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

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Equations for calculating species properties

Weighted properties: Interaction Strength

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, Dell, and Van M. Savage (2012)). Then the search rate for 2D interactions (see main text) is calculated as:

$$\alpha = \alpha_{2D} m_C^{0.68 \pm 0.12}$$

For 3D interactions it is calculated as:

$$\alpha = \alpha_{3D} m_C^{1.05 \pm 0.08}$$

where $\alpha_{2D} = 10^{-3.08}$ and $\alpha_{3D} = 10^{-1.77}$ are the intercepts for each interaction dimensionality.

As the resource density X_R is not known for our study case we estimated it according to the equation S18 and supplementary figures 2i & j (individuals/m2 - m3) from Pawar, Dell, and Van M. Savage (2012):

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

where p_x is -0.79±0.08 for 2D and -0.86±0.07 for 3D.

Interaction Strength variability

With the aim of taking into account the variability of the exponents in α and X_R estimations, we run 1000 simulations for calculating each pairwise predator-prey interaction. Due to the skewness nature of the estimated interaction distributions, we considered the median as the summarizing value. Such a skewness is shown in the following histogram for the interquartile range:

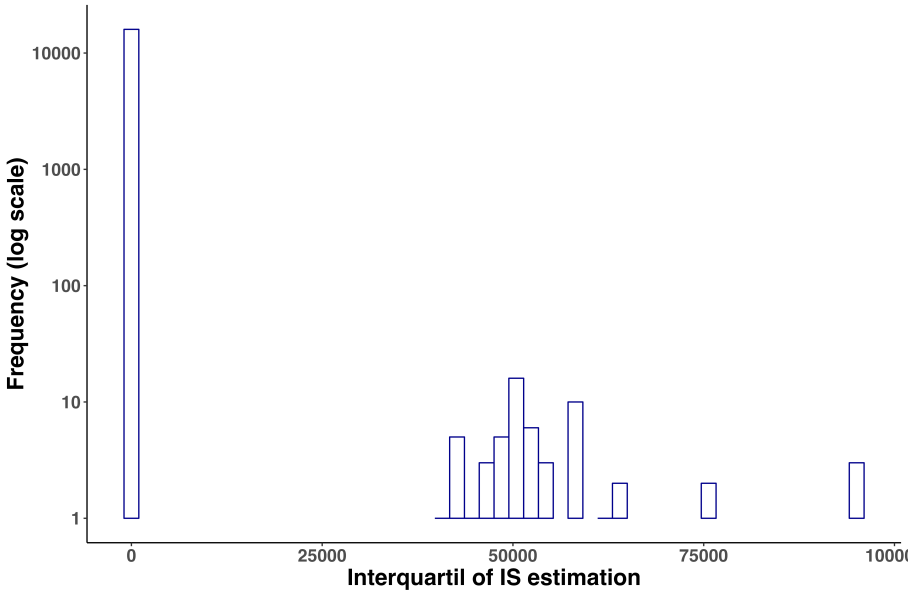

Figure 1: Frequency distribution of interquartile range for the estimated interaction strengths of the Weddell Sea food web. Total number of interactions = 16041.

Unweighted properties

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 trophic species of Weddell Sea food web. Ordered by decreasing median interaction strength. median IS = median interaction strength, Q1 IS = First quartil of the IS distribution, Q3 IS = Third quartil of the IS distribution, TL = trophic level, TS = trophic similarity.

Species	median IS	Q1 IS	Q3 IS	Degree	TL	TS
Mesonychoteuthis hamiltoni	0.0001966995	0.0001365333	0.0002661351	29	4.41	0.028
Orcinus orca	0.0001557436	0.0001064541	0.0003277949	26	5.03	0.037
Mirounga leonina	0.0001314364	9.396677e-05	0.0001564687	56	4.87	0.080
Hydrurga leptonyx	0.0001162399	8.113601e-05	0.0001403405	67	4.72	0.094
Leptonychotes weddelli	0.0001137129	8.153871e-05	0.0001387107	59	4.86	0.084
Ommatophoca rossii	0.0001124936	8.260369e-05	0.0001351128	56	4.87	0.080
Galiteuthis glacialis	0.0001120608	9.357928e-05	0.0001553956	30	3.26	0.039
Physeter macrocephalus	0.0001036752	8.089059e-05	0.0001732205	20	4.47	0.048
Arctocephalus gazella	0.0001021457	7.473746e-05	0.0001268715	61	4.67	0.093
Gonatus antarcticus	9.652858e-05	7.249701e-05	0.0001377233	36	4.31	0.046
Kondakovia longimana	9.585928e-05	7.611336e-05	0.0001235262	25	3.26	0.039
Champsocephalus gunnari	9.122016e-05	2.703339e-05	0.0001233331	46	3.72	0.086
Tursiops truncatus	9.075575e-05	7.320882e-05	0.0001471344	20	4.47	0.048
Aptenodytes forsteri	8.73558e-05	6.747587e-05	0.0001018936	53	4.78	0.084
Martialia hyadesi	8.573911e-05	6.897001e-05	0.0001194603	33	4.52	0.043
Macronectes halli	8.539775e-05	6.13833e-05	9.590528e-05	11	4.94	0.026
Notothenia marmorata	8.357614e-05	5.224627e-05	0.0001146762	44	4.09	0.091
Macrourus holotrachys	8.350777e-05	6.255264e-05	0.000100376	85	4.70	0.112
Lagenorhynchus cruciger	8.149072e-05	6.52583e-05	0.0001301868	20	4.47	0.048
Macrourus whitsoni	7.945909e-05	5.320661e-05	0.0001006711	92	4.55	0.124
Alluroteuthis antarcticus	7.703713e-05	6.138693e-05	8.198372e-05	19	4.25	0.029
Cryodraco antarcticus	7.677328e-05	5.455766e-05	0.0001008427	30	3.52	0.089
Moroteuthis ingens	7.611336e-05	3.516164e-05	0.000127813	46	4.04	0.074
Pygoscelis adeliae	7.500139e-05	3.516e-05	0.0001052905	7	3.78	0.026
Balaenoptera physalus	7.449494e-05	3.792601e-05	0.0001051213	37	4.04	0.081
Pleuragramma antarcticum	7.399497e-05	5.203507e-05	8.675948e-05	69	3.58	0.076
Lobodon carcinophaga	7.152872e-05	4.471639e-05	0.0001174308	28	4.24	0.061
Pagetopsis macropterus	7.132802e-05	5.673434e-05	8.291099e-05	76	4.64	0.113
Dacodraco hunteri	7.088062e-05	5.799175e-05	8.541761e-05	65	4.80	0.101
Balaenoptera musculus	6.985667e-05	3.679883e-05	9.719522e-05	37	4.04	0.081
Megaptera novaeangliae	6.325384e-05	5.200255e-05	7.590416e-05	4	3.26	0.024
Chionodraco hamatus	6.279276e-05	4.423083e-05	8.521572e-05	42	3.82	0.107
Muraenolepis marmoratus	6.270604e-05	3.169362e-05	8.740159e-05	36	3.19	0.104
Dissostichus mawsoni	6.133163e-05	3.676014e-05	0.0001260475	87	4.12	0.126
Macronectes giganteus	6.107095e-05	4.338151e-05	7.434798e-05	16	4.30	0.044
Notothenia coriiceps	5.828258e-05	3.221947e-07	8.273394e-05	130	4.27	0.126
Chionodraco myersi	5.714573e-05	4.735192e-05	7.572381e-05	37	4.09	0.094
Gymnoscopelus nicholsi	5.61347e-05	1.97785e-05	7.216516e-05	59	3.71	0.087
Psychroteuthis glacialis	5.44176e-05	2.958838e-05	7.766719e-05	23	3.91	0.054
Fulmarus glacialoides	5.424222e-05	3.132651e-05	9.14162e-05	17	4.33	0.052
Chaenodraco wilsoni	5.337367e-05	4.376893e-05	7.807835e-05	32	3.30	0.091
Bathylagus antarcticus	5.304983e-05	1.367918e-05	6.369375e-05	61	3.36	0.073
Trematomus hansoni	5.226749e-05	1.093131e-06	7.162206e-05	109	4.36	0.134
Balaenoptera acutorostrata	5.18112e-05	3.469161e-05	7.674102e-05	29	3.74	0.078
Parvicorbucula socialis	5.171502e-05	4.383826e-07	7.265275e-05	91	2.00	0.136

Species	median IS	Q1 IS	Q3 IS	Degree	TL	TS
Gymnoscopelus opisthopterus	5.165962e-05	1.53219e-05	6.429446e-05	54	3.40	0.082
Psilaster charcoti	5.00826e-05	1.713054e-06	6.030845e-05	59	4.40	0.082
Daption capense	4.956884e-05	3.339837e-05	8.67314e-05	15	4.39	0.051
Pagodroma nivea	4.886968e-05	3.293823e-05	6.213523e-05	11	4.21	0.045
Procellaria aequinoctialis	4.866293e-05	1.910661e-05	7.685853e-05	8	4.25	0.026
Pagetopsis maculatus	4.839935e-05	3.852502e-05	6.399541e-05	37	4.09	0.094
Electrona antarctica	4.810598e-05	2.214144e-05	5.744989e-05	65	3.48	0.105
Sterna vittata	4.754848e-05	4.39479e-05	5.114905e-05	2	3.88	0.012
Protomyctophum bolini	4.22158e-05	1.873725e-05	5.231825e-05	61	3.44	0.077
Thalassoica antarctica	4.189492e-05	2.220305e-05	7.433589e-05	19	4.32	0.053
Pareledone charcoti	4.057571e-05	1.811205e-05	5.203507e-05	83	4.57	0.108
Gymnodraco acuticeps	3.884877e-05	1.5338e-05	7.665931e-05	61	3.70	0.118
Aphrodroma brevirostris	3.878967e-05	3.033792e-05	5.478687e-05	11	4.20	0.045
Notolepis coatsi	3.873098e-05	2.162952e-05	4.838887e-05	58	3.50	0.073
Trematomus loennbergii	3.560908e-05	4.065414e-07	6.860811e-05	133	4.11	0.115
Gymnoscopelus braueri	3.537628e-05	1.390494e-05	6.115727e-05	62	3.52	0.087
Pentanymphon antarcticum	3.486427e-05	2.11512e-05	5.864187e-05	140	3.93	0.099
Racovitzia glacialis	3.482903e-05	1.395815e-05	7.27228e-05	53	3.54	0.114
Cygnodraco mawsoni	3.476307e-05	2.245787e-05	5.878673e-05	84	3.98	0.139
Pachyptila desolata	3.4193e-05	2.115317e-05	5.085189e-05	33	4.23	0.079
Oceanites oceanicus	3.399299e-05	1.910661e-05	4.551958e-05	8	4.07	0.033
Pareledone antarctica	3.236671e-05	1.999473e-06	5.893857e-05	107	4.41	0.120
Artedidraco orianae	3.176689e-05	9.799844e-06	5.862247e-05	52	3.76	0.117
Gerlachea australis	3.142521e-05	2.082568e-05	5.351601e-05	72	3.93	0.134
Callochiton gaussi	3.053632e-05	2.46626e-05	3.970353e-05	15	3.00	0.012
Halobaena caerulea	2.923088e-05	2.08355e-05	6.525857e-05	22	4.25	0.060
Epimeria rubrieques	2.886709e-05	9.559123e-06	3.693006e-05	85	3.47	0.157
Muraenolepis microps	2.83404e-05	4.765909e-07	5.728601e-05	88	3.69	0.133
Eusirus perdentatus	2.75491e-05	2.817967e-06	3.715821e-05	114	3.87	0.171
Euphausia superba	2.72961e-05	3.679194e-09	3.876641e-05	163	2.27	0.120
Puncturella conica	2.714755e-05	2.866116e-07	4.340499e-05	80	2.98	0.093
Pachycara brachycephalum	2.552969e-05	1.594504e-05	3.250969e-05	67	3.97	0.132
Prionodraco evansii	2.545579e-05	1.517545e-05	4.78598e-05	61	3.45	0.115
Epimeria robusta	2.461266e-05	1.158704e-05	3.147236e-05	90	3.46	0.159
Sterna paradisaea	2.43306e-05	1.491039e-05	4.677914e-05	7	4.04	0.031
Tryphosella murrayi	2.421157e-05	1.922695e-05	2.860685e-05	96	3.88	0.160
Pseudosagitta maxima	2.321101e-05	1.025065e-05	2.533475e-05	15	3.16	0.044
Pogonophryne permitini	2.318067e-05	6.667868e-07	3.826938e-05	104	3.93	0.142
Hyperia macrocephala	2.243137e-05	1.93218e-05	2.564952e-05	58	4.36	0.135
Desmonema glaciale	2.230202e-05	1.627485e-05	2.768185e-05	19	3.72	0.058
Pseudosagitta gazellae	2.173114e-05	1.972565e-05	2.23042e-05	11	3.18	0.029
Pogonophryne marmorata	2.166179e-05	1.228499e-06	5.183533e-05	70	3.68	0.119
Trematomus eulepidotus	2.164313e-05	4.187295e-06	5.738943e-05	71	3.64	0.117
Pogonophryne phyllopogon	2.161291e-05	6.300283e-07	4.367464e-05	103	3.92	0.145
Abyssorchomene nodimanus	2.14144e-05	7.123154e-06	3.61006e-05	137	4.21	0.130
Pogonophryne barsukovi	2.132162e-05	4.990555e-07	4.303784e-05	104	3.93	0.142
Pogonophryne scotti	2.124038e-05	3.765903e-07	4.671151e-05	104	3.93	0.142
Primno macropa	2.004274e-05	1.540213e-05	2.374577e-05	74	3.56	0.150
Trematomus pennellii	1.936685e-05	3.329101e-07	5.753708e-05	192	4.04	0.158
Eusirus antarcticus	1.84164e-05	1.714363e-05	2.161291e-05	53	3.17	0.148
Liljeborgia georgiana	1.818318e-05	4.795309e-06	2.339604e-05	146	3.46	0.153
Aethotaxis mitopteryx	1.808874e-05	8.276477e-07	3.506017e-05	109	3.88	0.149

