

## 15. X-RAY MINERALOGY STUDIES OF LEG 10 CORES IN THE GULF OF MEXICO<sup>1</sup>

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Semiquantitative determinations of the mineral composition of bulk samples and the  $<2\mu$  fraction and qualitative determinations in the  $2-20\mu$  fraction were performed according to the methods described in the reports of Legs 1 and 2 and in Appendix III of Volume IV (Fig. 4). The mineral analysis of the  $2-20\mu$  and  $<2\mu$  fractions were performed on  $\text{CaCO}_3$ -free residues.

The results are presented in Tables 1 to 13 and also in Figures 1 to 26. The sediment ages, the lithologic units, and the nomenclature of the sediment types used in Figures 1 to 26 are from the DSDP Leg 10 hole summaries. The samples submitted for X-ray diffraction analysis from Leg 10 are listed in Table 14. The sample depths below the sea floor in the last column of Table 14 identify the samples as they are reported in Tables 1 to 13 and Figures 1 to 26. Single depths indicate single sediment samples. Brackets are used to indicate the samples which are combined into one composite sample; the depths give the range of the combined interval. The procedure on Leg 10 samples was to combine all of the sediment samples from one core into a single sample. The usual procedure for Legs 3 to 9 and Legs 11 *et seq.* has been to combine only samples of similar lithology which occur in one core.

No semiquantitative determinations of the mineral concentrations were made for the silt fractions ( $2-20\mu$ ) as in Legs 8, 9, and 11, but selected minerals that commonly have an authigenic origin were sought and are reported in Tables 1 to 13 on a ranked, semiquantitative scale. The

minerals sought were: barite, phillipsite, clinoptilolite, erionite, dolomite, siderite, rhodochrosite, goethite, hematite, magnetite, cristobalite, pyrite, and apatite. These minerals were ranked on an approximate semiquantitative scale as follows: major (M),  $<25$  per cent; abundant (A),  $25-8$  per cent; present (P),  $8-2$  per cent; and trace (T),  $>2$  per cent. The values of the diffuse scattering, amorphous scattering, and the two most abundant minerals are also included to help characterize the sample.

The use of drilling mud which contains montmorillonite and barite was as follows: Hole 85, after Core 4 and after Core 5; Hole 85A, before Core 1; Hole 86, after Core 11; Hole 87, before and after Core 1; Hole 89, after Core 3 and after Core 5; Hole 91, after Core 10. Generally the affected cores are free of any detectable contamination. However, the composited samples from Hole 87, Core 1 and Hole 89, Core 4 probably contain some montmorillonite from the drilling mud.

Between the X-ray diffraction analysis of the bulk samples and the  $<2\mu$  fractions of Leg 10, several changes were made to the diffractometer. The lithium fluoride receiving monochromator crystal was replaced by a graphite crystal and the slit system was modified. This resulted in a higher diffraction intensity and better resolution of the diffraction peaks. Calibration of the new instrument configuration by means of mineral standards was performed which resulted in the modification of the parameters in the X-ray diffraction data reduction program (MINLOG). The data of both sets of samples should be compatible within the limits of accuracy of our method. The parameters used for the semiquantitative determination of mineral concentration in bulk samples and  $<2\mu$  fractions are given in Table 15. The ranked semiquantitative data for the  $2-20\mu$  fractions were derived by using the new parameters.

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**TABLE 1**  
**Results of X-Ray Diffraction Analyses from Site 85<sup>a</sup>**

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Arag.	Quar.	K-Fe	Paly.	Kaol.	Mica	Chlo.	Mont.	Hali.	Clin.	Pyri.	Paly.
<b>Bulk Samples</b>																		
1	19-28	19.05-27.51	78.0	42.0	10.6	8.0	—	23.8	—	7.3	2.7	35.8	4.2	5.7	1.5	—	—	
2	48-57	48.08-51.77	80.5	44.5	11.9	8.8	—	13.0	—	6.2	1.6	44.5	4.5	5.3	4.2	—	—	
3	99-108	99.12-107.72	78.6	42.6	9.3	7.4	—	15.4	—	6.2	3.1	46.3	3.7	6.1	2.5	—	—	
4	189-198	189.51-190.43	78.1	42.1	22.9	4.1	25.0	10.8	—	6.5	—	21.6	1.7	7.0	—	—	—	
5	210-212	210.69-212.60	44.3	8.3	11.9	4.3	—	56.3	11.2	12.8	—	2.9	—	—	—	—	—	
2A	282-302	292.00	68.0	32.0	—	35.3	—	5.3	3.2	5.6	—	26.5	1.4	8.6	—	13.6	—	
<b>2-20μ Fraction</b>																		
1	19-28	19.05-27.51	63.4	42.8				†				*				T		
2	48-57	48.08-51.77	67.2	48.8		P		*			†							
3	99-108	99.12-107.72	65.4	46.0		P		†				*						
4	189-198	189.51-190.43	70.9	54.5				†				*				T		
5	210-212	210.69-212.60	59.9	37.3				*			†							
2A	282-302	292.0	64.7	44.9		P		†				*				T	P	
<b>&lt;2μ Fraction</b>																		
1	19-28	19.05-27.51	71.8	55.9				13.1	—	1.7	2.7	52.1	4.0	26.0	—			
2	48-57	48.08-51.79	67.4	49.0				19.9	2.8	4.5	1.5	60.4	4.4	6.1	—			
3	99-108	99.12-107.72	72.2	56.5				9.7	—	2.5	3.6	56.5	4.6	23.1	—			
4	189-198	189.51-190.43	77.8	65.2				13.4	14.8	2.5	2.5	35.9	3.8	27.0	—			
5	210-212	210.69-212.60	79.5	67.9				16.3	4.8	12.2	2.9	46.2	5.1	12.2	—			
2A	282-302	292.00	75.1	61.1				5.6	—	3.0	—	35.6	3.3	15.1		37.4		

<sup>a</sup>No entry in column indicates not determined

\* 1st Major Constituents

† 2nd Major Constituents

P - Present (8-2%)

T - Trace (&lt; 2%)

**TABLE 2**  
**Results of X-Ray Diffraction Analyses from Site 86<sup>a</sup>**

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Arag.	Quar.	K-Fe	Plag.	Kaol.	Mica	Chlo.	Mont.	Paly.	Clin.	Pyri.	Augi.	Gyps.
<b>Bulk Samples</b>																			
1	13-17	13.09	68.1	32.1	55.9	—	17.1	6.7	—	1.8	3.3	10.9	3.3	—	—	—	—	—	
		13.18-16.76	68.7	32.7	38.9	1.3	30.6	8.2	—	1.7	1.5	10.4	1.1	5.6	—	—	—	—	
2	52-61	52.60	69.8	33.8	53.8	—	11.7	7.4	—	2.3	1.0	16.9	1.4	5.5	—	—	—	—	
3	161-170	161.20-169.26	65.9	29.9	69.6	—	9.1	3.9	—	—	1.1	10.9	—	4.6	—	—	—	—	
4	257-266	257.30-263.75	60.9	24.9	81.1	—	—	3.0	—	—	1.5	7.0	—	4.5	2.7	—	—	—	
5	371-380	372.16-376.26	54.4	18.4	99.3	—	—	0.7	—	—	—	—	—	—	—	—	—	—	
7	498-507	499.69-504.77	53.8	17.8	95.0	—	—	1.3	—	—	—	—	—	—	—	—	—	3.7	
8	508-517	509.37-513.19	74.5	38.5	76.4	—	—	2.7	2.1	3.1	—	7.2	—	9.0	—	—	—	—	
9	551-560	551.05-552.60	55.8	19.8	86.8	—	—	2.2	1.8	—	—	5.4	—	3.5	—	—	—	—	

TABLE 2 - *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Arag.	Quar.	K-Fe	Plag.	Kaol.	Mica	Chlo.	Mont.	Paly.	Clin.	Pyri.	Augi.	Gyps.
<b>2-20<math>\mu</math> Fraction</b>																			
1	13-17	13.09 13.8-16.76	74.1 73.9	59.5 59.3		T		†				*			P				
2	52-61	52.60	68.7	51.1				†				*				T			
3	161-170	161.20-169.26	68.8	51.2		P		†				*				P			
4	257-266	257.30-263.75	79.3	67.6				*				†		T	T	P			
5	371-380	372.16-376.26	90.4	85.1				*				†			T				
7	440-449	499.69-504.77	70.9	54.5								†		P	*				
8	498-507	509.39-513.19	94.0	90.6				†				*		T					
9	508-517	551.05-552.60	70.2	53.4				†				*				P			
<b>&lt;2<math>\mu</math> Fraction</b>																			
1	13-17	13.09 13.8-16.76	80.0 76.8	68.7 63.7				6.3 15.3	— —	1.6 4.8	8.6 5.5	43.4 27.1	— 3.6	40.1 42.4	— —	— —	— —	— 1.2	
2	52-61	52.60	76.0	62.5				10.6	— —	— —	11.8	37.7	— —	39.6	— —	— —	— —	— —	
3	161-170	161.20-169.26	74.7	60.5				9.0	— —	— —	2.3	28.9	4.0	54.8	— —	— —	— —	1.0	
4	257-266	257.30-263.75	74.3	59.9				7.9	— —	— —	3.7	24.1	1.8	43.0	19.3	— —	— —	— —	
5	371-380	372.16-376.26	78.4	66.2				12.7	— —	— —	1.7	18.4	4.0	63.2	— —	— —	— —	— —	
7	498-507	499.69-504.77	75.8	62.3				11.1	— —	7.9	— —	13.2	— —	31.1	13.5	19.8	— —	2.5	
8	508-517	509.37-513.19	87.6	80.7				15.4	27.0	— —	4.4	21.6	— —	34.1	— —	— —	— —	— —	
9	551-560	551.05-552.60	78.3	66.0				10.9	14.4	— —	— —	18.7	6.1	24.0	24.2	— —	— —	1.7	

<sup>a</sup>No entry in column indicates not determined

\* 1st Major Constituents

† 2nd Major Constituents

P - Present (8-2%)

T - Trace (&lt; 2%)

TABLE 3  
Results of X-Ray Diffraction Analyses from Site 87<sup>a</sup>

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Quar.	Plag.	Mica	Chlo.	Mont.	Clin.	K-Fe	Amph.	Pyri.	Paly.	
<b>Bulk Samples</b>																	
1	648-657	649.05-650.41	68.9	32.9	5.1	1.8	18.2	25.6	33.2	2.1	4.9	2.4	4.9	1.5			
<b>2-20<math>\mu</math> Fraction</b>																	
1	0-6	649.05-650.41	75.6	61.8				†	*			P		P	T		
<b>&lt;2<math>\mu</math> Fraction</b>																	
1	648-657	649.05-650.41	79.1	67.3				7.4	2.2	25.3	3.4	45.0	1.8		1.7	12.2	

<sup>a</sup>No entry in column indicates not determined

\* 1st Major Constituents

† 2nd Major Constituents

P - Present (8-2%)

T - Trace (&lt; 2%)

**TABLE 4**  
**Results of X-Ray Diffraction Analyses from Site 88<sup>a</sup>**

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Quar.	Plag.	Kaol.	Mica	Chlo.	Mont.	Paly.	Hali.	Clin.	Pyri.
<b>Bulk Samples</b>																
1	0-6	0.27-5.37	75.7	39.7	35.0	—	14.0	5.5	3.2	20.4	—	15.4	6.5	—	—	
2	51-60	51.19-59.28	74.0	38.0	26.4	—	12.9	9.3	7.1	23.8	—	11.3	7.4	2.0	—	
3	98-104	99.10-103.90	72.3	36.3	43.8	—	11.5	3.8	3.3	17.2	—	11.2	8.2	—	—	
4	104-108	104.00-108.00	73.7	37.7	52.6	—	11.1	3.8	1.9	20.7	1.1	8.1	—	—	—	
5	128-135	128.05-136.41	69.5	33.5	61.2	1.5	7.2	7.0	1.7	11.1	—	9.4	—	—	—	
<b>2-20μ Fraction</b>																
1	0-6	0.27-5.37	64.3	44.3			*			†			T	T		
2	51-61	51.19-59.28	73.1	57.9			*			†		T	T	P		
3	98-104	99.10-103.90	70.8	54.4			*			†		T		P		
4	104-108	104.00-108.00	74.6	60.3			†			*		T		P		
5	128-135	128.05-136.41	80.5	69.5			†			*		T	T	P		
<b>&lt;2μ Fraction</b>																
1	0-6	0.27-5.37	81.0	70.4			18.7	3.9	7.9	37.9	1.6	30.0	—			
2	51-60	51.19-59.28	75.5	61.6			14.6	2.8	7.3	27.8	2.2	37.0	8.1			
3	98-104	99.10-103.90	76.9	63.9			11.6	—	9.1	27.7	—	34.0	17.6			
4	104-108	104.00-108.00	76.5	63.3			13.6	—	5.3	34.2	3.8	32.3	10.2			
5	128-135	128.05-136.41	83.1	73.5			11.9	—	2.2	38.0	2.6	28.8	16.7			

<sup>a</sup>No entry in column indicates not determined

\*1st Major Constituents

†2nd Major Constituents

P - Present (8-2%)

T - Trace (< 2%)

**TABLE 5**  
Results of X-Ray Diffraction Analyses from Site 89<sup>a</sup>

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Quar.	K-Fe	Plag.	Kaol.	Mica	Chlo.	Mont.	Clin.	Paly.	Pyri.	Gyps.
<b>Bulk Samples</b>																	
1	0-3	0.07-2.77	78.5	42.5	35.2	1.3	19.6	—	7.1	3.9	30.5	2.2	—				
2	50-59	51.29	71.9	35.9	45.9	—	15.5	—	5.9	3.5	19.8	1.2	7.2				
3	119-128	119.07-124.32	73.3	37.3	40.7	—	17.8	—	7.6	3.0	22.4	—	8.3				
4	220-224	220.02-228.26	68.4	32.4	56.3	—	13.5	1.5	6.8	3.0	11.8	—	7.1				
5	299-305	300.25	71.0	35.0	37.1	—	25.6	—	10.4	1.6	23.5	1.8	—				
6	376-380	377.24-382.86	69.1	33.1	31.1	—	24.6	—	10.0	3.2	25.8	1.1	4.2				
<b>2-20μ Fraction</b>																	
1	0-3.5	0.07-2.77	74.6	60.3		†			*			T	T				
2	50-59	51.29	70.0	53.1		*			†			T	T				
3	119-128	119.07-124.32	76.9	63.9		†			*			T	T	T			
4	220-224	220.02-228.26	72.5	57.1		*			†			T		P			
5	299-305	300.25	61.3	39.6		*			†					T			
6	376-380	379.24-382.86	61.8	40.3		*		†						T			
<b>&lt;2μ Fraction</b>																	
1	0-3	0.07-2.77	81.5	71.1		19.7		—	—	38.3	4.3	27.3	9.0	—	1.4		
2	50-59	51.29	79.9	68.7		10.9		1.3	6.2	41.6	3.0	32.3	4.7	—	—		
3	119-128	119.07-124.32	81.1	70.5		20.8		2.8	5.2	39.6	4.5	27.1	—	—	—		
4	220-229	220.02-228.26	78.3	66.1		11.4		—	2.0	21.5	2.7	42.4	19.8	—	1.2		
5	299-305	300.25	71.4	55.2		31.4		17.9	2.3	38.6	3.5	5.8	—	—	—		
6	376-380	379.24-382.86	76.2	62.6		19.3		7.2	7.3	42.5	3.0	19.7	—	1.0	—		

