Chlorophyll *a* concentration of phytoplankton during cruises of the 40-44th Japanese Antarctic Research Expeditions in 1998-2003

Toru Hirawake and Mitsuo Fukuchi

National Institute of Polar Research,
9-10, Kaga 1-chome, Itabashi-ku, Tokyo 173-8515

1. Introduction

This is a report on the phytoplankton chlorophyll *a* concentration on cruises of the icebreaker *Shirase* during the 40-44th Japanese Antarctic Research Expeditions (JARE) in 1998-2003 austral summers. Chlorophyll *a* concentration of phytoplankton was measured in two series: (1) spatial variation of chlorophyll *a* in the surface water along the cruise track, and (2) vertical profile of chlorophyll *a* in the Indian Ocean sector of the Southern Ocean.

2. Materials and methods

Surface seawater was sampled usually two or three times a day with plastic bucket (except JARE-44) and by pumping up through the hull. Subsurface water was collected with a Niskin bottle attached to the Rosette multi-sampler on a CTD or Van-Dorn bottle. Seawater samples of 200-300 ml were filtered onto a glass fiber filter (Whatman, GF/F). The filter was immediately soaked in N, N-dimethylformamide (Suzuki and Ishimaru, 1990), and pigments were extracted. The concentration of chlorophyll *a* and pheopigments were determined fluorometrically (Parsons *et al.*, 1984) with a fluorometer (Turner Design, 10-AU). The fluorometer was calibrated against a chlorophyll *a* standard (Sigma Chemical Co.) using a spectrophotometer and the value of specific absorption coefficient obtained by Porra *et al.* (1989).

3. Data

Maps of the sampling stations during JARE-40, -41, -42, -43 and -44 cruises are illustrated in Figs. 1, 2, 3, 4 and 5, respectively. Chlorophyll *a* and pheopigments concentration in sea surface water sampled with pump and bucket, and those of subsurface water are shown in Tables 1, 2 and 3, respectively. The data in this report are available on digital media.

4. Scientists on board

Sampling and analysis were carried out by following scientists.

JARE-40

Kentaro Watanabe	(National Institute of Polar Research)
Jun Nishikawa	(Ocean Research Institute, The University of Tokyo)
Akinori Takahashi	(Department of Polar Science, The Graduate University for Advanced Studies) (Present affiliation: Graduate School of Fisheries Science, Hokkaido University)
Yasutaka Tsuchiya	(Shimoda Marine Research Center, University of Tsukuba)
Sakae Kudoh	(National Institute of Polar Research)

JARE-41

Chiaki Hamada	(Nichiyu Giken Kogyo Co., Ltd.)
Haruko Umeda	(Department of Polar Science, The Graduate University for Advanced Studies) (Present affiliation: Korea Ocean Research and Development Institute)

JARE-42

Syuhei Ban	(Graduate School of Fisheries Science, Hokkaido University) (Present affiliation: School of Environmental Science, The University of Shiga Prefecture)
Waka Sato-Okoshi	(Graduate School of Agricultural Science, Tohoku University)
Toru Hirawake	(National Institute of Polar Research)

JARE-43
Toru Hirawake (National Institute of Polar Research)
JARE-44
Takehiro Masuzawa (Department of Biology, Faculty of Science, Shizuoka University)

5. Data policy

Before using the data for publication or presentation, please request permission in writing. Inquiries should be addressed to:

Mitsuo Fukuchi, Professor
National Institute of Polar Research
9-10, Kaga 1-chome, Itabashi-ku, Tokyo 173-8515, Japan
Phone: +81-3-3962-6031
Facsimile: +81-3-3962-4914
E-mail: fukuchi@nipr.ac.jp

Acknowledgments

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References

Parsons, T. R., Maita, Y. and Lalli, C. M. (1984): A Manual of Chemical and Biological Methods for Seawater Analysis. Oxford, Pergamon Press, 173p.

Porra, R. J., Thompson, W. A. and Kriedemann, P. E. (1989): Determination of accurate extinction coefficients and simultaneous equations for assaying chlorophyll *a* and *b* extracted with four different solvents: verification of the concentration of chlorophyll standards by atomic absorption spectroscopy. Biochim. Biophys. Acta, **975**, 384-394.

Suzuki, R. and Ishimaru, T. (1990): An improved method for the determination of phytoplankton chlorophyll using N, N-dimethylformamide. J. Oceanogr. Soc. Jpn., **46**, 190-194.

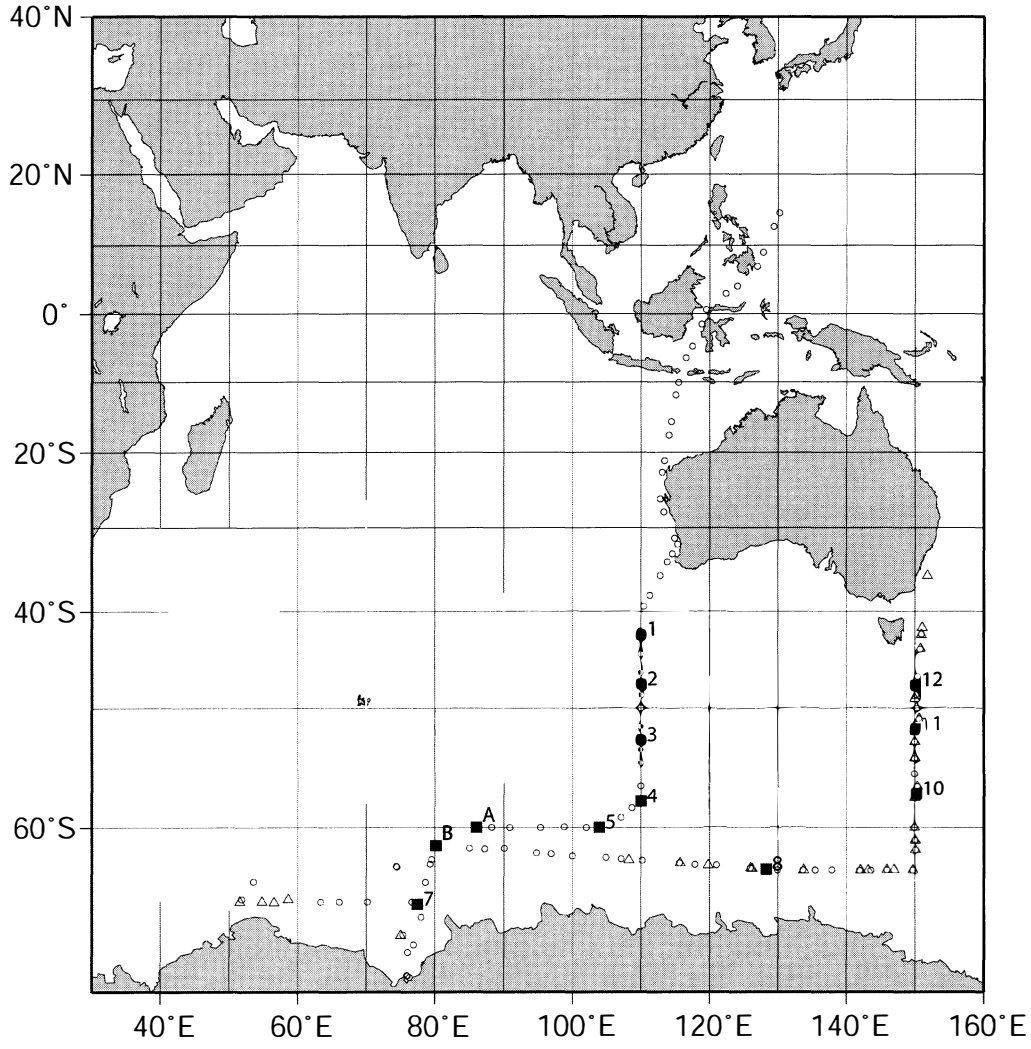

Fig. 1. Map showing the sites of sampling stations during JARE-40 in 1998/99. Open circles and triangles indicate surface water sampling by pump and bucket, respectively. Solid squares are stations for vertical water sampling.

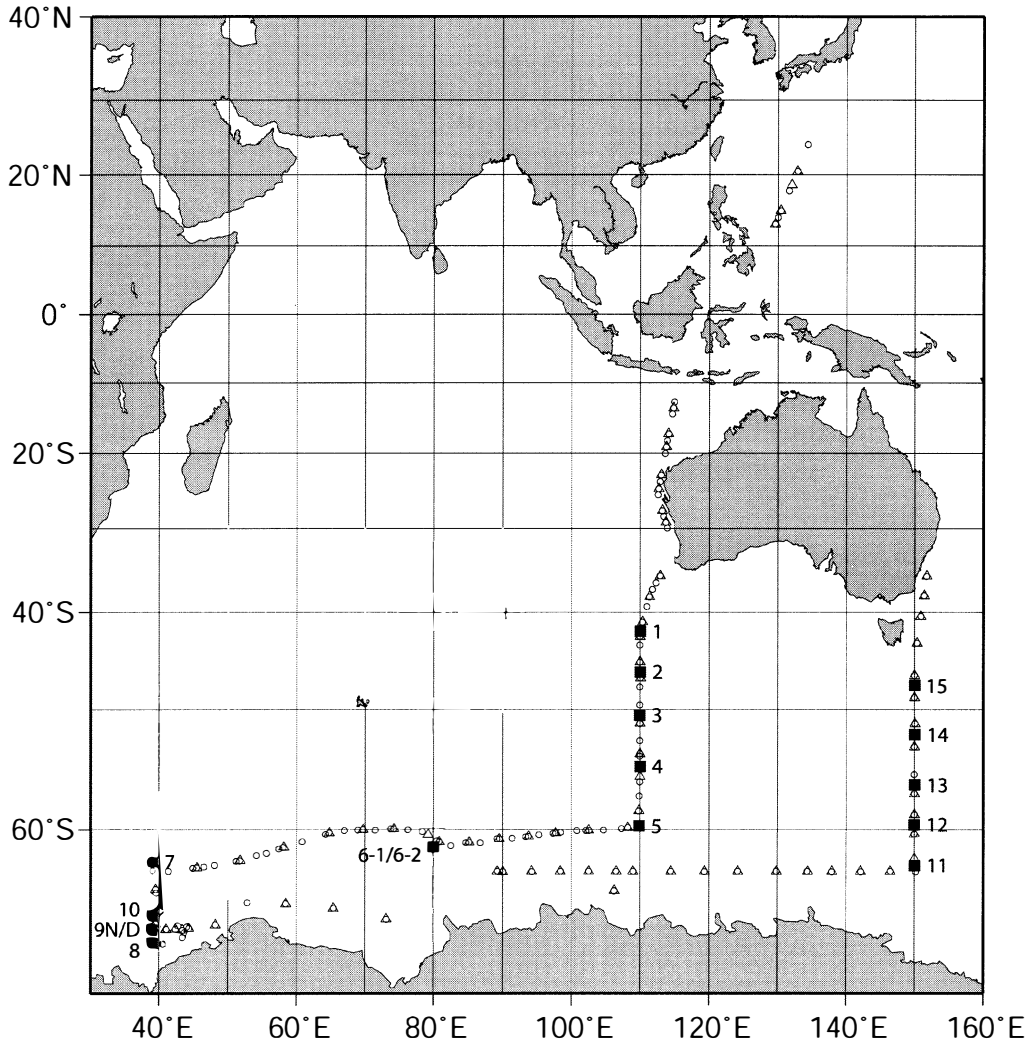

Fig. 2. Map showing the sites of sampling stations during JARE-41 in 1999/2000. Open circles and triangles indicate surface water sampling by pump and bucket, respectively. Solid squares are stations for vertical water sampling.

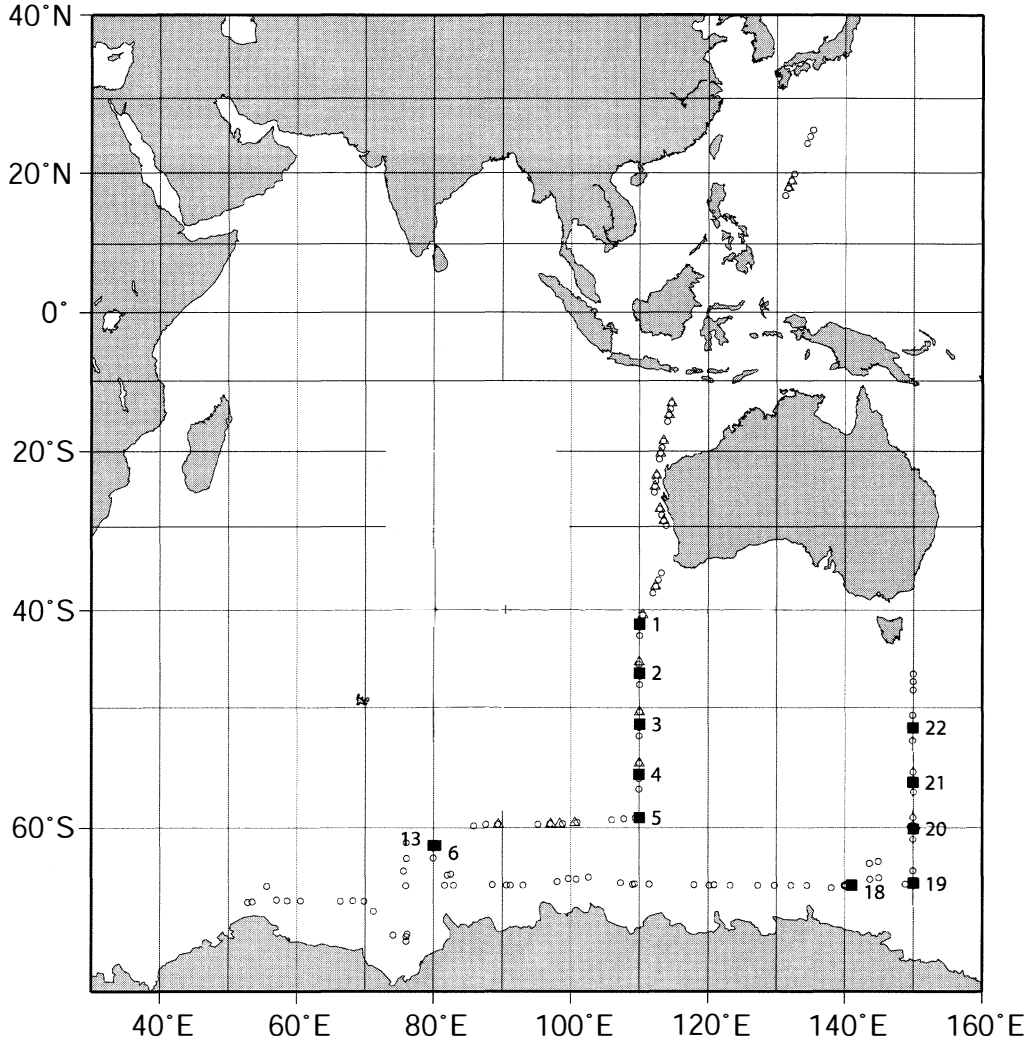

Fig. 3. Map showing the sites of sampling stations during JARE-42 in 2000/01. Open circles and triangles indicate surface water sampling by pump and bucket, respectively. Solid squares are stations for vertical water sampling.