Species	median IS	Q1 IS	Q3 IS	Degree	TL	TS
Themisto gaudichaudii	1.799074e-05	1.382881e-05	2.136403e-05	74	3.56	0.150
Trematomus nicolai	1.729916e-05	2.513011e-07	4.353583e-05	113	3.85	0.140
Periphylla periphylla	1.690793e-05	1.207214e-05	2.107191e-05	19	3.72	0.058
Callianira antarctica	1.679534e-05	8.341951e-06	2.968281e-05	28	3.60	0.064
Beroe cucumis	1.643935e-05	1.336421e-05	2.275433e-05	18	3.33	0.040
Clione antarctica	1.631213e-05	1.354922e-05	1.771916e-05	56	2.58	0.075
Lyrocteis flavopallidus	1.290995e-05	6.625389e-06	1.865211e-05	28	3.60	0.064
Dipulmaris antarctica	1.287384e-05	1.08976e-05	1.730424e-05	14	3.80	0.040
Solmundella bitentaculata	1.278612e-05	1.002709e-05	1.718462e-05	8	3.90	0.020
Cyllopus lucasii	1.232083e-05	1.424223e-08	2.438327e-05	165	2.39	0.156
Clione limacina	1.231628e-05	1.096148e-05	1.344297e-05	51	3.87	0.073
Clio pyramidata	1.229065e-05	1.021723e-05	1.371786e-05	58	3.16	0.088
Paraceradocus gibber	1.195645e-05	3.556344e-09	3.090785e-05	151	2.80	0.171
Eukrohnia hamata	1.123897e-05	9.347908e-06	1.350025e-05	38	3.16	0.075
Sagitta marri	1.088242e-05	7.25518e-06	1.129513e-05	17	3.16	0.048
Urticinopsis antarctica	1.086385e-05	2.268933e-06	1.724226e-05	27	3.76	0.078
Thysanoessa macrura	1.073406e-05	1.493036e-08	2.202282e-05	145	2.41	0.117
Atolla wyvillei	1.071082e-05	4.750118e-06	1.259985e-05	20	3.52	0.065
Scolymastra joubini	1.06115e-05	8.287471e-06	2.07311e-05	44	2.00	0.156
Euphausia crystallorophias	1.055721e-05	5.831225e-09	3.024803e-05	132	2.08	0.119
Anoxycalyx joubini	1.035041e-05	7.809468e-06	1.97624e-05	48	2.00	0.153
Aegires albus	1.006194e-05	5.864608e-07	1.570102e-05	60	3.00	0.092
Odontaster meridionalis	9.865129e-06	5.888296e-06	1.047482e-05	41	2.97	0.053
Dimophyes arctica	9.776935e-06	4.359833e-06	1.138698e-05	20	3.52	0.065
Diphyes antarctica	9.776935e-06	4.359833e-06	1.138698e-05	20	3.52	0.065
Rhodalia miranda	9.776935e-06	4.359833e-06	1.138698e-05	20	3.52	0.065
Rossella nuda	9.610958e-06	7.08422e-06	1.640458e-05	45	2.00	0.159
Heterophoxus videns	9.514281e-06	2.549281e-08	1.512433e-05	157	2.51	0.153
Bargmannia	9.340493e-06	7.934205e-06	1.189537e-05	56	3.33	0.091
Rhincalanus gigas	9.262505e-06	2.965445e-08	1.330863e-05	166	2.15	0.135
Euphausia frigida	8.601328e-06	1.495368e-08	2.231491e-05	137	2.27	0.119
Melphidippa antarctica	8.472612e-06	3.582393e-06	2.216866e-05	121	3.04	0.119
Paraeuchaeta antarctica	8.438333e-06	3.987499e-08	1.172287e-05	171	2.21	0.135
Rhachotropis antarctica	7.830221e-06	2.128528e-08	1.907372e-05	185	3.02	0.176
Ammothea carolinensis	7.817372e-06	3.858615e-06	3.302595e-05	135	3.93	0.099
Calanus propinquus	7.815191e-06	4.404369e-08	1.125116e-05	165	2.15	0.135
Calanoides acutus	7.662196e-06	4.533452e-08	1.113364e-05	166	2.17	0.136
Vibilia stebbingi	7.645086e-06	6.323715e-06	8.342107e-06	90	3.56	0.143
Vibilia antarctica	7.644671e-06	6.323715e-06	8.299484e-06	91	3.56	0.142
Cnemidocarpa verrucosa	7.439573e-06	1.379108e-06	1.658624e-05	7	2.00	0.041
Nymphon gracillimum	7.430778e-06	3.652224e-06	3.342044e-05	135	3.93	0.099
Metridia gerlachei	7.38965e-06	7.543234e-08	9.955142e-06	166	2.15	0.134
Conchoecia hettacra	7.006881e-06	6.183068e-06	8.674486e-06	77	3.24	0.119
Limacina helicina antarctica	6.126709e-06	5.241574e-06	7.219788e-06	62	3.16	0.092
Stylocordyla borealis	5.822439e-06	4.382217e-06	1.004552e-05	43	2.00	0.157
Kirkpatrickia variolosa	5.559206e-06	4.339895e-06	9.818171e-06	46	2.00	0.152
Rossella racovitzae	5.559206e-06	4.382541e-06	9.494407e-06	48	2.00	0.154
Tetilla leptoderma	5.214065e-06	3.985559e-06	8.93518e-06	49	2.00	0.152
Serolella bouveri	5.149662e-06	9.177471e-07	1.61616e-05	90	3.99	0.157
Serolis polita	5.149662e-06	9.177471e-07	1.61616e-05	90	3.99	0.157
Conchoecia antipoda	4.993181e-06	1.079134e-07	7.527226e-06	135	2.33	0.142
Nuttallochiton mirandus	4.929629e-06	3.659066e-06	6.304709e-06	54	3.00	0.043

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Uristes gigas	4.795309e-06	1.670862e-08	2.195962e-05	184	2.84	0.161
Rossella antarctica	4.283668e-06	3.095328e-06	7.929445e-06	43	2.00	0.157
Rossella tarenja	4.283668e-06	3.095328e-06	7.929445e-06	43	2.00	0.157
Systenopora contracta	4.126159e-06	2.765603e-06	9.23245e-06	31	2.00	0.125
Mycale acerata	4.113049e-06	3.134559e-06	7.905566e-06	44	2.00	0.156
Oediceroides calmani	3.850251e-06	7.638714e-09	2.384333e-05	153	2.77	0.166
Waldeckia obesa	3.718547e-06	2.386092e-06	2.210886e-05	197	3.52	0.138
Epimeriella walkeri	3.700698e-06	2.10983e-08	2.040712e-05	217	2.88	0.148
Luidiaster gerlachei	3.642808e-06	3.826461e-07	6.564107e-06	18	3.76	0.083
Tritoniella belli	3.591963e-06	2.221087e-06	5.982454e-06	87	2.98	0.085
Axociella nidificata	3.582981e-06	2.640696e-06	6.800686e-06	43	2.00	0.157
Chorismus antarcticus	3.529682e-06	2.283676e-08	9.977013e-06	213	3.14	0.139
Cassidulinoides parkerianus	3.496702e-06	6.226157e-08	5.425029e-06	86	2.00	0.124
Cibicides refulgens	3.496702e-06	4.063476e-08	5.425029e-06	89	2.00	0.129
Globocassidulina crassa	3.496702e-06	4.063476e-08	5.425029e-06	89	2.00	0.129
Ekmocucumis turqueti turqueti	3.496681e-06	3.065034e-06	6.097999e-06	16	2.00	0.110
Eulagisca gigantea	3.390802e-06	5.470998e-07	1.653661e-05	142	3.80	0.167
Laetmonice producta	3.387178e-06	8.431738e-07	1.472737e-05	136	3.94	0.178
Isodyctia cavicornuta	3.348039e-06	2.587973e-06	6.343817e-06	43	2.00	0.157
Isodyctia toxophila	3.348039e-06	2.587973e-06	6.343817e-06	43	2.00	0.157
Tedania oxeata	3.348039e-06	2.587973e-06	6.343817e-06	43	2.00	0.157
Tedania tantulata	3.348039e-06	2.587973e-06	6.343817e-06	43	2.00	0.157
Tedania vanhoeffeni	3.348039e-06	2.587973e-06	6.343817e-06	43	2.00	0.157
Tentorium papillatum	3.348039e-06	2.587973e-06	6.343817e-06	43	2.00	0.157
Tentorium semisuberites	3.348039e-06	2.587973e-06	6.343817e-06	43	2.00	0.157
Lenticulina antarctica	3.305791e-06	4.145444e-08	5.425029e-06	90	2.00	0.130
Isodyctia steifera	3.303905e-06	2.615016e-06	6.324263e-06	44	2.00	0.156
Haliclona dancoi	3.259771e-06	2.567476e-06	6.143582e-06	47	2.00	0.151
Haliclona tenella	3.259771e-06	2.567476e-06	6.143582e-06	47	2.00	0.151
Abyssorchomene rossi	3.232173e-06	5.680414e-09	2.333385e-05	164	2.65	0.156
Polyeunoa laevis	3.227399e-06	1.168458e-06	1.769131e-05	111	3.82	0.168
Primnoisis antarctica	3.155627e-06	1.532379e-06	8.083401e-06	39	3.52	0.117
Neogloboquadriana pachyderma	2.962716e-06	4.063476e-08	5.425029e-06	93	2.00	0.134
Ophioperla ludwigi	2.95261e-06	1.957285e-06	4.283668e-06	97	3.36	0.114
Cephalodiscus	2.9162e-06	2.080875e-06	3.131541e-06	4	2.00	0.038
Clathria pauper	2.818314e-06	2.135506e-06	4.966348e-06	43	2.00	0.157
Iophon radiatus	2.818314e-06	2.135506e-06	4.966348e-06	43	2.00	0.157
Aporocidaris milleri	2.762191e-06	1.941539e-06	3.094294e-06	60	3.31	0.075
Calyx arcuarius	2.737104e-06	2.180315e-06	4.947989e-06	44	2.00	0.156
Acodontaster conspicuus	2.721805e-06	8.334597e-07	4.273976e-06	13	3.00	0.042
Epimeria macrodonta	2.67354e-06	1.18306e-08	2.043938e-05	198	2.68	0.145
Homaxinella balfourensis	2.655894e-06	2.105425e-06	4.755457e-06	47	2.00	0.155
Ophiurolepis gelida	2.644838e-06	2.211203e-08	6.382925e-06	206	2.99	0.140
Colossendeis scotti	2.64206e-06	1.694946e-06	4.023995e-05	135	3.93	0.099
Flustra antarctica	2.64206e-06	1.881028e-06	6.143582e-06	31	2.00	0.125
Nematoflustra flagellata	2.64206e-06	1.881028e-06	6.143582e-06	31	2.00	0.125
Acodontaster hodgsoni	2.601068e-06	8.685232e-07	4.403865e-06	13	3.00	0.042
Astrochlamys bruneus	2.587451e-06	8.605022e-07	7.587963e-06	37	3.52	0.095
Bathydorus spinosus	2.57399e-06	1.880074e-06	4.388184e-06	43	2.00	0.157
Phorbas areolatus	2.57399e-06	1.880074e-06	4.388184e-06	43	2.00	0.157
Phorbas glaberrima	2.57399e-06	1.880074e-06	4.388184e-06	43	2.00	0.157
Odontaster validus	2.571906e-06	1.434346e-07	4.843179e-06	234	3.30	0.143

