

APPENDIX I. GRAIN SIZE ANALYSES, LEG 17

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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 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 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, and 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-size 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):

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

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

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

d_1 = density of solid particles arbitrarily set at 2.675 g/cc

d_2 = 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.

The reproducibility of the grain size analyses 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 IV of the Initial Reports of the Deep Sea Drilling Project.

REFERENCES

- Boyce, R. E., 1972. Grain Size Analysis, Leg 9, Deep Sea Drilling Project: Initial Reports of the Deep Sea Drilling Project, Volume IX. 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.), 3472 p.
- Krumbein, W. C. and Pettijohn, F. J., 1938, Manual of Sedimentary Petrography: New York (Appleton Century Cor.), 549 p.
- Shepard, F. P., 1954. Nomenclature based on sand-silt-clay ratios: J. Sediment. Petrol., v. 24, p. 151.
- Wentworth, C. K., 1922. A scale of grade and class terms for clastic sediments: J. Geol., v. 30, p. 377.

TABLE 1
Grain Size Determinations, Leg 17

Core Section, Top of Interval (cm)	Depth (cm)	Sand (%)	Silt (%)	Clay (%)	Classification
Site 164					
10-4, 21.0	116.7	0.7	28.3	71.0	Silty clay
12-1, 99.0	132.0	0.8	23.6	75.6	Clay
13-1, 133.0	138.3	0.2	23.8	76.0	Clay
17-1, 86.0	178.9	57.1	20.2	22.7	Sand-silt-clay
25-1, 122.0	253.2	41.5	23.5	34.9	Sand-silt-clay
Site 165					
2-1, 129.0	6.3	2.8	63.2	34.0	Clayey silt
Site 165A					
2-1, 54.0	14.5	1.6	61.8	36.6	Clayey silt
2-3, 14.0	17.1	2.2	52.9	44.9	Clayey silt
2-3, 60.0	17.6	7.1	60.4	32.5	Clayey silt
2-3, 80.0	17.8	7.5	67.9	24.6	Clayey silt
2-3, 96.0	18.0	18.0	57.9	24.1	Clayey silt

TABLE 1 – Continued

Core Section, Top of Interval (cm)	Depth (cm)	Sand (%)	Silt (%)	Clay (%)	Classification
8-1, 15.0	145.1	5.5	52.1	42.4	Clayey silt
8-1, 34.0	145.3	1.9	59.3	38.7	Silt
8-1, 82.0	145.8	11.3	84.6	4.1	Silt
8-1, 102.0	146.0	17.7	53.3	29.0	Clayey silt
8-6, 72.0	153.2	25.3	47.1	27.5	Sand-silt-clay
8-6, 88.0	153.4	10.2	57.0	32.8	Clayey silt
9-3, 113.0	158.1	15.4	42.6	42.0	Clayey silt
10-1, 60.0	201.6	2.3	46.5	51.1	Silty clay
10-4, 115.0	206.6	11.4	49.2	39.4	Clayey silt
11-3, 128.0	214.3	2.6	41.8	55.5	Silty clay
12-3, 110.0	223.1	3.4	43.7	53.0	Silty clay
12-5, 20.0	225.2	3.4	47.1	49.5	Silty clay
12-5, 45.0	225.4	11.1	57.4	31.5	Clayey silt
12-5, 107.0	226.1	0.7	67.0	32.4	Clayey silt
22-3, 127.0	400.3	3.3	45.5	51.2	Silty clay
23-2, 34.0	425.8	14.3	49.9	35.8	Clayey silt

Site 166

14-2, 70.0	180.2	10.4	40.4	49.1	Silty clay
25-1, 127.0	271.3	11.7	47.9	40.4	Clayey silt

