

Supplementary Materials: Interannual Variability of *Dinophysis acuminata* and *Protoceratium reticulatum* in a Chilean Fjord: Insights from the Realized Niche Analysis

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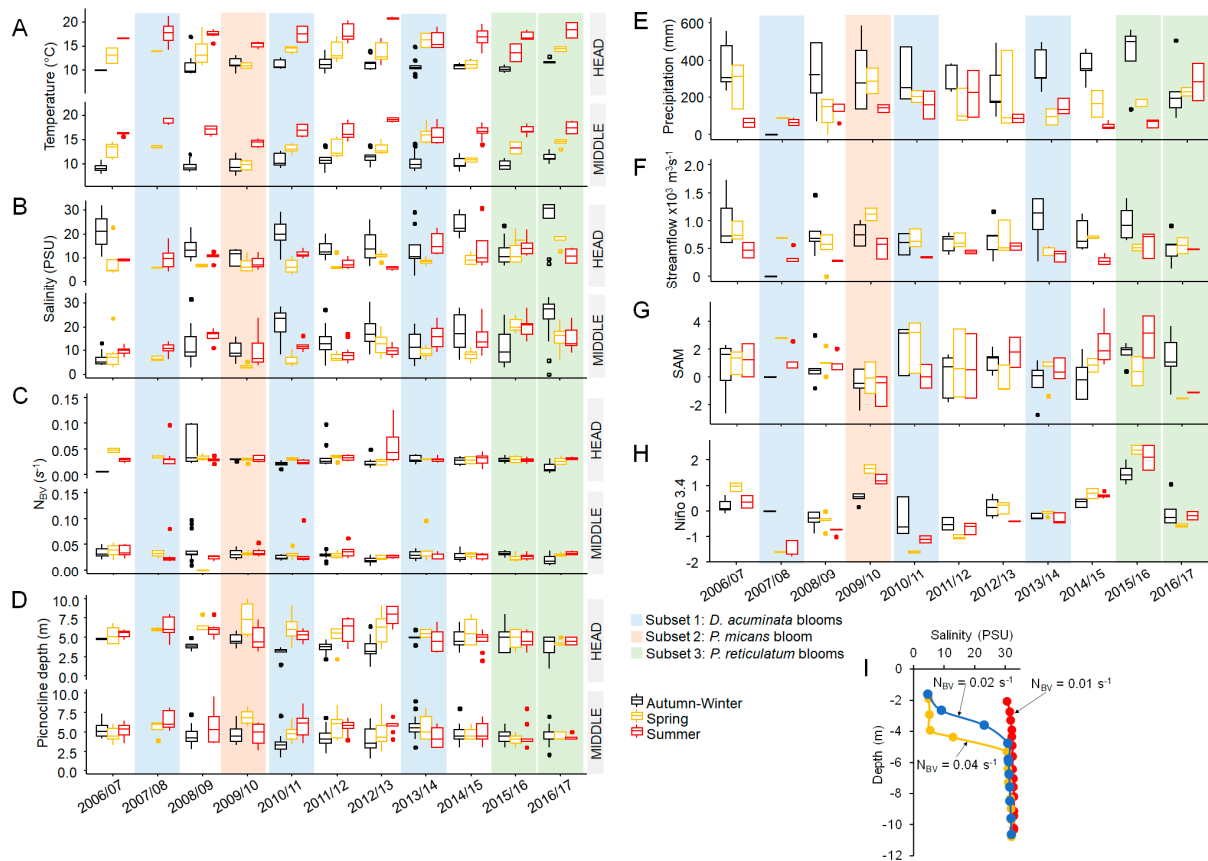


Figure S1. (A–H) Boxplots showing seasonal median values for the physical and meteorological variables in the different years. (I) Examples of salinity vertical profiles related to the different values of the Brunt-Väisälä buoyancy frequency.

