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## 45. NEOGENE PLANKTONIC FORAMINIFERS FROM THE WESTERN TROPICAL INDIAN OCEAN, LEG 115<sup>1</sup>

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### INTRODUCTION

Neogene calcareous sediments were recovered at 12 sites in the western Indian Ocean (Table 1). Approximately 1000 10-cm<sup>3</sup> samples, at a sampling interval of about 1.5 m, were collected from one hole at each site for planktonic foraminifer analysis. Samples were washed through a 63- $\mu$ m mesh sieve. Dried samples were weighted before and after washing to obtain the percentage of sand-size components, which are given in Table 2. The distribution of selected planktonic key species in each hole is reported in Tables 3–14, where the occurrence of a species in a sample is indicated with a cross (x) and a slash sign (/) indicates that this species is extremely rare or presents some taxonomic ambiguity.

A visual estimate of the abundance of various components other than planktonic foraminifers is also given in Tables 3–14, with the abbreviations R (rare), F (few), C (common), and A (abundant). An estimate of the foraminiferal fauna preservation state is reported at the right of each table using a qualitative preservation scale as follows: G (good), M (moderately good), P (poor), and VP (very poor). Also reported are the abundances of planktonic foraminifer fragments and foraminifers embedded in a calcareous matrix, both of which are a function of the preservation state (the first reflecting the intensity of carbonate dissolution and the second, the occurrence of recrystallization).

Table 15 summarizes the biostratigraphic zonal assignments.

An overview of planktonic foraminifer distribution in Neogene sediments from Ocean Drilling Program (ODP) Leg 115 has been presented in Backman, Duncan, et al. (1988) based on a preliminary examination of core-catcher samples. From the more detailed investigations conducted in this study, only tables and species illustrations are presented in this report because of publication deadlines. Taxonomic and biostratigraphic discussions will be presented elsewhere.

### ACKNOWLEDGMENTS

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### SPECIES LIST

Most of the references cited in the species list may be found in Kennett and Srinivasan (1983). Those not given by these authors are listed in this paper.

*Beella digitata* (Brady)

(Plate 1, Fig. 1)

*Globigerina digitata* Brady, 1879, p. 599, Pl. 80, Figs. 6–10.

*Candeina nitida* (d'Orbigny)

(Plate 1, Fig. 2)

*Candeina nitida* d'Orbigny, 1839, p. 107, Pl. 2, Figs. 27–28.

*Cassigerinella chipolensis* (Cushman and Ponton)

*Cassigerinella chipolensis* Cushman and Ponton, 1932, p. 98, Pl. 15, Fig. 2.

*Catapsydrax dissimilis* (Cushman and Bermudez)

(Plate 1, Figs. 3 and 4)

*Globigerina dissimilis* Cushman and Bermudez, 1937, p. 25, Pl. 3, Figs. 4–6.

*Catapsydrax stainforthi* (Bolli, Loeblich, and Tappan)

(Plate 1, Figs. 5 and 10)

*Catapsydrax stainforthi* Bolli, Loeblich, and Tappan, 1957, p. 37, Pl. 7, Fig. 11.

*Clavatorella bermudezi* Bolli

(Plate 6, Figs. 1–3)

*Hastigerinella bermudezi* Bolli, 1957, p. 112, Pl. 25, Fig. 1.

<sup>1</sup> Duncan, R. A., Backman, J., Peterson, L. C., et al., 1990. *Proc. ODP, Sci. Results*, 115: College Station, TX (Ocean Drilling Program).

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Table 1. Holes from Leg 115 analyzed for Neogene planktonic foraminifers.

Geographical area	Hole	Latitude	Longitude	Water depth (m)	Neogene sequences	
					Cores	Approximate thickness (m)
Southern Mascarene Plateau	705A	13°10.02'S	61°23.02'E	2320.3	1H-3H	27
	706A	13°06.85'S	61°22.26'E	2504.3	1H-2H	3.3
Northern Mascarene Plateau-Madingley Rise	707A	07°32.72'S	59°01.01'E	1552.3	1H-15H	142
	708A	05°27.35'S	59°56.63'E	4109.3	1H-8H, 9X-20X	185
	709C	03°54.90'S	60°33.10'E	3048.8	1H-20H, 21X-22X	203
	710A	04°18.70'S	60°58.80'E	3824.3	1H-13H, 14X-16X	152
	711A	02°44.56'S	61°09.78'E	4429.8	1H-10H	95
Northern Margin Chagos Bank	712A	04°12.99'S	73°24.38'E	2904.3	1R-6R	58
	713A	04°11.58'S	73°23.65'E	2915.3	1R-4R	31
Maldives Ridge	714A	05°03.60'N	73°47.20'E	2038.3	1H-13H, 14X-22X	197
	715A	05°04.89'N	73°49.88'E	2266.3	1R-11R	105
	716B	04°56.00'N	73°17.01'E	544.3	1H-28H	264

H = advanced hydraulic piston coring, X = extended core barrel, and R = rotary coring barrel.

*Dentoglobigerina altispira altispira* (Cushman and Jarvis)  
(Plate 6, Figs. 4-6)

*Globigerina altispira* Cushman and Jarvis, 1936, p. 5, Pl. 1, Fig. 13.

*Dentoglobigerina altispira globosa* Bolli  
(Plate 6, Figs. 7 and 8)

*Globoquadrina altispira globosa* Bolli, 1957, p. 111, Pl. 24, Figs. 9-10.

*Dentoglobigerina galavisi* (Bermudez)

*Globigerina galavisi* Bermudez, 1960, p. 1183, Pl. 4, Fig. 3.

*Dentoglobigerina globularis* (Bermudez)  
(Plate 6, Figs. 9 and 10)

*Globoquadrina altispira globularis* Bermudez, 1960, p. 1311, Pl. 13, Figs. 4-6; Blow, 1969, pp. 339-340.

*Globigerina angulisuturalis* Bolli

*Globigerina ciperoensis angulisuturalis* Bolli, 1957, p. 109, Pl. 22, Fig. 11.

*Globigerina angustiumbilocata* Bolli

*Globigerina ciperoensis angustiumbilocata* Bolli, 1957, p. 109, Pl. 22, Figs. 12-13.

*Globigerina bulloides* d'Orbigny

*Globigerina bulloides* d'Orbigny, 1826, p. 277; Banner and Blow, 1960, Pl. 1, Figs. 1-4.

*Globigerina ciperoensis* Bolli

*Globigerina ciperoensis* Bolli, 1954, p. 1, Figs. 3-6.

*Globigerina euapertura* Jenkins

*Globigerina euapertura* Jenkins, 1960, p. 351, Pl. 1, Fig. 8.

*Globigerina praebulloides* Blow

*Globigerina praebulloides* Blow, 1959, p. 180, Pl. 8, Fig. 47; Pl. 9, Fig. 48.

*Globigerina quinqueloba* Natland

*Globigerina quinqueloba* Natland, 1938, p. 149, Pl. 6, Fig. 7.

*Globigerinatella insueta* (Cushman and Stainforth)

*Globigerinatella insueta* Cushman and Stainforth, 1945, p. 69, Pl. 13, Figs. 7-9.

*Globigerinella adamsi* (Banner and Blow)  
(Plate 1, Figs. 11 and 12)

*Hastigerina (Bolliella) adamsi* Banner and Blow, 1959, Fig. 4.

*Globigerinella calida* (Parker)  
(Plate 1, Figs. 13-15)

*Globigerina calida* Parker, 1962, p. 221, Pl. 1, Figs. 9-13 and 15.

*Globigerinella praesiphonifera* (Blow)

*Hastigerina (H.) siphonifera praesiphonifera* Blow, 1969, p. 408, Pl. 54, Figs. 7-9.

*Globigerinella siphonifera* (d'Orbigny)  
(Plate 1, Figs. 16 and 17)

*Globigerina siphonifera* d'Orbigny, 1839, Pl. 4, Figs. 15-18.  
*Globigerina aequilateralis* Brady, 1884, Pl. 80, Figs. 18-21.  
*Hastigerina (H.) siphonifera* (d'Orbigny), Banner and Blow, 1960, Figs. 2 (lectotype), 3.

*Globigerinita glutinata* (Egger)  
(Plate 1, Figs. 8 and 9)

*Globigerina glutinata* Egger, 1893, p. 371, Pl. 13, Figs. 19-21.

*Globigerinoides altiapertura* Bolli  
(Plate 1, Figs. 18-20)

*Globigerinoides triloba altiapertura* Bolli, 1957, p. 113, Pl. 25, Fig. 7.

*Globigerinoides bisphericus* Todd

*Globigerinoides bispherica* Todd, 1954, in Todd et al., 1954, p. 681, Pl. 1, Figs. 1 and 4.

*Globigerinoides conglobatus* (Brady)  
(Plate 1, Figs. 21 and 22)

*Globigerina conglobata* Brady, 1879, p. 28b; 1884, Pl. 80, Figs. 1-5.

*Globigerinoides diminutus* Bolli  
(Plate 1, Figs. 23-25)

*Globigerinoides diminuta* Bolli, 1957, p. 114, Pl. 25, Fig. 11.

**Table 2. Percentages of the sand-size fraction (>63  $\mu\text{m}$ ) in Neogene sediments of Holes 705A, 706A, 707A, 708A, 709C, 710A, 711A, 712A, 713A, 714A, 715A, and 716B.**

Core, section, interval (cm)	Depth (mbsf)	>63 $\mu\text{m}$ (%)
115-707A-		
2H-5, 107-112	13.67	76.2
2H-6, 107-112	15.17	74.2
3H-1, 107-112	17.27	82.4
3H-2, 107-112	18.77	71.8
3H-3, 107-112	20.27	68.2
3H-4, 107-112	21.77	67.9
4H-1, 107-112	26.87	77.7
4H-2, 107-112	28.37	67.0
4H-3, 107-112	29.87	61.1
4H-4, 107-112	31.37	56.4
5H-1, 107-112	36.57	65.7
5H-2, 107-112	38.07	62.3
5H-3, 107-112	39.57	59.9
5H-4, 107-112	41.07	52.9
5H-5, 107-112	42.57	57.4
5H-6, 41-45	43.41	55.5
6H-1, 107-112	46.17	62.0
6H-2, 107-112	47.67	57.3
6H-3, 107-112	49.17	58.1
6H-4, 107-112	50.67	58.1
6H-5, 107-112	52.17	48.4
6H-6, 107-112	53.67	52.4
7H-1, 107-112	55.77	61.5
7H-2, 107-112	57.27	49.7
7H-3, 107-112	58.77	48.8
7H-4, 107-112	60.27	39.1
7H-5, 107-112	61.77	57.0
7H-6, 107-112	63.27	44.7
8H-1, 107-112	65.37	45.6
8H-2, 107-112	66.87	49.5
8H-3, 107-112	68.37	44.6
8H-4, 107-112	69.87	49.0
6H-5, 107-112	71.37	52.2
8H-6, 107-112	72.87	44.3
9H-1, 107-112	75.07	39.4
9H-2, 107-112	76.57	40.9
9H-3, 107-112	78.07	39.5
9H-4, 107-112	79.57	45.0
9H-5, 107-112	81.07	41.2
9H-6, 107-112	82.57	43.4
10H-1, 107-112	84.67	52.8
10H-2, 107-112	86.17	51.1
10H-3, 107-112	87.67	47.0
10H-4, 107-112	89.17	50.9
10H-5, 107-112	90.67	54.5
10H-6, 80-85	91.90	45.7
11H-1, 53-58	93.73	50.3
12H-1, 107-112	103.87	53.7
12H-2, 107-112	105.37	59.0
12H-3, 107-112	106.87	52.7
12H-4, 107-112	108.37	43.1
12H-5, 107-112	109.87	56.0
12H-6, 105-110	111.35	59.6
13H-1, 107-112	113.47	54.7
13H-2, 107-112	114.97	54.3
13H-3, 107-112	116.47	54.6
13H-4, 107-112	117.97	53.8
13H-5, 107-112	119.47	42.9
14H-1, 107-112	123.07	42.3
14H-2, 107-112	124.57	44.5
14H-3, 107-112	126.07	58.1
14H-4, 107-112	127.57	64.4
15H-1, 107-112	132.67	61.9
15H-2, 107-112	134.17	43.6
15H-3, 107-112	135.67	56.4
15H-4, 107-112	137.17	47.7
15H-5, 107-112	138.67	44.6
115-708A-		
6H-2, 105-110	49.75	6.0

**Table 2 (continued).**

Core, section, interval (cm)	Depth (mbsf)	>63 $\mu\text{m}$ (%)
115-708A- (Cont.)		
6H-3, 105-110	50.42	5.3
6H-5, 105-110	53.15	5.2
6H-7, 105-110	55.65	4.2
7H-2, 105-110	59.56	5.2
7H-3, 105-110	60.85	7.8
7H-4, 105-110	61.54	6.1
7H-5, 105-110	64.15	3.0
7H-6, 105-110	65.30	4.0
7H-7, 105-110	66.03	3.4
sH-1, 105-110	67.45	3.5
8H-2, 105-110	68.95	4.0
8H-6, 105-110	74.95	2.8
9H-1, 65-70	76.65	2.8
9H-CC, 22-27	79.31	1.9
10H-1, 106-111	83.16	1.7
10H-2, 106-111	84.66	1.5
12H-2, 105-110	103.95	3.0
12H-3, 105-110	105.45	2.2
12H-4, 105-110	106.95	2.3
13H-1, 12-16	111.12	3.0
13H-2, 100-104	112.46	2.6
13H-3, 46-50	113.42	1.3
13H-4, 9-13	114.55	1.8
13H-5, 83-86	116.79	2.5
14H-1, 105-110	121.65	1.1
14H-2, 105-110	123.15	1.5
14H-3, 105-110	124.65	3.3
14H-4, 105-110	126.15	1.2
14H-5, 105-110	127.65	1.2
14H-6, 135-140	129.45	1.0
15H-5, 105-110	137.35	0.5
16H-5, 108-112	147.08	0.4
17H-2, 105-110	152.15	0.8
17H-3, 105-110	153.65	0.5
17H-4, 105-110	155.15	0.7
18H-3, 105-110	163.35	0.8
19H-1, 105-110	169.65	5.0
20H-3, 7-11	181.27	1.3
115-709C-		
4H-1, 60-65	25.70	12.4
4H-2, 60-65	27.20	12.2
4H-4, 60-65	30.20	6.9
4H-5, 60-65	31.70	32.0
4H-6, 60-66	33.20	11.2
5H-1, 60-65	35.30	13.8
5H-2, 60-65	36.80	21.5
5H-3, 60-65	38.30	13.3
5H-4, 60-65	39.80	12.6
5H-5, 60-65	41.30	11.5
5H-6, 60-65	42.80	11.2
6H-1, 60-65	44.90	9.4
6H-2, 60-65	46.40	9.5
6H-3, 60-65	47.90	13.3
6H-4, 60-65	49.40	8.0
6H-5, 60-65	50.90	5.3
6H-6, 60-65	52.40	11.8
6H-7, 60-65	53.90	8.6
7H-1, 60-65	54.50	16.4
7H-2, 60-65	56.00	12.2
7H-3, 60-65	57.50	14.0
7H-4, 60-65	59.00	8.2
7H-5, 60-65	60.50	6.4
7H-6, 60-65	62.00	4.7
8H-2, 60-65	65.70	4.7
8H-3, 60-65	67.20	5.9
8H-4, 60-65	68.70	4.5
8H-5, 60-65	70.20	5.9
8H-6, 60-65	71.70	7.5
8H-7, 60-62	73.20	11.8
9H-2, 60-65	75.30	5.7
9H-3, 60-65	76.80	4.3
9H-4, 60-65	78.30	5.8
9H-5, 60-65	79.80	4.3
9H-6, 60-65	81.30	5.1

**Table 2 (continued).**

Core, section, interval (cm)	Depth (mbsf)	>63 $\mu\text{m}$ (%)
115-709C- (Cont.)		
10H-1, 60-65	83.50	4.8
10H-2, 60-65	85.00	5.0
10H-3, 60-65	86.50	4.3
10H-4, 60-65	88.00	3.2
10H-5, 60-65	89.50	2.6
10H-6, 60-65	91.00	12.5
11H-1, 60-65	93.10	4.1
11H-2, 60-65	94.60	5.6
11H-3, 60-65	96.10	7.1
11H-4, 60-65	97.60	6.8
11H-5, 60-65	99.10	17.6
12H-1, 60-62	102.80	13.2
12H-1, 120-125	103.40	12.4
12H-2, 60-62	104.30	12.5
12H-2, 120-125	104.90	10.4
12H-3, 60-62	105.80	10.7
12H-3, 120-125	106.40	6.8
12H-4, 60-62	107.30	19.9
12H-4, 120-125	107.90	15.6
12H-5, 120-125	109.40	20.5
12H-6, 60-62	110.30	17.0
12H-6, 120-125	110.90	17.3
13H-1, 60-62	112.40	15.1
13H-1, 120-125	113.00	6.1
13H-2, 60-62	113.90	11.6
13H-2, 120-125	114.50	8.2
13H-3, 60-62	115.40	4.3
13H-3, 120-125	116.00	4.1
13H-4, 60-62	116.90	3.6
13H-6, 120-125	120.50	9.5
14H-1, 60-62	122.00	4.0
14H-1, 120-125	122.60	6.2
14H-2, 60-62	123.50	8.1
14H-2, 120-125	124.10	10.9
14H-3, 60-62	125.00	17.0
14H-3, 120-125	125.60	10.5
14H-4, 60-62	126.50	13.4
14H-4, 120-125	127.10	6.6
14H-5, 60-62	128.00	10.1
14H-5, 120-125	128.60	7.7
14H-6, 60-62	129.50	16.0
14H-6, 120-125	130.10	5.7
15H-1, 60-65	131.70	9.3
15H-1, 120-125	132.30	13.0
15H-2, 60-65	133.20	6.4
15H-2, 120-125	133.80	8.6
15H-3, 60-65	134.70	7.3
15H-3, 120-125	135.30	2.9
15H-4, 60-65	136.20	4.1
15H-4, 120-125	136.80	8.6
15H-5, 60-65	137.70	6.7
15H-5, 120-125	138.30	5.8
15H-6, 60-65	139.20	6.5
15H-6, 120-125	139.80	3.7
15H-7, 25-30	140.35	4.3
16H-1, 60-65	141.40	11.0
16H-1, 120-125	142.00	8.7
16H-2, 60-65	142.90	7.8
16H-2, 120-125	143.50	9.7
16H-3, 60-65	144.40	2.6
16H-3, 120-125	145.00	8.1
16H-4, 60-65	145.90	8.5
16H-4, 120-125	146.50	11.5
16H-5, 60-65	147.40	6.8
16H-5, 120-125	148.00	9.7
16H-6, 60-65	148.90	12.7
16H-6, 120-125	149.50	17.9
16H-7, 60-65	150.40	10.0
17H-1, 60-65	151.10	9.1
17H-1, 120-125	151.70	9.1
17H-2, 60-65	152.60	4.8
17H-2, 120-125	153.20	5.6
17H-3, 60-65	154.10	4.9
17H-3, 120-125	154.70	6.0
17H-4, 60-65	155.60	6.5
17H-4, 120-125	156.20	5.7

Table 2 (continued).

