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Supplement of

Flux variations and vertical distributions of siliceous Rhizaria (Radiolaria and Phaeodaria) in the western Arctic Ocean: indices of environmental changes

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Table S1

Radiolarian counts of living and dead specimens (45µm-1 mm) in plankton tows at Station 32

Sample depth interval (m)		0-100	100-250	250-500	500-1000	0-100	100-250	250-500	500-1000
		Live	Live	Live	Live	Dead	Dead	Dead	Dead
Order	Spumellaria								
Family	Actinommidae								
	<i>Actinomma boreale</i>	0	8	1	0	0	2	8	40
	<i>Actinomma leptodermum leptodermum</i>	1	27	18	20	1	1	3	19
	<i>Actinomma</i> morphogroup A	0	0	0	0	0	0	0	3
	<i>Actinomma leptodermum longispina</i>	0	0	0	0	0	0	0	2
	<i>Actinomma leptodermum longispinum</i> juvenile	0	0	0	0	0	0	0	1
	<i>Actinommidae</i> spp. juvenile forms	8	49	13	12	2	15	9	30
	<i>Actinomma turidae</i>	0	0	0	0	0	0	0	0
	<i>Actinomma</i> morphogroup B	0	0	0	1	0	0	0	1
	<i>Actinomma</i> morphogroup B juvenile	0	2	0	0	0	0	0	0
	<i>Arachnosphaera dichotoma</i>	0	0	0	0	0	1	0	0
Family	Spongodiscidae								
	<i>Spongotrochus glacialis</i>	2	14	8	2	0	0	1	0
	<i>Stylodictya</i> sp.	0	0	0	3	0	0	0	5
	Spumellarida indet.	1	3	0	2	0	0	0	9
Order	Entactinaria								
	<i>Cleveiplegma boreale</i>	0	0	0	0	0	0	0	1
	<i>Joergensenium</i> sp. A	0	139	17	4	0	18	50	21
	<i>Joergensenium</i> sp. B	0	0	0	0	0	0	0	0
Order	Nassellaria								
Family	Sethophormididae								
	<i>Enneaphormis rotula/enneastrum</i>	0	0	0	2	0	2	0	2
	<i>Protoscenium simplex</i>	0	1	1	1	0	3	0	2
Family	Plagiacanthidae								
	<i>Ceratocyrtis histricosus</i>	0	1	17	1	0	0	6	2
	<i>Ceratocyrtis galeus</i>	0	0	0	6	0	0	1	0
	<i>Cladoscenium tricolpium?</i>	0	0	0	0	0	0	0	0
	<i>Lophophaena clevei</i>	0	4	1	4	0	3	2	2
	<i>Phormacantha hystrix</i>	0	3	0	0	0	1	2	1
	<i>Plectacantha oikiskos</i>	0	0	0	0	0	0	0	1
	<i>Pseudodictyophimus gracilipes clevei</i>	2	83	30	23	0	18	15	32
	<i>Pseudodictyophimus gracilipes gracilipes</i>	0	3	8	20	0	2	5	26
	<i>Pseudodictyophimus</i> spp. juvenile forms	0	0	1	5	0	0	1	0
	<i>Pseudodictyophimus gracilipes bicornis</i>	0	0	0	8	0	0	4	18
	<i>Pseudodictyophimus gracilipes multispinus</i>	0	1	0	0	0	1	0	0
	<i>Pseudodictyophimus plathycephalus</i>	0	1	2	17	0	0	3	14
	<i>Tetraplecta pinigera</i>	0	0	0	0	0	0	0	1
	<i>Tripodiscium gephyristes</i>	0	2	0	3	0	7	3	9
	Plagiacanthidae gen. et sp. in det.	0	2	16	73	0	0	2	4
Family	Eucyrtidiidae								
	<i>Artostrobus annulatus</i>	0	0	2	21	0	1	0	3
	<i>Artostrobus joergenseni</i>	0	0	1	3	0	0	0	0
	<i>Cycladophora davisiana</i>	0	0	12	94	0	0	0	2
	<i>Lithocampe platycephala/furcaspiculata</i>	0	0	0	0	0	1	0	1
	<i>Sethoconus tabulatus</i>	0	7	11	0	0	0	2	5
Family	Cannobotryidae								
	<i>Amphimelissa setosa</i>	885	229	17	91	215	578	210	259
	<i>Amphimelissa setosa</i> juvenile	357	69	4	22	163	136	56	124
	Nassellarida indet.	1	5	6	17	0	0	8	21
Order	Phaeodaria								
	<i>Lirella melo</i>	0	1	14	7	0	0	1	3
	<i>Protocystis harstoni</i>	0	0	15	0	0	0	5	1
	Total Radiolaria	1257	654	215	462	381	790	397	665

