20. X-RAY MINERALOGY OF SEDIMENTS FROM THE NORTHERN PACIFIC AND THE BERING SEA—LEG 19, DEEP SEA DRILLING PROJECT[1]

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METHODS

Semiquantitative determinations of the mineral composition in bulk samples, 2 to 20 μ, and $<2\ \mu$ fractions were performed according to the methods described in the reports of Legs 1 and 2 and in Appendix III of Volume IV, Initial Reports of the Deep Sea Drilling Project. The mineral analyses of the 2 to 20 μ and $<2\ \mu$ fractions were performed on $CaCO_3$-free residues.

The results are presented in Tables 1 to 12 and also in Figures 1 to 36. Sediment ages, lithologic units, and the nomenclature of the sediment types used in Figures 1 to 36 are from the DSDP Leg 19 Shipboard Core Descriptions. Samples submitted for X-ray diffraction analysis are listed in Table 13. The sample depths below the sea floor in the fifth column of Table 13 identify the samples as they are reported in Tables 1 to 12 and Figures 1 to 36. A brief sample description is provided in Table 13 to help characterize the sediment. The sediment descriptions are based on a preliminary classification proposed by the DSDP in La Jolla, November 7, 1972. The descriptive term "semi-indurated" was applied to sediments which showed a notable degree of compaction but which could be readily disaggregated in water. The suffix "stone" was applied to sediments which could not be disaggregated in water, implying a considerable degree of lithification. Color descriptors were used only in cases where the color was certain not to be the result of subaerial alteration.

Several unidentified minerals were detected in Leg 19 samples. These were reported on a ranked, semiqualitative scale using a hypothetical mineral concentration factor of 3.0 and other semiquantitative criteria as outlined below:

Trace	(<5%); diffraction pattern is weak and identification was made on the basis of two major diagnostic peaks.
Present	(5-25%); a number of peaks of the mineral are visible in the diffraction pattern.
Abundant	(25-65%); diffraction peaks of the mineral are prominent in the total diffraction pattern, but the peaks of other minerals are of an equivalent intensity.
Major	(>65%); the diffraction peaks of the mineral dominate the diffraction pattern.

Although a certain quantity of the unidentified minerals is implied, their concentration is not included in the concentrations of the identified minerals which are summed to 100 percent.

The usage of drilling mud containing montmorillonite and barite on Leg 19 was as follows: Hole 183, after Core 34; Hole 184, after Core 14; Hole 184B, before Core 1, after Cores 5, 10 13; Hole 186 after Cores 12, 23, 26; Hole 189, after Core 18; Hole 191, after Core 12; Hole 192A, before Core 1, after Core 4, and during coring of Core 6. Most samples submitted for X-ray diffraction analysis were not exposed to drilling mud. Two samples show a coincidence of a high montmorillonite content and the usage of drilling mud (184B-10-2, 10-12; 192A-5-1, 124-126) and are suspected of being contaminated.

[1]Institute of Geophysics and Planetary Physics, University of California, Riverside, Contribution No. 72-40.

TABLE 1
Results of X-ray Diffraction Analyses from Site 183

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Quar.	K-Fe	Plag.	Mica	Chlo.	Mont.	Phil.	Amph.	Goet.	U-1[a]	U-2[a]
Hole 183: Bulk Samples															
28	267-276	268.80	66.9	48.3	38.7	–	34.3	16.4	4.5	–	2.9	3.1	–		–
		269.70	69.1	51.8	36.6	–	34.9	19.2	6.0	–	–	3.3	–		–
38	472-481	474.70	77.4	64.7	33.7	–	25.2	27.7	13.4	–	–	–	–		–
39	500-509	500.80	87.7	80.8	28.4	–	18.5	30.9	9.4	12.8	–	–	–		–
		501.18	89.3	83.3	5.9	27.2	–	8.9	2.4	55.6	–	–	–		–
		501.20	87.7	80.7	30.1	30.5	–	30.9	8.5	–	–	–	Abund		Abund
Hole 183: 2-20μ Fraction															
28	267-276	268.80	68.3	50.5	31.8	–	27.5	19.7	8.5	–	9.2	3.4	–	Trace	
		269.70	59.4	36.5	39.7	–	38.9	11.8	6.6	–	–	3.0	–	Trace	
38	472-481	474.70	64.7	44.9	38.9	–	21.2	18.8	11.1	–	–	–	–	Trace	
39	500-509	500.80	72.3	56.7	33.5	–	28.8	18.3	8.5	11.0	–	–	–	–	
		501.18	80.6	69.6	8.8	33.6	–	4.1	1.7	43.1	8.7	–	–	–	
		501.20	82.6	72.8	27.4	44.2	–	23.5	4.8	–	–	–	Abund		
Hole 183: <2μ Fraction															
28	267-276	268.80	80.9	70.1	15.8	–	9.0	34.9	17.7	22.6			–		
		269.70	77.9	65.5	13.7	–	8.5	30.8	18.1	29.0			–		
38	472-481	474.70	79.7	68.3	23.6	–	14.5	26.5	16.9	18.5			–		
39	500-509	500.80	84.1	75.1	14.4	–	9.9	22.4	6.4	46.9			–		
		501.18	79.3	67.7	1.5	3.3	–	2.7	0.8	91.6			–		
		501.20	85.8	77.8	14.6	26.7	–	20.7	6.0	32.0			Major		

[a]Unidentified mineral. Peaks at 2.94A, 2.23A, 2.18A, and 1.80A.

[b]Unidentified mineral. Peaks at 12.1A.

TABLE 2
Results of X-ray Diffraction Analyses from Site 184

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Quar.	Plag.	Mica	Chlo.	Mont.	Pyri.	Amph.	Augi.
Hole 184: Bulk Samples													
6	202-211	204.40	61.6	40.0	88.9	4.2	2.7	3.2	1.1	–	–	–	–
		206.40	89.1	83.0	–	5.6	51.2	–	–	16.9	12.4	–	13.9
12	333-342	336.50	86.7	79.1	–	26.7	26.7	17.5	5.9	22.0	–	–	1.1
Hole 184: 2-20μ Fraction													
6	202-211	204.40	86.8	79.3	–	38.2	28.0	23.0	7.0	–	2.0	1.8	–
		206.40	85.6	77.5	–	6.4	49.2	–	–	15.7	17.3	–	11.4
12	333-342	336.50	79.4	67.8	–	28.9	34.5	16.3	6.6	6.2	2.0	1.8	3.7
Hole 184: <2μ Fraction													
6	202-211	204.40	87.9	81.0	–	17.0	11.0	29.1	9.8	33.1	–	–	–
		206.40	85.6	77.5	–	2.4	13.3	3.7	2.6	65.9	8.9	–	3.5
12	333-342	336.50	82.0	71.9	–	10.5	14.0	18.2	8.0	47.7	–	–	1.6

TABLE 3
Results of X-ray Diffraction Analyses from Site 184B

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Quar.	Cris.	Plag.	Mica	Chlo.	Mont.	Trid.	Clin.	Pyri.	U-3[a]
Hole 184B: Bulk Samples														
4	781-790	783.90	82.6	72.9	7.8	59.7	10.5	3.1	1.5	4.5	3.9	9.0	–	–
7	874-884	877.00	76.5	63.3	37.0	–	25.2	4.2	1.6	24.8	–	7.1	–	–
10	903-912	904.60	80.6	69.7	4.9	–	16.1	–	–	66.6	–	10.7	1.6	–
Hole 184B: 2-20μ Fraction														
4	781-790	783.90	72.4	56.9	16.1	39.4	21.4	3.0	1.4	–	3.2	13.6	1.9	–
7	874-884	877.00	65.9	46.7	44.3	–	36.3	3.5	1.9	5.9	–	8.1	–	–
10	903-912	904.60	75.7	62.1	9.1	–	22.7	–	–	53.1	–	11.8	3.3	–
Hole 184B: <2μ Fraction														
4	781-790	783.90	80.3	69.2	6.9	73.3	3.1	2.7	0.9	5.9	4.4	2.8		–
7	874-884	877.00	69.6	52.4	33.6	–	4.7	3.9	–	54.4	–	3.5		Abund
10	903-912	904.60	73.4	58.5	3.2	–	1.8	–	–	93.4	–	1.5		–

[a]Unidentified mineral. Peak at 4.21A (narrow).

TABLE 4
Results of X-ray Diffraction Analyses from Site 185

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Quar.	Cris.	Plag.	Mica	Chlo.	Mont.	Trid.	Clin.	Pyri.	Amph.	Augi.
Hole 185: Bulk Samples															
1	0-9	1.40	86.7	79.3	12.4	–	47.4	7.6	4.8	17.2	–	–	1.3	–	9.3
25	691-699	693.20	81.7	71.3	19.6	19.0	23.4	11.0	4.1	9.7	–	10.9	0.9	1.3	–
Hole 185: 2-20μ Fraction															
1	0-9	1.40	80.4	69.3	21.0	–	54.6	4.8	3.0	–	–	1.2	1.5	–	14.0
25	691-699	693.20	69.5	52.4	22.7	14.6	27.7	14.0	4.3	7.3	–	7.7	–	1.6	–
Hole 185: <2μ Fraction															
1	0-9	1.40	76.8	63.8	8.3	–	17.1	10.8	8.0	48.5	–	2.1	–	–	5.1
25	691-699	693.20	85.8	77.9	7.7	48.9	8.7	7.0	4.2	20.5	1.1	2.0	–	–	–

TABLE 5
Results of X-ray Diffraction Analyses from Site 186

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Quar.	Plag.	Mica	Chlo.	Mont.	Clin.	Anal.	Pyri.	Amph.	Augi.	Magn.	Bari.
Hole 186: Bulk Samples																
8	133.0-142.0	136.90	84.8	76.3	22.5	25.8	24.9	10.4	14.9	–	–	–	1.6	–	–	
11	207.0-216.0	214.90	82.2	72.2	13.8	53.1	8.6	2.2	6.3	1.6	1.3	–	1.4	11.7	–	
15	385.0-394.0	386.10	81.4	70.9	17.6	22.7	36.8	13.1	6.9	–	–	–	3.0	–	–	
17	422.0-431.0	426.00	84.0	75.1	21.0	28.0	27.3	8.8	14.9	–	–	–	–	–	–	
19	449.0-458.0	452.30	85.6	77.4	12.6	52.1	5.1	6.4	4.4	1.2	1.1	–	2.0	15.1	–	
		453.70	85.5	77.4	13.0	53.3	9.0	5.8	6.2	1.1	1.0	–	–	10.6	–	
21	506.0-515.0	509.30	85.5	77.3	9.5	40.6	3.8	2.2	8.2	6.2	4.0	–	3.5	22.0	–	
23	618.0-627.0	620.10	84.8	76.3	24.2	31.2	20.5	9.1	6.3	2.2	1.5	–	2.2	2.7	–	
		621.10	79.7	68.3	4.0	68.6	3.2	–	4.4	1.1	–	3.0	2.8	12.9	–	
		622.10	82.9	73.3	34.2	27.8	24.1	9.0	4.9	–	–	–	–	–	–	
26	805.0-814.0	806.80	87.2	80.1	23.1	34.1	17.5	7.4	8.9	3.7	1.9	–	–	3.3	–	
		807.70	85.9	78.0	23.3	30.8	28.6	10.1	5.0	–	–	–	2.2	–	–	
27	861.0-870.0	864.30	84.4	75.7	24.9	30.7	24.5	9.4	5.4	2.1	1.2	–	1.9	–	–	
		869.30	83.0	73.4	22.6	25.2	29.6	9.7	10.4	–	–	–	2.5	–	–	
28	917.0-926.0	919.60	73.6	58.8	2.3	76.6	2.2	–	–	–	–	–	9.0	6.8	3.0	
		920.60	82.7	72.9	25.2	27.9	27.8	10.3	6.9	–	–	–	1.9	–	–	
Hole 186: 2-20μ Fraction																
8	133.0-142.0	136.90	73.4	58.5	35.2	42.3	13.8	8.7	–	–	–	–	–	–	–	
11	207.0-216.0	214.90	76.0	62.5	28.7	41.8	12.1	6.6	–	1.1	1.2	–	2.5	6.0	–	
15	385.0-394.0	386.10	71.3	55.1	31.8	34.3	20.0	10.6	–	–	–	–	3.2	–	–	
17	422.0-431.0	426.00	73.0	57.8	30.4	40.8	16.3	6.4	–	–	–	–	2.0	4.1	–	
19	449.0-458.0	452.30	81.3	70.7	26.1	49.2	7.8	4.4	–	1.3	–	1.7	1.8	7.9	–	
		453.70	76.7	63.6	26.8	41.4	10.8	7.3	3.8	0.6	–	2.1	2.4	4.7	–	
21	506.0-515.0	509.30	77.5	64.9	20.4	35.8	8.2	3.3	11.1	3.6	2.3	7.3	–	8.0	–	
23	618.0-627.0	620.10	74.0	59.4	31.6	35.9	11.2	5.8	7.6	1.9	1.3	–	–	4.8	–	
		621.20	74.8	60.7	24.3	38.9	8.4	4.2	–	3.9	2.5	9.0	–	8.6	–	
		622.10	76.4	63.1	43.7	32.2	17.0	7.1	–	–	–	–	–	–	–	
26	805.0-814.0	806.80	74.7	60.5	28.6	33.6	10.8	5.1	11.4	2.4	1.5	–	–	6.5	–	
		807.70	78.8	67.0	36.4	39.2	16.3	7.3	–	0.7	–	–	–	–	–	
27	861.0-870.0	864.30	73.8	59.1	29.6	38.0	12.6	5.7	10.2	1.5	0.9	–	1.5	–	–	
		869.30	70.4	53.8	45.9	3.8	24.9	14.0	8.0	–	–	–	3.5	–	–	
28	917.0-926.0	919.60	83.3	73.9	18.4	47.7	9.9	4.3	–	–	–	6.4	3.7	4.7	4.8	
		920.60	70.1	53.2	36.6	35.3	18.3	8.2	–	–	–	–	1.5	–	–	
Hole 186: <2μ Fraction																
8	133.0-142.0	136.90	79.1	67.3	18.7	21.7	24.6	16.9	18.1	–	–	–	–	–	–	–
11	207.0-216.0	214.90	75.3	61.4	14.1	13.8	25.4	14.5	28.3	0.9	–	–	1.3	1.7	–	–
15	385.0-394.0	386.10	76.5	63.3	19.0	20.1	34.2	17.4	9.3	–	–	–	–	–	–	–
17	422.0-431.0	426.00	80.4	69.4	16.4	16.6	25.0	13.6	24.7	–	–	–	–	3.7	–	–
19	449.0-458.0	452.30	78.5	66.5	18.9	21.8	22.0	15.5	19.4	–	–	–	–	2.4	–	Pres
		453.70	78.3	66.1	16.3	17.7	24.8	13.7	24.8	–	–	–	1.6	1.2	–	–
21	506.0-515.0	509.30	82.0	71.8	11.2	13.1	15.1	8.1	45.1	3.2	1.1	–	–	3.2	–	–
23	618.0-627.0	620.10	80.9	70.1	15.8	13.8	18.9	11.6	32.9	1.1	–	–	–	5.9	–	–
		621.20	78.2	66.0	9.6	11.7	15.7	8.4	50.0	1.6	–	1.0	–	2.0	–	–
		622.10	85.2	76.9	22.1	11.4	31.0	12.8	22.7	–	–	–	–	–	–	–
26	805.0-814.0	806.80	79.3	67.6	12.2	13.5	15.7	8.0	42.3	1.7	–	–	–	6.7	–	–
		807.70	86.4	78.7	16.2	19.1	22.3	20.9	18.7	1.0	–	–	1.8	–	–	–
27	861.0-870.0	864.30	80.1	68.9	16.8	16.1	24.4	12.0	28.4	1.2	–	–	1.2	–	–	–
		869.30	77.2	64.3	20.6	19.5	26.0	13.8	18.4	–	–	–	1.8	–	–	–
28	917.0-926.0	919.60	84.0	75.0	13.0	42.4	15.8	5.4	16.8	–	–	–	3.3	–	3.4	Pres
		920.60	80.9	70.1	24.6	19.7	23.9	13.0	18.7	–	–	–	–	–	–	–

[a]Unidentified mineral. Peaks at 22.2A and 11.25A.