Core, section, interval (cm)	Depth (mbsf)	>63 $\mu\text{m}$ (%)
115-709C- (Cont.)		
17H-5, 60-65	157.10	20.5
17H-5, 120-125	157.70	24.5
17H-6, 60-65	158.60	8.5
17H-6, 120-125	159.20	8.5
18H-1, 60-65	160.80	9.9
18H-1, 120-125	161.40	10.7
18H-2, 60-65	162.30	5.5
18H-2, 120-125	162.90	10.4
18H-3, 60-65	163.80	11.2
18H-3, 120-125	164.40	10.6
18H-4, 60-65	165.30	33.2
18H-4, 120-125	165.90	18.1
18H-6, 120-125	168.90	7.6
18H-7, 60-65	169.80	8.4
19H-1, 60-65	170.50	4.8
19H-1, 120-125	171.10	7.4
19H-2, 60-65	172.00	4.5
19H-2, 120-125	172.60	8.9
19H-3, 60-65	173.50	6.8
19H-3, 120-125	174.10	9.4
19H-4, 60-65	175.00	5.2
19H-4, 120-125	175.60	10
19H-5, 60-65	176.50	7.8
19H-5, 120-125	177.10	6.2
19H-6, 60-65	178.00	9.6
19H-6, 120-125	178.60	10.2
19H-7, 60-65	179.50	6.4
20H-1, 60-65	180.10	10.1
20H-1, 120-125	180.70	11.3
20H-2, 60-65	181.60	5.3
20H-2, 120-125	182.20	3.4
20H-3, 60-65	183.10	4.8
20H-3, 120-125	183.70	9.5
20H-4, 60-65	184.60	3.6
20H-4, 120-125	185.20	8.1
20H-5, 60-65	186.10	8.2
20H-5, 120-125	186.70	6.9
20H-6, 60-65	187.60	10.7
20H-6, 120-125	188.20	12.8
20H-7, 60-65	189.10	7.5
21X-1, 60-65	189.70	9.1
21X-1, 120-125	190.30	7.9
21X-2, 60-65	191.20	8.5
21X-2, 120-125	191.80	6.9
21X-3, 60-65	192.70	10.8
21X-3, 120-125	193.30	8.3
21X-4, 60-65	194.20	9.7
21X-4, 120-125	194.80	10.6
21X-5, 60-65	195.70	9.0
21X-5, 120-125	196.30	13.1
21X-6, 60-65	197.20	10.1
21X-6, 120-125	197.80	10.5
22X-1, 60-65	199.30	6.6
22X-1, 120-125	199.90	6.2
22X-2, 60-65	200.80	8.3
22X-2, 120-125	201.40	8.5
22X-3, 60-65	202.30	5.5
22X-3, 120-125	202.90	9.3
22X-4, 60-65	203.80	7.4
22X-4, 120-125	204.40	10.7
22X-5, 60-65	205.30	6.8
22X-5, 120-125	205.90	8.8
115-710A-		
1H-1, 105-110	1.05	12.3
1H-2, 90-95	2.40	11.9
1H-3, 105-110	4.05	10.2
1H-4, 105-110	5.55	24.5
1H-5, 105-110	7.05	10.3
1H-6, 105-110	8.55	12.4
2H-1, 105-110	10.55	33.6
2H-2, 105-110	12.55	15.1
2H-3, 105-110	13.55	16.0
2H-4, 105-110	15.05	20.4

Table 2 (continued).

Core, section, interval (cm)	Depth (mbsf)	>63 $\mu\text{m}$ (%)
115-710A- (Cont.)		
2H-5, 105-110	16.55	15.9
2H-6, 105-110	18.05	13.4
4H-1, 105-110	29.85	5.3
4H-3, 105-110	32.85	8.4
4H-4, 105-110	34.35	5.4
4H-5, 105-110	35.85	3.9
6H-1, 105-110	48.95	2.9
6H-4, 10-15	52.50	2.3
6H-5, 40-45	54.30	2.9
6H-6, 40-45	55.80	2.0
7H-1, 105-110	58.55	2.7
7H-2, 105-110	60.05	2.0
7H-3, 105-110	61.55	2.7
7H-4, 105-110	63.05	1.8
7H-5, 105-110	64.55	3.4
7H-6, 105-110	66.05	3.0
8H-1, 105-110	68.15	4.7
8H-2, 105-110	69.65	2.0
8H-3, 105-110	71.15	2.0
8H-4, 105-110	72.65	4.1
8H-5, 105-110	74.15	4.4
8H-6, 105-110	75.65	5.0
9H-1, 105-110	77.65	1.6
9H-2, 105-110	79.15	0.8
9H-3, 105-110	80.65	0.4
9H-4, 105-110	82.15	0.9
9H-5, 105-110	83.65	0.6
9H-6, 105-110	85.15	2.9
10H-1, 105-110	87.25	0.3
10H-2, 105-110	88.75	0.8
10H-3, 105-110	90.25	0.2
10H-4, 105-110	91.75	0.4
10H-5, 105-110	93.25	1.0
10H-6, 105-110	94.75	0.8
11H-1, 105-110	96.85	1.8
11H-2, 105-110	98.35	0.2
11H-3, 105-110	99.85	0.9
11H-4, 105-110	101.35	0.2
11H-5, 105-110	102.85	1.4
11H-6, 105-110	104.35	1.4
12H-1, 105-110	106.55	0.3
12H-2, 105-110	108.05	0.5
12H-3, 105-110	109.55	0.7
12H-4, 105-110	111.05	0.3
12H-5, 105-110	112.55	0.2
12H-6, 105-110	114.05	0.3
13H-1, 105-110	116.25	0.1
13H-2, 105-110	117.75	0.6
13H-3, 105-110	119.25	0.5
13H-4, 105-110	120.75	0.4
13H-5, 105-110	122.25	0.3
13H-6, 105-110	123.75	0.2
14H-1, 105-110	125.95	0.4
14H-2, 105-110	127.45	0.3
14H-3, 105-110	128.95	0.4
14H-5, 105-110	131.95	1.3
14H-6, 105-110	133.45	5.1
15H-1 105-110	135.65	5.4
15H-2, 105-110	137.15	6.1
15H-3, 105-110	138.65	4.1
15H-4, 105-110	140.15	4.8
16H-1, 105-110	143.15	2.9
16H-2, 105-110	144.65	4.8
16H-3, 105-110	146.15	5.9
16H-4, 105-110	147.65	4.7
115-711A-		
1H-1, 105-110	1.05	7.4
1H-2, 105-110	2.55	11.2
1H-3, 105-110	4.05	2.2
1H-4, 105-110	5.55	8.4
1H-5, 105-110	7.05	10.2
2H-1, 105-110	9.15	7.7
2H-2, 105-110	10.65	3.5

Table 2 (continued).

Core, section, interval (cm)	Depth (mbsf)	>63 $\mu\text{m}$ (%)
115-711A- (Cont.)		
2H-3, 105-110	12.15	1.0
3H-3, 105-110	21.75	0.1
4H-3, 105-110	31.35	0.3
5H-3, 105-110	40.95	0.0
6H-3, 105-110	50.65	0.3
7H-3, 105-110	60.35	0.1
8H-3, 60-62	68.10	0.2
9H-3, 105-110	79.65	4.9
10H-3, 105-110	89.25	0.3
115-712A-		
1H-1, 133-138	1.33	31.3
1H-2, 133-138	2.83	78.7
1H-3, 133-138	4.33	35.3
1H-4, 133-138	5.83	27.5
1H-5, 133-138	7.33	24.3
1H-6, 133-138	8.83	26.3
2H-1, 105-110	10.45	34.5
2H-2, 105-110	11.95	14.6
2H-3, 105-110	13.45	11.6
2H-4, 105-110	15.08	20.7
2H-5, 105-110	16.58	18.5
3H-1, 105-110	20.05	15.9
3H-2, 105-110	21.55	16.2
3H-3, 105-110	23.05	8.9
3H-4, 105-110	24.55	24.2
4H-2, 105-110	31.15	39.2
4H-3, 32-37	31.92	49.0
5H-1, 105-110	39.35	33.5
5H-2, 105-110	40.85	30.2
6H-1, 105-110	48.95	80.4
6H-2, 105-110	50.45	62.6
115-713A-		
2H-2, 105-110	4.15	60.4
2H-3, 105-110	5.65	50.9
2H-4, 105-110	7.15	42.2
2H-6, 83-88	9.93	49.4
3H-1, 105-110	12.25	20.6
3H-2, 105-110	13.75	21.5
3H-3, 105-110	15.25	22.0
3H-4, 105-110	16.75	23.5
3H-5, 105-110	18.25	24.9
3H-6, 105-110	19.75	19.3
4H-1, 105-110	21.85	15.7
4H-2, 105-110	23.35	17.4
4H-3, 105-110	24.85	18.2
4H-4, 105-110	26.35	18.8
4H-5, 105-110	27.85	18.4
4H-6, 105-110	29.35	13.1
115-714A-		
3H-1, 110-115	13.50	34.4
3H-2, 110-115	15.00	37.9
3H-3, 110-115	16.50	32.2
3H-4, 110-115	18.00	36.1
3H-5, 98-103	19.38	51.4
3H-5, 138-143	19.78	38.1
3H-6, 20-25	20.10	46.4
3H-6, 110-115	21.00	45.2
4H-2, 20-25	22.38	36.8
4H-2, 105-110	23.23	39.2
4H-3, 105-110	24.68	34.5
4H-4, 20-25	25.33	33.7
4H-4, 105-110	26.18	37.2
4H-5, 20-25	26.83	35.4
4H-5, 105-110	27.68	38.7
4H-8, 20-25	31.33	37.2
5H-1, 20-25	31.90	49.2
5H-1, 105-110	32.75	32.0
5H-2, 20-25	33.40	28.2
5H-2, 105-110	34.25	31.2
5H-3, 20-25	34.90	41.8

Table 2 (continued).

Core, section, interval (cm)	Depth (mbsf)	> 63 $\mu$ m (%)
115-714A- (Cont.)		
5H-3, 105-110	35.75	25.7
5H-4, 20-25	36.40	34.5
5H-4, 105-110	37.25	22.7
5H-5, 20-25	37.90	46.3
5H-5, 105-110	38.75	24.8
5H-6, 20-25	39.40	37.4
5H-6, 110-115	40.25	23.1
5H-7, 20-25	40.90	42.9
6H-1, 20-25	41.60	26.7
6H-1, 110-115	42.45	17.0
6H-2, 20-25	43.10	24.7
6H-2, 110-115	43.95	28.7
6H-3, 20-25	44.60	24.5
6H-3, 110-115	45.45	15.1
6H-4, 20-25	46.10	41.6
6H-4, 110-115	46.95	38.0
6H-5, 20-25	47.60	24.2
6H-5, 110-115	48.45	25.8
6H-6, 20-25	49.10	31.6
6H-6, 110-115	49.95	45.6
6H-7, 20-25	50.60	39.4
7H-1, 20-25	51.20	36.2
7H-1, 110-115	52.05	33.3
7H-2, 20-25	52.70	34.5
7H-3, 110-115	55.05	35.2
7H 4, 20 25	55.70	38.2
7H-4, 110-115	56.55	31.5
7H-5, 20-25	57.20	32.6
7H-5, 110-115	58.05	34.1
7H-6, 20-25	58.70	35.0
7H-6, 110-115	59.55	28.2
7H-7, 20-25	60.20	31.6
8H-1, 20-25	60.80	29.0
8H-1, 110-115	61.65	34.5
8H-2, 20-25	62.30	36.7
8H-2, 110-115	63.15	41.9
8H-3, 20-25	63.80	23.0
8H-3, 110-115	64.65	28.8
8H-4, 20-25	65.30	23.9
8H-4, 110-115	66.15	27.5
8H-5, 20-25	66.80	30.1
8H-5, 110-115	67.65	27.4
8H-6, 20-25	68.30	20.2
8H-6, 110-115	69.15	28.3
8H-7, 20-25	69.80	44.6
9H-1, 20-25	70.40	36.5
9H-1, 110-115	71.25	34.0
9H-2, 20-25	71.90	29.9
9H-2, 110-115	72.75	26.3
9H-3, 20-25	73.40	23.7
9H-3, 110-115	74.25	32.8
9H-4, 20-25	74.90	21.0
10H-1, 20-25	80.00	22.2
10H-1, 110-115	80.85	21.7
10H-2, 20-25	81.50	27.0
10H-2, 110-115	82.35	31.1
10H-3, 20-25	83.00	23.3
10H-4, 20-25	84.50	25.1
10H-4, 110-115	85.35	26.3
10H-5, 20-25	86.00	30.8
10H-5, 110-115	86.85	54.7
10H-6, 20-25	87.50	30.2
10H-6, 110-115	88.35	18.2
10H-7, 20-25	89.00	30.0
11H-1, 20-25	89.70	22.5
11H-1, 110-115	90.55	29.2
11H-2, 20-25	91.20	28.3
11H-2, 110-115	92.05	30.0
11H-3, 20-25	92.70	52.7
11H-3, 110-115	93.55	42.7
11H-4, 20-25	94.20	42.7
11H-4, 110-115	95.05	37.5
11H-5, 20-25	95.70	30.5
11H-5, 110-115	96.55	24.7
11H-6, 20-25	97.20	30.7

Table 2 (continued).

Core, section, interval (cm)	Depth (mbsf)	> 63 $\mu$ m (%)
115-714A- (Cont.)		
11H-6, 110-115	98.05	29.2
12H-1, 110-115	100.15	23.2
12H-2, 20-25	100.80	29.2
12H-2, 110-115	101.65	32.2
12H-3, 20-25	102.30	23.8
12H-3, 110-115	103.15	19.7
12H-4, 20-25	103.80	20.6
12H-4, 110-115	104.65	16.7
12H-5, 20-25	105.30	18.6
12H-5, 110-115	106.15	33.2
12H-6, 20-25	106.80	24.3
12H-6, 110-115	107.65	26.7
12H-7, 20-25	108.30	24.5
13H-1, 20-25	108.90	16.7
13H-1, 110-115	109.75	15.5
13H-2, 20-25	110.40	22.3
13H-2, 110-115	111.25	25.7
13H-3, 20-25	111.90	19.8
13H-3, 110-115	112.75	23.8
13H-4, 20-25	113.40	23.0
13H-4, 110-115	114.25	22.6
13H-5, 20-25	114.90	22.9
13H-5, 110-115	115.75	23.6
13H-6, 20-25	116.40	24.6
13H-6, 110-115	117.25	24.0
13H-7, 20-25	117.90	29.4
14X-1, 20-25	118.60	26.0
14X-1, 110-115	119.45	29.5
14X-2, 20-25	120.10	33.8
14X-2, 110-115	120.95	36.0
14X-3, 20-25	121.60	34.9
14X-3, 110-115	122.45	31.4
14X-4, 20-25	123.10	31.9
14X-4, 110-115	123.95	31.9
14X-5, 20-25	124.60	31.7
14X-5, 110-115	125.45	34.2
14X-6, 20-25	126.10	27.5
14X-6, 110-115	126.95	17.6
15X-1, 20-25	127.00	26.9
15X-1, 110-115	127.85	28.5
15X-2, 20-25	128.50	26.3
15X-2, 110-115	129.35	32.0
15X-3, 20-25	130.00	21.1
15X-3, 110-115	130.85	29.8
15X-4, 20-25	131.50	26.0
15X-4, 110-115	132.35	28.3
15X-5, 20-25	133.00	24.8
15X-5, 110-115	133.85	32.9
15X-6, 20-25	134.17	30.8
16X-1, 20-25	136.60	26.4
16X-1, 110-115	137.45	32.5
16X-2, 20-25	138.10	32.2
16X-2, 110-115	138.95	33.8
16X-3, 20-25	139.60	20.9
16X-3, 110-115	140.45	24.7
16X-4, 20-25	141.10	21.7
16X-4, 110-115	141.95	26.7
16X-5, 20-25	142.60	23.4
16X-5, 110-115	143.45	31.8
17X-1, 20-25	146.30	23.9
17X-1, 110-115	147.15	23.5
17X-2, 20-25	147.80	26.6
17X-2, 110-115	148.65	32.7
17X-3, 20-25	149.30	27.6
17X-3, 110-115	150.15	24.7
17X-4, 20-25	150.80	25.4
17X-4, 110-115	151.65	24.2
17X-5, 20-25	152.30	30.5
18X-1, 20-25	155.90	29.3
18X-1, 110-115	156.75	31.3
18X-2, 20-25	157.40	37.2
18X-3, 20-25	158.90	67.6
18X-4, 20-25	160.40	34.6
18X-4, 110-115	161.25	38.6
18X-5, 20-25	165.50	38.6

Table 2 (continued).

