

Supplementary material

Is it the same every summer for the euphausiids of the Ross Sea?

Andrea De Felice, Ilaria Biagiotti, Giovanni Canduci, Ilaria Costantini, Sara Malavolti, Giordano Giuliani, Iole Leonori

Table S1. Levene Test of Homogeneity of Variance (center = mean) for all case studies of *E. crystallorophias*.

Depth		Df	F value	Pr (>F)	Signif.
0-200 m	group	95	1.8134	0.0002505	***
		197			
0.5 m	group	86	1.0893	0.3272	
		129			
97 m	group	86	1.669	0.004232	**
		129			
199 m	group	86	1.7547	0.001986	**
		126			

Signif. codes: '***' $p < 0.001$ '**' $p < 0.01$ '*' $p < 0.05$

Table S2. Levene Test of Homogeneity of Variance (center = mean) for all case studies of *E. superba*.

Depth		Df	F value	Pr (>F)	Signif.
0-200 m	group	164	1.2669	0.08066	
		128			
0.5 m	group	122	0.8274	0.8373	
		93			
97 m	group	122	1.0676	0.3723	
		93			
199 m	group	120	1.0346	0.4347	
		92			

Signif. codes: '***' $p < 0.001$ '**' $p < 0.01$ '*' $p < 0.05$

Table S3. Tukey multiple comparisons of means 95% family-wise confidence level, for *E. crystallorophias* and averaged environmental parameters.

Term	Contrast	Null.Value	Estimate	Conf.Low	Conf.High	Adj.P.Value
Year	2000-1994	0	0.0893365	-0.1500187	0.3286916	0.8925488
Year	2016-1994	0	0.1380727	-0.2062926	0.4824380	0.8596199
Year	2004-1994	0	0.1638691	-0.0743106	0.4020488	0.3598073
Year	1997-1994	0	0.3483177	0.0807957	0.6158398	0.0030706
Year	2014-1994	0	0.4663240	0.1510619	0.7815861	0.0004244
Year	2016-2000	0	0.0487362	-0.2754240	0.3728965	0.9980901
Year	2004-2000	0	0.0745326	-0.1333663	0.2824315	0.9080034
Year	1997-2000	0	0.2589812	0.0180239	0.4999386	0.0269810
Year	2014-2000	0	0.3769875	0.0839302	0.6700448	0.0036142
Year	2004-2016	0	0.0257964	-0.2974969	0.3490897	0.9999133
Year	1997-2016	0	0.2102450	-0.1352358	0.5557259	0.5024398
Year	2014-2016	0	0.3282513	-0.0553881	0.7118907	0.1413167
Year	1997-2004	0	0.1844486	-0.0553411	0.4242384	0.2376743
Year	2014-2004	0	0.3024549	0.0103569	0.5945529	0.0375638
Year	2014-1997	0	0.1180063	-0.1984740	0.4344865	0.8929515

Table S4. Tukey multiple comparisons of means 95% family-wise confidence level, for *E. crystallorophias* and environmental parameters at 0.5 m.

Term	Contrast	Null.Value	Estimate	Conf.Low	Conf.High	Adj.P.Value
Year	2016-2000	0	0.0449494	-0.2634470	0.3533458	0.9945114
Year	2004-2000	0	0.0707458	-0.1274347	0.2689263	0.8629699
Year	1994-2000	0	0.0810069	-0.2481719	0.4101858	0.9611527
Year	2014-2000	0	0.3732007	0.0943084	0.6520930	0.0027036
Year	2004-2016	0	0.0257964	-0.2813489	0.3329417	0.9993634
Year	1994-2016	0	0.0360575	-0.3681967	0.4403117	0.9991928
Year	2014-2016	0	0.3282513	-0.0362259	0.6927285	0.0995299
Year	1994-2004	0	0.0102611	-0.3177459	0.3382682	0.9999875
Year	2014-2004	0	0.3024549	0.0249467	0.5799631	0.0250281
Year	2014-1994	0	0.2921938	-0.0900287	0.6744162	0.2223580

Table S5. Tukey multiple comparisons of means 95% family-wise confidence level, for *E. crystallorophias* and environmental parameters at 97 m.

Term	Contrast	Null.Value	Estimate	Conf.Low	Conf.High	Adj.P.Value
Year	2016-2000	0	0.0449494	-0.2543432	0.3442420	0.9938413
Year	2004-2000	0	0.0707458	-0.1215844	0.2630760	0.8495053
Year	1994-2000	0	0.0810069	-0.2384546	0.4004685	0.9567704
Year	2014-2000	0	0.3732007	0.1025413	0.6438601	0.0018018
Year	2004-2016	0	0.0257964	-0.2722820	0.3238748	0.9992834
Year	1994-2016	0	0.0360575	-0.3562631	0.4283782	0.9990916
Year	2014-2016	0	0.3282513	-0.0254666	0.6819692	0.0830138
Year	1994-2004	0	0.0102611	-0.3080632	0.3285854	0.9999859
Year	2014-2004	0	0.3024549	0.0331387	0.5717711	0.0190845
Year	2014-1994	0	0.2921938	-0.0787455	0.6631331	0.1961439

Table S6. Tukey multiple comparisons of means 95% family-wise confidence level, for *E. crystallorophias* and environmental parameters at 199 m.

