

## 23. GRAIN SIZE ANALYSES

Robert E. Boyce, Scripps Institution of Oceanography, La Jolla, California

Aboard the *Glomar Challenger* 10-cc grain size samples were selected from each prominent lithology or every 1.5 meters where the lithology appeared uniform. The sand, silt, and clay-size percentages were determined and are listed in Table 1.

The sand, silt, and clay-size fractions were determined by standard sieving and pipette analysis. The sediment sample was dried and then dispersed in calgon solution. If the sediment failed to disaggregate in calgon, it was dispersed in hydrogen peroxide. The sand-size fraction was separated by a 62.5 micron sieve with the fines being processed via standard pipette analysis following Stokes settling velocity equation (Krumbein and Pettijohn, 1938, p. 95-96) which is discussed in Volume 9 of the *Initial Reports of the Deep Sea Drilling Project*. Step by step procedures are in Volume 4. When using splits of the same sample and having different operators over a long period of time the sand, silt, and clay-size fractions are reproducible within  $\pm 2.5$  per cent (absolute).

Grain diameters can be expressed in *phi* units or microns, *phi* unit being the grain diameter in mm expressed as the negative log to the base 2. These units and parameters are discussed in detail by Inman (1952). Sediment classification is after Shepard (1954) based on the Wentworth (1922) scale. The ternary diagram of Shepard's sediment classification is in Volume 9 of the *Initial Reports of the Deep Sea Drilling Project*.

**TABLE 1**  
Grain Size Determinations, Leg 10

Core, Section Interval (cm)	Sand (%)	Silt (%)	Clay (%)	Classification
<b>DSDP 85</b>				
1-1 (14.0)	0.1	22.8	77.1	Clay
1-2(10.0)	1.0	28.9	70.1	Silty clay
1-3 (29.0)	5.9	30.7	63.4	Silty clay
1-4 (13.0)	2.9	30.9	66.2	Silty clay
1-4 (88.0)	0.1	26.0	74.0	Silty clay
1-6 (10.0)	0.1	24.5	75.5	Clay
2-1 (4.0)	4.7	27.8	67.4	Silty clay
2-3 (17.0)	0.0	29.0	71.0	Silty clay
3-1 (5.0)	1.1	21.9	77.0	Clay
3-3 (4.0)	0.0	21.7	78.3	Clay
3-4 (13.0)	2.0	41.0	57.0	Silty clay
3-6 (57.0)	0.0	13.3	86.7	Clay
4-1 (9.5)	1.5	80.8	17.6	Silt
5-1 (77.0)	94.3	2.1	3.6	Sand
5-2 (29.0)	96.5	1.2	2.4	Sand

**TABLE 1 - Continued**

Core, Section Interval (cm)	Sand (%)	Silt (%)	Clay (%)	Classification
<b>DSDP 86</b>				
1-1 (19.0)	14.2	21.3	64.6	Silty clay
1-1 (39.0)	6.8	17.1	76.0	Clay
1-3 (19.0)	6.1	21.7	72.2	Silty clay
2-1 (74.0)	4.9	21.7	73.5	Silty clay
3-2 (8.0)	8.0	6.4	72.7	Silty clay
3-3 (14.0)	7.1	25.2	67.6	Silty clay
3-4 (20.0)	9.4	22.7	67.9	Silty clay
3-5 (30.0)	7.4	20.9	71.7	Silty clay
3-6 (31.0)	5.2	21.4	73.5	Silty clay
4-2 (29.0)	4.6	21.1	74.3	Silty clay
4-3 (19.0)	8.5	25.1	66.4	Silty clay
4-4 (29.0)	3.7	23.9	72.4	Silty clay
4-5 (15.0)	2.2	23.0	74.8	Silty clay
5-1 (110.0)	2.5	45.6	51.8	Silty clay
5-3 (12.0)	3.2	45.5	51.3	Silty clay
5-4 (19.0)	2.8	41.8	55.5	Silty clay
7-3 (19.0)	12.3	43.3	44.4	Silty clay
7-4 (19.0)	15.9	29.7	54.4	Silty clay
7-5 (21.0)	8.2	39.9	52.0	Silty clay
8-1 (92.0)	11.2	79.8	9.0	Silt
8-3 (18.0)	22.9	48.3	28.8	Sand-silt-clay
8-4 (19.0)	3.4	42.3	54.3	Silty clay
9-2 (20.0)	2.3	46.3	51.4	Silty clay
<b>DSDP 87</b>				
1-1 (135.0)	28.9	51.1	20.0	Sandy silt
<b>DSDP 88</b>				
1-2 (24.0)	6.9	15.0	78.1	Clay
1-3 (9.0)	3.7	16.4	79.9	Clay
1-4 (10.0)	3.5	17.1	79.4	Clay
2-2 (30.0)	6.1	17.1	76.8	Clay
2-3 (31.0)	2.4	16.7	80.9	Clay
2-4 (49.0)	5.1	18.6	76.4	Clay
2-5 (40.0)	5.8	30.9	63.3	Silty clay
2-6 (20.0)	3.5	18.0	78.5	Clay
3-3 (74.0)	5.8	18.3	75.9	Clay
3-4 (10.0)	3.2	24.4	72.3	Silty clay
3-5 (17.0)	3.5	21.4	75.1	Clay
3-3 (80.0)	2.7	24.4	72.9	Silty clay
4-3 (140.0)	2.7	18.4	78.9	Clay
4-5 (28.0)	1.0	12.9	86.1	Clay
5-5 (70.0)	1.1	16.0	82.8	Clay
5-6 (58.0)	0.7	15.7	83.6	Clay
<b>DSDP 89</b>				
1-2 (5.0)	3.2	14.4	82.4	Clay
1-3 (19.0)	2.2	10.5	87.3	Clay

