

Supplemental Information for “Community structure across the Western Antarctic continental shelf and a latitudinal change in epibenthic faunal abundance assessed by photographic surveys”

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Table S1 All raw data can be found at doi : 10.6084/m9.figshare.19123049.

Table S2 Metadata for each photograph analyzed can be found at doi : 10.6084/m9.figshare.19123049.

Table S3 SIMPER analysis for the discriminating taxa found between the three regions we have identified. Note the species that contribute to the dissimilarity the most are the ones listed in Table 2 as those that help define the within region community similarity.

Groups Amundsen region & Ross region						
Average dissimilarity = 97.23						
	Group Amundsen region	Group Ross region				
Species	Av.Abund	Av.Abund	Av.Dis s	Diss/S D	Contrib %	Cum. %
Py_1	0.09	2.37	12.09	0.86	12.44	12.44
Ophionotus_victoriae	0.16	1.63	7.36	0.63	7.57	20.01
Op_4	1.39	0.03	7.23	0.76	7.44	27.44
Ho_2	0.79	0.24	4.39	0.64	4.51	31.96
Ho_7	0.96	0.01	3.07	0.3	3.16	35.11
Po_4	0.89	0	3.03	0.49	3.11	38.23
Ar_1	0.1	0.42	2.79	0.42	2.87	41.1
Op_2	0.39	0.01	2.52	0.45	2.59	43.69
Py_2	0.05	0.43	2.43	0.53	2.5	46.19
Cn_5	0.46	0.05	2.16	0.45	2.22	48.41
Groups Amundsen region & Peninsula region						
Average dissimilarity = 98.55						
	Group Amundsen Region	Group Peninsula Region				
Species	Av.Abund	Av.Abund	Av.Dis s	Diss/S D	Contrib %	Cum. %
Ophionotus_victoriae	0.16	11.58	24.39	1.35	24.75	24.75
Iophon_sp1	0	5.83	9.84	0.97	9.98	34.73
Op_20	0	5.83	9.84	0.97	9.98	44.72

Po_13	0	2.87	4.56	0.62	4.62	49.34
Op_4	1.39	0.01	3.19	0.67	3.24	52.58
Tu_9	0	1.22	2.33	0.59	2.37	54.94
Cn_9	0.09	1.13	2.33	0.4	2.36	57.31
Op_21	0	1.29	2.06	0.63	2.09	59.39
Tu_1	0.05	0.96	1.87	0.68	1.89	61.28
Tu_7	0	0.74	1.78	0.46	1.81	63.09
Groups Ross region & Peninsula region						
Average dissimilarity = 93.47						
	Group Ross region	Group Peninsula region				
Species	Av.Abund	Av.Abund	Av.Dis s	Diss/S D	Contrib %	Cum. %
Ophionotus_victoriae	1.63	11.58	23.49	1.28	25.14	25.14
Iophon_sp1	0	5.83	10.17	0.98	10.88	36.02
Op_20	0	5.83	10.17	0.98	10.88	46.9
Py_1	2.37	0	5.62	0.76	6.01	52.91
Po_13	0.07	2.87	4.78	0.64	5.11	58.02
Cn_9	0.15	1.13	2.58	0.43	2.76	60.79
Tu_9	0	1.22	2.42	0.6	2.59	63.38
Op_21	0	1.29	2.12	0.63	2.27	65.65
Tu_1	0.13	0.96	2.03	0.71	2.17	67.81
Tu_7	0.02	0.74	1.88	0.47	2.01	69.83

Table S4 PERMANOVA results (no. permutations: 9,999) to compare benthic communities revealing significant differences between substrate type and phytodetritus denoted by bold p

values. * indicates heterogenous dispersions between comparison groups which might be explain the differences shown between region.

	<i>Comparison</i>	<i>t</i>	<i>p (perm)</i>
<i>Number of Species</i>	Amundsen vs Ross	5.01	< 0.01*
	Amundsen vs Peninsula	6.82	< 0.01
	Ross vs Peninsula	13.91	< 0.01*
<i>Abundance</i>	Amundsen vs Ross	4.86	< 0.01*
	Amundsen vs Peninsula	9.37	< 0.01
	Ross vs Peninsula	16.52	< 0.01*
<i>Shannon Index</i>	Amundsen vs Ross	3.67	< 0.01*
	Amundsen vs Peninsula	6.29	< 0.01*
	Ross vs Peninsula	11.84	< 0.01
<i>Simpson Index</i>	Amundsen vs Ross	1.54	0.16
	Amundsen vs Peninsula	2.08	0.07
	Ross vs Peninsula	1.11	0.31

Table S5 Eigen values, variation (%Variation), and percent of cumulative variation (Cum%Variation)for PC1 and PC2.

