18. X-RAY MINERALOGY OF SEDIMENTS FROM THE CENTRAL PACIFIC OCEAN[1]

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METHODS

Semiquantitative determinations of the mineral composition in bulk samples, 2-20 μm and <2 μm fractions, were performed according to the methods described in the reports of Legs 1 and 2 and in Appendix III of Volume IV. The mineral analyses of the 2-20 μm and <2 μm fractions were performed on $CaCO_3$–free residues.

The results are presented in Tables 1 to 9 and also in Figures 1 to 27. Sediment ages, lithologic units, and the nomenclature of the sediment types used in Figures 1 to 27 are from DSDP Leg 17 hole summaries. Samples submitted for X-ray diffraction analysis from Leg 17 are listed in Table 10. The sample depths below the sea floor in the last column of Table 10 identify the samples as they are reported in Tables 1 to 9 and Figures 1 to 27.

Several minerals for which no concentration factors have been established and seven unidentified minerals were detected in Leg 17 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 was 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 (25-26%); diffraction peaks of the mineral are prominant in the total diffraction pattern, but the peaks of other minerals are of an equivalent intensity.

Major (>65%); diffraction peaks of the mineral predominate the diffraction pattern.

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

The usage of drilling mud containing montmorillonite and barite on Leg 17 was as follows: Hole 164, after Cores 6, 9, 24, 27; Hole 165A, after Cores 15, 17, and during Core 16; Hole 167, after Cores 33, 37, 75, 84, 90; Hole 169, after Cores 1, 7; Hole 170, after Core 11; Hole 171, during and after Core 18, and after Cores 22, 30, 31. Inspection of the X-ray mineralogy data did not give a strong indication that the samples submitted for X-ray diffraction analysis have been contaminated with drilling mud. Montmorillonite and barite are common constituents of pelagic sediments in the equatorial Pacific.

There are considerably fewer X-ray data on the 2-20 μm and 2 μm fraction samples than on the bulk samples in the results of Leg 17. This is because a large number of the samples are highly calcareous or extensively recrystallized and did not yield a sufficiently large sample for analysis after decalcification and size-fractionation.

DISCUSSION

A number of unique mineral occurrences were encountered in Leg 17. Several of these are discussed below.

Chert

At least four mineralogical varieties of chert[2] have been encountered in DSDP X-ray mineralogy samples in Legs 1 to 17: (1) quartz, (2) low cristobalite, (3) a variety which resembles porcelanite from the Miocene Monterey Formation of California, and (4) a variety which consists of porcelanite that contains a considerable proportion of tridymite. Quartz is invariably associated with the last three varieties. The third and fourth varieties have been the most frequently recovered in DSDP cores and are discussed by Heath and Moberly (1971) from Leg 7 in the central Pacific. The fourth variety is predominant among Leg 17 cherts.

X-ray diffraction patterns of the porcelanite and porcelanite + tridymite varieties are presented in Figure 28A, B. The porcelanite variety has a broad, major diffraction peak at 4.10 Å and has no counterpart in synthetic, high-purity silica phases. Low and high cristobalite major peaks occur at 4.0 Å and 4.15 Å, respectively (Brown, 1961). The porcelanite + tridymite variety has the porcelanite pattern but displays additional peaks at 4.30 Å 4.08 Å, and 3.81 Å which correspond to the major peaks of tridymite. Tridymite was quantified by deconvoluting the 4.30 Å peak from the shoulder of the 4.10 Å peak of porcelanite and the 4.26 Å peak of quartz and by using a hypothetical concentration factor of 3.0.

Jones and Segnit (1971) classify the porcelanite and porcelanite + tridymite varieties together as *opal-CT*. To explain the crystal structure they cite the work of Flörke (1955, 1967), who has shown that low cristobalite formed in the presence of foreign ions develops a disordered diffraction pattern which can resemble a mixture of low cristobalite and tridymite. The shift of the major peak of low cristobalite from 4.04 Å and the formation of tridymite peaks are attributed to stacking disorders in the crystal structure of low cristobalite rather than to the actual existence of tridymite.

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[2]Chert is used as a rock term and in the broad sense refers to any compact, ultrafine-grained, high-purity silica phase.

From an examination of numerous diffractograms from widely distributed chert occurrences in Legs 1 to 17, there is a strong suggestion that a gradation between the porcelanite variety and the porcelanite + tridymite variety exists which is in accord with the Jones and Segnit classification of opals. It was also found, however, that the porcelanite + tridymite variety was more common in older and more deeply buried sediments than the porcelanite variety and that the major diffraction peak of porcelanite remained at 4.10 Å without regard to the tridymite peak intensities. The latter observations suggest that the transition from the porcelanite variety to the porcelanite + tridymite variety occurs progressively with time and may be an ordering phenomenon (rather than a disordering phenomenon). That is, tridymite may be forming from porcelanite. Whether or not this suggestion will bear up under the scrutiny of more data is not known at this time.

A diffractogram of a sample containing low cristobalite chert from a tuffaceous mudstone (7-61.0-1-1, 83-89) is shown in Figure 28C for comparison with the porcelanite varieties. In the Jones and Segnit (1971) opal classification, this is classed as *opal-C* which is typically found to occur in association with lava flows and is not genetically related to the porcelanite or *opal-CT* varieties. Clinoptilolite is frequently associated with chert occurrences and complicates the interpretation of the diffraction pattern of chert (Figure 28D).

Palygorskite

Palygorskite is common in Leg 17 cores and is most abundant in the <2 μm fraction. It was identified on the basis of its major diffraction peaks–10.5, 6.42, 5.40, 4.48, 3.22, 2.60, and 2.56 Å. A diffraction pattern of a sample containing palygorskite is shown in Figure 29. Its presence was confirmed in a number of samples by scanning electron microscope examination. The crystal fibers are approximately 0.1 μm long and 0.025 to 0.05 μm wide. The fibers are readily reduced in size by ultrasonic vibration. There was no shifting of the 10.5 Å peak when samples were X-rayed with an without an organic expanding agent.

No generalization about the sediment types which contain palygorskite can be made. Palygorskite occurs in calcareous ooze in Holes 165A, 167, and 171; in zeolitic brown clay in Holes 164, 166, and 170; and in claystone in Hole 169. Palygorskite is typically associated with mica and often with K-feldspar. Almost invariably, the montmorillonite content of palygorskite-bearing sediments is low. This negative correlation is particularly well illustrated in Hole 166, Cores 20 and 23 (Figures 10, 12).

Goethite

Well-crystallized goethite is found in Sample 166-27-1,70-72 cored approximately 17 meters above basalt in a sequence of brown, zeolitic, marl mudstone and chert of Hauterivian age. A diffractogram of the decalcified 2 μm fraction is shown in Figure 30.

Goethite in this sample has the degree of crystallinity that is found in sedimentary ironstone concretions but is considerably less crystalline than hydrothermally deposited goethite. Iron-rich sediments have frequently been analyzed in DSDP X-ray mineralogy samples, but goethite is seldom found except in sediments which are lower Cenozoic or older.

Gypsum

Gypsum was detected in the <2 μm fractions of several cores at the four easterly sites of Leg 17, namely, Sites 164, 165, 166, and 171 (Tables 1, 2, 3, 4, and 9).

At Site 165, the occurrence of gypsum coincides with an interval containing what shipboard geologists interpreted to be micrite turbidites. Here gypsum may have formed on a nearby, emergent guyot in the Line Islands chain and was subsequently transported into the deep-water environment by turbidity currents or some other type of allochthonous transport mechanism.

At Site 171 on Horizon Guyot, gypsum is found in a lithologic unit of volcaniclastic sand overlying a limestone unit which is reported by shipboard geologists to have been deposited under shallow-water conditions which in turn overlies basalt. Gypsum was also found in Cores 2, 4, and 5 at Site 171. Gypsum may have been supplied to these sediments by two separate sequences of erosion of the shallow-water sediments. Only one sample from the shallow-water limestone was available for diffraction analysis. Unfortunately there was not a sufficient quantity of insoluble residue after decalcification of the shallow-water limestone to determine whether it contained gypsum.

The occurrence of gypsum at Sites 164 and 166 cannot be readily related to an allochthonous transport mechanism. It is noteworthy that these sites, along with Site 165, occur in an area of the Pacific Ocean where evaporite deposits commonly occur in the lagoons and flats of modern islands and atolls (Schlanger, 1965).

Analcite

Analcite occurs in a number of samples from Hole 165A (Table 3 and Figures 7, 8, 9). It is associated with volcaniclastic sediments which contain considerable quantities of augite and magnetite. Analcite was seen in an optical examination as individual, rounded trapezohedral crystal grains with a refractive index close to 1.486 and very slight birefringence.

A diffraction pattern of a sample containing analcite is presented in Figure 31. The d-spacings of analcite from Leg 17, Hole 165A match those given on the ASTM X-ray Powder Data File card 7-363.

Volcaniclastic Sediments

Numerous occurrences of volcaniclastic sediments were encountered in Leg 17 cores. X-ray diffractograms of these sediments typically show detectable quantities of magnetite and augite and frequently contain anatase, hematite, analcite, and phillipsite. A representative diffractogram is shown in Figure 32.

An optical examination of several samples of volcaniclastic sediments was performed. Magnetite, which was identified on the basis of its blue, metallic luster and magnetic properties, was primarily found to occur within vitreous glass shards rather than as free grains. In devitrified shards, magnetite appeared to be altering to hematite. Augite grains were frequently seen with a sawtooth morphology, probably resulting from in situ dissolution, with no evidence of cloudy alteration. Phillipsite occurs as lath-like crystals forming within glass shards. The primary occurrence of quartz in volcaniclastic sediments is in rounded, saccharoidal aggregates of secondary origin. In one sample (165A-23-2, 145-150) the aggregates appeared to be quartz replacements of foraminifera and radiolaria tests but more commonly they appeared to be devitrified pumice.

Because of alteration of magnetite to hematite, dissolution of augite, and neoformation of analcite, phillipsite, and quartz, stratigraphic correlation among volcaniclastic sediment layers on the basis of mineral assemblages should only be attempted with extreme caution.

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TABLE 1
Results of X-Ray Diffraction Analyses from Hole 164

Bulk Samples

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Calc.	Quar.	Cris.	K-Fe.	Plag.	Mica	Chlor.	Mont.	Paly.	Trid.	Clin.	Phil.	Bari.	Hali.	U-1[a]
1	28-48	28.80-34.90	82.9	73.2	–	9.9	–	–	10.8	12.1	–	10.7	–	–	6.3	50.2	–	–	–
2	48-51	50.30	91.4	86.5	–	10.0	–	–	12.4	7.4	–	38.2	–	–	7.7	24.3	–	–	–
3	51-57	51.80	82.4	72.5	–	7.7	–	–	15.5	9.5	–	18.8	–	–	16.3	32.2	–	–	–
		55.0	90.3	84.9	–	7.4	37.7	–	8.0	4.3	–	11.8	–	14.7	16.0	–	–	–	–
4	57-66	57.90	98.7	97.9	–	7.0	63.0	–	8.0	–	–	13.8	–	–	8.2	–	–	–	A
6	75-84	75.60	97.3	95.8	–	2.4	79.9	–	–	2.0	–	–	–	–	2.6	12.2	–	0.7	–
7	84-93	84.80-89.30	84.8	76.2	–	22.1	–	6.0	4.9	10.8	–	–	36.3	–	20.0	–	–	–	–
		91.10-91.30	86.0	78.1	–	19.4	–	13.8	6.8	10.8	–	9.7	29.8	–	9.7	–	–	–	–
8	93-102	94.10-96.00	85.2	76.9	–	18.5	–	11.7	3.9	7.6	–	–	57.3	–	–	–	–	1.0	
10	112-122	113.30-113.50	80.8	70.0	–	19.1	–	3.6	1.9	14.1	–	–	46.4	–	14.8	–	–	–	–
		116.10-116.20	82.2	72.2	–	17.7	7.6	4.0	0.8	10.6	–	2.0	43.7	–	13.6	–	–	–	–
		117.50	85.7	77.7	–	14.6	18.9	3.9	–	7.8	–	–	40.5	4.5	9.9	–	–	–	–
14	150-159	150.40	80.6	69.7	–	18.1	6.8	–	2.3	12.0	–	–	51.3	0.8	8.8	–	–	–	–
		159.00	82.7	73.0	–	16.0	26.1	2.2	1.3	11.8	–	–	29.5	4.6	8.5	–	–	–	–
15	159-169	160.30	83.8	74.7	–	15.8	21.5	2.6	1.9	12.8	–	–	33.9	3.5	8.0	–	–	–	–
16	169-178	170.40	84.0	75.0	–	16.4	13.8	4.8	2.5	10.3	–	2.7	36.5	4.3	8.7	–	–	–	–
17	178-187	178.90	86.4	78.7	–	12.3	57.0	2.7	0.9	3.5	–	1.8	11.4	8.8	1.7	–	–	–	–
18	187-196	187.50	85.0	76.6	–	12.4	9.0	–	–	10.4	–	3.4	56.9	1.7	6.2	–	–	–	–
20	206-215	207.00	84.3	75.4	–	13.7	11.3	3.6	–	9.7	–	4.8	50.1	–	6.9	–	–	–	–
21	215-224	215.90	83.9	74.8	–	10.7	7.7	3.2	–	9.0	–	–	59.5	2.2	7.7	–	–	–	–
		216.20	80.3	69.2	–	–	–	13.0	12.7	–	–	29.9	–	–	43.9	–	–	–	–
25	252-261	253.10	68.7	51.1	4.3	77.3	–	–	–	5.3	1.1	–	6.8	–	–	–	5.2	–	–

2-20 μm Fractions

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Cris.	K-Fe.	Plag.	Mica	Mont.	Paly.	Trid.	Clin.	Phil.	Bari.	U-2[a]
1	28-48	28.80-34.80	67.2	48.8	9.0	–	–	–	6.0	2.9	–	–	8.1	74.1	–	–
2	48-51	50.30	92.3	87.9	9.3	–	–	31.9	5.7	6.7	–	–	11.0	35.3	–	–
3	51-57	51.80	72.5	57.1	6.6	–	–	17.6	4.2	6.8	–	–	21.6	43.2	–	–
4	57-66	57.90	95.0	92.2	23.1	–	–	42.8	–	–	–	–	34.1	–	–	M
6	75-84	75.60	97.1	95.5	2.9	64.7	–	3.7	5.3	–	–	–	5.3	18.2	–	–
7	84-93	84.80-89.30	61.4	39.7	28.8	–	13.7	5.8	9.6	–	–	–	42.1	–	–	–
		91.10-91.30	68.8	51.3	30.1	–	18.9	10.8	13.1	–	–	–	27.1	–	–	–
8	93-102	94.10-96.00	73.4	58.4	37.7	–	25.7	11.6	16.1	–	8.2	–	0.7	–	–	–

10	112-122	113.30-113.50	64.0	43.8	28.4	–	13.4	9.7	15.5	–	9.9	–	13.1	–	–	–
		116.10-116.20	66.9	48.3	29.5	–	13.0	–	24.6	–	7.7	–	25.1	–	–	–
		117.50	74.7	60.5	19.4	22.0	8.3	5.4	11.9	–	9.0	5.3	18.7	–	–	–
14	150-159	150.40	67.8	49.7	27.6	–	11.6	9.3	24.3	–	6.1	–	21.1	–	–	–
		159.00	71.9	56.1	22.3	14.3	6.9	6.3	19.5	–	4.6	2.2	23.9	–	–	–
15	159-169	160.30	74.2	59.7	22.1	13.3	8.3	6.1	22.3	–	5.1	3.3	19.6	–	–	–
16	169-178	170.40	71.6	55.7	18.8	8.1	9.5	6.0	27.1	–	4.7	–	25.8	–	–	P
17	178-187	178.90	83.8	74.7	13.0	49.3	5.3	3.4	10.2	–	4.7	7.7	6.5	–	–	–
18	187-196	187.50	71.5	55.4	20.2	4.2	6.9	4.3	29.4	–	15.7	1.0	18.3	–	–	–
20	206-215	207.00	69.4	52.2	22.1	–	8.3	5.5	33.4	–	6.9	–	23.8	–	–	–
21	215-224	215.90	69.2	51.9	18.8	6.9	12.6	4.2	12.4	–	10.5	–	34.5	–	–	–
		216.20	75.3	61.3	1.4	–	10.3	19.8	–	15.9	–	–	52.6	–	–	–
25	252-261	253.10	54.6	29.1	77.1	–	–	–	6.6	–	–	–	–	–	16.3	–

<2 μm Fractions

	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Cris.	K-Fe.	Plag.	Mica	Mont.	Paly.	Trid.	Clin.	Phil.	Gyps.	Goet.
1	28-48	28.80-34.80	89.1	83.0	10.7	–	–	9.6	9.9	43.0	–	–	1.9	22.0	2.7	–
2	48-51	50.30	83.6	74.4	4.8	–	–	1.2	2.9	75.5	–	–	1.9	12.2	1.7	–
3	51-57	51.80	89.3	83.3	8.6	–	–	10.9	11.0	46.0	–	–	7.2	13.6	2.7	–
4	57-66	57.90	93.5	89.8	3.6	16.3	–	4.7	7.8	64.2	–	–	1.8	–	1.6	–
6	75-84	75.60	93.4	89.8	3.6	48.5	–	–	–	27.2	–	5.3	2.6	10.4	2.4	–
7	84-93	84.80-89.30	88.1	81.4	19.1	–	–	–	16.5	12.3	37.7	–	12.4	–	2.0	–
		91.10-91.30	88.7	82.4	13.1	–	20.8	5.8	12.8	19.7	24.4	–	2.3	–	1.1	–
10	112-122	113.30-113.50	89.4	83.5	8.6	–	–	–	11.9	15.3	59.1	–	2.9	–	2.2	–
		116.10-116.20	86.6	79.0	7.8	3.5	2.1	–	10.5	8.3	65.4	–	2.3	–	–	–
		117.50	90.0	84.4	7.0	14.7	–	–	5.7	7.3	60.2	2.0	1.4	–	1.7	–
14	150-159	150.40	88.1	81.5	7.6	10.3	2.2	1.2	7.5	1.7	67.0	–	1.1	–	1.4	–
		159.00	87.9	81.1	6.0	–	–	–	9.1	6.2	59.5	–	–	17.7	1.4	–
15	159-169	160.30	90.4	85.0	6.8	13.3	–	–	13.8	3.5	59.4	–	1.0	–	2.2	–
16	169-178	170.40	90.5	85.1	6.8	14.3	–	–	12.3	11.6	53.7	–	–	–	1.3	–
17	178-187	178.90	92.5	88.3	6.1	54.6	1.6	–	5.5	4.8	20.0	7.4	–	–	–	–
18	187-196	187.50	90.2	84.7	5.9	12.2	3.9	–	8.5	4.6	59.9	1.8	–	–	3.2	–
20	206-215	207.00	90.3	84.8	7.1	7.9	–	–	14.7	11.1	57.9	–	–	–	1.4	–
21	215-224	215.90	90.8	85.7	6.9	18.8	–	–	3.6	–	67.2	1.6	1.3	–	–	–
		216.20	78.9	67.0	–	–	11.9	5.3	–	80.0	–	–	1.5	–	1.2	–
25	252-261	253.10	82.6	72.8	59.0	–	–	–	11.4	10.9	17.5	–	–	–	1.2	P

[a]Unidentified mineral U-1, peak at 2.79 Å (broad). A = abundance.
[b]Unidentified mineral U-2, peak at 4.21 Å (narrow). M = major; P = presence.