<sup>a</sup>No entry in column indicates not determined

\* 1st Major Constituents

† 2nd Major Constituents

P - Present (8-2%)

T - Trace (< 2%)







TABLE 8 - *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Quar.	Mica	K-Fe	Plag.	Kaol.	Paly.	Mont.	Chlo.	Clin.
<b>&lt;2μ Fraction</b>															
2	29-38	31.50-35.77	68.1	50.1				9.7	49.8	2.2	2.0	5.0	27.1	4.3	
3	87-96	88.20-93.77	72.9	57.7				11.1	56.7	—	1.7	6.4	20.5	3.6	
4	125-134	125.10-131.77	72.3	56.7				9.8	61.2	—	2.6	6.3	16.3	3.8	
5	173-182	173.10-181.27	69.5	52.4				10.8	53.7	—	—	7.0	23.7	4.0	
6	220-229	222.21-222.90	67.2	48.7				8.5	36.3	2.1	5.4	9.7	32.8	5.2	
8	262-265	262.84	74.8	60.7				11.6	18.5	9.7	—	5.0	52.7	2.5	

<sup>a</sup>No entry in column indicates not determined

\* 1st Major Constituents

† 2nd Major Constituents

P - Present (8-2%)

T - Trace (&lt; 2%)

TABLE 9  
Results of X-Ray Diffraction Analyses from Site 93<sup>a</sup>

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Arag.	Quar.	Plag.	Kaol.	Mica	Mont.	Chlo.	Pyri.	Clin.	Paly.	Gyps.
<b>Bulk Samples</b>																	
1	0-1	0.11 0.76	75.7 69.5	62.0 52.4	57.8 35.1	3.0 1.4	— 44.6	6.6 4.8	1.2 1.6	1.2 1.9	18.8 8.6	10.0 1.8	1.2 —				
<b>2-20μ Fraction</b>																	
1	0-1.5	0.11 0.76	79.3 70.2	67.7 53.5				†			*		P		T		
<b>&lt;2μ Fraction</b>																	
1	0-1	0.11 0.76	74.0 73.6	59.3 59.3				8.2 5.4	1.2 —	1.2 —	21.6 16.8	50.3 56.1	2.5 2.8		13.4 18.9	1.0 —	

<sup>a</sup>No entry in column indicates not determined

\* 1st Major Constituents

† 2nd Major Constituents

P - Present (8-2%)

T - Trace (&lt; 2%)





TABLE 10 - *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Arag.	Quar.	K-Fe	Plag.	Kaol.	Mica	Chlo.	Mont.	Clin.	Paly.	Pyri.	Gyps.	Bari.
<2μ Fraction (Continued)																			
23	478-487	479.60-480.27	96.7	94.8					9.3	—	—	4.0	26.3	2.0	58.4	—	—	—	—
24	489-496	490.10-490.77	98.4	97.5					20.8	—	—	—	—	—	79.1	—	—	—	—
25	496-500	499.10-499.77	94.1	90.8					20.7	—	—	8.0	—	—	60.9	—	10.0	—	—
26	500-507	503.10-503.77	98.2	97.2					10.0	—	—	—	—	—	28.4	—	61.5	—	—
28	532-540	538.10-538.77	98.1	97.1					100.0	—	—	—	—	—	—	—	—	—	—
30	571-580	571.71	98.0	96.8					6.8	—	—	—	—	—	18.2	—	74.8	—	—
33	612-616	613.30-613.92	76.8	63.8					10.2	—	4.8	—	22.1	4.3	53.4	5.2	—	—	—
35	625-627	626.29	76.3	63.0					17.3	22.5	5.1	—	32.2	4.0	11.7	7.1	—	—	—
36	627-634	627.00-627.40	70.5	53.9					24.4	31.1	2.0	—	33.3	4.9	4.3	—	—	—	—

<sup>a</sup>No entry in column indicates not determined<sup>\*</sup>1st Major Constituents<sup>†</sup>2nd Major Constituents

P - Present (8-2%)

T - Trace (&lt; 2%)

A - Abundant (25 - 8%)

TABLE 11  
Results of X-Ray Diffraction Analyses from Site 95<sup>a</sup>

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Arag.	Quar.	K-Fe	Plag.	Kaol.	Mica	Chlo.	Mont.	Paly.	Clin.	Pyri.	Gyps.	Cris.
<b>Bulk Samples</b>																			
1	0-7	0.75-6.12	69.0	51.5	66.8	2.8	7.5	6.5		1.8	2.3	11.9			—				
2	82-91	82.10-90.27	54.3	28.7	99.6	—	—	0.4		—	—	—							
3	121-130	121.10-129.27	58.4	35.1	99.5	—	—	0.5		—	—	—							
4	159-168	160.60-164.27	59.7	37.0	99.6	—	—	0.4		—	—	—							
5	198-207	198.05-103.27	58.0	34.3	99.7	—	—	0.3		—	—	—							
6	236-245	236.10-244.27	55.5	30.4	100.0	—	—	—		—	—	—							
7	274-283	274.10-282.27	62.2	40.9	99.6	—	—	0.4		—	—	—							
8	332-341	332.10-340.27	67.4	49.0	100.0	—	—	—		—	—	—							
10	363-371	363.10-363.77	52.7	26.0	98.3	—	—	—		—	—	—			1.7				
11	377-386	378.18-378.60	58.1	34.5	96.3	—	—	0.9		—	—	—			2.8				
12	386-395	390.60-391.27	59.3	36.4	94.3	—	—	0.6		2.3	—	—			2.8				
13	395-400	395.70-396.15	55.2	30.0	98.8	—	—	0.6		—	—	—							
14	400-408	400.57	55.2	29.9	97.0	—	—	—		—	—	—			3.0				
15	408-417	415.60-416.27	53.3	27.1	99.6	—	—	0.4		—	—	—							
16	417-426	424.60-425.27	50.9	23.3	100.0	—	—	—		—	—	—							
17	426-435	433.60-434.27	50.2	22.2	100.0	—	—	—		—	—	—							

TABLE 11 - *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Arag.	Quar.	K-Fe	Plag.	Kaol.	Mica	Chlo.	Mont.	Paly.	Clin.	Pyri.	Gyps.	Cris.
<b>2-20<math>\mu</math> Fraction</b>																			
1	0-7	0.75-6.12	66.3	47.3		A		*				†							
2	82-91	82.10-90.27	93.0	89.1				*				†			T				
3	121-130	121.10-129.27	92.4	88.1				*				†			T			A	
4	159-168	160.60-164.27	95.4	92.8				*		†								T	
5	198-207	198.05-203.27	92.0	87.5				*				†			T	T		T	
6	236-245	236.10-244.27	93.7	90.1				†	*									T	
7	274-283	274.10-282.27	97.4	96.0				*	†									T	
8	332-341	332.10-340.27	96.5	94.5				†	*										
10	363-371	363.10-363.77	63.1	42.4				†								*			
11	377-386	378.10-378.60	66.1	47.1					†							*			
13	397-400	395.70-396.15	63.6	43.2				*	†										
14	400-408	400.57	60.9	38.9					†							*			
15	408-417	415.60-416.27	61.6	40.0				*		†							P		
17	426-438	433.60-434.27	62.3	41.1				†	*								P		
<b>&lt;2<math>\mu</math> Fraction</b>																			
1	0-7	0.75-6.12	77.1	64.2				12.8	2.6	4.5	6.3	40.0	3.1	30.6	-	-	-	-	
2	82-91	82.10-90.27	83.2	73.7				13.1	-	-	2.6	21.4	1.5	61.4	-	-	-	-	
3	121-130	121.10-129.27	84.9	76.4				9.7	-	4.3	2.2	10.2	2.1	71.3	-	-	-	-	
4	159-168	160.60-164.27	84.3	75.5				8.3	2.8	2.6	4.9	13.0	2.0	66.5	-	-	-	-	
5	198-207	198.05-203.27	85.7	77.7				5.7	1.5	1.9	3.8	25.6	1.7	60.0	-	-	-	-	
6	236-245	236.10-244.27	82.1	72.1				12.8	-	3.4	4.4	11.9	2.4	64.7	-	-	-	-	
7	274-283	274.10-282.27	83.5	74.2				9.5	-	-	6.0	-	1.0	83.4	-	-	-	-	
8	332-341	332.10-340.27	89.3	83.3				7.9	3.1	-	5.0	-	1.5	44.6	37.6	-	-	-	
10	363-371	363.10-363.77	77.5	64.8				6.3	-	-	1.5	20.4	2.0	41.5	16.1	11.9	-	-	
11	377-386	378.18-378.60	76.9	63.9				7.4	6.7	-	1.0	22.2	2.5	36.8	13.4	10.0	-	-	
12	386-395	390.60-391.27	75.5	61.7				6.4	8.0	-	1.3	13.9	2.2	39.5	25.6	3.4	-	-	
13	395-400	395.70-396.15	74.9	60.8				7.1	3.4	-	2.2	12.4	2.2	45.7	22.6	4.1	-	-	
14	400-408	400.57	79.2	67.5				2.5	4.6	-	-	13.7	1.4	38.3	23.6	15.9	-	-	
15	408-417	415.60-416.27	68.2	50.3				1.5	2.3	-	-	7.8	1.5	76.5	9.4	-	-	1.0	
16	417-426	424.60-425.27	86.4	78.7				13.2	18.7	-	-	31.6	4.6	6.3	21.9	-	3.7	-	
17	426-435	433.60-434.27	86.0	78.1				5.9	4.5	-	-	34.3	4.3	24.1	25.9	-	-	1.0	

<sup>a</sup>No entry in column indicates not determined

\*1st Major Constituents

†2nd Major Constituents

P - Present (8-2%)

T - Trace (&lt; 2%)

A - Abundant (25 - 8%)

TABLE 12  
Results of X-Ray Diffraction Analyses from Site 96<sup>a</sup>

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor	Dolo.	Quar.	Calc.	Mica	K-Fe	Plag.	Kaol.	Clin.	Mont.	Chlo.	Paly.
<b>Bulk Samples</b>															
1	101-110	102.60-109.27	82.2	72.1	3.0	15.1	13.4	33.1	1.7	3.0	3.4	-	24.8	2.3	
2	199-208	199.10-207.27	57.5	33.6	-	0.8	99.2	-	-	-	-	-	-	-	
3	301-310	301.15-309.27	64.2	44.0	-	0.9	99.1	-	-	-	-	-	-	-	
5	329-332	329.20-329.83	63.5	43.0	-	0.8	95.1	-	1.2	-	-	2.8	-	-	
<b>2-20μ Fraction</b>															
1	101-110	102.60-109.27	64.8	45.1		†		*				T			
2	199-208	119.10-207.27	84.1	75.1		*		†				A			
3	301-310	301.15-309.27	93.3	89.6		*		†				T			
5	329-332	329.20-329.83	76.1	62.7		†						*			
<b>&lt;2μ Fraction</b>															
1	101-110	102.60-109.27	71.4	55.4		10.9		33.9		2.6	5.7	-	44.4	2.3	-
2	199-208	199.10-207.27	81.2	70.6		12.0		13.2		-	-	3.7	57.7	2.4	10.6
3	301-310	301.15-309.27	83.6	74.3		11.0		18.6		2.7	-	-	53.3	3.9	10.5
5	329-332	329.20-329.83	78.3	66.1		6.1		21.3		-	1.2	-	55.8	2.7	12.1

<sup>a</sup>No entry in column indicates not determined

\* 1st Major Constituents

† 2nd Major Constituents

P - Present (8-2%)

T - Trace (< 2%)

A - Abundant (25 - 8%)

TABLE 13  
Results of X Ray Diffraction Analyses from Site 97<sup>a</sup>

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Arag.	Quar.	K-Fe	Plag.	Kaol.	Mica	Chlo.	Mont.	Paly.	Clin.	Pyri.	Gyps.
<b>Bulk Samples</b>																		
1	0-5	0.67-1.27 2.10-4.27	74.4 63.5	60.0 43.0	31.3 89.2	2.0 -	16.7 3.3	10.1 2.1	-	2.2 -	4.2 1.3	22.6 4.1	10.5 -	-	-	-	-	
2	105-110	105.20-110.27	69.2	51.9	87.2	-	-	5.2	-	1.7	-	6.0	-	-	-	-	-	
3	142-145	143.60-145.77	72.7	57.4	80.4	-	-	6.7	2.3	3.4	-	7.1	-	-	-	-	-	
4	200-207	202.50-206.77	61.3	39.6	96.1	-	-	1.3	-	-	-	-	-	-	-	2.6	-	
5	250-253	251.25	60.6	38.4	93.9	-	-	0.7	-	-	-	-	-	-	5.7	-	-	
6	294-298	294.86	67.6	49.4	78.1	11.2	-	0.8	-	-	-	9.7	-	-	-	-	-	
7	305-308	306.10-306.77	63.8	43.4	89.8	4.2	-	-	-	-	-	5.6	-	-	-	-	-	
8	308-313	308.38-311.90	72.0	56.2	64.1	3.9	-	3.6	1.1	2.8	-	20.2	-	4.2	-	-	-	
11	330-333	330.30	54.4	28.8	100.0	-	-	-	-	-	-	-	-	-	-	-	-	
12	333-337	333.64	57.8	34.0	98.8	-	-	1.2	-	-	-	-	-	-	-	-	-	

