# 51. X-RAY MINERALOGY DATA FROM THE NAZCA PLATE—LEG 34 DEEP SEA DRILLING PROJECT[1]

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## METHODS

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

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 (*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 5. Table 6 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 5, a color description, and a sediment description of each sample. In a few cases, sediment samples of similar composition were composited. The composited samples are bracketed in Table 6 and are identified in Tables 1 to 5 by the subbottom depth of the uppermost sample in the composite.

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 assumes 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 zeolites 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 siliceous ooze, siliceous 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.

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

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% concentration are termed "abundant."

No lithified sediments were submitted for X-ray diffraction analysis from Leg 34.

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 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 Volume 28). Ideally, the amorphous content varies between 0 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 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 (10%-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 between 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, geothite may

TABLE 1
Results of X-Ray Diffraction Analysis, Hole 319

| Subbottom Depth (m) | Amor. | Calc. | Feld.[a] | Quar. | K-Fe. | Plag. | Kaol. | Mica | Chlo. | Goet. | Mont. | Clin. | Phil. | Gibb. | Hema. | Bari. | Amph. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bulk Sample** | | | | | | | | | | | | | | | | | |
| 1.4 | 82.2 | – | 21.1 | 0.7 | | | 14.0 | 4.8 | – | 13.8 | – | | 33.4 | | – | 12.2 | |
| 5.0 | 68.0 | 68.8 | – | 0.5 | | | 3.2 | – | 2.2 | 12.4 | – | | 7.5 | | – | 5.5 | |
| 7.4 | 52.7 | 94.1 | – | – | | | – | – | – | – | 5.9 | | – | | – | – | |
| 8.0 | 78.7 | 47.9 | 9.0 | 0.7 | | | 9.4 | – | – | 11.0 | – | | 8.9 | | – | 13.0 | |
| 10.9 | 46.0 | 83.1 | – | – | | | – | – | – | 4.4 | 10.8 | | – | | – | 1.6 | |
| 12.1 | 37.9 | 89.1 | – | – | | | – | – | – | 2.6 | 8.3 | | – | | – | – | |
| 13.3 | 48.9 | 85.7 | – | – | | | – | – | – | 4.7 | 9.6 | | – | | – | – | |
| 14.5 | 45.1 | 88.3 | – | – | | | – | – | – | 3.7 | 8.0 | | – | | – | – | |
| 21.7 | 48.3 | 87.4 | – | – | | | – | – | – | 3.1 | 8.2 | | – | | – | 1.4 | |
| 22.8 | 38.6 | 97.1 | – | – | | | – | – | – | 2.9 | – | | – | | – | – | |
| 28.7 | 33.8 | 96.0 | – | – | | | – | – | – | 4.0 | – | | – | | – | – | |
| 31.2 | 33.4 | 95.1 | – | – | | | – | – | – | 4.9 | – | | – | | – | – | |
| 32.1 | 27.5 | 96.3 | – | – | | | – | – | – | 3.7 | – | | – | | – | – | |
| 33.5 | 30.6 | 96.1 | – | – | | | – | – | – | 3.9 | – | | – | | – | – | |
| 35.1 | 23.5 | 96.3 | – | – | | | – | – | – | 3.7 | – | | – | | – | – | |
| 36.5 | 19.1 | 97.1 | – | – | | | – | – | – | 2.9 | – | | – | | – | – | |
| 39.6 | 15.1 | 97.8 | – | – | | | – | – | – | 2.2 | – | | – | | – | – | |
| 44.4 | 17.9 | 96.6 | – | – | | | – | – | – | 1.7 | – | | – | | 1.7 | – | |
| 45.9 | 16.0 | 97.8 | – | – | | | – | – | – | 2.2 | – | | – | | – | – | |
| 48.4 | 18.4 | 97.7 | – | – | | | – | – | – | 2 3 | – | | – | | – | – | |
| 51.7 | 20.2 | 92.3 | – | – | | | – | – | – | 3.4 | – | | 3.9 | | 0.3 | – | |
| 52.3 | 25.5 | 94.5 | – | – | | | – | – | – | 4.0 | – | | 1.5 | | – | – | |
| 54.7 | 15.2 | 96.8 | 1.0 | – | | | – | – | – | 2.2 | – | | – | | – | – | |
| 58.2 | 15.7 | 98.9 | – | – | | | – | – | – | 1.1 | – | | – | | – | – | |
| 63.0 | 17.4 | 97.7 | – | – | | | – | – | – | 2.3 | – | | – | | – | – | |
| 64.5 | 16.3 | 98.4 | – | – | | | – | – | – | 1.6 | – | | – | | – | – | |
| 65.2 | 16.7 | 98.3 | – | – | | | – | – | – | 1.7 | – | | – | | – | – | |
| 67.6 | 20.2 | 97.7 | – | – | | | – | – | – | 2.3 | – | | – | | – | – | |
| 68.8 | 19.8 | 96.5 | – | – | | | – | – | – | 3.5 | – | | – | | – | – | |
| 72.4 | 20.4 | 96.5 | – | – | | | – | – | – | 3.5 | – | | – | | – | – | |
| 73.6 | 22.3 | 98.2 | – | – | | | – | – | – | 1.8 | – | | – | | – | – | |
| 75.0 | 16.5 | 98.3 | – | – | | | – | – | – | 1.7 | – | | – | | – | – | |
| 76.9 | 22.1 | 96.3 | – | – | | | – | – | – | 3.7 | – | | – | | – | – | |
| 78.8 | 38.9 | 92.2 | – | – | | | – | – | – | 7.8 | – | | – | | – | – | |
| 79.9 | 32.8 | 94.6 | – | – | | | – | – | – | 5.4 | – | | – | | – | – | |
| 86.6 | 19.5 | 97.7 | – | – | | | – | – | – | 2.3 | – | | – | | – | – | |
| 92.6 | 25.9 | 95.9 | – | – | | | – | – | – | 4.1 | – | | – | | – | – | |
| 95.8 | 29.2 | 94.2 | – | – | | | – | – | – | 5.8 | – | | – | | – | – | |
| 100.7 | 26.1 | 97.5 | – | – | | | – | – | – | 2.5 | – | | – | | – | – | |
| 105.9 | 22.0 | 97.8 | – | – | | | – | – | – | 2.2 | – | | – | | – | – | |
| **2-20μm Fraction** | | | | | | | | | | | | | | | | | |
| 1.4 | 36.7 | | 9.6 | 1.0 | – | – | 13.0 | 4.9 | – | 16.6 | 12.2 | – | 27.7 | – | | 15.1 | – |
| 5.0 | 50.4 | | 22.0 | 2.2 | – | – | 7.7 | 4.0 | – | 11.1 | 20.1 | 1.1 | 20.8 | 0.2 | | 5.7 | 5.1 |
| 7.4 | 61.9 | | 14.6 | 1.9 | – | – | 8.0 | 5.4 | 1.5 | 13.5 | 53.6 | – | – | – | | 1.6 | – |
| 8.0 | 57.5 | | 12.0 | 0.4 | – | – | 10.3 | 3.7 | 1.5 | 14.6 | 29.9 | 1.9 | 15.6 | – | | 10.2 | – |
| 10.9 | 64.2 | | 4.5 | 0.7 | – | – | 5.0 | – | – | 24.3 | 54.8 | – | 3.0 | – | | 7.8 | – |
| 12.1 | 61.6 | | 6.0 | 0.9 | – | – | – | – | – | 6.5 | 76.1 | – | 2.0 | – | | 8.6 | – |
| 13.3 | 58.1 | | 7.0 | 0.6 | – | – | 2.8 | – | – | 15.3 | 54.1 | – | 15.6 | – | | 4.8 | – |
| 14.5 | 60.8 | | 14.6 | 1.4 | – | – | – | 4.1 | – | 16.6 | 53.6 | – | 4.6 | – | | 5.2 | – |
| 21.7 | 59.7 | | 8.9 | 1.7 | – | – | 6.5 | – | – | 17.4 | 56.1 | 1.3 | 4.2 | – | | 3.9 | – |
| 22.8 | 59.0 | | 3.5 | – | – | – | 3.8 | – | – | 14.2 | 70.4 | – | 4.1 | – | | 4.0 | – |
| 28.7 | 80.8 | | 9.3 | 2.3 | – | – | – | – | – | 26.2 | 5.6 | 24.7 | 31.8 | – | | – | – |
| 31.2 | 80.1 | | 7.1 | 1.4 | – | – | – | 11.6 | – | 33.8 | – | 20.2 | 25.8 | – | | – | – |
| 32.1 | 77.2 | | 8.4 | 1.3 | – | – | – | 7.8 | – | 22.7 | 4.7 | 28.7 | 26.5 | – | | – | – |
| 33.5 | 80.0 | | 12.1 | 7.6 | – | – | – | 12.7 | – | 21.4 | – | 19.1 | 20.0 | – | | 4.4 | 2.6 |
| 35.1 | 73.2 | | 7.8 | 3.5 | – | – | – | 13.0 | – | 19.0 | 10.8 | 27.5 | 18.4 | – | | – | – |
| 36.5 | 44.6 | | 8.3 | 7.0 | – | – | – | 7.0 | – | 13.6 | – | 20.2 | 44.0 | – | | – | – |
| 39.6 | 77.6 | | 12.6 | 5.6 | – | – | – | 9.0 | – | 29.2 | 2.8 | 22.8 | 14.2 | – | | 3.9 | – |
| 45.9 | 70.5 | | 19.5 | 7.1 | – | – | – | – | – | 36.2 | – | 26.2 | 11.0 | – | | – | – |
| 48.4 | 27.2 | | 34.2 | 7.1 | – | – | – | – | – | 16.9 | 10.9 | 18.4 | 12.3 | – | | – | – |
| 51.7 | 76.5 | | 32.6 | 5.3 | – | – | – | – | – | 27.9 | – | 11.5 | 22.6 | – | | – | – |
| 52.3 | 40.9 | | – | – | – | – | – | – | – | 12.3 | 9.0 | 1.8 | 76.9 | – | | – | – |
| 58.2 | 65.1 | | 2.8 | 4.9 | – | – | – | 29.5 | – | 16.0 | 5.4 | 11.5 | 16.7 | – | | 13.2 | – |
| 63.0 | 6.0 | | 15.7 | 13.5 | – | – | – | – | – | 28.2 | – | 17.7 | 24.9 | – | | – | – |
| 64.5 | 59.3 | | 11.2 | 7.0 | – | – | – | 7.8 | – | 15.5 | 6.6 | 27.8 | 23.9 | – | | – | – |
| 65.2 | 64.9 | | 11.2 | 6.6 | – | – | – | 7.5 | – | 18.2 | 6.1 | 25.8 | 24.6 | – | | – | – |
| 67.6 | 87.8 | | 11.6 | 6.7 | – | – | – | 11.1 | – | 44.8 | 5.1 | 15.0 | 5.7 | – | | – | – |
| 68.8 | 81.4 | | 12.5 | 6.1 | – | – | – | 13.1 | – | 33.6 | 4.8 | 20.0 | 9.9 | – | | – | – |
| 72.4 | 75.5 | | 22.1 | 7.2 | – | – | – | 9.0 | – | 27.0 | 3.9 | 21.7 | 9.1 | – | | – | – |
| 73.6 | 84.5 | | 11.3 | 5.2 | – | – | – | 12.6 | – | 32.1 | – | 27.6 | 11.1 | – | | – | – |
| 75.0 | 61.8 | | 7.7 | 4.2 | – | – | – | 5.2 | – | 10.0 | – | 40.0 | 32.9 | – | | – | – |
| 76.9 | 93.4 | | 11.4 | 5.3 | – | – | – | 18.5 | – | 34.0 | – | 19.6 | 11.2 | – | | – | – |
| 78.8 | 90.8 | | 8.8 | 7.3 | – | – | – | 11.0 | – | 59.9 | – | 9.5 | 3.5 | – | | – | – |
| 79.9 | 90.2 | | – | 6.6 | 11.2 | 7.3 | – | – | – | 74.8 | – | – | – | – | | – | – |
| 86.6 | 89.2 | | 10.9 | 4.1 | – | – | – | 11.2 | – | 42.7 | – | 19.0 | 5.8 | – | | 6.3 | – |

