Zone	Hole 689B Core-section (interval in cm)	Abundance Preservation	Actinocyclus ingens Actinocyclus ingens var. nodus Actinocyclus ingens var. ovalis Actinocyclus octonarius	Actinoptychus senarius Asteromphalus hookeri Asteromphalus kennettii Asteromphalus inaequabilis Asteromphalus oligocenicus Azpeitia nodulifer	Azpeitia tabularis group Coscinodiscus levisianus Coscinodiscus marginatus Coscinodiscus rhombicus Coscinodiscus intersectus	Crucidenticula kanayae Crucidenticula nicobarica Crucidenticula punctata Denticulopsis dimorpha Denticulopsis hustedtii	Denticulop Denticulop Denticulop Ethmodiscs	Eucampia balaustium Hemidiscus cuneiformis Hemidiscus sp. 1 Hemidiscus sp. 2	Katathiraia aspera Lisitzina ornata Mediaria splendida Neobrunia mirabilis	Nitzschia aurica Nitzschia aurica Nitzschia claviceps Nitzschia clementia	Nitzschia curta Nitzschia denticuloides Nitzschia donahuensis Nitzschia efferans	Nitzschia grossepunctata Nitzschia grossepunctata Nitzschia januaria Nitzschia kerguelensis	Nitzschia maleinterpretaria Nitzschia aff. porteri Nitzschia praecurta Nitzschia praeinterfrigidaria Nitzschia pseudokerguelensis	Nitzschia pissila Nitzschia reinholdii Raphidodiscus marylandicus Rhizosolenia alata Rhizosolenia barboi	Rhizosolenia bebetata Rhizosolenia hebetata Rocella gelida Rocella vigilans Rouxia antarctica Rouxia heteropolara	Rouxia naviculoides Rouxia oligocaenica Rouxia sp. 1 Rouxia sp. 2 Rouxia sp. 3	Stellarima microtrias Stephanopyxis turris Synedra jouseana Synedra miocenica Thalassionema hirosakiensis	Thalassionema nitzschioides Thalassiosira complicata Thalassiosira convexa var. aspinosa Thalassiosira fraga Thalassiosira armilis	Thalassiosira gractus Thalassiosira inura Thalassiosira lentiginosa Thalassiosira majuramica-torokina grot	Thalassiosira nordenskioeldii Thalassiosira oestrupii Thalassiosira oliverana Thalassiosira spinosa Thalassiosira spumellaroides Thalassiosira yabei Thalassiothrix longissina
Nitzschia interfrigidaria/ Cosmiodiscus insignis	1H-1, 56-58 1H-1, 114-115 1H-2, 28-29	A G A M C G A G			R R R		R R R	R		C F C R R	R R R R	R R F		R	R	R		R F	R F R R	R R F R R R F F R F F R F
4	1H-2, 50-52 1H-2, 114-115 1H-3, 28-29 1H-3, 114-115 1H-4, 28-29 1H-4, 45-47	A G F M F M	R R R	R R R	R R R R R R	R	R F R	R R		R F F R R R	R R R	R R	R R R R R F R	R R R R R R R R R R R	R R R R R R R R	F	R R R	R R R R R	R R F R R R	R R F F R R R R R R R
Nitzschia barronii	1H-4, 45-47 2H-1, 32-33 2H-1, 115-116 2H-2, 31-32 2H-2, 62-64 2H-2, 114-115 2H-3, 28-29	C G C M C M	R	R R R R	R R R	R R	R R R	R R	F	R R R F F R	R R R R	R*	F R R F R R	R R R R	R R R R R R R		R	R R R R	R R R R	R R R F R R R R R R R R R R R
Thalassiosira	2H-2, 62-64 2H-2, 114-115 2H-3, 28-29 2H-3, 90-92 2H-3, 114-115	C M C M	R	R	R R R	R R R	R R R	R R R	ą ą	F R F R F R	R R		F R F R R R R	R R R I	R R R R R R R R R R R R R	F	R R	R R F R R R	R R R F R R	R R R R R R R R R R R R R R R R R R R
inura	2H-4, 28-29 2H-4, 56-58 2H-4, 116-118 2H-4, 137-139	C M C M C M C M	R	D	R R R R R	R	R R	R R R	F	F R* F R* C F C R* R	R	R* R* R* R* R*	R R R F R F R R F R	R R R R R R R	R R R	F R R	R R	R R R R R R R R R*	R R R R R	R R R R R R R
