18. X-RAY MINERALOGY DATA FROM THE NORTHWEST PACIFIC, LEG 32, DEEP SEA DRILLING PROJECT[1]

I. Zemmels and H.E. Cook, University of California, Riverside, California

METHODS

Semiquantitative determinations of the mineral composition of bulk samples, 2-20 μm, and <2μm fractions were performed according to the methods described in the appendix of Volume 28, Initial Reports of the Deep Sea Drilling Project.

The method of sample preparation, in brief, is as follows: Bulk samples are washed to remove seawater salts and are ground to less than 10 μm under butanol. A portion of the sediment is decalcified in a sodium-acetate-buffered, acetic-acid solution (pH 4.5). The residue is fractionated into 2-20 μm and <2 μm samples by wet-sieving and centrifugation. The 2-20 μm samples are ground to less than 10 μm. These three preparations are treated with trihexylamine acetate to expand the smectites. All samples are X-rayed as random powders.

The results of the X-ray diffraction analysis are presented in Tables 1 to 18. Tables 1 to 9 summarize the mineral data provide stratigraphic information and sample identification. The sediment ages, lithologic units, and nomenclature of the sediment types are from the DSDP Leg 32 Hole Summaries and from a subsequent update supplied by Dr. James V. Gardner, DSDP.

The percentage of amorphous material is a measure of the weight fraction of amorphous material in each sample, which commonly consists of biogenic silica, volcanic glass, palagonite, allophane, and organic material. The amorphous content is calculated from the total diffuse scattering of the sample. The method of calculation assumes that the diffuse scatter in excess of the diffuse scatter from the crystalline materials is proportioned to the amorphous content. The diffuse scatter of the crystalline minerals is determined from the mineral calibration standards (see Appendix, Volume 28). Ideally, the amorphous content varies between zero and 100%, but, in cases where the minerals in the sample have a higher degree of crystallinity than the calibration standards, negative values can result. The negative values are reported as blanks and these samples can be assumed to contain little or no amorphous material.

The crystalline minerals are quantified by the method of mutual ratios using peak heights and concentration factors derived from ratioing the diagnostic peaks of minerals with the major peak of quartz. Unquantifiable minerals, i.e., unidentified minerals and minerals for which standards are not available, are tentatively quantified using a hypothetical concentration factor of 3.0 which is applied to the major peak of the mineral. The concentrations of the quantifiable minerals is summed to 100%. The amorphous content and the unquantifiable minerals are not included in the total. The unquantifiable minerals are reported on a qualitative scale as trace (less than 5%), present (5%-25%), abundant (25%-65%) and major (greater than 65%).

The precision of the mineral determination is approximately ±1 weight percent of the amount present. Because of differences in the crystallinity between the mineral calibration standards and the minerals in the samples and also diffraction peak interferences, the accuracy of the reported concentrations is often less than the precision of the method allows. In terms of the reported concentration, smectites may vary ±50%; micas, chlorites, cristobalite, tridymite, and goethite may vary ±20%; kaolinite, amphibole, augite, the feldspars, the zeolites, palygorskite, sepiolite and apatite may vary ±10%; the minerals which have stable crystal lattices and are not members of solid-solution series (or typically have limited crystal-lattice substitution in the sedimentary environment) such as quartz, low-

[1]Institute of Geophysics and Planetary Physics, University of California, Riverside, California, Contribution No. 74-27.

TABLE 1
Summary of X-Ray Mineralogy Samples, Sample Depths, Lithology, Age, and X-Ray Diffraction Results, Site 303

Sample (Interval in cm)	Sample Depth Below Sea Floor (m)	Lithology	Age	Bulk Sample Major Constituent			2-20μm Fraction Major Constituent			<2μm Fraction Major Constituent		
				1	2	3	1	2	3	1	2	3
Hole 303												
2-3, 20	65.2	Unit 1	Early Plio.	Quar.	Plag.	Mica	Quar.	Mica	Plag.	Mont.	Mica	Quar.
3-5, 136	124.4	Rad Diatom ooze	to late	Quar.	Mica	Plag.	Quar.	Mica	Plag.	Mont.	Mica	Quar.
4-2, 80	176.3	and pelagic clay	Miocene	No data			Quar.	Mica	Plag.	Mica	Quar.	Mont.
Hole 303A												
5-2, 118	250.5	Unit 2[a]	a	Mont.	Clin.	Quar.	Clin.	Mont.	Plag.	Mont.	K-Fe.	

[a]Zeolitic pelagic clay and chert; Turonian to Cenomanian

magnesium calcite, aragonite, dolomite, rhodochrosite, siderite, gibbsite, talc, barite, anatase, gypsum, anhydrite, halite, pyrite, hematite, and magnetite will vary less than ±5%.

The user of the X-ray mineralogy data should bear in mind that (1) the reported values are not absolute concentrations and some adjustment has to be made for the amorphous content and the unquantifiable minerals; (2) in a homogeneous system of minerals, the mineral concentration trends are reliable because of the precision, but when comparing mineral concentrations between different geographic regions or lithologic units, additional information regarding the crystallinity of the minerals is required; (3) the representativeness of the samples selected for X-ray diffraction analysis is the responsibility of the shipboard scientists and any questions pertaining to this aspect should be directed to them.

DRILLING MUD USAGE

Drilling mud, containing montmorillonite and barite, was used in Hole 303A between Cores 7 and 8, Cores 9 and 10; Hole 305 between Cores 43 and 44; Hole 307 between Cores 9 and 10; and Hole 310A while cutting Core 16 and between Cores 17 and 18. None of the samples submitted for X-ray diffraction analysis was directly exposed to the drilling mud.

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TABLE 2
Summary of X-Ray Mineralogy Samples, Sample Depths, Lithology, Age, and X-Ray Diffraction Results, Site 304

Sample (Interval in cm)	Sample Depth Below Sea Floor (m)	Lithology	Age	Bulk Sample Major Constituent			2-20μm Fraction Major Constituent			<2μm Fraction Major Constituent		
				1	2	3	1	2	3	1	2	3
1-4, 8	110.1	Unit 1[a]	a	Quar.	Mica	Plag.	Quar.	Mica	Plag.	Mica	Mont.	Quar.
2-2, 92	218.4	Unit 2[b]	b	Mont.	Quar.	Mica	Quar.	Mica	Plag.	Mont.	Mica	Quar.

[a]Radiolarian diatom ooze; late Miocene
[b]Unfossiliferous pelagic clay; Miocene cavings.

TABLE 3
Summary of X-Ray Mineralogy Samples, Sample Depths, Lithology, Age, and X-Ray Diffraction Results, Site 305