TABLE 1 - Continued

Core, Section Interval (cm)	Sand (%)	Silt (%)	Clay (%)	Classification
2-1 (140.0)	6.4	15.4	78.2	Clay
3-2 (30.0)	1.5	21.0	77.5	Clay
3-3 (25.0)	3.9	28.4	67.7	Silty clay
3-4 (30.0)	3.2	18.3	78.5	Clay
4-2 (20.0)	1.1	19.1	79.8	Clay
4-4 (40.0)	2.4	22.8	74.8	Silty clay
4-5 (49.0)	0.9	19.8	79.3	Clay
4-6 (20.0)	3.9	25.5	70.6	Silty clay
5-1 (110.0)	0.3	32.1	67.6	Silty clay
6-5 (23.0)	0.9	37.5	61.6	Silty clay
6-4 (30.0)	1.3	35.7	63.0	Silty clay
<b>DSDP 90</b>				
1-2 (20.0)	0.2	36.5	63.3	Silty clay
1-3 (19.0)	2.0	34.9	63.1	Silty clay
1-4 (20.0)	2.1	11.4	86.5	Clay
1-5 (20.0)	1.2	21.7	77.1	Clay
1-6 (20.0)	0.9	24.3	74.9	Silty clay
2-3 (20.0)	0.2	29.0	70.8	Silty clay
2-4 (75.0)	0.8	31.0	68.1	Silty clay
3-2 (20.0)	1.1	13.5	85.4	Clay
3-3 (22.0)	0.6	13.9	85.5	Clay
4-2 (20.0)	0.1	11.3	88.7	Clay
5-2 (20.0)	0.6	16.6	82.8	Clay
5-3 (20.0)	0.3	14.4	85.3	Clay
5-4 (10.0)	0.3	18.0	81.7	Clay
6-2 (20.0)	0.1	53.1	46.8	Clayey silt
7-1 (59.0)	0.1	27.9	72.0	Silty clay
7-2 (20.0)	0.1	28.3	71.6	Silty clay
7-3 (20.0)	0.1	36.9	63.1	Silty clay
9-1 (45.0)	1.6	43.5	54.9	Silty clay
10-1 (8.0)	13.0	47.8	39.2	Clayey silt
13-3 (84.0)	78.6	14.6	6.8	Sand
13-4 (35.0)	79.7	13.5	6.7	Sand
<b>DSDP 91</b>				
1-2 (20.0)	0.0	29.0	71.0	Silty clay
1-3 (20.0)	6.7	75.4	17.9	Silt
1-4 (20.0)	0.6	22.2	77.2	Clay
1-6 (20.0)	0.1	11.2	88.7	Clay
2-4 (20.0)	0.0	36.7	63.2	Silty clay
2-5 (20.0)	0.5	15.8	83.7	Clay
3-2 (6.0)	0.2	21.4	78.4	Clay
3-6 (20.0)	4.8	58.8	36.4	Clayey silt
4-2 (20.0)	1.1	41.8	57.1	Silty clay
4-3 (20.0)	2.8	33.5	63.7	Silty clay
4-4 (20.0)	0.3	50.6	49.0	Clayey silt
4-5 (20.0)	0.0	36.8	63.2	Silty clay
4-6 (10.0)	0.3	15.7	84.0	Clay
5-2 (8.0)	0.4	32.6	67.0	Silty clay
5-3 (10.0)	0.0	27.5	72.4	Silty clay
5-4 (15.0)	0.0	45.7	54.3	Silty clay
5-6 (5.0)	0.0	29.8	70.2	Silty clay
6-2 (10.0)	0.0	21.2	78.8	Clay
6-3 (20.0)	0.0	22.0	78.0	Clay
6-4 (20.0)	0.0	26.5	73.5	Silty clay
6-5 (5.0)	0.0	41.0	59.0	Silty clay