TABLE 13 - *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Calc.	Dolo.	Arag.	Quar.	K-Fe	Plag.	Kaol.	Mica	Chlo.	Mont.	Paly.	Clin.	Pyri	Gyps.
<b>2-20<math>\mu</math> Fraction</b>																		
1	0-5	0.67-1.27 2.10-4.27	70.3 75.0	53.6 60.9			†				*							
2	105-110	105.20-110.27	69.9	53.0			*			†						P		
3	142-145	143.60-145.77	62.8	41.8			*			†						P	P	
4	200-207	202.50-206.77	84.1	75.2			†									*		
5	250-253	251.25	69.4	52.3			*			†						A		
6	294-298	294.86	69.6	52.5			*			†						P		
7	305-308	306.10-306.77	59.0	36.0			†			*						P		
8	308-313	308.38-311.90	69.8	52.8			†			*						P		
12	333-337	333.64	79.2	67.6			*			†								
<b>&lt;2<math>\mu</math> Fraction</b>																		
1	0-5	0.67-1.27 2.10-4.27	72.7 77.9	57.3 65.4			8.0 13.0	1.1 3.1	5.9 16.0	26.1 42.6	2.6 1.4	56.4 23.8	-	-	-	-	-	
2	105-110	105.20-110.27	72.0	56.3			12.9	-	4.5	29.8	1.9	49.1	-	1.2	-	-	-	
3	142-145	143.60-145.77	80.8	70.0			11.7	-	5.1	33.4	2.1	43.5	-	1.4	1.4	1.0		
4	200-207	202.50-206.77	78.3	66.1			10.3	-	-	29.4	2.0	48.7	-	8.4	-	1.2		
5	250-253	251.25	73.6	58.8			2.0	-	1.0	11.0	-	77.6	7.2	-	-	1.0		
6	294-298	294.86	76.3	63.0			3.7	-	-	63.4	-	32.6	-	-	-	-		
7	305-308	306.10-306.77	78.6	66.5			2.3	-	-	60.7	-	36.3	-	-	-	-		
8	308-313	308.38-311.90	72.7	57.4			-	-	-	48.8	-	51.2	-	-	-	-		
12	333-337	333.64	84.6	75.9			3.9	-	-	-	-	66.7	28.5	-	-	1.0		

<sup>a</sup>No entry in column indicates not determined

\* 1st Major Constituents

† 2nd Major Constituents

P - Present (8-2%)

T - Trace (&lt; 2%)

A - Abundant (25 - 8%)











**TABLE 15**  
**Parameters for Semi-quantitative Determination of Mineral Concentrations**  
**Contained in the X-Ray Diffraction Data Reduction Program (MINILOG)**

Mineral	Bulk Samples			<2μ Fraction		
	Window (Degrees 2θ)	Concentration Factor	Threshold	Window (Degrees 2θ)	Concentration Factor	Threshold
Calcite	29.00-29.60	1.60	1.00	29.25-29.70	1.65	1.00
Aragonite	45.65-46.00	7.00	1.00	45.65-46.00	9.30	1.00
Dolomite	30.80-31.15	1.00	1.00	30.72-31.15	1.53	1.00
Siderite	31.90-32.40	1.20	1.00	31.70-32.10	1.15	2.00
Rhodochrosite	31.26-31.40	1.60	2.00	31.26-31.50	3.45	1.00
Quartz	26.45-26.95	1.00	0.30	26.45-26.95	1.00	0.30
Cristobalite	21.50-22.05	8.20	2.00	21.50-22.05	9.00	3.00
K-feldspar	27.35-27.79	2.30	1.00	27.35-27.79	4.30	1.00
Plagioclase	27.80-28.15	2.30	1.00	27.80-28.15	2.80	1.00
Kaolinite	12.00-12.85	3.00	1.00	12.20-12.60	2.25	1.00
Mica	8.50-9.20	12.60	1.00	8.70-9.10	10.00	1.00
Chlorite	5.70-6.49	4.00	1.00	18.50-19.10	4.36	1.00
Montmorillonite	4.50-5.40	8.20	1.00	4.00-5.40	3.00	1.00
Gibbsite				18.00-18.50	0.95	1.00
Palygorskite	8.20-8.50	10.70	1.00	8.20-8.50	9.20	1.00
Sepiolite	7.00-7.40	7.20	1.00	7.00-7.40	7.20	1.00
Clinoptilolite	9.71-9.99	2.60	1.00	9.80-10.10	1.56	1.00
Phillipsite	17.85-18.00	23.80	1.00	17.50-17.75	17.00	4.00
Eriionite	7.50-7.90	4.00	1.00	7.50-7.90	3.10	1.00
Tremolite				10.30-10.70	2.50	1.00
Augite	29.70-30.30	4.48	1.00	29.70-30.00	5.00	1.00
Hematite	33.20-33.30	2.50	1.00	33.15-33.40	3.33	2.00
Magnetite	35.30-35.70	1.48	1.00	35.30-35.70	2.10	1.00
Gypsum	11.30-11.80	0.64	1.00	11.30-11.80	0.40	1.00
Anhydrite	25.10-25.70	0.86	1.00	25.30-25.70	0.90	1.00
Barite	28.65-29.00	3.00	1.00	28.65-29.00	3.10	1.00
Halite	31.65-31.90	0.83	1.00	45.30-45.65	2.00	1.00
Pyrite	56.20-56.45	2.00	1.00	56.20-56.45	2.30	1.50
Apatite	32.20-32.40	2.80	1.00	31.70-32.10	3.10	2.50

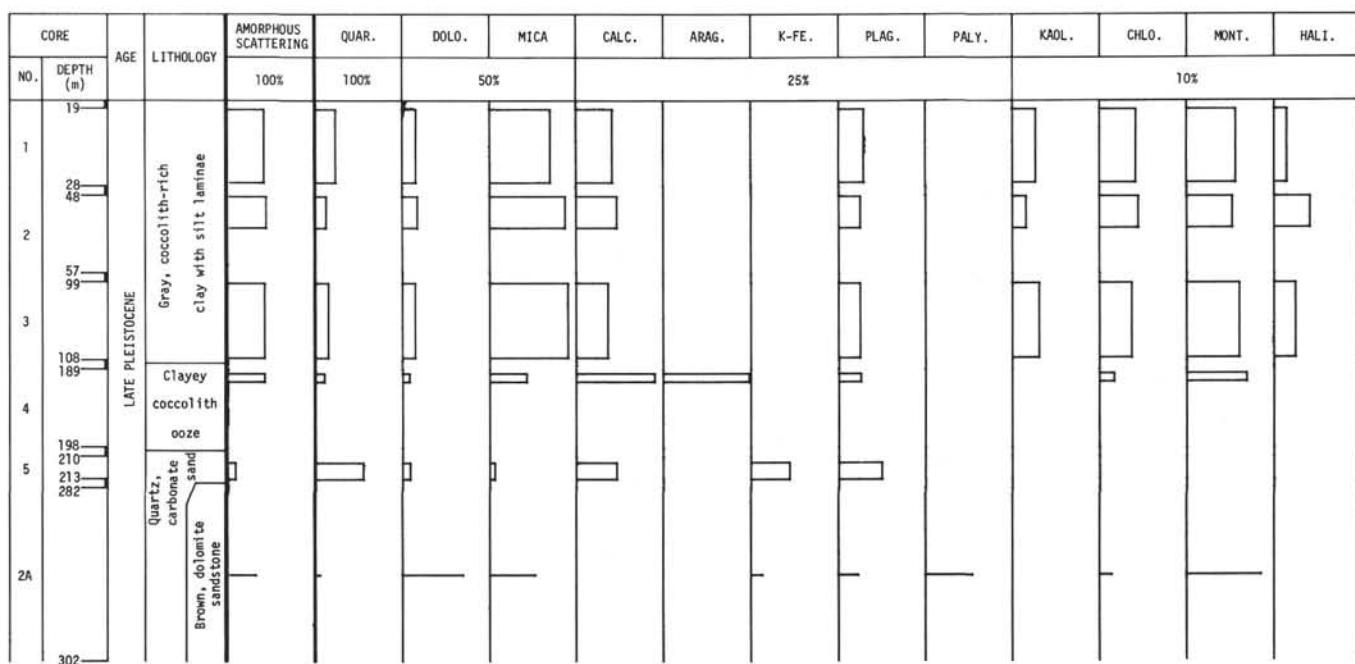


Figure 1. Site 85 bulk samples.

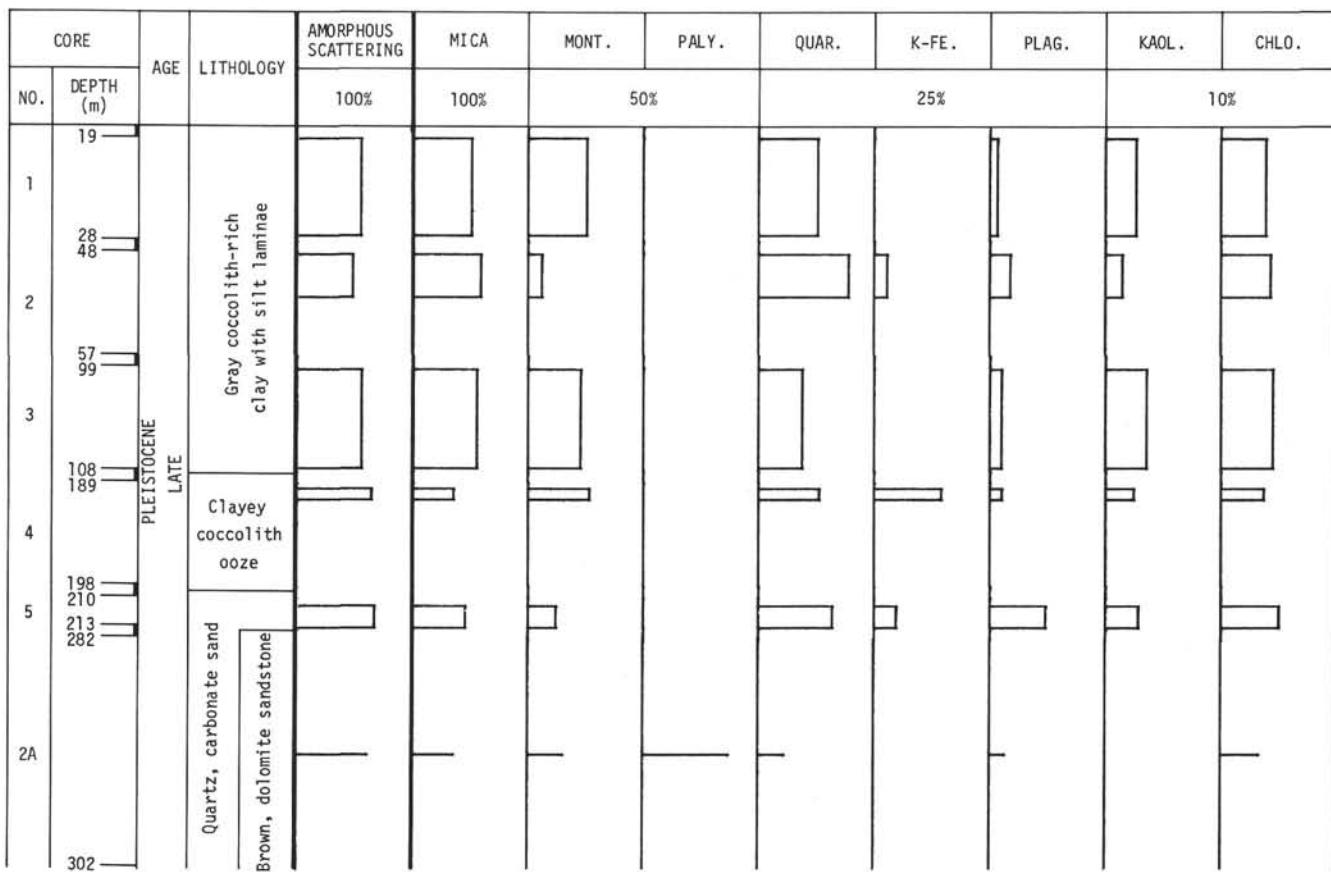


Figure 2. Site 85 &lt;2 µm fractions.

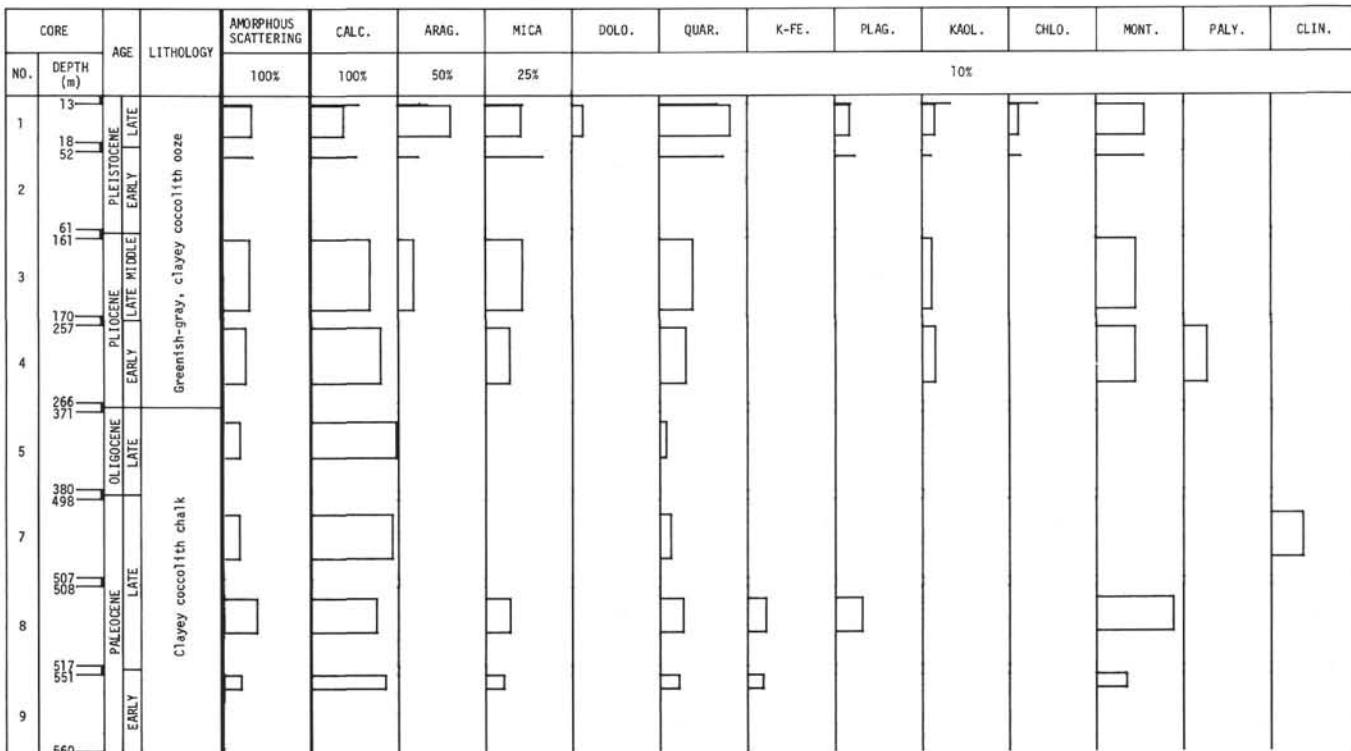


Figure 3. Site 86 bulk samples.