PC	Eigen values	%Variation	Cum%Variation
1	4.21	46.8	46.8
2	2.03	22.6	69.4

Table S6 Individual variable results from the distance based linear model with the eigen values for each variable for PC1 and PC2. Bold values indicate the most influential factors in PC1 and PC2 axes. Best step-wise distance based linear model results ($AICc = 3,015.8$, $R^2=0.42$, $p < 0.01$) included the bolded variables and explain 59.7% of the variation.

Variable	SS	Pseudo-F	P	Proportion	PC1	PC2
Maximum Fluorescence	1.14E+5	40.1	< 0.01	0.09	-0.423	0.012
Temperature	1.28E+5	45.7	< 0.01	0.10	-0.418	0.237
Salinity	1.13E+5	39.9	< 0.01	0.09	-0.333	0.437
pH	1.04E+5	36.2	< 0.01	0.08	-0.346	-0.306
Depth (m)	1.32E+5	47.4	< 0.01	0.11	-0.246	-0.369
Sea Ice Cover (%)	70,584	24.0	< 0.01	0.06	0.116	0.484
Longitude	57,098	19.2	< 0.01	0.05	0.145	-0.354
Latitude	88,279	30.4	< 0.01	0.07	0.332	0.370
Dissolved Oxygen (ml/l)	1.48E+5	53.7	< 0.01	0.12	0.460	-0.162

Table S7 Distance based linear model (DistLM) sequential test results providing the best environmental variables to predict the communities for these Antarctic shelf communities ($R^2 = 0.419$).

Variable	AICc	SS(trace)	Pseudo-F	P	Prop.	Cumul.	Residual df
+Dissolved Oxygen	3170	1.48E+05	53.716	0.0001	0.11892	0.11892	398
+Depth	3128.6	1.13E+05	45.463	0.0001	0.090532	0.20945	397
+Temperature	3104.4	62359	26.837	0.0001	0.050176	0.25962	396
+Max Sea Ice	3079.8	59309	27.215	0.0001	0.047722	0.30735	395
+Latitude	3047.8	70404	35.094	0.0001	0.05665	0.364	394
+Salinity	3030	38206	19.961	0.0001	0.030742	0.39474	393
+Max Fluorescence	3015.8	30002	16.284	0.0001	0.024141	0.41888	392

Figure S1 Results of the cluster+SIMPROF analysis showing three groups on the RDA plot which mostly represent the three regions except for the 28 labeled in Figure S1.

