I. X-RAY MINERALOGY DATA FROM THE SOUTHEAST PACIFIC BASIN—LEG 35 DEEP SEA DRILLING PROJECT[1]

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METHOD

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.

The method of sample preparation, 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 (*p*H 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 4. Table 5 contains the list of samples submitted for X-ray diffraction analysis, the subbottom depth of each sample which identifies the sample in Tables 1 to 4, a color description, and a sediment description of each sample.

The sediment description is based on a classification devised in the DSDP X-ray Mineralogy Lab for rapid smear-slide analysis of deep-sea sediments. The classification comprises four major sediment types: detrital (d) consisting of fragmented silicates and clay minerals, biogenous (b) consisting of skeletal debris, authigenic (a) common examples of which are zeolitites and chert, and chemical (c) primarily the iron-manganese colloids. The sediment types are given equivalent rank. Operationally a sediment is detrital if volumetrically $d + b > a + c$ and $d > b$; biogenous if $d + b > a + c$ and $b > d$; authigenic if $a + c > d + b$ and $a > c$; chemical if $a + c > d + b$ and $c > a$. Detrital sediments are further subdivided on the basis of texture into sand, silt, mud, and clay according to Folk's (1968) scheme.

Biogenous sediments are subdivided into siliceous ooze, calcareous ooze, and calcareous ooze in 25% increments of the components. The prefix *bio* is used when a biologic origin of the materials can be seen.

Authigenic and chemical sediments are given only gross descriptive terms such as chert or iron manganese colloid.

Components of other groups which appear in the major sediment type are acknowledged by modifiers to the sediment name according to the following scheme: components in concentrations of 2%-10% are used as adjectives or in conjunction with "bearing" (i.e., clayey and clay-bearing are synonymous), 10%-25% concentrations are termed "rich," 25%-50% concentrations are termed "abundant."

Mudrocks were named according to the classification of Blatt et al. (1972) which uses textural criteria for silt, mud, and clay and differentiates between fissile and nonfissile rocks. Thus, if abundant silt is visible, we have silt-shale or siltstone; if a grittiness is felt when chewed or scraped, we have mud-shale or mudstone; if no grittiness is felt, we have clay-shale or claystone. The term "argillite" is reserved for nonfissile mudrocks which show signs of incipient metamorphism.

A portion of the samples were run on Norelco diffraction equipment belonging to the Earth Sciences Department at the University of California, Riverside, because the DSDP equipment was inoperable part of the time. The two sets of data are compatible but the analytical precision of the Norelco-run data is somewhat lower. The Norelco-run data can be recognized in Tables 1 to 4 by the fact that no amorphous content is reported.

The *percent amorphous* 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 scatter 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 (Cook et al., 1975). 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; 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 are 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 crystallinity differences between the mineral

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TABLE 1
Results of X-Ray Diffraction Analysis From Site 322

Sample Depth Below Sea Floor (m)	Amor.	Quar.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Mont.	Clin.	Pyri.	Amph.	U-1[a]	U-2[b]
Bulk Samples													
81.8	41.5	30.5	6.8	43.1	–	7.5	3.2	5.3	0.5		3.1	tr	tr
295.2	57.5	21.4	3.0	37.6	–	9.9	5.8	19.8	0.7		1.8	tr	tr
352.7	54.0	30.1	2.8	33.0	0.7	5.9	5.7	18.3	1.0		2.5	tr	tr
354.6	57.0	19.1	2.7	32.0	1.0	10.2	6.7	26.1	0.7		1.6	tr	tr
391.8	54.6	21.2	5.9	36.1	–	6.9	4.0	20.6	3.6		1.7	–	tr
469.9	43.6	26.7	8.5	46.1	–	3.4	1.9	11.1	0.9		1.4	tr	tr
487.0	54.9	21.7	10.2	27.3	–	12.9	6.8	17.3	2.6		1.2	tr	tr
487.6	38.9	30.2	10.8	41.4	–	1.9	1.6	12.3	1.0		0.8	tr	tr
510.5	46.6	9.6	7.0	10.5	–	9.8	0.5	61.3	–		1.2	–	tr
511.9	56.6	18.0	6.9	16.2	0.9	19.2	1.0	36.9	0.3		0.5	–	tr
513.0	56.6	19.3	7.4	12.6	1.0	21.8	1.5	36.0	–		0.5	–	tr
513.8	64.3	22.1	12.8	11.8	1.1	26.8	2.2	22.2	0.4		0.6	–	tr
2-20 μm Fractions													
81.8	37.5	24.3	5.5	40.0	–	6.1	3.3	14.3	0.8	–	5.7	tr	tr
295.2	43.0	28.3	5.2	35.8	–	5.5	5.3	17.1	0.5	–	2.3	tr	tr
352.7	47.8	22.8	4.3	37.5	–	7.4	6.5	16.7	1.2	1.1	2.5	tr	tr
354.6	43.7	20.6	2.9	32.0	–	9.4	5.9	26.3	0.7	–	2.2	tr	tr
391.8	28.7	24.9	5.6	41.1	–	4.7	3.1	14.7	3.3	–	2.6	tr	tr
469.9	45.8	16.7	23.1	30.0	–	4.4	2.5	19.7	0.9	–	2.8	tr	tr
487.0	30.8	26.9	10.8	31.4	–	8.4	5.4	12.6	3.1	–	1.4	tr	tr
487.6	44.3	18.3	6.9	41.6	0.5	4.8	2.8	22.5	1.3	–	1.5	tr	tr
510.5	42.0	20.4	10.4	25.1	0.5	19.7	0.6	20.8	0.3	–	2.2	–	tr
511.9	33.9	31.7	12.8	26.8	0.7	19.8	1.1	5.6	0.5	–	0.8	–	tr
513.0	34.3	29.8	14.7	19.1	1.4	26.1	1.1	7.0	–	–	0.8	–	tr
513.8	36.8	33.6	13.7	17.8	0.8	27.6	2.5	4.0	–	–	–	–	tr
<2 μm Fractions													
81.8	76.2	8.3	4.9	13.2	1.7	4.5	2.7	63.5	0.3		0.9	tr	tr
295.2	69.8	8.7	4.1	16.0	0.7	7.6	5.3	55.9	0.5		1.2	tr	tr
352.7	65.8	7.4	3.5	15.8	–	5.8	8.4	58.0	0.3		0.8	tr	tr
354.6	64.0	7.0	3.4	14.2	–	6.7	6.8	60.6	0.5		0.8	tr	tr
391.8	55.7	8.9	4.8	13.3	0.7	7.6	4.5	56.9	2.5		0.8	tr	tr
469.9	68.9	5.6	4.3	10.0	–	3.6	2.8	72.5	0.6		0.5	tr	tr
487.0	65.1	9.7	7.3	10.6	–	13.5	8.3	48.8	1.1		0.7	tr	tr
487.6	63.0	5.2	3.3	9.2	0.4	3.5	4.1	72.6	0.6		1.0	tr	tr
510.5	24.1	4.8	3.6	6.1	–	5.0	0.6	79.3	0.3		0.4	–	tr
511.9	37.9	7.4	4.6	6.9	1.4	12.0	0.6	67.2	–		–	–	tr
513.0	48.0	9.3	4.6	6.8	1.7	18.2	0.8	58.6	–		–	–	tr
513.8	54.1	11.5	3.7	6.8	1.6	20.5	1.3	54.2	0.4		–	–	tr

