Supplementary Materials

TABLE S1. Samples used in this study with coordinates, water depth, dinocyst counts, cyst concentrations, grain size data (% fraction > 63 µm and < 63 µm), and hydrographic data for each sample. Nitrate (N), silicate (Si), and phosphate (P) concentrations are expressed in µmol L^{-1}. Concentrations of chlorophyll-*a* (February, May, August, November) are expressed in mg m^{-3}. Temperature and salinity are in °C and PSU (Practical Salinity Units).

Sample ID	Longitude (°W)	Latitude (°S)	Lab number	Depth (m)	Dinocyst counts	Concentrations (cysts g^{-1})	Organic linings of foraminifera (cells g^{-1})	*Halodinium* sp. (cells g^{-1})	> 63 µm	< 63 µm	P	Si	Chl.a.f	Ch.a.m	Ch.a.a	Ch.a.n	Tsum	Twin	Ssum	Swin
BV01	-66.0274	-46.3756	476-1	97	2,306	26,296	274	57	30	70	1.02	20.46	1.24	1.10	1.07	1.84	14.23	8.09	33.33	33.34
BV02	-66.3956	-46.6621	436-1	80	1,759	22,846	1,533	26	0	100	1.02	18.66	1.51	1.40	1.15	2.18	14.24	7.97	33.29	33.30
BV03	-66.7345	-46.6651	436-2	84	1,031	8,502	1,088	0	21	79	1.02	18.80	1.35	1.38	1.16	2.71	14.53	8.04	33.31	33.31
BV04	-66.7364	-45.9758	436-3	91	3,870	28,822	477	37	0	100	1.04	27.92	1.12	1.40	1.22	1.64	14.96	8.50	33.41	33.40
BV05	-66.7414	-45.7331	436-4	93	2,793	22,451	563	113	0	100	1.04	32.65	1.09	1.38	1.20	1.84	15.08	8.65	33.44	33.41
BV06	-66.7339	-45.9082	436-5	90	2,589	19,125	465	74	0	100	1.04	29.50	1.25	1.34	1.22	1.61	15.00	8.55	33.42	33.41
BV07	-66.2366	-45.7091	436-6	95	5,015	38,273	1,099	84	0	100	1.04	33.91	0.99	1.50	1.08	1.60	14.85	8.60	33.43	33.41
BV08	-66.2548	-45.6739	438-1	92	2,659	21,794	729	25	0	100	1.05	34.36	0.90	1.48	1.07	1.48	14.88	8.62	33.43	33.41
BV09	-66.5584	-45.982	438-2	95	4,137	35,452	1,620	0	0	100	1.04	28.10	0.86	1.23	1.17	1.54	14.85	8.48	33.41	33.40
BV10	-66.5119	-45.448	438-3	87	1,474	16,333	720	0	0	100	1.05	36.00	0.75	1.35	1.24	1.94	15.05	8.75	33.46	33.43
BV11	-65.7958	-45.0982	441-1	67	9,240	4,336	723	0	54	46	1.07	40.71	1.99	1.17	1.31	1.94	15.17	8.71	33.46	33.40
BV12	-65.8148	-45.0936	441-2	71	5,850	2,868	804	0	40	60	1.07	40.89	1.99	1.17	1.30	1.94	15.15	8.71	33.46	33.40
BV13	-65.7772	-45.1091	438-6	65	881	4,546	475	15	59	41	1.07	40.51	1.80	1.56	1.27	2.00	15.18	8.70	33.47	33.40
BV14	-65.777	-45.0773	455-6	56	167	1,071	257	0	78	22	1.07	41.12	1.99	1.17	1.24	1.94	15.20	8.70	33.47	33.40
BV15	-65.773	-45.0766	439-2	50	169	740	306	4	62	38	1.07	41.12	1.99	1.17	1.23	1.94	15.20	8.70	33.47	33.40
BV16	-65.7594	-45.0571	439-3	42	167	956	246	0	69	31	1.07	41.56	1.63	0.94	0.92	1.19	15.22	8.70	33.47	33.39
BV17	-65.7589	-45.0511	439-4	32	326	1,975	436	6	69	31	1.07	41.56	1.63	0.94	0.81	1.19	15.22	8.70	33.47	33.39
BV18	-65.8004	-45.0814	439-5	71	547	5,519	1,191	0	4	96	1.07	41.10	1.99	1.17	1.31	1.94	15.16	8.71	33.46	33.40
BV19	-65.8001	-45.095	439-6	64	702	6,446	1,543	0	66	34	1.07	40.71	1.99	1.17	1.30	1.94	15.16	8.71	33.46	33.40
BV20	-65.8022	-45.081	476-2	65	321	1,760	576	16	58	42	1.07	41.10	1.99	1.17	1.31	1.94	15.16	8.71	33.46	33.40
BV21	-65.8021	-45.0843	441-3	70	551	4,317	737	0	31	69	1.07	40.90	1.99	1.17	1.30	1.94	15.16	8.71	33.46	33.40
BV22	-66.42833	-45.28861	441-4	46	772	8,542	1,571	0	—	—	1.05	36.75	1.18	1.48	1.42	1.91	15.02	8.77	33.46	33.44
BV23	-66.2214	-45.1284	441-5	49	305	2,076	340	0	70	30	1.06	39.87	2.31	1.64	1.44	1.71	14.94	8.74	33.46	33.45
