

22. GRAIN-SIZE ANALYSES, LEG 27

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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. The results are listed in Table 1.

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 μ , 62.5 to 3.91 μ , and less than 3.91 μ , 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 nanofossils 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 μ 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/sec

t = time, in sec*

D = depth pipette is inserted, in cm

g = gravity, in cm/sec²*

r = radius of individual particles, in cm*

d₁ = density of solid particles arbitrarily set at 2.675 g/cc

d₂ = absolute density of distilled water at different temperatures (Hodgman et al., 1960, p. 2129)

η = viscosity of distilled water in poises at different temperatures (Hodgman et al., 1960, p. 2181)

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

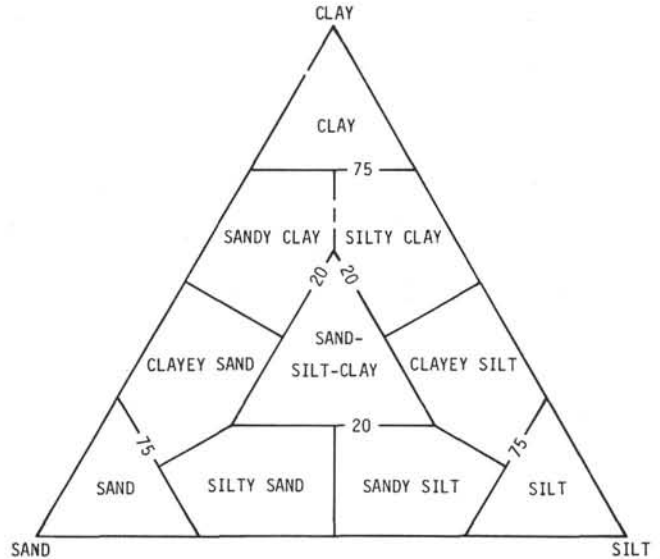


Figure 1. Sediment classification after Shepard (1954) with the sand, silt, and clay size fractions based on the Wentworth (1932) Grade Scale: Sand, silt, and clay size particles having respective diameters of 2000 to 62.5 μ , 62.5 to 3.91 μ , and less than 3.91 μ . Shepard's (1954) sediment classification is a function of sand, silt, and clay size percentages and not composition.

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 $\pm 2.5\%$ (absolute). For detailed step-by-step procedures, see Volume 4 of the Initial Reports of the Deep Sea Drilling Project.

REFERENCES

- Boyce, R. E., 1972. Grain size analyses, Leg 9, Deep Sea Drilling Project. In Hays, J. D., Initial Reports of the Deep Sea Drilling Project, Volume 9: Washington (U.S. Government Printing Office), p. 779.
- Hodgman, C. D., Weast, R. C., and Selby, S. M., 1960. Handbook of chemistry and physics: Cleveland (Chemical Rubber Publishing Co.).
- Krumbein, W. C. and Pettijohn, F. J., 1938. Manual of sedimentary petrography: New York (Appleton-Century-Crofts, Inc.).
- Shepard, F. P., 1954. Nomenclature based on sand-silt-clay ratios: J. Sediment. Petrol., v. 24, p. 151.
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TABLE 1
Grain-Size Determination, Leg 27