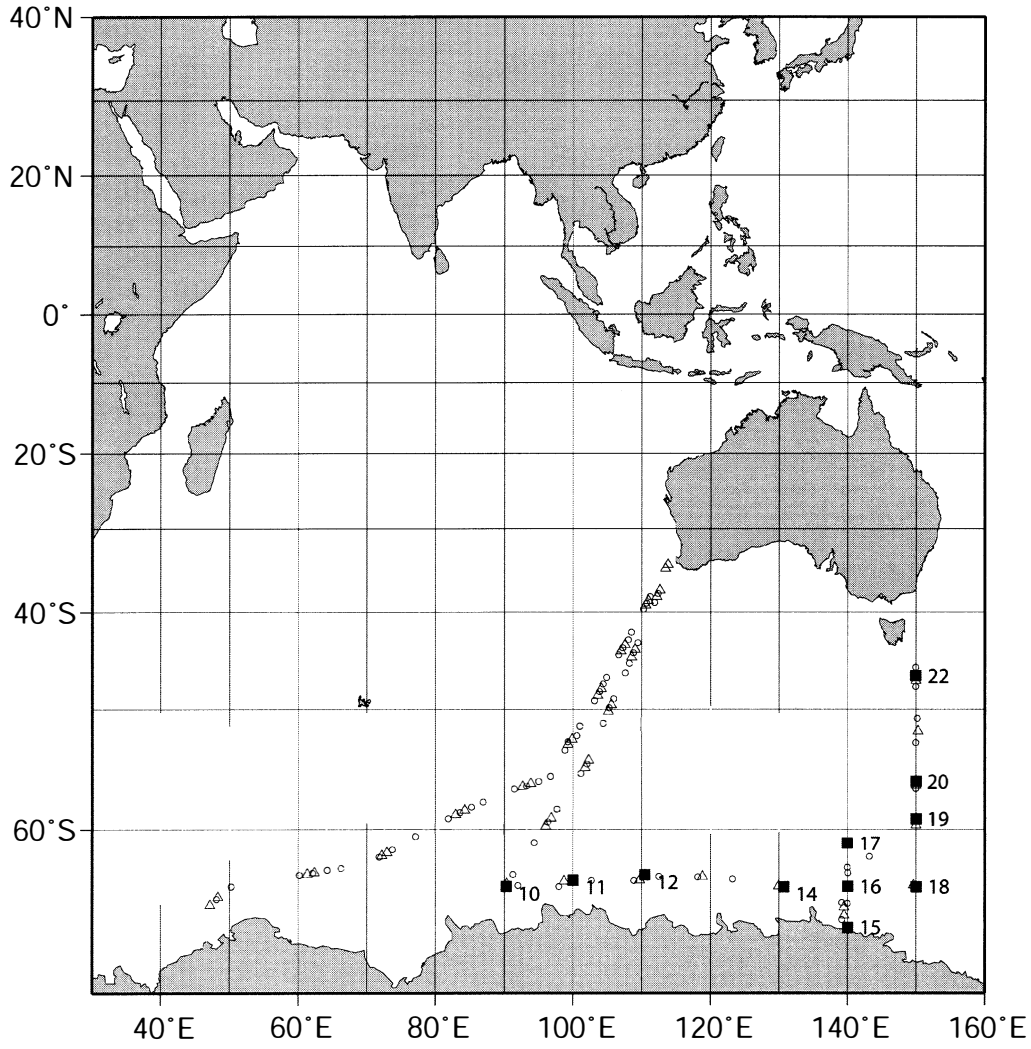

Fig. 4. Map showing the sites of sampling stations during JARE-43 in February and March 2002. Open circles and triangles indicate surface water sampling by pump and bucket, respectively. Solid squares are stations for vertical water sampling.

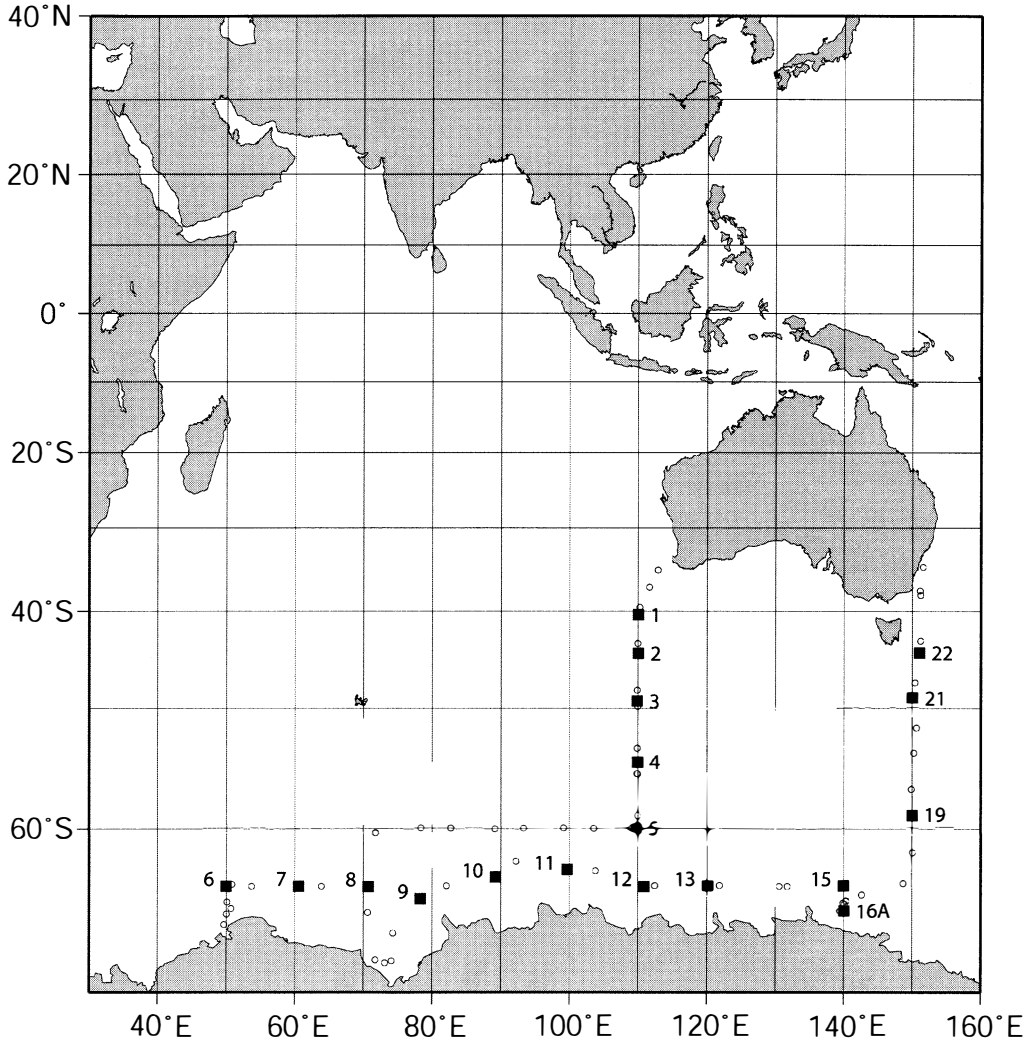

Fig. 5. Map showing the sites of sampling stations during JARE-44 in 2002/2003. Open circles indicate positions of surface water sampling. Solid squares are stations for vertical water sampling.

Table 1-1. Chlorophyll *a* and pheopigments concentration of surface water pumped up from hull during JARE-40.

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
Syowa Station										
225-23	1999/2/25	20:00	64	59.61	S	51	33.97	E	0.75	0.11
226-08	1999/2/26	5:00	64	59.67	S	54	50.07	E	1.43	0.20
226-13	1999/2/26	10:00	65	0.63	S	56	34.80	E	0.43	0.11
226-20	1999/2/26	17:00	64	49.56	S	58	38.58	E	0.30	0.04
228-10	1999/2/28	5:00	65	9.35	S	77	23.53	E	0.37	0.05
301-6	1999/3/1	1:50	65	13.79	S	77	20.34	E	0.27	0.07
301-8	1999/3/1	3:00	65	11.49	S	77	25.73	E	0.37	0.06
303-12	1999/3/3	7:25	66	59.02	S	74	58.12	E	0.26	0.10
307-15	1999/3/7	8:25	62	16.02	S	108	16.48	E	0.14	0.03
308-08	1999/3/8	1:05	62	30.25	S	115	45.30	E	0.20	0.04
308-17	1999/3/8	10:15	62	37.69	S	119	48.35	E	0.14	0.03
309-07	1999/3/8	23:50	62	50.35	S	125	59.00	E	0.39	0.07
309-08	1999/3/9	0:25	62	50.82	S	126	14.94	E	0.50	0.07
309-14	1999/3/9	6:50	62	57.34	S	128	17.59	E	0.35	0.06
310-07	1999/3/9	22:55	62	58.40	S	133	44.10	E	0.22	0.03
311-08	1999/3/10	23:05	62	59.52	S	142	2.69	E	0.21	0.02
311-11	1999/3/11	2:20	62	59.04	S	143	7.70	E	0.29	0.03
311-19	1999/3/11	10:55	62	59.54	S	145	58.32	E	0.35	0.05
311-22	1999/3/11	13:50	62	59.64	S	146	58.71	E	0.45	0.25
312-07	1999/3/11	21:53	62	59.70	S	149	41.23	E	0.27	0.05
313-07	1999/3/12	21:55	61	38.06	S	150	4.09	E	0.56	0.12
313-13	1999/3/13	3:55	60	57.12	S	150	1.59	E	0.57	0.12
313-19	1999/03/13	9:50	60	1.77	S	149	59.54	E	0.47	0.04
314-07	1999/03/13	21:55	57	44.65	S	149	58.47	E	0.25	0.04
315-13	1999/03/15	3:55	56	51.01	S	150	21.57	E	0.27	0.07
316-02	1999/03/15	16:15	54	27.96	S	149	59.92	E	0.42	0.15
316-07	1999/03/15	21:50	53	3.89	S	149	58.92	E	0.33	0.09
316-19	1999/03/16	9:55	51	2.16	S	150	38.83	E	0.71	0.33
317-01	1999/03/16	15:53	50	2.22	S	150	13.55	E		
317-02	1999/03/16	16:05	50	0.81	S	150	11.28	E	0.80	0.34
317-06	1999/03/16	20:15	49	4.80	S	149	59.82	E	0.81	0.50
317-07	1999/03/16	21:30	48	47.86	S	150	9.66	E	1.04	0.46
318-07	1999/03/17	20:55	44	6.89	S	150	47.24	E	0.38	0.34
318-13	1999/03/18	2:40	42	34.50	S	150	58.57	E	0.27	0.14
318-16	1999/03/18	5:30	41	50.14	S	151	5.59	E	0.14	0.05
319-20	1999/03/19	9:10	35	52.04	S	151	51.73	E	0.18	0.10
Sydney, Australia										

Table 1-2. Chlorophyll *a* and pheopigments concentration of surface water pumped up from hull during JARE-41.

