

10. DATA REPORT: SILICOFLAGELLATES AND EBRIDIANS RECOVERED FROM LEG 199 SITES 1218, 1220, AND 1221, EASTERN EQUATORIAL PACIFIC¹

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INTRODUCTION

Eight sites were drilled during Ocean Drilling Program (ODP) Leg 199 in the eastern equatorial Pacific Ocean from October to December, 2001. The sites were separated into two north-south transects with the northernmost being Site 1215 (26°1.77'N, 147°55.99'W) and the southernmost Site 1219 (7°48.01'N, 142°00.94'W). The goal for Leg 199 was to drill through the relatively thin overlying Neogene sequence to recover Paleogene sediments that were not buried deep enough to be lithified (see Shipboard Scientific Party, 2002).

The general location for the Leg 199 area of study is west and slightly north of a transect of seven sites (Sites 848–854) drilled in Neogene sequences during ODP Leg 138 in 1991. These sites were drilled north and south of the equator along the 110°W meridian and were studied by McCartney et al. (1995). They found silicoflagellates to be both abundant and diverse, including some unusual skeletal morphologies showing remarkable variability, in those sites located within 3° of the equator (Sites 848–851), but both abundance and diversity diminished considerably at Sites 852 (5°N) and 854 (11°N). In Hole 854B (11°13.433'N, 109°35.652'W), silicoflagellates were absent in nearly half of the slides examined.

Preliminary silicoflagellate analysis of Leg 199 sites showed a continued trend of rapidly decreasing productivity away from the equator, with most of the samples studied having few or no silicoflagellates. A

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hole from the southernmost of the eight sites, Hole 1219A (7°48.019'N, 142°00.940'W), was selected for detailed study (Engel and McCartney, this volume) with an interval of one sample per section and whole microscope slides counted for silicoflagellates. Diversity and abundance were generally low, with most slides being barren of silicoflagellates, although 31 species and subspecies were identified.

This data report presents the preliminary results of a study on silicoflagellates of samples recovered during Leg 199 (see Tables T1, T2, T3, T4), not including Site 1219. No silicoflagellate specimens were found at Sites 1215, 1216, 1217, and 1222. At Site 1221, silicoflagellates were found in only 1 of 24 samples examined. These slides were not entirely barren, as radiolarian fragments were frequently abundant and whole radiolarians and diatoms were sometimes present. Besides the one sample in Hole 1221A, silicoflagellates were only found at three sites (Sites 1218, 1219, and 1220). The best of these was Hole 1219A, which as mentioned above was chosen for detailed study. Silicoflagellates were found in 13 of 46 samples studied from Hole 1218A and in 8 of 34 samples from Holes 1220A and 1220B.

METHODS OF STUDY

The sample preparation method is presented in Engel and McCartney (this volume). For all studied samples, at least three transects across the length of the slide were made in search of silicoflagellates, with up to a whole slide examined where silicoflagellates were found to be present or the abundance or quality of diatoms suggested that silicoflagellates might be present. The presence of one or two specimens of a taxon are shown by an "X" in the tables; more than two specimens are shown by a "#." Total number of silicoflagellate specimens found is also provided in the tables.

DISCUSSION AND CONCLUSIONS

Silicoflagellates were very sparse in the Leg 199 samples studied. No silicoflagellates were found in Holes 1215A, 1216A, 1217A, 1221B, 1221C, or 1222A (Tables T1, T2, T3, T4) and only in one sample from Hole 1221A (Table T4). The three sites found to have silicoflagellates in multiple samples were from the southernmost sites. More specifically, these samples were found in Holes 1218A (Table T2), 1219A (Engel and McCartney, this volume), 1220A, and 1220B (Table T3). The abundance and diversity of silicoflagellates did not provide sufficient information to determine biostratigraphic zonations. The northernmost of these three sites, Site 1220 (10°10.601'N, 142°45.491'W), had a diversity and abundance generally similar to that of Leg 138 Hole 854A (McCartney et al., 1995), which is presently at a similar latitude. This supports the trend found in the Leg 138 study of rapidly diminishing silicoflagellate abundance away from the equator.

For Site 1221, silicoflagellates were only found in Sample 199-1221A-5H-4, 70–71 cm. This site is located south of the four sites that were not found to have silicoflagellates, further demonstrating the trend toward diminishing abundance away from the equator. The three silicoflagellate taxa, *Corbisema inermis*, *Corbisema regina*, and *Dictyochoa spinosa*, found in this sample suggest, on the basis of experience gained from the Hole 1219A study, that the sample in question is probably from the

T1. Silicoflagellates, Holes 1215A, 1216A, and 1217A, p. 6.

T2. Silicoflagellates, Hole 1218A, p. 7.

T3. Silicoflagellates and ebridians, Holes 1220A and 1220B, p. 8.

T4. Silicoflagellates and ebridians, Holes 1221A, 1221B, 1221C, and 1222A, p. 9.

Dictyocha hexacantha Zone, although the nominative species for this zone was not found.