Species	median IS	Q1 IS	Q3 IS	Degree	TL	TS
Eunoe spica	2.568684e-06	1.116468e-06	2.525976e-05	214	4.04	0.151
Ophiurolepis brevirima	2.531271e-06	2.216955e-08	5.423095e-06	223	3.01	0.143
Harpovoluta charcoti	2.522699e-06	7.847645e-07	3.659066e-06	79	3.02	0.089
Bathyplotes bongraini	2.455535e-06	2.275857e-06	4.224054e-06	17	2.00	0.111
Bathyplotes gourdoni	2.455535e-06	2.275857e-06	4.224054e-06	17	2.00	0.111
Solaster dawsoni	2.432853e-06	7.130127e-07	4.574601e-06	29	3.72	0.079
Ctenocidaris spinosa	2.41577e-06	1.742019e-06	2.777368e-06	75	3.25	0.075
Latrunculia apicalis	2.399592e-06	1.827416e-06	4.131959e-06	43	2.00	0.157
Latrunculia brevis	2.399592e-06	1.827416e-06	4.131959e-06	43	2.00	0.157
Acodontaster capitatus	2.385964e-06	9.363928e-07	3.963421e-06	13	3.00	0.042
Polymastia isidis	2.361721e-06	1.804414e-06	3.955252e-06	43	2.00	0.157
Echiniphimedia hodgsoni	2.35588e-06	1.300985e-06	3.29937e-06	83	2.97	0.129
Polymastia invaginata	2.261599e-06	1.827176e-06	3.941328e-06	44	2.00	0.156
Gorgonocephalus chiliensis	2.251199e-06	1.460738e-06	3.920062e-06	25	3.17	0.080
Notocidaris mortenseni	2.228635e-06	1.748268e-06	2.665876e-06	54	3.00	0.046
Reteporella hippocrepis	2.225124e-06	1.540844e-06	4.755457e-06	31	2.00	0.125
Pontiothauma ergata	2.194892e-06	8.222632e-07	4.507223e-06	41	4.24	0.117
Ekmocucumis steineni	2.135506e-06	1.890437e-06	3.60883e-06	16	2.00	0.110
Ekmocucumis turqueti	2.135506e-06	1.890437e-06	3.60883e-06	16	2.00	0.110
Austrodoris kerguelenensis	2.13174e-06	1.121023e-06	4.228831e-06	36	3.00	0.098
Artedidraco loennbergi	2.082949e-06	6.357904e-07	2.8498e-05	133	3.88	0.143
Notocrangon antarcticus	2.068323e-06	1.906859e-08	5.769274e-06	178	2.88	0.101
Eucranta mollis	2.067919e-06	9.214985e-07	4.391933e-06	68	2.00	0.158
Chiridota weddellensis	2.045889e-06	1.871125e-06	3.578208e-06	17	2.00	0.111
Molpadia musculus	2.045889e-06	1.871125e-06	3.578208e-06	17	2.00	0.111
Ophionotus victoriae	2.042432e-06	1.265292e-08	3.311959e-06	217	2.97	0.147
Eunoe spica spicoides	2.003808e-06	9.850306e-07	2.118929e-05	249	3.94	0.142
Barrukia cristata	1.999498e-06	9.263304e-07	2.739395e-06	99	3.71	0.150
Molgula pedunculata	1.993777e-06	5.674483e-07	7.165311e-06	5	2.00	0.048
Gnathiphimedia mandibularis	1.976631e-06	1.189502e-06	2.669946e-06	102	3.00	0.115
Oediceroides emarginatus	1.976631e-06	3.34963e-09	3.085097e-05	153	2.77	0.166
Ceratoserolis meridionalis	1.961986e-06	1.035259e-06	2.12443e-05	90	3.99	0.157
Frontoserolis bouvieri	1.961986e-06	1.035259e-06	2.12443e-05	90	3.99	0.157
Eunoe hartmanae	1.9577e-06	7.961559e-07	1.067148e-05	152	3.78	0.167
Harmothoe crosetensis	1.943487e-06	9.641638e-07	5.352745e-06	170	3.73	0.154
Harmotoe hartmanae	1.943487e-06	9.641638e-07	5.352745e-06	170	3.73	0.154
Epimeria similis	1.889469e-06	4.685747e-09	2.557948e-05	159	2.49	0.148
Fasciculiporoides ramosa	1.8832e-06	1.34243e-06	4.212708e-06	31	2.00	0.125
Ophioperla koehleri	1.875883e-06	9.00415e-07	2.709756e-06	21	2.00	0.075
Promachocrinus kerguelensis	1.830215e-06	1.009571e-06	4.171551e-06	8	2.00	0.055
Anthometra adriani	1.800754e-06	6.731522e-07	3.043996e-06	7	2.00	0.047
Bathypanoploea schellenbergi	1.763848e-06	7.04757e-09	2.557948e-05	195	2.87	0.146
Harmothoe spinosa	1.740063e-06	9.177645e-07	3.471285e-06	212	3.72	0.146
Dolloidraco longedorsalis	1.718874e-06	7.008707e-07	2.527875e-05	168	3.72	0.150
Aplidium vastum	1.713054e-06	4.765909e-07	5.982454e-06	5	2.00	0.048
Corella eumyota	1.713054e-06	4.765909e-07	5.982454e-06	5	2.00	0.048
Cinachyra antarctica	1.699815e-06	1.230601e-06	2.984104e-06	44	2.00	0.157
Camptoplites tricornis	1.694946e-06	1.178837e-06	3.580908e-06	31	2.00	0.125
Caulastraea curvata	1.694946e-06	1.178837e-06	3.580908e-06	31	2.00	0.125
Chondriovelum adeliense	1.694946e-06	1.178837e-06	3.580908e-06	31	2.00	0.125
Flustra angusta	1.694946e-06	1.178837e-06	3.580908e-06	31	2.00	0.125
Isoschizoporella tricuspis	1.694946e-06	1.178837e-06	3.580908e-06	31	2.00	0.125

Species	median IS	Q1 IS	Q3 IS	Degree	TL	TS
Melicerita obliqua	1.694946e-06	1.178837e-06	3.580908e-06	31	2.00	0.125
Synoicum adareanum	1.665199e-06	4.381975e-07	5.273584e-06	5	2.00	0.048
Alexandrella mixta	1.663223e-06	7.912314e-07	2.884076e-06	59	3.92	0.142
Ypsilocucumis turricata	1.662638e-06	1.454499e-06	2.813344e-06	17	2.00	0.111
Cinachyra barbata	1.647693e-06	1.204861e-06	2.986456e-06	43	2.00	0.157
Ctenocidaris perrieri	1.638565e-06	1.092832e-06	1.775688e-06	68	3.27	0.067
Iphimediella cyclogena	1.607865e-06	8.22175e-07	3.540431e-06	86	3.44	0.115
Ophiosparte gigas	1.578546e-06	4.184036e-07	8.674486e-06	301	3.43	0.155
Ainigmaptilon antarcticus	1.564434e-06	9.019493e-07	2.032461e-06	23	2.00	0.102
Alcyonium antarcticum	1.564434e-06	9.019493e-07	2.032461e-06	23	1.00	0.096
Armadillogorgia cyathella	1.564434e-06	9.019493e-07	2.032461e-06	23	2.00	0.102
Primnoella	1.564434e-06	9.019493e-07	2.032461e-06	23	2.00	0.102
Trematomus scotti	1.534496e-06	3.630501e-07	3.21887e-05	146	3.82	0.153
Maxilliphimedia longipes	1.531616e-06	7.172848e-07	2.908428e-06	60	3.26	0.136
Laternula elliptica	1.522498e-06	5.942141e-07	2.698016e-06	30	2.00	0.094
Paramoera walkeri	1.516919e-06	6.985279e-07	2.998968e-06	60	3.92	0.143
Ctenocidaris gigantea	1.5006e-06	1.073329e-06	1.717092e-06	70	3.27	0.071
Limopsis marionensis	1.408062e-06	6.952555e-07	2.432853e-06	29	2.00	0.094
Eurythenes gryllus	1.375984e-06	7.295642e-07	3.640816e-05	210	3.53	0.136
Artedidraco skottsbergi	1.369463e-06	5.540179e-07	2.932412e-05	135	3.86	0.138
Ctenocidaris gilberti	1.352572e-06	1.073329e-06	1.710216e-06	53	3.00	0.042
Trematomus lepidorhinus	1.318084e-06	3.576357e-07	3.940591e-05	95	3.81	0.123
Sterechinus neumayeri	1.215256e-06	4.25418e-09	2.718674e-06	141	2.68	0.119
Perknaster fuscus antarcticus	1.194931e-06	2.753774e-07	3.415098e-06	10	2.67	0.055
Harpagifer antarcticus	1.190703e-06	3.41474e-07	3.927767e-05	78	3.80	0.102
Austroflustra vulgaris	1.182237e-06	8.365443e-07	2.659508e-06	31	2.00	0.125
Bathydoris clavigera	1.179676e-06	6.291801e-07	2.44622e-06	46	3.16	0.107
Taeniogyrus contortus	1.172794e-06	9.248071e-07	1.778477e-06	20	2.00	0.110
Abyssocucumis liouvillei	1.149352e-06	1.019204e-06	1.958169e-06	16	2.00	0.110
Achlyonice violaecuspidata	1.116468e-06	1.010603e-06	1.944296e-06	17	2.00	0.111
Astrotoma agassizii	1.116468e-06	7.454145e-09	2.533885e-06	223	2.86	0.123
Phyllocomus crocea	1.113239e-06	5.092776e-07	2.135343e-06	66	2.00	0.152
Ascidia challengeri	1.092832e-06	2.745978e-07	3.50275e-06	5	2.00	0.048
Notaeolidia gigas	1.066349e-06	4.772955e-07	2.178256e-06	28	3.90	0.105
Momoculodes scabriculosus	1.050742e-06	5.083635e-07	2.16553e-06	49	2.00	0.144
Pseudorchomene coatsi	1.050742e-06	5.083635e-07	2.16553e-06	49	2.00	0.144
Pteraster affinis aculeatus	1.024164e-06	3.780034e-07	1.961656e-06	12	3.00	0.042
Bostrychopora dentata	1.017465e-06	7.336209e-07	2.2634e-06	31	2.00	0.125
Lageneschara lyrulata	1.017465e-06	7.336209e-07	2.2634e-06	31	2.00	0.125
Austrocidaris canaliculata	1.015927e-06	5.429963e-07	1.971806e-06	25	3.77	0.030
Lysasterias perrieri	1.014956e-06	2.965157e-07	2.035275e-06	30	3.46	0.088
Glyptonotus antarcticus	1.004102e-06	5.094286e-07	1.466329e-06	121	3.88	0.117
Psolus antarcticus	1.001795e-06	9.248071e-07	1.778477e-06	16	2.00	0.110
Psolus dubiosus	1.001795e-06	9.248071e-07	1.778477e-06	16	2.00	0.110
Epimeria georgiana	9.882144e-07	4.654007e-09	2.709148e-05	139	2.53	0.169
Neobuccinum eatoni	9.663427e-07	4.127796e-07	2.140693e-06	34	3.00	0.100
Pista spinifera	9.635585e-07	4.350614e-07	1.88962e-06	66	2.00	0.152
Terebella ehlersi	9.635585e-07	4.350614e-07	1.88962e-06	66	2.00	0.152
Psolus charcoti	9.462423e-07	8.658855e-07	1.637238e-06	16	2.00	0.110
Mesothuria lactea	9.446587e-07	8.703439e-07	1.618766e-06	17	2.00	0.111
Parschisturella ceruviata	8.965456e-07	4.649595e-07	1.772197e-06	45	2.00	0.139
Tubularia ralphii	8.945726e-07	4.271453e-07	2.078996e-06	53	3.44	0.122