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
Tokyo, Japan										
PO1	1999/11/16	8:02	24	7.44	N	134	19.26	E	0.16	0.06
PO2	1999/11/16	23:00	20	31.62	N	132	51.23	E	0.09	0.09
PO5	1999/11/17	11:00	17	46.41	N	131	37.63	E	0.07	0.07
PO6	1999/11/17	22:55	14	59.45	N	130	25.75	E	0.07	0.14
PO7	1999/11/18	3:00	14	1.12	N	130	0.14	E	0.06	0.09
PO8	1999/11/18	7:00	13	5.34	N	129	35.57	E	0.04	0.05
PO9	1999/11/23	3:00	12	44.60	S	114	57.73	E	0.05	0.12
PO10	1999/11/23	7:00	13	37.71	S	114	48.00	E	0.10	0.12
PO11	1999/11/23	11:00	14	29.08	S	114	39.55	E	0.05	0.12
PO12-1	1999/11/23	23:00	17	18.61	S	114	8.17	E	0.07	0.09
PO12-2	1999/11/24	3:00	18	12.94	S	113	58.23	E	0.08	0.08
PO13	1999/11/24	7:00	19	8.43	S	113	46.94	E	0.08	0.02
PO14	1999/11/24	11:00	20	3.74	S	113	37.05	E	0.09	0.05
PO15	1999/11/24	23:24	23	0.91	S	113	3.91	E	0.07	0.10
PO16	1999/11/25	3:00	23	52.52	S	112	53.68	E	0.09	0.05
PO17	1999/11/25	7:00	24	49.50	S	112	43.06	E	0.07	0.11
PO18	1999/11/25	11:00	25	38.77	S	112	37.59	E	0.13	0.05
PO19	1999/11/25	23:00	27	42.92	S	113	14.35	E	0.17	0.08
PO20	1999/11/26	3:00	28	25.29	S	113	27.75	E	0.10	0.07
PO21	1999/11/26	7:05	29	11.98	S	113	44.03	E	0.04	0.07
PO22	1999/11/26	11:00	29	54.80	S	113	57.02	E	0.09	0.03
Fremantle, Australia										
P0001	1999/12/04	0:00	35	47.92	S	112	53.69	E	0.07	0.04
P0002	1999/12/04	4:00	36	36.60	S	112	20.26	E	0.10	-0.01
P0003	1999/12/04	8:00	37	25.23	S	111	47.87	E	0.11	0.02
P0004	1999/12/04	12:00	38	15.31	S	111	23.56	E	0.18	0.04
P0005	1999/12/04	17:00	39	21.00	S	111	0.63	E	0.27	0.09
P0006	1999/12/05	1:00	41	7.09	S	110	20.23	E	0.26	0.31
P0007	1999/12/05	5:00	41	55.64	S	110	1.41	E	0.47	-0.03
P0008	1999/12/05	13:00	42	40.07	S	110	0.16	E	0.44	0.02
P0009	1999/12/05	17:00	43	33.71	S	109	59.82	E	0.49	0.07
P0010	1999/12/06	1:00	45	19.22	S	110	0.39	E	0.49	0.07
P0011	1999/12/06	5:00	46	10.97	S	110	1.01	E	0.36	0.07
P0012	1999/12/06	10:00	46	18.77	S	110	12.98	E	0.53	0.14
P0013	1999/12/06	13:00	46	56.47	S	110	4.13	E	0.28	0.08
P0014	1999/12/06	17:00	47	49.70	S	110	0.69	E	0.28	0.30
P0015	1999/12/07	1:00	49	34.99	S	109	57.94	E	0.65	0.14
P0016	1999/12/07	5:00	50	24.37	S	109	58.14	E	2.16	0.51
P0017	1999/12/07	13:00	51	18.61	S	109	59.38	E	1.42	0.18
P0018	1999/12/07	20:00	52	51.61	S	109	59.00	E	1.39	0.15
P0019	1999/12/08	1:00	54	0.25	S	109	58.75	E	0.98	0.65
P0020	1999/12/08	2:00	54	12.79	S	109	58.64	E	1.03	0.20
P0021	1999/12/08	15:00	56	19.55	S	109	57.14	E	0.77	0.10
P0022	1999/12/08	20:00	57	27.90	S	109	53.69	E	0.76	0.10
P0023	1999/12/09	1:00	58	37.91	S	109	49.45	E	0.66	0.13
P0024A	1999/12/09	13:03	59	52.32	S	108	12.21	E	0.73	0.10
P0024B	1999/12/09	15:00	59	57.01	S	107	18.31	E	0.87	0.09
P0025	1999/12/09	20:30	60	2.66	S	104	40.37	E	0.80	0.13
P0026	1999/12/10	1:00	60	4.38	S	102	33.16	E	0.99	0.16
P0027	1999/12/10	2:00	60	4.12	S	102	7.13	E	0.97	0.14
P0028	1999/12/10	5:00	60	4.83	S	100	48.79	E	1.12	0.16
P0029	1999/12/10	11:00	60	13.99	S	98	28.57	E	1.14	0.19
P0030	1999/12/10	13:00	60	16.93	S	97	44.65	E	1.37	0.24
P0031	1999/12/10	14:00	60	18.22	S	97	23.42	E	1.48	0.21
P0032	1999/12/10	20:00	60	24.78	S	95	19.45	E	1.83	0.32
P0033	1999/12/11	1:00	60	31.98	S	93	44.33	E	1.21	0.14

Table 1-2. (Continued)

	Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
	P0034	1999/12/11	2:00	60	34.06	S	93	25.93	E	1.26	0.22
	P0035	1999/12/11	8:00	60	40.22	S	91	24.01	E	1.45	0.24
	P0036	1999/12/11	13:00	60	41.78	S	89	33.41	E	2.52	0.50
	P0037	1999/12/11	14:00	60	43.12	S	89	12.38	E	1.73	0.28
	P0038	1999/12/11	21:00	60	59.18	S	86	53.04	E	5.19	1.06
	P0039	1999/12/12	2:00	60	58.22	S	85	14.37	E	2.21	0.39
	P0040	1999/12/12	3:00	60	59.29	S	84	50.14	E	1.94	0.36
	P0041	1999/12/12	9:00	61	12.32	S	82	35.02	E	2.81	0.55
	P0042	1999/12/12	14:00	60	58.87	S	80	50.65	E	4.16	0.47
	P0043	1999/12/12	15:00	60	54.82	S	80	30.62	E	3.73	0.54
	P0044	1999/12/13	17:00	60	14.61	S	78	27.33	E	3.09	0.44
	P0045	1999/12/13	22:00	60	3.32	S	76	16.92	E	2.68	0.44
	P0046	1999/12/14	3:00	60	1.14	S	74	15.33	E	2.75	0.38
	P0047	1999/12/14	4:00	60	1.10	S	73	50.01	E	2.70	0.31
	P0048	1999/12/14	10:00	60	2.28	S	71	33.53	E	2.39	0.35
	P0049	1999/12/14	15:00	60	2.09	S	69	41.93	E	2.11	0.29
	P0050	1999/12/14	17:00	60	2.76	S	68	56.37	E	1.87	0.31
	P0051	1999/12/14	22:00	60	4.54	S	66	57.42	E	0.77	0.12
	P0052	1999/12/15	3:00	60	16.38	S	64	46.04	E	1.31	0.21
	P0053	1999/12/15	4:00	60	22.56	S	64	15.08	E	1.23	0.19
	P0054	1999/12/15	10:00	60	57.78	S	60	54.71	E	1.18	0.13
	P0055	1999/12/15	15:00	61	22.35	S	58	7.83	E	0.26	0.04
	P0056	1999/12/15	16:00	61	28.31	S	57	32.96	E	0.37	0.05
	P0057	1999/12/15	20:00	61	46.17	S	55	39.94	E	1.22	0.14
	P0058	1999/12/15	23:00	61	57.20	S	54	12.41	E	0.25	0.04
	P0059	1999/12/16	4:00	62	16.10	S	51	43.93	E	0.17	0.03
	P0060	1999/12/16	5:00	62	19.50	S	51	12.37	E	0.18	0.02
	P0061	1999/12/16	11:00	62	34.97	S	48	3.94	E	0.20	0.03
	P0062	1999/12/16	14:00	62	41.95	S	46	29.01	E	0.59	0.12
	P0063	1999/12/16	16:00	62	45.94	S	45	25.68	E	0.70	0.08
	P0064	1999/12/16	17:00	62	47.92	S	44	54.77	E	0.50	0.07
	P0065	1999/12/17	0:00	62	59.89	S	41	16.87	E	0.94	0.16
	P0066	1999/12/17	5:00	62	29.02	S	39	14.57	E	1.12	0.11
	P0067	1999/12/17	12:00	62	58.32	S	39	0.22	E	1.21	0.10
	P0068	1999/12/17	17:00	64	9.91	S	39	27.07	E	1.31	0.10
	P0069	1999/12/17	18:00	64	23.35	S	39	31.76	E	1.12	0.13
	P0070	1999/12/18	0:00	65	31.11	S	40	5.74	E	0.50	0.12
	P0072	1999/12/18	12:00	67	25.68	S	40	28.54	E	0.53	0.09
Syowa Station											
	P0073	2000/02/17	16:59	66	45.25	S	39	0.48	E	1.25	0.15
	P0074	2000/02/18	5:00	66	29.60	S	39	12.65	E	1.44	0.20
	P0075	2000/02/18	17:00	66	16.26	S	39	27.24	E	0.54	0.04
	P0076	2000/02/19	5:00	66	34.97	S	40	59.99	E	1.48	0.21
	P0077	2000/02/19	17:00	66	33.90	S	42	20.08	E	1.99	0.24
	P0078	2000/02/19	21:02	66	22.67	S	42	39.85	E	2.96	0.39
	P0079	2000/02/20	3:00	67	2.17	S	43	19.99	E	2.69	0.31
	P0080	2000/02/20	5:00	66	37.61	S	43	20.33	E	2.56	0.34
	P0081	2000/02/20	9:00	66	45.20	S	43	39.44	E	2.10	0.26
	P0082	2000/02/20	15:00	66	25.93	S	44	0.05	E	1.58	0.24
	P0083	2000/02/20	17:00	66	31.39	S	44	20.04	E	0.86	0.09
	P0084	2000/02/21	5:00	66	19.97	S	48	11.06	E	1.66	0.27
	P0085	2000/02/24	5:17	64	59.03	S	52	51.13	E	0.68	0.12
	P0086	2000/02/24	17:00	65	2.10	S	58	29.82	E	0.45	0.06
	P0087	2000/02/25	4:00	65	19.73	S	65	27.17	E	0.46	0.08
	P0088	2000/02/25	16:00	65	59.61	S	73	6.44	E	0.44	0.04
	P0089	2000/03/03	14:00	62	59.12	S	89	16.64	E	2.43	0.53
	P0090	2000/03/04	2:00	63	1.73	S	90	3.75	E	1.48	0.38
	P0091	2000/03/04	14:00	63	0.80	S	94	15.45	E	0.55	0.09

Table 1-2. (Continued)

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
P0092	2000/03/05	2:00	62	59.10	S	98	27.92	E	0.60	0.09
P0093	2000/03/05	14:00	63	0.12	S	102	31.88	E	0.26	0.04
P0094	2000/03/06	1:00	62	59.78	S	106	31.90	E	0.52	0.08
P0095	2000/03/06	13:00	64	14.84	S	106	12.96	E	0.38	0.07
P0096	2000/03/07	1:00	62	59.82	S	109	1.41	E	0.83	0.22
P0097	2000/03/07	13:00	62	59.99	S	114	27.88	E	0.50	0.09
P0098	2000/03/08	0:00	63	0.36	S	119	21.97	E	0.37	0.03
P0099	2000/03/08	11:55	62	59.42	S	124	14.79	E	0.23	0.05
P0100	2000/03/09	0:00	62	59.94	S	129	51.29	E	0.16	0.03
P0101	2000/03/09	11:54	62	59.45	S	134	22.44	E	0.17	0.04
P0102	2000/03/09	22:55	63	0.32	S	137	56.99	E	0.22	0.04
P0103	2000/03/10	10:55	63	0.72	S	142	9.59	E	0.24	0.04
P0104	2000/03/10	22:55	62	59.47	S	146	29.16	E	0.49	0.10
P0105	2000/03/11	10:00	63	0.81	S	150	11.13	E	0.26	0.04
P0106	2000/03/12	22:00	60	20.46	S	149	59.87	E	0.24	0.03
P0107	2000/03/13	9:55	58	52.89	S	149	59.34	E	0.23	0.04
P0108	2000/03/13	22:00	57	15.82	S	149	59.64	E	0.31	0.04
P0109	2000/03/14	10:00	55	42.63	S	149	59.37	E	0.21	0.05
P0110	2000/03/14	21:50	53	22.02	S	149	59.23	E	0.48	0.24
P0111	2000/03/15	9:55	51	17.53	S	150	3.92	E	0.37	0.21
P0112	2000/03/15	21:54	48	51.30	S	149	59.00	E	0.38	0.19
P0113	2000/03/16	9:55	46	39.38	S	149	59.97	E	0.77	0.34
P0114	2000/03/16	21:55	43	22.21	S	150	19.04	E	0.69	0.30
P0115	2000/03/17	9:55	40	27.42	S	150	53.22	E	0.31	0.11
P0116	2000/03/17	21:55	38	7.35	S	151	21.70	E	0.27	0.14
P0117	2000/03/18	10:00	35	50.48	S	151	45.40	E	0.23	0.17

Sydney, Australia

Table 1-3. Chlorophyll *a* and pheopigments concentration of surface water pumped up from hull during JARE-42.

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* (mg m^{-3})	Pheo. (mg m^{-3})
Tokyo, Japan										
TF001	2000/11/15	21:58	25	53.41	N	135	16.75	E	0.10	0.02
TF002	2000/11/16	2:05	25	0.37	N	134	52.55	E	0.08	0.03
TF003	2000/11/16	6:12	24	4.96	N	134	27.29	E	0.08	0.03
TF004	2000/11/16	22:59	19	51.34	N	132	33.90	E	0.09	0.04
TF005	2000/11/17	3:11	18	52.55	N	132	7.14	E	0.07	0.03
TF006	2000/11/17	7:14	17	52.81	N	131	40.69	E	0.07	0.03
TF007	2000/11/17	11:13	16	53.83	N	131	14.56	E	0.06	0.03
TF008	2000/11/22	23:04	13	12.45	S	114	42.00	E	0.10	0.04
TF009	2000/11/23	2:55	14	1.33	S	114	31.08	E	0.13	0.05
TF010	2000/11/23	6:55	14	53.09	S	114	19.41	E	0.09	0.03
TF011	2000/11/23	11:04	15	49.95	S	114	6.97	E	0.11	0.04
TF012	2000/11/23	23:03	18	35.65	S	113	28.73	E	0.09	0.03
TF013	2000/11/24	3:09	19	31.41	S	113	15.05	E	0.08	0.03
TF014	2000/11/24	6:57	20	16.43	S	113	4.66	E	0.09	0.02
TF015	2000/11/24	11:01	21	4.06	S	112	54.66	E	0.09	0.02
TF016	2000/11/24	23:02	23	17.30	S	112	31.59	E	0.11	0.03
TF017	2000/11/25	3:00	24	3.61	S	112	24.12	E	0.13	0.03
TF018	2000/11/25	6:53	24	47.63	S	112	16.89	E	0.11	0.03
TF019	2000/11/25	11:14	25	34.46	S	112	12.17	E	0.10	0.03
TF020	2000/11/25	22:56	27	41.84	S	112	59.12	E	0.10	0.03
TF021	2000/11/26	3:00	28	30.62	S	113	17.10	E	0.11	0.03
TF022	2000/11/26	7:03	29	16.08	S	113	35.10	E	0.14	0.03
TF023	2000/11/26	10:58	29	53.56	S	113	55.16	E	0.09	0.02
Fremantle, Australia										
FS001	2000/12/03	23:56	35	41.32	S	113	10.51	E	0.19	0.07
FS002	2000/12/04	4:02	36	30.61	S	112	45.17	E	0.19	0.06
FS003	2000/12/04	7:58	37	15.51	S	112	22.13	E	0.56	0.16
FS004	2000/12/04	12:00	38	2.03	S	111	58.08	E	0.58	0.17
FS005	2000/12/05	1:00	40	33.04	S	110	30.13	E	0.66	0.17
FS006	2000/12/05	5:00	41	21.82	S	110	2.11	E	0.66	0.15
FS007	2000/12/05	8:58	41	47.84	S	110	4.92	E	0.85	0.16
FS008	2000/12/05	13:10	42	45.05	S	110	2.02	E	0.72	0.16
FS009	2000/12/06	2:01	45	46.61	S	109	58.22	E	0.69	0.18
FS010	2000/12/06	4:57	46	26.59	S	109	59.18	E	1.62	0.05
FS011	2000/12/06	9:25	46	56.07	S	110	7.00	E	1.48	0.18
FS012	2000/12/06	13:00	47	45.77	S	110	1.05	E	0.80	0.09
FS013	2000/12/07	0:54	50	23.11	S	110	0.95	E	0.72	0.10
FS014	2000/12/07	4:58	51	22.57	S	110	0.07	E	0.37	0.05
FS015	2000/12/07	8:57	51	49.19	S	110	0.12	E	0.65	0.08
FS016	2000/12/07	12:57	52	34.12	S	109	58.87	E	0.76	0.08
FS017	2000/12/08	0:57	54	56.03	S	109	59.16	E	0.29	0.03
FS018	2000/12/08	5:04	55	42.96	S	109	59.27	E	0.67	0.05
FS019	2000/12/08	8:59	56	13.12	S	110	0.26	E	0.70	0.07
FS020	2000/12/08	13:22	57	4.52	S	109	59.30	E	0.75	0.05
FS021	2000/12/09	0:04	59	9.07	S	110	0.09	E	0.32	0.02
FS022	2000/12/09	4:56	59	17.03	S	109	27.13	E	0.36	0.03
FS023	2000/12/09	8:58	59	21.19	S	107	44.76	E	0.31	0.03
FS024	2000/12/09	13:02	59	25.12	S	105	59.20	E	0.28	0.02
FS025	2000/12/10	0:06	59	36.47	S	100	57.09	E	0.47	0.03
FS026	2000/12/10	4:52	59	41.99	S	98	51.66	E	0.53	0.05
FS027	2000/12/10	9:00	59	43.72	S	97	0.09	E	0.60	0.04
FS028	2000/12/10	13:00	59	44.36	S	95	13.99	E	0.64	0.04
FS029	2000/12/11	1:57	59	44.87	S	89	22.05	E	0.81	0.06
FS030	2000/12/11	5:57	59	45.63	S	87	34.36	E	0.79	0.07
FS031	2000/12/11	10:09	59	52.64	S	85	50.82	E	0.63	0.05
Syowa Station, Antarctica										