TABLE 2
Results of X-Ray Diffraction Analyses from Hole 165

Bulk Samples

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Calc.	Quar.	Plag.	Kaol.	Mica	Chlo.	Mont.	Clin.	Phil.	Bari.
1	0-5	0.40	86.5	78.9	–	22.6	21.0	7.4	26.9	1.9	16.6	–	–	3.6
		2.20	86.9	79.6	19.6	10.3	5.9	–	11.8	1.5	13.0	2.0	35.9	–
2	5-14	5.60	88.2	81.6	–	24.5	11.1	4.3	28.5	2.2	16.3	1.6	7.6	3.9
		6.80	89.5	83.5	–	7.3	12.6	–	9.5	–	20.0	–	50.6	–
		7.50	86.5	78.9	–	17.1	15.1	–	19.9	–	18.4	2.0	24.9	2.6

2-20 μm Fractions

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Plag.	Mica	Chlor.	Clin.	Phil.
2	5-14	5.60	80.8	70.1	34.8	21.4	27.8	4.6	1.2	10.1
		7.50	83.3	73.8	23.3	20.9	13.6	–	1.9	40.3

<2 μm Fractions

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Dolo.	Quar.	Plag.	Kaol.	Mica	Chlor.	Mont.	Phil.	Gyps.
2	5-14	5.60	85.7	77.6	–	13.1	7.4	–	23.5	3.7	39.1	10.1	3.1
		7.50	82.6	72.8	1.8	7.9	–	1.5	13.2	–	49.8	22.3	3.3

TABLE 3
Results of X-Ray Diffraction Analyses from Hole 165A

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Calc.	Quar.	K-Fe.	Plag.	Kaol.	Mica	Mont	Paly.	Clin.	Phil.	Anal.	Hema.	Bari.	Hali.	Augi.	Magn.	Anat.
Bulk Samples																					
2	14-24	14.60-16.40	60.0	37.5	99.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		18.30-21.00	59.0	35.9	99.7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3	24-33	29.10	63.1	42.4	99.5	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		29.50	56.4	31.9	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		30.50	59.2	36.3	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	80-89	81.90	55.2	30.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		82.00-86.10	54.8	29.4	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6	127-136	128.00-135.50	57.2	33.2	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7	136-145	137.00-138.00	49.5	21.1	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		144.90	68.3	50.5	99.6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8	145-154	147.80-151.80	72.0	56.3	99.6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		153.30	74.6	60.4	99.4	0.6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9	154-163	156.40	68.0	50.1	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		158.00-160.80	89.0	82.9	91.5	0.7	–	–	–	3.6	–	–	–	–	–	–	4.2	–	–	–	–
		162.70	98.8	98.2	46.0	5.7	–	9.5	–	20.4	–	–	–	–	–	–	13.7	4.8	–	–	–
		162.90	80.9	70.1	96.4	–	–	–	–	–	–	–	–	–	–	–	3.4	–	–	–	–
10	201-211	201.70-206.70	60.2	37.8	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
11	210-219	212.00-217.00	64.2	44.0	99.6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
12	219-228	221.50-222.50	98.1	97.0	70.3	3.0	–	10.1	–	–	–	–	–	–	–	–	16.5	–	–	–	–
		226.00	86.9	79.6	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13	228-237	230.50	98.3	97.3	–	3.5	–	10.6	–	11.9	–	–	–	–	–	–	74.0	–	–	–	–
		235.00	98.7	97.9	–	1.7	–	11.8	–	22.6	9.7	–	4.2	–	–	–	50.1	–	–	–	–
18	290-321	291.00	75.0	61.0	62.3	3.2	4.2	–	–	3.3	6.7	11.0	9.4	–	–	–	–	–	–	–	–
		291.90	77.3	64.5	50.0	2.9	7.6	1.5	–	1.4	15.3	9.0	12.2	–	–	–	–	–	–	–	–
		293.00	58.5	35.2	93.0	–	4.2	–	–	–	2.8	–	–	–	–	–	–	–	–	–	–
		294.00	83.1	73.6	23.2	2.2	19.6	15.9	–	–	32.6	–	–	2.0	–	1.7	–	–	–	1.7	0.8
19	321-340	321.38	52.5	25.7	97.4	–	–	–	–	–	1.6	–	–	–	1.0	–	–	–	–	–	–
		321.42	82.9	73.2	1.8	0.9	20.3	8.7	–	–	35.5	–	–	26.7	3.0	–	–	–	–	3.0	–
		321.70	55.2	30.0	95.7	–	4.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		321.90	76.6	63.5	2.3	0.7	17.4	10.7	–	–	34.4	–	–	15.7	3.3	–	–	–	10.6	4.4	0.6
		323.60	79.0	67.2	26.6	0.9	12.7	–	–	–	34.7	–	–	14.8	3.6	–	–	–	4.1	2.5	–
20	340-368	342.60	75.6	61.8	4.7	0.4	12.3	9.2	–	2.4	41.7	–	–	12.8	5.1	–	–	–	7.8	3.1	0.6
		344.40	58.9	35.8	91.2	3.1	–	–	–	–	–	4.6	1.1	–	–	–	–	–	–	–	–
21	368-396	369.45	72.8	57.6	53.9	–	11.7	–	–	1.7	18.1	–	2.1	–	–	1.7	–	–	10.0	–	–
		369.47	52.9	26.4	93.4	1.3	–	–	–	–	–	–	5.4	–	–	–	–	–	–	–	–
		370.60	55.9	31.1	89.0	3.6	–	–	–	2.0	1.7	–	3.6	–	–	–	–	–	–	–	–
		371.30	70.7	54.3	65.4	12.1	2.6	–	–	3.0	4.0	6.9	6.1	–	–	–	–	–	–	–	–
		372.10	50.0	21.8	89.6	5.8	–	–	–	1.7	–	–	2.9	–	–	–	–	–	–	–	–
22	396-424	397.40	79.2	67.6	–	28.9	8.4	–	–	8.7	8.9	25.0	20.1	–	–	–	–	–	–	–	–
		399.10	80.5	69.6	23.0	6.9	–	6.5	5.9	2.2	19.6	9.8	18.1	–	–	–	–	–	5.6	2.4	–

TABLE 3 – *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Calc.	Quar.	K-Fe.	Plag.	Kaol.	Mica	Mont.	Paly.	Clin..	Phil.	Anal.	Hema.	Bari.	Hali.	Augi.	Magn.	Anat.
Bulk Samples – *Continued*																					
22	396-424	400.20	79.5	68.0	27.4	3.4	–	–	–	–	30.0	–	22.3	–	–	–	–	–	16.0	0.9	–
23	424-451	425.80	80.3	69.2	3.5	10.4	–	39.1	–	5.9	16.7	–	–	–	4.6	13.5	–	–	–	6.3	–
		426.50	78.6	66.6	17.0	–	8.3	33.8	–	2.3	19.2	–	6.3	–	–	1.7	–	–	7.1	4.3	–
		426.70	77.5	64.9	44.6	8.5	4.1	9.0	–	3.5	16.7	8.3	–	–	–	2.7	–	–	2.5	–	–
		427.00	56.4	31.9	24.8	44.9	6.0	2.9	–	1.9	8.5	–	–	–	6.4	4.7	–	–	–	–	–
25	460-480	461.00	79.0	67.3	8.7	15.7	12.3	26.4	–	7.9	19.8	–	0.8	–	1.7	4.0	–	–	–	2.6	–

2-20 μm Fractions

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	K-Fe.	Plag.	Kaol.	Mica	Mont.	Paly.	Clin.	Phil.	Anal.	Hema.	Pyri.	Bari.	Augi.	Magn.	Anat.	U-2[a]
2	14-24	14.60-16.40	97.0	95.3	17.3	–	35.2	1.5	12.7	8.3	–	–	17.0	–	–	–	7.9	–	–	–	–
		18.30-21.00	96.2	94.0	16.2	–	34.1	1.3	10.3	22.6	–	–	15.5	–	–	–	–	–	–	–	–
3	24-33	29.10	97.3	95.8	21.7	–	38.2	–	10.4	–	–	2.7	27.1	–	—	–	–	–	–	–	–
		30.50	97.8	96.5	17.9	–	30.4	–	18.8	–	–	5.1	27.8	–	–	–	–	–	–	–	–
5	80-89	81.90	98.8	98.1	10.7	–	19.3	–	39.9	–	–	8.1	22.0	–	–	–	–	–	–	–	–
		82.00-86.10	98.0	96.9	14.6	–	31.4	–	19.2	–	–	7.5	27.3	–	–	–	–	–	–	–	–
6	127-136	128.00-135.50	98.8	98.1	17.2	–	36.2	–	–	–	–	4.9	26.9	–	–	–	14.7		–	–	P
7	136-145	137.00-138.00	98.1	97.0	14.5	–	27.7	–	10.5	16.2	–	7.5	19.9	–	–	–	3.6	–	–	–	–
		144.90	98.4	97.6	10.4	–	12.1	–	14.5	–	–	5.0	18.2	–	–	–	39.8	–	–	–	–
8	145-154	147.80-151.80	98.3	97.4	8.8	–	16.0	–	17.2	–	–	–	17.7	–	–	–	40.3	–	–	–	–
		153.30	99.8	99.6	21.0	–	31.2	–	40.1	–	–	–	–	–	–	–	7.7	–	–	–	–
9	154-163	156.40	99.5	99.3	12.1	–	15.8	–	43.2	–	–	–	–	–	–	–	28.9	–	–	–	–
		158.00-160.80	98.8	98.1	21.8	–	31.4	–	–	–	–	–	–	–	–	–	46.8	–	–	–	–
		162.70	99.8	99.6	16.3	–	34.0	–	28.0	–	–	–	–	–	–	–	21.7	–	–	–	–
		162.90	98.8	98.1	–	–	14.8	–	17.8	–	–	–	–	–	–	–	67.4	–	–	–	–
10	201-211	201.70-206.70	98.8	98.2	0.5	–	16.3	–	–	–	–	–	–	–	–	–	83.1	–	–	–	—
11	210-219	212.00-217.00	98.5	97.6	–	–	22.0	–	–	–	–	–	–	–	–	–	78.0	–	–	–	–
12	219-228	221.50-222.50	99.5	99.2	3.4	–	26.0	–	–	–	–	–	–	–	–	–	70.6	–	–	–	–
		226.00	99.6	99.4	19.3	-	53.8	–	–	–	–	–	–	–	–	–	26.9	–	–	–	–
13	228-237	230.50	98.5	97.7	6.4	–	12.9	–	15.5	–	–	–	–	–	–	–	65.2	–	–	–	–
		235.00	99.4	99.1	3.5	–	–	–	13.4	–	–	–	60.9	–	–	–	22.2	–	–	–	–
18	290-321	291.00	70.1	53.3	12.4	19.5	–	–	9.1	–	–	45.6	–	–	13.4	–	–	–	–	–	–
		291.90	70.0	53.1	7.3	21.6	–	–	7.0	–	–	39.4	–	–	16.7	–	–	5.6	2.4	–	–
		293.00	73.1	58.0	2.9	44.5	26.6	–	3.8	–	–	0.7	6.2	–	10.0	–	–	–	5.3	–	–
		294.00	73.8	59.1	4.4	36.6	26.4	–	1.9	5.8	–	–	3.6	–	5.1	–	–	8.8	7.3	–	–
19	321-340	321.42	76.6	63.4	3.4	19.6	–	–	–	4.8	–	–	43.8	1.9	5.3	–	–	16.6	3.9	0.8	–
		321.90	70.4	53.7	1.1	14.3	15.4	–	–	8.0	–	–	24.5	0.8	5.5	–	–	21.1	8.8	0.6	–
		323.60	78.3	66.1	1.6	25.9	–	–	–	18.3	–	–	38.6	–	–	–	–	7.2	7.0	1.4	–

20	340-368	342.60	71.6	55.6	0.6	16.8	5.9	–	2.4	18.5	–	–	31.7	5.8	3.5	–	–	11.2	2.3	1.3	–
		344.40	75.6	61.8	31.7	20.5	–	–	17.9	–	4.9	18.8	–	–	4.6	–	–	–	1.7	–	–
21	368-396	369.45	69.3	52.0	1.3	27.1	10.4	–	3.3	–	–	3.9	–	–	5.0	–	–	45.1	3.9	–	–
		369.47	62.4	41.3	9.2	9.8	–	–	3.2	–	–	77.8	–	–	–	–	–	–	–	–	–
		370.60	67.8	49.7	21.9	9.6	–	–	11.8	8.7	5.3	42.7	–	–		–	–		–	–	–
		371.30	68.2	50.4	19.7	13.8	–	–	10.2	–	–	47.1	–	–	5.6	–	–	–	3.6	– –	–
		372.10	64.9	45.2	38.5	11.1	–	–	8.7	–	–	36.9	–	–	2.8	–	–	–	2.1	–	–
22	396-424	397.40	64.3	44.2	22.8	17.5	–	–	11.3	–	3.6	38.8	–	–	–	–	–	2.6	3.4	–	–
		399.10	66.4	47.5	7.9	17.3	17.1	–	2.7	–	–	33.1	–	0.7	–	–	–	17.2	4.0	–	–
		400.20	62.7	41.7	3.5	–	18.1	–	1.5	–	–	54.4	–	1.2	–	–	–	18.6	2.8	–	–
23	424-451	425.80	–	–	7.0	18.9	50.3	–	9.2	–	–	1.0	–	2.4	11.3	–	–		–	–	–
		426.50	67.8	49.8	0.8	29.3	39.6	–	2.5	–	–	4.8	–	–	3.9	–	–	12.6	6.6	–	–
		426.70	69.9	53.0	8.5	8.1	13.7	–	8.2	6.9	–	46.8	–	–	4.3	–	–	1.5	1.8	–	–
		427.00	54.8	29.3	63.3	18.3	5.4	–	3.5	–	–	–	–	5.8	3.7	–	–		–	–	–
25	460-480	461.00	70.5	53.8	23.4	21.5	36.5	–	5.9	–	–	1.4	–	1.3	4.7	0.6	–	–	4.7	–	–

<2 μm Fractions

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	K-Fe.	Plag.	Kaol.	Mica	Mont.	Paly.	Clin.	Phil.	Anal.	Hema.	Gyps.	Bari.	Hali.	Augi.	Magn.	Anat.
2	14-24	14.60-16.40	92.0	87.5	8.0	–	2.2	5.0	8.8	60.6	–	–	10.7	–	–	4.5	–	–	–	–	–
		18.30-21.00	92.9	88.9	10.1	–	19.3	3.1	6.8	52.9	–	–	4.3	–	–	3.6	–	–	–	–	–
3	24-33	29.10	90.6	85.3	6.8	–	11.6	6.0	9.2	51.1	–	–	6.5	–	–	8.7	–	–	–	–	–
		29.50	97.3	95.7	4.0	–	8.9	–	10.4	52.2	18.3	–	4.4	–	–	1.8	–	–	–	–	–
		30.50	92.1	87.6	8.5	–	19.8	5.5	7.6	55.7	–	0.8	–	–	–	2.2	–	–	–	–	–
5	80-89	81.90	90.1	84.6	1.9	–	1.3	1.0	53.6	35.5	–	–	2.8	–	–	3.8	–	–	–	–	–
		82.00-86.20	88.2	81.5	4.4	–	10.9	1.9	5.1	68.9	–	–	7.2	–	–	1.6	–	–	–	–	–
6	127-136	128.00-135.50	93.3	89.6	4.7	–	6.5	–	–	73.7	–	–	11.8	–	–	0.8	2.5	–	–	–	–
7	136-145	137.00-138.00	92.5	88.3	6.3	–	6.7	–	5.9	79.8	–	–	–	–	–	1.3	–	–	–	–	–
		144.90	92.1	87.7	5.5	–	5.8	–	11.0	57.4	–	–	8.7	–	–	2.1	9.5	–	–	–	–
8	145-154	147.80-151.80	95.4	92.8	10.0	–	7.4	3.0	11.3	52.3	–	–	9.2	–	–	–	6.7	–	–	–	–
		153.30	96.0	93.8	8.0	–	7.7	3.0	15.1	63.8	–	–	–	–	–	–	2.4	–	–	–	–
9	154-163	156.40	97.0	95.3	10.9	–	9.0	–	21.5	58.6	–	–	–	–	–	–	–	–	–	–	–
		158.00-160.80	94.6	91.6	13.7	–	8.0	5.4	17.2	51.0	–	–	–	–	–	–	4.7	–	–	–	–
		162.70	94.0	90.6	5.5	–	5.2	2.7	14.3	68.9	–	–	–	–	–	–	3.4	–	–	–	–
		162.90	96.4	94.4	18.0	–	25.5	–	–	–	–	–	–	–	–	–	56.5	–	–	–	–
10	201-211	201.70-206.70	78.9	67.1	2.8	–	8.5	–	17.3	61.1	–	–	–	–	–	–	10.3	–	–	–	–
11	210-219	212.00-217.00	99.6	99.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
12	219-228	221.50-222.50	96.3	94.2	6.4	–	7.1	–	16.9	58.0	–	–	–	–	–	–	11.6	–	–	–	–
		226.00	97.4	95.9	4.9	–	3.8	–	19.1	68.4	–	–	–	–	–	–	3.9	–	–	–	–
13	228-237	230.50	95.6	93.2	9.0	–	4.5	3.4	12.9	59.2	–	–	–	–	–	–	10.9	–	–	–	–
		235.00	96.4	94.3	4.7	–	7.3	–	15.7	65.0	–	–	–	–	–	–	7.3	–	–	–	–
18	290-321	291.00	87.2	80.1	8.3	4.7	0.9	–	8.5	55.4	19.9	2.0	–	–	–	–	–	–	–	–	–
		291.90	84.5	75.8	3.2	4.1	1.3	–	6.1	65.5	9.0	1.4	–	–	2.7	–	–	1.8	3.8	0.8	–
		293.00	75.6	61.9	–	7.8	–	–	–	88.2	–	–	–	–	1.6	–	–	–	–	–	1.9
		294.00	82.8	73.1	0.9	11.5	8.2	–	–	66.2	–	–	3.6	–	–	–	–	2.5	3.5	2.3	1.3

TABLE 3 – ***Continued***

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	K-Fe.	Plag.	Kaol.	Mica	Mont.	Paly.	Clin.	Phil.	Anal.	Hema.	Gyps.	Bari.	Hali.	Augi.	Magn.	Anat.
<2μ Fractions – ***Continued***																					
19	321-340	321.42	78.4	66.3	–	–	–	–	–	97.8	–	–	–	–	–	–	–	–	–	–	2.2
		321.70	83.0	73.5	11.2	42.1	–	–	12.6	–	–	–	–	–	20.4	–	–	–	–	–	13.8
		321.90	71.8	56.0	–	–	–	–	–	99.2	–	–	–	–	–	–	–	–	–	–	0.5
		323.60	77.1	64.3	–	–	–	–	–	98.7	–	–	–	–	–	–	–	–	–	–	0.9
20	340-368	342.60	74.7	60.5	–	–	–	–	–	92.0	–	–	5.1	1.9	–	–	–	–	–	–	1.1
		344.40	84.5	75.8	26.9	3.0	–	–	–	35.4	32.8	1.3	–	–	–	–	–	–	–	–	0.6
21	368-396	369.45	76.6	63.5	1.0	4.7	2.7	–	–	84.6	–	–	–	–	2.3	–	–	–	3.4	–	0.8
		369.47	78.4	66.3	24.4	2.3	–	–	4.0	56.5	–	12.8	–	–	–	–	–	–	–	–	–
		370.60	78.2	66.0	33.3	–	–	–	8.4	40.0	13.4	4.9	–	–	–	–	–	–	–	–	–
		371.30	81.7	71.5	30.2	–	–	–	–	50.0	17.2	2.6	–	–	–	–	–	–	–	–	–
		372.10	76.9	63.9	69.8	–	–	–	–	12.0	16.3	2.0	–	–	–	–	–	–	–	–	–
22	396-424	397.40	84.0	75.0	36.0	–	–	–	7.5	26.1	28.8	1.6	–	–	–	–	–	–	–	–	–
		399.10	78.6	66.6	8.5	3.2	–	–	–	80.1	6.3	1.9	–	–	–	–	–	–	–	–	–
		400.20	79.1	67.3	2.4	–	4.3	–	–	91.3	–	2.0	–	–	–	–	–	–	–	–	–
23	424-451	425.80	99.6	99.4	10.3	5.1	14.9	–	14.5	31.7	–	1.5	–	6.8	15.3	–	–	–	–	–	–
		426.50	78.5	66.4	0.8	11.3	5.0	–	–	79.2	–	1.5	–	–	1.6	–	–	–	0.6	–	–
		426.70	90.3	84.8	15.3	1.7	2.2	–	–	64.8	12.5	1.4	–	–	–	–	–	–	2.1	–	–
		427.00	62.8	41.9	23.3	9.8	2.7	–	2.8	37.1	–	–	–	12.2	12.2	–	–	–	–	–	–
25	460-480	461.00	80.8	70.0	7.9	5.1	10.9	–	6.6	62.3	–	–	–	1.2	4.2	–	–	–	–	0.8	0.9

[a]Unidentified mineral U-2, peak at 4.21 Å (sharp).

