19. GRAIN-SIZE DISTRIBUTION OF SEDIMENTS FROM THE MOUTH OF THE GULF OF CALIFORNIA, DEEP SEA DRILLING PROJECT LEG 65[1]

Mario Gutiérrez-Estrada, Universidad Nacional Autonóma de Mexico, Instituto de Ciencias del Mar y Limnología, Mexico 20, D. F.[2]

ABSTRACT

The grain-size distribution of 223 unconsolidated sediment samples from four DSDP sites at the mouth of the Gulf of California was determined using sieve and pipette techniques. Shepard's (1954) and Inman's (1952) classification schemes were used for all samples. Most of the sediments are hemipelagic with minor turbidites of terrigenous origin. Sediment texture ranges from silty sand to silty clay. On the basis of grain-size parameters, the sediments can be divided into the following groups: (1) poorly to very poorly sorted coarse and medium sand; and (2) poorly to very poorly sorted fine to very fine sand and clay.

INTRODUCTION

This chapter presents information on the grain sizes of deep-sea sediments recovered at four sites in the mouth of the Gulf of California during DSDP Leg 65 (Fig. 1). Grain size is one of the fundamental properties of deep-sea sediments and sedimentary rocks (Griffiths, 1967; Blatt et al., 1972). According to Thayer et al. (1974), little detailed work on grain-size distribution has been done using statistical parameters.

The main objective of this chapter is to provide basic data on grain size for different lithological units cored at these sites. The information may be useful for relating size distribution to depositional environment, mechanism of sedimentation, and such physical properties of sediments as porosity, bulk density, and shear strength.

METHODS

The distribution of sand, silt, and clay was determined on 10 cm^3 sediment samples collected at the time the cores were split and described on board the *Glomar Challenger*.

The sediment classification used (Fig. 2) is that of Shepard (1954), with the sand, silt, and clay boundaries based on the Wentworth (1922) scale.

Sand, silt, and clay fractions are composed of particles which range in diameter from 2.0 mm to 62.5 μm (-1.0 to $+4.0\phi$), 62.5 to 3.91 μm ($+4.0$ to $+8.0\phi$), and less than 3.91 μm ($+8.0\phi$), respectively. This classification is applied regardless of sediment type and origin (Bode, 1974); therefore, the sediment names used in this study may differ somewhat from those used elsewhere in this volume. Standard sieve, settling tube, and pipette methods were used to determine grain-size distribution. The sediment sample was dried and dispersed by soaking for 24 hours in 200 ml of distilled water. If a sample failed to disaggregate, it was treated with hydrogen peroxide and then with 50 ml of 10% sodium hexametaphosphate (calgon). If lumps of mud were still present after soaking, they were then gently crushed by hand (Folk, 1968; Thayer et al., 1974).

The sand fraction was removed by wet sieving, using a 62.5 μm sieve (No. 230 U.S. Standard Sieve) to separate it from the mud (silt plus clay) fraction. The silt and clay fractions were then analyzed by pipette techniques (Folk, 1968). Sampling depths and times were calculated using equations derived from Stokes' settling velocity equation (Krumbein and Pettijohn, 1938). Pipette withdrawals were taken at times corresponding to 1.0ϕ unit intervals from 4.0 to 11.0ϕ. Pipette analyses were terminated at 11.0ϕ because particles smaller than this diameter are strongly affected by Brownian movement of the water in which they are suspended (Irani and Callis, 1963; Thayer et al., 1974). The sand fraction was dried and analyzed at 1/8, 1/4, and $1/2\phi$ by the settling tube method (Emery, 1938). The cumulative percentages of sand and mud were then determined and cumulative curves drawn on a probability scale. If the cumulative percentage at 11.0ϕ was less than 95%, the unsampled fine population was interpolated by extending the cumulative curve in a straight line from 11.0ϕ to 14.0ϕ at 100% (Folk, 1968; Thayer et al., 1974). This assumes that all sediment is coarser than 14.0ϕ and that the clay mode lies near 12.0ϕ. Cumulative percentage values for 12.0 and 13.0ϕ were read directly from the interpolated curve.

Folk and Ward's (1957) and Inman's (1952) statistics were then calculated by computer from the grain-size data. Folk and Ward's (1957) statistics (graphic mean, inclusive graphic standard deviation, skewness, kurtosis, and transformed kurtosis) are used in this chapter since they are now most widely used by sedimentologists.

The measure for average sediment size is the graphic mean (M_z) given by the formula:

$$M_z = \frac{\phi_{16} + \phi_{84} + \phi_{50}}{3}$$

The uniformity of grain size (sorting) of sediments is called "inclusive graphic standard deviation" and is found by the formula:

$$\sigma_1 = \frac{\phi_{84} - \phi_{16}}{4} + \frac{\phi_{95} - \phi_5}{6.6}$$

Folk and Ward (1957) suggested the following classification for sorting: σ_1 under 0.35ϕ, very well sorted; $\sigma_1 = 0.35$ to 0.50ϕ, well sorted; $\sigma_1 = 0.5$ to 1.00ϕ, Moderately sorted; $\sigma_1 = 1.00$ to 2.00ϕ, poorly sorted; $\sigma_1 = 2.00$ to 4.00ϕ, very poorly sorted; and σ_1 over 4.0ϕ, extremely poorly sorted.

Skewness is a measure of the degree of asymmetry of the grain-size distribution. Folk and Ward (1957) proposed the measure "inclusive graphic skewness," defined as follows:

$$Sk_1 = \frac{\phi_{16} + \phi_{84} - 2\phi_{50}}{2(\phi_{84} - \phi_{16})} + \frac{\phi_5 + \phi_{95} - 2\phi_{50}}{2(\phi_{95} - \phi_5)}$$

Symmetrical population curves have $Sk_1 = 0$; curves with tails in the fine fraction have positive values to a limit of $+1.00$; and curves with tails in the coarse fraction have negative values with a limit of -1.00. Folk (1968) suggested the following scale for skewness; $Sk_1 =$

[1] Lewis, B. T. R., Robinson, P., et al., *Init. Repts. DSDP*, 65: Washington (U.S. Govt. Printing Office).

[2] Present address: Instituto de Ciencias del Mar y Limnología, Estacíon Mazatlán, Universidad Nacionál Autónoma de Mexico, Mazatlán, Sinaloa, Mexico.

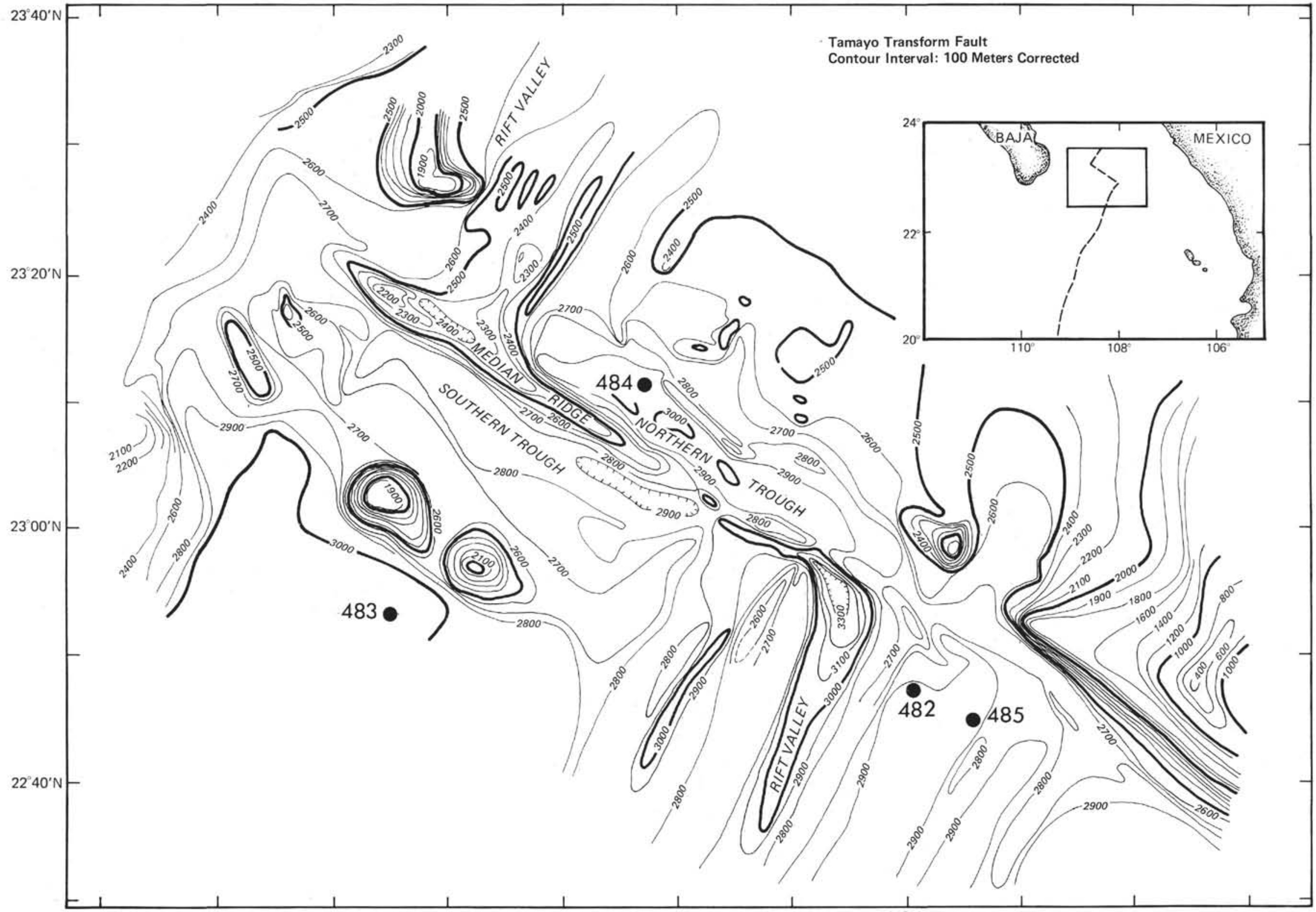

Figure 1. Locations of sites drilled on Leg 65. (Contours shown in corrected meters.)

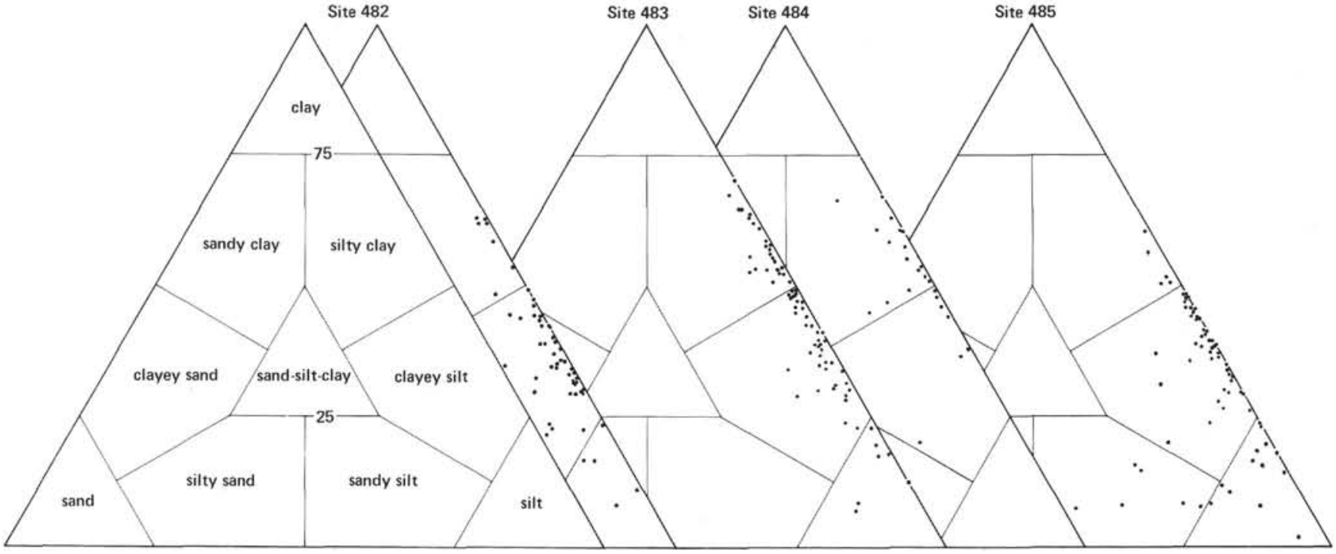

Figure 2. Triangular diagrams showing the Shepard (1954) classification scheme and the percentages of sand, silt, and clay in the sediments from Sites 482, 483, 484, and 485.

+1.00 to +0.30, strongly fine-skewed; Sk_1 = +0.30 to +0.10, fine-skewed; Sk_1 = +0.10 to −0.10, nearly symmetrical; Sk_1 = −0.30 to −1.00, strongly coarse-skewed.

Kurtosis, or peakedness of the distribution, is computed by comparing the spread of the central part of the distribution to the spread of the tails (Thayer et al., 1974). Graphic kurtosis is defined by Folk and Ward (1957) as follows:

$$K_G = \frac{\phi_{95} - \phi_5}{2.44\,(\phi_{75} - \phi_{25})}$$

Since the distribution of kurtosis values is strongly skewed in natural sediments, Folk and Ward (1957) have suggested that the kurtosis distribution must be normalized using the formula:

$$K'_G = \frac{K_G}{1 + K_G}$$

This value is called "transformed kurtosis." Folk and Ward further suggest the following classification: $K'_G < 0.40$, very platykurtic; $0.40 < K'_G < 0.47$, platykurtic; $0.47 < K'_G < 0.53$, mesokurtic; $0.53 < K_G < 0.60$, leptokurtic; $0.60 < K'_G < 0.75$, very leptokurtic, and $K'_G > 0.75$, extremely leptokurtic. For normal probability distributions K'_G is equal to 0.50.

RESULTS

Triangular diagrams showing sand-silt-clay percentages are shown in Figure 2. Percentages of sand-silt-clay and Shepard's (1954) textural terms for individual samples are tabulated in Table 1. Table 2 lists Folk and Ward's (1957) statistical parameters for all samples.