Species	median IS	Q1 IS	Q3 IS	Degree	TL	TS
Pseudostichopus mollis	8.835413e-07	8.070608e-07	1.483513e-06	17	2.00	0.111
Pseudostichopus villosus	8.835413e-07	8.070608e-07	1.483513e-06	17	2.00	0.111
Psolidium incertum	8.835413e-07	8.070608e-07	1.483513e-06	17	2.00	0.111
Trachythyone parva	8.835413e-07	8.070608e-07	1.483513e-06	17	2.00	0.111
Pyura setosa	8.714568e-07	2.352571e-07	3.047592e-06	5	2.00	0.048
Diplasterias brucei	8.295899e-07	4.136254e-07	1.568119e-06	29	3.83	0.052
Macroptychaster accrescens	8.239546e-07	4.261457e-07	1.279301e-06	46	3.80	0.076
Arcturidae	8.201596e-07	4.976851e-07	1.634549e-06	30	2.00	0.117
Tritonia antarctica	8.075119e-07	3.99966e-07	2.03193e-06	28	2.50	0.104
Yolida eightsi	7.931386e-07	3.838922e-07	1.610648e-06	37	2.00	0.102
Notasterias armata	7.855177e-07	4.335495e-07	1.413919e-06	12	3.00	0.042
Pyura tunicata	7.850349e-07	2.107837e-07	2.69732e-06	5	2.00	0.048
Scotoplanes globosa	7.837104e-07	6.72324e-07	1.391294e-06	17	2.00	0.111
Notasterias stylophora	7.75167e-07	3.577487e-07	1.156665e-06	12	3.00	0.042
Pyura discoveryi	7.3857e-07	1.938013e-07	2.596526e-06	5	2.00	0.048
Labidiaster annulatus	7.262738e-07	4.357885e-07	1.819104e-06	144	3.89	0.128
Cylindrotheca closterium	6.789966e-07	5.640899e-07	9.306303e-07	81	1.00	0.202
Gyrodinium lachryama	6.784794e-07	5.185108e-07	8.60802e-07	35	2.00	0.107
Aega antarctica	6.649717e-07	4.114656e-07	1.310033e-06	30	2.00	0.117
Lophaster gaini	6.595062e-07	2.754117e-07	1.173701e-06	12	3.00	0.042
Pyura bouvetensis	6.409226e-07	1.730817e-07	2.279512e-06	5	2.00	0.048
Elpidia glacialis	6.331611e-07	5.362027e-07	1.075839e-06	17	2.00	0.111
Laetmogone wyvillethompsoni	6.331611e-07	5.362027e-07	1.075839e-06	17	2.00	0.111
Echinopsolus acanthocola	6.205844e-07	5.173159e-07	1.012782e-06	16	2.00	0.110
Gnathia calva	6.071912e-07	2.28328e-07	5.153946e-06	48	3.56	0.126
Probuccinum tenuistriatum	6.016794e-07	1.427121e-07	5.366457e-05	41	4.24	0.117
Propeleda longicaudata	5.925714e-07	2.127886e-07	9.544477e-07	25	2.00	0.073
Thalassiosira antarctica	5.700961e-07	4.754783e-07	7.691411e-07	81	1.00	0.202
Hyperiella dilatata	5.576053e-07	3.653766e-08	1.336307e-05	129	2.15	0.157
Ophioceres incipiens	5.397046e-07	1.891863e-08	8.42434e-06	154	2.69	0.120
Liothyrella uva	5.113625e-07	2.583111e-07	7.644138e-07	2	2.00	0.041
Liothyrella uva antarctica	5.113625e-07	2.583111e-07	7.644138e-07	2	2.00	0.041
Amauropsis rossiana	5.088914e-07	2.160463e-07	1.434277e-06	30	3.32	0.105
Magellania fragilis	5.085476e-07	2.569214e-07	7.601738e-07	2	2.00	0.041
Limopsis lillei	5.070776e-07	2.363936e-07	8.832921e-07	29	2.00	0.094
Marseniopsis conica	4.667714e-07	2.039452e-07	1.285786e-06	28	3.00	0.103
Marseniopsis mollis	4.667714e-07	2.039452e-07	1.285786e-06	28	3.00	0.103
Marginella ealesa	4.625519e-07	2.085234e-07	9.193742e-07	28	2.00	0.114
Newnesia antarctica	4.625519e-07	2.085234e-07	9.193742e-07	28	2.00	0.114
Trematomus bernacchii	4.593613e-07	2.006028e-07	1.341004e-05	118	3.62	0.104
Amphidinium hadai	4.421246e-07	3.241335e-07	6.109879e-07	35	2.00	0.107
Sycozoa sigillinoides	4.261457e-07	1.097194e-07	1.433384e-06	5	2.00	0.048
Falsimargarita gemma	4.133372e-07	1.797468e-07	8.051013e-07	28	2.00	0.114
Diastylis mawsoni	3.634029e-07	2.845198e-07	4.725055e-07	8	2.00	0.044
Ekleptostylis debroyeri	3.634029e-07	2.845198e-07	4.725055e-07	8	2.00	0.044
Chaetoceros socialis	3.608027e-07	2.633108e-07	4.29925e-07	81	1.00	0.202
Fissidentalium majorinum	3.411732e-07	2.509714e-07	6.668215e-07	6	2.00	0.035
Natatolana meridionalis	3.347924e-07	2.10849e-07	6.616101e-07	31	2.00	0.117
Natatolana obtusata	3.347924e-07	2.10849e-07	6.616101e-07	31	2.00	0.116
Natatolana oculata	3.347924e-07	2.074642e-07	6.660774e-07	30	2.00	0.117
Cuenotaster involutus	3.086356e-07	2.316226e-07	1.299956e-06	8	2.00	0.061
Nacella concinna	3.049763e-07	1.976903e-07	7.906499e-07	21	3.00	0.083

Species	median IS	Q1 IS	Q3 IS	Degree	TL	TS
Lissarca notorcadensis	3.010757e-07	1.881614e-07	5.95349e-07	32	2.00	0.094
Trophon longstaffi	2.519385e-07	1.100545e-07	1.76048e-06	34	3.00	0.098
Pelagobia longicirrata	2.445062e-07	6.995065e-08	1.339122e-06	137	2.12	0.132
Compsothyris racovitzae	2.323979e-07	1.228803e-07	3.419154e-07	2	2.00	0.041
Magellania joubini	2.323979e-07	1.228803e-07	3.419154e-07	2	2.00	0.041
Golfingia margaritacea margaritacea	2.227077e-07	1.120792e-07	3.333363e-07	2	2.00	0.047
Munna globicauda	2.148629e-07	1.348937e-07	4.255366e-07	30	2.00	0.117
Baseodiscus antarcticus	2.106178e-07	1.337076e-07	2.60481e-07	90	3.53	0.070
Lineus longifissus	2.106178e-07	1.337076e-07	2.60481e-07	90	3.53	0.070
Parborlasia corrugatus	2.106178e-07	1.337076e-07	2.60481e-07	90	3.53	0.070
Alomasoma belyaevi	1.956442e-07	9.881887e-08	2.924695e-07	2	2.00	0.047
Monocaulus parvula	1.761507e-07	3.97151e-09	2.132574e-06	115	2.37	0.145
Cyclocardia astartoides	1.687487e-07	4.492885e-08	4.136948e-07	18	2.00	0.075
Vanadis antarctica	1.637624e-07	4.405846e-08	6.872733e-07	140	2.34	0.165
Perknaster densus	1.525828e-07	1.525828e-07	6.508076e-07	7	2.00	0.060
Cycethra verrucosa mawsoni	1.434346e-07	1.434346e-07	5.985218e-07	7	2.00	0.060
Alacia belgicae	1.414822e-07	8.468252e-08	4.240307e-07	124	2.08	0.130
Alacia hettacra	1.414822e-07	8.468252e-08	4.240307e-07	124	2.08	0.130
Boroecia antipoda	1.414822e-07	8.468252e-08	4.240307e-07	124	2.08	0.130
Metaconchoecia isocheira	1.414822e-07	8.468252e-08	4.240307e-07	124	2.08	0.130
Crania lecointei	1.389486e-07	9.124532e-08	1.866519e-07	2	2.00	0.041
Notioceramus anomalus	1.335162e-07	1.335162e-07	5.656196e-07	7	2.00	0.060
Cadulus dalli antarcticum	1.261431e-07	8.886378e-08	2.563518e-07	6	2.00	0.035
Golfingia nordenskojoeldi	1.255994e-07	7.181644e-08	1.793823e-07	2	2.00	0.047
Phascolion strombi	1.255994e-07	7.181644e-08	1.793823e-07	2	2.00	0.047
Perknaster sladeni	1.240537e-07	1.240537e-07	5.271194e-07	7	2.00	0.060
Silicularia rosea	1.171115e-07	5.054664e-08	4.783046e-07	118	2.37	0.143
Hamingia	9.209379e-08	4.941022e-08	1.347774e-07	2	2.00	0.047
Rhynchonereella bongraini	8.607902e-08	4.570314e-08	2.739096e-07	84	2.12	0.114
Maxmuelleria faex	7.807225e-08	4.285686e-08	1.132876e-07	2	2.00	0.047
Kampylaster incurvatus	7.755344e-08	7.755344e-08	3.528815e-07	7	2.00	0.060
Golfingia anderssoni	6.023754e-08	3.680015e-08	8.367493e-08	2	2.00	0.047
Coscinodiscus oculoides	5.893196e-08	2.473824e-08	1.580011e-07	81	1.00	0.202
Golfingia ohlini	5.673089e-08	4.966455e-08	6.379722e-08	2	2.00	0.047
Golfingia mawsoni	5.47208e-08	5.062035e-08	5.882126e-08	2	2.00	0.047
Echiurus antarcticus	5.300143e-08	3.603646e-08	6.99664e-08	2	2.00	0.047
Djerboa furcipes	5.224266e-08	1.871665e-08	5.091111e-07	116	2.08	0.154
Oradarea edentata	5.14485e-08	1.865585e-08	5.091111e-07	115	2.08	0.154
Haplocheira plumosa	5.006575e-08	1.778048e-08	5.091111e-07	115	2.08	0.156
Pseudo-Nitzschia liniola	4.62495e-08	2.029961e-08	1.332162e-07	81	1.00	0.202
Ihlea racovitzai	3.585471e-08	2.097115e-08	1.036547e-07	76	2.08	0.089
Salpa gerlachei	3.585471e-08	2.097115e-08	1.036547e-07	76	2.08	0.089
Euchaetomera antarcticus	3.326097e-08	1.378546e-08	1.513431e-05	105	2.36	0.133
Pseudo-Nitzschia subcurvata	3.277963e-08	1.531073e-08	1.070871e-07	81	1.00	0.202
Manguinea fusiformis	3.21218e-08	1.486009e-08	1.025105e-07	81	1.00	0.202
Pseudo-Nitzschia heimii	3.151126e-08	1.446766e-08	9.902539e-08	81	1.00	0.202
Edwardsia meridionalis	2.977446e-08	1.474916e-08	6.125673e-08	75	2.15	0.113
Isosicyonis alba	2.977446e-08	1.474916e-08	6.125673e-08	75	2.15	0.113
Clavularia frankiliana	2.902159e-08	1.37557e-08	1.209989e-06	101	2.35	0.138
Stellarima microtrias	2.805713e-08	1.259511e-08	8.080817e-08	81	1.00	0.202
Peraeospinosus pushkini	2.799688e-08	1.293416e-08	6.008763e-06	104	2.36	0.101

