	M68	10.1	564.4	32.42	gas not collected
MD02-2559	2,690–2,700	2,695	M69	8.3	566.0	32.62	gas not collected
MD02-2559	2,840–2,850	2,845	M70	9	565.5	32.49	gas not collected
MD02-2559	2,990–3,000	2,995	M71	10.2	566.6	32.58	gas not collected
MD02-2559	3,140–3,150	3,145	M72	9.2	571.2	32.28	gas not collected
MD02-2559	3,290–3,300	3,295	M73	9.7	570.1	32.36	gas not collected
MD02-2559	C.C.	3,343	M64	>10	566.2	32.26	gas not collected
MD02-2560	140–150	145	184	24	556.0	28.61	0.04
MD02-2560	280–290	285	M74	C-14 sample			gas not collected
MD02-2560	290–300	295	185	25	566.4	28.59	0.07
MD02-2560	440–450	445	186	22	565.0	28.20	0.00
MD02-2560	590–600	595	187	20	572.0	28.45	0.35
MD02-2560	730–740	735	M75	C-14 sample			gas not collected
MD02-2560	740–750	745	188	21	573.1	28.90	0.13
MD02-2560	890–900	895	189	20	574.2	29.18	0.13
MD02-2560	1,040–1,050	1,045	190	22	572.0	29.48	0.58
MD02-2560	1,180–1,190	1,185	191	20	574.3	29.99	0.58
MD02-2560	1,190–1,200	1,195	M76	C-14 sample			gas not collected
MD02-2560	1,340–1,350	1,345	192	18	575.5	30.24	1.26
MD02-2560	1,490–1,500	1,495	193	15	571.8	30.39	0.53
MD02-2560	1,640–1,650	1,645	194	13	573.5	30.45	2.28
MD02-2560	1,790–1,800	1,795	195	17	571.5	30.42	1.90
MD02-2560	1,940–1,950	1,945	196	16	579.8	30.65	1.95

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2560	2,090–2,100	2,095	197	13	576.1	30.51	0.75
MD02-2560	2,240–2,250	2,245	198	13	569.1	30.48	0.98
MD02-2560	2,390–2,400	2,395	199	13	569.8	30.31	1.13
MD02-2560	2,540–2,550	2,545	M78	10.2	LOST	LOST	gas not collected
MD02-2560	2,690–2,700	2,695	M79	9.6	573.6	30.91	gas not collected
MD02-2560	2,814–2,824	2,819	M77	10	579.0	31.06	gas not collected
MD02-2561	140–150	145	200	35	552.9	28.35	0.09
MD02-2561	250–280	265	242+243+244 IODINE	50			gas not collected
MD02-2561	280–290	285	M82	C-14 sample			gas not collected
MD02-2561	290–300	295	201	29	558.4	28.29	0.07
MD02-2561	440–450	445	202	25	562.0	28.44	0.03
MD02-2561	590–600	595	203	22	564.3	28.23	0.03
MD02-2561	700–730	715	245+246+247 IODINE	50			gas not collected
MD02-2561	730–740	735	M81	C-14 sample			gas not collected
MD02-2561	740–750	745	204	20	565.7	28.34	0.00
MD02-2561	890–900	895	205	19	575.7	29.06	0.00
MD02-2561	1,040–1,050	1,045	206	20	574.9	29.39	0.49
MD02-2561	1,150–1,180	1,165	248+249+250+251 IODINE	50			gas not collected
MD02-2561	1,180–1,190	1,185	M83	C-14 sample			gas not collected
MD02-2561	1,190–1,200	1,195	207	19	572.9	29.83	0.46
MD02-2561	1,340–1,350	1,345	208	16	576.4	30.39	0.33
MD02-2561	1,490–1,500	1,495	209	16	574.0	30.50	0.45
MD02-2561	1,640–1,650	1,645	210	15	578.5	30.95	0.70
MD02-2561	1,790–1,800	1,795	211	13	577.2	31.03	1.22
MD02-2561	1,940–1,950	1,945	212	15	575.8	31.16	1.30
MD02-2561	2,090–2,100	2,095	213	14	575.8	31.05	4.92
MD02-2561	2,240–2,250	2,245	214	15	574.6	31.01	3.04
MD02-2561	2,390–2,400	2,395	215	11	571.2	31.00	1.47
MD02-2561	2,540–2,550	2,545	M84	8.9	573.8	31.14	gas not collected
MD02-2561	2,690–2,700	2,695	M85	8.8	569.1	31.12	gas not collected
MD02-2561	2,840–2,850	2,845	M86	9.2	564.5	30.52	gas not collected
MD02-2561	C.C.	2,884	M80	>10	571.2	30.74	gas not collected
MD02-2562	140–150	145	216	21	556.7	29.21	0.14
MD02-2562	250–280	265	414+415+434+435 IODINE	18+30			gas not collected
MD02-2562	290–300	295	217	23	553.4	29.15	0.26