Site 482

Site 482 is located in a sediment-filled valley about 12 km east of the axis of the East Pacific Rise and 15 km south of the intersection of the East Pacific Rise and the Tamayo Fracture Zone (Fig. 1). The sediment thickness determined from reflection data is about 150 meters. The sedimentary section at this site consists of hemipelagic silty clay with occasional fine-grained turbidites. All of the sediments are of late Quaternary age.

Hole 482

The first hole drilled at Site 482 was only cored to a depth of 4.0 meters below mudline. One sample was analyzed. Sediment is a very poorly sorted, nearly-symmetrical, platykurtic silty clay with 45.6% silt and 48.4% clay. The coarsest 5% of the distribution (ϕ_5) averages 3.96ϕ and the average grain size for the entire sample is 8.09ϕ (Tables 1, 2).

Hole 482A

Hole 482A, drilled 70 meters east of Hole 482, was continuously cored from mudline to 44.0 meters subbottom. Ten samples were analyzed. Two lithological types of sediments were recognized, ranging from fine-grained hemipelagic sediments, generally silty clays and clayey silts, to fine-grained turbidites. The most conspicuous textural feature of these sediments is that the sand content in the turbidites ranges from 1.80 to 33.0% and increases with depth. Silt and clay percentages averaged 53.0% and 36.0%, respectively, and tend to decrease with depth.

The average values for the statistical parameters are as follows: coarsest 5% of the distribution, 4.40ϕ (47.36 μm); average grain size, 7.50ϕ (5.52 μm); sorting, 2.35ϕ (very poorly sorted); skewness, 0.21 (fine-skewed); and transformed kurtosis, 0.45 (platykurtic).

There are vertical variations in the statistical parameters and in the sand-silt-clay percentages in this hole at 1.6, 7.7, 16.7, 36.3, and 39.2 meters (Fig. 3). These variations result from the occurrence of poorly sorted ($\bar{\sigma}_1$ = 1.82ϕ), fine-skewed ($\overline{Sk_1}$ = 0.12), clayey silts with minor silty clays at the top of the section and turbidites near the base of the hole.

Hole 482B

Hole 482B was drilled 120 meters east of Hole 482. It was washed to 44 meters and then cored to 137.0 meters.

Table 1. Grain-size distribution of sediments from Sites 482, 483, 484, and 485.

Sample (interval in cm)	Sub-bottom Depth (m)	Sand (wt.%)	Silt (wt.%)	Clay (wt.%)	Lithology
Hole 482					
1-2, 50-52	2.00	5.92	45.68	48.40	Silty clay
Hole 482A					
1-2, 14-17	1.64	2.44	35.73	61.83	Silty clay
1-2, 23-25	1.73	0.82	37.23	61.95	Silty clay
2-2, 18-21	7.68	0.61	60.09	39.30	Clayey silt
2-2, 23-25	7.73	1.87	60.93	37.20	Clayey silt
3-1, 108-110	16.58	0.86	67.52	31.62	Clayey silt
3-1, 122-125	16.72	3.61	61.96	34.43	Clayey silt
4-2, 33-35	26.83	1.10	55.37	43.53	Clayey silt
4-4, 121-123	30.71	0.08	57.64	42.28	Clayey silt
5-2, 35-37	36.35	11.13	67.51	21.36	Clayey silt
5-4, 25-27	39.25	33.56	38.72	27.72	Clayey-sandy-silt
Hole 482B					
1-2, 23-25	45.73	5.26	77.90	16.84	Silt
1-4, 139-141	49.89	2.02	35.05	62.93	Silty clay
2-2, 23-25	55.23	2.44	62.58	34.98	Clayey silt
2-4, 39-41	58.39	0.51	59.63	39.86	Clayey silt
2-7, 17-20	62.67	1.12	69.21	29.67	Clayey silt
4-2, 23-25	74.23	1.07	67.58	31.35	Clayey silt
4-3, 95-97	76.45	1.46	65.54	33.00	Clayey silt
5-2, 103-105	84.53	3.09	67.21	29.70	Clayey silt
5-3, 36-38	85.36	0.37	65.63	34.00	Clayey silt
6-2, 12-14	93.12	9.56	67.76	22.68	Clayey silt
6-4, 24-26	96.24	44.50	43.32	12.18	Silty sand
7-2, 20-25	102.70	0.73	69.39	29.88	Clayey silt
7-2, 61-63	103.11	0.85	52.95	46.20	Clayey silt
8-3, 114-116	114.64	4.25	73.36	22.39	Clayey silt
8-4, 71-74	115.71	0.30	61.40	38.30	Clayey silt
9-3, 22-24	123.22	2.27	68.27	29.46	Clayey silt
9-4, 64-66	125.14	1.00	63.71	35.29	Clayey silt
10-4, 114-116	135.14	5.58	49.80	44.62	Clayey silt
10-5, 95-97	136.45	0.64	45.82	53.54	Silty clay
Hole 482C					
1-2, 15-17	46.15	1.09	88.20	10.71	Silt
1-2, 71-73	46.71	9.04	61.25	29.65	Clayey silt
2-2, 135-150	56.85	5.87	85.58	8.55	Silt
3-4, 135-150	69.35	3.31	57.76	38.93	Clayey silt
4-4, 135-150	78.85	30.15	52.30	17.55	Sandy silt
5-5, 135-150	89.85	3.81	51.77	44.42	Clayey silt
6-4, 135-150	116.85	0.42	55.30	44.28	Clayey silt
7-4, 8-10	125.08	0.96	67.34	31.70	Clayey silt
7-4, 135-150	126.35	0.42	55.30	44.28	Clayey silt
8-2, 6-9	131.56	0.53	75.91	23.56	Silt
8-2, 9-13	131.59	0.52	61.61	37.87	Clayey silt
Hole 482D					
1-2, 112-114	74.12	1.42	56.30	42.28	Clayey silt
1-3, 129-131	75.79		57.65	42.35	Clayey silt
2-2, 113-115	83.63	0.43	60.00	39.57	Clayey silt
2-3, 95-97	84.95	0.06	52.41	47.53	Clayey silt
3-2, 63-65	92.63	1.12	69.43	29.45	Clayey silt
3-2, 100-103	93.00	0.11	66.07	33.82	Clayey silt
3-6, 135-150	98.85				
4-2, 19-21	101.69	7.26	60.21	32.53	Clayey silt
4-2, 114-117	102.64	1.71	39.79	58.50	Silty clay
5-1, 95-98	110.45	0.61	67.09	32.30	Clayey silt
5-2, 103-105	112.03	7.13	76.00	16.87	Silt
6-2, 13-16	120.63	9.52	67.03	23.45	Clayey silt
6-4, 24-26	123.74	1.60	62.82	35.58	Clayey silt
7-2, 26-28	130.26		50.40	49.60	Clayey silt
7-3, 25-27	131.75	1.28	66.69	32.03	Clayey silt
Hole 482F					
2-2, 52-54	115.52	2.53	58.60	38.87	Clayey silt
3-2, 52-54	125.02	2.72	62.63	34.65	Clayey silt
4-2, 53-55	134.53	1.33	53.98	44.69	Clayey silt
Hole 483					
2-2, 105-120	3.15	0.90	35.61	63.49	Silty clay
2-3, 65-67	4.65	1.11	43.95	54.94	Silty clay
2-3, 108-110	5.08	6.51	40.84	52.65	Silty clay
3-2, 54-56	12.54	1.31	36.82	61.87	Silty clay
3-2, 06-88	12.86	2.50	30.00	67.50	Silty clay

Table 1. (Continued).

Sample (interval in cm)	Sub-bottom Depth (m)	Sand (wt.%)	Silt (wt.%)	Clay (wt.%)	Lithology
Hole 483 (Cont.)					
4-2, 54-57	22.04	0.38	29.45	70.17	Silty clay
4-2, 85-87	22.35	1.16	43.17	55.67	Silty clay
4-2, 129-144	22.79	0.96	35.24	63.80	Silty clay
5-3, 74-76	33.24	1.30	46.55	52.15	Silty clay
6-2, 72-74	41.22	6.37	63.89	29.74	Clayey silt
6-2, 90-93	41.40	2.06	49.64	48.30	Clayey silt
6-2, 35-150	41.85	1.98	38.61	59.41	Silty clay
7-2, 82-84	50.82	3.72	45.72	50.56	Silty clay
7-4, 94-96	53.94	1.60	35.40	63.00	Silty clay
8-2, 64-66	60.14	9.75	56.33	33.92	Clayey silt
8-3, 105-120	62.05	3.78	61.33	34.89	Clayey silt
8-4, 54-56	63.04	1.12	68.45	30.43	Clayey silt
9-2, 73-75	69.73	2.62	59.13	38.25	Clayey silt
9-4, 77-80	72.77	1.37	51.46	47.17	Clayey silt
9-4, 135-150	73.35	0.99	76.11	22.90	Silt
10-1, 135-150	78.35	1.89	78.32	19.79	Silt
10-2, 54-56	79.04	1.74	63.02	35.24	Clayey silt
10-2, 88-90	79.38	11.79	81.30	6.91	Silt
11-2, 22-24	87.22	0.42	41.61	57.97	Silty clay
11-2, 135-150	89.35	2.62	69.28	28.10	Clayey silt
11-4, 52-54	91.52	0.76	50.36	48.38	Clayey silt
12-3, 82-84	99.82	2.15	59.25	38.60	Clayey silt
12-4, 61-63	101.11	2.60	62.14	35.26	Clayey silt
13-1, 30-34	105.80	3.28	43.25	53.47	Silty clay
13-1, 96-98	106.46	1.66	59.10	39.24	Clayey silt
13-2, 56-58	107.56	2.80	60.36	36.84	Clayey silt
13-2, 62-66	107.62	10.74	60.51	28.75	Clayey silt
13-2, 82-84	107.82	5.11	39.10	55.79	Silty clay
13-3, 81-85	109.31	3.54	73.63	22.83	Clayey silt
17-1, 0-6	142.00	0.01	58.81	41.18	Clayey silt
18-1, 121-126	152.21		87.40	12.60	Silt
18-3, 60-65	154.60	42.62	42.54	14.84	Silty sand
18-4, 34-36	155.84	1.31	49.69	49.00	Clayey silt
18-4, 85-87	156.35	3.29	65.82	30.89	Clayey silt
Hole 483B					
1-3, 102-104	95.52	2.22	51.84	45.94	Clayey silt
1-3, 128-130	95.78	0.60	66.03	33.37	Clayey silt
1-4, 103-105	97.03	0.75	38.28	60.97	Silty clay
1-4, 129-144	97.29	1.10	45.42	53.48	Silty clay
1-5, 80-82	98.30	0.86	42.14	57.00	Silty clay
2-3, 122-124	105.22	1.13	56.20	42.67	Clayey silt
2-4, 60-62	106.10	0.90	49.90	49.20	Clayey silt
2-5, 108-110	108.08	4.04	58.83	37.13	Clayey silt
2-6, 110-112	109.60	1.10	54.53	44.37	Clayey silt
2-6, 137-141	109.87	2.52	68.56	28.92	Clayey silt
7-1, 0-2	133.00	0.36	60.02	39.62	Clayey silt
8-1, 0-3	137.50	0.77	81.23	18.00	Silt
20-1, 70-72	209.20	1.40	66.80	31.80	Clayey silt
20-2, 124-126	211.24	4.95	71.27	23.78	Clayey silt
25-2, 10-12	232.60	1.94	59.95	38.11	Clayey silt
Hole 483C					
1-1, 35-37	38.85	1.02	41.15	57.83	Silty clay
1-2, 96-98	39.96	2.41	32.97	64.62	Silty clay
1-3, 55-57	42.05	0.83	45.69	53.48	Silty clay
1-3, 129-131	42.79	0.47	52.37	47.16	Clayey silt
1-4, 60-62	43.60	0.96	58.10	40.94	Clayey silt
1-4, 135-150	44.35	2.34	80.06	17.60	Silt
1-5, 90-92	45.40	0.90	52.64	46.46	Clayey silt
2-3, 9-12	89.09	5.25	41.62	53.13	Silty clay
2-4, 106-108	91.56	2.17	49.85	47.98	Clayey silt
2-5, 90-93	92.90	1.37	42.28	56.35	Silty clay
2-7, 15-17	95.15	0.94	67.66	31.40	Clayey silt
3-2, 0-15	97.00	1.06	50.40	48.54	Clayey silt
3-2, 33-35	97.33	1.92	55.58	42.50	Clayey silt
3-2, 75-77	97.75	2.83	52.27	44.90	Clayey silt
4-1, 11-13	105.11	1.96	33.62	64.42	Silty clay
4-1, 19-21	105.19	0.45	48.83	50.72	Silty clay
4-2, 16-19	106.66	0.82	40.51	58.67	Silty clay
4-2, 29-31	106.79	3.24	62.50	34.26	Clayey silt
Hole 484					
1-1, 112-115	1.12	0.96	53.02	46.02	Clayey silt
1-1, 135-150	1.35	4.28	34.83	60.89	Silty clay
1-2, 18-20	1.68	0.80	38.73	60.46	Silty clay
1-2, 112-115	2.62	0.54	61.46	38.00	Clayey silt
1-4, 8-10	4.58	1.50	40.97	57.53	Silty clay
1-4, 12-30	4.62	7.58	44.08	48.34	Silty clay

Table 1. (Continued).