Core, Section, Top of Interval (cm)	Subbottom Depth (m)	Sand (%)	Silt (%)	Clay (%)	Classification
Site 259					
1-5, 74	6.7	3.4	31.9	64.7	Silty clay
3-2, 74	19.7	0.3	30.9	68.8	Silty clay
4-2, 74	29.2	4.9	46.4	48.7	Silty clay
4-5, 74	33.7	1.1	53.3	45.6	Clayey silt
5-2, 74	38.7	0.2	47.6	52.2	Silty clay
5-5, 74	43.2	0.4	39.6	60.0	Silty clay
6-2, 74	48.2	0.1	37.7	62.2	Silty clay
6-5, 74	52.7	0.2	45.1	54.7	Silty clay
7-2, 74	57.7	0.6	43.3	56.1	Silty clay
7-5, 74	62.2	0.6	21.7	77.7	Clay
8-2, 74	67.2	0.3	23.5	76.2	Clay
9-2, 74	76.7	1.8	16.8	81.3	Clay
9-5, 74	81.2	0.1	10.1	89.7	Clay
10-2, 74	86.2	1.5	18.6	79.9	Clay
10-5, 74	90.7	2.5	19.4	78.2	Clay
11-2, 74	95.7	0.9	24.7	74.4	Silty clay
11-5, 74	100.2	0.3	22.7	77.0	Clay
12-2, 74	105.2	0.6	22.5	77.0	Clay
12-5, 74	109.7	0.5	22.4	77.2	Clay
13-2, 74	114.7	0.7	23.8	75.4	Clay
13-5, 74	119.2	0.3	23.0	76.7	Clay
14-2, 74	124.2	0.3	25.6	74.1	Silty clay
14-5, 74	128.7	0.9	25.4	73.7	Silty clay
15-2, 74	133.7	0.3	25.1	74.6	Silty clay
15-5, 74	138.2	0.3	24.6	75.1	Clay
16-2, 74	143.2	0.1	23.4	76.5	Clay
17-2, 74	152.7	0.3	26.6	73.1	Silty clay
18-2, 74	162.2	0.1	11.9	88.0	Clay
19-2, 74	171.7	0.1	16.8	83.1	Clay
19-5, 74	176.2	0.1	15.2	84.7	Clay
20-2, 74	181.2	0.0	11.9	88.0	Clay
20-5, 85	185.9	0.0	12.8	87.1	Clay
21-2, 74	190.7	0.0	10.3	89.7	Clay
21-3, 74	192.2	0.2	17.8	82.0	Clay
21-5, 74	195.2	0.1	14.6	85.4	Clay
22-2, 74	200.2	0.0	17.6	82.4	Clay
23-2, 74	209.7	0.0	52.1	47.9	Clayey silt
23-5, 74	214.2	0.7	10.0	89.3	Clay
24-2, 74	219.2	0.1	14.5	85.4	Clay
25-2, 74	228.7	0.0	14.3	85.7	Clay
26-2, 74	238.2	19.1	25.0	55.9	Silty clay
26-5, 74	242.7	0.0	25.8	74.2	Silty clay
27-2, 74	247.7	2.7	22.2	75.1	Clay
27-5, 74	252.2	0.1	16.4	83.5	Clay
28-2, 74	257.2	0.2	23.0	76.8	Clay
29-2, 74	266.7	0.1	21.5	78.4	Clay
30-2, 74	276.2	22.4	14.3	63.4	Sandy clay
30-5, 74	280.7	0.1	10.3	89.6	Clay
31-2, 74	285.7	0.1	6.7	93.3	Clay
32-2, 74	295.2	0.2	9.6	90.2	Clay
Site 260					
1-2, 32	1.8	0.5	31.9	67.6	Silty clay
2-2, 55	46.1	0.1	21.5	78.4	Clay
3-2, 74	93.7	0.0	14.9	85.1	Clay
4-5, 74	136.2	0.0	48.8	51.2	Silty clay
7-2, 118	198.7	0.0	18.2	81.8	Clay
7-5, 130	203.3	0.1	18.1	81.8	Clay
8-5, 88	221.9	0.2	19.8	80.0	Clay
10-2, 78	245.8	5.6	32.7	61.7	Silty clay
12-2, 35	264.4	0.1	21.3	78.6	Clay
15-2, 74	293.2	0.1	20.7	79.3	Clay
16-2, 74	302.7	0.3	22.2	77.5	Clay