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2562	440–450	445	218	22	559.5	29.69	0.21
MD02-2562	590–600	595	219	22	565.1	30.05	0.09
MD02-2562	700–730	715	252+253+254 IODINE	50			gas not collected
MD02-2562	740–750	745	220	24	565.4	30.21	0.33
MD02-2562	890–900	895	221	22	574.1	30.77	0.21
MD02-2562	1,040–1,050	1,045	222	17	573.1	30.89	0.22
MD02-2562	1,150–1,180	1,165	259+260+261 IODINE	50			gas not collected
MD02-2562	1,190–1,200	1,195	223	20	571.5	31.50	0.95
MD02-2562	1,340–1,350	1,345	224	16	570.6	31.61	0.51
MD02-2562	1,490–1,500	1,495	225	16	571.5	31.94	1.53
MD02-2562	1,640–1,650	1,645	226	16	567.3	31.83	2.36
MD02-2562	1,790–1,800	1,795	227	14	570.4	32.30	1.03
MD02-2562	1,940–1,950	1,945	228	13	569.2	32.26	1.92
MD02-2562	1,950–1,980	1,965	255+256+257+258 IODINE	50			gas not collected
MD02-2562	2,090–2,100	2,095	229	12	568.3	32.36	4.01
MD02-2562	2,240–2,250	2,245	230	13	569.0	32.47	2.19
MD02-2562	2,390–2,400	2,395	231	12	566.3	32.43	0.40
MD02-2562	2,540–2,550	2,545	232	14	572.2	32.85	3.73
MD02-2562	C.C.	2,613	M87	9.6	568.7	32.47	gas not collected
MD02-2563C2	0–10	5	240	31	567.1	27.07	1.36
MD02-2563C2	97–107	102	241	28	695.6	3.08	46.21
MD02-2563C2	45–55	50	238	26	615.5	19.38	1.72
MD02-2563C2	145–155	150	239	26	786.0	0.10	1,836.01
MD02-2563C2	192–202	197	236	27	884.0	0.54	1,182.65
MD02-2563C2	253–263	258	234	28	995.0	0.54	529.57
MD02-2563C2	292–302	297	237	20	1,064	0.16	431.96
MD02-2563C2	327–337	332	235	21	1,121	0.06	315.68
MD02-2563C2	365–375	370	233	22	1,157	0.10	1,682.70
MD02-2565	140–150	145	272	12	1,981	0.00	73.79
MD02-2565	280–290	285	M89	C-14 sample			gas not collected
MD02-2565	290–300	295	273	18	1,842	0.00	486.88
MD02-2565	390–400	395	263+264	31			496.67
MD02-2565	440–450	445	274	22	1,946	0.00	652.52
MD02-2565	580–590	585	M88	C-14 sample			gas not collected
MD02-2565	590–600	595	275	20	2,169	0.00	137.25
MD02-2565	740–750	745	276	24	2,144	0.00	316.87

