Table T11. Calcareous nannofossil range chart, Zones NN18–NN2. (See table notes. Continued on the five pages.)

Epoch	Zone	Core, section, interval (cm)	Depth (mbsf)	Preservation	Abundance	*Amaurolithus delicatus*	*Amaurolithus primus*	*Amaurolithus tricorniculatus*	*Braarudosphaera bigelowii*	*Calcidiscus leptoporus*	*Calcidiscus premacintyrei*	*Calcidiscus macintyrei*	*Calcidiscus tropicus*	*Ceratolithus cristatus*	*Ceratolithus atlanticus*	*Coccolithus miopelagicus*	*Coccolithus pelagicus*	*Coccolithus pelagicus* (with bar)	*Coronocyclus nitescens*	*Cyclicargolithus floridanus*	*Cryptococcolithus mediaperforatus*	*Discoaster asymmetricus*	*Discoaster bergeni*	*Discoaster bollii*	*Discoaster braarudii*	*Discoaster brouweri*	*Discoaster calcaris*	*Discoaster challengeri*	*Discoaster deflandrei*	*Discoaster druggii*	*Discoaster exilis*	*Discoaster kugleri*	*Discoaster musicus*	*Discoaster neorectus*	*Discoaster pansus*	*Discoaster pentaradiatus*	*Discoaster petaliformis*	*Discoaster prepentaradiatus*	*Discoaster quinqueramus*	*Discoaster surculus*	*Discoaster* spp.	*Discoaster triradiatus*	*Discoaster variabilis*	*Florisphaera profunda*	*Gephyrocapsa* spp. (<2 µm)
		190-1177A-																																											
		1R-CC		G	C							C					C									F																		A	
	NN18	2R-CC		M	F		R			C																C																		A	A
		3R-CC		M	R					C																F																		A	A
		4R-3, 68-69	332.18	P	F							R						F				F				R														R			F	C	C
	NN17	4R-CC		M	R					C				R				F								F										C								A	A
		5R-CC		P	R					C								C								F										C						F		D	C
		6R-CC		P	R					C																F										F								A	
		7R-4, 75-76	362.55	M	F					C		F					F																			C				F		F	F	A	A
		7R-CC		G	C			R		C							F					R				F										C				R				A	C
		8R-4, 65-66	372.15		B																																								
		8R-CC		P	R					C																F										C				F					A
Pliocene		9R-3, 75-76	380.35	P	R					F		C														A										C				C	F		F		C
	NN16-15	9R-CC		P	R																					C																		A	A
		10R-3, 75-76	389.85		B																																								
		10R-CC			B																																								
		11R-3, 70-71	399.4		B																																								
		11R-CC			B																																								
		12R-2, 52-53	406.7		B																																								
		12R-CC		P	R					A																																			
	NN14-12	13R-3, 75-76	418.65	P	F	F																				C										A				A		F	A		
		13R-CC		M	R																																								
		14R-3, 70-71	428.2		B																																								
		14R-CC		P	R	F	F			C							C														C							C	C	F		C			
		15R-CC			B																																								
		16R-CC			B																																								
		17R-CC			B																																								
	NN11	18R-CC		P	R																													C											
late Miocene		19R-CC		M	R																																		A						
		20R-CC			B																																								
		21R-CC		M	R					C																		F															C	A
		22R-CC			B																																								
		23R-1, 74-75	511.84	M	R					R		R					C						F	R		C		F							F	R			R						
	NN10b	23R-CC		M	F								F		R										F	F								R			C			F			C	
		24R-CC			B																																								
		25R-CC			B																																								

Table T11 (continued).

