

# Data report: X-ray analyses of bulk sediment in IODP Holes U1320A and U1324B, northern Gulf of Mexico<sup>1</sup>

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## Abstract

We present the results of 276 X-ray diffraction analyses of bulk sediment from Brazos-Trinity IV (Integrated Ocean Drilling Program [IODP] Hole U1320A) and Ursa (IODP Hole U1324B) Basins. The mineralogy at both locations is qualitatively very similar, with quartz and phyllosilicates dominating the assemblages and calcite, dolomite, K-feldspars, plagioclases, and halite present in varying amounts. Ankerite (iron-rich dolomite) was observed in only one sample. Although the composition of the sediment is relatively monotonous, trends in the percent occurrence of each fraction are observed and can be linked to changes in the lithostratigraphic units and core descriptions from Expedition 308. The data presented here will help establish a link between geomechanical behaviors of the sediments and matrix effects driven by mineral composition.

## Introduction

Integrated Ocean Drilling Program (IODP) Expedition 308 drilled Pleistocene sediments from the Gulf of Mexico in Brazos-Trinity IV and Ursa Basins (see the “[Expedition 308 summary](#)” chapter). The goal of the expedition was to measure in situ pore pressure in a normally pressured (Brazos-Trinity IV) and an overpressured (Ursa) basin and compare these data with geotechnical measurements on the cores. During the expedition, a link was established between overpressured sediments and slope failure, leading to important turbidity transport and deposits (Flemings et al., 2008). Here, we present X-ray diffraction (XRD) data from bulk sediment from two holes, one from Brazos-Trinity IV Basin (Hole U1320A) and one from Ursa Basin (Hole U1324B). XRD is an excellent tool to quickly identify mineral phases in the sediment and quantify their abundances. The ultimate goal of our research is to tie the trends observed in the bulk rock mineralogy with similar trends in grain size ([Sawyer et al.](#)), in situ pore pressures (Flemings et al., 2008; [Long et al.](#)), and mechanical behavior of the sediment ([Long et al.](#)). Our working hypothesis is that the amount and type of clay minerals present in the matrix of the mudstone from both basins will likely affect sediment behavior. This integration, however, will require additional data, in particular detailed mineralogy of the phyllosilicate fraction (i.e., clay minerals), which is beyond the scope of this data report.

<sup>1</sup>John, C.M., and Adatte, T., 2009. Data report: X-ray analyses of bulk sediment in IODP Holes U1320A and U1324B, northern Gulf of Mexico. In Flemings, P.B., Behrmann, J.H., John, C.M., and the Expedition 308 Scientists, *Proc. IODP*, 308: College Station, TX (Integrated Ocean Drilling Program Management International, Inc.). doi:10.2204/iodp.proc.308.214.2009

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## Methods

A total of 276 samples were taken onboard the R/V *JOIDES Resolution* during Expedition 308 (77 samples from Hole U1320A and 199 samples from Hole U1324B). Sample volume was 10 cm<sup>3</sup>, and the sample frequency was 1 sample per 3 m (one every two core sections, typically taken in odd-numbered sections).

XRD analyses were carried out at the Geological Institute of the University of Neuchâtel, Switzerland. The samples were prepared following procedures described in Kübler (1987) and Adatte et al. (1996). Random powder of the bulk sample was used for characterization of the whole-rock mineralogy. Nearly 20 g of each sample was ground with a “jaw” crusher to obtain small chips (1–5 mm) of rock. Approximately 5 g was reserved for bulk sediment analyses and dried at 60°C and then ground again to a homogeneous powder with particle sizes <40 µm. An aliquot of 800 mg of this powder was pressed (20 bar) in a powder holder covered with a blotting paper and analyzed by XRD.

Whole-rock composition was determined by XRD (SCINTAG XRD 2000 diffractometer). The scans were done using the following conditions:

- X-ray powder diffractometer (SCINTAG XDS 2000)
- Spectral counter (THERMO ARL water-cooled silicon detector)
- Wavelength: 1.5406 Å CuKα1
- Generator power: 45 kV and 40 mA
- Goniometer type: θ/θ
- Goniometer radius: 250 mm
- Emitting slits: 2 and 4 mm
- Receiving slits: 0.5 and 0.3 mm
- Continuous scan
- Round (ø 25 mm) glass plates
- Goniometer speed: 1°/min
- Acquisition step size: 0.03°
- Sample spinning: on
- Scanned interval: 2°–65°20'

The files generated with SCINTAG are raw data (.RD) that are transformed in a routine by the software (DMS program, v. 2.63, graphic-normal display) into calculated (.NI) files. The calculations are fast fourier noise filter, background subtraction, and Kα2 stripping. The measurements are made on calculated files.

An internal standard (Kimmeridgian micritic limestone from the Ain region [France] composed of 99%

calcite) was run at the beginning of each day to track the aging of the X-ray source tube by looking at the intensity of the peak at 29.43°20' and the data were corrected accordingly. The resulting diffractograms were analyzed using MacDiff 4.2.5, and each mineral in the assemblage was identified by the *hkl* reflection of characteristic peaks (Table T1). The intensities of these characteristic peaks were collected for the semiquantitative analysis (Table T2). We chose peaks with no interference as much as possible, but this was not possible for plagioclase and K-feldspar, and we had to discriminate between their characteristic peaks by means of a profile-fitting function using MacDiff 4.2.5 and the Pearson VII method provided in this software.

Semiquantitative analysis was based on the following equation (Ferrero, 1965, 1966; Klug and Alexander, 1974; Kübler, 1983):

$$I = I_o \times C_m \times (\mu_m / \mu_e), \quad (1)$$

where

$I_o$  = intensity of pure mineral (external standard, counts per second [cps]),

$I$  = intensity of the mineral to be quantified (cps),

$\mu_m$  = mass absorption coefficient of pure mineral,

$\mu_e$  = mass absorption coefficient of the sample (mineral + matrix), and

$C_m$  = mineral concentration in the sample (wt%).

The peak intensity ( $I$ ) of a mineral “m” in a given assemblage is a function of the abundance of “m” ( $C_m$ ), the peak intensity (in counts per second) of an external standard containing 100% “m” ( $I_o$ ), and the coefficient of mass absorption ( $\mu_m$ ) of “m” as well as of the whole assemblage ( $\mu_e$ ). This relationship is nonlinear, except when  $\mu_m = \mu_e$ . Determining  $\mu_e$  (or the coefficient of the so called “matrix”) is the principal difficulty in using this technique, as it depends on the proportion of each mineral present in the matrix, which is unknown, as it is the quantity that we want to measure. Here, we follow the method of Ferrero (1966). We assume that the matrix is composed exclusively of clay minerals (micas, chlorites, kaolinites, and smectites), and we use a  $\mu_e = 47.0$ , which was determined to be a good average value for a matrix dominated by illite in sedimentary rocks. We can then rewrite Equation 1 to calculate the weight percent of each mineral in the assemblage using

$$C_m = [(I \times \mu_e) / (I_o \times \mu_m)] \times 100. \quad (2)$$

A list of the 100% intensity ( $I_o$ ) and coefficient of mass absorption ( $\mu_m$ ) of characteristic peaks for the external standards used is given in Table T1. This semiquantitative method leaves us with an “un-



quantified” fraction of the rock matrix equals to  $100 - \Sigma C_m$ . This fraction averages <5% but could be as high as 15% in some samples (Table T3). Two approaches with respect to the unquantified matrix can be considered. We can either assume that a portion of the rock matrix is either uncrytallized, poorly crystallized, or composed of phases present below detection limit and was thus not taken into account during the quantification process (this fraction could comprise organic matter or poorly crystallized minerals such as opal, phosphates, etc.) or we can assume that we underestimated the amount of phyllosilicates. Phyllosilicates represent a family of very different clay minerals (e.g., kaolinite, smectite, chlorite, etc.). We used the broad peak at  $19.90^\circ 2\theta$  as the characteristic peak for phyllosilicates, and we quantified them using a “standard”  $\mu_m$  of 47 (Table T1). But the specific mixing of these minerals present in our sediment is likely to deviate from the “average” composition estimated for  $\mu_m$ , potentially explaining the amount of unquantified minerals. Both options are equally valid, and the correct quantification values are probably affected by a combination of both effects. Here, we decided to give the percent phyllosilicates values both with and without the added unquantified fraction (Figs. F1A, F2A; red curve represents weight percent phyllosilicates alone and the blue curve represents weight percent phyllosilicates with the unquantified fraction added). This gives a bracket for the “true” phyllosilicate content. In general, the difference between the two curves is small, giving us good confidence in our quantification results.

Instrumental error, caused by the fluctuation of the X-ray source, detector, and amplification of the signal, has been estimated by measuring the same sample (100% quartz) six times under the same conditions. The mean peak surface error is <3% and the mean intensity error is <1%. Errors associated with the quantification step are more difficult to accurately predict as they depend on the actual matrix effect of each sample, which is unknown. Experience with this method suggests that a conservative error estimate for the quantified values would be 5%–10% for phyllosilicates and 5% for grain minerals.

## Results

The minerals identified (Table T2) are quartz, phyllosilicates, K-feldspars, plagioclases (sodic feldspar), calcite, dolomite, halite, and ankerite (Fe-rich dolomite, present as trace in a single sample [308-U1320A-2H-5, 44–46 cm]). Phyllosilicates typically dominate the <2  $\mu\text{m}$  fraction and are thus often

called clay minerals, even though they can occur in a wide range of size fractions. Quartz, phyllosilicates, plagioclases, and feldspars are typical detrital minerals. Dolomite can either result from in situ diagenesis or (more likely in the levee deposits considered here) can be eroded from ancient carbonate rocks and subsequently transported by fluvial processes. Calcite typically comes from benthic and pelagic foraminifers such as the ones identified in Holes U1320A and U1324B (see the “[Expedition 308 summary](#)” chapter). Halite is most likely precipitated from pore water within the sediment, and so its concentration is a function of porosity and not of the primary sedimentologic composition of the rock.

### Stratigraphic evolution of mineralogy in Hole U1320A

Lithostratigraphic Unit V (174.4–299.6 meters below seafloor [mbsf]) is characterized by an average of 23% quartz, 33%–40% phyllosilicates, 3% K-feldspar, 6% plagioclases, 12% calcite, 14% dolomite, and 1% halite (Fig. F1A, F1B). The composition of this interval is very stable, although calcite and dolomite tend to decrease uphole of 200 mbsf in favor mostly of phyllosilicates.

Lithostratigraphic Unit IV (145.3–174.4 mbsf) is characterized by an average of 30% quartz, 44%–54% phyllosilicates, 3% K-feldspar, 5% plagioclases, 3% calcite, 4% dolomite, and 1% halite (Fig. F1A, F1B). Compared to the previous intervals, carbonates are much less important and the lithology is dominated by thick sand units and turbidites (see the “[Expedition 308 summary](#)” chapter).

Lithostratigraphic Unit III (137.50–145.3 mbsf) is characterized by an average of 20% quartz, 42%–43% phyllosilicates, 15% K-feldspar, 4% plagioclases, 12% calcite, 4% dolomite, and 1% halite (Fig. F1A, F1B). This interval contains the highest amount of K-feldspar found in this study and calcite values similar to Unit V. The lithology in this interval was interpreted as hemipelagic mudstones (see the “[Expedition 308 summary](#)” chapter).

