

Supplementary Information:

Table A1 Concentrations of selected ions in different size ranges.

Set	Size range	Na ⁺	Cl ⁻	Ca ²⁺	SO ₄ ²⁻	MSA
	(μm)	(ng m^{-3})	(ng m^{-3})	(ng m^{-3})	(ng m^{-3})	(ng m^{-3})
S1	0.056-0.10	0.66	1.03	0.55	8.09	1.55
	0.10-0.18	1.20	2.07	0.98	19.84	2.22
	0.18-0.32	7.08	0.41	0.93	91.32	27.64
	0.32-0.56	15.61	1.94	1.03	85.25	29.77
	0.56-1.0	106.23	141.60	3.58	75.74	23.63
	1.0-1.8	403.96	593.10	10.06	118.27	16.66
	1.8-3.2	591.61	944.82	20.24	166.59	10.54
	3.2-5.6	1026.40	1643.58	28.71	278.57	7.43
	5.6-10	554.18	935.46	14.73	158.41	2.42
	10-18	200.48	327.91	7.83	52.54	1.09
S2	0.056-0.10	5.52	1.43	1.30	27.37	1.82
	0.10-0.18	1.89	2.63	1.82	59.58	2.30
	0.18-0.32	289.01	18.50	2.20	130.76	20.40
	0.32-0.56	16.03	1.59	2.08	95.35	35.27
	0.56-1.0	63.02	88.32	4.08	42.85	18.39
	1.0-1.8	631.32	389.82	6.31	113.11	13.50
	1.8-3.2	407.27	676.02	12.37	119.77	10.95
	3.2-5.6	689.04	1155.41	18.80	195.21	6.67
	5.6-10	390.68	673.45	14.89	106.98	2.46
	10-18	124.11	224.38	5.54	34.56	N.D.
S3	0.056-0.10	1.45	0.69	0.88	15.00	1.19
	0.10-0.18	3.59	4.99	1.63	85.40	5.07
	0.18-0.32	4.40	0.69	2.31	165.86	19.69
	0.32-0.56	9.72	0.80	4.71	95.38	15.78
	0.56-1.0	17.62	15.90	4.91	28.57	5.03
	1.0-1.8	24.96	20.47	3.44	22.71	5.55
	1.8-3.2	16.95	19.33	1.58	9.58	1.76
	3.2-5.6	26.56	40.88	1.63	11.26	1.35
	5.6-10	16.81	28.01	1.31	5.03	1.05
	10-18	5.33	8.42	0.88	1.76	N.D.
S4	0.056-0.10	1.89	1.39	0.92	43.93	1.39

	0.10-0.18	3.25	0.45	1.39	129.68	5.65
	0.18-0.32	6.61	N.D.	2.45	211.65	38.08
	0.32-0.56	66.55	4.18	1.36	172.13	61.40
	0.56-1.0	52.43	48.91	4.19	80.48	38.24
	1.0-1.8	185.66	288.18	6.50	71.27	20.45
	1.8-3.2	263.55	422.82	12.81	84.37	8.76
	3.2-5.6	410.63	659.74	17.06	127.08	6.32
	5.6-10	293.43	483.91	14.21	94.76	1.95
	10-18	90.44	158.60	4.71	31.88	N.D.
	0.056-0.10	1.66	0.37	0.75	60.71	2.26
	0.10-0.18	4.30	0.85	2.05	135.65	4.91
	0.18-0.32	12.54	1.74	4.78	231.79	30.09
	0.32-0.56	10.36	2.94	4.75	143.76	57.77
S5	0.56-1.0	79.50	91.38	4.97	121.69	53.46
	1.0-1.8	386.69	616.61	14.19	129.29	20.94
	1.8-3.2	336.33	548.21	15.94	114.37	7.07
	3.2-5.6	895.92	1415.99	39.89	289.78	9.68
	5.6-10	150.08	252.51	7.01	51.59	1.46
	10-18	217.90	366.84	7.58	66.92	1.39
	0.056-0.10	1.59	1.33	0.98	19.54	1.26
	0.10-0.18	3.71	0.71	0.81	56.84	4.15
	0.18-0.32	7.22	0.59	2.06	181.15	59.11
	0.32-0.56	13.99	2.50	1.96	173.32	92.06
S6	0.56-1.0	74.01	89.39	3.76	90.68	45.16
	1.0-1.8	222.38	349.07	8.35	71.84	13.16
	1.8-3.2	499.32	810.08	18.35	143.28	9.99
	3.2-5.6	741.18	1151.55	24.25	196.96	4.68
	5.6-10	702.28	1139.14	25.65	199.34	1.92
	10-18	328.82	543.14	14.34	104.34	N.D.
	0.056-0.10	4.10	0.12	3.46	567.46	3.31
	0.10-0.18	11.44	1.00	9.61	561.12	7.54
	0.18-0.32	34.70	0.94	23.33	927.23	67.49
S7	0.32-0.56	32.94	3.49	7.93	346.19	95.31
	0.56-1.0	169.30	218.23	14.30	186.51	56.16
	1.0-1.8	814.47	1256.61	39.49	279.94	33.99

