

### 43. CALCIUM CARBONATE AND ORGANIC CARBON IN SAMPLES FROM DEEP SEA DRILLING PROJECT SITES 463, 464, 465, AND 466<sup>1</sup>

Walter E. Dean, U.S. Geological Survey, Denver, Colorado

#### METHODS

Percent CaCO<sub>3</sub> was determined in selected samples aboard the ship by the carbonate-bomb technique (Müller and Gastner, 1971). Results of these analyses are listed in Table 1 and plotted in Figures 1, 3, 4, and 5 as plus signs (+). Samples collected specifically for analyses of CaCO<sub>3</sub> and organic carbon were analyzed at three shore-based laboratories. Concentrations of total carbon, organic carbon, and CaCO<sub>3</sub> were determined in some samples at the DSDP sediment laboratory, using a Leco carbon analyzer, by personnel of the U.S. Geological Survey, under the supervision of T. L. Vallier (Table 2; plotted as square symbols in Figs. 1, 3, 4, and 5). Most of these samples were collected from lithologic units containing relatively high concentrations of organic carbon. Sample procedures are outlined in Boyce and Bode (1972). Precision and accuracy are both  $\pm 0.3\%$  absolute for total carbon,  $\pm 0.06\%$  absolute for organic carbon, and  $\pm 3\%$  absolute for CaCO<sub>3</sub>.

Concentrations of CaCO<sub>3</sub> were determined in some samples with a Leco carbon analyzer at the University of Oslo under the supervision of Jörn Thiede (Table 3; plotted as circles in Figs. 1, 3, 4, and 5). The Oslo samples were mostly from lithologic units containing very low concentrations of organic carbon. The concentration of CaCO<sub>3</sub> was calculated by multiplying the total carbon content by 8.33. The accuracy of the method is  $-2\%$  to  $+5\%$  of the amount of CaCO<sub>3</sub> present.

Concentrations of CaCO<sub>3</sub> and organic carbon were determined at the University of Oslo on selected samples from Cores 69 through 72 of Hole 463 that were suspected to contain relatively high concentrations of organic carbon (Table 4; Fig. 2).

Concentrations of CaCO<sub>3</sub> and organic carbon were determined at the U.S. Geological Survey, Denver, Colorado, in samples of mid-Cretaceous limestone from Holes 463, 465A, and 466 that were suspected to contain relatively high concentrations of organic carbon (see Dean et al., this volume). Results of the USGS analyses are plotted as triangles in Figures 1, 2, 4, and 5. Concentrations of carbonate in samples analyzed by Müller et al. (this volume) are plotted in Figures 1, 3, 4, and 5 as X-symbols.

#### RESULTS

##### Site 463

The CaCO<sub>3</sub> content of Lithologic Unit I (0–450 m sub-bottom) is relatively constant at about 90%, with a decrease to about 80% between 200 and 300 meters (Fig. 1). Contents of CaCO<sub>3</sub> in Lithologic Unit II (450–585 m) range from 1 to 100%, but most are greater than 50%. Variations in concentration of CaCO<sub>3</sub> in the multi-colored limestone of Unit II is the result of variations in degree of silicification. A number of alternating couplets of light and dark limestones within this multicolored unit were specifically sampled to examine differences in content of CaCO<sub>3</sub> between different-colored limestones. In general, the lower concentrations of CaCO<sub>3</sub> are found

in the darker limestones (red, pink, and dark-green), and the higher concentrations are found in the lighter-colored limestones (light-green). In Lithologic Unit III, CaCO<sub>3</sub> is diluted by volcanic ash and organic matter, and this is reflected in the generally lower concentrations of CaCO<sub>3</sub> in most samples analyzed from this unit. About half of the "limestone" samples analyzed from Lithologic Unit IV have concentrations of CaCO<sub>3</sub> < 50%. Examination of thin sections from this unit reveals a considerable amount of silicification, and concentrations of SiO<sub>2</sub> range from 4 to 71%, with an average of about 33% (Dean, this volume).

Most of the organic-carbon concentrations of samples from Lithologic Unit III (Cores 67–71) are high relative to concentrations commonly observed in pelagic carbonate sediments and rocks. Thin (3–80 cm) layers of dark, apparently organic-carbon-rich limestone occur within Unit III, especially in Cores 70 and 71 (Fig. 2). These layers contain as much as 7.5% organic carbon, but most samples from dark, organic-looking limestone layers contain less than 4.0% organic carbon. Dark colors are also due to the presence of dark tuffaceous material in the same unit. Therefore, interpretation of high organic content on the basis of dark color alone should be made with caution. Also, it is not known whether the association of organic matter with tuffaceous material in Lithologic Unit III is coincidental or if there is a causal relation between the two.

##### Site 464

The relatively high concentrations of CaCO<sub>3</sub> (up to 20%; Fig. 3) in the siliceous-fossil oozes of Lithologic Unit IA are due to minor amounts of nannofossils and recrystallized CaCO<sub>3</sub>, as observed in smear slides. As expected, the siliceous-fossil clays of Lithologic Unit IB and red and brown clays of Lithologic Unit II contain no CaCO<sub>3</sub>. Samples of silicified limestone associated with chert in Lithologic Unit III contain some CaCO<sub>3</sub>, indicating that the CaCO<sub>3</sub> in these "limestones" probably has largely been replaced by SiO<sub>2</sub>.

##### Site 465

The CaCO<sub>3</sub> content of Lithologic Unit I (nannofossil ooze; 0–276 m sub-bottom) is relatively constant between 88 and 96% (Fig. 4). The concentrations of CaCO<sub>3</sub> in Lithologic Unit II (laminated limestone) are generally lower and more variable, because of varying degrees of silicification within this unit (SiO<sub>2</sub> varies between 1 and 25%; Dean, this volume). Concentrations

<sup>1</sup> Initial Reports of the Deep Sea Drilling Project, Volume 62.

Table 1. Results of shipboard carbonate-bomb analyses, Sites 463, 464, 465, and 466.

