

Supplementary Material for ‘New insights into the Weddell Sea ecosystem applying a quantitative network approach’

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Equations for calculating species properties

We used the estimation of the interaction strength as the weighted property for the species of the Weddell Sea food web. The main equation to estimate the interaction strength IS was:

$$IS = \alpha X_R \frac{m_R}{m_C}$$

where α is the search rate, X_R is the resource density, and m_R and m_C are the body mass for the resource and the consumer, respectively (Pawar, Dell, and Van M. Savage 2012). We assume the case were resources are scarce because this resembles field conditions, figure 3 e & f and equation 3 from Pawar’s paper. Then the search rate for 2D interactions (see main text) is calculated as

$$\alpha = \alpha_{2D} m_C^{0.68}$$

For 3D interactions is calculated as:

$$\alpha = \alpha_{3D} m_C^{1.05}$$

where α_{2D} and α_{3D} are the intercepts for each interaction dimensionality.

As the resource density X_R is not known we estimated it according to the equation S18 and supplementary figures 2i & j (individuals/m² - m³)

$$X_R = X_0 m_R^{-p_x}$$

where p_x is -0.79 for 2D and -0.86 for 3D.

As unweighted properties we calculated degree, trophic level and trophic similarity. The degree k is simply the total number of feeding links in which the species participates. It was calculated as:

$$L = \sum_{i=1}^S k_i$$

where L is the total number of feeding links for the i^{th} species in the food web; here denoted as k_i . The trophic level refers to a species’ vertical position in the food web, relative to the primary producers that support the community. Species that do not consume any other species in the web are primary producers or other basal resources; species with no predators are top predators; those with both predators and prey are intermediate consumers. Trophic levels TP were calculated for every species based on its position in the food web using the “prey-averaged technique”:

$$TP_i = \frac{\sum_j TP_j}{n_i} + 1$$

where n_i is the total number of prey taxa consumed by taxon i , and TP_j represents the trophic position of all prey items j of taxon i (Thompson et al. 2007). The trophic similarity TS between every pair of species in the food web was calculated using the following algorithm:

$$TS = \frac{c}{a + b + c}$$

where c is the number of predators and prey common to the two species, a is the number of predators and prey unique to one species, and b is the number of predators and prey unique to the other species. When the two species have the same set of predators and prey, $TS = 1$; when the two species have no common predators or common prey, $TS = 0$ (Martinez 1991).

Table 1 shows the mentioned properties for every species of the Weddell Sea food web.

Table 1: Weighted (interaction strength) and unweighted properties of the species of Weddell Sea food web. Ordered by decreasing mean interaction strength. IS_mean = mean interaction strength, TL = trophic level, TS = trophic similarity.

Species	IS_mean	Degree	TL	TS
Orcinus orca	0.0001825	26	5.03	0.037
Mesonychoteuthis hamiltoni	0.0001802	29	4.41	0.028
Mirounga leonina	0.0001203	56	4.87	0.080
Physeter macrocephalus	0.0001139	20	4.47	0.048
Leptonychotes weddelli	0.0001060	59	4.86	0.084
Galiteuthis glacialis	0.0001050	30	3.26	0.039
Ommatophoca rossii	0.0001042	56	4.87	0.080
Hydrurga leptonyx	0.0001031	67	4.72	0.094
Tursiops truncatus	0.0001011	20	4.47	0.048
Arctocephalus gazella	0.0000928	61	4.67	0.093
Lagenorhynchus cruciger	0.0000903	20	4.47	0.048
Gonatus antarcticus	0.0000895	36	4.31	0.046
Kondakovia longimana	0.0000846	25	3.26	0.039
Macrourus holotrachys	0.0000830	85	4.70	0.112
Notothenia marmorata	0.0000827	44	4.09	0.091
Parvicorbucula socialis	0.0000817	91	2.00	0.136
Martialia hyadesi	0.0000816	33	4.52	0.043
Aptenodytes forsteri	0.0000809	53	4.78	0.084
Lobodon carcinophaga	0.0000799	28	4.24	0.061
Macronectes halli	0.0000792	11	4.94	0.026
Cryodraco antarcticus	0.0000791	30	3.52	0.089
Dissostichus mawsoni	0.0000782	87	4.12	0.126
Champsoscephalus gunnari	0.0000762	46	3.72	0.086
Balaenoptera physalus	0.0000740	37	4.04	0.081
Moroteuthis ingens	0.0000724	46	4.04	0.074
Dacodraco hunteri	0.0000719	65	4.80	0.101
Macrourus whitsoni	0.0000714	92	4.55	0.124
Pagetopsis macropterus	0.0000708	76	4.64	0.113
Pygoscelis adeliae	0.0000694	7	3.78	0.026
Balaenoptera musculus	0.0000686	37	4.04	0.081
Alluroteuthis antarcticus	0.0000686	19	4.25	0.029
Pleuragramma antarcticum	0.0000681	69	3.58	0.076
Chionodraco hamatus	0.0000658	42	3.82	0.107
Muraenolepis marmoratus	0.0000639	36	3.19	0.104
Chionodraco myersi	0.0000636	37	4.09	0.094

Species	IS_mean	Degree	TL	TS
Balaenoptera acutorostrata	0.0000612	29	3.74	0.078
Daption capense	0.0000602	15	4.39	0.051
Chaenodraco wilsoni	0.0000594	32	3.30	0.091
Fulmarus glacialis	0.0000585	17	4.33	0.052
Macronectes giganteus	0.0000541	16	4.30	0.044
Pagetopsis maculatus	0.0000531	37	4.09	0.094
Megaptera novaeangliae	0.0000531	4	3.26	0.024
Psychroteuthis glacialis	0.0000529	23	3.91	0.054
Thalassoica antarctica	0.0000517	19	4.32	0.053
Gymnoscopelus nicholsi	0.0000499	59	3.71	0.087
Notothernia coriiceps	0.0000494	130	4.27	0.126
Gymnodraco acuticeps	0.0000490	61	3.70	0.118
Procellaria aequinoctialis	0.0000482	8	4.25	0.026
Sterna vittata	0.0000466	2	3.88	0.012
Pagodroma nivea	0.0000464	11	4.21	0.045
Trematomus hansonii	0.0000461	109	4.36	0.134
Halobaena caerulea	0.0000450	22	4.25	0.060
Aphrodroma brevirostris	0.0000449	11	4.20	0.045
Racovitzia glacialis	0.0000441	53	3.54	0.114
Gymnoscopelus opisthopterus	0.0000436	54	3.40	0.082
Bathylagus antarcticus	0.0000432	61	3.36	0.073
Pachyptila desolata	0.0000420	33	4.23	0.079
Cygnodraco mawsoni	0.0000419	84	3.98	0.139
Psilaster charcoti	0.0000417	59	4.40	0.082
Electrona antarctica	0.0000410	65	3.48	0.105
Pentanympyon antarcticum	0.0000385	140	3.93	0.099
Gerlachea australis	0.0000385	72	3.93	0.134
Pareledone charcoti	0.0000381	83	4.57	0.108
Trematomus loennbergii	0.0000374	133	4.11	0.115
Gymnoscopelus braueri	0.0000373	62	3.52	0.087
Protomyctophum bolini	0.0000367	61	3.44	0.077
Muraenolepis microps	0.0000360	88	3.69	0.133
Trematomus eulepidotus	0.0000358	71	3.64	0.117
Pareledone antarctica	0.0000354	107	4.41	0.120
Artedidraco orianae	0.0000352	52	3.76	0.117
Oceanites oceanicus	0.0000347	8	4.07	0.033
Notolepis coatsi	0.0000347	58	3.50	0.073
Sterna paradisaea	0.0000331	7	4.04	0.031
Prionodraco evansii	0.0000321	61	3.45	0.115
Pogonophryne marmorata	0.0000313	70	3.68	0.119
Trematomus pennellii	0.0000304	192	4.04	0.158
Callochiton gaussi	0.0000299	15	3.00	0.012
Trematomus nicolai	0.0000282	113	3.85	0.140
Pogonophryne scotti	0.0000280	104	3.93	0.142
Pogonophryne phyllopogon	0.0000268	103	3.92	0.145
Pogonophryne barsukovi	0.0000257	104	3.93	0.142
Abyssorhynchomene nodimanus	0.0000256	137	4.21	0.130
Pachycara brachycephalum	0.0000252	67	3.97	0.132
Eusirus perdentatus	0.0000249	114	3.87	0.171
Epimeria rubriques	0.0000245	85	3.47	0.157
Desmonema glaciale	0.0000240	19	3.72	0.058
Pogonophryne permitini	0.0000235	104	3.93	0.142

Species	IS_mean	Degree	TL	TS
<i>Hyperia macrocephala</i>	0.0000233	58	4.36	0.135
<i>Tryphosella murrayi</i>	0.0000229	96	3.88	0.160
<i>Puncturella conica</i>	0.0000227	80	2.98	0.093
<i>Euphausia superba</i>	0.0000224	163	2.27	0.120
<i>Epimeria robusta</i>	0.0000222	90	3.46	0.159
<i>Aethotaxis mitopteryx</i>	0.0000221	109	3.88	0.149
<i>Trematomus lepidorhinus</i>	0.0000214	95	3.81	0.123
<i>Callianira antarctica</i>	0.0000210	28	3.60	0.064
<i>Pseudosagitta gazellae</i>	0.0000205	11	3.18	0.029
<i>Primno macropa</i>	0.0000201	74	3.56	0.150
<i>Periphylla periphylla</i>	0.0000198	19	3.72	0.058
<i>Eusirus antarcticus</i>	0.0000194	53	3.17	0.148
<i>Harpagifer antarcticus</i>	0.0000193	78	3.80	0.102
<i>Pseudosagitta maxima</i>	0.0000191	15	3.16	0.044
<i>Probuccinum tenuistriatum</i>	0.0000190	41	4.24	0.117
<i>Colossendeis scotti</i>	0.0000189	135	3.93	0.099
<i>Ammonothea carolinensis</i>	0.0000189	135	3.93	0.099
<i>Nymphon gracillimum</i>	0.0000188	135	3.93	0.099
<i>Themisto gaudichaudii</i>	0.0000183	74	3.56	0.150
<i>Trematomus scotti</i>	0.0000183	146	3.82	0.153
<i>Beroe cucumis</i>	0.0000179	18	3.33	0.040
<i>Scolymastra joubini</i>	0.0000177	44	2.00	0.156
<i>Eurythenes gryllus</i>	0.0000173	210	3.53	0.136
<i>Clione antarctica</i>	0.0000171	56	2.58	0.075
<i>Anoxycalyx joubini</i>	0.0000170	48	2.00	0.153
<i>Euphausia crystallorophias</i>	0.0000166	132	2.08	0.119
<i>Artedidraco skottsbergi</i>	0.0000163	135	3.86	0.138
<i>Trematomus bernacchii</i>	0.0000162	118	3.62	0.104
<i>Paraceradocus gibber</i>	0.0000161	151	2.80	0.171
<i>Eunoe spica</i>	0.0000161	214	4.04	0.151
<i>Liljeborgia georgiana</i>	0.0000160	146	3.46	0.153
<i>Dipulmaris antarctica</i>	0.0000159	14	3.80	0.040
<i>Artedidraco loennbergi</i>	0.0000159	133	3.88	0.143
<i>Oediceroides emarginatus</i>	0.0000156	153	2.77	0.166
<i>Rossella nuda</i>	0.0000147	45	2.00	0.159
<i>Eunoe spica spicoides</i>	0.0000143	249	3.94	0.142
<i>Lyrocteis flavopallidus</i>	0.0000141	28	3.60	0.064
<i>Dolloidraco longedorsalis</i>	0.0000139	168	3.72	0.150
<i>Solmundella bitentaculata</i>	0.0000138	8	3.90	0.020
<i>Melphidippa antarctica</i>	0.0000136	121	3.04	0.119
<i>Cyllopus lucasii</i>	0.0000135	165	2.39	0.156
<i>Antarctomysis maxima</i>	0.0000133	105	2.36	0.133
<i>Clio pyramidata</i>	0.0000131	58	3.16	0.088
<i>Clione limacina</i>	0.0000129	51	3.87	0.073
<i>Oediceroides calmani</i>	0.0000125	153	2.77	0.166
<i>Bathypanoploea schellenbergi</i>	0.0000122	195	2.87	0.146
<i>Thysanoessa macrura</i>	0.0000122	145	2.41	0.117
<i>Epimeria georgiana</i>	0.0000120	139	2.53	0.169
<i>Euphausia frigida</i>	0.0000119	137	2.27	0.119
<i>Ophioparte gigas</i>	0.0000118	301	3.43	0.155
<i>Eukrohnia hamata</i>	0.0000117	38	3.16	0.075
<i>Waldeckia obesa</i>	0.0000117	197	3.52	0.138