BV25	-66.2141	-45.1265	441-6	52	364	1,608	305	35	32	68	1.06	39.87	2.31	1.64	1.44	1.71	14.94	8.74	33.46	33.45
BV26	-66.2062	-45.1128	443-1	43	473	5,172	1,334	0	7	93	1.06	40.09	2.31	1.64	1.42	1.71	14.93	8.74	33.46	33.45
BV27	-66.2193	-45.114	476-3	44	1,072	12,726	2,018	36	10	90	1.06	40.07	2.31	1.64	1.45	1.71	14.94	8.74	33.46	33.45
BV28	-66.2246	-45.1134	443-2	45	322	1,800	363	6	20	80	1.06	40.04	2.31	1.64	1.45	1.71	14.94	8.74	33.46	33.45
BV29	-66.2288	-45.1084	443-3	45	159	480	175	3	80	20	1.06	40.04	2.31	1.64	1.47	1.71	14.95	8.74	33.46	33.44
BV30	-66.2245	-45.1024	443-4	40	528	4,685	932	9	8	92	1.06	40.25	2.31	1.64	1.46	1.71	14.94	8.74	33.46	33.45
BV32	-66.2263	-45.1018	443-5	42	222	1,204	678	0	0	100	1.06	40.25	2.31	1.64	1.47	1.71	14.94	8.74	33.46	33.45
BV33	-66.2364	-45.1145	443-6	46	339	2,275	443	0	36	64	1.06	40.02	2.31	1.64	1.47	1.71	14.95	8.74	33.46	33.44
BV34	-65.9627	-45.3581	455-1	93	1,120	15,469	677	0	0	100	1.07	37.62	0.86	1.47	1.06	1.76	15.05	8.76	33.46	33.42
BV35	-66.2287	-45.4674	459-3	87	1,979	29,400	847	30	0	100	1.05	36.31	0.83	1.43	1.10	1.46	14.95	8.70	33.45	33.42
BV36	-65.99	-45.7499	473-4	95	1,113	19,118	258	86	0	100	1.05	31.96	1.45	1.07	1.04	1.84	14.77	8.54	33.42	33.40
BV37	-66.0171	-45.7494	455-3	99	1,878	45,848	1,269	0	0	100	1.05	31.93	1.25	1.22	1.04	1.73	14.78	8.55	33.42	33.40
BV38	-65.9215	-45.7641	455-4	97	673	8,268	233	0	0	100	1.05	31.99	1.61	0.95	1.02	1.77	14.73	8.51	33.42	33.40
BV39	-65.755	-45.1807	459-4	90	1,323	13,161	746	30	0	100	1.07	39.42	1.32	1.34	1.15	1.79	15.18	8.70	33.47	33.40
BV40	-65.7753	-45.3062	476-5	90	1,331	14,170	873	43	0	100	1.07	38.07	0.92	1.30	1.04	1.85	15.09	8.73	33.46	33.41
BV41	-65.6428	-45.3024	456-1	91	1,085	12,087	758	0	2	98	1.08	37.96	1.07	1.23	1.03	1.80	15.11	8.69	33.46	33.40
BV42	-65.5118	-45.298	459-5	92	920	9,649	587	0	7	93	1.08	37.86	1.06	1.31	1.03	1.84	15.12	8.64	33.46	33.39
BV43	-65.5038	-45.4324	456-3	97	1,752	22,450	692	0	0	100	1.08	36.99	1.65	1.14	0.98	2.26	15.02	8.60	33.45	33.39
BV44	-65.6381	-45.4406	456-4	96	2,193	31,506	690	0	0	100	1.08	37.01	1.54	1.18	1.00	2.01	15.05	8.67	33.45	33.40
BV45	-65.7693	-45.4449	456-5	95	1,010	12,808	621	25	0	100	1.07	37.09	1.24	1.23	0.97	1.99	15.02	8.69	33.45	33.41
BV46	-65.7636	-45.5843	456-6	99	1,062	18,806	602	71	0	100	1.07	35.83	1.64	0.90	0.97	1.95	14.89	8.60	33.44	33.40
BV47	-65.633	-45.5807	458-1	98	1,989	31,010	795	0	0	100	1.08	36.55	2.00	0.85	1.01	2.68	14.85	8.56	33.44	33.39
BV48	-65.5033	-45.5766	458-2	95	2,007	32,316	499	81	0	100	1.08	36.89	1.92	0.93	0.99	2.82	14.88	8.54	33.44	33.39
BV49	-65.4993	-45.7161	458-3	94	2,068	33,551	795	81	0	100	1.07	35.85	2.26	0.86	1.02	3.08	14.72	8.45	33.42	33.38
BV50	-65.631	-45.7201	458-4	94	2,231	45,742	1,169	103	0	100	1.07	34.97	1.99	0.86	1.08	2.57	14.75	8.50	33.42	33.39
BV51	-63.7921	-45.6656	458-5	95	3,891	44,616	1,972	0	0	100	1.07	36.92	0.80	1.07	0.53	3.61	15.02	7.89	33.43	33.34
BV52	-61.9825	-45.6089	458-6	108	537	5,026	1,526	0	49	51	1.05	39.73	1.25	0.92	0.44	2.03	14.55	7.05	33.53	33.54
BV54	-59.9773	-45.5792	459-1	647	26	64	138	0	39	61	1.03	41.93	1.78	0.51	0.35	3.09	12.20	5.59	33.87	33.93
BV55	-60.149	-45.5636	459-2	141	51	160	616	0	53	47	1.03	41.84	2.52	0.64	0.42	4.44	12.37	5.72	33.84	33.90

TABLE S2. List of dinoflagellate taxa present in our samples with code names.

