

Supplement 1

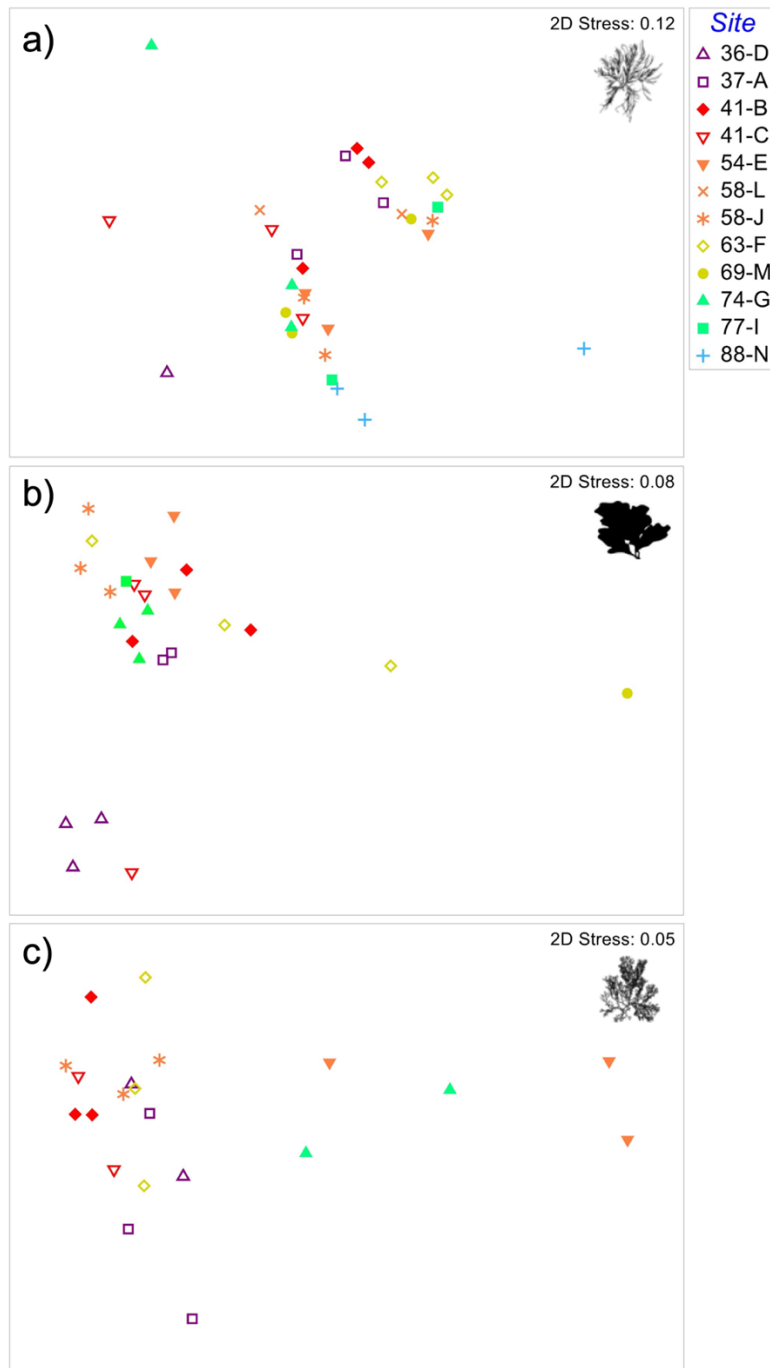


Fig. S1. NMDS visualizations of the fatty acid signatures (50 fatty acids, proportional data) of the two seaweeds, color-coded according to the sites and ice cover gradient: a) *Desmarestia menziesii*; b) *Iridaea cordata*; c) *Plocamium* sp.. Ice cover (NIC annual %) was not a significant explanatory variable (DISTLM tests) in the multivariate fatty acids of these taxa (see **Table 2**, **Table S3**).