**TABLE 1** – *Continued*

| Subbottom Depth (m) | Amor. | Calc. | Feld.[a] | Quar. | K-Fe. | Plag. | Kaol. | Mica | Chlo. | Goet. | Mont. | Clin. | Phil. | Gibb. | Hema. | Bari. | Amph. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2-20μm Fraction** – *Continued* | | | | | | | | | | | | | | | | | |
| 92.6 | 86.4 | | 17.1 | 7.1 | – | – | – | 10.0 | – | 35.1 | – | 24.1 | 6.6 | – | | – | – |
| 95.8 | 90.3 | | – | 5.5 | 4.6 | 8.3 | – | 9.5 | – | 66.3 | – | 2.5 | 3.4 | – | | – | – |
| 100.7 | 92.1 | | 7.7 | 5.2 | – | – | – | 9.4 | – | 64.4 | – | 3.2 | 3.8 | – | | 6.3 | – |
| 105.9 | 84.4 | | 13.7 | 6.8 | – | – | – | 11.5 | – | 22.3 | – | 29.9 | 10.8 | – | | 4.9 | – |
| **<2μm Fraction** | | | | | | | | | | | | | | | | | |
| 1.4 | 88.1 | | 5.3 | 0.7 | | | 9.5 | – | | 24.9 | 18.1 | – | 33.2 | | – | 8.3 | |
| 5.0 | 88.1 | | 12.3 | 0.7 | | | – | – | | 60.0 | 17.9 | – | – | | 4.0 | 5.2 | |
| 7.4 | 88.0 | | 11.8 | 1.4 | | | – | – | | 41.5 | 40.4 | – | – | | – | 5.0 | |
| 8.0 | 84.5 | | – | 1.8 | | | – | 6.1 | | 38.2 | 43.6 | 2.2 | – | | – | 8.1 | |
| 10.9 | 73.7 | | – | – | | | – | – | | 24.7 | 69.1 | – | – | | – | 6.2 | |
| 12.1 | 74.7 | | 7.6 | – | | | – | – | | 6.2 | 79.6 | – | – | | – | 6.6 | |
| 13.3 | 72.0 | | – | – | | | – | – | | 34.8 | 65.2 | – | – | | – | – | |
| 14.5 | 74.0 | | – | – | | | – | – | | 30.5 | 69.5 | – | – | | – | – | |
| 21.7 | 76.9 | | – | – | | | – | – | | 30.6 | 69.4 | – | – | | – | – | |
| 22.8 | 80.9 | | – | – | | | – | – | | 34.3 | 65.7 | – | – | | – | – | |
| 28.7 | 92.0 | | – | – | | | – | – | | 91.3 | 8.7 | – | – | | – | – | |
| 31.2 | 90.0 | | – | – | | | – | – | | 91.3 | 8.7 | – | – | | – | – | |
| 32.1 | 91.7 | | – | – | | | – | – | | 81.6 | 18.4 | – | – | | – | – | |
| 33.5 | 90.9 | | – | – | | | – | – | | 91.3 | 8.7 | – | – | | – | – | |
| 35.1 | 88.9 | | – | – | | | – | – | | 77.8 | 22.2 | – | – | | – | – | |
| 36.5 | 87.1 | | – | – | | | – | – | | 89.5 | 10.5 | – | – | | – | – | |
| 39.6 | 90.9 | | – | – | | | – | – | | 90.1 | 9.9 | – | – | | – | – | |
| 44.4 | 78.6 | | – | – | | | – | – | | 48.3 | 51.7 | – | – | | – | – | |
| 45.9 | 88.9 | | – | – | | | – | – | | 81.6 | 18.4 | – | – | | – | – | |
| 48.4 | 84.0 | | – | – | | | – | – | | 87.5 | 12.5 | – | – | | – | – | |
| 51.7 | 88.9 | | – | – | | | – | – | | 80.2 | 19.8 | – | – | | – | – | |
| 52.3 | 88.6 | | – | – | | | – | – | | 79.9 | 20.1 | – | – | | – | – | |
| 54.7 | 63.1 | | – | – | | | – | – | | 77.8 | 22.2 | – | – | | – | – | |
| 58.2 | 90.9 | | – | – | | | – | – | | 77.8 | 22.2 | – | – | | – | – | |
| 63.0 | 88.0 | | – | – | | | – | – | | 83.7 | 16.3 | – | – | | – | – | |
| 64.5 | 93.1 | | – | – | | | – | – | | 80.8 | 19.2 | – | – | | – | – | |
| 65.2 | 88.9 | | – | – | | | – | – | | 82.4 | 17.6 | – | – | | – | – | |
| 67.6 | 89.1 | | – | – | | | – | – | | 70.0 | 30.0 | – | – | | – | – | |
| 68.8 | 87.3 | | – | 1.7 | | | – | – | | 85.6 | 8.7 | 3.9 | – | | – | – | |
| 72.4 | 90.3 | | – | – | | | – | – | | 83.2 | 16.8 | – | – | | – | – | |
| 73.6 | 82.3 | | – | – | | | – | 9.1 | | 80.0 | 10.9 | – | – | | – | – | |
| 75.0 | 91.1 | | – | – | | | – | – | | 84.6 | 15.4 | – | – | | – | – | |
| 76.9 | 80.3 | | – | – | | | – | – | | 79.6 | 20.4 | – | – | | – | – | |
| 78.8 | 84.6 | | – | – | | | – | – | | 92.8 | 7.2 | – | – | | – | – | |
| 79.9 | 81.4 | | – | – | | | – | – | | 100.0 | – | – | – | | – | – | |
| 86.6 | 85.7 | | – | – | | | – | – | | 86.6 | 13.4 | – | – | | – | – | |
| 92.6 | 86.6 | | – | – | | | – | – | | 92.2 | 7.8 | – | – | | – | – | |
| 95.8 | 82.9 | | – | – | | | – | – | | 100.0 | – | – | – | | – | – | |
| 100.7 | 82.0 | | – | – | | | – | – | | 93.0 | 7.0 | – | – | | – | – | |
| 105.9 | 85.5 | | – | 1.9 | | | – | – | | 76.5 | 20.0 | – | – | | – | 1.7 | |

[a]Plagioclase and K-feldspar are reported as undifferentiated feldspars when there is significant interference with phillipsite or they occur in small concentrations.