Epoch	Zone	Core, section, interval (cm)	Depth (mbsf)	Preservation	Abundance	*Hayella challengeri*	*Helicosphaera ampliaperta*	*Helicosphaera carteri*	*Helicosphaera euphratis*	*Helicosphaera granulata*	*Helicosphaera intermedia*	*Helicosphaera mediterranea*	*Helicosphaera orientalis*	*Helicosphaera perch-nielseniae*	*Helicosphaera walbersdorfensis*	*Helicosphaera scissura*	*Helicosphaera sellii*	*Helicosphaera stalis*	*Helicosphaera* spp.	*Hughesius tasmaniae*	*Pontosphaera japonica*	*Pontosphaera multipora*	*Pseudoemiliania lacunosa*	*Pseudoemiliania ovata*	*Reticulofenestra haqii*	*Reticulofenestra minuta*	*Reticulofenestra minutula*	*Reticulofenestra pseudoumbilicus* (5–7 µm)	*Reticulofenestra pseudoumbilicus* (>7 µm)	*Reticulofenestra* spp.	*Scapholithus fossilis*	*Sphenolithus abies*	*Sphenolithus ciperoensis*	*Sphenolithus dissimilis*	*Sphenolithus grandis*	*Sphenolithus disbelemnos*	*Sphenolithus delphix*	*Sphenolithus heteromorphus*	*Sphenolithus moriformis*	*Sphenolithus* spp.	*Syracosphaera* spp.	*Triquetrorhabdulus rugosus*	*Triquetrorhabdulus milowii*	*Umbilicosphaera jafari*	*Umbilicosphaera rotula*	*Umbilicosphaera rotaria*	*Umbilicosphaera sibogae* var. *sibogae*
		190-1177A-																																													
		1R-CC		G	C																		C	C		A	A													C						C	
	NN18	2R-CC		M	F																		C	C		C	A																			C	
		3R-CC		M	R																		C			A	A																			C	
		4R-3, 68-69	332.18	P	F			R														R				D	A	C	R			C							C					R	R		
	NN17	4R-CC		M	R												R					R	C	C		A	A																		F		
		5R-CC		P	R																		C	C		A	C																				
		6R-CC		P	R																		C			A	A	F												C							
		7R-4, 75-76	362.55	M	F			C															F			A	A																				
		7R-CC		G	C																		C	C		A	A				F									F					F		
		8R-4, 65-66	372.15		B																																										
		8R-CC		P	R																			C			A																				
Pliocene		9R-3, 75-76	380.35	P	R																			A		C	C																				
	NN16-15	9R-CC		P	R																					A																					
		10R-3, 75-76	389.85		B																																										
		10R-CC			B																																										
		11R-3, 70-71	399.4		B																																										
		11R-CC			B																																										
		12R-2, 52-53	406.7		B																																										
		12R-CC		P	R																					A		A																			
	NN14-12	13R-3, 75-76	418.65	P	F																				A				F																		
		13R-CC		M	R																				D	A																					
		14R-3, 70-71	428.2		B																																										
		14R-CC		P	R																							A	D			F															
		15R-CC			B																																										
		16R-CC			B																																										
		17R-CC			B																																										
	NN11	18R-CC		P	R																				A															A							
		19R-CC		M	R																				A																						
late Miocene		20R-CC			B																																										
		21R-CC		M	R			C																		A						C												C	F	
		22R-CC			B																																										
		23R-1, 74-75	511.84	M	R			R														F			F	D		F	R			F							R	F					R		
	NN10b	23R-CC		M	F			R																	C	D			R			C			R				F						F		
		24R-CC			B																																										
		25R-CC			B																																										

Table T11 (continued).