Sample (interval in cm)	Depth Sub-bottom (m)	CaCO <sub>3</sub> (bomb) (%)	Lithology
463-1-3, 70-71	3.7	> 90	Nannofossil ooze
2-3, 85-86	9.4	89	Nannofossil ooze
3-3, 89-90	18.9	79	Foraminifer ooze
4-3, 73-74	28.2	88	Foraminifer-nannofossil ooze
5-1, 83-84	34.8	89	Nannofossil ooze
6-3, 70-71	41.7	96	Foraminifer-nannofossil ooze
7-3, 100-101	47.5	91	Nannofossil chalk
8-3, 60-61	56.6	91	Foraminifer-nannofossil chalk
9-3, 33-34	65.8	91	Foraminifer-nannofossil chalk
10-3, 81-82	75.8	69	Foraminifer-nannofossil chalk
11-3, 31-32	84.8	91	Foraminifer-nannofossil chalk
12-6, 85-86	99.4	91	Foraminifer-nannofossil chalk
13-3, 55-56	104.1	91	Foraminifer-nannofossil chalk
14-2, 100-101	112.5	91	Foraminifer-nannofossil chalk
15-3, 80-81	123.3	91	Foraminifer-nannofossil chalk
16-4, 20-21	133.7	89	Foraminifer-nannofossil chalk
17-3, 100-101	142.5	91	Foraminifer-nannofossil chalk
19-3, 127-128	161.8	92	Foraminifer-nannofossil chalk
20-1, 57-59	167.6	91	Foraminifer-nannofossil chalk
21-3, 104-105	180.5	100	Foraminifer-nannofossil chalk
22-3, 104-105	190.0	89	Foraminifer-nannofossil chalk
23-1, 131-132	196.8	96	Nannofossil-foraminifer chalk
24-3, 34-35	202.8	88	Foraminifer-nannofossil chalk
25-2, 28-29	206.8	86	Foraminifer-nannofossil chalk
26-3, 20-21	217.2	86	Foraminifer-nannofossil chalk
27-2, 35-36	225.9	79	Foraminifer-nannofossil chalk
29-1, 58-59	243.6	81	Nannofossil-foraminifer chalk
30-2, 35-36	254.4	76	Nannofossil chalk
31-1, 12-13	262.1	81	Nannofossil limestone
33-2, 107-108	283.6	88	Nannofossil chalk
34-3, 20-21	293.7	86	Nannofossil foraminifer chalk
48-3, 70-71	427.2	91	Nannofossil chalk
55-1, 64-65	481.1	87	Limestone
56-1, 93-94	490.9	88	Nannofossil limestone
57-1, 44-45	499.9	84	Nannofossil limestone (light-green)
58-2, 10-11	510.6	70	Nannofossil limestone (pink)
59-1, 10-11	518.6	80	Nannofossil limestone (dark-green)
59-2, 16-17	520.2	66	Nannofossil limestone (dark-green)
60-2, 42-44	529.9	88	Nannofossil limestone (pink)
62-1, 91-92	538.4	57	Nannofossil limestone (dark-green)
63-1, 47-48	547.5	79	Nannofossil limestone (light-green)
63-1, 52-53	547.5	62	Nannofossil limestone (red)
64-2, 34-35	558.3	85	Nannofossil limestone (light-green)
64-2, 52-53	553.5	69	Nannofossil limestone (pink)
65-2, 16-17	567.7	85	Nannofossil limestone (light-green)
65-2, 27-28	567.8	73	Nannofossil limestone (pink)
66-3, 64-65	579.1	77	Nannofossil limestone (light-gray)
66-3, 79-80	579.3	68	Nannofossil limestone (light-green)
67-1, 24-25	585.2	58	Nannofossil limestone (light-gray, cherty)
69-2, 18-19	605.7	85	Nannofossil limestone (bluish-white)
69-2, 30-31	605.8	42	Volcanic ash (greenish-black)
71-3, 21-22	626.2	36	Limestone (light-green)
73-4, 75-76	647.3	8	Limestone (bluish-gray)
73-4, 90-91	647.4	30	Limestone (dark-gray)
74-2, 13-14	653.1	86	Limestone (light-gray)
76-1, 46-49	670.9	41	Limestone (light-gray)
77-1, 110-111	681.1	22	Limestone (white)
79-1, 34-35	699.3	4	Limestone (white; siliceous)
81-2, 8-9	712.1	90	Limestone (light-gray, sandy)
82-1, 50-51	718.5	90	Limestone (light-gray)
83-1, 77-78	728.3	47	Limestone (white)
84-1, 134-135	738.3	75	Limestone (white)
85-1, 99-100	747.5	87	Limestone (light-gray, clastic)
464-2-3, 135-136	7.85	11.5	Diatom-radiolarian ooze
3-3, 89-90	14.90	11.5	Clayey radiolarian ooze
4-3, 80-81	26.30	0.0	Siliceous clay
5-3, 85-86	35.85	0.0	Siliceous clay
6-5, 65-66	48.15	0.0	Brown clay
7-2, 145-146	53.95	0.0	Brown clay
9-6, 74-75	78.25	0.5	Brown clay
10-2, 136-137	82.36	1.5	Red clay
11-1, 11-12	89.11	0.0	Porcellanite
12-1, 22-23	98.72	19	Siliceous limestone
13, CC, 9-10	117.5	26.5	Siliceous limestone
465-2-2, 33-34	2.83	81	Nannofossil ooze
2-5, 33-34	7.33	90	Nannofossil ooze
3-3, 66-67	14.16	90	Nannofossil ooze
4-3, 59-60	23.60	88	Nannofossil ooze
5-3, 109-110	33.59	88	Nannofossil ooze
6-3, 99-100	43.00	94	Nannofossil ooze
10-5, 16-17	83.16	90	Nannofossil ooze
465A-1-1, 55-56	39.55	93	Nannofossil ooze
3-2, 70-71	60.20	90	Nannofossil ooze
3-4, 70-71	63.20	89	Nannofossil ooze
9-4, 82-84	120.32	81	Foraminifer-nannofossil ooze
10-3, 64-65	128.14	96	Foraminifer-nannofossil ooze

Table 1. (Continued).