Taxa	Code
Alexandrium cf. *catenella*	Acat
Impagidinium paradoxum	Ipar
Nematosphaeropsis labyrinthus	Nlab
Operculodinium centrocarpum	Ocen
O. centrocarpum short spines	Ocss
Spiniferites delicatus	Sdel
Spiniferites ramosus	Sram
Spiniferites bentorii	Sben
Spiniferites mirabilis	Smir
Spiniferites pachydermus	Spac
Spiniferites spp.	Sspp
Pentapharsodinium dalei	Pdal
Echinidinium sp.C	EspC
Echinidinium sp.D	EspD
Brigantedinium simplex	Bsim
Brigantedinium auranteum	Baur
Brigantedinium cariacoense	Bcar
Brigantedinium spp.	Bspp
Protoperidinium americanum	Pame
Dubridinium sp.	Dubr
Selenopemphix nephroides	Snep
Selenopemphix quanta	Squa
Protoperidinium nudum	Pnud
Stelladinium stellatum	Stel
Trinovantedinium pallidifulvum	Tpal
Votadinium spinosum	Vspi
Votadinium calvum	Vcal
Quinquecuspis concreta	Qcon
Polykrikos schwartzii	Psch
Polykrikos kofoidii	Pkof

TABLE S3. Relative abundance (%) of dinoflagellate cyst taxa in our samples.

Sample ID	Acat	Ipar	Nlab	Ocen	Ocss	Sdel	Sram	Sben	Smir	Spac	Sspp	Pdal	EspC	EspD	Bsim	Baur	Bcar	Bspp	Pame	Dubr	Snep	Squa	Pnud	Stel	Tpal	Vspi	Vcal	Qcon	Psch	Pkof
BV01	0.22	0.00	0.00	7.24	0.56	0.00	74.02	0.65	11.41	0.43	0.91	0.00	0.43	0.26	0.00	1.06	0.00	0.82	0.03	0.04	0.00	0.00	0.22	0.00	0.00	0.22	0.00	0.04	0.00	1.43
BV02	1.53	0.00	0.00	7.11	1.02	0.00	64.70	0.00	12.79	0.57	1.02	0.00	1.31	0.11	0.61	3.29	0.77	1.53	0.00	0.91	0.11	0.11	0.28	0.00	0.06	0.06	0.00	0.23	0.00	1.88
BV03	2.04	0.00	0.00	9.41	0.78	0.00	58.00	0.00	10.96	0.68	1.26	0.00	3.98	0.00	0.12	4.31	0.35	2.79	0.00	1.55	0.00	0.00	0.29	0.19	0.19	0.00	0.00	0.00	0.00	3.10
BV04	1.16	0.00	0.00	13.26	0.49	0.00	71.96	0.13	2.25	0.41	0.18	0.05	0.44	0.00	0.05	2.91	0.22	1.24	0.00	0.26	0.05	0.03	0.03	0.03	0.00	0.03	0.00	0.08	0.08	4.68
BV05	0.18	0.00	0.00	13.28	0.07	0.00	72.93	0.00	2.90	0.50	0.07	0.04	1.00	0.00	0.17	2.79	0.93	1.61	0.08	0.21	0.04	0.07	0.14	0.18	0.00	0.00	0.00	0.25	0.00	2.54
BV06	0.50	0.00	0.00	21.13	2.09	0.00	51.41	0.19	5.99	0.66	0.08	0.00	3.01	0.27	0.71	4.58	2.12	0.35	0.35	1.54	0.00	0.46	0.19	0.08	0.12	0.00	0.00	0.42	0.00	3.75
BV07	0.06	0.00	0.00	13.48	0.08	0.00	68.20	0.16	4.29	0.76	0.20	0.04	1.32	0.08	0.62	3.54	0.80	1.77	0.00	0.14	0.04	0.22	0.06	0.24	0.02	0.00	0.00	0.24	0.00	3.67
BV08	0.15	0.00	0.00	12.03	0.26	0.00	61.98	0.41	7.48	0.56	0.26	0.04	1.65	0.00	0.93	5.29	1.25	2.49	0.00	0.60	0.08	0.08	0.04	0.11	0.00	0.34	0.00	0.56	0.00	3.38