Species	IS_mean	Degree	TL	TS
<i>Eucopia australis</i>	0.0000117	105	2.36	0.133
<i>Uristes gigas</i>	0.0000115	184	2.84	0.161
<i>Urticinopsis antarctica</i>	0.0000114	27	3.76	0.078
<i>Atolla wyvillei</i>	0.0000110	20	3.52	0.065
<i>Rhachotropis antarctica</i>	0.0000110	185	3.02	0.176
<i>Epimeria similis</i>	0.0000108	159	2.49	0.148
<i>Eulagisca gigantea</i>	0.0000106	142	3.80	0.167
<i>Laetmonice producta</i>	0.0000106	136	3.94	0.178
<i>Abyssorhomene plebs</i>	0.0000106	107	2.08	0.159
<i>Systenopora contracta</i>	0.0000104	31	2.00	0.125
<i>Epimeriella walkeri</i>	0.0000103	217	2.88	0.148
<i>Sagitta marri</i>	0.0000103	17	3.16	0.048
<i>Polyeunoa laevis</i>	0.0000102	111	3.82	0.168
<i>Aegires albus</i>	0.0000102	60	3.00	0.092
<i>Bargmannia</i>	0.0000102	56	3.33	0.091
<i>Abyssorhomene rossi</i>	0.0000101	164	2.65	0.156
<i>Stylocordyla borealis</i>	0.0000100	43	2.00	0.157
<i>Ceratoserolis meridionalis</i>	0.0000098	90	3.99	0.157
<i>Frontoserolis bouvieri</i>	0.0000098	90	3.99	0.157
<i>Kirkpatrickia variolosa</i>	0.0000096	46	2.00	0.152
<i>Rossella racovitzae</i>	0.0000095	48	2.00	0.154
<i>Rhodalina miranda</i>	0.0000093	20	3.52	0.065
<i>Dimophyes arctica</i>	0.0000093	20	3.52	0.065
<i>Diphyes antarctica</i>	0.0000093	20	3.52	0.065
<i>Serolella bouvieri</i>	0.0000093	90	3.99	0.157
<i>Serolis polita</i>	0.0000093	90	3.99	0.157
<i>Cnemidocarpa verrucosa</i>	0.0000091	7	2.00	0.041
<i>Epimeria macrodonta</i>	0.0000090	198	2.68	0.145
<i>Heterophoxus videns</i>	0.0000089	157	2.51	0.153
<i>Eunoe hartmanae</i>	0.0000088	152	3.78	0.167
<i>Odontaster meridionalis</i>	0.0000087	41	2.97	0.053
<i>Rhincalanus gigas</i>	0.0000086	166	2.15	0.135
<i>Tetilla leptoderma</i>	0.0000086	49	2.00	0.152
<i>Vibilia antarctica</i>	0.0000083	91	3.56	0.142
<i>Vibilia stebbingi</i>	0.0000083	90	3.56	0.143
<i>Conchoecia hettacra</i>	0.0000078	77	3.24	0.119
<i>Paraeuchaeta antarctica</i>	0.0000077	171	2.21	0.135
<i>Rossella antarctica</i>	0.0000076	43	2.00	0.157
<i>Rossella tarenja</i>	0.0000076	43	2.00	0.157
<i>Salpa thompsoni</i>	0.0000075	108	2.28	0.103
<i>Mycale acerata</i>	0.0000075	44	2.00	0.156
<i>Nematoflustra flagellata</i>	0.0000073	31	2.00	0.125
<i>Flustra antarctica</i>	0.0000073	31	2.00	0.125
<i>Calanus propinquus</i>	0.0000073	165	2.15	0.135
<i>Calanoides acutus</i>	0.0000072	166	2.17	0.136
<i>Euchaetomera antarcticus</i>	0.0000071	105	2.36	0.133
<i>Coscinodiscus oculoides</i>	0.0000071	81	1.00	0.202
<i>Hyperliella dilatata</i>	0.0000068	129	2.15	0.157
<i>Harmothoe crosetensis</i>	0.0000068	170	3.73	0.154
<i>Harmothoe hartmanae</i>	0.0000068	170	3.73	0.154
<i>Chorismus antarcticus</i>	0.0000067	213	3.14	0.139
<i>Limacina helicina antarctica</i>	0.0000067	62	3.16	0.092

Species	IS_mean	Degree	TL	TS
<i>Axociella nidificata</i>	0.0000067	43	2.00	0.157
<i>Labidiaster annulatus</i>	0.0000065	144	3.89	0.128
<i>Isodyctia toxophila</i>	0.0000065	43	2.00	0.157
<i>Isodyctia cavicornuta</i>	0.0000065	43	2.00	0.157
<i>Tentorium papillatum</i>	0.0000065	43	2.00	0.157
<i>Tentorium semisuberites</i>	0.0000065	43	2.00	0.157
<i>Tedania oxeata</i>	0.0000065	43	2.00	0.157
<i>Tedania tantulata</i>	0.0000065	43	2.00	0.157
<i>Tedania vanhoeffeni</i>	0.0000065	43	2.00	0.157
<i>Metridia gerlachei</i>	0.0000064	166	2.15	0.134
<i>Isodyctia steifera</i>	0.0000064	44	2.00	0.156
<i>Cassidulinoides parkerianus</i>	0.0000063	86	2.00	0.124
<i>Haliclona dancoi</i>	0.0000062	47	2.00	0.151
<i>Haliclona tenella</i>	0.0000062	47	2.00	0.151
<i>Pseudo-Nitzschia liniola</i>	0.0000061	81	1.00	0.202
<i>Reteporella hippocrepis</i>	0.0000061	31	2.00	0.125
<i>Cibicides refulgens</i>	0.0000061	89	2.00	0.129
<i>Globocassidulina crassa</i>	0.0000061	89	2.00	0.129
<i>Lenticulina antarctica</i>	0.0000060	90	2.00	0.130
<i>Neogloboquadrina pachyderma</i>	0.0000058	93	2.00	0.134
<i>Harmothoe spinosa</i>	0.0000057	212	3.72	0.146
<i>Nuttallochiton mirandus</i>	0.0000056	54	3.00	0.043
<i>Ophiurolepis brevirima</i>	0.0000056	223	3.01	0.143
<i>Ophiurolepis gelida</i>	0.0000055	206	2.99	0.140
<i>Ophionotus victoriae</i>	0.0000055	217	2.97	0.147
<i>Notocrangon antarcticus</i>	0.0000054	178	2.88	0.101
<i>Iophon radiatus</i>	0.0000054	43	2.00	0.157
<i>Clathria pauper</i>	0.0000054	43	2.00	0.157
<i>Primnoisis antarctica</i>	0.0000053	39	3.52	0.117
<i>Fasciculiporoides ramosa</i>	0.0000053	31	2.00	0.125
<i>Calyx arcuarius</i>	0.0000053	44	2.00	0.156
<i>Homaxinella balfourensis</i>	0.0000051	47	2.00	0.155
<i>Ophioceres incipiens</i>	0.0000050	154	2.69	0.120
<i>Astrocllamys bruneus</i>	0.0000050	37	3.52	0.095
<i>Odontaster validus</i>	0.0000050	234	3.30	0.143
<i>Flustra angusta</i>	0.0000047	31	2.00	0.125
<i>Camptoplites tricornis</i>	0.0000047	31	2.00	0.125
<i>Melicerita obliqua</i>	0.0000047	31	2.00	0.125
<i>Isoschizoporella tricuspis</i>	0.0000047	31	2.00	0.125
<i>Caulastraea curvata</i>	0.0000047	31	2.00	0.125
<i>Chondriovelum adeliense</i>	0.0000047	31	2.00	0.125
<i>Bathydorus spinosus</i>	0.0000047	43	2.00	0.157
<i>Phorbas areolatus</i>	0.0000047	43	2.00	0.157
<i>Phorbas glaberrima</i>	0.0000047	43	2.00	0.157
<i>Pseudo-Nitzschia subcurvata</i>	0.0000047	81	1.00	0.202
<i>Tritoniella belli</i>	0.0000046	87	2.98	0.085
<i>Manguinea fusiformis</i>	0.0000046	81	1.00	0.202
<i>Conchoecia antipoda</i>	0.0000045	135	2.33	0.142
<i>Latrunculia apicalis</i>	0.0000045	43	2.00	0.157
<i>Latrunculia brevis</i>	0.0000045	43	2.00	0.157
<i>Ophioperla ludwigi</i>	0.0000045	97	3.36	0.114
<i>Pseudo-Nitzschia heimii</i>	0.0000045	81	1.00	0.202