	2H-5, 55-57 2H-5, 87-89 2H-5, 114-115 2H-6, 29-30	C G C M C M	R		R R R R			R	F	C R R C R* R C C R	R		R F R C F R R F R	R R R R R	R	R R R	R	R R R R	***************************************	R R R R R R
			R R R R		R R R R R R R R R R R R	R R R R R R	H B B	R R R	F F F F	C R R C R C R C R	R R R R		F R F R F F F	R R R R R R	R R R	R R	R R	R R R R R R	114-5, 23-22 A 114-115 C 115-28-28 C 114-215 C	R R R R R R R R R R R
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2H-6, 114-115 2H-7, 18-20 3H-1, 56-58 3H-1, 143-145 3H-2, 56-58 3H-2, 118-120 3H-2, 148-150 3H-3, 56-58 3H-3, 148-150 3H-4, 56-58	C M C M C M	R R R R R R R	R R R	R R R R R R R R R R R R R R	R R R R R R R R R R F F	R	R R R R R R R	F F R R R	C R R F R	R R R R	A	R F F R R R	R R R	R	R R		R R R	R R R R	?R
-	3H-5, 28-29 3H-5, 80-82 3H-5, 114-115	C M F M	F R R R R R	R R R	R R R R R R R R R R R R	F F C F C		R R	R F	R R R	R R R	R	F R R	R	R		R R	2 30 2 34 9 34 9 16	R R R R	R R
Asteromphalus kennettii	3H-6, 28-29 3H-6, 55-57 3H-6, 113-114 3H-6, 148-150	C M A G C M	R R F C	R R R	R R F R R R R R R	R C R F F C R C	3 - M 5 1	R	R R	R R R	R R	R R R	R R R R	R	R R R R	R	R R	R	H44, 71-35 C H44, 11-35 C H44, 11-35 C H45, 12-35 C H45, 12-35 C H45, 11-35 C H45, 115-37 F H55, 115	R R F R
1	4H-1, 112-113 4H-2, 28-30 4H-2, 113-114 4H-3, 31-32	C M . C M . F M . F M .	A R A A A	R R R R	R F F R F F	R C R F R F R F			R	R R R R R	R R R	R	R R R R	R R	R R R	A A	R R	R	H=6, 28=23 28=6, 75=75 38=6, 115=116 18-6, 115=116 28=26	R R R R
5 2. u	4H-4, 113-114 4H-5, 28-29	FM	F F R	R	R R R R R R R R R R R	F F R A F C C C F A		2 2	R	R R R	R R R	R R	R R R R R	R R R R	R R R		R R	R	日本 (15年) 日	R F R R F R
Nitzschia praecurta	4H-5, 148-150 4H-6, 28-29 4H-6, 87-89 4H-7, 32-34	C M C M C M C M F M	R R R	R	R R R R R R R R R R	A F A F A R A R	R	1	R R R R	R ?R R	R		R R R R	R R R	R R		R R R R	R	14-3, 26-37 16-115-716 16-2, 21-38 18-4, 21-38 18-4, 21-316 18-4, 21-316	R R R R R R R R R
8	5H-1, 118-120 5H-2, 28-29 5H-2, 86-88 5H-2, 114-115	C M C M	R R		R R R R R R R R	A A R A R A	R		1	R	R	R	R R R	R R	R R R		R R R	R	1 811-211 2-31 00 000-70-800 1 811-211 8-31	R R R
3	5H-3, 145-147 5H-4, 27-28	F M F M F M	R		R R R R R R R R R	A R A R A A R			10	R	R R		K	R	R R R	9 R 9 R	R	3 A M	H2 18-18 P	R R R
Denticulopsis praedimorpha	5H-5, 28-29 5H-5, 114-115 5H-6, 28-29 5H-6, 114-115	F M F M F M	R R R		R R R R R R R R R R R R R	F R F R F R	R C C R A A		15		R R R R R			R	R R R	R	R		H4, 28-28 C H4, 115-416 C H5, 28-28 E	R R R
3	6H-1, 27-28 6H-1, 114-115 6H-2, 28-29 6H-2, 114-115	A G A G R P C M	R F R F R R		R R R R R R R R F	F R R R R	A A A A	R	P	R R R	R R R R R R F R	9	3	R R R	R R	R	R	R	H 25-11 C	F R R
Nitzschia denticuloides	6H-3, 114-115 6H-4, 28-29 6H-4, 114-115	C M	C F C F F F	K T	R R R R R R R R R	R R C	R R		R R R	9 7	R R R R R R F R R	R	R	R	R R	R R	R	R	3 46-75 1-8 3 46-75 1-8 3 46-45 1-8	R R R
D. hustedtii N. grossepunctata	6H-5, 114-115 6H-6, 28-29 6H-6, 114-115	F M F P	C C C C F A		R R R R R R R	C C R F R F			R R R	R	F R	R R R R	R	R R R R	R	R R R R R R	R	R R R	7 (2-4) (4) 2 (1-4) (4)	R R R
	7H-1, 28-29 7H-1, 115-116 7H-2, 28-29 7H-2, 65-67	F M C M	A C F C	R	R R	R R	R F R	26				R R	R	R R	R	R R	R R	F	9 231-041 A-8 9 85-72 A-8 3 211-041 A-9 2 86-52 A-9	R