Table 1-3. (Continued)

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
SS001	2001/02/27	13:15	65	5.34	S	52	51.22	E	0.39	0.18
SS002	2001/02/27	17:10	65	2.49	S	53	30.01	E	0.37	0.08
SS003	2001/02/28	4:02	64	4.54	S	55	34.97	E	0.27	0.04
SS004	2001/02/28	8:04	64	56.32	S	57	3.83	E	0.29	0.05
SS005	2001/02/28	11:58	64	59.77	S	58	39.20	E	0.23	0.04
SS006	2001/02/28	16:00	65	0.13	S	60	34.93	E	0.27	0.05
SS007	2001/03/01	4:02	65	0.62	S	66	23.97	E	0.33	0.06
SS008	2001/03/01	8:00	64	59.46	S	68	13.47	E	0.28	0.05
SS009	2001/03/01	12:00	65	0.77	S	69	52.65	E	0.21	0.02
SS010	2001/03/01	16:10	65	37.96	S	71	14.84	E	0.31	0.05
SS011	2001/03/02	3:00	67	1.81	S	74	7.52	E	0.37	0.07
SS012	2001/03/02	8:05	67	6.09	S	75	59.02	E	0.36	0.06
SS013	2001/03/02	11:05	67	22.44	S	76	0.08	E	0.50	0.08
SS014	2001/03/02	15:00	66	58.10	S	76	10.91	E	0.28	0.04
SS015	2001/03/03	3:01	64	2.68	S	75	57.57	E	0.20	0.04
SS016	2001/03/03	7:00	63	5.61	S	75	40.16	E	0.11	0.01
SS017	2001/03/03	11:00	62	15.51	S	76	3.21	E	0.16	0.01
SS018	2001/03/03	15:00	61	7.42	S	75	59.98	E	0.13	0.01
SS019	2001/03/04	3:18	61	19.77	S	80	0.02	E	0.63	0.06
SS020	2001/03/04	7:08	61	17.67	S	80	0.26	E	0.54	0.04
SS021	2001/03/04	11:00	61	31.11	S	80	0.14	E	1.20	0.03
SS022	2001/03/04	15:00	62	12.38	S	79	58.42	E	0.93	0.06
SS023	2001/03/05	2:59	63	59.71	S	81	33.08	E	0.22	0.02
SS024	2001/03/05	7:00	63	21.61	S	81	59.93	E	0.22	0.02
SS025	2001/03/05	11:13	63	16.99	S	82	33.11	E	0.27	0.04
SS026	2001/03/05	15:04	64	0.06	S	82	54.85	E	0.19	0.02
SS027	2001/03/06	2:00	63	59.46	S	88	35.10	E	0.65	0.07
SS028	2001/03/06	6:02	63	59.85	S	90	38.16	E	0.30	0.03
SS029	2001/03/06	10:02	63	59.92	S	91	13.34	E	0.31	0.03
SS030	2001/03/06	14:00	63	59.72	S	92	59.96	E	0.17	0.02
SS031	2001/03/07	2:06	63	46.18	S	98	0.87	E	0.44	0.05
SS032	2001/03/07	6:00	63	36.13	S	99	37.09	E	0.17	0.01
SS033	2001/03/07	10:00	63	37.09	S	100	49.75	E	0.29	0.03
SS034	2001/03/07	14:00	63	28.63	S	102	33.39	E	0.19	0.01
SS035	2001/03/08	1:00	63	50.48	S	107	17.36	E	0.27	0.04
SS036	2001/03/08	5:00	63	57.17	S	109	2.06	E	0.15	0.01
SS037	2001/03/08	9:00	63	54.50	S	109	20.45	E	0.18	0.02
SS038	2001/03/08	13:00	63	56.91	S	111	27.66	E	0.22	0.02
SS039	2001/03/09	1:00	63	59.67	S	118	0.30	E	0.21	0.02
SS040	2001/03/09	5:00	63	59.85	S	120	10.91	E	0.27	0.04
SS041	2001/03/09	9:00	63	59.31	S	120	53.05	E	0.26	0.03
SS042	2001/03/09	13:00	64	0.01	S	123	16.18	E	0.26	0.04
SS043	2001/03/10	0:00	63	59.92	S	127	19.22	E	0.24	0.01
SS044	2001/03/10	4:00	63	59.95	S	129	41.61	E	0.24	0.03
SS045	2001/03/10	8:00	64	0.05	S	132	8.39	E	0.18	0.03
SS046	2001/03/10	12:00	64	0.03	S	134	30.78	E	0.20	0.03
SS047	2001/03/11	0:03	63	59.99	S	139	55.62	E	0.21	0.04
SS048	2001/03/11	3:00	63	57.94	S	140	3.14	E	0.20	0.03
SS049	2001/03/11	7:00	64	4.60	S	140	2.56	E	0.21	0.03
SS050	2001/03/11	11:00	64	9.42	S	138	2.65	E	0.17	0.02
SS051	2001/03/11	23:00	63	37.39	S	143	40.24	E	0.22	0.02
SS052	2001/03/12	3:00	62	36.48	S	143	40.45	E	0.17	0.01
SS053	2001/03/12	7:05	62	27.77	S	144	60.00	E	0.19	0.02
SS054	2001/03/12	11:07	63	30.75	S	145	0.09	E	0.31	0.04
SS055	2001/03/12	22:00	63	59.83	S	148	50.11	E	0.23	0.03
SS056	2001/03/13	2:10	63	53.26	S	149	59.78	E	0.13	0.02
SS057	2001/03/13	6:11	63	51.02	S	150	7.12	E	0.15	0.02
SS058	2001/03/13	10:00	63	8.41	S	150	0.13	E	0.21	0.02

Table 1-3. (Continued)

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
SS059	2001/03/13	22:01	60	55.52	S	150	0.08	E	0.30	0.03
SS060	2001/03/14	2:02	60	11.08	S	150	0.05	E	0.23	0.03
SS061	2001/03/14	6:40	59	51.86	S	149	56.34	E	0.28	0.04
SS062	2001/03/14	10:00	59	17.47	S	149	59.88	E	0.18	0.02
SS063	2001/03/14	22:00	57	20.01	S	150	0.54	E	0.33	0.04
SS064	2001/03/15	2:00	56	39.46	S	149	57.93	E	0.19	0.03
SS065	2001/03/15	6:00	56	23.33	S	150	8.24	E	0.34	0.08
SS066	2001/03/15	10:00	55	43.90	S	149	59.98	E	0.27	0.04
SS067	2001/03/15	22:00	53	2.34	S	149	59.44	E	0.28	0.06
SS068	2001/03/16	2:00	52	2.82	S	150	1.55	E	0.40	0.16
SS069	2001/03/16	6:00	51	45.75	S	150	6.37	E	0.36	0.14
SS070	2001/03/16	10:00	50	41.29	S	149	59.15	E	0.28	0.10
SS071	2001/03/16	22:06	48	18.71	S	149	59.29	E	0.44	0.19
SS072	2001/03/17	2:01	47	29.53	S	149	59.98	E	0.54	0.24
SS073	2001/03/17	6:03	46	44.30	S	149	59.94	E	0.46	0.23

Sydney, Australia

Table 1-4. Chlorophyll *a* and pheopigments concentration of surface water pumped up from hull during JARE-43.

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
Syowa Station, Antarctica										
SS01	2002/2/16	9:13	64	46.45	S	48	7.00	E	0.33	0.05
SS02	2002/2/16	13:32	63	58.88	S	50	16.44	E	0.32	0.03
SS03	2002/2/17	5:23	63	14.17	S	60	11.82	E	0.13	0.00
SS04	2002/2/17	9:01	63	5.32	S	62	10.00	E	0.11	0.01
SS05	2002/2/17	13:02	62	56.21	S	64	17.72	E	0.13	0.01
SS06	2002/2/17	16:53	62	47.41	S	66	18.29	E	0.12	0.01
SS07	2002/2/18	4:03	62	0.85	S	71	48.32	E	0.28	0.03
SS08	2002/2/18	8:15	61	29.51	S	73	42.94	E	0.28	0.03
SS09	2002/2/18	15:59	60	31.54	S	77	7.82	E	0.44	0.06
SS10	2002/2/19	3:05	59	10.80	S	81	52.62	E	0.48	0.08
SS11	2002/2/19	7:06	58	44.24	S	83	35.21	E	0.28	0.04
SS12	2002/2/19	10:56	58	19.94	S	85	16.20	E	0.24	0.04
SS13	2002/2/19	14:55	57	55.69	S	86	55.87	E	0.24	0.04
SS14	2002/2/20	2:01	56	57.70	S	91	36.01	E	0.22	0.03
SS15	2002/2/20	5:59	56	41.11	S	93	18.91	E	0.17	0.02
SS16	2002/2/20	9:59	56	18.59	S	95	2.78	E	0.39	0.08
SS17	2002/2/20	13:57	55	55.90	S	96	49.23	E	0.21	0.02
SS18	2002/2/21	2:06	53	39.55	S	98	48.65	E	0.29	0.06
SS19	2002/2/21	5:55	52	54.87	S	99	14.92	E	0.32	0.07
SS20	2002/02/21	9:57	52	24.77	S	100	35.37	E	0.48	0.13
SS21	2002/02/21	13:59	51	31.22	S	101	4.20	E	0.30	0.06
SS22	2002/02/22	1:00	49	11.70	S	103	9.29	E	0.21	0.05
SS23	2002/02/22	5:08	48	20.10	S	103	52.55	E	0.40	0.14
SS24	2002/02/22	9:01	47	35.43	S	104	24.73	E	0.30	0.10
SS25	2002/02/22	13:05	46	54.91	S	104	55.58	E	0.23	0.08
SS26	2002/02/23	1:07	44	37.99	S	106	40.83	E	0.26	0.13
SS27	2002/02/23	5:00	43	54.15	S	107	16.99	E	0.42	0.13
SS28	2002/02/23	9:12	43	1.07	S	108	3.07	E	0.37	0.16
SS29	2002/02/23	12:39	42	13.59	S	108	33.07	E	0.28	0.11
SS30	2002/02/24	1:07	39	38.76	S	110	14.85	E	0.20	0.06
SS31	2002/02/24	5:06	38	56.97	S	110	44.22	E	0.18	0.04
SS32	2002/02/24	9:06	38	13.57	S	111	14.09	E	0.20	0.05
SS33	2002/02/27	4:02	37	51.73	S	112	25.39	E	0.18	0.06
SS34	2002/02/27	7:58	38	53.52	S	111	52.67	E	0.40	0.11
SS35	2002/02/28	1:00	43	19.75	S	109	26.36	E	0.67	0.17
SS36	2002/02/28	5:05	44	24.99	S	108	48.07	E	0.43	0.12
SS37	2002/02/28	9:18	45	30.83	S	108	11.68	E	0.39	0.14
SS38	2002/02/28	13:00	46	27.59	S	107	36.57	E	0.42	0.11
SS39	2002/03/01	1:00	49	0.00	S	105	56.08	E	0.26	0.06
SS40	2002/03/01	5:03	49	50.19	S	105	17.32	E	0.37	0.08
SS41	2002/03/01	12:42	51	19.23	S	104	27.10	E	0.40	0.06
SS42	2002/03/02	5:05	54	49.61	S	102	7.72	E	0.19	0.02
SS43	2002/03/02	9:06	55	38.64	S	101	14.43	E	0.18	0.02
SS44	2002/03/03	0:00	58	28.51	S	97	44.16	E	0.25	0.03
SS45	2002/03/03	5:11	59	27.68	S	96	25.50	E	0.30	0.03
SS46	2002/03/03	13:06	60	59.70	S	94	22.75	E	1.19	0.06
SS47	2002/03/04	0:05	63	10.57	S	91	14.51	E	0.61	0.14
SS48	2002/03/04	13:13	63	53.90	S	92	2.08	E	0.20	0.02
SS49	2002/03/05	1:19	63	57.89	S	97	57.68	E	0.50	0.14
SS50	2002/03/05	12:59	63	34.11	S	102	41.81	E	0.28	0.04
SS51	2002/03/06	2:08	63	35.16	S	108	53.91	E	0.35	0.03
SS52	2002/03/06	13:08	63	18.41	S	112	31.36	E	0.22	0.02
SS53	2002/03/07	2:07	63	20.95	S	118	12.26	E	0.32	0.04
SS54	2002/03/07	12:57	63	30.24	S	123	16.61	E	0.41	0.05
SS55	2002/03/09	0:13	64	59.29	S	139	10.13	E	0.20	0.04
SS56	2002/03/09	9:55	66	1.56	S	139	9.23	E	3.21	0.51

Table 1-4. (Continued)

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
SS57	2002/03/10	10:38	65	2.37	S	140	0.06	E	0.20	0.04
SS58	2002/03/11	7:41	63	5.21	S	140	1.66	E	0.17	0.03
SS59	2002/03/11	10:28	62	43.26	S	140	0.52	E	0.08	0.01
SS60	2002/03/12	9:25	61	59.04	S	143	12.34	E	0.08	0.01
SS61	2002/03/14	22:22	56	52.93	S	149	59.83	E	0.11	0.01
SS62	2002/03/15	22:26	53	0.24	S	150	0.08	E	0.65	0.15
SS63	2002/03/16	7:58	50	51.04	S	150	11.50	E	0.56	0.16
SS64	2002/03/16	22:00	47	50.46	S	150	0.15	E	0.89	0.27
SS65	2002/03/17	10:36	45	55.95	S	150	0.04	E	0.76	0.33

Sydney, Australia

Table 1-5. Chlorophyll *a* and pheopigments concentration of surface water pumped up from hull during JARE-44.