Sample (Interval in cm)	Sample Depth Below Sea Floor (m)	Lithology	Age	Bulk Sample Major Constituent			2-20μm Fraction Major Constituent			<2μm Fraction Major Constituent		
				1	2	3	1	2	3	1	2	3
4-3, 43	29.9	Unit 1	Pleistocene	Calc.			Quar.	Mica	Plag.	Mica	Quar.	Mont.
5-2, 130	38.3	Foram-bearing	to	Calc.			Quar.	Mica	Plag.	Insufficient residue		
5-4, 83	40.8	nanno ooze	Pliocene	Calc.	Mica	Quar.	Mica	Quar.	Plag.	Mica.	Quar.	Mont.
6-4, 86	50.4			Calc.			Phil.	Quar.	Mica	Mica	Quar.	Mont.
6-5, 20	51.2			Calc.			Mica	Phil.	Quar.	Mica	Mont.	Quar.
6-5, 130	52.3			Calc.			Phil.	Quar.	Mica	Paly.	Quar.	Phil.
7-2, 102	57.0			Calc.			Phil.	Quar.	K-Fe.	Mica	Quar.	Paly.
7-5, 50	61.0	Unit 2	Maestrich-	Calc.			Phil.	Quar.	Plag.	Mica	Quar.	K-Fe.
8-2, 100	66.5	Foram-bearing	tian to late	Calc.			Insufficient residue			Mica	Quar.	Paly.
9-5, 100	80.0	nanno ooze	Miocene	Calc.			Quar.	K-Fe.	Phil.	Mica	Paly.	Quar.
10-5, 100	89.0			Calc.			Quar.	K-Fe.	Plag.	Mica	Quar.	K-Fe.
11-2, 66	93.7			Calc.			K-Fe.	Plag.	Quar.	Mica	Paly.	Quar.
13-2, 100	113.0			Calc.			K-Fe.	Quar.		Mont.		
15-5, 99	136.5			Calc.			K-Fe.	Quar.	Mica	Mont.	Paly.	Mica
16-2, 100	141.5			Calc.			Insufficient residue			Mont.	Mica	Quar.
16-5, 3	145.0			Calc.			Insufficient residue			Mica	Mont.	Quar.
17-5, 100	155.5	Unit 3	Companian	Calc.			Insufficient residue			Mont.	Paly.	Mica
20-5, 102	183.5	Foram nanno	to Maestrich-	Calc.			Insufficient residue			Mont.	Mica	Paly.
23-5, 102	212.0	ooze, chalk	tian	Calc.			Insufficient residue			Mont.	Paly.	Quar.
25-5, 99	230.5	and chert		Calc.			Insufficient residue			Insufficient residue		
59-1, 140	551.9			Calc.	Quar.		Quar.	Mica.	Bari.	Quar.	Mont.	
59-1, 130	551.8	Unit 4	Aptian	Quar.	Calc.		Insufficient residue			Insufficient residue		
65-1, 100	608.0	limestone	to	Quar.	Cris.		Quar.	Cris.	Pyri.	Mont.	Cris.	
65-1, 129	608.3	porcellanite	Barremian	Cris.	Quar.	Trid.	Cris.	Quar.	Trid.	Cris.	Trid.	Quar.
66-1, 115	617.7	and chert		Calc.	Quar.		Quar.			Quar.	Paly.	Mica
60-1, 104	561.0			Quar.	Calc.		Insufficient residue			Insufficient residue		

TABLE 4
Summary of X-Ray Mineralogy Samples, Sample Depths, Lithology, Age, and X-Ray Diffraction Results, Site 306

Sample (Interval in cm)	Sample Depth Below Sea Floor (m)	Lithology	Age	Bulk Sample Major Constituent			2-20μm Fraction Major Constituent			<2μm Fraction Major Constituent		
				1	2	3	1	2	3	1	2	3
1-2, 128	2.8	Unit 1[a]	a	Calc.	Quar.		Quar.	Mica	Plag.	Mica	Quar.	
8-1, 104	114.0	Unit 3[b]	b	Calc.	Quar.	Trid.	Cris.	Quar.	Trid.	Trid.	Cris.	
21-1, 67	281.7			Calc.	Quar.		Quar.	Mica	K-Fe.	Quar.		
21-1, 144	282.4	Unit c	c	Calc.	Quar.		Quar.	Mica	K-Fe.	Quar.	Mica	
29-7, 0	364.5	Nanno chalk		Calc.	Quar.		Quar.			Quar.	Mixl.	
36-7, 0	420.5	and chert		Calc.			Bari.	K-Fe.	Pyri.	Mixl.	Mont.	
40-1, 135	450.9			Calc.			Bari.	Mica	Quar.	Mixl.	Quar.	

[a]Foram nanno ooze; mixed Quaternary and Albian.
[b]Radiolarian-bearing porcellanite and chert; Aptian.
[c]Barremian-Hauterivian to Valanginian.

TABLE 5
Summary of X-Ray Mineralogy Samples, Sample Depths, Lithology, Age, and X-Ray Diffraction Results, Site 307

Sample (Interval in cm)	Sample Depth Below Sea Floor (m)	Lithology	Age	Bulk Sample Major Constituent			2-20μm Fraction Major Constituent			<2μm Fraction Major Constituent		
				1	2	3	1	2	3	1	2	3
1-2, 100	2.5	Unit 1[a]	a	Mica	Quar.	Plag.	Mica	Quar.	Plag.	Mica	Mont.	Quar.
5-7, 0	112.0	Unit 2b	b	Plag.	Mont.	Clin.	Plag.	Clin.	Mont.	Mont.	Plag.	K-Fe.
9-1, 108	233.6	Unit 3		Quar.	Dolo.		Insufficient residue			Insufficient residue		
12-7, 0	306.5	Chert, nanno chalk	Early	K-Fe.	Mont.	Quar.	K-Fe.	Mont.	Quar.	Mont.	K-Fe.	Kaol.
11-1, 100	289.5	and calc. porcell.	Cret.	Dolo.	Quar.	Cris.	Quar.	Kaol.		Quar.	Kaol.	Mica
12-1, 108	298.6			Quar.	Mixl.	Hema.	Quar.	Hema.		Quar.	Mixl.	Hema.

[a]Zeolitic pelagic clay; Quaternary.
[b]Radiolarian-bearing altered ash; Albian.

TABLE 6
Summary of X-Ray Mineralogy Samples, Sample Depths, Lithology, Age, and X-Ray Diffraction Results, Site 308

Sample (Interval in cm)	Sample Depth Below Sea Floor (m)	Lithology	Age	Bulk Sample Major Constituent			2-20μm Fraction Major Constituent			<2μm Fraction Major Constituent		
				1	2	3	1	2	3	1	2	3
1-1, 110	1.1	Altered volcanic	Early	K-Fe.	Mont.	Plag.	K-Fe.	Plag.	Augi.	Mont.	K-Fe.	
2-2, 37	14.4	ash and biogenous	Eocene	Calc.	Mont.	K-Fe.	Clin.	K-Fe.	Plag.	Mont.	Pyri.	
3-1, 98	41.5	volcanic silt		Calc.	Pyri.		Pyri.	K-Fe.	Ilme.	Mont.	Pyri.	

TABLE 7
Summary of X-Ray Mineralogy Samples, Sample Depths, Lithology, Age, and X-Ray Diffraction Results, Site 310

Sample (Interval in cm)	Sample Depth Below Sea Floor (m)	Lithology	Age	Bulk Sample Major Constituent			2-20μm Fraction Major Constituent			<2μm Fraction Major Constituent		
				1	2	3	1	2	3	1	2	3
Hole 310												
1-1, 5	0.1	Unit 1	Late	Calc.	Quar.		Quar.	Mica	Plag.	Mica	Quar.	Plag.
1-2, 100	2.5	Radiolarian-	Miocene	Calc.	Mica	Quar.	Quar.	Mica	Plag.	Mica	Mont.	Quar.
3-2, 99	17.0	bearing nanno	to	Calc.			Mica	Quar.	Plag.	Mica	Quar.	Mont.
4-2, 41	25.9	ooze	Quaternary	Calc.	Quar.	Mica	Quar.	Mica	Plag.	Mica	Mont.	Quar.
5-6, 32	41.3			Calc.			Mica	Quar.	Plag.	Mica	Quar.	Mont.
6-5, 130	50.3			Calc.	Mica	Quar.	Mica	Quar.	Plag.	Mica	Quar.	Mont.
8-5, 100	69.0			Calc.	Quar.	Mica	Mica	Quar.	Plag.	Paly.	Quar.	Mica
9-6, 5	79.1	Unit 2[a]	a	Calc.	Quar.	Phil.	Mica	Quar.	Phil.	Phil.	Mica	Quar.
10-6, 101	89.0			Calc.	Phil.	K-Fe.	Phil.	K-Fe.		Mont.	Apat.	K-Fe.
13-6, 98	117.5	Unit 4[b]	b	Calc.	Clin.		Clin.	Mica		Mont.	Paly.	Mica.
Hole 310A												
17-7, 0	334.0	Unit 5[c]	c	Bari.	Pyri.	Trid.	Bari.	Pyri.	Trid.	Mont.	Cris.	Paly.