BV09	0.02	0.00	0.00	17.65	0.63	0.00	64.59	0.31	3.50	0.94	0.19	0.00	1.52	0.00	0.57	4.55	1.99	0.43	0.00	0.19	0.07	0.19	0.31	0.07	0.00	0.02	0.00	0.24	0.00	1.98
BV10	0.41	0.00	0.00	17.44	0.07	0.00	56.17	0.14	3.12	1.09	0.27	0.00	1.63	0.00	1.72	8.96	1.89	0.86	0.00	0.07	0.00	0.00	0.14	0.07	0.00	0.00	0.00	0.27	0.00	5.70
BV11	0.22	0.00	0.00	13.20	0.00	0.00	46.43	0.00	5.41	0.54	0.00	0.00	3.46	0.00	1.55	3.11	3.11	4.14	0.00	0.54	0.22	0.32	0.11	0.00	0.11	0.00	0.00	0.00	0.00	17.53
BV12	0.34	0.00	0.00	12.48	0.00	0.00	46.32	0.00	2.74	1.54	0.17	0.00	4.27	0.51	0.39	3.35	0.79	0.59	0.00	0.51	0.00	0.34	0.00	0.17	0.00	0.34	0.00	0.34	0.34	24.44
BV13	0.57	0.00	0.00	12.26	0.79	0.57	48.24	0.00	3.52	0.45	0.91	0.00	5.11	0.00	1.78	3.08	1.14	1.78	0.16	0.11	0.45	0.23	0.45	0.11	0.00	1.02	0.11	0.00	0.68	16.46
BV14	0.00	0.00	0.00	14.97	0.00	0.00	40.12	0.00	2.40	0.00	1.80	0.00	5.39	0.60	1.80	2.10	0.30	1.80	0.00	0.60	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	26.95
BV15	0.59	0.00	0.00	13.61	0.00	0.00	30.18	0.59	0.59	1.78	0.59	0.00	8.88	0.00	2.59	6.90	4.31	6.90	0.00	0.59	0.00	0.00	0.00	0.00	0.59	0.00	0.59	0.00	0.00	20.71
BV16	0.60	0.00	0.00	14.37	0.60	0.00	41.92	0.00	4.19	1.20	0.00	0.00	0.60	0.60	0.77	5.36	3.06	4.59	0.00	1.20	0.60	1.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.56
BV17	0.31	0.00	0.00	13.50	1.84	0.31	40.49	0.31	3.37	1.23	1.23	0.00	7.06	0.00	0.92	4.60	0.92	2.76	0.00	0.92	0.00	0.00	0.00	0.92	0.00	0.00	0.00	0.00	1.53	17.79
BV18	0.37	0.00	0.00	11.70	0.00	0.00	58.32	0.55	4.02	0.37	0.37	0.18	2.56	0.37	0.45	4.02	0.45	1.12	0.00	0.73	0.18	0.91	0.00	0.37	0.00	0.00	0.00	0.37	0.00	12.61
BV19	0.85	0.00	0.00	10.68	0.00	0.00	60.97	0.00	3.56	0.14	0.28	0.14	1.28	0.00	0.20	2.37	0.20	2.37	0.00	0.00	0.00	0.28	0.00	0.43	0.00	0.14	0.00	0.00	0.14	15.95
BV20	0.93	0.00	0.00	7.17	1.56	0.00	56.70	0.00	5.61	0.62	0.31	0.00	3.12	0.62	0.58	2.30	0.58	4.03	0.00	0.00	0.62	0.31	0.31	0.00	0.00	0.00	0.00	0.00	0.00	14.64
BV21	0.00	0.00	0.00	10.34	0.36	0.00	54.81	0.00	3.09	1.09	0.54	0.00	3.99	0.18	0.59	2.18	0.59	3.17	0.00	0.91	0.00	0.18	0.36	0.18	0.36	0.18	0.00	0.00	0.00	16.88
BV22	8.68	0.00	0.13	10.75	1.04	0.00	38.86	0.13	6.09	0.65	0.00	1.17	2.85	1.55	0.34	2.05	0.17	0.68	0.00	0.00	0.13	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	24.61
BV23	0.66	0.00	0.00	8.52	0.00	0.00	29.84	0.33	6.23	0.98	0.00	0.00	3.28	0.00	0.00	2.50	0.00	6.68	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.33	39.34