Core, section, interval (cm)	Depth (mbsf)	> 63 $\mu$ m (%)
115-714A- (Cont.)		
19X-2, 105-110	167.85	30.2
19X-3, 20-25	168.50	29.1
19X-4, 20-25	170.00	22.5
19X-4, 110-115	170.85	30.7
19X-5, 20-25	171.50	37.4
19X-6, 20-25	173.00	31.7
19X-CC, 20-25	174.50	30.1
20X-1, 20-25	175.20	33.6
20X-3, 105-110	179.05	28.5
20X-4, 110-115	180.55	31.6
20X-5, 20-25	181.20	31.9
21X-1, 25-30	184.95	40.0
22X-1, 20-25	194.60	22.7
22X-1, 110-115	195.45	24.9
22X-2, 20-25	196.10	11.4
22X-2, 110-115	196.95	18.3
22X-4, 20-25	199.10	28.0
22X-4, 110-115	199.95	20.4
22X-5, 20-25	200.60	12.4
22X-5, 53-58	200.93	23.7
115-715A-		
6H-1, 105-110	47.85	37.0
6H-2, 105-110	49.35	41.1
6H-3, 105-110	50.85	52.6
6H-4, 105-110	52.35	45.7
6H-5, 105-110	53.85	37.8
6H-6, 105-110	55.35	39.6
7H-1, 105-110	57.55	27.9
7H-2, 105-110	59.05	32.6
7H-3, 105-110	60.55	31.9
7H-4, 105-110	62.05	31.1
7H-5, 105-110	63.55	31.6
7H-6, 105-110	65.05	41.3
8H-1, 105-110	67.15	39.4
8H-2, 105-110	68.65	35.4
8H-3, 105-110	70.15	44.1
8H-4, 105-110	71.65	40.9
8H-5, 105-110	73.15	42.0
8H-6, 105-110	74.65	41.4
9H-1, 105-110	76.75	39.7
9H-2, 105-110	78.25	38.1
9H-3, 105-110	79.75	37.3
9H-4, 105-110	81.25	38.2
9H-5, 105-110	82.75	37.2
9H-6, 105-110	84.25	40.1
10H-2, 105-110	87.85	45.2
10H-3, 105-110	89.35	44.8
10H-4, 105-110	90.85	40.0
10H-5, 105-110	92.35	32.8
10H-6, 105-110	93.85	37.8
11H-1, 105-110	95.95	30.0
11H-2, 105-110	97.45	36.3
11H-3, 105-110	98.95	36.3
11H-4, 105-110	100.45	38.6
11H-5, 105-110	101.95	38.6
11H-6, 105-110	103.45	36.1
115-716B-		
12H-1, 105-108	101.35	62.0
12H-2, 105-108	102.85	60.2
12H-3, 105-108	104.35	55.7
12H-4, 105-108	105.85	47.9
12H-5, 105-108	107.35	46.1
12H-6, 105-108	108.85	39.0
13H-1, 105-108	111.05	56.8
13H-2, 105-108	112.55	52.2
13H-3, 105-108	114.05	47.3
13H-4, 105-108	115.55	56.8
13H-5, 105-108	117.05	52.5
13H-6, 105-108	118.55	46.6
14H-1, 105-108	120.75	34.1
14H-2, 105-108	122.25	57.0
14H-3, 105-108	123.75	51.1



Table 2 (continued).

Core, section, interval (cm)	Depth (mbsf)	>63 $\mu\text{m}$ (%)
115-716B- (Cont.)		
14H-4, 105-108	125.25	44.8
14H-5, 105-108	126.75	45.4
14H-6, 105-108	128.25	48.4
15H-1, 105-108	130.35	42.6
15H-2, 105-108	131.85	51.1
15H-3, 105-108	133.35	46.2
15H-5, 105-108	136.35	51.2
15H-6, 105-108	137.85	51.0
16H-1, 105-108	139.95	47.3
16H-2, 105-108	141.45	50.6
16H-3, 105-108	142.95	48.1
16H-4, 105-108	144.45	48.7
16H-5, 105-108	145.95	53.4
16H-6, 105-108	147.45	52.0
17H-1, 105-108	149.65	35.1
17H-2, 105-108	151.15	31.6
17H-3, 105-108	152.65	27.2
17H-4, 105-108	154.15	34.3
17H-5, 105-108	155.65	19.9
17H-6, 105-108	157.15	6.9
18H-1, 105-108	159.35	28.2
18H-2, 105-108	160.85	50.8
18H-3, 105-108	162.35	44.4
18H-4, 105-108	163.85	29.9
18H-5, 105-108	165.35	26.9
18H-6, 105-108	166.85	24.9
19H-1, 105-108	168.95	11.7
19H-2, 105-108	170.45	37.0
19H-3, 105-108	171.95	20.0
19H-4, 105-108	173.45	8.4
19H-5, 105-108	174.95	8.2
19H-6, 105-108	176.45	25.8
20H-1, 105-108	178.55	22.1
20H-2, 105-108	180.05	31.3
20H-3, 105-108	181.55	15.1
20H-4, 105-108	183.05	10.1
20H-5, 105-108	184.55	33.7
20H-6, 105-108	186.05	25.2
21H-1, 105-108	188.25	32.6
21H-2, 105-108	189.75	12.7
21H-3, 105-108	191.25	26.3
21H-4, 105-108	192.75	38.6
21H-5, 105-108	194.25	27.7
21H-6, 105-108	195.75	25.9
22H-1, 105-108	197.95	9.0
22H-2, 105-108	199.45	12.5
22H-4, 105-108	202.45	14.7
22H-5, 105-108	203.95	23.1
22H-6, 105-108	205.45	23.9
23H-1, 105-108	207.55	23.5
23H-2, 105-108	209.05	12.0
23H-3, 105-108	210.55	17.0
23H-4, 105-108	212.05	23.5
23H-5, 105-108	213.55	22.6
23H-6, 105-108	215.05	27.1
24H-1, 105-108	217.15	21.8
24H-2, 105-108	218.65	24.3
24H-3, 105-108	220.15	11.2
24H-4, 105-108	221.65	12.3
24H-5, 105-108	223.15	13.5
24H-6, 105-108	224.65	19.2
25H-1, 105-108	226.85	16.4
25H-2, 105-108	228.35	11.4
25H-3, 105-108	229.85	11.6
25H-4, 105-108	231.35	15.8
25H-5, 105-108	232.85	9.6
25H-6, 105-108	234.35	9.1
26H-1, 105-108	236.55	5.3
26H-2, 105-108	238.05	12.1
26H-3, 105-108	239.55	7.2
26H-4, 105-108	241.05	5.0
26H-5, 105-108	242.55	8.2
26H-6, 105-108	244.05	11.6
27H-1, 105-108	246.15	6.6
27H-2, 105-108	247.65	11.3

Table 2 (continued).

Core, section, interval (cm)	Depth (mbsf)	>63 $\mu\text{m}$ (%)
115-716B- (Cont.)		
27H-3, 105-108	249.15	6.8
27H-4, 105-108	250.65	9.6
27H-5, 105-108	252.15	6.3
27H-6, 105-108	253.65	4.6
28H-1, 105-108	255.75	6.4
28H-2, 105-108	257.25	5.8
28H-3, 105-108	258.75	6.4
28H-4, 105-108	260.25	2.9
28H-5, 105-108	261.75	3.5
28H-6, 105-108	263.25	6.1

*Globigerinoides elongatus* (d'Orbigny)  
(Plate 1, Figs. 26 and 27)

*Globigerinoides elongatus* d'Orbigny, 1826.

*Globigerinoides elongatus* (d'Orbigny), Parker, 1973, p. 272, Pl. 1, Fig. 9.

*Globigerinoides ruber* (d'Orbigny), Parker, 1967, p. 156, Pl. 22, Fig. 4.

*Globigerinoides fistulosus* (Schubert)  
(Plate 2, Figs. 1-3)

*Globigerina fistulosa* Schubert, 1910, p. 323, Fig. 1.

*Globigerinoides mitra* Todd  
(Plate 2, Figs. 4-6 and 11)

*Globigerinoides mitra* Todd, 1957, p. 302, Pl. 78, Figs. 3 and 6.

*Globigerinoides obliquus extremus* Bolli  
(Plate 2, Figs. 7 and 8)

*Globigerinoides obliquus extremus* Bolli and Bermudez, 1965, p. 139, Pl. 1, Figs. 10-12.

*Globigerinoides obliquus obliquus* Bolli  
(Plate 2, Figs. 9, 10, and 14)

*Globigerinoides obliqua* Bolli, 1957, p. 113, Pl. 25, Figs. 9, 10.

*Globigerinoides primordius* Blow and Banner  
(Plate 2, Figs. 12 and 13)

*Globigerinoides primordius* Blow and Banner, 1962.

*Globigerinoides quadrilobatus* (d'Orbigny) s.l.  
(Plate 2, Figs. 15-19)

*Globigerina quadrilobata* d'Orbigny, 1846, p. 164, Pl. 9, Figs. 7-10.

*Globigerina sacculifera* Brady, 1877, p. 535; 1884, Pl. 80, Figs. 11-17.

*Globigerina sacculiferus* (Brady) var. *immatura* LeRoy, 1939, p. 263, Pl. 3, Figs. 19-21.

*Globigerina triloba* Reuss, 1850, p. 374, Pl. 447, Fig. 11.

**Remarks.** The four subspecies *G. quadrilobatus immaturus*, *G. quadrilobatus trilobus*, *G. quadrilobatus quadrilobatus*, and *G. quadrilobatus sacculifer* were not separated in the species examination for this report.

*Globigerinoides ruber* (d'Orbigny) s.l.  
(Plate 2, Figs. 20 and 21)

*Globigerina rubra* d'Orbigny, 1839, p. 82, Pl. 4, Figs. 12-14.

*Globigerinoides subquadratus* Brönnimann, in Todd et al., 1954, p. 680, Pl. 1, Figs. 5 and 8.

**Remarks.** The early-middle Miocene species *G. subquadratus* was not separated in this report from the late middle Miocene to Holocene species *G. ruber*.

Table 3. Distribution of Neogene planktonic foraminifers in sediments of Hole 705A.

Series	Zone	Core, section, interval (cm)	Depth (mbsf)	<i>Candeina nitida</i>	<i>Globigerinella calida</i>	<i>Globigerinella siphonifera</i>	<i>Globigerinita glutinata</i>	<i>Globigerinoides conglobatus</i>	<i>Globigerinoides elongatus</i>	<i>Globigerinoides fistulosus</i>	<i>Globigerinoides obliquus extremus</i>	<i>Globigerinoides obliquus obliquus</i>	<i>Globigerinoides quadrilobatus s.l.</i>	<i>Globigerinoides ruber s.l.</i>	<i>Orbulina universa</i>	<i>Globorotalia scitula</i>	<i>Globorotalia menardii s.l.</i>	<i>Globorotalia limbata</i>	<i>Globorotalia margaritae</i>	<i>Globorotalia tumida tumida</i>	<i>Globorotalia crassaformis s.l.</i>	<i>Globorotalia tosaensis</i>	<i>Globorotalia truncatulinoides</i>	<i>Globorotaloides hexagona</i>	<i>Dentoglobigerina altispira altispira</i>	<i>Dentoglobigerina altispira globosa</i>	<i>Globoquadrina barroemouensis</i>	<i>Globoquadrina conglomerata</i>	<i>Globoquadrina dehiscens</i>	<i>Globoquadrina venezuelana</i>	<i>Neogloboquadrina acostaensis</i>	<i>Neogloboquadrina dutertrei</i>	<i>Neogloboquadrina humerosa</i>	<i>Pulleniatina obliquiloculata</i>	<i>Pulleniatina primalis</i>	<i>Sphaeroidinella dehiscens</i>	<i>Sphaeroidinellopsis kochi</i>	<i>Sphaeroidinellopsis seminulina</i>	Benthic foraminifers	Planktonic foraminifer fragments	Preservation			
Pleistoc.	N22	1H-CC	8.50	x		x						x	x x / x						x	x x							x																R	G
Upper Pliocene	N21	2H-4, 80-82	13.80		x	x			x / x	x x	x		x x x							x x							x								x x x							R	G	
		2H-5, 80-82	15.30		x	x	x		x x	x x	x		x x x x x							x x															x x							R	G	
		2H-6, 36-38	16.36		x	x			x x	x x	x x		x x x x x							/ x /								x							x x							R	G	
	N19	2H-CC	18.00	/	x	x			/ x	x			x x						x x								x /							x x x								R	G	
		3H-1, 80-83	18.80		x	x			x	x x		x x x							/ x x															x x x								R	G	
		3H-2, 57-60	20.07	/	x	x				x x		x x x							x															x x x								R	G	
		3H-CC	27.50	/	x	x				x x		x x x							x x								/ / x							x x									R	G

Table 4. Distribution of Neogene planktonic foraminifers in sediments of Hole 706A.

Series	Zone	Core, section, interval (cm)	Depth (mbsf)	<i>Beella digitata</i>	<i>Candeina nitida</i>	<i>Globigerina adamsi</i>	<i>Globigerinella calida</i>	<i>Globigerinella siphonifera</i>	<i>Globigerinoides conglobatus</i>	<i>Globigerinoides elongatus</i>	<i>Globigerinoides quadrilobatus s.l.</i>	<i>Globigerinoides ruber s.l.</i>	<i>Orbulina universa</i>	<i>Globorotalia scitula</i>	<i>Globorotalia menardii s.l.</i>	<i>Globorotalia tumida tumida</i>	<i>Globorotalia crassaformis s.l.</i>	<i>Globorotalia truncatulinoides</i>	<i>Globorotalia theyeri</i>	<i>Globorotalia unguolata</i>	<i>Dentoglobigerina altispira altispira</i>	<i>Globoquadrina conglomerata</i>	<i>Neogloboquadrina dutertrei</i>	<i>Neogloboquadrina humerosa</i>	<i>Pulleniatina obliquoculata</i>	<i>Sphaeroidinella dehiszens</i>	<i>Sphaeroidinellopsis kochi</i>	<i>Sphaeroidinellopsis seminulina</i>	Benthic foraminifers	Mollusc fragments	Planktonic foraminifer fragments	Preservation	
Pleistoc.	N22	1H-1, 80-83	0.80	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	/	x	x	x	x	x	x			F	C	VR	G	
		1H-2, 73-76	2.23		x		x		x	x	x	x	x	x	x	x	x	x	x		/	x	x			x	x	/		F	C	R	G
		1H-CC	2.50				x		x	x	x	x	x	x	x	x	x	x	x		/	x	x	/	x	x	/	x			VR	G	
		2H-1, 80-83	3.30				x		x	x	x	x	x	x	x	x	x	x	x	x		x	x			x	x			VR	G		

*Globoquadrina baroemouensis* (LeRoy)  
(Plate 6, Figs. 11 and 16)

*Globigerina baroemouensis* LeRoy, 1939, p. 263, Pl. 6, Figs. 1 and 2.

*Globoquadrina binaiensis* (Koch)  
(Plate 6, Figs. 12-15)

*Globigerina? aspera* Koch, 1926, p. 746, Fig. 22.  
*Globigerina binaiensis* Koch, 1935, p. 558.

*Globoquadrina conglomerata* (Schwager)  
(Plate 6, Fig. 21)

*Globigerina conglomerata* Schwager, 1866, Pl. 7, Fig. 113.  
*Globigerina conglomerata* Schwager, Banner and Blow, 1960, Pl. 2, Fig. 3 (neotype).  
*Globoquadrina conglomerata* (Schwager), Parker, 1962, Pl. 6, Figs. 11-18.

*Globoquadrina dehiszens* (Chapman, Parr and Collins)  
(Plate 6, Fig. 17)

*Globorotalia dehiszens* Chapman, Parr and Collins, 1934, p. 569, Pl. 11, Fig. 36.

*Globoquadrina praedeiszens* Blow and Banner  
(Plate 6, Figs. 18 and 19)

*Globoquadrina dehiszens praedeiszens* Blow and Banner, 1962, p. 116, Pl. 15, Figs. Q-S.

*Globoquadrina sellii* Borsetti  
(Plate 6, Figs. 20 and 24)

*Globoquadrina sellii* Borsetti, 1959, Pl. 1, Fig. 3.

*Globoquadrina tripartita* (Koch)

*Globigerina bulloides* var. *tripartita* Koch, 1926, p. 746, Fig. 21.

*Globoquadrina venezuelana* (Hedberg)  
(Plate 6, Figs. 22 and 23)

*Globigerina venezuelana* Hedberg, 1937, p. 681, Pl. 92, Fig. 7.

*Globorotalia archaeomenardii* Bolli

*Globorotalia archaeomenardii* Bolli, 1957, p. 119, Pl. 28, Fig. 11.

*Globorotalia crassaformis* (Galloway and Wissler)  
(Plate 5, Fig. 11)

*Globigerina crassaformis* Galloway and Wissler, 1927, p. 41, Pl. 7, Fig. 12.

*Globorotalia fohsi fohsi* Cushman and Ellisor  
(Plate 4, Figs. 4-6)

*Globorotalia fohsi* Cushman and Ellisor, 1939, p. 12, Pl. 2, Fig. 6.

*Globorotalia fohsi lobata* Bermudez  
(Plate 4, Figs. 7-9)

*Globorotalia lobata* Bermudez, 1949, p. 286, Pl. 22, Figs. 15-17.

*Globorotalia fohsi robusta* Bolli

*Globorotalia fohsi robusta* Bolli, 1950, pp. 84, 89, Pl. 15, Fig. 3.

*Globorotalia inflata* d'Orbigny

*Globigerina inflata* d'Orbigny, 1839, in Barker-Webb, P., and Berthelot, S., 1839, p. 134, Pl. 2, Figs. 7-9.

*Globorotalia juanai* Bermudez and Bolli

*Globorotalia juanai* Bermudez and Bolli, 1969, pp. 171-172, Pl. 14, Figs. 1-6.

*Globorotalia kugleri* Bolli  
(Plate 3, Figs. 8-11)

*Globorotalia kugleri* Bolli, 1957, p. 118, Pl. 28, Fig. 5.

