19. GRAIN-SIZE ANALYSES, LEG 32

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Sand-silt-clay distribution was determined on 10-cc sediment samples collected at the time the cores were split and described. Results are listed in the table below.

The sediment classification used here is that of Shepard (1954) with the sand, silt, and clay boundaries based on the Wentworth (1922) scale (Figure 1). Thus the sand, silt, and clay fractions are composed of particles whose diameters range from 2000 to 62.5 microns, 62.5 to 3.91 microns, and less than 3.91 microns, respectively. This classification is applied regardless of sediment type and origin; therefore, the sediment names used in this table may differ from those used elsewhere in this volume, e.g., a silt composed of nannofossils in this table may be called a nanno ooze in a site chapter.

Standard sieve and pipette methods were used to determine the grain-size distribution. The sediment sample was dried and dispersed in a Calgon solution. If a sediment sample failed to disaggregate, it was treated with a sonic probe and, if necessary, hydrogen peroxide. Sediment samples which resisted the above treatment were not analyzed.

The sand fraction was removed by wet sieving using a 63-micron sieve, and the silt and clay fractions were analyzed by standard pipette analysis. Sampling depths and times were calculated using equations derived from Stokes settling velocity equation (Krumbein and Pettijohn, 1938, p. 95-96):

$$\frac{D}{t} = V = \frac{2(d_1 - d_2)gr^2}{9\eta}$$

$$t = \frac{9D\eta}{2gr^2(d_1 - d_2)}$$

where

V = velocity in cm/s
t = time in seconds*
D = depth pipette is inserted, in cm
g = gravity in cm/sec²*
r = radius of individual particles in cm*
d_1 = density of solid particles arbitrarily set at 2.675 gm/cc
d_2 = absolute density of distilled water at different temperatures (Hodsman et al., 1960, p. 2129)
η = viscosity of distilled water in poises at different temperatures (Hodsman et al., 1960, p. 2181).*

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*Five figures were used in calculations to avoid rounding off variations.

The reproducibility of the grain-size analysis has been previously tested (Boyce, 1972), and it was found that over a period of time with several operators the reproducibility for the sand-silt-clay fractions is ±2.5% (absolute). For detailed step-by-step procedures see Volume IV of the Initial Reports of the Deep Sea Drilling Project.
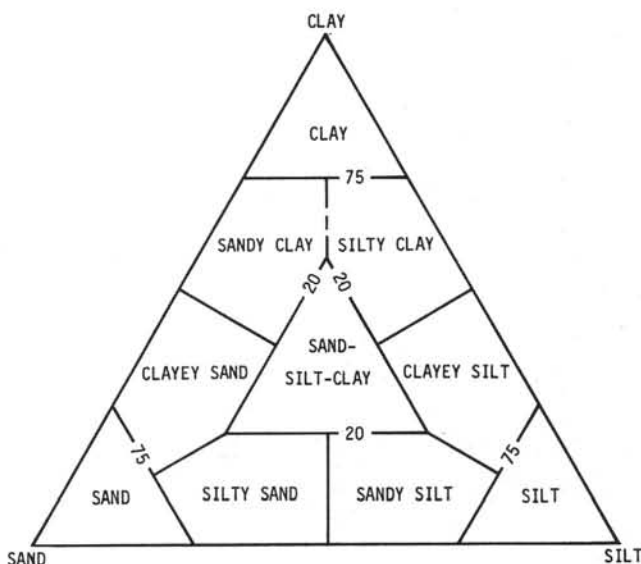

Figure 1. *Sediment classification after Shepard (1954) with the sand, silt, and clay-size fractions based on the Wentworth (1932) Grade Scale: Sand, silt, and clay-size particles having respective diameters of 2,000 to 62.5 microns, 62.5 to 3.91 microns, and less than 3.91 microns. Shepard's (1954) sediment classification is a function of sand, silt, and clay-size percentages and not composition.*

REFERENCES

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TABLE 1
Grain-Size Determination for Leg 32