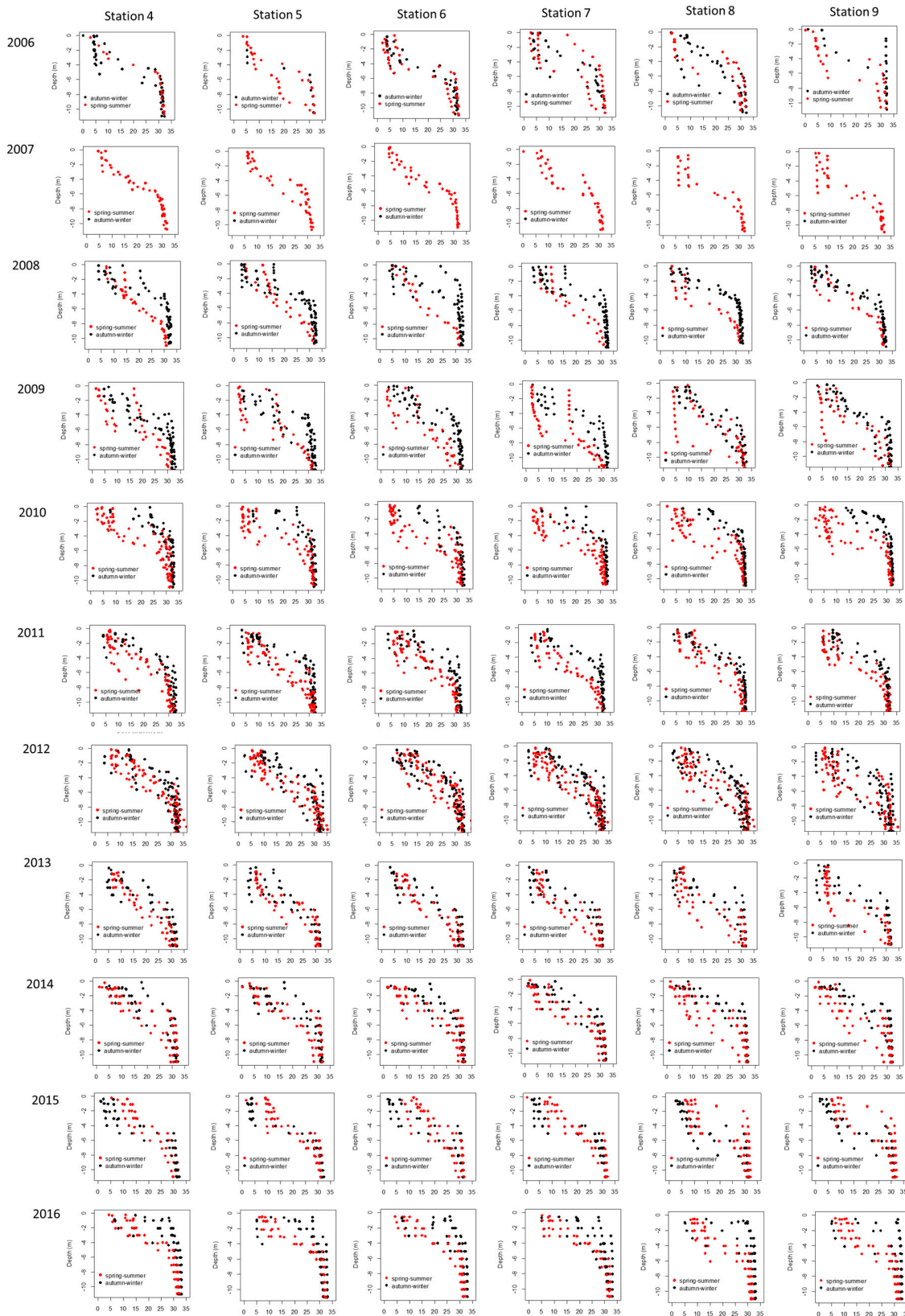


Figure S2. Salinity vertical profiles.