Species	median IS	Q1 IS	Q3 IS	Degree	TL	TS
Porosira pseudodenticulata	2.793662e-08	1.252563e-08	7.95878e-08	81	1.00	0.202
Thalassiosira tumida	2.63107e-08	1.159892e-08	6.999178e-08	81	1.00	0.202
Thalassiosira ritscheri	2.624137e-08	1.156513e-08	6.971769e-08	81	1.00	0.202
Thalassiosira lentiginosa	2.617822e-08	1.153437e-08	6.946827e-08	81	1.00	0.202
Ophiacantha antarctica	2.564069e-08	1.26592e-08	4.003492e-07	90	2.16	0.125
Abyssorchomene plebs	2.49287e-08	8.350765e-09	2.216289e-05	107	2.08	0.159
Nitzschia lecointei	2.480364e-08	1.103538e-08	6.447999e-08	81	1.00	0.202
Parmaphorella mawsoni	2.438857e-08	1.375305e-08	2.88734e-07	86	2.00	0.128
Salpa thompsoni	2.430192e-08	1.346447e-08	1.733991e-05	108	2.28	0.103
Actinocyclus actinochilus	2.425541e-08	1.080826e-08	6.279281e-08	81	1.00	0.202
Dictyocha speculum	2.199368e-08	1.385373e-08	4.271537e-08	30	1.00	0.110
Porosira glacialis	2.18237e-08	9.6432e-09	5.636287e-08	81	1.00	0.202
Isotealia antarctica	1.976451e-08	1.180898e-08	6.671012e-08	74	2.21	0.106
Thalassiosira gracilis expecta	1.966764e-08	8.480819e-09	4.996814e-08	81	1.00	0.202
Ampelisca richardsoni	1.959325e-08	6.937939e-09	1.131035e-06	108	2.00	0.159
Actinocyclus spiritus	1.856558e-08	8.096224e-09	4.779338e-08	81	1.00	0.202
Camylaspis maculata	1.812572e-08	1.055327e-08	3.482684e-08	66	2.00	0.097
Eudorella splendida	1.761209e-08	9.966826e-09	3.239967e-08	68	2.00	0.102
Vaunthompsonia indermis	1.761209e-08	9.966826e-09	3.239967e-08	68	2.00	0.102
Proboscia truncata	1.704812e-08	7.55662e-09	4.386545e-08	81	1.00	0.202
Azpeitia tabularis	1.684713e-08	7.466724e-09	4.31349e-08	81	1.00	0.202
Porania antarctica	1.671115e-08	1.03026e-08	3.64839e-08	72	2.12	0.108
Rhizosolenia antennata	1.63569e-08	6.671586e-09	3.873542e-08	81	1.00	0.202
Manguinea rigida	1.630969e-08	6.992491e-09	4.048219e-08	81	1.00	0.202
Eucampia antarctica	1.597536e-08	6.543489e-09	3.803298e-08	81	1.00	0.202
Thalassiosira trifulta	1.524402e-08	6.137307e-09	3.591437e-08	81	1.00	0.202
Nitzschia kerguelensis	1.517095e-08	6.09392e-09	3.579504e-08	81	1.00	0.202
Odontella weissflogii	1.517095e-08	6.09392e-09	3.579504e-08	81	1.00	0.202
Thalassiosira gravida	1.488074e-08	5.923095e-09	3.532189e-08	81	1.00	0.202
Nototanais dimorphus	1.469447e-08	1.066477e-08	2.805713e-08	69	2.00	0.104
Nototanais antarcticus	1.455432e-08	1.066477e-08	2.8027e-08	70	2.00	0.105
Actinocyclus utricularis	1.413125e-08	5.541536e-09	3.417282e-08	81	1.00	0.202
Banquisia belgicae	1.413125e-08	5.541536e-09	3.417282e-08	81	1.00	0.202
Chaetoceros concavicornis	1.413125e-08	5.541536e-09	3.417282e-08	81	1.00	0.202
Chaetoceros criophilum	1.413125e-08	5.541536e-09	3.417282e-08	81	1.00	0.202
Corethron criophilum	1.413125e-08	5.541536e-09	3.417282e-08	81	1.00	0.202
Pseudo-Nitzschia prolongatoides	1.398864e-08	5.443517e-09	3.415766e-08	81	1.00	0.202
Thalassiosira frenguelliopsis	1.388148e-08	5.354252e-09	3.392988e-08	81	1.00	0.202
Thalassiosira australis	1.32721e-08	4.862685e-09	3.045084e-08	81	1.00	0.202
Thalassiosira gracilis	1.32721e-08	4.862685e-09	3.045084e-08	81	1.00	0.202
Porania antarctica glabra	1.307845e-08	6.548193e-09	2.611232e-08	72	2.12	0.108
Chaetoceros flexuosum	1.224385e-08	4.271874e-09	2.751283e-08	81	1.00	0.202
Proboscia alata	1.207053e-08	4.144596e-09	2.681657e-08	81	1.00	0.202
Oswaldella antarctica	1.153437e-08	4.862685e-09	9.306303e-07	93	2.00	0.128
Proboscia inermi	1.117759e-08	3.655737e-09	2.373163e-08	81	1.00	0.202
Sterechinus antarcticus	1.055074e-08	2.680485e-09	1.700366e-06	121	2.47	0.101
Bodo saltans	1.047241e-08	5.230062e-09	2.040519e-08	32	3.00	0.108
Chaetoceros bulbosum	1.041188e-08	3.148448e-09	2.123888e-08	81	1.00	0.202
Chaetoceros dichaeta	1.041188e-08	3.148448e-09	2.123888e-08	81	1.00	0.202
Chaetoceros pelagicus	1.041188e-08	3.148448e-09	2.123888e-08	81	1.00	0.202
Fragilariopsis separanda	1.041188e-08	3.148448e-09	2.123888e-08	81	1.00	0.202
Fragilariopsis linearis	9.893299e-09	2.888424e-09	2.016798e-08	81	1.00	0.202

Species	median IS	Q1 IS	Q3 IS	Degree	TL	TS
Fragilariopsis nana	9.893299e-09	2.888424e-09	2.016798e-08	81	1.00	0.202
Fragilariopsis obliquecostata	9.893299e-09	2.888424e-09	2.016798e-08	81	1.00	0.202
Fragilariopsis rhombica	9.893299e-09	2.888424e-09	2.016798e-08	81	1.00	0.202
Fragilariopsis ritscheri	9.893299e-09	2.888424e-09	2.016798e-08	81	1.00	0.202
Fragilariopsis kerguelensis	9.353684e-09	2.658185e-09	1.936967e-08	81	1.00	0.202
Trichotoxon reinboldii	9.000744e-09	2.563283e-09	1.887812e-08	81	1.00	0.202
Phaeocystis antarctica	8.906517e-09	4.339412e-09	1.71765e-08	30	1.00	0.110
Fragilariopsis sublinearis	8.267227e-09	2.169726e-09	1.666754e-08	81	1.00	0.202
Nematocarcinus lanceopes	8.242873e-09	3.492658e-09	6.730801e-07	90	2.39	0.111
Eucopia australis	8.182022e-09	3.262085e-09	2.578615e-05	105	2.36	0.133
Anthomastus bathyproctus	7.826422e-09	3.528914e-09	1.005512e-06	84	2.02	0.133
Chaetoceros neglectum	7.567656e-09	1.880278e-09	1.421549e-08	81	1.00	0.202
Fragilariopsis curta	7.567656e-09	1.880278e-09	1.421549e-08	81	1.00	0.202
Fragilariopsis pseudonana	7.567656e-09	1.880278e-09	1.421549e-08	81	1.00	0.202
Fragilariopsis vanheurckii	7.567656e-09	1.880278e-09	1.421549e-08	81	1.00	0.202
Nitzschia neglecta	7.567656e-09	1.880278e-09	1.421549e-08	81	1.00	0.202
Silicioflagellata	6.587074e-09	3.259095e-09	1.234305e-08	30	1.00	0.110
Antarctomysis maxima	5.73193e-09	2.342752e-09	2.880825e-05	105	2.36	0.133
Navicula glaciei	5.714033e-09	1.360598e-09	9.206776e-09	81	1.00	0.202
Navicula schefterae	5.714033e-09	1.360598e-09	9.206776e-09	81	1.00	0.202
Bathybiaster loripes	5.496427e-09	2.46937e-09	1.110237e-06	101	2.67	0.131
Fragilariopsis cylindrus	5.176133e-09	1.275172e-09	8.345545e-09	81	1.00	0.202
Sediment	2.983855e-09	1.089848e-09	6.335435e-09	57	1.00	0.064
Austrosignum grande	2.099819e-09	1.024369e-09	1.20403e-06	89	2.00	0.138
Phytodetritus	1.738243e-09	8.316905e-10	5.752081e-09	226	1.00	0.094
Abatus curvidens	1.302266e-09	1.302266e-09	1.302266e-09	2	2.00	0.039
Abatus shackeltoni	1.227636e-09	1.227636e-09	1.227636e-09	2	2.00	0.039
Abatus cavernosus	1.089848e-09	1.089848e-09	1.089848e-09	2	2.00	0.039
Abatus nimrodi	9.830281e-10	9.830281e-10	9.830281e-10	2	2.00	0.039
Gersemia antarctica	4.368498e-10	2.553266e-10	3.38733e-06	87	2.08	0.132

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). 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. The x for the self-limitation effect of the species is 0 unless the species presents cannibalism. We performed 1000 extinction simulations for every species. Our results showed that the proportion of Jacobians that were locally stable was zero, probably due to the absence of self-limitation in the species. Thus, we considered the distribution of maximum eigenvalues as the stability index, hereafter QSS. For testing if the QSS difference before and after the extinction is positive or negative we performed a contrast. This means that for each simulation we made the difference of the QSS after extinction with the median value of the 1000 simulations of QSS for the whole network, thus we obtained a distribution of QSS differences. A positive difference indicates that the food web's stability is greater without the targeted

species, suggesting that the species in question contributes to the network's instability. Conversely, a negative difference implies that the network is less stable without the species, indicating a stabilizing effect. Due to the variability in the estimation of the eigenvalues, we decided to consider that a substantial impact on stability was reached when the proportion of either negative or positive differences within this distribution must exceeded 0.55. Figure 2 shows this for four species.

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'.