TABLE 6
Results of X-ray Diffraction Analyses from Site 187

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Quar.	Plag.	Mica	Chlo.	Mont.	Clin.	Amph.
Hole 187: Bulk Samples											
3	267-276	268.00	83.6	74.4	22.6	27.9	25.0	9.7	14.7	–	–
4	361-370	363.30	85.1	76.8	23.1	30.5	24.7	9.4	8.8	1.4	2.1
Hole 187: 2-20μ Fraction											
3	267-276	268.00	70.7	54.1	30.9	37.4	20.6	9.5			1.5
4	361-370	363.30	72.1	56.5	31.5	39.5	18.4	8.8			1.7
Hole 187: <2μ Fraction											
3	267-276	268.00	79.0	67.1	15.7	14.1	27.4	14.7	28.1		
4	361-370	363.30	79.9	68.6	17.6	18.7	25.2	12.3	26.2		

TABLE 7
Results of X-ray Diffraction Analyses from Site 188

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Quar.	Cris.	Plag.	Mica	Chlo.	Mont.	Trid.	Clin.	Anal.	Pyri.	Amph.	Hali.	U-4[a]
Hole 188: Bulk Samples																			
3	30-39	35.70	96.2	94.0	–	–	24.1	–	32.2	21.5	14.9	–	–	–		7.4	–	–	
6	124-133	127.20	98.0	96.9	12.1	–	16.2	–	30.6	16.3	12.7	–	–	–		6.3	–	5.8	
		127.40	86.9	79.6	–	–	24.6	–	18.7	30.9	6.5	19.2		–		–	–	–	
		127.70	90.0	84.4	–	–	26.1	–	33.0	24.9	5.9	4.0		–		4.3	1.8	–	
7	171-180	174.80	91.4	86.6	–	–	15.4	–	39.7	14.8	6.3	20.0		–		3.8	–	–	
9	283-292	286.70	92.3	88.0	–	–	18.8	–	28.1	15.7	6.3	29.5		–		1.7	–	–	
		287.00	97.4	96.0	–	–	16.8	–	44.9	15.8	12.9	–		–		5.0	4.7		
12	425-434	426.10	87.0	79.7	–	–	23.3	–	34.3	18.8	8.2	9.8		–		4.0	1.7	–	
14	564-573	565.30	90.0	84.3	–	–	19.4	–	39.6	7.3	5.8	18.7		–		7.6	–	1.6	
15	573-582	575.70	95.3	92.7	1.9	–	17.3	–	53.9	5.1	9.4	7.6		–		4.8	–	–	
17	601-610	601.40	62.5	41.4	–	94.5	1.9	–	3.6	–	–	–		–		–	–	–	
	6	601.80	91.7	87.1	–	–	3.4	88.3	4.7	–	1.1	1.2		–		1.4	–	–	
		601.90	89.6	83.8	–	–	5.9	75.9	8.6	2.6	0.9	2.9		1.3		2.0	–	–	
Hole 188: 2-20μ Fraction																			
3	30-39	35.70	92.3	87.9	–	–	32.3	–	41.6	10.3	5.1	–	–	–	–	8.4	2.2		
6	124-133	127.20	96.7	94.8	–	–	28.2	–	48.6	13.5	4.9	–	–	–	–	4.8[b]	–		
		127.40	73.4	58.5	–	–	38.5	–	33.2	18.3	5.6	–	–	–	–	2.7	1.8		
		127.70	86.4	78.7	–	–	31.0	–	44.9	12.8	6.5	–	–	–	–	3.3	1.5		
7	171-180	174.80	88.7	82.4	–	–	18.5	–	62.6	7.9	4.1	–	–	–	–	5.2	1.8		
9	283-292	286.70	85.0	76.6	–	–	35.3	–	42.3	12.5	5.5	–	–	–	–	4.4	–		
12	425-434	426.10	82.0	71.9	–	–	29.4	–	37.4	16.9	8.8	–	–	–	–	5.3	2.2		
14	564-573	565.30	83.8	74.8	–	–	18.6	–	38.3	6.2	6.7	21.5	–	1.5	1.1	6.1	–		
15	573-582	575.70	94.5	91.4	–	–	16.5	–	62.4	–	3.6	11.1	–	–	–	6.4	–		
17	601-610	601.80	90.4	85.1			3.3	89.6	4.9	1.0	–	–	–	–	–	1.3	–		

TABLE 7 – *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Quar.	Cris.	Plag	Mica	Chlo.	Mont.	Trid.	Clin.	Anal.	Pyri.	Amph.	Hali.	U-4[a]
Hole 188: <2μ Fraction																			
3	30-39	35.70	94.1	90.8	–	–	25.5	–	26.5	22.0	8.3	10.4	–	–	–	7.3	–	–	–
6	124-133	127.20	97.0	95.3	–	–	27.7	–	40.0	12.9	8.4	6.0	–	–	–	5.0	–	–	–
		127.40	81.5	71.1	–	–	17.1	–	14.5	31.0	8.7	26.5	–	–	–	2.2	–	–	–
		127.70	89.8	84.0	–	–	21.6	–	23.6	22.6	10.6	15.8	–	–	–	5.8	–	–	Pres
7	171-180	174.80	91.8	87.2	–	–	16.6	–	25.5	11.1	8.0	32.7	–	1.3	–	3.4	1.4	–	–
9	283-292	286.70	84.8	76.3	–	–	14.2	–	14.1	15.6	7.8	46.7	–	1.7	–	–	–	–	–
12	425-434	426.10	88.2	81.6	–	–	18.1	–	17.9	18.4	8.2	33.6	–	–	–	2.5	1.3	–	–
14	564-573	565.30	88.9	82.7	–	–	17.9	–	20.8	7.1	4.2	47.2	–	1.3	–	–	1.5	–	–
15	573-582	575.70	90.9	85.8	–	–	16.5	–	21.9	8.6	3.9	46.6	–	–	–	2.5	–	–	–
17	601-610	601.80	97.4	95.9	–	–	0.9	81.4	2.2	2.7	–	5.0	7.8	–	–	–	–	–	–

[a]Unidentified mineral. Peaks at 22.2A and 11.25A.

TABLE 8
Results of X-ray Diffraction Analyses from Site 189

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Quar.	Plag.	Mica	Chlo.	Mont.	Clin.	Pyri.	Amph.
Bulk Samples													
6	212.0-221.0	213.70	81.0	70.3	–	32.2	23.6	20.0	4.5	17.8	1.9	–	–
7	296.0-305.0	297.60	82.0	71.8	–	32.7	32.9	12.3	5.7	13.5	3.0	–	–
8	362.0-371.0	363.10	76.7	63.6	–	34.0	21.3	30.0	5.6	6.4	1.1	–	1.7
9	426.0-435.0	427.20	87.7	80.7	–	26.0	24.1	10.7	18.7	17.9	2.7	–	–
10	537.0-546.0	537.60	77.3	64.6	–	36.3	14.4	40.0	7.9	1.5	–	–	–
11	641.0-650.0	644.30	73.9	59.2	–	48.6	10.8	11.4	3.5	25.6	–	–	–
		644.80	65.9	46.8	–	62.0	14.8	7.5	3.5	6.5	4.3	1.4	–
		645.30	73.3	58.2	–	68.1	14.4	5.9	3.5	6.9	–	1.2	–
12	706.0-715.0	708.00	64.0	43.7	–	73.7	13.1	7.3	3.0	2.9	–	–	–
		708.30	60.4	38.1	–	11.0	30.7	5.3	2.0	41.5	7.7	1.7	–
13	725.0-733.0	728.50	80.2	69.1	–	53.4	21.8	9.8	5.4	7.7	–	2.0	–
14	743.0-752.0	747.40	66.8	48.2	–	46.0	32.1	12.2	9.7	–	–	–	–
		748.30	65.9	46.6	–	23.0	36.8	10.2	29.9	–	–	–	–
		749.00	63.9	43.6	33.2	13.1	38.0	2.8	7.9	–	5.0	–	–
15	771.0-780.0	771.90	58.8	35.6	–	57.7	17.9	15.2	6.0	1.9	–	1.3	–
		773.70	79.8	68.4	–	53.7	15.8	19.8	5.3	3.9	–	1.6	–
16	799.0-808.0	802.80	–	–	–	39.1	29.0	4.0	1.4	25.3	–	1.2	–
17	818.0-827.0	820.50	77.0	64.0	–	61.8	16.7	17.7	3.8	–	–	–	–
20	865.0-871.0	867.20	69.0	51.5	–	71.4	16.6	8.0	4.0	–	–	–	–
Hole 189: 2-20μ Fraction													
6	212.0-221.0	213.70	73.0	57.9	32.1	29.7	14.5	4.3	14.0	2.5	1.3	0.8	0.9
7	296.0-305.0	297.60	76.3	63.0	29.9	38.8	7.4	2.8	16.8	3.0	1.4	–	–
8	362.0-371.0	363.10	67.8	49.7	33.4	22.6	33.6	9.0	–	–	–	–	1.4
9	426.0-435.0	427.20	75.8	62.1	33.7	35.5	6.3	3.7	17.1	2.5	1.2	–	–
10	537.0-546.0	537.60	68.4	50.6	37.7	18.1	31.7	7.1	5.5	–	–	–	–

TABLE 8 – *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Quar.	Plag.	Mica	Chlo.	Mont.	Clin.	Pyri.	Amph.
Bulk Samples													
11	641.0-650.0	644.30	60.7	38.5	53.6	21.2	10.4	4.3	8.8	–	–	1.6	–
		644.80	63.2	42.5	57.9	21.6	5.8	3.5	–	8.6	–	2.6	–
		645.30	60.7	38.6	59.2	20.1	6.6	3.4	8.4	–	–	2.2	–
12	706.0-715.0	708.00	59.0	36.0	61.6	25.2	8.6	4.6	–	–	–	–	–
		708.30	75.5	61.7	16.3	31.6	2.9	4.5	31.6	10.0	–	3.2	–
13	725.0-733.0	728.50	62.2	40.9	46.1	29.2	8.4	5.6	6.6	–	–	4.1	–
14	743.0-752.0	747.40	63.6	43.1	46.3	31.8	11.6	8.8	–	–	–	1.5	–
		748.30	63.4	42.9	22.7	30.0	10.3	37.1	–	–	–	–	–
15	771.0-780.0	771.90	59.5	36.7	57.4	27.4	9.7	3.8	–	–	–	1.7	–
		773.70	61.7	40.1	53.0	26.7	11.3	5.5	–	–	–	–	–
17	818.0-827.0	820.50	60.4	38.2	61.7	22.9	9.3	4.5	–	–	–	1.6	–
20	865.0-871.0	867.20	57.9	34.2	60.1	25.7	8.2	4.2	–	–	–	1.7	–
<2μ Fraction													
6	212.0-221.0	213.70	82.6	72.8	25.5	15.2	13.6	6.8	38.9	–			
7	296.0-305.0	297.60	81.5	71.0	24.3	13.1	13.3	6.3	41.4	1.6			
8	362.0-371.0	363.10	80.3	69.2	21.6	14.5	23.5	7.4	33.0	–			
9	426.0-435.0	427.20	82.4	72.5	24.4	13.3	10.1	5.3	45.8	1.1			
10	537.0-546.0	537.60	80.5	69.5	26.5	9.2	34.4	8.0	21.9	–			
11	641.0-650.0	644.30	65.2	45.6	57.0	6.8	8.9	2.9	24.4	–			
		644.80	67.0	48.4	71.8	7.2	5.5	3.0	10.6	1.9			
		645.30	61.6	40.1	68.9	3.8	4.8	1.9	20.6	–			
12	706.0-715.0	708.00	61.0	39.0	77.8	6.4	6.5	3.0	6.3	–			
		708.30	74.1	59.5	6.0	2.0	1.8	1.0	88.1	1.0			
13	725.0-733.0	728.50	69.5	52.4	67.4	7.3	6.6	3.2	15.6	–			
14	743.0-752.0	747.40	70.2	53.4	59.7	9.5	11.2	5.2	14.4	–			
		748.30	72.3	56.8	16.8	11.3	16.2	41.8	13.8	–			
15	771.0-780.0	771.90	73.3	58.3	32.2	12.8	25.5	11.8	17.7	–			
		773.70	72.4	56.9	54.7	8.6	13.8	5.7	17.2	–			
17	818.0-827.0	820.50	69.0	51.6	73.3	5.7	9.8	3.4	7.8	–			
20	865.0-871.0	867.20	66.0	46.8	75.2	5.3	9.4	3.3	6.8	–			

TABLE 9
Results of X-Ray Diffraction Analyses from Site 190

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Quar.	Plag.	Mica	Chlo.	Mont.	Clin.	Pyri.	Amph.
Bulk Samples												
7	75.0- 84.0	77.20	63.4	42.8	29.0	23.2	36.4	8.0	3.3		–	–
9	112.0-121.0	113.80	84.0	74.9	34.7	14.5	39.5	9.5	1.8		–	–
12	225.0-234.0	227.90	80.6	69.6	26.6	13.2	47.1	10.0	3.1		–	–
13	328.0-337.0	330.10	86.4	78.8	29.6	17.5	36.7	6.1	10.1		–	–
14	421.0-430.0	423.80	91.2	86.3	32.8	31.8	17.6	3.5	11.5		1.5	1.3
		428.60	98.4	97.4	21.3	56.5	–	2.9	19.3		–	–
15	609.0-618.0	610.30	77.1	64.2	15.2	32.7	45.2	6.8	–		–	–

TABLE 9 – *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Quar.	Plag.	Mica	Chlo.	Mont.	Clin.	Pyri.	Amph.
Hole 190: 2-20μ Fraction												
7	75.0- 84.0	77.10	75.9	62.4	37.7	26.6	27.9	6.1	–	–	–	1.7
9	112.0-121.0	113.80	61.5	39.9	41.4	17.2	32.8	8.7	–	–	–	–
12	225.0-234.0	227.90	63.3	42.6	34.7	17.1	36.7	9.5	–	–	–	2.0
13	328.0-337.0	330.10	76.7	63.5	36.3	21.6	28.0	5.9	6.7	–	–	1.4
14	421.0-430.0	423.80	88.0	81.2	41.5	37.1	15.0	4.2	–	–	2.2	–
		428.60	97.3	95.8	27.7	54.6	9.6	5.0	–	3.1	–	–
Hole 190: <2μ Fraction												
7	75.0- 84.0	77.10	81.4	70.9	14.7	10.1	29.9	7.3	38.0	–	–	
9	112.0-121.0	113.80	77.8	65.2	21.2	10.8	40.9	10.7	16.4	–	–	
12	225.0-234.0	227.90	77.4	64.7	21.0	11.6	39.0	11.0	17.4	–	–	
13	328.0-337.0	330.10	82.0	71.9	20.7	10.2	30.6	7.4	31.1	–	–	
14	421.0-430.0	423.80	89.5	83.6	16.1	12.5	19.6	3.9	45.7	–	2.1	
		428.60	91.3	86.5	9.4	14.5	20.1	4.8	47.6	3.6	–	

TABLE 10
Results of X-ray Diffraction Analyses from Site 191

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Quar.	Plag.	Mica	Chlo.	Mont.	Clin.	Pyri.	Amph.	U-3[a]	U-5[b]
Hole 191: Bulk Samples														
7	227.0-236.0	229.50	80.9	70.1	24.3	15.6	42.1	9.3	6.6	–	–	2.1	–	–
9	321.0-330.0	321.60	81.3	70.8	24.7	17.0	38.1	8.1	10.7	–	–	1.4	–	–
11	452.0-461.0	454.60	77.7	65.2	27.9	15.9	37.8	8.5	8.3	–	–	1.7	–	–
12	520.0-527.0	521.80	80.5	69.6	26.3	16.6	39.4	8.5	9.2	–	–	–	–	–
13	620.0-629.0	622.10	81.2	70.6	23.8	13.3	27.9	6.2	15.2	11.8	1.8	–	–	–
14	723.0-732.0	725.30	76.7	63.6	8.8	31.7	2.4	–	57.1	–	–	–	Pres	Abund
Hole 191: 2-20μ Fraction														
7	227.0-236.0	229.50	88.6	82.2	35.9	25.2	32.5	6.4	–	–	–	–		–
9	321.0-330.0	321.60	68.0	49.9	37.6	26.2	27.8	7.4	–	–	–	1.0		–
11	452.0-461.0	454.60	62.7	41.7	35.7	21.5	31.6	8.6	–	–	–	2.5		–
12	520.0-527.0	521.80	71.1	54.9	34.8	25.5	29.2	8.4	–	–	–	2.1		–
13	620.0-629.0	622.10	69.7	52.6	34.3	23.4	20.6	5.2	–	13.7	2.8	–		–
14	723.0-732.0	725.30	69.4	52.1	7.8	45.7	2.2	–	43.0	–	–	1.3		Abund
Hole 191: <2μ Fraction														
9	321.0-330.0	321.60	79.8	68.4	18.2	10.1	31.2	9.4	31.1		–			
11	452.0-461.0	454.60	78.3	66.1	17.5	9.8	39.5	11.8	21.3		–			
12	520.0-527.0	521.80	82.5	72.7	19.6	13.1	28.0	8.4	30.2		0.6			
13	620.0-629.0	622.10	83.5	74.2	27.6	14.3	26.1	6.6	23.7		1.6			
14	723.0-732.0	725.30	68.1	50.2	0.9	1.6	–	–	97.5		–			

[a]Unidentified mineral. Peak at 4.21A (narrow).
[b]Unidentified mineral. Peaks at 3.21A, 2.52A, and 2.14A.