	1.8-3.2	1460.28	2267.98	63.42	420.06	21.10
	3.2-5.6	N.D.	3625.99	89.84	617.68	13.02
	5.6-10	1278.47	1992.79	51.87	365.31	3.54
	10-18	651.78	1030.11	29.45	202.18	1.49
	0.056-0.10	0.84	0.79	0.97	14.94	2.65
	0.10-0.18	2.00	1.59	0.76	50.25	14.04
	0.18-0.32	6.51	3.80	2.74	263.93	95.32
	0.32-0.56	4.52	2.04	1.13	96.94	44.91
	0.56-1.0	41.87	11.45	2.56	127.28	81.63
S8	1.0-1.8	123.21	195.19	5.46	56.45	25.26
	1.8-3.2	433.12	685.88	13.30	136.88	26.67
	3.2-5.6	805.91	1301.37	24.51	231.83	17.65
	5.6-10	469.75	764.03	12.82	135.87	3.67
	10-18	135.74	229.29	4.99	38.16	N.D.
	0.056-0.10	2.44	0.50	3.02	55.91	N.D.
	0.10-0.18	13.92	11.47	13.83	136.51	2.65
	0.18-0.32	15.98	5.87	17.98	193.26	14.73
	0.32-0.56	17.23	9.30	5.51	57.12	10.43
	0.56-1.0	71.36	116.96	7.76	41.38	4.52
S9	1.0-1.8	381.12	635.51	21.10	126.60	7.26
	1.8-3.2	601.69	995.54	27.88	181.98	4.05
	3.2-5.6	1095.38	1877.36	47.77	327.86	2.87
	5.6-10	850.35	1449.83	33.31	257.42	N.D.
	10-18	429.55	739.83	18.17	133.27	N.D.
	0.056-0.10	1.29	0.39	1.14	26.70	1.45
	0.10-0.18	2.77	2.49	1.80	56.41	N.D.
	0.18-0.32	10.33	1.32	2.54	123.39	6.75
	0.32-0.56	8.87	1.59	1.97	55.71	4.95
	0.56-1.0	59.01	85.60	4.47	30.65	6.38
S10	1.0-1.8	231.20	371.96	8.71	73.77	9.30
	1.8-3.2	374.44	630.50	14.75	110.09	5.86
	3.2-5.6	1272.13	2109.15	44.75	354.18	5.48
	5.6-10	805.91	1335.07	24.81	212.98	N.D.
	10-18	534.32	888.62	20.65	144.37	N.D.

N.D. stands for not determined.