[a]U-1 persistent peak at 9.5Å. Intensity of peak was not observed to be dependent on any other minerals identified.

[b]U-2 peak at 2.53Å, possibly magnetite. Optical examination indicates its presence, but secondary peaks were not detected.

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. geothite may vary ±20%; kaolinite, amphibole, augite, the feldspars the zeolites, palygorskite, sepiolite, 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-magnesium calcite, aragonite, dolomite, rhodochrosite, siderite, gibbsite, talc, barite, anatase, gypsum, anhydrite, halite, pyrite, hematite, magnetite, will vary less than ±5%.

The user of the X-ray mineralogy data should bear in mind that (1) the reported values are relative concentrations and that some adjustment has to be made for the amorphous content and the unquantifiable minerals to obtain the absolute concentrations, (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 AND MUD USAGE

Drilling mud, containing montmorillonite and barite, was used in Hole 325 between Cores 8 and 9. The sample

TABLE 2
Results of X-Ray Diffraction Analysis From Site 323

Sample Depth Below Sea Floor (m)	Amor.	Calc.	Dolo.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Goet.	Mont.	Trid.	Clin.	Gibb.	Amph.	U-1[a]	U-2[b]
Bulk Samples																		
76.6	33.8	–	–	45.3	–	16.1	28.8	–	5.6	1.7	–	2.6	–	–	–	–	tr	–
79.3	62.0	–	–	19.5	–	3.7	20.0	–	22.1	6.2	–	26.7	–	0.7	–	1.1	tr	–
161.8	66.0	–	–	16.0	–	9.7	14.3	0.8	24.9	1.3	–	31.7	–	0.3	–	0.9	tr	–
162.2	54.2	–	–	16.9	–	5.7	15.9	0.9	15.9	0.6	–	42.5	–	0.6	–	0.9	tr	tr
258.7	32.2	–	–	42.7	–	13.2	35.7	–	2.6	1.5	–	2.5	–	0.7	–	1.1	tr	–
258.9	46.9	–	–	13.2	–	7.7	15.1	–	11.7	–	–	51.1	–	0.5	–	0.7	tr	–
333.4	57.8	–	–	15.6	–	2.3	19.0	0.4	20.4	0.6	–	40.0	–	0.8	–	0.9	tr	tr
341.5	59.9	–	–	15.5	–	3.9	18.7	0.4	17.3	0.3	–	42.5	–	0.3	0.2	0.9	–	–
341.5	48.5	–	–	13.5	–	7.4	17.0	0.7	14.9	–	–	45.3	–	0.5	–	0.8	tr	tr
341.5	62.8	–	–	23.9	–	9.1	27.3	–	18.9	9.4	–	10.3	–	0.4	–	0.7	tr	tr
342.9	60.5	–	–	13.0	–	8.1	13.6	0.7	19.7	0.2	–	43.8	–	0.2	–	0.8	–	–
343.0	62.6	–	–	14.6	–	4.5	15.1	0.8	19.9	–	–	43.9	–	0.3	–	0.9	–	–
363.6	48.6	–	–	16.2	–	8.5	17.1	0.4	16.2	2.2	–	38.2	–	0.3	–	0.9	–	–
409.1	38.0	–	–	12.9	–	5.6	15.8	0.3	20.8	1.5	–	42.1	–	0.2	–	0.7	–	–
409.2	67.8	–	–	8.5	57.5	2.6	6.2	0.2	7.8	1.4	–	2.3	13.4	–	–	–	–	–
409.4	70.2	–	–	22.1	15.8	6.3	17.0	–	21.9	6.6	–	8.2	1.7	0.4	–	–	–	–
458.0	60.5	–	–	24.1	–	17.4	21.3	–	15.9	2.4	–	17.4	–	–	–	1.6	–	–
458.3	49.6	–	–	6.2	70.9	2.8	4.7	–	4.7	0.7	–	–	10.0	–	–	–	–	tr
504.2	46.2	–	–	22.3	–	9.4	22.4	–	11.6	3.4	–	29.9	–	0.4	–	0.6	–	–
505.7	51.6	–	–	21.8	–	7.2	20.8	0.5	18.7	2.1	–	26.9	–	0.7	–	1.2	–	–
507.3	52.3	–	–	20.1	–	11.4	18.6	0.5	19.9	3.5	–	24.8	–	0.7	–	0.6	tr	–
551.2	57.2	–	–	24.9	–	11.4	16.3	0.6	27.0	7.6	–	11.9	–	0.4	–	–	–	–
600.2	39.6	–	–	32.1	–	10.0	18.5	–	9.9	1.2	–	27.8	–	0.5	–	–	–	–
600.3	39.8	–	–	28.4	–	9.1	17.8	–	19.9	1.1	–	23.7	–	–	–	–	–	–
600.6	41.8	–	–	19.2	–	8.7	9.6	1.4	29.1	7.3	–	24.9	–	–	–	–	–	–
625.4	46.3	–	–	26.4	–	12.0	11.7	1.3	15.0	4.0	–	29.6	–	–	–	–	–	–
638.4	47.1	–	–	11.3	–	7.7	7.3	0.9	9.9	2.5	5.8	54.6	–	–	0.1	–	–	–
656.6	41.7	–	–	11.3	–	13.7	8.9	1.2	8.0	1.9	6.5	48.4	–	–	–	–	–	–
657.9	53.3	–	–	12.6	–	14.5	8.6	2.0	7.9	1.6	8.2	44.4	–	–	–	–	–	–