BV25	1.37	0.00	0.00	7.97	0.00	0.00	30.22	0.55	5.77	0.82	0.00	0.27	3.57	0.00	1.69	6.33	1.27	2.53	0.00	0.00	0.82	0.82	0.27	0.27	0.00	0.27	0.00	0.00	0.55	34.62
BV26	3.38	0.00	0.00	7.19	1.06	0.00	41.65	0.00	2.75	0.00	0.00	0.42	4.86	2.33	0.82	3.48	0.82	1.23	0.00	0.42	0.42	0.00	0.42	1.06	0.00	0.00	0.00	0.00	0.00	27.70
BV27	5.41	0.00	0.00	9.14	0.00	0.00	39.46	0.09	3.26	0.37	0.19	0.47	4.01	0.93	0.52	2.35	0.44	1.92	0.00	0.93	0.09	0.00	0.19	0.19	0.28	0.00	0.00	0.09	0.00	29.66
BV28	0.62	0.00	0.00	10.56	0.62	0.00	16.46	0.93	4.35	0.31	0.00	0.00	4.66	0.00	2.17	7.07	2.17	5.98	0.00	1.24	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	2.17	39.75
BV29	21.38	0.00	0.00	3.77	0.63	0.00	21.38	0.00	5.03	0.00	1.89	0.00	12.58	3.77	0.63	1.89	0.63	3.14	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.64
BV30	3.60	0.00	0.00	12.50	0.38	0.00	38.07	0.00	3.03	0.19	0.57	0.38	4.17	1.89	0.41	0.83	0.91	1.82	0.00	0.95	0.00	0.00	0.38	0.19	0.76	0.00	0.00	0.00	0.00	28.98
BV32	2.25	0.00	0.00	7.21	0.45	0.00	35.14	0.00	9.46	1.80	1.35	0.45	6.76	6.31	0.90	1.80	0.90	5.41	0.00	0.45	0.00	0.00	0.00	1.35	0.45	0.45	0.00	0.45	0.00	16.67
BV33	5.60	0.00	0.00	5.90	0.88	0.00	35.10	0.00	3.83	0.00	0.59	0.29	7.08	2.06	0.17	3.29	1.39	3.12	0.00	0.29	1.47	0.00	0.59	0.29	0.00	1.18	0.00	0.29	0.00	26.55
BV34	1.25	0.00	0.00	18.04	3.93	0.00	59.82	1.34	4.29	0.00	1.25	0.00	0.54	0.98	0.15	1.85	0.21	0.56	0.00	0.18	0.00	0.00	0.98	0.18	0.00	0.00	0.00	0.18	0.00	4.29
BV35	0.30	0.00	0.00	17.64	1.87	0.40	53.71	0.66	2.07	0.86	1.06	0.00	3.54	0.00	0.85	5.66	3.12	1.13	0.00	0.25	0.00	0.00	0.30	0.25	0.00	0.05	0.00	0.25	0.15	5.86
BV36	0.45	0.00	0.00	11.23	0.72	0.00	67.48	0.72	3.95	0.36	0.18	0.00	1.80	0.36	0.10	4.75	0.95	0.76	0.00	0.63	0.18	0.00	0.36	0.09	0.00	0.00	0.00	0.54	0.00	4.40
BV37	1.33	0.00	0.00	14.06	1.33	0.00	62.73	0.37	2.08	0.75	1.22	0.05	2.50	0.48	0.34	5.04	1.03	1.26	0.00	0.85	0.00	0.00	0.37	0.16	0.00	0.00	0.00	0.69	0.00	3.35
BV38	0.45	0.15	0.00	18.13	2.53	0.00	52.60	0.30	2.82	0.59	0.89	0.15	2.97	0.89	0.26	7.67	1.85	1.06	0.00	0.59	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.30	0.00	5.50
BV39	2.19	0.00	0.00	9.22	0.38	0.00	60.47	0.00	4.54	0.53	0.83	0.15	2.72	0.53	0.32	2.23	0.53	0.85	0.00	0.76	0.08	0.00	1.06	0.08	0.23	0.30	0.00	0.08	0.00	11.94
BV40	0.90	0.00	0.00	8.94	1.35	0.00	64.54	0.00	3.38	0.98	0.00	0.00	1.58	0.45	0.78	4.67	1.33	1.11	0.00	0.68	0.23	0.00	0.15	0.38	0.15	0.15	0.00	0.00	0.00	8.26
