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Supplement of

Copepod faecal pellet transfer through the meso- and bathypelagic layers in the Southern Ocean in spring

Anna Belcher et al.

Correspondence to: Anna Belcher (a.belcher@noc.soton.ac.uk)

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Table S1: Absolute number of FPs (n_{FP}) counted in sediment trap (ST) sample split and Marine Snow Catcher (MSC) samples. Three replicates were counted for ST samples and are presented as mean (standard deviation), where as all FPs collected in the MSC samples were counted. Krill FPs are not included.

Cruise	Site	Sampling Method	n_{FP}
JR291	P2	MSC	4
	P2	MSC	9
	P2	MSC	28
	P3	MSC	15
	P3	MSC	74
JR304	P3	MSC	120
	P3	MSC	252
Dec 2009	P2	ST	422 (98)
	P3	ST	1156 (195)
Dec 2010	P2	ST	564 (134)
	P3	ST	974 (238)

Table S2: Zooplankton abundance (ind. m⁻²) from Bongo samples (200 µm mesh, 0-200 m) taken in the Scotia Sea, Antarctica during research cruises JR304 and JR291. Species in bold are those used to estimate size distributions of egested faecal pellets.

Species and Stage	JR291				JR304			
	P3				P2			
	E072	E126	E131	E137	E44	E38	E40	
<i>Rhincalanus gigas male</i>	27	0	0	0	0	0	0	
<i>Rhincalanus gigas female</i>	712	383	356	329	55	7	465	
<i>Rhincalanus gigas V</i>	219	164	164	246	0	0	383	
<i>Rhincalanus gigas IV</i>	0	27	0	27	0	0	27	
<i>Rhincalanus gigas III</i>	55	246	274	301	0	0	110	
<i>Rhincalanus gigas II</i>	876	602	274	219	110	0	0	
<i>Rhincalanus gigas I</i>	548	164	137	27	137	0	0	
<i>Rhincalanus gigas nauplii</i>	110	876	1,314	438	1,971	5,256	25,405	
<i>Calanoides acutus female</i>	82	137	164	192	0	301	82	
<i>Calanoides acutus V</i>	1,615	2,436	2,135	2,190	164	0	274	
<i>Calanoides acutus IV</i>	3,039	1,205	1,643	1,150	575	383	1,424	
<i>Calanoides acutus III</i>	548	219	192	411	602	1,341	6,351	
<i>Calanoides acutus II</i>	55	55	164	356	329	3,285	10,622	
<i>Calanoides acutus I</i>	0	0	0	274	411	3,532	7,775	
<i>Calanus simillimus male</i>	0	0	0	27	0	0	0	
<i>Calanus simillimus female</i>	27	110	55	27	0	0	137	
<i>Calanus simillimus V</i>	0	27	27	0	0	0	0	
<i>Calanus simillimus IV</i>	0	27	82	82	0	0	0	
<i>Calanus simillimus III</i>	0	27	0	27	0	0	110	
<i>Calanus simillimus II</i>	0	27	82	246	0	0	0	
<i>Calanus simillimus I</i>	0	55	164	274	0	0	0	
<i>Calanus propinquus male</i>	0	0	0	27	0	0	0	
<i>Calanus propinquus female</i>	27	0	27	0	0	0	27	
<i>Calanus propinquus V</i>	110	55	55	27	0	0	0	
<i>Calanus propinquus IV</i>	27	55	82	0	27	164	0	
<i>Calanus propinquus III</i>	0	55	0	0	82	274	438	