Sample (interval in cm)	Depth Sub-bottom (m)	CaCO <sub>3</sub> (bomb) (%)	Lithology
11-3, 60-62	137.60	96	Nannofossil ooze
12-2, 70-72	145.70	94	Nannofossil ooze
15-3, 20-21	175.20	93	Foraminifer-nannofossil ooze
16-4, 37-38	186.37	96	Foraminifer-nannofossil ooze
17-1, 20-22	191.20	93	Foraminifer-nannofossil ooze
18-2, 4-5	202.04	88	Foraminifer-nannofossil ooze
19-2, 92-93	212.42	94	Nannofossil ooze
20-1, 110-111	220.60	94	Foraminifer-nannofossil ooze
21-4, 75-76	234.25	92	Foraminifer-nannofossil chalk
26-1, 44-45	276.94	93	Laminated limestone (bottom of turbidite)
26-1, 49-50	276.99	94	Laminated limestone (top of a graded turbidite)
27-2, 89-90	288.39	92	Laminated limestone
27-2, 110-111	288.60	20	Chert
28-1, 111-112	296.61	93	Laminated limestone
28-1, 123-124	296.73	70	Black limestone band
29-1, 93-94	305.93	58	Gray, massive limestone
466-1-1, 20-21	0.20	79	Foraminifer-nannofossil ooze
1-1, 62-63	0.62	74	Radiolarian-nannofossil ooze
1-3, 120-120	4.20	82	Nannofossil ooze (light-gray)
2-2, 22-23	9.72	87	Nannofossil ooze (light-gray)
2-6, 22-23	15.72	70	Nannofossil ooze (green-gray)
3-1, 100-101	18.50	78	Nannofossil ooze (green-gray)
3-1, 120-121	18.70	89	Nannofossil ooze (white)
4-2, 34-35	28.84	89.5	Nannofossil ooze (white)
5-2, 42-43	38.42	89.5	Nannofossil ooze (white)
5-5, 42-43	42.92	92	Nannofossil ooze (white)
6-3, 85-86	49.85	90	Nannofossil ooze (light-gray)
6-6, 85-86	54.36	66	Nannofossil ooze (white)
7-2, 10-11	57.10	90	Nannofossil ooze (white)
7-6, 10-11	63.10	90	Nannofossil ooze (light-gray-brown)
8-3, 90-91	68.90	93	Nannofossil ooze (pale-brown)
8-6, 90-91	73.40	82	Nannofossil ooze (dark yellow-brown)
9-3, 60-61	78.10	91	Nannofossil ooze (pale brown)
11-1, 52-54	88.52	98	Nannofossil ooze (white)
12-1, 29-30	93.79	97	Nannofossil ooze (white)
13-2, 100-101	105.50	97	Nannofossil ooze (white)
14-1, 74-75	113.24	93	Nannofossil ooze (white)
15-3, 47-48	125.47	93	Nannofossil ooze (white)
16-2, 109-110	134.09	93	Nannofossil ooze (white)
17-1, 77-78	141.77	96	Nannofossil ooze (white)
29-1, 60-61	255.60	73	Limestone (dark olive-gray)
30-1, 10-11	264.60	93	Limestone (olive-gray)
30-1, 59-60	265.19	80	Limestone (olive-gray)
30-1, 71-72	315.21	90	Laminated limestone
31-1, 15-16	324.15	93	Laminated limestone
32-1, 94-95	334.44	81	Laminated limestone
33-1, 65-66	343.65	88	Laminated limestone
34-1, 15-16	352.65	82	Laminated limestone
34-1, 69-70	293.69	90	Nannofossil chalk (olive-gray)
35-1, 37-38	362.37	84	Laminated limestone
35-1, 42-43	302.92	85	Nannofossil chalk (olive-gray)
36-2, 120-121	374.20	85	Laminated limestone
38-2, 15-16	392.15	84	Laminated limestone
39-2, 34-35	401.85	83	Laminated limestone
40-1, 108-109	410.58	81	Massive gray limestone

of CaCO<sub>3</sub> in the gray limestones intercalated with the typical olive-gray laminated limestone of Unit II tend to be lower, because of increased silicification of these limestones.

Most of the samples of olive laminated limestone from Lithologic Unit II have high concentrations of organic carbon relative to concentrations commonly observed in pelagic carbonate sediments and rocks, with a maximum observed value of 8.6% (Fig. 4). The section containing unusually high concentrations of organic carbon in Hole 465A is 136 meters thick and spans about 5 m.y., from late Albian to early Cenomanian.

#### Site 466

The concentrations of CaCO<sub>3</sub> in nannofossil oozes from Lithologic Unit IA are slightly lower than those in nannofossil oozes from Lithologic Unit IB, although concentrations are relatively high in both units (gener-

