

Berriasian–Barremian (Early Cretaceous) radiolarians from paleo-Pacific regions (DSDP and ODP Holes 463, 800A, 801B, 765C, 1213B, and the Goshikigahama bedded red shale of the Northern Shimanto Belt

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(Received March 29, 2007; 1st review finished May 8, 2007; Accepted January 24, 2008)

Abstract

Approximately 340 radiolarian species were distinguished in Berriasian to Barremian sediments deposited on the Mid-Pacific Mountains, Pigafetta Basin, the Argo Abyssal Plain, Shatsky Rise, and the Goshikigahama in Southwest Japan. A comparison with several other Berriasian to Barremian sediments revealed four radiolarian provinces dating back to at least the Tithonian: the mid-latitudinal Pacific, western Tethys, Austral-Southern Boreal, and the tropical Pacific. In contrast to the tropical Pacific province, the mid-latitudinal Pacific province was characterized by occurrences of *Cinguloturris*, *Eucyrtidiellum*, *Mirifusus*, *Protunuma*, *Ristola*, and *Solenotryma*, the western Tethys province included *Bernoullius*, *Hexapyramis*, *Katroma*, *Parvivacca*, *Pseudocrucella*, and *Spongotripos*, and the Austral-Southern Boreal province was diversified with *Parvingula*, *Pseudoeucyrtis*, and *Windalia*.

Key words: Berriasian, Hauterivian, Valanginian, Barremian, Pacific, Radiolaria

Introduction

Radiolarians from the Late Jurassic (Tithonian) to the earliest Early Cretaceous have been reported from Japan (Nishizono, 1996; Hori, 1999), the western Pacific (Matsuoka, 1992; Matsuoka, 1998), North America (Pessagno et al., 1993; Yang, 1993; Hull, 1997; Pessagno, 1977), Europe (Steiger, 1992; Gorican, 1994; Jud, 1994), Oman (Kiessling, 1995; Dumitrica et al., 1997), and the Antarctic Peninsula (Kiessling and Scasso, 1996; Kiessling, 1999). Early Cretaceous radiolarians from the proto-Pacific have also been found in Japan (Nakaseko and Nishimura, 1981), far-eastern Russia (Kemkin and Kemkina, 1993; Vishnevskaya, 2001), the California Range (Pessagno, 1977; Yang, 1993), New Zealand (Aita and Grant-Mackie, 1992), and other areas, but few Berriasian–Barremian species have been identified from the proto-Pacific, with the exception of approximately 400 species from a Berriasian soft tuff sample dredged from the Mariana Trench (Matsuoka, 1998). This limited knowledge of Berriasian–Barremian radiolarian

diversity in the proto-Pacific prevents the use of radiolarians in the reconstruction of paleoceanography.

In this paper, we investigated the faunal diversity and provincialism of proto-Pacific Berriasian–Barremian radiolarians recovered from the following five localities harboring well-preserved radiolarians from the Early Cretaceous: the Mid-Pacific Mountains (DSDP Leg 62, Hole 463), the Argo Abyssal Plain northwest of Australia (ODP Leg 123, Hole 765C), Pigafetta Basin in the western Pacific (ODP Leg 129, Holes 800A and 801B), Shatsky Rise (ODP Leg 198, Hole 1213B) and the Goshikigahama bedded red shale of the Northern Shimanto Belt, Yokonami Peninsula, Kochi, Japan. Schaaf (1981), Baumgartner (1992), Matsuoka (1992), and Okamura (1992) illustrated well-preserved radiolarians from these localities. Reconstruction of the Pacific plate motion and magnetic inclination data place their original positional sites in the low-latitudinal Pacific in the Early Cretaceous (Taira et al., 1980; Larson et al., 1992; Jenkyns and Wilson, 1999; Shipboard Scientific Party, 2002). We used both scanning electron microscope (SEM) and transmitted-light microscope to identify and classify the specimens into a total of 344 species.

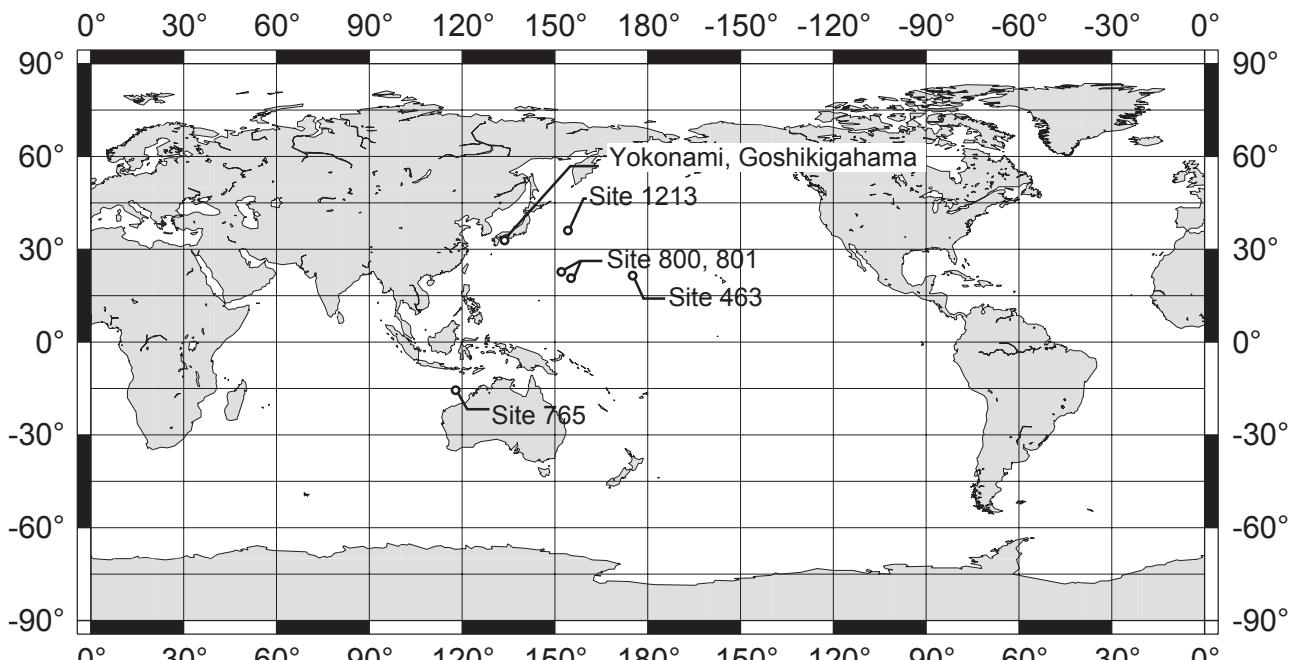


Fig. 1. Location of the sites examined in this study, created by Online Map Creation (<http://www.aquarius.geomar.de/omc/>).

Materials and Methods

Examined materials (Table 1) were selected from the Lower Cretaceous of Holes 1213B (Figs. 1, 2), 800A and 801B (Figs. 1, 3), 463 (Figs. 1, 4), A-sequence of the Goshikigahama bedded red shale in Okamura (1992) (Fig 5), and Hole 765C (Fig. 6). The information on locality, lithology and estimated ages is summarized in Table 1. Radiolarians were extracted from the samples using standard methods. Siliceous rocks were soaked in a diluted 3% HF solution for 1–24 h, depending on the siliceous content, and calcareous samples were treated with diluted HCl to completely dissolve calcareous matter. The residues were concentrated on a 63-µm screen. Individual radiolarians were picked out with a fine brush under a binocular microscope and digitally photographed using two digital SEMs VE-8800 (Keyence, Osaka, Japan) and JSM-6330F (JEOL, Tokyo, JAPAN), and then identified or divided to species level. Several extremely well-preserved radiolarian samples were also examined under a transmitted-light microscope at a magnitude of 100–400 after embedding the residues on microscopic slides with Entellan Neu (Merck, Darmstadt, Germany).

Results

Radiolarians identified from Hole 1213B (Table 2) comprised 80 genera and 201 species from 19 of 33 examined samples; Hole 800A (Table 3) yielded 70 genera and 158

species from 13 of 15 samples; Hole 801B (Table 4) contained 56 genera and 130 species from 5 of 7 samples; Hole 463 (Table 5) had 71 genera and 137 species from all 17 samples; the Goshikigahama bedded red shale (Table 6) contained 61 genera and 131 species from 27 of 30 samples; and Hole 765C (Table 7) yielded 45 genera and 88 species from 17 of 30 samples.

Radiolarian assemblages from Holes 1213B, 800A, and 801B showed similar compositions, with abundant nassellarian *Archaeodictyomitra*, *Cryptamphorella*, *Hiscocapsa*, *Holocryptocanium*, *Pdobursa*, *Praexitus*, *Pseudodictyomitra*, *Pseudoxitus*, *Sethocapsa*, *Stichocapsa*, *Stichomitra*, *Svintizium*, *Syringocapsa*, *Tethysetta*, *Thanarla*, *Xitus*, and *Zhamoidellum*, as well as abundant spumellarian *Acaeniotyle*, *Acanthocircus*, *Alievium*, *Archaeospongoprunum*, *Becus*, *Emiluvia*, *Pantanellium*, and *Praeconosphaera*. Common flat radiolarians included *Angulobrachia*, *Crucella*, *Halesium*, *Tritrabs*, and *Spongostaurus*; rare genera included *Cinguloturris*, *Mirifusus*, and *Ristola*. *Vallupus* species were detected only in the lowest horizon of Hole 801B. Despite a careful search, we did not find *Eucyrtidiellum*, *Protunuma*, or *Solenotryma*, which were recognized as non-tropical elements by Matsuoka (1998). The radiolarian assemblages of Hole 463 and the Goshikigahama bedded red shale essentially coincided with those of Holes 1213B, 800A, and 801B, differing from these three holes by abundant discoidal and spiral radiolarians such as *Cromyodruppa concentrica* Lipman, *Lithelius*, and *Pseudoaulophacus* in Hole 463 and consistent occurrences of *Eucyrtidiellum* and *Solenotryma* in the Goshikigahama bedded red shale.

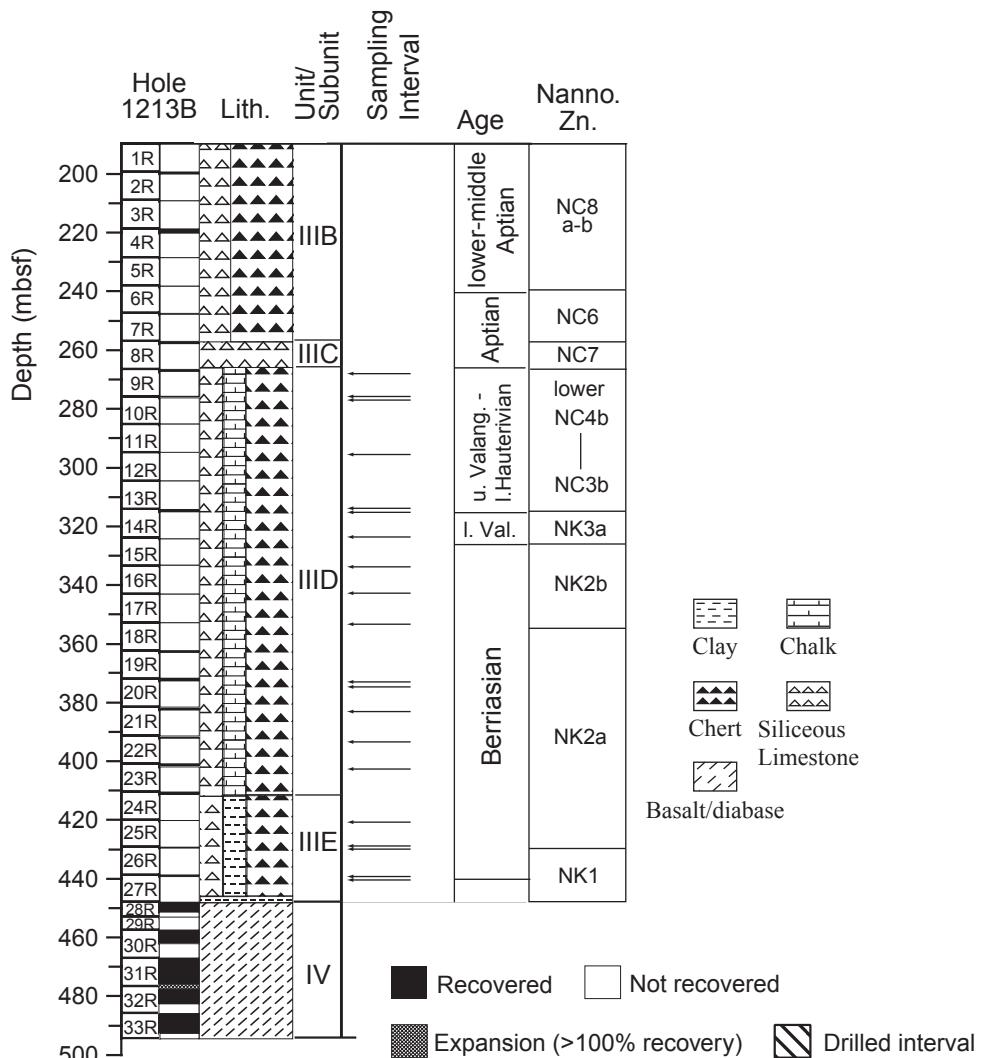


Fig. 2. Columnar section of Hole 1213B with sample horizons, modified from Bralower et al. (2002). Nannofossil biostratigraphy is from Bown (2005).

The radiolarian assemblages of Hole 765C differed between mudstone and sandy mudstone, as noted by Baumgartner (1992). Radiolarians in the mudstone are few, but well-preserved, and include *Archaeodictyomitra*, *Cryptamphorella*, *Holocryptocanum*, *Stichomitra*, *Thanarla*, and *Williriedellum*. In contrast, the sandy mudstone is characterized by abundant *Parvingingula* and *Windalia*, which are rarely recovered from the tropical Pacific, and abundant *Pseudoeucyrtis* species. Tethyan genera identified from Hole 765C by Baumgartner (1992), such as *Acaeniotyle*, *Crucella*, *Hiscocapsa*, *Pantanellium*, *Pseudodictyomitra*, and *Tethysetta*, began to be found in the Barremian. These faunal differences between mudstone and sandy mudstone weakened after the Barremian.