*Globorotalia limbata* (d'Orbigny)  
(Plate 4, Figs. 19-21 and 24-28)

*Rotalia limbata* d'Orbigny, 1826, p. 274 (nomen nudum).  
*Rotalia limbata* d'Orbigny, in Fornasini, 1902, p. 56, Fig. 55.  
*Rotalia limbata* d'Orbigny, Banner and Blow, 1960, pp. 30-31, Pl. 5, Fig. 3 (lectotype).



*Globorotalia (Globorotalia) cultrata limbata* (d'Orbigny), Blow, 1969, Pl. 7, Figs. 4–6; Pl. 42, Figs. 2, 3.

*Globorotalia multicamerata* Cushman and Jarvis, Lamb and Beard, 1972, Pl. 14, Figs. 5–8.

*Globorotalia margaritae* Bolli and Bermudez  
(Plate 5, Figs. 4–6)

*Globorotalia margaritae* Bolli and Bermudez, 1965, p. 138, Pl. 1, Figs. 16–18.

*Globorotalia mayeri* Cushman and Ellisor—*Globorotalia siakensis*  
LeRoy group  
(Plate 3, Figs. 12–20)

*Globorotalia mayeri* Cushman and Ellisor, 1939, p. 11, Pl. 2, Fig. 4.  
*Globorotalia siakensis* LeRoy, 1939, p. 262.

**Remarks.** No attempt was made in this report to separate the two species *G. mayeri* and *G. siakensis*.

*Globorotalia menardii* (Parker, Jones and Brady) s.l.  
(Plate 4, Figs. 10–18, 22, and 23)

*Rotalia menardii* Parker, Jones and Brady, 1865, p. 20, Pl. 3, Fig. 81.  
*Pulvinulina menardii* (d'Orbigny) var. *fimbriata* Brady, 1884, p. 691, Pl. 103, Fig. 3.

**Remarks.** The Pleistocene variant *fimbriata* characterized by a peripheral carina with spikelike outgrowth (see Plate 7, Figs. 17, 18, 22, and 23) was not treated as a subspecies in this report.

*Globorotalia miozea* Finlay  
(Plate 5, Figs. 1–3)

*Globorotalia miozea* Finlay, 1939, p. 326, Pl. 29, Figs. 159–161.

*Globorotalia opima nana* Bolli

*Globorotalia opima nana* Bolli, 1957, p. 118, Pl. 28, Fig. 3.

*Globorotalia peripheroacuta* Blow and Banner  
(Plate 3, Figs. 26–28)

*Globorotalia (Turborotalia) peripheroacuta*, Blow and Banner, 1966, p. 294, Pl. 1, Fig. 2.

*Globorotalia peripheroronda* Blow and Banner  
(Plate 3, Figs. 23–25)

*Globorotalia (Turborotalia) peripheroronda* Blow and Banner, 1966, p. 294, Pl. 1, Fig. 1.

*Globorotalia plesiotumida* Blow and Banner

*Globorotalia (G.) tumida* (Brady) *plesiotumida* Blow and Banner, 1965, p. 1353, Fig. 2.

*Globorotalia praefohsi* Blow and Banner  
(Plate 4, Figs. 1–3)

*Globorotalia (Globorotalia) praefohsi* Blow and Banner, 1966, p. 295, Pl. 1, Figs. 3–4; Pl. 2, Figs. 6, 7 and 10–11.

*Globorotalia praemenardii* Cushman and Stainforth

*Globorotalia praemenardii* Cushman and Stainforth, 1945, p. 70, Pl. 13, Fig. 14.

*Globorotalia praescitula* Blow

*Globorotalia scitula praescitula* Blow, 1959, p. 221, Pl. 19, Fig. 12.

*Globorotalia pseudokugleri* Blow  
(Plate 3, Figs. 6–7)

*Globorotalia pseudokugleri* Blow, 1969, p. 391.

*Globorotalia scitula* (Brady)  
(Plate 3, Figs. 21, 22, and 29)

*Pulvinulina scitula* Brady, 1882, p. 716 (figures in Brady, 1882, Pl. 103, Fig. 7).

*Pulvinulina scitula* Brady, Banner and Blow, 1960, Pl. 5, Fig. 5 (lectotype).

*Globorotalia theyeri* Fleisher  
(Plate 5, Figs. 13–15)

*Globorotalia theyeri* Fleisher, 1974, p. 1028, Pl. 12, Fig. 9; Pl. 13, Figs. 1–5.

*Globorotalia tosaensis* Takayanagi and Saito

*Globorotalia tosaensis* Takayanagi and Saito, 1962, p. 81, Pl. 28, Figs. 11–12.

*Globorotalia truncatulinoidea* (d'Orbigny)  
(Plate 5, Figs. 12, 18, and 23)

*Rotalina truncatulinoidea* d'Orbigny, 1839, in Barker-Webb, P., and Berthelot, S., p. 132, Pl. 2, Figs. 25–27.

*Globorotalia tumida tumida* (Brady)  
(Plate 5, Fig. 7)

*Pulvinulina menardii* (d'Orbigny) var. *tumida* Brady, 1877, p. 535.

*Globorotalia tumida flexuosa* (Kock)  
(Plate 5, Figs. 8–10)

*Pulvinulina tumida* Brady var. *flexuosa* Kock, 1923, p. 351, Figs. 9 and 10.

*Globorotalia ungulata* Bermudez  
(Plate 5, Figs. 16 and 17)

*Globorotalia ungulata* Bermudez, 1960, p. 1304, Pl. 15, Fig. 6.

*Globorotaloides hexagona* (Natland)  
(Plate 5, Figs. 19, 20, and 24)

*Globigerina hexagona* Natland, 1938, p. 149, Pl. 7, Fig. 1.

*Globorotaloides suteri* Bolli  
(Plate 5, Figs. 21 and 22)

*Globorotaloides suteri* Bolli, 1957, p. 117, Pl. 27, Figs. 9–13.

*Globorotaloides variabilis* Bolli  
(Plate 5, Figs. 25–27)

*Globorotaloides variabilis* Bolli, 1957, p. 117, Pl. 27, Figs. 15–20.

*Globoturborotalita druryi* (Akers)

*Globigerina druryi* Akers, 1955, p. 654, Pl. 65, Fig. 1.

*Globoturborotalita nepenthes* (Todd)  
(Plate 7, Figs. 1 and 2)

*Globigerina nepenthes* Todd, 1957, p. 301, Fig. 7.

*Neogloboquadrina acostaensis* (Blow)  
(Plate 7, Figs. 3–6, 10, and 11)

*Globorotalia acostaensis* Blow, 1959, p. 208, Pl. 17, Fig. 106.

*Neogloboquadrina dutertrei* (d'Orbigny)  
(Plate 7, Figs. 12–16)

*Globigerina dutertrei* d'Orbigny, 1839, p. 84, Pl. 4, Figs. 19–21.



Table 5 (Continued).

Zone	Core, section interval (cm)	Depth (mbsf)	<i>Globorotalia menardii</i> s.l.	<i>Globorotalia limbata</i>	<i>Globorotalia mozea</i>	<i>Globorotalia juanai</i>	<i>Globorotalia margaritae</i>	<i>Globorotalia pleiotumida</i>	<i>Globorotalia tumida tumida</i>	<i>Globorotalia tumida flexuosa</i>	<i>Globorotalia crassatormis</i> s.l.	<i>Globorotalia tosaensis</i>	<i>Globorotalia truncatulumoides</i>	<i>Globorotaboides hexagona</i>	<i>Globorotaboides sulteri</i>	<i>Globorotaboides variabilis</i>	<i>Dentoglobigerina aitispira aitispira</i>	<i>Dentoglobigerina aitispira globosa</i>	<i>Dentoglobigerina galayisi</i>	<i>Dentoglobigerina globularis</i>	<i>Globoquadrina baromoensis</i>	<i>Globoquadrina binaiensis</i>	<i>Globoquadrina conglommerata</i>	<i>Globoquadrina dehiscens</i>	<i>Globoquadrina pradehiscens</i>	<i>Globoquadrina sellii</i>	<i>Globoquadrina tripartista</i>	<i>Globoquadrina venezuelana</i>	<i>Globobulimina neperithes</i>	<i>Neoglobobulimina acostaensis</i>	<i>Neoglobobulimina duterrei</i>	<i>Neoglobobulimina humerosa</i>	<i>Pulleniatina obliquiculata</i>	<i>Pulleniatina primalis</i>	<i>Sphaeroidinella dehiscens</i>	<i>Sphaeroidinellopsis disjuncta</i>	<i>Sphaeroidinellopsis kochi</i>	<i>Sphaeroidinellopsis seminulina</i>	Benthic foraminifers	Ostracodes	Radiolarians	Sponge spicules	Fish remains	Calcareous aggregates	Foraminifers embedded	Planktonic foraminifer fragments	Preservation	
N22	1H-CC	6.60	x					x / x	x														/						x x	x	x				R							F	G					
N21	2H-5, 107-112	13.67	x					x / /	x														x						/ x x x						R							F	M					
	2H-6, 107-112	15.17	x					x / /	x														x						/ x x x						F							F	M					
	2H-CC	16.20	x					x x /	x														/						/ x x x						F							F	G					
	3H-1, 107-112	17.27	x x					x x	x														/						x x x x						F							F	M					
N19	3H-2, 107-112	18.77	x x					x /	x								x	x					/					/ x x x x								x							F	M				
	3H-3, 107-112	20.27	x x					x x	x	x							x	x	x				/					/ x x x x								x						F	M					
	3H-4, 107-112	21.77	x x	/				x / x	x	x							x	x	x								/ x x x x										F						F	M				
	3H-CC	25.80	x x					x x /	x	x							x	x	x								/ x x x x									F						F	G					
	4H-1, 107-112	26.87	x x	/				x x /	x	x							x	x	x								/ x x x x										R						F	G				
	4H-2, 107-112	28.37						x x	x	x							x	x	x								/ x x x x															F	M					
	4H-3, 107-112	29.87						x x x	x	x							x	x	x							/ /		/ x x x x															F	M				
	4H-4, 107-112	31.37						x x x	x	x							x	x	x							/		/ x x x x														F	M					
	4H-CC	35.50						x x	x	x							x	/ x /	/					/ /			/ /	/ x x x x																F	M			
	5H-1, 107-112	36.57						x	x	x							x	/ x /	/					/ /		/ /	/ x x x x			/ x x x x															F	M		
	5H-2, 107-112	38.07	x x	x	x x				x x	x	x						x	x x x	x						x x /		x x /	/ x x x x			/ x x x x														F	M		
	5H-3, 107-112	39.57	x x	/	x				x	x	x						x	x x x	x						x x /		x x /	/ x x x			/ x x x														F	M		
	5H-4, 107-112	41.07	x x	/	x				x	x	x						x	x x	x						x x /		x x /	/ x x x /			/ x x x /														F	M		
	5H-5, 107-112	42.57	x x		x				x	x	x						x	x x x	x						x /		x x /	/ x x x /			/ x x x /														F	M		
5H-6, 107-112	43.41	x x	/	x				x	x	x						x	x x x	x						x / x		x x x	/ x x x			/ x x x															F	M		
5H-CC	45.10	x x	x	x				x	x	x						x	x x x	x						x /		x x x	/ x x x			/ x x x																F	G	
6H-1, 107-112	46.17	x x	/	x				x	x	x						x	x x x	x						x x x		x x x	/ x x x			/ x x x																F	G	
6H-2, 107-112	47.67	x x	x	x				x	x	x						x	x x	x						x x x		x x x	/ x /			/ x /																	F	M
N18	6H-3, 107-112	49.17	x x	/	x			x	x x	x						x	x x	x				/		x x x x	/ x	x x x	/ x	x	x	x x x															F	M		
	6H-4, 107-112	50.67	x x	x	x /			x	x x	x						x	x x	x						x x x	x x	x x x	x x	x x x	x x	x x	x x															F	M	
	6H-5, 107-112	52.17	x x	x x	x /			x	x x	x						x	x x	x						x x x	/ x	x x x	/ x	x x x	/ x	x x x																F	M	
	6H-6, 107-112	53.67	x x	x	x			x	x							x	x							x x x	x	x	/ x	x x x	/ x	x x x																F	M	
	6H-CC	54.70	x x	x	x			x	x							x	x							/	x x x	x /	x x x	/ x	x x x	/ x	x x x																F	G
	7H-1, 107-112	55.77	x x	x /	x x				x x	x							x	x					/		x x x	x x	x x x	x x	x x x	x x	x x																R	G
N17b	7H-2, 107-112	57.27	x x	x				x	x x	x						x	x x	x				/		x x x	x x	x x x	x x	x x x	x x	x x																	R	G
	7H-3, 107-112	58.77	x x	/ /				x	x x	x						x	x x	x						x x x	x /	x	x	x x x	/ x	x	x																R	G
	7H-4, 107-112	60.27	x x	x /				x	x x	x						x	x x	x						x x x	x	x	x x x	x	x	x																	F	G
	7H-5, 107-112	61.77	x x	x / x				x	x x	x						x	x x	x						x x x	x	x	x x x	x	x	x	x																F	G
	7H-6, 107-112	63.27	x x	x /				x	x x	x						x	x x	x					/		x x x	x	x	x x x	x	x	x																F	M
	7H-CC	64.30	x x	/	x			x	x x	x						x	x x	x					/		x x x	x	x	x x x	x	x	x																F	G
	8H-1, 107-112	65.37	x x		/			x	x x	x						x	x x	x						x x x	x	x	x x x	x	x	x x																F	G	
	8H-2, 107-112	66.87	x x					x	x x	x						x	x x	x						x x	x	x	x x	x	x	x																	F	M

*Pulleniatina obliquiculata* (Parker and Jones)  
(Plate 7, Fig. 20)

*Pullenia sphaeroides* (d'Orbigny) var. *obliquiculata* Parker and Jones;  
1865, p. 368, Pl. 19, Fig. 4.

*Pulleniatina primalis* Banner and Blow  
(Plate 7, Figs. 17-19)

*Pulleniatina primalis* Banner and Blow, 1967, p. 142, Pl. 1, Figs. 3-8;  
Pl. 3, Fig. 2.

*Sphaeroidinella dehiscens* (Parker and Jones)  
(Plate 7, Figs. 21 and 22)

*Sphaeroidina bulloides* d'Orbigny var. *dehiscens* Parker and Jones, 1865,  
p. 369, Pl. 19, Fig. 5.

*Sphaeroidinellopsis disjuncta* (Finlay)

*Sphaeroidinella disjuncta* Finlay, 1940, p. 467, Pl. 67, Figs. 224-228.

*Sphaeroidinellopsis kochi* Caudri  
(Plate 7, Figs. 23-26)

*Globigerina kochi* Caudri, 1934, p. 144 (type figures in *Eclogae Geol.*  
*Helv.*, Bd. 18(2), Fig. 8).  
*Sphaeroidinella multiloba* LeRoy, 1944, p. 91, Pl. 4, Figs. 7-9.  
*Sphaeroidinella seminulina* (Schwager), Parker, 1967, p. 161, Pl. 23,  
Figs. 1-5.  
*Sphaeroidinellopsis hancocki* Bandy, 1975, p. 57, Pl. 1, Fig. 3.

*Sphaeroidinellopsis seminulina* (Schwager)

*Globigerina seminulina* Schwager, 1866, p. 256, Pl. 7, Fig. 112.  
*Sphaeroidinella dehiscens subdehiscens* Blow, 1959, p. 195, Pl. 12, Figs.  
71-72.  
*Sphaeroidinella subdehiscens* Blow, Parker, 1967, p. 162, Pl.

Table 5 (Continued).

Series	Zone	Core, section interval (cm)	Depth (mbsf)	<i>Candeina nitida</i>	<i>Cassigerinella chipolensis</i>	<i>Catapsydrax dissimilis</i>	<i>Catapsydrax staineri</i>	<i>Globigerina angulicostata</i>	<i>Globigerina angustumbilicata</i>	<i>Globigerina cipoensis</i>	<i>Globigerina euapertura</i>	<i>Globigerina praebullosa</i>	<i>Globigerinella insueta</i>	<i>Globigerinella calida</i>	<i>Globigerinella praesiphonifera</i>	<i>Globigerinella siphonifera</i>	<i>Globigerinita glutinata</i>	<i>Globigerinoides altiapertura</i>	<i>Globigerinoides bispericus</i>	<i>Globigerinoides conglobatus</i>	<i>Globigerinoides minutus</i>	<i>Globigerinoides elongatus</i>	<i>Globigerinoides fistulosus</i>	<i>Globigerinoides mitra</i>	<i>Globigerinoides obliquus extremus</i>	<i>Globigerinoides obliquus obliquus</i>	<i>Globigerinoides primordius</i>	<i>Globigerinoides quadrilobatus s.l.</i>	<i>Globigerinoides ruber s.l.</i>	<i>Præorbulina sicana</i>	<i>Præorbulina transitoria</i>	<i>Præorbulina glomerosa curva</i>	<i>Præorbulina glomerosa glomerosa</i>	<i>Orbulina suturalis</i>	<i>Orbulina universa</i>	<i>Globorotalia pseudokugleri</i>	<i>Globorotalia kugleri</i>	<i>Globorotalia opima nana</i>	<i>Globorotalia mayeri-G. siakensis</i>	<i>Globorotalia praescitula</i>	<i>Globorotalia scitula</i>	<i>Globorotalia peripheronda</i>	<i>Globorotalia peripheracuta</i>	<i>Globorotalia praebohsi</i>	<i>Globorotalia foehsi foehsi</i>	<i>Globorotalia foehsi lobata</i>	
Upper Miocene	N17a to N16	8H-3, 107-112	68.37	x																					x x x										x												
		8H-4, 107-112	69.87	x																						x x x										x											
		8H-5, 107-112	71.37	x																						x x x											x										
		8H-6, 107-112	72.87																							x x x											x										
		8H-CC	74.00																							x x x											x										
		9H-1, 107-112	75.07																							x x x											x										
		9H-2, 107-112	76.57		x																					x x x											x										
		9H-3, 107-112	78.07																							x x x											x										
		9H-4, 107-112	79.57																							x x x											x										
		9H-5, 107-112	81.07																							x x x										x											
	9H-6, 107-112	82.57		x																					x x x										x												
	9H-CC	83.60																							x x x												x										
	10H-1, 107-112	84.67																							x x x												x										
	10H-2, 107-112	86.17																							x x x												x										
	10H-3, 107-112	87.67																							x x x												x										
	10H-4, 107-112	89.17																							x x x												x										
	10H-5, 107-112	90.67																							x x x												x										
	10H-6, 80-85	91.90																							x x x												x										
	10H-CC	93.20																							x x x												x										
	11H-1, 53-58	93.73																							x x x												x										
	11H-CC	102.80													x										x x x												x										
Middle Miocene	N15	12H-1, 107-112	103.87																						x x										x x												
		12H-2, 107-112	105.37																						/ x x											x											
		12H-3, 107-112	106.87													x									x x											x x											
		12H-4, 107-112	108.37													x x									x x												x x										
		12H-5, 107-112	109.87													x x									x x												x x										
		12H-6, 105-110	111.35													x x									x x												x x										
		12H-CC	112.40													x									/ x x												x x										
Lower Miocene	N14	13H-1, 107-112	113.47																					x x x											x x												
		13H-2, 107-112	114.97													x x									x x x										x												
		13H-3, 107-112	116.47													x x									x x											x x											
	N13	13H-4, 107-112	117.97																						/ x x											x x											
		13H-5, 107-112	119.47																						/ x x x											x x											
	N12	13H-CC	122.00																x					x x x x												x x										x x	
N11-10	14H-1, 107-112	123.07							x															/ x												x x							/				
N9	14H-2, 107-112	124.57									x				x									x x /												/ x											
N8	14H-3, 107-112 14H-4, 107-112 14H-CC	126.07 127.57 131.60									x													x / x												x x x x x											
Lower Miocene	N7-6	15H-1, 107-112	132.67																					/ x x																							
		15H-2, 107-112 15H-3, 107-112	134.17 135.67																						x x x x																						
	N4	15H-4, 107-112 15H-5, 107-112 15H-CC	137.17 138.67 141.30																						x x x x																						
Oligoc.	P22	16H-1, 107-112	142.37	x x x	x x x	/																																									







Table 6 (Continued).