Nitzschia grossepunctata	7H-3, 86-88 7H-3, 115-116	R P C M C M F M	R R R I	R	R R R R R R	R	C F A A		R R R R	R		R F R	R F	R R R R R R		R R R R	R R R R R	R R R	HA 113-116 F HA 128-29 F HA 12	R R R R R R
Denticulopsis maccollumii	7H-3, 145-147 7H-4, 28-29	C M C M	1 1 R	R R R	R R R R R R R R R R R R R R	R R	A C A R		-			R R		R R R R R		R R R R		F F R F R	2 (11-44) 1-2 2 (11-44) 2-2 2 (20-20-4	R R R
~~~	7H-5, 55-57	C M F M R P R P F M	1	R R R R R R	R R F R R R	R	R		R				A F	R R R		R R R R	R	F C R C R R F R R		R R F F
Minant	7H-6, 115-116 7H-7, 28-29 8H-1, 28-29 8H-1, 88-90	F M F M F M		R R F R R	R R R R R	R	R R R						C F F R F R	R R R R R R R		R R R R	R R F R R R R R R R R	R R F R R R	1-6, 114-123 R 1-7, 28-29 R mir Figure & (Abb.	C F C C
Nitzschia maleinterpretaria	8H-2, 114-115 8H-3, 28-29 8H-3, 86-88	F M P M F M		R R R R R R	R R R F R		R R						R R R	R R R		R	C R	R C C R C		R R R F C F F
Oligocene		R P R P R P	]	R R R R	R R R R R		R C F		R R				F R	R R	R C R F F F R		F F R  R  C R  F R	R		F F C R
Oligocene	8H-4, 114-115 8H-4, 144-146 8H-5, 28-29 8H-5, 114-115	R P F P R P		K	R		R F		R R F F					R	R R R R C R C R		C C F R C F C F			

Zone	Hole 690B Core-section (interval in cm)	Abundance Preservation Actinocyclus ingens Actinocyclus ingens var. nodus Actinocyclus octonarius	Asteromphalus benarus Asteromphalus kennettii Asteromphalus inaequabilis Asteromphalus oligocenicus Azpeitia noduliler	Azpeitia tabularis group Coscinodiscus levisianus Coscinodiscus marginatus Coscinodiscus rhombicus	Coscinodiscus insignis Coscinodiscus intersectus Crucidenticula kanayae Crucidenticula nicobarica Denticulopsis dimorpha Denticulopsis hustediii	Denticulopsis lauta Denticulopsis maccollumii Denticulopsis praedimorpha Ethmodiscus rex Ethmodiscus spp.	Eucampia balaustium Hemidiscus sp. 1 Hemidiscus sp. 3 Katathiraia aspera Lisitzina ornata	Mediaria splendida Neobrunia mirabilis Nitzschia arcula Nitzschia barronii	Nitzschia claviceps Nitzschia clementia Nitzschia curta Nitzschia denticuloides	Nitzschia donanuensis Nitzschia efferans Nitzschia fossilis Nitzschia grossepunciata Nitzschia interfrigidaria	Nitzschia Januaria Nitzschia kerguelensis Nitzschia naleinterpretaria Nitzschia aff., porteri	Nitzschia praecurta Nitzschia praeinterfrigidaria Nitzschia pseudokerguelensis Nitzschia pusilla Nitzschia senaranda	Nitzschia weaveri Raphidodiscus marylandicus Rhizosolenia alata Rhizosolenia barboi Rhizosolenia styliformis	Rocella gelida Rocella vigilans Rouxia antarctica Rouxia heteropolara Rouxia sp. 1 Rouxia sp. 2 Rouxia sp. 3	Stellarina microtrias Stephanopyxis turris Synedra jouseana Synedra miocenica Thalassionema hirosakiensis Thalassionema nitzschioides Thalassiosira complicata Thalassiosira fonga	Thalassiosira inura Thalassiosira kolbei Thalassiosira kolbei Thalassiosira majuramica-torokina group Thalassiosira nordenskioeldii Thalassiosira oliverana Thalassiosira spinosa Thalassiosira spumellaroides Thalassiosira yabei Thalassiosira yabei
T. lentiginosa		R P R	31		2.3		R	- A		9 9	C	R		1 2		F
A. ingens T. kolbel	~~~~~~	F M			R		R	F		R	· · · · · · · · · · · · · · · · · · ·		R R	F		R R R F