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2565	880–890	885	M90	C-14 sample			gas not collected
MD02-2565	890–900	895	277	20	2,198	0.00	216.19
MD02-2565	1,040–1,050	1,045	278	25	2,223	0.00	359.64
MD02-2565	1,190–1,200	1,195	279	23	2,197	0.00	363.20
MD02-2565	1,340–1,350	1,345	280	24	2,178	0.00	514.66
MD02-2565	1,490–1,500	1,495	281	21	2,218	0.00	250.59
MD02-2565	1,640–1,650	1,645	282	19	2,238	0.00	516.06
MD02-2565	1,790–1,800	1,795	283	15	2,268	0.00	769.54
MD02-2565	1,940–1,950	1,945	284	19	2,177	0.00	732.47
MD02-2565	2,090–2,100	2,095	285	18	2,195	0.00	892.21
MD02-2565	2,240–2,250	2,245	286	20	2,163	0.00	1,689.21
MDO2-2566	140–150	145	287	31	548.8	28.42	0.06
MDO2-2566	260–290	275	416+417 IODINE	32			gas not collected
MDO2-2566	290–300	295	288	22	553.3	28.75	0.28
MDO2-2566	440–450	445	289	18	562.2	29.24	0.13
MDO2-2566	590–600	595	290	18	572.6	30.03	0.26
MDO2-2566	710–740	725	438+439+440 IODINE	50			gas not collected
MDO2-2566	740–750	745	291	18	569.1	30.11	0.20
MDO2-2566	890–900	895	292	21	574.2	30.13	0.00
MDO2-2566	1,040–1,050	1,045	293	23	572.9	30.36	0.24
MDO2-2566	1,160–1,190	1,175	400+401+402+403 IODINE	50			gas not collected
MDO2-2566	1,190–1,200	1,195	294	20	570.7	30.47	0.18
MDO2-2566	1,340–1,350	1,345	295	18	570.9	30.54	0.40
MDO2-2566	1,490–1,500	1,495	296	16	564.7	29.88	0.24
MDO2-2566	1,640–1,650	1,645	297	15	566.5	29.81	0.61
MDO2-2566	1,790–1,800	1,795	298	12	568.7	29.63	0.86
MDO2-2566	1,940–1,950	1,945	299	12	570.3	29.23	0.49
MDO2-2566	2,090–2,100	2,095	300	13	569.6	29.03	1.97
MDO2-2566	2,240–2,250	2,245	301	9.5	573.6	28.51	0.30
MDO2-2566	2,390–2,400	2,395	302	10	570.3	27.86	0.86
MDO2-2566	2,540–2,550	2,545	M92+M94	12.3	567.2	27.33	gas not collected
MDO2-2566	C.C.	2,609	M91	>10	565.9	27.03	gas not collected
MD02-2567	140–150	145	303	27	562.6	28.87	0.00
MD02-2567	250–280	265	436+437 IODINE	60			gas not collected
MD02-2567	280–290	285	M94	C-14 sample	568.9	27.37	gas not collected
MD02-2567	290–300	295	304	18	567.1	29.03	0.13

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2567	440–450	445	305	16	571.3	29.33	0.00
MD02-2567	590–600	595	306	13	572.3	29.53	0.26
MD02-2567	700–730	715	322+323+324+325 IODINE	50			gas not collected
MD02-2567	740–750	745	307	12	574.5	29.76	0.18
MD02-2567	890–900	895	308	13	572.6	29.94	0.23
MD02-2567	1,040–1,050	1,045	309	14	575.5	30.37	0.00
MD02-2567	1,150–1,180	1,165	318+319+320+321 IODINE	>50			gas not collected
MD02-2567	1,190–1,200	1,195	310	15	577.8	31.02	0.17
MD02-2567	1,340–1,350	1,345	311	15	575.9	31.23	0.46
MD02-2567	1,490–1,500	1,495	312	16	572.9	31.22	0.13
MD02-2567	1,640–1,650	1,645	313	18	577.6	31.40	0.24
MD02-2567	1,790–1,800	1,795	314	15	577.3	31.28	0.65
MD02-2567	1,940–1,950	1,945	315	14	576.6	31.00	0.26
MD02-2567	2,090–2,100	2,095	316	14	575.1	30.66	0.51
MD02-2567	2,240–2,250	2,245	317	13	581.3	30.63	0.80
MD02-2567	2,390–2,400	2,395	M99	9.2	574.3	29.88	gas not collected
MD02-2567	2,540–2,550	2,545	M98	9.8	575.2	29.43	gas not collected
MD02-2567	C.C.	2,659	M93	9.7	568.1	28.53	gas not collected
MD02-2569	0–10	5	328	21	554.7	24.60	43.62
MD02-2569	90–100	95	341	17	558.8	14.50	20.18
MD02-2569	190–200	195	342	17	557.7	0.94	5,045.27
MD02-2569	200–210	205	M102	C-14 sample			gas not collected
MD02-2569	290–310	300	343+351	28+25	364.5	2.18	835.84
MD02-2569	374–400	387	340	20	609.7	0.49	327.23
MD02-2569	400–410	405	344	17	754.7	0.11	725.32
MD02-2569	410–420	415	M101	C-14 sample			gas not collected
MD02-2569	590–600	595	345	20	577.7	0.09	2163.42
MD02-2569	740–750	745	347	11	943.4	0.00	873.54
MD02-2569	816–820	818	330	17	763.0	0.31	386.01
MD02-2569	820–830	825	348	15	727.3	0.21	1,889.44
MD02-2569	865–875	870	346+350+M100 DOC IODINE	41+33			106.91
MD02-2569	995–1,005	1,000	349	13	853.5	0.00	1,208.77
MD02-2569	C.C.	1,036	327	17	864.9	1.58	1,237.49
MD02-2570	140–150	145	352	22	558.9	27.39	4.26
MD02-2570	260–290	275	412+413 IODINE	32			gas not collected