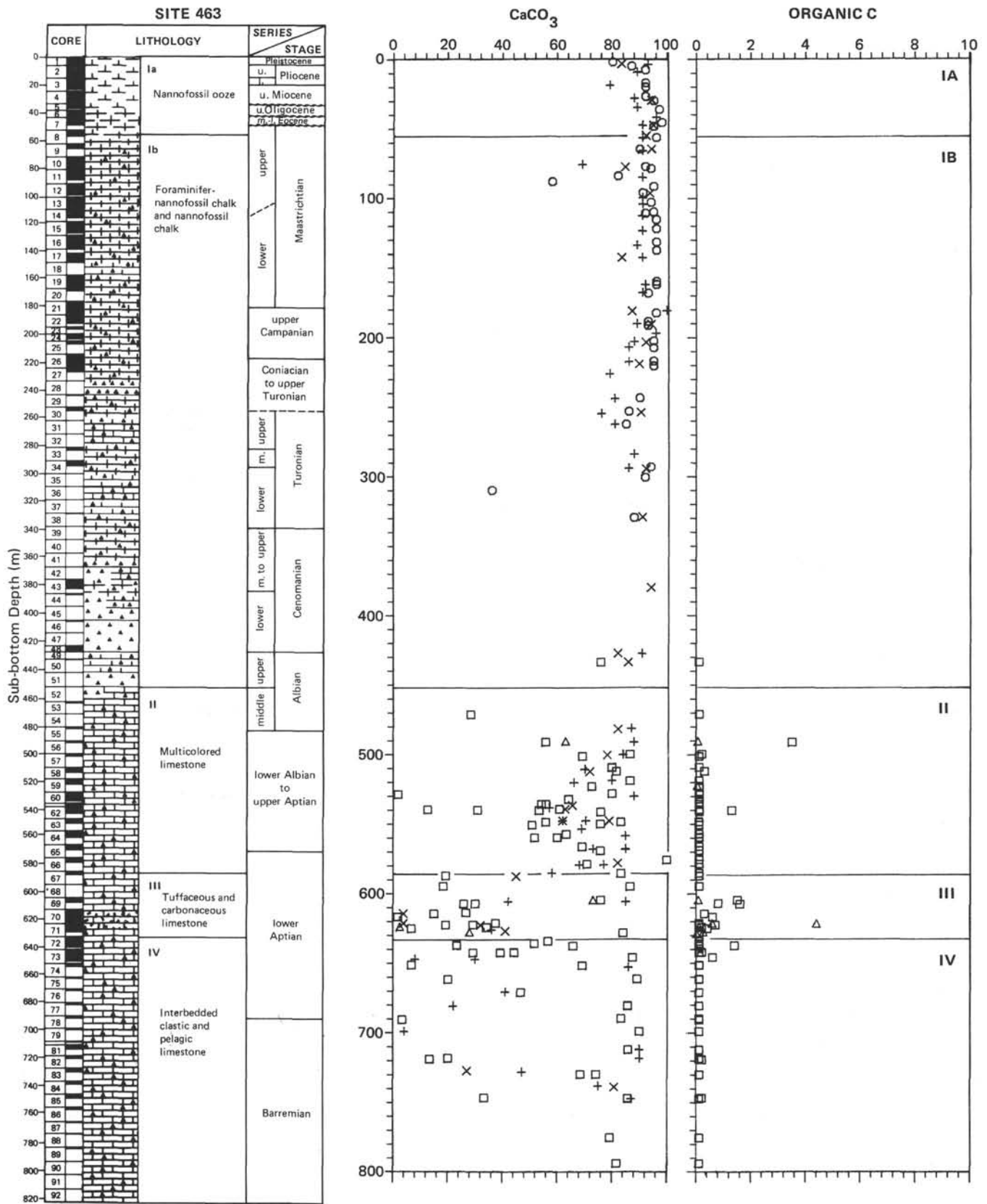


Figure 1. Concentrations of CaCO<sub>3</sub> and organic carbon in samples from Hole 463. Organic-carbon concentrations were determined with a Leco carbon analyzer at DSDP (squares). Organic carbon values from Dean et al. (this volume) are plotted as triangles. CaCO<sub>3</sub> concentrations were determined by Leco at DSDP (squares), by Leco at the University of Oslo (circles), or by shipboard carbonate-bomb (plus signs). Additional values of CaCO<sub>3</sub> from Dean et al. (this volume) are plotted as triangles, and from Muller et al. (this volume) as X-symbols.