Lithostratigraphic Unit II (2.65–137.50 mbsf) is characterized by an average of 47% quartz, 30%–34% phyllosilicates, 4% K-feldspar, 4% plagioclases, 6% calcite, 4% dolomite, and 1% halite (Fig. F1A, F1B). The mineralogical composition of this interval is variable, with quartz content ranging from 16% to 83%. This variability reflects the interbedding of sandstone and mudstone identified during Expedition 308 (see the “[Expedition 308 summary](#)” chapter). No samples were analyzed from lithostratigraphic Unit I (upper 2.65 m of the hole).



## Stratigraphic evolution of mineralogy in Hole U1324B

Lithostratigraphic Unit II (364.70–600.80 mbsf) is characterized by an average of 33% quartz, 27%–30% phyllosilicates, 7% K-feldspar, 9% plagioclases, 6% calcite, 14% dolomite, and 1% halite (Fig. F2A, F2B). The composition of this interval is very stable, although quartz content starts to decrease uphole of 400 mbsf in favor mostly of dolomite and, to a lesser extent, calcite. This interval was interpreted as overbank deposits (see the “[Expedition 308 summary](#)” chapter).

Lithostratigraphic Unit I (0–364.70 mbsf) is characterized by an average of 25% quartz, 35%–39% phyllosilicates, 4% K-feldspar, 6% plagioclases, 20% calcite, 15% dolomite, and 1% halite (Fig. F2A, F2B). Dolomite content is initially very high in this interval (average = 17%; as much as 23%), but trends show a steady decline in the content of this mineral starting at the base of Subunit IID (151.0 mbsf). From Subunit IC (107 mbsf) to the top of the hole, dolomite content averages 10% with a minimum of 5%. This decrease in dolomite content is paralleled by an increase in calcite. The whole interval of Unit I was interpreted as a succession of rapidly deposited distal turbidite and intervals of discrete mass transport deposits (see the “[Expedition 308 summary](#)” chapter).

## Acknowledgments

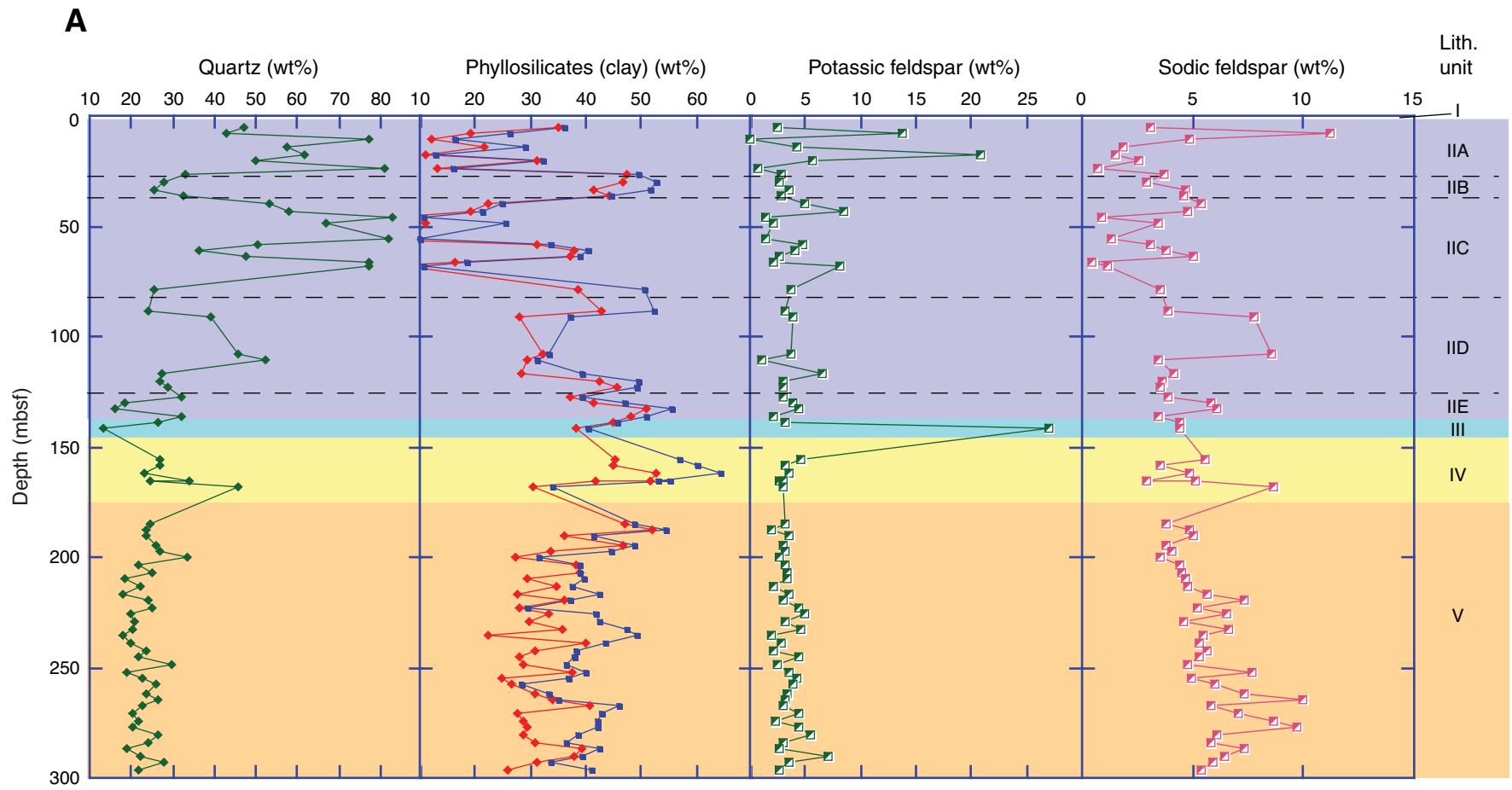
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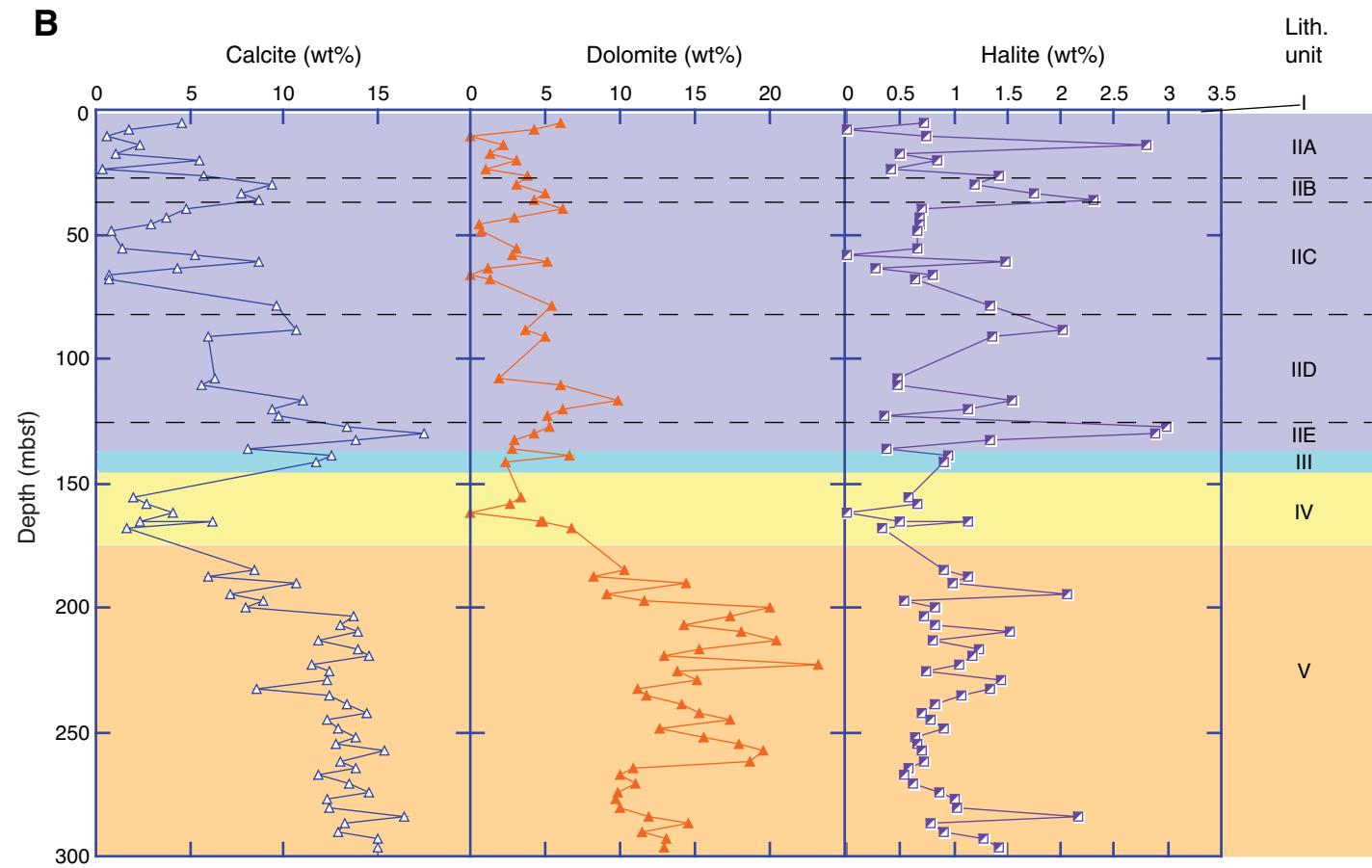
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**Figure F1.** Stratigraphic evolution of mineralogy, Hole U1320A. Results are given in percent of the bulk sediment. A. Quartz, phyllosilicates, potassic feldspar (K-feldspar), and plagioclases (sodic plagioclases). Phyllosilicates: red curve = minimum quantification values without addition of the unquantified fraction, blue curve = maximum values with the added unquantified fraction (see the “Methods” chapter for details). (Continued on next page.)



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Figure F1 (continued). B. Calcite, dolomite, and halite.



**Figure F2.** Stratigraphic evolution of mineralogy, Hole U1324B. Results are given in percent of the bulk sediment. A. Quartz, phyllosilicates, potassic feldspar (K-feldspar), and plagioclases (sodic plagioclases). Phyllosilicates: red curve = minimum quantification values without addition of the unquantified fraction, blue curve = maximum values with the added unquantified fraction (see the “Methods” chapter for details). (Continued on next page.)