**TABLE 2**
**Results of X-Ray Diffraction Analysis, Hole 320**

| Subbottom Depth (m) | Amor. | Calc. | Feld.[a] | Quar. | K-Fe. | Plag. | Kaol. | Mica | Chlo. | Goet. | Mont. | Clin. | Phil. | Pyri. | Bari. | Magn. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bulk Sample** | | | | | | | | | | | | | | | | |
| 6.5 | 71.7 | – | – | 28.6 | 3.7 | 16.7 | 2.9 | 29.5 | 1.7 | – | 16.1 | – | – | 0.7 | – | |
| 10.9 | 74.4 | – | – | 29.0 | 3.0 | 16.8 | 5.1 | 29.7 | 3.4 | – | 12.7 | – | – | – | 0.3 | |
| 74.5 | 48.1 | 82.1 | 1.3 | 1.2 | – | – | 0.5 | 3.1 | 0.5 | 8.9 | – | 1.2 | 1.1 | – | – | |
| 75.7 | 43.5 | 82.4 | 2.1 | 1.3 | – | – | – | 2.9 | – | 10.5 | – | 0.8 | – | – | – | |
| 103.7 | 18.3 | 99.0 | – | – | – | – | – | – | – | 1.0 | – | – | – | – | – | |
| 109.4 | 20.9 | 98.9 | – | – | – | – | – | – | – | 1.1 | – | – | – | – | – | |
| 110.6 | 23.9 | 98.1 | – | – | – | – | – | – | – | 1.9 | – | – | – | – | – | |
| **2-20μm Fraction** | | | | | | | | | | | | | | | | |
| 6.5 | 58.2 | | – | 44.3 | 3.1 | 18.0 | 2.9 | 22.9 | 3.0 | – | 5.7 | – | – | – | – | – |
| 10.9 | 62.2 | | – | 40.4 | 5.6 | 21.3 | 4.7 | 19.6 | 3.8 | – | 2.9 | – | – | 1.3 | 0.4 | – |
| 74.5 | 73.1 | | 10.1 | 15.4 | – | – | 3.1 | 27.1 | 1.4 | 26.9 | 5.5 | – | 9.8 | – | 0.9 | – |
| 75.7 | 75.4 | | 4.7 | 11.3 | – | – | 4.1 | 19.7 | 0.8 | 17.8 | 3.9 | 23.8 | 11.2 | – | 2.5 | – |
| 103.7 | 31.5 | | 16.4 | 8.8 | – | – | – | – | – | 26.7 | – | 18.5 | 13.0 | – | 16.6 | – |
| 109.4 | 78.5 | | 10.3 | 4.8 | – | – | 3.8 | – | – | 14.8 | 7.2 | 47.5 | 6.5 | – | 3.6 | 1.4 |
| 110.6 | 80.8 | | 14.1 | 2.7 | – | – | 3.7 | 8.0 | – | 15.8 | 3.1 | 44.5 | 3.5 | – | 4.1 | 0.6 |
| **<2μm Fraction** | | | | | | | | | | | | | | | | |
| 6.5 | 43.1 | | – | 10.4 | 3.4 | 4.5 | 4.9 | 23.5 | 1.4 | – | 52.0 | – | – | – | – | – |
| 10.9 | 63.5 | | – | 14.1 | 2.0 | 7.1 | 4.9 | 21.7 | 3.1 | – | 46.0 | – | – | 1.1 | – | – |
| 74.5 | 85.5 | | 2.8 | 2.4 | – | – | – | 57.5 | – | 30.5 | 6.9 | – | – | – | – | – |
| 75.7 | 85.0 | | – | 2.8 | – | – | – | – | – | 74.5 | 22.7 | – | – | – | – | – |
| 103.7 | 78.2 | | – | 2.3 | – | – | – | – | – | 53.5 | 36.3 | 1.7 | 3.6 | – | 2.6 | – |
| 109.4 | 78.0 | | – | – | – | – | – | – | 59.6 | | 40.4 | – | – | – | – | – |
| 110.6 | 82.6 | | – | 3.6 | – | – | – | – | – | 66.4 | 27.1 | – | – | – | – | 2.8 |

[a]Plagioclase and K-feldspar are reported as undifferentiated feldspars when there is significant interference with phillipsite or they occur in small concentrations.

**TABLE 3**
**Results of X-Ray Diffraction Analysis, Hole 320A**

| Subbottom Depth (m) | Amor. | Quar. | K-Fe. | Plag. | Kaol. | Mica | Chlo. | Mont. | Phil. | Bari. |
|---|---|---|---|---|---|---|---|---|---|---|
| **Bulk Sample** | | | | | | | | | | |
| 0.4 | 73.5 | 32.0 | 6.6 | 18.2 | 5.5 | 24.1 | 3.3 | 10.4 | – | – |
| 4.1 | 69.9 | 29.4 | 3.0 | 16.1 | 7.6 | 25.5 | 3.5 | 12.7 | 2.0 | 0.2 |
| 5.4 | 73.5 | 27.0 | 2.9 | 14.5 | 3.6 | 28.5 | 2.2 | 20.4 | – | 0.8 |
| **2-20μm Fraction** | | | | | | | | | | |
| 0.4 | 59.9 | 42.6 | 4.3 | 23.1 | 3.3 | 19.8 | 3.8 | 3.0 | – | – |
| 4.1 | 56.2 | 45.6 | 4.8 | 23.1 | 1.7 | 11.6 | 1.9 | 2.5 | 6.1 | 2.9 |
| 5.4 | 65.6 | 46.5 | 4.3 | 23.7 | 3.5 | 16.5 | 2.5 | 3.0 | – | – |
| **<2μm Fraction** | | | | | | | | | | |
| 0.4 | 57.7 | 14.0 | 0.4 | 6.2 | 4.1 | 22.8 | 2.8 | 45.6 | 3.7 | 0.4 |
| 4.1 | 55.7 | 21.0 | 1.5 | 6.8 | 3.1 | 32.2 | 3.6 | 24.2 | 6.4 | 1.1 |
| 5.4 | 51.2 | 11.5 | 2.9 | 5.5 | 8.4 | 22.0 | 3.9 | 45.6 | – | 0.2 |