TABLE 4
Results of X-Ray Diffraction Analyses from Hole 166

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Calc.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlor.	Mont.	Paly.	Trid.	Clin.	Phil.	Bari.	Hali.	Magn.	Goet.	U-3[a]	U-3[b]
Bulk Samples																							
2	1-11	3.50	95.0	92.2	–	21.6	–	5.5	20.6	–	21.4	5.7	18.1	–	–	–	–	5.4	1.8	–	–	–	–
		5.00	97.2	95.6	–	25.5	–	–	21.6	6.3	16.9	–	15.1	–	–	–	–	10.6	4.0	–	–	–	–
		9.50	97.0	95.4	–	24.8	–	–	17.2	8.5	22.3	–	14.4	–	–	–	–	10.7	2.0	–	–	–	–
4	20-29	21.00	97.2	95.6	37.6	14.0	–	–	13.1	4.0	–	–	10.0	–	–	–	–	12.9	8.3	–	–	–	–
8	84-93	86.60	95.1	92.3	60.4	4.6	–	–	6.4	–	8.9	–	9.1	–	–	–	–	5.4	5.3	–	–	–	–
		88.00	93.4	89.7	62.3	6.6	–	–	–	2.8	5.7	–	15.4	–	–	–	–	3.7	3.5	–	–	–	–
9	103-112	104.10	95.8	93.4	3.5	9.6	–	–	27.0	8.4	8.2	–	30.9	–	–	–	–	5.4	7.1	–	–	–	–
		107.00	95.4	92.8	–	12.2	–	–	34.5	5.9	12.2	–	22.5	–	–	–	6.1	–	6.7	–	–	–	–
		108.50	95.9	93.6	–	11.7	–	–	28.1	2.6	–	–	30.1	–	–	–	17.5	–	10.0	–	–	–	–
10	121-130	128.30	96.2	94.0	3.3	7.9	–	–	20.0	–	8.4	–	32.6	–	–	–	15.8	8.2	3.8	–	–	–	–
12	159-163	160.00	98.1	97.1	16.8	13.1	–	–	13.3	4.8	12.8	–	–	–	–	–	–	23.4	15.8	–	–	–	–

13	169-178	173.00	97.8	96.6	–	20.0	–	–	–	8.9	22.0	–	–	–	–	–	–	35.0	14.0	–	–	–	–
		176.00	97.7	96.4	–	17.9	–	–	–	8.5	18.9	–	–	–	–	–	–	35.2	19.5	–	–	–	–
16	189-198	195.10	83.8	74.7	–	2.4	–	–	7.9	–	–	–	20.7	–	–	52.8	–	14.3	1.8	–	–	T	–
		195.40	88.0	81.2	–	2.5	41.9	–	–	–	3.8	–	22.6	–	11.6	11.4	–	6.3	–	–	–	T	–
		196.20	97.4	96.0	–	2.9	–	–	–	–	–	–	35.7	–	–	21.5	–	33.2	6.7	–	–	T	–
20	221-230	221.60	82.2	72.2	–	18.8	–	7.6	–	–	13.7	–	5.4	54.5	–	–	–	–	–	–	–	–	T
		224.20	82.5	72.7	–	16.3	–	11.1	–	–	11.9	–	4.2	56.5	–	–	–	–	–	–	–	–	T
		224.90	83.0	73.5	–	17.1	–	10.4	–	–	12.6	–	3.8	56.1	–	–	–	–	–	–	–	–	P
		229.80	81.2	70.6	–	13.4	–	4.6	2.4	–	13.4	–	4.2	62.0	–	–	–	–	–	–	–	–	T
23	250-260	251.80	87.0	79.7	–	10.0	34.8	1.4	0.8	–	4.9	–	7.8	33.0	–	7.3	–	–	–	–	–	–	–
		252.40	84.2	75.4	–	2.0	–	12.8	31.4	–	–	–	25.1	–	–	26.5	–	–	–	2.1	–	T	–
		252.80	83.3	73.9	0.8	1.6	–	32.8	27.0	–	3.5	–	29.6	–	–	1.9	–	–	–	2.8	–	–	–
		252.90	83.1	73.6	–	1.4	–	18.6	40.9	–	2.6	–	–	–	–	36.6	–	–	–	–	–	–	–
24	260-270	260.90	77.9	65.5	37.4	3.2	–	–	–	–	24.9	–	34.6	–	–	–	–	–	–	–	–	–	–
		267.10	77.4	64.6	12.5	–	–	–	–	–	9.4	–	14.8	–	–	63.3	–	–	–	–	–	–	–
25	270-279	270.90	77.6	65.0	–	8.5	–	28.6	–	–	–	–	60.6	–	–	–	–	–	2.2	–	–	–	–
		271.20	77.8	65.4	–	9.0	–	30.2	–	–	–	–	60.7	–	–	–	–	–	–	–	–	–	–
27	289-298	289.70	76.5	63.2	68.4	14.7	–	–	–	–	5.1	–	11.8	–	–	–	–	–	–	–	P	–	–

2-20 μm Fractions

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlor.	Mont.	Paly.	Trid.	Clin.	Phil.	Bari.	Hali.	Augi.	Magn.	Goet.	U-2[c]	U-4[d]
2	1-11	3.50	96.1	93.9	33.1	–	9.4	26.6	–	20.6	5.7	2.8	–	–	–	–	1.8	–	–	–	–	–	–
		5.00	98.0	96.8	32.4	–	–	18.4	–	23.2	–	–	–	–	–	23.6	2.4	–	–	–	–	–	–
		9.50	97.4	95.9	23.7	–	–	13.2	4.0	26.9	–	13.8	–	–	–	18.4	–	–	–	–	–	–	–
4	20-29	21.00	99.4	99.0	31.1	–	–	34.5	–	34.4	–	–	–	–	–	–	–	–	–	–	–	–	–
8	84-93	86.60	99.1	98.6	33.8	–	–	44.8	–	21.4	–	–	–	–	–	–	–	–	–	–	–	–	–
		88.00	97.4	95.9	19.4	–	–	48.0	4.1	16.5	–	–	–	–	–	–	11.9	–	–	–	–	–	–
9	103-112	104.10	97.3	95.8	17.1	–	–	43.0	–	–	–	14.9	–	–	2.6	22.4	–	–	–	–	–	–	–
		107.00	97.8	96.5	13.1	–	–	48.1	2.1	11.6	–	7.9	–	–	–	17.2	–	–	–	–	–	–	–
		108.50	96.5	94.5	14.3	–	–	39.6	–	7.7	–	8.3	–	–	–	30.1	–	–	–	–	–	–	–
10	121-130	128.30	97.0	95.2	16.7	–	–	42.7	–	–	–	–	–	–	2.9	35.9	–	1.8	–	–	–	P	–
12	159-163	160.00	98.8	98.1	12.7	–	–	64.8	–	10.8	–	–	–	–	–	–	11.7	–	–	–	–	–	–
13	169-178	173.00	99.3	98.9	22.0	–	–	52.3	–	–	–	–	–	–	–	–	25.7	–	–	–	—	A	–
		176.00	99.7	99.5	23.7	–	–	38.5	–	–	–	–	–	–	–	–	37.9	–	–	–	–	–	–
16	189-198	195.10	71.1	54.8	–	–	–	–	–	–	–	9.0	–	–	73.8	–	17.1	–	–	–	–	–	–
		195.40	88.4	81.9	1.1	53.8	–	1.6	–	–	–	–	–	21.1	17.1	–	5.3	–	–	–	–	–	–
		196.20	98.7	98.0	22.9	–	–	–	–	21.8	–	20.7	–	–	27.8	–	6.8	–	–	–	–	–	–
20	221-230	221.60	68.0	50.0	34.7	–	32.9	–	–	25.5	–	–	6.9	–	–	–	–	–	–	–	–	–	T
		224.20	70.9	54.5	31.3	–	29.9	–	–	29.9	–	–	8.9	–	–	–	–	–	–	–	–	–	P
		224.90	77.8	65.3	30.8	–	33.5	–	–	28.5	–	–	7.2	–	–	–	–	–	–	–	–	–	T
		229.80	75.8	62.2	28.4	–	23.9	12.1	–	31.1	–	–	4.6	–	–	–	–	–	–	–	–	–	–
23	250-260	251.80	84.8	76.2	13.5	27.5	7.4	4.9	–	10.7	–	–	3.8	6.7	25.7	–	–	–	–	–	–	–	–
		252.40	85.4	77.3	1.7	–	20.7	16.5	–	2.8	–	14.3	–	–	39.5	–	–	–	4.6	–	–	–	–
		252.80	86.9	79.6	1.2	–	28.9	34.2	–	–	–	21.7	–	–	10.9	–	–	–	–	3.1	–	–	–
		252.90	79.0	67.2	1.4	–	18.6	40.9	–	2.6	–	–	–	–	36.6	–	–	–	–	–	–	–	–

TABLE 4 – *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlor.	Mont.	Paly.	Trid.	Clin.	Phil.	Bari.	Hali.	Augi.	Magn.	Goet.	U-2[c]	U-4[d]
2-20 μm Fractions – *Continued*																							
24	260-270	260.90	84.0	75.0	3.5	–	–	3.3	–	4.1	–	23.6	–	–	65.6	–	–	–	–	–	–	–	–
		267.10	82.9	73.3	–	–	–	–	–	3.1	–	19.4	–	–	77.5	–	–	–	–	–	–	–	–
25	270-279	270.90	82.9	73.3	12.3	–	38.0	–	–	–	–	49.7	–	–	–	–	–	–	–	–	–	P	–
		271.20	78.7	66.8	18.1	–	57.2	–	–	–	–	24.7	–	–	–	–	–	–	–	–	–	–	–
27	289-298	289.70	–	–	64.4	–	–	–	–	16.6	–	18.9	–	–	–	–	–	–	–	–	P	–	–

<2μm Fractions

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlor.	Mont.	Paly.	Trid.	Clin.	Phil.	Gyps.	Bari.	Hali.	Magn.	Goet.	U-3[e]	U-4[f]
2	1-11	3.50	90.5	85.1	10.6	–	5.9	7.2	3.5	11.5	3.8	57.6	–	–	–	–	–	–	–	–	–	–	–
		5.00	92.5	88.2	10.3	–	–	7.9	7.1	16.2	–	58.6	–	–	–	–	–	–	–	–	–	–	–
		9.50	90.2	84.7	10.8	–	–	10.2	6.0	12.5	–	60.5	–	–	–	–	–	–	–	–	–	–	–
4	20-29	21.00	95.3	92.7	8.0	–	–	5.7	6.5	8.1	–	71.8	–	–	–	–	–	–	–	–	–	–	–
8	84-93	86.60	90.3	84.8	5.5	–	–	9.6	3.8	5.5	–	75.6	–	–	–	–	–	–	–	–	–	–	–
		88.00	91.3	86.4	8.2	–	–	14.5	7.9	8.8	–	60.6	–	–	–	–	–	–	–	–	–	–	–
9	103-112	107.00	92.1	87.7	8.2	–	–	15.9	5.6	–	–	62.2	–	–	–	8.1	–	–	–	–	–	–	–
		108.50	91.6	86.8	6.8	–	–	11.4	1.9	–	–	63.5	–	–	–	16.4	–	–	–	–	–	–	–
10	121-130	128.30	92.5	88.3	5.4	–	–	16.5	2.7	–	–	66.9	–	–	–	7.4	1.0	–	–	–	–	–	–
12	159-163	160.00	95.0	92.2	12.8	–	–	5.8	6.0	11.1	–	60.7	–	–	–	–	–	3.7	–	–	–	–	–
13	169-178	173.00	94.2	91.0	16.5	–	–	6.5	7.8	14.5	–	54.7	–	–	–	–	–	–	–	–	–	–	–
		176.00	94.0	90.7	11.4	–	–	6.0	6.6	9.1	–	63.3	–	–	–	–	–	3.5	–	–	–	–	–
16	189-198	195.10	87.5	80.5	3.8	–	–	3.6	–	–	–	80.0	–	–	4.5	–	–	8.0	–	–	–	P	–
		195.40	79.0	68.2	1.4	14.6	–	–	–	2.9	–	77.2	–	–	2.5	–	–	1.5	–	–	–	T	–
		196.20	95.2	92.5	2.1	–	–	–	–	10.7	–	77.5	–	–	1.7	–	–	3.4	4.6	–	–	P	–
20	221-230	221.60	86.8	79.4	11.8	–	7.4	–	–	12.0	–	11.3	57.1	–	–	–	–	–	–	–	–	–	T
		224.20	86.9	79.5	10.5	–	7.0	–	–	–	–	12.7	69.9	–	–	–	–	–	–	–	–	–	P
		224.90	88.3	81.7	8.2	–	5.8	–	–	15.5	–	5.8	64.6	–	–	–	–	–	–	–	–	–	T
		229.80	85.4	77.2	7.4	–	5.7	–	–	18.2	–	6.4	62.5	–	–	–	–	–	–	–	–	–	T
23	250-260	252.80	89.4	83.5	5.5	23.2	1.6	1.1	–	10.0	–	23.7	31.6	3.3	–	–	–	–	–	–	–	–	–
		252.40	80.8	70.1	0.7	–	11.3	6.2	–	4.3	–	76.5	–	–	–	–	–	–	–	1.0	–	–	–
		252.80	70.9	54.5	0.7	–	4.4	3.4	–	2.3	–	89.2	–	–	–	–	–	–	–	–	–	–	–
		252.90	84.0	75.1	–	–	12.1	8.5	–	24.7	–	53.6	–	–	1.1	–	–	–	–	–	–	–	–
24	260-270	260.90	77.7	65.1	–	–	9.8	–	–	38.2	–	50.9	–	–	1.1	–	–	–	–	–	–	–	–
		267.10	81.5	71.1	–	–	7.9	–	–	34.5	–	55.9	–	–	1.6	–	–	–	–	–	–	–	–
25	270-279	270.90	76.6	63.4	1.3	–	–	–	–	4.5	–	94.1	–	–	–	–	–	–	–	–	–	–	–
		271.20	67.1	48.6	1.1	–	1.8	–	–	2.5	–	94.5	–	–	–	–	–	–	–	–	–	–	–
27	289-298	289.70	88.1	81.4	21.6	–	–	–	–	–	–	74.5	–	–	–	–	1.4	–	2.5	–	A	–	–

[a]Unidentified mineral U-3, peak at 6.44 Å (broad); [b]Unidentified mineral U-4, peaks (sharp) at 7.18 Å, 2.99 Å, and 1.98 Å; [c]Unidentified mineral U-2, peak at 4.21 Å (sharp).

TABLE 5
Results of X-Ray Diffraction Analyses from Hole 167

Bulk Samples

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Calc.	Quar.	Plag.	Mica	Mont.	Clin.	Bari.
1	0-9	4.00-5.00	47.7	17.9	100.0	–	–	–	–	–	–
5	103-112	105.00-109.80	44.3	12.9	100.0	–	–	–	–	–	–
9	223-232	224.00	44.8	13.8	100.0	–	–	–	–	–	–
11	197-306	298.00-304.00	46.8	16.8	100.0	–	–	–	–	–	–
14	407-416	408.00-412.40	46.0	15.7	100.0	–	–	–	–	–	–
21	500-509	502.50-504.00	45.6	15.0	100.0	–	–	–	–	–	–
39	657-666	658.20	48.5	19.6	99.0	1.0	–	–	–	–	–
43	694-703	696.50	54.7	29.3	7.6	92.4	–	–	–	–	–
55	805-814	807.50	46.6	16.6	99.4	0.6	–	–	–	–	–
66	898-907	898.70-900.40	76.2	62.8	–	21.5	13.5	–	40.1	21.8	3.0
77	999-1008	1000.20	44.7	13.6	98.1	1.9	–	–	–	–	–
88	1108-1119	1109.20	42.7	10.4	95.9	2.3	–	1.8	–	–	–
93	1157-1166	1157.80-1159.20	44.6	13.5	97.6	1.0	–	1.4	–	–	–

2-20 μm Fractions

	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	K-Fe.	Plag.	Mica	Chlor.	Mont.	Clin.	Pyrite	Spha.	Bari.	Magn.	Born.	U-5[a]
11	297-306	298.00-304.00	97.6	96.3	16.1	–	21.9	18.3	–	29.9	–	–	–	13.8	–	–	–
14	407-416	408.00-412.40	96.1	93.9	9.8	24.9	20.0	13.2	–	14.6	3.9	–	–	13.6	–	–	–
21	500-509	502.50-504.00	97.2	95.7	15.4	–	46.2	–	–	–	–	–	–	38.4	–	–	–
43	694-703	696.50	62.8	41.9	92.0	–	–	–	–	–	–	–	–	–	8.0	–	–
66	898-907	898.70-900.40	70.4	53.7	19.6	–	15.9	3.8	–	15.3	43.0	–	–	2.4	–	–	–
77	999-1008	1000.20	65.7	46.4	40.2	7.8	–	24.1	2.0	–	–	9.6	5.0	11.2	–	P	P
88	1108-1119	1109.20	69.0	51.5	44.9	22.4	9.0	19.9	3.7	–	–	–	–	–	–	–	–
93	1157-1166	1157.80-1159.20	66.3	47.4	40.8	12.5	3.7	26.8	4.0	–	–	1.5	–	10.6	–	–	–

<2μ Fractions

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	K-Fe.	Plag.	Mica	Chlor.	Mont.	Paly.	Magn.	Goet.
43	694-703	696.50	78.7	66.7	68.8	–	–	4.5	–	–	8.3	18.4	P
55	805-814	807.50	88.8	82.5	10.3	7.1	–	33.6	2.7	6.4	39.9	–	–
66	898-907	898.70-900.40	77.8	65.3	15.0	–	9.3	–	–	75.7	–	–	–
77	999-1008	1000.20	77.2	64.3	59.8	–	–	30.9	3.3	6.0	–	–	–
88	1108-1119	1109.20	80.0	68.7	44.8	–	–	16.6	5.2	33.3	–	–	–
93	1157-1116	1147.80-1159.20	73.2	58.1	3.6	–	–	12.9	–	83.5	–	–	–

[a]Unidentified mineral U-5, peaks at 1.645 Å and 1.670 Å.
P = present.

TABLE 6
Results of X-Ray Diffraction Analyses from Hole 168

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Plag.	Mica	Mont.	Clin.	Phil.	Hali
Bulk Samples											
4	31-38	33.10	97.0	95.4	15.1	13.3	13.0	28.0	4.8	23.8	2.0

2-20 μm Samples

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Plag.	Mica	Mont.	Clin.	Phil.
4	31-38	33.10	98.0	96.9	14.7	12.4	12.0	13.4	5.5	42.0

<2 μm Samples

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Plag.	Kaol.	Mica	Mont.	Clin.	Phil.
4	31-38	33.10	88.8	82.6	11.1	5.5	3.1	12.2	52.6	6.7	8.9

TABLE 7
Results of X-Ray Diffraction Analyses from Hole 169

Bulk Samples

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Calc.	Quar.	Cris.	K-Fe.	Mica	Mont.	Paly.	Trid.	Clin.	U-6[a]
2	99-108	108.00	83.1	73.5	–	8.5	17.6	7.4	3.7	3.8	13.3	5.9	39.8	–
6	182-192	189.10	53.5	27.3	46.6	–	–	–	–	53.4	–	–	–	–
7	192-201	193.20	84.4	75.6	–	19.9	–	8.2	6.1	8.8	56.3	–	0.6	–
		193.50	78.9	67.0	33.6	15.0	–	–	5.3	6.6	38.5	–	1.0	T

2-20 µm Fractions

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlor.	Mont.	Paly.	Trid.	Clin.	U-6[a]
2	98-108	108.00	71.3	55.2	11.3	18.9	21.5	–	–	5.0	–	–	–	5.6	37.6	–
6	182-192	189.10	52.0	25.0	–	–	–	–	1.0	–	–	99.0	–	–	–	–
7	192-201	193.20	78.1	65.8	21.3	–	12.9	3.8	–	25.4	1.3	6.0	26.4	–	3.1	–
		193.50	78.3	66.2	26.3	–	5.8	1.5	–	17.2	0.7	7.7	37.5	–	3.2	P

<2 µm Fractions

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Cris.	K-Fe.	Mica	Chlor.	Mont.	Paly.	Trid.	Clin.
2	99-108	108.00	87.1	79.8	4.8	27.7	7.1	6.9	–	17.9	27.4	2.0	6.2
6	182-192	189.10	56.5	32.0	–	–	–	–	–	100.0	–	–	–
7	192-201	193.20	85.1	76.7	17.7	–	7.9	8.4	–	18.2	46.9	–	0.8
		193.50	86.7	79.3	18.5	–	3.6	4.3	–	16.5	57.2	–	–

[a]Unidentified mineral U-6, peaks at 3.40 Å and 2.42 Å.
T = trace
P = present.