[a]Zeolitic, nanno ooze; and nanno ooze; Oligocene and middle Miocene
[b]Nanno ooze; Maestrichtian to late Campanian.
[c]Chert and nanno ooze; Campanian

TABLE 8
Summary of X-Ray Mineralogy Samples, Sample Depths, Lithology, Age, and X-Ray Diffraction Results, Site 311

Sample (Interval in cm)	Sample Depth Below Sea Floor (m)	Lithology	Age	Bulk Sample Major Constituent			2-20μm Fraction Major Constituent			<2μm Fraction Major Constituent		
				1	2	3	1	2	3	1	2	3
1-6, 142	8.9	Unit 1	Late	Augi.	Plag.	Phil.	Plag.	Augi.	Phil.	Mont.	Augi.	
1-2, 99	2.5	Zeolitic pelagic	Oligocene	Quar.	Mica.	Plag.	Mica	Quar.	Plag.	Mica	Mont.	Quar.
2-3, 106	13.1	clay		K-Fe.	Phil.	Quar.	K-Fe.	Phil.	Mica	Mont.	K-Fe.	Quar.
2-5, 80	15.8			Calc.	K-Fe.	Plag.	K-Fe.	Magn.	Plag.	Mont.	Phil.	K-Fe.
4-7, 0	24.0	Unit 2[a]	a	Mont.	Phil.		Mont.	Phil.		Mont.	Phil.	

[a]Volcanic turbidites; age unknown.

TABLE 9
Summary of X-Ray Mineralogy Samples, Sample Depths, Lithology, Age, and X-Ray Diffraction Results, Site 313

Sample (Interval in cm)	Sample Depth Below Sea Floor (m)	Lithology	Age	Bulk Sample Major Constituent			2-20μm Fraction Major Constituent			<2μm Fraction Major Constituent		
				1	2	3	1	2	3	1	2	3
1-2, 99	2.5		Quaternary	Calc.			Mica	Quar.	Plag.	Mica	Phil.	Quar.
1-5, 49	6.5		to	Calc.	Quar.	Plag.	Mica	Plag.	Quar.	Mica	Mont.	Plag.
2-2, 99	38.0		early	Calc.			Plag.	Phil.	Quar.	Mont.	Plag.	
3-2, 101	76.0	Unit 1	Maestrich-	Calc.			Clin.	Phil.	Plag.	Mont.	Clin.	Phil.
3-5, 99	80.5	Foram-nanno	tian	Calc.			Insufficient residue			Mont.	Phil.	Clin.
4-5, 99	118.5	ooze, rad nanno		Calc.			Insufficient residue			Mont.	Clin.	Mica
5-2, 69	151.7	ooze, zeolitic		Calc.			Clin.	Plag.	K-Fe.	Mont.	Clin.	Plag.
7-5, 89	174.9	nanno ooze. and		Calc.			Clin.	Plag.	Mont.	Mont.	Kaol.	Plag.
12-2, 98	207.5	chalks and cherts		Calc.			Insufficient residue			Mont.	Plag.	K-Fe.
13-2, 99	216.5			Calc.			K-Fe.	Bari.	Quar.	Mont.	K-Fe.	Quar.
15-2, 49	234.5			Calc.			Bari.	Clin.	Quar.	Mont.	Paly.	Quar.
19-5, 100	305.5			Calc.			Clin.	Mont.	Plag.	Mont.	Mica.	Quar.
22-2, 120	399.7			Calc.			Clin.	Cris.	K-Fe.	Mont.	Paly.	Cris.
23-7, 0	409.0			Calc.	Mont.		Augi.	Mont.	Plag.	Mont.		
24-3, 83	413.3	Unit 2	early	Calc.			K-Fe.	Hema.	Mica	Mont.	Mica	K-Fe.
24-5, 110	416.6	Foram nanno	Maestrich-	Mont.	Calc.	Augi.	Phil.	Mont.	Anal.	Mont.	Phil.	
28-4, 54	452.5	limestone and	tian to	Calc.	Mont.		Phil.	K-Fe.	Mont.	Mont.		
30-1, 61	466.6	calcareous	Companian	Calc.	K-Fe.	Mont.	K-Fe.	Plag.		Mont.	K-Fe.	
31-2, 66	477.7	volcanic sand-		Arag.	Calc.		Clin.	K-Fe.	Plag.	Mont.		
33-2, 85	496.9	stone, siltstone,		Mont.	Calc.	Phil.	Mont.	Phil.	K-Fe.	Mont.	Phil.	
35-4, 84	518.8	claystone and		Mont.	Calc.		Mont.	Phil.	K-Fe.	Mont.		
35-5, 95	520.5	breccia in turbidite		Calc.			Phil.	K-Fe.	Augi.	Mont.		
41-5, 147	576.5	sequences		Calc.			K-Fe.	Plag.	Mica.	Mont.	K-Fe.	Plag.
42-3, 130	582.8			Mont.	Calc.		Mont.	K-Fe.	Magn.	Mont.		
42-3, 145	583.0			Calc.			Clin.	Bari.	K-Fe.	Mont.	Quar.	Bari

TABLE 10
Results of X-Ray Diffraction Analysis, Site 303

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Amor.	Calc.	Quar.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Mont.	Clin.	Bari.
Bulk Samples													
2	62.0-71.0	65.2	94.5	4.6	40.1	–	25.5	–	24.6	5.2	–	–	–
3	117.0-126.0	124.4	87.6	–	37.3	4.4	18.7	3.3	27.3	1.8	7.2	–	–
5A	247.8-257.0	250.5	77.1	1.7	13.5	4.8	6.3	–	10.5	–	31.9	26.9	4.4
2-20μm Fraction													
2	62.0-71.0	65.20	88.3	–	42.5	–	22.8	–	29.8	5.0	–	–	–
3	117.0-126.0	124.4	73.4	–	40.9	4.0	22.8	1.4	27.1	3.7	–	–	–
4	174.0-183.0	176.3	64.8	–	42.6	–	23.3	0.7	32.3	1.1	–	–	–
5A	247.8-257.0	250.5	48.7	–	7.5	4.1	9.6	–	8.2	–	10.3	56.6	3.6
<2μm Fractions													
2	62.0-71.0	65.2	80.5	–	25.1	–	13.2	4.1	25.7	5.3	26.5	–	–
3	117.0-126.0	124.4	62.0	–	18.4	2.3	7.7	3.6	27.8	3.6	36.6	–	–
4	174.0-183.0	176.3	57.0	–	23.6	2.5	11.4	9.5	31.8	–	21.1	–	–
5A	247.8-257.0	250.5	57.7	4.6	4.6	6.4	4.7	–	4.4	–	77.6	1.1	1.1