**TABLE 4**
**Results of X-Ray Diffraction Analysis, Hole 320B**

| Subbottom Depth (m) | Amor. | Calc. | Feld. | Quar. | K-Fe. | Plag. | Kaol. | Mica | Chlo. | Goet. | Mont. | Clin. | Phil. | Bari. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bulk Sample** | | | | | | | | | | | | | | |
| 136.4 | 26.1 | 97.8 | | | | | | | | 2.2 | | | | |
| 140.9 | 25.6 | 95.9 | | | | | | | | 4.1 | | | | |
| 146.6 | 27.5 | 97.3 | | | | | | | | 2.7 | | | | |
| 147.9 | 34.9 | 95.8 | | | | | | | | 4.2 | | | | |
| 148.6 | 27.6 | 95.9 | | | | | | | | 4.1 | | | | |
| 150.5 | 28.6 | 95.5 | | | | | | | | 4.5 | | | | |
| 151.7 | 32.8 | 91.4 | | | | | | | | 8.6 | | | | |
| **2-20μm Fraction** | | | | | | | | | | | | | | |
| 136.4 | 85.4 | | – | 7.9 | 9.0 | 7.9 | 6.6 | 8.9 | – | 19.0 | 8.5 | 27.9 | – | 4.2 |
| 140.9 | 83.1 | | 5.4 | 8.2 | – | – | 5.1 | 13.3 | 1.6 | 27.1 | 4.3 | 19.5 | 13.1 | 2.4 |
| 146.6 | 87.2 | | 7.4 | 6.3 | – | – | – | 13.8 | – | 24.1 | 11.0 | 23.8 | 13.6 | – |
| 147.9 | 90.9 | | – | 6.1 | 6.0 | 4.9 | – | 12.6 | – | 39.2 | 12.1 | 19.1 | – | – |
| 148.6 | 53.3 | | – | 5.4 | 13.8 | 9.0 | – | 10.5 | – | 22.5 | 7.0 | 31.7 | – | – |
| 150.5 | 91.4 | | 9.9 | 7.8 | – | – | – | 11.5 | – | 48.2 | 6.9 | 15.8 | – | – |
| 151.7 | 88.1 | | 4.7 | 5.6 | – | – | – | 8.7 | – | 63.5 | – | 17.5 | – | – |
| **<2μm Fraction** | | | | | | | | | | | | | | |
| 136.4 | 79.1 | | | – | | | | – | | 50.3 | 49.7 | – | – | |
| 140.9 | 79.5 | | | 2.8 | | | | – | | 53.6 | 25.5 | – | 18.1 | |
| 146.6 | 58.9 | | | 1.4 | | | | 8.5 | | 32.6 | 57.4 | – | – | |
| 147.9 | 61.7 | | | – | | | | 3.5 | | 44.9 | 50.3 | 1.4 | – | |
| 148.6 | 69.3 | | | 1.3 | | | | 8.1 | | 58.6 | 32.0 | – | – | |
| 150.5 | 72.3 | | | – | | | | – | | 67.8 | 32.2 | – | – | |
| 151.7 | 78.6 | | | – | | | | – | | 92.7 | 7.3 | – | – | |