TABLE 8
Results of X-Ray Diffraction Analyses from Hole 170

Bulk Samples

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Calc.	Quar.	K-Fe.	Plag.	Mica	Mont.	Paly.	Clin.	Phil.	Pyrite	Anat.
2	1-15	6.50	83.4	74.1	–	5.1	–	–	–	11.4	15.1	–	68.4	–	–
6	101-110	108.00	81.3	70.8	32.9	10.8	3.8	–	7.4	3.6	41.4	–	–	–	–
7	110-120	113.30	86.4	78.8	7.9	14.9	9.8	2.8	8.8	7.7	43.8	4.3	–	–	–
15	184-192	184.00	85.0	76.6	9.6	4.4	29.6	5.5	–	33.5	–	16.0	–	0.7	0.7
		184.47	79.7	68.3	–	3.4	19.7	–	4.0	14.3	–	56.9	–	–	1.2
		184.51	84.9	76.5	6.6	6.2	42.0	4.5	–	38.7	–	–	–	–	2.0
		185.30	83.6	74.4	32.4	2.7	18.9	–	–	44.0	–	–	–	–	2.1
		186.00	83.1	73.6	27.7	3.9	18.4	–	6.2	42.1	–	–	–	–	1.8

2-20 μm Samples

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	K-Fe.	Plag.	Mica	Chlor.	Mont.	Paly.	Clin.	Phil.	Anat.
2	1-15	6.50	87.4	80.3	1.3	3.5	8.4	–	–	–	–	3.2	83.6	–
6	101-110	108.00	66.9	48.3	26.3	19.4	11.1	12.5	–	–	9.6	21.0	–	–
7	110-120	113.30	71.9	56.0	24.1	16.3	6.8	32.3	1.2	–	8.7	10.7	–	–
15	184-192	184.00	77.6	65.1	4.6	30.1	4.9	2.5	–	28.3	–	29.7	–	–
		184.47	66.6	47.8	4.7	23.8	2.4	3.2	–	5.0	–	60.3	–	0.6
		184.51	75.8	62.2	6.8	42.6	–	–	–	23.1	–	26.8	–	0.7
		185.30	82.6	72.8	5.4	34.2	–	–	–	58.1	–	–	–	2.3
		186.00	82.9	73.2	7.7	35.3	–	4.4	–	50.9	–	–	–	1.7

<2 μm Fractions

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	K-Fe.	Plag.	Mica	Mont.	Paly.	Clin.	Phil.	Anat.
2	1-15	6.50	85.4	77.2	6.8	7.1	10.3	–	28.0	12.1	5.0	30.7	–
6	101-110	108.00	86.2	78.5	8.2	5.2	0.7	8.4	19.4	57.0	1.2	–	–
7	110-120	113.30	87.7	80.8	13.2	7.2	2.4	11.1	24 9	39.0	2.2	–	–
15	184-192	184.00	82.8	73.2	2.7	13.2	–	–	83.1	–	–	–	1.1
		184.47	84.1	75.2	3.1	8.9	2.4	–	79.2	–	2.7	–	3.7
		184.51	82.8	73.2	2.4	14.6	2.1	–	79.0	–	–	–	1.8
		186.00	81.6	71.2	1.3	–	–	–	96.4	–	–	–	2.4

TABLE 9

Results of X-Ray Diffraction Analyses from Hole 171

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Calc.	Quar.	Cris.	K-Fe.	Plag.	K aol.	Mica	Mont.	Trid.	Clin.	Phil.	Hema.	Pyrite	Magn.	Anat.	Goet.[a]
Bulk Samples																				
1	0-9	2.40-8.40	54.0	28.1	98.9	1.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2	22-31	23.00-29.00	90.4	85.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3	41-50	42.10-49.50	50.3	22.3	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4	59-68	60.00-66.00	51.9	24.8	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	78-87	79.00-85.00	49.6	21.2	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6	97-106	99.50	48.5	19.5	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8	124-133	128.00-131.00	46.3	16.2	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9	143-152	147.00-149.00	53.3	27.1	91.2	6.9	1.9	–	–	–	–	–	–	–	–	–	–	–	–	–
13	190-199	195.50	49.8	21.6	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
15	217-226	219.20	48.4	19.3	99.1	–	–	–	–	–	–	–	–	0.9	–	–	–	–	–	–
		225.50	72.2	56.5	43.9	18.2	24.6	–	–	–	–	–	13.3	–	–	–	–	–	–	–
		225.60	49.6	21.3	98.8	1.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
16	226-236	231.50-234.50	48.2	19.1	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
17	236-245	240.00-242.10	48.8	20.0	98.6	1.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–
19	255-264	256.00-262.00	48.4	19.4	98.0	–	–	–	–	–	–	–	–	1.0	–	–	–	–	–	–
21	273-282	275.50	53.3	27.0	63.0	33.0	1.8	–	–	–	–	–	1.4	0.7	–	–	–	–	–	–
22	282-292	282.90-285.30	64.8	45.0	61.9	–	–	–	–	–	–	2.0	–	35.0	–	–	–	–	–	–
23	292-301	297.40-298.20	61.2	39.3	53.5	–	–	–	–	–	–	–	–	46.0	–	–	–	–	–	–
24	301-310	302.00	72.9	57.7	53.4	–	7.2	–	–	–	4.5	2.9	1.3	30.0	–	–	–	–	–	–
25	310-320	311.50	61.1	39.1	85.7	–	–	–	–	–	–	–	–	14.0	–	–	–	–	–	–
		315.40-316.10	63.6	43.1	74.6	–	–	1.6	–	–	–	1.5	–	22.0	–	–	–	–	–	–
26	320-329	320.30-320.30	83.9	74.8	40.9	–	–	6.0	3.9	0.9	–	46.4	–	–	–	–	–	–	1.8	–
		321.40	66.1	47.1	81.8	0.6	–	2.7	–	–	–	2.8	–	12.0	–	–	–	–	–	–
		322.60	62.2	40.9	83.7	0.7	–	14.2	–	–	–	–	–	1.4	–	–	–	–	–	–
		323.00	66.8	48.2	82.9	0.7	–	1.8	–	–	–	2.3	–	7.1	5.2	–	–	–	–	–
		323.40	82.4	72.6	26.5	0.5	–	–	–	–	–	14.0	–	1.0	50.2	1.3	1.3	4.2	0.7	–
		323.60	86.4	78.7	25.9	4.4	–	14.2	–	–	–	24.6	–	–	26.8	–	2.5	–	1.6	P
		324.20	61.5	39.8	88.0	1.5	–	4.3	–	–	–	–	–	2.9	–	–	3.2	–	–	–
		324.40	76.1	62.6	58.3	3.3	–	15.3	–	–	7.5	3.8	–	9.7	–	–	1.1	–	1.0	–
28	338-347	338.60-340.20	75.8	62.3	80.2	0.5	–	1.8	–	–	–	2.8	–	–	13.9	–	–	–	0.8	T
		340.90	70.7	54.2	92.0	–	–	2.0	–	–	–	3.2	–	–	2.2	–	–	–	0.6	–
29	347-357	349.50-351.00	45.3	14.5	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

TABLE 9 – *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Cris.	K-Fe.	Plag.	Mica	Chlor.	Mont.	Trid.	Clin.	Phil.	Hema.	Pyrite	Bari.	Magn.	Anat.	Goet.
2-20 µm																				
2	22-31	23.00-29.00	91.2	86.2	16.6	–	22.0	22.4	12.6	5.2	–	–	–	–	–	–	21.3	–	–	–
5	78-87	79.00-85.00	95.2	92.5	13.4	–	32.1	26.1	8.3	–	–	–	1.9	–	–	–	18.2	–	–	–
15	217-226	225.50	77.5	64.8	37.5	38.1	–	–	–	–	–	23.1	–	–	–	–	1.3	–	–	–
19	255-264	256.00-262.00	63.0	42.3	7.8	5.6	7.2	–	4.3	–	–	–	63.5	–	–	–	11.6	–	–	–
21	273-282	275.50	62.1	40.7	74.2	6.1	–	–	1.5	–	–	4.6	13.6	–	–	–	–	–	–	–
22	282-292	282.90-285.30	56.4	31.8	–	–	–	–	–	–	–	–	100.0	–	–	–	–	–	–	–
23	292-301	297.40-298.20	53.8	27.8	–	–	–	–	–	–	–	–	100.0	–	–	–	–	–	–	–
24	301-310	302.00	75.4	61.5	–	36.4	–	–	–	–	–	6.5	57.2	–	–	–	–	–	–	–
25	310-320	311.50	68.4	50.6	1.6	–	–	–	2.3	–	–	–	81.1	––	–	11.7	3.3	–	–	–
	315.40	315.40-316.10	65.1	45.5	–	–	–	–	–	–	–	–	97.3	–	–	2.7	–	–	–	–
26	320-329	320.30	89.3	83.4	3.4	–	26.8	–	–	–	–	–	7.7	54.2	–	3.3	–	–	4.7	–
		321.40	66.2	47.2	–	–	7.6	–	–	–	5.5	–	85.1	–	–	1.9	–	–	–	–
		322.60	77.3	64.5	8.6	–	38.9	–	–	–	6.1	–	44.2	–	–	2.2	–	–	–	–
		323.00	73.3	58.3	2.3	–	7.9	–	–	–	10.8	–	53.8	23.0	–	2.3	–	–	–	–
		323.40	77.3	64.5	1.1	–	–	–	–	–	19.5	–	3.1	64.3	2.7	2.1	–	7.2	–	–
		323.60	71.7	55.7	2.2	–	14.2	–	–	–	27.0	–	–	48.1	–	6.0	–	–	2.6	T
		324.20	71.7	55.7	11.0	–	34.6	–	2.5	–	–	–	25.9	–	–	26.0	–	–	–	–
		324.40	77.2	64.4	3.9	–	13.4	–	7.1	–	67.9	–	–	–	–	–	–	–	–	P
28	338-347	338.60-340.20	89.7	83.9	1.6	–	17.7	–	–	–	29.8	–	–	44.8	–	1.3	–	–	4.7	P
		340.90	87.3	80.2	2.1	–	10.0	–	–	–	65.9	–	–	18.4	–	–	–	–	3.6	T

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlor.	Mont.	Paly.	Trid.	Clin.	Phil.	Hema.	Pyrite	Gyps.	Bari.	Magn.	Anat.	Goet.	U-7[a]
<2 µm Fractions																								
1	0-9	2.40-8.40	92.2	87.8	–	–	–	12.0	–	65.5	22.6	–	–	–	–	–	–	–	–	–	–	–	–	–
2	22-31	23.00-29.00	91.2	86.2	12.3	–	12.5	5.3	–	23.9	4.8	27.5	–	–	–	–	–	1.0	1.9	9.7	–	–	–	–
4	59-68	60.00-66.00	99.0	98.4	18.9	–	–	23.8	–	40.6	–	–	–	–	–	–	–	–	4.6	12.0	–	–	–	–
5	78-87	79.00-85.00	94.1	90.8	10.0	–	4.2	4.9	–	12.3	4.1	55.7	–	–	–	–	–	–	1.0	7.6	–	–	–	–
9	142-152	147.00-149.00	85.4	77.1	15.2	31.5	–	–	–	14.7	–	28.8	–	4.5	3.1	–	–	–	–	2.2	–	–	–	–
15	217-226	219.20	89.3	83.3	18.3	–	–	–	4.4	55.2	–	–	–	–	14.4	–	–	–	–	7.7	–	–	–	–
		225.50	87.1	79.8	7.2	61.8	–	–	–	1.6	–	–	–	29.5	–	–	–	–	–	–	–	–	–	–
		225.60	04.6	91.6	13.1	–	–	–	5.1	60.8	–	–	17.9	–	–	–	–	–	–	3.1	–	–	–	–
16	226-236	231.50-234.50	84.3	75.5	10.8	–	6.5	1.9	1.8	21.1	–	47.9	–	–	9.9	–	–	–	–	–	–	–	–	–

TABLE 9 – *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amorp.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlor.	Mont.	Paly.	Trid.	Clin.	Phil.	Hema.	Pyrite	Gyps.	Bari.	Magn.	Anat.	Goet.	U-7[a]
<2μm **Fractions** – *Continued*																								
17	236-245	240.00-242.10	83.7	74.5	22.6	16.6	3.0	–	–	16.2	–	28.1	–	4.7	4.1	–	–	–	–	4.7	–	–	–	–
19	255-264	256.00-262.00	87.5	80.4	5.8	17.8	–	–	–	14.7	–	53.9	–	1.7	5.0	–	–	–	–	1.1	–	–	–	–
21	273-282	275.50	82.2	72.1	25.8	41.0	–	–	–	6.5	–	17.1	–	4.3	5.3	–	–	–	–	–	–	–	P	–
22	282-292	282.90-285.30	87.2	80.0	2.8	–	–	–	–	24.3	–	63.5	–	–	9.4	–	–	–	–	–	–	–	P	–
23	292-301	297.40-298.20	83.5	74.2	1.4	–	6.4	–	–	–	–	76.9	–	–	13.7	–	–	–	–	–	–	1.6	P	–
24	301-310	302.00	86.2	78.4	–	14.2	–	–	–	31.6	–	49.1	–	1.5	3.5	–	–	–	–	–	–	–	T	–
25	310-320	311.50	90.9	85.7	3.4	–	–	3.0	–	17.0	–	64.3	–	–	3.0	–	–	–	1.8	7.4	–	–	–	–
		315.40-316.10	87.1	79.8	3.9	–	11.1	–	–	13.7	–	65.2	–	–	1.8	–	–	44.2	–	–	–	–	–	–
26	320-329	320.30	73.9	59.1	–	–	–	–	–	–	–	98.7	–	–	–	–	–	–	–	–	–	1.3	–	–
		321.40	83.3	73.9	1.7	–	3.4	–	–	–	–	88.9	–	–	4.7	–	–	1.3	–	–	–	–	–	–
		322.60	89.2	83.1	0.9	–	–	–	–	12.8	–	83.1	–	–	–	–	–	–	3.2	–	–	–	–	–
		323.00	80.3	69.2	1.7	–	1.2	–	–	–	–	80.9	–	–	5.8	7.1	–	2.8	–	–	–	–	–	–
		323.40	83.4	74.1	0.7	–	–	–	–	–	–	76.0	–	–	–	14.4	6.2	–	–	–	2.7	–	–	P
		323.60	87.6	80.6	1.9	–	–	–	–	–	–	83.7	–	–	–	10.4	–	–	–	–	–	4.0	P	T
		324.20	86.7	79.3	4.4	–	6.6	–	–	4.8	–	67.1	-	–	5.0	–	–	10.8	1.4	–	–	–	–	–
		324.40	92.9	88.9	4.7	–	–	–	–	34.5	–	48.9	–	–	3.7	–	–	–	–	–	–	8.3	P	–
28	338-347	338.60-340.20	86.1	78.3	–	–	1.6	–	–	–	–	86.9	–	–	–	5.1	–	–	–	–	–	6.4	P	–

[a]Unidentified mineral U-7, peak at 5.78 Å.

TABLE 10
X-Ray Diffraction Analysis from Leg 17

Hole	Core	Section	Depth in Section (cm)	Depth Below Sea Floor (m)
164	1	1	80-82	28.8-34.8
		5	80-82	28.8-34.8
	2	2	80-82	50.3
	3	1	80-82	51.8
		3	100-101	55.0
	4	1	86-88	57.9
	6	1	56-58	75.6
	7	1	80-82	84.8-89.3
		4	80-82	84.8-89.3
		5	110-112	91.1-91.3
		5	128-130	91.1-91.3
	8	1	107-109	94.1-96.0
		2	147-149	94.1-96.0
	10	1	132-134	113.3-113.5
		2	3-5	113.3-113.5
		3	113-115	116.1-116.2
		3	119-121	116.1-116.2
		4	101-104	117.5
	14	1	35-37	150.4
		CC	–	159.0
	15	1	127-129	160.3
	16	1	142-144	170.4
	17	1	88-90	178.9
	18	1	52-54	187.5
	20	1	98-100	207.0
	21	1	90-91	215.9
		1	118-120	216.2
	25	1	108-110	253.1
165	1	1	40-42	0.40
		2	70-72	2.2
	2	1	60-62	5.6
		2	30-32	6.8
		2	100-102	7.5
165A	2	1	60-62	14.6-16.4
		2	93-95	14.6-16.4
		3	130-132	18.3-21.0
		5	90-92	18.3-21.0
			100-102	18.3-21.0
	3	4	58-60	29.1
		4	100-102	29.5
		5	21-23	30.5
	5	2	38-40	81.9
		2	71-73	82.0-86.1
		4	142-144	82.0-86.1
		5	12-14	82.0-86.1
	6	1	100-102	128.0-135.5
		2	100-102	128.0-135.5
		3	100-102	128.0-135.5
		4	100-102	128.0-135.5
		5	100-102	128.0-135.5
		6	100-102	128.0-135.5
	7	1	100-102	137.0-138.0
		2	100-102	137.0-138.0
		6	135-137	144.9
	8	2	130-132	147.8-151.8
		5	80-82	147.8-151.8
		6	81-83	153.3
	9	2	93-95	156.4
		3	100-102	158.0-160.8
		5	78-80	158.0-160.8
		6	122-126	162.7
		6	144-146	162.9
	10	1	70-72	201.7-206.7
		4	120-122	201.7-206.7
	11	2	54-56	212.0-217.0
		3	123-125	212.0-217.0

TABLE 10 – *Continued*

Hole	Core	Section	Depth in Section (cm)	Depth Below Sea Floor (m)
165A	11	5	100-101	212.0-217.0
	12	2	96-98	221.5-222.5
		3	50-52	221.5-222.5
		5	100-102	226.0
	13	2	100-102	230.5
		5	100-102	235.0
	18	1	100-102	291.0
		2	42-44	291.9
		2	149-150	293.0
		3	100-102	294.0
	19	1	38-39	321.38
		1	42-43	321.42
		1	67-68	321.7
		1	86-89	321.9
		2	113-114	323.6
	20	2	107-108	342.6
		3	140-143	344.4
	21	1	144-145	369.45
		1	147-148	369.47
		2	114-116	370.6
		3	34-35	371.3
		3	111-113	372.1
	22	1	140-142	397.4
		3	6-8	399.1
		3	124-126	400.2
	23	2	34-37	425.8
		2	95-97	426.5
		2	118-120	426.7
		2	145-150	427.0
	25	1	100-120	461.0
166	2	2	104-106	3.5
		3	100-102	5.0
		6	100-102	9.5
	4	1	100-101	21.0
	8	2	106-108	86.6
		3	100-102	88.0
	9	1	110-112	104.1
		3	100-102	107.0
		4	100-102	108.5
	10	5	127-129	128.3
	12	1	100-102	160.0
	13	3	100-102	173.0
		5	100-102	176.0
	16	5	9-11	195.1
		5	44-46	195.4
		5	120-122	196.2
	20	1	63-65	221.6
		3	24-26	224.2
		3	88-90	224.9
		6	130-132	229.8
	23	2	31-33	251.8
		2	85-87	252.4
		2	131-133	251.8
		2	141-143	252.9
	24	1	90-92	260.9
		5	113-115	267.1
	25	1	85-87	270.9
		1	121-123	271.2
	27	1	70-72	289.7
167	1	3	100-102	4.0-5.5
		4	80-82	4.0-5.5
	5	2	49-51	105.0-109.8
		3	110-112	105.0-109.8
		5	85-87	105.0-109.8
	9	1	100-102	224.0
	11	1	100-102	224.0

TABLE 10 – *Continued*

Hole	Core	Section	Depth in Section (cm)	Depth Below Sea Floor (m)
167	11	2	18-20	298.0-304.0
		2	35-37	298.0-304.0
		5	100-102	298.0-304.0
	14	1	103-105	408.0-412.4
		2	33-35	408.0-412.4
		4	90-92	408.0-412.4
	21	2	100-102	502.5-504.0
		3	100-102	502.5-504.0
	39	1	122-124	658.2
	43	2	100-102	696.5
	55	2	95-97	807.5
	66	1	67-68	898.7-900.4
		2	90-92	898.7-900.4
	77	1	115-116	1109.2
	88	1	115-118	1109.2
	92	1	98-99	1157.8-1159.2
			100-100	1157.8-1159.2
168	4	2	60-62	33.1
169	2	CC	–	108.0
	6	5	115-117	189.1
	7	1	35-37	193.2
		1	117-120	193.5
170	2	4	100-102	6.5
	6	5	100-102	108.0
	7	3	33-35	113.3
	15	1	1-3	184.0
		1	47-49	184.47
		1	51-53	184.51
		1	126-128	185.3
		2	50-52	186.0
171	1	2	90-92	2.4-8.4
		4	100-102	2.4-8.4
		6	90-92	2.4-8.4
	2	1	100-102	23.0-29.0
		2	60-62	23.0-29.0
		3	15-17	23.0-29.0
		4	100-102	23.0-29.0
		5	100-102	23.0-29.0
	3	1	110-112	42.1-49.5
		2	100-102	42.1-49.5
		4	100-102	42.1-49.5
		6	100-102	42.1-49.5
	4	1	100-102	60.0-66.0
		3	100-102	60.0-66.0
		5	100-102	60.0-66.0

TABLE 10 – *Continued*

Hole	Core	Section	Depth in Section (cm)	Depth Below Sea Floor (m)
	5	1	100-102	79.0-85.0
		3	100-102	79.0-85.0
		4	100-102	79.0-85.0
		5	100-102	79.0-85.0
	6	2	100-102	99.5
	8	3	100-102	128.0-131.0
		5	100-102	128.0-131.0
	9	3	100-102	147.0-149.0
		5	55-57	147.0-149.0
	13	4	100-102	195.5
	15	2	74-76	219.2
		6	97-99	225.5
		6	110-112	225.6
	16	4	100-102	231.5-234.5
		6	100-102	231.5-234.5
	17	3	102-104	240.0-242.1
		5	13-15	256.0-262.0
	19	1	100-102	256.0-262.0
		3	100-102	256.0-262.0
		5	100-102	256.0-262.0
171	21	2	98-100	275.5
	22	1	91-93	282.9-285.3
		2	100-102	282.9-285.3
		3	32-34	282.9-285.3
	23	4	92-94	297.4-298.2
		5	18-20	297.4-298.2
	24	1	104-106	302.0
	25	2	5-9	311.5
		4	92-99	315.4-316.1
		5	12-17	315.4-316.1
	26	1	28-30	320.3
		1	140-142	321.4
		2	107-110	322.6
		2	147-150	323.0
		3	43-47	323.4
		3	63-65	323.6
		3	119-121	324.2
		3	141-143	324.4
	28	1	56-61	338.6-340.2
		1	61-67	338.6-340.2
		2	17-20	338.6-340.2
		2	73-75	338.6-340.2
		2	141-143	340.9
	29	2	100-102	349.5-351.0
		3	100-102	349.5-351.0