Epoch	Zone	Core, section, interval (cm)	Depth (mbsf)	Preservation	Abundance	*Amaurolithus delicatus*	*Amaurolithus primus*	*Amaurolithus tricorniculatus*	*Braarudosphaera bigelowii*	*Calcidiscus leptoporus*	*Calcidiscus premacintyrei*	*Calcidiscus macintyrei*	*Calcidiscus tropicus*	*Ceratolithus cristatus*	*Ceratolithus atlanticus*	*Coccolithus miopelagicus*	*Coccolithus pelagicus*	*Coccolithus pelagicus* (with bar)	*Coronocyclus nitescens*	*Cyclicargolithus floridanus*	*Cryptococcolithus mediaperforatus*	*Discoaster asymmetricus*	*Discoaster bergeni*	*Discoaster bollii*	*Discoaster braarudii*	*Discoaster brouweri*	*Discoaster calcaris*	*Discoaster challengeri*	*Discoaster deflandrei*	*Discoaster druggii*	*Discoaster exilis*	*Discoaster kugleri*	*Discoaster musicus*	*Discoaster neorectus*	*Discoaster pansus*	*Discoaster pentaradiatus*	*Discoaster petaliformis*	*Discoaster prepentaradiatus*	*Discoaster quinqueramus*	*Discoaster surculus*	*Discoaster* spp.	*Discoaster triradiatus*	*Discoaster variabilis*	*Florisphaera profunda*	*Gephyrocapsa* spp. (<2 µm)
		26R-1, 49-50	540.59	P	R																																								
		26R-CC			B																																								
		27R-CC			B																																								
		28R-CC		P	R																																								
		29R-CC			B																																								
		30R-CC			B																																								
late Miocene	NN10a-7	31R-CC		P	R																																								
		32R-1, 68-69	598.48	P	R																							A																	
		32R-CC		P	F											C	A							C				C			C	C													
		33R-2, 69-70	609.69		B																																								
		33R-CC			B																																								
		34R-CC		P	R												F		F												F	F									F				
		35R-CC		P	F												F			C				F					F		F	C													
		36R-1, 40-41	636.7	P	R												C							A					C		C	F													
		36R-CC		P	R				F								C		F	F									C		C													F	
		37R-2, 74-75	647.14	P	F												C			C				F					C																
		37R-3, 74-75	648.14	P	F					F	R					R	C			F									C		R														
	NN6	37R-CC		P	R																							C	A		C														
		38R-CC		P	F					C	C						C			C									C		C		F								C			F	
		39R-2, 76-77	667.46	P	R												A																												
		39R-CC		P	R					A							C		A	A									C		C														
middle Miocene		40R-1, 71-72	675.51	P	R											C	A			C																									
		40R-CC		P	R														C	A																									
		41R-2, 65-66	686.55	P	R														C	F																									
		41R-CC		P	R															C																	F								
		42R-1, 55-56	694.55	P	R															C																										
		42R-CC		P	R					C										F									C																
		43R-2, 66-67	705.86	P	R						C					C	C			C									C																
	NN5	43R-CC		P	R																								C																
		44R-1, 110-111	714.4		B																																								
		44R-2, 54-55	715.34	P	R																																								
		44R-CC		P	C					C	F						F			F									F								F								
		45R-1, 96-97	723.86	P	F															C																										
		45R-CC			B																																								
		46R-1, 110-111	733.6	P	R												R			F									C												F				
		46R-2, 40-41	734.4	P	R																																								
		46R-CC		P	C					C							C			C									C		C		C												

Table T11 (continued).