Zone	Core, section interval (cm)	Depth (mbsf)	<i>Dentoglobigerina alispira alispira</i>	<i>Dentoglobigerina alispira globosa</i>	<i>Dentoglobigerina globularis</i>	<i>Globoquadrina barroemouensis</i>	<i>Globoquadrina binatalensis</i>	<i>Globoquadrina conglomerata</i>	<i>Globoquadrina selli</i>	<i>Globoquadrina venezuelana</i>	<i>Globobulborotalia druryi</i>	<i>Globobulborotalia nepenthes</i>	<i>Neoglobobulborotalia acostaensis</i>	<i>Neoglobobulborotalia duterrei</i>	<i>Neoglobobulborotalia humerosa</i>	<i>Pulleniatina obliquiloculata</i>	<i>Pulleniatina primalis</i>	<i>Sphaeroidinella dehiscentes</i>	<i>Sphaeroidinellopsis kochi</i>	<i>Sphaeroidinellopsis semimulina</i>	<i>Globigerinatheka spp.*</i>	<i>Morozovella spp.*</i>	Minute fauna*	Benthic foraminifers	Ostracodes	Radiolarians	Sponge spicules	Fish remains	Calcareous aggregates	Foraminifers embedded	Planktonic foraminifer fragments	Preservation	
N22	1H-CC 2H-CC	9.03 19.60				x						x	x	x	x	x							R	A	A	C						P M	
N21	3H-CC 4H-CC	28.10 37.60	x			x						x	x	x	x	x	x						F	A	A	C		F	F	A		P/M P/M	
N19 to N18	5H-CC	47.20	x			x	x									x	x	x	x				F	C	C							P/M	
	6H-2, 105-110	49.75														/	x	x	x				F	A	A							P	
	6H-3, 22-27	50.42															x	x	x				F	A	A							VP	
	6H-5, 105-110	53.15															x						F	A	A							VP	
	6H-7, 105-110	55.65															/	x	x				F	A	A							P	
	6H-CC	56.80	x			x		x								/	x	x	x				F	A	F							P	
	7H-2, 126-130	59.56															/	x	x				F	A	A							G	
	7H-3, 105-110	60.85																x	x				F	A	A							P	
	7H-4, 24,29	61.54																/					F	A	A							P	
	7H-5, 135-142	64.15				x		x					x	x	x	x							C	A	A							P	
	7H-6, 100-105	65.30	x	x				x					x			x							C	A	A							P	
	7H-7, 23-28	66.03	x	x				x					x			x							C	A	A							P	
	7H-CC	66.40	x	x				x	x	x			x	x	x	x							C	F	F							M	
	8H-1, 105-110	67.45																					C	A	A							P	
8H-2, 105-110	68.95																					C	A	A							P		
8H-6, 105-110	74.95															x		x				F	A	A							P		
8H-CC	76.00	x	x				x					x	x	x	x							F	C	C	R		F	A			M		
N17b	9X-1, 65-70	76.65						x				x											F	A	A							VP	
	9X-CC, 22-27	79.31										x	x										F	C	C							VP	
	9X-CC	82.10	x	x				x				x				/							F	C	C							P	
	10X-1, 106-111	83.16						x				x											F	A	A							VP	
	10X-2, 106-111	84.66										x											F	A	A							VP	
	10X-CC	91.70	x					x				x	x										F	C	C							P	
	11X-CC	101.40	x					x				x	x			/							F	R	C		F	A				M	
N17 to N14	12X-2, 105-112	103.95									x												C	A	A							VP	
	12X-3, 105-112	105.45									x												C	A	A							VP	
	12X-4, 105-111	106.95									x												C	A	A							VP	
	12X-CC	111.00	x					x				x											F	C	C							P/M	
	13X-1, 12-16	111.12										x											F	R	A	A						VP	
	13X-2, 100-104	112.46										x											F	A	A							VP	
	13X-3, 46-50	113.42										/											F	A	A							VP	
	13X-4, 9-13	114.55										/											F	A	A							VP	
	13X-5, 83-86	116.79										/											R	C	C							VP	
	13X-CC	120.60	x	x				x				x											C	C	C							M	
	14X-1, 105-110	121.65						/				/											C	A	A	R						VP	
	14X-2, 105-110	123.15						x				x	x										F	A	A							VP	
	14X-3, 105-110	124.65	x	x				x				x	x										F	C	C							P	
	14X-4, 105-110	126.15	x	x				x				x											C	A	A							P	
14X-5, 105-110	127.65						x				x											R	A	A	F						VP		
Unzoned	14X-6, 135-140	129.45	x				x																F	A	A	R	R					P	
	14X-CC	130.30	x				x																A	C	A	R	R						P
	15X-5, 105-110	137.35	x				x																C	R	A	R	R						VP
	15X-CC	140.00	x				x																R	C	A	R	R						P
	16X-5, 108-112	147.08					x																R	C	A	R	R						P
	16X-CC	149.60	x				x																R	C	A	R	R						P
	17X-2, 105-110	152.15																					R	C	A	R	R						VP
N6 to N4	17X-3, 105-110	153.65																					A	A	A							VP	
	17X-4, 105-110	155.15																					C	A	A							VP	
	17X-CC	159.50																					R	F	A							VP	
	18X-3, 105-110	163.35																					F	C	A							P	
	18X-CC	168.60	x																				F	C	A							P	
	19X-1, 105-110	169.65	x																				C	A	A							P	
	19X-CC	178.20																					R	A	A							VP	
20X-3, 7-11	181.27																					R	A	A							VP		

\* Reworked



Table 7 (Continued).

Zone	Core, section interval (cm)	Depth (mbsf)	<i>Globorotalia tumida tumida</i>	<i>Globorotalia tumida flexuosa</i>	<i>Globorotalia crassatiformis</i> s.l.	<i>Globorotalia truncatulinoides</i>	<i>Globorotaloides hexagona</i>	<i>Globorotaloides suteri</i>	<i>Globorotaloides variabilis</i>	<i>Clavatorella bermudezi</i>	<i>Dentoglobigerina albispira albispira</i>	<i>Dentoglobigerina albispira globosa</i>	<i>Dentoglobigerina galavisi</i>	<i>Dentoglobigerina globularis</i>	<i>Globobuccina barreñoensis</i>	<i>Globobuccina binalensis</i>	<i>Globobuccina conglomerata</i>	<i>Globobuccina dehiscens</i>	<i>Globobuccina praedehiscens</i>	<i>Globobuccina sellii</i>	<i>Globobuccina tripartita</i>	<i>Globobuccina venezuelana</i>	<i>Globobuccina nepeinfes</i>	<i>Neogobboquadrina acostaisensis</i>	<i>Neogobboquadrina douterlei</i>	<i>Neogobboquadrina humerosa</i>	<i>Pulleniatina obliquiculata</i>	<i>Pulleniatina primalis</i>	<i>Sphaeroidinella dehiscens</i>	<i>Sphaeroidinellopsis disjuncta</i>	<i>Sphaeroidinellopsis kochi</i>	<i>Sphaeroidinellopsis seminulina</i>	Benthic foraminifers	Ostracodes	Radiolarians	Sponge spicules	Fish remains	Calcareous aggregates	Foraminifers embedded	Planktonic foraminifer fragments	Preservation								
N22	1H-CC 2H-CC	5.80 15.40	x x	x	x	x	/	/						/								x	x		x			R	R	R		R	F	R	R		R	R	F	G	G								
N21	3H-CC 4H-1, 60-65 4H-2, 60-65	25.10 25.70 27.20	x x x	x x x	/	/	/	/						/									x	x	x	x	x	x		F	R	R	F	F	R	R	F	C	F	F	F	A	M	M					
N19	4H-5, 60-65 4H-CC 5H-1, 60-65 5H-2, 60-65 5H-5, 60-65 5H-CC 6H-2, 60-65 6H-6, 60-65 6H-CC 7H-1, 60-65 7H-2, 60-65	31.70 34.70 35.30 36.80 41.30 44.30 46.40 52.40 53.90 54.50 56.00	x x x x x x x x x x x	x x x x x x x x x x x	/	/	/	/	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	F	F	F	R	R	R	R	F	R	F	R	A	M	M
	7H-3, 60-65 7H-CC	57.50 63.60	x x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	R	F	F	R	R	R	R	R	R	R	A	M	M								
	8H-2, 60-65 8H-5, 60-65 8H-CC 9H-1, 60-62 9H-2, 60-62 9H-3, 60-62	65.70 70.20 73.20 73.80 75.30 76.80		/	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	C	C	R	R	C	F	R	R	C	R	A	M	M								
	9H-4, 60-62 9H-CC 10H-2, 60-62 10H-6, 60-62 10H-CC 11H-2, 60-62 11H-CC 12H-1, 120-125 12H-2, 120-125 12H-3, 120-125 12H-4, 120-125	78.30 82.90 85.00 91.00 92.50 94.60 102.20 103.40 104.90 106.40 107.40		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	F	R	C	C	R	R	C	C	R	R	R	R	A	M	M					
	12H-5, 120-125 12H-6, 120-125 12H-CC	109.40 110.90 111.80		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	R	F	F	F	R	R	R	R	R	R	R	R	C	M	M						
	13H-1, 120-125	113.00	/	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	C	F	C	C	C	C	C	C	C	C	A	P	P								
	13H-2, 120-125 13H-3, 120-125	114.50 116.00		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	F	C	F	R	R	R	R	R	R	R	R	R	C	M	P						
	13H-4, 120-125 13H-5, 120-125 13H-6, 120-125 13H-CC	117.50 119.00 120.50 121.40		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	F	F	F	F	F	F	F	F	F	F	F	F	A	P	M						
N12 to N8	14H-1, 120-125 14H-2, 120-125 14H-3, 120-125 14H-4, 120-125 14H-5, 120-125 14H-6, 120-125	122.60 124.10 125.60 127.10 128.60 130.10	x /	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	R	R	R	R	R	R	R	R	R	R	R	R	R	R	C	M					











Table 9. Distribution of Neogene planktonic foraminifers in sediments of Hole 711A.

Series	Zone	Core, section, interval (cm)	Depth (mbsf)	<i>Catapsydrax dissimilis</i>	<i>Globigerinella siphonifera</i>	<i>Globigerinoides conglobatus</i>	<i>Globigerinoides quadrilobatus</i> s.l.	<i>Globigerinoides ruber</i> s.l.	<i>Orbulina universa</i>	<i>Globorotalia opima nana</i>	<i>Globorotalia mayeri- G. siakensis</i>	<i>Globorotalia scitula</i>	<i>Globorotalia limbata</i>	<i>Globorotalia tumida tumida</i>	<i>Globorotalia crassaformis</i> s.l.	<i>Globorotalia tosaensis</i>	<i>Globorotalia truncatulinoides</i>	<i>Globorotaloides suteri</i>	<i>Globoquadrina conglomerata</i>	<i>Globoquadrina praedehiscens</i>	<i>Globoquadrina sellii</i>	<i>Globoquadrina venezuelana</i>	<i>Globobulborotalia nepenthes</i>	<i>Neogloboquadrina dutertrei</i>	<i>Neogloboquadrina humerosa</i>	<i>Pulleniatina obliquiloculata</i>	<i>Sphaeroidinella dehiscens</i>	<i>Sphaeroidinellopsis seminulina</i>	Benthic foraminifers	Ostracodes	Radiolarians	Sponge spicules	Fish remains	Foraminifers embedded	Planktonic foraminifer fragments	Preservation	
Pleistoc.	N22	1H-1, 105-110	1.05	x x x					x				x	x x x /					x					x	x /			F	A A			A		P			
Pliocene	N21	1H-2, 105-110	2.55	x x x /					x	x x	x x /			x x /					x					x x x /			F	C C			A		P				
		1H-3, 105-110	4.05								x	/ x /			/ x /										/ /		C	A C R			A		VP				
		1H-4, 105-110	5.55	/ / /					x		/ x	x x /			/ x x /					x					/ / x x		F	A F R			A		P				
		1H-5, 105-110	7.05									/ / /			/ / /										/ / / /		F	A A			A		VP				
	N18	1H-CC	8.10												x x x /										/ x x		C	C F			A		VP				
		2H-1, 105-110	9.15												x x x										/ /		F	F F			A		VP				
		2H-2, 105-110	10.65												x										/		F	F F			A		VP				
		2H-3, 105-110	12.15											x x												x	C	C			A		VP				
	2H-CC	17.70											x													C	A A C	F	A			VP					
Pliocene to Upper Miocene	Post N14	3H-3, 105-110	21.75																										A A								
		3H-CC	27.30																										A A C								
		4H-3, 105-110	31.35																									C	C F F								
		4H-CC	36.90																				x				/	C	F F F	F	C			VP			
?	?	5H-3, 105-110	40.95																																		
		5H-CC	46.60																																		
		6H-3, 105-110	50.65																																		
		6H-CC	56.30																																		
		7H-3, 105-110	60.35																																		
		7H-CC	66.00																																		
Lower Miocene to Oligocene	Pre N6	8H-2, 60-62	68.10	x											x														C		A			A		VP	
		8H-CC	75.60	x												x													C R		C		A		VP		
		9H3, 105-110	79.65																																		VP
		9H-CC	85.20	x												x													A	A A C			C		VP		
		10H-3, 105-110	89.25	x												x													C	A A F			C		VP		
		10H-CC	94.80													/															A A						
11H-3, 105-110	98.85	x							x /					x					x x x								C	C A			A		VP				





Table 10 (Continued).