## TABLE 5
### Results of X-Ray Diffraction Analysis, Hole 321

| Subbottom Depth (m) | Amor. | Calc. | Feld.[a] | Quar. | K-Fe. | Plag. | Kaol. | Mica | Chlo. | Goet. | Paly. | Mont. | Clin. | Phil. | Hema. | Bari. | Amph. | U-1[b] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bulk Sample** | | | | | | | | | | | | | | | | | | |
| 0.9 | 73.0 | – | – | 25.7 | 2.7 | 21.9 | 6.7 | 30.1 | 4.7 | – | – | 7.6 | – | – | | 0.7 | – | – |
| 2.1 | 74.4 | – | – | 25.7 | 1.4 | 21.3 | 4.5 | 24.7 | 4.8 | – | – | 16.0 | – | – | | 1.7 | – | – |
| 3.3 | 73.3 | – | – | 29.3 | 1.5 | 23.0 | 5.1 | 23.5 | 3.7 | – | – | 13.9 | – | – | | – | – | – |
| 4.9 | 73.7 | – | – | 28.4 | 5.5 | 21.3 | 6.2 | 21.2 | 2.3 | – | – | 12.4 | – | – | | 1.0 | 1.7 | – |
| 6.4 | 76.0 | – | – | 25.8 | – | 21.7 | 2.3 | 21.9 | 1.4 | – | 12.2 | 11.9 | 0.5 | – | | 0.9 | 1.4 | Tr |
| 12.0 | 76.6 | – | – | 27.7 | 2.2 | 23.9 | 3.8 | 25.6 | 1.5 | – | – | 13.9 | – | – | | – | 1.5 | Tr |
| 15.8 | 76.2 | – | – | 28.0 | 0.3 | 24.7 | 3.3 | 22.1 | 2.1 | – | – | 15.5 | – | 3.0 | | 1.1 | – | Tr |
| 22.5 | 79.1 | – | – | 25.1 | – | 26.2 | 5.6 | 21.0 | 2.6 | – | – | 18.3 | 0.5 | – | | – | 0.7 | – |
| 23.9 | 79.9 | – | – | 22.9 | 1.4 | 24.6 | 5.8 | 20.3 | 5.2 | – | – | 18.2 | 0.4 | – | | 0.3 | 0.8 | – |
| 25.4 | 76.7 | – | – | 21.9 | 0.9 | 21.0 | 4.3 | 20.5 | 2.9 | – | 3.4 | 22.8 | 0.5 | – | | 0.9 | 0.8 | Tr |
| 31.9 | 81.1 | – | – | 20.4 | 1.6 | 24.7 | 3.9 | 17.8 | 0.3 | – | 1.8 | 22.1 | 0.4 | 4.1 | | 1.9 | 1.0 | Tr |
| 33.1 | 79.3 | – | – | 22.4 | – | 25.7 | 5.4 | 18.0 | 3.7 | – | – | 23.0 | – | – | | 0.7 | 1.0 | – |
| 34.7 | 81.4 | – | – | 21.2 | – | 26.2 | 7.5 | 16.6 | 2.0 | – | 7.0 | 18.4 | – | – | | 1.1 | – | – |
| 36.4 | 79.8 | – | – | 15.3 | – | 37.8 | 2.9 | 18.7 | 1.6 | – | 2.9 | 16.0 | – | 2.7 | | 2.1 | – | – |
| 37.7 | 88.5 | – | – | 18.2 | – | 28.9 | 5.9 | 16.7 | 5.9 | – | 5.5 | 18.7 | – | – | | – | – | Tr |
| 42.1 | 81.3 | – | – | 13.5 | – | 27.8 | 4.3 | 19.1 | 2.8 | – | – | 29.8 | – | 1.5 | | 1.2 | – | – |
| 42.7 | 86.0 | – | – | 15.1 | – | 28.0 | 4.0 | 20.9 | 1.8 | – | – | 23.8 | – | 3.6 | | 1.3 | 1.6 | – |
| 44.3 | 83.5 | – | – | 11.4 | 21.7 | 20.4 | 2.8 | 31.8 | – | – | – | 11.1 | – | – | | 0.8 | – | Tr |
| 54.8 | 78.7 | – | – | 13.9 | 17.1 | 14.4 | 3.3 | 15.2 | 3.8 | – | – | 29.8 | – | – | | 2.5 | – | – |
| 47.3 | 80.7 | – | – | 10.7 | 17.3 | 18.4 | 5.2 | 16.9 | 1.4 | – | – | 21.6 | – | 4.0 | | 3.8 | 0.8 | Tr |
| 51.0 | 77.6 | – | 32.3 | 14.7 | – | – | 2.7 | 18.0 | – | – | – | 17.6 | 1.8 | 12.9 | | – | – | – |
| 52.3 | 74.8 | – | 23.3 | 13.6 | – | – | 3.3 | 20.4 | 2.6 | – | – | 15.9 | 0.6 | 19.4 | | – | 1.0 | – |
| 53.8 | 72.9 | – | 19.6 | 18.2 | – | – | 1.1 | 23.3 | 1.6 | 3.9 | – | 4.4 | 0.9 | 27.0 | | – | – | – |
| 55.2 | 70.6 | – | 12.3 | 10.0 | – | – | – | 17.2 | – | 22.4 | – | 8.6 | – | 29.5 | | – | – | – |
| 56.7 | 70.5 | – | – | 9.2 | – | 7.2 | – | 15.4 | 2.5 | 25.1 | – | 9.1 | 0.7 | 30.2 | | – | 0.7 | – |
| 59.0 | 17.3 | 100.0 | – | – | – | – | – | – | – | – | – | – | – | – | | – | – | – |
| 63.4 | 16.1 | 100.0 | – | – | – | – | – | – | – | – | – | – | – | – | | – | – | – |
| 69.4 | 35.0 | 83.0 | 4.3 | 1.5 | – | – | – | – | – | 7.1 | – | – | – | 4.0 | | – | – | – |
| 73.8 | 42.5 | 87.5 | 1.6 | 1.1 | – | – | – | – | – | 9.9 | – | – | – | – | | – | – | – |
| 74.7 | 49.2 | 78.5 | 1.1 | 1.4 | – | – | – | – | – | 17.0 | – | – | – | 1.4 | | – | – | – |
| 76.3 | 26.8 | 95.5 | – | 0.4 | – | – | – | – | – | 4.1 | – | – | – | – | | – | – | – |
| 78.4 | 23.5 | 96.0 | – | – | – | – | – | – | – | 4.0 | – | – | – | – | | – | – | – |
| 79.3 | 23.6 | 97.9 | – | 0.3 | – | – | – | – | – | 1.9 | – | – | – | – | | – | – | – |
| 80.8 | 23.3 | 96.7 | – | 0.2 | – | – | – | – | – | 2.4 | – | – | – | 0.7 | | – | – | – |
| 87.3 | 79.8 | – | – | 8.6 | 2.8 | 17.7 | 1.7 | 7.6 | – | 10.9 | – | 47.3 | – | 3.3 | | – | – | – |
| 88.8 | 20.5 | 98.6 | – | – | – | – | – | – | – | 1.4 | – | – | – | – | | – | – | – |
| 90.3 | 19.7 | 98.2 | – | – | – | – | – | – | – | 1.8 | – | – | – | – | | – | – | – |
| 91.8 | 21.3 | 98.2 | – | – | – | – | – | – | – | 1.8 | – | – | – | – | | – | – | – |
| 116.5 | 32.0 | 95.6 | – | 0.2 | – | – | – | – | – | 4.2 | – | – | – | – | | – | – | – |
| 117.4 | 38.3 | 94.4 | – | 0.2 | – | – | – | – | – | 5.3 | – | – | – | – | | – | – | – |
| 119.7 | 43.1 | 93.4 | – | – | – | – | – | – | – | 4.0 | – | – | – | 2.6 | | – | – | – |
| **2-20μm Fraction** | | | | | | | | | | | | | | | | | | |
| 0.9 | 54.1 | | – | 39.0 | 5.4 | 27.9 | 3.3 | 17.3 | 4.0 | – | – | 2.4 | – | – | – | 0.6 | – | – |
| 2.1 | 58.2 | | – | 39.6 | – | 28.6 | 5.0 | 17.9 | 3.9 | – | – | 3.8 | – | – | – | 1.2 | – | – |
| 3.3 | 45.2 | | – | 17.7 | 2.1 | 12.7 | 1.4 | 62.5 | 1.9 | – | – | 1.7 | – | – | – | – | – | – |
| 4.9 | 58.9 | | – | 38.3 | 4.6 | 29.2 | 2.0 | 15.7 | 3.1 | – | – | 3.7 | – | 1.9 | – | – | 1.6 | – |
| 6.4 | 65.4 | | – | 38.2 | 0.1 | 30.3 | 3.9 | 15.9 | 1.7 | – | 3.8 | 2.5 | 0.6 | 1.2 | – | – | 1.7 | Tr |
| 12.0 | 60.9 | | – | 32.2 | 3.8 | 25.6 | 3.8 | 21.5 | 3.2 | – | – | 6.5 | 0.6 | – | – | 1.1 | 1.8 | Tr |
| 15.8 | 57.4 | | – | 34.3 | 1.9 | 21.4 | 3.4 | 25.2 | – | – | – | 6.8 | 0.6 | 5.4 | – | – | 1.1 | Tr |
| 22.5 | 68.2 | | – | 31.8 | – | 32.2 | 3.8 | 19.8 | 3.4 | – | – | 6.6 | 0.7 | – | – | 0.6 | 1.2 | – |
| 23.9 | 70.7 | | – | 29.7 | 1.5 | 30.7 | 4.1 | 22.7 | 3.3 | – | – | 5.1 | 0.6 | – | – | 1.3 | 1.1 | – |
| 25.4 | 33.5 | | – | 31.1 | – | 27.6 | 2.0 | 21.2 | 3.3 | – | – | 7.5 | 0.5 | 5.9 | – | – | 0.9 | – |
| 31.9 | 69.6 | | – | 26.6 | – | 31.8 | 2.8 | 20.4 | 1.6 | – | 1.8 | 8.6 | 1.0 | 4.0 | – | – | 1.6 | Tr |
| 33.1 | 68.9 | | – | 30.5 | – | 30.8 | 2.8 | 18.0 | 2.0 | – | – | 9.0 | – | 4.9 | – | 0.6 | 1.3 | Tr |
| 34.7 | 70.4 | | – | 26.2 | – | 38.6 | 2.2 | 18.3 | 3.0 | – | 2.7 | 4.6 | 0.7 | 2.1 | – | 0.9 | 0.7 | – |
| 36.4 | 70.7 | | – | 20.6 | – | 39.8 | 1.8 | 21.4 | 2.4 | – | 2.5 | 5.4 | – | 3.0 | – | 3.2 | – | – |
| 37.7 | 85.4 | | – | 20.9 | – | 41.7 | 4.4 | 19.2 | 2.7 | – | 5.6 | 5.5 | – | – | – | – | – | Tr |
| 42.1 | 73.6 | | – | 18.2 | – | 45.7 | 2.6 | 18.5 | 2.2 | – | – | 7.8 | 0.9 | 1.5 | – | 1.4 | 1.2 | Tr |
| 42.7 | 77.0 | | – | 21.9 | – | 37.4 | 2.8 | 18.0 | 3.6 | – | – | 7.3 | 0.6 | 4.5 | – | 2.6 | 1.3 | – |
| 44.3 | 75.0 | | – | 16.9 | 18.4 | 35.2 | 2.9 | 11.2 | – | – | – | 8.0 | 0.8 | 2.6 | – | 3.1 | 1.0 | Tr |
| 45.8 | 67.0 | | – | 16.8 | 23.5 | 23.5 | 3.6 | 15.0 | 2.4 | – | – | 7.5 | 1.0 | 2.1 | – | 3.6 | 1.0 | – |
| 47.3 | 70.8 | | – | 16.7 | 23.4 | 21.0 | 4.6 | 14.4 | 1.9 | – | – | 9.7 | 0.5 | 3.6 | – | 2.9 | 1.3 | – |
| 51.0 | 57.9 | | 23.8 | 21.4 | – | – | 1.0 | 24.0 | 1.1 | – | – | 6.1 | 2.0 | 19.5 | – | – | 1.2 | – |
| 52.3 | 56.2 | | 31.9 | 16.5 | – | – | 0.7 | 20.8 | 0.8 | – | – | 5.8 | 0.9 | 21.7 | – | – | 1.0 | – |
| 53.8 | 26.2 | | 17.4 | 16.4 | – | – | 1.2 | 21.7 | 1.6 | – | 2.1 | 1.4 | 0.8 | 36.9 | – | – | 0.6 | Tr |
| 55.2 | 27.7 | | 1.3 | 16.9 | – | – | – | 23.0 | 1.6 | 2.0 | – | 2.7 | 0.8 | 50.3 | – | – | 1.5 | – |
| 56.7 | 18.9 | | – | 8.2 | – | 9.7 | – | 17.6 | 0.6 | 3.5 | – | 4.5 | 0.5 | 54.8 | – | – | 0.7 | – |
| 59.0[c] | ND | | 36.3 | 8.6 | – | – | – | – | – | 17.7 | – | – | – | 37.3 | – | – | – | – |
| 63.4[c] | ND | | 48.9 | 7.6 | – | – | – | – | – | 17.7 | – | – | – | 25.8 | – | – | – | – |
| 69.4 | 47.7 | | 1.9 | 15.0 | – | – | – | 16.2 | 1.8 | 17.6 | – | – | 0.3 | 46.0 | – | 0.6 | 0.5 | – |
| 73.8 | 75.4 | | 16.6 | 12.4 | – | – | 1.3 | 25.3 | 1.7 | 34.0 | – | 2.8 | – | 6.0 | – | – | – | – |
| 74.7 | 74.0 | | 15.7 | 13.3 | – | – | 0.7 | 19.8 | 1.2 | 35.5 | 3.4 | – | – | 10.4 | – | – | – | – |
| 76.3 | 57.9 | | 16.6 | 17.7 | – | – | 1.8 | 24.3 | 4.0 | 19.0 | – | – | 1.0 | 15.1 | – | – | 0.6 | – |
| 78.4[c] | ND | | 34.7 | 13.2 | – | – | – | 8.1 | – | 18.2 | – | – | – | 25.9 | – | – | – | – |
| 79.3[c] | ND | | 34.8 | 8.6 | – | – | – | 7.1 | – | 29.5 | – | – | – | 20.1 | – | – | – | – |
| 80.8[c] | ND | | 42.9 | 14.3 | – | – | – | – | – | 17.4 | – | – | – | 25.4 | – | – | – | – |
| 87.3 | 73.1 | | – | 10.9 | 11.5 | 66.0 | 0.9 | 3.1 | 0.7 | 2.4 | – | 4.4 | – | – | – | – | – | – |
| 88.8[c] | ND | | – | 11.1 | 8.4 | 36.5 | – | 8.8 | – | 10.3 | – | – | – | 25.0 | – | – | – | – |
| 90.3[c] | ND | | 34.3 | 4.8 | – | – | – | – | – | 16.8 | – | – | – | 27.1 | 17.0 | – | – | – |