BV41	1.11	0.00	0.00	7.47	1.20	0.00	64.15	0.09	3.32	1.01	0.74	0.00	2.40	1.01	0.39	3.92	0.78	0.98	0.00	2.49	0.18	0.00	1.57	0.28	0.00	0.00	0.09	0.18	0.00	6.64
BV42	0.98	0.00	0.00	10.76	0.98	0.00	66.20	0.00	2.50	1.52	0.33	0.00	1.85	0.22	0.78	3.82	1.04	0.45	0.00	1.20	0.00	0.00	0.11	0.43	0.22	0.00	0.00	0.00	0.00	6.63
BV43	1.37	0.00	0.00	9.25	0.97	0.00	66.21	0.00	3.77	0.86	0.34	0.00	1.88	0.68	0.80	3.54	0.91	0.91	0.00	1.77	0.00	0.00	0.46	0.11	0.00	0.11	0.06	0.17	0.00	5.82
BV44	0.18	0.00	0.00	8.76	0.50	0.00	70.95	0.00	5.11	0.96	0.41	0.00	2.01	0.36	0.46	2.86	0.46	0.29	0.00	1.00	0.05	0.46	0.41	0.09	0.05	0.18	0.00	0.27	0.00	4.20
BV45	0.10	0.00	0.00	11.49	0.69	0.00	60.50	0.00	2.67	0.50	0.30	0.10	3.17	0.40	1.64	6.73	1.64	0.98	0.00	1.78	0.00	0.00	0.10	0.10	0.10	0.10	0.00	0.20	0.00	6.73
BV46	0.09	0.00	0.00	11.39	0.38	0.00	61.49	0.00	5.37	0.75	0.47	0.00	1.32	0.38	0.15	8.12	1.65	0.90	0.00	1.41	0.09	0.00	0.00	0.19	0.00	0.09	0.09	0.09	0.00	5.56
BV47	0.35	0.00	0.00	11.26	1.56	0.45	62.69	0.45	6.13	1.26	1.06	0.00	1.96	0.30	0.79	3.44	1.06	0.13	0.00	0.40	0.00	0.20	0.10	0.20	0.00	0.10	0.00	0.30	0.00	5.78
BV48	0.20	0.10	0.00	7.52	0.90	0.35	67.91	0.35	6.73	1.20	0.60	0.05	0.25	0.00	0.12	4.07	0.96	0.54	0.00	0.95	0.00	0.25	0.05	0.20	0.00	0.20	0.00	0.20	0.05	6.28
BV49	0.15	0.00	0.05	6.38	0.92	1.89	57.74	0.58	7.45	0.73	2.47	0.00	1.45	0.00	0.61	5.70	0.61	0.81	0.00	1.74	0.05	0.15	0.29	0.15	0.00	0.24	0.00	0.53	0.05	9.28
BV50	0.18	0.09	0.00	13.63	1.17	0.18	49.57	0.22	10.71	1.97	2.33	0.09	1.34	0.00	1.10	6.33	1.79	0.55	0.00	0.58	0.04	0.45	0.00	0.00	0.00	0.40	0.00	0.27	0.00	6.99
BV51	0.31	0.00	0.00	2.08	0.77	1.46	48.27	0.39	13.54	1.18	2.78	0.00	1.23	0.00	0.35	2.38	0.98	2.10	0.00	2.70	0.00	0.00	0.00	0.00	0.00	0.13	0.05	0.80	0.51	17.99
BV52	1.49	0.00	0.37	10.24	1.68	0.56	17.88	0.00	12.66	0.37	0.56	0.19	1.49	0.00	1.15	8.64	1.44	4.03	0.00	18.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	17.88
BV54	0.00	19.23	0.00	0.00	0.00	0.00	7.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.08	0.00	0.00	46.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.85
BV55	1.96	5.88	0.00	1.96	0.00	0.00	19.61	0.00	0.00	0.00	1.96	0.00	5.88	0.00	6.24	2.50	4.99	41.18	0.00	7.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE S4. Summary statistics for Redundancy Analyses (RDA) with marginal and conditional effects.