TABLE 11
Results of X-Ray Diffraction Analysis, Site 304

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Amor.	Quan.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Mont.	Clin.
Bulk Samples											
1	105.5-115.0	110.1	94.8	46.5	–	18.2	4.4	23.0	4.5	3.3	–
2	216.0-225.5	218.4	65.4	25.8	–	11.9	2.2	21.5	–	38.7	–
2-20μm Fractions											
1	105.5-115.0	110.1	81.9	38.9	6.1	23.0	–	24.8	7.2	–	–
2	216.0-225.5	218.4	48.1	37.9	–	25.7	2.7	32.7	–	–	1.1
<2μm Fractions											
1	105.5-115.0	110.1	72.9	22.2	–	10.4	6.2	30.3	7.1	23.8	–
2	216.0-225.5	218.4	50.1	12.6	–	4.3	4.2	14.8	–	64.0	–

TABLE 12
Results of X-Ray Diffraction Analysis, Site 305

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Amor.	Calc.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Mont.	Paly.	Trid.	Clin.	Phil.	Pyri.	Apat.	Bari.	Amph.	U-2[a]	U-3[b]
Bulk Samples																						
4	26.5-35.5	29.9	31.7	98.3	1.0	–	0.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	35.5-45.0	38.3	46.2	89.9	3.6	–	–	2.5	–	2.5	–	–	–	–	–	–	–	–	1.5	–	–	–
		40.8	53.5	75.7	5.7	–	3.3	3.9	1.6	7.6	1.2	–	–	–	–	–	–	–	1.0	–	–	–
6	45.0-54.5	50.4	41.9	86.0	2.2	–	2.4	1.9	–	2.4	–	–	–	–	–	3.7	–	–	1.5	–	–	–
		51.2	34.5	91.1	1.2	–	1.4	1.4	–	1.2	–	–	–	–	–	1.9	–	–	1.8	–	–	–
		52.3	32.3	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7	54.5-64.0	57.0	18.5	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		61.0	38.3	98.3	0.5	–	–	–	–	–	–	–	–	–	–	1.2	–	–	–	–	–	–
8	64.0-73.0	66.5	22.4	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9	73.0-82.0	80.0	20.0	99.7	0.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10	82.0-91.5	89.0	15.5	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
11	91.5-101.0	93.7	17.7	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13	110.5-120.0	113.0	20.8	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
15	129.5-139.0	136.5	14.8	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
16	139.0-148.5	141.5	17.3	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		145.0	22.3	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
17	148.5-158.0	155.5	35.5	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
20	176.5-186.0	183.5	19.2	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
23	205.0-214.0	212.0	18.9	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
25	223.5-233.0	230.5	28.7	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

TABLE 12 – *Continued*

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Amor.	Calc.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Mont.	Paly.	Trid.	Clin.	Phil.	Pyri.	Apat.	Bari.	Amph.	U-2[a]	U-3[b]
59	550.5-560.0	551.8	34.9	38.4	60.5	–	–	–	–	1.1	–	–	–	–	–	–	–	–	–	–	–	–
		551.9	32.8	93.3	6.7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
60	560.0-569.5	561.0	33.4	46.8	53.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
65	607.0-616.5	608.0	52.0	2.5	64.3	26.5	–	–	–	–	–	–	–	2.5	–	–	2.7	–	1.6	–	–	–
		608.3	47.8	–	16.3	62.8	–	–	–	2.1	–	5.7	–	10.5	1.7	–	0.9	–	–	–	–	–
66	616.5-626.0	617.7	33.9	62.8	33.4	–	–	–	–	–	–	–	2.5	–	–	–	–	–	1.3	–	–	–
2-20μm Fractions																						
4	26.5-35.5	29.9	88.7	–	34.7	–	7.6	19.2	–	33.6	4.9	–	–	–	–	–	–	–	–	–	–	–
5	35.5-45.0	38.3	46.5	–	36.7	–	5.9	18.0	2.0	33.5	3.9	–	–	–	–	–	–	–	–	–	–	–
		40.8	41.3	–	33.0	–	6.1	16.6	3.0	36.0	3.3	–	–	–	–	–	–	–	1.1	1.0	–	–
6	45.0-54.5	50.4	32.8	–	20.8	–	8.3	13.4	–	19.0	2.9	–	–	–	1.5	28.5	–	–	5.6	–	–	–
		51.2	32.0	–	17.9	–	9.4	12.3	–	24.1	3.1	–	–	–	–	22.3	–	–	10.9	–	–	–
		52.3	77.4	–	19.0	–	8.7	13.4	–	18.3	2.3	–	–	–	1.1	33.1	–	–	4.1	–	–	–
7	54.5-64.0	57.0	88.1	–	26.2	–	19.5	12.1	–	6.8	1.2	–	–	–	–	31.7	–	–	2.6	–	–	–
		61.0	68.5	–	15.8	–	6.7	8.8	–	4.2	1.3	–	–	–	–	63.2	–	–	–	–	–	–
9	73.0-82.0	80.0	89.0	–	31.8	–	24.7	11.4	–	8.7	2.3	–	–	–	–	19.5	–	–	1.6	–	–	Trace
10	82.0-91.5	89.0	82.5	–	28.8	–	22.7	15.7	–	13.4	2.4	–	4.8	–	–	8.3	–	–	4.0	–	–	Trace
11	91.5-101.0	93.7	94.3	–	9.5	–	68.8	17.7	1.3	1.0	–	–	–	–	–	–	–	–	1.7	–	–	Trace
13	110.5-120.0	113.0	81.2	–	29.3	–	60.9	–	–	5.9	0.9	–	–	–	–	–	–	–	3.1	–	–	Pres
15	129.5-139.0	36.5	92.6	–	33.4	–	54.7	–	–	7.5	–	–	–	–	–	–	–	–	4.4	–	–	Trace
59	550.5-560.0	551.9	42.2	–	46.7	–	7.1	3.5	–	21.6	1.9	–	–	–	–	–	0.6	–	18.5	–	–	–
65	607.0-616.5	608.0	29.5	–	64.2	25.3	–	–	–	–	–	–	–	2.0	–	–	8.5	–	–	–	Pres	–
		608.3	25.8	–	23.5	50.9	5.6	–	2.6	1.5	–	–	–	7.6	6.5	–	1.8	–	–	–	–	–
66	616.5-626.0	617.7	29.5	–	88.7	–	1.8	–	–	6.5	–	–	–	–	–	–	–	–	3.0	–	–	–
<2μm Fractions																						
4	26.5-35.5	29.9	79.6	–	21.0	–	2.6	7.1	7.1	36.1	7.3	18.8	–	–	–	–	–	–	–	–	–	–
5	35.5-45.0	40.8	75.4	–	27.1	–	4.7	10.7	2.0	36.4	5.2	12.2	–	–	–	–	–	–	1.6	–	–	–
6	45.0-54.5	50.4	73.7	–	23.5	–	5.9	9.0	3.5	32.9	4.2	13.0	7.0	–	–	–	–	–	0.9	–	–	–
		51.2	65.9	–	10.0	–	4.2	8.2	9.3	28.0	6.0	24.9	7.1	–	–	–	–	–	2.2	–	–	–
		52.3	89.4	–	12.8	–	3.6	6.9	4.1	7.3	7.5	3.4	45.8	–	–	8.6	–	–	–	–	–	–
7	54.5-64.0	57.0	88.9	–	19.7	–	11.3	8.6	2.7	31.6	5.3	1.6	13.5	–	–	5.7	–	–	–	–	–	–
		61.0	83.3	–	17.7	–	10.7	3.7	3.1	34.9	6.5	5.5	7.3	–	–	10.6	–	–	–	–	–	–
8	64.0-73.0	66.5	92.9	–	13.4	–	6.5	5.0	3.5	43.0	8.7	6.6	13.2	–	–	–	–	–	–	–	–	–
9	73.0-82.0	80.0	81.0	–	14.0	–	6.2	–	3.1	34.8	7.5	6.2	23.7	–	–	4.5	–	–	–	–	–	–
10	82.0-91.5	89.0	86.7	–	18.4	–	12.5	4.0	3.9	36.7	7.5	5.1	10.7	–	–	–	–	1.2	–	–	–	–
11	91.5-101.0	93.7	83.5	–	14.5	–	8.2	2.3	4.4	32.7	7.2	10.3	20.4	–	–	–	–	–	–	–	–	–
13	110.5-120.0	113.0	79.6	–	0.4	–	0.4	0.2	–	–	0.2	98.7	–	–	–	–	–	–	–	–	–	Trace
15	129.5-139.0	136.5	80.6	–	13.7	–	12.0	–	–	16.1	4.3	37.2	16.6	–	–	–	–	–	–	–	–	–
16	139.0-148.5	141.5	83.7	–	11.5	–	9.7	–	–	16.9	3.9	53.0	5.0	–	–	–	–	–	–	–	–	–
		145.0	78.2	–	8.3	–	5.8	2.9	–	44.2	3.6	27.2	6.2	–	–	–	–	–	1.7	–	–	–
17	148.5-158.0	155.5	81.5	–	9.8	–	6.6	1.5	2.9	13.9	3.1	46.6	15.6	–	–	–	–	–	–	–	–	–
20	176.5-186.0	183.5	81.7	–	9.6	–	4.7	–	3.0	17.8	3.2	48.0	13.7	–	–	–	–	–	–	–	–	–
23	205.0-214.0	212.0	75.6	–	10.0	–	9.3	–	2.8	8.8	3.3	49.4	15.3	–	–	–	–	–	1.1	–	–	–
59	550.5-560.0	551.9	45.6	–	80.2	–	1.0	–	–	2.8	–	10.1	4.8	–	–	–	–	–	1.1	–	–	–
65	607.0-616.5	608.0	34.5	–	54.8	42.9	–	–	–	–	–	–	–	1.1	–	–	1.2	–	–	–	–	–
		608.3	33.2	–	7.5	67.1	0.9	1.1	–	3.5	–	3.8	3.5	10.7	1.8	–	–	–	–	–	–	–
66	616.5-626.0	617.7	59.7	–	68.2	–	1.6	–	–	10.0	0.7	2.6	15.3	–	–	–	–	–	1.6	–	–	–