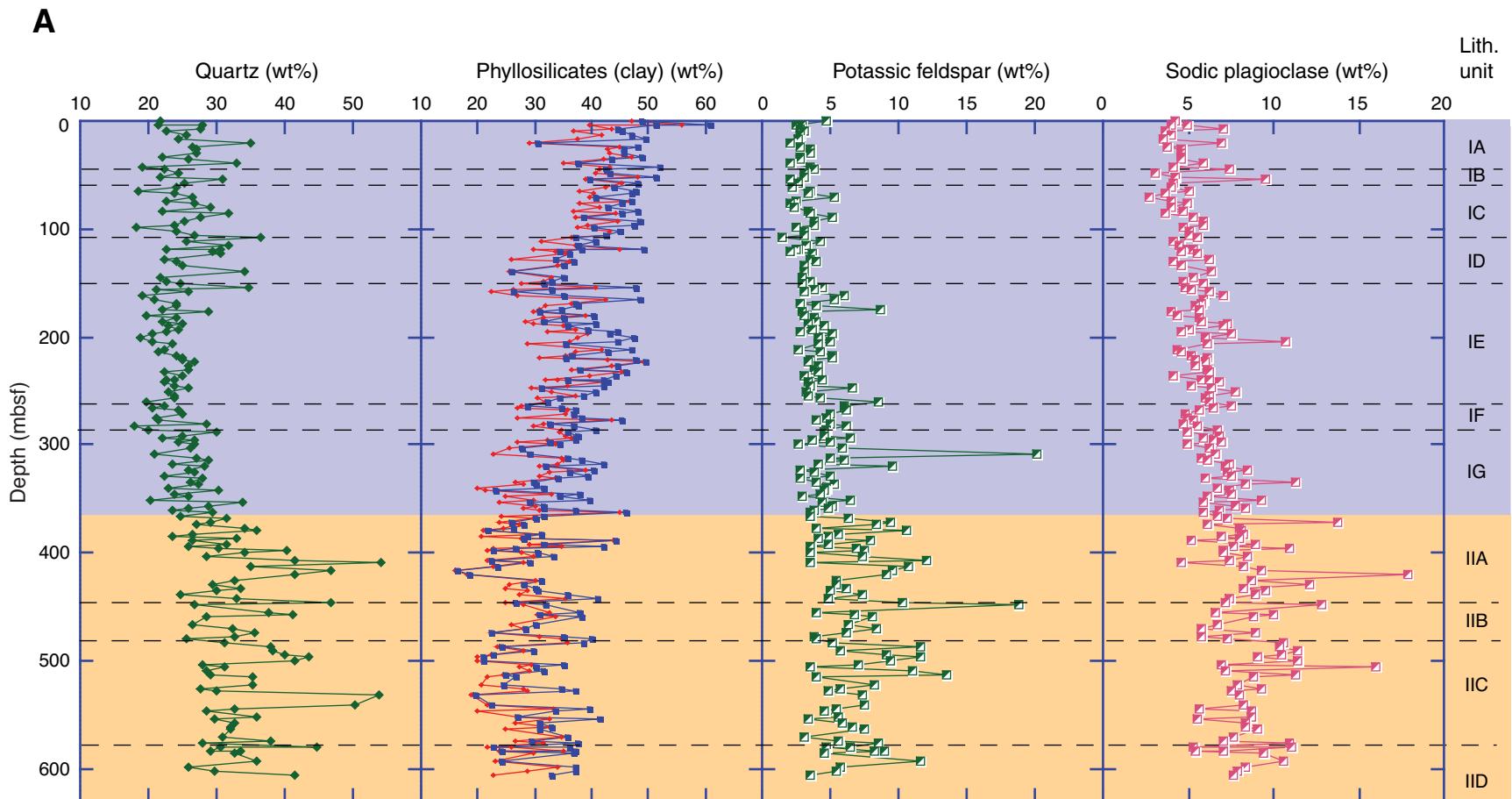
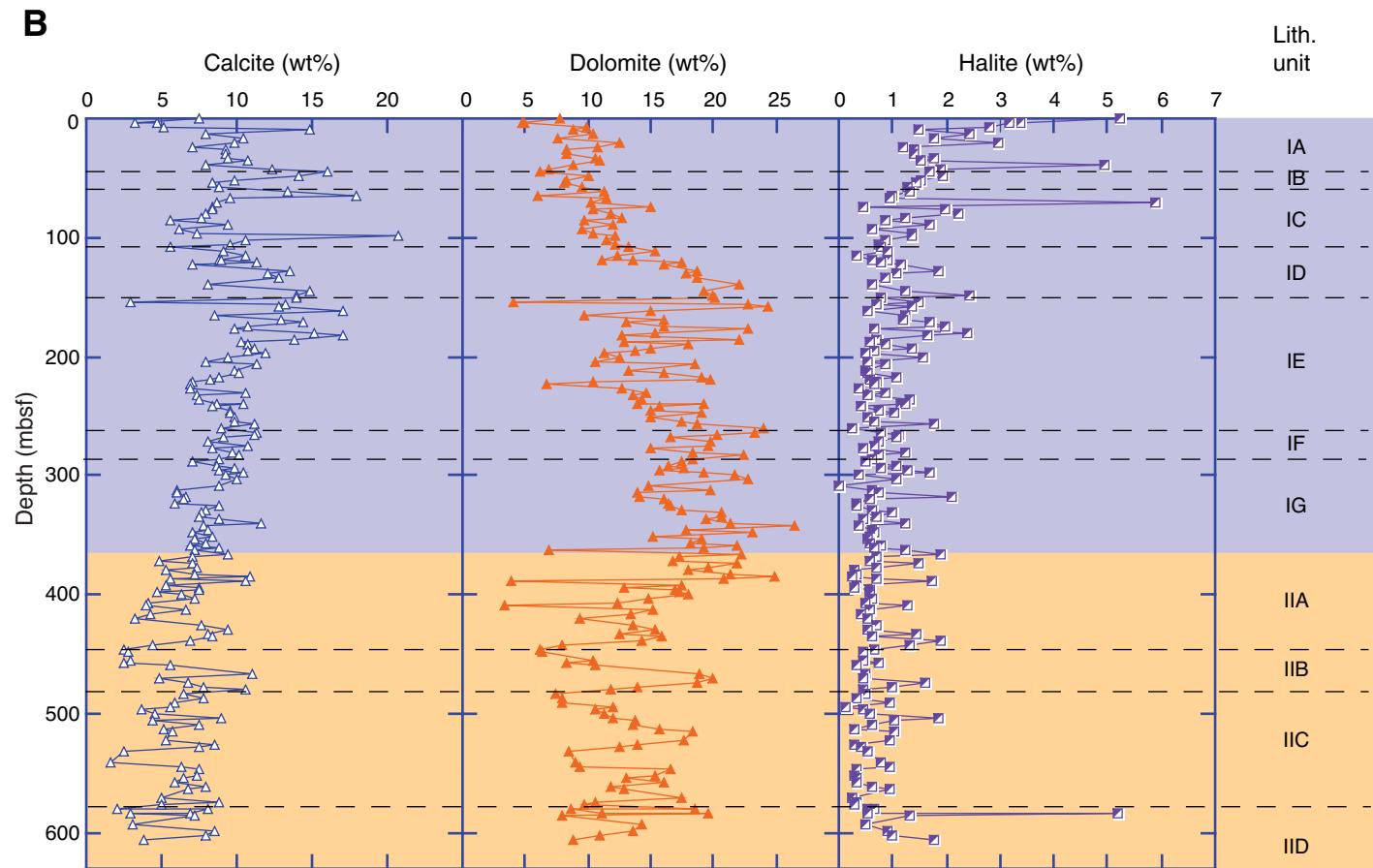


Figure F2 (continued). B. Calcite, dolomite, and halite.



**Table T1.** Bulk rock XRD analyses data. ([See table note.](#))

Mineral	<i>hkl</i>	°2θ	d(Å)	<i>I</i> <sub>o</sub> (cpm)	μ <sub>m</sub>
Phyllosilicates	—	19.900	4.460	20,000	47
Quartz	101	26.652	3.342	679,420	36
Potassic feldspar	2	27.507	3.240	72,550	51
Sodic feldspar	2	27.893	3.196	129,850	34
Calcite	104	29.406	3.035	231,380	74
Ankerite	104	30.797	2.901	346,037	108
Dolomite	104	30.939	2.888	316,840	49
Halite	200	31.693	2.821	487,807	78

Note: cpm = counts per minute.

**Table T2.** Characteristic peak analyses. (Continued on next four pages.) (See table note.)

Core, section, interval	Depth (mbsf)	Peak (cps)							
		Phyllosilicates	Quartz	K-feldspar	Plagioclase	Calcite	Dolomite	Ankerite	Halite
308-U1320A-									
2H-1, 44–46	4.94	98	4,809	69	117	249	298	0	75
2H-3, 44–46	7.94	24	3,155	286	288	30	95	0	0
2H-5, 44–46	10.94	34	6,761	0	166	33	16	0	85
3H-1, 44–46	14.44	42	4,320	76	26	65	53	0	291
3H-3, 60–62	17.6	33	6,788	731	49	52	60	0	55
3H-5, 45–47	20.45	78	3,986	131	78	253	125	0	85
4H-1, 44–46	23.94	47	17,281	21	29	24	57	0	59
4H-3, 44–46	26.94	114	2,520	64	108	255	151	0	139
4H-5, 44–46	29.94	104	1,893	57	83	396	116	0	112
5H-1, 46–48	33.46	83	1,070	33	80	245	118	0	71
5H-3, 45–47	36.45	113	2,602	64	157	419	202	0	219
5H-5, 46–48	39.46	79	8,235	151	211	326	294	0	80
6H-1, 45–47	42.95	62	6,472	263	156	186	134	0	73
6H-3, 44–47	45.94	32	9,061	65	66	207	76	0	78
6H-5, 45–47	48.95	22	4,952	37	97	41	33	0	72
7H-1, 44–47	52.44	—	—	—	—	—	—	—	—
7H-3, 44–47	55.44	29	8,169	35	33	74	145	0	77
7H-5, 44–47	58.44	84	4,195	115	96	244	115	0	0
8H-1, 45–47	61.05	100	3,027	109	116	419	241	0	143
8H-3, 45–47	64.05	102	4,734	89	189	257	91	0	27
8H-5, 45–47	66.14	51	8,056	65	14	35	0	0	94
9H-1, 45–47	67.75	21	6,642	211	38	33	62	0	71
11X-1, 42–44	78.72	78	1,375	37	71	282	94	0	69
12X-1, 45–47	88.35	92	1,600	47	79	366	101	0	153
12X-3, 45–47	91.35	47	2,737	67	204	179	121	0	36
14X-1, 47–49	107.57	89	4,522	91	299	303	83	0	50
14X-3, 46–49	110.56	80	4,377	27	106	262	252	0	49
15X-1, 44–46	117.14	62	1,258	97	87	379	333	0	96
15X-3, 44–46	120.14	88	1,233	44	74	355	195	0	106
15X-5, 44–46	123.14	94	1,645	45	98	413	196	0	32
16X-1, 107–109	127.37	86	2,433	64	107	556	199	0	275
16X-3, 45–47	129.75	85	1,167	78	152	695	151	0	253
16X-5, 41–43	132.71	109	973	68	138	519	111	0	120
17X-1, 41–43	136.31	121	2,500	48	99	357	112	0	37
17X-3, 45–47	138.65	104	1,984	68	121	601	246	0	86
17X-5, 44–46	141.64	86	983	576	118	521	86	0	81
19X-1, 45–47	155.65	98	1,576	61	104	42	96	0	57
19X-3, 45–47	158.65	93	1,404	50	75	30	57	0	65
19X-5, 45–47	161.65	127	1,553	56	114	137	0	0	0
20X-1, 46–48	165.26	136	2,967	84	121	106	243	0	50
20X-1, 46–48	165.26	104	1,610	45	118	224	183	0	109
20X-3, 44–46	168.24	80	3,802	75	274	81	292	0	34
22X-1, 44–46	184.54	115	1,885	71	108	361	397	0	86
22X-3, 42–44	187.52	123	1,764	43	139	261	324	0	109
22X-5, 44–46	190.54	72	1,533	53	113	410	508	0	91
23X-1, 47–49	194.27	115	2,099	71	132	329	394	0	196
23X-3, 47–49	197.27	79	1,844	50	88	301	373	0	51
23X-5, 47–49	200.27	62	2,451	57	100	347	733	0	80
24X-1, 42–44	203.82	86	1,537	66	121	567	639	0	66
24X-3, 41–43	206.81	88	1,805	73	123	543	533	0	75
24X-5, 41–43	209.81	55	1,098	71	129	442	572	0	92
25X-1, 44–47	213.44	89	1,745	66	131	535	791	0	73
25X-3, 47–48	216.47	48	1,129	54	126	456	482	0	81
25X-5, 41–43	219.41	84	1,781	64	230	602	520	0	107
26X-1, 45–47	223.05	73	1,964	94	166	483	943	0	97
26X-3, 46–48	225.87	62	1,224	106	151	440	448	0	68
26X-5, 44–46	228.85	65	1,352	67	125	467	525	0	132
27X-1, 44–46	232.64	78	1,429	80	159	323	388	0	125
27X-3, 44–46	235.64	32	848	21	123	377	232	0	68
27X-5, 44–46	238.64	90	1,426	59	144	553	524	0	75
28X-1, 45–47	242.35	65	1,501	44	155	512	452	0	64
28X-3, 45–47	245.35	59	1,446	96	147	431	536	0	73
28X-5, 45–47	248.35	61	1,983	53	132	503	439	0	84
29X-1, 42–44	251.92	89	1,407	74	207	613	647	0	58
29X-3, 42–44	254.92	49	1,480	90	137	487	628	0	61
29X-5, 42–44	257.92	61	1,917	83	181	678	751	0	63
30X-1, 44–46	261.54	71	1,772	70	201	579	705	0	67