TABLE 11
Results of X-ray Diffraction Analyses from Site 192[a]

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Quar.	Cris.	Plag.	Mica	Chlo.	Mont.	Clin.
Hole 192: Bulk Samples												
24	625.0-634.0	627.30	87.8	80.9	–	26.4	–	26.5	25.9	7.1	14.1	–
26	709.0-718.0	710.60	87.9	81.1	–	22.7	–	22.5	19.4	5.1	27.9	2.3
27	746.0-755.0	749.70	84.8	76.3	–	16.3	25.5	15.9	18.4	4.7	15.4	3.9
28	784.0-793.0	784.60	87.2	80.1	–	19.0	21.1	17.3	23.7	6.3	9.4	3.2
29	793.0-802.0	794.30	77.9	65.5	52.2	7.2	23.6	5.0	7.0	1.7	3.2	–
30	849.0-858.0	851.90	82.3	72.4	–	19.8	21.3	11.3	15.9	3.7	28.0	–
Hole 192: 2-20μ Fraction												
24	625.0-634.0	627.30	79.2	67.5	29.9	–	27.9	18.5	6.1	17.7	–	
26	709.0-718.0	710.60	80.4	69.4	27.5	–	30.9	15.2	4.5	20.0	1.9	
27	746.0-755.0	749.70	75.7	62.0	25.9	16.6	25.6	15.7	5.7	7.0	3.4	
28	784.0-793.0	784.60	74.7	60.4	28.2	9.9	28.6	14.9	5.2	10.3	2.9	
29	793.0-802.0	794.30	75.3	61.4	27.3	34.7	22.1	10.1	3.6	–	2.2	
30	849.0-858.0	851.90	71.5	55.5	36.6	19.4	20.7	13.2	3.8	6.3	–	
Hole 192: <2μ Fraction												
24	625.0-634.0	627.30	82.8	73.2	23.5	–	18.4	19.0	7.7	31.4		
26	709.0-718.0	710.60	85.3	77.0	22.1	–	18.6	15.5	2.8	41.0		
27	746.0-755.0	749.70	84.7	76.1	10.2	41.7	8.7	10.2	2.1	27.1		
28	784.0-793.0	784.60	82.7	73.0	13.2	33.2	10.7	12.2	2.7	28.0		
29	793.0-802.0	794.30	84.1	75.2	7.5	57.9	5.6	8.1	2.2	18.8		
30	849.0-858.0	851.90	78.8	66.8	13.1	34.3	5.9	11.9	2.9	31.9		

TABLE 12
Results of X-ray Diffraction Analyses from Hole 192A

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Quar.	K-Fe	Plag.	Mica	Mont.	Augi.	Hema.	Clin.	Magn.
Hole 192A: Bulk Samples														
5	1043-1053	1043.30	76.8	63.8	82.1	2.3		3.2	3.0	9.3	–			
		1043.70	71.4	55.3	88.1	10.1		–	–	1.8	–			
		1044.20	75.3	61.4	–	1.3		34.8	–	21.2	42.7			
Hole 192A: 2-20μ Fraction														
5	1043-1053	1043.30	82.2	72.2		14.4	–	34.3	4.6	34.2	–	7.8	4.6	–
		1043.70	76.8	63.8		66.1	5.5	–	7.6	8.4	–	12.4	–	–
		1044.20	64.3	44.2		1.7	–	40.9	–	–	44.6	–	–	12.8
Hole 192A: <2μ Fraction														
5	1043-1053	1043.30	83.9	74.8		10.4		–	6.5	74.5	–	8.6		
		1043.70	81.6	71.3		46.0		–	8.0	31.8	–	14.2		
		1044.20	79.4	67.9		1.0		14.5	–	72.1	12.5	–		

TABLE 13
Samples Submitted for X-ray Diffraction Analysis from Leg 19 and Sediment Description

Hole	Core	Section	Interval (cm)	Depth Below Sea Floor (m)	Sediment Description
183	28	2	30-33	268.8	Dark, ash-rich coarse sand
			118-120	269.7	Gray silt
	38	2	120-122	474.7	Clayey siltstone
	39	1	80-81	500.8	Clayey siltstone
			118-119	501.18	Ferruginous, claystone
			120-121	501.2	Ferruginous, claystone
184	6	2	93-95	204.4	Nanno ooze
		3	135-139	206.4	Dark, ash-rich, silt
	12	3	50-53	336.5	Diatom clay
184B	4	2	137-138	783.9	Claystone
	7	2	148-150	877.0	Claystone
	10	2	10-12	904.6	Dark silty claystone
185	1	1	136-138	1.4	Dark silty clay
	25	2	71-73	693.2	Silty claystone
186	8	3	86-88	136.9	Volcanic ash
	11	6	37-39	214.9	Clayey sand
	15	1	113-116	386.1	Ash-rich clay
	17	3	99-101	426.0	Silty volcanic sand
	19	3	28-30	452.3	Volcanic sand
		4	17-19	453.7	Volcanic sand
	21	3	31-33	509.3	Clayey sand
	23	2	62-64	620.1	Sandy, clayey silt
		3	15-17	621.2	Sand with clayballs
			113-115	622.1	Semi-indurated sandy silt
	24	3	75-77	806.8	Semi-indurated, silty sand
	26	2	31-33	807.7	Semi-indurated clay
	27	3	30-35	864.3	Clayey siltstone
		6	82-83	869.3	Very fine-grained ash with pumice pebbles
		3	92-94	920.6	Siltstone
187	3	1	100-102	268.0	Clayey diatom silt
	4	2	78-80	363.3	Clayey silt
188	3	4	117-119	35.7	Silty diatom ooze
	6	3	22-24	127.2	Silty diatom ooze
			38-41	127.4	Silty diatom ooze
			65-66	127.7	Silty diatom ooze
	7	3	80-82	174.8	Silty diatom ooze
	9	3	68-70	268.7	Silty diatom ooze
			96-97	287.0	Silty diatom ooze
	12	1	115-120	426.1	Slightly indurated diatom ooze
	12	1	130-135	565.3	Slightly indurated diatom ooze
	15	2	120-122	575.7	Slightly indurated diatom ooze
	17	1	40-42	601.4	Gray dolomite
			80-82	601.8	Chert
			90-92	601.9	Gray chert
189	6	2	18-20	213.7	Diatom clay
	7	2	6-8	297.6	Diatom-bearing clay
	8	1	107-109	363.1	Clay
	9	1	117-119	427.2	Clay
	10	1	59-61	537.6	Silty clay
	11	3	28-30	644.3	Silty clay
	11	3	75-77	644.8	Clayey siltstone
			130-132	645.3	Clayey siltstone
	12	2	50-52	708.0	Clayey siltstone
			83-85	708.3	Claystone
	13	3	55-57	728.5	Siltstone

TABLE 13 – *Continued*

Hole	Core	Section	Interval (cm)	Depth Below Sea Floor (m)	Sediment Description
	14	3	140-142	747.4	Sandy mudstone
		4	78-80	748.3	Sandy mudstone
			148-150	749.0	Silty chalk
	15	1	94-96	771.9	Semi-indurated sandy, silty, clay
		2	120-122	773.7	Semi-indurated silty, clay
	16	3	76-78	802.8	Semi-indurated clay
	17	2	103-105	820.5	Semi-indurated clay
	20	2	68-70	867.2	Semi-indurated silty clay
190	7	2	55-57	77.1	Diatom silt
	9	2	33-35	113.8	Silty clay
	12	2	141-143	227.9	Silty clay
	13	2	63-65	330.1	Radiolarian clay
	14	2	48-50	423.8	Radiolarian clay
		6	12-14	428.6	Fine-grained ash
	15	1	126-128	610.3	Fine-grained ash
191	7	2	101-103	229.5	Silty clay
	9	1	65-67	321.6	Silty clay
	11	2	106-108	454.6	Ash-rich, silty clay
	12	2	29-31	521.8	Diatom silty clay
	13	2	57-59	622.1	Silty claystone
	14	2	78-80	725.3	Volcanic ash
192	24	2	81-83	627.3	Diatom claystone
	26	2	14-16	710.6	Claystone
	27	3	70-72	749.7	Ash-rich claystone
	28	1	58-60	784.6	Claystone
	29	1	128-130	794.3	Claystone
	30	2	140-142	851.9	Claystone
192A	5	1	32-34	1043.3	Brown micrite
			70-72	1043.7	Brown micrite
			124-126	1044.2	Volcanic gravel