[a]U-2 identifiable peaks located at 1.755, 2.683, and 2.309Å.

bU-3 identifiable peaks located at 1.933, 1.972, and 2.528Å.

TABLE 13
Results of X-Ray Diffraction Analysis, Site 306

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Amor.	Calc.	Quar.	Cris.	K-Fe.	Plag.	Mica	Chlo.	Mont.	Trid.	Pyri.	Mixl.	Bari.	Amph.
Bulk Samples																
1	0.0-9.5	2.8	53.4	84.9	8.6	–	–	1.7	4.8	–	–	–	–	–	–	–
8	113.0-122.5	114.0	33.6	46.8	11.5	30.3	–	–	–	–	–	11.5	–	–	–	–
21	281.0-290.5	281.7	31.0	92.6	5.9	–	–	–	–	–	–	–	–	–	1.5	–
		282.4	33.1	90.5	7.3	–	–	–	1.3	–	–	–	–	–	0.9	–
29	355.5-365.0	364.5	31.4	85.7	14.3	–	–	–	–	–	–	–	–	–	–	–
36	411.5-421.0	420.5	30.1	97.8	–	–	–	–	–	–	–	–	0.5	–	1.8	–
40	449.5-459.0	450.9	43.5	96.6	0.5	–	–	–	–	–	–	–	–	–	2.9	–
2-20μm Fractions																
1	0.0-9.5	2.8	42.9	–	33.0	–	5.3	24.4	30.6	5.7	–	–	–	–	–	1.0
8	113.0-122.5	114.0	26.9	–	25.2	54.3	–	–	–	–	–	20.5	–	–	–	–
21	281.0-290.5	281.7	60.3	–	45.8	–	19.6	4.3	22.9	1.4	–	–	3.5	–	2.6	–
		282.4	38.5	–	52.3	–	11.4	4.3	22.8	1.5	–	–	3.6	–	4.0	–
29	355.5-365.0	364.5	28.4	–	86.1	–	2.0	–	5.0	–	–	–	2.3	–	4.6	–
36	411.5-421.0	420.5	33.4	–	13.2	–	23.6	2.4	11.3	1.9	–	–	14.5	–	33.2	–
40	449.5-459.0	450.9	35.4	–	15.0	–	12.4	–	18.2	–	–	–	13.2	6.8	34.4	–
<2μm Fractions																
1	0.0-9.5	2.8	68.3	–	19.0	–	–	8.1	50.8	10.1	12.0	–	–	–	–	–
8	113.0-122.5	114.0	17.1	–	3.2	76.3	–	–	1.5	–	–	19.1	–	–	–	–
21	281.0-290.5	281.7	47.4	–	88.4	–	1.9	–	7.0	–	2.7	–	–	–	–	–
		282.4	54.6	–	80.1	–	4.3	–	7.5	–	2.4	–	–	5.6	–	–
29	355.5-365.0	364.5	48.8	–	83.0	–	2.6	–	5.0	–	–	–	1.0	7.7	0.8	–
36	411.5-421.0	420.5	68.6	–	4.3	–	2.4	–	4.1	–	13.8	–	1.3	72.3	1.8	–
40	449.5-459.0	450.9	70.4	–	9.0	–	–	–	–	–	–	–	2.4	85.5	3.0	–

TABLE 14
Results of X-Ray Diffraction Analysis, Site 307

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Amor.	Calc.	Dolo.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Mont.	Clin.	Hema.	Pyri.	Mixl.	Bari.	Anat.	Goet.
Bulk Samples																				
1	0.0-9.0	2.5	71.9	–	–	27.5	–	4.1	15.9	2.1	42.1	3.6	4.6	–	–	–	–	–	–	–
5	103.0-112.5	112.0	78.2	–	–	5.8	–	6.6	34.3	–	10.6	–	23.3	19.5	–	–	–	–	–	–
9	232.5-241.5	233.6	49.6	3.1	5.6	91.3	–	–		–	–	–	–	–	–	–	–	–	–	–
11	288.5-297.5	289.5	51.1	–	84.6	8.6	6.9	–	–	–	–	–	–	–	–	–	–	–	–	–
12	297.5-307.0	298.6	67.0	–	–	78.5	–	–	–	–	–	–	–	–	10.5	–	11.0	–	–	P
		306.5	58.3	–	–	7.2	–	51.4	–	7.1	–	–	32.9	–	–	–	–	–	1.3	–
2-20μm Fractions																				
1	0.0-9.0	2.5	34.9	–	–	31.2	–	5.8	17.2	1.7	38.8	5.3	–	–	–	–	–	–	–	–
5	103.0-112.5	112.0	62.0	–	–	10.5	–	11.3	29.4	–	6.7	1.9	16.2	24.0	–	–	–	–	–	–
11	288.5-297.5	289.5	25.9	–	28.4	42.8	–	–	–	9.0	8.7	–	–	–	4.5	–	–	6.7	–	–
12	297.5-307.0	298.6	36.5	–	–	84.3	–	–	–	–	4.1	–	–	–	8.6	–	3.1	–	–	T
		306.5	30.4	–	–	9.3	–	71.5	–	4.3	–	–	13.9	–	–	–	–	–	1.0	–
<2μm Fractions																				
1	0.0-9.0	2.5	66.2	–	–	16.6	–	4.9	8.8	2.9	39.0	6.7	21.1	–	–	–	–	–	–	–
5	103.0-112.5	112.0	62.6	–	–	4.1	–	6.0	13.2	–	–	–	73.5	1.1	–	–	–	–	2.0	–
11	288.5-297.5	289.5	51.7	–	–	59.2	–	–	–	19.9	11.4	–	–	–	9.5	–	–	–	–	–
12	297.5-307.0	298.6	70.7	–	–	37.9	–	–	–	–	–	–	–	–	28.9	–	33.2	–	–	P
		306.5	51.6	–	–	2.7	–	13.1	–	12.5	–	–	68.7	–	–	0.7	–	–	2.2	–