Discussion and results

We examined five localities of Early Cretaceous radiolarians in the proto-Pacific region and identified 344 species from

approximately 130 samples from Berriasian to Barremian in age. The diversity is comparable to the Berriasian faunas reported by Matsuoka (1998) from a Berriasian tuffaceous clayey radiolarite sample dredged from the Mariana Trench, although it is different between our result and Matsuoka's report on total number of examined samples and age intervals. Matsuoka (1998) noted that the tropical assemblage contained rare *Cinguloturris*, *Mirifusus*, *Ristola*, and *Solenotryma*, but no *Eucyrtidium* or *Protunuma*. On the other hand, as noted by Matsuoka (1998), radiolarians from the Torinosu Group of Southwest Japan (Matsuoka and Yao, 1985) and Taukha Belt in Far East Russia (Kemkin et al., 1992; 1997) included *Cinguloturris*, *Eucyrtidiellum*, *Mirifusus*, *Protunuma*, *Ristola* and *Solenotryma*, suggesting mid-latitude fauna. The radiolarian assemblages from Holes 1213B, 800A, and 801B are also tropical fauna, as shown by a reconstruction of their original depositional position in reference to Pacific Plate motion (Larson et al., 1992; Jenkyns and Wilson, 1999; Shipboard Scientific Party, 2002). These assemblages are similar to that

Hole 800A

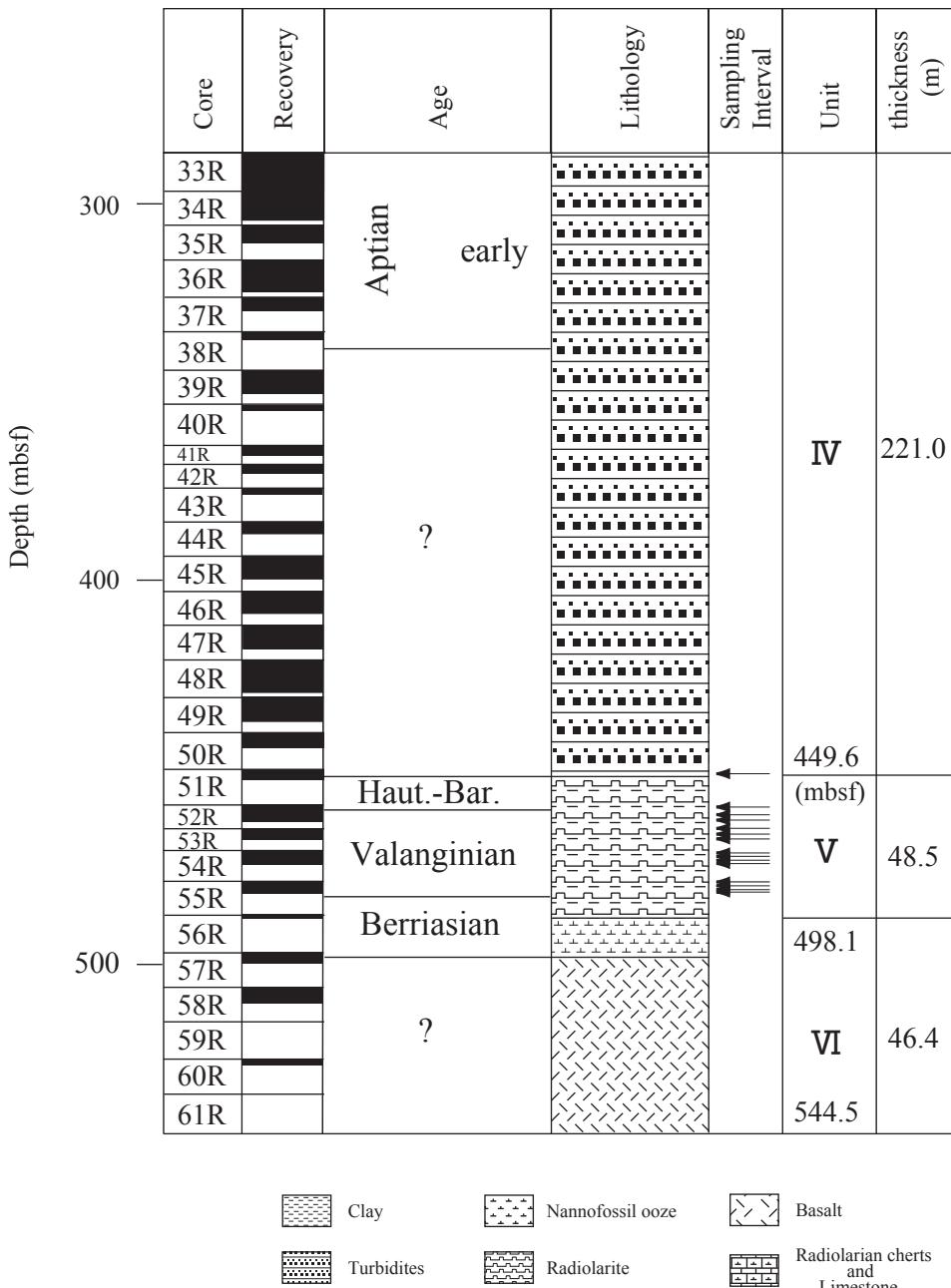


Fig. 3. Columnar section of Hole 800A with sample horizons, modified from Lancelot et al., (1990).

found by Matsuoka, except for the absence of *Parvivacca* and *Tripocyclia*, suggesting that the Berriasian tropical Pacific was marked by rare or absent *Cinguloturris*, *Eucyrtidiellum*, *Mirifusus*, *Protunuma*, *Ristola*, and *Solenotryma*. In a similar sense, the Goshikigahama bedded red shale yields *Eucyrtidium* and *Solenotryma* which are non-tropical elements, suggested by Matsuoka (1998), so that this red shale may have deposited on north place than Holes 1213B, 800A and 801B. Diversified Berriasian-Barremian radiolarian faunas have also been reported from the western Tethyan region (e.g., Gorican, 1994; Jud, 1994). The Tethyan radiolarian assemblages are similar

to the tropical Pacific radiolarian assemblages we examined from Holes 800A, 801B, and 1213B, with the exception of the absence or rare occurrence of *Bernoullius*, *Hexapyramis*, *Katroma*, *Parvivacca*, *Pseudocrucella*, and *Spongotripos*.

The similarities and differences in radiolarian assemblages among the tropical Pacific (Holes 800A, 801B, and 1213B), the mid-latitude Pacific (Torinosu Group and Taukha Belt), the Austral-Southern boreal region (Hole 765C), and the western Tethys suggest that provincialism was established by the Berriasian. Kiessling (1999) cited the result of Baumgartner (1992) that recognized the Tithonian assemblage from the

Hole 801B

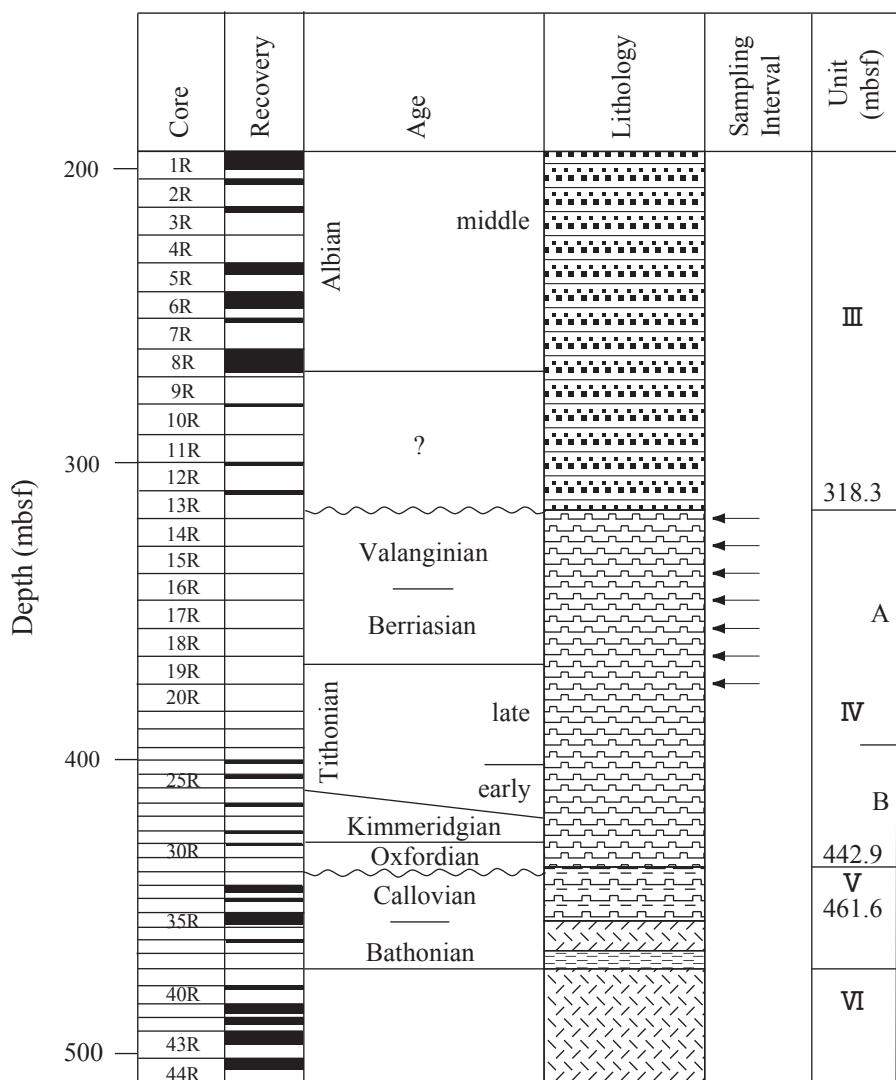


Fig. 4. Columnar section of Hole 801B with sample horizons, modified from Lancelot et al. (1990).

sandy mudstone of Hole 765C and he considered it is part of the Tethyan province for the low-latitudinal Pacific and Tethyan regions, which was a transitional zone between Tethyan and Austral-Southern Boreal provinces.

Acknowledgments

We greatly acknowledge the critical review by Osamu Takahashi (Tokyo Gakugei University). Professor Makoto Okamura (Kochi University) and Dr. Atsushi Ando (Research Institute for Humanity and Nature) kindly offered samples from the Goshikigahama Bedded Red Shale and Hole 463, respectively. We thank the Ocean Drilling Program for sample distributions.

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DSDP Site 463: Mid-Pacific Mountains

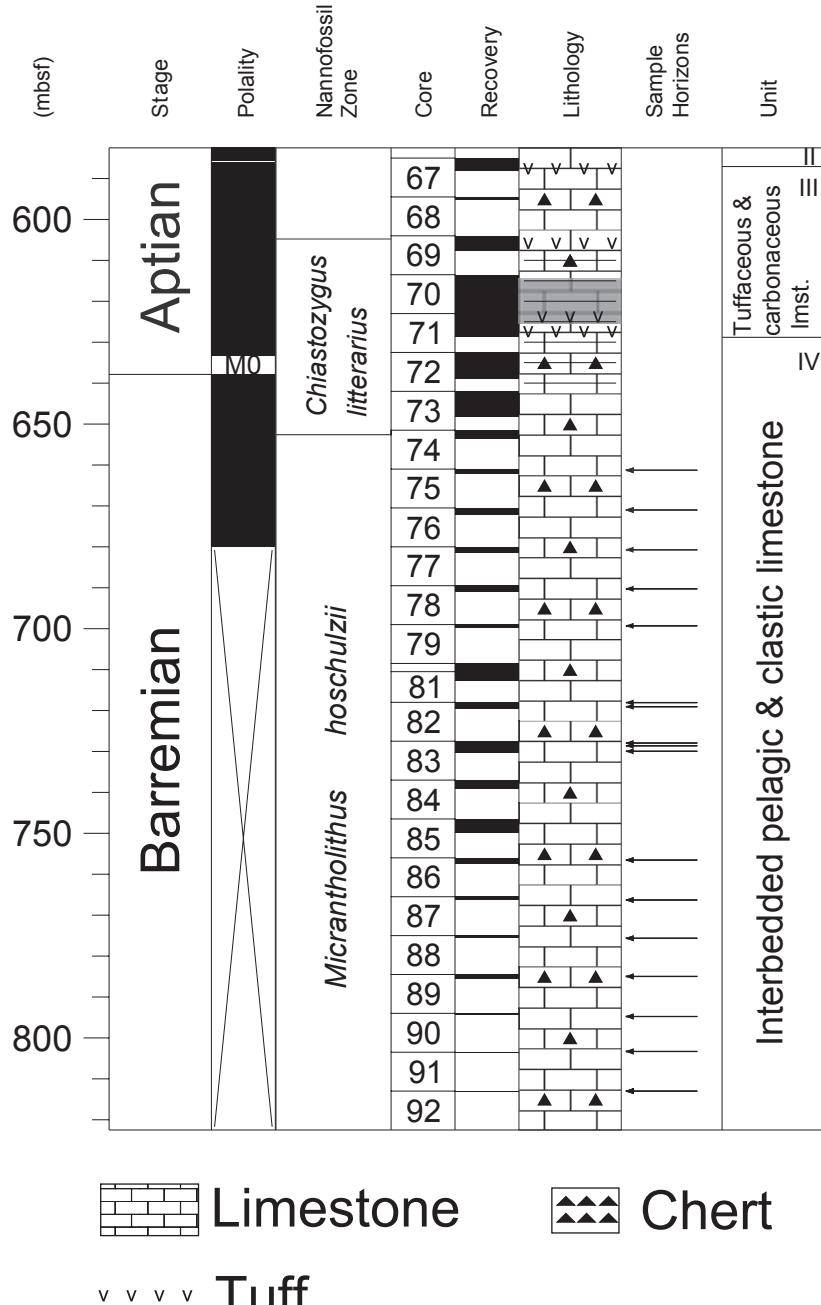


Fig. 5. Columnar section of Hole 463 modified from Thiede et al. (1981) with sample horizons.
Nannofossil biostratigraphy is from Erba (1994).

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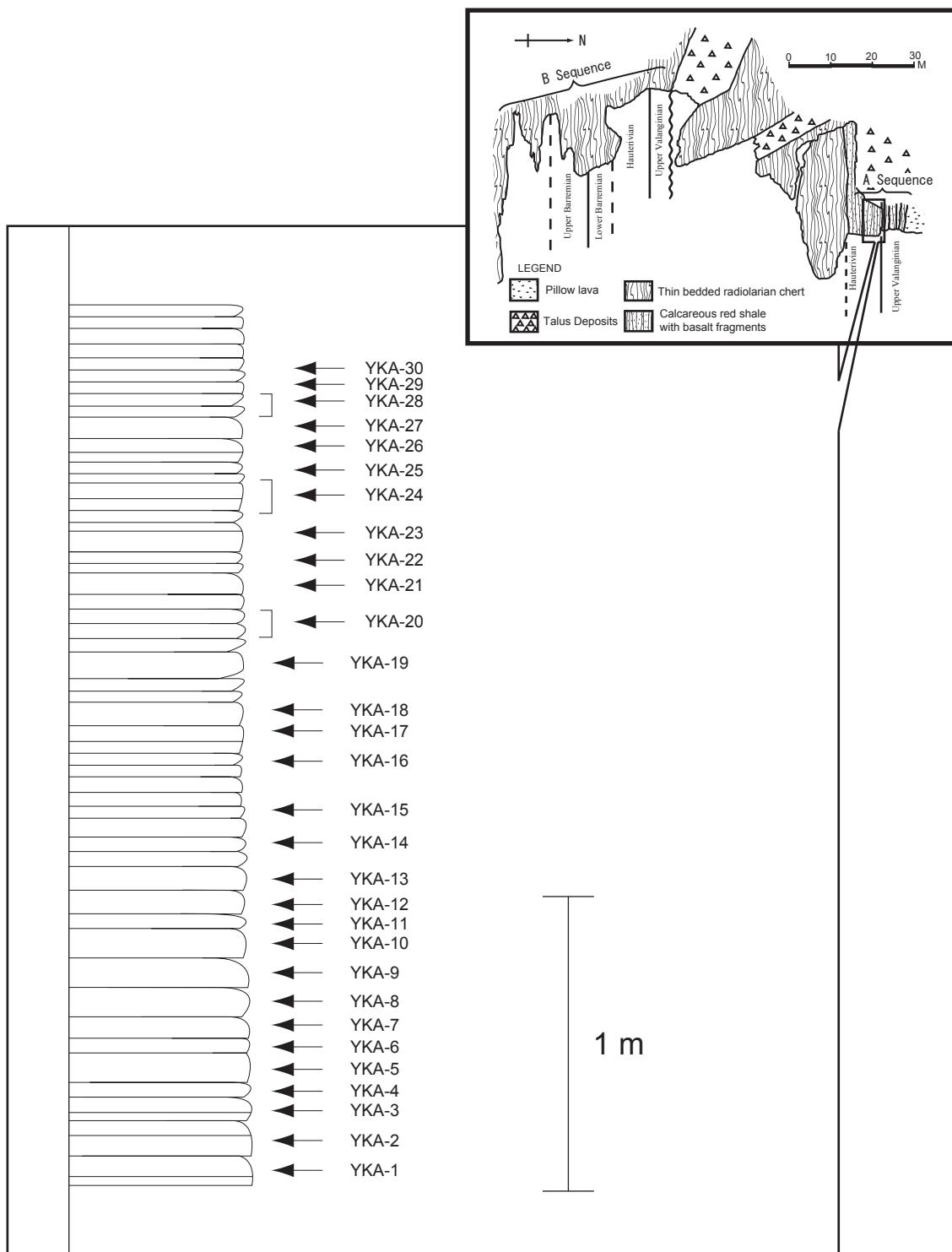


Fig. 6. Sketched outcrop of the upper right side of Goshikigahama, Yokonami Peninsula, Kochi Prefecture, Japan, modified from Okamura (1992).