659.5	43.1	–	–	11.9	–	13.5	6.9	1.8	7.4	2.0	6.7	49.7	–	–	0.3	–	–	–
660.7	45.3	–	–	10.2	–	12.6	3.7	2.3	5.3	1.6	7.2	57.2	–	–	–	–	–	–
662.4	59.8	–	–	12.3	–	18.3	3.7	2.3	7.9	2.6	10.3	42.6	–	–	–	–	–	–
663.5	64.8	73.1	–	3.2	–	3.9	1.3	–	2.7	–	3.2	12.7	–	–	–	–	–	–
665.4	35.5	55.3	0.2	3.8	–	4.5	1.0	–	–	–	–	35.2	–	–	–	–	–	–
667.8	42.9	–	–	8.1	–	11.8	3.8	0.8	4.1	0.3	–	71.1	–	–	–	–	–	–
669.7	16.3	–	–	5.8	–	18.4	2.1	–	6.7	–	–	63.6	–	3.5	–	–	–	tr
695.7	28.6	–	–	10.7	–	15.8	3.1	–	8.6	0.3	–	58.0	–	3.5	–	–	–	–
697.0	54.7	–	–	12.8	–	14.5	6.4	–	11.0	0.3	–	44.5	–	10.5	–	–	–	tr
698.0	30.1	–	–	13.7	–	5.7	9.2	–	5.9	–	–	46.2	–	18.8	–	0.4	–	–
699.0	36.1	–	–	14.7	–	9.3	9.6	–	7.6	–	–	45.6	–	12.7	–	0.5	–	tr
2-20 µm Fractions																		
76.6	31.7			39.3	–	15.8	32.1	0.9	4.9	2.1	–	2.3	–	0.6		2.0	tr	tr
79.3	39.3			25.6	–	7.0	25.9	0.6	19.6	7.3	–	12.2	–	0.4		1.4	tr	–
161.8	49.7			27.3	–	11.4	22.2	1.3	22.9	1.5	–	11.5	–	0.5		1.5	tr	–
162.2	42.9			30.0	–	13.6	26.5	–	17.0	1.1	–	10.6	–	0.5		0.8	tr	tr
258.7	43.0			38.8	–	10.5	36.6	–	4.9	2.9	–	4.6	–	0.6		1.0	tr	tr
258.9	35.3			25.0	–	10.2	25.1	–	15.8	–	–	22.1	–	0.4		1.3	tr	tr
333.4	38.7			26.7	–	7.2	32.7	–	18.3	–	–	12.4	–	1.3		1.4	tr	tr
341.5	46.6			21.5	–	7.0	24.6	–	18.0	0.8	–	27.2	–	0.4		0.6	tr	–
341.5	43.5			24.1	–	10.0	26.9	–	14.0	–	–	23.2	–	0.4		1.3	tr	tr
341.5	41.3			24.2	–	9.8	24.9	0.6	13.7	11.8	–	12.8	–	0.8		1.3	tr	tr
342.9	59.1			22.9	–	6.6	20.6	–	19.8	–	–	28.5	–	0.4		1.3	tr	–
343.0	65.1			24.7	–	8.3	20.9	–	21.6	0.9	–	21.7	–	0.4		1.4	–	–
363.6	34.4			24.3	–	12.1	22.9	–	18.4	3.6	–	17.2	–	0.4		1.3	tr	–
409.1	36.4			23.5	–	9.6	22.9	–	22.3	3.1	–	18.0	–	–		0.6	–	tr
409.2	32.8			24.9	41.3	6.8	11.9	–	6.3	1.4	–	–	7.4	–		–	–	–
409.4	N.D.[c]			34.9	–	9.5	21.6	0.8	17.6	7.3	–	8.2	–	–		–	–	–
458.0	31.5			30.9	–	6.9	28.6	–	13.4	3.9	–	14.3	–	0.5		1.6	tr	tr
458.3	N.D.			18.1	54.8	4.3	9.6	–	4.8	–	–	–	8.4	–		–	–	–
504.2	24.1			28.5	–	8.8	27.9	–	14.1	4.7	–	14.8	–	0.5		0.7	–	–
505.7	26.2			32.4	–	10.2	23.6	–	16.2	3.0	–	13.2	–	0.5		0.8	–	–
507.3	N.D.			32.0	–	12.8	24.9	–	13.8	4.1	–	11.1	–	0.5		0.8	–	–
551.2	N.D.			37.5	–	12.1	19.9	–	20.4	7.9	–	2.2	–	–		–	–	–
600.2	N.D.			40.7	–	14.8	24.5	–	11.3	2.3	–	4.8	–	0.7		–	–	–
600.3	N.D.			39.4	–	15.8	26.0	–	14.9	0.8	–	2.4	–	0.7		–	–	–
600.6	N.D.			47.9	–	13.6	17.7	–	15.2	5.7	–	–	–	–		–	–	–
624.2	N.D.			39.3	–	13.1	18.3	–	19.7	5.9	–	3.7	–	–		–	–	–
625.4	N.D.			47.0	–	13.2	16.8	0.7	15.2	4.7	–	2.4	–	–		–	–	–
638.4	N.D.			31.1	–	16.9	18.2	0.7	14.5	4.1	4.2	10.2	–	–		–	–	–
656.6	N.D.			32.3	–	23.2	17.7	1.0	10.2	2.6	5.4	7.8	–	–		–	–	–
657.9	N.D.			28.2	–	24.9	15.3	1.8	11.6	1.7	5.6	10.8	–	–		–	–	–
659.6	N.D.			31.2	–	24.1	13.1	1.4	10.3	3.1	5.5	11.4	–	–		–	–	–
660.7	N.D.			28.9	–	28.6	10.3	2.4	10.5	2.5	6.1	10.8	–	–		–	–	–
662.4	N.D.			31.0	–	30.5	7.9	0.4	9.6	4.5	6.2	9.9	–	–		–	–	–
663.5	N.D.			31.0	–	33.0	5.9	0.4	9.8	3.8	6.9	9.1	–	–		–	–	–
665.4	N.D.			30.8	–	33.6	8.6	0.4	6.5	2.0	–	18.2	–	–		–	–	–
667.8	N.D.			32.3	–	37.6	5.6	0.7	9.2	0.8	–	13.8	–	–		–	–	–
669.7	N.D.			27.8	–	40.8	10.2	–	7.9	–	–	7.4	–	5.9		–	–	tr
695.7	N.D.			30.8	–	29.9	15.7	–	12.0	–	–	6.7	–	4.8		–	–	–
697.0	N.D.			31.3	–	25.0	11.8	–	11.4	–	–	7.3	–	13.2		–	–	tr
698.0	N.D.			29.9	–	12.1	22.0	–	7.9	–	–	4.2	–	23.9		–	–	tr
699.0	N.D.			32.5	–	16.3	16.2	–	9.7	–	–	5.1	–	20.3		–	–	tr