TABLE 1 - Continued

Core, Section Top of Interval (cm)	Subbottom Depth (m)	Sand (%)	Silt (%)	Clay (%)	Classification
Site 261					
2-2, 74	11.7	0.0	20.3	79.7	Clay
3-2, 74	49.7	0.0	16.5	83.5	Clay
4-2, 74	97.2	0.2	33.5	66.3	Silty clay
6-2, 74	173.2	0.0	10.5	89.5	Clay
6-5, 74	177.7	0.0	9.8	90.1	Clay
7-2, 74	182.7	0.0	9.9	90.1	Clay
8-2, 74	192.2	0.1	10.0	90.0	Clay
8-5, 74	196.7	0.1	15.2	84.8	Clay
19-3, 90	307.9	0.0	15.0	85.0	Clay
19-5, 74	310.7	0.0	11.1	88.9	Clay
20-2, 81	315.8	0.0	13.6	86.4	Clay
22-2, 74	344.2	0.0	18.0	82.0	Clay
22-5, 74	348.7	0.0	9.2	90.8	Clay
23-2, 74	363.2	0.0	31.9	68.1	Silty clay
24-2, 68	382.2	0.0	6.2	93.8	Clay
27-2, 104	439.5	0.2	14.8	84.9	Clay
Site 262					
1-2, 74	2.2	1.2	30.9	67.9	Silty clay
1-3, 26	3.3	0.0	35.3	64.7	Silty clay
3-5, 74	21.2	1.3	36.5	62.2	Silty clay
4-2, 78	26.3	0.9	34.0	65.1	Silty clay
5-5, 74	40.2	0.7	34.1	65.2	Silty clay
6-2, 74	45.2	0.8	36.6	62.6	Silty clay
6-3, 26	46.3	0.4	29.9	69.6	Silty clay
6-5, 74	49.7	0.5	31.9	67.6	Silty clay
7-2, 129	55.3	0.3	28.5	71.2	Silty clay
7-5, 74	59.2	0.5	30.6	68.8	Silty clay
8-2, 119	64.7	0.7	32.7	66.6	Silty clay
8-5, 74	68.7	1.1	32.1	66.8	Silty clay
9-5, 74	78.2	0.5	33.3	66.2	Silty clay
10-2, 74	83.2	0.9	30.0	69.1	Silty clay
11-2, 74	92.7	0.4	35.7	63.9	Silty clay
11-5, 74	97.2	0.6	34.5	64.8	Silty clay
12-5, 74	106.7	0.0	53.8	46.2	Clayey silt
13-2, 74	111.7	0.6	33.1	66.4	Silty clay
13-5, 47	116.0	0.5	38.5	61.0	Silty clay
14-2, 74	121.2	0.7	32.6	66.7	Silty clay
14-5, 74	125.7	0.5	30.3	69.2	Silty clay
15-2, 74	130.7	0.7	28.4	70.9	Silty clay
15-5, 74	135.2	0.6	32.8	66.7	Silty clay
16-2, 74	140.2	0.8	31.9	67.3	Silty clay
16-5, 74	144.7	5.6	37.9	56.6	Silty clay
17-2, 70	149.7	1.5	27.3	71.2	Silty clay
17-5, 74	154.2	1.5	30.4	68.1	Silty clay
18-2, 74	159.2	0.8	25.6	73.6	Silty clay
18-3, 90	160.9	0.8	28.6	70.6	Silty clay
18-5, 74	163.7	1.6	27.7	70.8	Silty clay
19-2, 74	168.7	1.2	25.8	73.0	Silty clay
19-5, 74	173.2	0.6	27.6	71.8	Silty clay
20-2, 74	178.2	1.0	27.7	71.3	Silty clay
20-5, 74	182.7	1.2	27.4	71.4	Silty clay
21-2, 74	187.7	3.4	26.6	69.9	Silty clay
21-5, 74	192.2	1.9	27.0	71.1	Silty clay
22-2, 74	197.2	0.5	26.3	73.2	Silty clay
22-5, 74	201.7	0.9	23.8	75.3	Clay
23-2, 74	206.7	1.1	22.1	76.7	Clay
23-5, 74	211.2	1.8	27.0	71.2	Silty clay
24-2, 74	216.2	3.4	25.0	71.6	Silty clay
25-2, 74	225.7	3.2	25.4	71.4	Silty clay
25-5, 74	230.2	1.6	25.6	72.8	Silty clay
26-2, 74	235.2	2.1	25.8	72.1	Silty clay
26-5, 74	239.7	4.3	26.0	69.7	Silty clay