Sample (interval in cm)	Sub-bottom Depth (m)	Sand (wt.%)	Silt (wt.%)	Clay (wt.%)	Lithology
Hole 484A					
1-2, 113-115	2.63	0.46	38.98	60.56	Silty clay
1-3, 95-98	3.95	0.57	48.45	50.98	Silty clay
1-4, 68-71	5.18	0.98	55.13	43.89	Clayey silt
2-2, 129-131	10.79	0.70	45.80	53.50	Silty clay
2-3, 135-150	12.35	2.60	61.04	36.36	Clayey silt
2-4, 86-90	13.36	21.66	61.24	17.10	Sandy silt
2-4, 113-116	13.63	2.34	42.61	55.05	Silty clay
2-5, 92-94	14.92	1.37	45.27	53.36	Silty clay
3-2, 22-24	19.22	9.50	43.52	46.98	Silty clay
3-4, 139-142	23.39	0.10	32.67	67.23	Silty clay
3-6, 4-6	25.04	3.77	38.04	58.19	Silty clay
4-2, 13-15	28.63	1.01	36.07	62.92	Silty clay
4-3, 26-29	30.26	4.80	46.00	49.20	Silty clay
4-4, 65-68	32.15	0.82	51.33	47.85	Clayey silt
5-2, 123-125	39.23	8.29	25.44	66.27	Silty clay
6-2, 96-98	48.46	13.83	41.58	44.59	Silty clay
6-4, 140-142	51.90	0.30	50.38	49.32	Clayey silt
6-5, 13-16	52.13	0.86	47.30	51.84	Silty clay
Hole 485					
1-1, 129-144	1.29	1.67	46.77	51.56	Silty clay
1-2, 3-5	1.53	3.35	46.35	50.30	Silty clay
1-2, 64-66	2.14	0.16	70.24	29.60	Clayey silt
2-1, 35-37	3.35	1.20	51.95	46.85	Clayey silt
2-3, 71-73	6.71	0.45	37.92	61.63	Silty clay
3-1, 42-44	12.92	13.31	55.63	31.06	Clayey silt
3-1, 52-54	13.02	2.58	41.00	56.42	Silty clay
3-2, 59-61	14.59	3.03	57.86	39.11	Clayey silt
3-2, 73-75	14.73	18.23	74.33	7.44	Sandy silt
3-3, 48-50	15.98	0.51	61.02	38.47	Clayey silt
3-3, 88-90	16.38	3.70	80.81	15.49	Silt
3-5, 135-150	19.85	0.80	38.80	60.40	Clayey silt
3-6, 107-110	21.07	0.40	61.15	38.45	Clayey silt
4-1, 135-150	23.35	17.48	62.34	20.18	Clayey silt
4-2, 13-15	23.63	5.97	58.29	35.74	Clayey silt
4-3, 36-38	25.36	0.10	51.80	48.10	Clayey silt
5-2, 135-150	34.35	0.59	53.77	45.64	Clayey silt
5-3, 54-56	35.04	2.57	58.84	38.59	Clayey silt
5-4, 128-131	37.28	0.70	55.82	43.48	Clayey silt
6-2, 23-25	42.73	1.55	52.40	46.05	Clayey silt
6-7, 3-6	50.03	0.75	55.82	43.43	Clayey silt
Hole 485A					
1-2, 23-25	52.23	10.88	51.98	37.14	Clayey silt
1-5, 129-144	57.79	1.77	47.68	50.55	Silty clay
1-6, 130-132	59.30	0.61	57.84	41.55	Clayey silt
2-2, 25-27	61.75	0.24	58.37	41.39	Clayey silt
2-2, 50-53	62.00	2.74	68.11	29.15	Clayey silt
2-4, 48-51	64.98	0.40	62.54	37.06	Clayey silt
3-2, 33-35	71.33	1.21	79.12	19.67	Silt
3-2, 115-118	72.15	2.13	61.87	36.00	Clayey silt
3-2, 129-144	72.29	0.81	58.20	40.99	Clayey silt
4-1, 48-51	79.48	0.44	59.83	39.73	Clayey silt
4-1, 55-57	79.55	0.46	58.04	40.90	Clayey silt
5-3, 15-17	91.65	0.57	66.43	33.00	Clayey silt
5-3, 120-123	92.70	0.56	59.85	39.59	Clayey silt
5-3, 129-144	92.92	0.44	65.90	33.66	Clayey silt
5-4, 40-43	93.40	4.84	68.84	26.32	Clayey silt
6-2, 22-24	99.72	3.23	67.91	29.86	Clayey silt
6-3, 68-71	101.68	—	65.00	35.00	Clayey silt
6-3, 104-107	102.04	39.06	53.32	7.62	Sandy silt
7-2, 22-25	109.22	1.68	54.17	44.15	Clayey silt
8-2, 23-25	118.73	0.13	76.68	23.19	Silt
8-2, 107-110	119.57	0.18	51.96	47.86	Clayey silt
8-2, 135-150	119.85	1.33	61.01	37.66	Clayey silt
9-2, 76-78	128.76	16.29	75.38	8.33	Silt
9-2, 95-98	128.95	24.73	60.40	14.87	Sandy silt
9-2, 135-150	129.35	20.22	70.79	8.99	Sandy silt
10-2, 35-37	137.85	0.26	73.33	26.41	Clayey silt
10-2, 67-70	138.17	0.22	54.48	45.30	Clayey silt
11-1, 80-82	146.30	0.25	73.55	26.20	Clayey silt
11-2, 88-90	147.88	12.83	75.23	11.94	Silt
18-1, 93-95	184.53	8.18	84.22	7.60	Silt
18-1, 103-106	185.16	12.04	77.56	10.40	Silt
19-2, 16-19	189.66	31.15	60.77	8.08	Sandy silt
19-2, 65-67	190.15	25.12	59.70	15.18	Sandy silt
19-2, 78-81	190.28	0.39	62.76	36.85	Clayey silt
20-1, 65-68	192.65	5.03	67.23	27.74	Clayey silt
20-1, 135-150	193.35	1.80	93.84	4.36	Silt
22-4, 135-150	207.35	0.22	84.96	14.82	Silt

Table 1. (Continued).

Sample (interval in cm)	Sub-bottom Depth (m)	Sand (wt.%)	Silt (wt.%)	Clay (wt.%)	Lithology
Hole 485A (Cont.)					
22-6, 34-36	209.34	0.44	67.19	32.37	Clayey silt
26-1, 51-54	226.51	—	66.20	33.80	Clayey silt
27-1, 96-99	231.46	0.35	76.37	23.28	Silt
27-1, 121-124	231.71	0.20	56.04	43.76	Clayey silt
28-1, 113-116	236.13	—	54.40	45.60	Clayey silt
33-2, 97-99	269.47	0.20	70.15	29.65	Clayey silt
34-1, 41-43	277.41	3.51	77.89	18.60	Silt
36-2, 23-25	296.73	0.11	81.86	18.03	Silt
37-1, 41-44	304.41	0.26	51.24	48.50	Clayey silt
37-1, 94-96	304.94	5.00	78.66	16.34	Silt

At this depth basalts were encountered. About 92 meters of basalt were drilled to a total sub-bottom depth of 229 meters. Nineteen sediment samples were analyzed from this hole, and two lithological types recognized. Type 1 consists of fine-grained hemipelagic sediments represented by silts at the top of the section and by clayey silts and silty clays immediately overlying the basement. These sediments have a general composition of 1.0% sand, 62.0% silt, and 37.0% clay. The coarsest 5% of the distribution (ϕ_5) averages 5.0ϕ (31.25 μm), and the mean grain size averages 7.5ϕ (5.52 μm). The sediments are poorly sorted ($\bar{\sigma}_1 = 2.00\phi$), mesokurtic $\overline{K'_G}$ 0.47), and fine-skewed ($\overline{Sk}_I = 0.24$). These deposits show bioturbation where they are interbedded with turbidites. This suggests slow sedimentation between the various turbidity current events.

Type 2 consists of fine-grained turbidites. The turbidites can easily be recognized in Figure 4, where sand content increases suddenly and clay percentage decreases. The general composition of this sediment is: 10.0% sand, 60.0% silt, and 30.0% clay. These turbidites, 0.05 to 1.5 meters thick, commonly display a basal sandy clayey silt layer with abundant benthic foraminifers. Average values for statistical parameters are: ϕ_5, 4.0ϕ (62.5 μm); average grain size, 7.00ϕ (7.81 μm); sorting, 2.08ϕ (very poorly sorted); skewness, 0.26 (fine-skewed); and transformed kurtosis, 0.52 (mesokurtic).

Hole 482C

Hole 482C, drilled 100 meters east of 482B, was washed to 44.5 meters and cored from 92 to 111 meters. The hole was cored continuously from 44.5 to 92 meters and from 111 meters to 132.6 meters. The sediments recovered were soft to relatively firm, late Quaternary clayey silts and silts, containing irregular burrows filled with sand.

Eleven samples were analyzed from the sediments overlying basalt (Tables 1 and 2). The sediment is poorly sorted ($\bar{\sigma}_1 = 1.90\phi$) and fine-skewed ($\overline{Sk}_1 = 0.16\phi$), although the silts tend to be coarse-skewed and mesokurtic ($\overline{K'_G} = 0.48$). The average grain size is 7.0ϕ (7.8 μm), and ϕ_5 averaged 4.0ϕ (62.5 μm). The general composition is 8.0% sand, 68.0% silt, and 24.0% clay (Tables 1 and 2). The coarser sediments may represent fine-grained turbidites.

Table 2. Statistical parameters of sediments from Sites 482, 483, 484, and 485.

Sample (interval in cm)	Sub-bottom Depth (m)	Coarsest 5% of the Distribution (ϕ)	Av. Grain Size, M_z (ϕ)	Sorting, σ_1 (ϕ)	Skewness, Sk_1	Kurtosis, K_G	Transformed Kurtosis, K_G'
Hole 482							
1-2, 50-52	2.00	3.96	8.09	2.46	0.036	0.868	0.46
Hole 482A							
1-2, 14-17	1.64	4.54	8.31	2.15	−0.113	0.923	0.48
1-2, 23-25	1.73	5.37	8.89	2.19	0.036	0.701	0.41
2-2, 18-21	7.68	4.73	7.41	2.05	0.181	0.884	0.47
2-2, 23-25	7.73	4.59	7.86	2.47	0.377	0.852	0.46
3-1, 108-110	16.58	4.53	5.21	0.26	−0.160	1.473	0.59
3-1, 122-125	16.72	4.16	7.38	2.49	0.234	0.874	0.47
4-2, 33-35	26.83	4.84	8.10	2.38	0.280	0.791	0.44
4-4, 121-123	30.71	4.96	8.06	2.23	0.249	0.905	0.47
5-2, 35-37	36.35	3.83	6.18	2.19	0.454	0.964	0.49
5-4, 25-27	39.25	2.49	5.94	2.76	0.166	0.802	0.44
Hole 482B							
1-2, 23-25	45.73	4.00	6.20	1.97	0.435	1.501	0.60
1-4, 139-141	49.89	5.22	8.14	1.62	−0.111	1.227	0.55
2-2, 23-25	55.23	4.57	7.64	2.20	0.248	1.057	0.51
2-4, 39-41	58.39	4.60	7.45	2.16	0.039	0.838	0.45
2-7, 17-20	62.67	4.81	7.15	1.86	0.301	1.207	0.54
4-2, 23-25	74.23	5.33	7.21	1.38	0.238	1.024	0.51
4-3, 95-97	76.45	4.75	7.35	1.96	0.226	0.907	0.47
5-2, 103-105	84.53	5.02	7.11	1.80	0.381	1.009	0.50
5-3, 36-38	85.36	4.76	7.52	2.07	0.291	1.053	0.51
6-2, 12-14	93.12	3.40	6.71	2.02	0.212	1.107	0.52
6-4, 24-26	96.24	2.66	4.91	2.17	0.534	1.217	0.55
7-2, 20-25	102.70	4.76	7.26	2.06	0.386	1.000	0.50
7-2, 61-63	103.11	5.34	8.35	2.38	0.319	0.576	0.36
8-3, 114-116	114.64	4.15	6.80	1.93	0.304	1.336	0.57
8-4, 71-74	115.71	4.72	7.77	2.46	0.475	0.859	0.46
9-3, 22-24	123.22	4.25	7.70	2.73	0.176	0.804	0.44
9-4, 64-66	125.14	4.70	7.53	2.16	0.256	0.945	0.49
10-4, 114-116	135.14	3.97	8.11	2.55	0.226	0.805	0.44
10-5, 95-97	136.45	5.31	8.05	1.79	−0.091	0.792	0.44
Hole 482C							
1-2, 15-17	46.15	4.62	6.76	1.27	−0.276	1.010	0.50
1-2, 71-73	46.71	3.87	6.64	2.05	0.145	0.875	0.46
2-2, 135-150	56.85	3.96	6.17	1.47	−0.059	0.712	0.41
3-4, 135-150	69.35	4.41	7.76	2.41	0.271	0.927	0.48
4-4, 135-150	78.85	2.10	5.26	2.21	0.489	0.853	0.46
5-5, 135-150	89.85	4.25	7.27	1.84	−0.176	1.274	0.56
6-4, 135-150	116.85	5.09	8.28	2.24	0.271	0.864	0.46
7-4, 8-10	125.08	4.64	7.52	2.29	0.336	0.982	0.49
7-4, 135-150	126.35	2.35	7.12	2.61	0.001	1.000	0.50
8-2, 6-9	131.56	5.01	7.19	1.88	0.465	1.378	0.58
8-2, 9-13	131.59	4.84	7.45	1.94	0.222	0.821	0.45
Hole 482D							
1-2, 112-114	74.12	5.10	8.12	2.26	0.296	0.828	0.45
1-3, 129-131	75.79	4.86	7.49	1.79	0.066	1.185	0.54
2-2, 113-115	83.63	5.06	7.30	1.74	0.124	1.112	0.52
2-3, 95-97	84.95	4.85	8.06	2.35	0.133	0.893	0.47
3-2, 63-65	92.63	4.82	6.99	1.42	0.001	0.799	0.44
3-2, 100-103	93.00	4.85	7.77	2.03	0.337	1.195	0.54
3-6, 135-150	98.85	4.94	6.99	1.30	0.026	0.722	0.42
4-2, 19-21	101.69	3.92	7.25	2.07	0.228	1.063	0.51
4-2, 114-117	102.64	4.60	8.46	2.35	−0.049	0.877	0.46
5-1, 95-98	110.45	4.91	7.44	2.04	0.342	0.974	0.49
5-2, 103-105	112.03	2.49	5.95	2.24	0.412	1.424	0.58
6-2, 13-16	120.63	3.86	6.59	2.24	0.304	1.095	0.52
6-4, 24-26	123.74	4.27	6.13	2.33	0.835	0.798	0.44
7-2, 26-28	129.26	4.86	7.90	2.11	0.006	0.907	0.47
7-3, 25-27	131.75	4.65	7.46	2.32	0.456	0.934	0.48
Hole 482F							
2-2, 52-54	115.52	4.55	7.76	2.19	0.196	1.019	0.50
3-2, 52-54	125.02	4.53	7.50	2.20	0.310	0.908	0.48
4-2, 53-55	134.53	5.34	8.24	2.22	0.291	0.818	0.45
Hole 483							
2-2, 105-120	3.15	5.40	8.99	2.15	0.024	0.734	0.42
2-3, 65-67	4.65	5.31	8.18	1.75	−0.053	0.963	0.49
2-3, 108-110	5.08	3.94	7.88	1.75	−0.301	1.008	0.50
3-2, 54-56	12.54	5.32	8.82	1.93	−0.177	0.915	0.47
3-2, 86-88	12.86	5.54	9.27	1.99	−0.457	0.871	0.46
4-2, 54-57	22.04	5.83	9.02	2.06	−0.036	0.726	0.42
4-2, 85-87	22.35	5.47	8.65	2.17	0.157	0.750	0.42
4-2, 129-144	22.79	5.35	8.86	2.22	0.018	0.651	0.40
5-3, 74-76	33.24	5.62	8.54	2.09	0.227	0.765	0.43
6-2, 72-74	41.22	3.94	7.07	2.09	0.211	1.121	0.53
6-2, 90-93	41.40	5.24	8.29	2.26	0.202	0.785	0.44
6-2, 135-150	41.85	4.55	8.72	2.34	−0.002	0.790	0.44
7-2, 82-84	50.82	4.34	8.40	2.43	0.113	0.807	0.45
7-4, 94-96	53.94	4.85	8.37	2.13	−0.049	1.000	0.50
8-2, 64-66	60.14	1.96	7.87	2.88	0.134	1.484	0.59

Table 2. (Continued).