Term	Contrast	Null.Value	Estimate	Conf.Low	Conf.High	Adj.P.Value
Year	2016-2000	0	0.0388190	-0.2529393	0.3305772	0.9961369
Year	2004-2000	0	0.0692718	-0.1195695	0.2581131	0.8506965
Year	1994-2000	0	0.0798680	-0.2314423	0.3911783	0.9549062
Year	2014-2000	0	0.3670703	0.1030559	0.6310847	0.0016077
Year	2004-2016	0	0.0304528	-0.2596712	0.3205768	0.9984675
Year	1994-2016	0	0.0410490	-0.3402972	0.4223953	0.9983085
Year	2014-2016	0	0.3282513	-0.0155720	0.6720746	0.0691214
Year	1994-2004	0	0.0105963	-0.2991829	0.3203754	0.9999821
Year	2014-2004	0	0.2977985	0.0355913	0.5600058	0.0171748
Year	2014-1994	0	0.2872023	-0.0733608	0.6477653	0.1867183

Table S7. Tukey multiple comparisons of means 95% family-wise confidence level, for *E. superba* and averaged environmental parameters.

Term	Contrast	Null.Value	Estimate	Conf.Low	Conf.High	Adj.P.Value
Year	1997-2004	0	0.0247614	-0.3159717	0.3654946	0.9999454
Year	2016-2004	0	0.0559694	-0.4034194	0.5153583	0.9993084
Year	2000-2004	0	0.3256875	0.0302701	0.6211048	0.0212008
Year	1994-2004	0	0.4367032	0.0982579	0.7751486	0.0034689
Year	2014-2004	0	0.7968376	0.3817761	1.2118991	0.0000012
Year	2016-1997	0	0.0312080	-0.4597087	0.5221247	0.9999719
Year	2000-1997	0	0.3009261	-0.0414662	0.6433183	0.1212290
Year	1994-1997	0	0.4119418	0.0318020	0.7920816	0.0249945
Year	2014-1997	0	0.7720762	0.3223684	1.2217840	0.0000210
Year	2000-2016	0	0.2697180	-0.1909028	0.7303389	0.5460663
Year	1994-2016	0	0.3807338	-0.1085977	0.8700653	0.2261789
Year	2014-2016	0	0.7408682	0.1957295	1.2860068	0.0016657
Year	1994-2000	0	0.1110158	-0.2290998	0.4511314	0.9367153
Year	2014-2000	0	0.4711501	0.0547256	0.8875747	0.0163548
Year	2014-1994	0	0.3601344	-0.0878425	0.8081112	0.1947490

Table S8. Tukey multiple comparisons of means 95% family-wise confidence level, for *E. superba* and environmental parameters at 0.5 m.

Term	Contrast	Null.Value	Estimate	Conf.Low	Conf.High	Adj.P.Value
Year	2016-2004	0	0.0559694	-0.4093070	0.5212458	0.9973922
Year	1994-2004	0	0.2266373	-0.2702414	0.7235159	0.7188562
Year	2000-2004	0	0.3101819	0.0099699	0.6103940	0.0390091
Year	2014-2004	0	0.7968376	0.3764567	1.2172185	0.0000044
Year	1994-2016	0	0.1706678	-0.4417132	0.7830488	0.9397847
Year	2000-2016	0	0.2542125	-0.2129591	0.7213841	0.5653163
Year	2014-2016	0	0.7408682	0.1887430	1.2929933	0.0026044
Year	2000-1994	0	0.0835447	-0.4151091	0.5821985	0.9906505
Year	2014-1994	0	0.5702004	-0.0088060	1.1492068	0.0558526
Year	2014-2000	0	0.4866557	0.0641781	0.9091333	0.0149657

Table S9. Tukey multiple comparisons of means 95% family-wise confidence level, for *E. superba* and environmental parameters at 97 m.

Term	Contrast	Null.Value	Estimate	Conf.Low	Conf.High	Adj.P.Value
Year	2016-2004	0	0.0559694	-0.3758699	0.4878088	0.9965142
Year	1994-2004	0	0.2266373	-0.2345332	0.6878077	0.6587057
Year	2000-2004	0	0.3101819	0.0315447	0.5888192	0.0206992
Year	2014-2004	0	0.7968376	0.4066674	1.1870079	0.0000006
Year	1994-2016	0	0.1706678	-0.3977044	0.7390401	0.9222368
Year	2000-2016	0	0.2542125	-0.1793859	0.6878109	0.4904991
Year	2014-2016	0	0.7408682	0.2284215	1.2533149	0.0009027
Year	2000-1994	0	0.0835447	-0.3792733	0.5463627	0.9875980
Year	2014-1994	0	0.5702004	0.0328042	1.1075965	0.0314693
Year	2014-2000	0	0.4866557	0.0945394	0.8787719	0.0067985

Table S10. Tukey multiple comparisons of means 95% family-wise confidence level, for *E. superba* and environmental parameters at 199 m.

Term	Contrast	Null.Value	Estimate	Conf.Low	Conf.High	Adj.P.Value
Year	2016-2004	0	0.0501521	-0.3836054	0.4839097	0.9977636
Year	1994-2004	0	0.2083551	-0.2547885	0.6714986	0.7290175
Year	2000-2004	0	0.2639455	-0.0183866	0.5462777	0.0792336
Year	2014-2004	0	0.7910203	0.3990004	1.1830402	0.0000009
Year	1994-2016	0	0.1582030	-0.4119389	0.7283448	0.9406496
Year	2000-2016	0	0.2137934	-0.2224075	0.6499943	0.6608872
Year	2014-2016	0	0.7408682	0.2268260	1.2549104	0.0009486
Year	2000-1994	0	0.0555905	-0.4098422	0.5210232	0.9974616
Year	2014-1994	0	0.5826652	0.0435959	1.1217346	0.0269093
Year	2014-2000	0	0.5270748	0.1323530	0.9217965	0.0027830