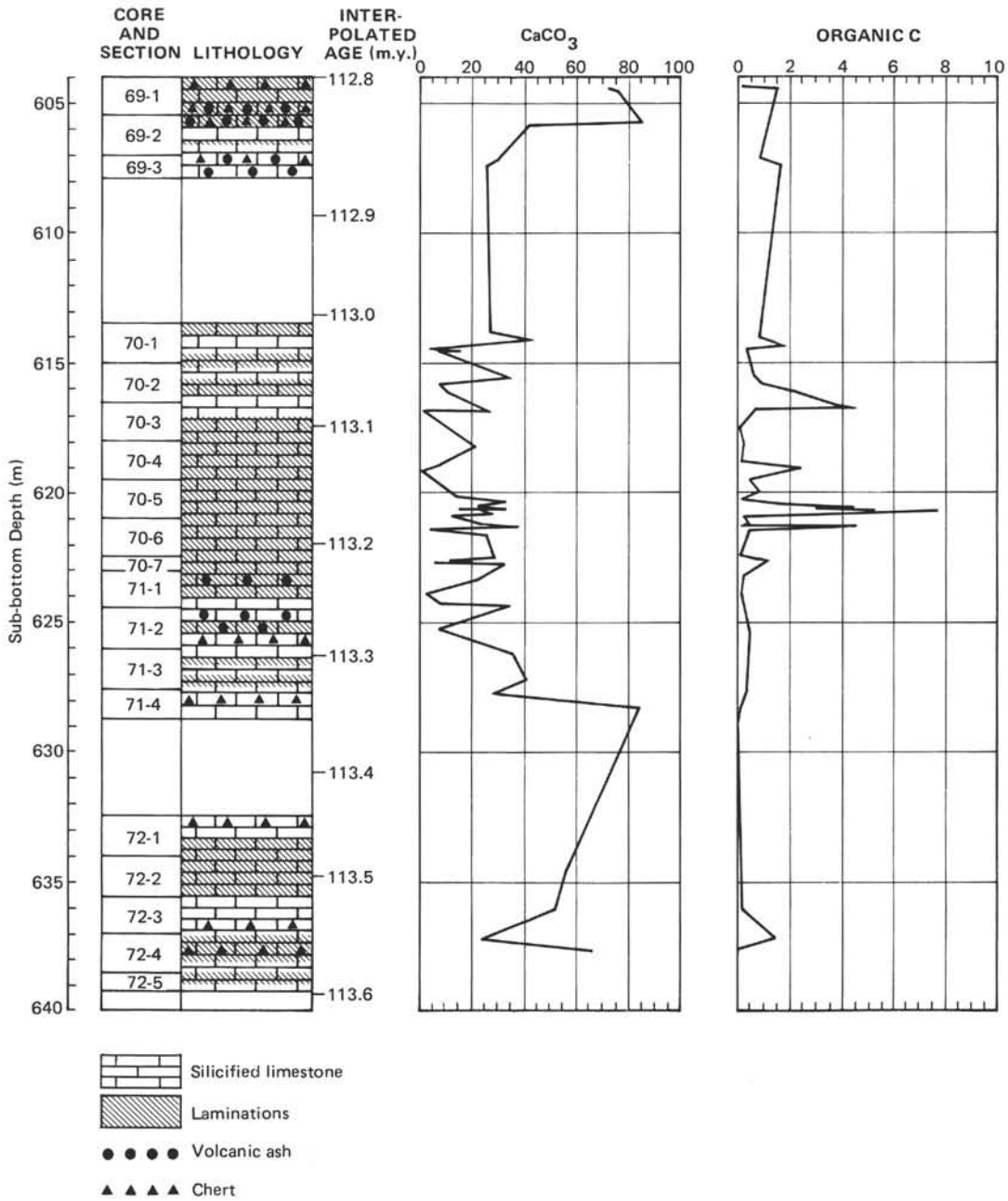


Figure 2. Lithologic summary and concentrations of  $\text{CaCO}_3$  and organic carbon in Cores 69 through 72, Hole 463.

ally greater than 88%; Fig. 5). The lower concentrations of  $\text{CaCO}_3$  in Lithologic Unit IA, particularly in the upper part of the unit, are probably due to dilution by siliceous microfossils. Concentrations of  $\text{CaCO}_3$  in samples of olive-gray limestone from Lithologic Unit II range between 6 and 95%, which is similar to the range of values observed for concentrations of  $\text{CaCO}_3$  in olive-gray limestones of equivalent age at Site 465.

The nanofossil chalk and limestone of Lithologic Unit II contains up to 7.5% organic carbon and is the

lateral equivalent of the organic-carbon-rich laminated limestone at Site 465.

REFERENCES

Boyce, R. E., and Bode, G. W., 1972. Carbon and carbonate analyses, Leg 9 Deep Sea Drilling Project, In Hays, J. D., et al., *Init. Repts. DSDP, 9*: Washington (U.S. Govt. Printing Office), 797-816.  
 Müller, G., and Gastner, M., 1971. The "Karbonat Bombe"; A simple device for the determination of the carbonate content in sediments, soils and other materials: *N. Jahrb. Mineral., Monatshefte*, 10:466-469.

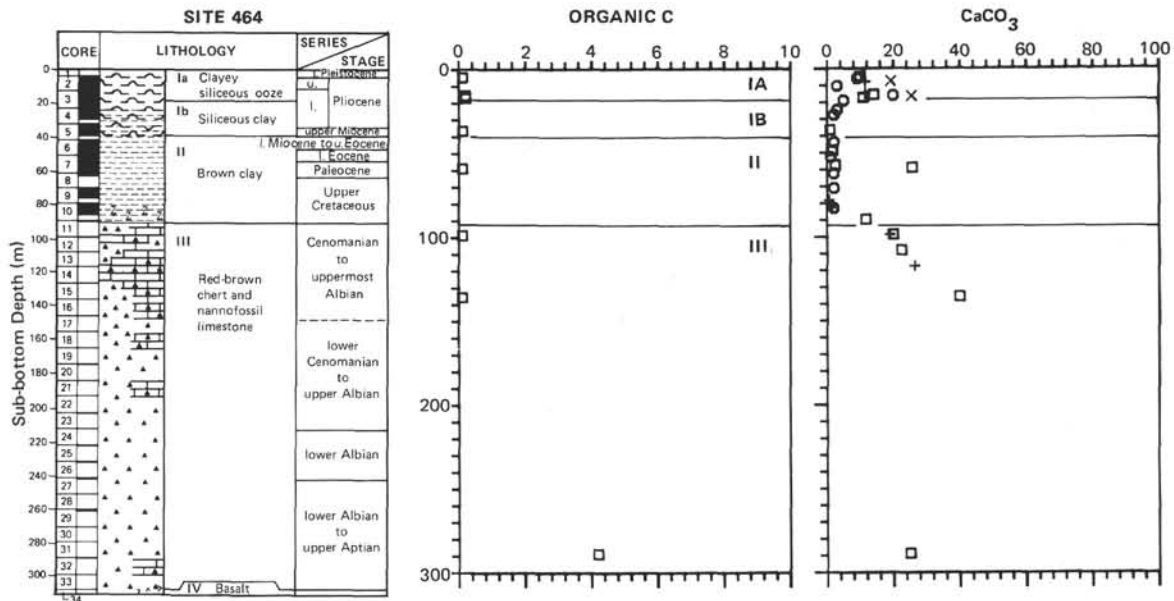


Figure 3. Concentrations of  $\text{CaCO}_3$  and organic carbon in samples from Hole 464. Organic-carbon concentrations were determined with a Leco carbon analyzer at DSDP (squares). Concentrations of  $\text{CaCO}_3$  were determined by Leco at DSDP (squares), carbonate-bomb (plus signs). Additional values of  $\text{CaCO}_3$  from Müller et al. (this volume) are plotted as X-symbols.