Zone	Core, section, interval (cm)	Depth (mbsf)	<i>Globorotalia miozea</i>	<i>Globorotalia margaritae</i>	<i>Globorotalia tumida tumida</i>	<i>Globorotalia tumida flexuosa</i>	<i>Globorotalia crassatiformis</i> s.l.	<i>Globorotaloides hexagona</i>	<i>Globorotaloides suteri</i>	<i>Globorotaloides variabilis</i>	<i>Clavatirella bermudezi</i>	<i>Dentoglobigerina altispira altispira</i>	<i>Dentoglobigerina altispira globosa</i>	<i>Globoquadrina baroemoensis</i>	<i>Globoquadrina conglomerata</i>	<i>Globoquadrina dehiscens</i>	<i>Globoquadrina venezuelana</i>	<i>Globobulimina nepenthes</i>	<i>Neogloboquadrina acostaensis</i>	<i>Neogloboquadrina humerosa</i>	<i>Pulleniatina obliquiloculata</i>	<i>Pulleniatina primalis</i>	<i>Sphaeroidinella dehiscens</i>	<i>Sphaeroidinellopsis disjuncta</i>	<i>Sphaeroidinellopsis kochi</i>	<i>Sphaeroidinellopsis seminulina</i>	Benthic foraminifers	Ostracodes	Radiolarians	Sponge spicules	Fish remains	Calcareous aggregates	Foraminifers embedded	Planktonic foraminifer fragments	Preservation	
N19	1R-1, 133-138	1.33	x	/	x							x	x					x	x	x			x	x		F		R	R			F	C	M		
	1R-2, 133-138	2.83	x	x	x							x	x	x				x	x	x			x	x	x	F		R	R	R			F	C	M	
	1R-3, 133-138	4.33	x	/	x							x	x	x				/	x	x			/	x	x	F		R	R	R			F	C	M	
	1R-4, 133-138	5.83	x					x				x	x	x	x				x	x	x			/	x	x	F		R	R	R			F	C	M
	1R-5, 133-138	7.33	x					x				x	x	x	x				x	x	x			/	x	x	F		R	R	R			F	C	M
	1R-6, 133-138	8.83	x					x				x	x	x	/			/	/	x	x			/	x	x	F		F	F			F	C	M	
	1R-CC	9.40	x									x	x	x	/			/	/	x	x			/	x	x	R		R	R			C	F	M	
	2R-1, 105-110	10.45	x					x				x	x	x				x	x	x			/	x	x	F		F	F	F			F	C	M	
	2R-2, 105-110	11.95	x					x				x	x	x				x	x	x	x	x		/	x	x	F		R	F	F			F	C	M
	2R-3, 105-110	13.45						x				x	x	x				x	/	x	x	x		x	x	F		R					F	C	M	
	2R-4, 105-110	15.08	/	/				x				x	x	x				x	/	x	x	/		x	x	R		R	R	R			C	C	M	
	2R-5, 105-110	16.58	x	x				x				x	x	x				x	/	x	/	x		x	x	F		R	F	F			F	C	M	
	2R-CC	19.00	x	x						x		x	x	x				x	/	x	x	x		x	x	F		R	R	R			F	C	M	
	3R-1, 105-110	20.05	/	/								x	x	x				x	/	x	x			x	x	F		F				F	F	C	M	
3R-2, 105-110	21.55	x	x								x	x	x				x	x	x				x	x	R		R	F	F			F	F	M		
3R-3, 105-110	23.05	/	/								x	x	x				x	/	x	x			x	x	R		F	F			F	F	M			
3R-4, 105-110	24.55	/	x								x	x	x				x	x	x				x	x	F/R		R	F	F			R	F	M		
3R-CC	28.60	x	x				/				x	x	/	x			x	x	x	x			x	x	C		R		R			F	R	G		
N17	4R-2, 105-110	31.15						/	x	x	x	x	x				x	x	x				x	x	F		R				F	F	M			
N16	4R-3, 32-37	31.92						x	x	x	x	x	x				x	/	x				x	x	R		R				F/R	F	M			
N15	4R-CC	38.30	x						x	x	x	x	x				x	/					x	x	F		R	C			C	C	M/P			
N14	5R-1, 105-110	39.35						/	x	/		x	/	x	x								x	x	R		F	F			C	C	M			
	5R-2, 105-110	40.85						/	x	x		x	x	x	/								x	x	F		R	R			F	C	M/P			
N13	5R-CC	47.90						x		/		x	x	x									x	x	F		R		R			F	F	M		
N9	6R-1, 105-110	48.95						x	/	x		x	x	x									x		C						F	C	M			
N8	6R-2, 105-110	50.45						x	x	x		x	x	x									x		R						F	C	M			
	6R-CC	57.50						x	x	x		x	x	x									x		R						F	F	M			













Table 13. Distribution of Neogene planktonic foraminifers in sediments of Hole 715A.

Series	Zone	Core, section interval (cm)	Depth (mbsf)	<i>Beella digitata</i>	<i>Candeina nitida</i>	<i>Catapsydrax dissimilis</i>	<i>Catapsydrax staineri</i>	<i>Globigerina quinqueloba</i>	<i>Globigerinatella insueta</i>	<i>Globigerinella calida</i>	<i>Globigerinella praesiphonifera</i>	<i>Globigerinella siphonifera</i>	<i>Globigerinita glutinata</i>	<i>Globigerinoides altiperforatus</i>	<i>Globigerinoides bispheicus</i>	<i>Globigerinoides conglobatus</i>	<i>Globigerinoides diminutus</i>	<i>Globigerinoides elongatus</i>	<i>Globigerinoides obliquus obliquus</i>	<i>Globigerinoides primordius</i>	<i>Globigerinoides quadrilobatus s.l.</i>	<i>Globigerinoides ruber s.l.</i>	<i>Prasorbulina sicana</i>	<i>Prasorbulina transitoria</i>	<i>Prasorbulina glomerosa curva</i>	<i>Prasorbulina glomerosa glomerosa</i>	<i>Prasorbulina glomerosa circularis</i>	<i>Orbulina suturalis</i>	<i>Orbulina universa</i>	<i>Globorotalia kugleri s.l.</i>	<i>Globorotalia opima nana</i>	<i>Globorotalia mayeri- G. siakensis</i>	<i>Globorotalia praescitula</i>						
Pleistoc.	N22	1R-CC	8.10	x	x					x	x	x		x	x				x	x																			
		2R-CC	17.80	/	x						x	x	x		x	x				x	x																		
		3R-CC	27.50		x						x	x	x		x	x				x	x																		
		4R-CC	37.10		x							x	x		x	x				x	x																		
		5R-CC	46.80		x						x	x			x					x	x																		
Middle Miocene	N12	6R-1, 105-110	47.85																x	x								x	x										
		6R-2, 105-110	49.35								x									x	x							x	x										
		6R-3, 105-110	50.85								x									x	x							x	x										
	N11- N10	6R-4, 105-110	52.35								x									x	x							x	x										
		6R-5, 105-110	53.85								x									x	x							x	x										
	N9	6R-6, 105-110	55.35							/	x				x					x	/	x						x	x										
		6R-CC	56.50												x					x	x						x	x											
	N8	7R-1, 105-110	57.55												x					x	x							x	x										
		7R-2, 105-110	59.05								x				x					x	x							x	x										
		7R-3, 105-110	60.55								x				x					x	x							x	x										
		7R-4, 105-110	62.05								x				x					x	x							x	x										
		7R-5, 105-110	63.55								x				x	x				x	x							x	x										
		7R-6, 105-110	65.05								x	x			x	x				x	x							x	x										
		7R-CC	66.10								x				x	x				x	x							x	x										
		8R-1, 105-110	67.15								x				x	x				x	/	x						x	x										
		8R-2, 105-110	68.65								x				x	x				x	x							x	x										
		8R-3, 105-110	70.15								x				x	x				x	x							x	x										
		8R-4, 105-110	71.65								x				x	x				x	x							x	x										
		8R-5, 105-110	73.15								x				x	x				x	x							x	x										
		8R-6, 105-110	74.65								x				x	x				x	/	x						x	x										
8R-CC		75.70								x				x					x	x							x	x											
Lower Miocene	N7	9R-1, 105-110	76.75							x				x					x	x																			
		9R-2, 105-110	78.25							x				x					/	x	x																		
		9R-3, 105-110	79.75							x				x						x	x																		
		9R-4, 105-110	81.25							x				x	/					x	x																		
		9R-5, 105-110	82.75							x	/			x						/	x	x																	
	N6	9R-6, 105-110	84.25			x					x				/					x	x																		
		9R-CC	85.30			x					x									x	x																		
	N5	10R-2, 105-106	87.85			x														x	x	/																	
		10R-3, 105-110	89.35			x														x	x	/																	
		10R-4, 105-110	90.85			x	x		/					x						x	x																		
		10R-5, 105-110	92.35			x															x	x																	
		10R-6, 105-110	93.85			x								/							/	x	/																
		10R-CC	94.90			x	x							x						x	x	/																	
		11R-1, 105-110	95.95			x	x							x						x	x	x																	
		11R-2, 105-110	97.45			x	x							x						x	x	x																	
11R-3, 105-110	98.95			x	x							x						x	x	x																			
11R-4, 105-110	100.45			x	x							x						/	x																				
N4b	11R-5, 105-110	101.95			x	x							x						/	x								/	x	x									
	11R-6, 105-110	103.45			x	x							x						x	x																			
	11R-CC	104.60			x	x							x						x	x																			





Table 15. Assignment of Leg 115 samples to the Neogene planktonic foraminifer zonation. Uppermost and lowermost samples assigned to each zone are indicated. Numbers in parentheses are sub-bottom depth (mbsf) of the top of these samples.

Series	Planktonic foraminifer zone Blow (1969) Kennel and Srinivasan (1983)	Age (Ma)		Hole 705A	Hole 706A	Hole 707A	Hole 708A	Hole 709C
		Berggren et al. (1985)	Barron et al. (1985a,b)					
Pleistocene	N 22	1.9		Top (0)	Top (0)	Top (0)	Top (0)	Top (0)
				1H-CC (8.50)	2H-1, 80-83 (3.30)	1H-CC (6.60)	2H-CC (18.60)	2H-CC (15.40)
Pliocene	upper	3.1		2H-4, 80-82 (13.80)		2H-5, 107-112 (13.67)	3H-CC (28.10)	3H-CC (25.10)
				2H-6, 36-38 (16.36)		3H-1, 107-112 (17.27)	4H-CC (37.60)	4H-2, 60-65 (27.20)
	lower	5.1	4.9	2H-CC (18.0)		3H-2, 107-112 (18.77)	5H-CC (47.20)	4H-5, 60-65 (31.70)
				3H-CC (27.50)		6H-2, 107-112 (47-67)		7H-2, 60-65 (56.00)
Miocene	upper	5.2	5.2		6H-3, 107-112 (49.17)	6H-1, 107-112 (55.77)	8H-CC (76.00)	7H-3, 60-65 (57.50)
					5.8	6.3	7H-1, 107-112 (55.77)	8H-CC (76.00)
	8.0	8.0	7H-2, 107-112 (57.27)				9X-1, 65-70 (76-65)	8H-2, 60-65 (65.70)
			10.2		8.6	8H-2, 107-112 (66.87)	11X-CC (101.40)	9H-3, 60-62 (76.80)
	10.4	9.9				8H-3, 107-112 (68.37)	12X-2, 105-110 (103.95)	9H-4, 60-62 (78.30)
			11.3		10.9	11H-CC (102.80)		12H-4, 120-125 (107.30)
	11.8	11.8				12H-1, 107-112 (103.87)		12H-5, 120-125 (108-80)
			13.5		13.5	12H-CC (112.40)	12H-CC (111.60)	12H-CC (111.60)
	13.9	14.0				13H-1, 107-112 (113.47)		13H-1, 120-125 (112.40)
			14.6		14.6	13H-3, 107-112 (116-17)		14X-5, 105-110 (127-65)
	15.2	15.2				13H-4, 107-112 (117-97)		13H-3, 120-125 (115.40)
			16.3		16.3	13H-5, 107-112 (119.47)		13H-4, 120-125 (116.90)
	17.6	17.6				13H-CC (122.00)		13H-CC (121.40)
			17.9		17.9	14H-1, 107-112 (123.07)		14H-1, 120-125 (122.00)
	20.1	20.1				14H-2, 107-112 (124.57)		
			21.2		21.2	14H-3, 107-112 (126.07)		
23.2	23.2	14H-CC (131.60)		14H-CC (131.10)				
		23.7	23.7	15H-1, 107-112 (132.67)	16H-4, 120-125 (145.90)			
Oligocene	J' 22						17X-3, 105-110 (153.65)	16H-5, 120-125 (147.40)
		15H-2, 107-112 (134.17)	18H-3, 120-125 (163.80)					
						15H-3, 107-112 (135.67)	18H-5, 120-125 (166.80)	
						15H-4, 107-112 (134.17)	19H-5, 120-125 (176.50)	
						15H-CC (141.30)	19H-6, 120-125 (178.00)	
						16H-1, 107-112 (142.37)	21X-5, 120-125 (195.70)	
							21X-6, 120-125 (197.20)	
							22X-3, 120-125 (202.30)	
							22X-4, 120-125 (203.80)	

Table 15 (Continued).

Hole 710A	Hole 711A	Hole 712A	Hole 713A	Hole 714A	Hole 715A	Hole 716B
Top (0)	Top (0)		Top (0)	Top (0)	Top (0)	Top (0)
1H-5, 105-110 (7.05)	1H-1, 105-110 (1.05)		1R-CC (1.60)	3H-5, 98-103 (19.38)	5R-CC (46.80)	6H-6, 105-108 (51.05)
1H-6, 105-110 (8.55)	1H-2, 105-110 (2.55)		2R-2, 105-110 (4.15)			7H-2, 105-108 (54.65)
3H-3, 105-110 (23.25)			2R-4, 105-110 (7.15)			11H-4, 105-108 (98.15)
3H-CC (28.80)		1R-1, 133-138 (1.33)	2R-5, 105-110 (8.65)			12H-1, 105-108 (104.25)
4H-CC (38.30)		3R-CC (28.60)	3R-6, 105-110 (19.75)			16H-1, 105-108 (142.85)
6H-1, 105-110 (48.95)		4R-2, 105-110 (31.15)	3R-CC (20.80)			17H-1, 105-108 (152.45)
			4R-2, 105-110 (23.35)			23H-1, 105-108 (207.55)
			4R-2, 105-110 (24.85)			23H-6, 105-108 (215.05)
			4R-CC (30.50)			28H-CC (264.40)
		4R-3, 32-37 (31.92)		3H-5, 138-143 (19.78)		
9H-CC (86.20)		4R-CC (38.30)		5H-3, 20-25 (34.90)		
10H-1, 105-110 (87.25)		5R-1, 105-110 (39.35)		5H-5, 20-25 (37.90)		
		5R-2, 105-110 (40.85)		6H-3, 20-25 (44.60)		
		5R-CC (47.90)		6H-4, 20-25 (46.10)		
10H-5, 105-110 (93.25)				8H-7, 20-25 (69.80)		
10H-6, 105-110 (94.75)				8H-CC (70.20)	6R-1, 105-110 (47.85)	
				10H-7, 20-25 (89.00)	6R-3, 105-110 (50.85)	
				10H-CC (89.50)	6R-4, 105-110 (52.35)	
				11H-6, 20-25 (97.20)		
				11H-CC (99.10)		
				12H-3, 105-110 (103.15)	6R-5, 105-110 (53.85)	
		6R-1, 105-110 (48.95)		12H-4, 20-25 (103.80)	6R-6, 105-110 (55.35)	
		6R-2, 105-110 (50.45)		12H-5, 20-25 (105.30)	6R-CC (56.50)	
		6R-CC (57.50)		12H-5, 105-110 (106.15)	7R-1, 105-110 (57.55)	
				16X-5, 20-25 (142.60)	8R-CC (75.70)	
				16X-CC (146.10)	9R-1, 105-110 (76.75)	
				17X-CC (155.70)	9R-5, 105-110 (82.75)	
				18X-1, 20-25 (155.90)	9R-6, 105-110 (84.25)	
				18X-CC (165.30)	9R-CC (85.30)	
				19X-1, 20-25 (165.50)	10R-2, 105-110 (87.85)	
14X-5, 105-110 (131.95)				20X-CC (184.70)	11R-4, 105-110 (100.45)	
14X-6, 105-110 (13.45)				21X-1, 25-30 (184.95)	11R-5, 105-110 (101.95)	
15X-2, 105-110 (134.95)				21X-CC (194.60)	11R-CC (104.60)	
15X-3, 105-110 (136.45)						
16X-2, 105-110 (144.65)	10H-CC (94.80)			22X-1, 20-25 (194.60)		
16X-3, 105-110 (146.15)				22X-2, 105-110 (196.95)		



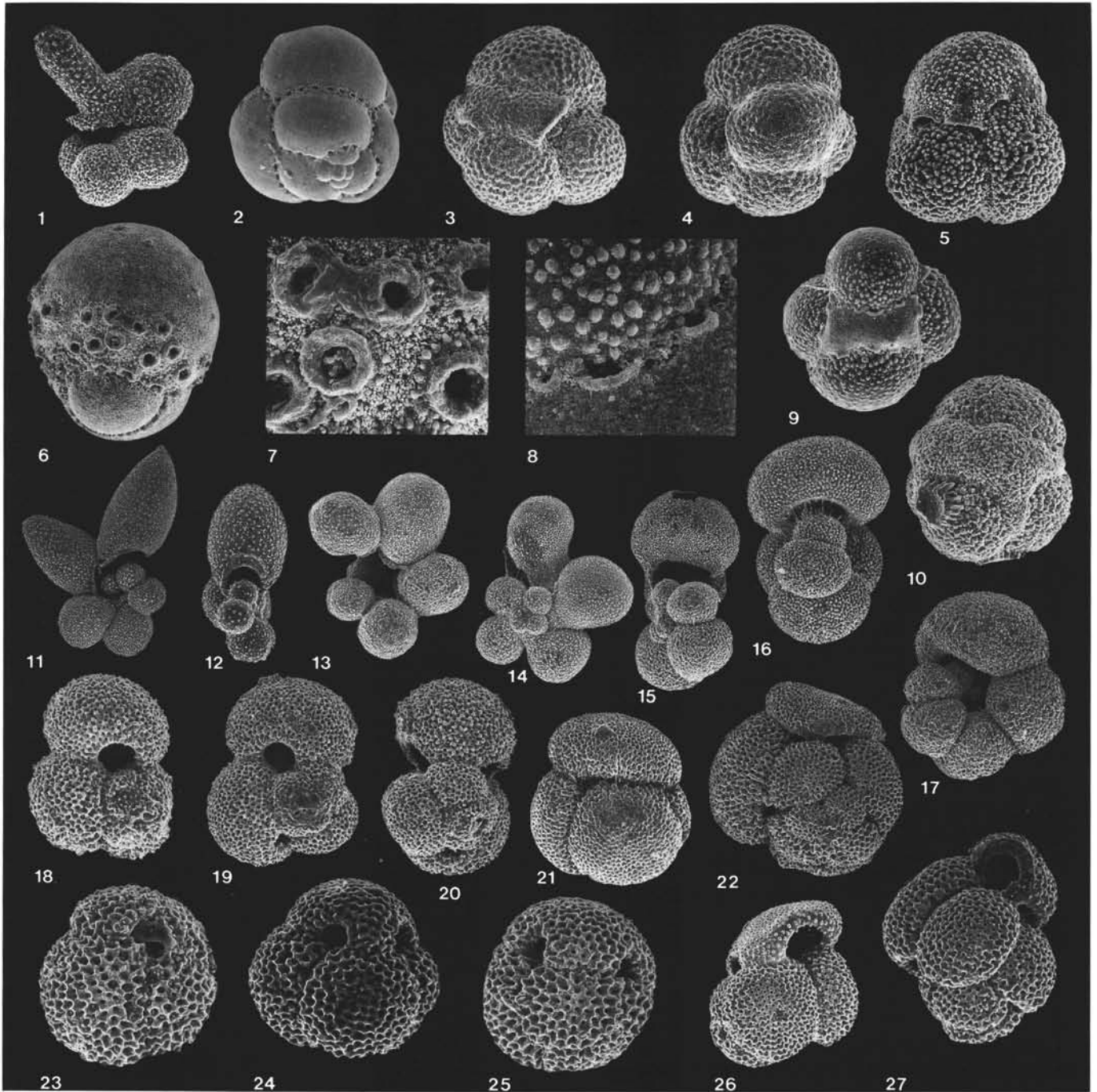


Plate 1. 1. *Beella digitata*; Sample 115-714A-1H-CC,  $\times 60$ . 2. *Candeina nitida*; Sample 115-715A-4R-CC,  $\times 52$ . 3, 4. *Catapsydrax dissimilis*; (3) Sample 115-709C-17H-CC,  $\times 67$ ; (4) Sample 115-707A-16H-1, 107–112 cm,  $\times 67$ . 5, 10. *Catapsydrax stainforthi*; Sample 115-707A-15H-1, 107–112 cm; (5)  $\times 97$ ; (10)  $\times 75$ . 6, 7. *Globigerinatella insueta*; Sample 115-709C-16H-5, 120–125 cm; (6)  $\times 75$ ; (7)  $\times 224$ . 8, 9. *Globigerinita glutinata*; Sample 115-707A-5H-CC; (8)  $\times 373$ ; (9)  $\times 97$ . 11, 12. *Globigerinella adamsi*; Sample 115-706A-1H-1, 80–83 cm; (11)  $\times 37$ ; (12)  $\times 45$ . 13–15. *Globigerinella calida*; Sample 115-715A-1R-CC; (13, 15)  $\times 37$ ; (14)  $\times 45$ . 16, 17. *Globigerinella siphonifera*; (16) Sample 115-706A-1H-1, 80–83 cm,  $\times 45$ ; (17) Sample 115-706A-1H-CC,  $\times 45$ . 18–20. *Globigerinoides altiapertura*; Sample 115-707A-15H-3, 107–112 cm; (18)  $\times 67$ ; (19, 20)  $\times 60$ . 21, 22. *Globigerinoides conglobatus*; (21) Sample 115-706A-1H-CC,  $\times 45$ ; (22) Sample 115-706A-1H-2, 73–76 cm,  $\times 45$ . 23–25. *Globigerinoides diminutus*; Sample 115-707A-14H-CC,  $\times 97$ . 26, 27. *Globigerinoides elongatus*; (26) Sample 115-707A-3H-1, 107–112 cm,  $\times 60$ ; (27) Sample 115-705A-2H-6, 36–38 cm,  $\times 75$ .