**TABLE 5** – *Continued*

| Subbottom Depth (m) | Amor. | Calc. | Feld.[a] | Quar. | K-Fe. | Plag. | Kaol. | Mica | Chlo. | Goet. | Paly. | Mont. | Clin. | Phil. | Hema. | Bari. | Amph. | U-1[b] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2-20µm Fraction**– *Continued* | | | | | | | | | | | | | | | | | | |
| 91.8[c] | ND | | 37.1 | 15.4 | – | – | – | – | – | 18.1 | – | – | – | 29.4 | – | – | – | – |
| 116.5 | 91.9 | | – | 8.8 | 19.2 | 10.9 | – | 13.0 | – | 34.3 | – | – | 13.7 | – | – | – | – | – |
| 117.4 | 89.8 | | – | 6.8 | 12.1 | 7.9 | – | 13.9 | – | 59.2 | – | – | – | – | – | – | – | – |
| 119.7 | 67.5 | | – | – | – | – | – | – | – | 11.2 | – | 9.6 | – | 79.1 | – | – | – | – |
| **<2µm Fraction** | | | | | | | | | | | | | | | | | | |
| 0.9 | 52.0 | | – | 11.9 | 3.2 | 9.3 | 6.8 | 21.6 | 3.6 | – | – | 42.9 | – | – | | 0.7 | – | – |
| 2.1 | 60.4 | | – | 15.9 | 3.0 | 11.1 | 3.0 | 16.8 | 2.8 | – | – | 47.0 | – | – | | 0.4 | – | – |
| 3.3 | 61.6 | | – | 13.5 | 2.2 | 8.9 | 4.9 | 15.4 | 3.5 | – | – | 51.6 | – | – | | – | – | – |
| 4.9 | 66.1 | | – | 17.1 | – | 12.2 | 3.5 | 18.9 | 3.6 | – | – | 36.4 | – | 8.3 | | – | – | – |
| 6.4 | 64.4 | | – | 18.0 | – | 12.0 | 3.0 | 16.0 | 2.6 | – | 8.4 | 37.4 | – | 2.2 | | 0.4 | – | – |
| 12.0 | 67.4 | | – | 18.5 | 4.7 | 14.0 | 4.4 | 15.8 | 1.1 | – | – | 40.7 | – | – | | – | 0.8 | Tr |
| 15.8 | 65.4 | | – | 19.9 | 2.6 | 11.3 | 3.3 | 19.4 | 3.3 | – | – | 37.3 | – | 2.1 | | 0.4 | 0.3 | Tr |
| 22.5 | 67.5 | | – | 16.6 | 1.4 | 12.1 | 3.6 | 14.9 | 2.7 | – | – | 46.8 | 0.5 | – | | 0.5 | 0.8 | – |
| 23.9 | 67.9 | | – | 13.6 | 0.3 | 11.5 | 4.1 | 6.9 | 1.8 | – | 10.5 | 49.3 | 0.6 | – | | – | 1.4 | – |
| 25.4 | 67.3 | | – | 15.0 | 0.8 | 12.5 | 4.2 | 7.1 | 1.5 | – | 5.4 | 51.7 | 0.5 | – | | 0.5 | 0.8 | Tr |
| 31.9 | 70.0 | | – | 14.3 | – | 11.2 | 3.6 | 4.0 | 2.3 | – | 3.1 | 56.1 | 1.0 | 2.8 | | 0.8 | 0.8 | Tr |
| 33.1 | 68.7 | | – | 14.4 | 4.4 | 11.3 | 4.9 | 5.7 | 1.4 | – | – | 55.6 | – | – | | 0.5 | 1.7 | – |
| 34.7 | 73.6 | | – | 13.7 | 0.5 | 13.4 | 4.3 | 5.5 | 4.4 | – | – | 51.9 | 0.4 | 4.7 | | 0.6 | 0.7 | – |
| 36.4 | 68.5 | | – | 10.3 | – | 8.5 | 1.1 | 5.0 | 1.5 | – | 5.7 | 59.6 | – | 5.3 | | 2.9 | – | – |
| 37.7 | 75.9 | | – | 11.4 | – | 13.5 | 4.5 | 9.7 | 2.8 | – | – | 57.0 | – | – | | 1.1 | – | Tr |
| 42.1 | 69.5 | | – | 8.6 | – | 10.5 | 5.3 | 2.4 | – | – | – | 67.6 | 0.9 | 1.7 | | 1.2 | 1.7 | Tr |
| 42.7 | 67.9 | | – | 8.5 | 1.4 | 9.1 | 3.8 | 4.9 | 1.6 | – | – | 69.7 | – | – | | 1.0 | – | – |
| 44.3 | 64.7 | | – | 7.3 | 6.9 | 8.2 | 3.7 | 5.7 | 1.7 | – | – | 60.0 | – | 5.9 | | 0.5 | – | – |
| 45.8 | 66.8 | | – | 8.9 | 6.7 | 9.4 | 5.0 | – | – | – | – | 65.7 | 0.9 | 2.0 | | – | 1.4 | – |
| 47.3 | 71.8 | | – | 6.3 | 4.1 | 5.2 | 4.4 | 3.1 | 3.7 | – | – | 64.5 | 1.1 | 5.2 | | 0.6 | 1.8 | – |
| 51.0 | 64.6 | | 6.9 | 8.1 | – | – | 2.4 | 4.6 | 1.9 | – | – | 69.4 | – | 6.6 | | – | – | – |
| 52.3 | 63.3 | | 9.6 | 7.5 | – | – | – | 2.5 | – | – | – | 73.0 | 0.6 | 5.7 | | – | 1.0 | – |
| 53.8 | 68.9 | | 8.7 | 7.4 | – | – | – | 13.9 | – | 6.3 | 11.1 | 47.1 | 1.3 | 3.4 | | – | 0.8 | Tr |
| 55.2 | 77.1 | | 16.2 | 7.5 | – | – | – | 9.9 | – | 33.7 | – | 24.3 | 1.5 | 6.0 | | – | 0.9 | – |
| 56.7 | 81.0 | | – | 5.4 | – | 6.6 | – | 14.2 | 2.8 | 49.7 | – | 15.3 | 1.3 | 4.0 | | – | 0.6 | – |
| 59.0 | 83.0 | | 11.5 | 6.1 | – | – | 3.5 | 8.7 | 4.8 | 27.2 | – | 32.0 | – | 6.2 | | – | – | – |
| 63.4 | 76.8 | | 0.1 | 2.3 | – | – | 2.9 | 11.2 | 3.4 | 17.0 | – | 61.4 | 0.8 | – | | – | 1.0 | – |
| 69.4 | 82.4 | | 3.4 | 6.9 | – | – | – | 17.7 | 3.5 | 63.8 | – | – | – | 4.8 | | – | – | – |
| 73.8 | 81.8 | | 6.4 | 2.9 | – | – | 1.1 | 8.1 | 1.5 | 76.0 | – | 4.0 | – | – | | – | – | – |
| 74.7 | 76.8 | | 4.3 | 3.0 | – | – | – | 7.9 | – | 74.0 | – | 3.9 | – | 6.8 | | – | – | – |
| 76.3 | 89.6 | | 7.8 | 14.3 | – | – | – | – | – | 73.6 | – | 4.3 | – | – | | – | – | – |
| 78.4 | 89.9 | | – | 4.4 | – | – | – | – | – | 81.6 | – | 14.0 | – | – | | – | – | – |
| 79.3 | 88.8 | | – | 4.5 | – | – | – | – | – | 83.5 | – | 11.9 | – | – | | – | – | – |
| 80.8 | 88.4 | | 4.5 | 3.5 | – | – | – | – | – | 76.5 | – | 15.6 | – | – | | – | – | – |
| 87.3 | 84.6 | | 8.1 | 5.5 | – | – | – | – | – | 10.3 | – | 76.1 | – | – | | – | – | – |
| 88.8 | 82.5 | | – | 3.6 | 2.3 | 4.4 | – | 10.8 | 2.6 | 54.0 | – | 13.3 | – | 9.0 | | – | – | – |
| 90.3 | 85.2 | | 10.0 | 4.5 | – | – | 1.8 | – | – | 66.2 | – | 11.9 | – | 5.6 | | – | – | – |
| 91.8 | 82.1 | | 11.3 | 4.0 | – | – | – | 12.4 | – | 56.5 | – | 12.1 | – | 3.7 | | – | – | – |
| 116.5 | 86.3 | | – | 1.9 | – | – | – | – | – | 91.3 | – | 6.8 | – | – | | – | – | – |
| 117.4 | 84.3 | | – | – | – | – | – | – | – | 93.3 | – | 6.7 | – | – | | – | – | – |
| 119.7 | 69.4 | | – | – | – | – | – | – | – | 18.6 | – | 81.4 | – | – | | – | – | – |

[a]Plagioclase and K-feldspar are reported as undifferentiated feldspars when there is significant interference with phillipsite or they occur in small concentrations.

[b]Major peak is located at 11 Å (8.05°2θ). Allophane and amine-expanded halloysite have peaks at this location. Both of these minerals belong to the Kaolinite group.