Sample Interval (cm)	Subbottom Depth (m)	Sand (%)	Silt (%)	Clay (%)	Classification
Site 303					
2-3, 20	65.20	2.6	47.2	50.1	Silty clay
3-5, 135	124.35	5.5	48.6	45.9	Clayey silt
4-2, 83	176.33	1.0	18.7	80.3	Clay
Site 305					
1-2, 115	2.65	2.9	23.8	73.3	Silty clay
1-5, 100	7.00	9.6	37.6	52.8	Silty clay
2-2, 100	10.50	11.9	42.7	45.4	Silty clay
2-3, 100	12.00	5.7	28.1	66.2	Silty clay
3-2, 100	19.50	4.0	26.2	69.8	Silty clay
4-2, 100	29.00	1.3	16.7	81.9	Clay
5-2, 133	38.33	1.8	31.3	66.9	Silty clay
5-5, 110	42.60	0.5	30.8	68.7	Silty clay
6-2, 100	47.50	1.0	29.0	70.0	Silty clay
6-4, 90	50.40	2.7	40.4	56.8	Silty clay
6-5, 43	51.43	2.0	44.7	53.3	Silty clay
6-5, 132	52.32	0.6	56.9	42.5	Clayey silt
7-2, 100	57.00	0.2	39.8	60.0	Silty clay
7-5, 46	60.96	0.3	43.4	56.3	Silty clay
8-2, 102	66.52	0.8	56.2	43.0	Clayey silt
8-5, 100	71.00	2.1	46.5	51.4	Silty clay
9-2, 100	75.50	0.3	59.0	40.7	Clayey silt
9-5, 102	80.02	0.2	49.5	50.3	Silty clay
10-2, 100	84.50	0.7	61.1	38.2	Clayey silt
10-5, 103	89.03	0.7	62.3	37.0	Clayey silt
11-2, 70	93.70	2.1	69.5	28.4	Clayey silt
11-5, 100	98.50	2.8	69.5	27.7	Clayey silt
12-2, 90	103.40	2.4	55.9	41.7	Clayey silt
12-5, 100	108.00	5.1	56.8	38.0	Clayey silt
13-2, 102	113.02	0.1	50.7	49.1	Clayey silt
13-5, 100	117.50	3.6	47.1	49.3	Silty clay
14-5, 100	127.00	1.1	40.6	58.3	Silty clay
15-5, 97	136.47	0.1	26.6	73.2	Silty clay
16-2, 97	141.47	0.1	28.0	71.9	Silty clay
16-5, 5	145.05	7.6	31.0	61.4	Silty clay

TABLE 1 – Continued

Sample Interval (cm)	Subbottom Depth (m)	Sand (%)	Silt (%)	Clay (%)	Classification
Site 305 – Continued					
17-5, 102	155.52	0.1	25.4	74.4	Silty clay
18-3, 75	161.75	5.3	25.1	69.7	Silty clay
18-5, 100	165.00	8.2	23.1	68.7	Silty clay
19-5, 101	174.01	5.7	20.7	73.6	Silty clay
20-2, 100	179.00	0.5	25.7	73.8	Silty clay
20-5, 100	183.50	0.1	21.2	78.6	Clay
21-2, 70	188.20	2.6	24.1	73.4	Silty clay
21-5, 100	193.00	0.0	14.2	85.7	Clay
23-2, 90	207.40	1.1	34.3	64.6	Silty clay
23-5, 100	212.00	0.0	36.7	63.3	Silty clay
24-5, 100	221.00	1.0	23.8	75.2	Clay
25-2, 106	226.06	1.6	29.1	69.4	Silty clay
25-5, 96	230.46	3.9	34.5	61.6	Silty clay
26-2, 120	235.70	5.2	24.9	69.9	Silty clay
26-5, 110	240.10	9.1	26.2	64.7	Silty clay
Site 306					
1-2, 103	2.53	0.2	21.2	78.6	Clay
Site 307					
1-2, 137	2.87	15.1	47.3	37.6	Clayey silt
Site 308					
2-2, 40	14.40	14.8	50.6	34.6	Clayey silt
3-1, 90	41.40	19.2	60.0	20.8	Clayey silt
Site 310					
3-2, 104	18.04	3.4	31.9	64.7	Silty clay
6-5, 108	51.08	0.8	27.5	71.7	Silty clay
10-6, 98	90.48	0.4	39.4	60.2	Silty clay
Site 311					
1-2, 102	2.52	0.1	17.8	82.1	Clay