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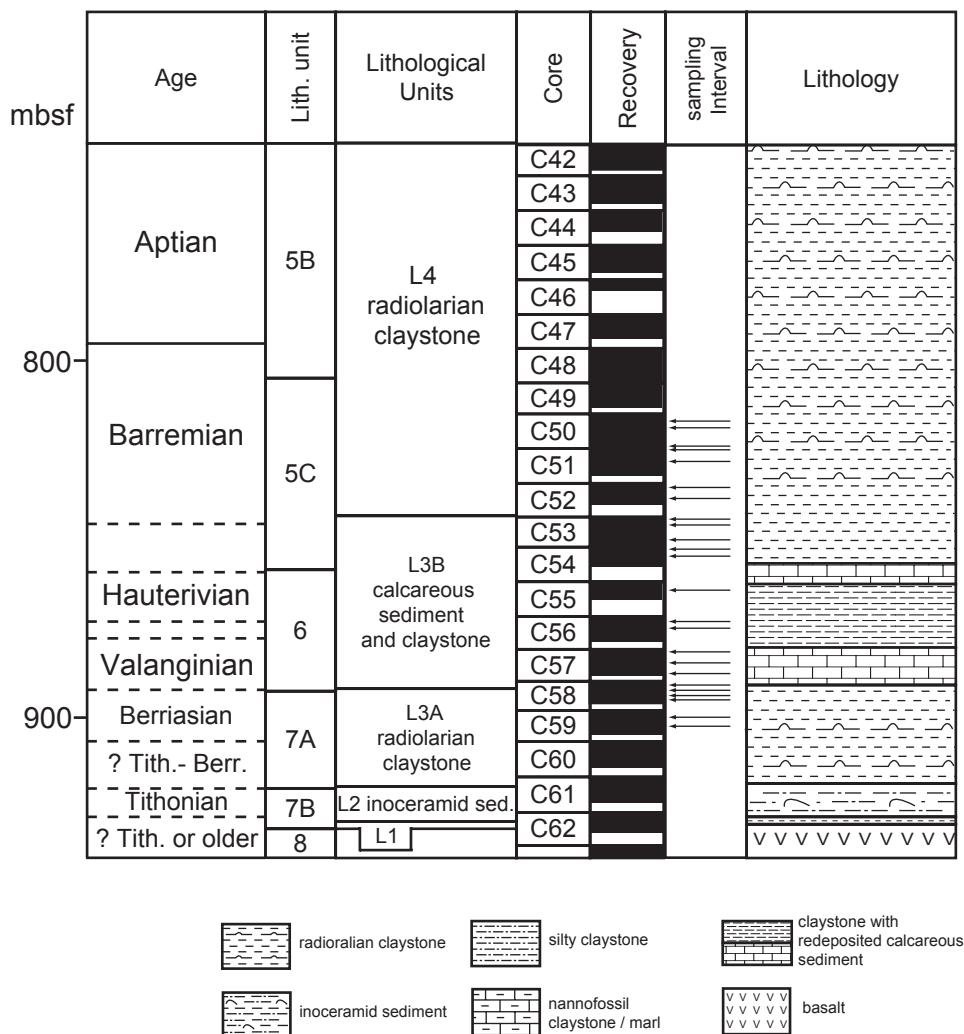


Fig. 7. Columnar section of Hole 765C (from Dumoulin and Bown, 1992) with sample horizons.

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Table 1. Sample lists

DSDP/ODP Leg	Site	Locality	Water depth (m)	Lithology	Age	Ref.
198	Hole 1213B	Shatsky Rise (31°34.6576'N, 157°17.8621'E)	3882.8	chert, siliceous limestone, and mudstone	Berriasian - late Valanginian / late Hauterivian	1, 2
129	Hole 800A	Pigafetta Basin (21°55.38'N, 152°19.37'E)	5686	clay and radiolarite	late Berriasian - Hauterivian / Barremian	3, 4
129	Hole 801B	Pigafetta Basin (18°38.54'N, 156°21.58'E)	5682	radiolarite	late Tithonian - Valanginian	3, 4
62	Hole 463	Mid-Pacific Mountain (21°21'N, 174°40'E)	2525	pelagic limestone and clastic limestone	Barremian	5, 6
123	Hole 765C	Argo Abyssal Plain (51°58.54'S, 117°34.49'E)	5717.7	mudstone with interbedded millimeter-scale layers	late Tithonian - Barremian	7
Goshikigahama bedded red shale	Northern Shimanto Belt, Yokonami Prefecturee, Kochi, Japan	-	-	bedded red shale	Hauterivian	4, 8

References : 1 = Shipboard Scientific Party, 2002; 2 = Bown, 2005; 3 = Larson et al., 1992; 4 = Matsuoka, 1995; 5 = Thiede et al., 1981; 6 = Erba, 1994; 7 = Dumoulin and Bown, 1992; 8 = Okamura, 1992

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Table 2. Radiolarian occurrence in Hole 1213B.

	Hole 1213B											
Abundance	A	C	C	C	R	R	R	R	R	R	R	R
Preservation	M	P	P	P	M	P	M	M	P	P	M	M
<i>Acaenioityle diaphorogona</i> Foreman s.l.	+	+	+	+	1213B 27R-1 21-22 cm							
<i>Acaenioityle umbilicata</i> (Rüst)					1213B 27R-1 16-19 cm							
<i>Acanthocircus trizonalis</i> (Rüst)					1213B 26R-1 13-45 cm							
<i>Actinomma</i> spp.					1213B 26R-1 7-8 cm							
<i>Alievium picum</i> Kiessling					1213B 25R-1 37-40 cm							
<i>Alievium regulare</i> (Wu and Li)					1213B 23R-1 117-119 cm							
<i>Angulobrachia</i> (?) portmanni Baumgartner					1213B 22R-1 130-140 cm							
<i>Angulobrachia mediopulvilla</i> Steiger					1213B 21R-1 148-150 cm							
<i>Angulobrachia</i> sp. A of Baumgartner 1980					1213B 20R-1 78-81 cm							
<i>Arcanicapsa adrianae</i> (Jud)					1213B 20R-1 14-16 cm							
<i>Archaeocenosphaera nodulosa</i> Dumitrica					1213B 17R-1 0-1 cm							
<i>Archaeodictyonitra conica</i> (Squinabol)					1213B 16R-1 15-17 cm							
<i>Archaeodictyonitra excellens</i> (Tan)					1213B 15R-1 15-16 cm							
<i>Archaeodictyonitra immenhauseri</i> Dumitrica					1213B 14R-1 140-150 cm							
<i>Archaeodictyonitra mitra</i> Dumitrica					1213B 14R-1 17-19 cm							
<i>Archaeodictyonitra praeguttata</i> Dumitrica					1213B 12R-1 19-12 cm							
<i>Archaeodictyonitra pseudomulticostata</i> (Tan)					1213B 10R-1 33-35 cm							
<i>Archaeodictyonitra tumandae</i> Dumitrica					1213B 10R-1 21-22 cm							
<i>Archaeodictyonitra vulgaris</i> Pessagno					1213B 9R-1 107-109 cm							
<i>Archaeodictyonitra</i> sp. A												
<i>Archaeodictyonitra</i> sp. B												
<i>Archaeodictyonitra</i> sp. C												
<i>Archaeospongoprunum patricki</i> Jud s.l.												
<i>Archaeospongoprunum praelongum</i> Pessagno												
<i>Archaeospongoprunum tehamaensis</i> Pessagno												
<i>Archaeospongoprunum</i> sp. A												
<i>Archaeotriastrum moszleri</i> Kiessling												
<i>Archicapsa guttiformis</i> Tan												
<i>Artocapsa amphorella</i> Jud												
<i>Artostrobium</i> sp. 1 of Matsuoka 1998												
<i>Becus gemmatus</i> Wu												
<i>Becus horridus</i> (Squinabol)												
<i>Becus triangulocentrum</i> Dumitrica												
<i>Bistarkum fleosum</i> (Khavakov)												
<i>Bistarkum</i> sp. A												
<i>Canoptum banale</i> Jud												
<i>Cavaspasia euganea</i> (Squinabol)												
<i>Cingulourtis cylindra</i> Kemkin and Rudenko												
<i>Crucella angulata</i> Yang												
<i>Crucella bossoensis</i> Jud												
<i>Crucella lipmanae</i> Jud												
<i>Cryptamphorella clivosa</i> (Aliev)												
<i>Cryptamphorella conara</i> (Foreman) s.l.												
<i>Cryptamphorella dumitricai</i> Schaaf												
<i>Deviatus diamphius</i> (Foreman)												
<i>Diacanthocapsa</i> aff. <i>galeata</i> Dumitrica												
<i>Distylocapsa veneta</i> (Squinabol)												
<i>Emiluvia</i> (?) sp. A												
<i>Emiluvia chica decussata</i> (Steiger)												
<i>Emiluvia omanensis</i> Kiessling												
<i>Emiluvia pessagnoi</i> Foreman												
<i>Eoxitus</i> sp. A												
<i>Eucyrtis columbaria</i> Renz												
<i>Godia coronata</i> (Tumanda)												
<i>Gongylithorax verbeekii</i> (Tan)												
<i>Halesium</i> (?) <i>lineatum</i> Jud												
<i>Halesium palmatum</i> Dumitrica												
<i>Halesium</i> sp. 1 of Matsuoka 1998												
<i>Halesium</i> sp. A												
<i>Hemicryptocapsa capita</i> Tan												
<i>Hemicryptocapsa tuberosa</i> Dumitrica												
<i>Hiscocapsa asseni</i> (Tan)												
<i>Hiscocapsa globosa</i> (Rüst)												
<i>Hiscocapsa grutterinki</i> (Tan)												
<i>Hiscocapsa</i> aff. <i>grutterinki</i> (Tan)												
<i>Hiscocapsa kaminogoensis</i> (Aita)												
<i>Hiscocapsa pseudouterculus</i> (Aita)												
<i>Hiscocapsa simplex</i> (Taketani)												
<i>Hiscocapsa uterculus</i> (Parona)												
<i>Hiscocapsa zweili</i> (Jud)												
<i>Hiscocapsa</i> sp. A												
<i>Holocryptocanium barbui</i> Dumitrica												

Table 2 (Continued).

Berriasian-Barremian radiolarians in the Pacific

Table 2 (Continued).

	A	C	C	C	R	A	R	R	A	C	R	C	C	C	A	A	R	A	A	R	R
Abundance	A	C	C	C	R	A	R	R	A	C	R	C	C	C	A	A	R	A	A	R	R
Preservation	M	P	P	P	P	M	P	M	M	P	P	M	M	M	M	PM	M	M	PM	M	M
<i>Sethocapsa</i> sp. B																	+				
<i>Sethocapsa</i> sp. C																					
<i>Spongocapsula coronata</i> (Squinabot)																		+			
<i>Spongodiscidae</i> gen. et sp. Indet. A																					
<i>Spongodiscidae</i> gen. et sp. Indet. B																					
<i>Spongopyle</i> sp. A																					
<i>Spongostaurus compactus</i> Kiessling																					
<i>Spongostichomitra</i> aff. <i>elatica</i> (Aliev)																					
<i>Spumellaria</i> gen. et sp. indet A																					
<i>Staurocychia martini</i> Rüst																					
<i>Stichocapsa pulchella</i> (Rust)																					
<i>Stichocapsa rutteni</i> (Tan)																					
<i>Stichocapsa</i> sp. B																					
<i>Stichomitra</i> aff. <i>japonica</i> (Nakaseko and Nishimura)																					
<i>Stichomitra mediocris</i> (Tan) of Dumitrica et al. 1997																					
<i>Stichomitra</i> cf. <i>pseudochrysalis</i> (Tan) of Dumitrica et al. 1997																					
<i>Stichomitra</i> sp. A																					
<i>Stichomitra</i> (?) sp. aff. <i>S. euganea</i> (Squinabot)																					
<i>Stylosphaera</i> spp.																					
<i>Suna echiodes</i> (Foreman)																					
<i>Suna hybum</i> (Foreman)																					
<i>Svinitzium columnarium</i> (Jud)																					
<i>Svinitzium deppressum</i> (Baumgartner)																					
<i>Svinitzium mizutani</i> Dumitrica																					
<i>Svinitzium pseudopugae</i> Dumitrica																					
<i>Syringocapsa agolarium</i> Foreman																					
<i>Syringocapsa limatum</i> Foreman																					
<i>Tethysetta boesii</i> (Parona)																					
<i>Tethysetta mashitaensis</i> (Mizutani)																					
<i>Tethysetta ovoidale</i> Dumitrica																					
<i>Tethysetta pygmaea</i> Dumitrica																					
<i>Tethysetta sphaerica</i> (Steiger)																					
<i>Tethysetta usutanensis</i> (Tumanda)																					
<i>Thanarla brouweri</i> (Tan)																					
<i>Thanarla elegantissima</i> (Cita)																					
<i>Thanarla pacifica</i> Nakaseko and Nishimura																					
<i>Thanarla praeveneta</i> Pessagno																					
<i>Thanarla pseudodecora</i> (Tan)																					
<i>Thanarla pulchra</i> (Squinabot)																					
<i>Thanarla</i> sp. A																					
<i>Triactoma mexicana</i> Pessagno and Yang																					
<i>Triactoma titthonianum</i> Rüst																					
<i>Tricolocapsa</i> aff. <i>campana</i> Kiessling																					
<i>Tricolocapsa</i> <i>dispar</i> (Tan)																					
<i>Trimulus</i> <i>parvatus</i> O'Dogherty																					
<i>Tritrabs</i> <i>ewigi</i> gr. Pessagno																					
<i>Triversus</i> aff. <i>japonica</i> Takemura of Hull 1997																					
<i>Triversus</i> sp. A																					
<i>Triversus</i> sp. B																					
<i>Triversus</i> sp. C																					
<i>Xiphostylidae</i> gen. et sp. indet 1 of Matsuoka 1998																					
<i>Xiphostylidae</i> gen. et sp. indet A																					
<i>Xitus dicorus</i> Wu																					
<i>Xitus robustus</i> Wu																					
<i>Xitus sandovali</i> Jud																					
<i>Xitus spicularius</i> (Aliev)																					
<i>Xitus</i> aff. <i>spicularius</i> (Aliev) sensu O'Dogherty																					
<i>Zhamoideum ovum</i> Dumitrica																					

Abundance: A=Abundant, C=Common, R=Rare

Preservation: M=moderate, PM=poor to moderate, P=poor
cf. (=confer)