Nitzschia interfrigidaria/ Cosmiodiscus insignis	2H-3, 28-29 2H-3, 114-115 2H-4, 28-29 2H-4, 114-115 2H-5, 28-29	C M C M R C M R C G R R A G A G	8	R R R R R R R R	R R R R	I A	R R R R	R F F F F R C	R R R	R R R R R R R R R R R R R R R R R R R	R R R R	R R	R R R R	F R R C F F R F R F R R R R R F R R F R F	R R R R R R R R R R R R R R R R R R R	R R R F F R R R F F R R R R R R R R R R
Nitzschia barronii	2H-6, 28-29 2H-6, 114-115	C M C M C M C M R	R R	R		C C R R	R R	R R R R F R F R	1 1	R R R	R	R R F R R	R R R R	R R F R R F R F R F	R R R R R R R R R R R R R R R R	R R R R F F R R R R R R R R R R R R R R
Thalassiosira inura	3H-1, 115-116 3H-2, 27-28 3H-2, 115-116			R R R	R R R		R R	F R F F	R R	R	R	F R R	R F F R R R R R R R R R	R F F R	R R	R R R F F F F F F F F F F F F F F F F F
Cosmiodiscus intersectus	3H-3, 125-127 3H-4, 23-25 3H-4, 73-75 3H-4, 115-116 3H-5, 27-28	C M R C M R	R	R R R F F R R	R R R R R F F	R	R R	R C F C F C R F R C R F	R F	R R	R R		R R R R R F R F R R F R R R R R	R R R	R R R R R R	R R R R R
Asteromphalus kennettii	3H-6, 23-25 3H-6, 73-75 3H-6, 115-116 3H-7, 23-25 4H-1, 26-27 4H-1, 49-51 4H-1, 115-116 4H-2, 28-29 4H-2, 115-116	F M R R F M R F M R C M R C M C R C M C R C M F C M R	R R R R R	R R R R R R R R R R R R R R R R R R R	F F F C R C F R R F F F F F C	R	R R	R R	R R R F R F	R F	R R R R R R R R R R R R R R R R R R R	R R R	R R R R R R R R R R R R R R R R R R R	7 7 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	R R R R R R R R
Nitzschia praecurta	4H-3, 115-116	F M R R P R	9 8 8	R R R R R R R R R	A R A R A R A R	16 16	R	R	R F	2	4 A A A A A A A A A A A A A A A A A A A	R R R	R R R R R R R R	H H H H	R R	R R R R R
Denticulopsis preadimorpha	4H-6, 115-116 5H-1, 28-29 5H-1, 116-117 5H-2, 28-29 5H-2, 115-116 5H-3, 28-29 5H-3, 115-116	F M R F M R F M F M C M R A G R F M F R R		R R R R R R R R R R R R R R R R R R R	ARARAR CFRRR RRRRRRRRRRRR	R R F A A C C A C R	R R		R R R R F R F R F F F	R F F R			R R R R R R R R R R R R R R R R R R R	R R	R R R R R R R R R R R R R R R R R R R	R R R R R R R R R R R R R R R R R R R
Nitzschia	5H-5, 28-29 5H-5, 115-116	F M F R F M C C	я я	R R	R F				F				R	R R	B	R R
D. hustedtii/	5H-6, 115-116	F M C F C M C A		$\frac{R}{R}$	R F R		R	R	R F	R		R	R	R R	R	R
N. grossepunctata  Nitzschia grossepunctata	6H-1, 27-28 6H-1, 50-52 6H-1, 114-115 6H-2, 27-28 6H-2, 49-51 6H-2, 114-115	F M R C M R		R R R R R R R R R R	R R R R R R R	R R R F A R A C R	8	R R R	F	R ?R F F F R R R R R R	R R R	R	R R R R R R R R R R R	R R	R R F R R R R F R F	R R R R R R R
Nitzschia maleinterpretaria	6H-3, 27-28 6H-3, 49-51 6H-3, 114-115 6H-4, 27-28 6H-4, 114-115 6H-5, 27-28 6H-5, 114-115 6H-6, 27-28 6H-6, 49-51 6H-6, 115-116 6H-7, 28-29 7H-1, 28-28	C M R F M C M F M F M F M F M F M R P	R R R R R R R	R R R R R	R R R R	R R R R F R R R X C C C	2 2	R R	3 9		A C A C F X R R	F F F R		F F R R R I	R R F R R R R R R R R R R F C C F F C C X X R R R R R R R R R R R R R R R R	R R R R F C R C F F R F R F R F
T. spumellaroides	7H-1, 114-115	hadiahamman				F			·					R R C	R A C	
Oligocene	7H-2, 28-29 7H-2, 114-115 7H-3, 28-29 7H-3, 114-115 7H-4, 28-29 7H-5, 28-29 7H-5, 114-115	R P R P R P R P R P R P	R R R	R R R		R R R R F	R R R F R F R F				9	3	R	C C R R R F	C F C F A C F C F C F C F A F C F A F C A F C A F C	#4, 76-85 C M R R R R R R R R R R R R R R R R R R

For other hiatuses compare Figure 6. (Abbreviations are explained in Table 3).