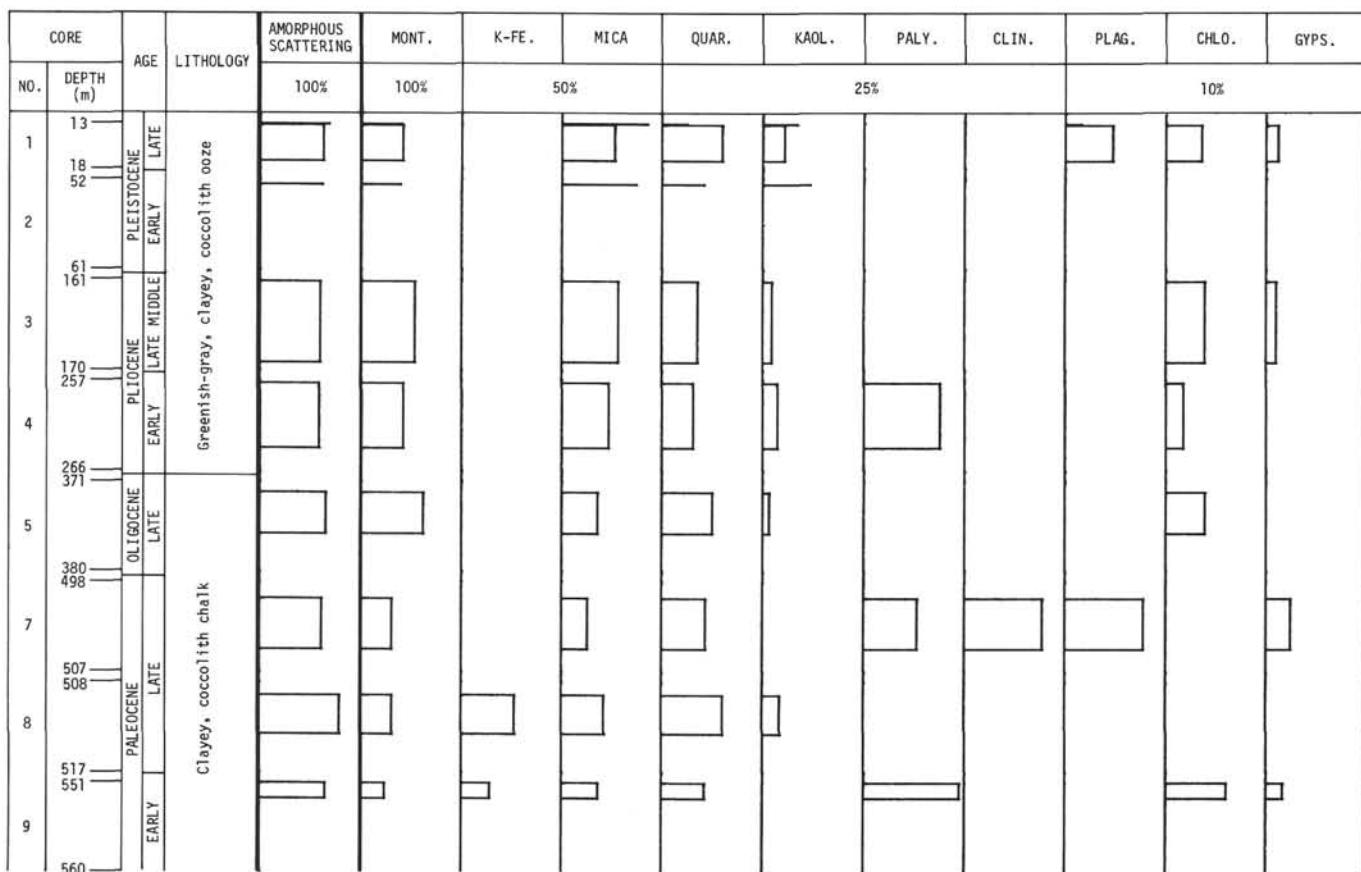
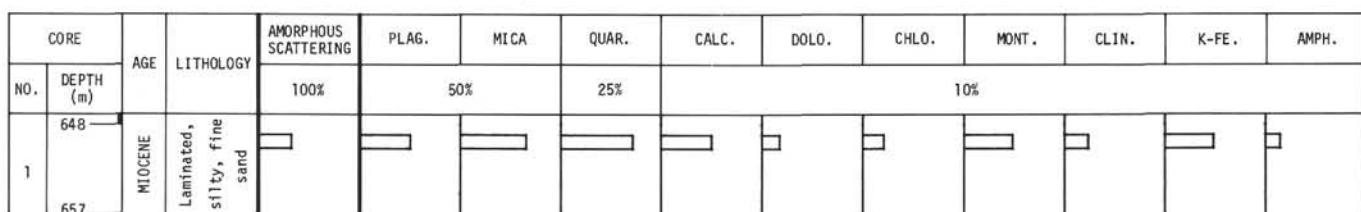
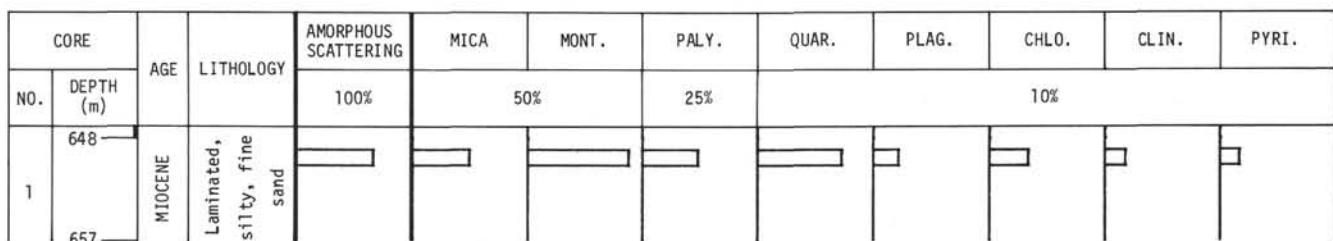
Figure 4. Site 86  $<2 \mu\text{m}$  fractions.

Figure 5. Site 87 bulk samples.

Figure 6. Site 87  $<2 \mu\text{m}$  fractions.

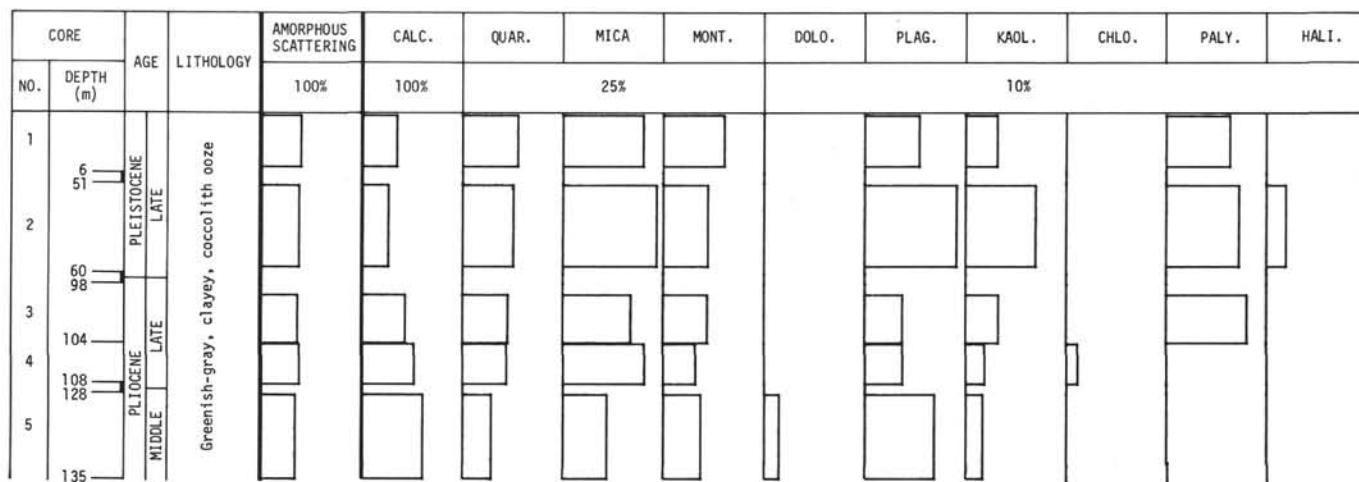


Figure 7. Site 88 bulk samples.

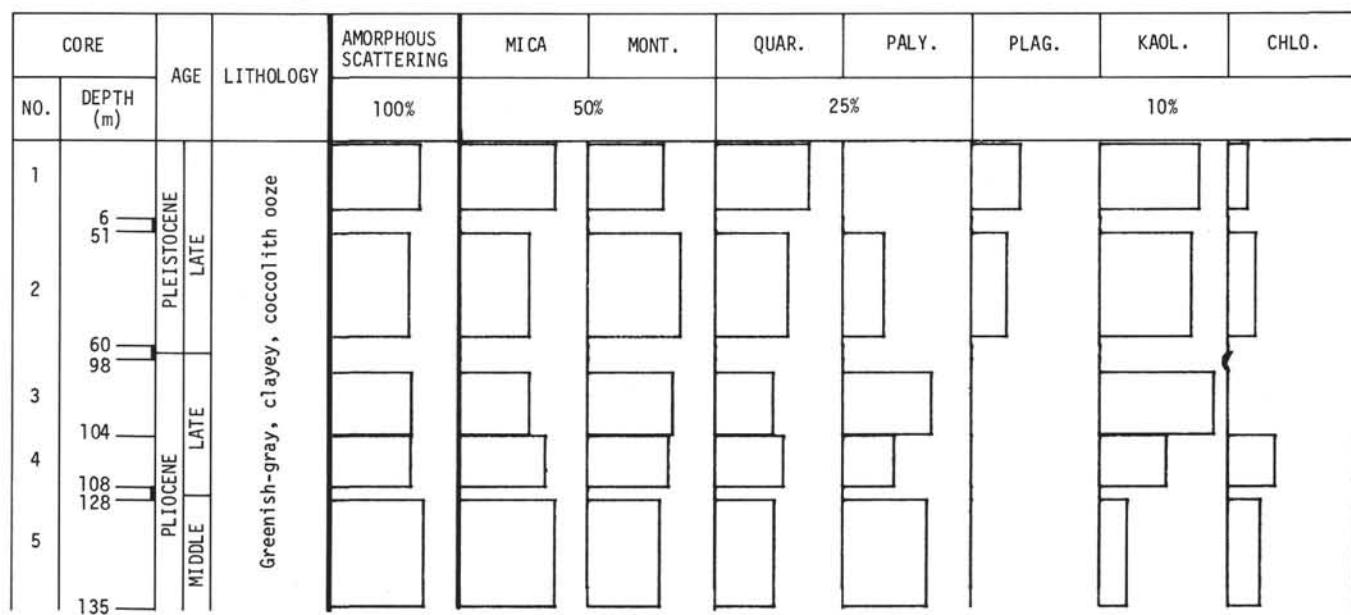


Figure 8. Site 88 &lt;2 µm fractions.

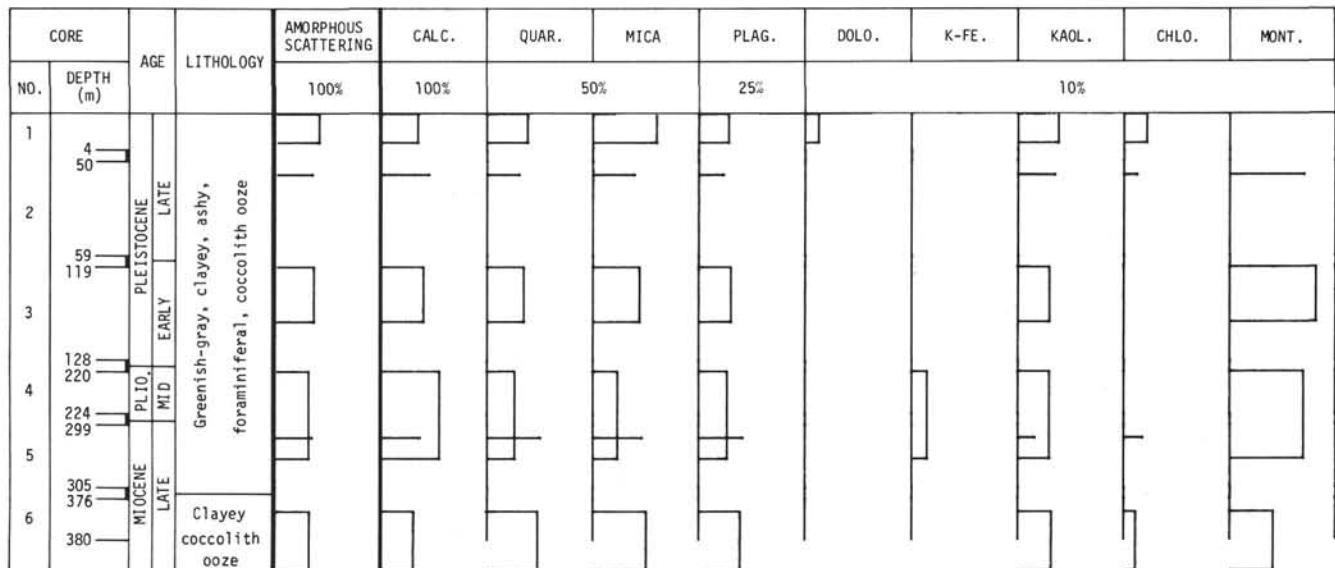


Figure 9. Site 89 bulk samples.