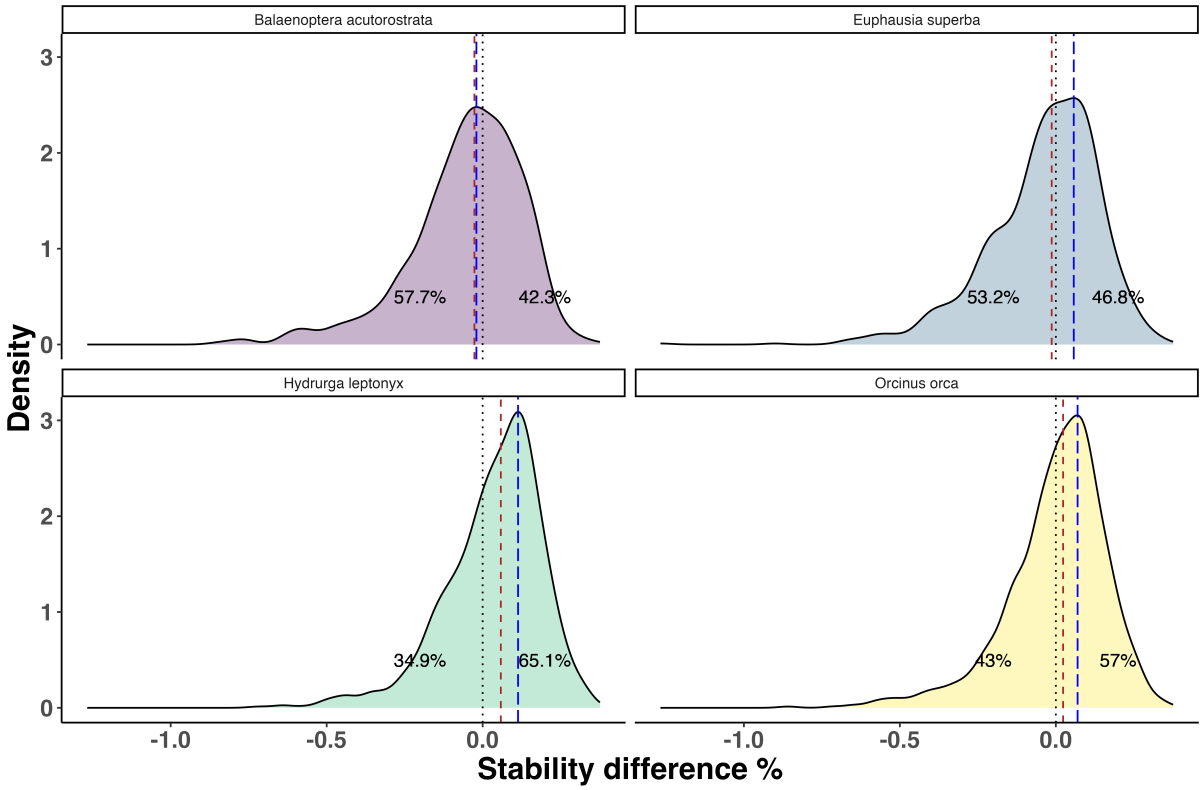

Figure 2: Distribution of relative stability differences (between the whole network and the network minus one species) when the species in question are removed from the Weddell Sea food web. Stability differences are shown as percentages. Central tendencies are shown: median in brown dash, mode in blue longdash.

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

Table 2: Summary of maximum eigenvalue (QSS) distribution of differences before and after performing extinction simulations in the Weddell Sea food web. Ordered by decreasing proportion of positive differences. Prop dif QSS + = Proportion of positive differences, Prop dif QSS - = Proportion of negative differences, median difQSS relat = median of relative QSS differences.

Species	Prop dif QSS +	Prop dif QSS -	median difQSS relat
Hydrurga leptonyx	0.651	0.349	0.0582380
Arctocephalus gazella	0.613	0.387	0.0322909
Mirounga leonina	0.581	0.419	0.0312906
Mesonychoteuthis hamiltoni	0.573	0.427	0.0265289

Species	Prop dif QSS +	Prop dif QSS -	median difQSS relat
Orcinus orca	0.570	0.430	0.0232904
Macrourus holotrachys	0.568	0.432	0.0239889
Notothenia marmorata	0.563	0.437	0.0183958
Macrourus whitsoni	0.558	0.442	0.0223483
Ommatophoca rossii	0.558	0.442	0.0236585
Leptonychotes weddelli	0.551	0.449	0.0204262
Dissostichus mawsoni	0.547	0.453	0.0195471
Notothenia coriiceps	0.544	0.456	0.0181917
Pagetopsis macropterus	0.542	0.458	0.0133901
Clio pyramidata	0.539	0.461	0.0132594
Edwardsia meridionalis	0.534	0.466	0.0111048
Galiteuthis glacialis	0.532	0.468	0.0117626
Megaptera novaeangliae	0.530	0.470	0.0100044
Nototanais antarcticus	0.530	0.470	0.0081931
Isosicyonis alba	0.529	0.471	0.0091071
Natatolana meridionalis	0.529	0.471	0.0083387
Echiurus antarcticus	0.528	0.472	0.0097771
Paraceradocus gibber	0.527	0.473	0.0088182
Martialia hyadesi	0.526	0.474	0.0086266
Nitzschia neglecta	0.526	0.474	0.0082240
Aptenodytes forsteri	0.525	0.475	0.0092236
Pleuragramma antarcticum	0.525	0.475	0.0127623
Trematomus pennellii	0.525	0.475	0.0092681
Golfingia nordenskojoeldi	0.523	0.477	0.0093687
Chionodraco myersi	0.522	0.478	0.0079624
Silicioflagellata	0.522	0.478	0.0067129
Thalassiosira gravida	0.522	0.478	0.0079688
Thalassiosira ritscheri	0.522	0.478	0.0089235
Trematomus loennbergii	0.521	0.479	0.0090177
Ctenocidaris perrieri	0.520	0.480	0.0045898
Eucopia australis	0.520	0.480	0.0063218
Bathybiaster loripes	0.519	0.481	0.0071585
Camylaspis maculata	0.519	0.481	0.0075011
Cylindrotheca closterium	0.519	0.481	0.0071210
Kondakovia longimana	0.519	0.481	0.0065312
Psychroteuthis glacialis	0.519	0.481	0.0047244
Golfingia margaritacea margaritacea	0.518	0.482	0.0061283
Notaeolidia gigas	0.518	0.482	0.0106079
Ekleptostylis debroyeri	0.517	0.483	0.0090180
Notasterias stylophora	0.517	0.483	0.0042340
Tedania vanhoeffeni	0.517	0.483	0.0087910
Trematomus hansoni	0.517	0.483	0.0058990
Caulastraea curvata	0.516	0.484	0.0096405
Crania lecointei	0.516	0.484	0.0037504
Cyllopus lucasii	0.516	0.484	0.0047906
Dimophyes arctica	0.516	0.484	0.0068132
Magellania joubini	0.516	0.484	0.0054193
Perknaster densus	0.516	0.484	0.0027993
Phorbas glaberrima	0.516	0.484	0.0060650
Flustra antarctica	0.515	0.485	0.0039654
Fragilariopsis linearis	0.515	0.485	0.0033586
Pseudo-Nitzschia prolongatoides	0.515	0.485	0.0089807

Species	Prop dif QSS +	Prop dif QSS -	median difQSS relat
Trematomus nicolai	0.515	0.485	0.0062671
Aethotaxis mitopteryx	0.514	0.486	0.0043803
Ekmocucumis turqueti	0.514	0.486	0.0080713
Acodontaster conspicuus	0.513	0.487	0.0040223
Urticinopsis antarctica	0.513	0.487	0.0046915
Bathypanoploea schellenbergi	0.512	0.488	0.0042547
Cassidulinoides parkerianus	0.512	0.488	0.0059199
Desmonema glaciale	0.512	0.488	0.0033888
Golfingia anderssoni	0.512	0.488	0.0075599
Isodyctia steifera	0.512	0.488	0.0044246
Lageneschara lyrulata	0.512	0.488	0.0036662
Pagetopsis maculatus	0.512	0.488	0.0048215
Pogonophryne marmorata	0.512	0.488	0.0030079
Gorgonocephalus chiliensis	0.511	0.489	0.0045626
Kirkpatrickia variolosa	0.511	0.489	0.0027825
Rossella antarctica	0.511	0.489	0.0022915
Anthomastus bathyproctus	0.510	0.490	0.0047369
Chaetoceros criophilum	0.510	0.490	0.0016969
Chaetoceros socialis	0.510	0.490	0.0033011
Macroptychaster accrescens	0.510	0.490	0.0027970
Ophionotus victoriae	0.510	0.490	0.0022531
Pogonophryne scotti	0.510	0.490	0.0048291
Serolella bouveri	0.510	0.490	0.0047019
Dictyocha speculum	0.509	0.491	0.0034916
Mesothuria lactea	0.509	0.491	0.0020680
Ophiurolepis gelida	0.509	0.491	0.0038004
Pachyptila desolata	0.509	0.491	0.0028994
Pseudosagitta gazellae	0.509	0.491	0.0031234
Artedidraco loennbergi	0.508	0.492	0.0038814
Gerlachea australis	0.508	0.492	0.0039727
Phorbas areolatus	0.508	0.492	0.0032709
Polymastia invaginata	0.508	0.492	0.0037578
Porosira pseudodenticulata	0.508	0.492	0.0017527
Propeleda longicaudata	0.508	0.492	0.0024102
Trophon longstaffi	0.508	0.492	0.0039214
Bargmannia	0.507	0.493	0.0033179
Baseodiscus antarcticus	0.507	0.493	0.0029885
Dolloidraco longedorsalis	0.507	0.493	0.0038833
Gnathiphimedia mandibularis	0.507	0.493	0.0038035
Gymnoscopelus braueri	0.507	0.493	0.0049433
Harpovoluta charcoti	0.507	0.493	0.0015015
Lenticulina antarctica	0.507	0.493	0.0017082
Lyrocteis flavopallidus	0.507	0.493	0.0042962
Ophiacantha antarctica	0.507	0.493	0.0022393
Callianira antarctica	0.506	0.494	0.0027097
Isotealia antarctica	0.506	0.494	0.0027374
Moroteuthis ingens	0.506	0.494	0.0035174
Solaster dawsoni	0.506	0.494	0.0030059
Solmundella bitentaculata	0.506	0.494	0.0015497
Stellarima microtrias	0.506	0.494	0.0019913
Camptoplites tricornis	0.505	0.495	0.0009800
Cinachyra barbata	0.505	0.495	0.0016805