Species	IS_mean	Degree	TL	TS
<i>Polymastia isidis</i>	0.0000044	43	2.00	0.157
<i>Gorgonocephalus chiliensis</i>	0.0000044	25	3.17	0.080
<i>Polymastia invaginata</i>	0.0000044	44	2.00	0.156
<i>Trophon longstaffi</i>	0.0000044	34	3.00	0.098
<i>Ekmocucumis turqueti turqueti</i>	0.0000043	16	2.00	0.110
<i>Gersemia antarctica</i>	0.0000043	87	2.08	0.132
<i>Eucranta mollis</i>	0.0000043	68	2.00	0.158
<i>Austrodoris kerguelensis</i>	0.0000041	36	3.00	0.098
<i>Fissidentalium majorinum</i>	0.0000040	6	2.00	0.035
<i>Stellarima microtrias</i>	0.0000040	81	1.00	0.202
<i>Luidiaster gerlachei</i>	0.0000039	18	3.76	0.083
<i>Porosira pseudodenticulata</i>	0.0000039	81	1.00	0.202
<i>Nematocarcinus lanceopes</i>	0.0000039	90	2.39	0.111
<i>Pontiothauma ergata</i>	0.0000037	41	4.24	0.117
<i>Thalassiosira tumida</i>	0.0000036	81	1.00	0.202
<i>Thalassiosira ritscheri</i>	0.0000036	81	1.00	0.202
<i>Thalassiosira lentiginosa</i>	0.0000036	81	1.00	0.202
<i>Peraeospinosus pushkini</i>	0.0000034	104	2.36	0.101
<i>Austroflustra vulgaris</i>	0.0000034	31	2.00	0.125
<i>Barrukia cristata</i>	0.0000034	99	3.71	0.150
<i>Nitzschia lecointei</i>	0.0000034	81	1.00	0.202
<i>Molgula pedunculata</i>	0.0000033	5	2.00	0.048
<i>Harpovoluta charcoti</i>	0.0000033	79	3.02	0.089
<i>Actinocyclus actinochilus</i>	0.0000033	81	1.00	0.202
<i>Cinachyra barbata</i>	0.0000031	43	2.00	0.157
<i>Cinachyra antarctica</i>	0.0000031	44	2.00	0.157
<i>Bathydoris clavigera</i>	0.0000031	46	3.16	0.107
<i>Bathyplores gourdoni</i>	0.0000031	17	2.00	0.111
<i>Bathyplores bongraini</i>	0.0000031	17	2.00	0.111
<i>Porosira glacialis</i>	0.0000031	81	1.00	0.202
<i>Gnathia calva</i>	0.0000031	48	3.56	0.126
<i>Lageneschara lyrulata</i>	0.0000030	31	2.00	0.125
<i>Bostrychopora dentata</i>	0.0000030	31	2.00	0.125
<i>Solaster dawsoni</i>	0.0000030	29	3.72	0.079
<i>Tubularia ralphii</i>	0.0000029	53	3.44	0.122
<i>Corella eumyota</i>	0.0000029	5	2.00	0.048
<i>Aplidium vastum</i>	0.0000029	5	2.00	0.048
<i>Laternula elliptica</i>	0.0000029	30	2.00	0.094
<i>Aporocidaris milleri</i>	0.0000029	60	3.31	0.075
<i>Astrotoma agassizii</i>	0.0000028	223	2.86	0.123
<i>Echiniphimedia hodgsoni</i>	0.0000028	83	2.97	0.129
<i>Acodontaster conspicuus</i>	0.0000028	13	3.00	0.042
<i>Thalassiosira gracilis expecta</i>	0.0000028	81	1.00	0.202
<i>Ekmocucumis steineni</i>	0.0000028	16	2.00	0.110
<i>Ekmocucumis turqueti</i>	0.0000028	16	2.00	0.110
<i>Synoicum adareanum</i>	0.0000027	5	2.00	0.048
<i>Acodontaster hodgsoni</i>	0.0000027	13	3.00	0.042
<i>Actinocyclus spiritus</i>	0.0000027	81	1.00	0.202
<i>Limopsis marionensis</i>	0.0000027	29	2.00	0.094
<i>Notocidaris mortenseni</i>	0.0000026	54	3.00	0.046
<i>Molpadia musculus</i>	0.0000026	17	2.00	0.111
<i>Chiridota weddellensis</i>	0.0000026	17	2.00	0.111

Species	IS_mean	Degree	TL	TS
Ctenocidaris spinosa	0.0000026	75	3.25	0.075
Acodontaster capitatus	0.0000025	13	3.00	0.042
Notaeolidia gigas	0.0000025	28	3.90	0.105
Proboscia truncata	0.0000025	81	1.00	0.202
Gnathiphimedia mandibularis	0.0000025	102	3.00	0.115
Phyllocomus crocea	0.0000025	66	2.00	0.152
Azpeitia tabularis	0.0000025	81	1.00	0.202
Salpa gerlachei	0.0000025	76	2.08	0.089
Ihlea racovitzai	0.0000025	76	2.08	0.089
Promachocrinus kerguelensis	0.0000025	8	2.00	0.055
Cephalodiscus	0.0000024	4	2.00	0.038
Manguinea rigida	0.0000024	81	1.00	0.202
Iphimediella cyclogena	0.0000024	86	3.44	0.115
Rhizosolenia antennata	0.0000023	81	1.00	0.202
Eucampia antarctica	0.0000023	81	1.00	0.202
Anthometra adriani	0.0000023	7	2.00	0.047
Nacella concinna	0.0000022	21	3.00	0.083
Tritonia antarctica	0.0000022	28	2.50	0.104
Maxilliphimedia longipes	0.0000022	60	3.26	0.136
Thalassiosira trifulta	0.0000022	81	1.00	0.202
Pista spinifera	0.0000022	66	2.00	0.152
Terebella ehlersi	0.0000022	66	2.00	0.152
Nitzschia kerguelensis	0.0000022	81	1.00	0.202
Odontella weissflogii	0.0000022	81	1.00	0.202
Neobuccinum eatoni	0.0000022	34	3.00	0.100
Marseniopsis mollis	0.0000021	28	3.00	0.103
Marseniopsis conica	0.0000021	28	3.00	0.103
Alexandrella mixta	0.0000021	59	3.92	0.142
Ophioperla koehleri	0.0000021	21	2.00	0.075
Perknaster fuscus antarcticus	0.0000021	10	2.67	0.055
Thalassiosira gravida	0.0000021	81	1.00	0.202
Amauropsis rossiana	0.0000021	30	3.32	0.105
Paramoera walkeri	0.0000020	60	3.92	0.143
Ypsilocucumis turricata	0.0000020	17	2.00	0.111
Actinocyclus utricularis	0.0000020	81	1.00	0.202
Banquisia belgicae	0.0000020	81	1.00	0.202
Chaetoceros concavicornis	0.0000020	81	1.00	0.202
Chaetoceros criophilum	0.0000020	81	1.00	0.202
Corethron criophilum	0.0000020	81	1.00	0.202
Monocaulus parvula	0.0000020	115	2.37	0.145
Pseudo-Nitzschia prolongatoides	0.0000020	81	1.00	0.202
Thalassiosira frenguelliopsis	0.0000020	81	1.00	0.202
Ascidia challengeri	0.0000019	5	2.00	0.048
Thalassiosira australis	0.0000018	81	1.00	0.202
Thalassiosira gracilis	0.0000018	81	1.00	0.202
Lysasterias perrieri	0.0000018	30	3.46	0.088
Alcyonium antarcticum	0.0000017	23	1.00	0.096
Primnoella	0.0000017	23	2.00	0.102
Ainigmaptilon antarcticus	0.0000017	23	2.00	0.102
Armadillologorgia cyathella	0.0000017	23	2.00	0.102
Yolida eightsi	0.0000017	37	2.00	0.102
Chaetoceros flexuosum	0.0000017	81	1.00	0.202

Species	IS_mean	Degree	TL	TS
<i>Ctenocidaris perrieri</i>	0.0000017	68	3.27	0.067
<i>Glyptonotus antarcticus</i>	0.0000017	121	3.88	0.117
<i>Proboscia alata</i>	0.0000016	81	1.00	0.202
<i>Ctenocidaris gigantea</i>	0.0000016	70	3.27	0.071
<i>Cadulus dalli antarcticum</i>	0.0000016	6	2.00	0.035
<i>Sterechinus neumayeri</i>	0.0000016	141	2.68	0.119
<i>Ctenocidaris gilberti</i>	0.0000016	53	3.00	0.042
<i>Momoculodes scabriculosus</i>	0.0000016	49	2.00	0.144
<i>Pseudorchomene coatsi</i>	0.0000016	49	2.00	0.144
<i>Abyssocucumis liouvillei</i>	0.0000016	16	2.00	0.110
<i>Pyura setosa</i>	0.0000016	5	2.00	0.048
<i>Isotealia antarctica</i>	0.0000015	74	2.21	0.106
<i>Proboscia inermi</i>	0.0000015	81	1.00	0.202
<i>Achlyonice violaecuspidata</i>	0.0000015	17	2.00	0.111
<i>Pteraster affinis aculeatus</i>	0.0000015	12	3.00	0.042
<i>Taeniogyrus contortus</i>	0.0000014	20	2.00	0.110
<i>Pelagobia longicirrata</i>	0.0000014	137	2.12	0.132
<i>Pyura tunicata</i>	0.0000014	5	2.00	0.048
<i>Parschisturella ceruviata</i>	0.0000014	45	2.00	0.139
<i>Austrocidaris canaliculata</i>	0.0000014	25	3.77	0.030
<i>Psolus dubiosus</i>	0.0000014	16	2.00	0.110
<i>Psolus antarcticus</i>	0.0000014	16	2.00	0.110
<i>Clavularia frankiliana</i>	0.0000014	101	2.35	0.138
<i>Pyura discoveryi</i>	0.0000014	5	2.00	0.048
<i>Propeleda longicaudata</i>	0.0000014	25	2.00	0.073
<i>Chaetoceros bulbosum</i>	0.0000014	81	1.00	0.202
<i>Chaetoceros dictyota</i>	0.0000014	81	1.00	0.202
<i>Chaetoceros pelagicus</i>	0.0000014	81	1.00	0.202
<i>Fragilariopsis separanda</i>	0.0000014	81	1.00	0.202
<i>Baseodiscus antarcticus</i>	0.0000013	90	3.53	0.070
<i>Lineus longifissus</i>	0.0000013	90	3.53	0.070
<i>Parborlasia corrugatus</i>	0.0000013	90	3.53	0.070
<i>Vanadis antarctica</i>	0.0000013	140	2.34	0.165
<i>Psolus charcoti</i>	0.0000013	16	2.00	0.110
<i>Cuenotaster involutus</i>	0.0000013	8	2.00	0.061
<i>Newnesia antarctica</i>	0.0000013	28	2.00	0.114
<i>Marginella ealesa</i>	0.0000013	28	2.00	0.114
<i>Fragilariopsis linearis</i>	0.0000013	81	1.00	0.202
<i>Fragilariopsis nana</i>	0.0000013	81	1.00	0.202
<i>Fragilariopsis obliquecostata</i>	0.0000013	81	1.00	0.202
<i>Fragilariopsis rhombica</i>	0.0000013	81	1.00	0.202
<i>Fragilariopsis ritscheri</i>	0.0000013	81	1.00	0.202
<i>Silicularia rosea</i>	0.0000013	118	2.37	0.143
<i>Mesothuria lactea</i>	0.0000012	17	2.00	0.111
<i>Arcturidae</i>	0.0000012	30	2.00	0.117
<i>Notasterias armata</i>	0.0000012	12	3.00	0.042
<i>Pyura bouvetensis</i>	0.0000012	5	2.00	0.048
<i>Diplasterias brucei</i>	0.0000012	29	3.83	0.052
<i>Fragilariopsis kerguelensis</i>	0.0000012	81	1.00	0.202
<i>Notasterias stylophora</i>	0.0000012	12	3.00	0.042
<i>Trichotoxon reinboldii</i>	0.0000011	81	1.00	0.202
<i>Psolidium incertum</i>	0.0000011	17	2.00	0.111