Epoch	Zone	Core, section, interval (cm)	Depth (mbsf)	Preservation	Abundance	*Hayella challengeri*	*Helicosphaera ampliaperta*	*Helicosphaera carteri*	*Helicosphaera euphratis*	*Helicosphaera granulata*	*Helicosphaera intermedia*	*Helicosphaera mediterranea*	*Helicosphaera orientalis*	*Helicosphaera perch-nielseniae*	*Helicosphaera walbersdorfensis*	*Helicosphaera scissura*	*Helicosphaera sellii*	*Helicosphaera stalis*	*Helicosphaera* spp.	*Hughesius tasmaniae*	*Pontosphaera japonica*	*Pontosphaera multipora*	*Pseudoemiliania lacunosa*	*Pseudoemiliania ovata*	*Reticulofenestra haqii*	*Reticulofenestra minuta*	*Reticulofenestra minutula*	*Reticulofenestra pseudoumbilicus* (5–7 µm)	*Reticulofenestra pseudoumbilicus* (>7 µm)	*Reticulofenestra* spp.	*Scapholithus fossilis*	*Sphenolithus abies*	*Sphenolithus ciperoensis*	*Sphenolithus dissimilis*	*Sphenolithus grandis*	*Sphenolithus disbelemnos*	*Sphenolithus delphix*	*Sphenolithus heteromorphus*	*Sphenolithus moriformis*	*Sphenolithus* spp.	*Syracosphaera* spp.	*Triquetrorhabdulus rugosus*	*Triquetrorhabdulus milowii*	*Umbilicosphaera jafari*	*Umbilicosphaera rotula*	*Umbilicosphaera rotaria*	*Umbilicosphaera sibogae* var. *sibogae*
		26R-1, 49-50	540.59	P	R																							C	C									C		D								
		26R-CC			B																																											
		27R-CC			B																																											
		28R-CC		P	R																					D																						
		29R-CC			B																																											
		30R-CC			B																																											
late Miocene	NN10a-7	31R-CC		P	R																				D																							
		32R-1, 68-69	598.48	P	R																				A				A																	C		
		32R-CC		P	F								F													A		A	A									F										
		33R-2, 69-70	609.69		B																																											
		33R-CC			B																																											
		34R-CC		P	R			F					F									F			C	D			A	C		C							C	F						F		
		35R-CC		P	F			F													F				C	D		C	C				F						C	C		F		C			C	
		36R-1, 40-41	636.7	P	R			F																				A	F						F			A										
		36R-CC		P	R					C								F			F				A	A		C										C								A		
		37R-2, 74-75	647.14	P	F	F																			A	D		C	C																		F	
		37R-3, 74-75	648.14	P	F	A		R					F		R							R			A	D		C	C						R				F	C	R				C		
	NN6	37R-CC		P	R						A										C					A		A	C											A								
		38R-CC		P	F	C								F				C							A	A		C	F										C	C				C	C		
		39R-2, 76-77	667.46	P	R																					A																						
		39R-CC		P	R	A																						A																				
		40R-1, 71-72	675.51	P	R			C																		A		A										C	A									
		40R-CC		P	R																	C				A		C									C	C	A									
middle Miocene		41R-2, 65-66	686.55	P	R																																	A	A	A								
		41R-CC		P	R	F																				A								C				A		A	C							
		42R-1, 55-56	694.55	P	R																					A		C										A		A						F		
		42R-CC		P	R						C															A		F										C	C		A							
		43R-2, 66-67	705.86	P	R																					A		F	F									A	C	C								
	NN5	43R-CC		P	R																					A		A												D								
		44R-1, 110-111	714.4		B																																											
		44R-2, 54-55	715.34	P	R																					A		A										C		A						C		
		44R-CC		P	C																				C	A		F										C		D								
		45R-1, 96-97	723.86	P	F																				C	A		C										A		A								
		45R-CC			B																																											
		46R-1, 110-111	733.6	P	R																				C	A												A	A	C								
		46R-2, 40-41	734.4	P	R																																			D								
		46R-CC		P	C																	F			C	D		F										C	C	A				C				

Table T11 (continued).

Epoch	Zone	Core, section, interval (cm)	Depth (mbsf)	Preservation	Abundance	*Amaurolithus delicatus*	*Amaurolithus primus*	*Amaurolithus tricorniculatus*	*Braarudosphaera bigelowii*	*Calcidiscus leptoporus*	*Calcidiscus premacintyrei*	*Calcidiscus macintyrei*	*Calcidiscus tropicus*	*Ceratolithus cristatus*	*Ceratolithus atlanticus*	*Coccolithus miopelagicus*	*Coccolithus pelagicus*	*Coccolithus pelagicus* (with bar)	*Coronocyclus nitescens*	*Cyclicargolithus floridanus*	*Cryptococcolithus mediaperforatus*	*Discoaster asymmetricus*	*Discoaster bergeni*	*Discoaster bollii*	*Discoaster braarudii*	*Discoaster brouweri*	*Discoaster calcaris*	*Discoaster challengeri*	*Discoaster deflandrei*	*Discoaster druggii*	*Discoaster exilis*	*Discoaster kugleri*	*Discoaster musicus*	*Discoaster neorectus*	*Discoaster pansus*	*Discoaster pentaradiatus*	*Discoaster petaliformis*	*Discoaster prepentaradiatus*	*Discoaster quinqueramus*	*Discoaster surculus*	*Discoaster* spp.	*Discoaster triradiatus*	*Discoaster variabilis*	*Florisphaera profunda*	*Gephyrocapsa* spp. (<2 µm)
middle Miocene	NN5	47R-2, 76-77	744.36	P	F											F				C									C																	
		47R-4, 41-42	747.01	P	C					C							C			C	C												C													
		47R-CC		P	C															A									A				A									A				
		48R-2, 74-75	753.94	P	R												C			C									C																	
		48R-CC		P	R												C												C																	
		49R-3, 72-73	765.02		B																																								
		49R-CC			B																																								
		50R-2, 77-78	773.27	P	R																																								
		50R-CC		P	M															A									A																	
early Miocene	NN4-2	51R-2, 75-76	782.85		B																																								
		51R-CC			B																																								
		52R-2, 76-77	792.56		B																																								
		53R-3, 74-75	803.64		B																																								
		54R-CC		P	F											C	A		A	A									A	C																
		55R-2, 74-75	821.44	P	F					F							A		F	D									A																	
		56R-1, 132-133	830.12	P	R												C		A	A									A	C																
		56R-2, 35-36	830.65	P	R												D												C	C																