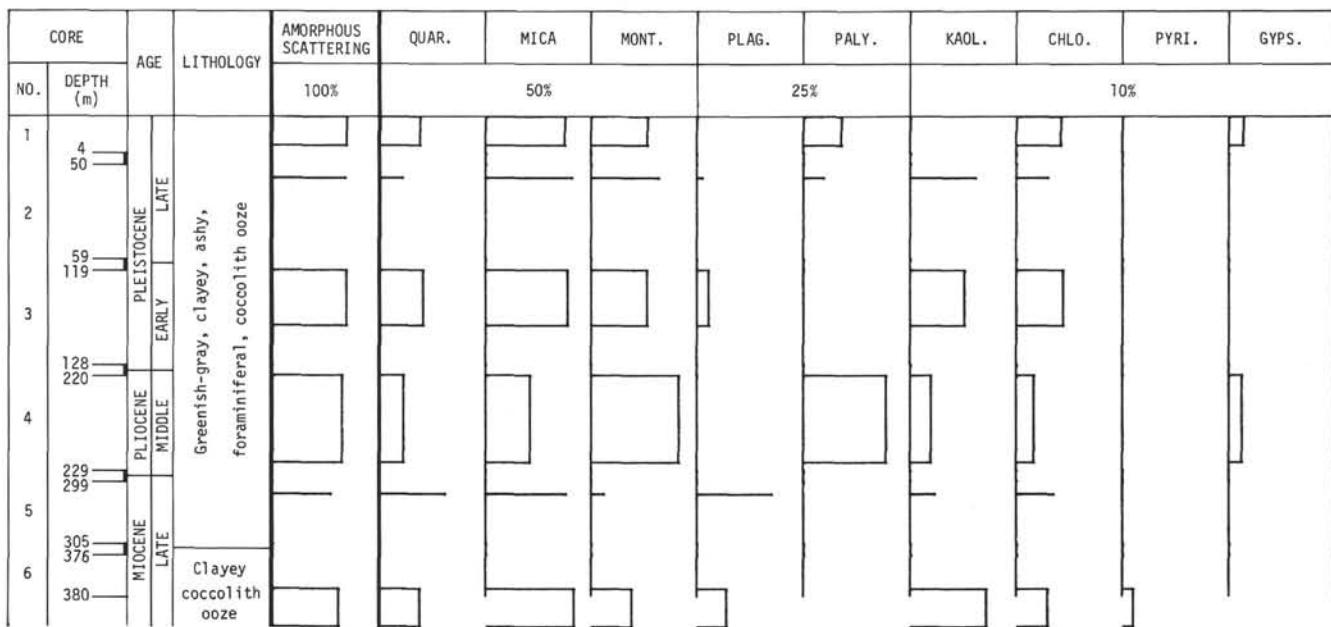
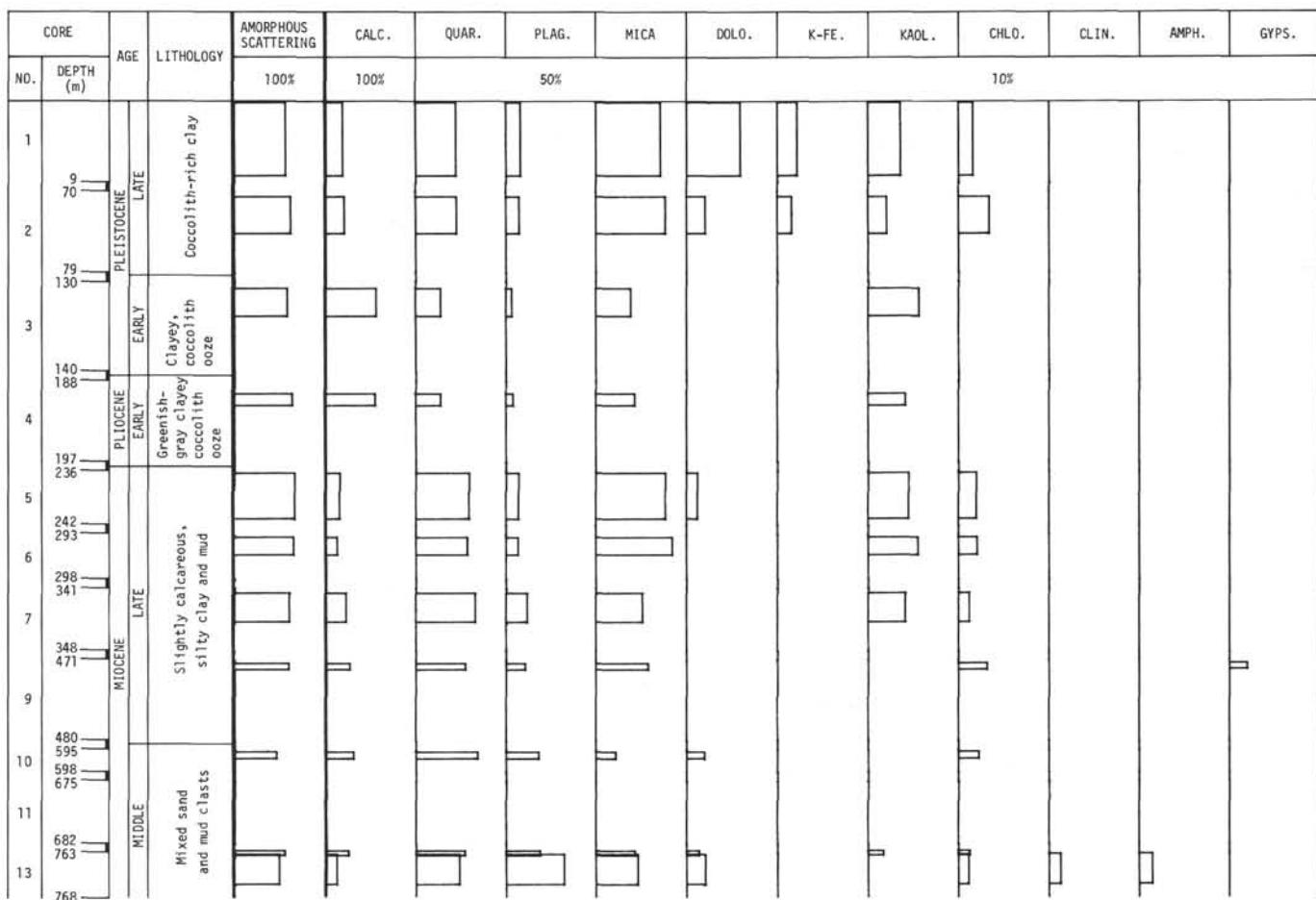
Figure 10. Site 89 <2  $\mu\text{m}$  fractions.

Figure 11. Site 90 bulk samples.

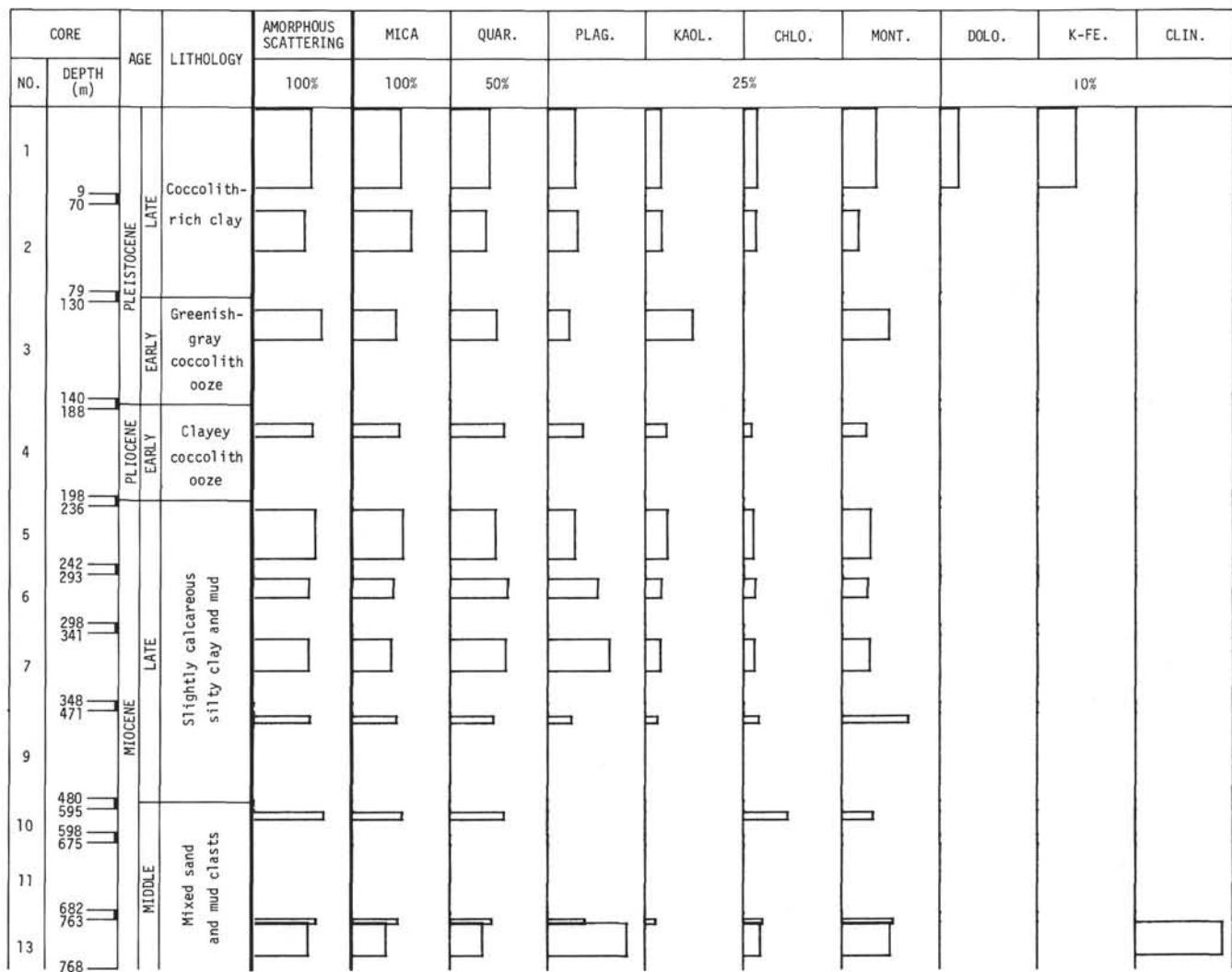


Figure 12. Site 90 &lt;2 µm fractions.

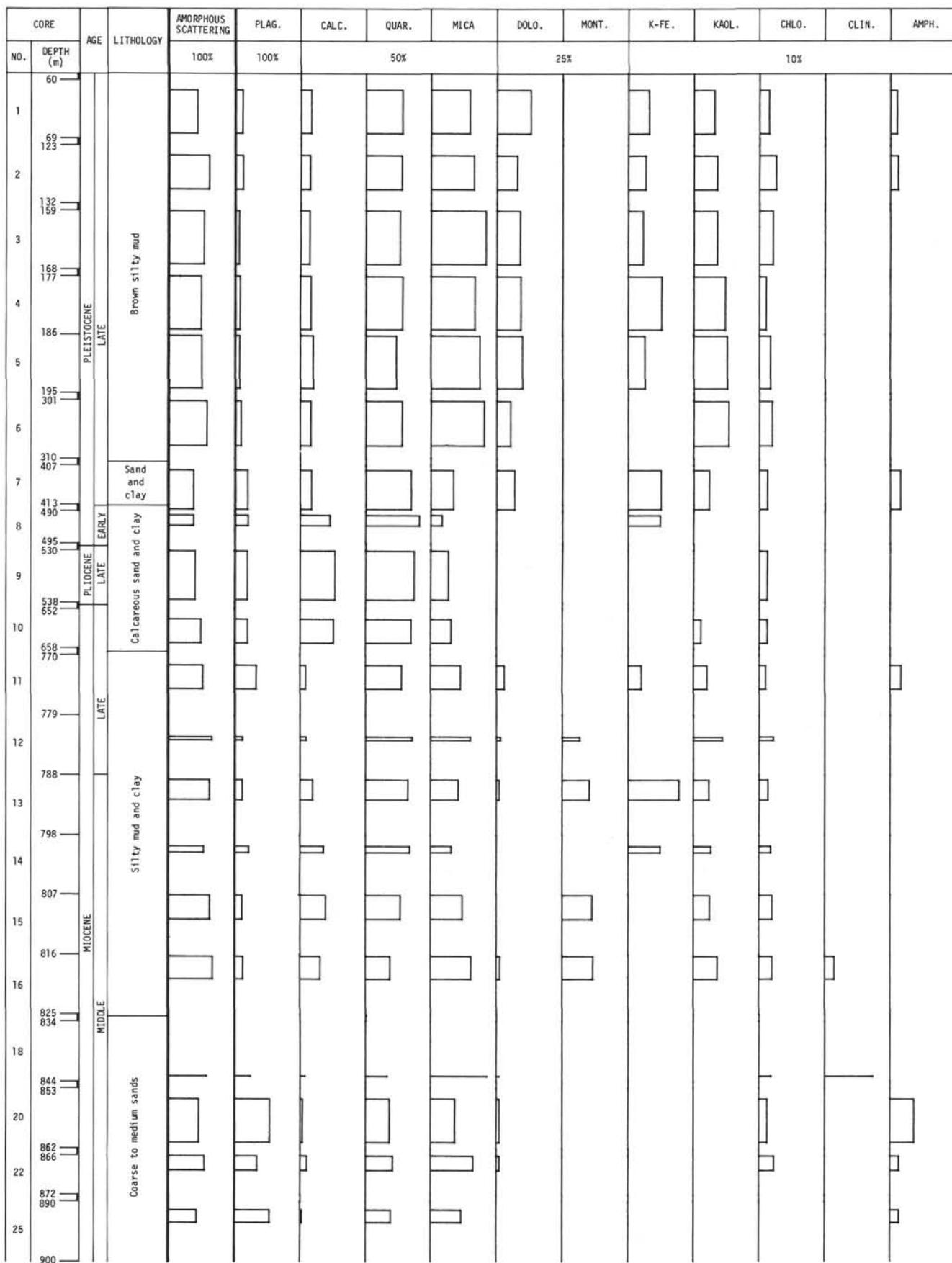


Figure 13. Site 91 bulk samples.