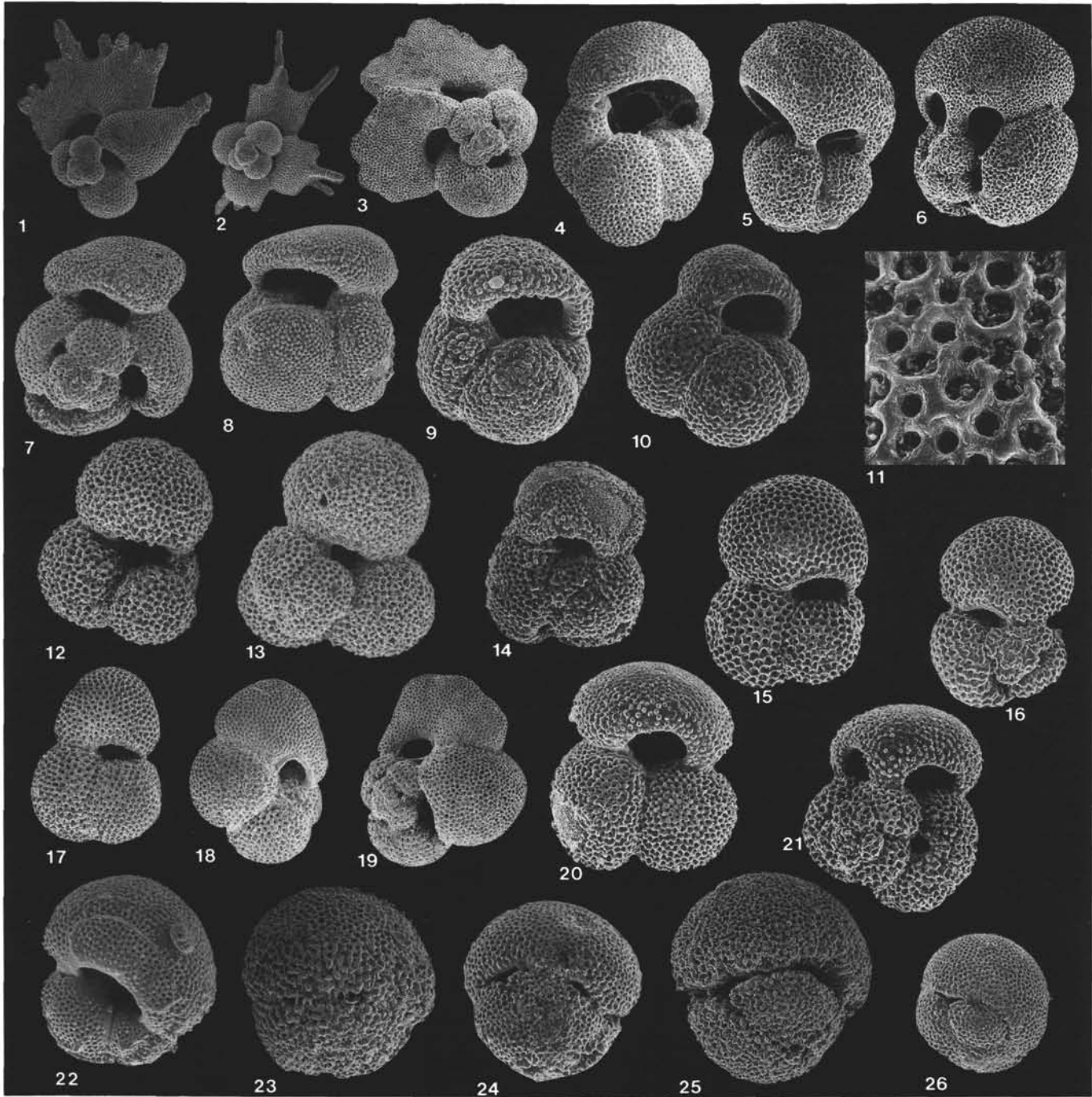


Plate 2. 1-3. *Globigerinoides fistulosus*; (1) Sample 115-705A-2H-6, 36-38 cm,  $\times 27$ ; (2) Sample 115-707A-3H-1, 107-112 cm,  $\times 22$ ; (3) Sample 115-707A-3H-2, 107-112 cm,  $\times 45$ . 4-6, 11. *Globigerinoides mitra*; Sample 115-714A-4H-3, 20-25 cm; (4)  $\times 56$ ; (5)  $\times 52$ ; (6)  $\times 45$ ; (11)  $\times 261$ . 7, 8. *Globigerinoides obliquus extremus*; Sample 115-707A-9H-6, 107-112 cm,  $\times 52$ . 9, 10, 14. *Globigerinoides obliquus obliquus*; (9, 14) Sample 115-707A-12H-1, 107-112 cm,  $\times 67$ ; (10) Sample 115-716B-28H-CC,  $\times 67$ . 12, 13. *Globigerinoides primordius*; Sample 115-707A-15H-5, 107-112 cm,  $\times 75$ . 15, 16. *Globigerinoides quadrilobatus trilobus*; (15) Sample 115-714A-6H-CC,  $\times 67$ ; (16) Sample 115-709C-7H-CC,  $\times 52$ . 17-19. *Globigerinoides quadrilobatus sacculifer*; (17) Sample 115-707A-3H-1, 107-112 cm,  $\times 45$ ; (18) Sample 115-709C-7H-CC,  $\times 45$ ; (19) Sample 115-707A-5H-2, 107-112 cm,  $\times 37$ . 20, 21. *Globigerinoides ruber*; Sample 115-707A-3H-1, 107-112 cm; (20)  $\times 67$ ; (21)  $\times 60$ . 22-24. *Praeorbulina sicana*; (22, 23) Sample 115-714A-16X-4, 20-25 cm; (22)  $\times 60$ ; (23)  $\times 52$ ; (24) Sample 115-714A-14X-1, 140-145 cm,  $\times 60$ . 25, 26. *Praeorbulina glomerosa curva*; (25) Sample 115-707A-14H-3, 107-112 cm,  $\times 52$ ; (26) Sample 115-714A-13H-5, 140-145 cm,  $\times 60$ .

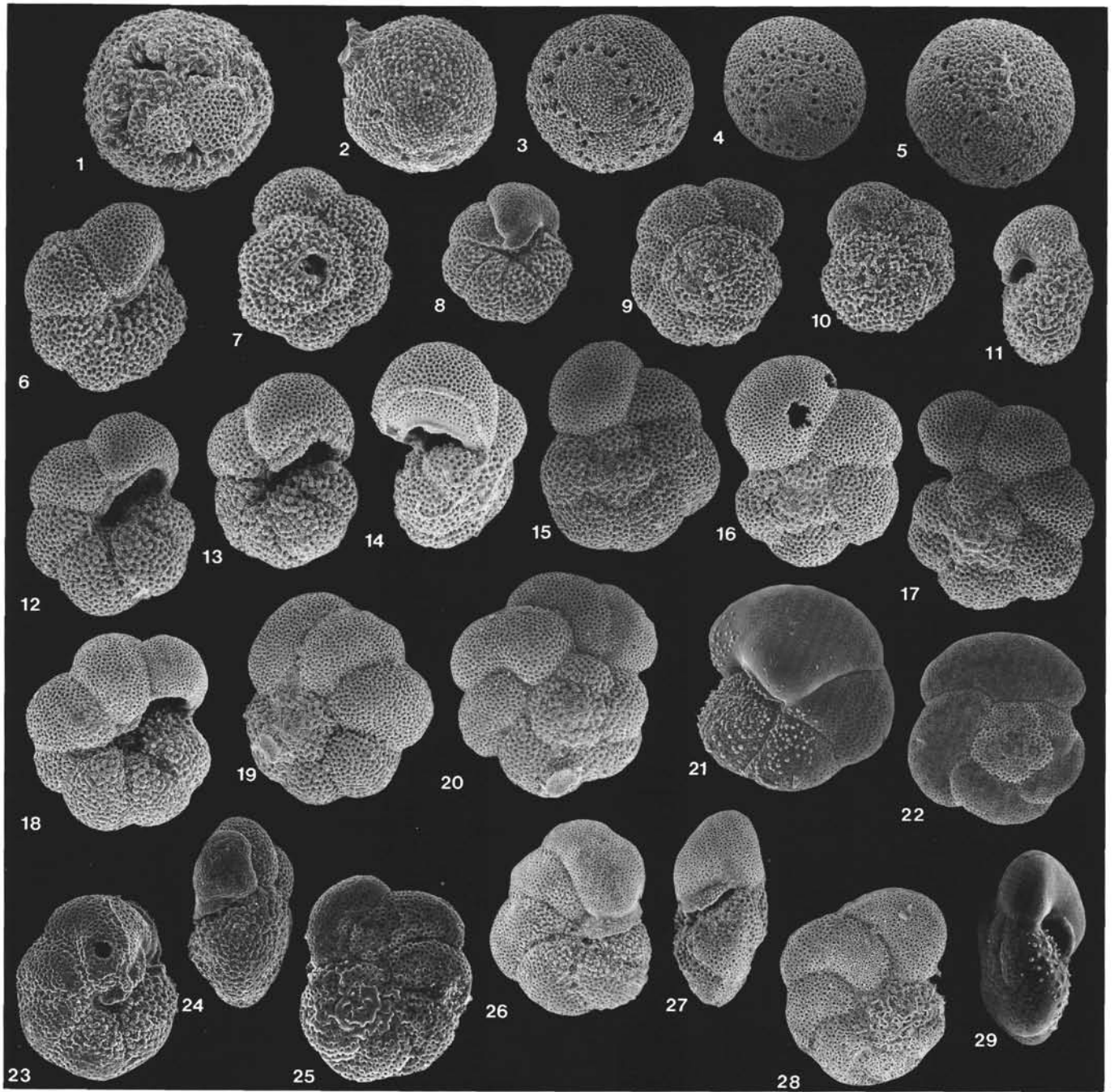


Plate 3. 1, 2. *Praeorbulina glomerosa glomerosa*; (1) Sample 115-714A-13H-5, 140–145 cm,  $\times 60$ ; (2) Sample 115-714A-13H-4, 20–25 cm,  $\times 60$ . 3. *Praeorbulina glomerosa circularis*; Sample 115-714A-13H-5, 140–145 cm,  $\times 60$ . 4, 5. *Orbulina suturalis*; (4) Sample 115-714A-10H-CC,  $\times 52$ ; (5) Sample 115-714A-12H-4, 105–110 cm,  $\times 60$ . 6, 7. *Globorotalia pseudokugleri*; Sample 115-707A-15X-CC,  $\times 90$ . 8–11. *Globorotalia kugleri*; Sample 115-707A-15X-CC,  $\times 90$ . 12–20. *Globorotalia mayeri*–*G. siakensis* group; (12–17, 20) Sample 115-707A-13H-CC; (12, 13, 16, 17)  $\times 75$ ; (14, 15)  $\times 67$ ; (18, 19) Sample 115-714A-12H-3, 140–145 cm; (18)  $\times 60$ ; (19)  $\times 67$ . 21, 22, 29. *Globorotalia scitula*; (21) Sample 115-705A-1H-CC,  $\times 60$ ; (22) Sample 115-716B-28H-CC,  $\times 75$ ; (29) Sample 115-705A-2H-4, 80–82 cm,  $\times 75$ . 23–25. *Globorotalia peripheroronda*; (23, 24) Sample 115-707A-14H-CC,  $\times 75$ ; (25) Sample 115-714A-13H-5, 20–25 cm,  $\times 82$ . 26–28. *Globorotalia peripheroacuta*; (26) Sample 115-714A-13H-4, 20–25 cm,  $\times 75$ ; (27, 28) Sample 115-714A-12H-3, 140–145 cm; (27)  $\times 82$ ; (28)  $\times 75$ .



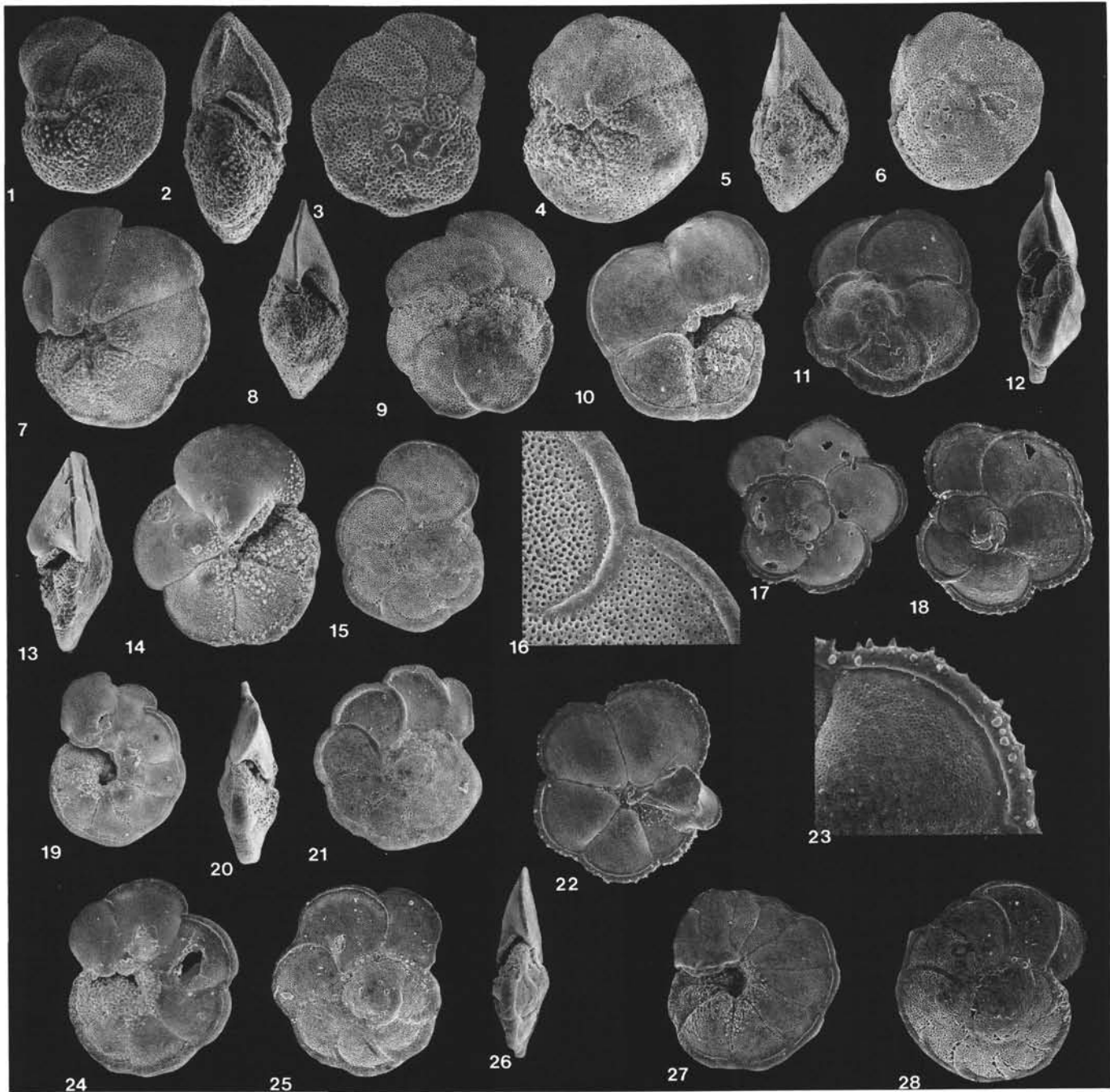


Plate 4. 1-3. *Globorotalia praefohsi*; (1) Sample 115-714A-11H-5, 20-25 cm,  $\times 75$ ; (2) Sample 115-714A-11H-4, 20-25 cm,  $\times 75$ ; (3) Sample 115-714A-11H-6, 20-25 cm,  $\times 75$ . 4-6. *Globorotalia fohsi fohsi*; Sample 115-707A-13H-CC; (4)  $\times 75$ ; (5)  $\times 67$ ; (6)  $\times 60$ . 7-9. *Globorotalia fohsi lobata*; Sample 115-707A-13H-CC; (7, 9)  $\times 52$ ; (8)  $\times 60$ . 10-18, 22, 23. *Globorotalia menardii* s.l.; (10-12) Sample 115-706A-1H-1, 80-83 cm,  $\times 27$ ; (13, 14) Sample 115-707A-13H-3, 107-112 cm,  $\times 52$ ; (15, 16) Sample 115-707A-9H-5, 107-112 cm; (15)  $\times 37$ ; (16)  $\times 112$ ; (17, 18, 22, 23) *G. menardii* var. *fimbriata*, Sample 115-714A-1H-CC; (17, 18, 22)  $\times 27$ ; (23)  $\times 90$ . 19-21, 24-28. *Globorotalia limbata*; (19-21) Sample 115-707A-5H-2, 107-112 cm,  $\times 27$ ; (24, 25) Sample 115-707A-9H-5, 107-112 cm,  $\times 37$ ; (26) Sample 115-707A-11H-CC,  $\times 31$ ; (27, 28) Sample 115-705A-2H-5, 80-82 cm,  $\times 45$ .