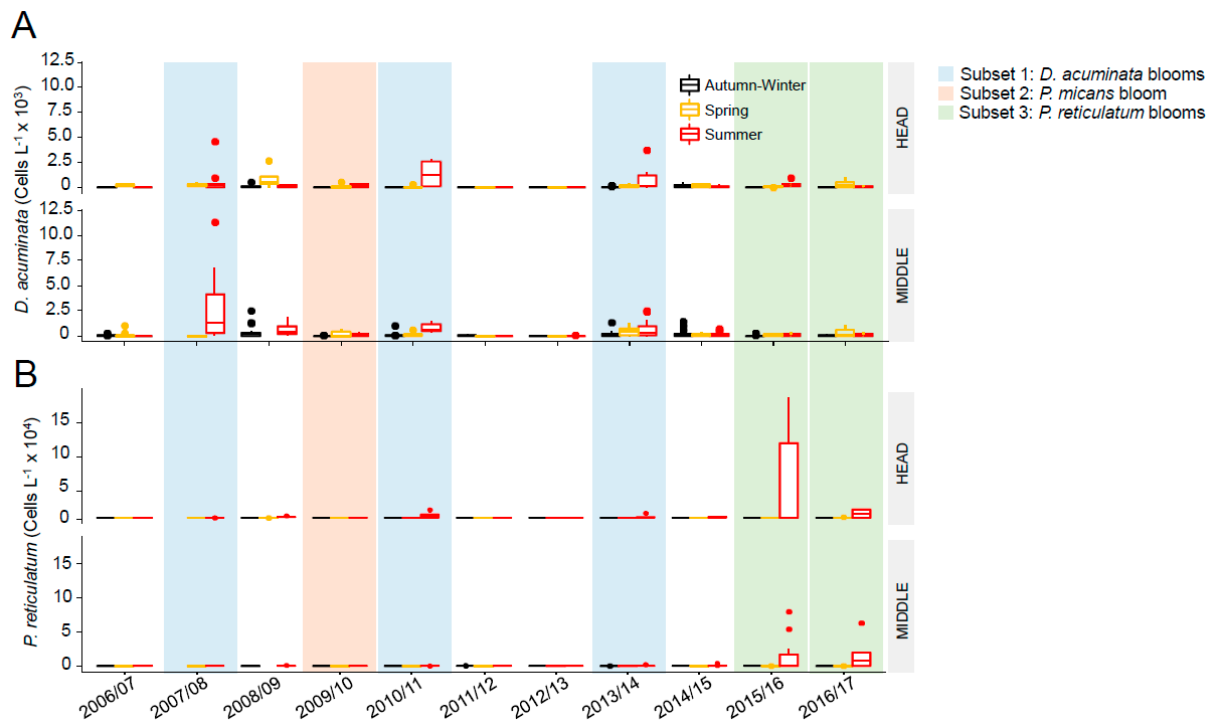


Figure S3. Box-plots showing seasonal median values for *Dinophysis acuminata* (A) and *Protoceratium reticulatum* (B) in the different years.

Table S1. Niche parameters estimated through the OMI analysis for the five *Dinophysis* species and *Protoceratium reticulatum* in the Reloncaví fjord during the 10-years time series. Niche parameters are given both as absolute values and percentages of variability of each species. Inertia = total variability, OMI = outlying mean index (i.e., marginality), Tol = Tolerance, Rtol = Residual Tolerance, OMI% = percentage of variability given by OMI, Tol% = percentage of variability given by Tol, Rtol% = percentage of variability given by Rtol. *P*-values are given by the nu number of random permutations (out of 10,000) that yielded a higher value than the observed marginality (OMI). Species in bold were the ones significant (*p* < 0.05).