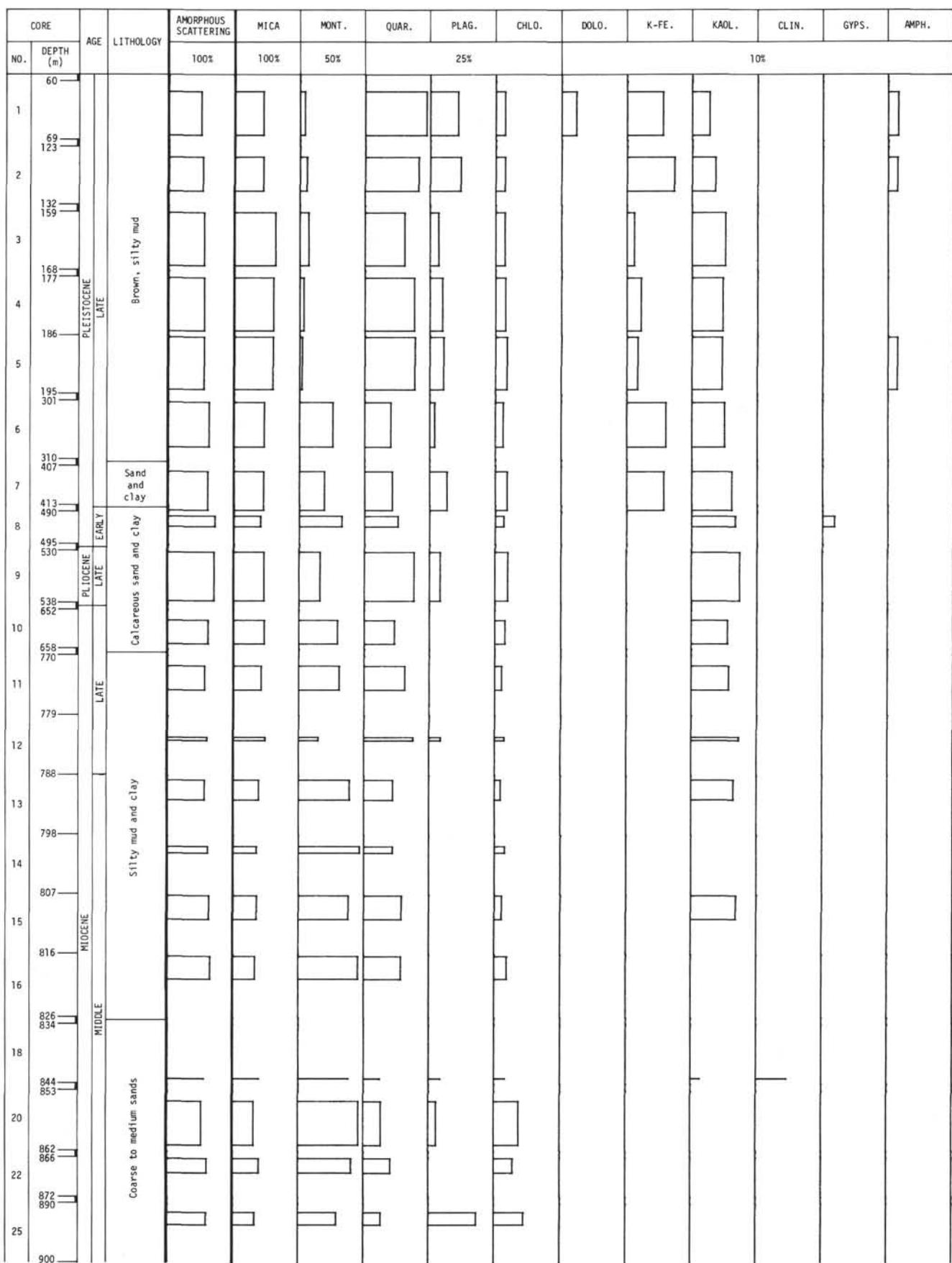


Figure 14. Site 91 &lt;2 µm fractions.

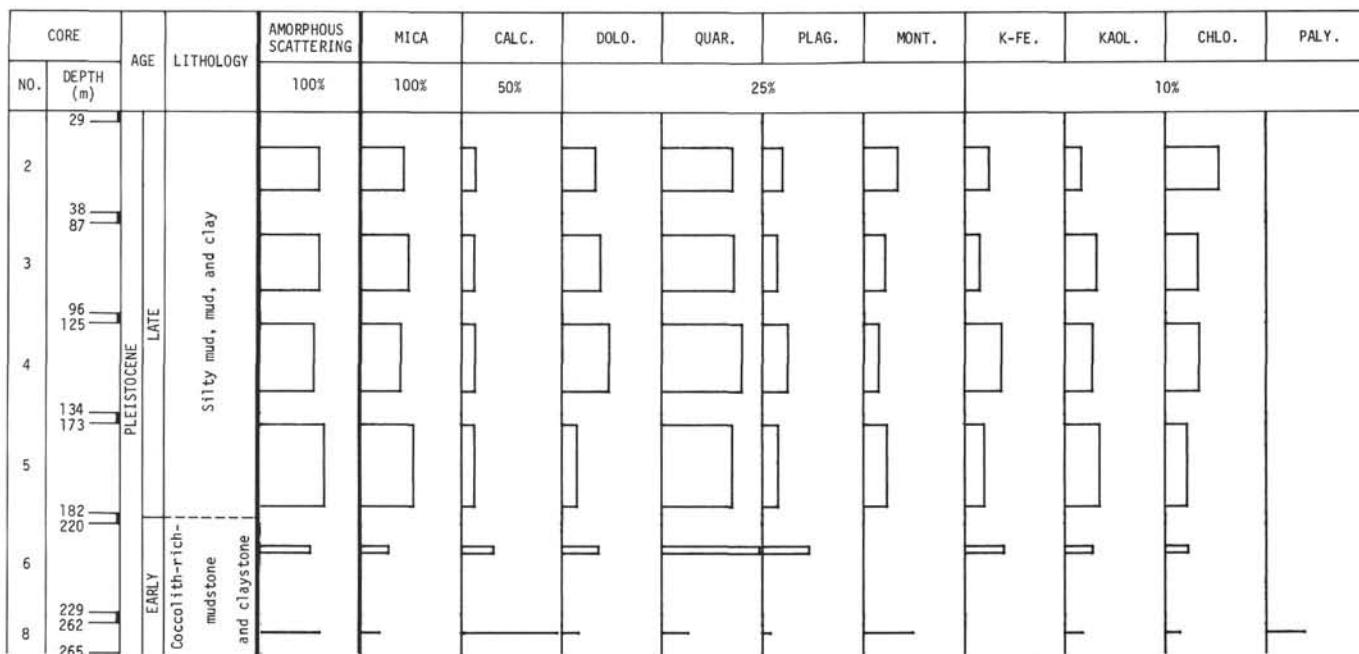


Figure 15. Site 92 bulk samples.

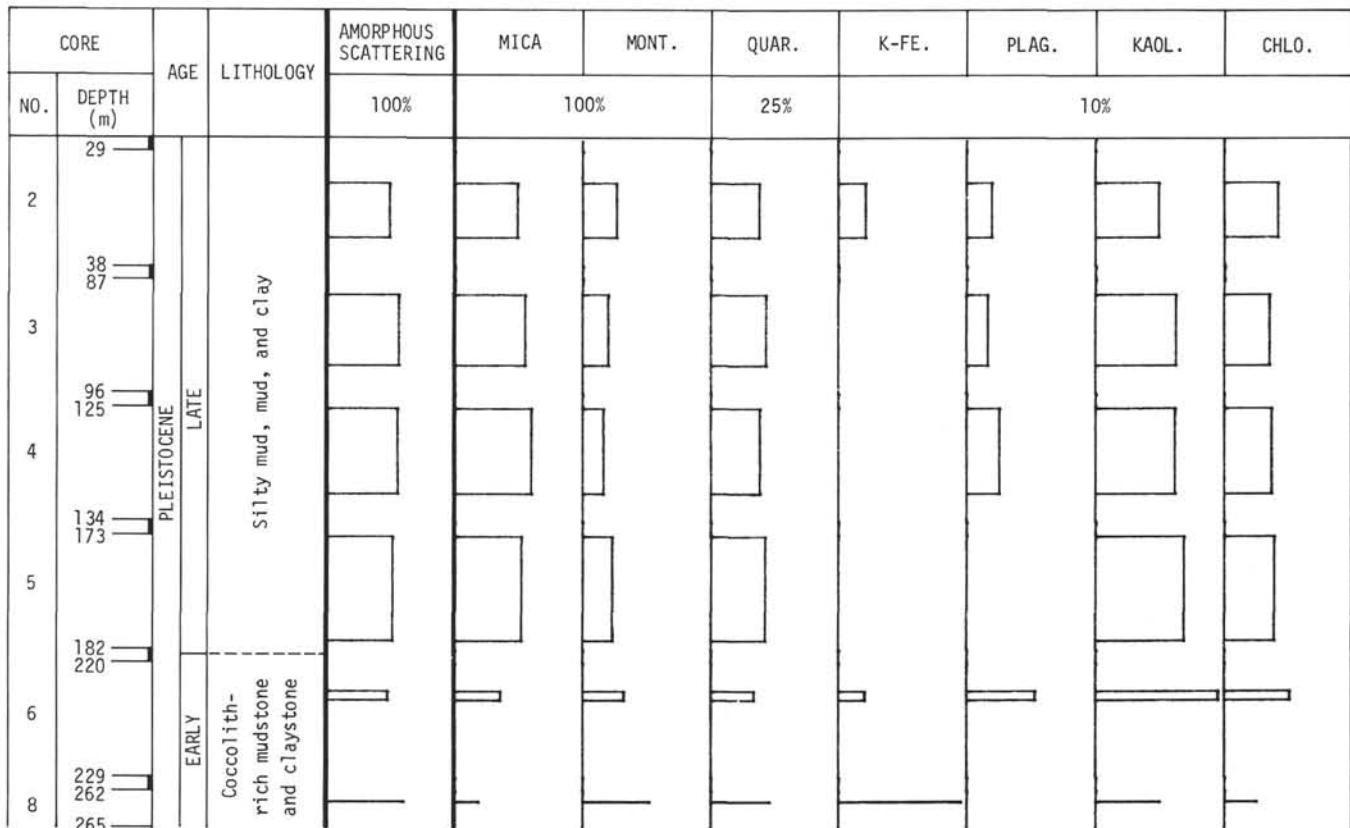


Figure 16. Site 92 &lt;2 µm fractions.

CORE		AGE	LITHOLOGY	AMORPHOUS SCATTERING	CALC.	ARAG.	MICA	DOLO.	QUAR.	PLAG.	KAOL.	MONT.	CHLO.	
NO.	DEPTH (m)				100%	100%	50%	25%	10%					
1	2	*	Clayey coccolith ooze											

\* HOLOCENE AND LATE MIocene

Figure 17. Site 93 bulk samples.

CORE		AGE	LITHOLOGY	AMORPHOUS SCATTERING	MONT.	MICA	PALY.	QUAR.	PLAG.	KAOL.	CHLO.	GYPS.	
NO.	DEPTH (m)			100%	100%	25%	10%						
1	2	*	Clayey coccolith ooze										

\* HOLOCENE AND LATE MIocene

Figure 18. Site 93 &lt;2 µm fractions.

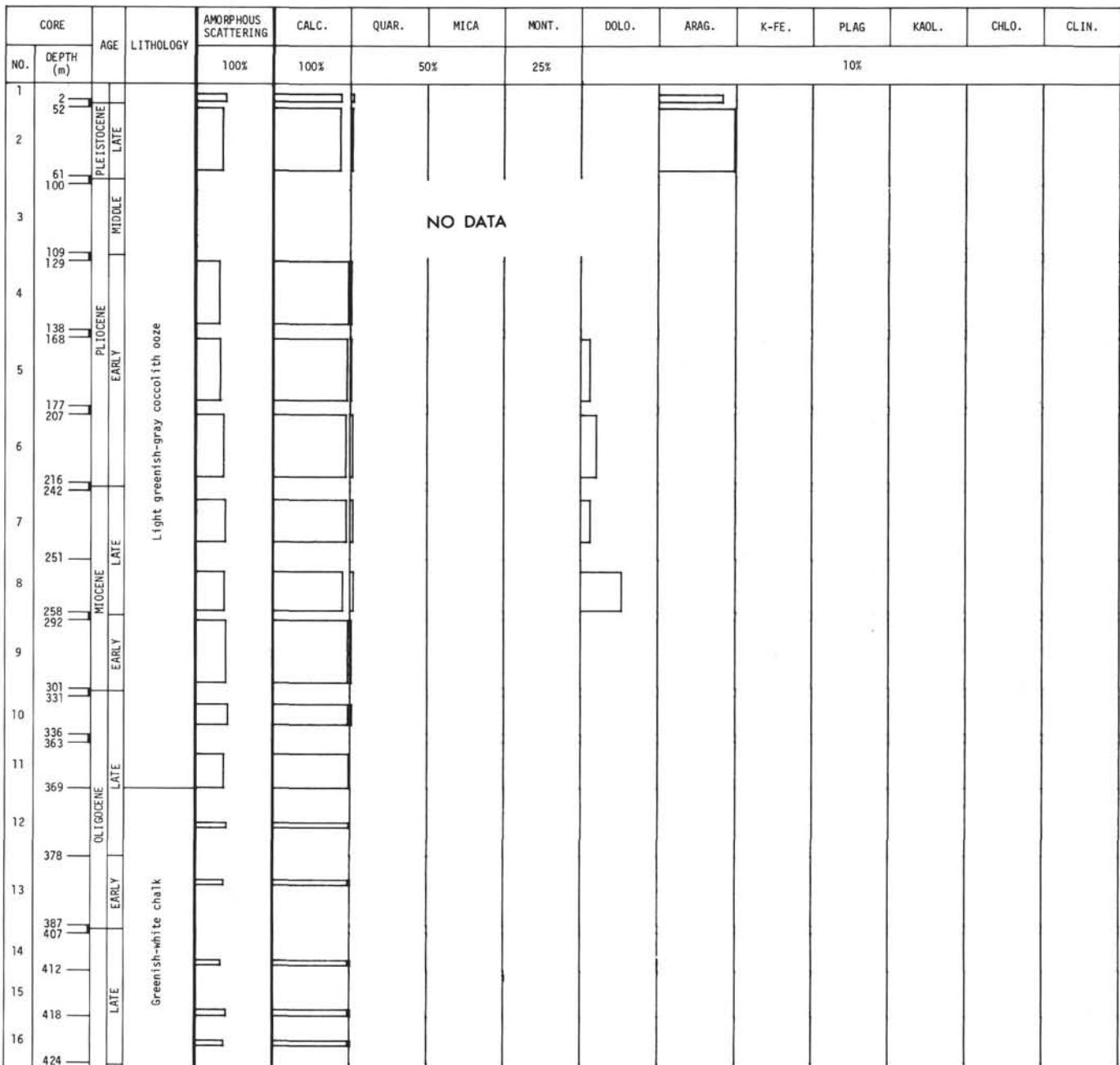


Figure 19. Site 94 bulk samples.