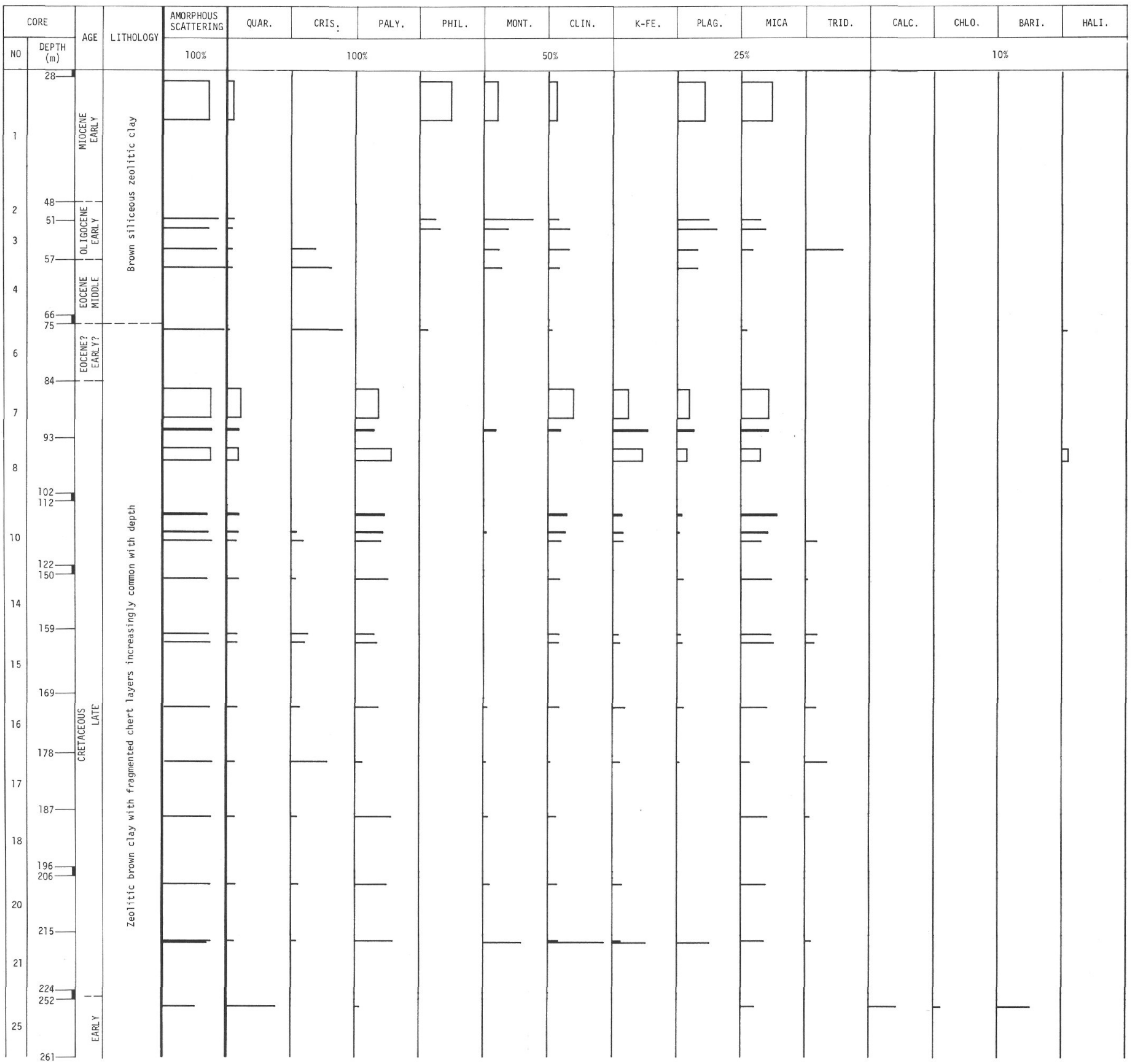

Figure 1. *Hole 164, bulk samples.*

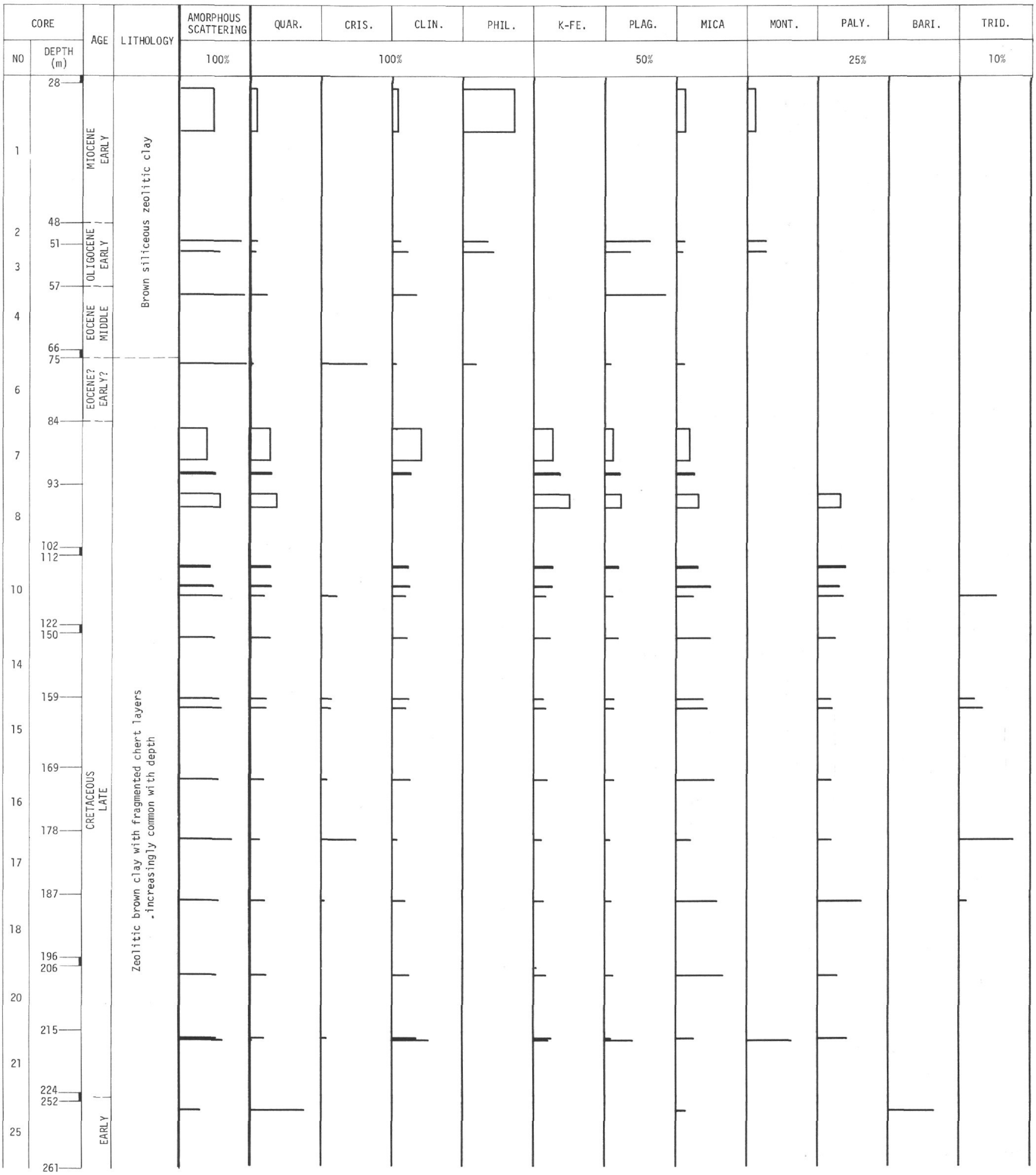

Figure 2. *Hole 164, 2-20μ samples.*

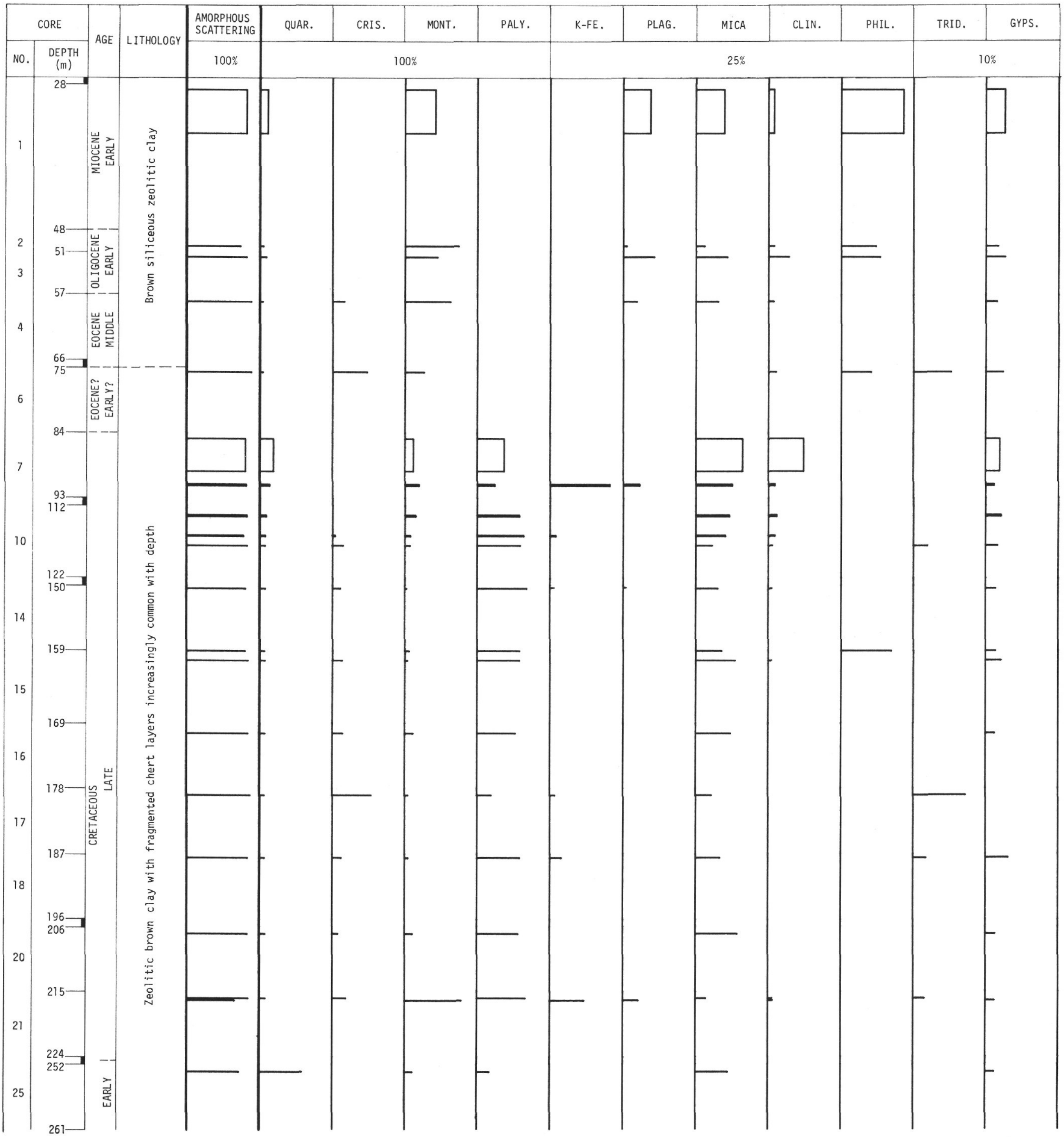

Figure 3. *Hole 164, <2μ samples.*

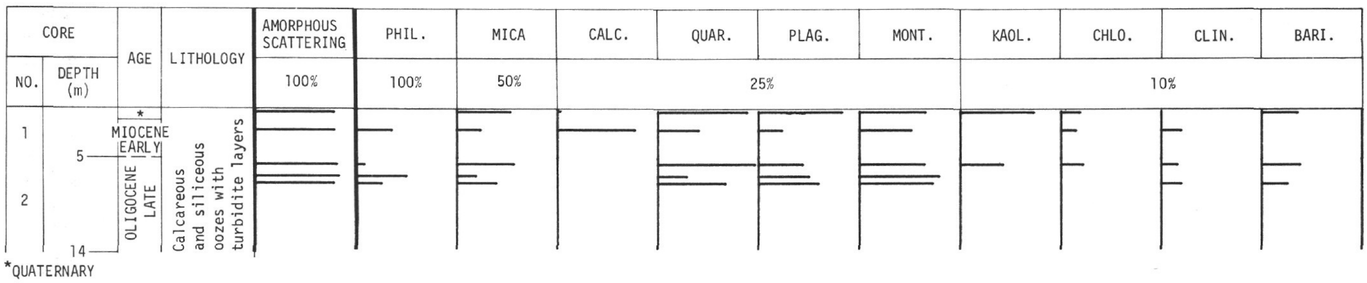

Figure 4. *Hole 165, bulk samples.*

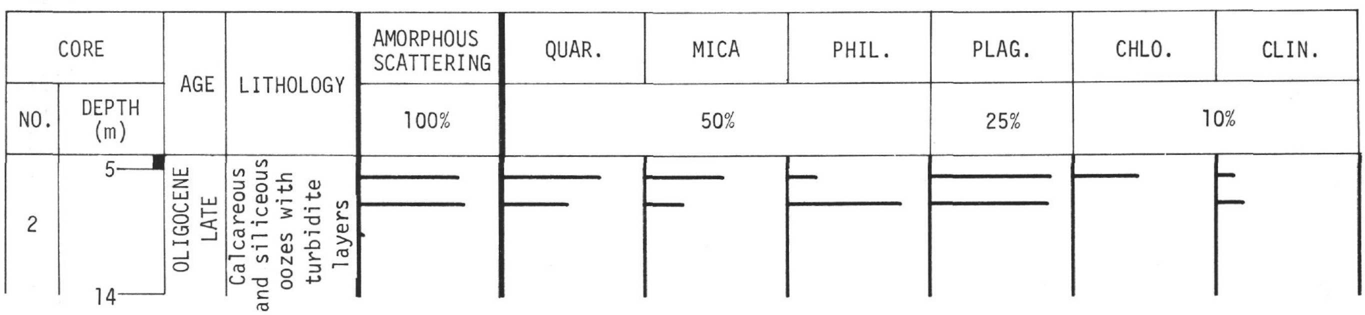

Figure 5. *Hole 165, 2-20μ samples.*

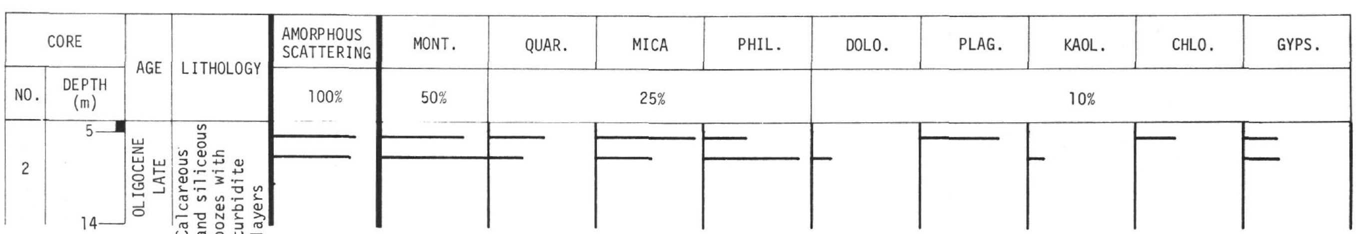

Figure 6. *Hole 165, <2μ samples.*

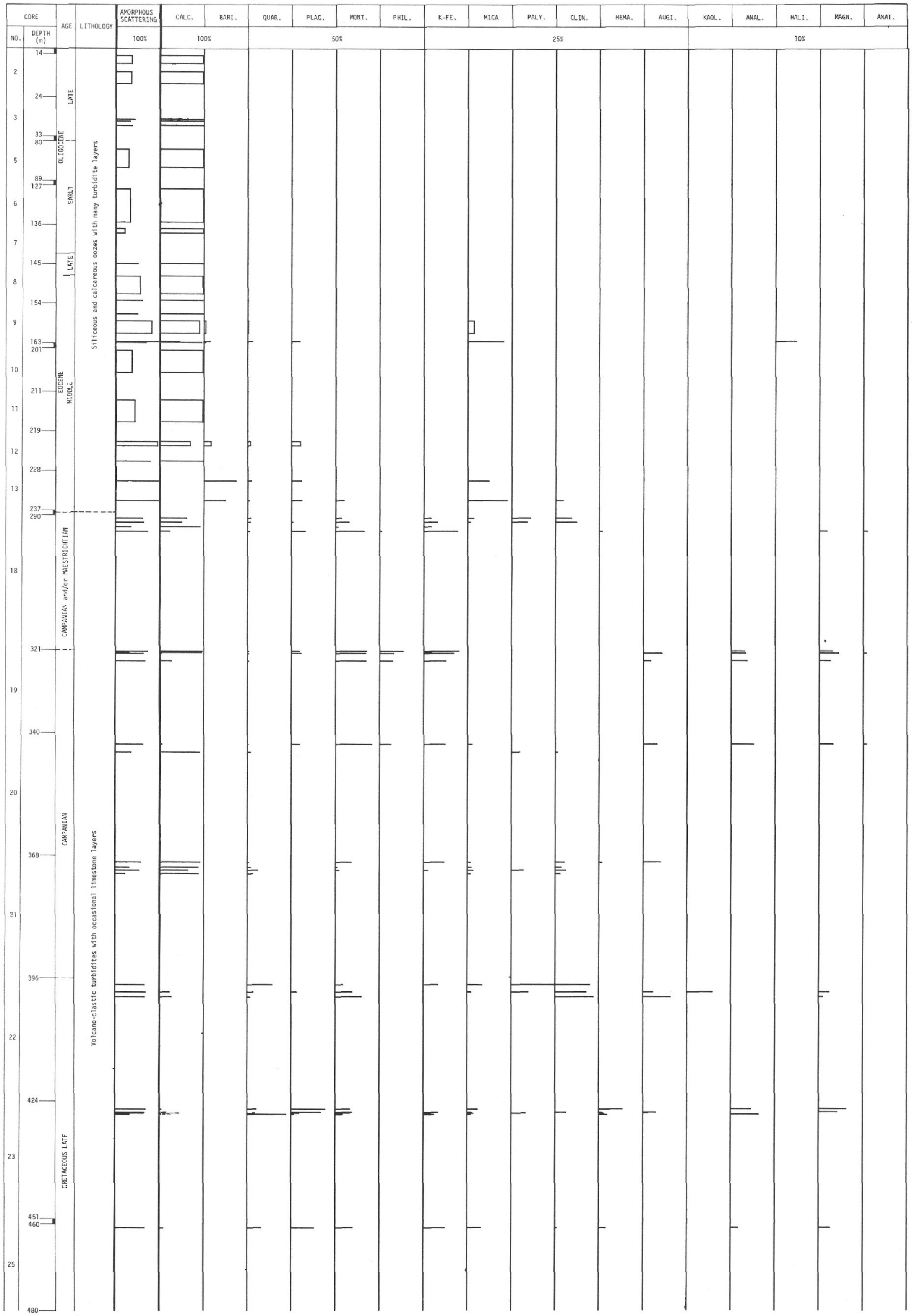

Figure 7. *Hole 165A, bulk samples.*

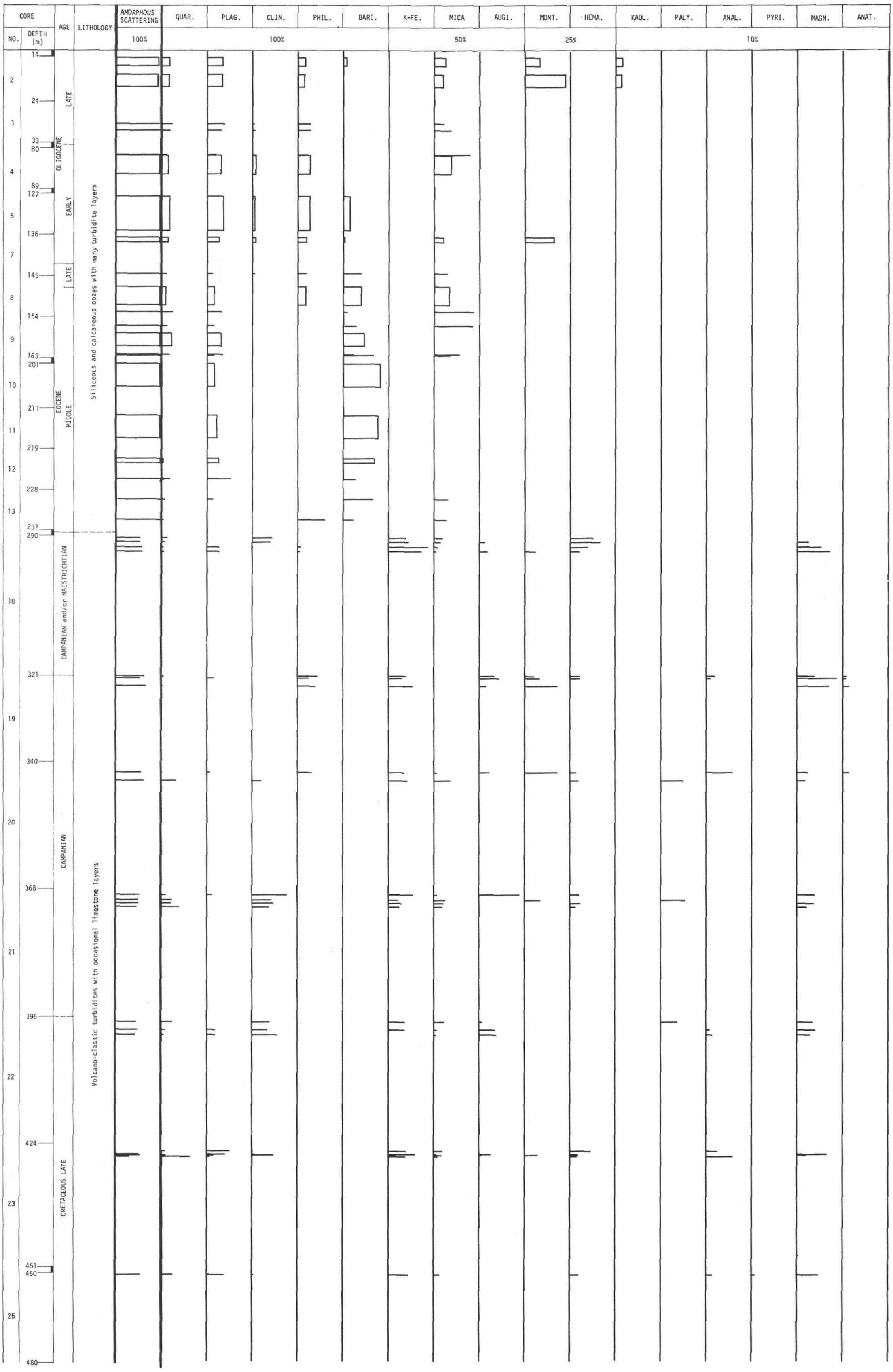

Figure 8. *Hole 165A, 2-20μ samples.*

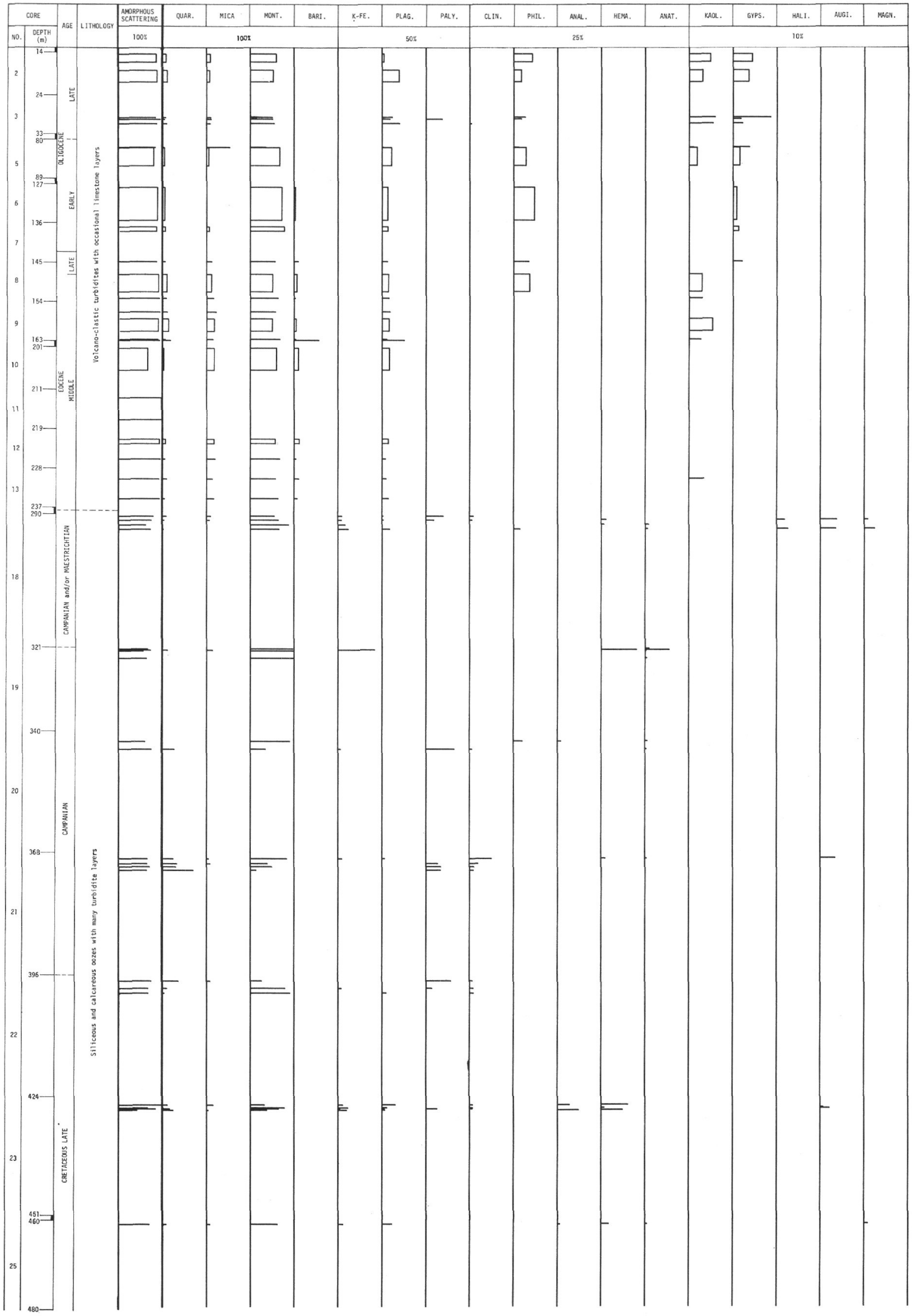

Figure 9. *Hole 165A, <2μ samples.*

Figure 10. *Hole 166, bulk samples.*

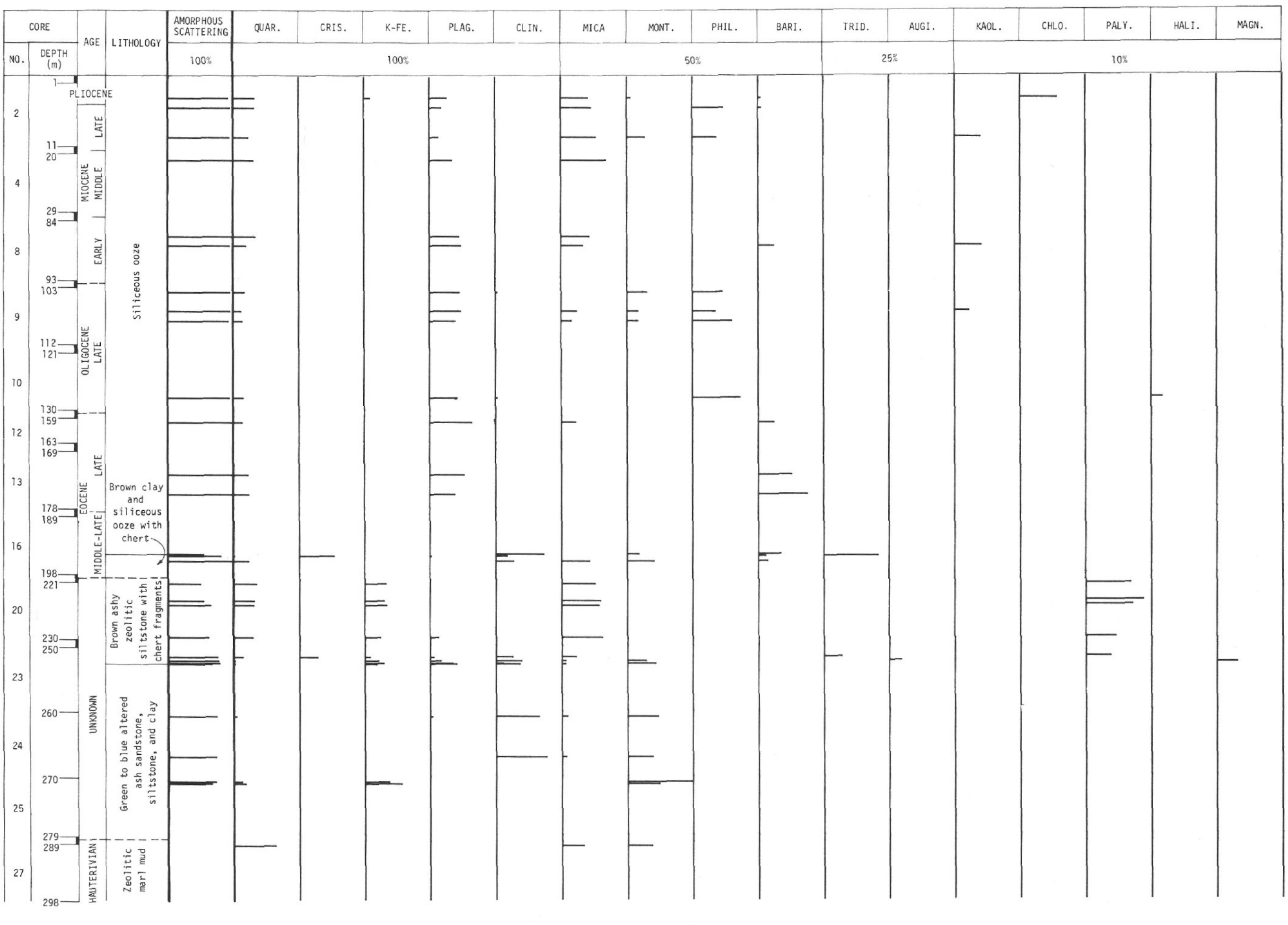

Figure 11. *Hole 166, 2-20μ samples.*

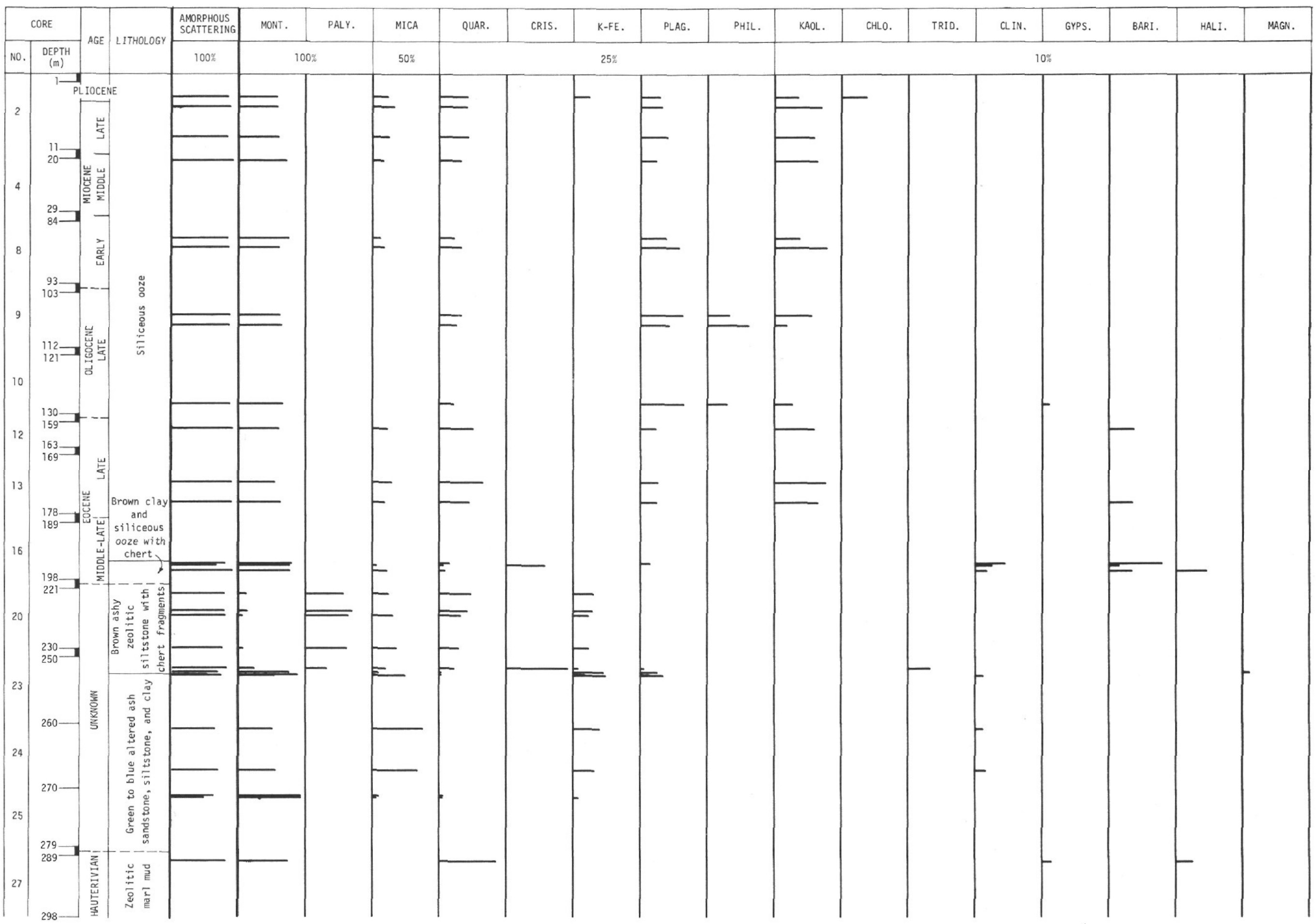

Figure 12. *Hole 166,* $<2\mu$ *samples.*

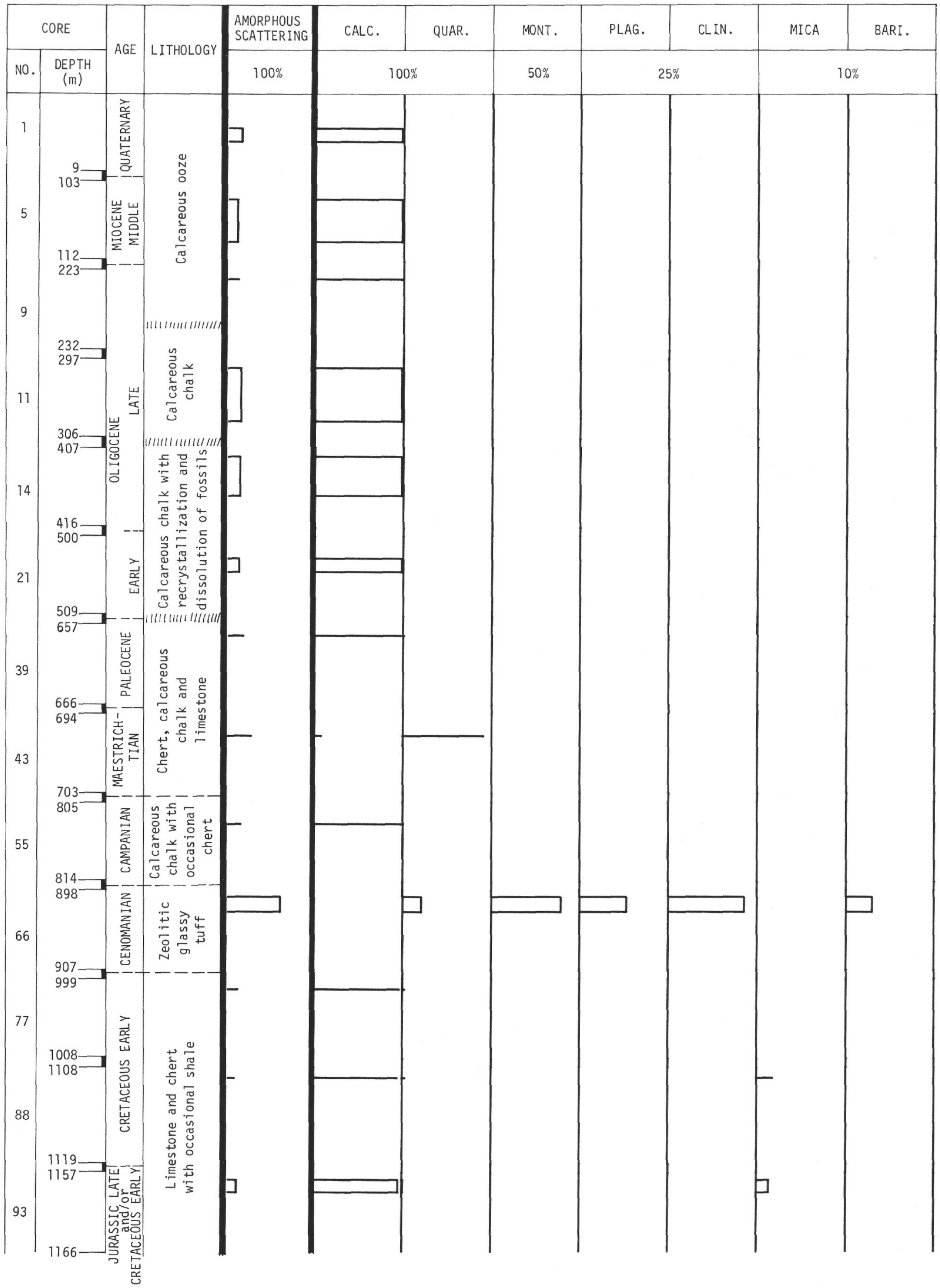