The general absence of silicoflagellates can be the result of some combination of low biosilicious productivity and a water column and pore waters that are corrosive to opaline silica (Scherer, 1998). However, this does not entirely explain the frequent presence of radiolarians and occasional presence of complete diatoms in samples where silicoflagellates were not found. Silicoflagellates, with their thin and hollow skeletal elements, may be more susceptible to dissolution than the larger and more massively built radiolarians and diatoms.

The diminishing presence of silicoflagellates away from the equator may suggest that silicoflagellates simply do not thrive away from regions of highest productivity.

NOMENCLATURE CITED

Silicoflagellate and ebridian taxa found in this study are listed below. The systematic paleontology for many of the cited species is included in [Engel and McCartney](#), this volume. For taxa not discussed by Engel and McCartney, citation is made to another article in the literature that presents a discussion and species concept similar to that used in this study.

Silicoflagellates

Bachmannocena apiculata (Schulz); Engel and McCartney, this volume.
Bachmannocena circularis (Ehrenberg); Bukry, 1987.
Bachmannocena quadrangula (Ehrenberg); McCartney and Harwood, 1992.
Corbisema apiculata (Schulz); Engel and McCartney, this volume.
Corbisema inermis inermis (Lemmermann); Engel and McCartney, this volume.
Corbisema regina Bukry; Engel and McCartney, this volume.
Corbisema triacantha (Ehrenberg); Engel and McCartney, this volume.
Dictyocha extensa longa (Bukry); McCartney et al., 1995.
Dictyocha fibula fibula Ehrenberg; Engel and McCartney, this volume.
Dictyocha messenensis Haeckel; McCartney et al., 1995.
Dictyocha perlaevis perlaevis Frenguelli; Bukry, 1979.
Dictyocha spinosa (Deflandre); Engel and McCartney, this volume.
Dictyocha aculeata subaculeata Bukry; McCartney et al., 1995.
Dictyocha subclinata Bukry, 1981.
Distephanus crux crux Ehrenberg; Bukry, 1976.
Distephanus crux hannai Bukry; Engel and McCartney, this volume.
Distephanus pulchra (Shiller); Ling and Takahashi, 1985.
Distephanus speculum speculum (Ehrenberg); Engel and McCartney, this volume.
Naviculopsis eobiapiculata Bukry, 1978.
Naviculopsis foliacea Deflandre; Engel and McCartney, this volume.

Ebridians

Craniopsis sp.; McCartney and Wise, 1990.
Ebriopsis antiqua (Schulz); Ling, 1977.

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Table T1. Abundance of silicoflagellates in selected samples from Holes 1215A, 1216A, and 1217A.

Core, section, interval (cm)	Depth (mbsf)	Total silicoflagellate count
199-1215A-		
4H-1, 70-71	20.9	0
4H-4, 70-71	25.4	0
5H-1, 71-72	30.4	0
5H-4, 71-72	34.9	0
6H-1, 71-72	39.9	0
6H-4, 71-72	44.4	0
199-1216A-		
1H-1, 70-71	0.7	0
1H-4, 71-72	5.2	0
199-1217A-		
5H-1, 70-72	34.7	0
5H-4, 70-72	39.2	0
6H-1, 71-72	44.2	0
6H-4, 71-72	48.3	0
7H-2, 70-71	52.9	0
7H-5, 70-71	57.4	0
9H-1, 71-72	61.9	0
9H-4, 71-72	65.3	0
11H-1, 71-72	80.9	0
11H-4, 71-72	85.4	0

Table T2. Abundance of silicoflagellates in selected samples from Hole 1218A.

Core, section, interval (cm)	Depth (mbsf)	<i>Bachmannocena circularis</i>	<i>Bachmannocena quadrangula</i>	<i>Corbisema triacantha</i>	<i>Dictyocha fibula fibula</i>	<i>Dictyocha extensa longa</i>	<i>Dictyocha perlaevis perlaevis</i>	<i>Dictyocha messenensis</i>	<i>Dictyocha aculeata subaculeata</i>	<i>Distephanus crux crux</i>	<i>Distephanus pulchra</i>	<i>Distephanus speculum speculum</i>	<i>Naviculopsis</i> sp.	Total silicoflagellate count
199-1218A-														
1H-1, 71-72	0.7			X			#	#	X		X			15
1H-4, 71-72	5.2		#					X						8
2H-1, 70-71	8.9													0
2H-4, 70-71	13.4													0
3H-1, 70-71	18.4				X			X						3
3H-4, 70-71	22.9				X			X						2
4H-1, 71-72	27.9	X												0
4H-4, 71-72	32.4													0
5H-1, 70-71	37.4													0
5H-4, 70-71	41.9													0
6H-1, 71-72	46.9													0
6H-4, 71-72	51.4		X											1
7H-1, 71-72	56.4													0
7H-4, 71-72	60.9													0
8H-2, 71-72	67.4													0
8H-5, 71-72	71.9													0
11H-1, 71-72	94.4													0
11H-4, 71-72	98.9													0
12H-1, 70-71	103.9										X	X		2
12H-4, 70-71	108.4										X			2
13H-1, 72-73	113.4										X			1
13H-4, 71-72	117.9										#	X		5
14H-1, 70-71	122.9													0
14H-4, 70-71	127.4			X										1
15H-1, 70-71	132.4													0
15H-4, 70-71	136.9													0
16H-1, 71-72	141.9													0
16H-4, 71-72	146.4													0
17H-1, 70-71	151.4													0
17H-4, 70-71	155.9													0
18H-1, 70-71	160.9													0
18H-4, 70-71	165.4													0
19H-1, 71-72	170.4									X				1
19H-4, 71-72	174.9													0
20H-1, 71-72	179.9			X										1
20H-4, 70-71	184.4													0
22X-1, 71-72	196.6													0
22X-4, 71-72	201.1													0
26X-1, 71-72	235.0													0
26X-4, 71-72	239.5													0
27X-1, 70-71	244.6													0
27X-4, 70-71	249.1													0
28X-1, 70-71	254.2													0
28X-4, 71-72	258.7													0
29X-1, 67-68	263.8													0
29X-4, 70-71	268.3													0