Table S2

Radiolarian counts of living and dead specimens (45µm-1 mm) in plankton tows at Station 56

Sample depth unterval (m)		0-100	100-250	250-500	500-1000	0-100	100-250	250-500	500-1000
		Live	Live	Live	Live	Dead	Dead	Dead	Dead
Order	Spumellaria								
Family	Actinommidae								
	<i>Actinomma boreale</i>	1	18	9	0	1	3	38	153
	<i>Actinomma leptodermum leptodermum</i>	158	102	61	11	44	1	18	60
	<i>Actinomma</i> morphogroup A	0	0	0	0	0	0	0	1
	<i>Actinomma leptodermum longispina</i>	0	0	2	0	0	0	1	0
	<i>Actinomma leptodermum longispinum</i> juvenile	0	0	0	0	0	0	0	0
	<i>Actinommidae</i> spp. juvenile forms	1106	448	82	74	14	26	80	156
	<i>Actinomma turidae</i>	0	0	1	8	0	0	1	0
	<i>Actinomma</i> morphogroup B	0	1	0	0	0	0	1	0
	<i>Actinomma</i> morphogroup B juvenile	0	19	3	0	0	0	1	0
	<i>Arachnosphaera dichotoma</i>	0	0	6	3	0	0	3	3
Family	Spongodiscidae								
	<i>Spongotrochus glacialis</i>	28	32	9	5	0	0	0	0
	<i>Stylodictya</i> sp.	0	0	1	0	0	0	0	0
	Spumellarida indet.	1	10	3	5	0	2	4	4
Order	Entactinaria								
	<i>Cleveplegma boreale</i>	0	1	2	0	0	0	1	0
	<i>Joergensenium</i> sp. A	0	337	67	2	4	23	385	215
	<i>Joergensenium</i> sp. B	0	0	0	0	0	0	0	1
Order	Nassellaria								
Family	Sethophormididae								
	<i>Enneaphormis rotula/enneastrum</i>	0	2	14	4	0	1	10	5
	<i>Protoscenium simplex</i>	0	14	8	0	0	18	19	15
Family	Plagiacanthidae								
	<i>Ceratocyrtis histicosus</i>	0	4	39	0	0	0	10	4
	<i>Ceratocyrtis galeus</i>	0	0	28	0	0	0	3	8
	<i>Cladoscenium tricolpium?</i>	0	0	2	1	0	0	2	2
	<i>Lophophaena clevei</i>	0	33	23	16	1	1	13	24
	<i>Phormacantha hystrix</i>	8	24	0	1	4	5	8	11
	<i>Plectacantha oikiskos</i>	1	0	3	0	0	0	3	1
	<i>Pseudodictyophimus gracilipes clevei</i>	45	276	124	78	2	64	162	114
	<i>Pseudodictyophimus gracilipes gracilipes</i>	5	9	26	32	0	1	25	54
	<i>Pseudodictyophimus</i> spp. juvenile forms	2	9	18	20	0	0	9	11
	<i>Pseudodictyophimus gracilipes bicornis</i>	0	0	8	13	0	0	12	27
	<i>Pseudodictyophimus gracilipes multispinus</i>	0	2	0	0	0	2	3	0
	<i>Pseudodictyophimus plathycephalus</i>	0	7	25	70	0	0	35	40
	<i>Tetraplecta pinigera</i>	0	0	0	0	0	0	1	1
	<i>Tripodiscium gephyristes</i>	0	10	60	5	0	2	31	24
	Plagiacanthidae gen. et sp. in det.	0	0	184	212	0	0	13	39
Family	Eucyrtidiidae								
	<i>Artostrobus annulatus</i>	0	0	3	41	0	0	1	22
	<i>Artostrobus joergenseni</i>	0	1	17	1	0	0	1	0
	<i>Cycladophora davisiana</i>	1	7	112	285	1	1	11	24
	<i>Lithocampe platycephala/furcaspiculata</i>	0	1	2	0	0	0	0	1
	<i>Sethoconus tabulatus</i>	0	13	11	0	1	1	54	11
Family	Cannobotryidae								
	<i>Amphimelissa setosa</i>	454	1558	11	10	2415	5026	4085	1883
	<i>Amphimelissa setosa</i> juvenile	138	183	4	3	181	526	521	417
	Nassellarida indet.	19	30	98	44	3	8	48	45
Order	Phaeodaria								
	<i>Lirella melo</i>	1	3	57	90	0	0	4	2
	<i>Protocystis harstoni</i>	0	2	2	0	0	0	10	3
	Total Radiolaria	1968	3156	1125	1034	2671	5711	5627	3381