Species	Prop dif QSS +	Prop dif QSS -	median difQSS relat
Clione antarctica	0.505	0.495	0.0023987
Eulagisca gigantea	0.505	0.495	0.0007266
Fulmarus glacialoides	0.505	0.495	0.0018270
Natatolana oculata	0.505	0.495	0.0011171
Reteporella hippocrepis	0.505	0.495	0.0019210
Rhynchonereella bongraini	0.505	0.495	0.0022910
Sterna vittata	0.505	0.495	0.0023508
Stylocordyla borealis	0.505	0.495	0.0033806
Trematomus bernacchii	0.505	0.495	0.0021561
Waldeckia obesa	0.505	0.495	0.0024522
Chaetoceros concavicornis	0.504	0.496	0.0013448
Falsimargarita gemma	0.504	0.496	0.0012544
Globocassidulina crassa	0.504	0.496	0.0020306
Liljeborgia georgiana	0.504	0.496	0.0013039
Monocaulus parvula	0.504	0.496	0.0005649
Nitzschia kerguelensis	0.504	0.496	0.0020456
Parborlasia corrugatus	0.504	0.496	0.0013657
Pareledone charcoti	0.504	0.496	0.0013661
Physeter macrocephalus	0.504	0.496	0.0008654
Pogonophryne phyllopogon	0.504	0.496	0.0011003
Thysanoessa macrura	0.504	0.496	0.0012274
Abyssocucumis liouvillei	0.503	0.497	0.0012950
Bathydoris clavigera	0.503	0.497	0.0028458
Labidiaster annulatus	0.503	0.497	0.0003740
Salpa thompsoni	0.503	0.497	0.0009690
Serolis polita	0.503	0.497	0.0008018
Astrochlamys bruneus	0.502	0.498	0.0008001
Cryodraco antarcticus	0.502	0.498	0.0016087
Epimeria georgiana	0.502	0.498	0.0006987
Euchaetomera antarcticus	0.502	0.498	0.0013019
Pentanymphon antarcticum	0.502	0.498	0.0005864
Perknaster sladeni	0.502	0.498	0.0008425
Pogonophryne permitini	0.502	0.498	0.0002546
Probuccinum tenuistriatum	0.502	0.498	0.0013972
Rhachotropis antarctica	0.502	0.498	0.0007659
Acodontaster hodgsoni	0.501	0.499	0.0011094
Austrocidaris canaliculata	0.501	0.499	0.0003520
Axociella nidificata	0.501	0.499	0.0002910
Chaetoceros dichaeta	0.501	0.499	0.0000346
Cuenotaster involutus	0.501	0.499	0.0007711
Fragilariopsis cylindrus	0.501	0.499	0.0002557
Gersemia antarctica	0.501	0.499	0.0010437
Liothyrella uva	0.501	0.499	0.0006468
Pyura discoveryi	0.501	0.499	0.0007100
Thalassiosira australis	0.501	0.499	0.0012156
Ainigmaptilon antarcticus	0.500	0.500	-0.0001649
Cibicides refulgens	0.500	0.500	0.0001178
Flustra angusta	0.500	0.500	-0.0001896
Gymnodraco acuticeps	0.500	0.500	0.0000998
Harmotoe hartmanae	0.500	0.500	0.0003728
Limopsis lillei	0.500	0.500	0.0004295
Pachycara brachycephalum	0.500	0.500	-0.0000500

Species	Prop dif QSS +	Prop dif QSS -	median difQSS relat
Psilaster charcoti	0.500	0.500	0.0001576
Rhodalia miranda	0.500	0.500	0.0002211
Rossella tarenja	0.500	0.500	0.0000790
Tetilla leptoderma	0.500	0.500	0.0001494
Thalassiosira trifulta	0.500	0.500	-0.0000996
Chiridota weddellensis	0.499	0.501	-0.0010806
Isoschizoporella tricuspis	0.499	0.501	-0.0002841
Parvicorbucula socialis	0.499	0.501	-0.0001631
Phaeocystis antarctica	0.499	0.501	-0.0001461
Sycozoa sigillinoides	0.499	0.501	-0.0011296
Synoicum adareanum	0.499	0.501	-0.0002467
Trachythyone parva	0.499	0.501	-0.0003053
Tryphosella murrayi	0.499	0.501	-0.0005343
Armadillogorgia cyathella	0.498	0.502	-0.0023066
Austrosignum grande	0.498	0.502	-0.0003971
Cygnodraco mawsoni	0.498	0.502	-0.0002223
Fragilariopsis kerguelensis	0.498	0.502	-0.0007914
Maxmuelleria faex	0.498	0.502	-0.0010493
Muraenolepis microps	0.498	0.502	-0.0004239
Thalassiosira gracilis expecta	0.498	0.502	-0.0002924
Chionodraco hamatus	0.497	0.503	-0.0012882
Diphyes antarctica	0.497	0.503	-0.0017090
Epimeria similis	0.497	0.503	-0.0016099
Eunoe spica spicoides	0.497	0.503	-0.0006674
Fragilariopsis rhombica	0.497	0.503	-0.0012413
Oswaldella antarctica	0.497	0.503	-0.0017838
Pseudo-Nitzschia heimii	0.497	0.503	-0.0013588
Ypsilocucumis turricata	0.497	0.503	-0.0008072
Bathylagus antarcticus	0.496	0.504	-0.0012683
Bostrychopora dentata	0.496	0.504	-0.0030830
Dipulmaris antarctica	0.496	0.504	-0.0022872
Hamingia	0.496	0.504	-0.0030751
Lagenorhynchus cruciger	0.496	0.504	-0.0019112
Odontella weissflogii	0.496	0.504	-0.0011033
Ophioperla ludwigi	0.496	0.504	-0.0007503
Psolus antarcticus	0.496	0.504	-0.0023681
Pyura tunicata	0.496	0.504	-0.0025805
Scolymastra joubini	0.496	0.504	-0.0018918
Vaunthompsonia indermis	0.496	0.504	-0.0019649
Ammothea carolinensis	0.495	0.505	-0.0017501
Calyx arcuarius	0.495	0.505	-0.0019267
Echiniphimedia hodgsoni	0.495	0.505	-0.0027247
Eunoe hartmanae	0.495	0.505	-0.0016984
Glyptonotus antarcticus	0.495	0.505	-0.0014988
Gonatus antarcticus	0.495	0.505	-0.0027379
Gymnoscopelus nicholsi	0.495	0.505	-0.0010180
Newnesia antarctica	0.495	0.505	-0.0025157
Oradarea edentata	0.495	0.505	-0.0044435
Paramoera walkeri	0.495	0.505	-0.0023683
Pontiothauma ergata	0.495	0.505	-0.0023953
Salpa gerlachei	0.495	0.505	-0.0017212
Trematomus lepidorhinus	0.495	0.505	-0.0016022

Species	Prop dif QSS +	Prop dif QSS -	median difQSS relat
Trematomus scotti	0.495	0.505	-0.0012912
Anthometra adriani	0.494	0.506	-0.0024176
Barrukia cristata	0.494	0.506	-0.0023785
Eusirus perdentatus	0.494	0.506	-0.0046083
Harmothoe spinosa	0.494	0.506	-0.0022896
Muraenolepis marmoratus	0.494	0.506	-0.0028276
Notolepis coatsi	0.494	0.506	-0.0019983
Nototanais dimorphus	0.494	0.506	-0.0017890
Porania antarctica glabra	0.494	0.506	-0.0015953
Vibilia stebbingi	0.494	0.506	-0.0014300
Azpeitia tabularis	0.493	0.507	-0.0029656
Bathyplotes bongraini	0.493	0.507	-0.0007116
Fragilariopsis ritscheri	0.493	0.507	-0.0029602
Iphimediella cyclogena	0.493	0.507	-0.0026846
Isodyctia cavicornuta	0.493	0.507	-0.0020899
Latrunculia brevis	0.493	0.507	-0.0029820
Terebella ehlersi	0.493	0.507	-0.0034257
Trematomus eulepidotus	0.493	0.507	-0.0010600
Abyssorchomene plebs	0.492	0.508	-0.0024938
Actinocyclus spiritus	0.492	0.508	-0.0019679
Alomasoma belyaevi	0.492	0.508	-0.0042964
Echinopsolus acanthocola	0.492	0.508	-0.0057993
Harmothoe crosetensis	0.492	0.508	-0.0028233
Luidiaster gerlachei	0.492	0.508	-0.0033875
Ophioceres incipiens	0.492	0.508	-0.0034192
Phytodetritus	0.492	0.508	-0.0045845
Pogonophryne barsukovi	0.492	0.508	-0.0032684
Polymastia isidis	0.492	0.508	-0.0054013
Primnoella	0.492	0.508	-0.0025488
Scotoplanes globosa	0.492	0.508	-0.0021334
Sterechinus antarcticus	0.492	0.508	-0.0036710
Thalassiosira lentiginosa	0.492	0.508	-0.0029557
Trichotoxon reinboldii	0.492	0.508	-0.0022528
Eurythenes gryllus	0.491	0.509	-0.0068590
Gymnoscopelus opisthopterus	0.491	0.509	-0.0047407
Hyperia macrocephala	0.491	0.509	-0.0016421
Laetmonice producta	0.491	0.509	-0.0035854
Metridia gerlachei	0.491	0.509	-0.0041704
Natatolana obtusata	0.491	0.509	-0.0028313
Neogloboquadriana pachyderma	0.491	0.509	-0.0033988
Protomyctophum bolini	0.491	0.509	-0.0040030
Artedidraco orianae	0.490	0.510	-0.0056516
Bathyplotes gourdoni	0.490	0.510	-0.0048060
Ceratoserolis meridionalis	0.490	0.510	-0.0052969
Champsocephalus gunnari	0.490	0.510	-0.0024889
Eucampia antarctica	0.490	0.510	-0.0036513
Fragilariopsis sublinearis	0.490	0.510	-0.0060890
Lineus longifissus	0.490	0.510	-0.0018020
Manguinea rigida	0.490	0.510	-0.0034919
Navicula schefterae	0.490	0.510	-0.0032010
Nitzschia lecointei	0.490	0.510	-0.0036853
Notasterias armata	0.490	0.510	-0.0025762

Species	Prop dif QSS +	Prop dif QSS -	median difQSS relat
Proboscia truncata	0.490	0.510	-0.0042327
Systenopora contracta	0.490	0.510	-0.0018426
Balaenoptera physalus	0.489	0.511	-0.0036744
Compsothyris racovitzae	0.489	0.511	-0.0032968
Eudorella splendida	0.489	0.511	-0.0032353
Eukrohnia hamata	0.489	0.511	-0.0048904
Haliclona tenella	0.489	0.511	-0.0037653
Melphidippa antarctica	0.489	0.511	-0.0045582
Thalassiosira antarctica	0.489	0.511	-0.0032131
Abatus curvidens	0.488	0.512	-0.0054183
Cephalodiscus	0.488	0.512	-0.0038693
Chorismus antarcticus	0.488	0.512	-0.0030444
Clavularia frankiliana	0.488	0.512	-0.0051405
Djerboa furcipes	0.488	0.512	-0.0037924
Elpidia glacialis	0.488	0.512	-0.0045144
Fragilariopsis obliquecostata	0.488	0.512	-0.0052588
Frontoserolis bouvieri	0.488	0.512	-0.0032634
Golfingia mawsoni	0.488	0.512	-0.0054661
Lysasterias perrieri	0.488	0.512	-0.0049979
Peraeospinosus pushkini	0.488	0.512	-0.0066603
Primnoisis antarctica	0.488	0.512	-0.0063024
Puncturella conica	0.488	0.512	-0.0056781
Tedania oxeata	0.488	0.512	-0.0065368
Abatus shackeltoni	0.487	0.513	-0.0030984
Abyssorchomene nodimanus	0.487	0.513	-0.0031439
Boroecia antipoda	0.487	0.513	-0.0061579
Chaetoceros bulbosum	0.487	0.513	-0.0039333
Chaetoceros flexuosum	0.487	0.513	-0.0047528
Coscinodiscus oculoides	0.487	0.513	-0.0053402
Fragilariopsis curta	0.487	0.513	-0.0070815
Fragilariopsis vanheurckii	0.487	0.513	-0.0062002
Lobodon carcinophaga	0.487	0.513	-0.0063867
Molpadia musculus	0.487	0.513	-0.0047462
Oediceroides calmani	0.487	0.513	-0.0062316
Primno macropa	0.487	0.513	-0.0029989
Pseudo-Nitzschia subcurvata	0.487	0.513	-0.0041229
Rhizosolenia antennata	0.487	0.513	-0.0056520
Atolla wyvillei	0.486	0.514	-0.0065291
Banquisia belgicae	0.486	0.514	-0.0076616
Eucranta mollis	0.486	0.514	-0.0050463
Fragilariopsis nana	0.486	0.514	-0.0072714
Kampylaster incurvatus	0.486	0.514	-0.0044364
Limopsis marionensis	0.486	0.514	-0.0057213
Odontaster meridionalis	0.486	0.514	-0.0036272
Pseudorchomene coatsi	0.486	0.514	-0.0053202
Pseudostichopus villosus	0.486	0.514	-0.0047324
Psolus charcoti	0.486	0.514	-0.0057572
Rhincalanus gigas	0.486	0.514	-0.0036697
Acodontaster capitatus	0.485	0.515	-0.0083951
Cadulus dalli antarcticum	0.485	0.515	-0.0067344
Chondriovelum adeliense	0.485	0.515	-0.0048009
Epimeria macrodonta	0.485	0.515	-0.0063029