TABLE 1 - Continued

Core, Section Interval (cm)	Sand (%)	Silt (%)	Clay (%)	Classification
7-1 (70.0)	26.4	66.6	6.9	Sandy silt
7-2 (30.0)	28.2	65.5	6.3	Sandy silt
7-3 (10.0)	54.9	41.2	3.9	Silty sand
7-4 (20.0)	1.4	38.4	60.2	Silty clay
7-5 (20.0)	0.5	25.1	74.4	Silty clay
8-1 (20.0)	47.9	34.2	17.9	Silty sand
8-2 (20.0)	54.7	29.4	15.9	Silty sand
9-1 (20.0)	54.5	29.4	16.1	Silty sand
9-2 (20.0)	53.0	36.7	10.4	Silty sand
9-3 (20.0)	74.8	20.3	4.8	Silty sand
9-4 (20.0)	57.9	23.4	18.7	Silty sand
9-6 (40.0)	1.9	14.2	83.9	Clay
10-2 (20.0)	18.3	51.6	30.1	Clayey silt
10-4 (20.0)	21.2	62.4	16.4	Sandy silt
11-2 (20.0)	77.6	17.4	4.9	Sand
11-3 (10.0)	2.7	20.9	76.5	Clay
11-4 (20.0)	0.0	16.4	83.6	Clay
13-2 (20.0)	3.6	30.2	66.2	Silty clay
13-3 (20.0)	1.4	18.3	80.3	Clay
15-2 (20.0)	1.0	35.5	63.5	Silty clay
15-3 (20.0)	42.4	9.9	47.7	Sandy clay
16-2 (80.0)	0.9	27.0	72.1	Silty clay
16-3 (20.0)	9.1	55.4	35.5	Clayey silt
18-6 (134.0)	0.2	81.9	17.9	Silt
20-2 (20.0)	84.9	10.6	4.5	Sand
20-6 (20.0)	74.9	14.5	10.6	Silty sand
22-1 (20.0)	84.3	8.0	7.6	Sand
22-2 (10.0)	2.1	25.2	72.7	Silty clay
25-1 (110.0)	95.6	2.2	2.2	Sand
25-2 (20.0)	96.1	2.1	1.7	Sand
25-3 (40.0)	97.7	0.7	1.6	Sand
<b>DSDP 92</b>				
2-2 (20.0)	0.0	25.2	74.8	Silty clay
2-3 (20.0)	0.1	27.0	72.9	Silty clay
2-4 (20.0)	0.0	26.5	73.5	Silty clay
2-5 (20.0)	0.1	26.1	73.8	Silty clay
3-2 (20.0)	0.0	36.3	63.6	Silty clay
3-3 (20.0)	0.1	28.1	71.9	Silty clay
3-4 (20.0)	0.0	32.7	67.3	Silty clay
3-5 (20.0)	0.0	31.6	68.3	Silty clay
4-1 (20.0)	0.0	30.3	69.6	Silty clay
4-3 (20.0)	0.0	28.6	71.4	Silty clay
4-5 (20.0)	0.0	34.9	65.1	Silty clay
5-2 (20.0)	0.1	26.9	73.1	Silty clay
5-3 (20.0)	0.0	24.9	75.1	Clay
5-4 (22.0)	0.1	24.5	75.3	Clay
5-5 (20.0)	0.0	25.9	74.1	Silty clay
5-6 (20.0)	0.0	24.8	75.2	Clay
6-2 (127.0)	6.0	36.9	57.1	Silty clay
8-1 (103.0)	0.1	33.1	66.8	Silty clay
<b>DSDP 93</b>				
1-2 (20.0)	0.4	36.9	62.7	Silty clay
<b>DSDP 94</b>				
1-2 (20.0)	4.6	29.4	66.0	Silty clay