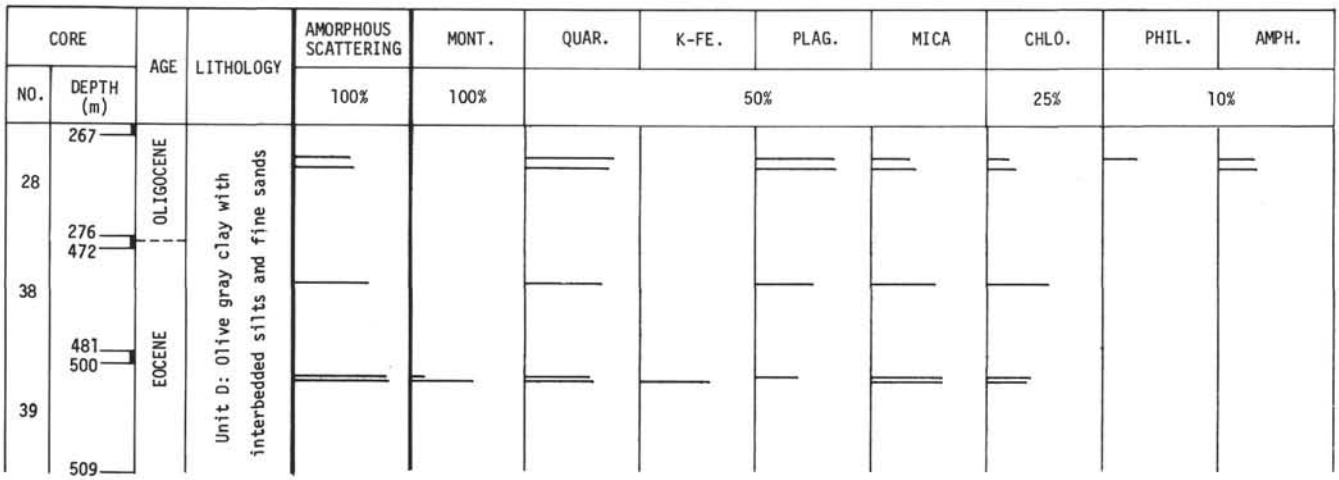

Figure 1. *Hole 183, bulk samples.*

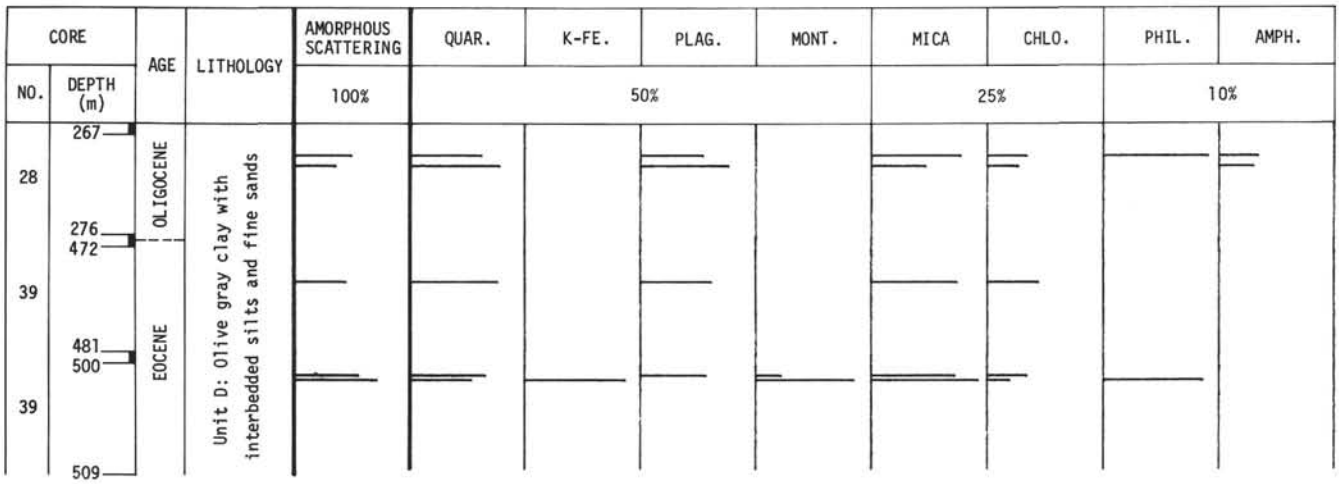

Figure 2. *Hole 183, 2-20 μ samples.*

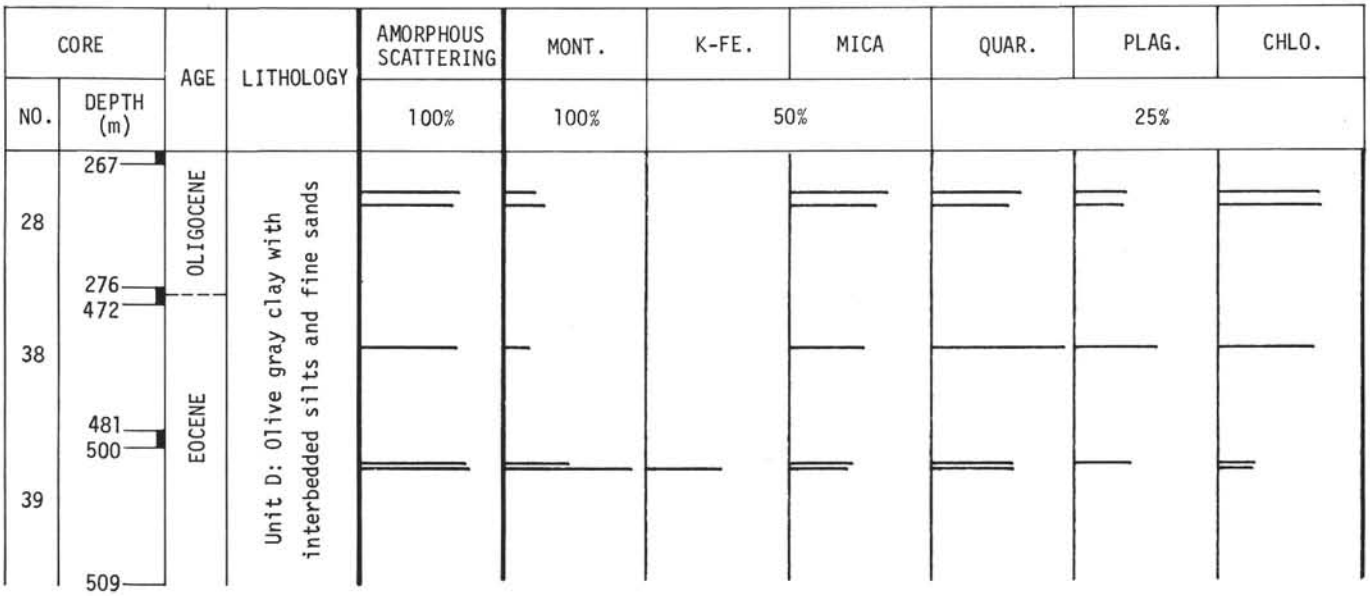

Figure 3. *Hole 183, <2 μ samples.*

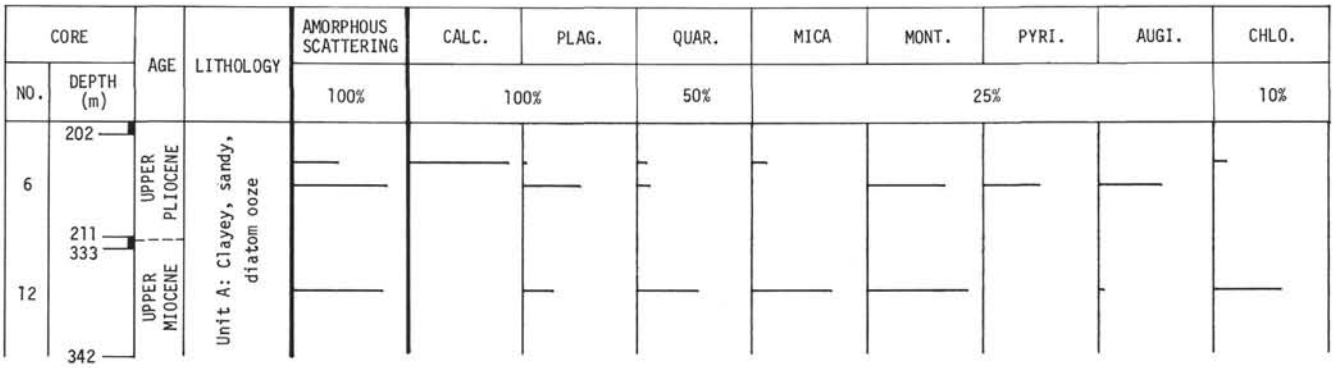

Figure 4. *Hole 184, bulk samples.*

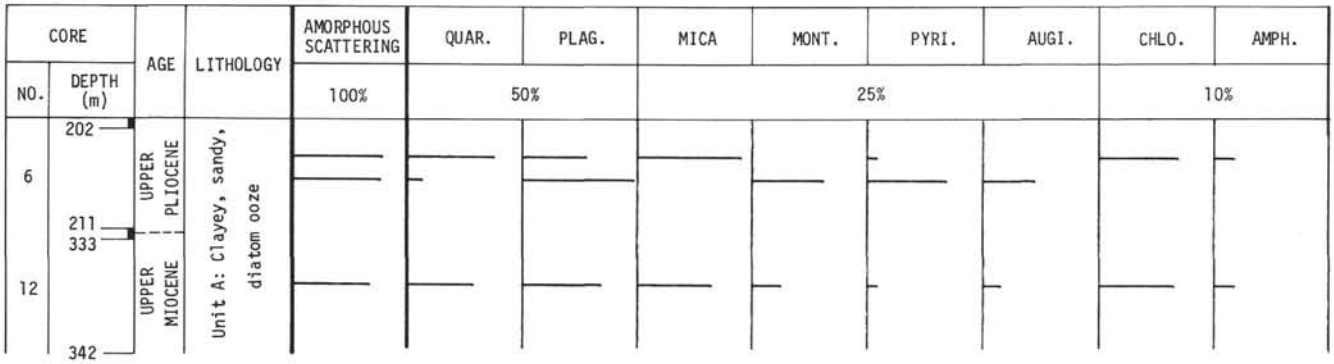

Figure 5. *Hole 184, 2-20 μ samples.*

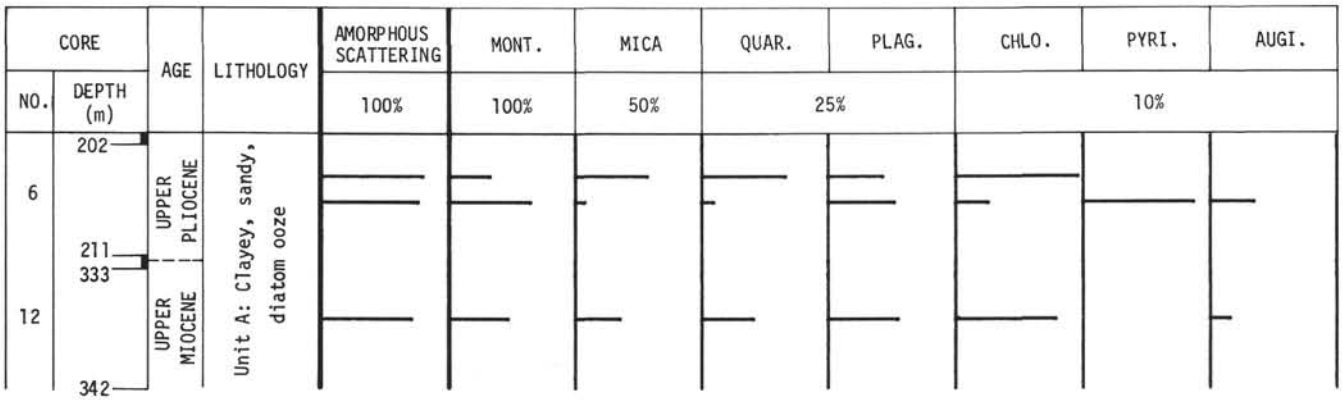

Figure 6. *Hole 184, <2 μ samples.*

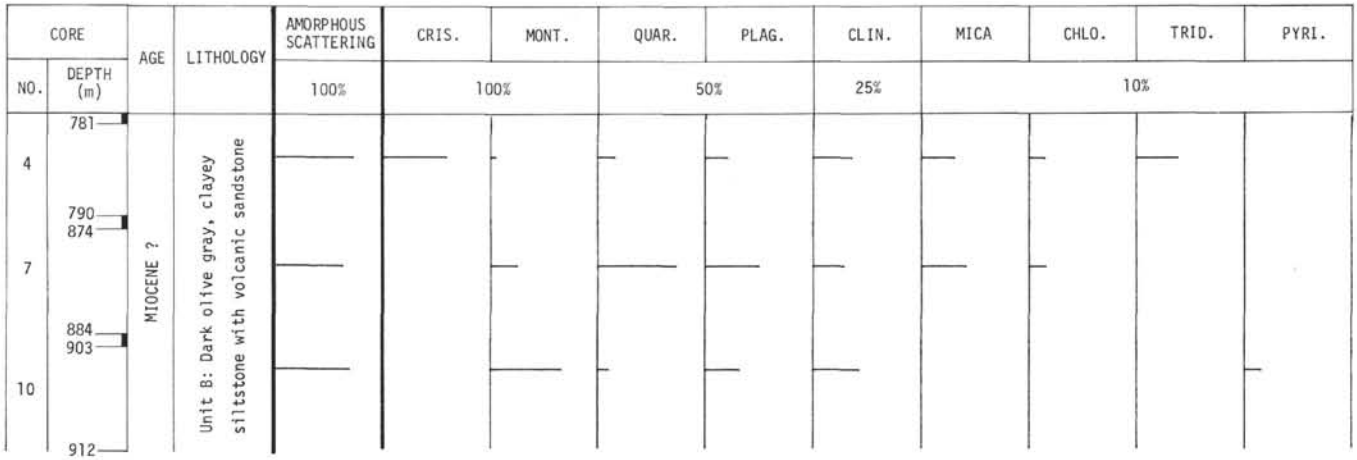

Figure 7. *Hole 184B, bulk samples.*

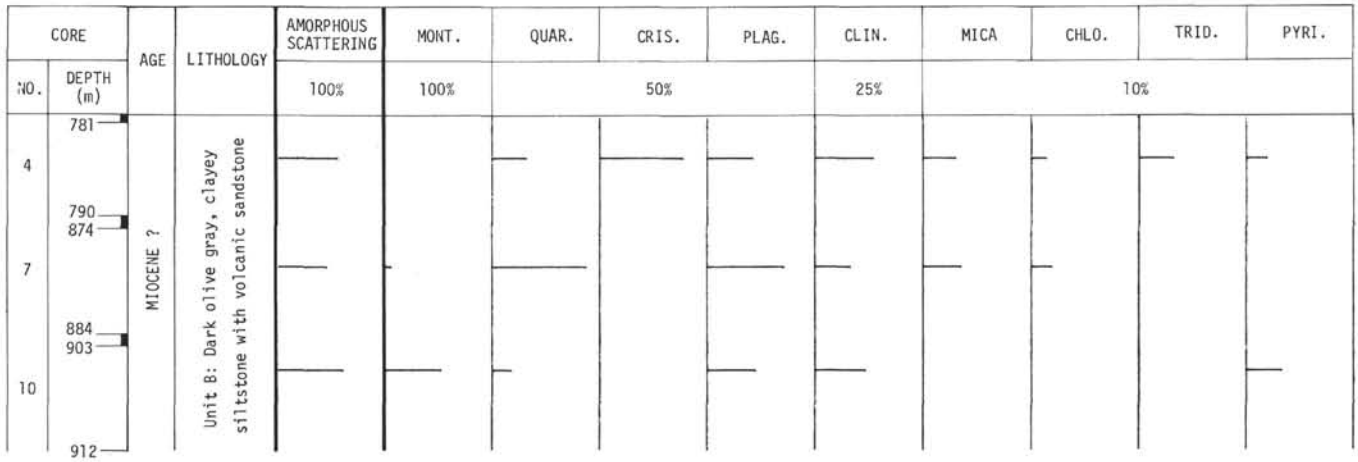