Site 167

1-3, 105.0	4.0	24.2	32.5	43.4	Sand-silt-clay
1-5, 136.0	7.4	24.3	31.0	44.7	Sand-silt-clay
2-2, 108.0	11.6	27.4	29.5	43.1	Sand-silt-clay
2-6, 80.0	17.3	24.7	30.8	44.5	Sand-silt-clay
3-4, 70.0	23.2	11.4	26.0	62.5	Silty clay
3-5, 50.0	24.5	18.3	30.6	51.1	Silty clay
4-1, 54.0	66.5	4.7	35.4	59.8	Silty clay
4-3, 72.0	69.7	4.6	37.5	57.9	Silty clay
4-4, 66.0	71.2	8.6	39.6	51.7	Silty clay
4-6, 100.0	74.5	6.3	42.8	50.8	Silty clay
5-3, 64.0	106.6	3.2	47.2	49.6	Silty clay
6-4, 80.0	145.3	11.0	48.5	40.5	Clayey silt
7-2, 90.0	151.4	0.4	51.6	47.9	Clayey silt
7-5, 103.0	156.0	16.7	50.5	32.9	Clayey silt
7-5, 147.0	156.5	5.6	54.8	39.6	Clayey silt
8-1, 124.0	187.2	12.4	57.4	30.2	Clayey silt
9-1, 110.0	224.1	2.4	53.2	44.3	Clayey silt
9-2, 52.0	225.0	6.3	55.3	38.4	Clayey silt
9-4, 88.0	228.4	16.3	41.9	41.8	Clayey silt
10-6, 88.0	268.4	3.0	45.7	51.3	Silty clay
11-1, 72.0	297.7	3.8	59.3	37.0	Clayey silt
11-5, 70.0	303.7	4.2	49.0	46.8	Clayey silt
12-2, 80.0	336.3	5.7	48.4	45.9	Clayey silt
12-4, 60.0	339.1	3.1	53.5	43.5	Clayey silt
13-5, 80.0	376.8	11.9	64.5	23.6	Clayey silt
14-2, 106.0	409.6	6.7	52.2	41.1	Clayey silt
14-4, 41.0	411.9	7.6	41.7	50.7	Silty clay
15-5, 127.0	442.3	8.2	48.1	43.8	Clayey silt
18-2, 80.0	474.3	3.3	53.9	42.9	Clayey silt
19-2, 80.0	483.3	3.6	44.1	52.3	Silty clay

TABLE 1 – Continued

Core, Section Top of Interval (cm)	Depth (cm)	Sand (%)	Silt (%)	Clay (%)	Classification
20-2, 51.0	493.0	2.8	47.6	49.6	Silty clay
21-5, 60.0	506.6	5.8	49.0	45.2	Clayey silt
22-1, 80.0	509.8	7.3	57.4	35.2	Clayey silt
23-2, 30.0	520.8	9.6	62.8	27.6	Clayey silt
23-5, 106.0	526.1	8.2	61.8	30.0	Clayey silt
28-2, 40.0	556.9	2.6	44.4	52.9	Silty clay
32-3, 132.0	596.3	3.5	45.4	51.1	Silty clay
39-1, 125.0	658.3	17.8	34.9	47.2	Silty clay
42-5, 65.0	691.7	10.7	43.6	45.6	Silty clay
45-6, 93.0	721.4	3.4	22.7	73.9	Silty clay
55-2, 95.0	807.5	1.1	33.8	65.1	Silty clay
57-1, 148.0	824.5	0.3	22.0	77.7	Clay
58-2, 66.0	829.2	0.1	9.7	90.2	Clay
58-3, 15.0	830.2	0.1	22.7	77.2	Clay

Site 170

2-2, 51.0	3.0	0.1	36.2	63.6	Silty clay
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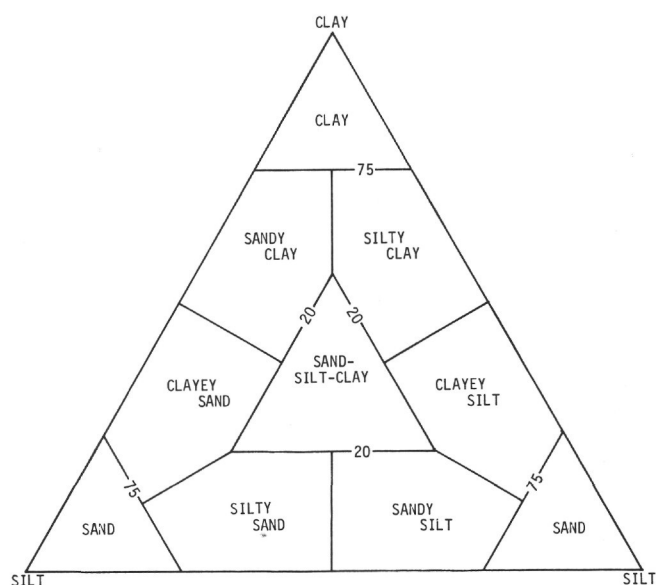


Figure 1. Sediment classification after Shepard (1954) with the sand, silt, and clay size fractions based on the Wentworth (1922) grade scale: sand, silt, and clay size particles have respective diameters of 2000 to 62.5 microns, 62.5 to 3.91 microns, and <3.91 microns. Shepard's (1954) sediment classification is a function of sand, silt, and clay size particles and not composition.