[c]There was insufficient material in these samples to obtain highly reliable data.

**TABLE 6**
**Samples Submitted for X-Ray Diffraction Analysis, Leg 34**

| Sample (Interval in cm) | Subbottom Depth (m) | GSA Color | GSA Color Code Number | Sediment Description |
|---|---|---|---|---|
| **Hole 319** | | | | |
| 1-1, 110-112 | 1.4 | Dusky yellowish-brown | 10 YR 2/2 | Fe-Mn colloid bearing clay |
| 1-2, 130-132 | 3.1 | Dusky yellowish-brown | 10 YR 2/2 | Fe-Mn colloid bearing clay |
| 1-3, 20-22 | 3.5 | Dusky yellowish-brown | 10 YR 2/2 | Fe-Mn colloid bearing clay |
| 1-4, 20-22 | 5.0 | Moderate brown | 5 YR 3/4 | Volcanic glass bearing Fe-Mn colloid bearing clayey calcareous ooze |
| 1-5, 117-119 | 7.4 | Moderate brown | 5 YR 4/4 | Clayey calcareous ooze |
| 1-6, 20-22 | 8.0 | Grayish-brown | 5 YR 3/2 | Fe-Mn colloid bearing clayey calcareous ooze |
| 2-1, 137-139 | 10.9 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 2-2, 106-108 | 12.1 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing muddy calcareous ooze |
| 2-3, 80-82 | 13.3 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 2-4, 45-47 | 14.5 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 3-2, 123-125 | 21.7 | Moderate yellowish-brown | 10 YR 5/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 3-3, 76-78 | 22.8 | Moderate yellowish-brown | 10 YR 5/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 4-1, 2-4 | 28.7 | Moderate yellowish-brown | 10 YR 5/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 4-2, 100-102 | 31.2 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 4-3, 36-38 | 32.1 | Moderate yellowish-brown | 10 YR 5/4 | Fe-Mn colloid bearing muddy calcareous ooze |
| 4-4, 26-38 | 33.5 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 4-5, 36-38 | 35.1 | Moderate yellowish-brown | 10 YR 5/4 | Fe-Mn colloid bearing volcanic glass bearing clayey calcareous ooze |
| 4-6, 26-28 | 36.5 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing volcanic glass bearing clayey calcareous ooze |
| 5-2, 10-12 | 39.6 | Moderate orange-pink | 5 YR 8/4 | Fe-Mn colloid bearing calcareous ooze |
| 5-3, 36-38 | 41.4 | Moderate orange-pink | 5 YR 8/4 | Fe-Mn colloid bearing calcareous ooze |
| 5-4, 40-42 | 42.9 | Moderate orange-pink | 5 YR 8/4 | Fe-Mn colloid bearing calcareous ooze |
| 5-5, 40-42 | 44.4 | Moderate orange-pink | 5 YR 8/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 5-6, 40-42 | 45.9 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 6-1, 84-86 | 48.4 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 6-3, 121-123 | 51.7 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 6-4, 31-32 | 52.3 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 6-5, 120-122 | 54.7 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing volcanic glass bearing clayey calcareous ooze |

**TABLE 6** – *Continued*

| Sample (Interval in cm) | Subbottom Depth (m) | GSA Color | GSA Color Code Number | Sediment Description |
|---|---|---|---|---|
| **Hole 319** – *Continued* | | | | |
| 7-1, 101-103 | 58.2 | Grayish-orange | 10 YR 7/4 | |
| 7-2, 60-62 | 59.3 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing volcanic glass bearing clayey calcareous ooze |
| 7-3, 24-26 | 60.5 | Grayish-orange | 10 YR 7/4 | |
| 7-4, 124-126 | 63.0 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing volcanic glass bearing clayey calcareous ooze |
| 7-5, 128-130 | 64.5 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 7-6, 44-46 | 65.2 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing volcanic glass bearing clayey calcareous ooze |
| 8-1, 104-106 | 67.6 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing volcanic glass bearing muddy calcareous ooze |
| 8-2, 80-82 | 68.8 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing volcanic glass bearing muddy calcareous ooze |
| 8-4, 136-138 | 72.4 | Light brown | 5 YR 5/6 | Fe-Mn colloid bearing volcanic glass bearing calcareous ooze |
| 8-5, 110-112 | 73.6 | Moderate yellowish-brown | 10 YR 5/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 8-6, 100-102 | 75.0 | Moderate yellowish-brown | 10 YR 5/4 | Fe-Mn colloid bearing volcanic glass bearing muddy calcareous ooze |
| 9-1, 89-91 | 76.9 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 9-2, 127-129 | 78.8 | Moderate brown | 5 YR 3/4 | Fe-Mn colloid bearing volcanic glass bearing clayey calcareous ooze |
| 9-3, 91-93 | 79.9 | Dark yellowish-brown | 10 YR 4/2 | Fe-Mn colloid bearing clayey calcareous ooze |
| 10-1, 106-108 | 86.6 | Moderate yellowish-brown | 10 YR 5/4 | |
| 10-2, 82-84 | 87.8 | Moderate yellowish-brown | 10 YR 5/4 | Fe-Mn colloid bearing volcanic glass bearing muddy calcareous ooze |
| 10-3, 70-72 | 89.2 | Moderate yellowish-brown | 10 YR 5/4 | |
| 10-4, 101-103 | 91.0 | Moderate yellowish-brown | 10 YR 5/4 | |
| 10-5, 110-112 | 92.6 | Moderate yellowish-brown | 10 YR 5/4 | Fe-Mn colloid bearing muddy calcareous ooze |
| 11-1, 63-65 | 95.8 | Moderate yellowish-brown | 10 YR 5/4 | |
| 11-2, 60-62 | 97.3 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 11-3, 120-122 | 99.4 | Moderate brown | 5 YR 4/4 | |
| 11-4, 100-102 | 100.7 | Moderate brown | 5 YR 4/4 | |
| 11-5, 60-62 | 101.8 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 11-6, 100-102 | 103.7 | Moderate brown | 5 YR 4/4 | |
| 12-1, 134-136 | 105.9 | Grayish-orange | 10 YR 7/4 | |
| 12-2, 80-82 | 106.8 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing volcanic glass bearing muddy calcareous ooze |
| 12-3, 97-99 | 108.5 | Grayish-orange | 10 YR 7/4 | |

TABLE 6 – *Continued*

| Sample (Interval in cm) | Subbottom Depth (m) | GSA Color | GSA Color Code Number | Sediment Description |
|---|---|---|---|---|
| **Hole 320** | | | | |
| 1-1, 20-22 | 6.5 | Yellowish-gray | 5 Y 7/2 | |
| 1-2, 100-102 | 8.8 | Grayish-green | 5 G 5/2 | Volcanic glass bearing biosiliceous-rich clay |
| 1-3, 128-130 | 10.6 | Yellowish-gray | 5 Y 7/2 | |
| 1-4, 10-12 | 10.9 | Grayish-green | 5 G 5/2 | |
| 1-5, 30-32 | 12.6 | Grayish olive-green | 5 GY 3/2 | Volcanic glass bearing biosiliceous-rich mud |
| 1-6, 94-96 | 14.8 | Grayish olive-green | 5 GY 3/2 | |
| 2-1, 100-102 | 74.5 | Light olive-gray | 5 Y 5/2 | Fe-Mn colloid bearing muddy biosiliceous calcareous ooze |
| 2-2, 69-71 | 75.7 | Dark yellowish-brown | 10 YR 4/2 | Fe-Mn colloid bearing volcanic glass bearing calcareous ooze |
| 3-1, 123-125 | 103.7 | Light brown | 5 YR 6/4 | |
| 3-2, 74-76 | 104.8 | Light brown | 5 YR 6/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 3-3, 130-132 | 106.8 | Light brown | 5 YR 6/4 | |
| 3-4, 67-69 | 107.7 | Light brown | 5 YR 6/4 | |
| 3-5, 88-90 | 109.4 | Light brown | 5 YR 6/4 | Fe-Mn colloid bearing calcareous ooze |
| 3-6, 59-61 | 110.6 | Moderate yellowish-brown | 10 YR 5/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| **Hole 320A** | | | | |
| 1-1, 40-42 | 0.4 | Dark yellowish-brown | 10 YR 4/2 | Volcanic glass bearing biosiliceous mud |
| 1-3, 111-113 | 4.1 | Light olive-gray | 5 Y 5/2 | Volcanic glass-rich clay |
| 1-4, 89-91 | 5.1 | Light olive-gray | 5 Y 5/2 | Volcanic glass-rich biosiliceous-rich mud |
| **Hole 320B** | | | | |
| 1-1, 10-12 | 136.4 | Moderate yellowish-brown | 10 YR 5/4 | |
| 1-2, 70-72 | 138.5 | Moderate yellowish-brown | 10 YR 5/4 | Fe-Mn bearing colloid volcanic glass rich silty calcareous ooze |
| 1-3, 67-69 | 140.0 | Moderate yellowish-brown | 10 YR 5/4 | |
| 1-4, 10-12 | 140.9 | Light brown | 5 YR 6/4 | |
| 1-5, 89-90 | 143.2 | Light brown | 5 YR 6/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 1-6, 65-67 | 144.5 | Light brown | 5 YR 6/4 | |
| 2-1 111-113 | 146.6 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing muddy calcareous ooze |
| 2-2, 90-92 | 147.9 | Moderate brown | 5 YR 3/4 | Fe-Mn colloid bearing muddy calcareous ooze |
| 2-3, 10-12 | 148.6 | Dark yellowish-brown | 10 YR 4/2 | Fe-Mn colloid bearing clayey calcareous ooze |
| 2-4, 50-52 | 150.5 | Dark yellowish-brown | 10 YR 4/2 | Fe-Mn colloid bearing volcanic glass bearing clayey calcareous ooze |
| 2-5, 20-22 | 151.7 | Dark yellowish-brown | 10 YR 4/2 | Fe-Mn colloid bearing muddy calcareous ooze |
| **Hole 321** | | | | |
| 1-1, 90-92 | 0.9 | Dark yellowish-brown | 10 YR 4/2 | Fe-Mn colloid bearing biosiliceous bearing volcanic glass rich mud |
| 2-1, 60-62 | 2.1 | Pale yellowish-brown | 10 YR 6/2 | Biosiliceous clay |