TABLE 2 – *Continued*

Sample Depth Below Sea Floor (m)	Amor.	Calc.	Dolo.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Goet.	Mont.	Trid.	Clin.	Gibb.	Amph.	U-1[a]	U-2[b]
<2 μm Fractions																		
76.6	58.2			9.1	–	8.1	11.9	1.4	12.8	7.8	–	47.7	–	0.6		0.6	tr	–
79.3	64.0			8.8	–	3.8	10.5	2.0	15.8	7.6	–	51.5	–	–		–	–	–
161.8	63.0			7.9	–	2.8	8.7	2.6	13.8	0.9	–	62.6	–	0.3		0.4	tr	–
162.2	54.7			7.1	–	3.6	8.8	1.1	13.0	0.3	–	65.1	–	0.5		0.4	tr	tr
258.7	N.D.			8.4	–	7.3	11.2	2.1	19.0	11.0	–	35.5	–	4.9		0.5	tr	–
258.9	34.9			4.5	–	3.9	5.0	0.4	6.5	–	–	78.5	–	0.3		–	tr	–
333.4	N.D.			9.0	–	9.0	13.0	–	12.6	–	–	55.4	–	1.0		–	–	–
341.5	N.D.			7.0	–	6.2	10.0	–	9.7	–	–	67.2	–	–		–	–	–
341.5	36.6			5.0	–	5.0	7.5	–	7.0	0.3	–	74.6	–	0.3		0.4	tr	–
341.5	59.8			10.3	–	4.5	13.5	–	14.1	8.2	–	48.8	–	0.4		0.3	tr	–
342.9	51.9			6.6	–	5.5	9.0	–	11.5	0.5	–	66.3	–	0.2		0.4	tr	–
343.0	58.8			7.8	–	7.3	10.3	0.3	14.8	0.2	–	58.6	–	0.2		0.4	tr	tr
363.6	39.2			5.1	–	4.1	7.1	0.4	11.5	0.5	–	70.6	–	0.2		0.4	tr	–
409.1	29.5			4.7	–	4.7	7.0	0.3	10.3	0.3	–	72.2	–	0.2		0.4	–	tr
409.2	63.2			5.7	65.1	3.2	5.7	0.4	5.0	1.2	–	2.1	11.7	–		–	–	–
409.4	55.5			6.7	36.9	4.2	8.5	0.4	13.8	3.6	–	21.4	4.3	0.3		–	–	–
458.0	50.8			6.7	–	6.1	10.1	0.4	10.3	1.4	–	64.8	–	0.2		–	tr	–
458.3	56.3			3.2	66.7	2.1	2.8	–	5.5	–	–	7.0	12.7	–		–	–	–
504.2	38.4			6.1	–	6.7	8.7	0.3	9.3	2.2	–	66.2	–	0.5		–	–	–
505.7	40.3			6.3	–	6.1	6.6	–	9.4	0.8	–	70.3	–	0.5		–	–	–
507.3	46.9			12.9	–	4.6	13.6	0.3	12.7	2.2	–	53.5	–	0.2		–	–	–
551.2	49.5			11.2	–	8.1	9.4	0.3	19.3	4.8	–	46.5	–	0.4		–	–	–
600.2	18.1			4.5	–	2.9	4.2	–	8.0	0.6	–	79.7	–	–		–	–	–
600.3	21.6			6.3	–	2.8	3.7	–	11.8	0.9	–	75.5	–	–		–	–	–
600.6	36.5			9.8	–	6.8	6.0	–	23.1	6.1	–	47.7	–	0.2		0.3	–	–
624.2	44.1			7.7	–	8.0	5.2	1.0	12.0	2.2	–	63.9	–	–		–	–	–
625.4	34.1			7.0	–	6.5	5.0	0.7	10.8	3.0	–	57.1	–	–		–	–	–
638.4	31.1			3.2	–	2.3	1.5	0.8	2.1	1.0	5.0	84.1	–	–		–	–	–
656.6	34.5			5.3	–	5.7	2.8	1.1	3.0	0.5	6.9	74.7	–	–		–	–	–
657.9	44.4			4.4	–	6.6	1.9	0.8	2.0	0.5	7.2	76.5	–	–		–	–	–
659.5	37.9			6.7	–	7.5	4.0	0.7	4.8	0.9	4.4	71.1	–	–		–	–	–
660.7	40.7			5.1	–	6.4	1.8	1.5	2.0	0.9	6.9	75.5	–	–		–	–	–
662.4	46.0			8.0	–	10.8	2.9	1.7	5.3		6.2	63.8	–	–		–	–	–
663.5	47.2			3.9	–	5.4	1.0	1.2	2.1	1.0	6.3	79.1	–	–		–	–	–
665.4	12.9			1.5	–	2.4	1.0	0.4	1.1	0.3	–	93.2	–	–		–	–	–
667.8	2.8			3.0	–	3.8	2.0	–	1.1	–	–	90.1	–	–		–	–	–
669.7	39.5			1.5	–	2.4	0.5	–	1.1	–	–	93.9	–	0.6		–	–	–
695.7	42.8			4.3	–	5.9	2.4	–	3.1	–	–	83.1	–	1.3		–	–	–
697.0	46.3			3.0	–	3.1	2.5	–	3.2	–	–	86.8	–	1.4		–	–	–
698.0	37.7			2.5	–	1.6	1.0	–	2.2	–	–	91.3	–	1.4		–	–	–
699.0	44.2			3.7	–	3.0	1.5	–	2.1	–	–	86.9	–	2.8		–	–	–

