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55. *DATA REPORT:* X-RAY BULK MINERALOGY OF EXMOUTH AND WOMBAT PLATEAU SEDIMENTS, NORTHWEST AUSTRALIAN MARGIN[1]

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ABSTRACT

X-ray diffraction data for 386 samples from the Exmouth and Wombat plateaus were collected. Bulk mineralogy was identified and semiquantitative relative abundances of clay, calcite, quartz, and feldspar were calculated based on intensities of characteristic peaks of each mineral.

INTRODUCTION

On Leg 122 of the Ocean Drilling Program (ODP), we drilled six holes in the northwest Australian continental margin. Four of the sites (759, 760, 761, and 764) were located on the Wombat Plateau, sampling sediments as old as Upper Triassic (Carnian). The oldest Wombat sediments represent an early rift environment, progressing upsection through carbonate platform, hemipelagic, and finally eupelagic marine sections.

The two Exmouth Plateau sites (762 and 763) reached bottom in Cretaceous sediments (Berriasian-Valanginian) of a prograding margin. Overlying the marginal environment are hemipelagic and pelagic sequences. Both the Wombat and Exmouth plateaus exhibit patterns of sedimentation characteristic of post-rift subsidence along a passive margin.

SAMPLE DESCRIPTION

Sediments for bulk X-ray analysis were selected from the set of physical properties samples taken aboard the ship. One sample per core was chosen. Samples were selected such that they were representative, wherever possible, of the core as a whole, rather than of an anomalous interval. In addition to physical properties measurements (velocity, density, and porosity in almost all samples; electrical resistivity and thermal conductivity in the softer samples) each of the physical properties samples was measured for carbonate content using coulometric analysis (see Haq, von Rad, O'Connell, et al., 1990, for data).

PROCEDURES

Bulk mineralogy samples were freeze-dried, ground to a fine powder, and packed into stainless steel sample holders to yield random orientation of grains. All analyses were performed on a Scintag Pad V computer-automated X-ray diffraction system equipped with a solid state Ge detector and Scintag analytical software. Samples were continuously scanned from 2°–60° 2θ at 2° 2θ/min using CuKα radiation. Raw X-ray patterns were stripped of Kα_2 radiation and smoothed with a three-point filter. Background energy was removed using variable frequency sampling. Peak intensities were read from a listing of the resulting net intensity profiles.

Relative percentages of quartz, total clay, calcite, and feldspar were determined from the bulk samples using a series of multicomponent mixtures as external standards (Brindley, 1980) and a simultaneous linear equation algorithm that accounts for peak overlap (Karlak and Burnett, 1966). The total clay component of the standards was itself a mixture of illite, smectite, kaolinite, and minor chlorite. Briefly, empirical constants characteristic of pairs of mineral components were determined from each of nine standard mixtures of the three minerals and clay mixture. These constants were used with relative intensities and weight fractions of the component pairs in the standards and intensities from the unknowns to relate peak intensity to relative abundance. Intensities of the major characteristic peaks were used for calcite (3.04 Å), quartz (3.34 Å), and feldspar (3.20 Å), whereas the mixed peak at approximately 4.5 Å was used to quantify total clay. Average constants were calculated from the standard runs and used to recompute all of the standard mixtures.

A comparison of calculated results vs. actual content of calcite, clay, quartz, and feldspar is shown in Figure 1. Results suggest that bulk estimates are accurate to within 10% of true composition. Shipboard calcite content determinations were made using a coulometer. The process involves dissolution of approximately 50 mg of powdered sample in hydrochloric acid, followed by a titration to measure the amount of carbon dioxide produced (see Haq, von Rad, O'Connell, et al., 1990). A comparison of shipboard and X-ray determinations of carbonate content from the physical properties samples at Site 762 also suggests agreement of the two procedures to within 10% (Fig. 2).

Qualitative identification of accessory minerals and the breakdown of total clay into kaolinite, illite, and smectite were based on the presence of characteristic peaks. Abundances (trace, minor, and abundant) of zeolite (clinoptilolite-heulandite, see Biscaye, 1965), pyrite, and siderite were assigned by virtue of relative peak intensities. The reader should be aware that the presence of zeolites and/or chert tends to mask the intensity of the mixed clay peak used for calculation. Based on relative peak heights of clay peaks not used in the calculation in samples with or without zeolite, we estimate that this effect increases uncertainty by 3%–5%. In some samples phases such as siderite, dolomite, or chert were the major components of the sediment. These samples have been identified in the data table and have been excluded from the relative abundance plots.

RESULTS

Data are tabulated in Table 1 and plotted vs. depth below seafloor in Figure 3. It should be noted that the paucity of sampling can create artificially smooth gradients in the relative concentration of minerals seen in the depth displays.

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[1] von Rad, U., Haq, B. U., et al., 1992. *Proc. ODP, Sci. Results,* 122: College Station, TX (Ocean Drilling Program).

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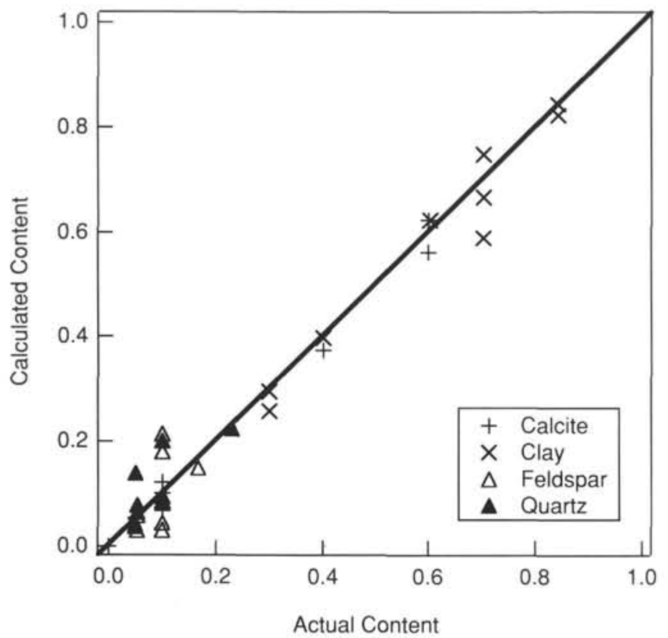

Figure 1. Comparison of laboratory standard data to calculated values from X-ray diffraction patterns using coefficients averaged from all standardization runs.