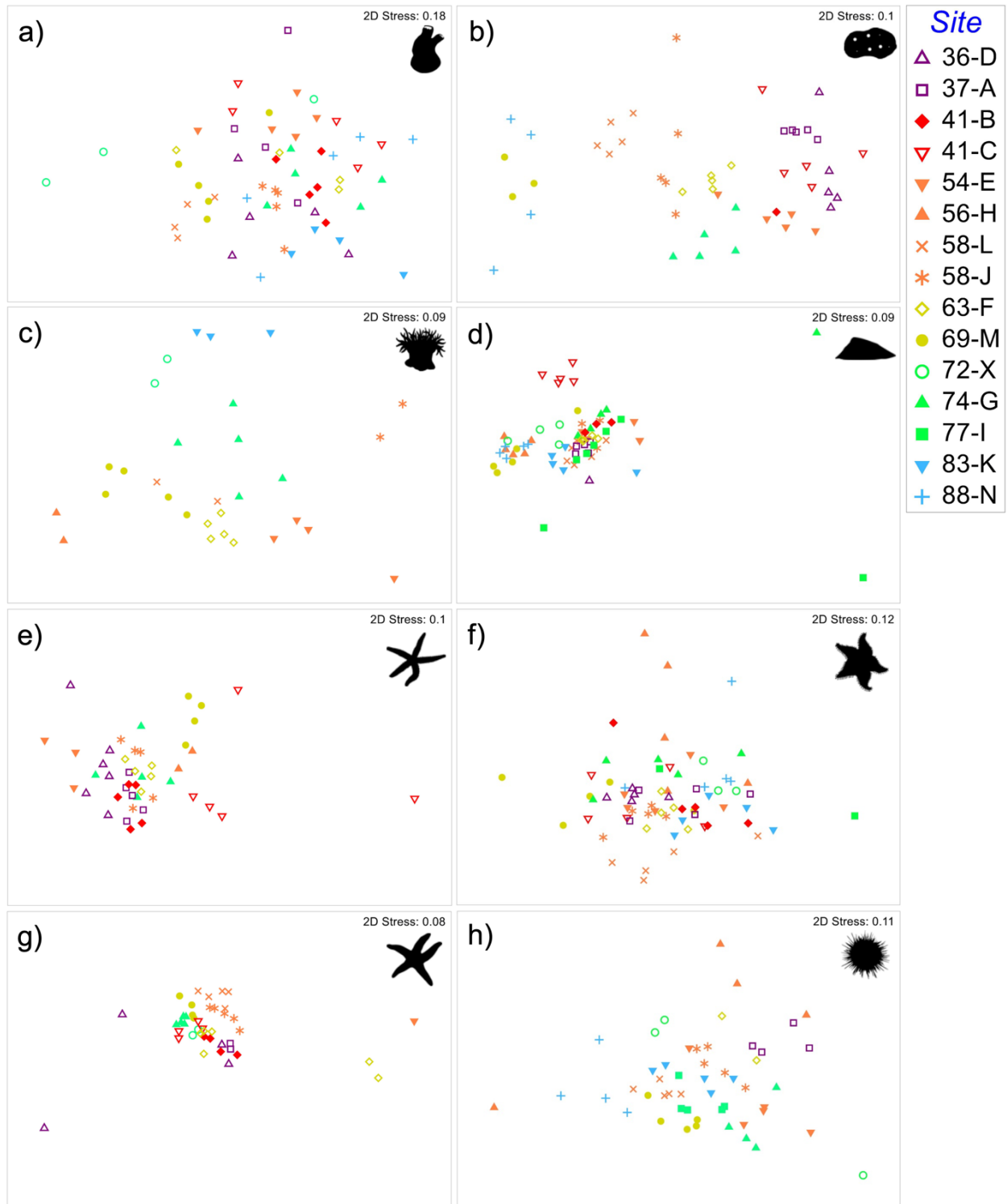


Fig S2. NMDS visualizations of the fatty acid signatures (50 fatty acids, proportional data) of a) *Cnemidocarpa* sp.; b) *Dendrilla antarctica*; c) *Isotealia antarctica*; d) *Nacella concinna*; e) *Neosmilaster georgianus*; f) *Odontaster validus*; g) *Perknaster aurorae*; and h) *Sterechnus neumayeri*. Ice cover (NIC annual %) was a significant explanatory variable for the multivariate fatty acid compositions in five of these consumers (a, b, c, f, h) (see **Table 2**, **Table S3**).