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* (mg m^{-3})	Pheo. (mg m^{-3})
Fremantle, Australia										
1	2002/12/4	0:00	35	11.20	S	112	53.48	E	0.20	0.07
2	2002/12/4	12:01	37	14.21	S	111	41.11	E	0.29	0.09
3	2002/12/5	1:00	39	31.21	S	110	17.89	E	0.18	0.06
4	2002/12/5	11:10	40	18.63	S	110	3.39	E	0.29	0.11
5	2002/12/6	1:00	43	29.43	S	109	59.95	E	0.31	0.09
7	2002/12/7	0:55	48	15.26	S	109	54.09	E	0.85	0.39
8	2002/12/7	11:02	49	47.99	S	109	58.04	E	0.54	0.12
9	2002/12/8	1:03	53	34.18	S	109	56.28	E	0.47	0.08
10	2002/12/8	11:00	55	48.72	S	109	53.21	E	0.29	0.05
11	2002/12/9	1:00	59	4.90	S	109	56.88	E	0.39	0.07
12	2002/12/9	11:51	59	59.54	S	109	9.77	E	0.50	0.04
13	2002/12/10	1:00	60	0.55	S	103	34.63	E	0.60	0.06
14	2002/12/10	11:00	59	59.19	S	99	13.62	E	0.56	0.06
15	2002/12/11	1:03	59	59.69	S	93	20.37	E	0.25	0.03
16	2002/12/11	11:00	59	59.84	S	89	6.54	E	0.67	0.09
17	2002/12/12	2:03	60	0.43	S	82	39.03	E	1.46	0.20
18	2002/12/12	12:09	60	0.32	S	78	21.78	E	1.05	0.15
19	2002/12/13	3:00	60	20.45	S	71	45.05	E	0.15	0.02
Syowa Station, Antarctica										
101	2003/2/23	15:06	66	21.19	S	49	39.86	E	0.93	0.19
102	2003/02/24	5:00	63	53.98	S	50	0.07	E	0.23	0.02
103	2003/02/24	14:58	65	43.05	S	49	59.82	E	0.68	0.12
104	2003/02/25	5:02	64	10.60	S	50	20.18	E	0.19	0.04
105	2003/02/25	15:02	65	22.80	S	50	40.25	E	0.44	0.09
106	2003/02/26	5:00	63	52.55	S	50	49.42	E	0.48	0.05
107	2003/02/26	15:00	64	59.95	S	50	7.05	E	0.25	0.02
108	2003/02/27	4:35	64	1.38	S	50	0.67	E	0.17	0.02
109	2003/02/27	14:55	64	0.03	S	53	43.71	E	0.36	0.02
110	2003/02/28	3:33	64	0.04	S	60	29.19	E	0.16	0.00
111	2003/02/28	14:00	64	0.07	S	63	54.40	E	0.12	0.02
112	2003/03/01	3:19	64	0.03	S	70	25.77	E	0.23	0.03
113	2003/03/01	14:06	65	37.64	S	70	39.02	E	0.44	0.08
114	2003/03/02	3:00	68	19.74	S	71	47.04	E	3.30	0.72
115	2003/03/02	13:00	68	29.36	S	73	8.34	E	2.12	0.43
116	2003/03/03	3:00	68	21.96	S	74	6.10	E	1.89	0.36
117	2003/03/03	13:00	66	50.25	S	74	19.12	E	0.44	0.09
118	2003/03/04	2:25	64	48.02	S	78	8.65	E	0.64	0.08
119	2003/03/04	12:56	63	59.11	S	82	4.71	E	0.52	0.11
120	2003/03/05	2:31	63	26.61	S	89	9.52	E	0.73	0.12
121	2003/03/05	12:45	62	20.23	S	92	14.73	E	0.20	0.02
122	2003/03/06	1:31	62	52.59	S	99	35.67	E	0,47	0.07
123	2003/03/06	11:49	62	59.77	S	103	50.41	E	0.93	0.11
124	2003/03/07	0:30	63	59.88	S	110	49.32	E	1.17	0.18
125	2003/03/07	11:00	63	59.85	S	112	30.70	E	0.83	0.11
126	2003/03/07	23:28	63	59.96	S	120	4.61	E	0.77	0.10
127	2003/03/08	9:53	64	0.01	S	121	52.44	E	0.74	0.10
128	2003/03/09	0:05	63	59.89	S	130	37.00	E	0.63	0.08
129	2003/03/09	9:58	64	0.01	S	131	44.70	E	0.26	0.03
130	2003/03/09	22:32	64	0.37	S	139	53.43	E	0.39	0.05
131	2003/03/10	9:00	65	33.68	S	139	28.31	E	0.36	0.06
132	2003/03/10	22:30	65	33.38	S	139	59.76	E	0.31	0.05
133	2003/03/11	9:48	65	5.17	S	139	56.76	E	0.50	0.08
134	2003/03/11	23:05	65	8.92	S	140	9.22	E	0.46	0.09
135	2003/03/13	1:41	64	58.23	S	140	22.17	E	0.33	0.06
136	2003/03/13	8:59	64	37.33	S	142	35.88	E	0.29	0.05
137	2003/03/13	22:00	63	48.04	S	148	41.24	E	0.29	0.05

Table 1-5. (Continued)

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
138	2003/03/14	8:03	61	45.81	S	150	5.11	E	0.26	0.04
139	2003/03/14	21:26	59	8.85	S	149	59.98	E	2.36	0.41
140	2003/03/15	8:00	56	59.36	S	149	55.07	E	0.74	0.17
141	2003/03/15	22:05	54	0.64	S	150	14.51	E	0.40	0.18
142	2003/03/16	8:00	51	51.29	S	150	36.45	E	0.36	0.10
143	2003/03/16	21:30	49	6.14	S	150	0.60	E	0.38	0.21
144	2003/03/17	8:00	47	30.95	S	150	24.66	E	0.86	0.39
145	2003/03/17	21:28	44	32.77	S	151	2.23	E	1.00	0.50
146	2003/03/18	7:46	43	13.46	S	151	15.06	E	1.68	0.69
147	2003/03/19	5:43	38	10.91	S	151	12.56	E	0.22	0.07
148	2003/03/19	8:00	37	37.58	S	151	10.69	E	0.24	0.09
149	2003/03/19	20:33	34	52.14	S	151	36.68	E	0.18	0.07

Sydney, Australia

Table 2-1. Chlorophyll *a* and pheopigments concentration of surface water sampled with bucket during JARE-40.

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
Tokyo, Japan										
TF-1	1998/11/17	22:55	14	34.21	N	130	14.16	E	0.05	0.02
TF-1	1998/11/17	22:55	14	34.21	N	130	14.16	E	0.06	0.01
TF-2	1998/11/18	6:55	12	40.80	N	129	25.53	E	0.06	0.01
TF-3	1998/11/18	22:55	8	59.04	N	127	51.12	E	0.16	0.05
TF-4	1998/11/19	6:55	6	56.75	N	127	0.53	E	0.11	0.03
TF-5	1998/11/19	22:50	4	4.16	N	124	3.04	E	0.55	0.05
TF-6	1998/11/20	6:50	2	55.64	N	122	24.62	E	0.26	0.03
TF-7	1998/11/20	22:50	0	36.38	N	119	35.46	E	0.98	0.13
TF-8	1998/11/21	8:20	1	34.48	S	118	54.07	E	0.21	0.02
TF-9	1998/11/21	22:50	4	49.79	S	117	32.93	E	0.24	0.09
TF-10	1998/11/22	6:50	6	31.60	S	116	36.90	E	0.37	0.06
TF-11	1998/11/22	22:50	10	6.03	S	115	27.61	E	0.14	0.05
TF-12	1998/11/23	6:50	11	53.60	S	115	7.84	E	0.36	0.17
TF-13	1998/11/23	22:50	15	42.13	S	114	26.69	E	0.16	0.07
TF-14	1998/11/24	6:50	17	36.64	S	114	5.26	E	0.10	0.03
TF-15	1998/11/24	22:45	21	8.84	S	113	25.66	E	0.12	0.03
TF-16	1998/11/25	6:45	22	44.79	S	113	6.80	E	0.56	0.20
TF-17	1998/11/25	22:50	26	16.96	S	112	49.86	E	0.14	0.05
TF-18	1998/11/26	6:45	28	0.21	S	113	20.95	E	0.82	0.30
TF-19	1998/11/26	22:45	31	17.83	S	114	55.15	E	0.19	0.06
Fremantle, Australia										
FS-1	1998/12/03	5:00	32	2.80	S	115	20.86	E	0.44	0.10
FS-2	1998/12/03	11:00	33	14.32	S	114	34.44	E	0.13	0.04
FS-3	1998/12/03	16:00	34	15.44	S	113	54.11	E	0.14	0.05
FS-4	1998/12/03	23:55	35	51.71	S	112	50.60	E	0.15	0.05
FS-5	1998/12/04	4:55	36	53.11	S	112	9.38	E	-	-
FS-6	1998/12/04	10:55	38	7.98	S	111	17.76	E	0.31	0.07
FS-7	1998/12/04	17:05	39	26.48	S	110	23.94	E	0.24	0.04
FS-8	1998/12/05	0:52	41	19.74	S	110	0.19	E	-	-
FS-9	1998/12/05	11:55	43	26.82	S	110	0.95	E	-	-
FS-10	1998/12/05	17:00	44	37.25	S	110	0.41	E	1.88	0.48
FS-11	1998/12/06	0:52	46	31.72	S	109	58.87	E	1.64	0.20
FS-12	1998/12/06	11:55	48	45.28	S	110	1.62	E	1.18	0.15
FS-13	1998/12/06	17:00	50	0.67	S	109	59.67	E	0.75	0.07
FS-14	1998/12/07	0:55	51	43.30	S	109	59.55	E	1.38	0.09
FS-15	1998/12/07	11:55	53	46.38	S	109	59.70	E	1.88	0.11
FS-16	1998/12/07	17:00	54	53.34	S	109	59.44	E	0.64	0.06
FS-17	1998/12/08	0:52	56	49.73	S	109	59.00	E	0.95	0.08
FS-18	1998/12/08	12:00	58	33.71	S	108	43.43	E	0.99	-0.12
FS-19	1998/12/08	17:00	59	16.51	S	107	5.49	E	0.32	0.00
FS-20	1998/12/09	6:00	60	0.11	S	102	5.36	E	0.28	0.04
FS-21	1998/12/09	11:55	59	59.48	S	98	49.66	E	0.48	-0.03
FS-22	1998/12/09	18:05	59	59.95	S	95	21.46	E	0.92	0.03
FS-23	1998/12/10	2:00	60	0.04	S	90	56.34	E	1.44	0.13
FS-24	1998/12/10	7:12	60	0.86	S	88	13.94	E	0.68	0.04
FS-25	1998/12/11	14:00	62	34.48	S	79	18.66	E	0.55	0.04
FS-26	1998/12/11	19:40	63	44.91	S	78	40.00	E	0.46	-0.05
FS-27	1998/12/12	2:55	65	14.22	S	77	48.88	E	0.92	0.09
FS-28	1998/12/17	14:05	62	45.94	S	74	28.80	E	0.40	0.03
FS-29	1998/12/17	14:30	62	43.41	S	74	21.36	E	0.37	0.07
FS-30	1998/12/17	19:05	62	18.15	S	73	10.06	E	-	-
FS-31	1998/12/18	2:50	61	50.15	S	70	22.97	E	-	-
FS-32	1998/12/18	7:55	61	33.65	S	68	4.86	E	-	-
FS-33	1998/12/18	13:50	61	28.54	S	65	31.64	E	-	-
FS-34	1998/12/18	20:00	61	33.04	S	63	0.71	E	-	-
FS-35	1998/12/19	4:00	61	50.26	S	59	34.86	E	-	-

Table 2-1. (Continued)