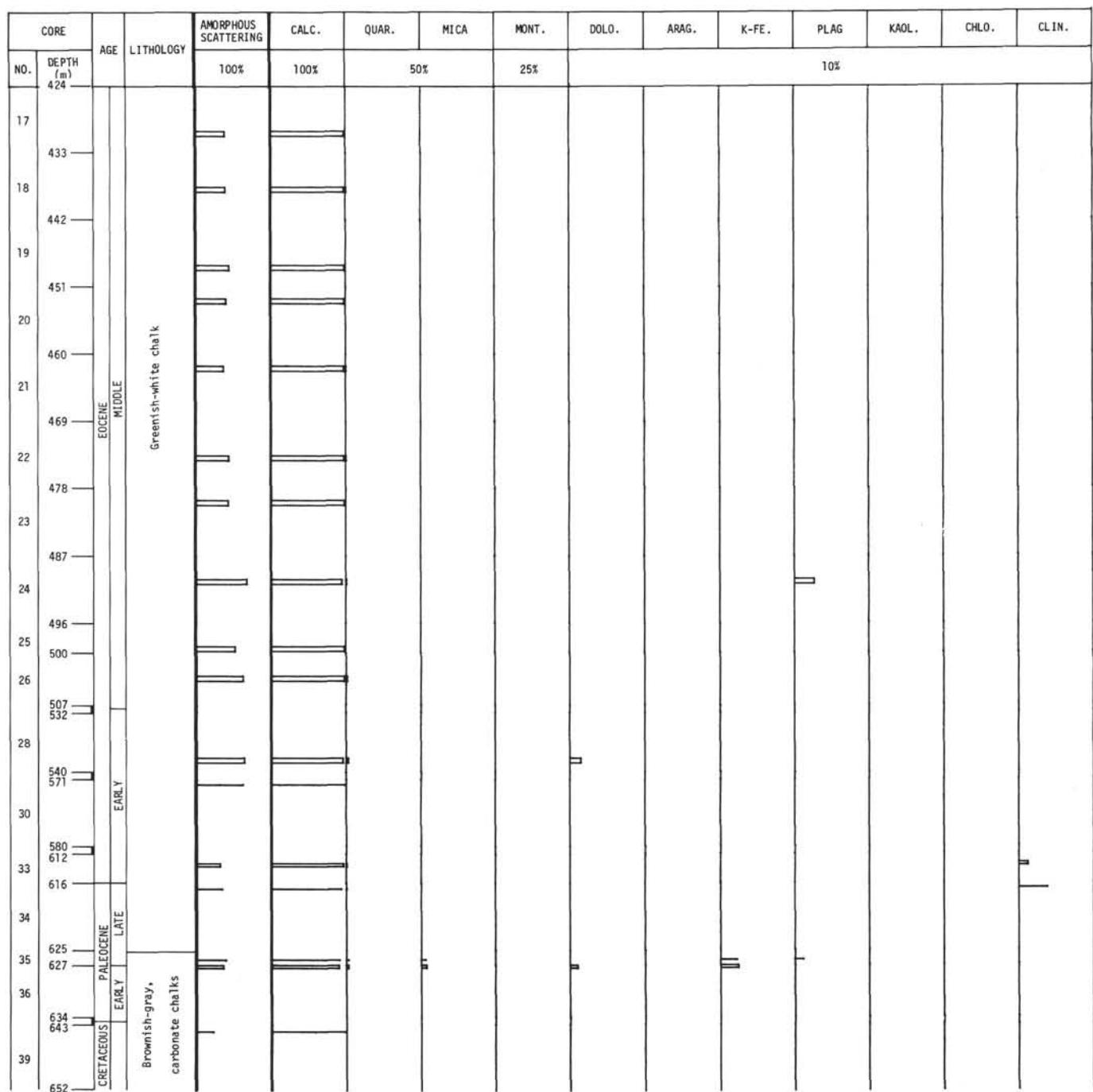
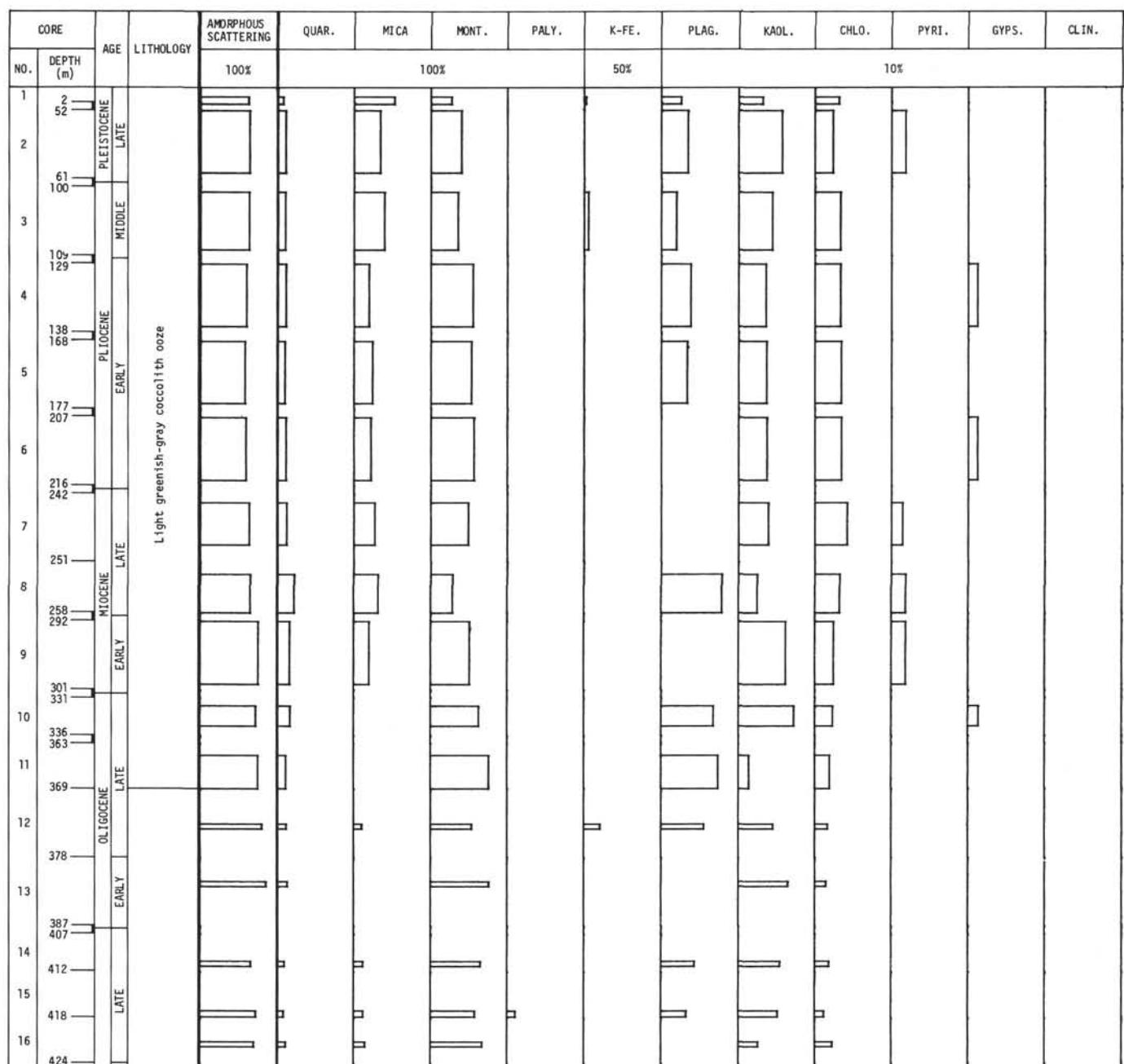


Figure 19. (Continued).

Figure 20. Site 94 <2  $\mu\text{m}$  fractions.

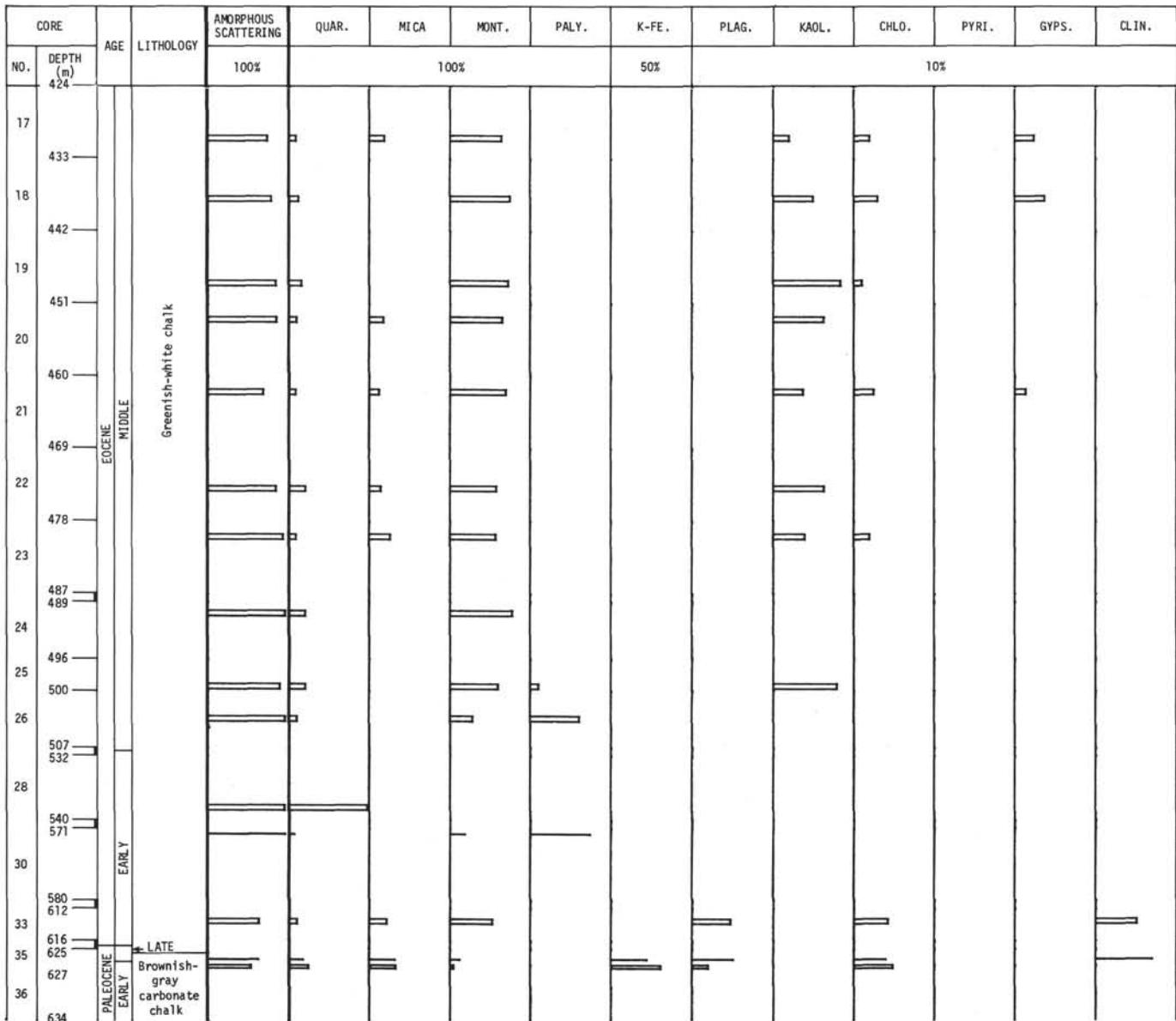


Figure 20. (Continued)

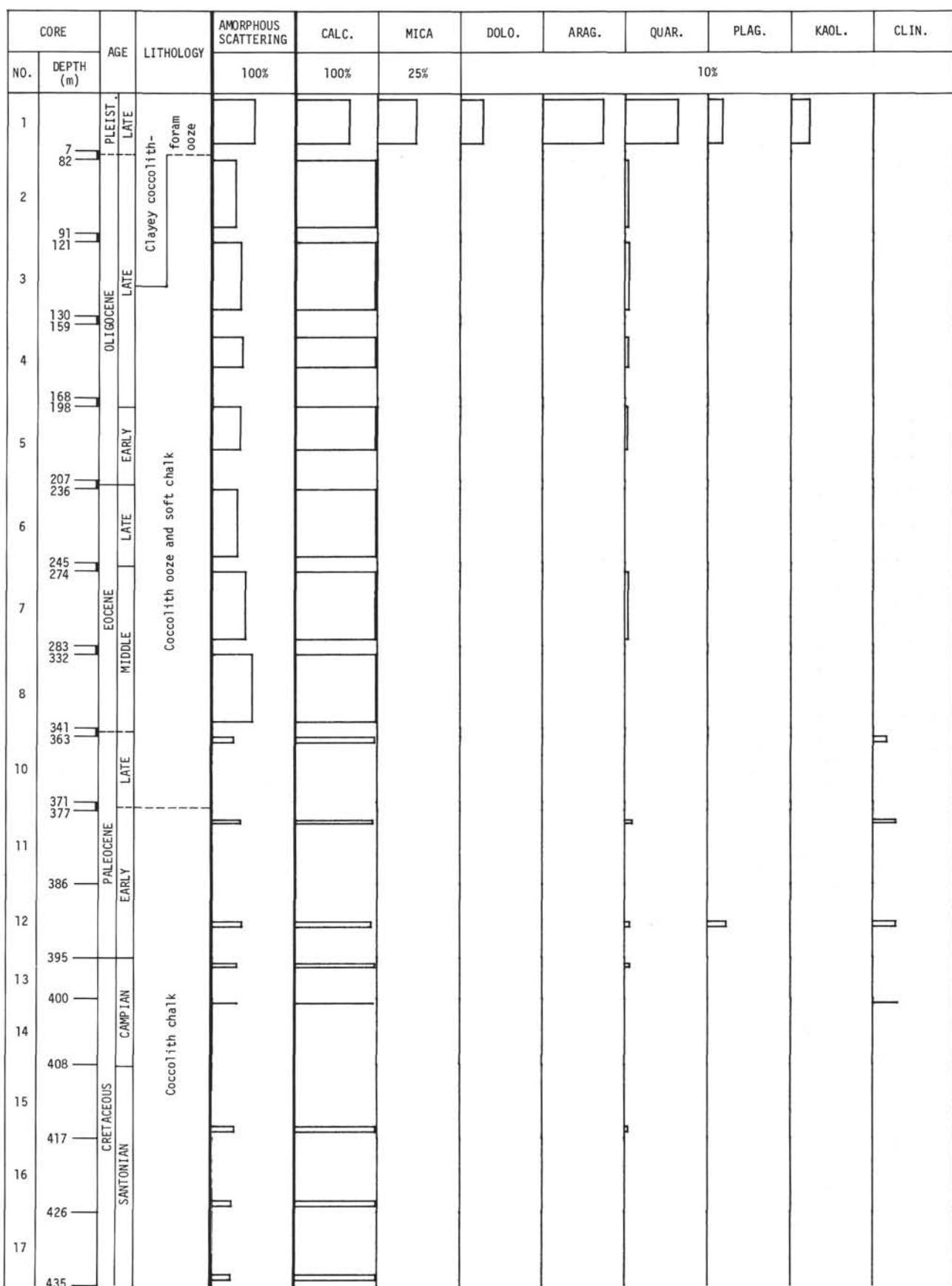


Figure 21. Site 95 bulk samples.