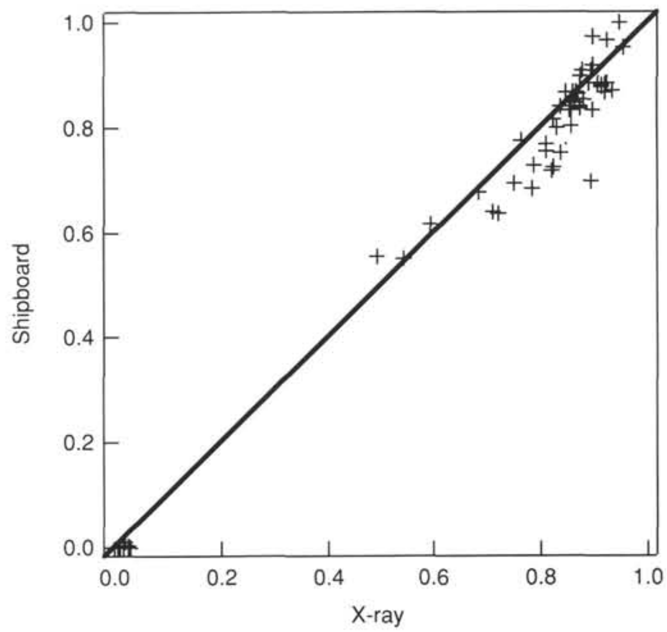

Figure 2. Comparison of calcium carbonate (calcite) content determined from physical properties samples using coulometry and content calculated from X-ray diffraction patterns for Site 762. The line represents equality of the two methods.

Site 759, Wombat Plateau

Site 759 is dominated by terrigenous input throughout most of the sedimentary section sampled by drilling. Calcite abundance exceeds 50% in only four intervals. Relative calcite maxima are seen at unit boundaries between Units 3 and 4 and Units 4 and 5. There were no samples analyzed from Unit 2. Feldspar is a minor component throughout, with a maximum concentration of 6.5% at approximately 89 mbsf. Dolomite and siderite are present in the lower sections of the hole.

Site 760, Wombat Plateau

Terrigenous sediments are ubiquitous below the Unit 2/3 boundary at Site 760. The uppermost two units consist mainly of pelagic and hemipelagic calcareous oozes. Shallow-water limestones seen within Units 5 and 6 constitute the only other occurrences of calcite-rich material. Feldspar abundance is somewhat greater at Site 760 than at Site 759, with a peak in relative concentration of 17% occurring at 245 mbsf.

Site 761, Wombat Plateau

Cenozoic (Unit 1) and Cretaceous (Unit 2) pelagic oozes and chalks overly a thin, predominantly terrigenous Unit 3. Below Unit 3 terrigenous input variably increases within shallow-water limestones. Chert and cherty limestones are present between 90 and 240 mbsf. Feldspar is a minor component, with a peak abundance of 6% at 256 mbsf (obscured by another data point in Fig. 3; see Table 1).

Site 762, Exmouth Plateau

Units 1 through 4 are a series of nannofossil oozes and chalks with varying relative clay and quartz content. Feldspar is virtually absent from this primarily eupelagic depositional setting. Beneath the carbonate section, terrigenous Units 5 and 6 record early delta progradation on the platform. Pyrite and siderite are common (but not ubiquitous) in Units 5 and 6; feldspar approaches 4% in some samples.

Site 763, Exmouth Plateau

Eupelagic oozes and chalks of Units 1 through 3 are underlain by a calcareous claystone (Unit 4) and a mixed sequence of mostly clay and siltstone (Unit 5). Units 6 and 7 are prodeltaic, interspersed with shallow-water limestone beds. Pyrite is common below 200 mbsf and siderite is seen below 700 mbsf, sometimes being the major component of the sediments. Feldspar is relatively scarce above 800 mbsf.

Site 764, Wombat Plateau

Units 1 through 3 are composed of nannofossil oozes and chalks. Alternating calcareous claystones and marly limestones (recrystallized) are seen in Units 4 and 5. Unit 6 is almost entirely reef limestone with some interlayered shalely sequences. Unit 7 is a carbonate mudstone. Minor feldspar is occasionally present, but only in significant amounts in the lowermost sample.

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Table 1. Relative abundances of clay, quartz, feldspar, and calcite calculated from Leg 122 X-ray diffraction data.