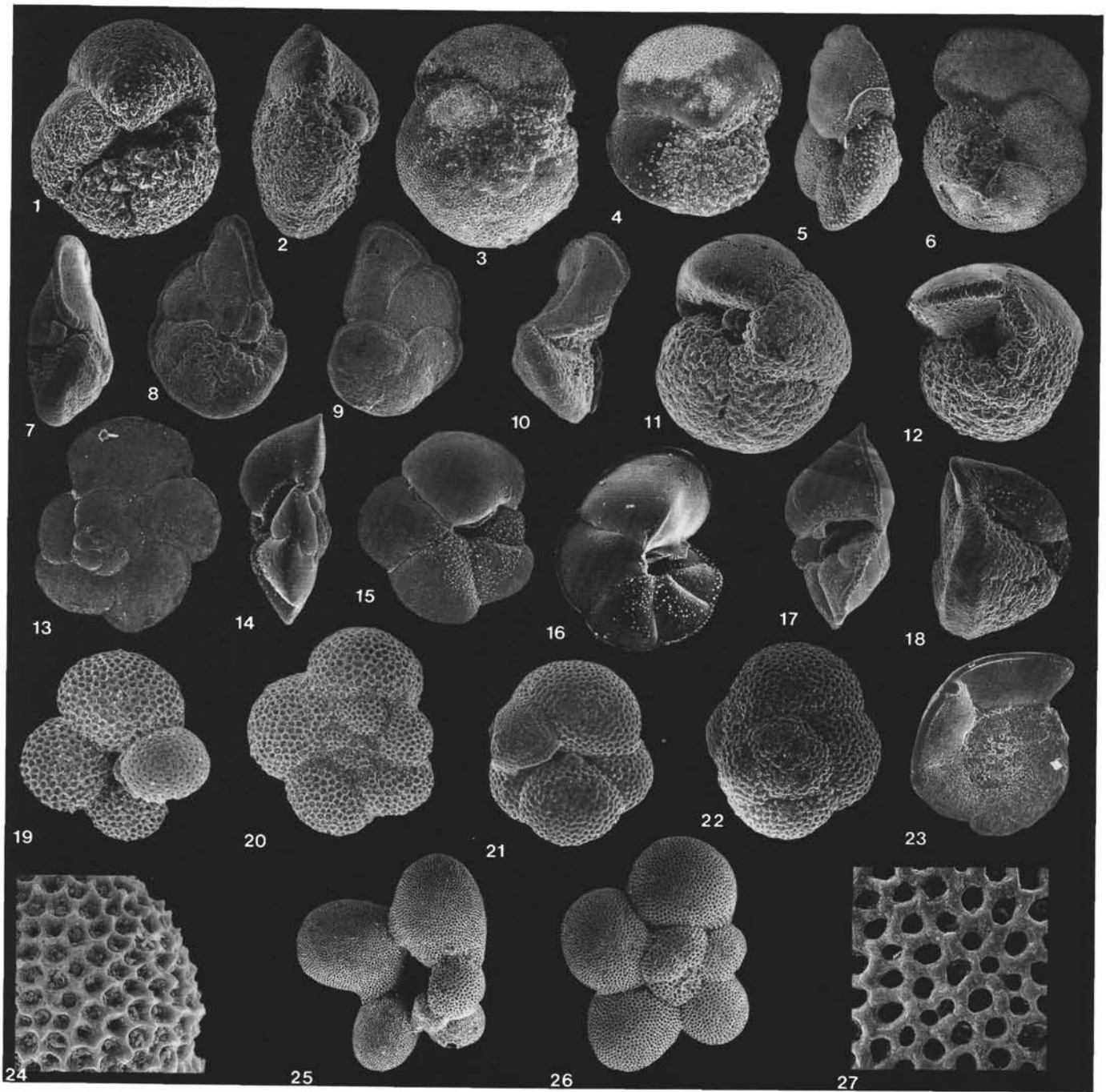


Plate 5. 1-3. *Globorotalia miozea*; Sample 115-707A-13H-CC; (1, 2)  $\times 60$ ; (3)  $\times 56$ . 4-6. *Globorotalia margaritae*; Sample 115-707A-5H-CC; (4)  $\times 75$ ; (5)  $\times 67$ ; (6)  $\times 60$ . 7. *Globorotalia tumida tumida*; Sample 115-706A-1H-1, 80-83 cm,  $\times 27$ . 8-10. *Globorotalia tumida flexuosa*; Sample 115-709C-5H-1, 60-65 cm,  $\times 27$ . 11. *Globorotalia crassaformis*; Sample 115-707A-2H-CC,  $\times 52$ . 12, 18, 23. *Globorotalia truncatulinoides*; Sample 115-706A-1H-2, 73-76 cm; (12, 18)  $\times 45$ ; (23)  $\times 38$ . 13-15. *Globorotalia theyeri*; Sample 115-715A-1R-CC; (13)  $\times 45$ ; (14, 15)  $\times 52$ . 16, 17. *Globorotalia ungulata*; Sample 115-706A-1H-1, 80-83 cm,  $\times 40$ . 19, 20, 24. *Globorotaloides hexagona*; Sample 115-707A-5H-CC; (19)  $\times 75$ ; (20)  $\times 90$ ; (24)  $\times 373$ . 21, 22. *Globorotaloides suteri*; Sample 115-707A-14H-CC; (21)  $\times 75$ ; (22)  $\times 60$ . 25-27. *Globorotaloides variabilis*; Sample 115-714A-6H-CC; (25)  $\times 45$ ; (26)  $\times 49$ ; (27)  $\times 373$ .

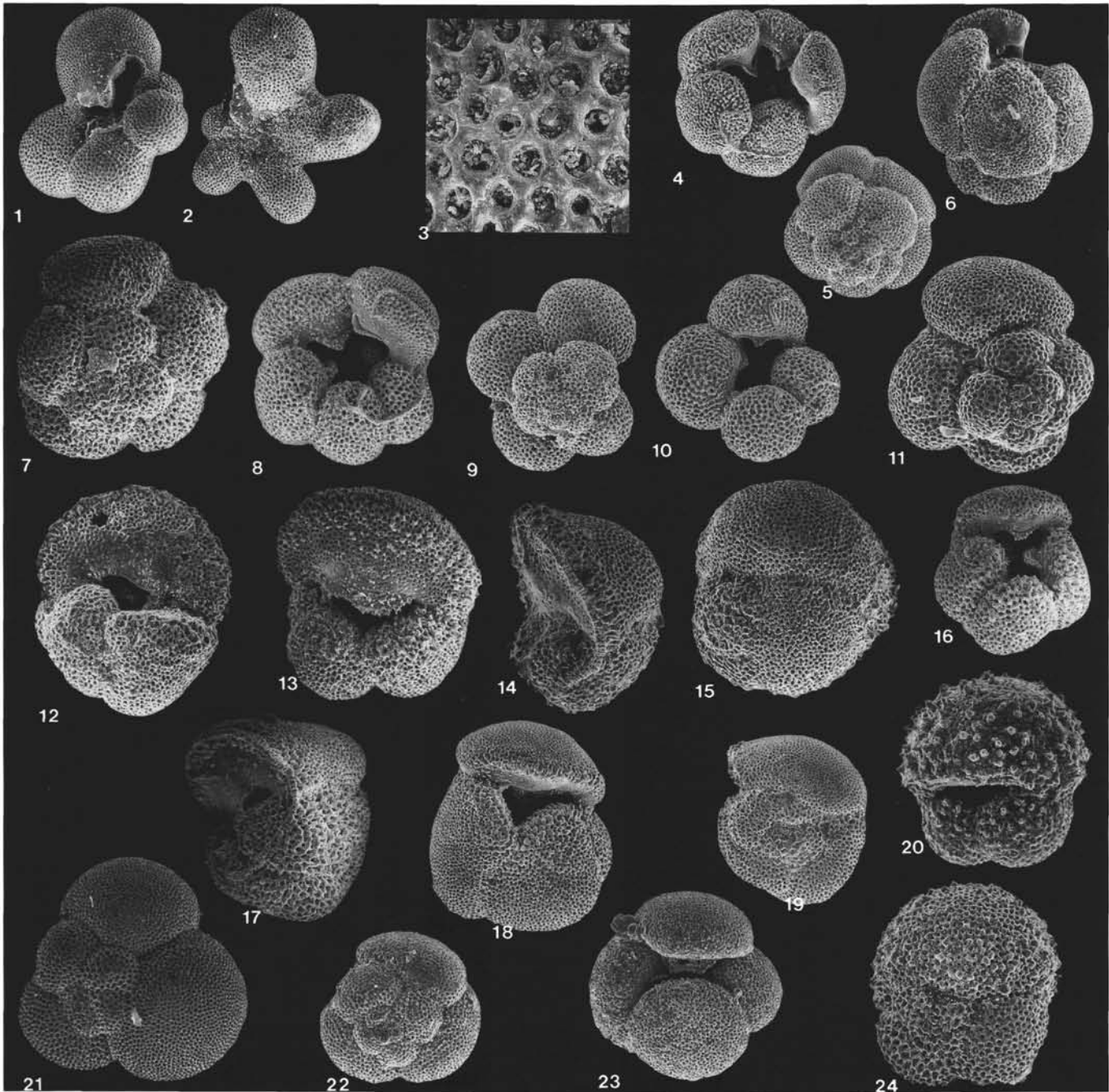


Plate 6. 1-3. *Clavatorella bermudezi*; (1, 3) Sample 115-709C-14H-5, 120-125 cm; (1)  $\times 45$ ; (3)  $\times 373$ ; (2) Sample 115-714A-12R-6, 140-145 cm,  $\times 49$ . 4-6. *Dentoglobigerina altispira altispira*; Sample 115-707A-6H-5, 107-112 cm,  $\times 45$ . 7, 8. *Dentoglobigerina altispira globosa*; Sample 115-707A-13H-CC; (7)  $\times 56$ ; (8)  $\times 60$ . 9, 10. *Dentoglobigerina globularis*; Sample 115-707A-15H-5, 107-112 cm,  $\times 52$ . 11, 16. *Globoquadrina baroemoensis*; (11) Sample 115-714A-19X-CC,  $\times 60$ ; (16) Sample 115-707A-13H-CC,  $\times 60$ . 12-15. *Globoquadrina binaiensis*; (12, 14, 15) Sample 115-714A-19X-CC; (12)  $\times 60$ ; (14)  $\times 67$ ; (15)  $\times 60$ ; (13) Sample 115-707A-13H-CC,  $\times 60$ . 17. *Globoquadrina dehiscens*; Sample 115-707A-13H-CC,  $\times 67$ . 18, 19. *Globoquadrina praedeheiscens*; Sample 115-709C-7H-CC,  $\times 52$ . 20, 24. *Globoquadrina sellii*; Sample 115-709C-23X-5, 105-110 cm; (20)  $\times 52$ ; (24)  $\times 56$ . 21. *Globoquadrina conglomerata*; Sample 115-705A-2H-6, 36-38 cm,  $\times 45$ . 22, 23. *Globoquadrina venezuelana*; Sample 115-707A-15H-3, 107-112 cm,  $\times 45$ .



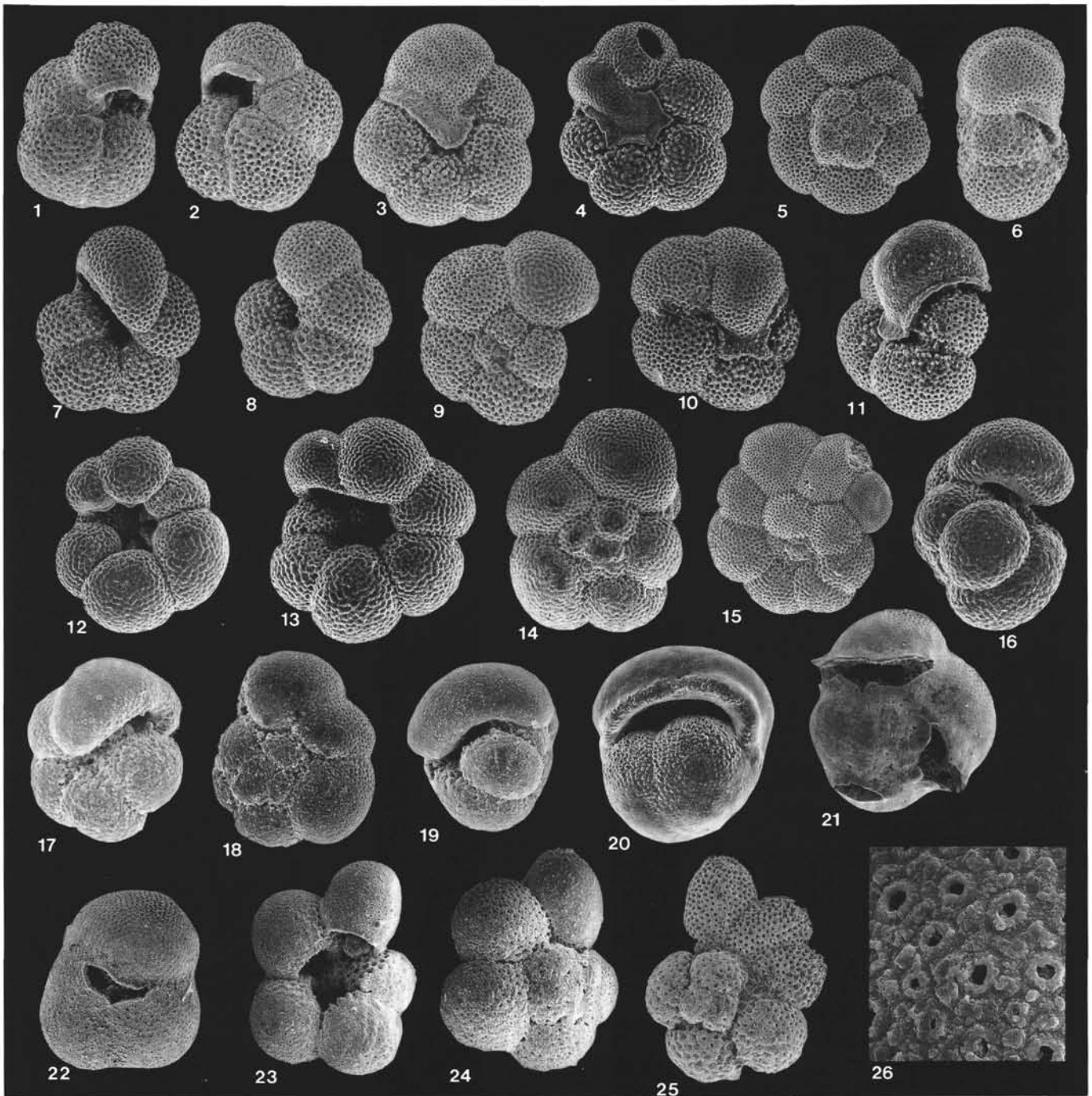


Plate 7. 1, 2. *Globoturborotalita nepenthes*; Sample 115-707A-5H-CC,  $\times 75$ . 3–6, 10, 11. *Neogloboquadrina acostaensis*; (3–5) Sample 115-707A-9H-CC,  $\times 75$ ; (6) Sample 115-707A-9H-6, 107–112 cm,  $\times 75$ ; (10, 11) Sample 115-714A-4H-3, 20–25 cm; (10)  $\times 90$ ; (11)  $\times 97$ . 7–9. *Neogloboquadrina humerosa*; Sample 115-707A-5H-CC,  $\times 75$ . 12–16. *Neogloboquadrina dutertrei*; (12) Sample 115-706A-1H-CC,  $\times 52$ ; (13, 14) Sample 115-707A-2H-5, 107–112 cm; (13)  $\times 60$ ; (14)  $\times 56$ ; (15, 16) Sample 115-706A-2H-1, 80–83 cm; (15)  $\times 52$ ; (16)  $\times 60$ . 17–19. *Pulleniatina primalis*; Sample 115-707A-8H-2, 107–112 cm,  $\times 75$ . 20. *Pulleniatina obliquiloculata*; Sample 115-707A-3H-1, 107–112 cm,  $\times 52$ . 21, 22. *Sphaeroidinella dehiscens*; (21) Sample 115-706A-1H-2, 73–76 cm,  $\times 31$ ; (22) Sample 115-707A-5H-2, 105–112 cm,  $\times 37$ . 23–26. *Sphaeroidinellopsis kochi*; (23, 24, 26) Sample 115-707A-13H-CC; (23, 24)  $\times 49$ ; (26)  $\times 373$ ; (25) Sample 115-707A-11H-CC,  $\times 31$ .