Sample (interval in cm)	Sub-bottom Depth (m)	Coarsest 5% of the Distribution (ϕ)	Av. Grain Size, M_z (ϕ)	Sorting, σ_1 (ϕ)	Skewness, Sk_1	Kurtosis, K_G	Transformed Kurtosis, K'_G
Hole 483 (Cont.)							
8-3, 105-120	62.05	4.30	7.25	1.65	−0.104	1.336	0.57
8-4, 54-56	63.04	4.97	7.62	2.19	0.432	1.090	0.52
9-2, 73-75	69.73	4.49	7.73	2.28	0.246	0.998	0.50
9-4, 77-80	72.77	4.90	7.62	1.66	−0.120	1.011	0.50
9-4, 135-150	73.35	4.52	6.60	1.82	0.256	1.069	0.51
10-1, 135-150	78.35	4.46	6.62	1.45	0.020	0.790	0.44
10-2, 54-56	79.04	5.16	7.31	1.71	0.242	0.842	0.45
10-2, 88-90	79.38	1.33	5.65	1.72	−0.184	1.765	0.64
11-2, 22-24	87.22	5.27	8.59	2.11	−0.005	0.816	0.45
11-2, 135-150	89.35	4.78	7.06	1.86	0.290	0.927	0.48
11-4, 52-54	91.52	4.78	8.20	2.32	0.124	0.823	0.45
12-3, 82-84	99.82	4.85	7.85	2.26	0.308	0.857	0.46
12-4, 61-63	101.11	4.51	7.33	1.88	0.129	0.880	0.47
13-1, 30-34	105.80	4.60	8.55	2.56	0.147	0.660	0.40
13-1, 96-98	106.46	4.64	7.88	2.39	0.306	0.932	0.48
13-2, 56-58	107.56	4.43	7.55	2.21	0.217	1.015	0.50
13-2, 62-66	107.62	3.84	7.00	2.57	0.264	0.897	0.47
13-2, 82-84	107.82	2.61	8.64	2.73	−0.108	0.860	0.46
13-3, 81-85	109.31	4.53	7.10	1.31	−0.162	1.141	0.53
17-1, 0-6	142.00	5.27	8.00	2.19	0.419	0.831	0.45
18-1, 121-126	152.21	4.59	6.17	1.74	0.350	1.244	0.55
18-3, 60-65	154.60	2.74	5.22	2.17	0.617	1.330	0.57
18-4, 34-36	155.84	4.70	8.13	2.35	0.089	0.839	0.45
18-4, 85-87	156.35	4.33	7.29	2.17	0.295	1.055	0.51
Hole 483B							
1-3, 102-104	95.52	5.14	8.22	2.23	0.226	0.843	0.46
1-3, 128-130	95.78	4.82	7.46	2.11	0.370	0.977	0.49
1-4, 103-105	97.03	4.47	7.06	2.96	0.920	0.472	0.32
1-4, 129-144	97.29	5.35	8.42	2.25	0.107	0.722	0.42
1-5, 80-82	98.38	5.14	8.61	2.25	0.067	0.781	0.43
2-3, 122-124	105.22	4.84	8.05	2.21	0.287	0.908	0.47
2-4, 60-62	106.10	5.29	8.29	2.09	0.181	0.992	0.49
2-5, 108-110	108.08	4.30	7.95	2.48	0.285	1.012	0.50
2-6, 110-112	109.60	4.66	8.20	2.18	0.222	1.079	0.52
2-6, 137-141	109.87	4.25	7.12	2.45	0.347	0.881	0.46
7-1, 0-2	133.00	5.17	8.10	2.31	0.341	0.959	0.48
8-1, 0-3	137.50	4.68	6.70	1.69	0.267	1.416	0.59
20-1, 70-72	209.20	4.68	7.40	2.11	0.306	0.990	0.50
20-1, 124-126	211.24	4.00	6.67	1.89	0.311	1.000	0.50
25-2, 10-12	232.60	4.39	7.67	2.62	0.314	0.804	0.45
Hole 483C							
1-1, 35-37	38.85	5.51	8.86	2.04	0.139	0.808	0.45
1-2, 96-98	39.96	4.61	8.48	2.05	−0.146	1.065	0.51
1-3, 55-57	42.05	5.51	8.26	1.92	0.083	0.930	0.48
1-3, 129-131	42.79	4.84	7.99	1.90	0.082	0.979	0.49
1-4, 60-62	43.60	5.01	7.84	2.06	0.220	0.933	0.48
1-4, 135-150	44.35	5.06	6.85	1.23	0.001	0.856	0.46
1-5, 90-92	45.40	4.57	8.08	2.58	0.138	0.820	0.45
2-3, 9-12	89.09	3.98	8.31	2.63	−0.009	0.763	0.43
2-4, 106-108	91.56	5.01	8.30	2.29	0.203	0.785	0.44
2-5, 90-93	92.90	5.14	8.62	2.33	0.069	0.649	0.39
2-7, 15-17	95.15	4.90	7.18	1.79	0.275	1.093	0.52
3-2, 0-15	97.00	4.80	7.79	1.86	−0.082	0.760	0.43
3-2, 33-35	97.33	4.71	7.99	2.27	0.198	0.952	0.49
3-2, 75-77	97.75	4.28	7.86	2.60	0.079	0.734	0.42
4-1, 11-13	105.11	5.22	9.09	2.33	−0.144	0.666	0.40
4-1, 19-21	105.19	5.20	8.45	2.05	0.194	0.872	0.46
4-2, 16-19	106.66	4.72	8.12	2.09	−0.126	0.903	0.47
4-2, 29-31	106.79	4.40	7.57	2.27	0.284	1.018	0.50
Hole 484							
1-1, 112-115	1.12	4.70	8.16	2.49	0.197	0.685	0.41
1-1, 135-150	1.35	5.12	8.78	2.22	0.031	0.774	0.44
1-2, 18-20	1.68	4.57	9.13	2.64	−0.450	0.973	0.49
1-2, 112-115	2.62	4.72	7.60	2.23	0.273	0.924	0.48
1-4, 8-10	4.58	4.55	8.26	1.90	−0.298	0.973	0.49
1-4, 12-30	4.62	3.90	8.11	2.63	0.047	0.862	0.46
Hole 484A							
1-2, 113-115	2.63	5.10	8.81	2.22	0.076	0.731	0.42
1-3, 95-98	3.95	4.72	8.24	2.04	0.092	1.244	0.55
1-4, 68-71	5.18	4.98	8.13	2.35	0.289	0.858	0.46
2-2, 129-131	10.79	5.47	8.63	2.11	0.204	0.798	0.44
2-3, 135-150	12.35	4.21	7.30	2.62	0.356	0.652	0.40
2-4, 86-90	13.36	1.67	5.85	2.54	0.102	1.347	0.57
2-4, 113-116	13.63	4.41	8.10	2.31	−0.101	0.951	0.49
2-5, 92-94	14.92	4.66	8.47	2.36	0.101	0.937	0.48
3-2, 22-24	19.22	1.99	8.22	2.94	−0.006	0.995	0.49
3-4, 139-142	23.39	4.80	9.06	2.36	−0.234	0.812	0.45
3-6, 4-6	25.04	4.82	8.54	2.10	0.017	1.040	0.51
4-2, 13-15	28.63	5.43	8.59	1.85	−0.040	0.944	0.48
4-3, 26-29	30.26	4.09	8.24	2.54	0.078	0.772	0.44
4-4, 65-68	32.15	4.65	8.54	2.35	0.231	0.777	0.44
5-2, 123-125	39.23	3.51	8.79	2.69	−0.188	0.842	0.45
6-2, 96-98	48.46	1.64	7.91	3.09	−0.038	1.014	0.50

Table 2. (Continued).

Sample (interval in cm)	Sub-bottom Depth (m)	Coarsest 5% of the Distribution (ϕ)	Av. Grain Size, M_z (ϕ)	Sorting, σ_1 (ϕ)	Skewness, Sk_1	Kurtosis, K_G	Transformed Kurtosis, K'_G
Hole 484A (Cont.)							
6-4, 140–142	51.90	4.72	8.45	2.30	0.192	0.790	0.44
6-5, 13–16	52.13	5.14	8.38	2.32	0.124	0.865	0.46
Hole 485							
1-1, 129–144	1.29	5.62	8.78	2.13	0.239	0.668	0.40
1-2, 3–5	1.53	5.95	9.17	2.07	0.050	0.799	0.44
1-1, 64–66	2.14	4.46	6.80	2.30	0.507	0.787	0.44
2-1, 35–37	3.35	4.72	8.02	2.10	0.112	0.860	0.46
2-3, 71–73	6.71	5.73	8.52	1.77	0.060	1.002	0.50
3-1, 42–44	12.92	3.22	6.97	2.72	0.187	0.935	0.48
3-1, 52–54	13.02	4.17	8.67	2.43	0.023	0.787	0.44
3-2, 59–61	14.59	4.29	7.84	2.63	0.253	0.752	0.43
3-2, 73–75	14.73	1.70	4.99	1.67	0.209	2.005	0.67
3-3, 48–50	15.98	4.92	8.02	2.37	0.321	0.827	0.45
3-3, 88–90	16.38	4.10	5.94	1.91	0.537	1.747	0.64
3-5, 135–150	19.85	5.61	8.00	1.36	−0.098	1.752	0.64
3-6, 107–110	21.07	5.02	7.90	2.28	0.334	0.793	0.44
4-1, 135–150	23.35	3.29	5.73	1.90	0.419	0.723	0.42
4-2, 13–15	23.63	3.96	7.51	2.70	0.278	0.819	0.45
4-3, 36–38	25.36	5.20	8.34	2.23	0.225	0.801	0.44
5-2, 135–150	34.35	4.71	8.01	2.42	0.163	0.720	0.42
5-3, 54–56	35.04	4.51	7.95	2.46	0.285	0.913	0.48
5-4, 128–131	37.28	4.93	8.14	2.35	0.251	0.793	0.44
6-2, 23–25	42.73	4.76	8.30	2.53	0.171	0.757	0.43
6-7, 3–6	50.03	4.70	7.98	2.31	0.132	0.886	0.47
Hole 485A							
1-2, 23–25	52.23	1.84	7.77	3.06	0.117	0.983	0.49
1-5, 129–144	57.79	4.68	7.95	2.01	−0.013	1.214	0.54
1-6, 130–132	59.30	4.82	8.24	2.37	0.294	0.980	0.49
2-2, 25–27	61.75	5.55	8.00	2.13	0.388	0.747	0.43
2-2, 50–53	62.00	4.42	7.20	2.06	0.265	1.029	0.51
2-4, 48–51	64.98	4.70	7.34	2.09	0.234	0.783	0.44
3-2, 33–35	71.33	4.47	6.60	1.81	0.243	1.239	0.55
3-2, 115–118	72.15	4.50	7.44	2.19	0.263	0.966	0.50
3-2, 129–144	72.42	4.79	7.22	1.52	−0.100	0.876	0.47
4-1, 48–51	79.48	4.90	7.93	2.17	0.247	1.033	0.51
4-1, 55–57	79.55	4.80	7.99	2.12	0.146	1.257	0.56
5-3, 15–17	91.65	4.80	7.34	1.83	0.217	0.764	0.43
5-3, 120–123	92.70	4.78	7.88	2.35	0.291	0.830	0.45
5-3, 129–144	92.92	4.65	7.12	2.00	0.310	0.728	0.42
5-4, 40–43	93.40	4.00	6.61	1.95	0.107	0.791	0.44
6-2, 22–24	99.72	4.28	6.86	1.64	0.008	0.928	0.48
6-3, 68–71	101.68	4.70	7.24	2.03	0.234	0.884	0.47
6-3, 104–107	102.04	3.37	4.79	1.63	0.613	1.819	0.65
7-2, 22–25	109.22	4.85	8.20	2.33	0.198	1.050	0.51
8-2, 23–25	118.75	5.14	6.92	1.31	0.242	0.945	0.49
8-2, 107–110	119.57	5.15	8.37	2.44	0.233	0.593	0.37
8-2, 135–150	119.85	4.80	7.58	1.96	0.168	1.082	0.52
9-2, 76–78	128.76	3.47	4.89	1.40	0.478	2.142	0.68
9-2, 95–98	128.95	3.50	5.65	2.03	0.349	1.016	0.50
9-2, 135–150	129.35	3.64	4.88	1.31	0.518	1.887	0.65
10-2, 35–37	137.85	4.97	6.93	1.28	0.079	0.771	0.43
10-2, 67–70	138.17	4.85	7.74	1.79	0.014	0.834	0.45
11-1, 80–82	146.30	4.56	6.76	2.05	0.327	0.929	0.48
11-2, 88–90	147.88	1.62	5.53	2.08	0.302	1.763	0.64
18-1, 93–95	184.53	3.62	5.20	1.48	0.549	2.012	0.67
18-1, 103–106	185.16	3.80	5.28	1.63	0.605	1.592	0.61
19-2, 16–19	189.66	3.10	4.76	1.43	0.334	1.423	0.59
19-2, 65–67	190.15	1.52	5.21	2.68	−0.016	1.251	0.55
19-2, 78–81	190.28	4.90	7.66	2.10	0.267	0.937	0.48
20-1, 65–68	192.65	3.99	6.71	1.82	0.373	1.157	0.54
20-1, 135–150	193.35	4.49	6.09	1.03	0.207	1.005	0.50
22-4, 135–150	207.35	4.94	6.95	1.13	−0.225	1.033	0.51
22-6, 34–36	209.34	4.60	7.08	2.10	0.279	0.840	0.46
26-1, 51–54	226.51	5.05	7.86	1.84	0.203	1.141	0.53
27-1, 96–99	231.46	5.25	6.89	1.31	0.247	0.823	0.45
27-1, 121–124	231.71	5.28	8.21	2.26	0.436	0.708	0.41
28-1, 113–116	236.13	5.27	8.24	2.22	0.245	0.804	0.45
33-2, 97–99	269.47	4.79	7.47	1.90	0.412	1.265	0.56
34-1, 41–43	277.41	4.10	6.12	1.74	0.494	1.023	0.51
36-2, 23–25	296.73	4.77	6.43	1.72	0.627	1.554	0.61
37-1, 41–44	304.41	4.78	8.06	2.30	0.087	0.772	0.44
37-1, 94–96	304.94	4.00	6.14	1.92	0.469	1.520	0.60

[a] Coarsest 5%.