Sample	Depth (mbsf)	Clay	Quartz	Feldspar	Calcite	Zeolite	Pyrite	Siderite	Notes[a]
122-759B-									
3R-3, 145	16.95	0.16	0.17	0.00	0.68				K, I
4R-3, 93	25.93	0.14	0.09	0.00	0.77				K
7R-1, 140	51.40	0.20	0.77	0.03	0.01	T	T		K, I, S
8R-1, 52	60.02	0.21	0.10	0.01	0.68	T	T		K
11R-1, 138	89.38	0.72	0.22	0.07	0.00		T		K, I, S
12R-1, 99	98.49	0.09	0.02	0.00	0.90	T			
13R-2, 119	109.69	0.47	0.52	0.01	0.00		M		K, I, S
14R-1, 140	117.90	0.31	0.67	0.01	0.01		M		K, I, S
16R-1, 56	136.06	0.13	0.68	0.01	0.18		T		K, I
17R-1, 14	145.14	0.04	0.86	0.01	0.10		T		K, I
18R-1, 57	155.07	0.37	0.62	0.01	0.00		T		K, I, S
19R-2, 140	166.90	0.39	0.61	0.01	0.00		T		K, I, S
20R-2, 84	175.84	0.45	0.55	0.00	0.00		A		K, I, S
21R-3, 32	186.32	0.34	0.65	0.01	0.00				K, I, S
22R-3, 63	196.13	0.04	0.32	0.00	0.64				Dolomite
23R-2, 97	204.47	0.02	0.13	0.00	0.85	T	M		K, I
24R-2, 140	214.40	0.23	0.76	0.01	0.00		M		K, I, S
27R-1, 140	236.90	0.32	0.67	0.01	0.00		T	T	K, I, S
28R-1, 89	241.39	0.30	0.69	0.01	0.00		T	M	K, I, S
29R-3, 105	249.55	0.47	0.52	0.01	0.00		T	A	K, I, S
30R-1, 118	251.68	0.34	0.64	0.02	0.00		T		K, I, S
31R-3, 131	259.31	0.36	0.63	0.01	0.00	T		A	K, I, S
32R-3, 81	263.81	0.47	0.53	0.01	0.00	T		M	K, I, S
33R-3, 43	268.43	0.52	0.47	0.01	0.00		T	A	K, I, S
34R-2, 140	272.90	0.32	0.67	0.01	0.00		T	M	K, I, S
35R-2, 129	277.29	0.34	0.66	0.00	0.00	T	T	M	K, I, S
36R-3, 105	283.55	0.42	0.57	0.01	0.00			T	K, I, S
37R-2, 86	286.36	0.40	0.61	0.00	0.00			A	All siderite
38R-4, 27	293.77	0.41	0.59	0.01	0.00		T	A	K, I, S
39R-5, 86	305.36	0.38	0.61	0.01	0.00		M	T	K, I, S
122-760A-									
1H-4, 145	5.95	0.10	0.10	0.00	0.80				K, I
1H-4, 145	13.65	0.21	0.13	0.00	0.66				K, I, S
3H-4, 145	23.15	0.01	0.04	0.00	0.95				Calcite
4H-4, 80	32.00	0.14	0.02	0.00	0.84				I, S
5H-5, 145	43.65	0.18	0.07	0.00	0.75				K, I
6H-5, 145	53.15	0.07	0.05	0.00	0.87				K, S
7H-5, 145	62.65	0.09	0.21	0.00	0.70				K, S
8H-4, 145	70.65	0.01	0.03	0.00	0.96				Calcite
9H-5, 145	81.65	0.35	0.65	0.00	0.00				K, I, S
10H-2, 145	86.65	0.56	0.44	0.01	0.00				K, I, S
10X-4, 140	89.60	0.12	0.87	0.01	0.00				K, I, S
11X-1, 70	93.90	0.31	0.67	0.01	0.00		M		K, I, S
12X-2, 58	104.78	0.43	0.56	0.01	0.00				K, I
13X-1, 87	113.07	0.39	0.60	0.01	0.00				K, I
14X-1, 19	116.39	0.23	0.75	0.02	0.00				K, I
16X-4, 79	140.49	0.36	0.63	0.02	0.00				K, I
17X-1, 65	145.35	0.23	0.77	0.00	0.00				K, I
19X-2, 140	166.60	0.30	0.70	0.01	0.00				K, I
20X-2, 11	174.81	0.26	0.72	0.02	0.00		T	T	K, I
21X-1, 27	182.97	0.41	0.57	0.02	0.00				K, I, S
22X-3, 32	191.22	0.47	0.52	0.01	0.00			M	K, I, S
23X-1, 18	193.08	0.55	0.43	0.02	0.00			M	K, I
24X-1, 76	198.66	0.34	0.65	0.01	0.00				K, I, S
25X-4, 140	208.80	0.26	0.72	0.02	0.00				K, I
26X-1, 107	208.97	0.26	0.74	0.01	0.00				K, I, S
27X-1, 145	214.35	0.40	0.59	0.01	0.00				K, I, S
28X-2, 120	220.60	0.45	0.54	0.01	0.00				K, I, S
29X-4, 54	227.94	0.24	0.70	0.06	0.00				K, I, S
30X-5, 140	239.80	0.41	0.58	0.02	0.00				K, I, S
31X-3, 54	245.44	0.05	0.57	0.17	0.22		T	T	K, I
33X-4, 80	259.70	0.45	0.55	0.01	0.00				K, I, S
34X-1, 91	260.31	0.22	0.71	0.07	0.00		T	T	I, S
35X-3, 140	268.80	0.37	0.62	0.02	0.00				K, I, S
36X-2, 2	270.92	0.33	0.66	0.01	0.00			T	K, I, S
37X-CC, 1	282.79	0.48	0.51	0.01	0.01		A		K, I, S
38X-1, 16	284.06	0.00	0.59	0.00	0.41		M		Dolomite
122-760B-									
2R-1, 58	90.48	0.51	0.48	0.01	0.00				K, I
3R-1, 114	100.54	0.40	0.58	0.01	0.00				K, I, S
6R-2, 99	285.49	0.55	0.44	0.01	0.00				K, I, S
7R-1, 147	293.97	0.56	0.43	0.01	0.00				K, I, S
9R-2, 15	313.15	0.49	0.50	0.01	0.00				K, I

Table 1 (continued).