[a]U-1 Persistent peak at 9.5Å. Intensity of peak was not observed to be dependent on any other minerals identified.

[b]U-2 Peak at 2.53Å, possibly magnetite. Optical examination indicates its presence, but secondary peaks were not detected.

[c]N.D. = no data.

submitted for X-ray diffraction analysis from Core 9 (depth 643.6 m) which may have been directly exposed to the drilling mud does not contain an inordinate amount of montmorillonite and contains no barite.

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TABLE 3
Results of X-Ray Diffraction Analysis From Site 324

Sample Depth Below Sea Floor (m)	Amor.	Quar.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Mont.	Clin.	Amph.	U-1[a]
Bulk Samples											
12.3	64.2	15.7	9.3	19.2	–	18.4	5.1	30.3	0.3	1.8	tr
15.4	60.5	24.6	13.9	23.5	1.2	14.6	5.3	15.1	0.4	1.4	tr
49.2	58.4	36.8	25.8	24.2	0.8	6.8	1.4	4.2	–	–	–
50.2	54.4	22.2	15.4	15.3	4.3	24.3	4.2	13.3	0.4	0.6	tr
50.6	48.9	27.5	16.2	21.9	0.7	12.2	3.5	16.2	0.5	1.4	tr
79.3	49.2	21.8	15.0	16.9	2.6	19.5	5.4	18.2	–	0.6	–
108.9	20.5	38.9	25.6	27.8	–	4.8	1.4	–	0.6	1.0	tr
136.1	41.9	30.9	15.2	17.1	1.4	17.4	5.2	12.6	–	–	–
136.7	45.0	30.7	13.8	20.6	0.7	23.0	5.8	5.4	–	–	tr
156.1	47.3	23.4	12.9	14.6	1.7	22.4	6.2	18.1	–	0.6	–
174.4	24.8	35.4	18.6	21.2	0.8	15.2	3.8	4.0	–	0.9	–
2-20 μm Fractions											
12.3		34.6	16.2	29.5	–	12.6	4.7		0.5	1.9	tr
15.4		38.1	17.2	27.1	0.6	10.9	4.6		0.2	1.3	tr
49.2		48.4	20.3	22.9	–	5.2	2.5		–	0.8	–
50.2		38.5	20.4	20.9	1.6	14.2	4.5		–	–	–
50.6		38.8	17.4	26.9	0.3	11.1	3.7		0.6	1.2	tr
79.3		41.0	19.6	21.7	0.5	12.3	4.3		0.2	0.6	–
108.9		43.0	21.9	28.1	–	3.9	1.5		0.2	1.3	tr
136.1		39.3	17.7	18.3	1.7	17.3	4.8		–	1.0	–
136.7		43.1	15.5	20.5	–	15.6	4.9		0.3	–	tr
156.1		40.2	16.6	21.3	1.0	15.4	5.0		–	0.5	–
174.4		49.9	15.7	22.7	–	8.0	3.2		–	0.6	–
<2 μm Fractions											
12.3		8.4	5.5	11.5	–	14.5	6.3	52.4	0.4	1.1	tr
15.4		8.9	7.3	11.4	2.5	13.5	5.3	50.5	0.2	0.4	tr
49.2		6.7	5.4	4.6	11.1	19.6	2.2	49.4	0.4	0.6	tr
50.2		7.2	6.2	5.7	9.1	22.2	2.6	46.8	0.2	–	–
50.6		7.3	4.8	7.1	1.9	15.2	3.8	59.1	0.4	0.4	–
79.3		16.4	10.0	12.0	2.0	18.2	4.8	35.9	0.3	0.4	tr
108.9		4.6	3.9	3.8	4.0	15.2	4.3	63.5	0.7	–	–
136.1		6.8	7.3	5.6	11.5	22.2	2.0	44.6	–	–	–
136.7		12.2	9.8	10.7	–	32.0	9.6	25.6	–	–	–
156.1		9.9	8.8	7.4	5.3	24.6	4.7	39.3	–	–	–
174.4		13.0	9.0	8.8	4.7	37.9	8.8	17.7	–	–	–