Figure 13. *Hole 167, bulk samples.*

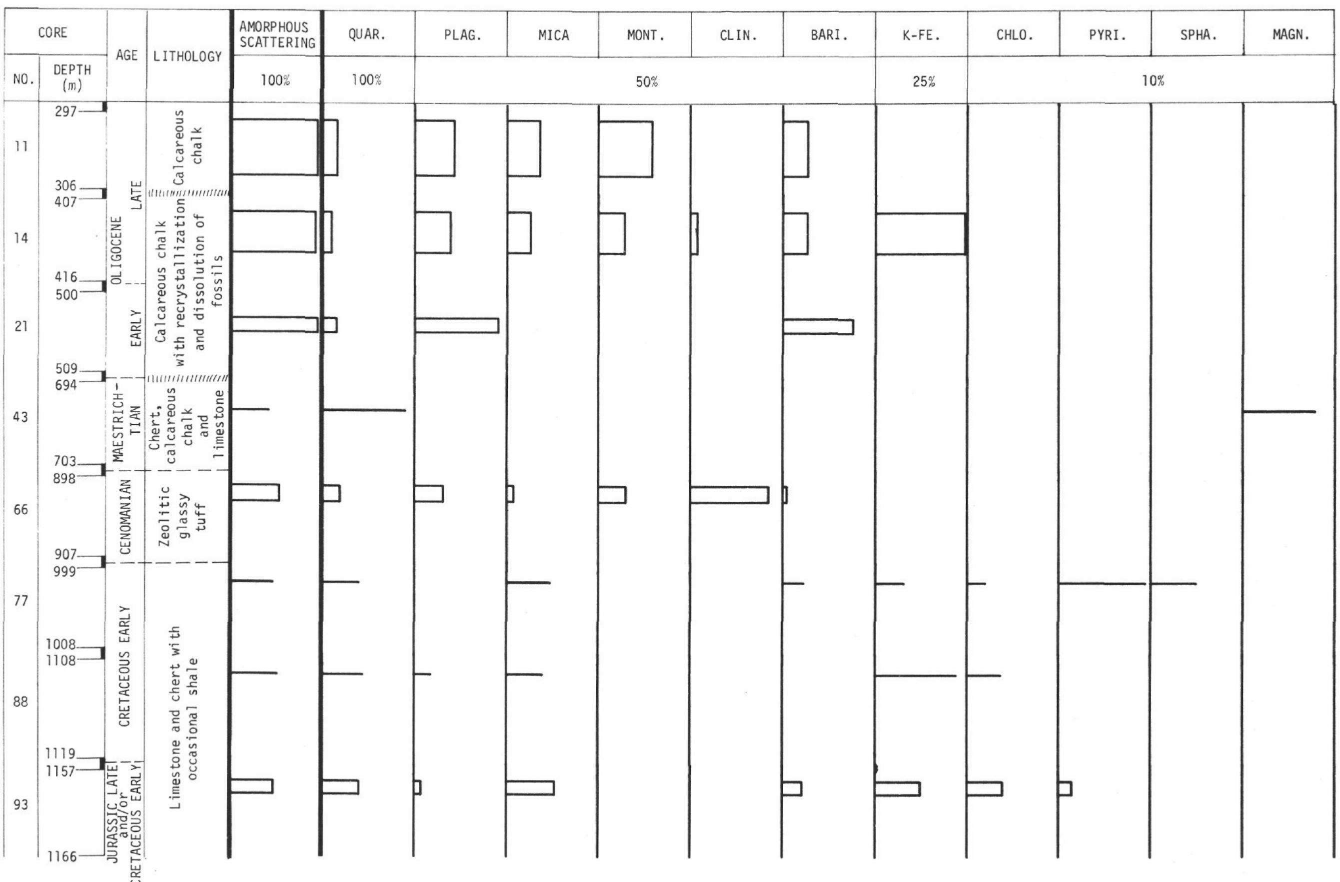

Figure 14. *Hole 167, 2-20μ samples.*

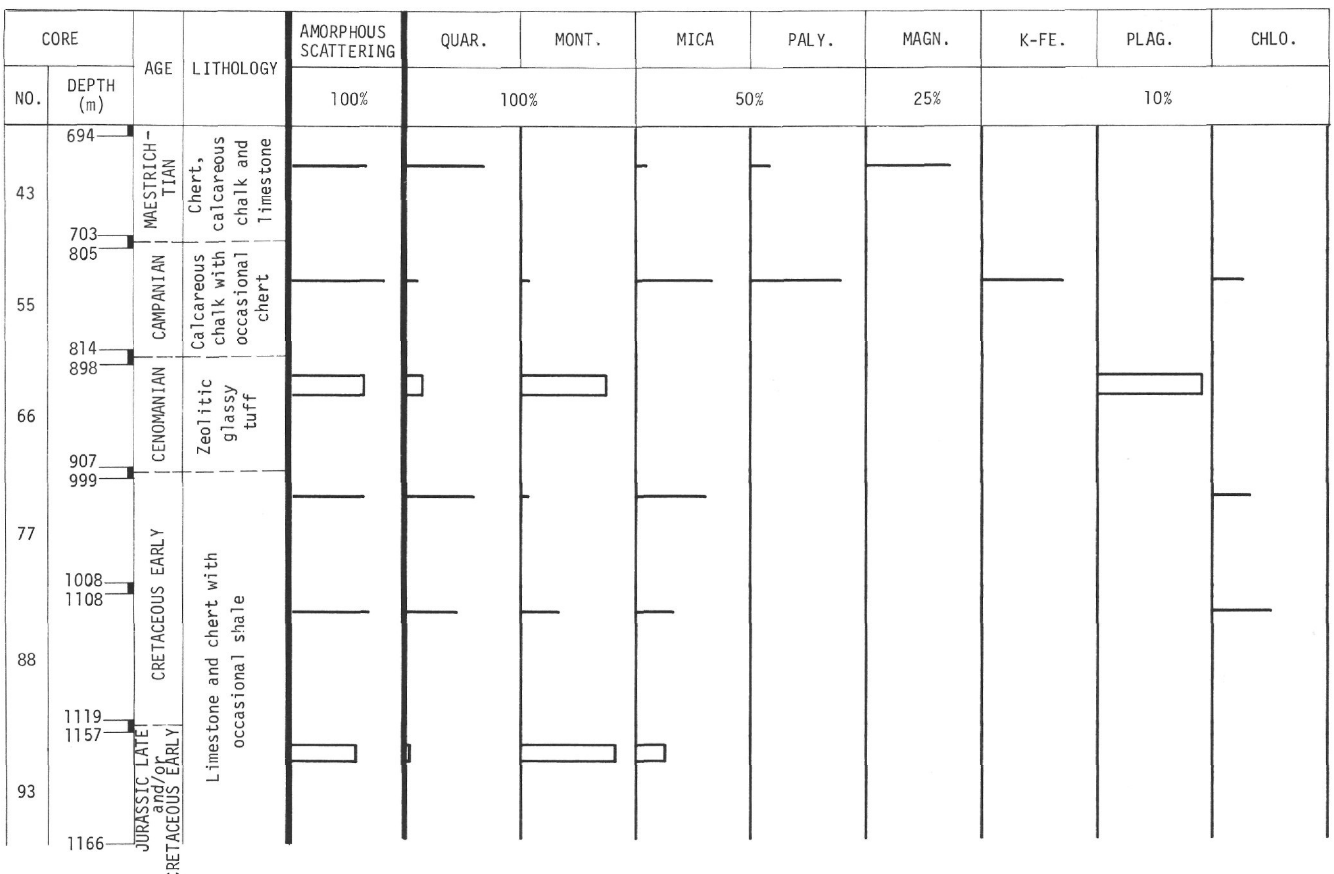

Figure 15. *Hole 167, <2μ samples.*

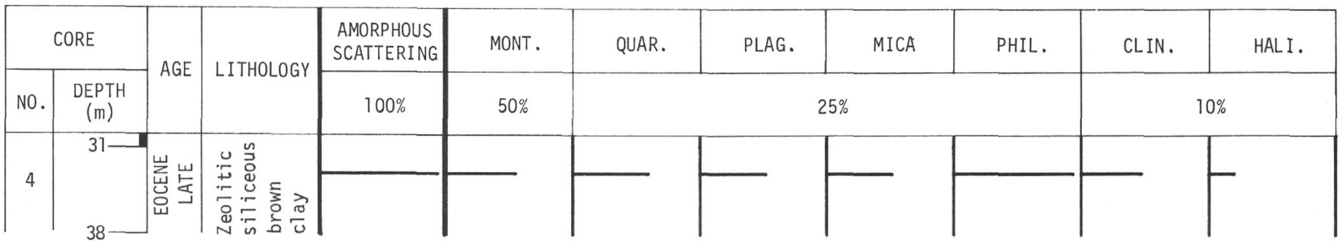

Figure 16. *Hole 168, bulk samples.*

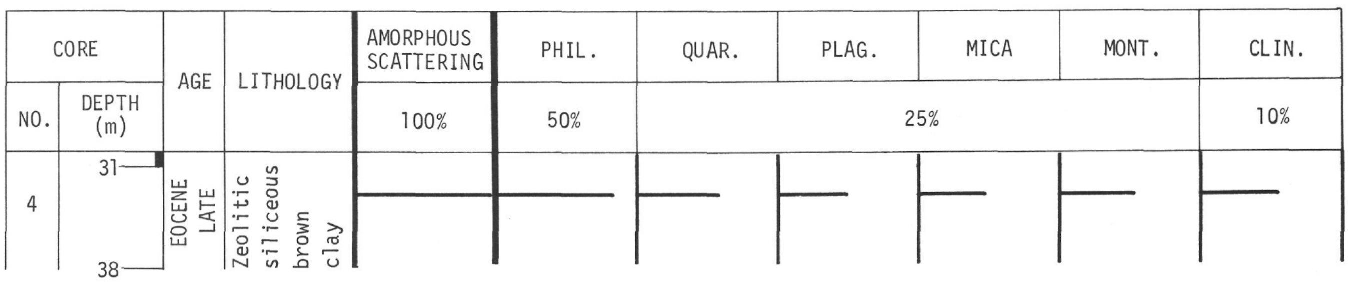

Figure 17. *Hole 168, 2-20μ samples.*

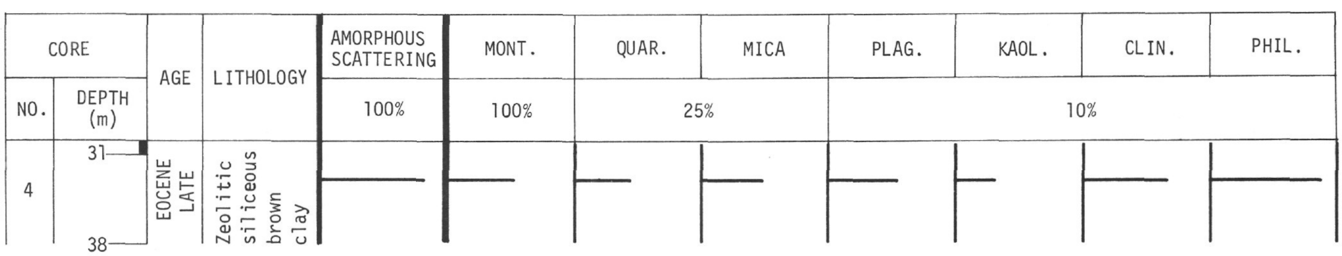

Figure 18. *Hole 168, <2μ samples.*

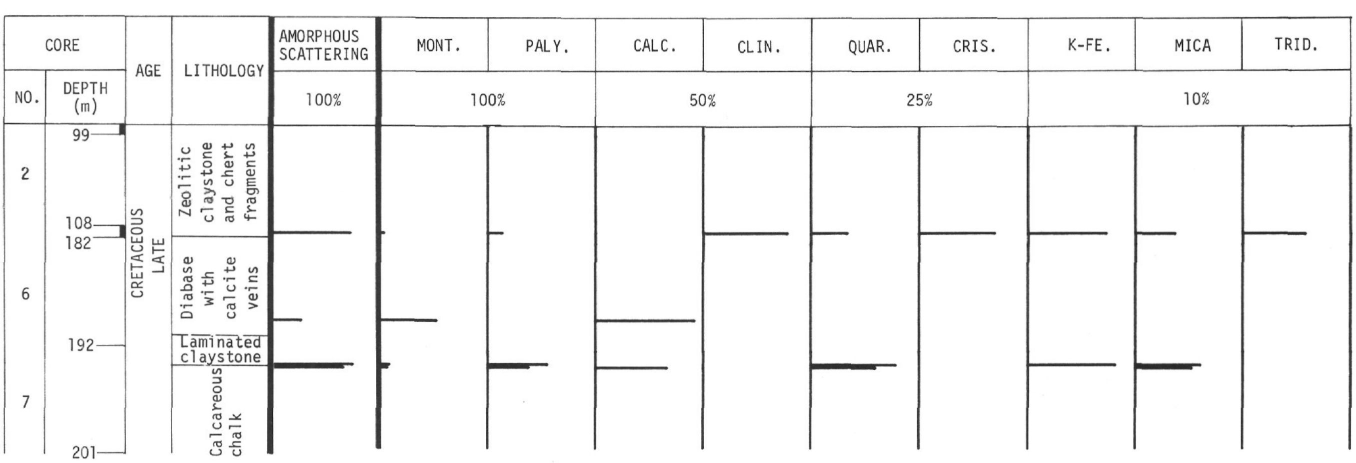

Figure 19. *Hole 169, bulk samples.*

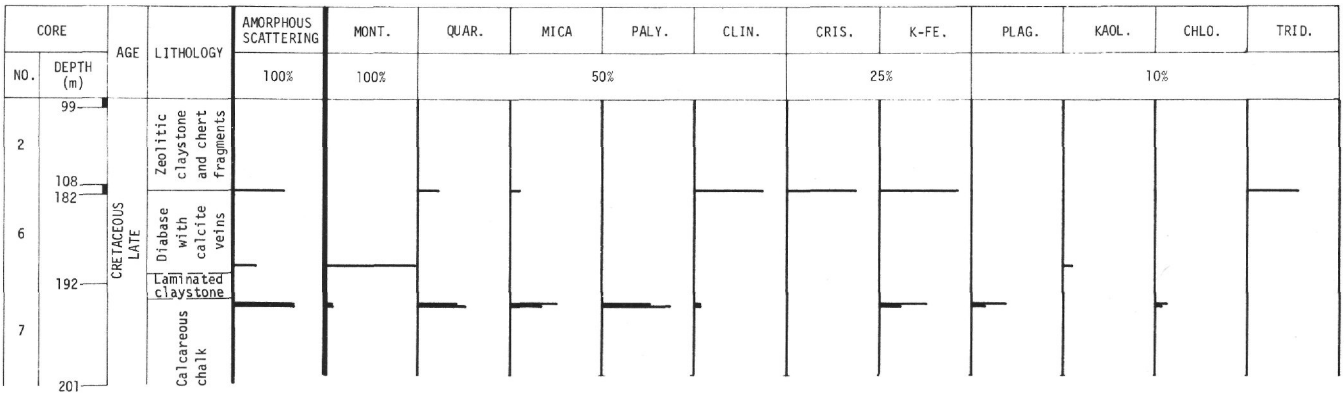

Figure 20. *Hole 169, 2-20μ samples.*

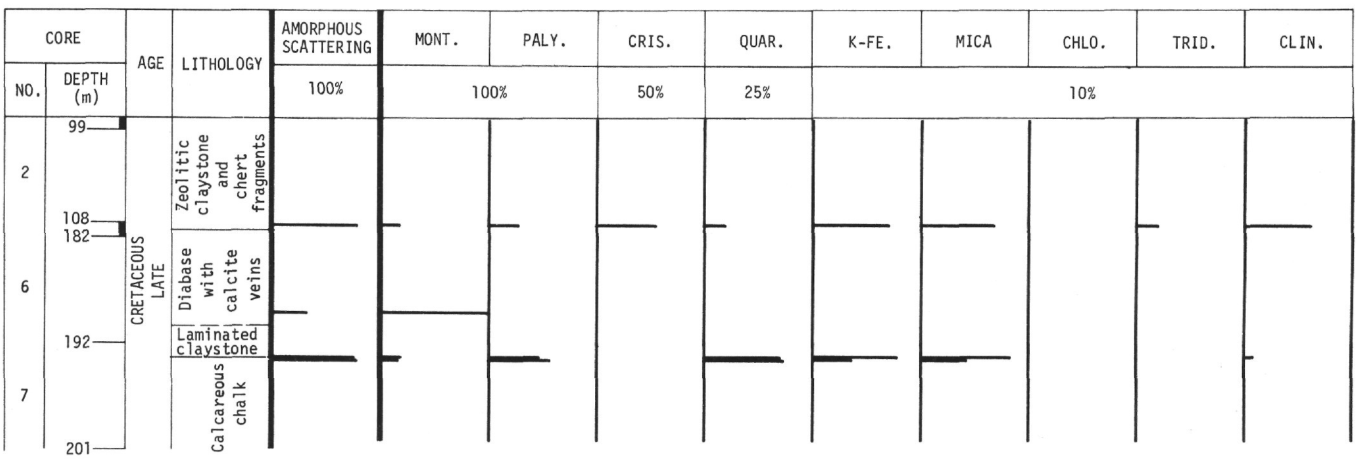

Figure 21. *Hole 169, <2μ samples.*

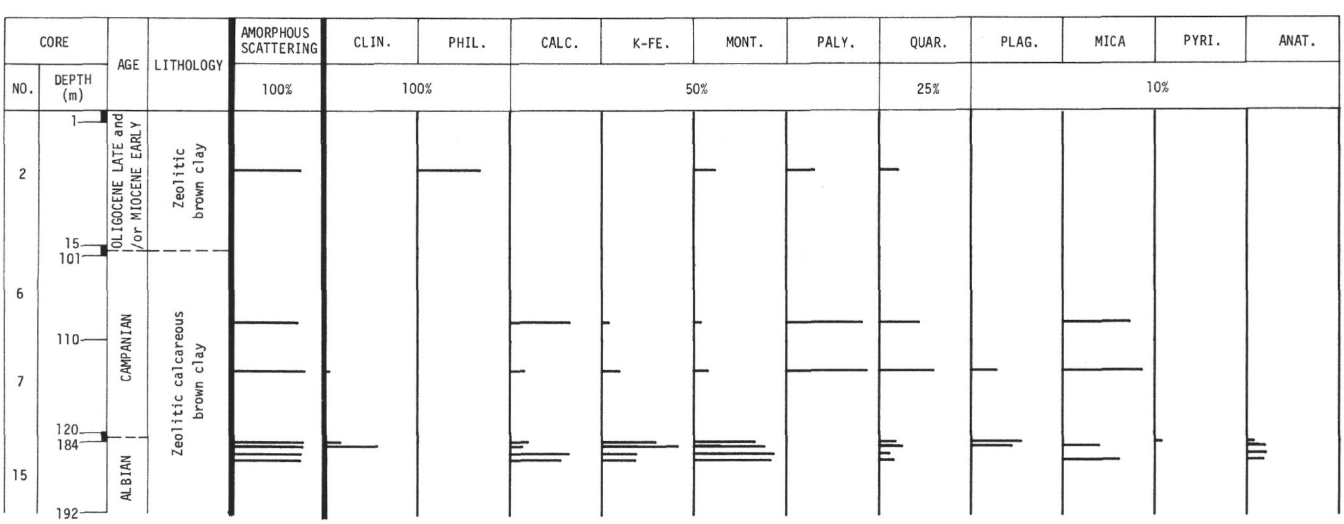

Figure 22. *Hole 170, bulk samples.*

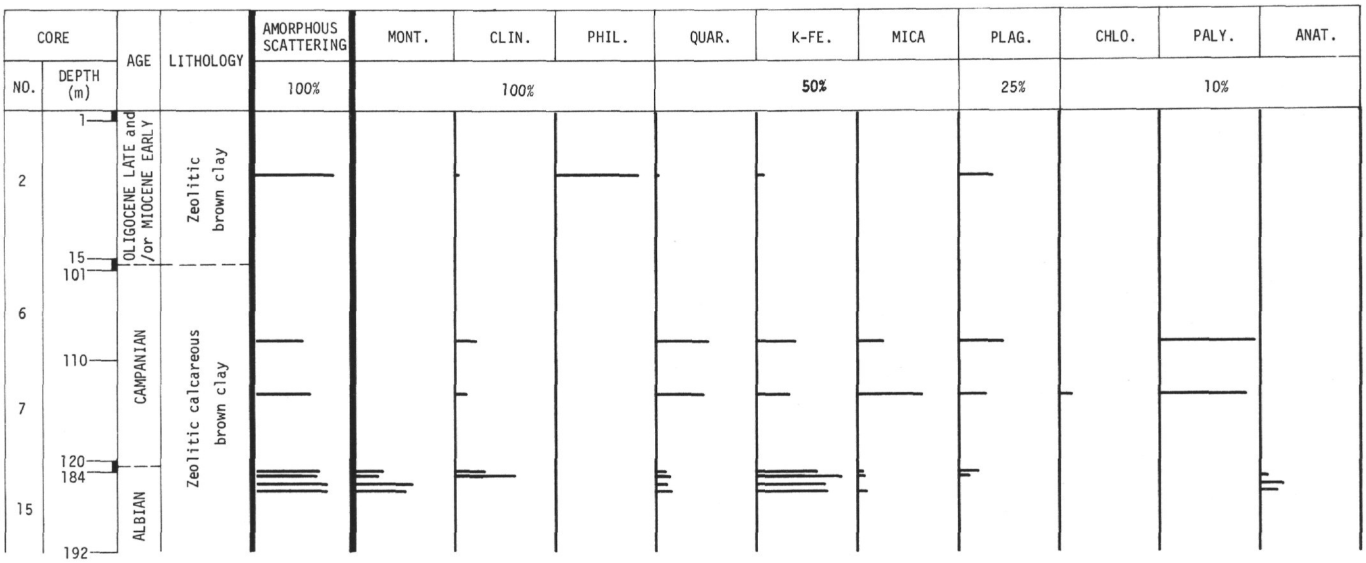

Figure 23. *Hole 170, 2-20μ samples.*

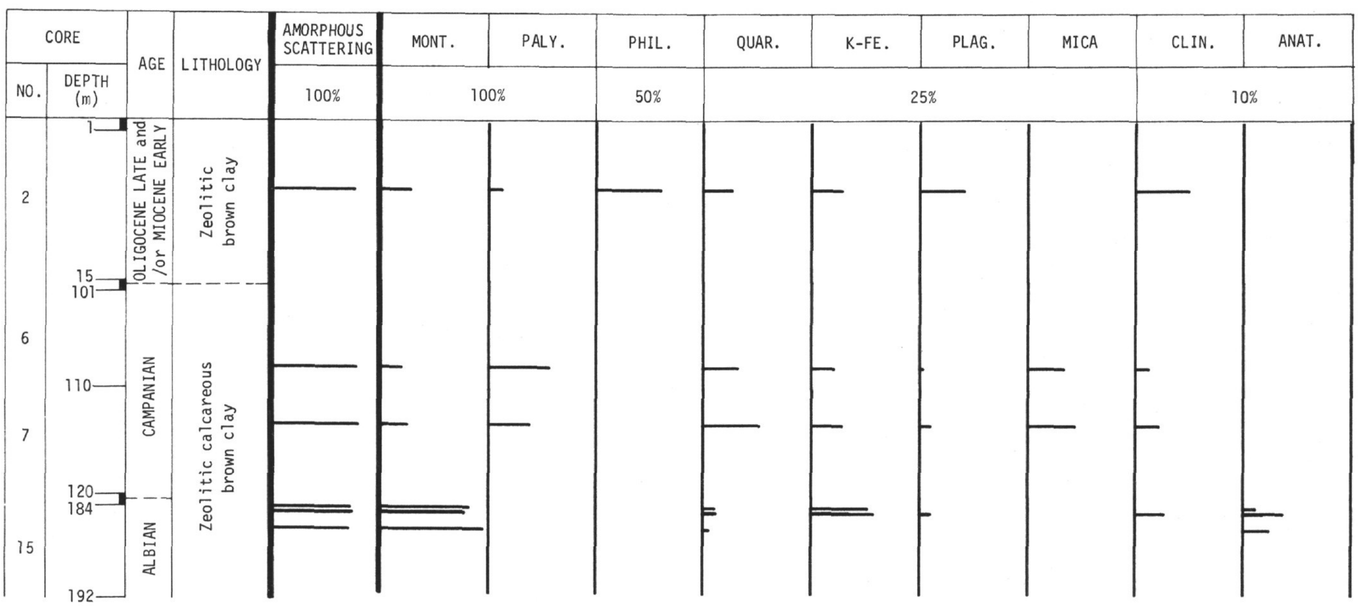

Figure 24. *Hole 170, <2μ samples.*

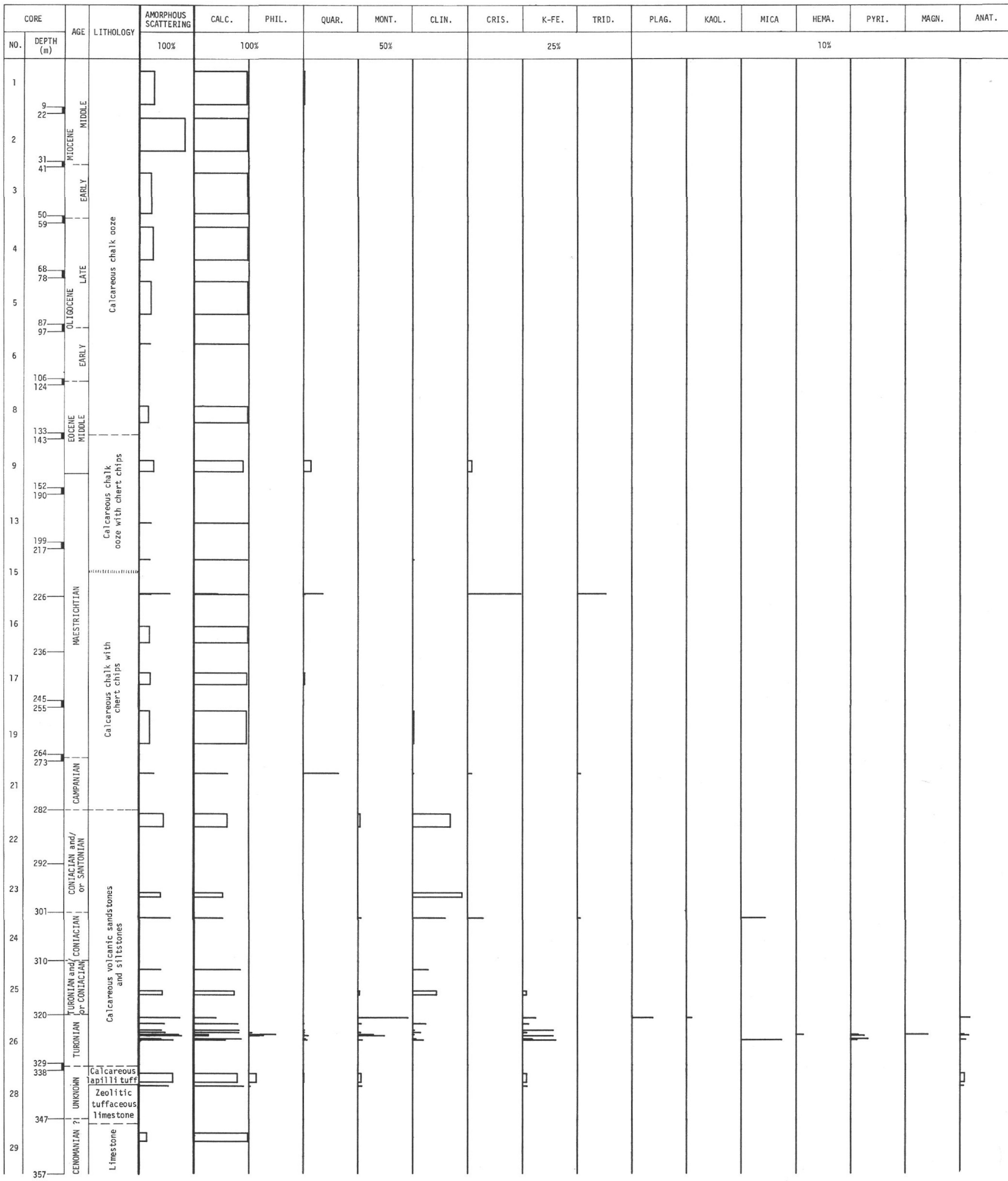