Sample	Depth (mbsf)	Clay	Quartz	Feldspar	Calcite	Zeolite	Pyrite	Siderite	Notes[a]
10R-1, 140	322.40	0.32	0.66	0.02	0.00				K, I, S
11R-2, 88	332.88	0.47	0.52	0.02	0.00				I, S
12R-3, 81	343.81	0.55	0.45	0.01	0.00				K, I, S
13R-2, 140	352.40	0.30	0.69	0.02	0.00				K, I, S
14R-2, 30	360.80	0.06	0.17	0.00	0.77				I
15R-1, 54	369.04	0.03	0.00	0.00	0.97				Calcite
16R-3, 140	382.40	0.24	0.73	0.03	0.00				K, I, S
17R-2, 58	389.58	0.02	0.09	0.01	0.88				K
19R-2, 140	409.40	0.23	0.75	0.02	0.00				K, I, S
20R-3, 142	420.42	0.47	0.52	0.01	0.00				K, I, S
21R-4, 58	430.58	0.41	0.56	0.03	0.00				K, I, S
22R-3, 140	439.40	0.24	0.75	0.01	0.00				K, I, S
23R-3, 50	448.00	0.44	0.55	0.01	0.00				K, I, S
24R-1, 68	454.68	0.38	0.62	0.00	0.00				K, I, S
25R-2, 140	466.40	0.27	0.70	0.02	0.00				K, I, S
26R-3, 18	471.18	0.34	0.64	0.02	0.00				K, I, S
27R-3, 4	480.54	0.34	0.63	0.03	0.00		T	M	K, I, S
28R-2, 140	489.90	0.23	0.70	0.07	0.00		T	T	K, I, S
29R-1, 8	496.58	0.36	0.63	0.02	0.00		T	T	K, I, S
122-761B-									
1H-3, 58	3.58	0.07	0.07	0.01	0.86				K, I, S
2H-3, 75	7.95	0.12	0.14	0.00	0.74				K
3H-2, 33	15.53	0.16	0.12	0.00	0.72				K
3H-6, 66	21.86	0.16	0.17	0.00	0.67				K
4H-4, 80	28.50	0.08	0.04	0.00	0.88				K, I, S
5H-2, 103	35.23	0.14	0.04	0.00	0.82				I, S
6H-4, 85	47.75	0.07	0.03	0.00	0.91				K
7H-4, 73	56.93	0.20	0.10	0.00	0.70				K
8H-5, 84	68.04	0.02	0.02	0.00	0.97				Calcite
9H-6, 50	78.70	0.00	0.02	0.00	0.98				Calcite
10H-2, 68	82.38	0.10	0.02	0.00	0.89				I
11X-1, 80	90.50	0.00	0.98	0.00	0.02				Chert
14X-4, 45	106.65	0.02	0.02	0.00	0.96				K
16X-3, 117	126.87	0.29	0.04	0.00	0.68				K
17X-4, 21	136.91	0.11	0.03	0.00	0.86				K
18X-4, 37	146.57	0.13	0.01	0.00	0.85				K, S
19X-4, 146	157.16	0.19	0.02	0.00	0.79	T			K
20X-2, 69	162.89	0.14	0.02	0.00	0.84	M			K
21X-1, 25	170.45	0.13	0.03	0.00	0.84	A			K
22X-4, 111	185.31	0.05	0.02	0.00	0.94	A			I
23X-4, 32	194.02	0.17	0.03	0.00	0.81	M			K
24X-4, 37	203.57	0.12	0.01	0.00	0.86	M			
25X-4, 9	212.79	0.09	0.02	0.00	0.89	M			K
26X-1, 12	217.82	0.09	0.02	0.00	0.89	M			
28X-CC, 10	241.83	0.22	0.04	0.00	0.74				Cherty
29X-1, 38	245.08	0.11	0.09	0.00	0.80	A			I
30X-2, 69	256.39	0.12	0.85	0.01	0.01	A			I, S
31X-CC, 34	264.04	0.00	0.02	0.00	0.98				Calcite
32X-CC, 3	273.54	0.00	0.00	0.00	1.00				Calcite
33X-CC, 28	283.42	0.08	0.02	0.00	0.91				Calcite
122-761C-									
2R-1, 44	160.64	0.12	0.02	0.00	0.86	A			S
5R-3, 24	233.24	0.09	0.04	0.00	0.88	M			I
6R-1, 59	235.59	0.08	0.03	0.00	0.90	T			I
7R-2, 7	241.57	0.22	0.16	0.01	0.62	A			
8R-1, 25	245.25	0.16	0.12	0.00	0.72	A			I
9R-1, 145	251.45	0.31	0.54	0.09	0.06	A			K, S
9R-2, 8	251.58	0.92	0.02	0.00	0.05				Mica
10R-2, 37	256.87	0.25	0.68	0.07	0.01				S
12R-1, 70	265.20	0.02	0.00	0.00	0.98				Calcite
15R-1, 23	279.73	0.02	0.00	0.00	0.98				Calcite
23R-4, 48	342.18	0.29	0.04	0.00	0.67				S
24R-2, 27	348.47	0.56	0.15	0.00	0.29		M		S, I, dolomite
25R-CC, 34	357.50	0.20	0.05	0.00	0.76		T		S
26R-4, 144	371.64	0.13	0.04	0.00	0.82	A			
30R-2, 98	401.18	0.70	0.26	0.01	0.04				S, K
31R-4, 129	413.99	0.03	0.01	0.00	0.96				Calcite
32R-3, 115	421.85	0.14	0.56	0.04	0.26	M	M		I
33R-2, 40	429.10	0.40	0.59	0.01	0.00		A		K, I, S
122-762B-									
1H-2, 145	2.95	0.11	0.09	0.00	0.80				S, I
1H-4, 90	5.40	0.11	0.05	0.00	0.84		T		K
3H-3, 111	18.01	0.09	0.08	0.00	0.83	T			
4H-4, 93	28.83	0.14	0.11	0.00	0.76				K, I

Table 1 (continued).

Sample	Depth (mbsf)	Clay	Quartz	Feldspar	Calcite	Zeolite	Pyrite	Siderite	Notes[a]
5H-4, 93	38.33	0.14	0.18	0.00	0.68				K
6H-5, 145	49.85	0.20	0.09	0.00	0.70				K, I
7H-4, 92	57.32	0.17	0.11	0.00	0.72				K
11H-4, 64	95.04	0.13	0.07	0.00	0.80				K
12H-5, 145	106.85	0.12	0.06	0.00	0.83				K
13H-3, 80	112.70	0.07	0.04	0.00	0.90	T			K
14H-4, 87	123.77	0.03	0.09	0.00	0.89	T			I
15H-5, 145	135.35	0.11	0.03	0.00	0.86				I, S
16H-5, 70	144.10	0.03	0.13	0.00	0.84				
17H-4, 62	152.02	0.02	0.29	0.00	0.70				
18H-5, 145	163.85	0.02	0.18	0.00	0.80	M			K
19H-5, 49	172.39	0.01	0.08	0.00	0.91				
122-762C-									
2X-4, 83	75.33	0.13	0.09	0.00	0.78	T	T		S, I, K
4X-3, 145	93.45	0.01	0.03	0.00	0.96	T			K
5X-1, 90	99.40	0.09	0.04	0.00	0.88	T			K
6X-4, 108	213.58	0.01	0.02	0.00	0.97	T			S, I
7X-3, 145	221.95	0.02	0.03	0.00	0.94	M			K, I
8X-4, 95	232.45	0.16	0.11	0.00	0.73	T			K, S, I
10X-3, 145	250.45	0.08	0.03	0.00	0.89	M			K
10X-7, 65	255.65	0.12	0.53	0.00	0.35		T		K, I, S
11X-4, 48	260.48	0.06	0.02	0.00	0.92	T			S, I
12X-2, 88	267.38	0.12	0.03	0.00	0.85	M			S, I, K
13X-2, 88	276.88	0.06	0.03	0.00	0.91	M	T		S, K
14X-5, 145	291.45	0.11	0.03	0.00	0.86	M			K
15X-3, 30	296.80	0.11	0.03	0.00	0.87	M			S, I
16X-3, 83	306.83	0.11	0.03	0.00	0.87	M			
17X-4, 145	318.45	0.13	0.03	0.00	0.84	A			K
19X-4, 62	336.62	0.12	0.02	0.00	0.87	M			S, I
20X-2, 145	343.95	0.01	0.03	0.00	0.96	A			K
22X-3, 40	363.40	0.15	0.04	0.00	0.82	M			I, K
23X-2, 145	372.45	0.10	0.03	0.00	0.87	M			I
24X-1, 40	379.40	0.13	0.03	0.00	0.84	M			S
25X-4, 40	393.40	0.26	0.04	0.00	0.70	M			I
26X-4, 140	403.90	0.10	0.03	0.00	0.87	M			I
27X-3, 60	406.10	0.29	0.07	0.00	0.64	M			S, I
28X-2, 5	413.55	0.18	0.02	0.00	0.80	T			K, S
29X-2, 140	424.40	0.17	0.03	0.00	0.80	M			S, K
31X-2, 85	442.85	0.13	0.02	0.00	0.85	T			S
31X-4, 85	445.85	0.12	0.03	0.00	0.86	T-M			K, I
32X-2, 140	452.90	0.00	0.02	0.00	0.98	M			I
33X-5, 88	466.38	0.22	0.05	0.00	0.73	M			S, I
34X-4, 29	473.79	0.15	0.02	0.00	0.83	T			K, S
35X-1, 140	479.90	0.14	0.06	0.00	0.80	M			K
36X-1, 22	488.22	0.11	0.02	0.00	0.87	M			K
37X-3, 98	501.48	0.24	0.12	0.00	0.64	M			S, I
38X-4, 42	511.92	0.25	0.07	0.00	0.68	M	T		K
41X-1, 56	536.06	0.11	0.04	0.00	0.85	T			I
41X-4, 23	540.23	0.32	0.12	0.00	0.55	T			S
43X-4, 115	560.15	0.00	0.00	0.00	1.00	T			
44X-4, 140	569.90	0.01	0.00	0.00	0.99				
45X-4, 95	578.95	0.10	0.02	0.00	0.88	T			S, I
46X-4, 65	588.15	0.25	0.14	0.00	0.62	T			S, I
47X-5, 140	599.90	0.07	0.03	0.00	0.90				K, S
48X-5, 55	608.55	0.15	0.07	0.00	0.78	T			K, S
49X-4, 19	616.19	0.01	0.02	0.00	0.97	T			
50X-2, 145	623.95	0.06	0.09	0.00	0.85	T			I, S, K
51X-4, 142	636.42	0.12	0.05	0.00	0.83	T			S, I, K
53X-4, 140	655.40	0.13	0.14	0.00	0.73	T			I, K, S
54X-4, 49	663.99	0.12	0.11	0.00	0.77				K, S
55X-4, 7	673.07	0.10	0.07	0.00	0.84				S, K
56X-5, 140	685.40	0.15	0.11	0.00	0.74	T			K, I
57X-2, 56	689.56	0.10	0.06	0.00	0.84	T			K
58X-5, 12	703.12	0.09	0.02	0.00	0.89	T	T		I
59X-4, 140	712.40	0.05	0.03	0.00	0.91				
60X-4, 7	720.57	0.10	0.03	0.00	0.87		T		K, I
61X-2, 35	727.35	0.09	0.03	0.00	0.88		T		K, S
62X-4, 140	740.90	0.01	0.03	0.00	0.97				
63X-1, 43	744.93	0.01	0.04	0.00	0.95	T			K, S
64X-4, 2	758.52	0.09	0.04	0.00	0.87				I
66X-4, 140	770.90	0.06	0.03	0.00	0.91				
67X-CC, 34	771.34	0.09	0.03	0.00	0.88	T			I
68X-1, 140	776.40	0.08	0.03	0.00	0.89	T			
72X-1, 140	796.40	0.12	0.05	0.00	0.83				K, I
74X-3, 24	807.74	0.06	0.06	0.00	0.88	T	T		K
75X-CC, 2	813.71	0.13	0.11	0.01	0.76	T	T		S, K