Table T2 (continued). (Continued on next page.)

Core, section, interval	Depth (mbsf)	Peak (cps)							
		Phyllosilicates	Quartz	K-feldspar	Plagioclase	Calcite	Dolomite	Ankerite	Halite
30X-3, 44–46	264.54	78	1,922	69	278	582	414	0	54
30X-5, 43–45	267.53	91	1,569	65	162	499	374	0	49
31X-1, 45–47	271.15	50	1,328	72	168	478	375	0	56
31X-3, 45–47	274.15	55	1,391	47	209	566	321	0	80
31X-5, 45–47	277.15	59	1,257	70	242	437	314	0	55
32X-1, 44–46	280.74	68	1,988	118	167	559	375	0	94
32X-3, 42–44	283.72	59	1,540	64	157	626	367	0	194
32X-5, 43–45	286.73	89	1,352	57	199	547	501	0	71
33X-1, 44–46	290.34	92	1,660	154	207	615	497	0	83
33X-3, 44–46	293.34	68	1,906	74	160	618	486	0	116
33X-5, 45–47	296.35	44	1,260	47	147	513	404	0	95
308-U1324B-									
1H-1, 45–47	0.45	129	1,914	101	117	348	357	0	566
1H-3, 45–47	3.45	132	1,606	56	114	141	182	0	324
2H-1, 45–47	4.25	80	1,483	40	110	162	153	0	208
2H-3, 45–47	7.25	106	2,333	64	214	266	388	0	269
2H-5, 34–36	10.14	80	1,411	45	97	566	273	0	135
3H-1, 44–46	13.74	95	1,801	62	112	293	347	0	229
3H-3, 44–46	16.74	82	1,575	57	99	348	207	0	166
3H-5, 45–47	19.75	109	3,250	68	221	505	573	0	464
4H-1, 44–47	23.24	103	1,885	38	109	303	414	0	114
4H-3, 44–47	26.24	97	1,921	76	130	395	317	0	134
4H-5, 45–47	29.25	97	1,921	76	130	395	317	0	134
5H-1, 45–47	32.75	109	1,540	62	127	348	368	0	164
5H-3, 45–47	35.75	104	1,880	61	125	482	484	0	190
5H-5, 45–47	38.75	109	3,250	68	221	505	573	0	464
6H-1, 45–47	42.25	84	1,090	58	99	427	183	0	81
6H-3, 45–47	45.25	115	1,901	79	273	733	228	0	151
6H-5, 45–47	48.25	95	1,739	86	109	579	371	0	176
7H-1, 45–47	51.75	106	1,508	66	118	374	275	0	143
7H-3, 45–47	54.76	109	2,596	70	476	531	439	0	138
7H-5, 45–47	57.76	103	1,813	57	117	375	366	0	121
8H-1, 44–47	61.24	97	1,748	48	108	559	427	0	119
8H-3, 45–47	64.25	77	923	53	109	567	115	0	90
8H-5, 45–47	67.25	91	1,655	72	104	359	399	0	90
9H-1, 44–46	70.74	91	1,946	132	101	309	410	0	795
9H-3, 45–47	73.75	130	1,909	75	138	436	717	0	101
9H-5, 45–47	76.75	88	2,177	70	145	280	325	0	32
10H-1, 43–45	80.23	104	2,281	73	140	384	571	0	209
10H-3, 43–45	83.23	83	1,398	53	104	285	450	0	118
10H-5, 43–45	86.23	117	2,544	98	133	331	498	0	82
11H-1, 39–41	89.69	109	2,914	134	178	486	648	0	347
11H-3, 44–46	92.74	102	1,784	63	172	225	336	0	58
11H-5, 45–47	95.75	92	1,782	83	168	318	404	0	128
12H-1, 45–47	99.25	82	1,251	52	149	767	407	0	119
12H-3, 45–47	102.25	108	2,027	90	172	449	515	0	83
12H-5, 45–47	105.25	109	2,093	67	142	471	614	0	68
13H-1, 40–42	108.7	104	3,323	58	163	294	613	0	138
13H-3, 45–47	111.75	58	1,584	93	116	346	507	0	84
13H-5, 44–46	114.74	96	2,495	70	126	498	512	0	78
14H-1, 44–46	118.24	102	1,593	37	111	337	387	0	58
14H-2, 45–47	119.21	61	2,159	36	152	307	459	0	87
14H-3, 45–47	120.07	99	2,787	80	182	530	820	0	76
14H-5, 45–47	122.1	88	2,363	81	160	337	638	0	110
15H-1, 45–47	127.75	—	—	—	—	—	—	—	—
15H-3, 45–47	130.75	87	2,175	106	166	616	835	0	99
15H-5, 45–47	133.75	77	1,795	86	164	532	704	0	78
16H-1, 43–45	136.73	45	1,247	54	143	440	589	0	77
16H-3, 43–45	139.23	68	2,959	102	228	490	1034	0	60
16H-5, 45–47	141.68	—	—	—	—	—	—	—	—
17H-1, 45–47	145.35	67	1,355	61	143	566	666	0	111
17H-3, 45–47	148.35	70	1,592	73	128	569	727	0	217
17H-5, 45–47	151.35	61	1,690	64	162	541	714	0	72
18H-1, 44–46	154.14	95	2,473	77	117	42	82	0	41
18H-2, 46–48	155.66	52	1,238	60	117	469	806	0	65
18H-3, 49–51	157.19	49	1,801	66	171	491	878	0	126
19H-1, 44–46	162.44	55	1,205	102	153	613	474	0	48
19H-3, 44–46	165.44	92	1,475	94	151	323	295	0	118

Table T2 (continued). (Continued on next page.)

Core, section, interval	Depth (mbsf)	Peak (cps)							
		Phyllosilicates	Quartz	K-feldspar	Plagioclase	Calcite	Dolomite	Ankerite	Halite
19H-5, 44–46	168.44	86	1,800	79	156	571	634	0	108
20H-1, 45–47	171.25	70	1,652	83	149	557	452	0	61
20H-3, 45–47	174.25	63	1,425	184	129	406	564	0	106
20H-5, 45–47	177.25	68	2,094	86	140	500	937	0	61
21H-1, 45–47	179.45	101	1,754	102	178	723	664	0	212
21H-3, 45–47	182.45	61	1,421	81	152	616	430	0	55
21H-5, 45–47	185.45	64	1,612	79	154	550	810	0	63
22H-1, 45–47	187.35	60	1,388	53	178	353	418	0	56
22H-3, 45–47	190.35	84	1,760	104	192	570	786	0	79
22H-5, 45–47	193.35	85	1,779	79	139	466	565	0	126
23H-1, 44–46	194.24	74	1,659	60	129	451	522	0	60
23H-3, 45–47	197.25	90	1,503	110	209	457	391	0	46
24H-1, 45–47	200.85	82	1,309	66	139	359	441	0	50
24H-3, 45–47	203.85	81	1,382	89	279	303	371	0	53
24H-5, 44–46	206.84	57	1,513	89	170	394	644	0	82
25H-1, 44–46	207.94	—	—	—	—	—	—	—	—
25H-3, 45–47	210.95	94	1,569	56	124	376	466	0	46
25H-5, 45–47	213.95	81	1,508	91	129	389	572	0	51
26H-1, 44–46	216.54	82	1,772	113	146	376	781	0	101
26H-3, 45–47	219.55	67	1,481	88	142	307	721	0	54
26H-5, 45–47	222.05	103	1,867	79	154	308	408	0	68
27H-1, 45–47	222.95	124	2,090	76	183	341	305	0	62
27H-3, 45–47	225.95	103	1,934	90	154	339	538	0	36
28H-1, 44–46	229.54	84	1,893	81	172	487	594	0	80
28H-3, 44–46	232.56	113	1,806	89	177	358	566	0	49
28H-5, 44–46	235.56	91	1,808	70	118	283	519	0	51
29H-1, 45–47	239.05	55	1,313	73	134	323	494	0	110
29H-2, 45–47	240.55	78	1,579	96	173	439	725	0	114
29H-3, 45–47	242.05	105	1,879	74	193	436	676	0	40
29H-5, 45–47	245.05	77	1,657	56	146	321	500	0	70
30H-1, 45–47	247.75	71	1,961	143	179	447	769	0	95
30H-3, 45–47	250.75	72	1,549	71	191	375	539	0	49
30H-5, 45–47	253.75	86	1,755	73	174	418	669	0	61
31H-1, 45–47	257.25	68	1,664	91	166	431	675	0	69
31H-3, 45–47	260.25	74	1,506	184	173	378	982	0	69
31H-5, 45–47	263.25	63	1,617	130	207	475	880	0	72
32H-1, 45–47	265.05	60	1,274	108	153	306	619	0	104
32H-3, 45–47	268.05	85	1,853	133	157	389	668	0	102
32H-5, 45–47	271.05	89	1,881	106	130	356	776	0	69
33H-1, 43–45	274.13	60	1,476	80	112	323	671	0	62
33H-3, 45–47	277.05	113	1,790	107	177	399	617	0	42
33H-5, 44–46	280.04	74	2,146	130	160	451	740	0	116
34H-1, 45–47	282.95	63	1,230	132	153	382	805	0	69
34H-3, 45–47	285.95	79	1,417	104	191	291	594	0	60
34H-5, 45–47	288.95	82	2,268	101	141	308	685	0	48
35H-1, 45–47	290.85	81	1,781	90	186	331	589	0	104
35H-3, 45–47	293.85	84	1,613	140	163	414	671	0	73
35H-4, 44–47	295.34	73	1,923	82	183	338	568	0	123
36H-1, 44–46	296.84	60	1,727	108	197	396	692	0	64
36H-3, 47–49	299.87	83	2,127	79	168	436	909	0	36
36H-5, 44–46	302.84	59	1,930	127	174	424	866	0	100
37H-3, 45–48	309.05	48	1,453	435	147	331	525	0	0
38H-1, 45–47	311.75	85	2,073	111	166	302	814	0	59
38H-3, 45–47	314.75	81	2,106	112	148	264	551	0	71
38H-5, 45–47	317.75	76	1,609	69	179	245	515	0	110
39H-1, 45–47	319.65	75	2,167	231	227	323	668	0	54
39H-3, 45–47	322.65	98	2,051	76	294	262	653	0	32
39H-5, 45–47	325.53	72	1,871	86	210	318	598	0	33
40H-1, 44–46	328.04	64	1,430	89	214	292	628	0	58
40H-3, 44–46	331.04	89	2,546	103	239	418	882	0	93
41H-1, 44–46	333.94	53	1,836	90	329	282	770	0	69
41H-3, 48–50	336.98	64	1,974	116	211	340	711	0	42
42H-1, 44–46	339.44	36	1,317	80	189	326	658	0	116
42H-3, 45–47	342.45	62	2,296	101	214	339	1041	0	38
43H-1, 44–46	345.44	71	1,703	95	214	309	652	0	60
43H-3, 45–47	348.45	46	1,693	66	177	222	824	0	65
43H-5, 44–46	351.44	65	1,368	115	233	267	504	0	56
44H-1, 44–46	353.14	53	2,425	76	170	295	722	0	52