Table 3. Radiolarian occurrence in Hole 800A

	800A 55R-2 135-137 cm		800A 55R-1 58-60 cm		800A 54R-2 95-97 cm		800A 54R-2 54-56 cm		800A 54R-1 138-140 cm		800A 54R-1 54-56 cm		800A 53R-2 57-59 cm		800A 53R-1 144-146 cm		800A 53R-1 64-66 cm		800A 52R-CC 5-7 cm		800A 52R-2 47-49 cm		800A 52R-1 36-38 cm		800A 51R-1 105-107						
Abundance	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	M	PM	PM	M	M	PM	P	PM	P	P	
<i>Acaeniotyle diaphorogona</i> Foreman																					+	+	+	+	+	+	+	+	+	+	
<i>Acaeniotyle</i> (?) <i>glebulosa</i> Foreman																					+	+	+	+	+	+	+	+	+	+	
<i>Acaeniotyle umbilicata</i> (Rüst)																					+	+	+	+	+	+	+	+	+	+	
<i>Acanthocircus carinatus</i> Foreman																															
<i>Acanthocircus furiosus</i> Jud	+																														
<i>Acanthocircus trizonalis</i> (Rüst)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	1	+	+			
<i>Alievium</i> (?) <i>echinus</i> Dumitrica																															
<i>Alievium nodulosum</i> Dumitrica																															
<i>Alievium regulare</i> (Wu and Li)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Archaeodictyomitra apiarium</i> (Rüst)	+																														
<i>Archaeodictyomitra chalilovi</i> (Aliev)																															
<i>Archaeodictyomitra excellens</i> (Tan)	+	+																													
<i>Archaeodictyomitra immenhauseri</i> Dumitrica																															
<i>Archaeodictyomitra lacrimula</i> (Foreman)																															
<i>Archaeodictyomitra mitra</i> Dumitrica	+																														
<i>Archaeodictyomitra pseudomulticostata</i> (Tan)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Archaeodictyomitra sliteri</i> Pessagno																															
<i>Archaeodictyomitra tumandae</i> Dumitrica																															
<i>Archaeodictyomitra vulgaris</i> Pessagno	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Archaeodictyomitra</i> sp. A	+																														
<i>Archaeodictyomitra</i> sp. B	+	+																													
<i>Archaeospongoprunum patricki</i> Jud	+																														
<i>Archaeospongoprunum tehamaensis</i> Pessagno																															
<i>Archaeotriastrum mostleri</i> Kiessling	+																														
<i>Becus gemmatus</i> Wu																															
<i>Becus horridus</i> (Squinabol)		+																													
<i>Becus triangulocentrum</i> Dumitrica			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Cavaspongia euganea</i> (Squinabol)																															
<i>Cecrops septemporatus</i> (Parona)																															
<i>Crolanium pythiae</i> Schaa																															
<i>Cromyodruppa concentrica</i> Lipman group																															
<i>Crucella angulata</i> Yang																															
<i>Crucella bossoensis</i> Jud																															
<i>Cryptamphorella clivosa</i> (Aliev)																															
<i>Cryptamphorella conara</i> (Foreman) <i>sensu lato</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Cryptamphorella dumitricai</i> Schaa																															
<i>Cryptamphorella gilkeyi</i> (Dumitrica)																															
<i>Cyclastrum</i> sp. A																															
<i>Deviatius diampadius</i> (Foreman)																															
<i>Dibolachras tythropora</i> Foreman																															
<i>Ditrabs sansalvadorensis</i> (Pessagno)																															
<i>Emiluvia chica decussata</i> (Steiger)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Eucyrtis columbaria</i> Renz																															
<i>Gongylothorac verbeekii</i> (Tan)																															
<i>Halesium</i> (?) <i>lineatum</i> Jud																															
<i>Halesium palmatum</i> Dumitrica																															
<i>Hemicryptocapsa capita</i> Tan																															
<i>Hemicryptocapsa tuberosa</i> Dumitrica																															
<i>Hexalonche</i> spp.																															
<i>Hiscocapsa asseni</i> (Tan)	+	+																													
<i>Hiscocapsa grutterinki</i> (Tan)																															
<i>Hiscocapsa</i> aff. <i>grutterinki</i> (Tan)	+																														
<i>Hiscocapsa kaminogoensis</i> (Aita)																															
<i>Hiscocapsa orca</i> (Foreman)																															
<i>Hiscocapsa pseudouterculus</i> (Aita)																															
<i>Hiscocapsa simplex</i> (Taketani)																															
<i>Hiscocapsa uterculus</i> (Parona)																															

Berriasian-Barremian radiolarians in the Pacific

Table 3 (Continued).

	800A 55R-2 135-137 cm											
	800A 55R-1 58-60 cm	800A 54R-2 95-97 cm	800A 54R-2 54-56 cm	800A 54R-1 138-140 cm	800A 54R-1 54-56 cm	800A 53R-2 57-59 cm	800A 53R-1 144-146 cm	800A 53R-1 64-66 cm	800A 52R-CC 5-7 cm	800A 52R-2 47-49 cm	800A 52R-1 36-38 cm	800A 51R-1 05-107
Abundance	A	A	A	A	A	A	A	A	A	A	A	C
Preservation	M	PM	PM	M	M	M	PM	M	P	PM	P	P
<i>Hiscocapsa zweili</i> (Jud)	+											
<i>Hiscocapsa</i> sp.A												+
<i>Holocryptocanium barbui</i> Dumitrica	+			+	+							
<i>Homoeoparonaella</i> aff. <i>irregularis</i> (Parona)	+						+					
<i>Jacus</i> (?) <i>italicus</i> Jud	+					+		+				
<i>Loopus blabla</i> (Schaaf)								+	+			
<i>Mictyoditra curvata</i> Dumitrica				+	+		+					
<i>Mictyoditra thiensis</i> (Tan)			+	+	+		+					
<i>Mirifusus chenodes</i> (Renz)					+			+				
<i>Mirifusus dianae minor</i> Baumgartner			+	+	+		+					
<i>Mita</i> sp. A	+											
<i>Napora durhami</i> (Pessagno)	+	+			+	+		+				
<i>Neorelumbra kiesslingi</i> Dumitrica												
<i>Neorelumbra manokawaensis</i> (Tumanda)								+	+			
<i>Novixitus</i> (?) <i>tuberculatus</i> Wu				+	+		+	+	+			
<i>Obeliscoites vinassai</i> (Squinabol)												
<i>Obesacapsula bullata</i> Steiger												
<i>Obesacapsula</i> aff. <i>morroensis</i> Pessagno												
<i>Obesacapsula rusconensis rusconensis</i> Baumgartner												
<i>Obesacapsula verbana</i> (Parona)												
<i>Orbiculiforma</i> sp.3 of Matsuoka 1998												
<i>Pantanellium meraceibaensis</i> Pessagno sensu Figen 2000												
<i>Pantanellium squinaboli</i> (Tan)												
<i>Paronaella trifoliacea</i> Ozvoldova												
<i>Paronaella</i> aff. <i>spinosa</i> (Parona)												
<i>Phaseliformis</i> sp. A												
<i>Podobursa bicaudata</i> (Parona)												
<i>Podobursa polylophia</i> Foreman												
<i>Podobursa triacantha</i> (Fischlli)												
<i>Podobursa tricola</i> Foreman												
<i>Praecaneta cosmoconica</i> (Foreman)												
<i>Praeacaneta longa</i> (Jud)												
<i>Praeconosphaera sphaeraconus</i> (Rüst)												
<i>Praexitus alievi</i> (Foreman)												
<i>Pseudocrolanium puga</i> (Schaaf)												
<i>Pseudodictyomitra carpatica</i> (Loziniyak)												
<i>Pseudodictyomitra conicostrata</i> Dumitrica												
<i>Pseudodictyomitra leptoconica</i> (Foreman)												
<i>Pseudodictyomitra lilyae</i> (Tan)												
<i>Pseudodictyomitra nodocostata</i> Dumitrica												
<i>Pseudodictyomitra nuda</i> (Schaaf)												
<i>Pseudodictyomitra suyarii</i> Dumitrica												
<i>Pseudodictyomitrella spinosa</i> Kotur												
<i>Pseudoeucyrtis tenuis</i> (Rüst)												
<i>Pseudoeucyrtis zhamoidai</i> (Foreman)												
<i>Pseudoxitus laguncula</i> Dumitrica												
<i>Pseudoxitus seriola</i> Dumitrica												
<i>Savaryella</i> (?) sp.												
<i>Sethocapsa congduensis</i> Wu and Li												
<i>Sethocapsa leiostraca</i> Foreman												
<i>Sethocapsa trachyostraca</i> Foreman												
<i>Sethocapsa tricornis</i> Jud												
<i>Sethocapsa</i> sp. A												
<i>Spongopyle</i> sp. A												
<i>Spongostaurus compactus</i> Kiessling												
<i>Spongostichomitra</i> aff. <i>elatica</i> (Aliev)												
<i>Staurocyclia martini</i> Rüst												

Table 3 (Continued).

	800A 55R-2 135-137 cm											
Abundance	A	A	A	A	A	A	A	A	A	A	A	C
Preservation	M	PM	PM	M	M	M	M	PM	M	P	PM	P
<i>Stichocapsa pulchella</i> (Rüst)	+	+	+								+	+
<i>Stichocapsa rutteni</i> (Tan)	+											
<i>Stichocapsa</i> sp. B	+											
<i>Stichomitra</i> aff. <i>altiforamina</i> Tumanda								+				+
<i>Stichomitra</i> aff. <i>asymbatos</i> Foreman				+	+	+			+			
<i>Stichomitra</i> aff. <i>japonica</i> (Nakaseko and Nishimura)				+	+	+						+
<i>Stichomitra mediocris</i> (Tan) of Dumitrica et al. 1997				+	+	+						+
<i>Stichomitra pseudochrysalis</i> (Tan)				+	+	+						+
<i>Stichomitra pseudopinguis</i> (Tan)				+	+	+						+
<i>Stichomitra</i> sp.A				+	+	+						+
<i>Suna echiodes</i> (Foreman)				+	+	+						+
<i>Svinitzium columnarium</i> (Jud)				+	+	+						+
<i>Svinitzium depressum</i> (Baumgartner)				+	+	+						+
<i>Svinitzium mizutanii</i> Dumitrica				+								+
<i>Svinitzium pseudopuga</i> Dumitrica				+	+	+						+
<i>Syringocapsa agolarium</i> Foreman				+								+
<i>Syringocapsa lata</i> Yang					+	+						
<i>Syringocapsa limatum</i> Foreman					+	+						+
<i>Syringocapsa vicetina</i> (Squinabol)					+	+						+
<i>Tethysetta boesii</i> (Parona)				+	+	+						
<i>Tethysetta columna</i> (Rüst)				+								
<i>Tethysetta hullae</i> Dumitrica												+
<i>Tethysetta masitaensis</i> (Mizutani)												
<i>Tethysetta ovoidala</i> Dumitrica												
<i>Tethysetta usotanensis</i> (Tumanda)												
<i>Tetrapaurinella staurus</i> Dumitrica				+	+	+						
<i>Tetratrabs radix</i> Jud												
<i>Thanarla brouweri</i> (Tan)				+	+	+						
<i>Thanarla elegantissima</i> (Cita)				+	+	+						
<i>Thanarla pacifica</i> Nakaseko and Nishimura				+	+	+						
<i>Thanarla praeveneta</i> Pessagno				+								
<i>Thanarla pulchra</i> (Squinabol)				+	+	+						
<i>Triactoma mexicana</i> Pessagno and Yang							+					
<i>Triactoma tithonianum</i> (Rüst)							+					
<i>Tricolocapsa</i> aff. <i>canpana</i> Kiessling				+								
<i>Trirrabs ewingi</i> (Pessagno) <i>sensu lato</i>				+	+	+			+			
<i>Triversus</i> sp. A					+	+						
<i>Xitus dicorus</i> Wu					+	+						+
<i>Xitus horridus</i> Jud												+
<i>Xitus robustus</i> Wu				+	+	+	+	+	+	+	+	
<i>Xitus sandovali</i> Jud												
<i>Xitus spicularius</i> (Aliev)				+	+	+			+			
<i>Xitus</i> aff. <i>spicularius</i> (Aliev)				+	+	+			+			
<i>Zhamoidellum ovum</i> Dumitrica				+	+	+			+			

Abundance: A=Abundant, C=Common, R=Rare

Preservation: M=moderate, PM=poor to moderate, P=poor

Berriasian-Barremian radiolarians in the Pacific

Table 4. Radiolarian occurrence in Hole 800B

	801B 20R-1 7-9 cm	801B 19R-1 18-20 cm	801B 18R-1 8-10 cm	801B 17R-1 22-24 cm	801B 16R-1 28-30 cm	801B 15R-1 23-25 cm	801B 14R-1 7-9 cm
Abundance	B	A	A	A	A	B	A
Preservation	-	M	M	M	PM	-	M
<i>Acaeniotyle diaphorogona</i> Foreman		+					+
<i>Acaeniotyle umbilicata</i> (Rüst)							+
<i>Acanthocircus furiosus</i> Jud			+	+			+
<i>Acanthocircus trizonalis</i> (Rüst)			+	+	+		+
<i>Acanthocircus variabilis ocellatus</i> (Squinabol)							+
<i>Acanthocircus variabilis variabilis</i> (Squinabol)							+
<i>Alievium regulare</i> (Wu and Li)		+		+	+		+
<i>Angulobracchia</i> (?) <i>rugosa</i> Jud	+						
<i>Archaeodictyomitra apiarium</i> (Rüst)	+	+		+	+		+
<i>Archaeodictyomitra conica</i> (Squinabol)			+	+			
<i>Archaeodictyomitra excellens</i> (Tan)	+	+		+	+		+
<i>Archaeodictyomitra immenhauseri</i> Dumitrica			+	+			
<i>Archaeodictyomitra mitra</i> Dumitrica			+		+		+
<i>Archaeodictyomitra pseudomulticostata</i> (Tan)	+	+			+		+
<i>Archaeodictyomitra tumandae</i> Dumitrica		+		+	+		+
<i>Archaeodictyomitra vulgaris</i> Pessagno	+		+		+		+
<i>Archaeodictyomitra</i> sp. A	+		+				+
<i>Archaeodictyomitra</i> sp. B					+		
<i>Archaeospongoprunum patricki</i> Jud			+	+	+		
<i>Archaeospongoprunum tehamaensis</i> Pessagno				+	+		+
<i>Archaeotriastrum mostleri</i> Kiessling							+
<i>Becus triangulocentrum</i> Dumitrica					+	cf	+
<i>Candissa</i> sp. 2 of Matsuoka 1998	+						
<i>Cecrops septemporatus</i> (Parona)							+
<i>Cinguloturris cylindra</i> Kemkin and Rudenko	+	+					
<i>Crucella angulata</i> Yang	+						+
<i>Cryptamphorella clivosa</i> (Aliev)			+				+
<i>Cryptamphorella conara</i> (Foreman)	+	+					+
<i>Cryptamphorella dumitricai</i> Schaaf			+				+
<i>Emiluvia chica decussata</i> Steiger	+	+					+
<i>Emiluvia pessagnoi</i> Foreman	+						
<i>Emiluvia omanensis</i> Kiessling				+			
<i>Gongylothorax verbeekii</i> (Tan)			+				+
<i>Halesium palmatum</i> Dumitrica	+						+
<i>Hemicryptocapsa capita</i> Tan					+		+
<i>Hemicryptocapsa tuberosa</i> Dumitrica							+
<i>Hiscocapsa asseni</i> (Tan)					+		+
<i>Hiscocapsa grutterinki</i> (Tan)							+
<i>Hiscocapsa</i> aff. <i>grutterinki</i> (Tan)							+
<i>Hiscocapsa kaminogoensis</i> (Aita)	+			+			+
<i>Hiscocapsa pseudouterculus</i> (Aita)	+	+					+
<i>Hiscocapsa uterculus</i> (Parona)							+
<i>Hiscocapsa zweilii</i> (Jud)						+	
<i>Hiscocapsa</i> sp. A							+
<i>Holocryptocanum barbui</i> Dumitrica			+	+			+
<i>Hsuum arabicum</i> Dumitrica	+						
<i>Loopus doliolum</i> Dumitrica	+	+					
<i>Loopus yangi</i> Dumitrica	+	+					

Table 4 (Continued).