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
FS-36	1998/12/19	8:50	61	56.35	S	57	17.71	E	-	-
FS-37	1998/12/19	14:50	62	40.00	S	55	1.97	E	-	-
FS-38	1998/12/19	20:00	63	43.44	S	53	32.33	E	0.23	0.02
FS-39	1998/12/20	3:55	64	50.22	S	51	51.77	E	0.31	0.09
Syowa Station										
SS-1	1999/02/27	4:00	65	0.26	S	63	24.84	E	0.35	0.06
SS-2	1999/02/27	9:00	65	0.13	S	66	7.17	E	0.41	0.06
SS-3	1999/02/27	16:00	64	59.94	S	70	14.60	E	0.73	0.13
SS-4	1999/02/28	2:45	64	59.34	S	76	39.62	E	0.42	0.04
SS-5	1999/03/01	7:50	65	54.45	S	77	57.71	E	0.34	0.07
SS-6	1999/03/01	15:00	67	29.58	S	76	55.31	E	0.63	0.14
SS-7	1999/03/02	2:50	69	9.95	S	75	58.68	E	6.07	1.92
SS-8	1999/03/02	8:00	69	16.27	S	76	16.60	E	5.81	1.57
SS-9	1999/03/02	14:50	69	9.00	S	75	56.98	E	6.48	1.42
SS-10	1999/03/03	3:00	67	55.97	S	76	0.35	E	2.04	0.74
SS-11	1999/03/03	8:00	66	57.01	S	75	19.98	E	0.29	0.06
SS-12	1999/03/03	14:50	65	43.16	S	77	40.56	E	-	-
SS-13	1999/03/04	2:50	62	14.38	S	79	33.34	E	0.16	0.03
SS-14	1999/03/04	14:50	61	19.41	S	80	0.08	E	0.23	0.02
SS-15	1999/03/05	2:50	61	29.02	S	84	60.00	E	0.33	0.06
SS-16	1999/03/05	8:00	61	30.50	S	87	16.25	E	0.35	0.04
SS-17	1999/03/05	14:50	61	28.07	S	90	5.33	E	0.23	0.03
SS-18	1999/03/06	1:50	61	48.49	S	94	47.84	E	0.38	0.06
SS-19	1999/03/06	6:50	61	52.65	S	96	55.77	E	0.24	0.04
SS-20	1999/03/06	13:50	62	0.52	S	99	59.52	E	0.30	0.05
SS-21	1999/03/07	0:55	62	7.34	S	104	56.83	E	0.20	0.03
SS-22	1999/03/07	5:55	62	13.11	S	107	9.16	E	0.16	0.03
SS-23	1999/03/07	12:50	62	19.87	S	110	13.11	E	0.21	0.05
SS-24	1999/03/08	0:50	62	29.89	S	115	38.84	E	0.20	0.02
SS-25	1999/03/08	5:40	62	34.69	S	117	52.62	E	0.16	0.02
SS-26	1999/03/08	12:55	62	37.73	S	121	3.70	E	0.24	0.04
SS-27	1999/03/08	23:50	62	50.35	S	125	59.00	E	0.34	0.04
SS-28	1999/03/09	11:50	62	57.85	S	129	56.17	E	0.18	0.03
SS-29	1999/03/09	22:50	62	58.37	S	133	42.35	E	0.22	0.04
SS-30	1999/03/10	3:50	62	57.71	S	135	26.71	E	0.19	0.03
SS-31	1999/03/10	10:50	62	58.00	S	137	52.20	E	0.18	0.03
SS-32	1999/03/10	22:50	62	59.42	S	141	57.56	E	0.19	0.04
SS-33	1999/03/11	3:45	62	58.81	S	143	34.73	E	0.24	0.05
SS-34	1999/03/11	10:50	62	59.56	S	145	56.62	E	0.36	0.09
SS-35	1999/03/11	21:50	62	59.68	S	149	40.24	E	0.27	0.05
SS-36	1999/03/12	21:50	61	38.47	S	150	5.24	E	0.59	0.11
SS-37	1999/03/13	3:50	60	57.55	S	150	2.18	E	0.61	0.09
SS-38	1999/03/13	9:50	60	1.77	S	149	59.54	E	0.52	0.10
SS-39	1999/03/13	21:50	57	45.45	S	149	58.60	E	0.28	0.03
SS-40	1999/03/15	3:50	56	51.68	S	150	21.88	E	0.26	0.07
SS-41	1999/03/15	10:00	55	46.81	S	149	59.21	E	0.14	0.02
SS-42	1999/03/15	16:00	54	31.75	S	149	59.46	E	0.44	0.20
SS-43	1999/03/15	21:50	53	3.89	S	149	58.92	E	0.33	0.09
SS-44	1999/03/16	9:55	51	2.16	S	150	38.83	E	0.72	0.32
SS-45	1999/03/16	15:50	50	2.51	S	150	13.91	E	0.81	0.50
SS-46	1999/03/16	15:50	50	2.51	S	150	13.91	E	0.86	0.40
SS-47	1999/03/16	21:50	48	43.14	S	150	9.36	E	1.02	0.49
SS-48	1999/03/17	9:50	46	56.53	S	150	24.34	E	1.04	0.54
SS-49	1999/03/17	20:50	44	7.71	S	150	47.12	E	0.40	0.33
SS-50	1999/03/18	2:55	42	31.23	S	150	59.31	E	0.21	0.10
Sydney, Australia										

Table 2-2. Chlorophyll *a* and pheopigments concentration of surface water sampled with bucket during JARE-41.

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
Tokyo, Japan										
B1	1999/11/16	23:00	20	31.62	N	132	51.23	E	0.03	0.17
B2	1999/11/17	7:00	18	37.72	N	132	1.38	E	0.05	0.18
B3	1999/11/17	22:55	14	59.45	N	130	25.75	E	0.05	0.23
B4	1999/11/18	7:00	13	5.34	N	129	35.57	E	0.06	0.05
B5	1999/11/23	6:51	13	37.81	S	114	48.40	E	0.16	0.05
B6	1999/11/23	22:48	17	16.12	S	114	8.60	E	0.05	0.15
B7	1999/11/24	6:50	19	6.34	S	113	47.21	E	0.10	0.02
B8	1999/11/24	23:00	22	55.53	S	113	4.97	E	0.07	0.14
B9	1999/11/25	6:54	24	48.25	S	112	43.37	E	0.10	0.08
B10	1999/11/25	22:48	27	40.84	S	113	13.57	E	0.17	0.12
B11	1999/11/26	7:01	29	11.23	S	113	43.79	E	0.10	0.02
Fremantle, Australia										
B0001	1999/12/3	23:56	35	47.27	S	112	54.14	E	0.09	0.01
B0002	1999/12/4	11:57	38	14.80	S	111	23.88	E	0.13	0.15
B0003	1999/12/5	0:45	41	4.01	S	110	21.45	E	0.38	0.11
B0004	1999/12/5	13:00	42	40.07	S	110	0.16	E	0.43	0.05
B0005	1999/12/6	1:00	45	19.22	S	110	0.39	E	0.44	0.16
B0006	1999/12/6	13:00	46	56.47	S	110	4.13	E	0.33	0.08
B0008	1999/12/7	12:46	51	15.81	S	109	59.27	E	1.20	0.18
B0009	1999/12/8	0:55	53	59.20	S	.09	58.82	E	0.91	0.19
B0010	1999/12/8	12:58	55	52.92	S	.09	59.29	E	0.90	0.13
B0011	1999/12/09	0:46	58	35.10	S	.09	51.23	E	0.72	0.12
B0012	1999/12/09	13:00	59	52.18	S	.08	13.39	E	0.77	0.03
B0013	1999/12/10	1:01	60	4.38	S	.02	32.82	E	0.98	0.07
B0014	1999/12/10	13:00	60	16.93	S	97	44.65	E	1.28	0.49
B0015	1999/12/11	0:55	60	31.83	S	93	45.79	E	0.95	0.18
B0016	1999/12/11	13:00	60	41.78	S	89	33.41	E	2.19	0.52
B0017	1999/12/12	1:52	60	58.09	S	85	17.48	E	1.78	0.41
B0018	1999/12/12	13:52	61	0.13	S	80	52.06	E	2.93	0.82
B0019	1999/12/13	15:00	60	27.67	S	79	14.05	E	2.34	0.50
B0020	1999/12/14	2:52	60	1.19	S	74	18.17	E	2.42	0.58
B0021	1999/12/14	14:55	60	2.07	S	69	43.89	E	1.58	0.32
B0022	1999/12/15	2:59	60	16.31	S	64	46.37	E	1.02	0.19
B0023	1999/12/15	14:52	61	21.79	S	58	11.74	E	0.21	0.04
B0024	1999/12/16	3:45	62	15.25	S	51	50.69	E	0.14	0.03
B0025	1999/12/16	15:50	62	45.64	S	45	30.32	E	0.55	0.12
B0026	1999/12/17	5:01	62	28.85	S	39	14.36	E	0.95	0.20
B0027	1999/12/17	17:00	64	9.91	S	39	27.07	E	1.10	0.15
Syowa Station										
B0028	2000/02/17	16:55	66	45.84	S	38	59.94	E	1.37	0.12
B0029	2000/02/18	5:00	66	29.60	S	39	12.65	E	1.66	0.20
B0030	2000/02/18	17:00	66	16.26	S	39	27.24	E	0.68	0.06
B0031	2000/02/19	4:58	66	34.51	S	40	60.00	E	1.08	0.11
B0032	2000/02/19	17:00	66	33.90	S	42	20.08	E	2.53	0.29
B0033	2000/02/20	5:00	66	37.61	S	43	20.33	E	2.24	0.27
B0034	2000/02/20	17:00	66	31.39	S	44	20.04	E	1.05	0.13
B0035	2000/02/21	5:00	66	19.97	S	48	11.06	E	1.69	0.25
B0036	2000/02/24	17:00	65	2.10	S	58	29.82	E	0.43	0.06
B0037	2000/02/25	3:50	65	19.54	S	65	23.07	E	0.45	0.09
B0038	2000/02/25	15:52	65	58.44	S	73	4.77	E	0.55	0.06
B0039	2000/03/03	13:55	62	59.16	S	89	14.87	E	3.26	0.62
B0040	2000/03/04	1:55	63	1.54	S	90	2.24	E	1.72	0.30
B0041	2000/03/04	13:55	63	0.88	S	94	13.70	E	0.57	0.08
B0042	2000/03/05	1:52	62	58.97	S	98	25.13	E	0.48	0.10
B0043	2000/03/05	14:00	63	0.12	S	102	31.88	E	0.26	0.05
B0044	2000/03/06	1:00	62	59.78	S	106	31.90	E	0.36	0.06

Table 2-2. (Continued)

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
B0045	2000/03/06	13:00	64	14.84	S	106	12.96	E	0.43	0.07
B0046	2000/03/07	0:55	62	59.76	S	108	59.14	E	0.83	0.15
B0047	2000/03/07	13:00	62	59.99	S	114	27.88	E	0.59	0.08
B0048	2000/03/08	0:00	63	0.36	S	119	21.97	E	0.30	0.05
B0049	2000/03/08	11:55	62	59.42	S	124	14.79	E	0.21	0.03
B0050	2000/03/09	0:00	62	59.94	S	129	51.29	E	0.16	0.03
B0051	2000/03/09	12:00	62	59.38	S	134	24.41	E	0.16	0.04
B0052	2000/03/09	22:55	63	0.32	S	137	56.99	E	0.21	0.05
B0053	2000/03/10	10:55	63	0.72	S	142	9.59	E	0.27	0.05
B0054	2000/03/10	22:50	62	59.50	S	146	27.41	E	0.50	0.14
B0055	2000/03/12	9:52	62	9.85	S	150	0.39	E	0.23	0.04
B0056	2000/03/12	22:00	60	20.46	S	149	59.87	E	0.27	0.06
B0057	2000/03/13	9:55	58	52.89	S	149	59.34	E	0.23	0.05
B0058	2000/03/13	21:52	57	16.81	S	149	59.57	E	0.20	0.06
B0059	2000/03/14	21:50	53	22.02	S	149	59.23	E	0.49	0.24
B0060	2000/03/15	9:55	51	17.53	S	150	3.92	E	0.37	0.20
B0061	2000/03/15	21:54	48	51.30	S	149	59.00	E	0.38	0.18
B0062	2000/03/16	9:55	46	39.38	S	149	59.97	E	0.81	0.37
B0063	2000/03/16	21:55	43	22.21	S	150	19.04	E	0.70	0.32
B0064	2000/03/17	9:55	40	27.42	S	150	53.22	E	0.32	0.12
B0065	2000/03/17	21:55	38	7.35	S	151	21.70	E	0.27	0.14
B0066	2000/03/18	9:55	35	49.78	S	151	45.23	E	0.23	0.09

Sydney, Australia

Table 2-3. Chlorophyll *a* and pheopigments concentration of surface water sampled with bucket during JARE-42.

	Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
Tokyo, Japan											
	Sat001	2000/11/17	2:58	18	55.83	N	132	8.51	E	0.07	0.02
	Sat002	2000/11/17	6:50	17	57.92	N	131	42.86	E	0.07	0.03
	Sat003	2000/11/22	22:50	13	10.50	S	114	42.90	E	0.09	0.04
	Sat004	2000/11/23	6:50	14	52.39	S	114	19.61	E	0.10	0.04
	Sat005	2000/11/23	22:47	18	32.48	S	113	29.36	E	0.09	0.03
	Sat006	2000/11/24	6:48	20	14.95	S	113	4.95	E	0.09	0.02
	Sat007	2000/11/24	22:47	23	14.89	S	112	31.96	E	0.12	0.04
	Sat008	2000/11/25	6:48	24	46.82	S	112	17.05	E	0.32	0.03
	Sat009	2000/11/25	22:47	27	40.29	S	112	58.52	E	0.12	0.04
	Sat010	2000/11/26	6:48	29	13.64	S	113	34.12	E	0.11	0.03
Fremantle, Australia											
	Sat011	2000/12/4	7:48	37	13.64	S	112	22.95	E	0.67	0.15
	Sat012	2000/12/5	0:48	40	30.37	S	110	31.52	E	0.61	0.16
	Sat013	2000/12/6	0:48	45	29.32	S	109	58.00	E	0.57	0.20
	Sat014	2000/12/7	0:48	50	22.06	S	110	0.87	E	0.64	0.09
	Sat015	2000/12/8	0:48	54	54.65	S	109	59.07	E	0.22	0.03
	Sat016	2000/12/10	1:00	59	37.62	S	100	36.96	E	0.49	0.03
	Sat017	2000/12/10	5:48	59	42.34	S	98	26.38	E	0.70	0.03
	Sat018	2000/12/10	8:50	59	43.72	S	97	3.90	E	0.63	0.04
	Sat019	2000/12/11	1:48	59	44.90	S	89	24.91	E	0.82	0.04
Syowa Station, Antarctica											

Table 2-4. Chlorophyll *a* and pheopigments concentration of surface water sampled with bucket during JARE-43.