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2570	290–300	295	353	15	564.0	4.64	14.29
MD02-2570	440–450	445	354	17	561.9	0.81	435.14
MD02-2570	590–600	595	355	14	564.0	0.66	704.93
MD02-2570	710–740	725	409+410 IODINE	45			gas not collected
MD02-2570	740–750	745	356	11	567.6	0.15	260.43
MD02-2570	890–900	895	357	11	570.5	0.08	170.22
MD02-2570	1,040–1,050	1,045	358	11	568.1	0.00	341.01
MD02-2570	1,160–1,190	1,175	405+406 IODINE	25			gas not collected
MD02-2570	1,190–1,200	1,195	359	9	581.8	0.04	263.39
MD02-2570	1,340–1,350	1,345	360	11	578.6	0.25	624.60
MD02-2570	1,490–1,500	1,495	361	21	570.4	0.00	400.70
MD02-2570	1,640–1,650	1,645	362	19	573.8	0.00	503.60
MD02-2570	1,790–1,800	1,795	363	20	572.6	0.00	461.43
MD02-2570	1,940–1,950	1,945	364	18	572.4	0.00	600.61
MD02-2570	2,090–2,100	2,095	365	16	574.6	0.00	956.55
MD02-2570	2,240–2,250	2,245	366	15	570.8	0.00	945.86
MD02-2570	2,390–2,400	2,395	367	18	575.0	0.08	768.28
MD02-2570	2,540–2,550	2,545	M104	10	571.1	0.00	gas not collected
MD02-2570	2,690–2,700	2,695	M105	>10	571.1	0.00	gas not collected
MD02-2570	C.C.	2,839	M103	7.8	570.5	0.00	gas not collected
MD02-2571C2	45–55	50	371	-	564.8	28.99	0.67
MD02-2571C2	70–80	75	396	32	560.1	28.53	1.33
MD02-2571C2	95–105	100	372	15	559.4	28.55	26.97
MD02-2571C2	120–130	125	395	29	561.1	27.69	7.23
MD02-2571C2	145–155	150	373	-	568.4	26.69	3.78
MD02-2571C2	170–180	175	397	29	558.0	24.86	1.43
MD02-2571C2	195–205	200	374	-	563.3	23.10	3.47
MD02-2571C2	216–223	219.5	M107	C-14 sample			gas not collected
MD02-2571C2	220–230	225	387	28	523.1	18.47	1.33
MD02-2571C2	245–255	250	375	14	570.6	17.68	8.73
MD02-2571C2	270–280	275	388	27	560.5	11.63	59.49
MD02-2571C2	295–305	300	376	16	578.7	2.09	325.44
MD02-2571C2	320–330	325	389	22	560.4	0.52	394.46
MD02-2571C2	345–355	350	377	14	570.1	0.72	2,662.02
MD02-2571C2	370–380	375	390	13+26	569.7	0.37	1,196.65
MD02-2571C2	377–390	383.5	M108	C-14 sample			gas not collected
MD02-2571C2	395–405	400	378	12	573.5	0.32	670.28