Table S5
 Summary information of previous sediment trap studies in the North Pacific Ocean

Station	Latitude	Longitude	Area	Water Depth (m)	Mooring depth (m)	Sampled Duration	Mean of total radiolaria flux (specimens m ⁻² day ⁻¹)	Reference
M4	53°01'N	145°30'E	Okhotsk Sea	1756	300 (upper) 1550 (lower)	7 Aug. 1998 - 7 June. 2000	383 2448	Okazaki et al. (2003)
M6	49°30'N	146°28'E	Okhotsk Sea	804	300 (upper) 700 (lower)	7 Aug. 1998 - 7 June. 2000	418 798	Okazaki et al. (2003)
AB	53.5°N	177°W	Bering Sea	3788	3200	7 Aug. 1990 - 3 Aug. 2000 15 Aug. 2002 - 6 July. 2005	8216	Ikenoue et al. (2012) a
SA	49°N	174°W	Cetral North Pacific	5406	4800	9 Aug. 1990 - 6 July. 2005	6336	Ikenoue et al. (2012) a
50N	50°01'N	165°02'E	North western North Pacific	5570	3260	1 Dec. 1997 - 18 May 2000	4340	Okazaki et al. (2005)
K2	47°N	160°E	North western North Pacific	5280	4810	20 Mar. 2005 - 20 May. 2006	2462	Ikenoue et al. (2010)
KNOT	43°58'N	155°03'E	North western North Pacific	5370	2957	1 Dec. 1997 - 14 May 2000	5833	Okazaki et al. (2005)
40N	40°00'N	165°00'E	North western North Pacific	5483	2986	1 Dec. 1997 - 30 Jan. 2000	10002	Okazaki et al. (2005)

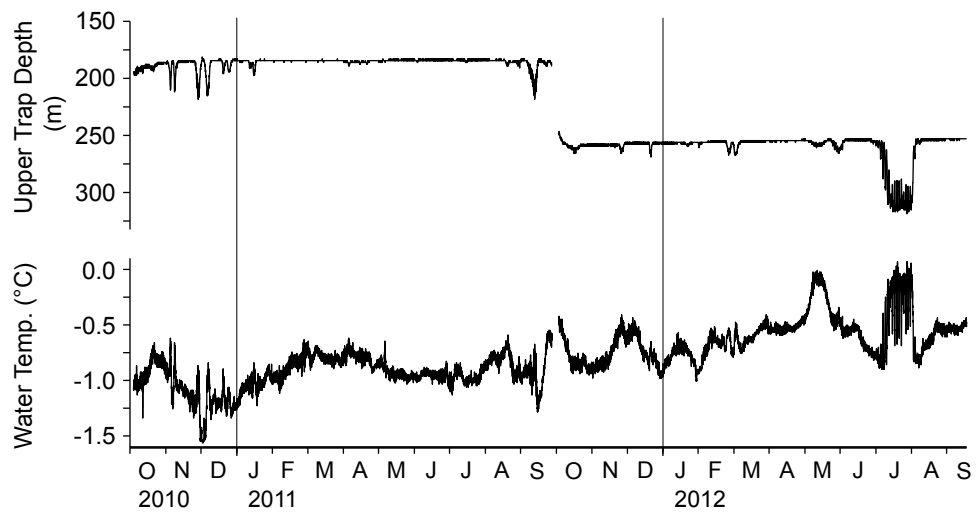


Fig. S1. Moored trap depth and the water temperature in the upper trap.