TABLE 1 – Continued

Core, Section Interval (cm)	Sand (%)	Silt (%)	Clay (%)	Classification
2-2 (20.0)	13.1	29.1	57.8	Silty clay
2-3 (20.0)	9.3	36.1	54.6	Silty clay
2-4 (20.0)	12.4	28.0	59.7	Silty clay
2-5 (20.0)	9.2	21.7	69.0	Silty clay
2-6 (20.0)	7.8	22.3	69.9	Silty clay
3-2 (20.0)	10.0	29.4	60.6	Silty clay
3-3 (20.0)	8.4	30.9	60.7	Silty clay
3-4 (20.0)	9.9	28.2	61.9	Silty clay
3-5 (128.0)	6.8	32.5	60.7	Silty clay
3-6 (20.0)	9.9	31.9	58.2	Silty clay
4-2 (20.0)	6.6	23.0	70.4	Silty clay
4-3 (20.0)	4.8	20.4	74.8	Silty clay
4-4 (20.0)	5.5	22.5	72.0	Silty clay
4-5 (20.0)	4.9	22.4	72.6	Silty clay
4-6 (20.0)	5.9	26.6	67.5	Silty clay
5-2 (20.0)	5.4	24.3	70.4	Silty clay
5-3 (20.0)	8.3	26.2	65.5	Silty clay
5-4 (20.0)	4.8	22.7	72.4	Silty clay
5-5 (20.0)	6.1	27.2	66.8	Silty clay
5-6 (20.0)	6.2	26.9	66.9	Silty clay
6-2 (20.0)	6.5	31.1	62.5	Silty clay
6-4 (20.0)	1.5	37.4	61.1	Silty clay
6-4 (30.0)	4.6	27.1	68.2	Silty clay
6-5 (20.0)	3.9	30.6	65.5	Silty clay
6-6 (20.0)	5.7	27.4	66.9	Silty clay
7-3 (20.0)	2.4	32.3	65.3	Silty clay
7-4 (20.0)	3.7	29.1	67.2	Silty clay
7-5 (20.0)	3.9	35.3	60.8	Silty clay
8-3 (20.0)	7.5	34.0	58.5	Silty clay
8-4 (20.0)	2.5	34.2	63.3	Silty clay
8-5 (20.0)	9.8	44.3	46.0	Silty clay
9-2 (20.0)	13.3	41.0	45.6	Silty clay
9-3 (20.0)	11.9	43.0	45.0	Silty clay
9-4 (20.0)	12.3	40.7	47.0	Silty clay
9-5 (20.0)	22.9	42.0	35.1	Sand-silt-clay
9-6 (20.0)	12.4	39.9	47.7	Silty clay
10-2 (20.0)	2.5	41.6	55.9	Silty clay
10-3 (20.0)	3.2	45.0	51.8	Silty clay
11-2 (20.0)	4.3	49.3	46.4	Clayey silt
11-3 (20.0)	3.8	47.6	48.6	Silty clay
11-4 (20.0)	4.2	48.5	47.3	Clayey silt
11-5 (20.0)	4.0	47.6	48.3	Silty clay
11-6 (20.0)	4.0	48.2	47.8	Clayey silt
12-4 (20.0)	10.4	50.2	39.4	Clayey silt
13-3 (20.0)	7.8	50.5	41.7	Clayey silt
14-4 (20.0)	1.8	54.2	44.0	Clayey silt
15-4 (64.0)	6.8	61.8	31.4	Clayey silt
16-3 (20.0)	8.9	57.2	33.9	Clayey silt
17-5 (20.0)	8.6	55.4	35.9	Clayey silt
18-4 (20.0)	5.3	57.3	37.4	Clayey silt
21-2 (20.0)	3.2	55.9	40.9	Clayey silt
<b>DSDP 95</b>				
1-1 (110.0)	19.9	25.3	54.8	Silty clay
2-1 (20.0)	9.6	51.9	38.5	Clayey silt
2-3 (20.0)	13.0	45.6	41.4	Clayey silt
2-6 (20.0)	16.8	47.9	35.3	Clayey silt
3-1 (20.0)	17.2	39.4	43.4	Silty clay
3-2 (110.0)	8.5	42.5	49.0	Silty clay