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)
MD02-2571C2	420–430	425	391	27	575.3	0.17	820.52
MD02-2571C2	445–455	450	379	25	569.8	0.22	419.58
MD02-2571C2	470–480	475	392	25	576.7	0.20	873.46
MD02-2571C2	495–505	500	380	13	581.0	0.22	865.15
MD02-2571C2	520–530	525	393	25	582.2	0.20	587.66
MD02-2571C2	545–555	550	381	19	580.0	0.13	1,520.42
MD02-2571C2	570–580	575	394	27	589.7	0.06	867.66
MD02-2571C2	582–597	589.5	M109	C-14 sample			gas not collected
MD02-2571C2	595–605	600	382	16	582.6	0.26	696.80
MD02-2571C2	645–655	650	383	15	573.7	0.00	1,306.22
MD02-2571C2	695–705	700	384	23	545.9	0.00	295.22
MD02-2571C2	745–755	750	398	-	587.0	0.11	890.34
MD02-2571C2	754–771	762.5	M106	C-14 sample			gas not collected
MD02-2571C2	795–805	800	385	22	590.7	0.00	375.66
MD02-2571C2	895–905	900	386	-	592.2	0.00	1,038
MD02-2571C2	995–1,005	1,000	399	-	589.5	0.00	401.55
MD02-2571C2	TOP OF C.C.	1,036	370	-	601.3	0.00	1,527.47
MD02-2571C2	C.C.	1,037	369	24	595.2	2.17	1,411.59
MD02-2574	295–305	300	418	17	560.3	27.89	gas not collected
MD02-2574	445–455	450	419	17	557.0	26.78	gas not collected
MD02-2574	595–605	600	420	18	555.2	25.57	gas not collected
MD02-2574	745–755	750	421	15	565.1	24.55	gas not collected
MD02-2574	895–905	900	422	13	562.0	22.72	gas not collected
MD02-2574	1,045–1,055	1,050	423	9.5	566.0	21.03	gas not collected
MD02-2574	1,195–1,205	1,200	424	8	563.8	18.67	gas not collected
MD02-2574	1,345–1,355	1,350	425	7	572.9	16.80	gas not collected
MD02-2574	1,495–1,505	1,500	426	6	578.0	14.47	gas not collected
MD02-2574	1,645–1,655	1,650	427	6	572.8	12.04	gas not collected
MD02-2574	1,795–1,805	1,800	428	6	582.3	10.04	gas not collected
MD02-2574	1,945–1,955	1,950	429	6	570.3	7.62	gas not collected
MD02-2574	2,095–2,105	2,100	430	6	575.2	6.63	gas not collected
MD02-2574	2,245–2,255	2,250	431	-	610.8	4.95	gas not collected
MD02-2574	2,395–2,405	2,400	432	-	568.2	2.85	gas not collected
MD02-2574	2,545–2,555	2,550	433	-	567.1	1.39	gas not collected
MD02-2574	2,695–2,705	2,700	M110	>10	565.7	0.69	gas not collected
MD02-2574	2,845–2,855	2,850	M118	9.8	579.0	0.29	gas not collected
MD02-2574	2,995–3,005	3,000	M111	7.8	576.8	0.21	gas not collected
MD02-2574	3,145–3,155	3,150	M112	-	572.1	0.00	gas not collected
MD02-2574	3,295–3,305	3,300	M113	6.9	572.9	0.09	gas not collected

Table 1. Summary of shipboard pore-water geochemical measurements. — Continued

[cm, centimeter; mL, milliliter; mM, millimole; µM, micromole; C.C., core catcher; >, greater than]

Core	Interval (cm)	Mid depth (cm)	Syringe number	Fluid volume (mL)	Chloride (mM)	Sulfate (mM)	Methane (µM)

NOTES:
0.00 entry indicates an amount below detection limit
M prefix for syringe number indicates Manheim-style squeezer sample; all others were Reeburgh-style squeezers
“+” sign in Syringe Number column indicates syringes combined; the volume of each prior to combining is indicated in the Fluid Volume column.
“C-14 sample” indicates samples collected by J. Pohlman for DIC and(or) DOC 14C AMS analysis.
Iodine isotope samples were obtained by combining the syringes listed in Syringe Number column; total volume is indicated in the Fluid Volume column.