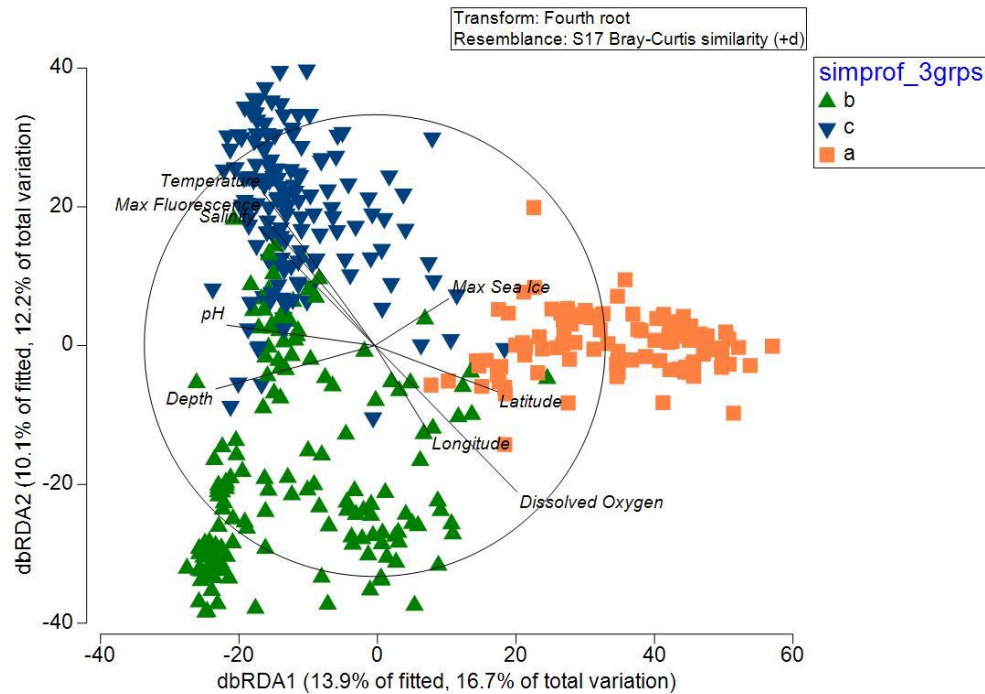


Figure S2 Cluster + SIMPROF analysis showing distinction between 3 groupings of community compositions from our 8 sites : 3 groups at 19.2% similarity, $\pi = 1.75$, $p = 0.01$, No. permutations = 9,999, Cophenetic correlation = 0.75. BE = Bellingshausen site, EA = Eastern Amundsen site,

MR = Mid Ross Sea site, NR = Near Ross Sea site, SI = Seymour Island site, and WG = Wright's Gulf site.

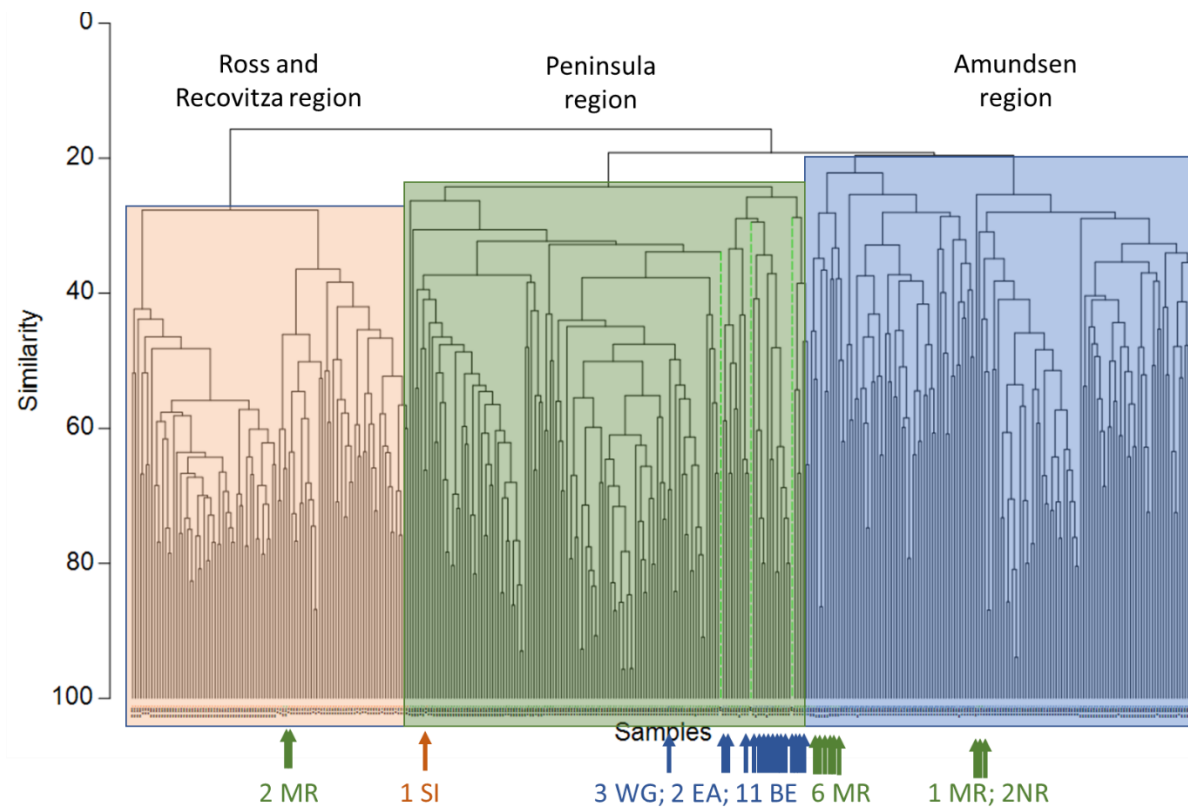


Figure S3 RDA plot showing the dominant macrofaunal taxa that contribute to the distinctions between the regions and sites (A) and the abundance (B).