TABLE 1 – Continued

Core, Section Interval (cm)	Sand (%)	Silt (%)	Clay (%)	Classification
3-3 (80.0)	8.9	41.3	49.7	Silty clay
3-4 (40.0)	2.0	85.7	12.3	Silt
3-5 (20.0)	7.1	43.2	49.7	Silty clay
3-6 (20.0)	11.4	44.3	44.3	Clayey silt
4-2 (20.0)	7.0	50.6	42.4	Clayey silt
4-3 (20.0)	10.3	47.7	42.0	Clayey silt
5-1 (20.0)	12.9	53.6	33.5	Clayey silt
5-2 (20.0)	6.0	60.3	33.6	Clayey silt
5-3 (20.0)	12.7	55.2	32.1	Clayey silt
5-4 (20.0)	11.9	55.8	32.3	Clayey silt
6-2 (20.0)	1.3	62.6	36.1	Clayey silt
6-3 (20.0)	3.4	66.6	30.1	Clayey silt
6-4 (20.0)	2.0	58.7	39.3	Clayey silt
6-5 (20.0)	2.1	62.2	35.7	Clayey silt
6-6 (20.0)	1.7	60.6	37.7	Clayey silt
7-2 (20.0)	15.1	55.8	29.1	Clayey silt
7-3 (20.0)	17.2	52.0	30.8	Clayey silt
7-4 (20.0)	19.9	56.5	23.6	Clayey silt
7-5 (20.0)	24.7	52.7	22.6	Sand-silt-clay
7-6 (20.0)	17.7	52.4	29.9	Clayey silt
8-1 (20.0)	15.8	53.3	30.9	Clayey silt
8-2 (20.0)	15.7	52.3	32.0	Clayey silt
8-3 (20.0)	12.8	58.0	29.1	Clayey silt
8-4 (20.0)	18.7	54.9	26.5	Clayey silt
8-5 (20.0)	19.3	57.5	23.1	Clayey silt
8-6 (25.0)	15.7	56.6	27.7	Clayey silt
10-1 (25.0)	13.6	55.0	31.5	Clayey silt
<b>DSDP 96</b>				
1-3 (20.0)	0.0	18.3	81.7	Clay
1-4 (20.0)	0.1	15.8	84.2	Clay
1-5 (20.0)	0.0	12.4	87.6	Clay
1-6 (20.0)	0.0	14.3	85.7	Clay
2-1 (20.0)	6.3	50.1	43.6	Clayey silt
2-2 (20.0)	5.2	48.2	46.6	Clayey silt
2-2 (20.0)	10.1	53.7	36.2	Clayey silt
2-5 (20.0)	4.2	50.1	45.6	Clayey silt
2-6 (20.0)	4.6	50.8	44.6	Clayey silt
3-2 (20.0)	5.7	48.1	46.1	Clayey silt
3-3 (20.0)	4.9	45.9	49.2	Silty clay
3-4 (20.0)	5.9	44.9	49.2	Silty clay
3-5 (20.0)	5.2	39.3	55.5	Silty clay
3-6 (25.0)	4.4	45.2	50.3	Silty clay
<b>DSDP 97</b>				
1-2 (20.0)	14.4	31.0	54.6	Silty clay
1-3 (20.0)	10.0	25.8	64.2	Silty clay
1-4 (20.0)	11.1	25.1	63.9	Silty clay
2-2 (20.0)	1.2	28.5	70.4	Silty clay
2-3 (20.0)	0.7	30.2	69.1	Silty clay
2-4 (20.0)	1.8	24.5	73.7	Silty clay
3-3 (20.0)	2.1	35.6	62.2	Silty clay
4-3 (20.0)	3.5	48.2	48.4	Silty clay
4-4 (20.0)	8.4	54.7	36.9	Clayey silt
4-5 (20.0)	5.7	52.9	41.5	Clayey silt
5-1 (132.0)	0.6	45.0	54.4	Silty clay
6-1 (98.0)	6.6	31.4	62.0	Silty clay
7-2 (9.0)	2.2	48.1	49.8	Silty clay
8-1 (68.0)	0.9	13.8	85.3	Clay
8-1 (95.0)	4.3	49.4	46.3	Clayey silt
8-3 (60.0)	11.9	47.4	40.8	Clayey silt

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