Table 1 (continued).

Sample	Depth (mbsf)	Clay	Quartz	Feldspar	Calcite	Zeolite	Pyrite	Siderite	Notes[a]
76X-4, 82	819.82	0.20	0.24	0.00	0.55	T	T		I
77X-6, 140	828.40	0.15	0.08	0.00	0.77	T	T		I, S
78X-1, 91	829.91	0.12	0.13	0.00	0.75	T	T		I
79X-2, 109	841.09	0.52	0.46	0.01	0.01	A	M		S, I
81X-3, 116	852.66	0.47	0.50	0.03	0.00		M		K, S, I
82X-3, 140	857.90	0.41	0.56	0.03	0.00		M		K, S, I
83X-1, 59	859.09	0.40	0.59	0.02	0.00		M		K, S, I
84X-1, 70	864.20	0.37	0.61	0.03	0.00		M	M	K, S, I
85X-1, 114	874.14	0.43	0.55	0.02	0.00		M	M	K, S, I
86X-3, 140	886.90	0.35	0.61	0.04	0.00		M		K, S, I
87X-2, 21	893.71	0.30	0.67	0.03	0.00		M	M	K, S, I
88X-4, 65	906.65	0.35	0.62	0.03	0.00		M	T	K, S, I
89X-4, 140	916.90	0.32	0.67	0.01	0.00		M	M	K, S, I
90X-4, 86	925.86	0.26	0.71	0.03	0.00		M	T	K, S, I
91X-2, 21	931.71	0.27	0.72	0.02	0.00		M	T	K, S, I
122-763A-									
1H-2, 145	2.95	0.15	0.13	0	0.72				K
2H-4, 145	10.85	0.01	0.12	0	0.88				
3H-4, 145	20.35	0.21	0.11	0	0.68				K
5H-4, 145	39.35	0.12	0.12	0	0.76				K
6H-4, 145	48.85	0.12	0.08	0	0.8				K, I
7H-4, 145	58.35	0.17	0.16	0.01	0.66				K, I
8H-4, 145	67.85	0.15	0.11	0.01	0.73				K, I
9H-4, 140	77.3	0.14	0.09	0	0.78				K, I
10H-4, 145	86.85	0	0.03	0	0.97	M			
11H-4, 93	95.83	0.08	0.04	0	0.88				K, I
11H-4, 93	95.83	0.09	0.03	0	0.88				K, I
14H-4, 7	123.47	0.1	0.07	0	0.83				K
15H-4, 6	132.96	0.05	0.03	0	0.92				K
16H-4, 145	143.85	0.08	0.06	0	0.86				S
17H-4, 84	152.74	0.2	0.26	0	0.54				K, S, I
18H-4, 97	162.37	0.09	0.08	0	0.83	T			K, I
19H-4, 145	172.35	0.06	0.25	0	0.68	M			K
20H-4, 24	180.64	0.12	0.09	0	0.8	M			K, I
21H-4, 55	190.45	0.08	0.04	0	0.88	M			K
122-763B-									
2X-4, 15	194.65	0.05	0.04	0.00	0.91	T			S
3X-4, 145	205.45	0.01	0.04	0.00	0.95	A			
4X-2, 106	211.56	0.01	0.04	0.00	0.96	T	T		I
5X-4, 16	223.16	0.13	0.06	0.00	0.82	M	T		S, K
6X-4, 145	233.95	0.11	0.17	0.00	0.72				S
7X-2, 51	239.51	0.12	0.02	0.00	0.86	T			S, K
8X-4, 42	251.92	0.18	0.10	0.00	0.72	T	T		K, S
10X-4, 21	270.71	0.13	0.06	0.00	0.81	T	T		K, I
11X-4, 32	280.32	0.08	0.03	0.00	0.89	T	T		K, I, S
12X-3, 140	289.40	0.02	0.04	0.00	0.94				
13X-4, 91	299.91	0.11	0.04	0.00	0.86	T	T		K
14X-4, 8	308.58	0.10	0.02	0.00	0.88	T	T		K, I
15X-4, 140	319.40	0.01	0.03	0.00	0.97	T			
16X-4, 73	328.23	0.09	0.02	0.00	0.90	T			
17X-5, 96	339.46	0.25	0.04	0.00	0.71	T			K, I
18X-3, 140	346.40	0.14	0.04	0.00	0.82				S, I
19X-4, 137	357.37	0.15	0.04	0.00	0.81	T	T		S, K
20X-3, 7	364.07	0.16	0.02	0.00	0.82	T	T		I
21X-3, 26	373.76	0.19	0.05	0.00	0.77	A	M		K, S, I
22X-1, 35	380.35	0.12	0.04	0.00	0.84	A	T		
23X-5, 16	395.66	0.25	0.12	0.00	0.63	A	M		K, I, S
24X-5, 140	406.40	0.17	0.12	0.00	0.71	A	M		S, K
25X-3, 105	412.55	0.49	0.15	0.00	0.36	A	A		S, I, K
26X-3, 38	421.38	0.37	0.12	0.00	0.52	A	M		S, I
27X-4, 140	433.40	0.30	0.19	0.00	0.51	A	M		S
28X-4, 54	442.04	0.28	0.21	0.00	0.52	A	M		S, I, K
29X-4, 68	451.68	0.29	0.16	0.01	0.54	A	M		S, K
30X-4, 140	461.90	0.39	0.20	0.01	0.41	A	T		K, I
31X-4, 134	471.34	0.43	0.21	0.01	0.35	A	M		S, I, K
32X-4, 46	479.96	0.31	0.11	0.01	0.57	A	M		K, S
33X-4, 140	490.40	0.32	0.20	0.01	0.48	A	M		I
34X-3, 120	498.20	0.43	0.20	0.01	0.37	A	T		S, I, K
35X-4, 45	508.45	0.47	0.20	0.00	0.32	A	T		S, I, K
36X-4, 140	518.90	0.22	0.20	0.01	0.58	M	T		
37X-3, 135	526.85	0.21	0.08	0.00	0.71	M			K, I
38X-1, 4	532.04	0.19	0.19	0.01	0.61		T		S
38X-1, 79	532.79	0.27	0.19	0.01	0.53	T	T		S, I, K
39X-2, 7	543.07	0.12	0.68	0.00	0.21				I, K
40X-2, 111	553.61	0.45	0.24	0.01	0.31	T	T		S, I, K