Table T2 (continued). (Continued on next page.)

Core, section, interval	Depth (mbsf)	Peak (cps)							
		Phyllosilicates	Quartz	K-feldspar	Plagioclase	Calcite	Dolomite	Ankerite	Halite
44H-3, 44–46	356.04	80	2,295	115	247	381	750	0	55
45X-1, 44–46	358.34	61	1,849	84	211	249	814	0	76
45X-3, 45–47	361.35	69	1,667	83	195	338	671	0	62
46X-1, 45–47	362.85	128	2,315	78	169	355	306	0	165
46X-3, 43–45	365.83	47	1,718	79	192	318	786	0	29
47H-1, 45–47	368.45	74	2,436	154	223	325	685	0	66
47H-3, 42–44	371.42	59	2,270	216	412	217	682	0	58
48H-1, 45–47	373.65	71	2,232	218	226	386	996	0	140
48H-3, 45–47	376.65	59	2,616	91	234	322	780	0	69
48H-5, 45–47	379.65	72	3,175	472	328	365	915	0	28
49H-1, 44–46	381.94	83	2,429	145	275	396	922	0	126
49H-3, 44–46	384.94	35	1,513	86	172	170	754	0	24
49H-4, 44–46	386.35	75	2,954	94	258	381	947	0	69
50H-1, 45–47	388.35	136	2,122	179	144	448	145	0	162
50H-3, 45–47	391.35	71	2,367	90	235	190	667	0	31
50H-5, 45–47	393.85	70	1,705	57	192	238	433	0	28
51X-2, 45–47	396.45	52	2,253	156	320	299	635	0	57
52X-1, 45–47	397.25	75	3,820	212	257	248	829	0	58
52X-3, 45–47	400.25	67	2,621	79	207	279	723	0	56
52X-5, 45–47	403.25	71	2,165	166	244	315	581	0	58
53X-1, 41–43	406.81	58	3,877	309	255	239	576	0	52
53X-2, 42–44	408.32	73	5,192	86	146	193	145	0	137
53X-5, 38–40	412.78	56	3,121	247	246	296	614	0	56
54X-1, 103–105	417.03	43	4,303	253	319	254	612	0	44
54X-3, 45–47	419.45	48	3,646	224	572	157	404	0	56
55X-1, 45–47	426.15	77	2,606	146	284	381	567	0	68
55X-3, 45–47	429.15	59	2,155	122	353	370	567	0	53
55X-5, 45–47	432.15	50	2,278	116	211	267	417	0	36
56X-1, 45–46	435.75	66	2,217	111	277	326	587	0	61
56X-3, 45–47	438.75	55	1,456	142	228	209	485	0	98
56X-5, 45–47	441.75	82	2,226	92	192	130	239	0	35
57X-1, 45–47	445.45	64	4,103	283	242	116	302	0	70
57X-3, 45–47	448.45	57	1,568	405	349	124	254	0	43
58X-1, 44–46	455.04	69	2,847	71	202	91	394	0	47
58X-3, 44–46	458.04	88	4,089	212	381	153	474	0	81
58X-4, 45–47	459.55	80	2,153	164	231	160	303	0	31
59X-3, 45–47	466.59	49	1,823	104	174	409	669	0	52
59X-5, 45–47	469.59	87	3,431	273	217	332	997	0	47
60X-1, 45–47	474.35	71	3,639	159	378	427	924	0	172
60X-3, 45–47	477.35	76	2,565	68	152	231	473	0	104
60X-5, 45–47	480.35	80	1,768	72	197	392	402	0	47
61X-1, 45–47	483.95	95	2,618	130	342	313	328	0	53
61X-3, 45–47	486.95	65	3,465	433	394	422	386	0	141
61X-5, 47–49	489.97	76	3,298	146	374	293	358	0	102
62X-1, 51–53	493.61	73	4,135	284	436	363	719	0	100
62X-3, 45–47	496.43	55	3,929	330	317	188	510	0	52
62X-5, 45–47	499.43	52	3,564	246	364	167	459	0	65
63X-1, 50–52	503.2	67	2,017	169	216	328	422	0	190
63X-3, 47–49	506.17	74	2,603	89	527	217	618	0	112
63X-5, 43–45	509.13	75	2,254	270	237	306	534	0	63
64X-1, 45–47	512.85	76	2,750	379	404	308	798	0	30
64X-3, 45–47	514.57	53	2,847	99	288	233	717	0	44
65X-1, 45–47	522.35	55	2,980	205	254	259	774	0	100
65X-3, 45–47	525.35	58	1,958	93	265	302	513	0	28
65X-5, 45–47	528.35	70	2,291	87	220	204	405	0	46
66X-1, 44–46	532.04	62	6,677	207	304	139	433	0	67
67X-1, 45–47	541.55	66	5,112	185	294	153	521	0	93
67X-3, 45–47	544.55	67	1,512	109	149	196	304	0	97
67X-5, 45–47	547.07	33	1,341	90	241	269	574	0	34
68X-1, 46–49	551.16	82	4,490	165	313	457	772	0	33
68X-3, 45–47	554.15	71	2,218	84	176	253	522	0	37
68X-5, 45–47	557.15	69	2,677	148	270	235	701	0	36
69X-1, 45–47	560.85	87	2,782	177	294	388	579	0	66
69X-3, 45–47	563.85	48	2,483	163	266	268	479	0	99
70X-1, 44–46	570.44	108	2,845	114	289	314	815	0	43
70X-3, 44–46	573.44	67	3,104	115	223	374	410	0	35
70X-5, 44–46	576.44	57	1,652	126	238	142	285	0	32
71X-1, 46–48	580.06	65	4,484	168	176	190	929	0	58

**Table T2 (continued).**

Core, section, interval	Depth (mbsf)	Peak (cps)							
		Phyllosilicates	Quartz	K-feldspar	Plagioclase	Calcite	Dolomite	Ankerite	Halite
71X-1, 47–49	580.07	55	1,918	71	291	198	193	0	70
71X-3, 44–46	583.04	91	2,390	201	223	326	475	0	57
71X-3, 45–47	583.05	81	3,392	242	202	187	1069	0	545
71X-5, 45–47	586.05	82	2,304	68	264	252	258	0	44
73X-1, 44–46	593.64	84	3,997	440	637	242	803	0	55
74X-1, 42–44	599.02	82	1,905	111	260	301	475	0	95
74X-3, 45–47	602.05	59	1,507	109	233	296	418	0	86
74X-5, 45–47	605.05	34	2,952	26	226	38	256	0	71

Note: cps = counts per second, — = no data.