TABLE 15
Results of X-Ray Diffraction Analysis, Site 308

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Amor.	Calc.	Quar.	K-Fe.	Plag.	Kaol.	Mont.	Clin.	Phil.	Pyri.	Anhy.	Ilme.	Augi.	U-1[a]	Magn.
Bulk Samples																	
1	0.0-3.0	1.1	78.2	6.9	3.9	37.0	16.7	–	23.8	5.4	–	1.0	–	–	5.4	–	–
2	12.5-21.5	14.4	64.2	56.4	–	10.3	6.6	–	11.9	6.0	–	2.9	–	5.9	–	–	–
3	40.5-49.5	41.5	61.5	85.9	–	–	–	–	3.4	–	–	7.1	0.6	2.9	–	T	–
2-20μm Fractions																	
1	0.0-3.0	1.1	43.2	–	5.7	37.0	18.8	1.4	6.1	11.5	–	0.7	–	–	13.5	–	5.3
2	12.5-21.5	14.4	41.7	–	2.9	25.0	11.5	–	9.8	33.8	–	10.7	–	6.4	–	–	–
3	40-5-49.5	41.5	44.3	–	3.6	21.9	5.7	–	–	–	6.2	42.0	5.7	14.8	–	–	–
<2μm Fractions																	
1	0.0-3.0	1.1	60.2	–	1.8	9.9	2.3	–	76.3	4.5	–	0.7	–	–	4.5	–	–
2	12.5-21.5	14.4	68.0	–	–	3.8	–	–	83.0	1.6	–	11.5	–	–	–	–	–
3	40.5-49.5	41.5	70.9	–	0.9	–	–	7.0	74.3	–	–	15.5	–	2.3	–	–	–

[a]U-1 identifiable peak located at 3.07A.

TABLE 16
Results of X-Ray Diffraction Analysis, Site 310

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Amor.	Calc.	Sepi.	Quar.	K-Fe.	Cris.	Plag.	Koal.	Mica	Chlo.	Mont.	Paly.	Trid.	Clin.	Phil.	Pyri.	Apat.	Bari.	Amph.	Goet.	Anal.
Bulk Samples																							
1	0.0-5.0	0.1	55.6	83.6	–	6.3	–	–	3.4	–	4.9	1.8	–	–	–	–	–	–	–	–	–	–	–
		2.5	60.4	62.8	–	13.0	–	–	6.1	–	16.2	2.0	–	–	–	–	–	–	–	–	–	–	–
3	14.5-24.0	17.0	32.7	97.0	–	1.7	–	–	–	–	1.3	–	–	–	–	–	–	–	–	–	–	–	–
4	24.0-33.5	25.9	45.2	85.1	–	6.3	1.1	–	2.3	–	5.2	–	–	–	–	–	–	–	–	–	–	–	–
5	33.5-43.0	41.3	32.5	96.3	–	1.3	–	–	–	–	1.7	–	–	–	–	–	–	–	–	0.7	–	–	–
6	43.0-52.5	50.3	52.3	76.5	–	7.5	–	–	3.4	1.2	8.3	1.1	–	–	–	–	–	–	–	2.0	–	–	–
8	62.0-71.5	69.0	49.8	80.3	–	7.8	–	–	2.7	–	5.6	1.3	–	–	–	–	–	–	–	2.3	–	–	–
9	71.5-80.5	79.1	52.0	59.3	–	11.9	–	–	5.2	–	9.1	0.9	–	–	–	–	9.6	–	–	3.9	–	–	–
10	80.5-90.0	89.0	58.4	41.0	–	5.7	14.7	–	–	–	3.3	–	4.5	–	–	–	30.8	–	–	–	–	–	–
13	109.0-118.5	117.5	31.3	88.9	–	4.3	–	–	–	–	–	–	–	–	–	6.8	–	–	–	–	–	–	–
17A	325.0-334.0	334.0	55.9	–	–	9.9	–	13.1	2.8	–	6.6	–	–	8.7	13.3	2.5	–	14.2	–	28.8	–	–	–
2-20μm Fractions																							
1	0.0-5.0	0.1	52.5	–	5.5	39.3	–	–	19.2	–	29.5	5.7	–	–	–	–	–	–	–	–	0.9	–	–
		2.5	47.0	–	4.7	36.0	3.3	–	19.2	–	30.3	5.7	–	–	–	–	–	–	–	–	0.9	–	–
3	14.5-24.0	17.0	51.9	–	8.6	31.3	3.5	–	14.4	–	35.9	6.3	–	–	–	–	–	–	–	–	–	–	–
4	24.0-33.5	25.9	44.1	–	5.2	34.1	4.7	–	17.3	–	31.7	5.9	–	–	–	–	–	–	–	–	1.1	–	–
5	33.5-43.0	41.3	54.3	–	8.7	29.9	2.8	–	14.6	–	36.4	6.2	–	–	–	–	–	–	–	1.3	–	–	–
6	43.0-52.5	50.3	55.8	–	4.0	32.9	–	–	15.5	–	37.8	5.9	–	–	–	–	–	–	–	3.8	–	–	–
8	62.0-71.5	69.0	48.2	–	2.9	30.2	4.3	–	15.5	–	35.7	5.1	–	–	–	–	–	–	–	5.1	1.3	–	–
9	71.5-80.5	79.1	25.3	–	–	27.0	–	–	12.6	–	33.2	3.4	–	–	–	–	17.8	–	–	5.8	–	–	–
10	80.5-90.0	89.0	20.5	–	–	9.1	30.9	–	–	–	7.3	1.0	–	–	–	–	51.8	–	–	–	–	–	–
13	109.0-118.5	117.5	57.2	–	–	9.0	9.3	–	–	–	10.0	1.8	8.6	–	–	61.2	–	–	–	–	–	–	–
17A	325.0-334.0	334.0	30.3	–	–	7.4	3.6	1.8	4.9	–	11.0	–	–	4.0	11.9	11.7	2.3	12.9	–	28.0	–	–	0.6
<2μm Fractions																							
1	0.0-5.0	0.1	68.0	–	–	22.8	–	–	9.9	4.3	44.2	9.2	9.6	–	–	–	–	–	–	–	–	–	–
		2.5	68.5	–	–	16.4	3.4	–	9.7	–	39.6	5.2	25.7	–	–	–	–	–	–	–	–	–	–
3	14.5-24.0	17.0	69.6	–	–	19.4	–	–	8.4	5.6	41.7	11.5	13.5	–	–	–	–	–	–	–	–	–	–
4	24.0-33.5	25.9	66.6	–	–	17.8	–	–	5.0	3.6	43.8	10.1	19.8	–	–	–	–	–	–	–	–	–	–
5	33.5-43.0	41.3	64.6	–	–	17.8	–	–	6.1	3.7	43.9	10.0	17.3	–	–	–	–	–	–	1.2	–	–	–
6	43.0-52.5	50.3	74.9	–	–	22.5	–	–	8.8	2.6	40.0	5.3	18.2	–	–	–	–	–	–	2.4	–	–	–
8	62.0-71.5	69.0	80.2	–	–	21.3	–	–	9.4	7.0	15.0	1.5	12.6	30.9	–	–	–	–	–	2.2	–	–	–
9	71.5-80.5	79.1	75.7	–	–	13.8	–	–	9.4	–	20.6	2.9	4.4	20.4	–	–	27.0	–	–	1.5	–	–	–
10	80.5-90.0	89.0	72.5	–	–	6.2	13.3	–	–	–	5.9	1.9	40.1	7.8	–	–	10.0	–	14.7	–	–	–	–
13	109.0-118.5	117.5	66.7	–	–	4.3	–	–	–	–	9.6	2.2	73.2	10.7	–	–	–	–	–	–	–	P	–
17A	325.0-334.0	334.0	53.4	–	–	9.1	–	26.6	–	–	–	–	28.2	21.1	6.2	–	–	1.8	–	7.0	–	–	–