Figure 25. *Hole 171, bulk samples.*

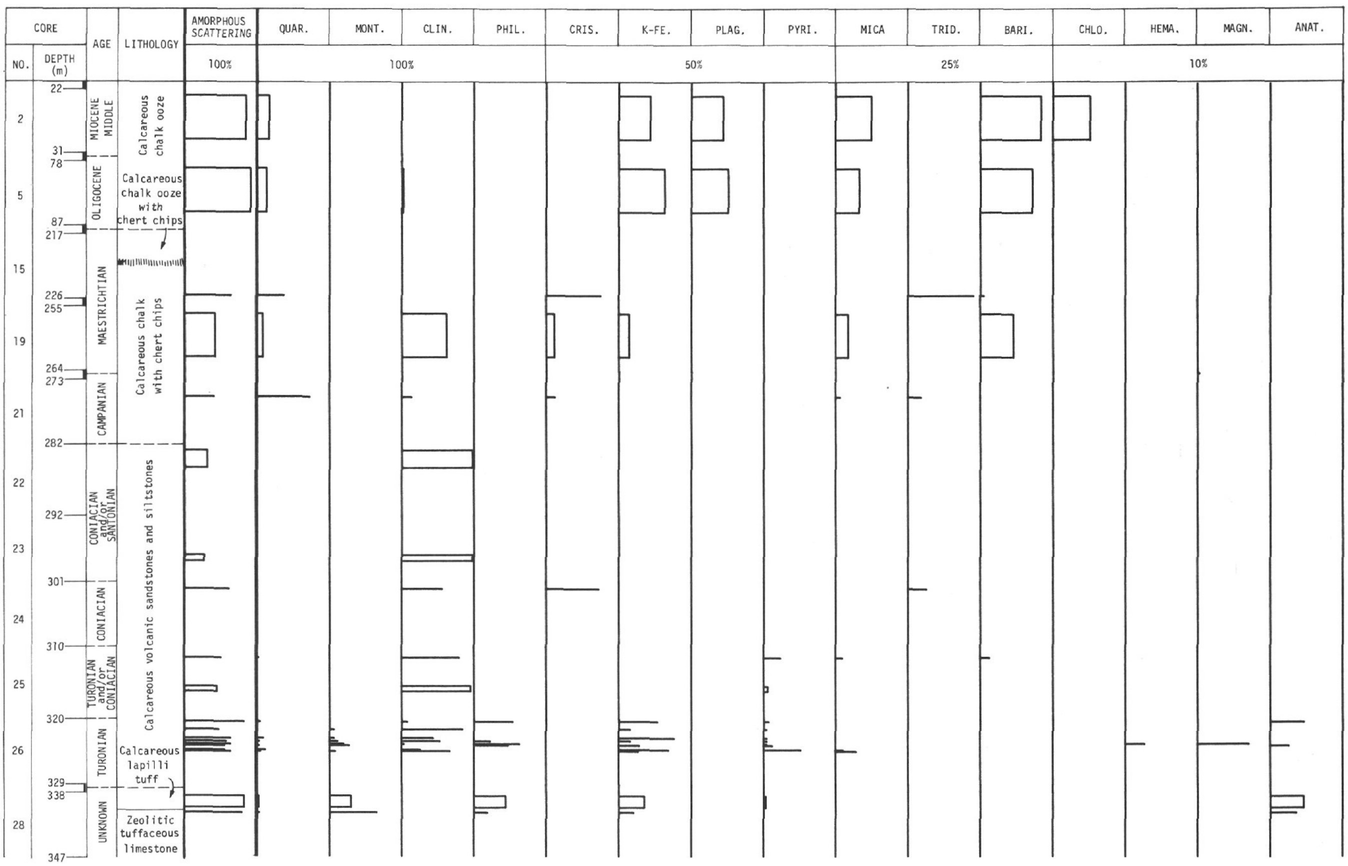

Figure 26. *Hole 171, 2-20µ samples.*

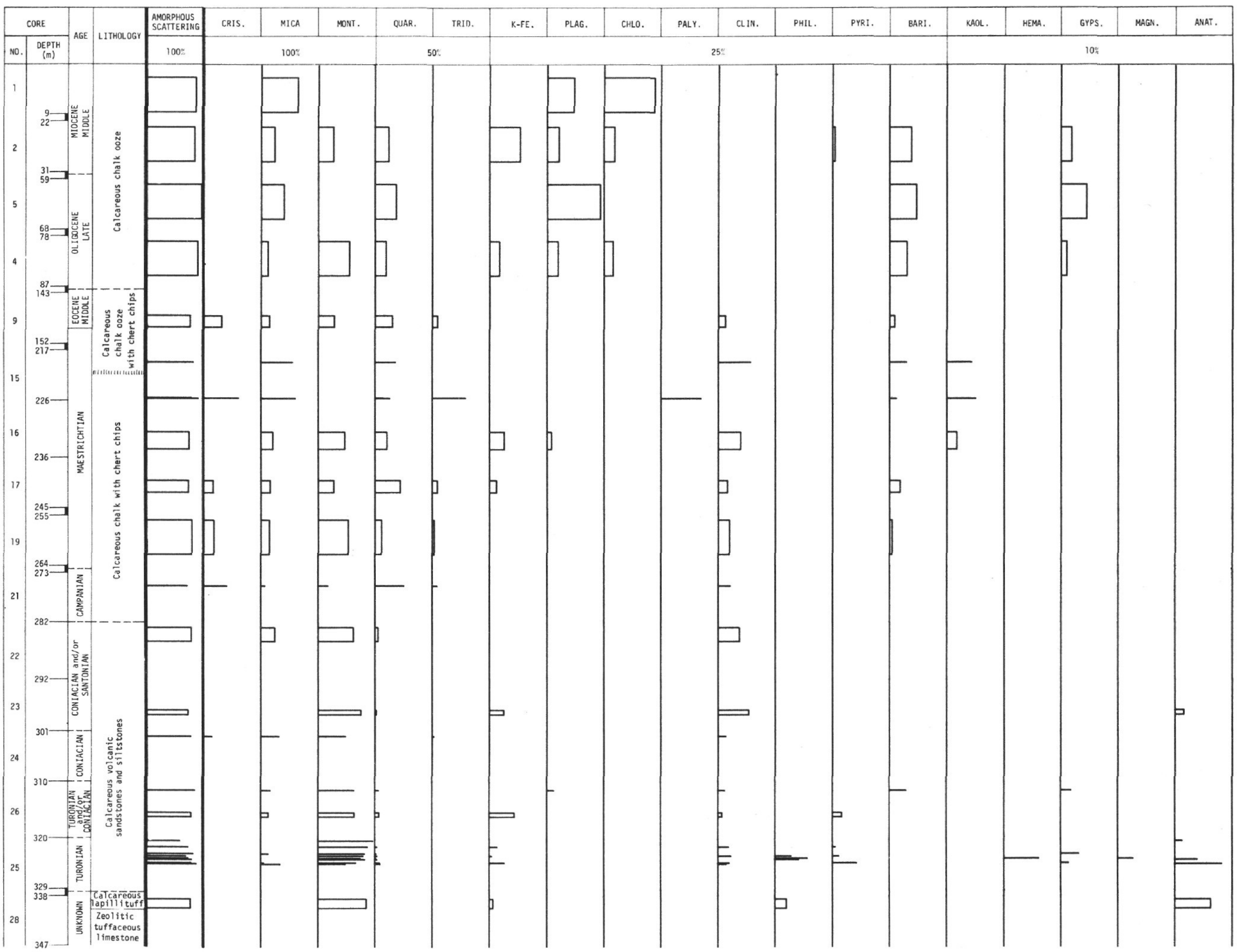

Figure 27. *Hole 171, <2μ samples.*

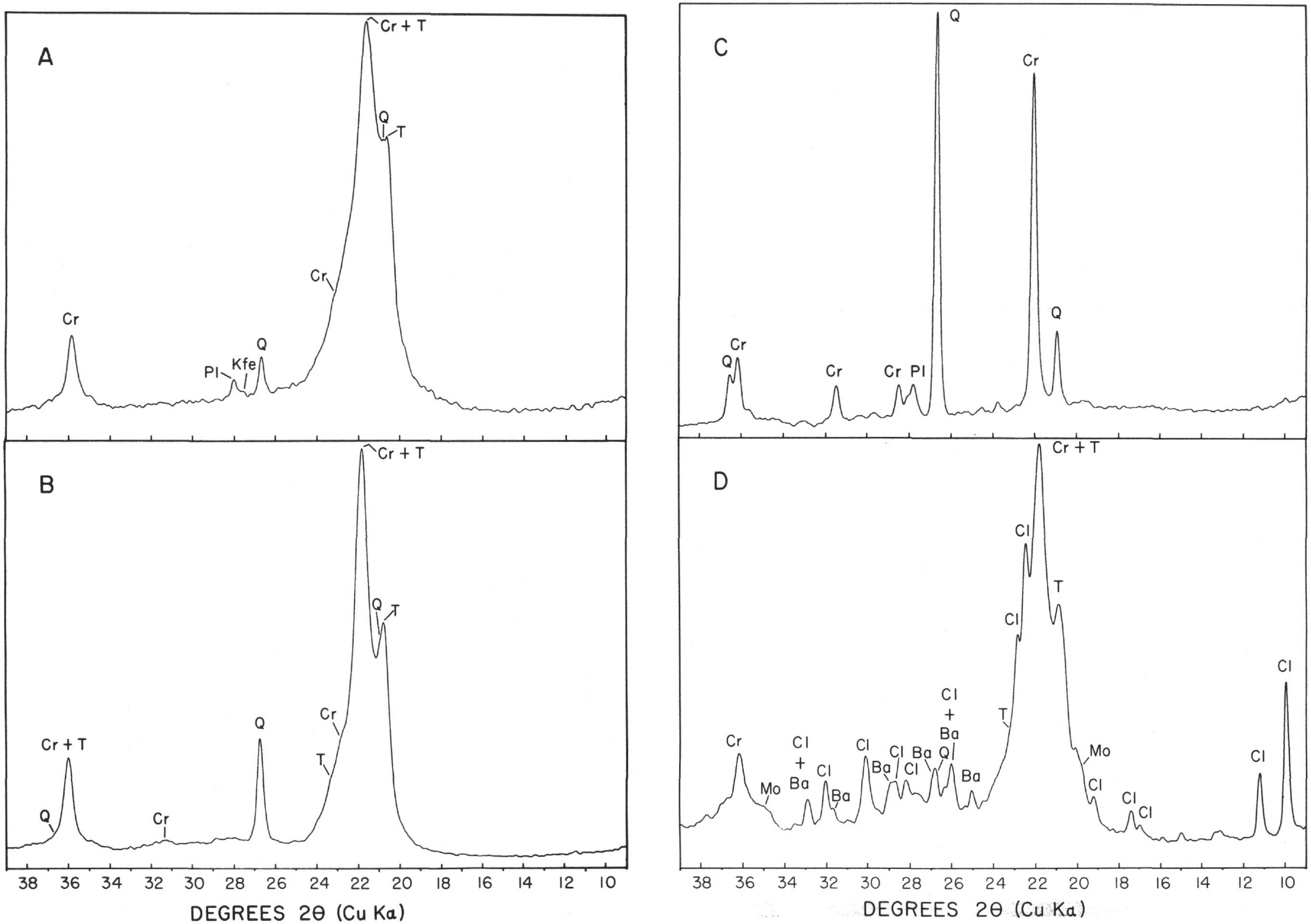

Figure 28. *X-ray diffractograms of chert (CuKα radiation, graphite diffracted beam monochrometer). (A) Porcelanite from Monterey Formation (Miocene), California; (B) Porcelanite + tridymite in Maastrichtian foraminiferal nannofossil chalk from Leg 17 (171-15-6, 97-99); (C) Low cristobalite in early Miocene, tuffaceous mudstone from Leg 7 (61.0-1-1, 83-89); (D) Porcelanite + tridymite associated with clinoptilolite in middle- or late-Eocene, Radiolarian ooze from Leg 17 (166-16-5, 44-46). (Ba = barite, Cl = clinoptilolite, Cr = cristobalite, Mo = montmorillonite, Pl = plagioclase, Q = quartz, T = tridymite.)*

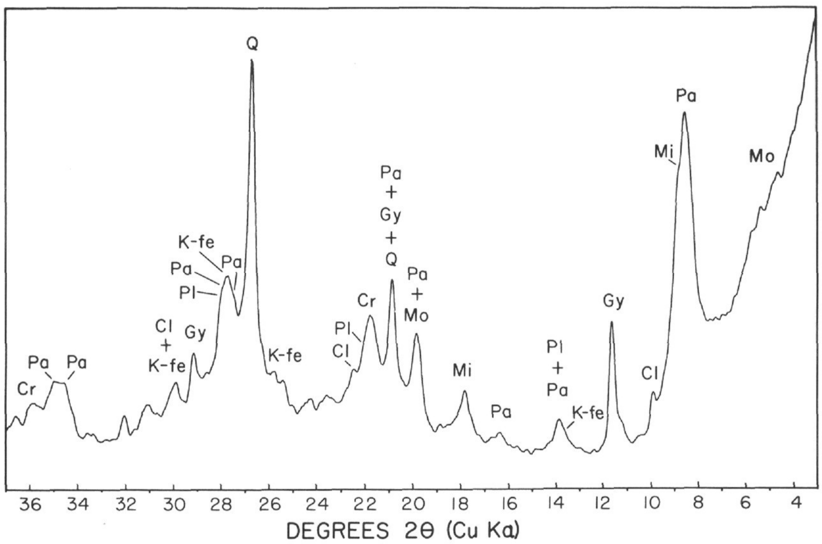