**Table T3.** Bulk rock analyses quantified results. (Continued on next four pages.) (See table note.)

Core, section, interval (cm)	Depth (mbsf)	Abundance (wt%)								
		Phyllosilicates	Quartz	K-feldspar	Plagioclase	Calcite	Dolomite	Ankerite	Halite	Unquantified
308-U1320A-										
2H-1, 44–46	4.9	35.2	47.0	2.5	3.1	4.6	6.0	0.0	0.7	0.9
2H-3, 44–46	7.9	19.3	42.8	13.8	11.2	1.7	4.3	0.0	0.0	6.9
2H-5, 44–46	10.9	12.0	77.4	0.0	4.8	0.6	0.0	0.1	0.7	4.2
3H-1, 44–46	14.4	21.6	57.3	4.2	1.8	2.4	2.3	0.0	2.8	7.6
3H-3, 60–62	17.6	11.2	61.9	20.8	1.5	1.0	1.3	0.0	0.5	1.7
3H-5, 45–47	20.5	31.2	50.1	5.6	2.6	5.5	3.0	0.0	0.8	1.2
4H-1, 44–46	23.9	13.3	81.0	0.6	0.7	0.4	1.0	0.0	0.4	2.6
4H-3, 44–46	26.9	47.3	32.9	2.8	3.7	5.8	3.8	0.0	1.4	2.2
4H-5, 44–46	29.9	46.7	27.9	2.6	3.0	9.4	3.0	0.0	1.2	6.2
5H-1, 46–48	33.5	41.6	25.7	3.6	4.7	7.8	5.1	0.0	1.8	9.9
5H-3, 45–47	36.5	44.1	32.6	2.9	4.6	8.7	4.2	0.0	2.3	0.7
5H-5, 46–48	39.5	22.4	53.2	4.9	5.3	4.9	6.1	0.0	0.7	2.4
6H-1, 45–47	43.0	19.3	58.0	8.5	4.8	3.8	3.0	0.0	0.7	2.1
6H-3, 44–47	45.9	9.2	82.9	1.5	0.9	3.0	0.6	0.0	0.7	1.3
6H-5, 45–47	49.0	11.1	66.8	2.1	3.5	0.8	0.7	0.0	0.7	14.3
7H-1, 44–47	52.4	—	—	—	—	—	—	—	—	—
7H-3, 44–47	55.4	9.2	82.0	1.5	1.3	1.4	3.1	0.0	0.7	0.9
7H-5, 44–47	58.4	31.0	50.3	4.8	3.1	5.2	2.7	0.0	0.0	2.7
8H-1, 45–47	61.1	38.0	36.5	4.0	3.8	8.7	5.2	0.0	1.5	2.4
8H-3, 45–47	64.1	37.1	47.5	2.7	5.0	4.4	1.1	0.0	0.3	2.0
8H-5, 45–47	66.1	16.2	77.4	2.1	0.4	0.7	0.0	0.0	0.8	2.4
9H-1, 45–47	67.8	8.7	77.3	8.2	1.1	0.7	1.4	0.0	0.6	2.1
11X-1, 42–44	78.7	38.4	25.7	3.8	3.5	9.6	5.4	0.0	1.3	12.2
12X-1, 45–47	88.4	42.8	24.3	3.2	3.9	10.7	3.7	0.0	2.0	9.5
12X-3, 45–47	91.4	27.9	39.0	3.9	7.8	6.0	4.9	0.0	1.4	9.2
14X-1, 47–49	107.6	32.4	45.7	3.7	8.5	6.4	1.9	0.0	0.5	0.8
14X-3, 46–49	110.6	29.5	52.1	1.1	3.4	5.6	6.0	0.0	0.5	1.8
15X-1, 44–46	117.1	28.2	27.4	6.5	4.2	11.1	9.9	0.0	1.5	11.3
15X-3, 44–46	120.1	42.5	27.0	3.1	3.7	9.5	6.2	0.0	1.1	7.1
15X-5, 44–46	123.1	45.7	28.9	3.1	3.5	9.7	5.1	0.0	0.3	3.7
16X-1, 107–109	127.4	37.0	32.2	3.0	3.9	13.4	5.3	0.0	3.0	2.2
16X-3, 45–47	129.8	41.4	18.5	3.8	5.8	17.5	4.2	0.0	2.9	5.8
16X-5, 41–43	132.7	50.9	16.0	4.3	6.1	13.9	3.0	0.0	1.3	4.5
17X-1, 41–43	136.3	48.1	32.2	2.1	3.4	8.2	2.8	0.0	0.4	2.7
17X-3, 45–47	138.7	45.0	26.5	3.2	4.4	12.5	6.6	0.0	0.9	0.8
17X-5, 44–46	141.6	38.2	13.1	27.0	4.4	11.8	2.4	0.0	0.9	2.2
19X-1, 45–47	155.7	45.4	26.8	4.7	5.5	2.0	3.4	0.0	0.6	11.7
19X-3, 45–47	158.7	44.8	27.0	3.2	3.6	2.7	2.7	0.0	0.7	15.5
19X-5, 45–47	161.7	52.5	23.2	3.5	4.9	4.1	0.0	0.0	0.0	11.8
20X-1, 46–48	165.3	51.7	33.9	2.7	2.9	2.3	4.9	0.0	0.5	1.3
20X-1, 46–48	165.3	41.9	24.7	3.0	5.1	6.2	4.7	0.0	1.1	13.3
20X-3, 44–46	168.2	30.5	45.7	3.0	8.6	1.7	6.8	0.0	0.3	3.4
22X-1, 44–46	184.5	46.9	24.5	3.2	3.8	8.4	10.3	0.0	0.9	1.9
22X-3, 42–44	187.5	51.9	23.5	1.9	4.8	6.0	8.3	0.0	1.1	2.4
22X-5, 44–46	190.5	36.0	23.8	3.6	5.1	10.8	14.4	0.0	1.0	5.5
23X-1, 47–49	194.3	46.9	26.0	3.1	3.8	7.2	9.2	0.0	2.1	1.8
23X-3, 47–49	197.3	33.8	27.0	3.2	4.1	9.0	11.7	0.0	0.5	10.8
23X-5, 47–49	200.3	27.5	33.7	2.6	3.5	8.0	20.0	0.0	0.8	4.0
24X-1, 42–44	203.8	38.4	21.6	3.1	4.5	13.8	17.3	0.0	0.7	0.6
24X-3, 41–43	206.8	38.8	25.1	3.4	4.5	13.1	14.3	0.0	0.8	0.0
24X-5, 41–43	209.8	29.6	18.6	3.4	4.7	14.0	18.1	0.0	1.5	10.2
25X-1, 44–47	213.4	34.6	22.3	2.1	4.8	11.8	20.5	0.0	0.8	3.1
25X-3, 47–48	216.5	27.6	17.9	3.6	5.7	14.0	15.3	0.0	1.2	14.8
25X-5, 41–43	219.4	36.0	23.9	3.0	7.4	14.5	13.0	0.0	1.2	1.0
26X-1, 45–47	223.1	27.9	25.0	4.4	5.2	11.5	23.2	0.0	1.0	1.7
26X-3, 46–48	225.9	33.5	19.7	5.0	6.6	12.5	13.9	0.0	0.7	8.2
26X-5, 44–46	228.9	29.9	20.9	3.2	4.6	12.3	15.1	0.0	1.4	12.6
27X-1, 44–46	232.6	35.6	20.4	4.6	6.7	8.6	11.1	0.0	1.3	11.8
27X-3, 44–46	235.6	22.3	17.9	2.0	5.5	12.4	11.8	0.0	1.1	27.0
27X-5, 44–46	238.6	40.1	20.0	2.8	5.3	13.4	14.2	0.0	0.8	3.4
28X-1, 45–47	242.4	30.7	23.8	2.1	5.6	14.5	15.3	0.0	0.7	7.4
28X-3, 45–47	245.4	27.8	21.9	4.5	5.3	12.3	17.3	0.0	0.8	10.0
28X-5, 45–47	248.4	28.7	29.8	2.5	4.7	13.0	12.7	0.0	0.9	7.8
29X-1, 42–44	251.9	37.7	18.8	3.5	7.6	13.9	15.5	0.0	0.6	2.4
29X-3, 42–44	254.9	24.9	22.5	4.2	5.0	12.8	17.9	0.0	0.7	12.1
29X-5, 42–44	257.9	26.4	26.1	4.0	6.0	15.4	19.6	0.0	0.7	1.9
30X-1, 44–46	261.5	30.8	23.6	3.3	7.3	13.1	18.7	0.0	0.7	2.6
30X-3, 44–46	264.5	34.0	26.3	3.2	10.0	13.8	10.9	0.0	0.6	1.2

Table T3 (continued). (Continued on next page.)

Core, section, interval (cm)	Depth (mbsf)	Abundance (wt%)								
		Phyllosilicates	Quartz	K-feldspar	Plagioclase	Calcite	Dolomite	Ankerite	Halite	Unquantified
30X-5, 43–45	267.5	40.8	22.7	3.0	5.9	11.9	9.9	0.0	0.5	5.2
31X-1, 45–47	271.2	27.5	20.5	4.3	7.1	13.6	11.0	0.0	0.6	15.4
31X-3, 45–47	274.2	28.7	21.6	2.2	8.7	14.6	9.9	0.0	0.9	13.6
31X-5, 45–47	277.2	29.5	20.6	4.5	9.7	12.3	9.8	0.0	1.0	12.7
32X-1, 44–46	280.7	28.8	26.4	5.5	6.0	12.4	10.0	0.0	1.0	9.8
32X-3, 42–44	283.7	30.8	23.9	3.1	5.8	16.5	12.0	0.0	2.2	5.8
32X-5, 43–45	286.7	39.5	19.1	2.7	7.3	13.2	14.6	0.0	0.8	2.9
33X-1, 44–46	290.3	38.0	22.1	7.0	6.4	13.0	11.4	0.0	0.9	1.1
33X-3, 44–46	293.3	31.3	27.7	3.5	5.9	15.0	13.1	0.0	1.3	2.3
33X-5, 45–47	296.4	26.0	21.7	2.6	5.4	15.0	12.9	0.0	1.4	15.1
308-U1324B-										
1H-1, 45–47	0.5	47.1	21.8	4.8	4.3	7.5	7.7	0.0	5.2	1.7
1H-3, 45–47	3.5	56.0	21.4	2.5	4.0	3.3	4.7	0.0	3.4	4.7
2H-1, 45–47	4.3	39.7	27.9	2.9	5.0	4.8	5.0	0.0	3.2	11.6
2H-3, 45–47	7.3	43.6	27.7	2.9	7.0	5.1	9.9	0.0	2.8	1.1
2H-5, 34–36	10.1	37.0	22.7	3.1	3.6	14.9	8.9	0.0	1.5	8.4
3H-1, 44–46	13.7	41.7	25.7	2.8	4.0	7.9	10.3	0.0	2.4	5.2
3H-3, 44–46	16.7	37.7	24.6	2.6	3.5	10.5	7.7	0.0	1.8	11.7
3H-5, 45–47	19.8	29.0	35.1	2.1	7.0	9.9	12.5	0.0	3.0	1.5
4H-1, 44–47	23.2	44.9	26.5	2.8	3.8	7.0	10.7	0.0	1.2	3.2
4H-3, 44–47	26.2	42.8	27.1	3.5	4.6	9.3	8.3	0.0	1.4	3.0
4H-5, 45–47	29.3	43.2	27.1	3.5	4.6	9.3	8.3	0.0	1.4	2.6
5H-1, 45–47	32.8	47.2	22.0	2.9	4.5	9.3	10.7	0.0	1.8	1.6
5H-3, 45–47	35.8	42.0	26.0	2.9	4.5	10.8	10.9	0.0	1.5	1.4
5H-5, 45–47	38.8	34.9	32.9	2.1	5.9	8.0	8.8	0.0	4.9	2.5
6H-1, 45–47	42.3	43.1	19.2	3.6	4.1	12.3	6.9	0.0	1.9	9.0
6H-3, 45–47	45.3	41.3	22.3	3.8	7.5	16.0	6.2	0.0	1.7	1.2
6H-5, 45–47	48.3	40.7	24.5	3.1	3.1	14.1	10.1	0.0	1.9	2.5
7H-1, 45–47	51.8	48.1	21.7	3.1	4.2	9.9	8.3	0.0	1.5	3.3
7H-3, 45–47	54.8	39.0	30.8	2.1	9.6	8.5	8.1	0.0	1.4	0.6
7H-5, 45–47	57.8	45.3	25.3	2.6	4.2	8.8	9.6	0.0	1.3	2.9
8H-1, 44–47	61.2	42.3	24.1	2.3	4.0	13.3	11.2	0.0	1.3	1.5
8H-3, 45–47	64.3	37.8	18.7	3.6	5.1	18.0	6.0	0.0	1.0	9.9
8H-5, 45–47	67.3	40.4	23.9	3.3	3.7	9.6	11.4	0.0	1.0	6.8
9H-1, 44–46	70.7	39.8	26.5	5.3	2.7	8.7	10.2	0.0	5.9	1.0
9H-3, 45–47	73.8	46.6	22.7	2.5	4.0	8.4	15.0	0.0	0.5	0.4
9H-5, 45–47	76.8	37.8	26.9	2.1	5.0	8.5	10.5	0.0	2.0	7.4
10H-1, 43–45	80.2	41.5	29.1	2.3	4.0	8.0	11.7	0.0	2.2	1.2
10H-3, 43–45	83.2	36.8	22.0	3.4	4.7	7.7	12.8	0.0	1.3	11.4
10H-5, 43–45	86.2	44.1	31.7	3.5	3.7	5.6	9.7	0.0	0.8	1.0
11H-1, 39–41	89.7	37.0	27.8	5.2	5.4	9.5	12.0	0.0	1.7	1.5
11H-3, 44–46	92.7	44.7	25.4	3.8	5.9	6.1	9.6	0.0	0.6	3.9
11H-5, 45–47	95.8	39.2	23.9	3.8	5.9	7.4	10.4	0.0	1.3	8.0
12H-1, 45–47	99.3	37.5	18.2	2.6	4.7	20.8	12.2	0.0	1.4	2.7
12H-3, 45–47	102.3	43.2	24.0	3.1	5.1	10.6	11.5	0.0	0.9	1.6
12H-5, 45–47	105.3	42.3	26.8	3.1	5.1	9.6	12.2	0.0	0.7	0.3
13H-1, 40–42	108.7	36.6	36.3	1.5	5.5	5.6	13.2	0.0	0.8	0.6
13H-3, 45–47	111.8	31.1	25.5	4.3	4.1	9.2	15.3	0.0	0.9	9.6
13H-5, 44–46	114.7	37.0	31.7	3.2	4.5	10.5	12.3	0.0	0.3	0.4
14H-1, 44–46	118.2	44.8	22.6	2.7	5.0	8.9	11.0	0.0	0.6	4.5
14H-2, 45–47	119.2	29.6	30.6	2.4	5.3	9.0	13.7	0.0	0.9	8.5
14H-3, 45–47	120.1	33.6	29.5	2.1	4.5	11.4	17.5	0.0	0.8	0.6
14H-5, 45–47	122.1	35.4	30.5	3.6	5.6	7.1	16.0	0.0	1.1	0.6
15H-1, 45–47	127.8	—	—	—	—	—	—	—	—	—
15H-3, 45–47	130.8	36.1	24.1	4.0	4.1	12.1	17.8	0.0	1.1	0.8
15H-5, 45–47	133.8	33.9	24.9	3.0	4.5	12.8	18.8	0.0	0.8	1.2
16H-1, 43–45	136.7	25.8	22.5	3.6	6.2	13.6	18.8	0.0	1.9	7.8
16H-3, 43–45	139.2	25.5	34.1	3.1	6.4	8.1	22.0	0.0	0.6	0.2
16H-5, 45–47	141.7	—	—	—	—	—	—	—	—	—
17H-1, 45–47	145.4	33.0	21.6	2.9	5.3	14.9	19.2	0.0	1.2	1.9
17H-3, 45–47	148.4	31.6	22.6	3.5	4.8	14.0	19.9	0.0	2.4	1.3
17H-5, 45–47	151.4	27.7	24.8	3.0	5.9	14.0	20.1	0.0	0.8	3.7
18H-1, 44–46	154.1	40.8	34.8	4.3	4.9	2.9	4.0	0.0	1.5	6.9
18H-2, 46–48	155.7	26.1	21.3	3.8	5.2	13.2	22.7	0.0	0.7	6.9
18H-3, 49–51	157.2	22.4	25.9	3.1	6.2	12.8	24.4	0.0	1.4	3.9
19H-1, 44–46	162.4	26.9	19.2	6.0	7.1	17.1	15.0	0.0	0.5	8.2
19H-3, 44–46	165.4	42.6	21.0	5.3	5.9	8.6	9.7	0.0	1.3	5.8
19H-5, 44–46	168.4	36.5	24.2	2.8	5.7	12.9	16.1	0.0	1.2	0.7