Table 1 (continued).

Sample	Depth (mbsf)	Clay	Quartz	Feldspar	Calcite	Zeolite	Pyrite	Siderite	Notes[a]
41X-1, 55	561.05	0.67	0.33	0.00	0.00	T	A		S
42X-4, 44	574.94	0.43	0.56	0.01	0.01	M	M		S, I
42X-6, 140	578.90	0.40	0.52	0.07	0.00	A	A		S, I
44X-4, 67	594.17	0.49	0.47	0.00	0.04	A	M		S, I, K
45X-3, 140	602.90	0.26	0.71	0.03	0.00				S, I
45X-4, 13	603.13	0.59	0.39	0.01	0.01	A	M		S, I
46X-4, 59	613.09	0.53	0.46	0.00	0.00	A	A		S, I
47X-3, 47	620.97	0.60	0.38	0.01	0.02		A		S, I, K
48X-2, 105	625.05	0.24	0.06	0.00	0.71		M		K
48X-4, 81	627.81	0.18	0.45	0.01	0.36		M		I, K
49X-3, 135	631.85	0.33	0.19	0.01	0.47		M		K
50X-5, 146	639.96	0.41	0.58	0.01	0.00		A		S, I, K
51X-4, 66	642.66	0.25	0.74	0.01	0.00		A		S, I, K
53X-1, 32	647.82	0.11	0.50	0.01	0.38				S, I, K
122-763C-									
2R-3, 76	388.76	0.39	0.12	0.00	0.49	A	M		S, I, K
4R-1, 42	645.52	0.17	0.38	0.01	0.44	T	M		S, I, K
5R-1, 53	655.13	0.24	0.73	0.03	0.01	T	M		S, I, K
6R-1, 140	662.00	0.24	0.74	0.01	0.00	T	A		K, I
6R-2, 88	662.98	0.25	0.24	0.01	0.50		T		K, I
7R-1, 134	666.94	0.27	0.72	0.02	0.00		A		K, I
8R-1, 64	671.24	0.17	0.34	0.08	0.41		T		K, I
9R-4, 80	680.90	0.19	0.47	0.01	0.33		T		K, I, S
10R-4, 140	691.00	0.23	0.71	0.04	0.01		T		K, I, S
11R-2, 5	696.15	0.36	0.61	0.02	0.02		M		K, I, S
12R-1, 15	704.25	0.04	0.78	0.01	0.17		T		K, I
13R-3, 20	716.80	0.31	0.64	0.02	0.04	T	T		K, I, S
14R-3, 118	727.28	0.23	0.73	0.02	0.03	T	T		K, I
15R-3, 2	735.62	0.35	0.65	0.01	0.00		M	T	K, I
16R-6, 101	750.61	0.37	0.62	0.01	0.00	T	A	A	K, I, S
17R-4, 6	756.16	0.37	0.61	0.01	0.01		M	M	K, I, S
18R-3, 99	765.09	0.41	0.57	0.01	0.00		M	A	K, I
19R-1, 57	771.17	0.18	0.58	0.01	0.23		T	M	K, I
20R-1, 77	780.87	0.00	0.78	0.00	0.22				K
21R-4, 64	794.74	0.46	0.50	0.05	0.00	T	M	M	K, I, S
22R-3, 28	802.38	0.37	0.61	0.02	0.00		M	M	K, I, S
22R-4, 140	805.00	0.19	0.78	0.03	0.00		M		K, I, S
23R-4, 55	813.65	0.27	0.70	0.03	0.00		M	M	K, I, S
24R-4, 70	823.30	0.44	0.55	0.02	0.00		A	M	K, I, S
25R-6, 43	835.53	0.48	0.51	0.02	0.00		M	M	K, I, S
26R-1, 62	837.72	0.49	0.51	0.00	0.00		T	A++	K, I
27R-3, 90	850.50	0.35	0.63	0.02	0.00		M	M	K, I, S
28R-4, 140	862.00	0.27	0.72	0.01	0.00	T	M	M	K, I, S
28R-6, 85	864.45	0.33	0.65	0.02	0.00		M	M	K, I, S
29R-3, 37	868.97	0.33	0.66	0.01	0.00	T	A	M	K, I, S
30R-4, 134	880.94	0.33	0.67	0.01	0.00	T	A	M	K, I
31R-4, 70	899.30	0.28	0.71	0.01	0.00		A	M	K, I, S
32R-3, 128	898.38	0.33	0.66	0.01	0.00		M	A	K, I
32R-5, 140	901.50	0.27	0.71	0.02	0.00		M		K, I, S
33R-4, 87	908.97	0.47	0.52	0.01	0.00		M	M	K, I, S
34R-5, 41	919.51	0.36	0.59	0.06	0.00		M	A	K, I, S
34R-5, 140	920.50	0.32	0.66	0.02	0.00		M		K, I, S
35R-3, 23	925.83	0.35	0.64	0.02	0.00		A	A	K, I, S
36R-5, 112	939.22	0.36	0.62	0.03	0.00	T	A	M	K, I, S
37R-3, 130	945.90	0.31	0.68	0.01	0.00		M	M	K, I, S
38R-3, 143	955.53	0.37	0.61	0.01	0.01		M	M	K, I, S
39R-4, 22	965.32	0.41	0.58	0.01	0.00		M	A	S, I, K
39R-4, 42	965.52	0.32	0.27	0.01	0.41	A	T	T	S, I
40R-2, 88	972.48	0.42	0.57	0.01	0.00		M	A	K, I
41R-4, 140	985.50	0.34	0.64	0.02	0.00		M	A	K, I, S
42R-3, 67	992.77	0.37	0.61	0.02	0.00	T	M	M	K, I, S
43R-5, 115	1005.75	0.46	0.53	0.01	0.00		T	A	K, S, I
45R-4, 12	1022.22	0.40	0.59	0.02	0.00		A	A	S, I, K
46R-4, 119	1032.79	0.31	0.68	0.01	0.00		M	M	K, I, S
122-764A-									
1R-4, 145	5.95	0.11	0.14	0.00	0.75				K, I, S
2R-5, 96	6.96	0.04	0.15	0.00	0.81				K
3R-3, 76	22.76	0.22	0.09	0.00	0.69				K, I
3R-4, 145	24.95	0.16	0.11	0.00	0.73				K
4R-3, 80	32.30	0.08	0.06	0.00	0.86				Calcite
5R-2, 2	39.52	0.06	0.08	0.00	0.85	T			K
6R-1, 28	47.78	0.07	0.03	0.00	0.90	T			K, I
7R-2, 42	58.92	0.71	0.19	0.01	0.10				K, S