[a]U-1 persistent peak at 9.5Å. Intensity of peak was not observed to be dependent on any other minerals identified.

TABLE 4
Results of X-Ray Diffraction Analysis From Site 325

Sample Depth Below Sea Floor (m)	Amor.	Calc.	Quar.	Cris.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Mont.	Trid.	Clin.	Gibb.	Amph.	U-1[a]	U-2[b]
Bulk Samples																
35.0		–	21.4	–	14.1	28.9		12.7	6.6	13.2	–	0.7		2.3	tr	tr
35.3		–	20.0	–	12.1	28.5		16.9	6.4	12.1	–	0.7		2.3	tr	tr
36.8		–	22.0	–	10.2	30.5		14.2	5.8	14.6	–	0.4		2.4	tr	tr
39.8		–	29.3	–	15.7	36.7		5.5	4.2	5.1	–	0.5		3.0	tr	tr
39.9		–	21.0	–	6.0	37.9		7.0	6.0	17.0	–	0.4		4.7	tr	tr
169.4		–	24.5	–	10.4	36.9		6.5	7.0	10.5	–	0.8		3.4	tr	tr
178.9		–	22.5	–	10.5	37.1		7.4	6.0	12.4	–	1.1		3.1	tr	tr
180.0		–	27.1	–	16.5	38.8		3.5	5.0	4.9	–	0.5		3.7	tr	tr
182.2		–	25.2	–	14.0	39.4		4.9	6.0	6.1	–	0.4		4.1	tr	tr
520.0		–	13.9	28.2	15.3	26.0		1.9	3.0	9.5	–	1.4		0.8	tr	–
614.0		4.4	14.6	21.6	7.2	22.8		4.0	4.1	18.6	–	1.8		0.8	–	tr
615.1		13.7	12.8	18.3	16.9	18.9		5.1	2.0	10.2	–	1.5		0.7	–	tr
616.8		–	9.5	25.3	6.3	12.0		35.0	1.4	6.0	2.0	2.3		0.2	–	tr
643.6		–	23.8	–	17.6	34.4		1.5	1.3	7.2	–	13.6		0.6	–	tr
644.9		–	15.2	–	15.8	28.1		8.0	4.7	22.5	–	4.4		1.3	–	tr
710.5		–	6.6	–	14.2	22.4		–	0.7	51.9	–	3.7		0.5	–	tr
712.2		–	22.7	–	19.7	32.4		2.9	1.7	5.4	–	14.7		0.6	–	tr
2-20μm Fractions																
35.0			32.7	–	17.2	32.5	–	7.2	6.2	–		0.8		3.3	tr	tr
35.3			25.3	–	17.9	35.4	–	9.8	6.9	–		0.7		4.1	tr	tr
36.8			28.4	–	15.5	32.2	–	12.5	7.2	–		0.9		3.5	tr	tr
39.8			29.5	–	17.1	35.1	–	7.1	5.8	–		0.9		4.4	tr	tr
39.9			23.9	–	20.6	35.5	–	3.7	3.7	7.0		0.3		5.2	tr	–
169.4			32.0	–	16.2	39.9	–	2.0	5.0	–		0.8		4.1	tr	tr
178.9			26.0	–	24.2	33.6	–	5.2	6.0	–		1.1		4.0	tr	tr
180.0			29.8	–	16.6	40.6	–	3.9	4.0	–		0.8		4.4	tr	tr
182.2			26.0	–	17.9	42.0	–	4.3	4.2	–		0.6		5.0	tr	tr
520.0			17.4	34.4	11.4	26.9	0.3	2.2	2.3	3.4		0.9		0.9	tr	tr
614.0			20.3	19.1	20.4	25.3	–	5.4	4.0	2.5		1.9		1.1	–	tr
615.1			22.5	14.2	19.9	30.0	–	5.1	2.6	2.7		2.1		0.9	–	tr
616.8			21.7	30.4	14.4	18.4	–	6.7	3.3	3.1		1.2		0.8	–	tr
643.6			11.1	–	27.2	39.0	–	3.0	1.1	–		18.2		0.3	–	tr
644.9			25.3	–	35.0	15.7	–	6.7	5.2	7.1		3.3		1.8	–	tr
710.5			8.2	–	48.7	30.7	–	2.2	1.3	–		8.5		0.5	–	tr
712.2			21.9	–	26.9	33.2	–	4.7	2.2	–		10.0		1.2	–	tr
<2μm Fractions																
35.0	49.3		8.5	–	10.2	11.9	–	14.2	12.7	39.8	–	1.5	–	1.2	–	–
35.3	47.1		8.8	–	8.9	16.0	2.3	15.6	9.3	37.8	–	–	–	1.3	–	–
36.8	39.7		9.4	–	7.1	9.2	3.7	13.2	5.8	49.3	–	0.9	–	1.4	–	–
39.8	31.3		10.1	–	12.1	12.6	–	13.5	15.0	34.5	–	0.9	–	1.4	tr	–
39.9	49.1		8.0	–	9.3	14.2	1.6	8.7	7.7	48.7	–	–	–	1.8	tr	–
169.4	49.3		11.2	–	7.2	14.8	3.1	6.7	10.9	43.7	–	0.9	–	1.4	–	–
178.9	44.1		10.3	–	6.7	12.5	–	8.1	12.0	47.7	–	1.0	–	1.7	tr	–
180.0	42.7		10.6	–	13.5	13.6	–	12.0	14.2	33.6	–	0.4	–	2.1	tr	–
182.2	45.3		12.6	–	7.3	20.0	–	8.2	15.8	32.4	–	1.1	–	2.6	tr	–
520.0	18.4		4.3	48.7	4.4	10.5	–	3.1	3.1	22.9	2.4	0.8	–	–	–	–
614.0	50.9		9.8	–	11.8	15.4	–	9.0	6.7	44.9	–	1.2	–	1.3	–	–
615.1	33.9		7.8	13.8	7.3	20.2	1.0	7.6	2.3	39.1	–	1.0	–	–	–	tr
616.8	38.7		8.9	29.5	8.1	9.5	–	10.2	4.4	28.5	–	0.9	–	–	–	–
643.6	32.5		35.9	–	10.6	14.6	0.6	7.4	4.4	13.9	–	11.6	0.5	0.6	–	tr
644.9	39.3		17.6	–	6.4	15.3	–	7.5	6.7	44.5	–	1.9	–	–	–	–
710.5	1.2		3.4	–	4.5	7.3	–	1.6	2.3	79.8	–	1.2	–	–	–	–
712.2	28.8		34.8	–	9.7	14.5	0.5	10.8	5.2	20.1	–	3.9	–	0.6	–	–