Table S1. Full table of PERMANOVA results on the factor ‘site’.

taxon	df	SS	MS	Pseudo-F	Unique perms	p(MC)
<i>Desmarestia</i>	11	2073.8	188.52	1.7021	9878	0.0188*
<i>Iridaea</i>	9	1124.7	124.97	4.0863	9910	0.0001**
<i>Plocamium</i>	7	308.92	44.132	4.4735	9902	0.0003**
<i>Cnemidocarpa</i>	12	566.86	47.238	5.8189	9853	0.0001**
<i>Dendrilla</i>	10	978.66	97.866	15.565	9894	0.0001**
<i>Isotealia</i>	8	1435.9	179.49	11.434	9893	0.0001**
<i>Nacella</i>	14	1304.7	93.192	4.8391	9887	0.0001**
<i>Neosmilaster</i>	9	772.06	85.784	6.1131	9888	0.0001**
<i>Odontaster</i>	14	1525.8	108.99	3.7398	9837	0.0001**
<i>Perknaster</i>	10	1537.9	153.79	4.4744	9906	0.0001**
<i>Sterechinus</i>	11	1713.8	155.8	4.7877	9877	0.0001**

Table S2. Full table of PERDISM results on the factor 'site'.

taxon	df1	df2	F	p(perm)
<i>Desmarestia</i>	11	20	2.5962	0.7247
<i>Iridaea</i>	9	15	9.7022	0.0771
<i>Plocamium</i>	7	13	2.3645	0.6355
<i>Cnemidocarpa</i>	12	46	1.2396	0.6007
<i>Dendrilla</i>	10	37	3.4188	0.1252
<i>Isotealia</i>	8	21	2.762	0.3272
<i>Nacella</i>	14	54	2.7503	0.4243
<i>Neosmilaster</i>	9	35	4.0903	0.0480*
<i>Odontaster</i>	14	55	2.5142	0.1155
<i>Perknaster</i>	10	31	15.427	0.0002**
<i>Sterechinus</i>	11	39	5.0013	0.0297*

Table S3. Full table of DISTLM results, analyzing the Euclidean distance matrix calculated on the full fatty acid signature, with the explanatory variable of NIC sea ice cover.

taxon	Total SS (trace)	SS (trace)	Pseudo-F	R ²	P	Res. df
<i>Desmarestia</i>	4288.9	465.31	3.6509	0.10849	0.0077*	30
<i>Iridaea</i>	1583.4	187.39	3.0872	0.11834	0.0291*	23
<i>Plocamium</i>	437.17	55.864	2.7836	0.12779	0.0566	19
<i>Cnemidocarpa</i>	940.28	88.777	5.9427	0.09441	0.0003**	57
<i>Dendrilla</i>	1211.3	433.61	25.648	0.35797	0.0001**	46
<i>Isotealia</i>	1765.5	302.9	5.7985	0.17156	0.0004**	28
<i>Nacella</i>	2344.6	121.75	3.6697	0.05190	0.0132*	67
<i>Neosmilaster</i>	1263.2	88.027	3.2209	0.06969	0.0150*	43
<i>Odontaster</i>	3128.6	211.74	4.9362	0.06770	0.0020**	68
<i>Perknaster</i>	2603.4	156.28	2.5545	0.06003	0.0664	40
<i>Sterechinus</i>	2983	311.22	5.7078	0.10433	0.0004**	49