	Conditional effects				Marginal effects			
	Eigenvalues				With percentage data		With concentration data	
	With percentage data		With concentration data					
	RDA1 4.8	RDA2 2.8	RDA1 5.3	RDA2 3.4				
Variable	**P-value**	**VIF**	**P-value**	**VIF**	**Eigenvalues**	**P-value**	**Eigenvalues**	**P-value**
Depth	0.018	4	0.001	4	2	0.015	3.3	0.001
N	0.001	200	0.001	256	3	0.001	3.8	0.001
P	0.001	60	0.014	61	1.6	0.005	1.9	0.023
Si	0.005	26	0.001	21	0.8	0.1	2.1	0.001
Chl.a.f	0.226	13	0.008	12	0.7	0.137	2.2	0.001
Ch.a.m	0.003	7	0.001	7	1.6	0.001	2.3	0.001
Ch.a.a	0.006	20	0.042	21	2.8	0.001	4.7	0.001
Ch.a.n	0.115	5	0.014	6	2.2	0.002	4.4	0.001
Tsum	0.004	57	0.006	76	3.7	0.001	7.6	0.001
Twin	0.015	152	0.114	186	3.9	0.001	7.5	0.001
Ssum	0.001	175	0.002	170	3.3	0.002	8.7	0.001
Swin	0.088	335	0.489	387	3.6	0.002	9.1	0.001
> 63 µm	0.430	8	0.014	8	1.8	0.001	4.8	0.001
< 63 µm	0.072	5	0.078	5	2.1	0.001	4.5	0.001

FIGURE S1. Photomicrographs of dinoflagellate cysts from San Jorge Gulf. Scale bar is 10 µm. 1. *Spiniferites ramosus*. 2. *Spiniferites pachydermus*. 3. *Impagidinium paradoxum*. 4. *Spiniferites mirabilis*. 5. *Operculodinium centrocarpum*. 6. *Operculodinium centrocarpum* short processes. 7. *Alexandrium* cf. *catenella*. 8. *Nematosphaeropsis labyrinthus*. 9. *Quinquecuspis concreta*. 10. *Alexandrium* cf. *catenella*. 11. *Polykrikos kofoidii*. 12. *Polykrikos schwartzii*.

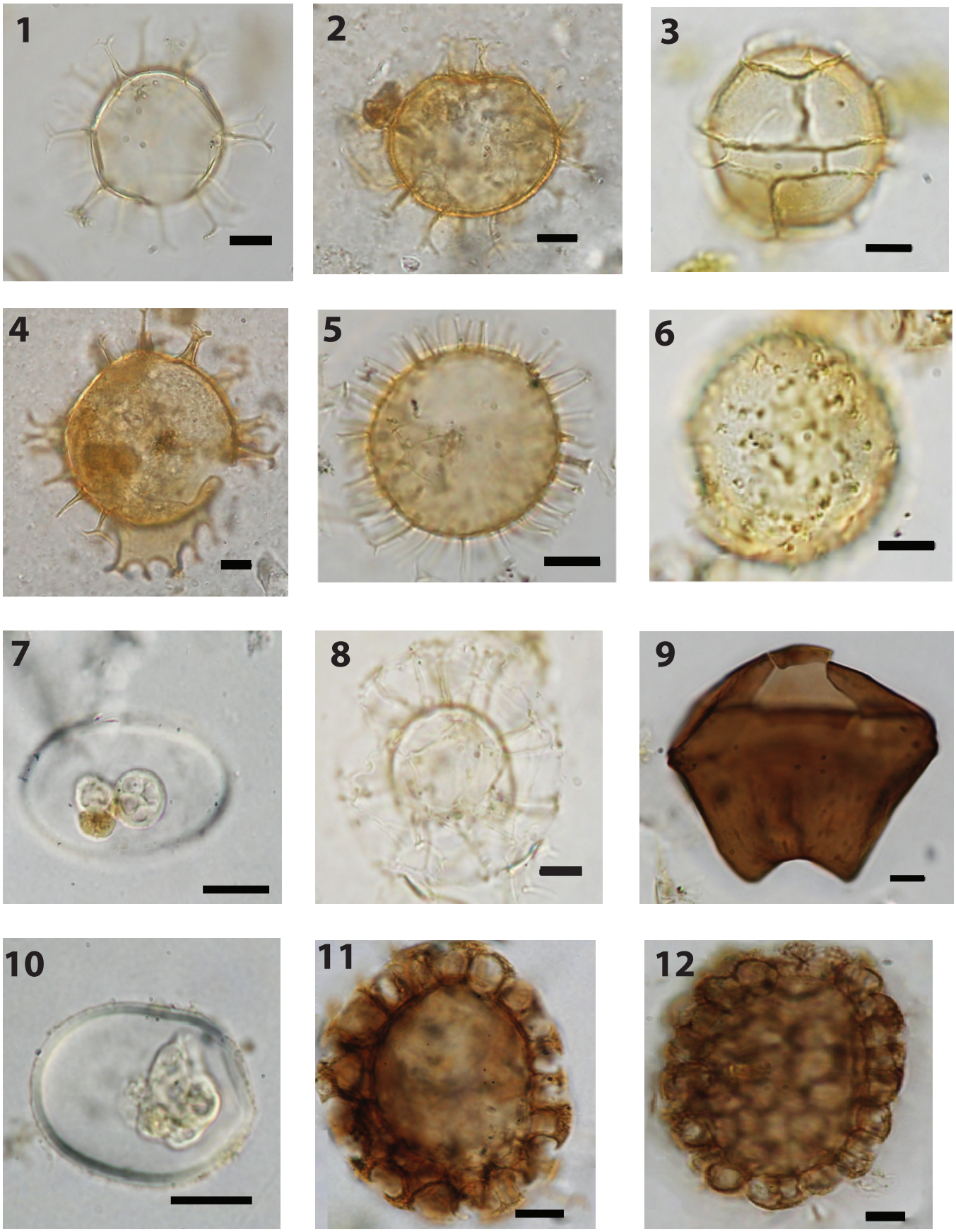

FIGURE S2. 1. *Trinovantedinium pallidifulvum*. 2. *Brigantedinium auranteum*. 3. *Brigantedinium simplex*. 4. *Dubridinium* sp. 5. *Echinidinium* sp.D. 6. *Echinidinium* sp.C. 7. *Votadinium spinosum*. 8. *Stelladinium stellatum*. 9. *Selenopemphix nephroides*. 10. *Selenopemphix quanta*. 11. *Halodinium* sp. 12. Organic lining of foraminifera.