TABLE 1 – Continued

Core, Section Top of Interval (cm)	Subbottom Depth (m)	Sand (%)	Silt (%)	Clay (%)	Classification
27-2, 74	244.7	2.2	25.1	72.7	Silty clay
27-5, 74	249.2	2.7	24.0	73.3	Silty clay
28-2, 74	254.2	9.5	30.8	59.7	Silty clay
29-2, 74	263.7	5.0	26.6	68.4	Silty clay
29-5, 74	268.2	5.6	21.0	73.4	Silty clay
30-2, 74	273.2	13.1	34.3	52.6	Silty clay
30-5, 74	277.7	8.6	34.0	57.4	Silty clay
31-2, 74	282.7	8.3	26.4	65.3	Silty clay
31-5, 74	287.2	7.8	33.1	59.1	Silty clay
32-2, 74	292.2	6.7	37.1	56.3	Silty clay
32-5, 74	296.7	4.6	33.2	62.2	Silty clay
33-2, 74	301.7	1.7	30.8	67.5	Silty clay
33-5, 74	306.2	0.9	31.6	67.6	Silty clay
34-2, 74	311.2	1.1	41.1	57.8	Silty clay
35-2, 74	320.7	3.5	37.8	58.7	Silty clay
35-5, 74	325.2	2.2	33.2	64.6	Silty clay
36-2, 74	330.2	5.6	32.3	62.1	Silty clay
36-5, 74	334.7	1.8	33.3	64.9	Silty clay
37-2, 2	339.0	10.2	56.8	33.0	Clayey silt
37-5, 91	344.4	3.6	44.8	51.7	Silty clay
38-2, 70	349.2	13.7	48.2	38.2	Clayey silt
38-5, 74	353.7	53.4	28.0	18.6	Silty sand
39-2, 52	358.5	44.6	32.0	23.3	Sand-silt-clay
39-5, 74	363.2	22.3	43.7	34.0	Sand-silt-clay
40-2, 64	368.1	25.1	33.9	41.0	Sand-silt-clay
41-2, 46	377.5	55.5	26.4	18.1	Silty sand
41-5, 59	382.1	46.1	29.4	24.5	Sand-silt-clay
42-2, 79	387.3	34.2	36.7	29.1	Sand-silt-clay
42-3, 40	388.4	21.2	47.0	31.8	Sand-silt-clay
43-2, 82	396.8	46.1	33.7	20.2	Sand-silt-clay
44-2, 74	406.2	50.3	29.5	20.3	Sand-silt-clay

TABLE 1 – Continued

Core, Section Top of Interval (cm)	Subbottom Depth (m)	Sand (%)	Silt (%)	Clay (%)	Classification
45-2, 108	416.1	28.1	55.0	16.9	Sandy silt
45-5, 75	420.3	26.0	55.0	19.1	Sandy silt
Site 263					
1-2, 74	2.2	1.8	45.3	52.9	Silty clay
2-2, 74	54.7	51.1	18.1	30.8	Clayey sand
3-2, 74	92.7	55.8	21.7	22.5	Sand-silt-clay
3-5, 74	97.2	51.5	25.7	22.9	Sand-silt-clay
4-2, 80	111.8	0.1	18.7	81.1	Clay
4-5, 74	116.2	0.1	18.8	81.1	Clay
6-2, 120	150.2	0.1	17.4	82.6	Clay
6-5, 74	154.2	0.1	16.7	83.3	Clay
7-2, 40	177.9	0.4	16.4	83.1	Clay
9-2, 74	225.7	0.0	14.6	85.4	Clay
10-2, 29	244.3	0.1	22.3	77.6	Clay
11-2, 72	263.7	0.1	7.2	92.7	Clay
12-4, 1	285.0	17.1	10.2	72.7	Sandy clay
13-5, 109	306.6	0.1	13.5	86.4	Clay
14-2, 90	320.9	0.1	16.2	83.7	Clay
14-5, 52	325.0	0.1	8.7	91.2	Clay
18-5, 7	419.6	0.1	22.3	77.6	Clay
19-2, 64	453.6	0.3	32.8	66.9	Silty clay
19-5, 11	457.6	0.4	25.8	73.8	Silty clay
22-2, 71	558.2	0.3	36.8	62.9	Silty clay
23-2, 72	596.2	0.7	47.6	51.6	Silty clay
23-5, 35	600.4	0.6	48.7	50.6	Silty clay
24-2, 58	634.1	0.3	49.1	50.6	Silty clay
28-2, 87	729.4	0.3	46.9	52.9	Silty clay
29-2, 108	739.1	0.3	36.4	63.3	Silty clay