Species	Prop dif QSS +	Prop dif QSS -	median difQSS relat
Notocidaris mortenseni	0.485	0.515	-0.0059463
Oediceroides emarginatus	0.485	0.515	-0.0041345
Paraeuchaeta antarctica	0.485	0.515	-0.0031913
Pelagobia longicirrata	0.485	0.515	-0.0033949
Pseudosagitta maxima	0.485	0.515	-0.0051500
Pyura bouvetensis	0.485	0.515	-0.0049726
Sagitta marri	0.485	0.515	-0.0039593
Aega antarctica	0.484	0.516	-0.0057122
Amauropsis rossiana	0.484	0.516	-0.0067281
Artedidraco skottsbergi	0.484	0.516	-0.0078217
Cinachyra antarctica	0.484	0.516	-0.0082003
Cyclocardia astartoides	0.484	0.516	-0.0032747
Gyrodinium lachryama	0.484	0.516	-0.0056621
Laternula elliptica	0.484	0.516	-0.0040563
Lissarca notorcadensis	0.484	0.516	-0.0058492
Nematocarcinus lanceopes	0.484	0.516	-0.0045953
Porosira glacialis	0.484	0.516	-0.0092357
Racovitzia glacialis	0.484	0.516	-0.0060069
Rossella racovitzae	0.484	0.516	-0.0085166
Thalassiosira tumida	0.484	0.516	-0.0042616
Uristes gigas	0.484	0.516	-0.0058431
Alacia hettacra	0.483	0.517	-0.0088251
Cnemidocarpa verrucosa	0.483	0.517	-0.0061612
Ctenocidaris gigantea	0.483	0.517	-0.0070339
Ctenocidaris gilberti	0.483	0.517	-0.0076822
Euphausia frigida	0.483	0.517	-0.0064351
Macronectes halli	0.483	0.517	-0.0047482
Bodo saltans	0.482	0.518	-0.0066985
Corella eumyota	0.482	0.518	-0.0072362
Halobaena caerulea	0.482	0.518	-0.0056020
Momoculodes scabriculosus	0.482	0.518	-0.0059426
Notioceramus anomalus	0.482	0.518	-0.0066014
Pseudostichopus mollis	0.482	0.518	-0.0070969
Silicularia rosea	0.482	0.518	-0.0049115
Tedania tantulata	0.482	0.518	-0.0055678
Abyssorchomene rossi	0.481	0.519	-0.0087070
Bathydorus spinosus	0.481	0.519	-0.0031180
Callochiton gaussi	0.481	0.519	-0.0082165
Colossendeis scotti	0.481	0.519	-0.0086793
Ekmocucumis turqueti turqueti	0.481	0.519	-0.0094141
Epimeriella walkeri	0.481	0.519	-0.0053542
Eunoe spica	0.481	0.519	-0.0107645
Eusirus antarcticus	0.481	0.519	-0.0055932
Hyperiella dilatata	0.481	0.519	-0.0080893
Ihlea racovitzai	0.481	0.519	-0.0055195
Iophon radiatus	0.481	0.519	-0.0047174
Manguinea fusiformis	0.481	0.519	-0.0056759
Maxilliphimedia longipes	0.481	0.519	-0.0080127
Procellaria aequinoctialis	0.481	0.519	-0.0099933
Chaetoceros neglectum	0.480	0.520	-0.0086514
Cycethra verrucosa mawsoni	0.480	0.520	-0.0070076
Diastylis mawsoni	0.480	0.520	-0.0077050

Species	Prop dif QSS +	Prop dif QSS -	median difQSS relat
Oceanites oceanicus	0.480	0.520	-0.0096389
Ophioperla koehleri	0.480	0.520	-0.0062868
Pista spinifera	0.480	0.520	-0.0119714
Proboscia inermi	0.480	0.520	-0.0050531
Sterna paradisaea	0.480	0.520	-0.0059022
Alcyonium antarcticum	0.479	0.521	-0.0070165
Astrotoma agassizii	0.479	0.521	-0.0069480
Beroe cucumis	0.479	0.521	-0.0103777
Conchoecia antipoda	0.479	0.521	-0.0061575
Fasciculiporoides ramosa	0.479	0.521	-0.0067969
Parschisturella ceruviata	0.479	0.521	-0.0083520
Aegires albus	0.478	0.522	-0.0131985
Arcturidae	0.478	0.522	-0.0093868
Ascidia challengeri	0.478	0.522	-0.0102953
Dacodraco hunteri	0.478	0.522	-0.0087207
Navicula glaciei	0.478	0.522	-0.0069482
Proboscia alata	0.478	0.522	-0.0088419
Taeniogyrus contortus	0.478	0.522	-0.0092234
Actinocyclus utricularis	0.477	0.523	-0.0094535
Conchoecia hettacra	0.477	0.523	-0.0111213
Marginella ealesa	0.477	0.523	-0.0060792
Molgula pedunculata	0.477	0.523	-0.0115538
Mycale acerata	0.477	0.523	-0.0058197
Nymphon gracillimum	0.477	0.523	-0.0100160
Perknaster fuscus antarcticus	0.477	0.523	-0.0071113
Calanoides acutus	0.476	0.524	-0.0092773
Macronectes giganteus	0.476	0.524	-0.0073498
Nematoflustra flagellata	0.476	0.524	-0.0081824
Pareledone antarctica	0.476	0.524	-0.0103898
Periphylla periphylla	0.476	0.524	-0.0058954
Tentorium papillatum	0.476	0.524	-0.0142374
Calanus propinquus	0.475	0.525	-0.0087820
Pteraster affinis aculeatus	0.475	0.525	-0.0113114
Yolida eightsi	0.475	0.525	-0.0111348
Antarctomysis maxima	0.474	0.526	-0.0100091
Aplidium vastum	0.474	0.526	-0.0053685
Ctenocidaris spinosa	0.474	0.526	-0.0094631
Diplasterias brucei	0.474	0.526	-0.0093896
Phascolion strombi	0.474	0.526	-0.0079501
Polyeunoa laevis	0.474	0.526	-0.0112179
Psolus dubiosus	0.474	0.526	-0.0133871
Tentorium semisuberites	0.474	0.526	-0.0093909
Chaetoceros pelagicus	0.473	0.527	-0.0114724
Liothyrella uva antarctica	0.473	0.527	-0.0107839
Marseniopsis conica	0.473	0.527	-0.0072547
Tritonia antarctica	0.473	0.527	-0.0069894
Achlyonice violaecuspidata	0.472	0.528	-0.0062392
Alacia belgicae	0.472	0.528	-0.0121889
Alluroteuthis antarcticus	0.472	0.528	-0.0098426
Fissidentalium majorinum	0.472	0.528	-0.0115593
Haplocheira plumosa	0.472	0.528	-0.0071960
Heterophoxus videns	0.472	0.528	-0.0092052

Species	Prop dif QSS +	Prop dif QSS -	median difQSS relat
Homaxinella balfourensis	0.472	0.528	-0.0111236
Nacella concinna	0.472	0.528	-0.0125569
Nuttallochiton mirandus	0.472	0.528	-0.0106262
Abatus nimrodi	0.471	0.529	-0.0106339
Epimeria robusta	0.471	0.529	-0.0091283
Phyllocomus crocea	0.471	0.529	-0.0099082
Pyura setosa	0.471	0.529	-0.0099551
Tubularia ralphii	0.471	0.529	-0.0087011
Alexandrella mixta	0.470	0.530	-0.0100610
Amphidinium hadai	0.470	0.530	-0.0162466
Aphrodroma brevirostris	0.470	0.530	-0.0120683
Daption capense	0.470	0.530	-0.0117756
Fragilariopsis separanda	0.470	0.530	-0.0110773
Golfingia ohlini	0.470	0.530	-0.0103279
Haliclona dancoi	0.470	0.530	-0.0062884
Lophaster gaini	0.470	0.530	-0.0118007
Ophiosparte gigas	0.470	0.530	-0.0143844
Tritoniella belli	0.470	0.530	-0.0102254
Ampelisca richardsoni	0.469	0.531	-0.0105817
Fragilariopsis pseudonana	0.469	0.531	-0.0094783
Laetmogone wyvillethompsoni	0.469	0.531	-0.0111505
Magellania fragilis	0.469	0.531	-0.0108887
Notocrangon antarcticus	0.469	0.531	-0.0124162
Anoxycalyx joubini	0.468	0.532	-0.0112583
Euphausia superba	0.468	0.532	-0.0132986
Isodyctia toxophila	0.468	0.532	-0.0120358
Melicerita obliqua	0.468	0.532	-0.0109312
Pseudo-Nitzschia liniola	0.468	0.532	-0.0117700
Austroflustra vulgaris	0.467	0.533	-0.0143087
Pagodroma nivea	0.467	0.533	-0.0124542
Porania antarctica	0.467	0.533	-0.0119238
Sterechinus neumayeri	0.467	0.533	-0.0108242
Themisto gaudichaudii	0.467	0.533	-0.0099845
Vibilia antarctica	0.467	0.533	-0.0138880
Austrodoris kerguelenensis	0.466	0.534	-0.0128756
Munna globicauda	0.466	0.534	-0.0134759
Odontaster validus	0.466	0.534	-0.0111110
Psolidium incertum	0.466	0.534	-0.0128606
Marseniopsis mollis	0.465	0.535	-0.0104161
Clathria pauper	0.463	0.537	-0.0110658
Corethron criophilum	0.463	0.537	-0.0157120
Ekmocucumis steineni	0.463	0.537	-0.0129377
Promachocrinus kerguelensis	0.463	0.537	-0.0140451
Harpagifer antarcticus	0.462	0.538	-0.0109307
Parmaphorella mawsoni	0.462	0.538	-0.0148042
Pygoscelis adeliae	0.462	0.538	-0.0125573
Sediment	0.462	0.538	-0.0108079
Tursiops truncatus	0.462	0.538	-0.0144362
Abatus cavernosus	0.461	0.539	-0.0145956
Balaenoptera musculus	0.461	0.539	-0.0157692
Latrunculia apicalis	0.461	0.539	-0.0126983
Thalassiosira gracilis	0.461	0.539	-0.0180251

Species	Prop dif QSS +	Prop dif QSS -	median difQSS relat
Electrona antarctica	0.460	0.540	-0.0154413
Epimeria rubrieques	0.460	0.540	-0.0159455
Rossella nuda	0.460	0.540	-0.0134992
Thalassoica antarctica	0.460	0.540	-0.0137090
Clione limacina	0.459	0.541	-0.0131543
Prionodraco evansii	0.459	0.541	-0.0147278
Vanadis antarctica	0.459	0.541	-0.0164304
Gnathia calva	0.458	0.542	-0.0137810
Chaenodraco wilsoni	0.457	0.543	-0.0136870
Metaconchoecia isocheira	0.457	0.543	-0.0175275
Euphausia crystallorophias	0.456	0.544	-0.0147971
Ophiurolepis brevirima	0.456	0.544	-0.0193088
Thalassiosira frenguelliopsis	0.456	0.544	-0.0151378
Actinocyclus actinochilus	0.454	0.546	-0.0145288
Limacina helicina antarctica	0.454	0.546	-0.0162732
Neobuccinum eatoni	0.452	0.548	-0.0184613
Aporocidaris milleri	0.447	0.553	-0.0213657
Balaenoptera acutorostrata	0.423	0.577	-0.0264863

Interaction strength distribution

The statistical distribution that best fitted the empirical interaction strength distribution was a 'log-Normal' due to the skew towards weaker interactions. 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
log-Normal	2	-359277.3	0.00
Gamma	2	-358374.4	902.90
Power-law	2	-348537.2	10740.04
Exponential	1	-327199.0	32078.28
Normal	2	-289859.5	69417.78
Uniform	2	-243904.0	115373.33

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