TABLE 6 – *Continued*

| Sample (Interval in cm) | Subbottom Depth (m) | GSA Color | GSA Color Code Number | Sediment Description |
|---|---|---|---|---|
| **Hole 321** – *Continued* | | | | |
| 2-2, 30-32 | 3.3 | Pale yellowish-brown | 10 YR 6/2 | Volcanic glass bearing biosiliceous clay |
| 2-3, 34-36 | 4.9 | Pale yellowish-brown | 10 YR 6/2 | Biosiliceous clay |
| 2-4, 34-36 | 6.4 | Pale yellowish-brown | 10 YR 6/2 | Volcanic glass-rich clay |
| 3-1, 102-104 | 12.0 | Pale yellowish-brown | 10 YR 6/2 | Volcanic glass bearing clay |
| 3-2, 30-32 | 12.8 | Pale yellowish-brown | 10 YR 6/2 | |
| 3-3, 30-32 | 14.3 | Pale yellowish-brown | 10 YR 6/2 | |
| 3-4, 30-32 | 15.8 | Pale yellowish-brown | 10 YR 6/2 | Volcanic glass bearing biosiliceous bearing clay |
| 3-5, 33-35 | 17.3 | Pale yellowish-brown | 10 YR 6/2 | |
| 3-6, 40-42 | 18.9 | Pale yellowish-brown | 10 YR 6/2 | |
| 4-2, 50-52 | 22.5 | Pale yellowish-brown | 10 YR 6/2 | Volcanic glass bearing mud |
| 4-3, 35-37 | 23.9 | Yellowish-gray | 5 YR 7/2 | Biosiliceous bearing volcanic glass-rich mud |
| 4-4, 36-38 | 25.4 | Yellowish-gray | 5 Y 7/2 | Volcanic glass-rich mud |
| 5-2, 40-42 | 31.9 | Yellowish-gray | 5 Y 7/2 | Volcanic glass rich mud |
| 5-3, 13-15 | 33.1 | Yellowish-gray | 5 Y 7/2 | Volcanic glass bearing mud |
| 5-4, 22-24 | 34.7 | Pale olive | 10 Y 6/2 | Volcanic glass-rich mud |
| 5-5, 35-37 | 36.4 | Yellowish-gray | 5 Y 7/2 | Volcanic glass-rich mud |
| 5-6, 19-21 | 37.7 | Light brown | 5 YR 6/4 | Feldspar and quartz bearing volcanic glass-rich silt |
| 6-2, 113-115 | 42.1 | Grayish-orange | 10 YR 7/4 | Feldspar and quartz bearing volcanic glass-rich silt |
| 6-3, 23-25 | 42.7 | Light brown | 5 YR 6/4 | Minor hornblende, feldspar, quartz, and volcanic glass bearing silt |
| 6-4, 29-31 | 44.3 | Yellowish gray | 5 Y 7/2 | Minor hornblende, feldspar, quartz, and volcanic glass bearing silt |
| 6-5, 28-30 | 45.8 | Yellowish-gray | 5 Y 7/2 | Hornblende, feldspar, quartz, and volcanic glass bearing biosiliceous silt |
| 6-6, 29-31 | 47.3 | Grayish-orange | 10 YR 7/4 | Minor hornblende, feldspar, quartz, and volcanic glass bearing silt |
| 7-2, 47-49 | 51.0 | Dusky yellowish-brown | 10 YR 2/2 | Feldspar and quartz bearing volcanic glass-rich mud |
| 7-3, 27-29 | 52.3 | Dusky yellowish-brown | 10 YR 2/2 | Minor hornblende, volcanic glass, feldspar, and quartz bearing mud |
| 7-4, 33-35 | 53.8 | Dusky yellowish-brown | 10 YR 2/2 | Volcanic glass, feldspar, and quartz bearing mud |
| 7-5, 20-22 | 55.2 | Dusky yellowish-brown | 10 YR 2/2 | Volcanic glass bearing biosiliceous mud |
| 7-6, 17-19 | 56.7 | Dusky yellowish-brown | 10 YR 2/2 | Volcanic glass bearing biosiliceous mud |
| 8-1, 46-48 | 59.0 | Yellowish-gray | 5 Y 7/2 | Calcareous ooze |
| 8-2, 41-43 | 60.4 | Yellowish-gray | 5 Y 7/2 | |
| 8-3, 40-42 | 61.9 | Yellowish-gray | 5 Y 7/2 | |

TABLE 6 – *Continued*

| Sample (Interval in cm) | Subbottom Depth (m) | GSA Color | GSA Color Code Number | Sediment Description |
|---|---|---|---|---|
| **Hole 321** – *Continued* | | | | |
| 8-4, 43-45 | 63.4 | Yellowish-gray | 5 Y 7/2 | Calcareous ooze |
| 8-5, 99-101 | 65.5 | Yellowish-gray | 5 Y 7/2 | |
| 8-6, 39-41 | 66.4 | Yellowish-gray | 5 Y 7/2 | |
| 9-1, 118-120 | 69.4 | Moderate brown | 5 YR 3/4 | Volcanic glass bearing muddy biocalcareous ooze |
| 9-2, 82-84 | 70.5 | Moderate brown | 5 YR 3/4 | |
| 9-3, 74-76 | 72.0 | Moderate brown | 5 YR 3/4 | |
| 9-4, 113-115 | 73.8 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing muddy calcareous ooze |
| 9-5, 44-46 | 74.7 | Moderate brown | 5 YR 4/4 | Fe-Mn colloid bearing muddy biocalcareous ooze |
| 9-6, 58-60 | 76.3 | Light brown | 5 YR 5/6 | Fe-Mn colloid bearing muddy calcareous ooze |
| 10-1, 84-86 | 78.4 | Light brown | 5 YR 5/6 | Fe-Mn colloid bearing muddy calcareous ooze |
| 10-2, 30-32 | 79.3 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing calcareous clay |
| 10-3, 30-32 | 80.8 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 11-1, 30-32 | 87.3 | Moderate brown | 5 YR 3/4 | Fe-Mn colloid bearing volcanic glass bearing mud |
| 11-2, 30-32 | 88.8 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 11-3, 30-32 | 90.3 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 11-4, 26-28 | 91.8 | Grayish-orange | 10 YR 7/4 | Fe-Mn colloid bearing clayey calcareous ooze |
| 13-1, 94-96 | 116.5 | Moderate brown | 5 YR 3/4 | Fe-Mn colloid bearing calcareous mud |
| 13-2, 35-37 | 117.4 | Moderate brown | 5 YR 3/4 | Fe-Mn colloid bearing calcareous mud |
| 13-3, 116-118 | 119.7 | Moderate brown | 5 YR 3/4 | Fe-Mn colloid bearing calcareous mud |

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 not absolute concentrations and that 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 AND MUD USAGE

Drilling mud, containing montmorillonite and barite, was used in Hole 319A between Cores 6 and 7 and Cores 7 and 8. None of the samples submitted for X-ray diffraction analysis were directly exposed to the drilling mud.

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