TABLE 17
Results of X-Ray Diffraction Analysis, Site 311

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Amor.	Calc.	Quar.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Mont.	Paly.	Phil.	Anal.	Bari.	Augi.	Magn.
Bulk Samples																	
1	0.0-9.0	2.5	69.1	–	38.5	3.7	17.0	–	32.9	4.2	3.8	–	–	–	–	–	–
		8.9	68.1	–	1.2	–	40.5	–	–	–	–	–	7.6	–	–	45.5	5.2
2	9.0-19.5	13.1	79.1	–	14.5	27.6	7.0	–	7.2	–	12.9	–	27.4	–	–	–	3.4
		15.8	58.9	59.7	–	24.9	8.2	–	1.5	–	1.2	–	–	–	–	–	4.5
4	22.5-28.0	24.0	46.8	5.0	–	–	–	–	–	–	63.8	–	27.4	1.7	–	–	2.0
2-20μm Fractions																	
1	0.0-9.0	2.5	43.7	–	32.9	4.3	16.2	–	41.7	4.8	–	–	–	–	–	–	–
		8.9	41.0	–	1.4	–	34.1	–	–	–	–	–	29.1	–	–	30.3	5.2
2	9.0-19.5	13.1	54.8	–	9.0	32.4	9.5	–	11.2	–	–	–	31.7	–	–	–	6.3
		15.8	46.4	–	1.4	62.6	13.8	–	4.5	–	2.2	–	–	–	–	–	15.6
4	22.5-28.0	24.0	18.1	–	–	–	–	–	–	–	65.8	–	26.9	2.8	–	–	4.5
<2μm Fractions																	
1	0.0-9.0	2.5	62.0	–	14.9	1.8	6.8	2.3	48.5	6.8	17.1	–	–	–	1.9	–	–
		8.9	68.2	–	–	–	4.6	–	–	–	80.5	–	4.2	–	–	9.0	1.7
2	9.0-19.5	13.1	75.4	–	11.7	16.5	4.8	–	7.0	–	44.7	6.9	8.5	–	–	–	–
		15.8	80.9	–	1.3	13.0	9.6	–	7.1	–	34.4	–	28.3	–	–	–	6.3
4	22.5-28.0	24.0	42.2	–	–	–	–	–	–	–	91.9	–	7.3	0.9	–	–	–

TABLE 18
Results of X-Ray Diffraction Analysis, Site 313

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Amor	Calc.	Arag.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Mont.	Paly.	Trid.	Clin.	Phil.	Anal.	Hema.	Bari.	Amph.	Augi.	Magn.	Anat.	U-Ia
Bulk Samples																									
1	0.0-8.0	2.5	30.5	98.5	–	1.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		6.5	65.8	46.2	–	13.5	–	6.6	13.5	1.4	13.0	2.5	3.4	–	–	–	–	–	–	–	–	–	–	–	–
2	35.5-45.0	38.0	30.6	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3	73.5-83.0	76.0	23.1	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		80.5	22.9	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4	111.5-121.0	118.5	21.1	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	149.5-159.0	151.7	23.1	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7	168.0-177.0	174.9	24.2	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
12	205.0-214.0	207.5	39.5	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13	214.0-223.0	216.5	29.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
15	232.5-242.0	234.5	23.7	98.1	–	0.3	–	–	–	–	–	–	–	–	–	–	–	–	–	1.7	–	–	–	–	–
19	298.5-308.0	305.5	20.8	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
22	397.0-400.0	399.7	22.9	98.2	–	0.3	–	–	–	–	–	–	–	–	–	1.5	–	–	–	–	–	–	–	–	–
23	400.0-409.5	409.0	35.0	87.3	–	1.1	–	–	3.7	–	–	–	5.7	–	–	–	–	–	–	–	–	2.2	–	–	–
24	409.5-419.0	413.3	39.3	92.4	–	0.6	–	3.6	–	–	–	–	3.4	–	–	–	–	–	–	–	–	–	–	–	–
		416.6	78.6	25.9	–	0.3	–	5.5	2.8	–	–	–	29.7	–	–	–	11.0	4.1	4.3	–	–	15.1	0.1	1.2	–
28	447.5-457.0	452.5	83.1	80.9	–	0.7	–	5.7	–	–	–	–	6.9	–	–	–	5.0	–	–	–	–	–	–	0.8	P
30	446.0-475.5	466.6	91.2	68.8	–	0.3	–	13.2	2.5	–	–	–	12.9	–	–	1.3	–	–	–	–	–	–	–	1.0	T
31	475.5-485.0	477.7	62.7	22.1	77.9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
33	494.5-504.0	496.9	28.8	26.5	–	0.9	–	12.3	–	–	–	–	28.8	–	–	–	21.6	1.6	3.9	–	–	–	2.4	2.0	–
35	513.5-523.0	518.8	27.8	29.0	–	–	–	–	–	–	–	–	67.0	–	–	–	3.1	–	–	–	–	–	–	0.9	T
		520.5	38.3	88.4	–	–	–	2.7	–	–	–	–	3.9	–	–	–	2.8	–	–	–	–	2.1	–	–	–
41	569.0-578.5	576.5	27.3	90.5	–	–	–	3.7	3.7	–	–	–	1.3	–	–	–	–	0.8	–	–	–	–	–	–	T
42	578.5-588.0	582.8	-21.0	15.2	–	–	–	2.9	–	–	–	–	76.8	–	–	1.7	–	–	–	–	–	–	0.9	2.4	–
		583.0	16.9	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2-20μm Fractions																									
1	0.0-8.0	2.5	56.4	–	–	29.7	–	5.7	21.8	–	35.7	4.9	–	–	–	–	–	–	–	2.1	–	–	–	–	–
		6.5	42.7	–	–	24.9	–	7.4	27.9	–	33.7	4.0	–	–	–	–	–	–	–	2.1	–	–	–	–	–
2	35.5-45.0	38.0	80.3	–	–	12.8	–	–	35.7	–	7.4	–	10.8	–	–	–	16.4	–	–	7.9	–	8.9	–	–	–
3	73.5-83.0	76.0	82.5	–	–	10.2	–	9.1	11.3	–	4.7	–	–	–	–	37.7	27.0	–	–	–	–	–	–	–	–
5	149.5-159.0	151.7	87.0	–	–	15.2	–	15.6	26.3	–	6.2	–	–	–	–	36.6	–	–	–	–	–	–	–	–	–
7	168.0-177.0	174.9	49.9	–	–	8.8	–	8.5	18.8	–	11.5	1.8	14.9	–	–	33.8	–	–	–	1.9	–	–	–	–	–
12	205.0-214.0	207.5	100.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13	214.0-223.0	216.5	99.4	–	–	14.7	–	55.4	–	–	–	–	–	–	–	–	–	–	–	29.9	–	–	–	–	–
15	232.5-242.0	234.5	37.9	–	–	14.8	–	3.1	11.4	–	6.1	–	–	–	–	29.1	–	–	–	35.5	–	–	–	–	–
19	298.5-308.0	305.5	44.3	–	–	8.0	–	–	8.5	–	6.7	–	9.5	–	–	67.3	–	–	–	–	–	–	–	–	–
22	397.0-400.0	399.7	73.4	–	–	5.1	10.2	8.2	6.2	–	5.5	–	7.6	–	4.1	47.3	–	–	–	5.9	–	–	–	–	–
23	400.0-409.5	409.0	49.8	–	–	0.5	–	–	7.4	–	–	–	25.3	–	–	–	–	–	–	–	–	66.8	–	–	–
24	409.5-419.0	413.3	47.5	–	–	4.6	–	35.0	9.1	–	12.4	–	8.2	–	–	3.0	–	–	14.8	3.1	–	4.7	4.5	0.5	–
		416.6	44.7	–	–	–	–	4.8	4.8	–	1.9	–	20.4	–	–	–	31.4	10.6	5.5	–	–	11.2	7.3	2.2	–
28	447.5-457.0	452.5	36.2	–	–	2.4	–	21.4	5.5	–	2.3	–	19.6	–	–	–	40.0	–	2.2	–	2.5	–	2.8	1.3	–
30	466.0-475.5	466.6	34.5	–	–	3.1	–	66.6	14.5	–	5.0	0.4	3.8	–	–	–	–	–	4.6	–	2.0	–	–	–	–
31	475.5-485.0	477.7	47.4	–	–	3.1	–	32.7	6.3	–	3.5	–	3.7	–	–	41.9	–	0.8	2.8	3.0	–	–	2.3	–	–
33	494.5-504.0	496.9	46.1	–	–	2.4	–	21.6	–	–	–	–	34.5	–	–	–	25.7	2.7	2.1	–	0.7	–	6.6	3.7	–
35	513.5-523.0	518.8	37.6	–	–	0.8	–	10.4	3.0	–	–	–	64.7	–	–	–	13.9	–	0.9	–	–	–	2.4	4.0	–
		520.5	84.9	–	–	4.0	–	26.2	6.0	–	5.8	–	11.3	–	–	0.7	19.8	0.6	5.4	–	0.6	11.5	6.2	1.9	–
41	569.0-578.5	576.5	72.5	–	–	1.7	–	47.9	20.8	–	12.1	–	6.4	–	–	–	–	4.9	–	–	2.5	–	3.6	–	–
42	578.5-588.0	582.8	48.7	–	–	0.8	–	15.3	–	–	–	–	66.1	–	–	1.6	–	–	–	–	–	–	11.3	5.0	–
		583.0	99.4	–	–	7.0	–	5.7	5.0	–	–	–	–	–	–	64.0	–	–	–	18.4	–	–	–	–	–