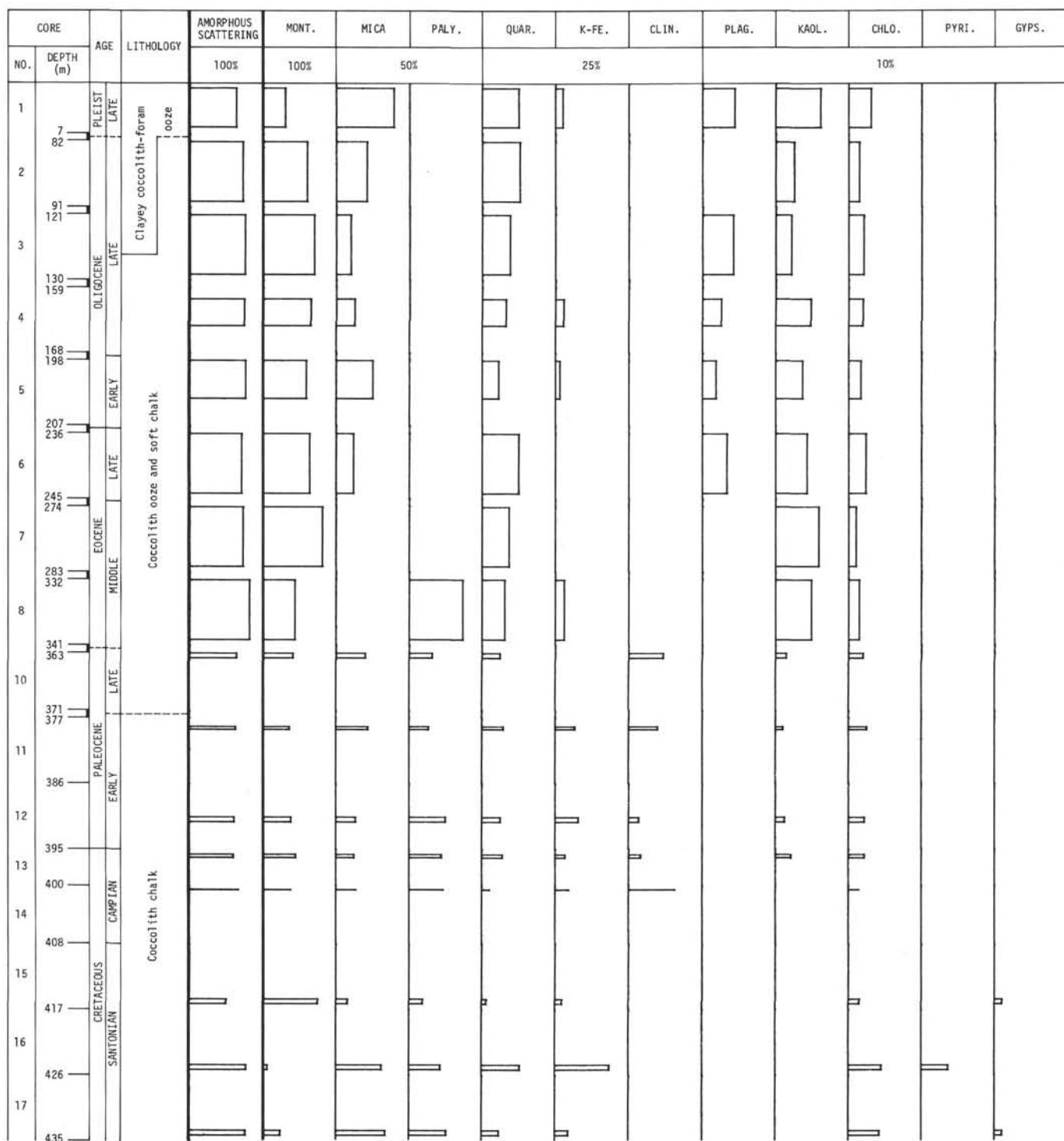


Figure 22. Site 95 &lt;2 µm fractions.

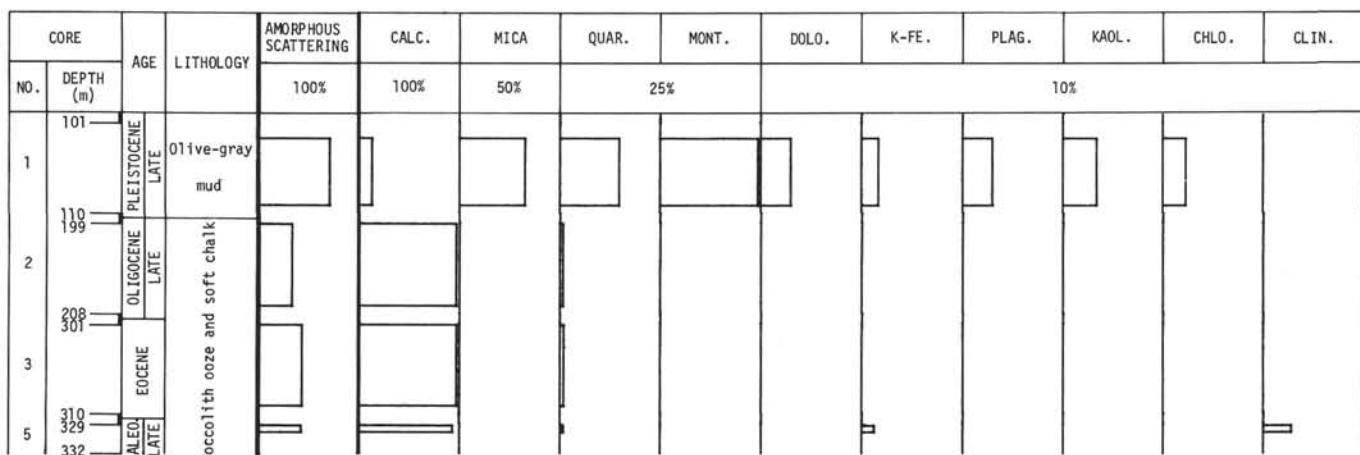
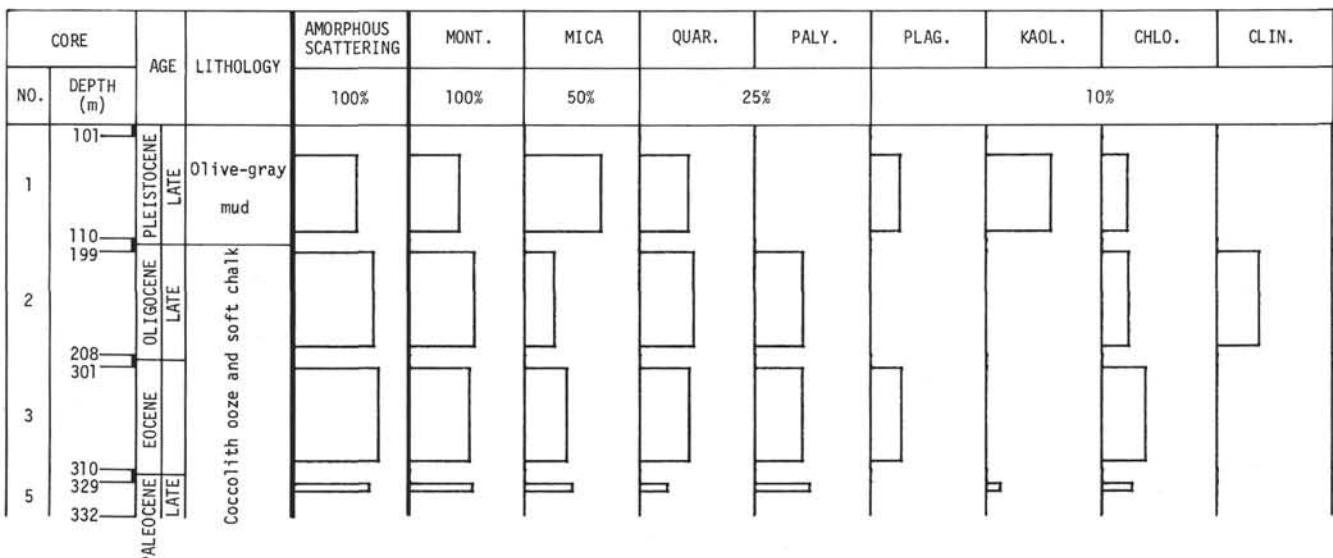


Figure 23. Site 96 bulk samples.

Figure 24. Site 96  $<2\text{ }\mu\text{m}$  fractions.

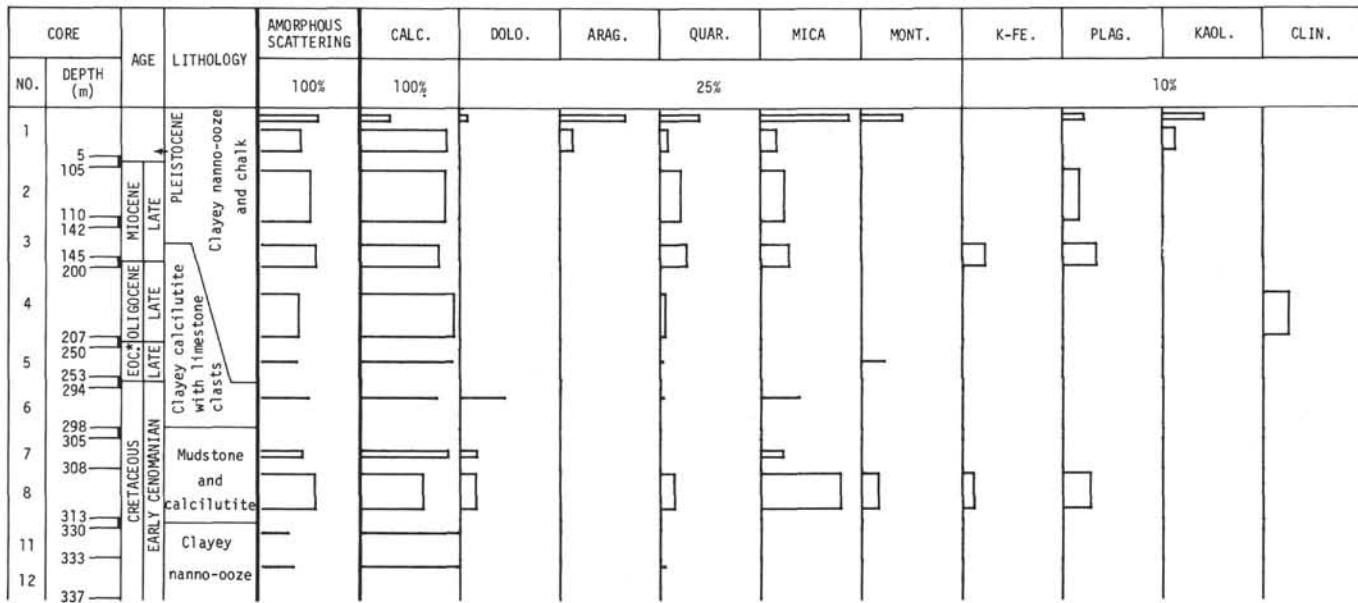
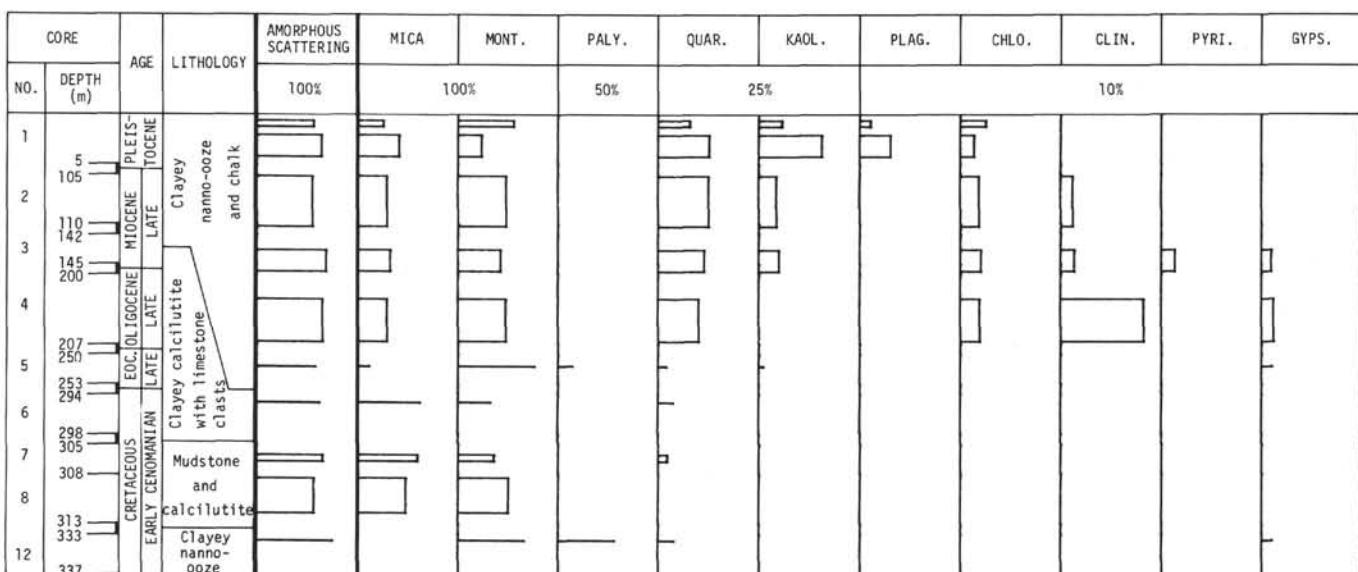


Figure 25. Site 97 bulk samples.

Figure 26. Site 97 <2  $\mu\text{m}$  fractions.