Species	IS_mean	Degree	TL	TS
Trachythyone parva	0.0000011	17	2.00	0.111
Pseudostichopus mollis	0.0000011	17	2.00	0.111
Pseudostichopus villosus	0.0000011	17	2.00	0.111
Falsimargarita gemma	0.0000011	28	2.00	0.114
Lophaster gaini	0.0000011	12	3.00	0.042
Limopsis lillei	0.0000011	29	2.00	0.094
Sterechinus antarcticus	0.0000010	121	2.47	0.101
Aega antarctica	0.0000010	30	2.00	0.117
Anthomastus bathyproctus	0.0000010	84	2.02	0.133
Edwardsia meridionalis	0.0000010	75	2.15	0.113
Isosicyonis alba	0.0000010	75	2.15	0.113
Macroptychaster accrescens	0.0000010	46	3.80	0.076
Fragilariopsis sublinearis	0.0000010	81	1.00	0.202
Scotoplanes globosa	0.0000010	17	2.00	0.111
Austrosignum grande	0.0000009	89	2.00	0.138
Chaetoceros neglectum	0.0000009	81	1.00	0.202
Fragilariopsis curta	0.0000009	81	1.00	0.202
Fragilariopsis pseudonana	0.0000009	81	1.00	0.202
Fragilariopsis vanheurckii	0.0000009	81	1.00	0.202
Nitzschia neglecta	0.0000009	81	1.00	0.202
Sediment	0.0000009	57	1.00	0.064
Ophiacantha antarctica	0.0000009	90	2.16	0.125
Echinopsolus acanthocola	0.0000009	16	2.00	0.110
Laetmogone wyvillethompsoni	0.0000008	17	2.00	0.111
Elpidia glacialis	0.0000008	17	2.00	0.111
Ampelisca richardsoni	0.0000008	108	2.00	0.159
Sycozoa sigillinoides	0.0000008	5	2.00	0.048
Perknaster densus	0.0000008	7	2.00	0.060
Alacia hettacra	0.0000007	124	2.08	0.130
Alacia belgicae	0.0000007	124	2.08	0.130
Metaconchoecia isocheira	0.0000007	124	2.08	0.130
Boroecia antipoda	0.0000007	124	2.08	0.130
Gyrodinium lachryama	0.0000007	35	2.00	0.107
Cylindrotheca closterium	0.0000007	81	1.00	0.202
Lissarca notorcadensis	0.0000007	32	2.00	0.094
Oswaldella antarctica	0.0000007	93	2.00	0.128
Cycethra verrucosa mawsoni	0.0000007	7	2.00	0.060
Rhynchonereella bongraini	0.0000007	84	2.12	0.114
Bathybiaster loripes	0.0000007	101	2.67	0.131
Notioceramus anomalus	0.0000007	7	2.00	0.060
Navicula glaciei	0.0000007	81	1.00	0.202
Navicula schefferae	0.0000007	81	1.00	0.202
Perknaster sladeni	0.0000006	7	2.00	0.060
Fragilariopsis cylindrus	0.0000006	81	1.00	0.202
Thalassiosira antarctica	0.0000006	81	1.00	0.202
Liothyrella uva	0.0000006	2	2.00	0.041
Liothyrella uva antarctica	0.0000006	2	2.00	0.041
Magellania fragilis	0.0000006	2	2.00	0.041
Natatolana oculata	0.0000006	30	2.00	0.117
Natatolana meridionalis	0.0000006	31	2.00	0.117
Natatolana obtusata	0.0000006	31	2.00	0.116
Parmaphorella mawsoni	0.0000005	86	2.00	0.128

Species	IS_mean	Degree	TL	TS
Cyclocardia astartoides	0.0000005	18	2.00	0.075
Amphidinium hadai	0.0000005	35	2.00	0.107
Kampylaster incurvatus	0.0000004	7	2.00	0.060
Oradarea edentata	0.0000004	115	2.08	0.154
Djerboa furcipes	0.0000004	116	2.08	0.154
Haplocheira plumosa	0.0000004	115	2.08	0.156
Diastylis mawsoni	0.0000004	8	2.00	0.044
Ekleptostylis debroyeri	0.0000004	8	2.00	0.044
Munna globicauda	0.0000004	30	2.00	0.117
Porania antarctica	0.0000004	72	2.12	0.108
Nototanais dimorphus	0.0000004	69	2.00	0.104
Porania antarctica glabra	0.0000004	72	2.12	0.108
Nototanais antarcticus	0.0000004	70	2.00	0.105
Chaetoceros socialis	0.0000003	81	1.00	0.202
Magellania joubini	0.0000003	2	2.00	0.041
Compsothyris racovitzae	0.0000003	2	2.00	0.041
Golfingia margaritacea margaritacea	0.0000003	2	2.00	0.047
Phytodetritus	0.0000002	226	1.00	0.094
Alomasoma belyaevi	0.0000002	2	2.00	0.047
Phascolion strombi	0.0000002	2	2.00	0.047
Golfingia nordenskojoeldi	0.0000002	2	2.00	0.047
Crania lecointei	0.0000002	2	2.00	0.041
Hamingia	0.0000001	2	2.00	0.047
Camylaspis maculata	0.0000001	66	2.00	0.097
Maxmuelleria faex	0.0000001	2	2.00	0.047
Eudorella splendida	0.0000001	68	2.00	0.102
Vaunthompsonia indermis	0.0000001	68	2.00	0.102
Golfingia anderssoni	0.0000001	2	2.00	0.047
Golfingia ohlini	0.0000001	2	2.00	0.047
Golfingia mawsoni	0.0000001	2	2.00	0.047
Echiurus antarcticus	0.0000001	2	2.00	0.047
Dictyocha speculum	0.0000001	30	1.00	0.110
Bodo saltans	0.0000000	32	3.00	0.108
Phaeocystis antarctica	0.0000000	30	1.00	0.110
Silicoflagellata	0.0000000	30	1.00	0.110
Abatus curvidens	0.0000000	2	2.00	0.039
Abatus shackeltoni	0.0000000	2	2.00	0.039
Abatus cavernosus	0.0000000	2	2.00	0.039
Abatus nimrodi	0.0000000	2	2.00	0.039

Extinction simulations and stability

We performed extinction simulations, one at a time, for every species in the Weddell Sea food web. In order to assess the impact on the stability of the food web we statistically compared a stability index before and after performing the extinction. For this, we applied Quasi-Sign Stability QSS that calculates the proportion of matrices that are locally stable. These matrices are created by sampling the values of the community matrix (the Jacobian) from a uniform distribution, preserving the sign structure: positive for predators and negative for prey. This stability index was originally proposed by Allesina and Pascual (2008). We used the R package multiweb to calculate QSS and to test the QSS difference before and after performing the extinction (Saravia, 2019). Two functions were specifically created for these analyses: ‘calc_QSS’ and ‘calc_QSS_extinction_dif’. For the QSS calculation we used a uniform distribution between 0 and maximum

values given by the parameters negative, positive and self-damping, corresponding to the sign of interactions and self-limitation effect. Since we had estimated the interaction strength for each interaction of the Weddell Sea food web, the limits of the distribution were $negative * -x, positive * x, self - damping * x$, where x is the value of the strength for the interaction in question. We performed 1000 extinction simulations for every species. Our results showed that the proportion of Jacobians that were locally stable was zero. Thus, we considered the mean maximum eigenvalue as the stability index, hereafter *QSS*. For testing the *QSS* difference before and after the extinction we performed an Anderson-Darling test considering a p-value < 0.01 (Scholz and Stephens 1987).

Table 2 summarizes the *QSS* results for every species extinction of the Weddell Sea food web.

Table 2: Summary of Quasi-Sign Stability (QSS) results before and after performing extinction simulations in the Weddell Sea food web. Ordered by increasing p-values of the Anderson-Darling test. QSS_all = Mean Quasi-Sign Stability before the extinction (whole food web), QSS_ext = Mean Quasi-Sign Stability after the extinction, difQSS = QSS difference between ‘QSS_all’ and ‘QSS_ext’, AD_pvalue = p-value for the Anderson-Darling test.

Species	QSS_all	QSS_ext	difQSS	AD_pvalue
Orcinus orca	0.0005504	0.0005037	4.67e-05	2.0000e-41
Macrourus holotrachys	0.0005504	0.0005149	3.55e-05	2.7314e-23
Pagetopsis macropterus	0.0005504	0.0005685	-1.80e-05	2.3777e-12
Abyssorhomene nodimanus	0.0005504	0.0005274	2.30e-05	8.5197e-10
Dissostichus mawsoni	0.0005504	0.0005287	2.17e-05	1.5670e-09
Macrourus whitsoni	0.0005504	0.0005292	2.12e-05	3.3043e-08
Hydrurga leptonyx	0.0005504	0.0005300	2.04e-05	9.6647e-06
Mesonychoteuthis hamiltoni	0.0005504	0.0005322	1.82e-05	4.5869e-05
Champscephalus gunnari	0.0005504	0.0005321	1.83e-05	6.7872e-05
Notothenia marmorata	0.0005504	0.0005345	1.60e-05	1.2256e-04
Arctocephalus gazella	0.0005504	0.0005331	1.73e-05	2.0857e-04
Trematomus pennellii	0.0005504	0.0005360	1.44e-05	1.0022e-03
Mirounga leonina	0.0005504	0.0005364	1.41e-05	1.2783e-03
Notothenia coriiceps	0.0005504	0.0005360	1.44e-05	1.6612e-03
Maxillipimedia longipes	0.0005504	0.0005549	-4.50e-06	9.7397e-03
Psychroteuthis glacialis	0.0005504	0.0005399	1.06e-05	2.3579e-02
Parvicorbucula socialis	0.0005504	0.0005536	-3.20e-06	3.1703e-02
Ommatophoca rossii	0.0005504	0.0005390	1.15e-05	3.2259e-02
Diplasterias brucei	0.0005504	0.0005512	-8.00e-07	3.5761e-02
Notasterias armata	0.0005504	0.0005519	-1.50e-06	4.4090e-02
Trematomus loennbergii	0.0005504	0.0005416	8.80e-06	4.4105e-02
Pachyptila desolata	0.0005504	0.0005397	1.07e-05	4.5519e-02
Magellania fragilis	0.0005504	0.0005543	-3.90e-06	4.6226e-02
Pseudorhomene coatsi	0.0005504	0.0005523	-1.90e-06	4.9689e-02
Molpadia musculus	0.0005504	0.0005492	1.30e-06	4.9710e-02
Tentorium papillatum	0.0005504	0.0005378	1.26e-05	5.1386e-02
Epimeria robusta	0.0005504	0.0005505	-1.00e-07	5.4021e-02
Munna globicauda	0.0005504	0.0005488	1.60e-06	5.5704e-02
Chionodraco myersi	0.0005504	0.0005385	1.19e-05	5.6001e-02
Trematomus hansonii	0.0005504	0.0005419	8.50e-06	5.6461e-02
Gymnodraco acuticeps	0.0005504	0.0005393	1.12e-05	5.9005e-02
Kondakovia longimana	0.0005504	0.0005409	9.50e-06	6.1225e-02
Ascidia challengerii	0.0005504	0.0005487	1.80e-06	6.4870e-02
Bostrychopora dentata	0.0005504	0.0005528	-2.30e-06	6.5496e-02