	801B 20R-1 7-9 cm	801B 19R-1 18-20 cm	801B 18R-1 8-10 cm	801B 17R-1 22-24 cm	801B 16R-1 28-30 cm	801B 15R-1 23-25 cm	801B 14R-1 7-9 cm
Abundance	B	A	A	A	A	B	A
Preservation	-	M	M	M	PM	-	M
<i>Mictyoditra thiensis</i> (Tan)		+	+	+		+	
<i>Mirifusus apenninicus</i> Jud	+						
<i>Mirifusus dianae minor</i> Baumgartner	+	+	+				
<i>Mita</i> sp. A				+			
<i>Napora dumitrica</i> (Pessagno)		+					+
<i>Napora durhami</i> (Pessagno)	+			+			+
<i>Neolerumbra kiesslingi</i> Dumitrica							+
<i>Novixitus</i> (?) <i>tuberculatus</i> Wu							+
<i>Obesacapsula bullata</i> Steiger		+					
<i>Obesacapsula</i> aff. <i>morroensis</i> Pessagno							+
<i>Obesacapsula rusconensis rusconensis</i> Baumgartner							+
<i>Pantanellium aduncum</i> (Parona)			+				
<i>Pantanellium berriasianum</i> Baumgartner		+					
<i>Pantanellium meraceibaensis</i> Pessagno <i>sensu</i> Figen 2000							+
<i>Pantanellium nodoaculeatum</i> Steiger	+	+					
<i>Pantanellium squinaboli</i> (Tan)	+	+	+	+	+		+
<i>Paronella</i> aff. <i>spinosa</i> (Parona)					+		
<i>Phalangites fusus</i> (Jud)		+	+				+
<i>Podobursa bicaudata</i> (Parona)	+	+	+				+
<i>Podobursa</i> (?) <i>polylophia</i> Foreman							+
<i>Podobursa triacantha</i> (Fischli)	+			+			+
<i>Podobursa tricola</i> Foreman							+
<i>Podocapsa amphitreptera</i> Foreman			+				
<i>Podocapsa furcata</i> Steiger		+					
<i>Praecaneta cosmoconica</i> (Foreman)	+	+	+				
<i>Praecaneta longa</i> (Jud)				+			
<i>Praeconosphaera sphaeraconus</i> (Rüst)	+				+		+
<i>Praexitus alievi</i> (Foreman)						+	
<i>Pseudoaulophacus</i> (?) <i>florealis</i> Jud					+		+
<i>Pseudodictyonita carpatica</i> (Lozyniyak)	+	+	+		+		+
<i>Pseudodictyonita leptocoonica</i> (Foreman)					+		+
<i>Pseudodictyonita nuda</i> (Schaaf)					+		
<i>Pseudodictyonita suyarii</i> Dumitrica							+
<i>Pseudodictyonita</i> sp. 4 of Dumitrica et al. 1997						+	
<i>Pseudodictyonita</i> sp. 5 of Dumitrica et al. 1997		+	+	+			
<i>Pseudodictyonita</i> sp. A	+	+	+				
<i>Pseudoeucyrtis zhamoidai</i> (Foreman)				+			+
<i>Pseudoxitus gifuensis</i> (Mizutani)							+
<i>Pseudoxitus laguncula</i> Dumitrica					+	+	
<i>Pseudoxitus seriola</i> Dumitrica							+
<i>Rhopalosyringium</i> sp.A of Gorican 1994							
<i>Saitoum elegans</i> De Wever							
<i>Sethocapsa leiostraca</i> Foreman							+
<i>Sethocapsa trachyostraca</i> Foreman				+			+
<i>Sethocapsa</i> sp. B			+	+			+
<i>Spongocapsula</i> cf. <i>coronata</i> (Squinabol)							+
<i>Spongopyle</i> sp. A					+		+
<i>Spongostichomitra</i> aff. <i>elatica</i> (Aliev)					+		+

Table 4 (Continued).

		801B 20R-1 7-9 cm	801B 19R-1 18-20 cm	801B 18R-1 8-10 cm	801B 17R-1 22-24 cm	801B 16R-1 28-30 cm	801B 15R-1 23-25 cm	801B 14R-1 7-9 cm
Abundance	B	A	A	A	A	B	A	
Preservation	-	M	M	M	PM	-	M	
<i>Stichocapsa pulchella</i> (Rüst)					+			+
<i>Stichocapsa rutteni</i> (Tan)		+						
<i>Stichocapsa</i> sp.6 of Matsuoka 1998		+						
<i>Stichomitra</i> aff. <i>asymbatos</i> Foreman		+	+					
<i>Stichomitra</i> aff. <i>japonica</i> (Nakaseko and Nishimura)		+	+	+				
<i>Stichomitra mediocris</i> (Tan)		+	+			+		+
<i>Stichomitra pseudochrysalis</i> (Tan)		+	+	+	+	+		+
<i>Stichomitra</i> sp. A		+	+			+		+
<i>Stichomitra</i> sp. C		+	+	+		+		+
<i>Svinitzium columnarium</i> (Jud)								+
<i>Svinitzium depressum</i> Dumitrica			+	+	+			+
<i>Svinitzium mizutanii</i> Dumitrica		+		+	+			
<i>Svinitzium pseudopuga</i> Dumitrica		+	+	+	+			+
<i>Syringocapsa agolarium</i> Foreman		+		+	+			+
<i>Syringocapsa limatum</i> Foreman		+		+	+			+
<i>Tethysetta boesii</i> (Parona)		+		+	+			+
<i>Tethysetta columnata</i> (Rüst)		+	+	+	+			
<i>Tethysetta</i> cf. <i>dhimeniaensis</i> (Baumgartner)		+						
<i>Tethysetta sphaerica</i> (Steiger)			+	+				
<i>Tethysetta usotanensis</i> (Tumanda)				+				+
<i>Tetratrabs radix</i> Jud	+							
<i>Thanarla brouweri</i> (Tan)			+	+	+			+
<i>Thanarla elegantissima</i> (Cita)				+	+			+
<i>Thanarla pacifica</i> Nakaseko and Nishimura					+			+
<i>Thanarla pulchra</i> (Squinabol)			+	+	+			+
<i>Triactoma mexicana</i> Pessagno and Yang		+	+	+	+			+
<i>Tricolocapsa</i> aff. <i>canpana</i> Kiessling					+			
<i>Tricolocapsa dispar</i> Tan			+					
<i>Tritrabs ewingi</i> (Pessagno)		+						+
<i>Vallupus laxus</i> Yang and Pessagno		+						
<i>Xitus robustus</i> Wu	+			+				+
<i>Xitus spicularius</i> (Aliev)					+			
<i>Xitus</i> aff. <i>spicularius</i> (Aliev)								+
<i>Zhamoidellum ovum</i> Dumitrica	+		+	+				+

Abundance: A=Abundant, C=Common, R=Rare

Preservation: M=moderate, PM= poor to moderate

cf. = confer

Table 5. Radiolarian occurrence in Hole 463

	463 92-1 6-8 cm	463 91-CC 3-5 cm	463 90-1 10-12 cm	463 89-1 30-32 cm	463 88-1 12-14 cm	463 87-1 10-12 cm	463 86-1 10-12 cm	463 83-CC 8-11 cm	463 83-2 8-12 cm	463 83-1 3-5 cm	463 82-CC 9-11 cm	463 82-1 25-30 cm	463 79-1 50-52 cm	463 78-1 54-56 cm	463 77-1 35-38 cm	463 76-1 24-29 cm	463 75-1 8-10 cm
Abundance	A	R	A	A	A	A	R	C	C	A	A	C	R	R	R	R	
Preservation	G	M	G	G	G	G	MG	MG	PM	PM	MG	M	M	M	M	M	
<i>Acaenioyle umbilicata</i> (Rüst)	+																
<i>Acanthocircus levis</i> (Donofrio and Mostler)																	+
<i>Acanthocircus trizonalis</i> (Rüst)	+		+		+												+
<i>Actinomma</i> spp.	+		+	+													
<i>Alievium nodulosum</i> Dumitrica																	
<i>Alievium regularare</i> (Wu and Li)	+		+	+	+	+	+	+	+	+	+	+					
<i>Archaeodictyonita excelleens</i> (Tan)					+	+											
<i>Archaeodictyonita immensusa</i> Dumitrica	+		+		+												
<i>Archaeodictyonita lacrimula</i> (Foreman)	+		+														
<i>Archaeodictyonita leptocostata</i> (Wu and Li)	+	+	+	+	+	+	+										
<i>Archaeodictyonita mitra</i> Dumitrica	+	+	+	+	+	+	+										
<i>Archaeodictyonita pseudomulticostata</i> (Tan)	+	+			+			+	+								
<i>Archaeodictyonita pseudoscalaris</i> (Tan)	+				+												
<i>Archaeodictyonita tumandae</i> Dumitrica	+	+	+			+											
<i>Archaeodictyonita vulgaris</i> Pessagno	+	+	+	+	+	+											
<i>Archaeodictyonita</i> sp. A	+	+															
<i>Archaeospongoprunum patricki</i> Jud <i>sensu lato</i>	+	+	+	+	+	+											
<i>Archaeotriastrum mostleri</i> Kiessling	+	+	+	+	+	+											
<i>Becus gemmatus</i> Wu	+	+	+	+	+	+											
<i>Becus helena</i> (Schaaf)	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Becus horridus</i> (Squinabola)	+	+	+														
<i>Becus rotula</i> Dumitrica	+	+	+	+	+	+											
<i>Becus schaafi</i> Dumitrica	+	+	+	+	+	+											
<i>Becus triangulocentrum</i> Dumitrica	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Cecrops septemporatus</i> (Parona)	+	+	+														
<i>Crolantium pythiae</i> Schaaf	+	+	+	+	+	+											
<i>Cromyodruppa concentrica</i> Lipman	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Crucella bosoensis</i> Jud	+	+	+	+	+	+											
<i>Crucella euganea</i> (Squinabola)	+	+															
<i>Crucella lipmanae</i> Jud	+																
<i>Cryptamphorella elivosa</i> (Aliev)	+																
<i>Cryptamphorella conara</i> (Foreman) <i>sensu lato</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Cryptamphorella dumitricai</i> Schaaf	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Cryptamphorella gilkeyi</i> (Dumitrica)	+	+	+	+	+	+											
<i>Cyclastrum rarum</i> (Squinabola)	+																
<i>Cyclastrum</i> sp. A																	
<i>Dactyliodiscus lenticulatus</i> (Jud)	+																
<i>Dactyliodiscus rubus</i> O'Dogherty	+																
<i>Deviatus diampidius</i> (Foreman)	+																
<i>Deviatus</i> sp.A	+																
<i>Dictyomitra communis</i> (Squinabola)																	+
<i>Dibolachras tythopora</i> Foreman																	
<i>Eucyrtis columbaria</i> Renz	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Gongylothorax verbeeki</i> (Tan)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Halesium palmatum</i> Dumitrica	+	+															
<i>Halesium crassum</i> (Ozvoldova)	+																
<i>Halesium</i> sp. A	+																
<i>Hexalonche</i> spp.	+																
<i>Hiscocapsa asseni</i> (Tan)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hiscocapsa grutterinki</i> (Tan)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hiscocapsa orca</i> (Foreman)	+																
<i>Hiscocapsa simplex</i> (Taketani)	+	+															
<i>Hiscocapsa uterculus</i> (Parona)	+																
<i>Holocryptocanium barbui</i> Dumitrica	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Jacus</i> (?) <i>italicus</i> Jud	+																
<i>Lithelius</i> spp.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Loopus blabla</i> (Schaaf)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Loopus doliolatum</i> Dumitrica	+																
<i>Lophophæna</i> sp. of Renz 1974																	
<i>Mirifusus chenodes</i> (Renz)																	
<i>Mita weddellensis</i> Kiessling																	
<i>Napora durhami</i> (Pessagno)	+																
<i>Neorelumbra manokawaensis</i> (Tumanda)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Novixitus</i> (?) <i>tuberculatus</i> Wu	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Obeliscoites perspicuus</i> (Squinabola)	+																
<i>Obesacapsula verba</i> (Parona)	+																
<i>Pantanellium squinaboli</i> (Tan)	+																
<i>Pantanellium masirahensis</i> Dumitrica	+																
<i>Paronella</i> (?) <i>annemariae</i> Jud	+																
<i>Paronella communis</i> (Squinabola)	+																
<i>Patellula vacaensis</i> Pessagno																	
<i>Podobursa triacanthus</i> (Fischli)	+																
<i>Podobursa tricola</i> Foreman	+																
<i>Porodiscus delicatulus</i> (Lipman)	+																
<i>Praexitus alievi</i> (Foreman)																	
<i>Pseudoacanthosphaera magnifica</i> (Squinabola)	+																
<i>Pseudoaulophacus sculptus</i> (Squinabola)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Berriasian-Barremian radiolarians in the Pacific

Table 5 (Continued).

	463 92-1 6-8 cm		463 91-CC 3-5 cm		463 90-1 10-12 cm		463 89-1 30-32 cm		463 88-1 12-14 cm		463 87-1 10-12 cm		463 86-1 10-12 cm		463 85-CC 8-11 cm		463 83-2 8-12 cm		463 83-1 3-5 cm		463 82-CC 9-11 cm		463 82-1 25-30 cm		463 79-1 50-52 cm		463 78-1 54-56 cm		463 77-1 35-38 cm		463 76-1 24-29 cm		463 75-1 8-10 cm	
Abundance	A	R	A	A	A	A	A	R	C	C	A	A	C	R	R	R	R	R	M	MG	MG	PM	PM	MG	M	M	M	M	M	M	M	M	M	
Preservation	G	M	G	G	G	G	G	MG	MG	MG	PM	PM	MG	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M			
<i>Pseudoaulophacus</i> (?) <i>florealis</i> Jud	+		+																															
<i>Pseudocolaniun puga</i> (Schaaf)	+		+	+																														
<i>Pseudodictyomitra carpatica</i> (Loziniyak)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Pseudodictyomitra conicostriata</i> Dumitrica																																		
<i>Pseudodictyomitra leptocoenica</i> (Foreman)	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Pseudodictyomitra liliiae</i> (Tan)	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Pseudodictyomitra lodogaensis</i> Pessagno																																		
<i>Pseudodictyomitra nodocostata</i> Dumitrica	+																																	
<i>Pseudodictyomitra nuda</i> (Schaaf)	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Pseudodictyomitra suvarii</i> Dumitrica	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Pseudoeucyrtis zhamaoidae</i> (Foreman)	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Pseudoeucyrtis tenuis</i> (Rüst)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Pseudoxitus laguncula</i> Dumitrica																																		
<i>Pseudoxitus seriola</i> Dumitrica	+																																	
<i>Saitoum cepeki</i> Schaaf																																		
<i>Saitoum elegans</i> De Wever	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Savarrella</i> (?) sp.	+																																	
<i>Sethocapsa leiostraca</i> Foreman																																		
<i>Sethocapsa molengraaffi</i> (Tan)	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Sethocapsa</i> sp. A	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Sciadioecapsa soeciosa</i> (Squinabol)																																		
<i>Sciadioecapsa</i> sp. A	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Spongopyle ecleptos</i> Renz	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Spongopyle</i> sp. of Schaaf, 1981	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Spongostaurus compactus</i> Kiessling	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Spongostichomitra</i> aff. <i>elatica</i> (Aliev)	+																																	
<i>Spumellaria</i> , gen. et sp. indet.	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Staurocyclia martini</i> Rüst	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Stichocapsa</i> cf. <i>pulchella</i> (Rüst)																																		
<i>Stichocapsa rutteni</i> Tan	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Stichocapsa</i> sp. A																																		
<i>Stichomitra altiforamina</i> Tumanda																																		
<i>Stichomitra</i> aff. <i>asymbatos</i> Foreman																																		
<i>Stichomitra mediocris</i> (Tan) sensu Schaaf	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Stichomitra pseudochrysalis</i> (Tan)	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Stichomitra pseudopinguis</i> (Tan)	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Stichomitra simplex</i> (Aliev and Smirova)																																		
<i>Stichomitra</i> aff. <i>japonica</i> (Nakaseko and Nishimura)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Stylosphaera</i> (?) <i>macroxiphus</i> (Rüst)																																		
<i>Stylospongia</i> (?) <i>titirez</i> Jud																																		
<i>Stylospongia</i> sp. A	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Swinitzium pseudopugna</i> Dumitrica	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Theocorys renzae</i> Schaaf	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
? <i>Tethysetta boesii</i> (Parona)	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Tethysetta usotanensis</i> (Tumanda)	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Tetrapauinella staurus</i> Dumitrica	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Tetratrabs</i> sp. A	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Thanarla brouweri</i> (Tan)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Thanarla conica</i> (Aliev)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Thanarla elegantissima</i> (Cita)																																		
<i>Thanarla pacifica</i> Nakaseko and Nishimura	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Thanarla praeveneta</i> Pessagno	+																																	
<i>Thanarla pulchra</i> (Squinabol)																																		
<i>Triactoma titthianum</i> Rüst																																		
<i>Tritrabs ewingi</i> (Pessagno)	+																																	
<i>Traversus</i> sp.	+		+																															