Hole 482D

This hole positioned 100 meters east of Hole 482C, was washed to 71.5 meters and then cored continuously to a total depth of 186.5 meters sub-bottom. The sediments recovered were late Quaternary hemipelagic muds (silts and clayey silts), with minor fine-grained turbidites (Cores 4, 5, and 6).

Fifteen samples were analyzed from this hole. Vertical variations in statistical parameters are plotted in Figure 5. The coarsest 5% of the distribution averages 4.50ϕ (44.19 μm), and mean grain size averages 7.35ϕ (6.13 μm). The sediments are very poorly sorted (σ_1 = 2.09ϕ), mesokurtic ($\bar{K}'_G = 0.49$), and fine-skewed ($\overline{Sk}_1$ = 0.25). Figure 5 also illustrates vertical variations in the percentages of sand, silt, and clay. There is an in-

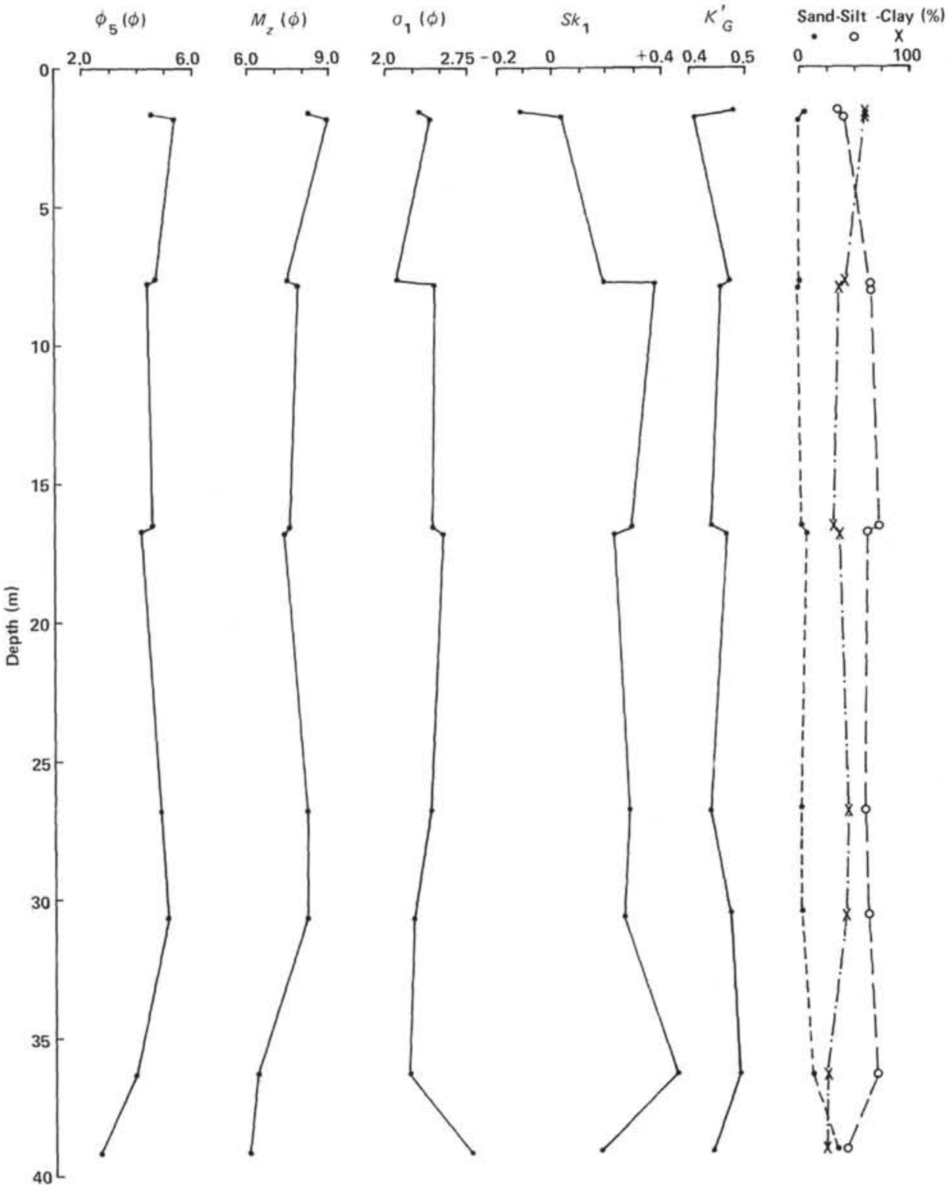

Figure 3. Variations in statistical parameters and percentages of sand, silt, and clay with depth in sediments from Hole 482A.

crease in the percent of sand and silt and a decrease in the percent of clay at about 101, 112, and 120 meters. These variations result from the occurrence of turbidites at the top of the interval and sandy muds at the base. Sand content in silt and clayey silt turbidites averages 8.0%. The turbidites are better developed in this hole than in Hole 482B, reflecting the position of Hole 482D near the center of the valley in which the site was drilled.

Hole 482F

Hole 482F, drilled 30 meters west of Holes A and B, was washed from 56.5 to 113.5 meters and then drilled to a total depth of 186 meters. The sediments recovered in this hole exhibit the same lithology as the basal sediments in Hole 482B.

Three samples were analyzed from Cores 2, 3, and 4. Texturally, the sediments are clayey silts (2.0% sand, 58.0% silt, 40% clay). The coarsest 5% of the distribution averages 4.80ϕ (35.90 μm), and the mean grain size is 7.80ϕ (4.48 μm). The sediments are very poorly sorted ($\bar{\sigma}_1$ = 2.20ϕ), fine skewed ($\overline{Sk}_1$ = 0.26), and mesokurtic ($\overline{K}'_G$ = 0.48). The sorting tends to decrease with depth.

Site 483

Site 483 is located about 52 km west of the crest of the East Pacific Rise and about 25 km east of the base of the continental slope of Baja California (Fig. 1). It lies in a NE-trending sediment pond about 8 km wide, underlain by a very flat, regular basement reflector. The sediment thickness is estimated to be about 105 meters and water depth is 3088 meters.

Hole 483

The first hole drilled at Site 483 was cored continuously from the mudline to a total depth of 204.5 meters. One-hundred ten meters of sediments were drilled above

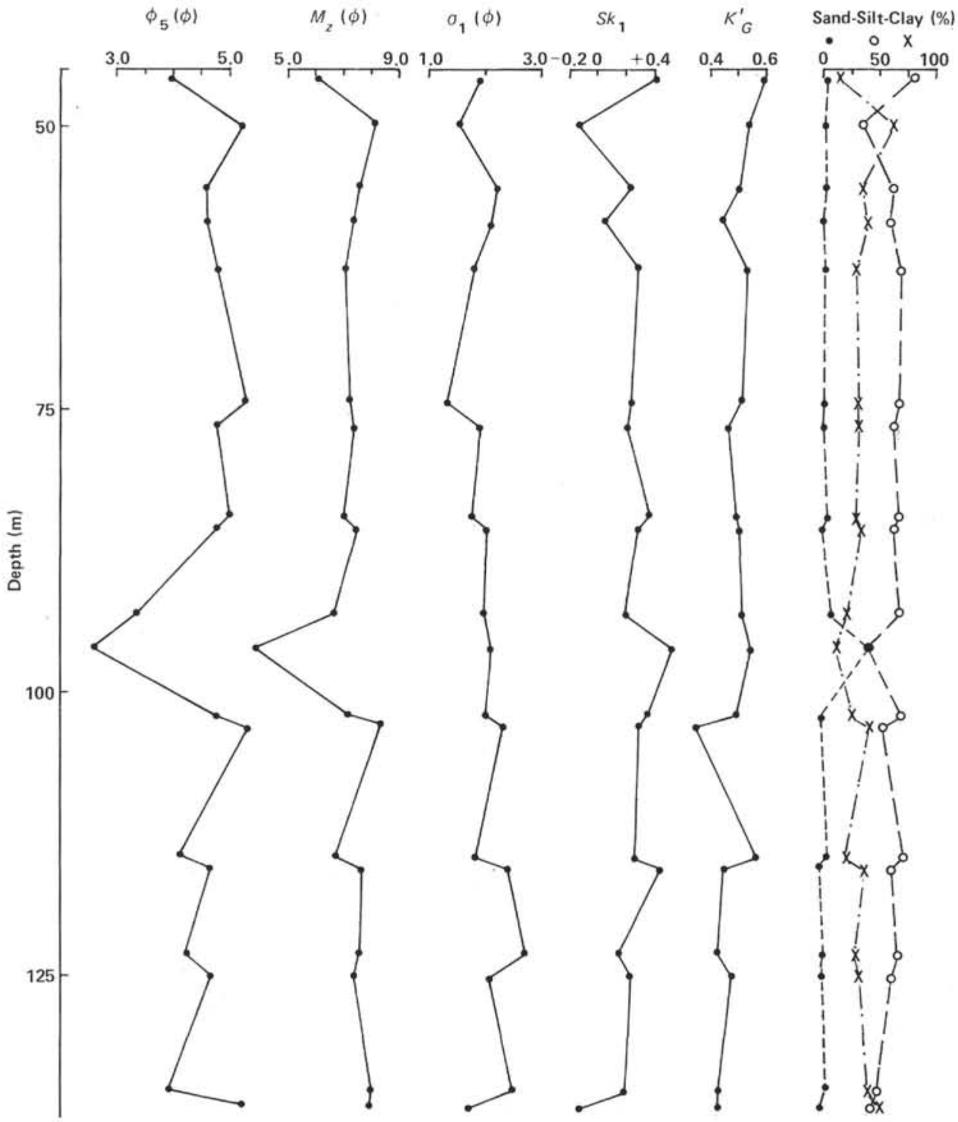

Figure 4. Variations in statistical parameters and percentages of sand, silt, and clay with depth in sediments from Hole 482B.

the uppermost basaltic unit and several sediment interlayers were partially recovered within the igneous pile. Two lithological units are recognized from the sediments overlying the basalts.

Unit I ranges from 0 to 39.0 meters and consists of upper Quaternary silty clays composed of approximately 38% silt and 59% clay. The sand content increases abruptly from 1.0 to more than 6.0% five meters below mudline. This variation results from the occurrence of turbidites.

The average mean values of statistical parameters (Table 2) are as follows: coarsest 5% of the distribution, 5.30ϕ (25.38 μm); average grain size, 8.70ϕ (2.40 μm); sorting, 2.0ϕ (poorly sorted); skewness, -0.07 (nearly symmetrical); and transformed kurtosis, 0.45 (platykurtic). Most of the sediments from this unit are coarse-skewed. The sorting becomes increasingly poor with depth. Vertical variations in statistical parameters are indicated in Figure 6.

Unit II ranges from 39.0 to 115 meters and consists of lower to upper Quaternary hemipelagic silty clays and clayey silts with minor silts. Twenty-one samples were analyzed. The most conspicuous textural features in this unit are a slight increase in sand and silt from 99 to 109 meters and a series of distinctive peaks at 41, 60, 79, and 107 meters (Fig. 7). These variations result from the occurrence of very thin (10 to 30 cm), fine-grained turbidite layers throughout this unit. The general composition is 4.0% sand, 56.0% silt, and 40.0% clay.

Average values for statistical parameters from sediments of this unit are: coarsest 5% of the distribution, 4.30ϕ (50.76 μm); average grain size 7.60ϕ (5.15 μm); sorting, 2.10ϕ (very poorly sorted); skewness, 0.11 (fine-skewed); and transformed kurtosis, 0.49 (mesokurtic).

Sediments interlayered with basalts were cored at various depths below the uppermost basalt/sediment contact. The following samples were analyzed from Cores 17 and 18:

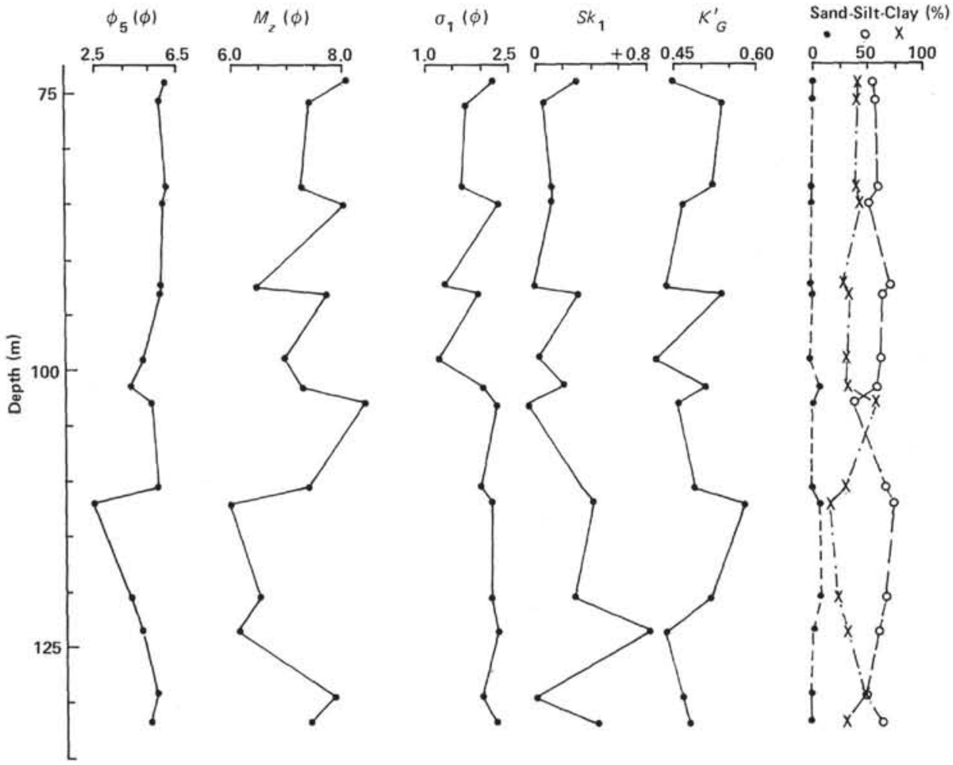

Figure 5. Variations in statistical parameters and percentages of sand, silt, and clay with depth in sediments from Hole 482D.