Notes: Abundance: D = dominant, A = abundant, C = common, F = few, R = rare. Preservation: P = poor, M = moderate, G = good. See **"Biostratigraphy,"** p. 9, in the "Explanatory Notes" chapter. This table is also available in **ASCII** format.

Table T11 (continued).

Epoch	Zone	Core, section, interval (cm)	Depth (mbsf)	Preservation	Abundance	*Hayella challengeri*	*Helicosphaera ampliaperta*	*Helicosphaera carteri*	*Helicosphaera euphratis*	*Helicosphaera granulata*	*Helicosphaera intermedia*	*Helicosphaera mediterranea*	*Helicosphaera orientalis*	*Helicosphaera perch-nielseniae*	*Helicosphaera walbersdorfensis*	*Helicosphaera scissura*	*Helicosphaera sellii*	*Helicosphaera stalis*	*Helicosphaera* spp.	*Hughesius tasmaniae*	*Pontosphaera japonica*	*Pontosphaera multipora*	*Pseudoemiliania lacunosa*	*Pseudoemiliania ovata*	*Reticulofenestra haqii*	*Reticulofenestra minuta*	*Reticulofenestra minutula*	*Reticulofenestra pseudoumbilicus* (5–7 µm)	*Reticulofenestra pseudoumbilicus* (>7 µm)	*Reticulofenestra* spp.	*Scapholithus fossilis*	*Sphenolithus abies*	*Sphenolithus ciperoensis*	*Sphenolithus dissimilis*	*Sphenolithus grandis*	*Sphenolithus disbelemnos*	*Sphenolithus delphix*	*Sphenolithus heteromorphus*	*Sphenolithus moriformis*	*Sphenolithus* spp.	*Syracosphaera* spp.	*Triquetrorhabdulus rugosus*	*Triquetrorhabdulus milowii*	*Umbilicosphaera jafari*	*Umbilicosphaera rotula*	*Umbilicosphaera rotaria*	*Umbilicosphaera sibogae* var. *sibogae*
middle Miocene	NN5	47R-2, 76-77	744.36	P	F									C											C	A												C	C	D								
		47R-4, 41-42	747.01	P	C																				C	D												C	C	C	C		F		C		
		47R-CC		P	C		C							A		C																					C							C			
		48R-2, 74-75	753.94	P	R		F					F													C	A								C		C	C		D								
		48R-CC		P	R																				A	A													A								
		49R-3, 72-73	765.02		B																																										
		49R-CC			B																																										
		50R-2, 77-78	773.27	P	R																																		D								
		50R-CC		P	M																					A																					
early Miocene	NN4-2	51R-2, 75-76	782.85		B																																										
		51R-CC			B																																										
		52R-2, 76-77	792.56		B																																										
		53R-3, 74-75	803.64		B																																										
		54R-CC		P	F	C														C															A													
		55R-2, 74-75	821.44	P	F																				C									F			F										
		56R-1, 132-133	830.12	P	R				C																																						
		56R-2, 35-36	830.65	P	R																																										