Table 6. Radiolarian occurrence of the section A of Goshikigahama, Yokonami Peninsula, Kochi Prefecture, Japan

	YKA-2	YKA-3	YKA-4	YKA-6	YKA-7	YKA-8	YKA-9	YKA-10	YKA-11	YKA-12	YKA-14	YKA-15	YKA-16	YKA-17	YKA-18	YKA-19	YKA-20	YKA-21	YKA-22	YKA-23	YKA-24	YKA-25	YKA-26	YKA-27	
Abundance	A	A	A	R	R	R	R	A	A	A	A	C	A	A	A	A	C	A	C	A	A	A	A	A	
Preservation	PM	P	PM	PM	PM	PM	P	PM	PM	PM	PM	P	PM	PM	PM	PM	PM	PM							
<i>Acaenioptyle umbilicata</i> (Rüst)																									
<i>Acanthocrinus trizonalis</i> (Rüst)																									
<i>Alievium (?) echinus</i> Dumitrica																									
<i>Alievium regularare</i> (Wu and Li)	+	+	+	+					+																
<i>Angulobrachium aff. digitata</i> Baumgartner																									
<i>Archaeodictyonmitra apiarium</i> (Rüst)		+	+	+																					
<i>Archaeodictyonmitra chalilovi</i> (Alev)																									
<i>Archaeodictyonmitra excellens</i> (Tan)																									
<i>Archaeodictyonmitra lacrimula</i> (Foreman)																									
<i>Archaeodictyonmitra leptostostata</i> (Foreman)																									
<i>Archaeodictyonmitra mitra</i> Dumitrica	+	+	+																						
<i>Archaeodictyonmitra pseudomulticostata</i> (Tan)	+	+	+																						
<i>Archaeodictyonmitra pseudoscalaris</i> (Tan)																									
<i>Archaeodictyonmitra tumandae</i> Dumitrica																									
<i>Archaeodictyonmitra vulgaris</i> Pessagno	+	+	+	+																					
<i>Archaeodictyonmitra</i> sp. A																									
<i>Archaeodictyonmitra</i> sp. B																									
<i>Archaeospongophrum patricki</i> Jud	+																								
<i>Archaeospongophrum praelongum</i> Pessagno																									
<i>Archaeospongophrum tehamaensis</i> Pessagno	+	+	+																						
<i>Archaeotriastrum mostleri</i> Kiessling	+	+																							
<i>Becus gemmatus</i> Wu																									
<i>Becus helenaee</i> (Schaaf)	+	+																							
<i>Becus triangulocentrum</i> Dumitrica	+	+	+																						
<i>Cecrops septemporatus</i> (Parona)	+	+																							
<i>Crolanum pythiae</i> Schaaf																									
<i>Cruccella euganea</i> (Squinabol)																									
<i>Cryptamphorella clivosa</i> (Alev)																									
<i>Cryptamphorella conara</i> (Foreman)																									
<i>Cryptamphorella dumitricai</i> Schaaf																									
<i>Cyrtocapsa</i> sp. C																									
<i>Deviatia diaphanthis</i> (Foreman)																									
<i>Emiliavia chica decussata</i> Steiger																									
<i>Eucyrtis columbaria</i> Renz																									
<i>Eucyrtidium aff. pyramidis</i> (Aita)																									
<i>Halesia</i> sp. A																									
<i>Hemicryptocapsa capita</i> Tan																									
<i>Hemicryptocapsa tuberosa</i> Dumitrica																									
<i>Hiscocapsa</i> aff. <i>accincta</i> (Steiger)																									
<i>Hiscocapsa asseni</i> (Tan)																									
<i>Hiscocapsa grutterinki</i> (Tan)	+	+	+																						
<i>Hiscocapsa kaminogoeensis</i> (Aita)																									
<i>Hiscocapsa simplex</i> (Taketani)																									
<i>Hiscocapsa uterulus</i> (Parona)																									
<i>Hiscocapsa zweili</i> (Jud)																									
<i>Holocryptocanum</i> spp.																									
<i>Homoeoparonella</i> aff. <i>irregularis</i> (Squinabol)																									
<i>Homoeoparonella</i> sp. A																									
<i>Hsum</i> sp. A																									
<i>Hsum</i> (?) sp. A																									
<i>Loopus</i> sp. A																									
<i>Micyoditra curvata</i> Dumitrica																									
<i>Micyoditra thienisi</i> (Tan)																									
<i>Mirifusus dianae minor</i> Baumgartner																									
<i>Napora durhami</i> (Pessagno)																									
<i>Neorelumbra manokawaensis</i> (Tumanda)																									
<i>Neorelumbra retracapsa</i> Dumitrica																									
<i>Neorelumbra</i> sp. 1 of Matsuoka 1998																									
<i>Novixitella</i> (?) <i>tuberculatus</i> Wu																									
<i>Obeliscoites perspicuus</i> (Squinabol)																									
<i>Obesacapsula rusconensis rusconensis</i> Baumgartner																									
<i>Orbiculiforma sakaii</i> Mizutani																									
<i>Orbiculiforma</i> sp. A																									
<i>Palinandromeda</i> sp. A																									
<i>Pantanellum squinaboli</i> (Tan)																									
<i>Paronella</i> aff. <i>spinosa</i> (Parona)																									
<i>Paronella trifoliaeacea</i> Ozvolodova																									
<i>Phaseliforma ovum</i> Jud																									
<i>Phaseliforma</i> sp. A																									
<i>Podobursa</i> cf. <i>triacantha</i> (Fischli)																									
<i>Podobursa</i> tricola Foreman																									
<i>Praecinosphaera sphaeracanthus</i> (Rüst)																									
<i>Praexitus alieni</i> (Foreman)																									
<i>Pseudoaulophacus</i> aff. <i>sculptus</i> (Squinabol)																									
<i>Pseudoaulophacus</i> (?) <i>forealis</i> Jud																									
<i>Pseudodictyonmitra carpathica</i> (Loziniyak)																									
<i>Pseudodictyonmitra conoconstrata</i> Dumitrica																									
<i>Pseudodictyonmitra leptocoatica</i> (Foreman)																									
<i>Pseudodictyonmitra leptocoatica</i> (Foreman)																									
<i>Pseudodictyonmitra lilyae</i> (Tan)																									
<i>Pseudodictyonmitra nodocostata</i> Dumitrica																									
<i>Pseudodictyonmitra nuda</i> (Schaaf)																									
<i>Pseudodictyonmitra suyari</i> Dumitrica																									
<i>Pseudoeucyrtis</i> (?) <i>absconditus</i> Dumitrica																									
<i>Pseudoeucyrtis</i> <i>apochrypha</i> O'Dogherty																									
<i>Pseudoeucyrtis</i> <i>tenuis</i> (Rüst)																									
<i>Pseudoeucyrtis</i> <i>zhamoidai</i> (Foreman)																									
<i>Pseudoxitus laguncula</i> Dumitrica																									
<i>Pseudoxitus seriolus</i> Dumitrica																									

Berriasian-Barremian radiolarians in the Pacific

Table 6 (Continued).

	YKA-2	YKA-3	YKA-4	YKA-6	YKA-7	YKA-8	YKA-9	YKA-10	YKA-11	YKA-12	YKA-14	YKA-15	YKA-16	YKA-17	YKA-18	YKA-19	YKA-20	YKA-21	YKA-22	YKA-23	YKA-24	YKA-25	YKA-26	YKA-27	YKA-28	
Abundance	A	A	A	R	R	R	A	A	A	C	A	A	A	C	A	C	A	C	A	A	A	A	A	A	A	
preservation	PM	PM	PM	PM	PM	PM	P	PM	PM	P	PM	P	PM	P	PM	PM	P	PM								
<i>Pseudoxitus</i> sp. A																										
<i>Pyramispongia barmsteiensis</i> (Steiger)	+	+																								
<i>Sethocapsa leiostraca</i> Foreman	+	+																								
<i>Sethocapsa molengraaffi</i> (Tan)	+																									
<i>Sethocapsa trachyostraca</i> Foreman	+	+	+																							
<i>Sethocapsa tricornis</i> Jud	+																									
<i>Solenotryma</i> sp. A	+	+																								
<i>Spongostaurus compactus</i> Kiessling																										
<i>Spongostichomitra</i> aff. <i>elatica</i> (Aliev)	+																									
<i>Staurocyclia martini</i> Rüst	+																									
<i>Sithocapsa altiforamina</i> Tumanda																										
<i>Sithocapsa pulchella</i> (Rüst)																										
<i>Sithocapsa rutteni</i> (Tan)																										
<i>Sithomitra</i> aff. <i>asymbatos</i> Foreman of Jud 1994																										
<i>Sithomitra</i> aff. <i>japonica</i> (Nakaseko and Nishimura)																										
<i>Sithomitra</i> cf. <i>mediocris</i> (Tan)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sithomitra</i> cf. <i>pseudochrysalis</i> (Tan)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sithomitra</i> cf. <i>pseudodopinguis</i> (Tan)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sithomitra</i> sp. A																										
<i>Stylospongia</i> (?) <i>titterez</i> Jud																										
<i>Stylospongia</i> sp. A																										
<i>Suna hybum</i> (Foreman)																										
<i>Svinitzium colummarium</i> (Jud)																										
<i>Svinitzium depressum</i> (Baumgartner)	+																									
<i>Svinitzium pseudopuga</i> Dumitrica	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sringocapsa lata</i> Yang																										
<i>Sringocapsa limatum</i> Foreman																										
<i>Tethysetta boesii</i> (Parona)																										
<i>Tethysetta</i> cf. <i>hullae</i> Dumitrica																										
<i>Tethysetta usotanensis</i> (Tumanda)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Tetrapaurinella staurus</i> Dumitrica																										
<i>Thanarla brouweri</i> (Tan)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Thanarla elegansissima</i> (Cita)																										
<i>Thanarla pacifica</i> Nakaseko and Nishimura	+																									
<i>Thanarla praeveneta</i> Pessagno	+	+	+																							
<i>Thanarla pulchra</i> (Squinabol)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Tritrabs ewingi</i> (Pessagno) <i>sensu lato</i>	+	+	+																							
<i>Xitus horridus</i> Jud																										
<i>Xitus robustus</i> Wu	+	+	+	+																						
<i>Xitus spicularius</i> (Aliev)					+	+																				
<i>Xitus</i> aff. <i>spicularius</i> (Aliev) <i>sensu O'Dogherty</i>	+	+	+																							
<i>Xitus</i> sp. B																										
<i>Zamoidellum ovum</i> Dumitrica	+	+	+																							

Abundance: A=Abundant, C=Common, R=Rare

Preservation: M=moderate, PM=poor to moderate, P=poor

Table 7. Radiolarian occurrence in Hole 765C

Znamiodellum sp. B Abundance: A=Abundant, C=Common, R=Rare

Preservation: G=good, M=moderate, PM= poor to moderate, P=poor

Radiolarians are absent in gray colored samples

Plate 1

1. *Acaeniotyle diaphorogona* Foreman

(Sample 1213B-27R-1, 21-22 cm)

2. *Acaeniotyle umbilicata* (Rüst)

(800A-54R-1, 138-140 cm)

3. *Praeconocaryomma hexagona* (Rüst) sensu Pessagno

(1213B-27R-1, 21-22 cm)

4. *Praeconocaryomma* sp. C of Kiessling (1999)

(765C-56R-2, 20-22 cm)

5. *Praeconocaryomma* sp. A

(765C-51R-1, 51-53 cm)

6. *Praeconosphaera sphaeraconus* (Rüst)

(1213B-20R-1, 78-81 cm)

7. *Praeconosphaera* sp. A

(765C-51R-1, 123-125 cm)

8. *Archaeospongoprnum patricki* Jud sensu lato

(463-90-1, 10-12 cm)

9. *Archaeospongoprnum praelongum* Pessagno

(1213B-20R-1, 14-16 cm)

10. *Archaeospongoprnum tehamaensis* Pessagno

(Goshikigahama-YKA-21)

11. *Archaeospongoprnum* sp. A

(1213B-20R-1, 78-81 cm)

12. *Pantanellium aduncum* (Parona)

(1213B-26R-1, 7-8 cm)

13. *Pantanellium masirahensis* Dumitrica

(463-83-1, 3-5 cm)

Plate 2

1. *Pantanellium meraceibaensis* Pessagno sensu Figen (2000)

(801B-14R-1, 7-9 cm)

2. *Pantanellium* sp. aff. *P. cantucapai* Pessagno and Macleod

(1213B-20R-1, 78-81 cm)

3. *Pantanellium nodoaculeatum* Steiger

(1213B-23R-1, 117-119 cm)

4. *Pantanellium squinaboli* (Tan)

(1213B-27R-1, 21-22 cm)

5. *Cecrops septemporatus* (Parona)

(801B-14R-1, 7-9 cm)

6. *Acanthocircus carinatus* Foreman

(800A-52R-2, 47-49 cm)

7. *Acanthocircus furiosus* Jud

(800A-54R-2, 95-97 cm)

8. *Acanthocircus levis* (Donofrio and Mostler)

(463-83-1, 3-5 cm)

9. *Acanthocircus trizonalis* (Rüst)

(800A-54R-2, 85-97 cm)

10. *Acanthocircus variabilis ocellatus* (Squinabol)

(801B-14R-1, 7-9 cm)

11. *Acanthocircus variabilis variabilis* (Squinabol)

(801B-14R-1, 7-9 cm)

12-15. *Actinomma* spp.

(12 and 13: 1213B-20R-1, 78-81 cm, 14 and 15: 463-90-1, 10-12 cm)

Plate 3

1. *Pseudoanthosphaera magnifica* (Squinabol)

(463-90-1, 10-12 cm)

2. *Suna hybum* (Foreman)

(Goshikigahama-YKA-23)

3. *Suna echiodes* (Foreman)

(800A-54R-2, 54-56 cm)

4. *Archaeocenosphaera nodulosa* Dumitrica

(1213B-14R-1, 17-19 cm)

5. *Triactoma mexicana* Pessagno and Yang

(1213B-27R-1, 21-22 cm)

6. *Triactoma tithonianum* Rüst

(1213B-20R-1, 78-81 cm)

7. *Lanubus* sp. of Yang (1993)

(1213B-20R-1, 78-81 cm)

8. *Xiphostylidae* gen. et sp. indet 1 of Matsuoka (1998)

(1213B-21R-1, 148-150 cm)

9. *Xiphostylidae* gen. et sp. indet. A

(1213B-20R-1, 78-81 cm)

10, 11. *Stylosphaera* spp.