Species	QSS_all	QSS_ext	difQSS	AD_pvalue
<i>Gymnoscopelus nicholsi</i>	0.0005504	0.0005374	1.30e-05	6.5803e-02
<i>Aporocidaris milleri</i>	0.0005504	0.0005484	2.00e-06	7.6558e-02
<i>Corethron criophilum</i>	0.0005504	0.0005489	1.50e-06	7.6593e-02
<i>Fulmarus glacialis</i>	0.0005504	0.0005539	-3.50e-06	8.0093e-02
<i>Primno macropa</i>	0.0005504	0.0005517	-1.20e-06	8.2341e-02
<i>Gonatus antarcticus</i>	0.0005504	0.0005406	9.80e-06	8.2731e-02
<i>Chiridota weddellensis</i>	0.0005504	0.0005388	1.16e-05	8.5019e-02
<i>Thalassiosira gracilis expecta</i>	0.0005504	0.0005486	1.90e-06	8.6326e-02
<i>Nitzschia neglecta</i>	0.0005504	0.0005520	-1.50e-06	8.6946e-02
<i>Paraeuchaeta antarctica</i>	0.0005504	0.0005526	-2.20e-06	8.7927e-02
<i>Balaenoptera acutorostrata</i>	0.0005504	0.0005495	9.00e-07	9.0060e-02
<i>Caulastraia curvata</i>	0.0005504	0.0005482	2.20e-06	9.5639e-02
<i>Phaeocystis antarctica</i>	0.0005504	0.0005530	-2.50e-06	1.1057e-01
<i>Trematomus bernacchii</i>	0.0005504	0.0005407	9.70e-06	1.1268e-01
<i>Melphidippa antarctica</i>	0.0005504	0.0005500	4.00e-07	1.1369e-01
<i>Lagenorhynchus cruciger</i>	0.0005504	0.0005541	-3.60e-06	1.1419e-01
<i>Proboscia alata</i>	0.0005504	0.0005509	-5.00e-07	1.1590e-01
<i>Pareledone antarctica</i>	0.0005504	0.0005422	8.30e-06	1.1648e-01
<i>Limopsis lillei</i>	0.0005504	0.0005493	1.10e-06	1.1732e-01
<i>Balaenoptera physalus</i>	0.0005504	0.0005536	-3.20e-06	1.1900e-01
<i>Sterna paradisaea</i>	0.0005504	0.0005539	-3.40e-06	1.1915e-01
<i>Macroptychaster accrescens</i>	0.0005504	0.0005532	-2.80e-06	1.1956e-01
<i>Bathydoris clavigera</i>	0.0005504	0.0005534	-2.90e-06	1.2000e-01
<i>Clione antarctica</i>	0.0005504	0.0005490	1.40e-06	1.2135e-01
<i>Nematoflustra flagellata</i>	0.0005504	0.0005417	8.70e-06	1.2468e-01
<i>Limopsis marionensis</i>	0.0005504	0.0005464	4.00e-06	1.3052e-01
<i>Trematomus nicolai</i>	0.0005504	0.0005414	9.00e-06	1.3080e-01
<i>Liothyrella uva antarctica</i>	0.0005504	0.0005500	4.00e-07	1.3244e-01
<i>Coscinodiscus oculoides</i>	0.0005504	0.0005478	2.70e-06	1.3517e-01
<i>Bathylagus antarcticus</i>	0.0005504	0.0005422	8.30e-06	1.4036e-01
<i>Harpovoluta charcoti</i>	0.0005504	0.0005510	-6.00e-07	1.4080e-01
<i>Abatus curvidens</i>	0.0005504	0.0005471	3.40e-06	1.4121e-01
<i>Anthometra adriani</i>	0.0005504	0.0005535	-3.10e-06	1.4617e-01
<i>Acodontaster conspicuus</i>	0.0005504	0.0005522	-1.80e-06	1.4965e-01
<i>Psolus charcoti</i>	0.0005504	0.0005407	9.70e-06	1.5151e-01
<i>Phascolion strombi</i>	0.0005504	0.0005475	2.90e-06	1.5159e-01
<i>Notocrangon antarcticus</i>	0.0005504	0.0005521	-1.60e-06	1.5231e-01
<i>Newnesia antarctica</i>	0.0005504	0.0005459	4.50e-06	1.5797e-01
<i>Oradarea edentata</i>	0.0005504	0.0005495	9.00e-07	1.6235e-01
<i>Navicula schefferae</i>	0.0005504	0.0005507	-2.00e-07	1.6871e-01
<i>Clione limacina</i>	0.0005504	0.0005466	3.80e-06	1.7135e-01
<i>Chaetoceros bulbosum</i>	0.0005504	0.0005408	9.60e-06	1.7201e-01
<i>Mycale acerata</i>	0.0005504	0.0005529	-2.40e-06	1.7240e-01
<i>Frontoserolis bouvieri</i>	0.0005504	0.0005510	-5.00e-07	1.7690e-01
<i>Echiniphimedia hodgsoni</i>	0.0005504	0.0005520	-1.60e-06	1.7770e-01
<i>Aplidium vastum</i>	0.0005504	0.0005479	2.60e-06	1.7942e-01
<i>Abyssorhomene plebs</i>	0.0005504	0.0005438	6.60e-06	1.8104e-01
<i>Macronectes giganteus</i>	0.0005504	0.0005493	1.20e-06	1.8266e-01
<i>Falsimargarita gemma</i>	0.0005504	0.0005516	-1.10e-06	1.8292e-01
<i>Ammotheca carolinensis</i>	0.0005504	0.0005519	-1.40e-06	1.8342e-01
<i>Nitzschia leointei</i>	0.0005504	0.0005438	6.60e-06	1.8506e-01
<i>Laetmogone wyvillethompsoni</i>	0.0005504	0.0005416	8.80e-06	1.8803e-01

Species	QSS_all	QSS_ext	difQSS	AD_pvalue
Themisto gaudichaudii	0.0005504	0.0005521	-1.70e-06	1.9483e-01
Rossella antarctica	0.0005504	0.0005513	-9.00e-07	1.9487e-01
Rossella tarenja	0.0005504	0.0005459	4.60e-06	1.9665e-01
Trematomus lepidorhinus	0.0005504	0.0005492	1.20e-06	1.9802e-01
Porosira pseudodenticulata	0.0005504	0.0005475	2.90e-06	2.0309e-01
Macroneustes halli	0.0005504	0.0005405	9.90e-06	2.0651e-01
Terebella ehlersi	0.0005504	0.0005549	-4.50e-06	2.0712e-01
Oceanites oceanicus	0.0005504	0.0005491	1.30e-06	2.1082e-01
Latrunculia apicalis	0.0005504	0.0005508	-4.00e-07	2.1278e-01
Colossendeis scotti	0.0005504	0.0005483	2.20e-06	2.1328e-01
Megaptera novaeangliae	0.0005504	0.0005465	3.90e-06	2.1379e-01
Pseudo-Nitzschia prolongatoides	0.0005504	0.0005489	1.60e-06	2.1381e-01
Iphimediella cyclogena	0.0005504	0.0005468	3.60e-06	2.1869e-01
Pentanymphe antarcticum	0.0005504	0.0005414	9.10e-06	2.2014e-01
Desmonema glaciale	0.0005504	0.0005479	2.60e-06	2.2128e-01
Harmotoe hartmanae	0.0005504	0.0005462	4.20e-06	2.2510e-01
Isoschizoporella tricuspidis	0.0005504	0.0005509	-5.00e-07	2.2662e-01
Sterechinus antarcticus	0.0005504	0.0005454	5.00e-06	2.2707e-01
Systenopora contracta	0.0005504	0.0005512	-7.00e-07	2.3017e-01
Aegires albus	0.0005504	0.0005404	1.00e-05	2.3063e-01
Natatolana meridionalis	0.0005504	0.0005466	3.90e-06	2.3246e-01
Epimeria macrodonta	0.0005504	0.0005498	6.00e-07	2.3402e-01
Golfingia margaritacea margaritacea	0.0005504	0.0005479	2.50e-06	2.3601e-01
Eulagisca gigantea	0.0005504	0.0005498	6.00e-07	2.3679e-01
Thalassoica antarctica	0.0005504	0.0005434	7.10e-06	2.3838e-01
Sagitta marri	0.0005504	0.0005461	4.30e-06	2.3864e-01
Pagodroma nivea	0.0005504	0.0005517	-1.20e-06	2.3992e-01
Liljeborgia georgiana	0.0005504	0.0005513	-9.00e-07	2.4072e-01
Oswaldella antarctica	0.0005504	0.0005417	8.80e-06	2.5027e-01
Procellaria aequinoctialis	0.0005504	0.0005493	1.10e-06	2.5057e-01
Rhachotropis antarctica	0.0005504	0.0005434	7.00e-06	2.5210e-01
Conchoecia hettacra	0.0005504	0.0005495	9.00e-07	2.5280e-01
Sterna vittata	0.0005504	0.0005408	9.60e-06	2.5487e-01
Artedidraco skottsbergi	0.0005504	0.0005492	1.20e-06	2.5741e-01
Lageneschara lyrulata	0.0005504	0.0005495	9.00e-07	2.5800e-01
Silicioflagellata	0.0005504	0.0005464	4.10e-06	2.5803e-01
Vibilia antarctica	0.0005504	0.0005458	4.70e-06	2.5831e-01
Pleuragramma antarcticum	0.0005504	0.0005436	6.80e-06	2.5835e-01
Golfingia mawsoni	0.0005504	0.0005500	4.00e-07	2.6142e-01
Rossella racovitzae	0.0005504	0.0005518	-1.40e-06	2.6274e-01
Proboscia inermi	0.0005504	0.0005499	5.00e-07	2.6312e-01
Moroteuthis ingens	0.0005504	0.0005502	2.00e-07	2.6714e-01
Alcyonium antarcticum	0.0005504	0.0005479	2.50e-06	2.6834e-01
Dacodraco hunteri	0.0005504	0.0005433	7.10e-06	2.6854e-01
Gersemia antarctica	0.0005504	0.0005428	7.60e-06	2.6966e-01
Promachocrinus kerguelensis	0.0005504	0.0005462	4.30e-06	2.7042e-01
Chionodraco hamatus	0.0005504	0.0005491	1.30e-06	2.7095e-01
Phytodetritus	0.0005504	0.0005454	5.10e-06	2.7109e-01
Harmothoe spinosa	0.0005504	0.0005447	5.70e-06	2.7133e-01
Silicularia rosea	0.0005504	0.0005535	-3.00e-06	2.7342e-01
Cylindrotheca closterium	0.0005504	0.0005445	5.90e-06	2.7414e-01
Homaxinella balfourensis	0.0005504	0.0005421	8.30e-06	2.7484e-01