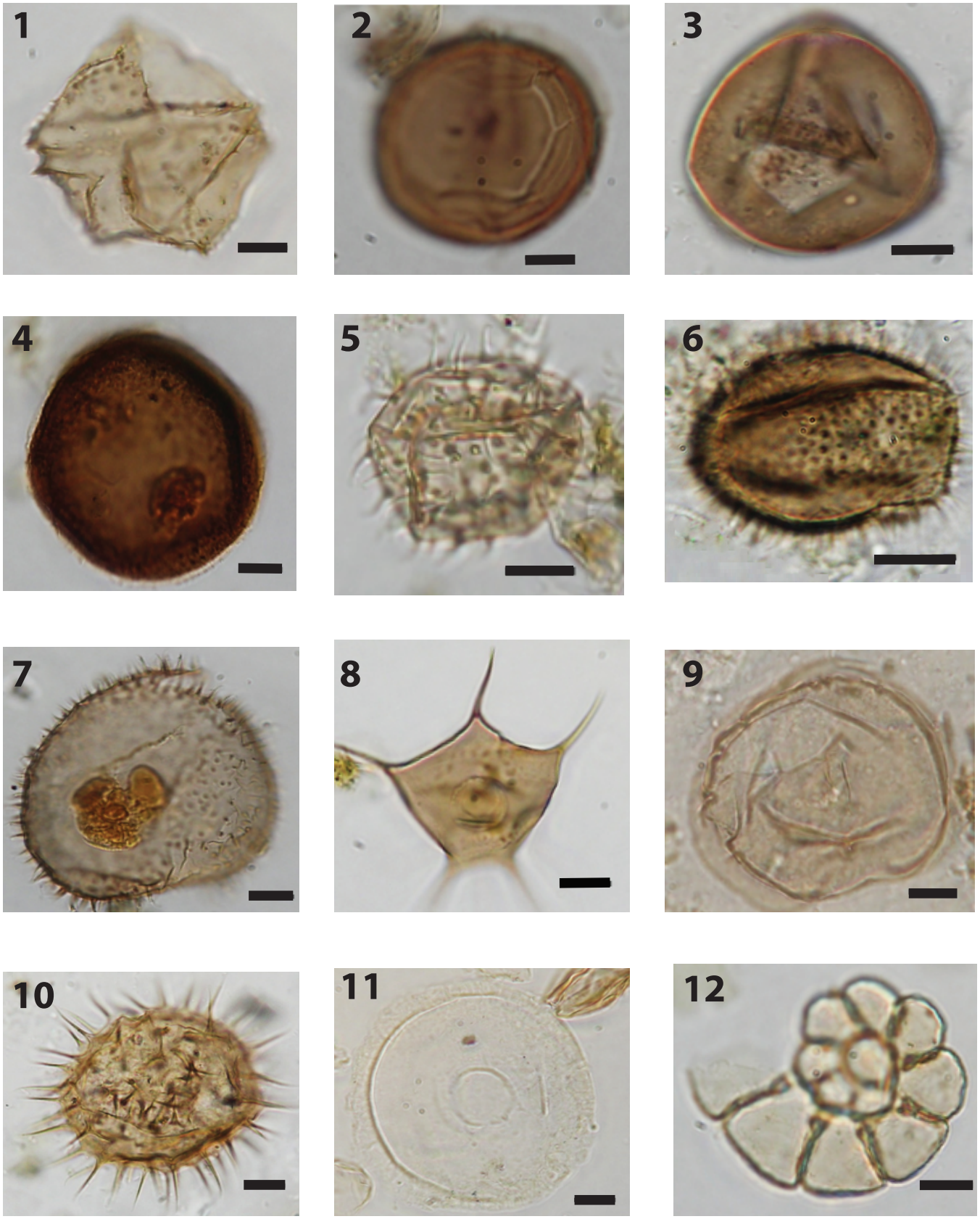

FIGURE S3. Scanning electron micrographs of dinocysts from San Jorge Gulf. 1. *Brigantedinium auranteum*. 2. *Brigantedinium cariacoense*. 3., 4., and 5. *Echinidinium* sp.D. 6. *Echinidinium* sp.C.