(1213B-20R-1, 78-81 cm)

12 *Protoxiphotractus ventosus* O'Dogherty

(765C-50R-3, 115-117 cm)

13. *Alievium (?) echinus* Dumitrica

(800A-52R-1, 36-38 cm)

14. *Alievium nodulosum* Dumitrica

(463-83-1, 3-5 cm)

15. *Alievium picum* Kiessling

(1213B-20R-1, 78-81 cm)

Plate 5**1. *Pseudoaulophacus (?) sp. B***

(765C-51R-1, 123-125 cm)

2. *Spongodiscidae gen. et sp. indet. A*

(1213B-27R-1, 21-22 cm)

3. *Spongodiscidae gen. et sp. indet. B*

(1213B-20R-1, 78-81 cm)

4. *Spongopyle ecleptos* Renz

(463-90-1, 10-12 cm)

5. *Spongopyle* sp. A

(1213B-20R-1, 78-81 cm)

6. *Spumellaria* gen. et sp. indet A

(1213B-20R-1, 78-81 cm)

7. *Cavaspongia euganae* (Squinabol)

(1213B-9R-1, 107-109 cm)

8. *Crucella angulata* Yang

(1213B-27R-1, 21-22 cm)

9. *Crucella bossoensis* Jud

(800A-54R-1, 138-140 cm)

10. *Crucella euganea* (Squinabol)

(463-90-1, 10-12 cm)

11. *Crucella lipmanae* Jud

(1213B-10R-1, 33-35 cm)

12. *Crucella messinae* Pessagno

(765C-51R-1, 51-53 cm)

13. *Crucella* sp.

(765C-51R-1, 51-53 cm)

14. *Orbiculiforma sakaii* Mizutani

(Goshikigahama-YKA-17)

15. *Orbiculiforma* sp. 3 of Matsuoka 1998

(800A-55R-1, 58-60 cm)

Plate 4**1. *Alievium regulare* (Wu and Li)**

(463-90-1, 10-12 cm)

2. *Becus helenae* (Schaaf)

(463-90-1, 10-12 cm)

3. *Becus gemmatus* Wu

(1213B-15R-1, 15-16 cm)

4. *Becus rotula* Dumitrica

(463-90-1, 10-12 cm)

5. *Becus horridus* (Squinabol)

(463-90-1, 10-12 cm)

6. *Becus schaafi* Dumitrica

(463-90-1, 10-12 cm)

7. *Becus triangulocentrum* Dumitrica

(463-90-1, 10-12 cm)

8. *Dactyliodiscus lenticulatus* (Jud)

(463-83-1, 3-5 cm)

9. *Dactyliodiscus rubus* O'Dogherty

(463-90-1, 10-12 cm)

10. *Godia coronata* (Tumanda)

(1213B-14R-1, 17-19)

11. *Pseudoaulophacus* aff. *sculptus* (Squinabol)

(63-90-1, 10-12 cm)

12. *Pseudoaulophacus* (?) *florealis* Jud

(463-89-1, 30-32 cm)

13. *Pseudoaulophacus* (?) sp. A

(765C-51R-1, 51-53 cm)

Plate 6**1. *Orbiculiforma* sp. A**

(765C-51R-1, 51-53 cm)

2. *Orbiculiforma* sp. B

(765C-51R-1, 51-53 cm)

3. *Savaryella novalensis* (Squinabol)

(765C-51R-1, 51-53 cm)

4. *Savaryella* (?) sp. A

(800A-55R-1, 58-60 cm)

5. *Tetratrabs radix* Jud

(800A-54R-2, 95-97 cm)

6. *Emiluvia chica decussata* (Steiger)

(800A-55R-1, 58-60 cm)

7. *Emiluvia omanensis* Kiessling

(1213B-23R-1, 117-119 cm)

8. *Emiluvia pessagnoi* Foreman

(801B-19R-1, 18-20 cm)

9. *Emiluvia* (?) sp. A

(1213B-20R-1, 78-81 cm)

10. *Staurocyclia martini* (Rüst)

(1213B-10R-1, 33-35 cm)

11. *Spongostaurus compactus* Kiessling

(1213B-26R-1, 43-45 cm)

12. *Spongostaurus* sp. A

(765C-51R-1, 51-53 cm)

Plate 7

1. *Tetrapaurinella staurus* Dumitrica

(765C-51R-1, 51-53 cm)

2. *Stylospongia* (?) *titirez* Jud

(765C-51R-1, 51-53 cm)

3. *Stylospongia* sp. A

(463-90-1, 10-12 cm)

4. *Tritrabs ewingi* (Pessagno)

(1213B-27R-1, 21-22 cm)

5. *Halesium* (?) *lineatum* Jud

(1213B-10R-1, 21-22 cm)

6. *Halesium palmatum* Dumitrica

(800A-55R-1, 58-60 cm)

7. *Halesium crassum* (Ozvoldova)

(765C-51R-1, 51-53 cm)

8. *Halesium* sp. A

(1213B-22R-1, 130-140 cm)

9. *Halesium* sp. B

(765C-51R-1, 51-53 cm)

10. *Homoeoparonaella* aff. *irregularis* (Squinabol)

(1213B-23R-1, 117-119 cm)

11. *Homoeoparonaella* sp. A

(Goshikigahama-YKA-23)

Plate 8

1. *Angulobracchia* aff. *digitata* Baumgartner

(Goshikigahama-YKA-3)

2. *Angulobracchia* (?) *rogosa* Jud

(801B-19R-1, 18-20 cm)

3. *Angulobracchia mediopulvilla* Steiger

(1213B-27R-1, 21-22 cm)

4. *Angulobracchia* (?) *portmanni* Baumgartner

(1213B-23R-1, 117-119 cm)

5. *Angulobracchia* sp. A of Baumgartner (1980)

(1213B-27R-1, 16-19 cm)

6. *Bistarkum fleosum* (Khabakov)

(1213B-22R-1, 130-134 cm)

7. *Bistarkum* sp. A

(1213B-20R-1, 78-81 cm)

8. *Cyclastrum rarum* (Squinabol)

(463-83-1, 3-5 cm)

9. *Cyclastrum orbiculare* (Rüst)

(765C-51R-1, 51-53 cm)

Plate 9

1. *Cyclastrum* sp. A

(765C-51R-1, 51-53 cm)

2. *Deviatus diamphidius* (Foreman) sensu lato

(463-90-1, 10-12 cm)

3. *Paronaella* (?) *annemariae* Jud

(463-90-1, 10-12 cm)

4. *Paronaella* aff. *spinosa* (Parona)

(1213B-15R-1, 15-16 cm)

5. *Paronaella trifoliacea* Ozvoldova
 (Goshikigahama-YKA-17)
6. *Paronaella* sp. A
 (765C-51R-1, 51-53 cm)
7. *Paronaella* (?) sp. A
 (765C-51R-1, 51-53 cm)
8. *Archaeotriastrum mostleri* Kiessling
 (800A-54R-1, 54-56 cm)
9. *Phaseliforma ovum* Jud
 (765C-53R-1, 98-100 cm)
10. *Phaseliforma* sp. A
 (Goshikigahama-YKA-9)
11. *Pyramispongia barmsteiensis* (Steiger)
 (Goshikigahama-YKA-3)
12. *Pseudodictyomitra* sp. 4 of Dumitrica et al. (1997)
 (1213B-15R-1, 15-16 cm)
13. *Pseudodictyomitra* sp. 5 of Dumitrica et al. (1997)
 (1213B-27R-1, 21-22 cm)
14. *Pseudodictyomitra* sp. A
 (801B-19R-1, 18-20 cm)
15. *Archaeodictyomitria apiarium* (Rüst)
 (Goshikigahama-YKA-4)
16. *Archaeodictyomitria chalilovi* (Aliev)
 (800A-52R-2, 47-49 cm)
17. *Archaeodictyomitria conica* (Squinabol)
 (1213B-20R-1, 78-81 cm)
18. *Archaeodictyomitria excellens* (Tan)
 (800A-53R-1, 144-146 cm)
19. *Archaeodictyomitria immenhauseri* Dumitrica
 (1213B-20R-1, 78-81 cm)
20. *Archaeodictyomitria lacrimula* (Foreman)
 (Goshikigahama-YKA-15)
21. *Archaeodictyomitria longovata* Dumitrica
 (765C-54R-1, 124-126 cm)

Plate 10

1. *Loopus blabla* (Schaaf)
 (463-89-1, 30-32 cm)
2. *Loopus doliolum* Dumitrica
 (1213B-27R-1, 21-22 cm)
3. *Loopus yangi* Dumitrica
 (1213B-27R-1, 21-22 cm)
4. *Loopus* sp. A
 (Goshikigahama-YKA-4)
5. *Pseudodictyomitra carpatica* (Loziniak)
 (1213B-27R-1, 21-22 cm)
6. *Pseudodictyomitra conicstriata* Dumitrica
 (800A-53R-1, 144-146 cm)
7. *Pseudodictyomitra leptocoonica* (Foreman)
 (463-90-1, 10-12 cm)
8. *Pseudodictyomitra lilyae* (Tan)
 (765C-53R-1, 98-100 cm)
9. *Pseudodictyomitra nodocostata* Dumitrica
 (463-89-1, 30-32 cm)
10. *Pseudodictyomitra nuda* (Schaaf)
 (1213B-20R-1, 78-81 cm)
11. *Pseudodictyomitra suyarii* Dumitrica
 (463-90-1, 10-12 cm)

Plate 11

1. *Archaeodictyomitria leptocostata* Dumitrica
 (463-90-1, 10-12 cm)
- 2, 3, 4. *Archaeodictyomitria mitra* Dumitrica
 (2: 1213B-10R-1, 33-35 cm, 3: 801B-18R-1, 8-10 cm, 4:
 1213B-16R-1, 15-16 cm)
5. *Archaeodictyomitria pseudomulticostata* (Tan)
 (801B-19R-1, 18-20 cm)
6. *Archaeodictyomitria pseudoscalaris* (Tan)
 (Goshikigahama-YKA-18)
7. *Archaeodictyomitria sliteri* Pessagno
 (800A-52R-CC, 5-7 cm)
8. *Archaeodictyomitria tumandae* Dumitrica
 (801B-18R-1, 8-10 cm)
9. *Archaeodictyomitria vulgaris* Pessagno
 (1213B-23R-1, 117-119 cm)
10. *Archaeodictyomitria* sp. A
 (1213B-27R-1, 21-22 cm)

11. *Archaeodictyomitra* sp. B

(1213B-23R-1, 117-119 cm)

12. *Archaeodictyomitra* sp. C

(1213B-23R-1, 117-119 cm)

13. *Mictyoditra curvata* Dumitrica

(800A-54R-1, 138-140 cm)

14. *Mictyoditra thiensis* (Tan)

(800A-54R-2, 95-97 cm)

15-19. *Mita* sp. A

(15, 16, 17: 1213B-20R-1, 78-81 cm, 18: 801B-17R-1,

22-24 cm, 19: 800A-55R-2, 135-137 cm)

Plate 12

1. *Mita weddellensis* Kiessling

(1213B-23R-1, 117-119 cm; 463-89-1, 30-32 cm)

2. *Mita* sp. 1 of Matsuoka (1998)

(1213B-20R-1, 78-81 cm)

3. *Thanarla brouweri* (Tan)

(463-90-1, 10-12 cm)

4. *Thanarla conica* (Aliev)

(463-90-1, 10-12 cm)

5. *Thanarla elegantissima* (Cita)

(800A-54R-2, 54-56 cm)

6, 7, 8. *Thanarla pacifica* Nakaseko and Nishimura

(6: 1213B-15R-1, 15-16 cm, 7: 800A-55R-2, 135-137 cm,

8: 463-90-1, 10-12 cm)

9. *Thanarla praeveneta* Pessagno

(1213B-16R-1, 15-17 cm)

10. *Thanarla pseudodecora* (Tan)

(1213B-20R-1, 78-81 cm)

11. *Thanarla pulchra* (Squinabol)

(801B-16R-1, 28-30 cm)

12. *Thanarla* sp. A

(1213B-20R-1, 78-81 cm)

13. *Hsuum arabicum* Dumitrica

(1213B-25R-1, 38-40 cm)

14. *Hsuum* sp. A

(Goshikigahama-YKA-4)

15. *Hsuum* (?) sp. A

(1213B-14R-1, 140-150 cm)

16. *Hsuum* (?) sp. B

(Goshikigahama-YKA-19)

17. *Artostrobium* sp. 1 of Matsuoka (1998)

(1213B-20R-1, 78-81 cm)

Plate 13

1. *Praeparicingula* sp. 1 of Matsuoka (1998)

(1213B-27R-1, 21-22 cm)

2. *Praecaneta cosmoconica* (Foreman)

(1213B-10R-1, 33-35 cm)

3. *Praecaneta longa* (Jud)

(1213B-21R-1, 148-150 cm)

4. *Praecaneta* sp. 3 of Matsuoka (1998)

(1213B-21R-1, 148-150 cm)

5. *Praecaneta* sp. 4 of Matsuoka (1998)

(1213B-27R-1, 21-22 cm)

6. *Tethysetta boesii* (Parona)

(801B-16R-1, 28-30 cm)

7. *Tethysetta columnna* (Rüst)

(800A-55R-2, 135-137 cm)

8. *Tethysetta* cf. *dhimeniaensis* (Baumgartner)

(801B-19R-1, 18-20 cm)

9. *Tethysetta hullae* Dumitrica

(800A-52R-2, 47-49 cm)

10. *Tethysetta mashitaensis* (Mizutani)

(1213B-23R-1, 117-119 cm)

11. *Tethysetta ovoidala* Dumitrica

(1213B-27R-1, 21-22 cm)

12. *Tethysetta pygmaea* Dumitrica

(1213B-27R-1, 21-22 cm)

13. *Tethysetta sphaerica* (Steiger)

(1213B-27R-1, 21-22 cm)

14-17. *Tethysetta usotanensis* (Tumanda)

(14: 1213B-10R-1, 33-35 cm, 15: 801B-14R-1, 7-9 cm,

16: Goshikigahama-YKA-2, 17: 800A-54R-1, 54-56 cm)

18. *Eoxitus* sp. A

(1213B-21R-1, 148-150 cm)

19. *Candissa* sp. 2 of Matsuoka (1998) (800A-54R-1, 54-56 cm)

(801B-19R-1, 18-20 cm)

20. *Windalia* sp. A (1213B-10R-1, 33-35 cm)

(765C-59R-2, 96-98 cm)

3. *Ristola altissima* (Rüst)

(1213B-23R-1, 117-119 cm)

4. *Ristola* sp. A

(765C-59R-2, 96-98 cm)

5. *Svintizium columnarium* Dumitrica

(801B-14R-1, 7-9 cm)

6. *Svintizium depressum* (Baumgartner)

(800A-54R-1, 138-140 cm)

7. *Svintizium pseudopuga* Dumitrica

(Goshikigahama-YKA-3)

8. *Svintizium mizutani* Dumitrica

(801B-17R-1, 22-24 cm)

9. *Pseudocrolanium puga* (Schaaf)

(463-90-1, 10-12 cm)

10. *Pseudocrolanium excisa* (Rüst)

(1213B-21R-1, 148-150 cm)

11. *Triversus* cf. *japonica* Takemura of Hull (1997)

(1213B-23R-1, 117-119 cm)

12. *Triversus* sp. A

(1213B-20R-1, 78-81 cm)

13. *Triversus* sp. B

(1213B-16R-1, 15-17 cm)

14. *Triversus* sp. C

(1213B-23R-1, 117-119 cm)

Plate 14

1. *Parvingula* sp. A

(765C-56R-2, 20-22 cm)

2. *Parvingula* sp. B

(765C-56R-2, 20-22 cm)

3. *Parvingula* sp. C

(765C-56R-2, 20-22 cm)

4. *Parvingula* (?) sp. A

(1213B-20R-1, 78-81 cm)

5. *Parvingula* (?) sp. B

(1213B-20R-1, 78-81 cm)

6. *Parvingula* (?) sp. C

(765C-59R-2, 96-98 cm)

7. *Parvingulid* sp. C of Baumgartner (1992)