Species	Code	Inertia	Absolute Values			Percentages of Variability			<i>p</i> -value
			OMI	Tol	Rtol	OMI%	Tol%	Rtol%	
<i>D. acuminata</i>	Dacum	12.65	0.61	3.26	8.77	4.80	25.80	69.40	0.009
<i>D. acuta</i>	Dacut	7.36	6.06	0.32	0.98	82.30	4.30	13.40	0.405
<i>D. caudata</i>	Dcau	20.11	18.80	0.01	1.29	93.50	0.10	6.40	0.009
<i>D. tripos</i>	Dtrip	18.66	5.84	3.63	9.19	31.30	19.40	49.30	0.029
<i>D. punctata</i>	Dpunc	9.65	0.80	2.10	6.74	8.40	21.80	69.80	0.158
<i>P. reticulatum</i>	Pret	15.21	5.75	1.07	8.38	37.80	7.10	55.10	0.009

Table S2. Subniche parameters estimated through the WitOMI analysis of *Dinophysis acuminata* (Dacum) and *Protoceratium reticulatum* (Pret) in the Reloncaví fjord for the summer months during the 10-years time series. Subniche parameters are given both as absolute values and percentages of variability of each species. WitOMIG = distance between the species center of gravity in the subset and mean habitat conditions (G); TolG = Tolerance in the subset related do G, RtolG = residual tolerance in the subset related do G, OMIG% = percentage of variability given by WitOMIG, TolG% = percentage of variability given by TolG, RtolG% = percentage of variability given by RtolG, InertiaG = total variability for WitOMIG. WitOMIGk = distance between the species center of gravity in the subset and mean habitat conditions of the subset (Gk); TolGk = Tolerance in the subset related do Gk, RtolGk = residual tolerance in the subset related do Gk, WitOMIGk% = percentage of variability given by WitOMIGk, TolGk% = percentage of variability given by TolGk, RtolGk% = percentage of variability given by RtolGk, InertiaGk = total variability for WitOMIGk. All subniches were significative ($p < 0.01$).

Species	InertiaG	Absolute Values			Percentages of Variability		
		WitOMIG	TolG	RtolG	WitOMIG%	TolG%	RtolG%
Subset 1: Summer months of years of <i>D. acuminata</i> blooms (2008, 2011 and 2014)							
Dacum1	11.79	1.747	0.420	9.621	14.8	3.6	81.6
Pret1	8.31	3.141	0.246	4.919	37.8	3	59.2
Subset 2: Summer months of the year of <i>P. micans</i> bloom (2009)							
Dacum2	15.95	13.574	0.256	2.118	85.1	1.6	13.3
Pret2	12.96	12.347	0.001	0.614	95.3	0	4.7
Subset 3: Summer months of years of <i>P. reticulatum</i> blooms (2016 and 2017)							
Dacum3	10.39	6.405	2.235	1.749	61.7	21.5	16.8
Pret3	9.71	3.126	1.083	5.498	32.2	11.2	56.6
Subset 4: Summer months of years with no dinoflagellate blooms							
Dacum4	12.19	10.543	0.174	1.474	86.5	1.4	12.1
Pret4	13.543	5.446	0.476	7.621	40.2	3.5	56.3
Subset 1: Summer months of years of <i>D. acuminata</i> blooms (2008, 2011 and 2014)							
Dacum1	10.21	0.17	1.84	8.21	1.60	18.00	80.40
Pret1	7.23	2.07	0.23	4.93	28.60	3.20	68.20
Subset 2: Summer months of the year of <i>P. micans</i> bloom (2009)							
Dacum2	5.08	2.71	1.26	1.12	53.30	24.70	22.00
Pret2	2.28	1.66	0.01	0.61	730	0.40	26.60
Subset 3: Summer months of years of <i>P. reticulatum</i> blooms (2016 and 2017)							
Dacum3	8.78	4.80	1.25	2.74	54.60	14.20	31.20
Pret3	9.25	2.67	0.21	6.37	28.80	2.30	68.90
Subset 4: Summer months of years with no dinoflagellate blooms							
Dacum4	9.26	7.61	0.12	1.53	82.20	1.30	16.50
Pret4	13.66	5.56	0.86	7.24	40.70	6.30	53.00