Table 1 (continued).

Sample	Depth (mbsf)	Clay	Quartz	Feldspar	Calcite	Zeolite	Pyrite	Siderite	Notes[a]
122-764B-									
2R-2, 72	42.22	0.09	0.01	0.01	0.89	M			K, I, S
3R-1, 56	45.56	0.14	0.02	0.00	0.84	T	T		S
6R-1, 50	60.50	0.22	0.08	0.00	0.70		T		K
7R-1, 91	65.91	0.20	0.03	0.00	0.77	T	T		S
8R-1, 38	70.38	0.09	0.04	0.00	0.87		T		K
8R-1, 130	71.30	0.23	0.04	0.00	0.73	T	T		K, S
9R-1, 10	79.60	0.00	0.00	0.00	1.00				Calcite
11R-1, 78	99.28	0.06	0.02	0.00	0.92	T			K, S
12R-1, 41	108.41	0.12	0.02	0.00	0.86	T			S
13R-1, 8	117.58	0.00	0.00	0.00	1.00	T			Calcite
14R-CC, 8	127.08	0.09	0.00	0.00	0.91	T			Calcite
15R-CC, 8	136.57	0.03	0.07	0.00	0.90	T			Calcite
16R-CC, 8	146.04	0.03	0.00	0.00	1.00				Calcite
20R-1, 80	175.80	0.00	0.00	0.00	1.00	T			Calcite
22R-2, 26	195.76	0.76	0.22	0.00	0.03	T			I, dolomite
24R-1, 54	213.54	0.60	0.31	0.02	0.08	T			S, dolomite
25R-1, 36	222.86	0.02	0.01	0.00	0.98	T			I
26R-1, 45	232.45	0.00	0.00	0.00	1.00				Calcite
27R-1, 40	241.90	0.01	0.01	0.00	0.98	T			Calcite
28R-2, 72	253.22	0.10	0.02	0.00	0.88	T			K
29R-1, 98	261.48	0.00	0.03	0.00	0.97				Calcite
30R-1, 80	270.80	0.01	0.01	0.00	0.98				Calcite
31R-3, 78	283.28	0.48	0.14	0.11	0.27	M	M		S

Note: A = abundant, M = minor, and T = trace; K = kaolinite, I = illite, and S = smectite.
[a] Noted mineral peaks swamped other mineral signals and no accessories were identified.