Table T3 (continued). (Continued on next page.)

Core, section, interval (cm)	Depth (mbsf)	Abundance (wt%)								
		Phyllosilicates	Quartz	K-feldspar	Plagioclase	Calcite	Dolomite	Ankerite	Halite	Unquantified
20H-1, 45–47	171.3	31.9	24.0	3.9	5.4	14.5	13.1	0.0	1.7	5.5
20H-3, 45–47	174.3	30.8	22.1	8.6	5.7	10.8	16.0	0.0	2.0	4.1
20H-5, 45–47	177.3	29.7	28.8	3.0	4.0	9.9	22.8	0.0	0.7	1.3
21H-1, 45–47	179.5	39.0	19.7	3.0	4.3	15.1	15.3	0.0	2.4	1.2
21H-3, 45–47	182.5	31.5	24.0	3.9	5.6	17.1	12.8	0.0	1.7	3.5
21H-5, 45–47	185.5	28.4	22.0	4.0	5.8	13.8	22.0	0.0	0.7	3.3
22H-1, 45–47	187.4	29.8	24.9	3.5	7.3	10.3	12.9	0.0	0.6	10.8
22H-3, 45–47	190.4	35.2	23.1	4.6	7.0	10.8	18.0	0.0	0.9	0.5
22H-5, 45–47	193.4	37.2	24.5	3.7	5.0	11.1	15.0	0.0	1.4	2.1
23H-1, 44–46	194.2	32.3	22.8	2.8	4.6	10.7	13.8	0.0	0.6	12.4
23H-3, 45–47	197.3	39.1	20.6	5.1	7.5	11.9	11.3	0.0	0.5	4.0
24H-1, 45–47	200.9	37.6	18.9	4.1	6.0	9.5	12.6	0.0	1.6	9.9
24H-3, 45–47	203.9	36.1	20.5	5.0	10.8	8.0	10.5	0.0	0.6	8.6
24H-5, 44–46	206.8	28.7	23.7	4.1	6.1	11.3	18.5	0.0	0.9	6.8
25H-1, 44–46	207.9	—	—	—	—	—	—	—	—	—
25H-3, 45–47	211.0	41.7	22.3	2.6	4.4	9.9	13.2	0.0	0.5	5.5
25H-5, 45–47	214.0	37.1	21.6	4.2	4.6	10.2	16.1	0.0	0.5	5.6
26H-1, 44–46	216.5	35.4	24.1	5.2	5.2	8.9	19.0	0.0	1.1	1.1
26H-3, 45–47	219.6	30.8	25.0	5.1	6.1	8.2	19.8	0.0	0.6	4.5
26H-5, 45–47	222.1	42.8	24.9	3.6	5.4	7.1	10.5	0.0	0.7	5.1
27H-1, 45–47	223.0	49.2	26.7	3.4	6.0	6.9	6.8	0.0	0.6	0.3
27H-3, 45–47	226.0	43.7	25.8	4.1	5.4	7.0	12.7	0.0	0.4	1.0
28H-1, 44–46	229.5	36.6	25.9	3.8	6.2	10.6	14.7	0.0	0.9	1.5
28H-3, 44–46	232.6	45.2	22.2	4.0	6.2	7.3	13.7	0.0	0.5	0.8
28H-5, 44–46	235.6	39.7	25.1	3.2	4.1	7.6	14.3	0.0	1.3	4.7
29H-1, 45–47	239.1	32.0	23.9	4.4	5.8	8.6	14.0	0.0	1.2	10.2
29H-2, 45–47	240.6	34.1	22.7	4.5	6.2	10.5	19.2	0.0	1.2	1.5
29H-3, 45–47	242.1	42.3	22.5	3.4	6.8	8.3	15.7	0.0	0.4	0.6
29H-5, 45–47	245.1	35.9	23.8	3.6	5.1	9.6	15.0	0.0	0.7	6.4
30H-1, 45–47	247.8	29.6	26.0	6.6	6.4	9.6	19.1	0.0	1.0	1.7
30H-3, 45–47	250.8	33.0	23.0	3.3	7.8	9.8	15.0	0.0	0.5	7.7
30H-5, 45–47	253.8	37.1	23.9	3.4	6.2	9.9	17.5	0.0	0.6	1.4
31H-1, 45–47	257.3	30.6	23.8	4.2	5.9	11.2	18.8	0.0	1.8	3.8
31H-3, 45–47	260.3	31.8	19.7	8.5	6.2	9.0	24.0	0.0	0.2	0.6
31H-5, 45–47	263.3	27.6	22.3	6.1	7.5	11.4	23.4	0.0	0.8	1.1
32H-1, 45–47	265.1	27.0	20.5	6.0	6.5	11.2	20.2	0.0	1.1	7.5
32H-3, 45–47	268.1	35.9	24.3	6.1	5.6	9.1	16.6	0.0	1.1	1.3
32H-5, 45–47	271.1	35.5	24.9	5.1	4.8	8.0	19.8	0.0	0.7	1.3
33H-1, 43–45	274.1	26.9	21.1	4.7	5.0	10.8	19.7	0.0	0.7	11.3
33H-3, 45–47	277.1	43.6	21.6	3.9	5.3	8.4	15.1	0.0	0.4	1.8
33H-5, 44–46	280.0	31.4	28.5	5.0	4.8	9.7	18.3	0.0	1.2	1.1
34H-1, 45–47	283.0	29.6	18.0	6.2	5.5	10.2	22.4	0.0	0.7	7.3
34H-3, 45–47	286.0	34.8	20.1	4.7	6.7	8.8	18.4	0.0	0.6	6.0
34H-5, 45–47	289.0	34.4	30.0	4.5	4.9	7.1	17.4	0.0	0.5	1.1
35H-1, 45–47	290.9	35.6	25.0	4.6	6.8	8.7	16.3	0.0	1.1	2.0
35H-3, 45–47	293.9	36.5	22.1	6.5	5.8	9.8	17.7	0.0	0.8	0.7
35H-4, 44–47	295.3	32.1	26.8	3.7	6.4	8.9	15.7	0.0	1.3	5.2
36H-1, 44–46	296.8	26.9	24.3	5.0	7.0	10.4	19.2	0.0	1.7	5.6
36H-3, 47–49	299.9	33.7	26.8	2.7	5.0	9.2	21.7	0.0	0.4	0.6
36H-5, 44–46	302.8	25.5	26.3	5.9	6.2	10.0	22.7	0.0	1.1	2.2
37H-3, 45–48	309.1	22.9	20.8	20.1	6.6	8.8	14.8	0.0	0.0	6.0
38H-1, 45–47	311.8	34.8	27.0	5.0	5.8	6.0	19.8	0.0	0.6	1.1
38H-3, 45–47	314.8	35.0	28.8	6.0	6.1	6.0	14.0	0.0	0.7	3.3
38H-5, 45–47	317.8	34.1	23.4	4.1	7.5	6.7	14.2	0.0	2.1	7.9
39H-1, 45–47	319.7	30.9	28.3	9.6	7.1	6.5	16.1	0.0	0.6	1.1
39H-3, 45–47	322.7	38.9	26.0	2.8	8.5	5.9	16.3	0.0	0.3	1.3
39H-5, 45–47	325.5	32.6	26.9	3.9	7.3	8.9	16.6	0.0	0.3	3.6
40H-1, 44–46	328.0	30.7	22.3	5.0	7.5	7.9	17.5	0.0	0.6	8.5
40H-3, 44–46	331.0	33.8	28.0	2.8	6.0	7.7	20.6	0.0	1.0	0.2
41H-1, 44–46	333.9	26.7	26.1	4.0	11.3	7.5	20.6	0.0	0.7	3.2
41H-3, 48–50	337.0	27.9	27.5	5.2	8.4	8.9	19.5	0.0	0.4	2.3
42H-1, 44–46	339.4	19.8	23.0	4.7	6.7	11.6	21.3	0.0	1.2	11.7
42H-3, 45–47	342.5	21.2	30.4	4.5	7.4	7.8	26.5	0.0	0.4	1.8
43H-1, 44–46	345.4	32.8	23.8	4.3	7.5	8.2	17.8	0.0	0.6	5.1
43H-3, 45–47	348.5	24.9	25.9	3.0	6.1	7.0	23.1	0.0	0.7	9.4
43H-5, 44–46	351.4	29.8	20.3	6.5	9.3	8.4	15.1	0.0	0.6	10.1
44H-1, 44–46	353.1	23.7	33.8	4.5	5.8	7.2	19.1	0.0	0.5	5.5
44H-3, 44–46	356.0	30.1	28.8	5.2	7.8	8.0	18.2	0.0	0.6	1.4
45X-1, 44–46	358.3	27.9	25.9	4.8	8.4	6.9	21.9	0.0	0.8	3.5

Table T3 (continued). (Continued on next page.)