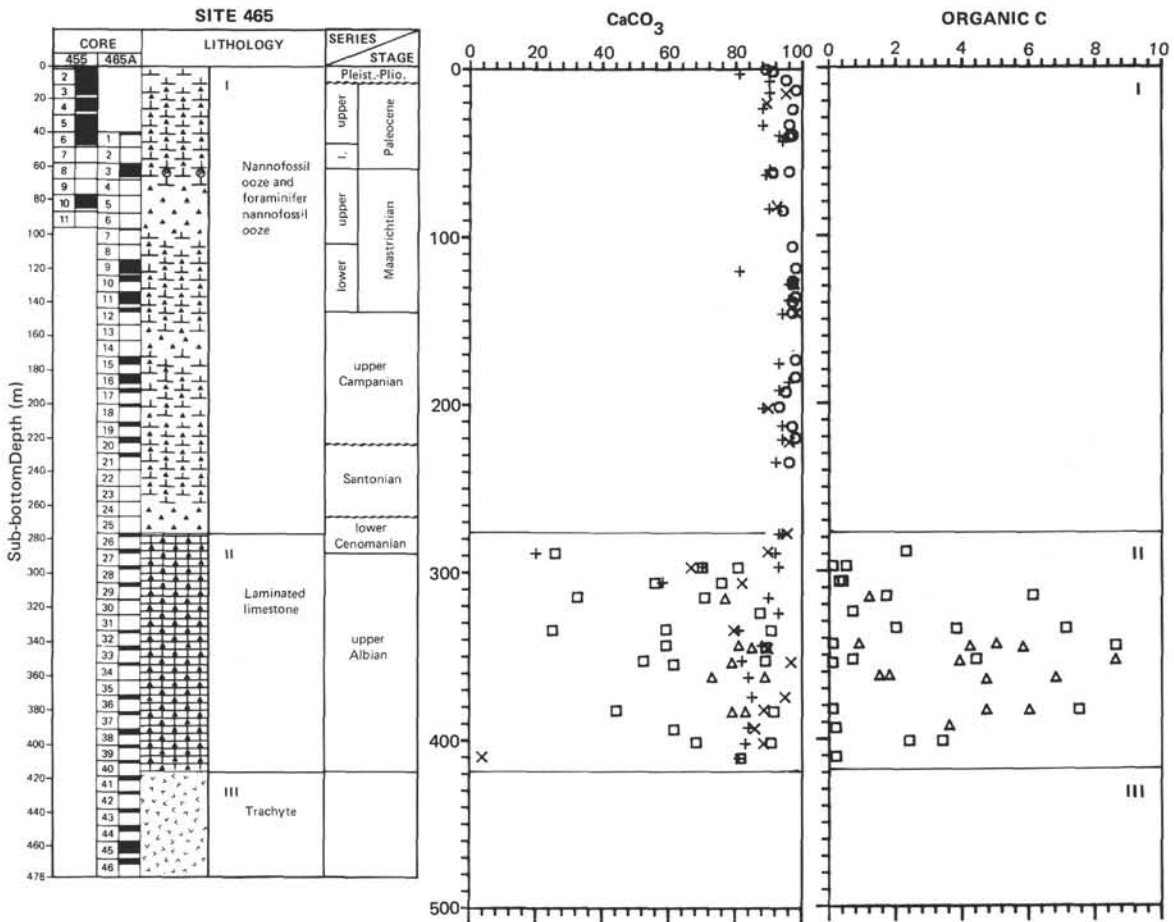


Figure 4. Concentrations of  $\text{CaCO}_3$  and organic carbon in samples from Holes 465 and 465A. Organic carbon concentrations were determined with a Leco carbon analyzer at DSDP (squares). Organic-carbon values from Dean et al. (this volume) are plotted as triangles.  $\text{CaCO}_3$  concentrations were determined by Leco at DSDP (squares), by shipboard carbonate bomb (plus signs). Additional values of  $\text{CaCO}_3$  and organic carbon from Dean et al. (this volume) are plotted as triangles, and from Müller et al. (this volume) as X-symbols.

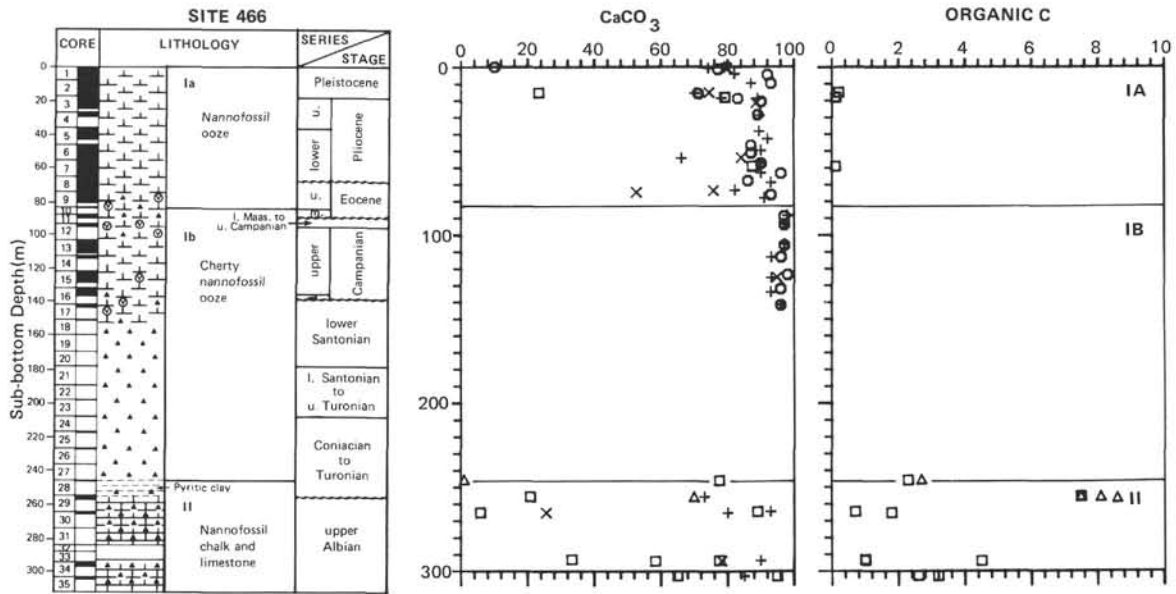


Figure 5. Concentrations of CaCO<sub>3</sub> and organic carbon in samples from Hole 466. Organic-carbon concentrations were determined with a Leco carbon analyzer at DSDP (squares). Organic-carbon values from Dean et al. (this volume) are plotted as triangles. CaCO<sub>3</sub> concentrations were determined by Leco at DSDP (squares), by Leco at the University of Oslo (circles), or by shipboard carbonate bomb (plus signs). Additional values of CaCO<sub>3</sub> and organic carbon from Dean et al. (this volume) are plotted as triangles, and from Müller et al. (this volume) as X-symbols.