Species	QSS_all	QSS_ext	difQSS	AD_pvalue
<i>Thalassiosira gravida</i>	0.0005504	0.0005477	2.70e-06	2.7610e-01
<i>Porosira glacialis</i>	0.0005504	0.0005492	1.30e-06	2.8185e-01
<i>Protomyctophum bolini</i>	0.0005504	0.0005445	5.90e-06	2.8225e-01
<i>Physeter macrocephalus</i>	0.0005504	0.0005479	2.50e-06	2.8229e-01
<i>Pseudo-Nitzschia heimii</i>	0.0005504	0.0005506	-2.00e-07	2.8321e-01
<i>Melicerita obliqua</i>	0.0005504	0.0005463	4.10e-06	2.8395e-01
<i>Manguinea fusiformis</i>	0.0005504	0.0005471	3.40e-06	2.8419e-01
<i>Pseudosagitta gazellae</i>	0.0005504	0.0005414	9.10e-06	2.8740e-01
<i>Thalassiosira lentiginosa</i>	0.0005504	0.0005492	1.20e-06	2.9166e-01
<i>Pelagobia longicirrata</i>	0.0005504	0.0005514	-1.00e-06	2.9261e-01
<i>Eusirus antarcticus</i>	0.0005504	0.0005492	1.20e-06	2.9309e-01
<i>Yolida eightsi</i>	0.0005504	0.0005445	5.90e-06	2.9379e-01
<i>Thalassiosira gracilis</i>	0.0005504	0.0005476	2.80e-06	2.9773e-01
<i>Golfingia anderssoni</i>	0.0005504	0.0005451	5.30e-06	2.9972e-01
<i>Acodontaster hodgsoni</i>	0.0005504	0.0005482	2.20e-06	3.0012e-01
<i>Laetmonice producta</i>	0.0005504	0.0005475	2.90e-06	3.0859e-01
<i>Tritoniella belli</i>	0.0005504	0.0005452	5.20e-06	3.0893e-01
<i>Ceratoserolis meridionalis</i>	0.0005504	0.0005490	1.40e-06	3.1032e-01
<i>Flustra angusta</i>	0.0005504	0.0005487	1.70e-06	3.1575e-01
<i>Eusirus perdentatus</i>	0.0005504	0.0005427	7.70e-06	3.1576e-01
<i>Electrona antarctica</i>	0.0005504	0.0005521	-1.60e-06	3.1614e-01
<i>Eudorella splendida</i>	0.0005504	0.0005513	-9.00e-07	3.1784e-01
<i>Daption capense</i>	0.0005504	0.0005483	2.10e-06	3.1923e-01
<i>Chaetoceros neglectum</i>	0.0005504	0.0005481	2.30e-06	3.1975e-01
<i>Neobuccinum eatoni</i>	0.0005504	0.0005496	8.00e-07	3.2433e-01
<i>Martialia hyadesi</i>	0.0005504	0.0005423	8.20e-06	3.2439e-01
<i>Vaunthompsonia indermis</i>	0.0005504	0.0005509	-5.00e-07	3.2604e-01
<i>Notioceramus anomalus</i>	0.0005504	0.0005448	5.60e-06	3.2613e-01
<i>Dictyocha speculum</i>	0.0005504	0.0005421	8.40e-06	3.2716e-01
<i>Periphylla periphylla</i>	0.0005504	0.0005487	1.70e-06	3.2754e-01
<i>Marseniopsis conica</i>	0.0005504	0.0005458	4.70e-06	3.2923e-01
<i>Pseudosagitta maxima</i>	0.0005504	0.0005511	-7.00e-07	3.3056e-01
<i>Scotoplanes globosa</i>	0.0005504	0.0005466	3.80e-06	3.3130e-01
<i>Ihlea racovitzai</i>	0.0005504	0.0005507	-3.00e-07	3.3608e-01
<i>Odontella weissflogii</i>	0.0005504	0.0005425	7.90e-06	3.3845e-01
<i>Cyclocardia astartoides</i>	0.0005504	0.0005488	1.70e-06	3.4142e-01
<i>Proboscia truncata</i>	0.0005504	0.0005447	5.70e-06	3.4331e-01
<i>Epimeriella walkeri</i>	0.0005504	0.0005453	5.10e-06	3.4533e-01
<i>Kirkpatrickia variolosa</i>	0.0005504	0.0005429	7.50e-06	3.4564e-01
<i>Muraenolepis microps</i>	0.0005504	0.0005420	8.50e-06	3.4568e-01
<i>Natatolana oculata</i>	0.0005504	0.0005511	-7.00e-07	3.4743e-01
<i>Alexandrella mixta</i>	0.0005504	0.0005478	2.60e-06	3.4849e-01
<i>Galiteuthis glacialis</i>	0.0005504	0.0005456	4.80e-06	3.4934e-01
<i>Eunoe spica</i>	0.0005504	0.0005447	5.70e-06	3.4969e-01
<i>Synoicum adareanum</i>	0.0005504	0.0005486	1.80e-06	3.5240e-01
<i>Eunoe spica spicoides</i>	0.0005504	0.0005505	-1.00e-07	3.5305e-01
<i>Euphausia superba</i>	0.0005504	0.0005420	8.50e-06	3.5330e-01
<i>Fragilariopsis separanda</i>	0.0005504	0.0005499	5.00e-07	3.5391e-01
<i>Marginella ealesa</i>	0.0005504	0.0005505	0.00e+00	3.5591e-01
<i>Euphausia crystallorophias</i>	0.0005504	0.0005418	8.60e-06	3.5646e-01
<i>Clio pyramidata</i>	0.0005504	0.0005433	7.10e-06	3.5820e-01
<i>Nuttallochiton mirandus</i>	0.0005504	0.0005514	-1.00e-06	3.5852e-01

Species	QSS_all	QSS_ext	difQSS	AD_pvalue
Sediment	0.0005504	0.0005488	1.60e-06	3.5913e-01
Anthomastus bathyproctus	0.0005504	0.0005424	8.00e-06	3.6020e-01
Perknaster fuscus antarcticus	0.0005504	0.0005485	1.90e-06	3.6370e-01
Psolus dubiosus	0.0005504	0.0005463	4.10e-06	3.6458e-01
Actinocyclus spiritus	0.0005504	0.0005470	3.40e-06	3.6591e-01
Baseodiscus antarcticus	0.0005504	0.0005463	4.10e-06	3.7022e-01
Isodyctia cavicornuta	0.0005504	0.0005536	-3.10e-06	3.7091e-01
Austroflustra vulgaris	0.0005504	0.0005509	-5.00e-07	3.7251e-01
Clavularia frankiliana	0.0005504	0.0005481	2.30e-06	3.7502e-01
Ampelisca richardsoni	0.0005504	0.0005440	6.40e-06	3.7675e-01
Labidiaster annulatus	0.0005504	0.0005479	2.50e-06	3.7741e-01
Leptonychotes weddelli	0.0005504	0.0005438	6.60e-06	3.7760e-01
Abyssocucumis liouvillei	0.0005504	0.0005502	2.00e-07	3.7765e-01
Cnemidocarpa verrucosa	0.0005504	0.0005488	1.60e-06	3.7940e-01
Echinopsolus acanthocola	0.0005504	0.0005494	1.00e-06	3.8181e-01
Pygoscelis adeliae	0.0005504	0.0005497	7.00e-07	3.8563e-01
Tubularia ralphii	0.0005504	0.0005487	1.70e-06	3.8565e-01
Gorgonocephalus chiliensis	0.0005504	0.0005495	9.00e-07	3.8836e-01
Trophon longstaffi	0.0005504	0.0005467	3.70e-06	3.9181e-01
Austrodoris kerguelenensis	0.0005504	0.0005421	8.30e-06	3.9208e-01
Pagetopsis maculatus	0.0005504	0.0005418	8.60e-06	3.9214e-01
Neogloboquadriana pachyderma	0.0005504	0.0005487	1.70e-06	3.9235e-01
Abatus cavernosus	0.0005504	0.0005478	2.60e-06	3.9640e-01
Fragilariopsis rhombica	0.0005504	0.0005463	4.10e-06	3.9653e-01
Polyeunoa laevis	0.0005504	0.0005455	4.90e-06	4.0048e-01
Thysanoessa macrura	0.0005504	0.0005481	2.30e-06	4.0096e-01
Abyssorchomene rossi	0.0005504	0.0005459	4.50e-06	4.0222e-01
Haplocheira plumosa	0.0005504	0.0005456	4.80e-06	4.0317e-01
Maxmuelleria faex	0.0005504	0.0005497	7.00e-07	4.0461e-01
Ophioceres incipiens	0.0005504	0.0005487	1.70e-06	4.0568e-01
Parmaphorella mawsoni	0.0005504	0.0005456	4.80e-06	4.0569e-01
Rhizosolenia antennata	0.0005504	0.0005450	5.50e-06	4.0607e-01
Actinocyclus actinochilus	0.0005504	0.0005447	5.70e-06	4.0723e-01
Camptoplites tricornis	0.0005504	0.0005460	4.40e-06	4.1012e-01
Serolis polita	0.0005504	0.0005470	3.40e-06	4.1242e-01
Fasciculiporoides ramosa	0.0005504	0.0005448	5.60e-06	4.1603e-01
Fragilariopsis linearis	0.0005504	0.0005481	2.40e-06	4.1706e-01
Pogonophryne barsukovi	0.0005504	0.0005430	7.50e-06	4.1846e-01
Tryphosella murrayi	0.0005504	0.0005492	1.30e-06	4.2162e-01
Paraceradocus gibber	0.0005504	0.0005457	4.70e-06	4.2183e-01
Solmundella bitentaculata	0.0005504	0.0005515	-1.00e-06	4.2647e-01
Parschisturella ceruviata	0.0005504	0.0005474	3.10e-06	4.2862e-01
Cycethra verrucosa mawsoni	0.0005504	0.0005450	5.50e-06	4.3024e-01
Alluroteuthis antarcticus	0.0005504	0.0005491	1.30e-06	4.3107e-01
Edwardsia meridionalis	0.0005504	0.0005431	7.30e-06	4.3211e-01
Bargmannia	0.0005504	0.0005508	-3.00e-07	4.3218e-01
Ophionotus victoriae	0.0005504	0.0005441	6.40e-06	4.3433e-01
Pseudo-Nitzschia subcurvata	0.0005504	0.0005484	2.00e-06	4.3438e-01
Taeniogyrus contortus	0.0005504	0.0005488	1.60e-06	4.3832e-01
Cinachyra barbata	0.0005504	0.0005435	6.90e-06	4.3842e-01
Salpa gerlachei	0.0005504	0.0005450	5.40e-06	4.4149e-01
Notolepis coatsi	0.0005504	0.0005462	4.30e-06	4.4150e-01