Core, section, interval (cm)	Depth (mbsf)	Abundance (wt%)								
		Phyllosilicates	Quartz	K-feldspar	Plagioclase	Calcite	Dolomite	Ankerite	Halite	Unquantified
45X-3, 45–47	361.4	30.7	23.6	3.8	6.9	8.9	19.2	0.0	0.7	6.4
46X-1, 45–47	362.9	45.0	29.3	3.5	5.9	7.2	6.9	0.0	1.2	0.9
46X-3, 43–45	365.8	24.1	24.6	3.6	6.7	9.5	22.2	0.0	1.9	7.4
47H-1, 45–47	368.5	29.9	31.3	6.3	7.3	7.1	17.2	0.0	0.7	0.2
47H-3, 42–44	371.4	23.9	29.0	9.3	13.8	4.8	16.8	0.0	0.6	1.8
48H-1, 45–47	373.7	27.4	27.0	8.3	6.1	7.0	21.9	0.0	1.5	0.8
48H-3, 45–47	376.7	24.4	34.1	4.0	8.0	7.3	19.6	0.0	0.7	1.8
48H-5, 45–47	379.7	20.9	36.0	10.6	8.1	5.3	18.1	0.0	0.3	0.8
49H-1, 44–46	381.9	31.1	26.3	5.6	8.2	7.1	21.3	0.0	0.3	0.0
49H-3, 44–46	384.9	20.7	23.6	4.8	7.0	10.9	24.9	0.0	0.2	7.9
49H-4, 44–46	386.4	27.5	32.9	4.1	8.0	5.7	20.8	0.0	0.7	0.3
50H-1, 45–47	388.4	43.8	26.3	8.0	5.1	10.6	3.8	0.0	1.7	0.6
50H-3, 45–47	391.4	28.9	31.5	4.9	8.9	5.3	17.5	0.0	0.3	2.8
50H-5, 45–47	393.9	34.8	25.9	3.6	7.6	7.5	13.0	0.0	0.3	7.4
51X-2, 45–47	396.5	22.5	30.4	6.9	10.9	7.6	17.0	0.0	0.6	4.1
52X-1, 45–47	397.3	21.7	40.2	7.4	7.0	4.7	17.3	0.0	0.6	1.0
52X-3, 45–47	400.3	27.6	34.0	3.5	7.0	6.3	18.0	0.0	0.6	3.1
52X-5, 45–47	403.3	29.7	28.5	7.4	8.4	7.2	14.7	0.0	0.6	3.4
53X-1, 41–43	406.8	21.7	41.3	12.1	7.5	4.1	12.3	0.0	0.5	0.6
53X-2, 42–44	408.3	27.9	54.2	3.5	4.6	4.0	3.4	0.0	1.3	1.1
53X-5, 38–40	412.8	22.8	35.1	10.7	8.3	6.6	15.2	0.0	0.6	0.7
54X-1, 103–105	417.0	16.0	46.9	9.5	9.2	4.3	13.5	0.0	0.4	0.2
54X-3, 45–47	419.5	18.2	41.5	9.1	17.9	3.3	9.3	0.0	0.5	0.2
55X-1, 45–47	426.2	30.1	32.6	5.5	8.7	7.7	13.6	0.0	0.7	1.3
55X-3, 45–47	429.2	25.6	29.3	5.4	12.1	9.5	15.3	0.0	0.5	2.2
55X-5, 45–47	432.2	24.7	33.7	6.1	8.2	8.0	12.5	0.0	1.5	5.4
56X-1, 45–46	435.8	28.6	30.1	4.9	9.5	8.3	15.9	0.0	0.6	2.1
56X-3, 45–47	438.8	27.2	24.8	7.4	9.0	6.9	14.2	0.0	1.9	8.6
56X-5, 45–47	441.8	35.3	33.0	4.9	7.5	4.3	7.9	0.0	1.3	5.8
57X-1, 45–47	445.5	24.7	46.9	10.2	7.2	2.4	6.1	0.0	0.7	1.8
57X-3, 45–47	448.5	28.0	26.8	18.9	12.9	2.8	6.3	0.0	0.4	3.9
58X-1, 44–46	455.0	32.6	37.6	4.0	6.6	3.0	10.5	0.0	0.5	5.3
58X-3, 44–46	458.0	30.5	41.1	6.8	10.0	2.4	8.2	0.0	0.8	0.2
58X-4, 45–47	459.6	33.6	28.5	8.1	8.8	5.6	10.6	0.0	0.3	4.7
59X-3, 45–47	466.6	25.8	26.6	6.3	6.7	11.0	19.0	0.0	0.5	4.2
59X-5, 45–47	469.6	28.1	32.2	8.3	5.8	4.9	19.9	0.0	0.4	0.4
60X-1, 45–47	474.4	22.4	35.5	6.1	8.9	6.8	18.6	0.0	1.6	0.0
60X-3, 45–47	477.4	30.9	32.7	3.8	5.8	7.8	13.9	0.0	1.0	4.2
60X-5, 45–47	480.4	34.6	25.7	4.0	7.3	10.5	11.8	0.0	0.5	5.6
61X-1, 45–47	484.0	35.8	31.0	5.2	10.6	6.4	7.5	0.0	0.5	2.9
61X-3, 45–47	487.0	23.6	37.9	11.6	10.3	7.8	7.9	0.0	0.4	0.7
61X-5, 47–49	490.0	28.1	38.4	5.8	11.4	5.9	8.0	0.0	0.9	1.5
62X-1, 51–53	493.6	22.3	40.0	9.1	10.5	5.6	12.0	0.0	0.1	0.4
62X-3, 45–47	496.4	19.9	43.7	11.6	9.1	3.7	10.7	0.0	0.5	0.9
62X-5, 45–47	499.4	19.9	41.6	9.5	11.4	4.6	11.3	0.0	0.6	1.2
63X-1, 50–52	503.2	29.3	27.9	7.1	7.0	9.0	12.0	0.0	1.8	5.8
63X-3, 47–49	506.2	27.5	31.1	3.5	16.0	4.4	13.8	0.0	1.0	2.8
63X-5, 43–45	509.1	29.0	28.5	11.0	7.2	7.5	13.7	0.0	0.6	2.6
64X-1, 45–47	512.9	24.4	29.1	13.6	11.3	5.1	15.8	0.0	0.3	0.5
64X-3, 45–47	514.6	21.8	35.3	3.9	8.9	5.8	18.3	0.0	1.0	5.0
65X-1, 45–47	522.4	20.7	35.4	8.2	7.9	5.3	17.7	0.0	0.9	3.8
65X-3, 45–47	525.4	27.9	27.6	5.7	9.3	8.6	14.0	0.0	0.3	6.7
65X-5, 45–47	528.4	28.8	29.9	4.8	7.6	7.5	12.6	0.0	0.4	8.5
66X-1, 44–46	532.0	18.8	53.7	7.3	8.0	2.5	8.4	0.0	0.6	0.6
67X-1, 45–47	541.6	21.7	50.3	7.5	8.2	1.6	9.1	0.0	0.8	0.8
67X-3, 45–47	544.6	33.4	32.7	5.4	5.7	6.3	9.3	0.0	0.9	6.3
67X-5, 45–47	547.1	19.9	28.6	4.6	8.7	7.6	16.7	0.0	0.3	13.7
68X-1, 46–49	551.2	26.8	35.8	5.6	8.7	7.3	15.4	0.0	0.3	0.1
68X-3, 45–47	554.2	32.6	29.7	3.4	5.6	6.5	13.1	0.0	0.3	8.9
68X-5, 45–47	557.2	26.8	32.7	5.9	8.4	5.8	16.1	0.0	0.3	4.1
69X-1, 45–47	560.9	32.4	31.9	6.6	8.3	8.0	11.8	0.0	0.6	0.3
69X-3, 45–47	563.9	24.8	32.1	7.6	9.0	6.8	12.9	0.0	0.9	6.0
70X-1, 44–46	570.4	34.9	30.9	3.1	7.7	5.1	17.5	0.0	0.2	0.7
70X-3, 44–46	573.4	26.5	38.0	5.7	7.0	8.9	10.6	0.0	0.3	3.1
70X-5, 44–46	576.4	31.4	27.9	8.6	11.0	5.1	9.8	0.0	0.3	6.0
71X-1, 46–48	580.1	21.8	44.6	6.5	5.2	2.0	18.5	0.0	0.5	0.9
71X-1, 47–49	580.1	25.9	30.6	4.7	11.1	8.1	8.7	0.0	0.7	10.4
71X-3, 44–46	583.0	35.0	29.0	8.2	7.1	6.9	11.1	0.0	0.5	2.2

**Table T3 (continued).**

Core, section, interval (cm)	Depth (mbsf)	Abundance (wt%)								
		Phyllosilicates	Quartz	K-feldspar	Plagioclase	Calcite	Dolomite	Ankerite	Halite	Unquantified
71X-3, 45–47	583.1	23.7	33.7	9.0	5.4	3.0	19.7	0.0	5.2	0.5
71X-5, 45–47	586.1	29.7	32.7	4.6	9.4	7.2	7.9	0.0	1.3	7.3
73X-1, 44–46	593.6	23.0	35.8	11.7	10.6	3.0	14.3	0.0	0.5	1.1
74X-1, 42–44	599.0	33.9	25.9	5.7	8.3	8.6	13.7	0.0	0.9	3.2
74X-3, 45–47	602.1	28.7	29.7	5.5	7.9	8.0	11.0	0.0	1.0	8.3
74X-5, 45–47	605.1	22.8	41.5	3.5	7.7	3.8	8.9	0.0	1.8	10.2

Note: — = no data.