Figure 8. *Hole 184B, 2-20 μ samples.*

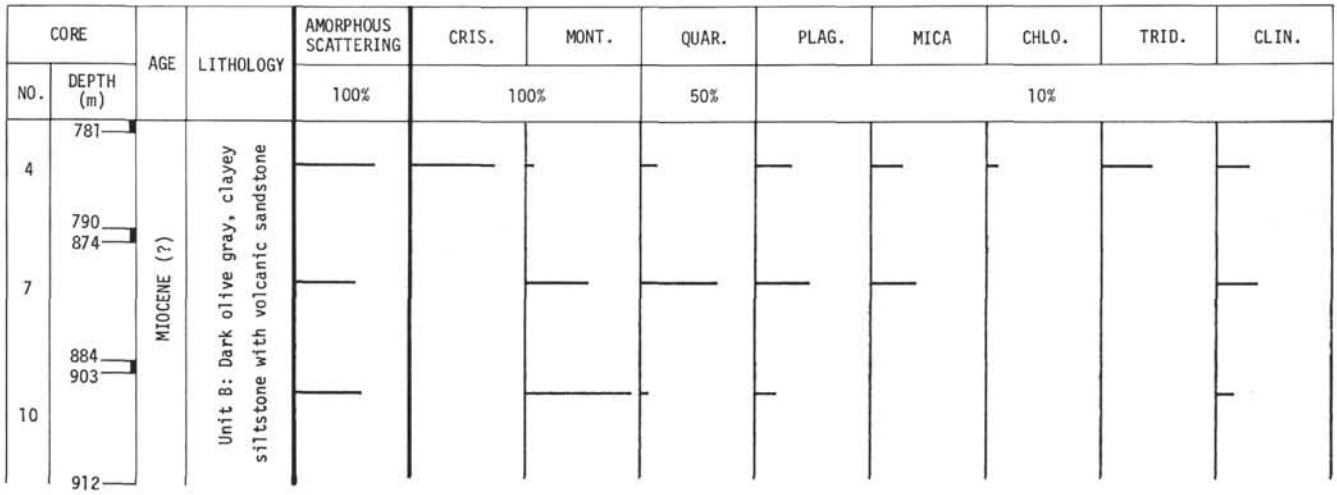

Figure 9. *Hole 184B, <2 μ samples.*

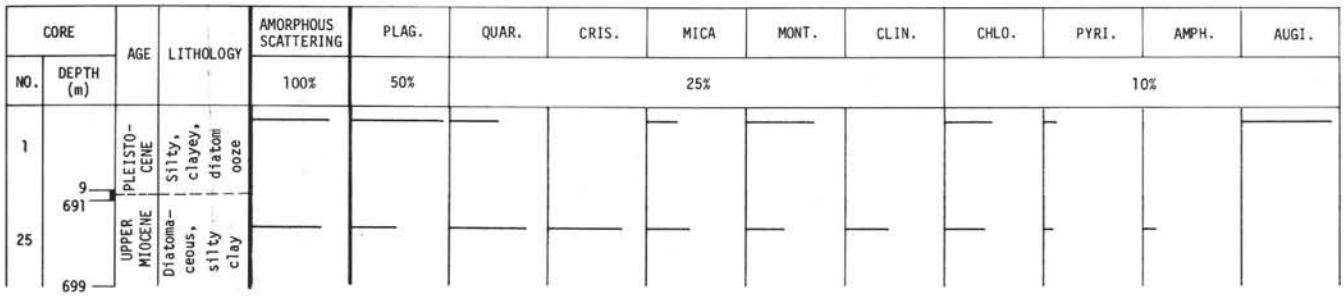

Figure 10. *Hole 185, bulk samples.*

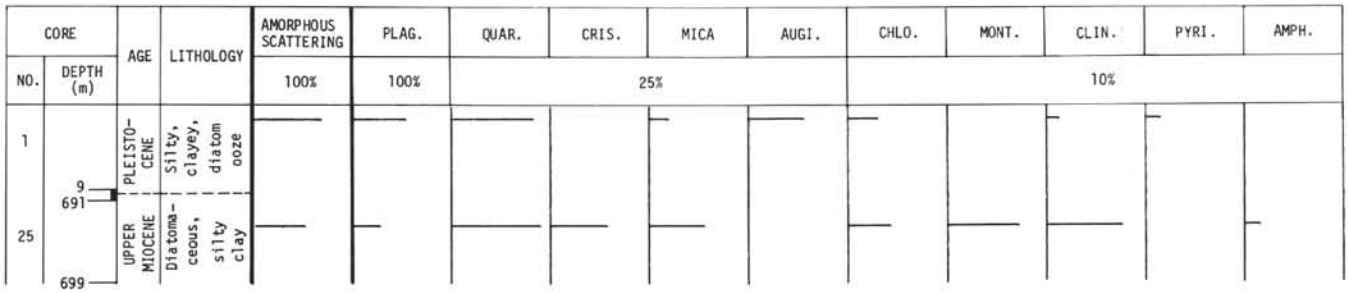

Figure 11. *Hole 185, 2-20 μ samples.*

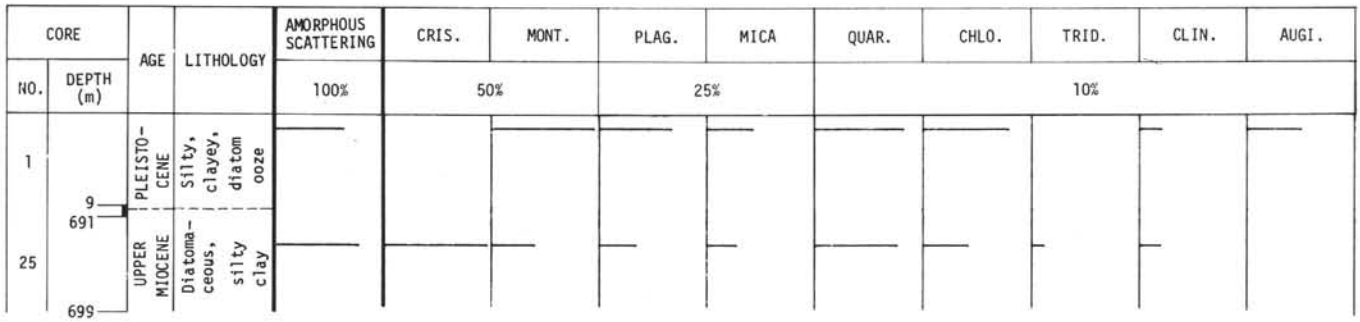

Figure 12. *Hole 185, <2 μ samples.*

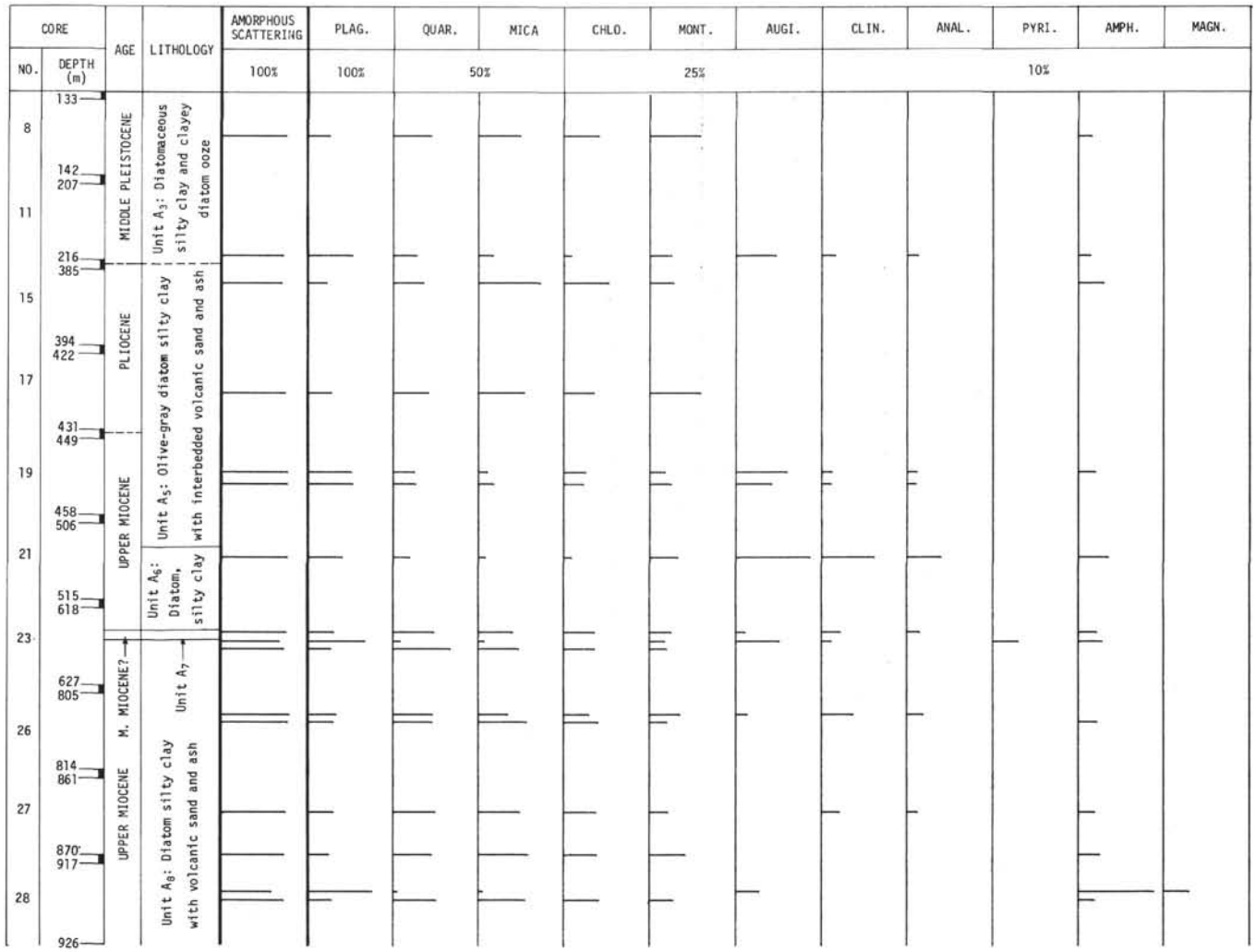

Figure 13. *Hole 186, bulk samples.*

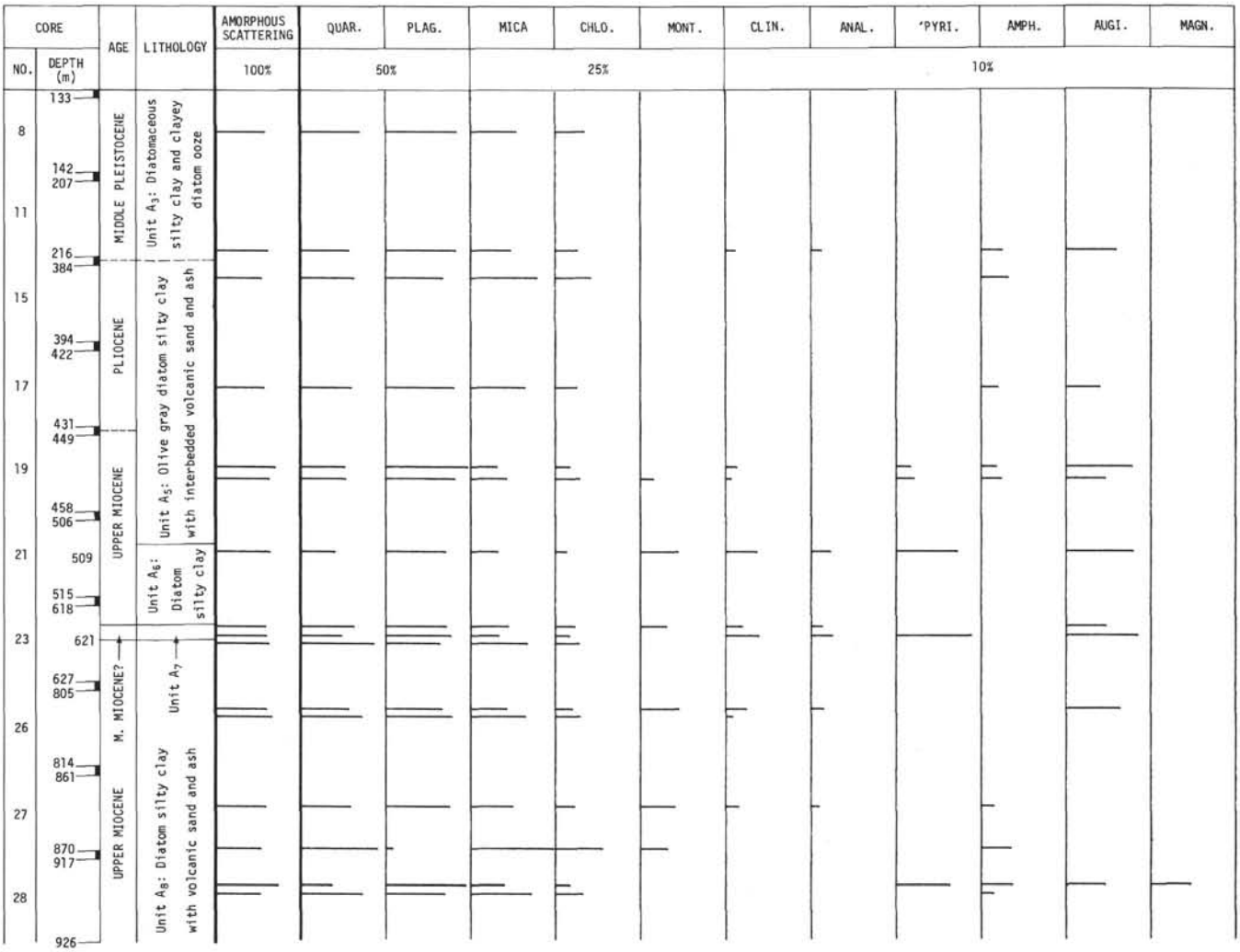

Figure 14. *Hole 186, 2-20 μ samples.*

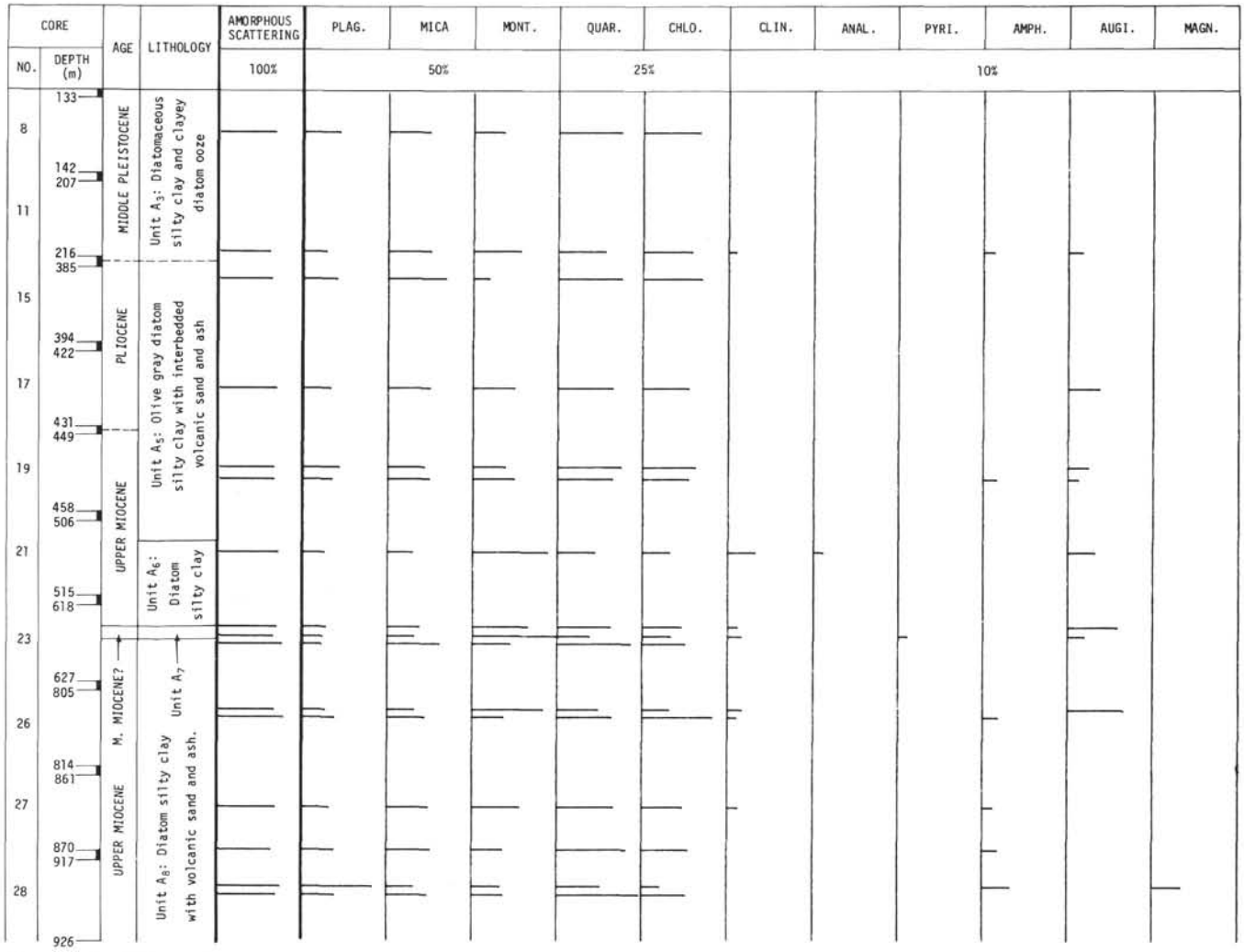