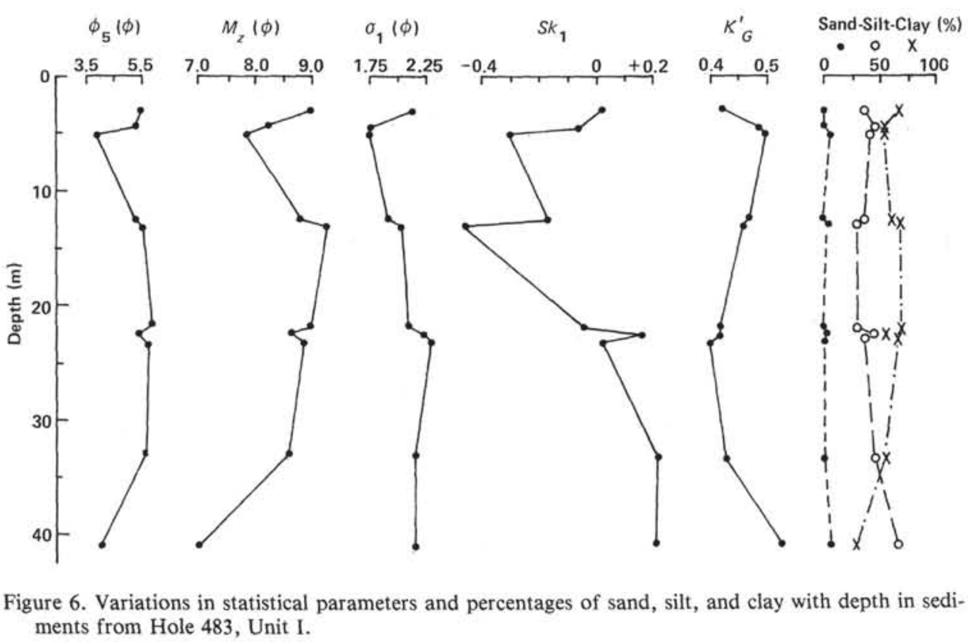

Figure 6. Variations in statistical parameters and percentages of sand, silt, and clay with depth in sediments from Hole 483, Unit I.

1) Core 17, 142.0 meters depth. A very poorly sorted ($\sigma_1 = 2.19\phi$); platykurtic ($K'_G = 0.45$); and strongly fine-skewed ($Sk_1 = 0.42$); clayey silt (clayey siltstone), with 58.81% silt and 41.18% clay (Tables 1 and 2). This sediment is in contact with coarse-grained basalt.

2) Core 18, Section 1; depth, 152.21 meters. One sample from the upper part of the section was analyzed. Texturally, the sediment is a poorly sorted ($\sigma_1 = 1.74\phi$); leptokurtic ($K'_G = 0.55$); and strongly fine-skewed silt (87.40% silt). The coarsest 5% of the distribution is 4.59ϕ (41.52 μm), and the average grain size is 6.17ϕ (13.88 μm).

3) Core 18, Section 3; depth 154.60 meters. One sample of a firm silty sand (42.62% sand, 42.54% silt) was analyzed. This sediment is very poorly sorted ($\sigma_1 =$ 2.17ϕ), strongly fine-skewed, and leptokurtic ($K'_G =$

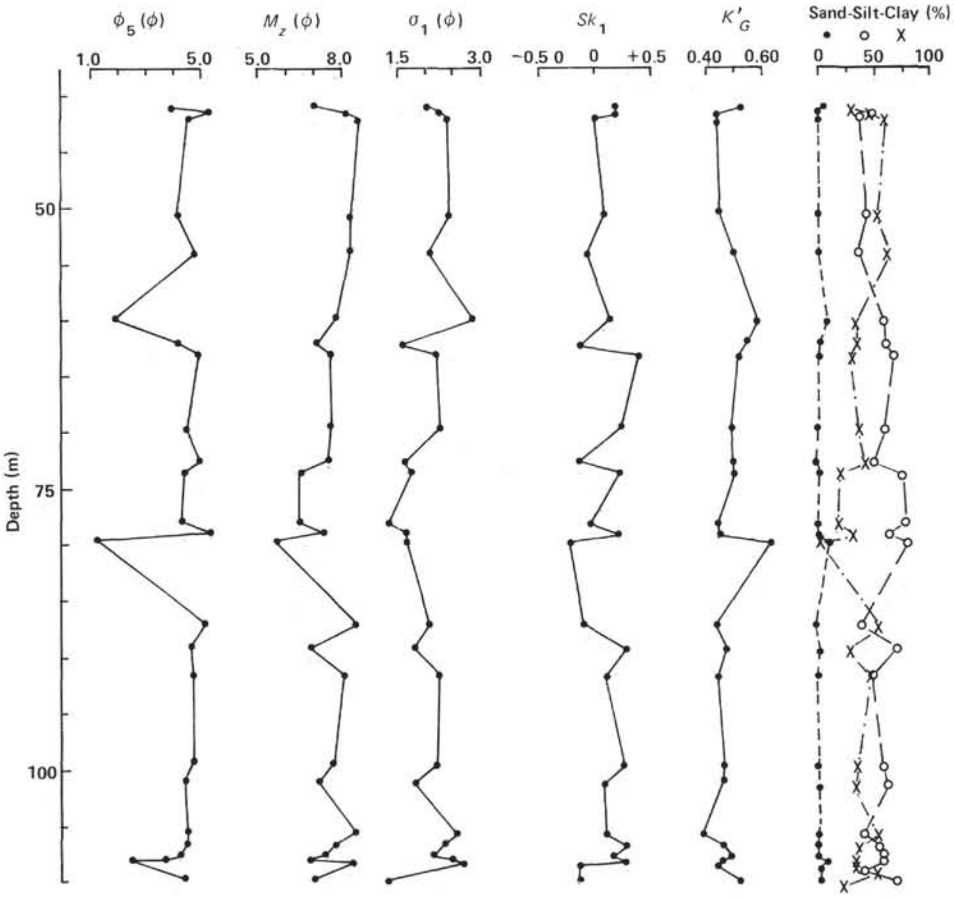

Figure 7. Variations in statistical parameters and percentages of sand, silt, and clay with depth in sediments from Hole 483, Unit II.

0.57); the average grain size is 5.22ϕ (26.83 μm), and ϕ_5 is 2.74ϕ (150 μm). This sediment may be from a rapidly deposited mud flow.

4) Core 18, Section 4; depth 155.84–156.35 meters. Two samples of firm, sandy clayey siltstone (33.0% sand, 65.0% silt, and 32.0% clay) were analyzed.

Statistical parameters from this sediment, are as follows: ϕ_5 is 4.5ϕ (44.19 μm); the average grain size, M_z = 7.7ϕ (4.81 μm); sorting = 2.26ϕ (very poorly sorted); skewness = 0.19 (fine-skewed); and transformed kurtosis, K'_G = 0.48 (mesokurtic). Sand and silt content tend to increase and clay percentage decreases with depth.

Hole 483B

Hole 483B is located 100 meters east of Hole 483. It was washed from the mudline to 91.5 meters and then cored continuously from this depth to a total depth of 267.0 meters. Sediments overlying basalt were cored between 91.5 and 110 meters and small pieces of sediment were recovered between several of the basalt units.

Ten samples were analyzed from the sediments overlying the uppermost basaltic unit, and five samples were analyzed from sediments between basalt. Sediments above basalt are Quaternary clayey silts (2.0% sand, 54.0% silt, 44.0% clay) with minor silty clays. Average values for statistical parameters are: coarsest 5% of the distribution, 4.75ϕ (37.16 μm); average grain size, 7.70ϕ (4.81 μm); sorting, 2.25ϕ (very poorly sorted); skewness, 0.30 (fine-skewed); and transformed kurtosis, 0.47 (mesokurtic). Vertical variations in statistical parameters and in sand-silt-clay percentages are shown in Figure 8. These variations result from the presence of occasional mud flows with a relatively high content of silt and sand at the base of the section.

Five samples were analyzed from sediments interlayered with basalt. At 133.0 meters depth (Core 7, Section 1) we recovered a Quaternary, very poorly sorted (σ_1 = 2.31ϕ), mesokurtic (K'_G = 0.48), and strongly fine-skewed (Sk_1 = 0.34), clayey silt (60% silt, 39% clay). The coarsest 5% of the distribution is 5.17ϕ (27.78 μm), and the average grain size is 8.10ϕ (3.64 μm) (Tables 1 and 2). One sample was analyzed from Core 8, Section 1 (137.50 m depth); this sediment is an upper Pliocene, poorly sorted (σ_1 = 1.69ϕ), leptokurtic (K'_G = 0.59), and strongly fine-skewed (Sk_1 = 0.26) silt (81.2% silt, 18.0% clay).

The sediments recovered between 209.20 and 211.24 meters (Core 20, Section 2) consist of an upper Pliocene clayey silt (3.0% sand, 69% silt, 28% clay). The sediment corresponds to a coarse-grained turbidite, and the sand content increases with depth. Average values for statistical parameters, are: coarsest 5% of the distribution, 4.34ϕ (49.37 μm); average grain size, 7.0ϕ (7.81 μm); sorting, 2.0ϕ (poorly sorted); skewness, 0.30 (fine-skewed); and transformed kurtosis, 0.50 (mesokurtic).

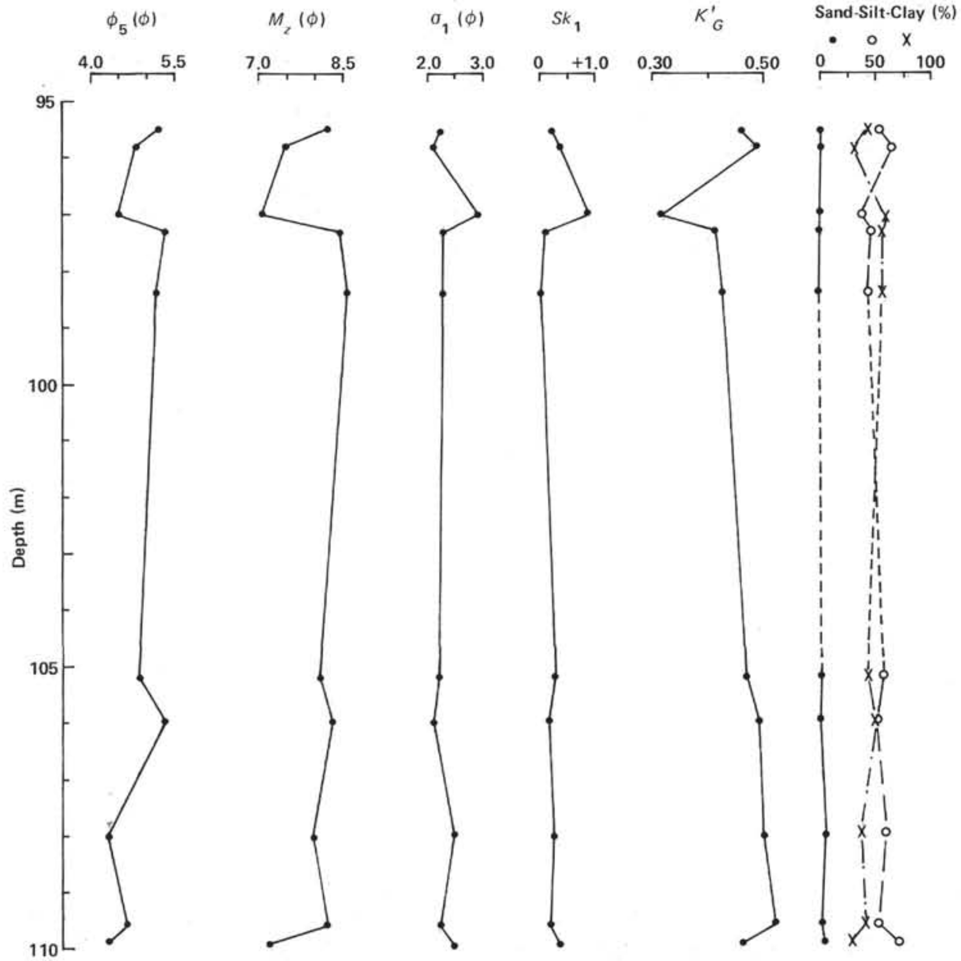

Figure 8. Variations in statistical parameters and percentages of sand, silt, and clay with depth in sediments from Hole 483B.

A hard, black clayey siltstone (59.95% silt, 38.11% clay) was drilled at 232.60 meters depth (Core 25, Section 2) between two basaltic units. This sediment is very poorly sorted ($\sigma_1 = 2.62\phi$), strongly fine-skewed ($Sk_1 = 0.31$), and platykurtic ($K'_G = 0.45$). The average grain size is 7.67ϕ (4.91 μm) and the coarsest 5% of the distribution is 4.39ϕ (47.70 μm).

Hole 483C

Hole 483C is located 450 meters east of Hole 483B, and 550 meters east of Hole 483. It was washed from the mudline to 38.5 meters depth (where a 9.0 m core was recovered) and from 48.0 to 86.0 meters. The hole was then cored continuously from this depth to 114.0 meters. The contact with the uppermost basalt unit was encountered at 107.0 meters depth. Eighteen samples were analyzed from this hole. The most conspicuous feature of the sediments from this hole is that those from Core 1 (38.5 to 48.0 m) are vitric, pelagic calcareous and siliceous biogenic clayey silts, while those from Cores 2, 3, and 4 (86.0 to 114.0 m), are dominantly hemipelagic silty clays and clayey silts (2.5% sand, 49.5% silt, 48.0% clay).