Sample #	Date (GMT)	Time (GMT)	Latitude Degrees	Minutes		Longitude Degrees	Minutes		Chl.*a* ($mg\ m^{-3}$)	Pheo. ($mg\ m^{-3}$)
Syowa Station, Antarctica										
SW-01	2002/2/16	7:17	65	8.53	S	47	10.48	E	0.37	0.04
SW-02	2002/2/16	9:45	64	39.85	S	48	21.68	E	0.33	0.05
SW-03	2002/2/17	7:34	63	8.71	S	61	22.91	E	0.10	0.01
SW-04	2002/2/17	9:25	63	4.42	S	62	22.71	E	0.09	0.01
SW-05	2002/2/18	5:00	61	53.86	S	72	13.82	E	0.36	0.04
SW-06	2002/2/18	6:35	61	42.06	S	72	57.27	E	0.37	0.02
SW-07	2002/2/19	5:34	58	53.80	S	82	55.01	E	0.27	0.03
SW-08	2002/2/19	8:40	58	33.81	S	84	15.24	E	0.91	0.15
SW-09	2002/2/20	4:43	56	44.20	S	92	46.26	E	0.16	0.02
SW-10	2002/2/20	7:32	56	30.37	S	93	57.85	E	0.18	0.02
SW-11	2002/2/21	4:35	53	10.16	S	99	15.10	E	0.35	0.09
SW-12	2002/2/21	7:50	52	42.32	S	99	54.29	E	0.35	0.08
SW-13	2002/2/22	3:32	48	40.04	S	103	35.92	E	0.31	0.06
SW-14	2002/2/22	6:40	48	1.19	S	104	5.79	E	0.30	0.09
SW-15	2002/2/23	3:33	44	11.67	S	106	59.89	E	0.39	0.16
SW-16	2002/2/23	6:36	43	34.88	S	107	36.13	E	0.50	0.15
SW-17	2002/2/24	3:34	39	13.05	S	110	33.13	E	0.33	0.10
SW-18	2002/2/24	6:39	38	40.27	S	110	55.75	E	0.20	0.05
SW-19	2002/2/25	3:40	34	54.48	S	113	29.04	E	0.10	0.02
SW-20	2002/2/25	6:35	34	26.83	S	113	47.40	E	0.10	0.03
SW-21	2002/2/27	2:35	37	28.91	S	112	37.16	E	0.15	0.05
SW-22	2002/2/27	5:33	38	15.29	S	112	12.97	E	0.14	0.03
SW-23	2002/02/28	3:40	44	2.46	S	109	1.91	E	0.21	0.06
SW-24	2002/02/28	6:38	44	49.41	S	108	33.71	E	0.42	0.10
SW-25	2002/03/01	3:35	49	35.42	S	105	36.48	E	0.27	0.05
SW-26	2002/03/01	6:40	50	12.46	S	105	11.00	E	0.32	0.07
SW-27	2002/03/02	3:35	54	29.41	S	102	21.97	E	0.20	0.01
SW-28	2002/03/02	6:31	55	8.07	S	101	50.63	E	0.25	0.01
SW-29	2002/03/03	3:35	59	8.82	S	96	50.29	E	0.24	0.04
SW-30	2002/03/03	6:36	59	44.62	S	96	4.26	E	0.29	0.03
SW-31	2002/03/04	3:32	63	46.91	S	90	20.34	E	0.26	0.05
SW-32	2002/03/05	3:30	63	36.74	S	98	40.95	E	0.68	0.09
SW-33	2002/03/06	3:37	63	33.89	S	109	41.43	E	0.27	0.03
SW-34	2002/03/07	3:35	63	20.67	S	118	53.89	E	0.28	0.05
SW-35	2002/03/08	2:33	63	56.23	S	129	55.75	E	0.28	0.04
SW-36	2002/03/09	1:34	65	15.48	S	139	29.84	E	0.25	0.04
SW-37	2002/03/09	3:45	65	46.33	S	139	30.45	E	0.21	0.04
SW-38	2002/03/13	0:36	63	52.71	S	149	35.22	E	0.09	0.02
SW-39	2002/03/14	0:35	59	40.58	S	149	59.55	E	0.08	0.02
SW-40	2002/03/15	0:34	56	35.29	S	150	0.20	E	0.08	0.01
SW-41	2002/03/16	3:02	51	59.31	S	150	17.57	E	0.69	0.28
SW-42	2002/03/17	0:33	47	12.79	S	150	0.07	E	0.77	0.30
Sydney, Australia										

Table 3-1. Vertical profile of chlorophyll *a* and pheopigments concentration during JARE-40. ND indicates no data.

Station	Date	Position	Depth (m)	Chl*a* ($mg\,m^{-3}$)	Phaeo ($mg\,m^{-3}$)
1	1998/12/5	42 - 32.80 S	0	ND	ND
		110 - 0.40 E	10	0.26	0.05
			20	ND	ND
			30	ND	ND
			50	ND	ND
			75	0.41	0.36
			100	ND	ND
			125	0.24	0.20
			150	0.10	0.08
			200	0.02	0.03
2	1998/12/6	47 - 42.70 S	0	0.17	0.06
		110 - 1.30 E	10	ND	ND
			20	ND	ND
			30	ND	ND
			50	0.30	0.33
			75	ND	ND
			100	ND	ND
			125	ND	ND
			150	ND	ND
			200	0.05	0.04
3	1998/12/7	52 - 54.50 S	0	0.69	0.19
		110 - 0.90 E	10	ND	ND
			20	0.64	0.24
			30	ND	ND
			50	ND	ND
			75	ND	ND
			100	ND	ND
			125	ND	ND
			150	ND	ND
			200	ND	ND
4	1998/12/8	58 - 1.30 S	0	0.72	0.09
		110 - 0.70 E	10	ND	ND
			20	0.65	0.13
			30	ND	ND
			50	0.53	0.19
			75	0.14	0.08
			100	ND	ND
			125	0.13	0.10
			150	0.09	0.06
			200	ND	ND
5	1998/12/9	59 - 59.10 S	0	0.24	0.02
		103 - 53.70 E	10	0.22	0.03
			20	0.24	0.01
			30	0.23	0.03
			50	0.30	0.02
			75	0.38	0.06
			100	0.28	0.23
			125	0.23	0.14
			150	0.10	0.07
			200	0.02	0.02
A	1998/12/10	59 - 59.40 S	0	1.76	0.12
		86 - 0.00 E	10	1.80	0.08
			20	1.78	0.05
			30	ND	ND
			50	1.41	0.26
			75	1.20	0.34
			100	0.17	0.12
			125	0.10	0.09
			150	0.07	0.07
			200	0.03	0.04
B	1998/12/11	61 - 18.06 S	0	1.34	0.22
		80 - 7.62 E	10	1.79	0.20
			20	1.44	0.13
			30	1.30	0.19
			50	1.51	0.20
			75	0.50	0.15
			100	0.30	0.12
			125	ND	ND
			150	ND	ND
			200	ND	ND
7	1999/2/28	65 - 7.68 S	0	1.03	ND
		77 - 25.23 E	25	1.15	ND
			50	1.06	ND
			75	0.46	ND
			100	0.07	ND
			150	0.03	ND
			200	0.01	ND
B	1999/3/4	61 - 17.90 S	0	0.25	0.03
		80 - 3.50 E	10	0.24	0.03
			20	0.24	0.02
			30	0.22	0.01
			50	0.26	0.04
			75	0.44	0.15
			100	0.06	0.04
			125	0.02	0.03
			150	0.02	0.02
			200	0.00	0.02
8	1999/3/9	62 - 55.01 S	0	0.32	0.05
		128 - 16.33 E	10	0.31	0.03
			20	0.30	0.03
			30	0.31	0.04
			50	0.35	0.05
			75	0.47	0.15
			100	0.14	0.09
			125	0.04	0.04
			150	0.02	0.03
			200	0.02	0.03
10	1999/3/14	57 - 27.40 S	0	0.06	ND
		150 - 13.80 E	25	0.10	ND
			50	0.19	ND
			75	0.56	ND
			100	0.10	ND
			150	0.02	ND
			200	0.01	ND
11	1999/3/16	51 - 57.30 S	0	0.64	0.30
		150 - 2.90 E	10	0.46	0.35
			20	0.48	0.30
			30	0.49	0.28
			50	0.44	0.29
			75	0.45	0.27
			100	0.27	0.20
			125	0.08	0.07
			150	0.07	0.08
			200	0.01	0.04
12	1999/3/17	47 - 50.00 S	0	1.09	0.55
		150 - 4.50 E	10	0.97	0.40
			20	0.14	2.49
			30	1.02	0.47
			50	1.07	0.52
			75	1.07	0.49
			100	0.13	0.20
			125	0.09	0.14
			150	0.03	0.06
			200	0.02	0.05

Table 3-2. Vertical profile of chlorophyll *a* and pheopigments concentration during JARE-41. ND indicates no data.

Station	Date	Position	Depth (m)	Chl.*a* (mg m^{-3})	Phaeo (mg m^{-3})
1	1999/12/5	42 - 5.40 S	0	0.46	0.06
		109 - 59.46 E	10	0.44	0.08
			20	0.42	0.08
			30	0.47	0.09
			50	0.65	0.35
			75	0.61	0.62
			100	0.12	0.08
			125	0.06	0.05
			150	ND	ND
			200	ND	ND
2	1999/12/6	46 - 20.59 S	0	0.23	0.04
		110 - 0.48 E	10	0.23	0.04
			20	0.20	0.05
			30	0.26	0.05
			50	0.22	0.04
			75	0.34	0.09
			100	0.29	0.18
			125	0.32	0.28
			150	0.23	0.21
			200	0.05	0.08
3	1999/12/7	50 - 30.96 S	0	2.49	0.09
		109 - 58.03 E	10	2.14	0.23
			20	2.20	0.27
			30	1.94	0.27
			50	1.82	0.28
			75	0.98	0.14
			100	0.92	0.26
			125	0.21	0.23
			150	0.66	0.33
			200	0.06	0.09
4	1999/12/8	55 - 3.74 S	0	0.66	0.10
		109 - 59.64 E	10	0.64	0.11
			20	0.67	0.10
			30	0.60	0.10
			50	0.66	0.11
			75	0.76	0.11
			100	0.43	0.16
			125	0.13	0.14
			150	0.04	0.07
			200	0.05	0.05
5	1999/12/9	59 - 44.27 S	0	0.84	0.09
		109 - 52.32 E	10	0.76	0.08
			20	0.76	0.09
			30	0.67	0.11
			50	0.58	0.24
			75	0.73	0.13
			100	0.31	0.18
			125	0.12	0.09
			150	0.05	0.05
			200	0.03	0.03
6-1	1999/12/13	61 - 22.22 S	0	4.40	0.06
		80 - 0.77 E	10	4.49	0.45
			20	4.14	0.70
			30	3.80	0.75
			50	1.67	0.49
			75	0.17	0.12
			100	0.08	0.07
			125	0.03	0.05
			150	ND	ND
			200	ND	ND
7	1999/12/17	62 - 20.68 S	0	1.28	0.16
		38 - 58.86 E	10	1.23	0.16
			20	1.40	0.23
			30	1.38	0.19
			50	0.67	0.26
			75	0.27	0.18
			100	0.19	0.13
			125	0.11	0.07
			150	ND	ND
			200	ND	ND
8	2000/2/17	67 - 20.81 S	0	1.44	0.21
		38 - 58.29 E	10	0.95	0.16
			20	1.08	0.14
			30	0.92	0.11
			50	0.55	0.34
			75	0.38	0.29
			100	0.28	0.18
			125	0.15	0.14
			150	0.10	0.09
			200	0.11	0.10
9Night	2000/2/17	66 - 35.68 S	0	1.40	0.25
		38 - 56.24 E	10	1.68	0.24
			20	1.81	0.23
			30	1.71	0.35
			50	1.46	0.59
			75	0.76	0.28
			100	0.22	0.17
			125	0.17	0.12
			150	0.08	0.08
			200	0.09	0.11
9Day	2000/2/18	66 - 37.57 S	0	1.71	0.22
		38 - 52.84 E	10	1.86	0.24
			20	1.72	0.22
			30	2.45	0.56
			50	0.69	0.39
			75	0.40	0.22
			100	0.23	0.18
			125	0.15	0.11
			150	0.08	0.08
			200	0.08	0.08
10	2000/2/18	65 - 47.95 S	0	0.96	0.17
		38 - 57.51 E	10	1.15	0.09
			20	1.20	0.11
			30	1.05	0.24
			50	0.75	0.21
			75	0.39	0.17
			100	0.24	0.13
			125	0.17	0.10
			150	0.11	0.07
			200	0.04	0.05
6-2	2000/3/1	61 - 19.21 S	0	0.89	0.47
		80 - 1.39 E	10	1.23	0.33
			20	1.05	0.39
			30	1.11	0.26
			50	0.95	0.44
			75	0.13	0.12
			100	0.08	0.07
			125	0.06	0.06
			150	0.04	0.04
			200	0.02	0.03
11	2000/3/12	62 - 35.93 S	0	0.25	0.04
		150 - 0.31 E	10	0.23	0.05
			20	0.21	0.04
			30	0.19	0.03
			50	0.21	0.04
			75	0.17	0.08
			100	0.18	0.09
			125	0.04	0.04
			150	0.02	0.03
			200	0.02	0.04
12	2000/3/13	59 - 38.86 S	0	0.22	0.05
		149 - 57.60 E	10	0.20	0.04
			20	0.20	0.04
			30	0.20	0.04
			50	0.20	0.04
			75	0.24	0.08
			100	0.21	0.07
			125	0.12	0.05
			150	0.04	0.03
			200	0.02	0.02
13	2000/3/14	56 - 35.05 S	0	0.24	0.04
		149 - 59.71 E	10	0.26	0.05
			20	0.26	0.07
			30	0.29	0.05
			50	0.29	0.06
			75	0.25	0.06
			100	0.29	0.08
			125	0.30	0.08
			150	0.25	0.13
			200	0.06	0.09
14	2000/3/15	52 - 17.59 S	0	0.44	0.13
		149 - 59.50 E	10	0.39	0.12
			20	0.36	0.12
			30	0.39	0.11
			50	0.39	0.13
			75	0.38	0.13
			100	0.38	0.14
			125	0.37	0.14
			150	0.02	0.02
			200	0.01	0.03

Table 3-2. (Continued)

Station	Date	Position	Depth (m)	Chl*a* (mg m^{-3})	Phaeo (mg m^{-3})
15	2000/3/16	47 - 38.75 S	0	0.52	0.24
		150 - 0.83 E	10	0.53	0.24
			20	0.54	0.24
			30	0.55	0.24
			50	0.63	0.30
			75	0.62	0.33
			100	0.22	0.17
			125	0.18	0.16
			150	0.18	0.05
			200	0.02	0.03

Table 3-3. Vertical profile of chlorophyll *a* and pheopigments concentration during JARE-42. ND indicates no data.