Figure 15. *Hole 186, <2 μ samples.*

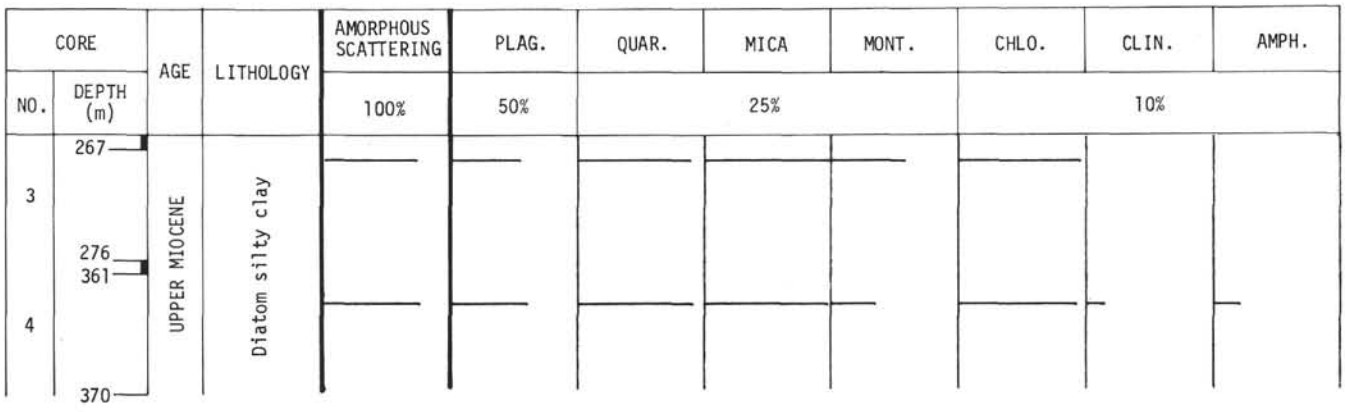

Figure 16. *Hole 187, bulk samples.*

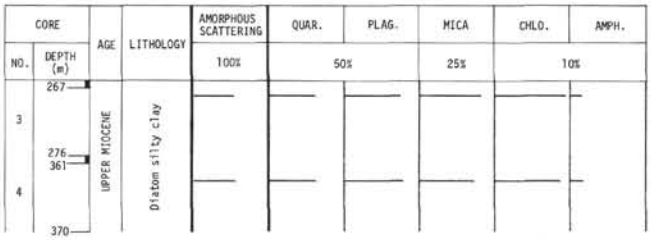

Figure 17. *Hole 187, 2-20 μ samples.*

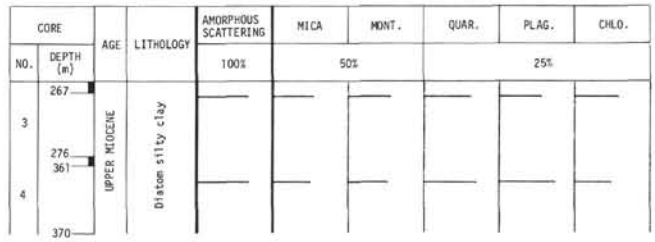

Figure 18. *Hole 187, <2 μ samples.*

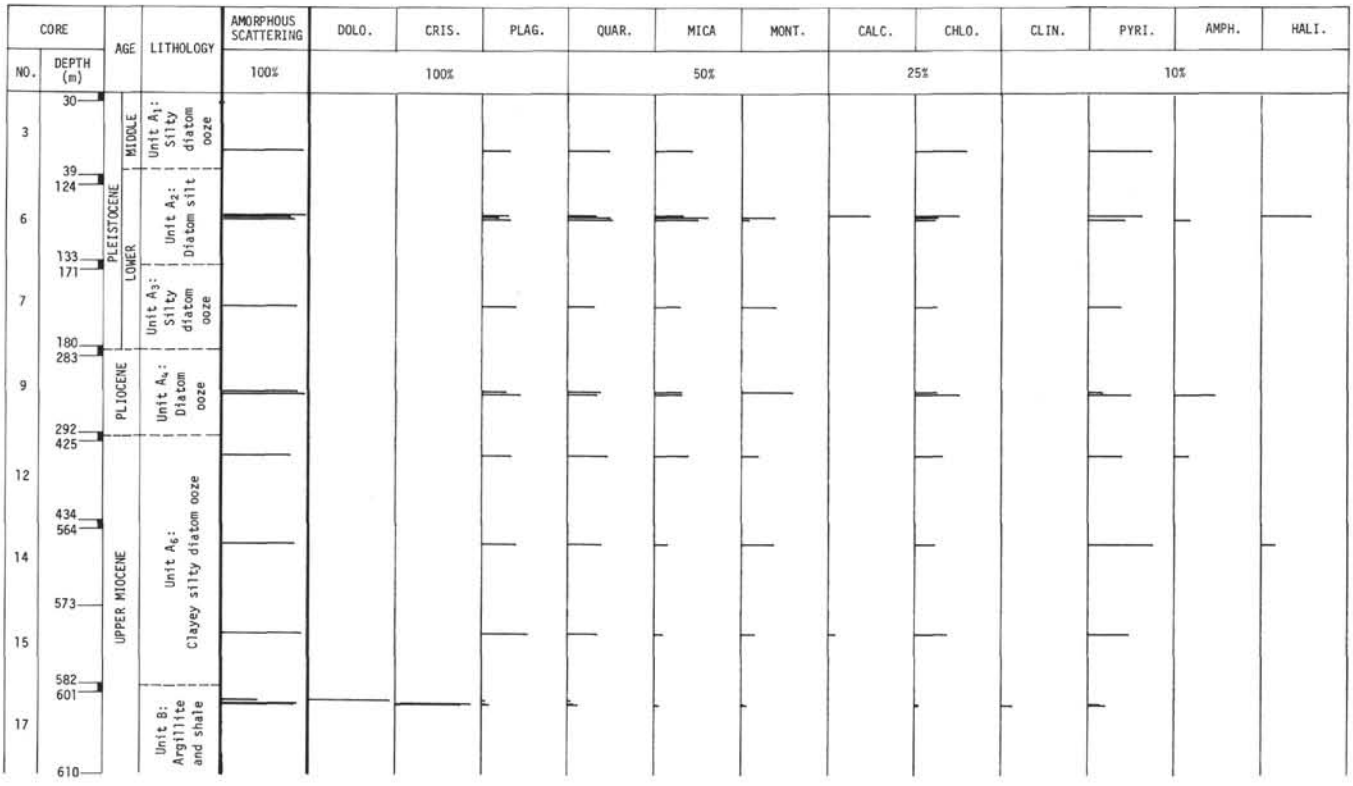

Figure 19. *Hole 188, bulk samples.*

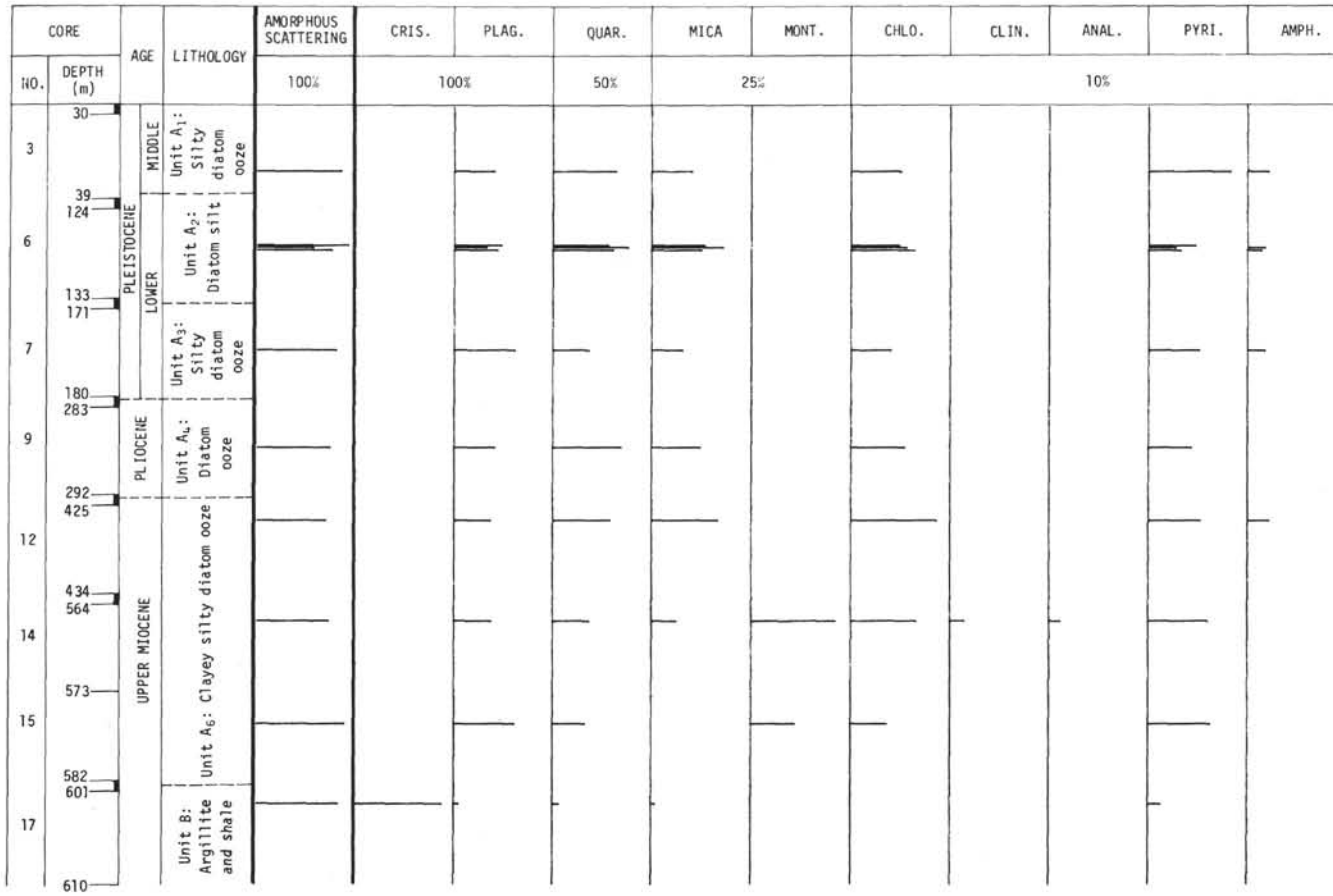

Figure 20. *Hole 188, 2-20 μ samples.*

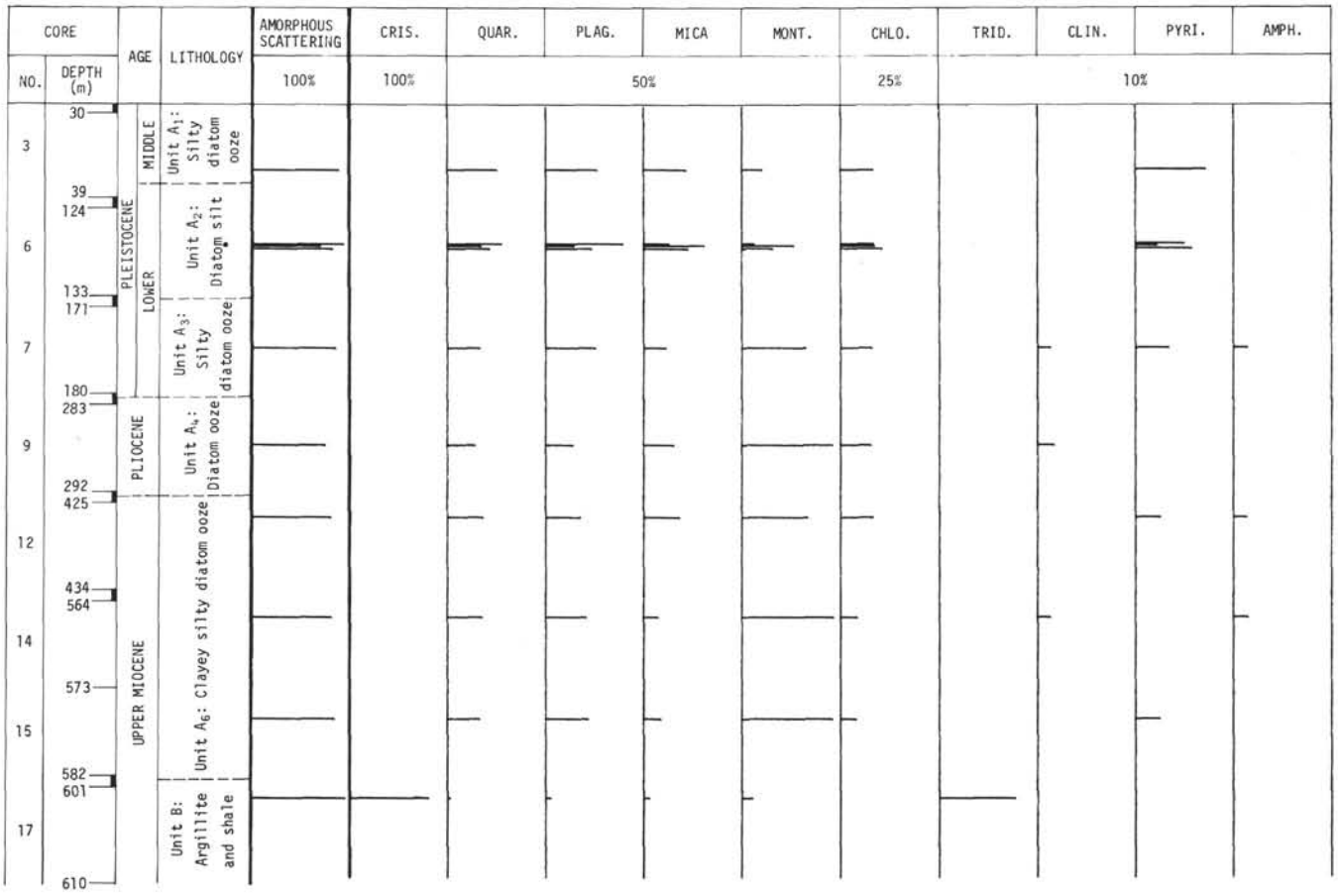

Figure 21. *Hole 188, <2 μ samples.*

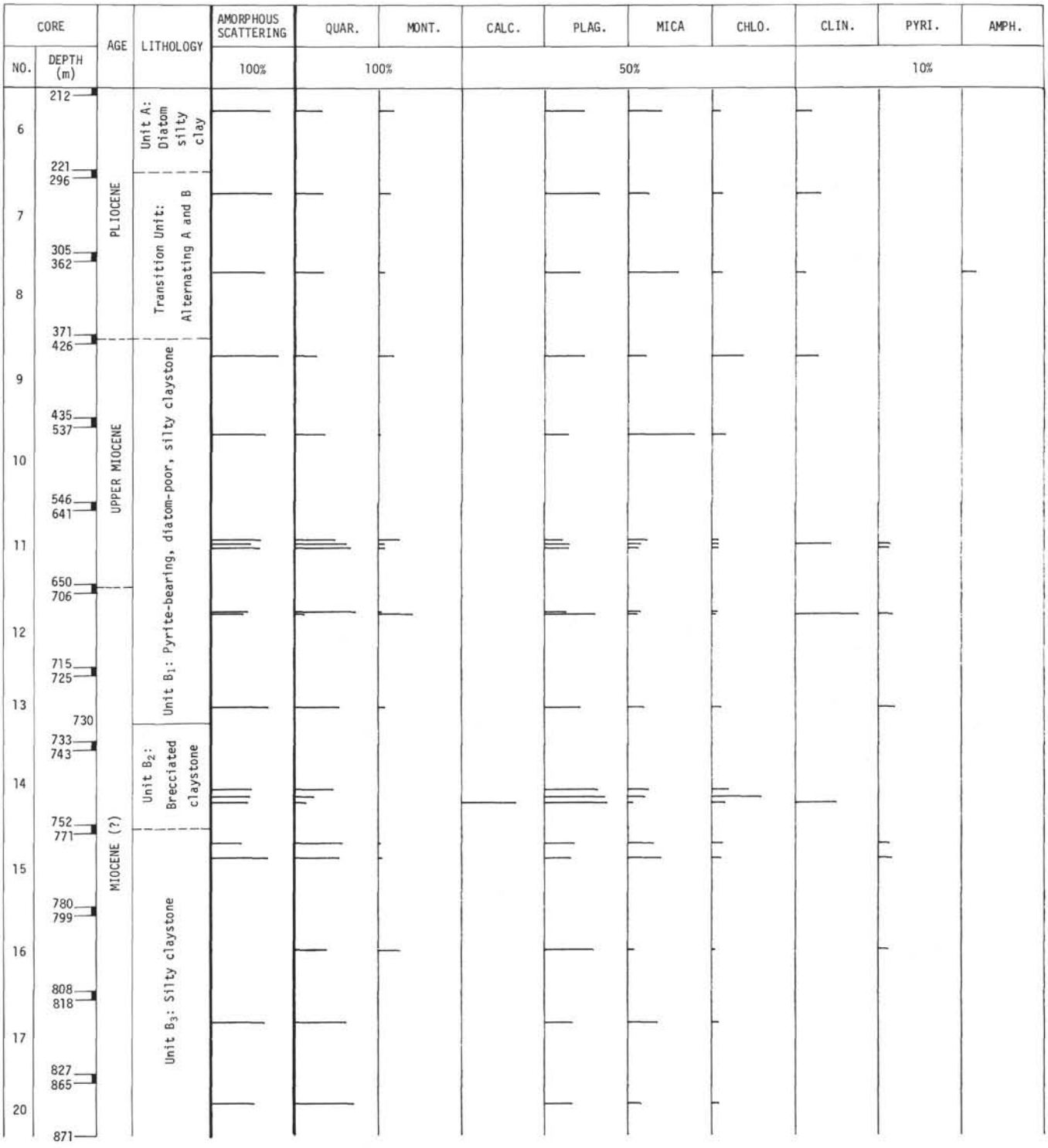