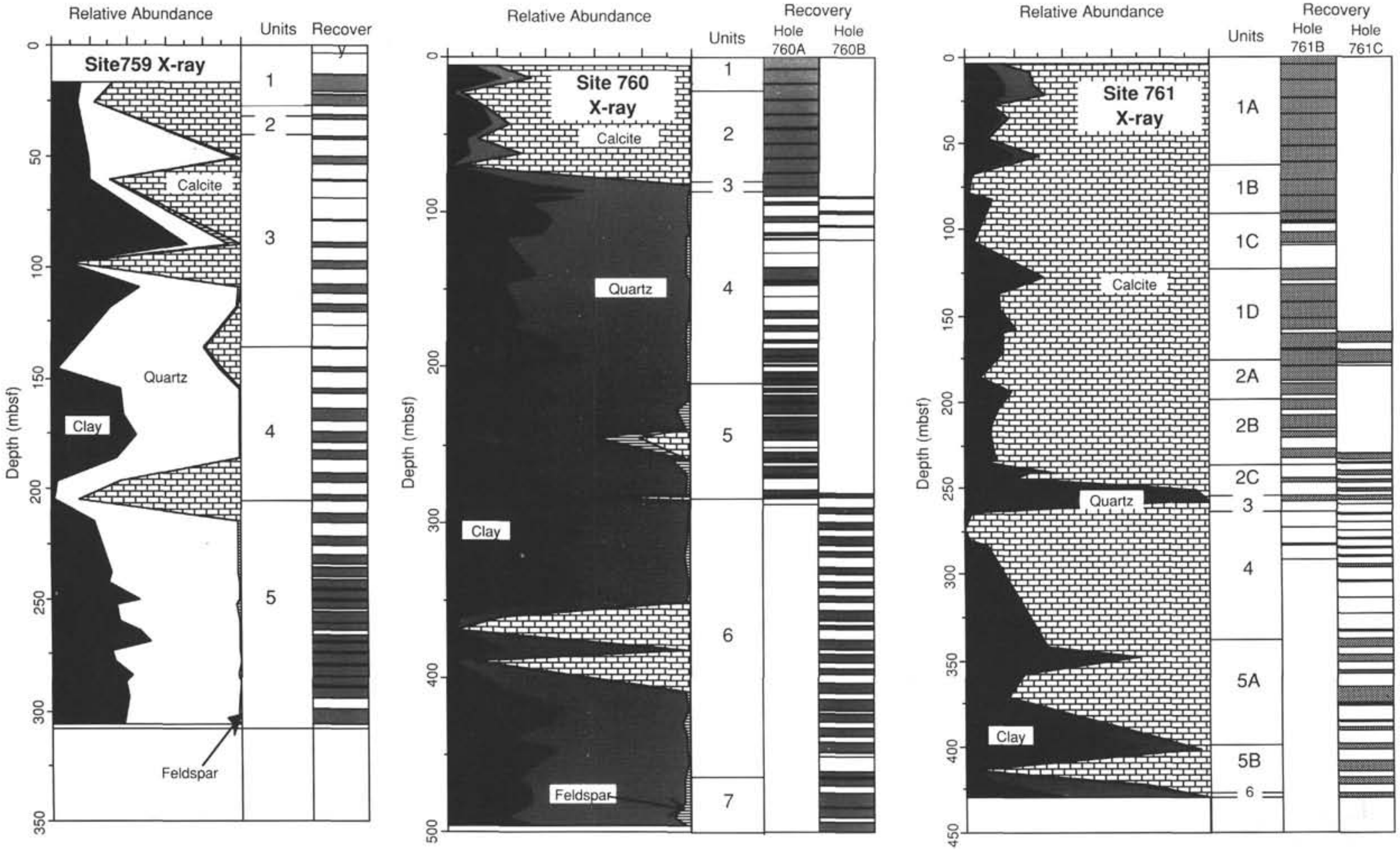

Figure 3. Relative abundances of clay, quartz, feldspar, and calcite from Leg 122 drill sites plotted vs. depth below seafloor. Columns at left show lithologic units and recovery (= shaded areas).

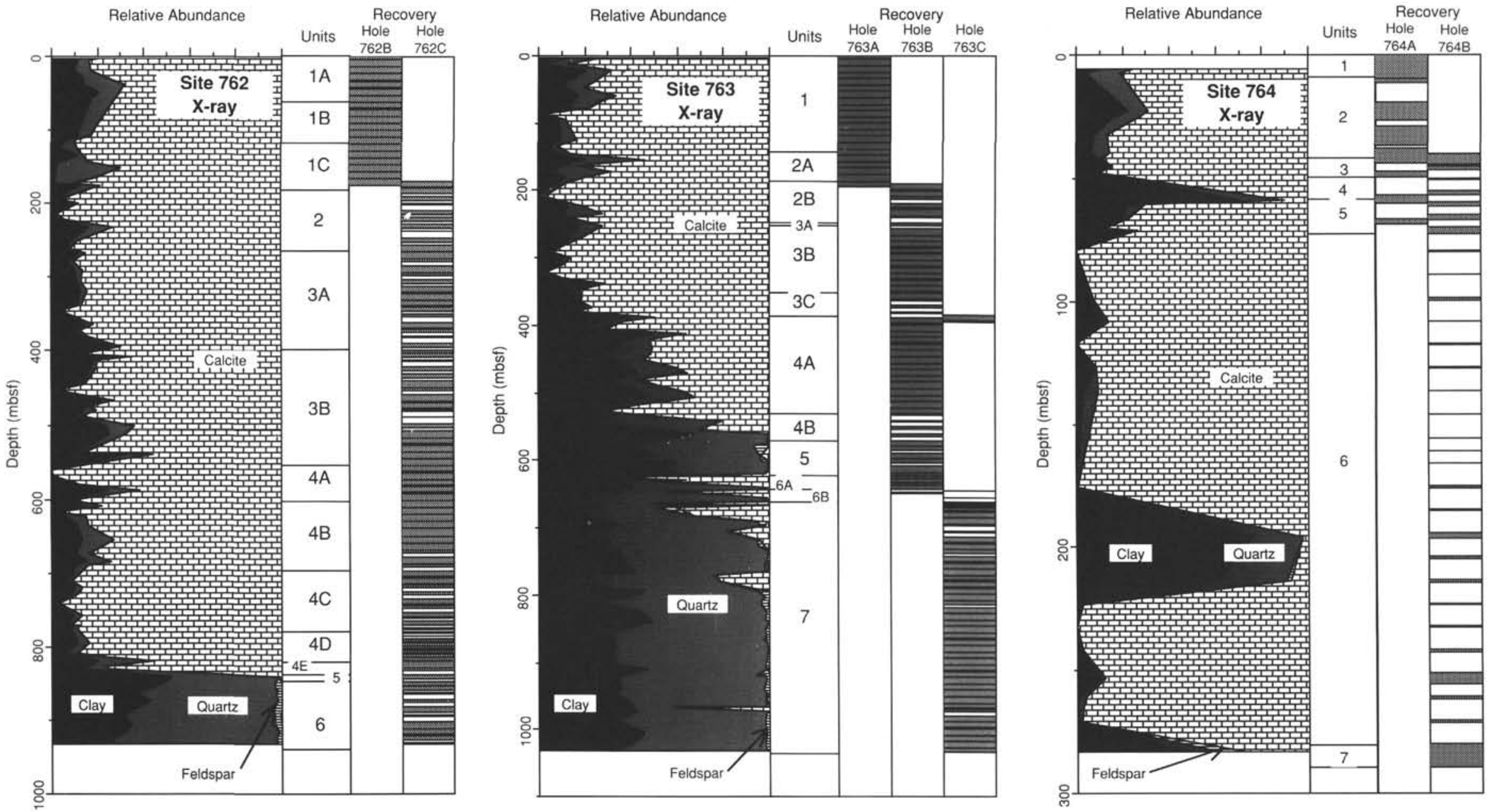

Figure 3 (continued).