Station	Date	Position	Depth (m)	Chl.*a* (mg m^{-3})	Phaeo (mg m^{-3})
1	2000/12/5	41 - 33.23 S 110 - 0.30 E	0	0.88	0.14
			10	0.84	0.20
			20	0.82	0.13
			30	0.80	0.13
			50	0.87	0.12
			75	0.78	0.12
			100	0.68	0.18
			125	0.12	0.05
			150	ND	ND
			200	ND	ND
2	2000/12/6	46 - 38.63 S 109 - 58.70 E	0	1.28	0.04
			10	1.18	0.08
			20	1.23	0.09
			30	1.22	0.09
			50	1.29	0.12
			75	1.31	0.11
			100	1.22	0.14
			125	0.11	0.12
			150	0.03	0.03
			200	0.06	0.06
3	2000/12/7	51 - 32.10 S 110 - 1.56 E	0	0.42	0.04
			10	0.45	0.02
			20	0.46	0.02
			30	0.44	0.06
			50	0.43	0.04
			75	0.62	0.11
			100	0.34	0.17
			125	0.11	0.05
			150	ND	ND
			200	ND	ND
4	2000/12/8	55 - 52.96 S 109 - 58.21 E	0	0.44	0.05
			10	0.81	0.06
			20	0.74	0.07
			30	0.77	0.05
			50	0.81	0.06
			75	0.66	0.08
			100	0.24	0.14
			125	0.17	0.09
			150	ND	ND
			200	ND	ND
5	2000/12/9	59 - 16.48 S 109 - 59.83 E	0	0.39	0.03
			10	0.35	0.03
			20	0.32	0.02
			30	0.36	0.02
			50	0.40	0.04
			75	0.54	0.09
			100	0.21	0.12
			125	0.09	0.04
			150	0.04	0.02
			200	0.01	0.01
6	2000/12/12	61 - 19.61 S 80 - 19.61 E	0	1.25	0.16
			10	1.15	0.12
			20	1.21	0.12
			30	1.17	0.15
			50	0.84	0.31
			75	0.44	0.22
			100	0.28	0.16
			125	0.11	0.07
			150	0.03	0.03
			200	0.03	0.03
13	2001/3/4	61 - 19.24 S 79 - 55.58 E	0	0.68	0.10
			10	0.64	0.05
			20	0.61	0.07
			30	0.60	0.06
			50	0.52	0.08
			75	0.31	0.20
			100	0.23	0.18
			125	0.15	0.09
			150	0.02	0.02
			200	0.01	0.02
18	2001/3/11	63 - 59.31 S 140 - 59.31 E	0	0.19	0.02
			10	0.25	0.05
			20	0.26	0.03
			30	0.29	0.02
			50	0.36	0.06
			75	0.50	0.18
			100	0.19	0.09
			125	0.05	0.04
			150	0.06	0.04
			200	0.01	0.02
19	2001/3/13	63 - 55.61 S 150 - 1.45 E	0	0.15	0.02
			10	0.16	0.02
			20	0.16	0.01
			30	0.16	0.02
			50	0.16	0.01
			75	0.33	0.11
			100	0.13	0.08
			125	0.07	0.04
			150	0.03	0.03
			200	0.01	0.02
20	2001/3/14	60 - 9.74 S 150 - 1.14 E	0	0.19	0.02
			10	0.22	0.02
			20	0.21	0.02
			30	0.20	0.03
			50	0.20	0.02
			75	0.56	0.17
			100	0.13	0.05
			125	0.05	0.03
			150	0.02	0.01
			200	0.02	0.02
21	2001/3/15	56 - 32.32 S 149 - 56.66 E	0	0.30	0.07
			10	0.30	0.09
			20	0.32	0.06
			30	0.31	0.06
			50	0.21	0.04
			75	0.32	0.05
			100	0.08	0.05
			125	0.04	0.03
			150	0.01	0.02
			200	0.00	0.02
22	2001/3/16	51 - 52.86 S 150 - 1.66 E	0	0.39	0.15
			10	0.39	0.14
			20	0.39	0.15
			30	0.39	0.17
			50	0.44	0.19
			75	0.39	0.22
			100	0.13	0.11
			125	0.04	0.04
			150	0.01	0.03
			200	0.01	0.02

Table 3-4. Vertical profile of chlorophyll *a* and pheopigments concentration during JARE-43. ND indicates no data.

Station	Date	Position	Depth (m)	Chl.*a* (mg m^{-3})	Phaeo (mg m^{-3})
10	2002/3/4	63 - 57.76 S	0	0.20	0.01
		90 - 14.44 E	10	0.18	0.05
			20	0.23	0.06
			30	0.20	0.03
			50	0.26	0.06
			75	0.51	0.15
			100	0.20	0.12
			125	0.13	0.08
			150	0.05	0.04
			200	0.02	0.02
11	2002/3/5	63 - 33.56 S	0	1.65	0.20
		100 - 1.73 E	10	1.88	0.17
			20	1.75	0.27
			30	1.62	0.26
			50	0.43	0.20
			75	0.17	0.13
			100	0.14	0.09
			125	0.07	0.06
			150	0.06	0.06
			200	ND	ND
12	2002/3/6	63 - 13.37 S	0	0.59	0.09
		110 - 28.62 E	10	0.58	0.05
			20	0.73	0.08
			30	0.81	0.09
			50	1.01	0.22
			75	0.36	0.19
			100	0.17	0.09
			125	0.07	0.06
			150	0.04	0.04
			200	0.18	0.08
14	2002/3/8	63 - 59.92 S	0	0.28	0.04
		130 - 40.56 E	10	0.28	0.04
			20	0.32	0.05
			30	0.28	0.04
			50	0.19	0.06
			75	0.20	0.07
			100	0.09	0.05
			125	0.06	0.05
			150	0.13	0.05
			200	0.34	0.05
15	2002/3/9	66 - 28.30 S	0	1.90	0.37
		140 - 3.14 E	10	1.89	0.44
			20	2.22	0.44
			30	1.96	0.48
			50	1.96	0.46
			75	1.86	0.44
			100	2.11	0.68
			125	2.07	0.55
			150	1.98	0.52
			200	1.92	0.52
16	2002/3/10	63 - 58.44 S	0	0.13	0.01
		140 - 0.47 E	10	0.11	0.01
			20	0.13	0.01
			30	0.10	0.01
			50	0.13	0.01
			75	0.22	0.06
			100	0.17	0.07
			125	0.11	0.05
			150	0.02	0.02
			200	0.01	0.02
17	2002/3/11	61 - 0.89 S	0	0.05	0.01
		139 - 58.32 E	10	0.05	0.01
			20	0.06	0.01
			30	0.05	0.01
			50	0.05	0.01
			75	0.06	0.01
			100	0.17	0.03
			125	0.16	0.04
			150	0.07	0.02
			200	0.01	0.01
18	2002/3/13	63 - 59.55 S	0	0.08	0.01
		149 - 59.50 E	10	0.09	0.01
			20	0.08	0.01
			30	0.08	0.01
			50	0.10	0.02
			75	0.16	0.03
			100	0.10	0.03
			125	0.03	0.02
			150	0.01	0.02
			200	0.01	0.02
19	2002/3/14	59 - 12.12 S	0	0.07	0.01
		150 - 0.40 E	10	0.07	0.01
			20	0.08	0.01
			30	0.09	0.02
			50	0.10	0.01
			75	0.19	0.03
			100	0.20	0.06
			125	0.13	0.04
			150	0.05	0.02
			200	0.02	0.02
20	2002/3/15	56 - 17.59 S	0	0.14	0.01
		149 - 58.24 E	10	0.15	0.01
			20	0.14	0.02
			30	0.12	0.02
			50	0.12	0.01
			75	0.10	0.05
			100	0.06	0.10
			125	0.03	0.07
			150	0.01	0.04
			200	0.01	0.03
22	2002/3/17	46 - 44.84 S	0	0.56	0.25
		149 - 57.27 E	10	0.58	0.26
			20	0.59	0.26
			30	0.53	0.26
			50	0.55	0.25
			75	0.51	0.24
			100	0.11	0.09
			125	0.03	0.04
			150	0.01	0.02
			200	0.01	0.02

Table 3-5. Vertical profile of chlorophyll *a* and pheopigments concentration during JARE-44. ND indicates no data.

Station	Date	Position	Depth (m)	Chl.*a* (mg m^{-3})	Phaeo (mg m^{-3})
1	2002/12/5	40 - 23.09 S	0	0.10	0.04
		110 - 0.69 E	10	0.10	0.06
			25	0.11	0.06
			50	0.26	0.17
			75	0.26	0.40
			100	0.26	0.08
			125	0.09	0.08
			150	0.05	0.06
			200	0.02	0.02
2	2002/12/6	44 - 32.16 S	0	0.30	0.12
		110 - 0.24 E	10	0.31	0.12
			25	0.32	0.16
			50	0.42	0.13
			75	ND	ND
			100	ND	ND
			125	0.26	0.19
			150	ND	ND
			200	ND	ND
3	2002/12/7	49 - 19.40 S	0	0.45	0.17
		109 - 50.65 E	10	0.49	0.20
			25	0.53	0.18
			50	0.45	0.17
			75	0.51	0.20
			100	0.51	0.20
			125	0.73	0.42
			150	2.18	1.39
			200	0.18	1.05
4	2002/12/8	54 - 51.29 S	0	0.22	0.04
		109 - 54.60 E	10	0.16	0.02
			25	0.23	0.05
			50	0.19	0.03
			75	ND	ND
			100	ND	ND
			125	ND	ND
			150	ND	ND
			200	ND	ND
5	2002/12/9	60 - 0.13 S	0	0.26	0.06
		109 - 42.06 E	10	0.24	0.05
			25	0.27	0.05
			50	0.31	0.07
			75	0.36	0.09
			100	0.04	0.05
			125	0.12	0.07
			150	0.32	0.13
			200	0.02	0.07
6	2003/2/27	63 - 59.22 S	0	0.09	0.02
		49 - 59.15 E	10	0.08	0.02
			25	0.15	0.02
			50	0.26	0.03
			75	ND	ND
			100	ND	ND
			125	0.22	0.13
			150	0.05	0.04
			200	0.01	0.02
7	2003/2/28	63 - 59.68 S	0	0.07	0.02
		60 - 34.44 E	10	0.06	0.01
			25	0.08	0.01
			50	0.16	0.03
			75	0.26	0.14
			100	0.24	0.14
			125	0.09	0.06
			150	0.02	0.03
			200	0.02	0.02
8	2003/3/1	64 - 0.83 S	0	0.12	0.03
		70 - 41.15 E	10	0.10	0.04
			25	0.11	0.03
			50	0.16	0.03
			75	0.21	0.10
			100	0.15	0.09
			125	0.07	0.05
			150	0.04	0.05
			200	0.01	0.03
9	2003/3/4	64 - 46.51 S	0	0.27	0.06
		78 - 14.75 E	10	0.22	0.04
			25	0.22	0.05
			50	ND	ND
			75	0.29	0.18
			100	0.15	0.12
			125	0.05	0.05
			150	0.05	0.04
			200	0.02	0.03
10	2003/3/5	63 - 25.21 S	0	0.69	0.18
		89 - 13.39 E	10	0.46	0.10
			25	0.54	0.11
			50	1.07	0.28
			75	0.33	0.16
			100	0.09	0.07
			125	0.07	0.13
			150	0.05	0.05
			200	0.05	0.05
11	2003/3/6	62 - 55.03 S	0	0.56	0.12
		99 - 40.15 E	10	0.41	0.07
			25	0.43	0.08
			50	0.46	0.24
			75	0.08	0.07
			100	0.04	0.05
			125	0.02	0.04
			150	0.04	0.04
			200	0.03	0.03
12	2003/3/7	64 - 0.50 S	0	0.94	0.22
		110 - 55.59 E	10	0.75	0.16
			25	0.97	0.15
			50	0.55	0.32
			75	0.29	0.21
			100	ND	ND
			125	0.08	0.07
			150	0.05	0.05
			200	0.02	0.04
13	2003/3/7	64 - 0.56 S	0	0.57	0.10
		120 - 8.88 E	10	0.68	0.13
			25	0.58	0.10
			50	0.36	0.11
			75	0.28	0.19
			100	ND	ND
			125	0.08	0.06
			150	0.05	0.05
			200	0.02	0.03
15	2003/3/9	63 - 59.71 S	0	0.33	0.07
		139 - 58.65 E	10	0.39	0.11
			25	0.34	0.07
			50	0.50	0.10
			75	0.72	0.31
			100	0.20	0.13
			125	0.07	0.03
			150	0.02	0.02
			200	0.01	0.01
16A	2003/3/10	65 - 33.14 S	0	0.20	0.03
		140 - 0.40 E	10	0.21	0.03
			25	0.23	0.05
			50	0.01	0.01
			75	0.49	0.28
			100	0.23	0.20
			125	0.11	0.08
			150	0.03	0.03
			200	0.02	0.04
19	2003/3/14	59 - 5.98 S	0	1.87	0.35
		150 - 0.75 E	10	1.13	0.32
			25	1.46	0.32
			50	ND	ND
			75	ND	ND
			100	ND	ND
			125	ND	ND
			150	ND	ND
			200	ND	ND

Table 3-5. (Continued)

Station	Date	Position	Depth (m)	Chl.*a* ($mg\ m^{-3}$)	Phaeo ($mg\ m^{-3}$)
21	2003/3/16	49 - 4.80 S	0	0.31	0.21
		150 - 2.56 E	10	0.33	0.21
			25	0.28	0.23
			50	0.33	0.29
			75	0.18	0.21
			100	0.07	0.07
			125	0.04	0.05
			150	0.01	0.04
			200	0.00	0.04
22	2003/3/17	44 - 30.01 S	0	1.12	0.46
		151 - 2.72 E	10	0.93	0.46
			25	1.03	0.44
			50	0.45	0.36
			75	0.12	0.13
			100	0.02	0.05
			125	0.01	0.03
			150	0.01	0.03
			200	0.00	0.03