[a]U-1 persistent peak at 9.5Å. Intensity of peak was not observed to be dependent on any other minerals identified.

[b]U-2 peak at 2.53Å, possibly magnetite. Optical examination indicates its presence, but secondary peaks were not detected.

TABLE 5
Samples Submitted for X-Ray Diffraction Analysis, Leg 35

Sample (Interval in cm)	Depth Below Sea Floor (m)	GSA Color	GSA Color Code Number	Sediment Description
Site 322				
1-4, 82-84	81.8	Grayish-green	10 GY 5/2	Mica bearing quartz rich muddy sandstone
3-1, 20-22	295.2	Dusky yellow-green	5 GY 5/2	Bioturbated sandy claystone
4-1, 65-69	352.7	Dark greenish-gray	5 GY 4/1	Muddy sand interlaminated with sandy clay
4-2, 110-112	354.6	Grayish-green	10 GY 5/2	Mudstone
5-1, 76-77	391.8	Dark greenish-gray	5 G 4/1	Mudstone
9-2, 140-142	469.9	Dusky brown	5 YR 2/2	Sandstone
10-1, 49-50	487.0	Olive-gray	5 Y 3/2	Clay
10-1, 106-107	487.6	Olive-gray	5 Y 3/2	Sandstone
11-4, 98-100	510.5	Dusky yellowish-brown	10 YR 2/2	Clay
11-5, 88-90	511.9	Dark yellowish-brown	10 YR 4/2	Clay
11-6, 46-48	513.0	Grayish-brown	5 YR 3/2	Fe-Mn colloid bearing clay
11-6, 129-130	513.8	Moderate brown	5 YR 3/4	Fe-Mn colloid bearing clay
Site 323				
1-1, 107-108	76.6	Medium light gray	N6	Clayey sandstone
1-3, 75-76	79.3	Light olive-gray	5 Y 6/1	Clay
2-1, 83-84	161.8	Yellowish-gray	5 Y 7/2	Clay
2-1, 119-120	162.2	Pale olive	10 Y 6/2	Clay
3-2, 119-120	258.7	Greenish-gray	5 G 6/1	Clayey sandstone
3-2, 136-137	258.9	Pale olive	10 Y 6/2	Clay
5-1, 140-141	333.4	Grayish-orange	10 YR 7/4	Manganese micronodule bearing clay
6-1, 140-141	341.5	Pale yellowish-brown Pale olive	10 YR 6/2 10 Y 6/2	Mud Sandy mud
6-1, 140-141	341.5	Grayish-orange	10 YR 7/4	Fe-Mn colloid bearing clay
6-1, 140-141	341.5	Olive-gray	5 Y 4/1	Fe-Mn colloid bearing clay
6-1, 135-137	342.9	Yellowish-gray	5 Y 7/2	Biosiliceous clay
6-1, 147-148	343.0	Pale yellowish-brown	10 YR 6/2	Clay
7-3, 5-6	363.6	Pale grayish-red	5 R 5/2	Mud
8-1, 106-107	409.1	Pinkish-gray	5 YR 8/1	Sandy mud
8-1, 117-118	409.2	Dusky yellowish-brown	10 YR 2/2	Siliceous argilite
8-1, 143-148	409.4	Grayish-olive green	5 GY 4/2	Biosiliceous mud
9-2, 99-100	458.0	Grayish-green	10 GY 5/2	Biosiliceous mud
9-2, 131-132	458.3	Dusky green	5 G 3/2	Siliceous argillite
10-1, 122-126	504.2	Grayish-green	10 GY 5/2	Mud
10-2, 117-120	505.7	Grayish-green	10 GY 5/2	Mud
10-3, 125-127	507.3	Grayish-green	10 GY 5/2	Mud
11-1, 70-72	551.2	Grayish-green	5 G 5/2	Mud
12-2, 71-72	600.2	Dusky yellow-green	5 GY 5/2	Sandy mud
12-2, 78-80	600.3	Grayish-green	10 GY 5/2	Sandy mud
12-2, 106-108	600.6	Greenish-gray	5 G 6/1	Sandy mud
13-5, 123-125	624.2	Dark yellowish-brown	10 YR 4/2	Sandy mud
13-6, 92-94	625.4	Dark greenish-gray	5 G 5/1	Sandy mud
14-2, 93-97	638.4	Dusky yellowish-brown	10 YR 2/2	Fe-Mn colloid bearing mud
15-1, 132-134	656.6	Dusky yellowish-brown	10 YR 2/2	Fe-Mn colloid bearing mud
15-2, 114-117	657.9	Dusky yellowish-brown	10 YR 2/2	Fe-Mn colloid bearing mud
15-3, 121-124	659.5	Grayish-brown	5 YR 3/2	Fe-Mn colloid and volcanic glass bearing mud