Species	QSS_all	QSS_ext	difQSS	AD_pvalue
Laternula elliptica	0.0005504	0.0005500	4.00e-07	4.4202e-01
Manguinea rigida	0.0005504	0.0005481	2.30e-06	4.4234e-01
Trichotoxon reinboldii	0.0005504	0.0005456	4.80e-06	4.4281e-01
Austrosignum grande	0.0005504	0.0005413	9.10e-06	4.4508e-01
Gyrodinium lachryama	0.0005504	0.0005449	5.50e-06	4.4662e-01
Pteraster affinis aculeatus	0.0005504	0.0005508	-3.00e-07	4.4762e-01
Dipulmaris antarctica	0.0005504	0.0005476	2.80e-06	4.4853e-01
Atolla wyvillei	0.0005504	0.0005441	6.40e-06	4.5131e-01
Perknaster densus	0.0005504	0.0005473	3.10e-06	4.5149e-01
Ctenocidaris gigantea	0.0005504	0.0005452	5.30e-06	4.5367e-01
Polymastia isidis	0.0005504	0.0005449	5.50e-06	4.5697e-01
Stylocordyla borealis	0.0005504	0.0005482	2.20e-06	4.6147e-01
Fragilariopsis pseudonana	0.0005504	0.0005486	1.80e-06	4.6227e-01
Ophioperla ludwigi	0.0005504	0.0005441	6.30e-06	4.6230e-01
Parborlasia corrugatus	0.0005504	0.0005461	4.30e-06	4.6562e-01
Aptenodytes forsteri	0.0005504	0.0005423	8.10e-06	4.6701e-01
Gnathiphimedia mandibularis	0.0005504	0.0005440	6.40e-06	4.6814e-01
Probuccinum tenuistriatum	0.0005504	0.0005500	4.00e-07	4.7029e-01
Phorbas areolatus	0.0005504	0.0005452	5.20e-06	4.7034e-01
Ctenocidaris perrieri	0.0005504	0.0005440	6.40e-06	4.7235e-01
Iophon radiatus	0.0005504	0.0005494	1.10e-06	4.7307e-01
Pseudo-Nitzschia liniola	0.0005504	0.0005483	2.10e-06	4.7336e-01
Pyura setosa	0.0005504	0.0005513	-9.00e-07	4.7974e-01
Cygnodraco mawsoni	0.0005504	0.0005484	2.00e-06	4.8084e-01
Pyura tunicata	0.0005504	0.0005486	1.90e-06	4.8148e-01
Camylaspis maculata	0.0005504	0.0005491	1.30e-06	4.8303e-01
Phyllocomus crocea	0.0005504	0.0005504	0.00e+00	4.8306e-01
Ctenocidaris spinosa	0.0005504	0.0005454	5.00e-06	4.8564e-01
Ekmocucumis turqueti turqueti	0.0005504	0.0005441	6.30e-06	4.8578e-01
Metridia gerlachei	0.0005504	0.0005476	2.90e-06	4.8719e-01
Echiurus antarcticus	0.0005504	0.0005439	6.50e-06	4.8747e-01
Polymastia invaginata	0.0005504	0.0005424	8.00e-06	4.8758e-01
Pogonophryne scotti	0.0005504	0.0005480	2.50e-06	4.8812e-01
Achlyonice violaeuspidata	0.0005504	0.0005474	3.00e-06	4.8855e-01
Haliclona tenella	0.0005504	0.0005457	4.70e-06	4.8963e-01
Pontiothauma ergata	0.0005504	0.0005491	1.30e-06	4.8991e-01
Isodyctia steifera	0.0005504	0.0005473	3.20e-06	4.9009e-01
Thalassiosira trifulta	0.0005504	0.0005465	3.90e-06	4.9011e-01
Tetilla leptoderma	0.0005504	0.0005470	3.40e-06	4.9352e-01
Epimeria similis	0.0005504	0.0005465	3.90e-06	4.9671e-01
Nacella concinna	0.0005504	0.0005470	3.40e-06	4.9709e-01
Amauropsis rossiana	0.0005504	0.0005462	4.20e-06	4.9929e-01
Pachycara brachycephalum	0.0005504	0.0005492	1.20e-06	4.9966e-01
Solaster dawsoni	0.0005504	0.0005471	3.30e-06	5.0025e-01
Cyllopus lucasii	0.0005504	0.0005541	-3.70e-06	5.0247e-01
Halobaena caerulea	0.0005504	0.0005463	4.10e-06	5.0595e-01
Trachythone parva	0.0005504	0.0005479	2.50e-06	5.0735e-01
Gymnoscopelus opisthopterus	0.0005504	0.0005453	5.10e-06	5.1246e-01
Anoxycalyx joubini	0.0005504	0.0005427	7.70e-06	5.1300e-01
Chondriovelum adeliense	0.0005504	0.0005463	4.20e-06	5.1307e-01
Primnoisis antarctica	0.0005504	0.0005447	5.80e-06	5.1314e-01
Salpa thompsoni	0.0005504	0.0005474	3.10e-06	5.2102e-01

Species	QSS_all	QSS_ext	difQSS	AD_pvalue
Bodo saltans	0.0005504	0.0005448	5.60e-06	5.2282e-01
Kampylaster incurvatus	0.0005504	0.0005499	5.00e-07	5.2308e-01
Hyperia macrocephala	0.0005504	0.0005462	4.20e-06	5.2327e-01
Chaetoceros concavicornis	0.0005504	0.0005493	1.10e-06	5.2338e-01
Dolloidraco longedorsalis	0.0005504	0.0005461	4.30e-06	5.2556e-01
Epimeria rubriques	0.0005504	0.0005503	1.00e-07	5.2730e-01
Conchoecia antipoda	0.0005504	0.0005492	1.30e-06	5.2800e-01
Barrukia cristata	0.0005504	0.0005437	6.80e-06	5.2841e-01
Phorbas glaberrima	0.0005504	0.0005497	7.00e-07	5.3029e-01
Paramoera walkeri	0.0005504	0.0005494	1.10e-06	5.3199e-01
Thalassiosira antarctica	0.0005504	0.0005471	3.30e-06	5.3362e-01
Pogonophryne phyllopogon	0.0005504	0.0005484	2.00e-06	5.3402e-01
Trematomus eulepidotus	0.0005504	0.0005468	3.60e-06	5.3809e-01
Thalassiosira tumida	0.0005504	0.0005443	6.10e-06	5.3823e-01
Euchaetomera antarcticus	0.0005504	0.0005502	3.00e-07	5.3945e-01
Compsothyris racovitzae	0.0005504	0.0005461	4.30e-06	5.4038e-01
Nototanais antarcticus	0.0005504	0.0005450	5.40e-06	5.4137e-01
Scolymastra joubini	0.0005504	0.0005465	4.00e-06	5.4161e-01
Bathydorus spinosus	0.0005504	0.0005441	6.30e-06	5.4179e-01
Hyperiella dilatata	0.0005504	0.0005457	4.70e-06	5.4181e-01
Pista spinifera	0.0005504	0.0005483	2.10e-06	5.4393e-01
Pogonophryne permitini	0.0005504	0.0005462	4.20e-06	5.4511e-01
Thalassiosira frenguelliopsis	0.0005504	0.0005470	3.40e-06	5.4875e-01
Pogonophryne marmorata	0.0005504	0.0005441	6.30e-06	5.5353e-01
Austrocidaris canaliculata	0.0005504	0.0005495	9.00e-07	5.5401e-01
Fragilariopsis nana	0.0005504	0.0005473	3.10e-06	5.5472e-01
Rossella nuda	0.0005504	0.0005487	1.70e-06	5.5606e-01
Fragilariopsis kerguelensis	0.0005504	0.0005460	4.40e-06	5.5886e-01
Oediceroides calmani	0.0005504	0.0005472	3.30e-06	5.5902e-01
Bathypanoploea schellenbergi	0.0005504	0.0005462	4.20e-06	5.5951e-01
Chaetoceros dictyota	0.0005504	0.0005452	5.20e-06	5.6397e-01
Haliclona dancoi	0.0005504	0.0005461	4.30e-06	5.6781e-01
Calanoides acutus	0.0005504	0.0005448	5.60e-06	5.6982e-01
Sycozoa sigillinoides	0.0005504	0.0005468	3.60e-06	5.7037e-01
Racovitzia glacialis	0.0005504	0.0005457	4.70e-06	5.7081e-01
Euphausia frigida	0.0005504	0.0005501	3.00e-07	5.7103e-01
Propeleda longicaudata	0.0005504	0.0005498	6.00e-07	5.7325e-01
Chaetoceros pelagicus	0.0005504	0.0005444	6.00e-06	5.7443e-01
Fragilariopsis vanheurnkii	0.0005504	0.0005450	5.40e-06	5.7477e-01
Calyx arcuarius	0.0005504	0.0005508	-4.00e-07	5.7485e-01
Tedania vanhoeffeni	0.0005504	0.0005438	6.60e-06	5.7804e-01
Glyptonotus antarcticus	0.0005504	0.0005499	5.00e-07	5.7832e-01
Eunoe hartmanae	0.0005504	0.0005487	1.70e-06	5.7907e-01
Ophiurolepis brevissima	0.0005504	0.0005487	1.80e-06	5.8260e-01
Lineus longifissus	0.0005504	0.0005499	5.00e-07	5.8308e-01
Cinachya antarctica	0.0005504	0.0005461	4.30e-06	5.8492e-01
Acodontaster capitatus	0.0005504	0.0005454	5.00e-06	5.8564e-01
Harpagifer antarcticus	0.0005504	0.0005481	2.40e-06	5.8681e-01
Antarctomysis maxima	0.0005504	0.0005456	4.80e-06	5.8835e-01
Latrunculia brevis	0.0005504	0.0005451	5.30e-06	5.8864e-01
Alacia hettacra	0.0005504	0.0005497	7.00e-07	5.9069e-01
Bathyploetes gourdoni	0.0005504	0.0005466	3.80e-06	5.9145e-01

Species	QSS_all	QSS_ext	difQSS	AD_pvalue
<i>Reteporella hippocrepis</i>	0.0005504	0.0005442	6.30e-06	5.9472e-01
<i>Notocidaris mortenseni</i>	0.0005504	0.0005505	0.00e+00	5.9497e-01
<i>Thalassiosira ritscheri</i>	0.0005504	0.0005465	4.00e-06	5.9514e-01
<i>Golfingia nordenskojoeldi</i>	0.0005504	0.0005511	-7.00e-07	5.9596e-01
<i>Bathyplores bongraini</i>	0.0005504	0.0005510	-6.00e-07	6.0100e-01
<i>Rhodalia miranda</i>	0.0005504	0.0005470	3.40e-06	6.0122e-01
<i>Ainigmactylon antarcticus</i>	0.0005504	0.0005472	3.20e-06	6.0337e-01
<i>Fragilariopsis cylindrus</i>	0.0005504	0.0005443	6.10e-06	6.0866e-01
<i>Serolella bouveri</i>	0.0005504	0.0005450	5.50e-06	6.1184e-01
<i>Stereochinus neumayeri</i>	0.0005504	0.0005460	4.40e-06	6.1345e-01
<i>Dimophyes arctica</i>	0.0005504	0.0005454	5.00e-06	6.1418e-01
<i>Abatus nimrodi</i>	0.0005504	0.0005493	1.10e-06	6.1540e-01
<i>Eucopia australis</i>	0.0005504	0.0005455	4.90e-06	6.1708e-01
<i>Heterophoxus videns</i>	0.0005504	0.0005508	-3.00e-07	6.2556e-01
<i>Odontaster meridionalis</i>	0.0005504	0.0005459	4.50e-06	6.2856e-01
<i>Harmothoe crosetensis</i>	0.0005504	0.0005500	4.00e-07	6.3432e-01
<i>Gnathia calva</i>	0.0005504	0.0005466	3.80e-06	6.3503e-01
<i>Cryodraco antarcticus</i>	0.0005504	0.0005439	6.50e-06	6.3596e-01
<i>Ypsilocucumis turricata</i>	0.0005504	0.0005479	2.50e-06	6.3904e-01
<i>Mesothuria lactea</i>	0.0005504	0.0005457	4.70e-06	6.3983e-01
<i>Ekmcucumis steineni</i>	0.0005504	0.0005467	3.70e-06	6.4189e-01
<i>Azpeitia tabularis</i>	0.0005504	0.0005476	2.80e-06	6.4405e-01
<i>Isotealia antarctica</i>	0.0005504	0.0005469	3.50e-06	6.4484e-01
<i>Puncturella conica</i>	0.0005504	0.0005439	6.60e-06	6.4755e-01
<i>Porania antarctica</i>	0.0005504	0.0005499	5.00e-07	6.4899e-01
<i>Psolus antarcticus</i>	0.0005504	0.0005465	3.90e-06	6.4976e-01
<i>Urticinopsis antarctica</i>	0.0005504	0.0005433	7.10e-06	6.5059e-01
<i>Tentorium semisuberites</i>	0.0005504	0.0005464	4.00e-06	6.5062e-01
<i>Ctenocidaris gilberti</i>	0.0005504	0.0005477	2.80e-06	6.5096e-01
<i>Arteidraco orianae</i>	0.0005504	0.0005499	5.00e-07	6.5118e-01
<i>Clathria pauper</i>	0.0005504	0.0005485	1.90e-06	6.5128e-01
<i>Monocaulus parvula</i>	0.0005504	0.0005453	5.10e-06	6.5152e-01
<i>Callianira antarctica</i>	0.0005504	0.0005485	1.90e-06	6.5862e-01
<i>Pyura bouvetensis</i>	0.0005504	0.0005449	5.60e-06	6.6543e-01
<i>Momoculodes scabriculosus</i>	0.0005504	0.0005513	-9.00e-07	6.6863e-01
<i>Diphyes antarctica</i>	0.0005504	0.0005455	4.90e-06	6.6869e-01
<i>Aega antarctica</i>	0.0005504	0.0005485	1.90e-06	6.6967e-01
<i>Eukrohnia hamata</i>	0.0005504	0.0005488	1.60e-06	6.7051e-01
<i>Notasterias stylophora</i>	0.0005504	0.0005469	3.60e-06	6.7055e-01
<i>Ophiurolepis gelida</i>	0.0005504	0.0005479	2.50e-06	6.7087e-01
<i>Magellania joubini</i>	0.0005504	0.0005485	1.90e-06	6.7115e-01
<i>Pareledone charcoti</i>	0.0005504	0.0005498	6.00e-07	6.7807e-01
<i>Tedania oxecta</i>	0.0005504	0.0005473	3.10e-06	6.7892e-01
<i>Ophioparte gigas</i>	0.0005504	0.0005481	2.40e-06	6.7936e-01
<i>Lophaster gaini</i>	0.0005504	0.0005448	5.60e-06	6.8102e-01
<i>Epimeria georgiana</i>	0.0005504	0.0005458	4.60e-06	6.8108e-01
<i>Notaeolidia gigas</i>	0.0005504	0.0005487	1.80e-06	6.8317e-01
<i>Porania antarctica glabra</i>	0.0005504	0.0005473	3.10e-06	6.8367e-01
<i>Calanus propinquus</i>	0.0005504	0.0005469	3.50e-06	6.8435e-01
<i>Armadillologorgia cyathella</i>	0.0005504	0.0005459	4.50e-06	6.8480e-01
<i>Astrochlamys bruneus</i>	0.0005504	0.0005476	2.80e-06	6.9077e-01
<i>Tursiops truncatus</i>	0.0005504	0.0005487	1.70e-06	6.9411e-01