Figure 22. *Hole 189, bulk samples.*

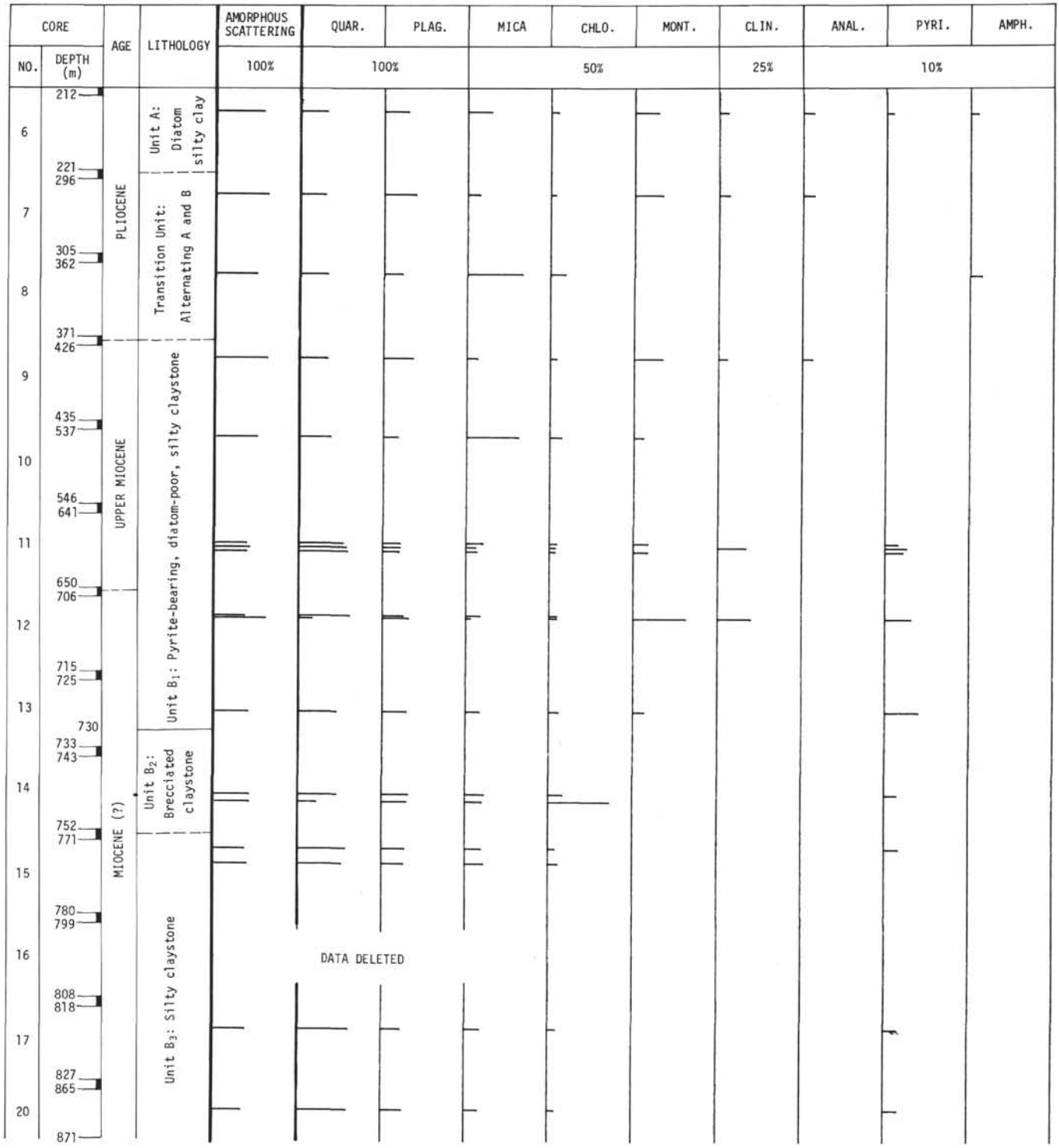

Figure 23. *Hole 189, 2-20 μ samples.*

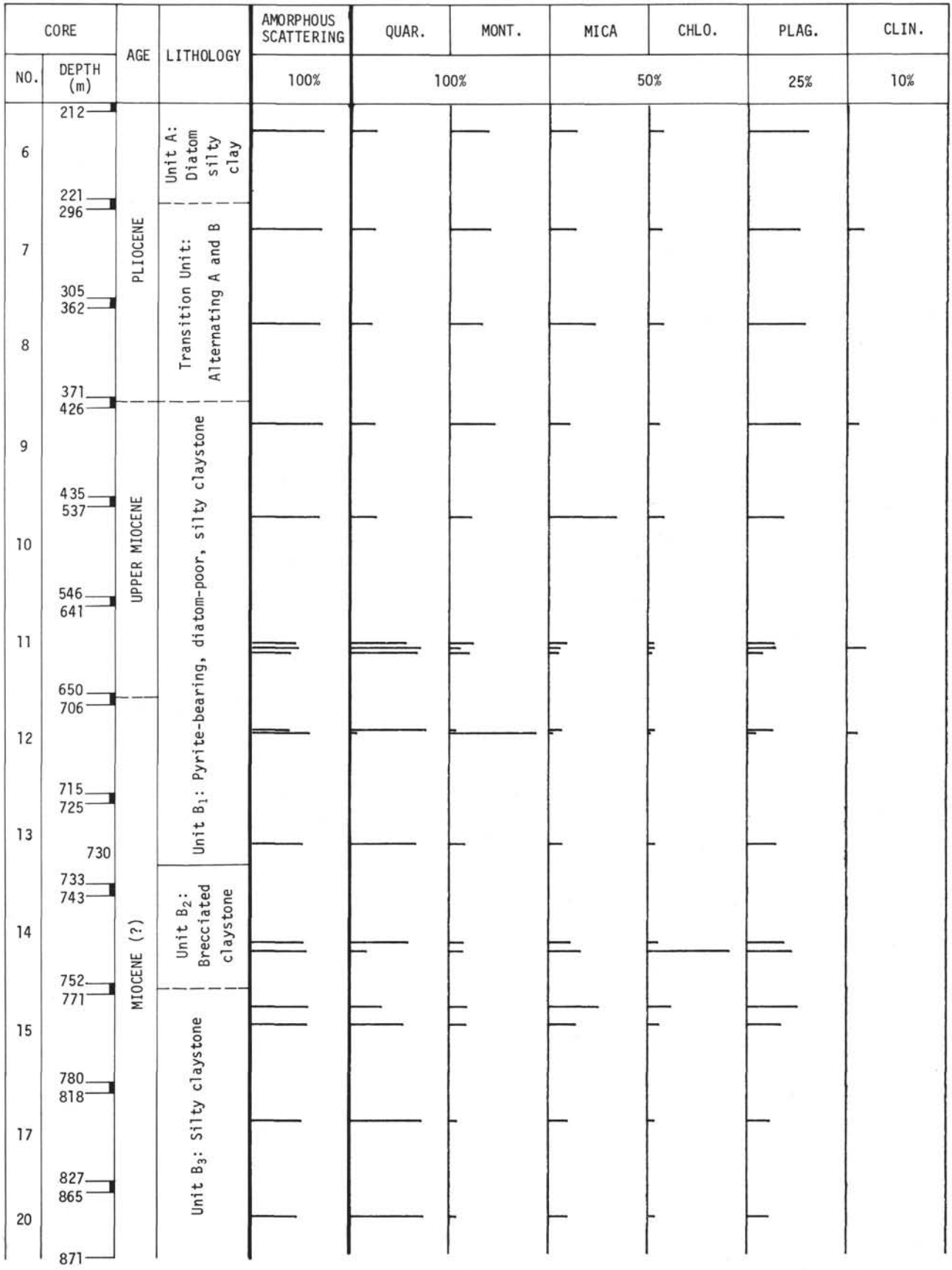

Figure 24. *Hole 189, <2 μ samples.*

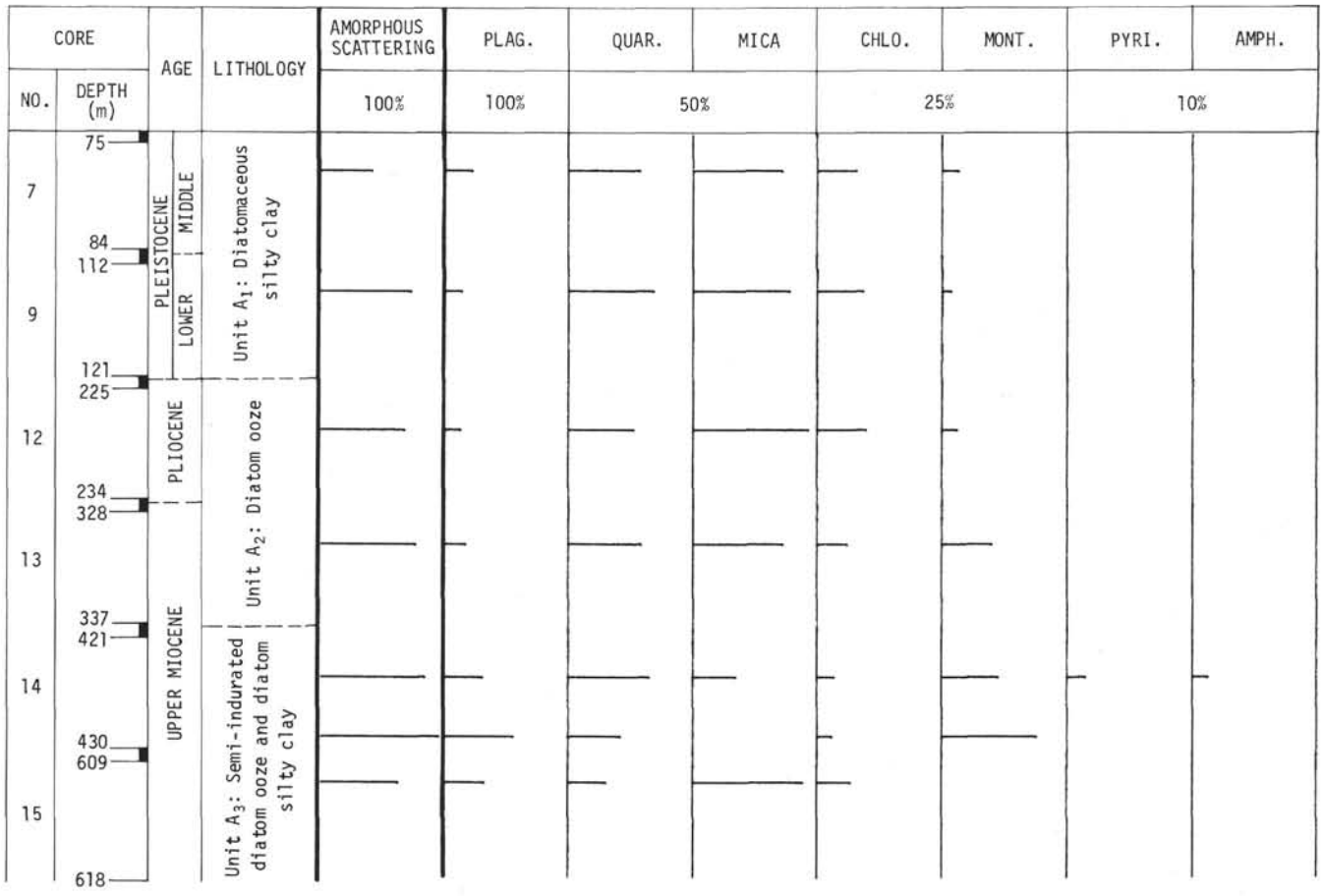

Figure 25. *Hole 190, bulk samples.*

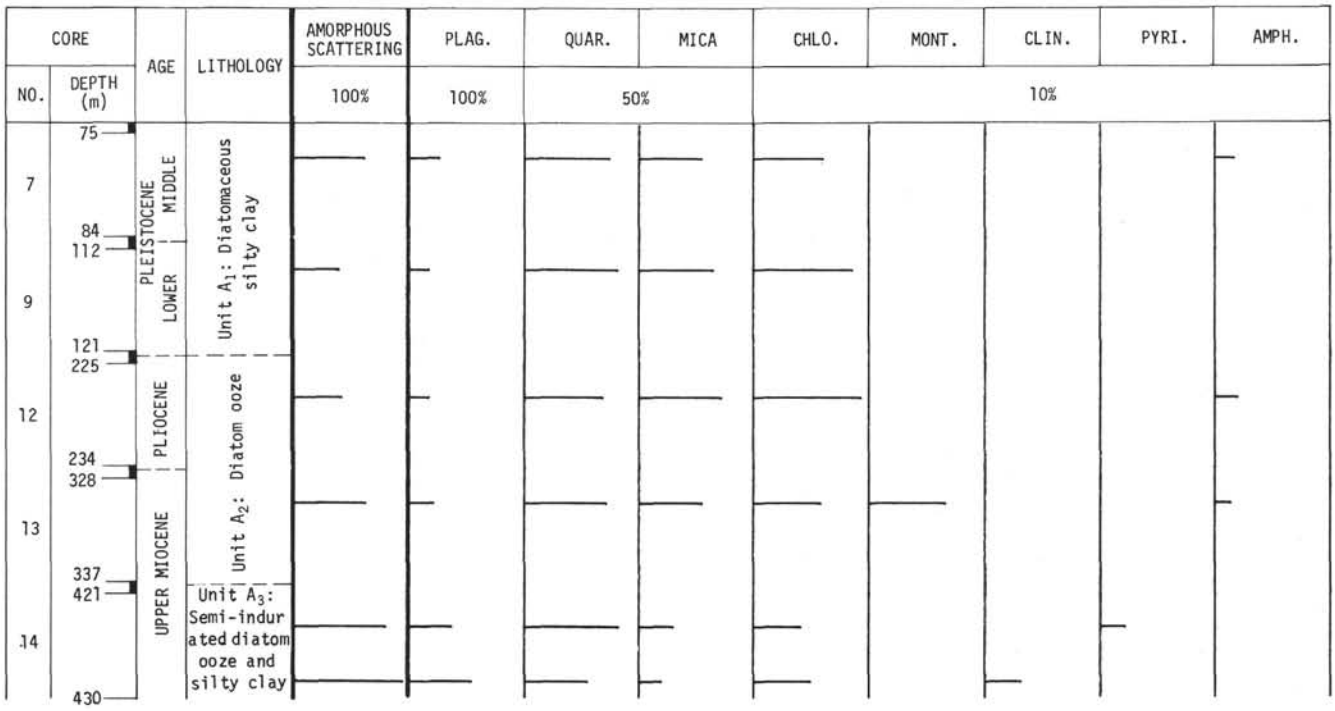

Figure 26. *Hole 190, 2-20 μ samples.*

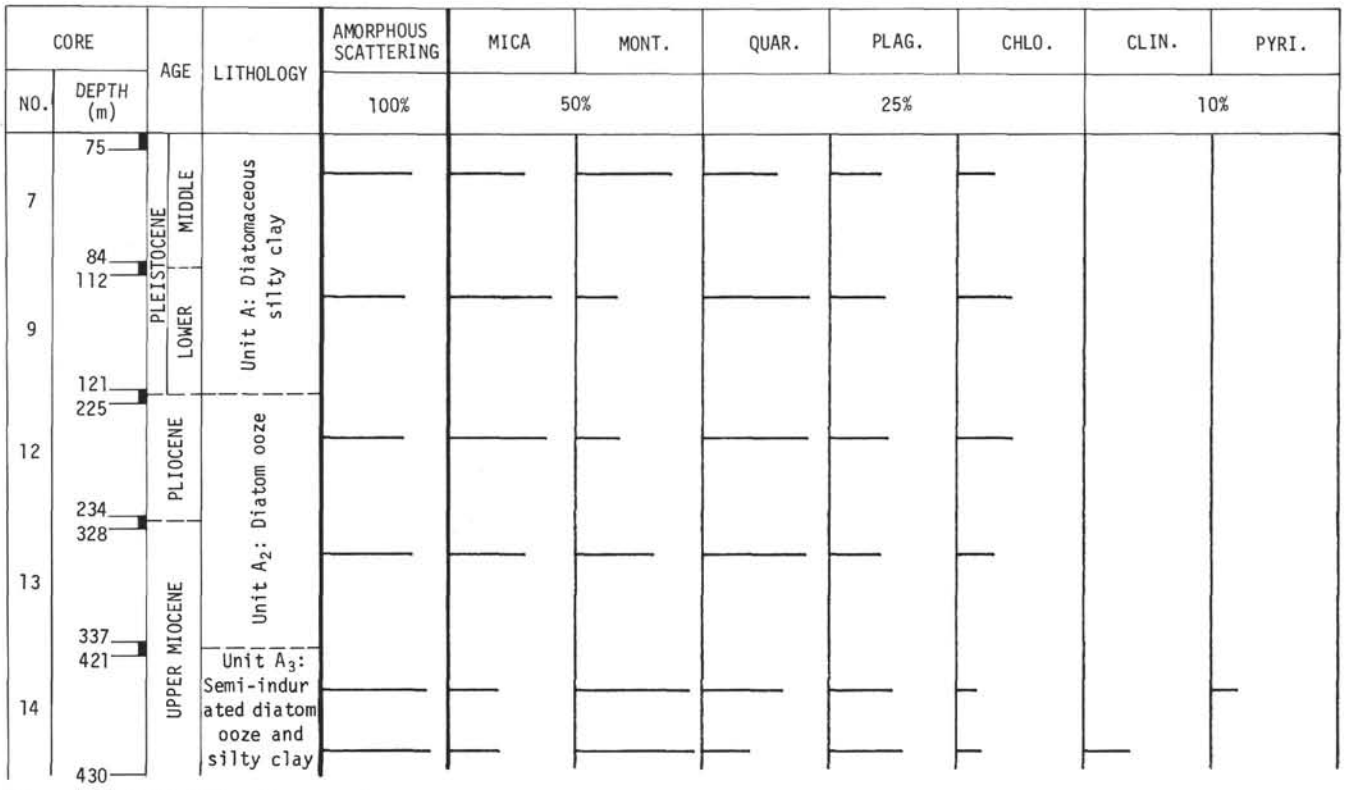

Figure 27. *Hole 190, <2 μ samples.*

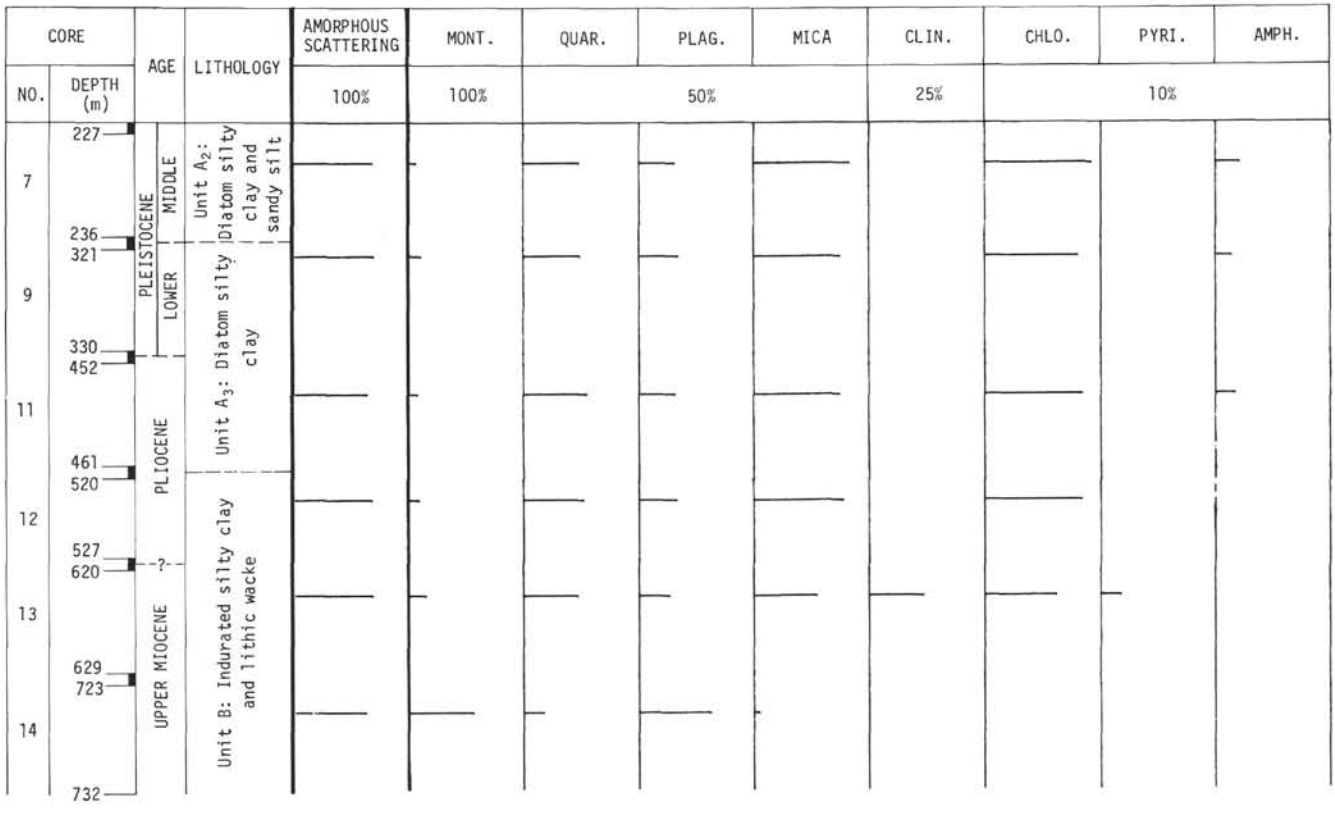

Figure 28. *Hole 191, bulk samples.*

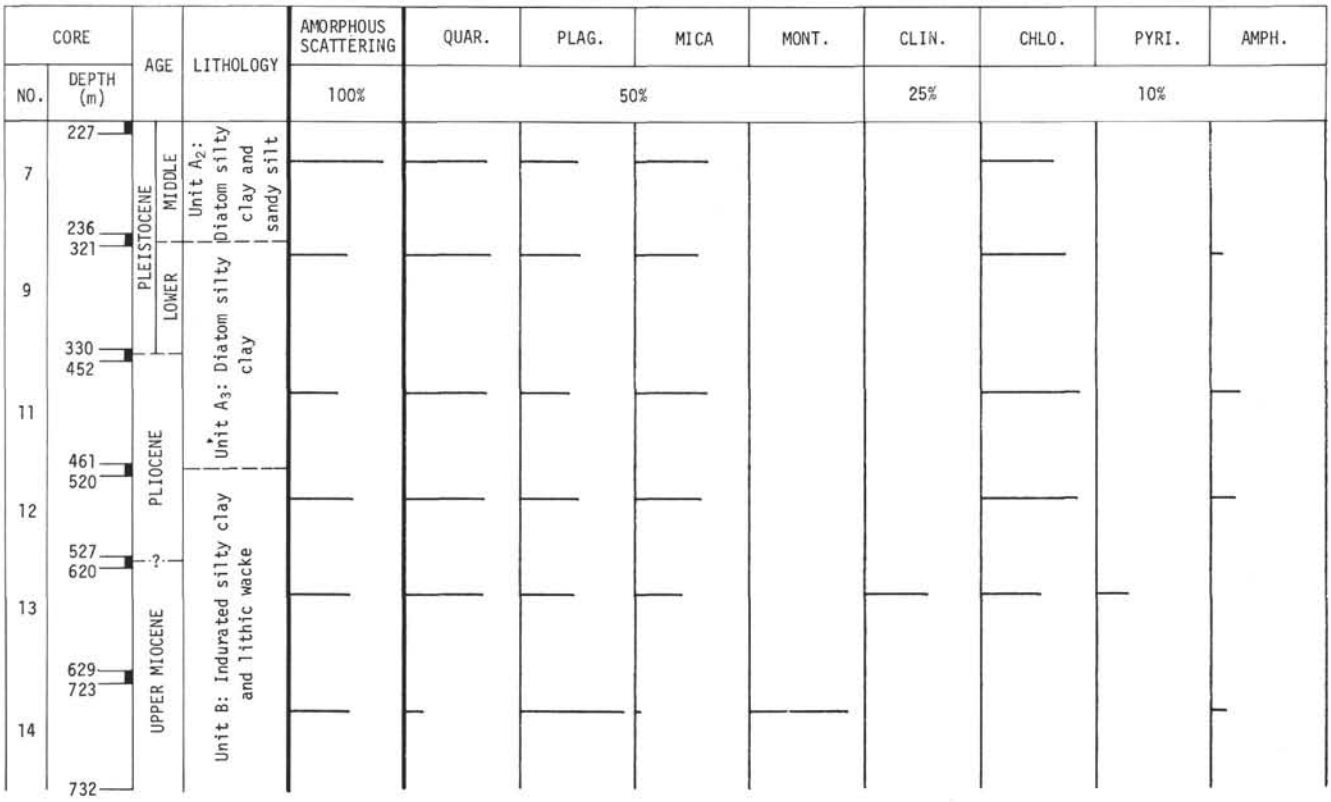

Figure 29. *Hole 191, 2-20 μ samples.*