Table 2. Results of analyses for CaCO<sub>3</sub> and organic carbon in samples from Sites 463, 464, 465, and 466, by Leco carbon analyzer at Deep Sea Drilling Project.

Sample	Sub-bottom Depth (m)	CaCO <sub>3</sub> (%)	Organic C (%)
463-50-1, 39 cm	433.39	75.8	0.1
53,CC, 26	471.00	28.3	0.1
56-1, 95	490.95	55.8	3.5
57-1, 16	499.66	86.6	0.2
57-2, 20	501.20	69.1	0.1
58-1, 10	509.10	80.0	0.1
58-3, 10	512.00	81.6	0.3
59-1, 18	518.68	86.6	0.1
59-3, 139	522.89	72.5	0.1
60-1, 18	528.00	80.0	0.1
60-1, 78	528.78	1.7	0.1
60-3, 110	532.10	64.1	0.1
61-1, 20	535.70	55.8	0.1
61-1, 28	535.78	54.1	0.0
62-2, 14	539.14	60.8	0.0
62-2, 71	539.71	12.5	0.1
62-2, 90	539.90	30.8	0.1
62-2, 116	540.16	53.3	1.3
62-3, 64	541.14	75.8	0.1
63-1, 128	548.28	83.3	0.1
63-2, 2	548.52	55.8	0.1
63-2, 128	549.78	75.8	0.0
62,CC, 10	550.65	50.8	0.1
64-1, 68	557.18	63.3	0.1
64-3, 9	559.59	60.0	0.1
64-3, 29	559.79	51.7	0.1
65-1, 14	566.14	69.1	0.1
65-3, 7	569.07	75.8	0.1
66-1, 10	575.60	100.0	0.1
66-3, 10	578.60	70.8	0.1
67-1, 25	585.25	83.3	0.1
67-2, 74	587.24	19.2	0.1

Table 2. (Continued).

Sample	Sub-bottom Depth (m)	CaCO <sub>3</sub> (%)	Organic C (%)
68-1, 16	594.66	86.6	0.1
68-1, 22	594.72	18.3	0.1
69-1, 46	604.46	75.8	1.5
69-3, 16	607.16	30.0	0.8
69-3, 41	607.41	25.8	1.6
70-1, 32	613.82	26.7	0.0
70-1, 100	614.50	15.0	0.3
70-3, 33	616.83	1.7	0.6
70-6, 31	621.31	37.5	0.1
70,CC, 0	622.50	29.2	0.1
70,CC, 16	622.66	19.2	0.7
71-1, 133	624.33	34.2	0.2
71-2, 74	625.24	6.7	0.4
71-4, 78	628.28	84.1	0.1
72-2, 37	634.37	56.6	0.1
72-3, 60	636.10	51.6	0.1
72-4, 24	637.24	23.3	1.4
72-4, 65	637.65	65.8	0.1
73-1, 36	642.36	44.2	0.2
73-1, 49	642.49	39.2	0.1
73-1, 59	642.56	29.2	0.0
73-3, 98	645.98	87.5	0.6
74-1, 10	651.50	6.7	0.1
74-1, 30	651.80	69.1	0.1
75-1, 51	661.51	89.1	0.1
75-1, 80	661.80	20.0	0.1
76-1, 70	671.20	46.7	0.1
77-1, 60	680.60	85.8	0.1
78-1, 34	689.84	83.3	0.1
78-1, 118	690.68	3.3	0.1
79-1, 7	699.07	90.0	0.1
81-2, 18	712.18	85.8	0.1
82-1, 48	718.48	20.0	0.1
82-1, 115	719.15	13.3	0.2
83-2, 89	729.89	74.1	0.1

Table 2. (Continued).

Sample	Sub-bottom Depth (m)	CaCO <sub>3</sub> (%)	Organic C (%)
83-2, 93	729.93	68.3	0.1
85-1, 18	746.68	33.3	0.2
85-1, 79	747.29	85.8	0.1
88-1, 34	775.34	79.1	0.1
90-1, 1	794.01	81.6	0.1
464-2-1, 128	4.78	10.0	0.1
3-2, 99	15.49	14.2	0.2
3-3, 99	16.99	10.9	0.2
5-4, 10	36.60	0.8	0.1
6-5, 130	48.80	1.7	0.0
7-5, 42	57.49	2.5	0.0
7-6, 42	58.92	25.8	0.1
11-1, 68	89.68	11.7	0.0
12-1, 20	98.70	20.0	0.1
13,CC, 10	108.10	22.5	0.0
16,CC, 8	135.66	40.0	0.1
32-1, 25	288.75	25.0	4.2
465-27,CC, 16	288.50	25.8	2.3
28-2, 9	297.09	80.8	0.5
28-2, 15	297.15	70.0	0.1
29-1, 110	306.10	75.8	0.3
29-1, 118	306.18	55.8	0.4
30-1, 23	314.73	32.5	6.1
30-1, 58	315.08	70.8	1.7
31-1, 14	324.14	87.5	0.7
32-1, 38	333.88	59.1	2.0
32-1, 84	334.34	25.0	7.1
32-1, 96	334.46	90.8	3.8
33-1, 30	343.30	59.1	0.1
33-2, 20	344.70	89.1	8.6
34-1, 9	352.59	89.1	0.7
35-10, 10	352.60	52.5	4.4
36-2, 64	354.64	61.6	0.1
37-1, 112	382.12	44.2	0.1
37-2, 21	382.71	91.6	7.5
38-2, 136	393.36	61.6	0.2
39-1, 111	401.11	68.3	2.4
39-1, 121	401.21	90.8	3.4
40-1, 111	410.61	81.6	0.2
466-2-5, 117	15.17	23.3	0.2
3-1, 58	18.08	79.1	0.1
7-3, 58	59.08	87.5	0.1
28,CC, 20	246.00	77.5	2.3
29-1, 72	255.72	20.8	7.5
30-1, 12	264.62	89.1	0.7
30-1, 81	265.31	5.8	1.8
34-1, 4	293.04	33.3	1.0
34-1, 48	293.48	77.5	1.0
34-1, 99	293.99	58.3	4.5
35-1, 25	302.75	65.0	2.6
35-1, 52	303.02	95.0	3.2

Table 3. Results of analyses for CaCO<sub>3</sub> in samples from Sites 463, 464, 465, and 466, by Leco carbon analyzer at the University of Oslo.