(765C-51R-1, 51-53 cm)

8. *Eusyringium* sp. A

(765C-56R-2, 20-22 cm)

9. *Eusyringium* sp. B

(765C-59R-2, 96-98 cm)

10. *Eusyringium* sp. C

(765C-51R-1, 123-125 cm)

11. *Eusyringium* sp. D

(765C-51R-1, 51-53 cm)

12. *Mirifusus chenodes* (Renz)

(463-90-1, 10-12 cm)

13. *Mirifusus apenninicus* Jud

(1213B-27R-1, 21-22 cm)

14. *Mirifusus cinctac* (Tan)

(1213B-27R-1, 21-22 cm)

Plate 15

1. *Mirifusus dianae minor* Baumgartner

Plate 16

1. *Palinandromeda* sp. A

(Goshikigahama-YKA-3)

2. *Sciadiocapsa* (?) sp. A

(463-90-1, 10-12 cm)

3. *Pseudodictyomitrella spinosa* Kozur

(1213B-23R-1, 117-119 cm)

4. *Pseudodictyomitrella* sp. A

(1213B-22R-1, 130-134 cm)

5. *Artocapsa amphorella* Jud

(1213B-27R-1, 16-19 cm)

Berriasian-Barremian radiolarians in the Pacific

- | | |
|---|---|
| 6. <i>Cyrtocapsa</i> aff. <i>pseudacella</i> Tan | 8. <i>Stichocapsa pulchella</i> (Rüst) |
| (765C-59R-2, 96-98 cm) | (1213B-20R-1, 78-81 cm) |
| 7. <i>Cyrtocapsa</i> (?) sp. A | 9. <i>Stichocapsa rutteni</i> (Tan) |
| (765C-56R-2, 21-22 cm) | (1213B-16R-1, 15-17 cm) |
| 8. <i>Cyrtocapsa</i> (?) sp. B | 10. <i>Stichocapsa</i> sp. 6 of Matsuoka (1998) |
| (765C-54R-1, 124-126 cm) | (801B-19R-1, 18-20 cm) |
| 9. <i>Cyrtocapsa</i> sp. C | 11. <i>Stichocapsa</i> sp. A |
| (Goshikigahama-YKA-7) | (1213B-14R-1, 17-19 cm) |
| 10. <i>Eucyrtidiellum</i> aff. <i>pyramis</i> (Aita) | 12. <i>Stichocapsa</i> sp. B |
| (Goshikigahama-YKA-19) | (1213B-14R-1, 17-19 cm) |
| 11. <i>Pseudoeucyrtis</i> (?) <i>absconditus</i> Dumitrica | 13. <i>Stichomitra</i> aff. <i>japonica</i> (Nakaseko and Nishimura) |
| (Goshikigahama-YKA-22) | (1213B-20R-1, 78-81 cm) |
| 12. <i>Pseudoeucyrtis</i> (?) <i>apochrypha</i> O'Dogherty | 14. <i>Stichomitra mediocris</i> (Tan) |
| (Goshikigahama-YKA-18) | (1213B-20R-1, 14-16 cm) |
| 13. <i>Phalangites fusus</i> (Jud) | 15. <i>Stichomitra pseudochrysalis</i> (Tan) |
| (1213B-15R-1, 15-16 cm) | (1213B-15R-1, 15-16 cm) |
| 14. <i>Phalangites</i> sp. A | 16. <i>Stichomitra pseudopinguis</i> (Tan) |
| (1213B-15R-1, 15-16 cm) | (Goshikigahama-YKA-17) |
| 15. <i>Pseudoeucyrtis micropora</i> (Squinabol) | 17. <i>Stichomitra</i> sp. A |
| (1213B-10R-1, 33-35 cm) | (1213B-14R-1, 17-19 cm) |
| 16. <i>Pseudoeucyrtis tenuis</i> (Rüst) | 18. <i>Stichomitra</i> sp. B |
| (1213B-10R-1, 33-35 cm) | (1213B-10R-1, 33-35 cm) |
| Plate 17 | |
| 1. <i>Pseudoeucyrtis zhamoidai</i> (Foreman) | 19. <i>Stichomitra</i> aff. <i>euganea</i> (Squinabol) |
| (1213B-10R-1, 33-35 cm) | (1213B-15R-1, 15-16 cm) |
| 2. <i>Pseudoeucyrtis</i> sp. A | 20. <i>Stichomitra</i> sp. C |
| (765C-56R-2, 20-22 cm) | (801B-17R-1, 22-24 cm) |
| 3. <i>Pseudoeucyrtis</i> sp. B | Plate 18 |
| (765C-56R-2, 20-22 cm) | |
| 4. <i>Pseudoeucyrtis</i> sp. C | 1. <i>Arcanicapsa adrianae</i> (Jud) |
| (765C-56R-2, 20-22 cm) | (1213B-23R-1, 117-119 cm) |
| 5. <i>Eucyrtis columbaria</i> (Renz) | 2. <i>Praexitus alieni</i> (Foreman) |
| (463-90-1, 10-12 cm) | (1213B-10R-1, 33-35 cm) |
| 6. <i>Solenotryma</i> sp. A | 3. <i>Xitus dicorus</i> Wu |
| (Goshikigahama-YKA-11) | (1213B-14R-1, 17-19 cm) |
| 7. <i>Stichocapsa altiforamina</i> Tumanda | 4. <i>Xitus horridus</i> Jud |
| (800A-53R-1, 144-146 cm) | (Goshikigahama-YKA-24) |
| Plate 18 | |
| 5. <i>Xitus robustus</i> Wu | (1213B-20R-1, 78-81 cm) |

- 6. *Xitus sandovali* Jud**
(1213B-23R-1, 117-119 cm)
- 7. *Xitus spicularius* (Aliev)**
(1213B-14R-1, 17-19 cm)
- 8. *Xitus aff. spicularius* (Aliev)**
(1213B-15R-1, 15-16 cm)
- 9. *Xitus* sp. A
(765C-51R-1, 123-125 cm)**
- 10. *Xitus* sp. B
(Goshikigahama-YKA-16)**
- 11. *Pseudoxitus gifuensis* (Mizutani)**
(1213B-20R-1, 78-81 cm)
- 12. *Pseudoxitus laguncula* Dumitrica**
(1213B-26R-1, 7-8 cm)
- 13-16. *Pseudoxitus seriola* Dumitrica**
(13: 1213B-10R-1, 33-35 cm, 14: 1213B-12R-1, 9-12 cm,
15: 800A-54R-2, 95-97 cm, 16: 463-89-1, 30-32 cm)
- 17. *Pseudoxitus* sp. A
(Goshikigahama-YKA-11)**
- 18. *Neorelumbra kieslingi* Dumitrica**
(800A-52R-2, 47-49 cm)
- 19. *Neorelumbra manokawaensis* (Tumanda)**
(800A-52R-1, 36-38 cm)
- 20. *Neorelumbra tetracapsa* Dumitrica
(Goshikigahama-YKA-3)**
- 7. *Obesacapsula bullata* Steiger**
(1213B-15R-1, 15-16 cm)
- 8. *Obesacapsula cetia* (Foreman)**
(1213B-27R-1, 21-22 cm)
- 9. *Obesacapsula aff. morroensis* Pessagno**
(801B-14R-1, 7-9 cm)
- 10. *Obesacapsula rusconensis rusconensis* Baumgartner**
(1213B-12R-1, 9-12 cm)
- 11. *Obesacapsula verbana* (Parona)**
(800A-54R-1, 54-56 cm)

Plate 20

- 1. *Obeliscoites perspicuus* (Squinabol)**
(765C-51R-1, 51-53 cm)
- 2. *Obeliscoites vinassai* (Squinabol)**
(1213B-14R-1, 17-19 cm)
- 3. *Spongocapsula coronata* (Squinabol)**
(1213B-10R-1, 33-35 cm)
- 4. *Spongocapsula* (?) sp. B of Baumgartner (1992)**
(765C-56R-2, 20-22 cm)
- 5. *Spongostichomitra aff. elatica* (Aliev)**
(1213B-10R-1, 33-35 cm)
- 6. *Hiscocapsa aff. accincta* (Steiger)**
(Goshikigahama-YKA-28)

- 7. *Hiscocapsa asseni* (Tan)**
(800A-53R-2, 57-59 cm)
- 8. *Hiscocapsa globosa* (Rüst)**
(1213B-27R-1, 21-22 cm)
- 9. *Hiscocapsa grutterinki* (Tan)**
(1213B-14R-1, 17-19 cm)
- 10. *Hiscocapsa aff. grutterinki* (Tan)**
(1213B-15R-1, 15-16 cm)
- 11. *Hiscocapsa kaminogoensis* (Aita)**
(1213B-20R-1, 78-81 cm)
- 12. *Hiscocapsa orca* (Foreman)**
(800A-55R-2, 135-137 cm)
- 13. *Hiscocapsa pseudouterculus* (Aita)**
(1213B-27R-1, 21-22 cm)

Plate 19

- 1. *Neorelumbra* sp. 1 of Matsuoka (1998)**
(Goshikigahama-YKA-2)
- 2. *Novixitus* (?) *tuberculatus* Wu**
(463-89-1, 30-32 cm)
- 3. *Crolanium pythiae* Schaaf**
(463-83-1, 3-5 cm)
- 4. *Canoptum banale* Jud**
(1213B-27R-1, 21-22 cm)
- 5. *Cinguloturris cylindra* Kemkin and Rudenko**
(801B-18R-1, 8-10 cm)
- 6. *Rhopalosyringium* sp. A of Goričan 1994**
(1213B-27R-1, 21-22 cm)

14. *Hiscocapsa simplex* (Taketani)
 (1213B-15R-1, 15-16 cm)
15. *Hiscocapsa uterculus* (Parona)
 (801B-14R-1, 7-9 cm)
16. *Hiscocapsa zweilii* (Jud)
 (1213B-15R-1, 15-16 cm)
17. *Hiscocapsa* sp. A
 (1213B-15R-1, 15-16 cm)
18. *Hiscocapsa* (?) sp.
 (765C-53R-1, 98-100 cm)
15. *Zhamoidellum* sp. B
 (765C-52R-1, 84-86 cm)
16. *Tricolocapsa* aff. *campana* Kiessling
 (1213B-21R-1, 148-150 cm)
17. *Tricolocapsa* *dispar* Tan
 (1213B-27R-1, 21-22 cm)
18. *Trimulus* *parmatus* O'Dogherty
 (1213B-20R-1, 21-22 cm)
19. *Distylocapsa veneta* (Squinabol)
 (1213B-10R-1, 33-35 cm)
20. *Cryptamphorella clivosa* (Aliev)
 (1213B-20R-1, 78-81 cm)
21. *Cryptamphorella conara* (Foreman)
 (1213B-20R-1, 78-81 cm)
22. *Cryptamphorella dumitrica* Schaaf
 (1213B-20R-1, 78-81 cm)
23. *Cryptamphorella gilkeyi* (Dumitrica)
 (463-90-1, 10-12 cm)
24. *Cryptamphorella sphaerica* (White)
 (1213B-20R-1, 78-81 cm)

Plate 21

1. *Sethocapsa congduensis* Wu and Li
 (1213B-14R-1, 17-19 cm)
2. *Sethocapsa leiostraca* Foreman
 (801B-14R-1, 7-9 cm)
3. *Sethocapsa molengraafi* (Tan)
 (Goshikigahama-YKA-3)
4. *Sethocapsa stella* (Parona)
5. *Sethocapsa tricornis* Jud
 (800A-53R-2, 57-59 cm)
6. *Sethocapsa trachyostraca* Foreman
 (1213B-10R-1, 33-35 cm)

7. *Sethocapsa* sp. A
 (1213B-14R-1, 7-9 cm)
8. *Sethocapsa* sp. B
 (1213B-15R-1, 15-16 cm)
9. *Sethocapsa* sp. C
 (1213B-14R-1, 7-9 cm)
10. *Sethocapsa* (?) sp. A
 (463-90-1, 10-12 cm)
11. *Archicapsa guttiformis* Tan
 (1213B-20R-1, 78-81 cm)
12. *Zhamoidellum ovum* Dumitrica
 (801B-19R-1, 18-20 cm)
13. *Zhamoidellum* sp. B of Kiessling (1999)
 (765C-59R-2, 96-98 cm)
14. *Zhamoidellum* sp. A
 (765C-59R-2, 96-98 cm)

Plate 22

1. *Hemicryptocapsa capita* Tan
 (1213B-17R-1, 0-1 cm)
2. *Hemicryptocapsa tuberosa* Dumitrica
 (1213B-10R-1, 33-35 cm)
- 3-4. *Holocryptocanium barbui* Dumitrica
 (1213B-20R-1, 78-81 cm)
5. *Gongylothorax verbeekii* (Tan)
 (1213B-10R-1, 33-35 cm)
6. *Diacanthocapsa* aff. *galeata* Dumitrica
 (1213B-20R-1, 78-81 cm)
7. *Williriedellum ruesti* (Tan) of Kiessling (1999)
 (765C-59R-2, 95-97 cm)
8. *Theocorys renzae* Schaaf
 (463-90-1, 10-12 cm)
9. *Napora durhami* (Pessagno)
 (1213B-20R-1, 78-81 cm)

10. *Napora dumitricai* (Pessagno)

(1213B-20R-1, 78-81 cm) ISHII Yuki, SUZUKI Noritoshi and KANO Harumasa

11. *Napora* sp. A

(1213B-22R-1, 130-140 cm)

12. *Napora* sp. B

(1213B-23R-1, 117-119 cm)

13. *Jacus* (?) *italicus* Jud

(1213B-9R-1, 107-109 cm)

14. *Saitoum elegans* De Wever

(1213B-23R-1, 117-119 cm)

15. *Podobursa bicaudata* (Parona)

(1213B-27R-1, 21-22 cm)

16. *Podobursa* (?) *polylophia* Foreman

(801B-14R-1, 7-9 cm)

17. *Podobursa triacantha* (Fischli)

(801B-14R-1, 7-9 cm)

Plate 24

1, 2. *Acaeniotyle* (?) *glebulosa* Foreman

(800A-54R-1, 138-140 cm)

3, 4. *Pantanellium berriasianum* Baumgartner

(801B-18R-1, 8-10 cm)

5, 6. *Porodiscus delicatulus* (Lipman)

(463-92-1, 6-8 cm)

7, 8. *Vallupus laxas* Yang and Pessagno

(801B-19R-1, 18-20 cm)

9, 10. *Crolanium pythiae* Schaad

(800A-53R-2, 57-59 cm)

11, 12. *Hexalonche* sp.

(463-90-1, 6-8 cm)

13, 14. *Cromyodruppa concentrica* Lipman

(463-92-1, 6-8 cm)

15, 16. *Paronaella communis* (Squinabol)

(463-92-1, 6-8 cm)

17, 18. *Lithelius* spp.

(463-92-1, 6-8 cm)

19, 20. *Pseudodictyomitra lologaensis* Pessagno

(463-90-1, 10-12 cm)

21, 22. *Sciadiocapsa speciosa* (Squinabol)

(463-92-1, 6-8 cm)

23, 24. *Dictyomitra communis* (Squinabol)

(463-76-1, 24-29 cm)

Plate 23

1. *Podobursa tricola* Foreman

(801B-14R-1, 7-9 cm)

2. *Podocapsa amphitreptera* Foreman

(765C-56R-2, 20-22 cm)

3. *Podocapsa furcata* Steiger

(801B-18R-1, 8-10 cm)

4. *Syringocapsa agolarium* Foreman

(801B-14R-1, 7-9 cm)

5. *Syringocapsa lata* Yang

(Goshikigahama-YKA-3)

6. *Syringocapsa limatum* Foreman

(801B-14R-1, 7-9 cm)

7. *Syringocapsa vicetina* (Squinabol)

(800A-53R-2, 57-59 cm)