TABLE 5 – *Continued*

Sample (Interval in cm)	Depth Below Sea Floor (m)	GSA Color	GSA Color Code Number	Sediment Description
15-4, 95-98	660.7	Dusky yellowish-brown	10 YR 2/2	Fe-Mn colloid bearing clay
15-5, 111-115	662.4	Dusky yellowish-brown	10 YR 2/2	Fe-Mn colloid bearing clay
15-6, 69-72	663.5	Grayish-brown	5 YR 3/2	Fe-Mn colloid bearing calcareous rich clay
16-1, 90-94	665.4	Pale brown	5 YR 5/2	Fe-Mn colloid bearing calcareous ooze
16-3, 31-33	667.8	Moderate brown	5 YR 4/4	Fe-Mn colloid bearing clay
16-4, 73-74	669.7	Dark yellowish-brown	10 YR 4/2	Fe-Mn colloid bearing clay
18-2, 116-118	695.7	Dark yellowish-brown	10 YR 4/2	Fe-Mn colloid bearing mud
18-3, 99-101	697.0	Moderate yellowish-brown	10 YR 5/4	Fe-Mn colloid bearing clay
18-4, 52-54	698.0	Dusky yellowish-brown Dark yellowish-brown	10 YR 2/2 10 YR 4/2	Fe-Mn colloid bearing mud
18-5, 0-2	699.0	Moderate brown	5 YR 3/4	Fe-Mn colloid bearing clay
Site 324				
1-3, 27-29	12.3	Pale yellowish-brown	10 YR 6/2	Clay
1-5, 40-46	15.4	Pale yellowish-brown	10 YR 6/2	Clay
2-2, 18-21	49.2	Light olive-gray	5 Y 6/1	Mud
2-2, 120-125	50.2	Grayish-olive	10 Y 4/2	Mud
2-3, 6-11	50.6	Light olive-gray	5 Y 5/2	Rock fragment bearing sandy mud
3-3, 81-86	79.3	Olive-gray	5 Y 4/1	Quartz and feldspar rich mud
4-4, 40-41	108.9	Dusky yellowish-green	5 GY 5/2	Quartz rich silty sand
	136.1	Dark yellowish-brown	10 YR 4/2	Mud
	136.7	Grayish-olive-green	5 GY 3/2	Quartz and feldspar bearing mud
7-3, 137-141	156.1	Dark greenish-gray	5 GY 4/1	Calcareous bearing quartz and feldspar rich mud
8-3, 91-92	174.4	Dark greenish-gray	5 G 4/1	Quartz rich feldspar and mafic mineral bearing silt
Site 325				
1-1, 103-106	35.0	Dark greenish-gray	5 G 4/1	Calcareous bearing mud
1-1, 130-132	35.3	Dark greenish-gray	5 G 4/1	Calcareous bearing mud
1-2, 131-134	36.8	Olive-gray	5 Y 4/1	Quartz rich mud
1-4, 131-133	39.8	Dark greenish-gray	5 G 4/1	Calcareous bearing metamorphic rock fragment bearing sandy mud
1-4, 143-144	39.9	Light olive-gray	5 Y 5/2	Quartz and feldspar bearing mud
2-2, 93-95	169.4	Olive-gray	5 Y 4/1	Calcite bearing mud
3-2, 90-92	178.9	Dark greenish-gray	5 GY 4/1	Calcareous bearing mud
3-3, 51-54	180.0	Dark greenish-gray	5 GY 4/1	Calcareous metamorphic rock fragment bearing sandy mud
3-4, 121-123	182.2	Dark greenish-gray	5 GY 4/1	Calcareous metamorphic rock fragment bearing heavy mineral bearing sandy mud
7-2, 0-2	520.0	Dark greenish-gray	5 GY 4/1	Mudstone
8-1, 147-149	614.0	Olive-gray	5 Y 4/1	Calcareous claystone
8-2, 112-113	615.1	Olive-gray	5 Y 4/1	Calcareous mudstone
8-3, 130-133	616.8	Dark greenish-gray	5 GY 4/1	Calcareous bearing claystone
9-2, 106-110	643.6	Dark greenish-gray Medium gray	5 GY 4/1 N 5	Silty sand
9-3, 92-95	644.9	Dark greenish-gray	5 G 4/1	Mudstone
10-2, 46-48	710.5	Light olive-gray	5 Y 5/2	Metamorphic rock fragment feldspar and quartz rich silty sandstone
10-3, 71-73	712.2	Well laminated sample ranging in color from very light gray N 8, to dark greenish gray 5 GY 4/1		Silty sand and muddy sand