Figure 29. *Palygorskite in decalcified, <2μ fraction of Cretaceous zeolitic brown clay (164-14-1, 35-37). (Cl = clinoptilolite, Cr = cristobalite, Gy = gypsum, K-fe = K-feldspar, Mi = mica, Mo = montmorillonite, Pa = palygorskite, Pl = plagioclase.)*

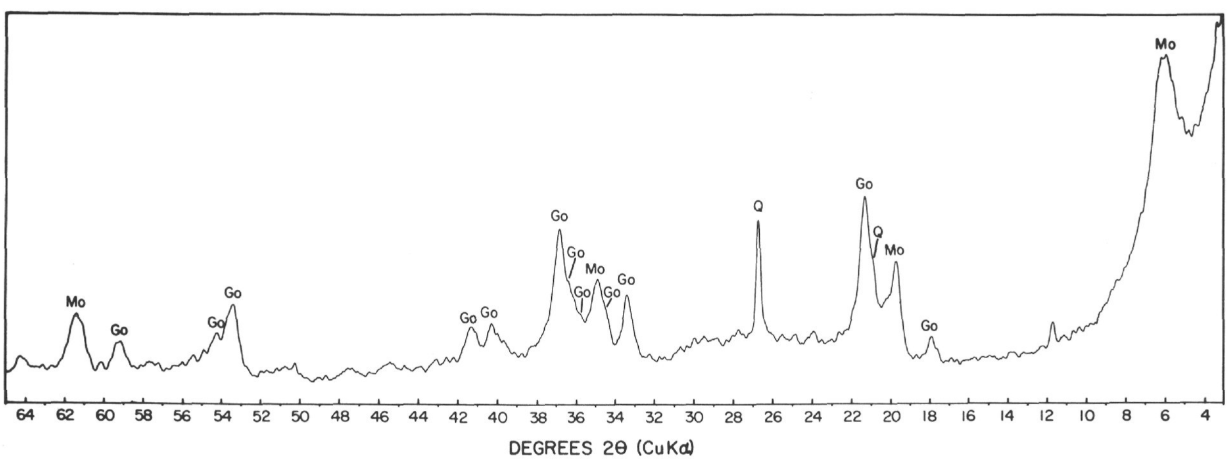

Figure 30. *Goethite in decalcified, <2μ fraction of Hauterivian zeolitic nannofossil marl (166-27-1, 70-72). (Go = goethite, Mo = montmorillonite, Q = quartz.)*

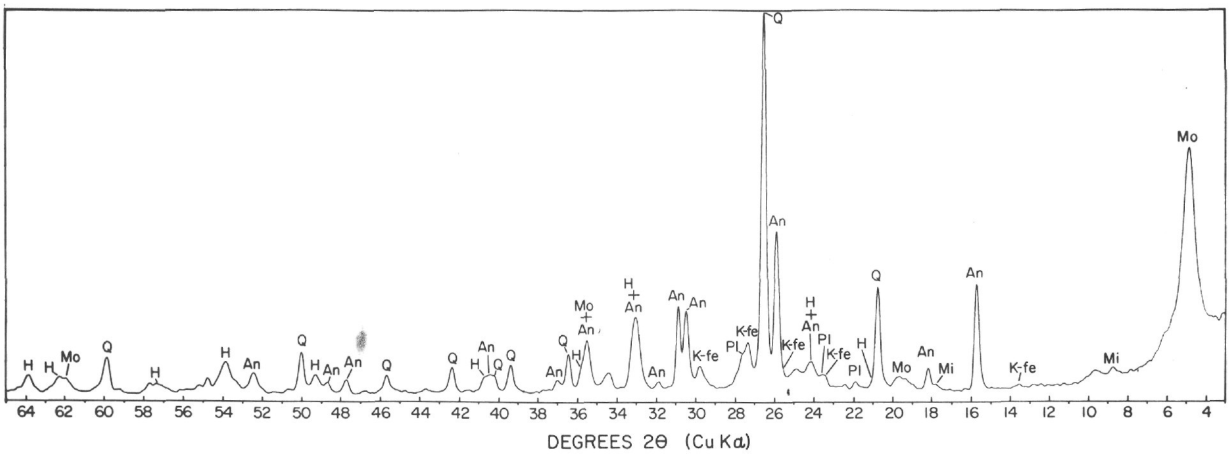

Figure 31. *Analcite in decalcified, <2μ fraction of Late Cretaceous volcanic sediment associated with basalt flows (165A-23-21, 145-150). (An = analcite, H = hematite, K-fe = K-feldspar, Mi = mica, Mo = montmorillonite, Pl = plagioclase, Q = quartz.)*

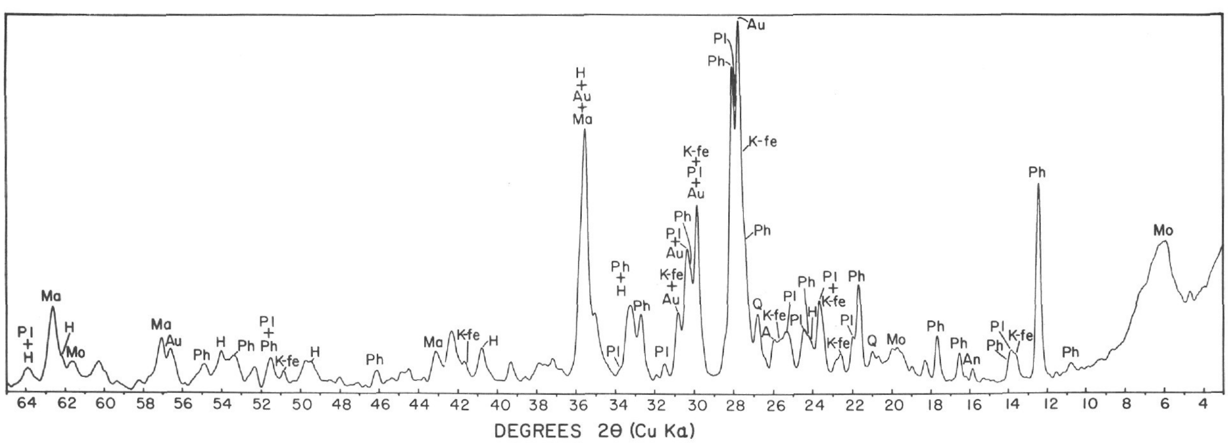

Figure 32. *Decalcified, 2-20μ fraction of Campanian volcaniclastic turbidite unit (165A-19-1, 86-89). (An = analcite, Au = Augite, H = hematite, K-fe = K-feldspar, Ma = magnetite, Mo = montmorillonite, Ph = phillipsite, Pl = plagioclase, Q = quartz.)*