Texturally, the sediments from the uppermost 1.5 meters of Core 1 are soft, vitric, radiolarian-bearing diatomaceous silty clays (37.0% silt, 61.0% clay). Below 1.5 meters, the sediments consist of siliceous nannofossil marls which grade through calcareous nannofossil-bearing silty clays (45.0% silt, 53.0% clay) to clayey silts and silts (60% silt, 38% clay) at a depth of 3.6 meters. The average statistical parameters are: coarsest 5% of the distribution, 4.6ϕ (41.23 μm); average grain size, 8.10ϕ (3.64 μm); sorting, 2.12ϕ (very poorly sorted); skewness, 0.08 (nearly symmetrical); and transformed kurtosis, 0.48 (mesokurtic). Vertical variations in statistical parameters and in sand–silt–clay percentages resulting from the occurrence of glass shard concentrations are shown in Figure 9. The silt percentage tends to increase with depth, and the clay content decreases at the base of the sediments (Fig. 9, Tables 1, 2).

The hemipelagic silty clays and clayey silts (Cores 2 to 4) are very poorly sorted ($\sigma_1 = 2.23\phi$) and display an average skewness of 0.08 (nearly symmetrical), although most of silty clays are coarse-skewed or strongly coarse-skewed. The transformed kurtosis averages 0.45 (platykurtic), ϕ_5 is 4.76ϕ (36.90 μm), and the average grain size is 8.11ϕ (3.62 μm).

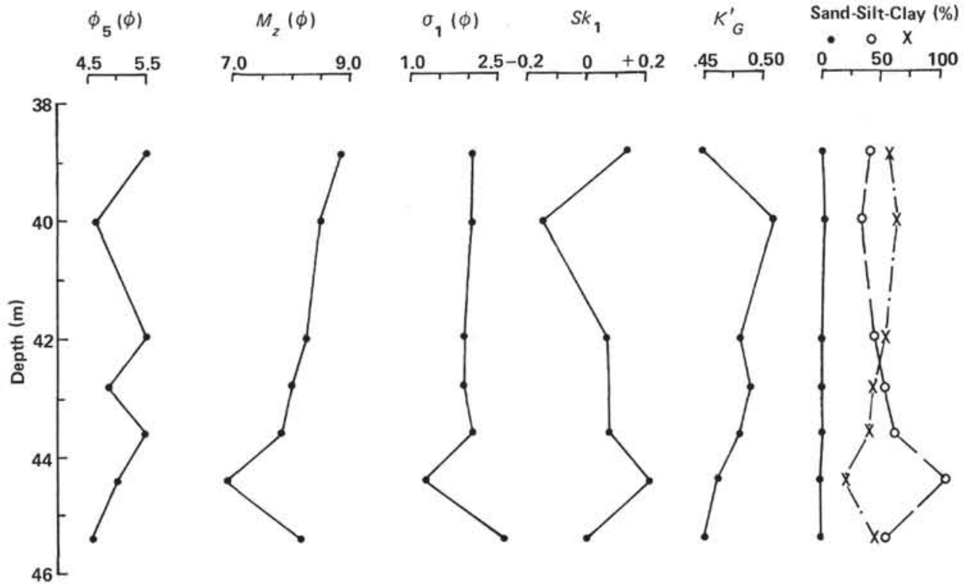

Figure 9. Variations in statistical parameters and percentages of sand, silt, and clay with depth in sediments from Hole 483C, Core 1.

Site 484

Two holes (484 and 484A) were drilled on top of a 75-meter basement high interpreted as a magnetic diapir in the northern trough of the Tamayo Fracture Zone.

Hole 484

This hole, located on the northern edge of a sediment pond topping the basement high, penetrated five meters into the sediment before touching basement. The entire section consists of late Quaternary, very fine-grained hemipelagic clayey silts, with minor interlayered beds of silty clay.

The uppermost 3.50 meters consist of soft nannofossil and diatomaceous ooze and mud. Texturally, the sediments are clayey silts and silty clays (45.0% silt, 52.0% clay). The coarsest 5% of the distribution averages 4.60ϕ (41.23 μm), and the average grain size is 8.34ϕ (3.09 μm). The sediments are very poorly sorted ($\bar{\sigma} = 2.35\phi$) and nearly symmetrical ($\overline{Sk}_1 = 0.03$), although the silty clays are strongly coarse-skewed and the clayey silts are fine-skewed. The transformed kurtosis averages 0.46 (platykurtic). Sand and clay percentages decrease with depth while the silt content increases (Tables 1, 2).

Three samples from the lowermost part of this hole (3.5 to 4.9 m depth) were analyzed. The sediments are silty clays (48.0% silt, 48.0% clay), with rare, thin sandy layers (3.0% sand) that may represent small turbidite cycles (Tables 1, 2).

Hole 484A

Hole 484A lies 75 meters west and 305 meters south of Hole 484, where the sediment thickness in the pond was a maximum. The hole was drilled to basement at a sub-bottom depth of 62 meters. The section consists of late Quaternary siliceous muds with intercalated turbidite layers and fine-grained hemipelagic sediments. Two lithological units are assigned to the section above the basement. Eighteen samples were analyzed.

Unit I ranges from 0.0 to 14.5 meters and consists of diatom and radiolarian muds with fine-grained turbidites. Texturally the sediments in this unit are mainly silty clays (45.0% silt, 50.0% clay) with minor clayey silts and sandy silts (21.0% sand). Average mean values for statistical parameters are: coarsest 5% of the distribution, 4.22ϕ (53.66 μm); average grain size, 8.23ϕ (3.33 μm); sorting, 2.39ϕ (very poorly sorted); skewness, 0.07 (nearly symmetrical); and transformed kurtosis, 0.47 (mesokurtic). The sandy silts (21.60% sand, 61.20% silt), are more coarse grained ($\phi_5 = 1.67\phi$; $M_z = 5.85\phi$), and leptokurtic (Tables 1, 2 and Fig. 10).

Unit II extends from 14.50 to 52.40 meters and consists of a late Quaternary fine-grained hemipelagic sequence with episodic sandy turbidites. Eleven samples were analyzed from this unit. Texturally the sediments in this unit are very homogeneous; most samples are silty clays (41.0% silt, 55.0% clay) with minor clayey silts (50.0% silt, 48.0% clay) (Fig. 2, Table 1). The coarsest 5% average 4.0ϕ (62.5 μm) and the average grain size is 8.5ϕ (2.76 μm). The sorting averages 2.44ϕ (very poorly sorted), the average skewness = 0.23 (fine-skewed), and the transformed kurtosis averages 0.56 (leptokurtic). The statistical parameters show peaks at 19, 25, 30, 39, and 48 meters. These peaks are caused by the presence of higher percentages of sand and may be related to turbidites (Fig. 10).

Site 485

Site 485 is located in a sediment-filled valley several kilometers east of the valley in which Site 482 was drilled. One hundred and fifty-three meters of sediments overlie the acoustic basement.

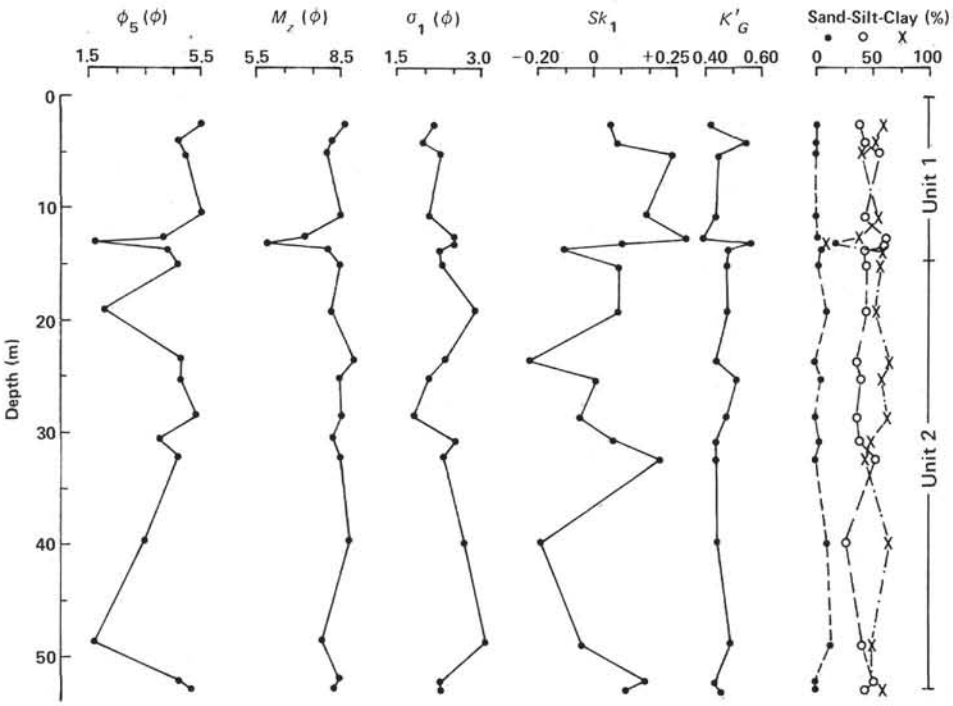

Figure 10. Variations in statistical parameters and percentages of sand, silt, and clay with depth in sediments from Hole 484A.

Hole 485

Hole 485 was cored from the mudline to 50.5 meters. Twenty-one samples from this hole were analyzed. The sediments are Quaternary in age and range from hemipelagic clayey silts (0.5% sand, 54.0% silt, 45.5% clay) and silty clays with minor terrigenous material ranging from silty clays and clayey silts to silts and sandy silts (6.0% sand, 58.0% silt, 36.0% clay) (Table 1). Texturally, the sediments are quite the variable. Because of the large variety of lithologic types included in the data, the average values of the statistical parameters display large standard deviations.

The sediments are very poorly sorted ($\bar{\sigma}_1 = 2.20\phi$); fine-skewed ($\overline{Sk}_1 = 0.23$); and very platykurtic ($\bar{K}'_G = 0.22$): ϕ_5 averages 4.50ϕ (44.19 μm); and the grain size averages 7.70ϕ (4.80 μm).

The terrigenous sediments, however, are slightly more coarse-grained: ϕ_5 averages 4.0ϕ (62.5 μm); the average grain size is 7.5ϕ (5.52 μm); the transformed kurtosis is 0.49 (mesokurtic); and they are very poorly sorted ($\bar{\sigma}_1 = 2.27$).

Vertical variations in the statistical parameters are shown in Figure 11. These variations result from the presence of terrigenous material interpreted as distal turbidites. The sand content is also variable and ranges from medium to very fine-grained.

Hole 485A

Hole 485A was drilled adjacent to Hole 485. It was washed to a depth of 50.5 meters and then cored continuously to a depth of 331.0 meters. The interval from 153.5 meters to the bottom of the hole consists of interlayered Quaternary sediments and basalt. Thirty samples were analyzed from the sediments overlying the basalt, and two lithologic units are assigned to this interval on the basis of the frequency and thickness of sandy and silty layers interpreted as distal turbidites.

Unit I ranges from 0.0 to 79.0 meters and consists of firm, Quaternary, nannofossil-bearing clayey silt (0.50% sand, 60.0% silt, 39.5% clay) with turbidite layers composed of silt and clayey silt (4.0% sand, 60.0% silt, 36.0% clay). The sediments display the following statistical parameters: coarsest 5% of the distribution, 4.40ϕ (47.35 μm); average grain size, 7.50ϕ (5.52 μm); sorting, 2.13ϕ (very poorly sorted); skewness, 0.19 (fine-skewed); and transformed kurtosis, 0.49 (mesokurtic). Vertical variations in the statistical parameters and in the sand-silt-clay content at 52.0 meters and from 62.0 to 72.0 meters (Fig. 12) result from the occurrence of sandy mud containing abundant foraminifers.

Unit II ranges from 79.0 to 149.5 meters and consists of firm nannofossil-bearing silts and clayey silts with turbidite layers composed of sandy mud and sandy silt. The general composition of the sediments is: 6.0% sand, 65% silt, and 29.0% clay. Variations in the percentage of sand, silt, and clay result from the presence of turbidites which grade from silt at the top to sandy muds at the base. The sand and silt content averages 14.0% and 65.0%, respectively, in the turbidites. Average values for statistical parameters are: coarsest 5% of the distribution, 4.30ϕ (50.76 μm); average grain size, 6.8ϕ (8.97 μm); sorting, 1.89ϕ (poorly sorted); skewness, 0.26 (fine-skewed); and transformed kurtosis, 0.50 (mesokurtic).

Seven sediment units were found interlayered with basalt. Eighteen samples of these sediments were analyzed from Cores 18 to 38.