<2μm Fractions

1	0.0-8.0	2.5	69.7	–	–	15.5	–	–	8.5	–	39.1	8.1	8.4	–	–	–	20.4	–	–	–	–	–	–	–	–
		6.5	75.7	–	–	18.3	–	5.7	18.5	2.5	30.7	3.9	20.3	–	–	–	–	–	–	–	–	–	–	–	–
2	35.5-45.0	38.0	75.7	–	–	9.2	–	–	13.7	–	11.4	2.9	47.1	–	–	–	6.0	–	–	3.3	–	6.4	–	–	–
3	73.5-83.0	76.0	85.7	–	–	9.7	–	3.7	9.6	–	12.0	2.7	27.1	–	–	20.1	15.1	–	–	–	–	–	–	–	–
		80.5	82.2	–	–	2.8	–	4.7	7.7	–	6.6	–	41.3	–	–	18.2	18.7	–	–	–	–	–	–	–	–
4	111.5-121.0	118.5	97.6	–	–	5.8	–	10.4	9.0	–	14.2	–	26.3	–	–	20.2	14.2	–	–	–	–	–	–	–	–
5	149.5-159.0	151.7	58.6	–	–	3.9	–	4.4	7.8	4.9	7.7	2.5	59.6	–	–	9.2	–	–	–	–	–	–	–	–	–
7	168.0-177.0	174.9	74.9	–	–	4.4	–	6.0	8.5	12.0	9.1	–	52.4	–	–	6.7	–	–	–	1.0	–	–	–	–	–
12	205.0-214.0	207.5	92.7	–	–	7.2	–	10.3	10.7	–	–	5.5	63.3	–	–	–	–	–	–	3.0	–	–	–	–	–
13	214.0-223.0	216.5	93.7	–	–	5.9	–	13.4	–	4.3	–	–	73.2	–	–	–	–	–	–	3.2	–	–	–	–	–
15	232.5-242.0	234.5	71.3	–	–	11.2	–	2.4	4.6	1.1	9.7	–	37.6	21.0	–	7.1	–	–	–	5.4	–	–	–	–	–
19	298.5-308.0	305.5	70.5	–	–	8.1	–	3.3	2.8	2.2	10.4	–	55.5	8.0	–	7.7	–	–	–	1.9	–	–	–	–	–
22	397.0-400.0	399.7	74.2	–	–	2.6	27.8	2.9	2.9	–	6.4	–	40.5	10.6	3.2	–	–	–	–	3.3	–	–	–	–	–
23	400.0-409.5	409.0	39.5	–	–	0.4	–	–	2.4	–	–	–	89.9	–	–	–	–	–	–	–	–	7.3	–	–	–
24	409.5-419.0	413.3	66.6	–	–	2.0	–	7.8	–	–	8.4	–	72.5	–	–	–	–	–	4.9	1.6	–	1.1	–	1.8	–
		416.6	49.2	–	–	–	–	–	1.6	–	2.3	–	86.9	–	–	–	5.9	1.2	–	–	–	–	–	2.2	–
28	447.5-457.0	452.5	57.2	–	–	–	–	–	–	–	–	–	94.6	–	–	–	3.0	–	–	–	–	–	–	2.4	–
30	466.0-475.5	466.6	61.5	–	–	0.9	–	6.2	2.6	–	–	–	85.3	–	–	–	–	–	2.9	–	–	–	–	2.0	–
31	475.5-485.0	477.7	58.8	–	–	1.3	–	–	–	–	–	–	94.4	–	–	1.8	–	–	–	1.5	–	–	–	1.1	–
33	494.5-504.0	496.9	43.3	–	–	–	–	1.6	–	–	–	–	83.4	–	–	–	8.8	0.7	–	–	–	–	2.5	3.0	–
35	513.5-523.0	518.8	31.1	–	–	–	–	–	–	–	–	–	99.3	–	–	–	–	–	–	–	–	–	–	0.7	–
		520.5	59.7	–	–	1.0	–	2.9	1.9	–	4.3	–	85.6	–	–	–	–	0.6	1.5	–	–	–	–	2.3	–
41	569.0-578.5	576.5	77.5	–	–	1.9	–	10.2	8.3	–	–	–	71.8	–	–	–	–	2.1	3.9	–	–	–	–	1.7	–
42	578.5-588.0	582.8	51.3	–	–	–	–	–	–	–	–	–	96.4	–	–	–	–	–	–	–	–	–	–	3.6	–
		583.0	81.7	–	–	10.2	–	–	–	–	–	–	72.7	–	–	7.1	–	–	–	10.0	–	–	–	–	–

[a]U-1 identifiable peak located at 3.07Å.