Notes: X = presence of one or two specimens of a taxon, # = presence of more than two specimens.

Table T3. Abundance of silicoflagellates and ebridians in selected samples from Holes 1220A and 1220B.

Core, section, interval (cm)	Depth (mbsf)	<i>Corbisema apiculata</i>	<i>Corbisema inermis inermis</i>	<i>Corbisema triacantha</i>	<i>Dictyochoa fibula fibula</i>	<i>Dictyochoa subclinata</i>	<i>Distephanus crux hanna</i>	<i>Distephanus speculum speculum</i>	<i>Naviculopsis eobiapiculata</i>	<i>Naviculopsis eobiapiculata/constructa?</i>	<i>Naviculopsis foliacea</i>	<i>Ebropsis antiqua</i> (ebridian)	Total silicoflagellate count
199-1220A-													
1H-1, 70-71	0.7												0
1H-4, 70-71	5.2												0
2H-1, 70-71	10.2												0
2H-4, 70-71	14.7												0
3H-1, 70-71	19.7												0
3H-4, 67-68	24.1						#						7
4H-1, 71-72	29.2						X	X					3
4H-4, 70-71	33.7												0
5H-1, 70-71	38.7												0
5H-4, 70-71	43.2												0
6H-1, 70-71	48.2												0
6H-4, 70-71	52.7												0
7H-1, 70-71	57.7		X					X					3
7H-4, 70-71	62.2	X		X									2
9H-1, 70-71	76.7							X					1
9H-4, 70-71	81.2												0
10H-1, 70-71	86.2								X				1
10H-4, 70-71	90.7												0
11H-1, 70-71	95.7												0
11H-4, 70-71	100.2												0
12H-1, 70-71	105.2												0
12H-4, 70-71	109.7		X	X							#		3
199-1220B-													
9H-1, 70-71	112.7					X						X	2
9H-4, 70-71	117.2												0
10H-1, 70-71	122.2												0
10H-4, 70-71	126.6												0
11H-1, 70-71	131.7												0
11H-4, 70-71	136.2												0
12H-1, 70-71	141.2												0
12H-4, 70-71	145.7												0
13H-1, 70-71	150.7												0
16X-1, 70-71	169.8												0
16X-4, 70-71	174.3												0
18X-1, 70-7	188.6												0

Notes: X = presence of one or two specimens of a taxon, # = presence of more than two specimens.

Table T4. Abundance of silicoflagellates and ebridians in selected samples from Holes 1221A, 1221B, 1221C, and 1222A.

Core, section, interval (cm)	Depth (mbsf)	<i>Corbisema inermis inermis</i>	<i>Corbisema regina</i>	<i>Dictyochoa spinosa</i>	<i>Craniopsis</i> sp.	Total silicoflagellate count
199-1221A-						
1H-4, 70-71	5.2					0
1H-7, 70-71	9.7					0
2H-1, 70-71	10.2					0
2H-4, 70-71	14.7					0
3H-1, 70-71	19.7					0
3H-4, 70-71	24.2					0
4H-1, 70-71	29.2					0
4H-4, 70-71	33.7					0
5H-1, 70-71	38.7					0
5H-4, 70-71	43.2	X	X	X	#	5
6H-3, 70-71	51.2					0
6H-6, 70-71	55.7					0
7H-1, 70-71	57.7					0
7H-4, 70-71	62.2					0
8H-1, 70-71	67.2					0
8H-4, 70-71	71.7					0
9H-1, 70-71	76.7					0
9H-4, 70-71	81.1					0
10H-1, 70-71	86.2					0
10H-4, 70-71	90.7					0
11H-4, 70-71	100.2					0
11H-7, 70-71	104.7					0
199-1221B-						
1H-1, 70-71	0.7					0
199-1221C-						
6X-1, 70-71	103.2					0
199-1222A-						
5H-4, 70-71	39.1					0
5H-7, 70-71	43.6					0
6H-1, 70-71	44.1					0
6H-4, 70-71	48.6					0
8H-2, 70-71	64.6					0

Notes: X = presence of one or two specimens of a taxon, # = presence of more than two specimens.