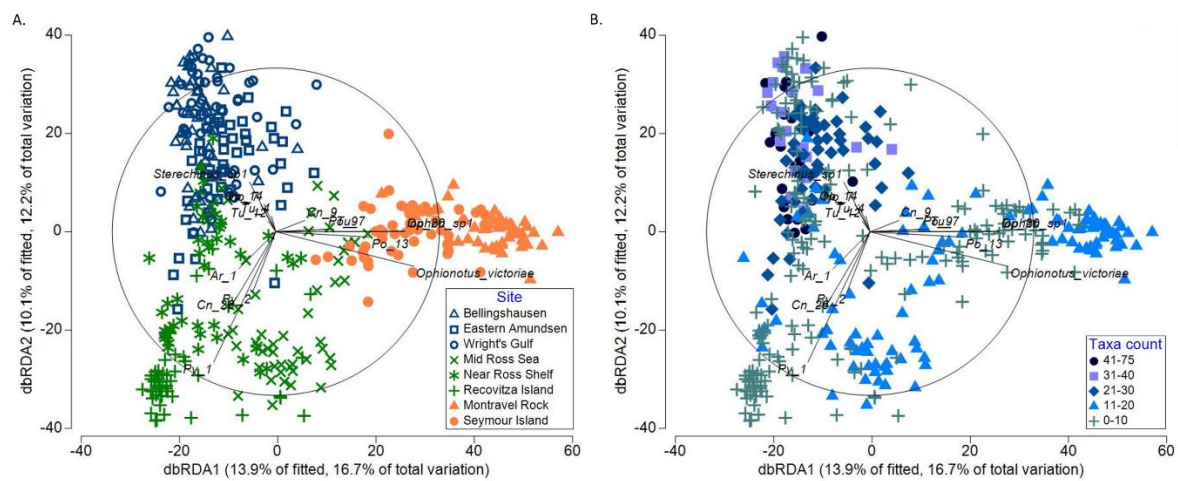


Figure S4 RDA plot showing the dominant macrofaunal taxa that contribute to the distinctions between the presence of phytodetritus (A) and the substrate (B).

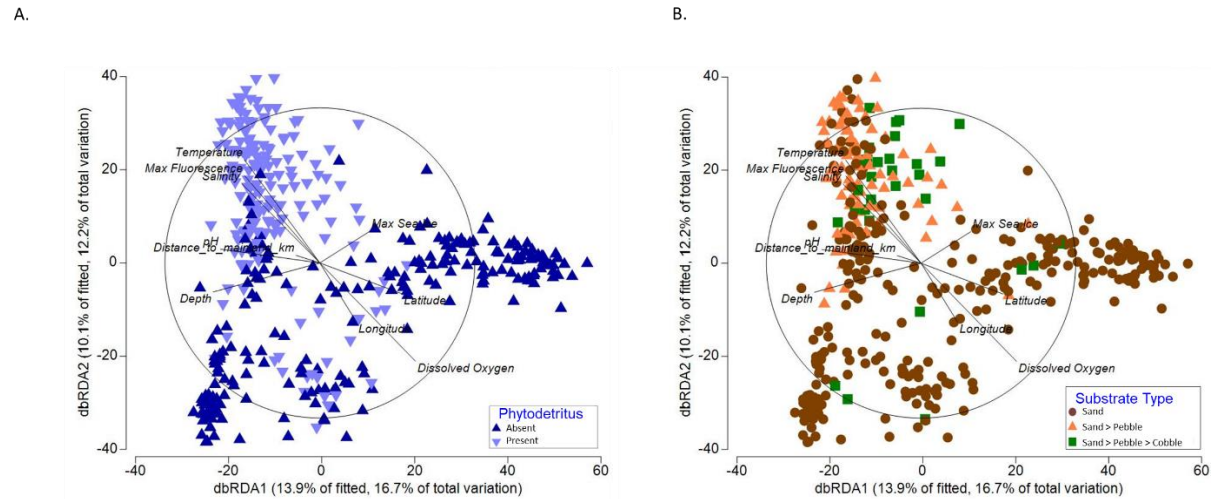


Figure S5 Boxplot of faunal abundance from the northernmost site to the southernmost site (left to right) showing the decreasing trend again with exception to Recovitza Island.