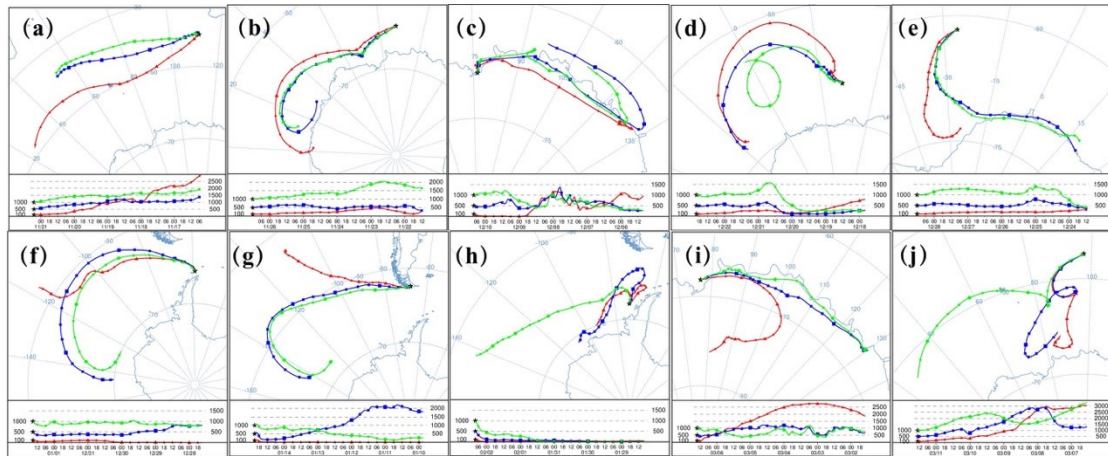


Figure A1 Air mass back trajectories (AMBTs) associated with the samples ((a) S1-(j) S10). The trajectories were made with the National Oceanic and Atmospheric Administration Global Data Assimilation System meteorology data base, using the Hybrid Single-Particle Lagrangian Integrated Trajectories (HYSPLIT) program. AMBTs were calculated at the 100 m, 500 m, and 1000 m heights every 6 h with backward 5 days.

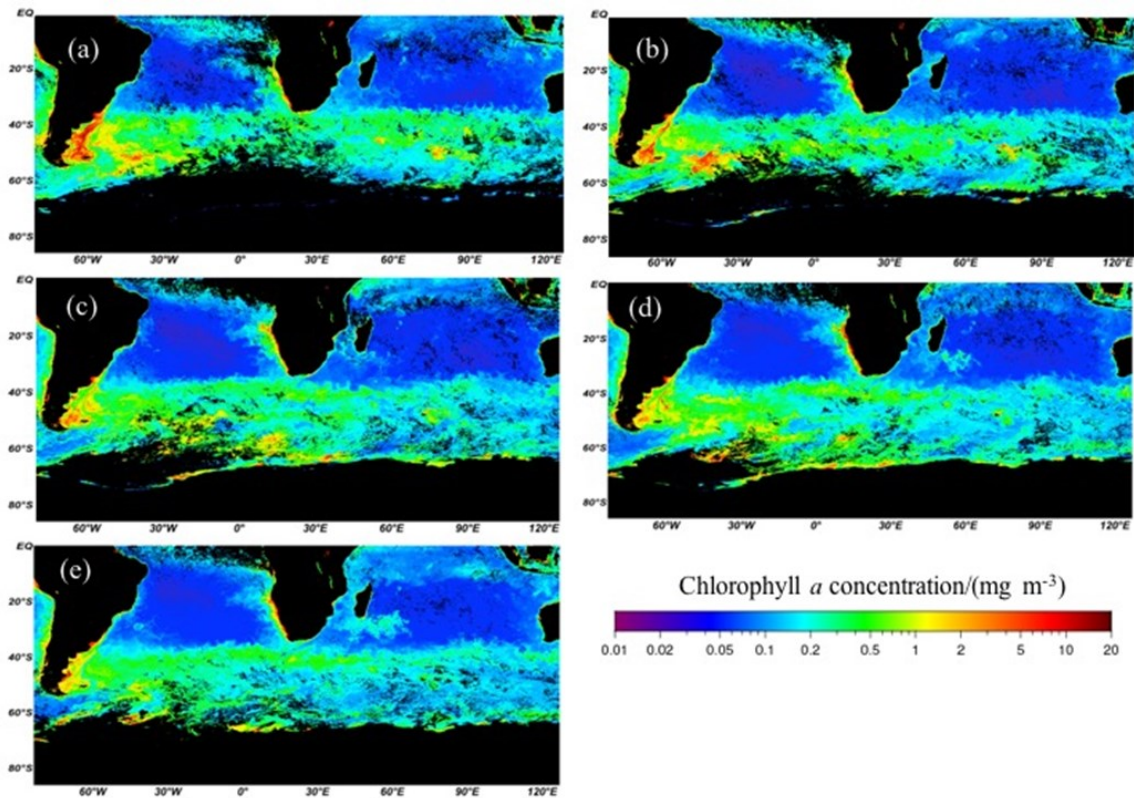


Figure A2 Map of oceanic Chlorophyll-*a* concentrations in the Southern Hemisphere. Monthly average concentration of Chlorophyll-*a* for (a) November 2011; (b) December 2011; (c) January 2012; (d) February 2012; (e) March 2012 (Data source: NASA ocean color website, <https://oceancolor.gsfc.nasa.gov>).