Sample	Sub-bottom Depth (m)	CaCO <sub>3</sub> (%)
463-1-2, 44 cm	1.94	80
1-4, 44	4.94	87
2-2, 54	7.54	92

Table 3. (Continued).

Sample	Sub-bottom Depth (m)	CaCO <sub>3</sub> (%)
3-2, 42	16.92	92
2-4, 42	19.92	92
4-2, 66	26.66	92
4-4, 65	29.65	95
5-2, 50	36.00	97
7-2, 52	45.52	98
7-4, 20	48.20	95
8-3, 21	56.21	96
9-2, 72	64.72	90
10-4, 52	77.02	92
10-5, 42	78.42	94
11-2, 82	83.82	82
11-5, 58	88.08	58
12-1, 24	91.24	95
12-4, 40	95.90	91
13-2, 69	102.69	94
13-7, 8	109.60	95
14-1, 46	110.46	92
14-4, 46	114.96	96
15-2, 59	121.59	96
16-2, 62	131.12	96
16-6, 61	137.11	96
19-2, 50	159.50	96
19-4, 70	161.70	96
20-1, 85	167.85	93
21-4, 110	182.10	96
22-2, 58	188.08	93
22-4, 56	191.06	93
24-2, 121	202.21	95
25-2, 51	207.01	95
26-2, 57	216.57	95
26-4, 102	220.02	95
29-1, 12	243.12	90
30-1, 30	252.80	86
31-1, 4	262.04	85
34-2, 68	292.68	94
35-1, 15	300.15	92
36-1, 10	309.60	36
38-1, 62	329.12	88
464-2-2, 75	5.75	9
2-5, 91	10.41	3
3-2, 144	15.92	20
3-4, 144	18.94	5
4-2, 65	24.65	3
4-4, 75	27.75	2
5-2, 100	34.50	0
5-4, 100	37.50	0
6-2, 88	43.88	2
7-2, 15	52.65	1
8-2, 45	62.45	2
9-1, 115	71.15	2
10-3, 60	83.10	2
465-1-1, 30	0.30	89
2-1, 57	1.57	91
2-4, 57	6.57	95
3-2, 65	12.65	98
4-3, 103	24.03	97
5-3, 70	33.20	96
6-1, 105	40.05	96
10-5, 106	84.06	94
1-1, 34	39.34	97
3-3, 14	61.14	96
3-3, 90	61.90	91
8-1, 14	105.64	97
9-3, 51	118.51	98
10-2, 29	126.29	97
10-3, 29	127.79	97

Table 3. (Continued).

Sample	Sub-bottom Depth (m)	CaCO <sub>3</sub> (%)
11-2, 10	135.60	98
11-4, 10	138.60	97
12-2, 10	145.10	97
15-1, 106	173.06	98
16-2, 33	183.33	98
17-1, 114	192.14	95
18-1, 55	201.05	93
19-2, 131	212.81	97
20-1, 18	219.68	98
21-4, 71	234.21	96
466-1-1, 134	1.34	77
1-4, 23	4.73	92
2-2, 41	9.91	93
2-6, 37	15.87	71
3-1, 136	18.86	83
3-3, 20	20.70	90
4-2, 14	28.64	89
5-1, 127	—	10
6-1, 77	46.77	87
6-4, 77	51.27	87
7-2, 44	57.44	90
7-6, 44	63.44	96
8-2, 135	67.85	86
9-2, 30	76.30	93
11-1, 97	88.97	97
12-1, 52	94.02	97
13-3, 20	106.20	97
14-1, 69	113.19	96
15-2, 20	123.70	98
16-1, 67	132.17	96
17-1, 89	141.89	96

Table 4. Results of analyses for CaCO<sub>3</sub> and organic carbon in samples from Site 463 by Leco carbon analyzer at the University of Oslo.

Sample	Sub-bottom Depth (m)	CaCO <sub>3</sub> (%)	Organic Carbon (%)
463-70-1, 60 cm	614.10	42.4	0.80
70-1, 92	614.42	10.8	1.70
70-1, 102	614.52	7.4	0.30
70-2, 58	615.58	34.9	0.60
70-2, 84	615.84	7.4	0.80
70-2, 116	616.16	11.6	2.10
70-3, 21	616.71	22.4	3.70
70-3, 32	616.82	25.8	4.40
70-3, 102	617.52	12.0	0.05
70-4, 17	618.17	20.8	0.20
70-4, 85	618.85	8.3	0.10
70-4, 112	619.12	0.8	2.30
70-5, 5	619.55	6.6	0.40
70-5, 48	619.98	13.3	0.80
70-5, 60	620.10	14.9	0.50
70-5, 80	620.30	32.4	0.20
70-5, 101	620.51	23.3	2.00
70-5, 110	620.60	32.4	4.40
70-5, 115	620.65	15.8	3.00
70-5, 120	620.70	25.8	5.10
70-5, 125	620.75	26.6	4.60
70-5, 130	620.80	27.4	7.50
70-5, 135	620.85	24.9	4.80
70-5, 140	620.90	12.4	1.80
70-5, 145	620.95	13.3	0.20
70-6, 16	621.16	22.4	0.40
70-6, 41	621.41	9.1	1.70
70-6, 47	621.47	11.6	0.40
70-6, 60	621.60	25.8	0.40
70-7, 14	622.64	10.8	0.00
70,CC, 20	622.70	6.6	1.20
71-1, 30	623.30	22.4	0.20
71-1, 97	623.97	3.3	0.00
71-1, 124	624.24	7.4	0.00