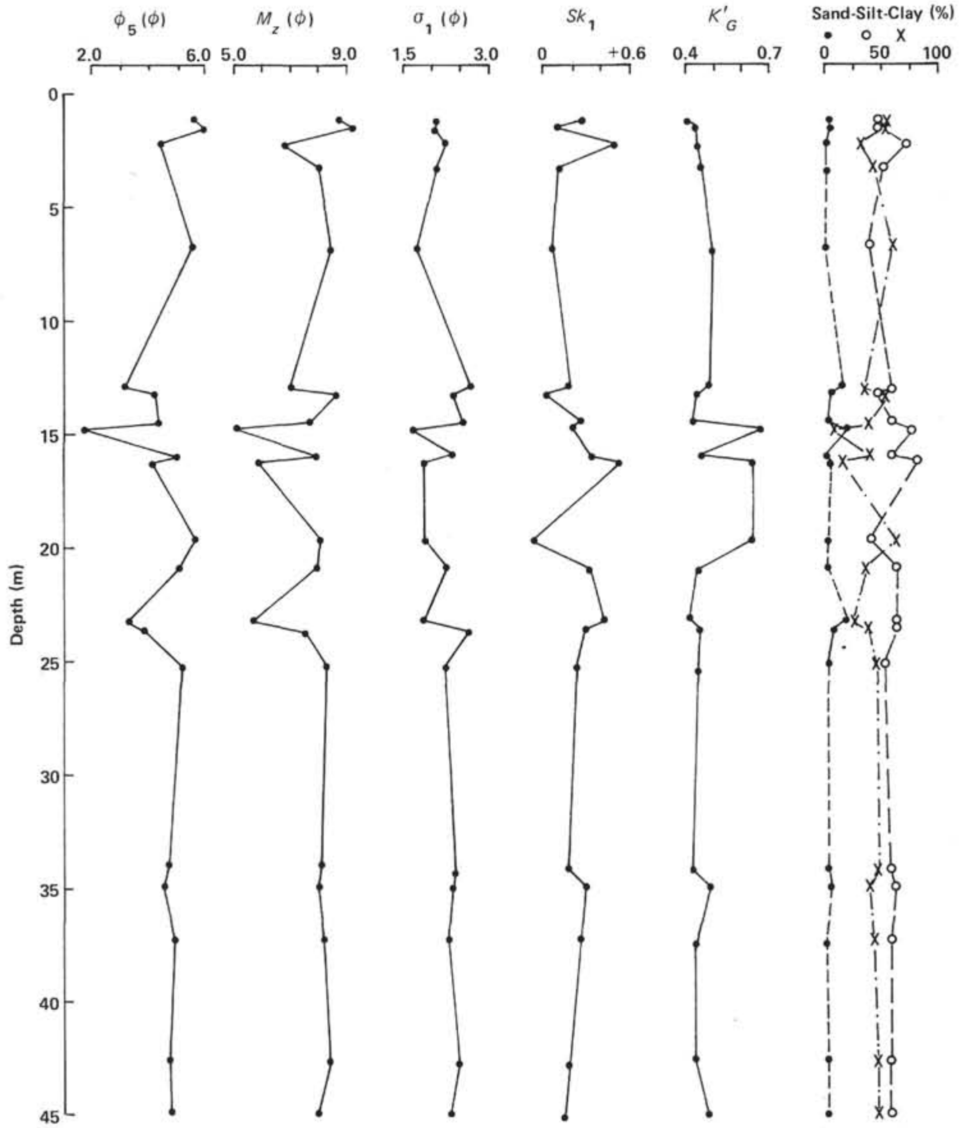

Figure 11. Variations in statistical parameters and percentages of sand, silt, and clay with depth in sediments from Hole 485.

The sediment analyzed from Cores 18 to 21 (184.50 to 201.5 m) ranges from soft silt to stiff, dehydrated nannofossil clayey silt and firm to stiff sandy silt containing visible foraminifers. The general composition of the sediments is: 12.0% sand, 72.0% silt, 16.0% clay. The coarsest 5% averages 3.60ϕ (82.47 μm), and the average grain size is 5.8ϕ (17.95 μm). The sediments are poorly sorted ($\sigma_1 = 1.73\phi$), strongly fine-skewed ($\overline{Sk}_1 = 0.33$), and leptokurtic ($\overline{K}'_G = 0.56$).

Cores 22 and 23 (201.7 to 211.90 m) recovered a stiff, nannofossil-rich clayey silt which grades with depth to indurated sandy mud. The silt contains pyrite-filled burrows. Two samples from Core 22 were analyzed.

Texturally the sediment ranges from a poorly sorted, coarse-skewed, mesokurtic silt (85.0% silt, 15.0% clay) at the top of the interval to a very poorly sorted, fine-skewed, platykurtic clayey silt (67.0% silt, 32.0 clay) (Tables 1 and 2).

Cores 26 to 28 (226.21–235.0 m) consist of firm to hard nannofossil-bearing clayey siltstone. Texturally the sediments consist of clayey silts with minor silts. General composition is 63.0% silt and 36.0% clay. Phi 5 is 5.20ϕ (27.20 μm) and the average grain size is 7.80ϕ (4.49 μm). Sorting averages 1.90ϕ (poorly sorted); skewness is 0.28 (fine-skewed), and the transformed kurtosis averages 0.46 (platykurtic). Both the silt content and the sorting diminish with depth (Tables 1 and 2).

Cores 33 and 34 (270.45–277.60 m) are composed of clayey siltstone and siltstone (74.0% silt, 24.0% clay). The sand content increases with depth from 0.20% to 3.51% near the contact with the underlying basalt. The sand-rich siltstone may represent a sandy turbidite. Texturally the sediments are poorly sorted ($\overline{\sigma}_1 = 1.82\phi$), strongly fine-skewed ($\overline{Sk}_1 = 0.45$), and leptokurtic ($\overline{K}'_G = 0.53$). Since only two samples were analyzed from this interval, the grain-size data cannot be considered representative of the section.

Core 36 (295.0–298.65 m) consists of hard nannofossil-bearing siltstone with finely laminated sandy mudstone. One sample was analyzed from this core. The

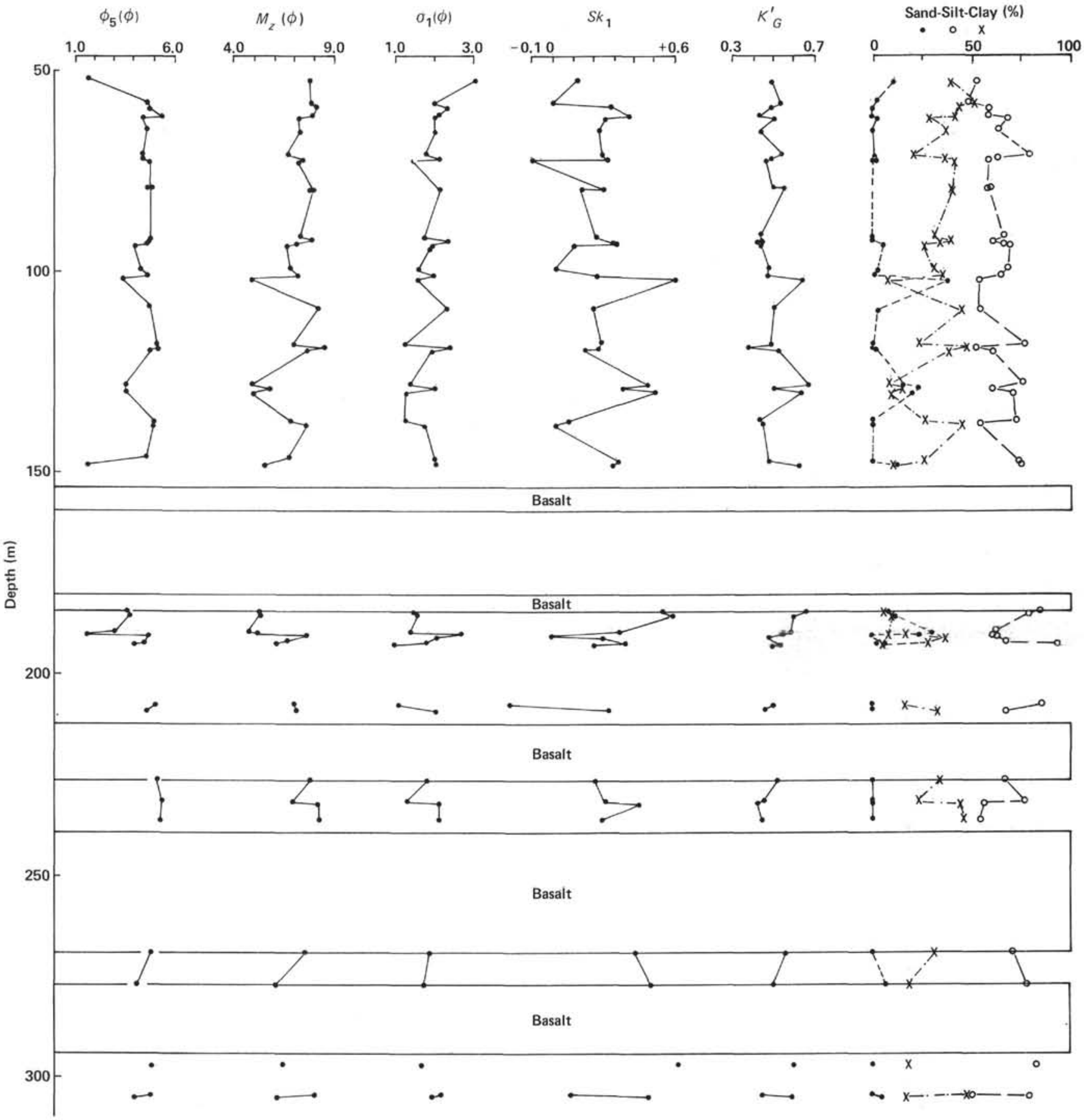

Figure 12. Variations in statistical parameters and percentages of sand, silt, and clay with depth in sediments from Hole 485A.

sediment is a poorly sorted, strongly fine-skewed, very leptokurtic silt (Table 2).

Cores 37 and 38 (304.0–314.55 m) consist of nannofossil-bearing clayey siltstone and siltstone. Two samples were analyzed from Core 37 (Tables 1 and 2). Texturally, the sediments consists of clayey silt and silt (2.6% sand, 65.0% silt, and 32.4% clay). Averaged values for statistical parameters, are: phi 5, 4.40ϕ (47.36 μm); average grain size, 7.0ϕ (7.81 μm); sorting, 2.11ϕ (very poorly sorted); skewness, 0.27 (fine-skewed); and transformed kurtosis, 0.52 (mesokurtic).

DISCUSSION

Five textural types ranging from sandy silt to silty clay were determined from the sediments cored at Sites 482 through 485 during Leg 65. Most are clayey silts (Fig. 2).

The sediments analyzed are Quaternary in age. A scatter diagram of average grain size versus sorting and skewness (Fig. 12) reveals that the best-sorted sediments have a mean diameter of almost 5.0ϕ (31.25 μm) while the worst-sorted sediments have mean sizes between 7.0

and 9.0ϕ (7.81–1.95 μm); above 5.0ϕ and below 9.0ϕ, the sorting improves with increasing grain size, so that the best-sorted sediments in the coarse silt-clay range have average diameters of about 5.0 and 7.0ϕ. Sorting is strongly dependent on the average grain size and this is a function of sediment composition; sediments that display the best sorting consist dominantly of one size populations (Folk, 1968; Thayer et al., 1973).

Folk and Ward (1957) and Thayer et al. (1974) have shown that skewness values which depart from the normal (i.e., which are greater than +0.1 or less than −0.1) result from unequal mixing of two normal size populations. Most of the sediments analyzed consist of a dominant population of fine silt along with a subordinate population of finer material. The resulting slight excess of finer material produces the positive skewness.

Average values for transformed kurtosis are 0.48 (mesokurtic) at Site 482; 0.47 (platykurtic) at Site 483; 0.35 (very platykurtic) at Site 484; and 0.49 (mesokurtic) at Site 485. These slight departures from normality (K'_G = 0.50) are also probably a consequence of the unequal mixing of two different size populations. In the sediments analyzed, this results from the mixing of silt (dominant population) with sand (subordinate coarse population).

CONCLUSIONS

Folk and Ward's statistical parameters have proven extremely useful in distinguishing and characterizing the unconsolidated lithologic units recovered on Leg 65 at the mouth of the Gulf of California.

All of the samples analyzed have mean sizes in the silt and clay range and are poorly to very poorly sorted. Skewness values exhibit considerable variability and the transformed kurtosis values range from very platykurtic (K'_G = 0.32, Site 483B, Core 1) to very leptokurtic (K'_G = 0.67, Site 485, Core 3).

Grain-size results from this study indicate marked variability. The vertical variations are chiefly the result of the occurrence of muddy terrigenous sediments (interpreted as turbidites or mud flows) interlayered with hemipelagic sediments. In general, the terrigenous sediments are coarser grained, more poorly sorted, and finer skewed than the hemipelagic sediments.

Sorting is dependent on average grain size. Sediments with an average grain size of about 5.0ϕ display the best sorting while those with mean sizes between 7.0 and 9.0ϕ have the poorest sorting. The values for skewness and kurtosis show slight departures from those predicted for a normal probability distribution.

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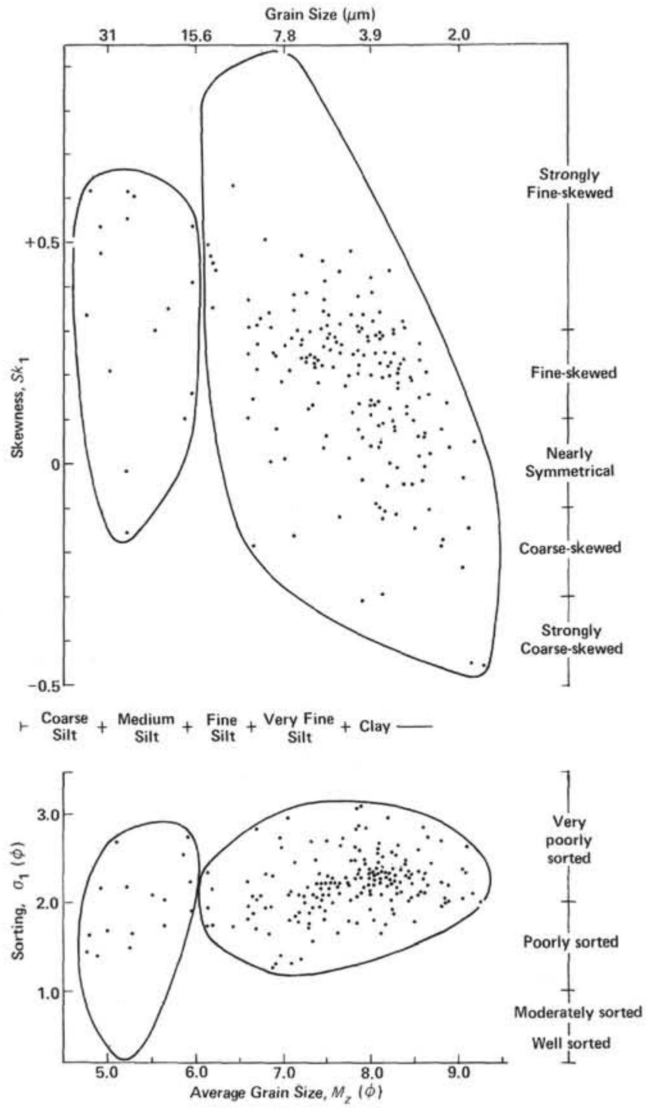

Figure 13. Scatter diagram showing average grain size versus sorting and skewness for Leg 65 sediments.