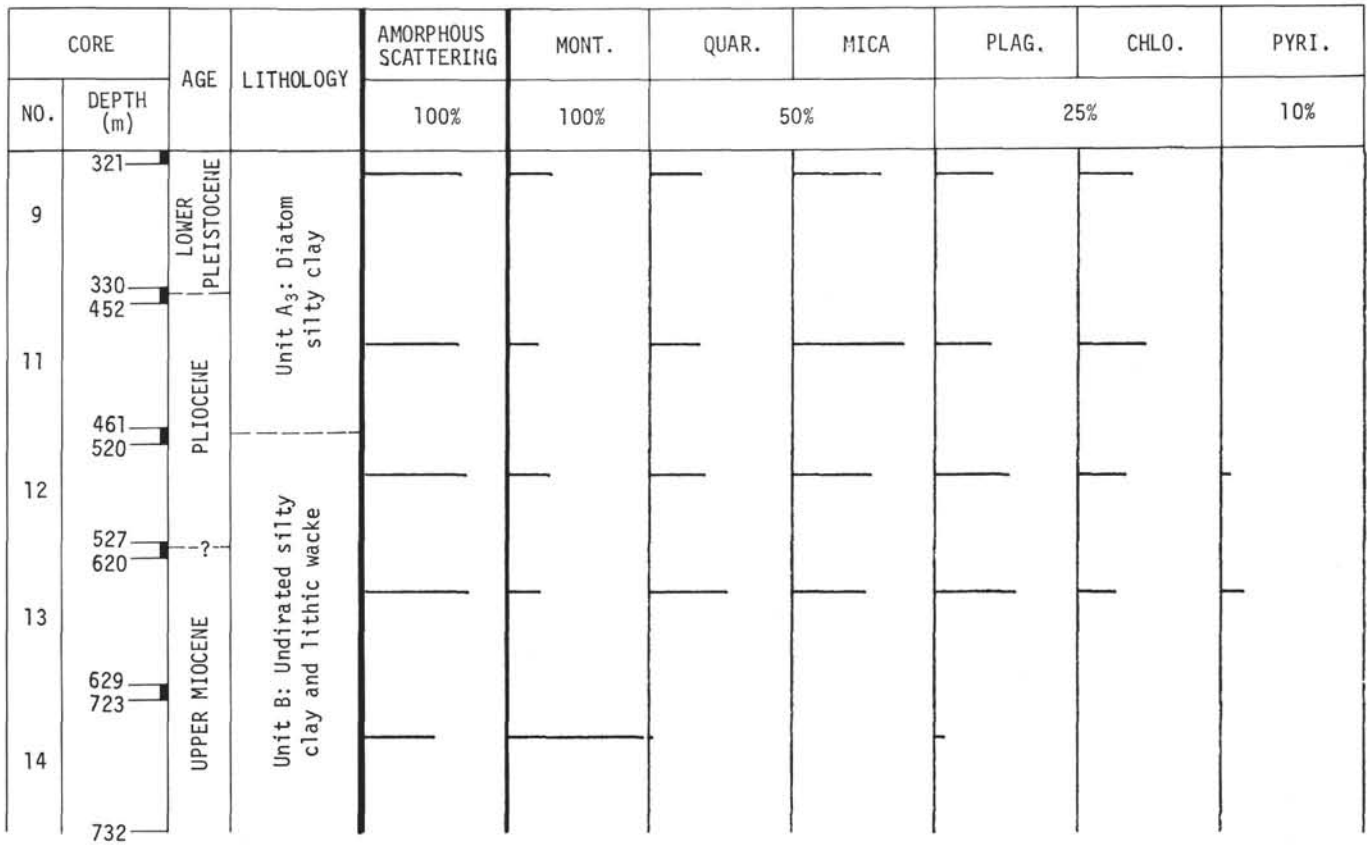

Figure 30. *Hole 191, <2 μ samples.*

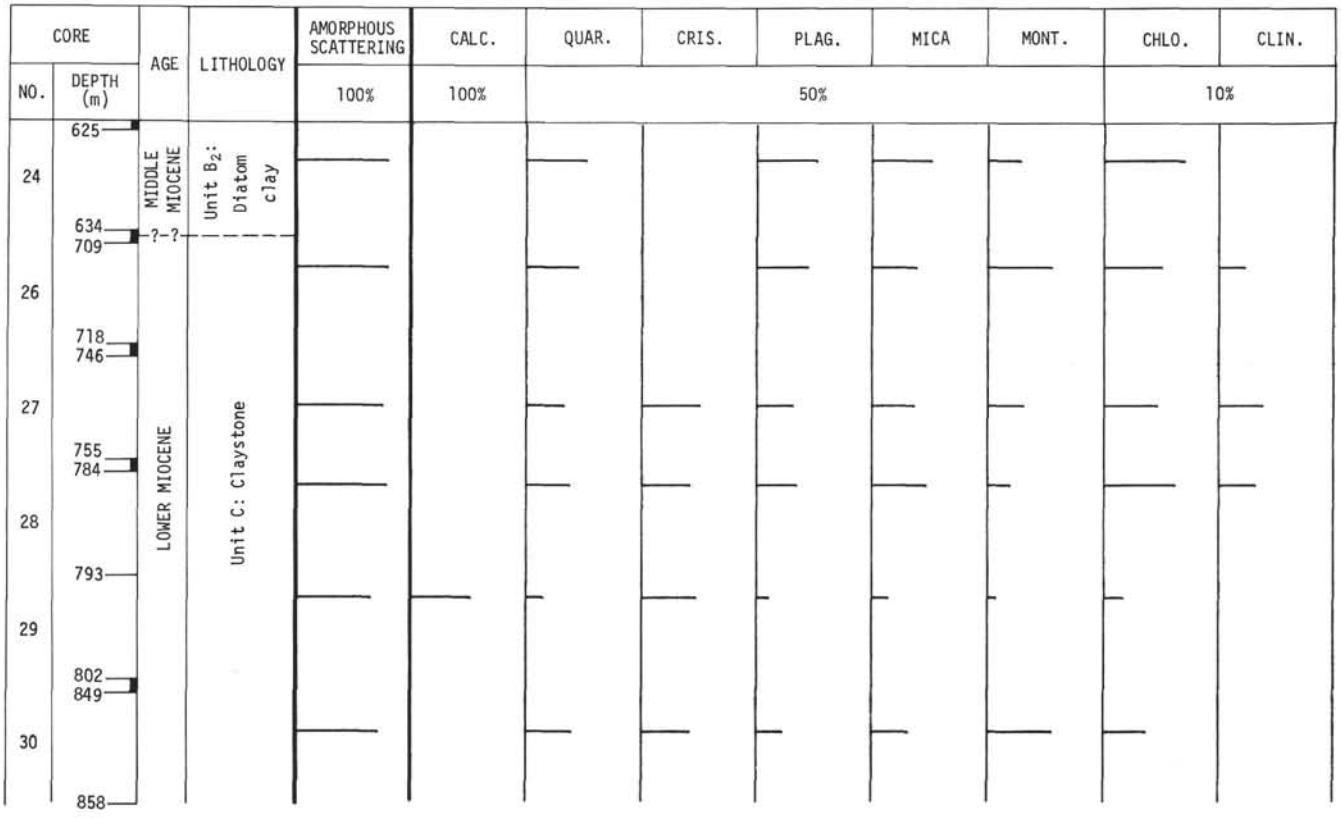

Figure 31. *Hole 192, bulk samples.*

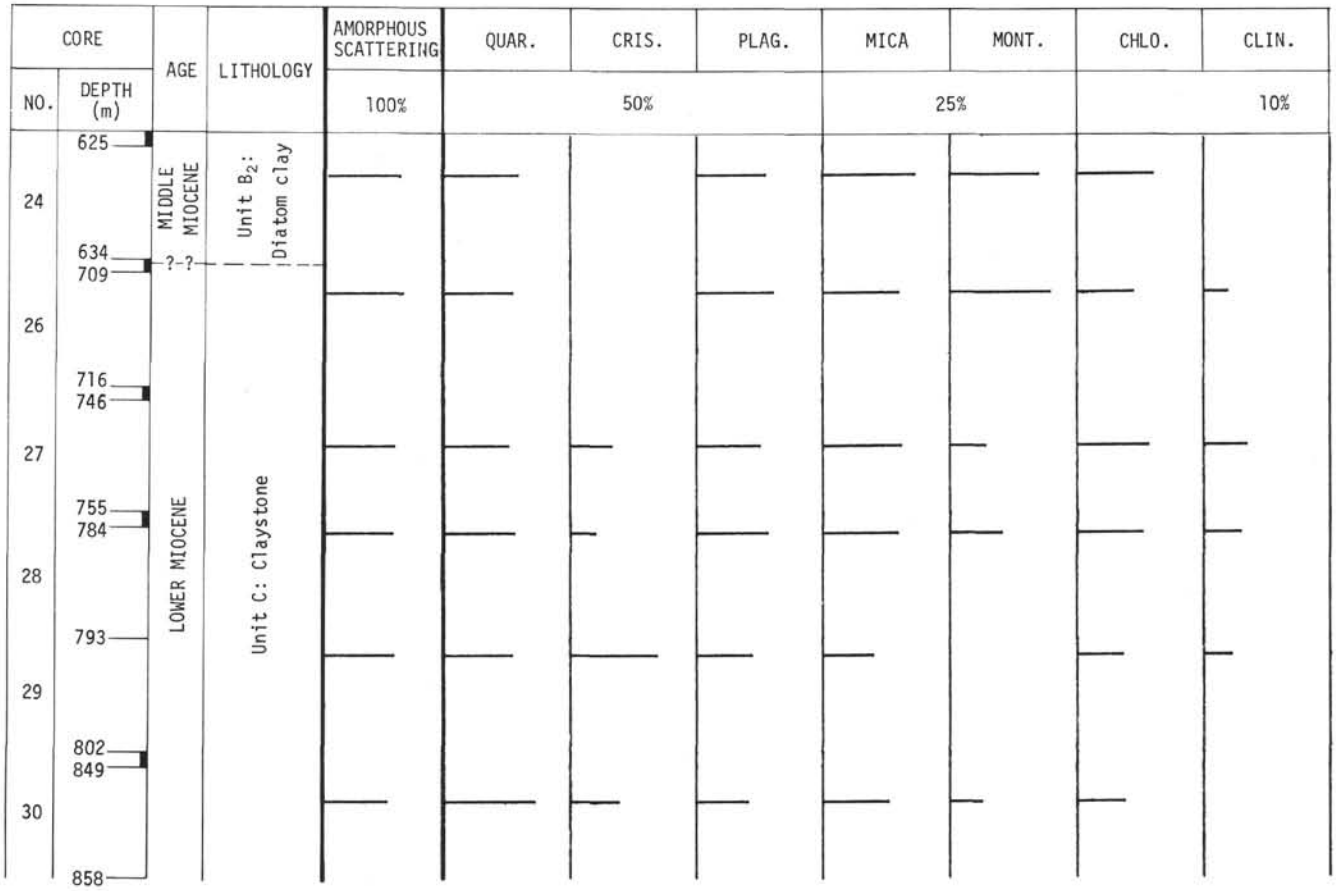

Figure 32. *Hole 192, 2-20 μ samples.*

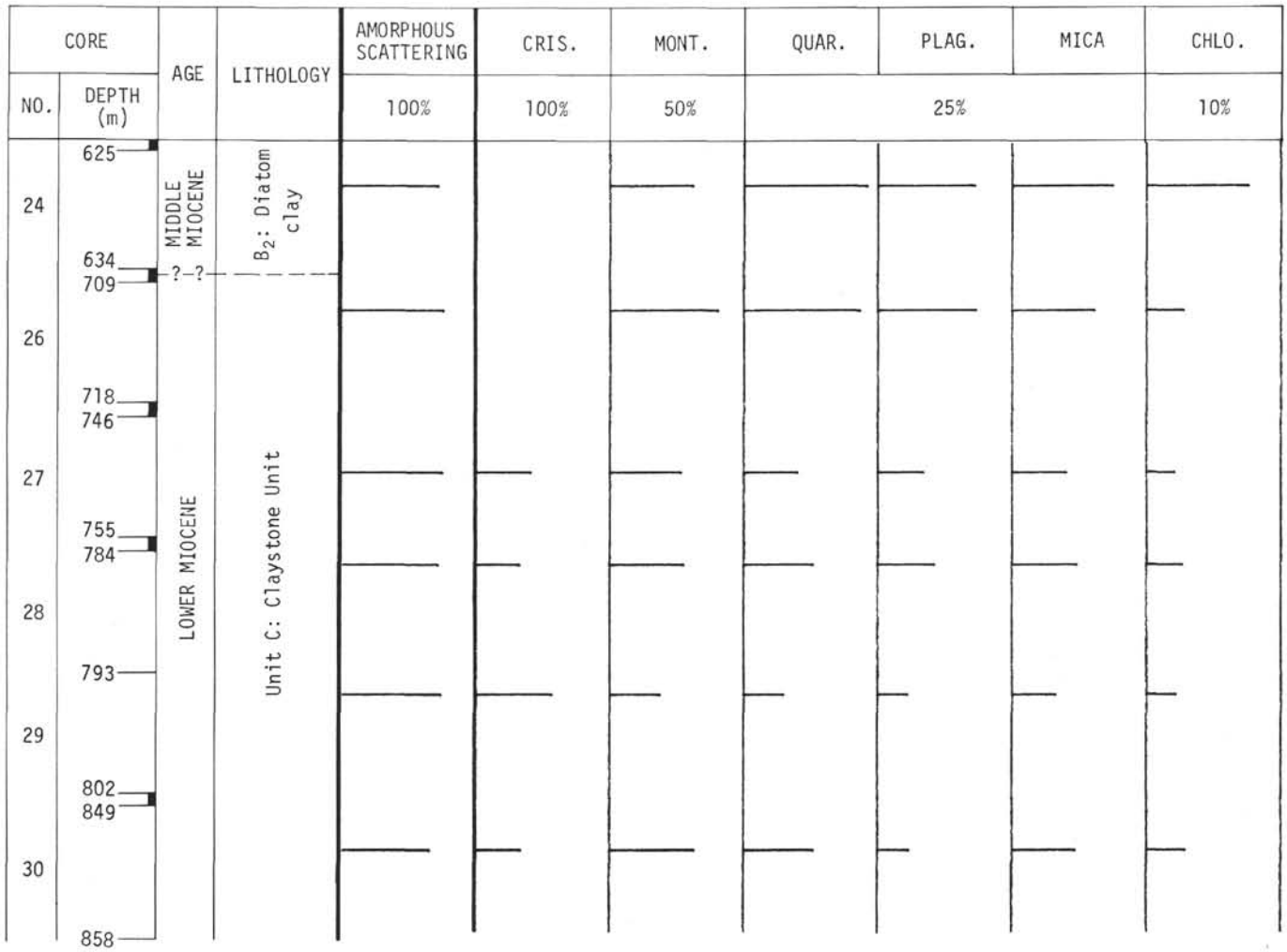

Figure 33. *Hole 192, <2 μsamples.*

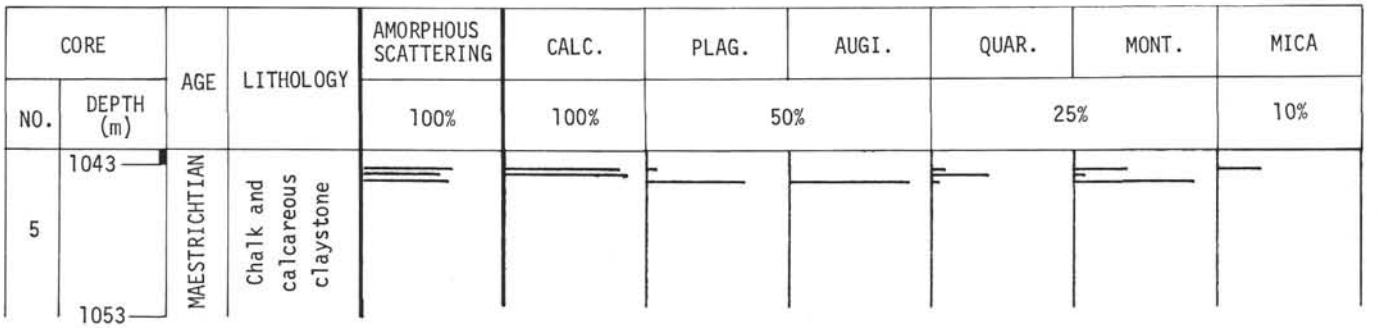

Figure 34. *Hole 192A, bulk samples.*

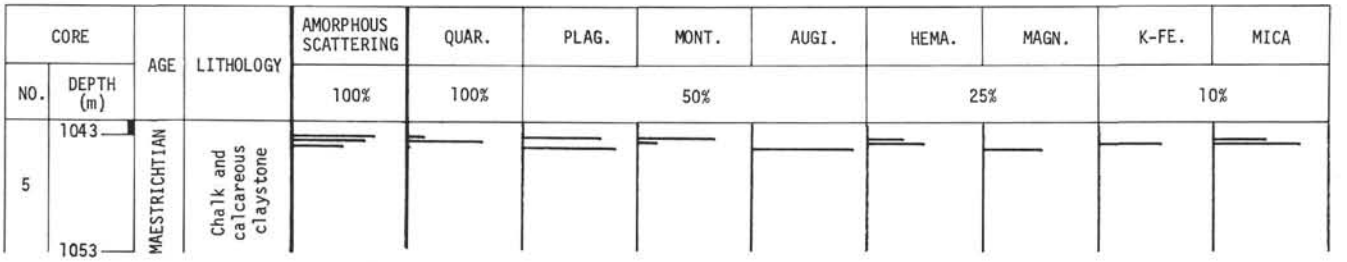

Figure 35. *Hole 192A, 2-20 μ samples.*

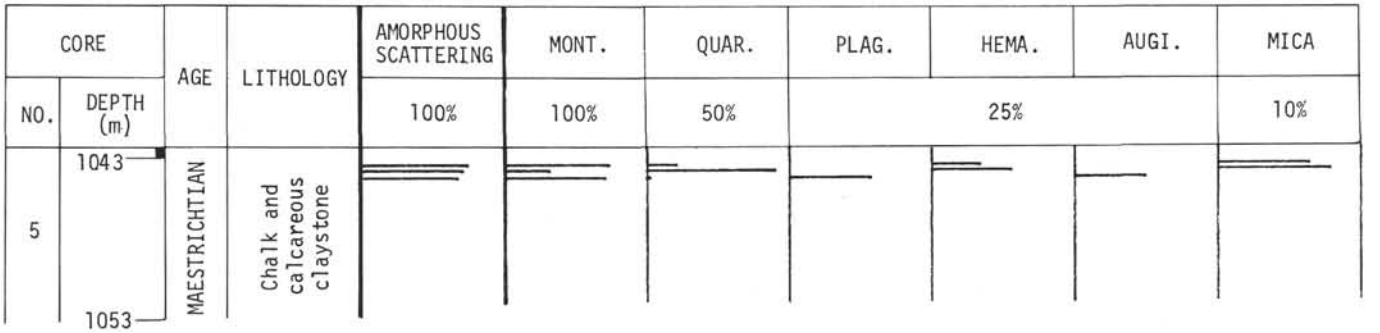

Figure 36. *Hole 192A, <2 μ samples.*