Species	QSS_all	QSS_ext	difQSS	AD_pvalue
Lenticulina antarctica	0.0005504	0.0005463	4.10e-06	6.9567e-01
Marseniopsis mollis	0.0005504	0.0005449	5.50e-06	6.9891e-01
Amphidinium hadai	0.0005504	0.0005464	4.00e-06	7.0103e-01
Lysasterias perrieri	0.0005504	0.0005464	4.10e-06	7.0131e-01
Metaconchoecia isocheira	0.0005504	0.0005446	5.80e-06	7.0326e-01
Fragilariopsis ritscheri	0.0005504	0.0005449	5.50e-06	7.0392e-01
Rhynchonereella bongraini	0.0005504	0.0005486	1.80e-06	7.0456e-01
Fragilariopsis obliquecostata	0.0005504	0.0005466	3.80e-06	7.0502e-01
Axociella nidificata	0.0005504	0.0005498	7.00e-07	7.0529e-01
Eucampia antarctica	0.0005504	0.0005510	-6.00e-07	7.1106e-01
Golfingia ohlini	0.0005504	0.0005478	2.70e-06	7.2000e-01
Primnoella	0.0005504	0.0005456	4.80e-06	7.2222e-01
Lobodon carcinophaga	0.0005504	0.0005481	2.30e-06	7.2446e-01
Chaetoceros criophilum	0.0005504	0.0005473	3.10e-06	7.2489e-01
Cibicides refulgens	0.0005504	0.0005455	5.00e-06	7.2764e-01
Chaetoceros socialis	0.0005504	0.0005459	4.60e-06	7.2917e-01
Abatus shackeltoni	0.0005504	0.0005483	2.10e-06	7.2954e-01
Tritonia antarctica	0.0005504	0.0005478	2.60e-06	7.3123e-01
Chaenodraco wilsoni	0.0005504	0.0005456	4.90e-06	7.3567e-01
Chaetoceros flexuosum	0.0005504	0.0005474	3.00e-06	7.3694e-01
Tedania tantulata	0.0005504	0.0005474	3.00e-06	7.3712e-01
Eucranta mollis	0.0005504	0.0005446	5.80e-06	7.3790e-01
Muraenolepis marmoratus	0.0005504	0.0005467	3.80e-06	7.3804e-01
Psolidium incertum	0.0005504	0.0005465	3.90e-06	7.3989e-01
Arcturidae	0.0005504	0.0005461	4.40e-06	7.4485e-01
Lyrocteis flavopallidus	0.0005504	0.0005448	5.70e-06	7.4610e-01
Vibilia stebbingi	0.0005504	0.0005488	1.60e-06	7.4631e-01
Navicula glaciei	0.0005504	0.0005496	8.00e-07	7.4730e-01
Aethotaxis mitopteryx	0.0005504	0.0005466	3.80e-06	7.4813e-01
Ekleptostylis debroyeri	0.0005504	0.0005460	4.50e-06	7.4826e-01
Fragilariopsis curta	0.0005504	0.0005504	0.00e+00	7.4838e-01
Aphrodroma brevirostris	0.0005504	0.0005470	3.40e-06	7.5455e-01
Isosicyonis alba	0.0005504	0.0005480	2.40e-06	7.5688e-01
Cuenotaster involutus	0.0005504	0.0005466	3.80e-06	7.5772e-01
Astrotoma agassizii	0.0005504	0.0005458	4.60e-06	7.6108e-01
Pseudostichopus mollis	0.0005504	0.0005461	4.30e-06	7.6321e-01
Isodyctia toxophila	0.0005504	0.0005448	5.60e-06	7.6350e-01
Gerlachea australis	0.0005504	0.0005461	4.30e-06	7.6643e-01
Actinocyclus utricularis	0.0005504	0.0005489	1.50e-06	7.6962e-01
Ophioperla koehlerii	0.0005504	0.0005506	-2.00e-07	7.7037e-01
Diastylis mawsoni	0.0005504	0.0005464	4.10e-06	7.7111e-01
Cadulus dalli antarcticum	0.0005504	0.0005505	0.00e+00	7.7284e-01
Fragilariopsis sublinearis	0.0005504	0.0005498	7.00e-07	7.7730e-01
Lissarca notorcadensis	0.0005504	0.0005475	2.90e-06	7.7787e-01
Pyura discoveryi	0.0005504	0.0005480	2.40e-06	7.7976e-01
Alacia belgicae	0.0005504	0.0005462	4.20e-06	7.8113e-01
Alomasoma belyaevi	0.0005504	0.0005450	5.40e-06	7.8180e-01
Callochiton gaussi	0.0005504	0.0005467	3.80e-06	7.8780e-01
Chorismus antarcticus	0.0005504	0.0005481	2.40e-06	7.8889e-01
Artedidraco loennbergi	0.0005504	0.0005481	2.30e-06	7.8945e-01
Eurythenes gryllus	0.0005504	0.0005458	4.60e-06	7.9123e-01
Fissidentalium majorinum	0.0005504	0.0005457	4.70e-06	7.9497e-01

Species	QSS_all	QSS_ext	difQSS	AD_pvalue
Molgula pedunculata	0.0005504	0.0005459	4.50e-06	7.9826e-01
Oediceroides emarginatus	0.0005504	0.0005461	4.30e-06	8.0963e-01
Nitzschia kerguelensis	0.0005504	0.0005481	2.40e-06	8.1180e-01
Djerboa furcipes	0.0005504	0.0005464	4.00e-06	8.1786e-01
Luidiaster gerlachei	0.0005504	0.0005509	-5.00e-07	8.1791e-01
Elpidia glacialis	0.0005504	0.0005464	4.10e-06	8.1838e-01
Corella eumyota	0.0005504	0.0005508	-4.00e-07	8.2422e-01
Cassidulinoides parkerianus	0.0005504	0.0005502	2.00e-07	8.4466e-01
Flustra antarctica	0.0005504	0.0005460	4.40e-06	8.4571e-01
Gymnoscopelus braueri	0.0005504	0.0005466	3.80e-06	8.4868e-01
Prionodraco evansii	0.0005504	0.0005472	3.20e-06	8.4906e-01
Thalassiosira australis	0.0005504	0.0005444	6.00e-06	8.5047e-01
Peraeospinosus pushkini	0.0005504	0.0005482	2.30e-06	8.5152e-01
Natatolana obtusata	0.0005504	0.0005462	4.20e-06	8.5152e-01
Waldeckia obesa	0.0005504	0.0005501	4.00e-07	8.5261e-01
Psilaster charcoti	0.0005504	0.0005466	3.80e-06	8.5942e-01
Stellarima microtrias	0.0005504	0.0005469	3.60e-06	8.6017e-01
Uristes gigas	0.0005504	0.0005469	3.60e-06	8.6143e-01
Cephalodiscus	0.0005504	0.0005469	3.50e-06	8.6187e-01
Limacina helicina antarctica	0.0005504	0.0005452	5.20e-06	8.6345e-01
Rhincalanus gigas	0.0005504	0.0005462	4.20e-06	8.6880e-01
Liothyrella uva	0.0005504	0.0005479	2.50e-06	8.9001e-01
Trematomus scotti	0.0005504	0.0005480	2.50e-06	8.9462e-01
Perknaster sladeni	0.0005504	0.0005472	3.20e-06	8.9727e-01
Pseudostichopus villosus	0.0005504	0.0005468	3.60e-06	9.0885e-01
Ophiacantha antarctica	0.0005504	0.0005468	3.60e-06	9.1208e-01
Boroecia antipoda	0.0005504	0.0005458	4.60e-06	9.1244e-01
Banquisia belgicae	0.0005504	0.0005471	3.30e-06	9.1417e-01
Bathyiaster loripes	0.0005504	0.0005481	2.30e-06	9.2714e-01
Ekmocucumis turqueti	0.0005504	0.0005470	3.40e-06	9.2871e-01
Globocassidulina crassa	0.0005504	0.0005482	2.20e-06	9.3398e-01
Crania lecointei	0.0005504	0.0005483	2.10e-06	9.3455e-01
Vanadis antarctica	0.0005504	0.0005474	3.10e-06	9.3605e-01
Hamingia	0.0005504	0.0005472	3.20e-06	9.5433e-01
Balaenoptera musculus	0.0005504	0.0005478	2.70e-06	9.5796e-01
Nymphon gracillimum	0.0005504	0.0005477	2.70e-06	9.6114e-01
Beroe cucumis	0.0005504	0.0005480	2.40e-06	9.6626e-01
Odontaster validus	0.0005504	0.0005482	2.20e-06	9.7064e-01
Nototanais dimorphus	0.0005504	0.0005470	3.40e-06	9.7187e-01
Nematocarcinus lanceopes	0.0005504	0.0005489	1.50e-06	9.7534e-01

Interaction strength distribution

The statistical distribution that best fitted the empirical interaction strength distribution was a ‘gamma’ due to the skew towards weaker interactions. Gamma parameters are: shape = 2.699e-1 and scale = 2.008e+4. Table 3 shows the results for the six candidate models used.

Table 3: Model comparison for the distribution of interaction strengths of the Weddell Sea food web. Order by best fit. References: df = degrees of freedom, AIC = Akaike Information Criterion, deltaAIC = difference with best fit. Log-Normal is the best model.

Model	df	AIC	deltaAIC
Gamma	2	-362028.3	0.00
log-Normal	2	-361975.5	52.86
Power-law	2	-353270.2	8758.15
Exponential	1	-327785.1	34243.23
Normal	2	-291497.0	70531.30
Uniform	2	-248179.0	113849.31

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