Species and Stage	JR291				JR304			
	P3				P2			
	E072	E126	E131	E137	E44	E38	E40	
<i>Calanus propinquus II</i>	0	0	0	0	27	383	1,424	
<i>Calanus propinquus I</i>	0	0	0	0	0	438	1,095	
<i>Euchaeta antarctica V</i>	0	0	0	0	27	0	0	
<i>Euchaeta antarctica IV</i>	0	0	0	0	27	0	0	
<i>Euchaeta antarctica III</i>	55	55	110	110	0	164	219	
<i>Euchaeta antarctica II</i>	110	164	739	0	0	0	438	
<i>Euchaeta antarctica I</i>	0	82	274	438	0	0	0	
<i>Euchirella rostrata/rostramagna</i>	0	0	27	0	0	0	0	
<i>Haloptilus</i>	0	27	0	0	0	82	27	
<i>Heterorhabdus</i>	0	27	27	0	55	0	0	
<i>Eucalanus longiceps</i>	0	0	0	0	0	0	27	
<i>Metridia gerlachei adult</i>	164	356	1,013	465	55	110	192	
<i>Metridia lucens adult</i>	0	0	465	246	301	0	0	
<i>Metridia male</i>	110	27	55	0	0	0	0	
<i>Metridia I-III</i>	14,455	17,959	27,595	15,769	3,395	15,331	33,289	
<i>Metridia IV-V</i>	2,847	3,066	3,504	5,256	767	0	1,752	
<i>Pleuromamma rob.</i>	0	0	55	0	0	0	0	
<i>Oithona similis</i>	121,768	137,099	122,206	123,082	30,552	68,769	184,843	
<i>Oithona frigida</i>	876	3,504	3,066	438	986	2,628	0	
<i>Oncaea</i>	10,074	9,198	16,207	4,818	14,783	4,818	12,264	
<i>Scolecithricella minor</i>	903	712	1,040	1,314	110	137	0	
<i>Scaphocalanus farrani</i>	0	0	27	0	0	0	0	
<i>Scaphocalanus copepodites</i>	0	0	164	0	0	0	0	
<i>Microcalanus</i>	1,314	2,628	8,760	2,190	876	7,884	7,008	
<i>Ctenocalanus</i>	55,190	33,289	21,463	25,843	5,366	17,083	65,702	
<i>Cteno/Micro copepodites</i>	0	0	0	0	2,628	0	3,504	
<i>Clausocalanus laticeps</i>	630	164	438	438	0	110	0	
<i>Clausocalanus copepodites</i>	0	438	438	0	0	0	876	
<i>Drepanopus 1-3</i>	876	7,884	5,694	7,008	0	0	0	
<i>Drepanopus 4-6</i>	0	876	438	0	0	0	0	

Species and Stage	JR291				JR304		
	P3				P2		
	E072	E126	E131	E137	E44	E38	E40
<i>Racovitzanus</i>	0	27	0	0	0	0	0
<i>Calanus nauplii</i>	8,322	7,446	26,719	18,835	14,126	12,264	28,909
<i>Cyclopoi nauplii</i>	0	0	2,190	4,380	6,023	0	0
<i>Thysanoessa calyptopes</i>	1,205	0	1,752	0	329	1,424	1,697
<i>Thysanoessa spp.</i>	277	137	82	274	110	5,858	1,451
<i>Euphausia frigida</i>	86	27	0	0	0	0	0
<i>Euphausia frigida calyptopis</i>	110	0	0	438	0	411	770
<i>Euphausia frigida furcilia</i>	55	0	82	192	0	110	55
<i>Euphausia triacantha calyptopis</i>	0	0	0	0	0	0	27
<i>Chaetognatha</i>	1,314	958	1,040	931	137	356	1,560
<i>Tomopteris</i>	0	0	82	438	0	110	0
<i>Pelagobia</i>	1,752	438	1,314	3,504	1,971	6,570	5,256
<i>Rhynchonerella bongraini</i>	0	0	0	0	0	27	0
<i>Themisto gaudichaudi</i>	21	0	0	0	0	0	55
<i>Ostracoda</i>	14	164	548	356	137	356	301
<i>Pteropoda</i>	0	0	0	876	0	1,752	876
<i>Limacina (large)</i>	0	0	0	0	0	110	0
<i>Spongiobranchea</i>	0	27	0	0	0	0	0
<i>Appendicularians</i>	6,570	10,074	20,149	35,479	2,957	15,331	33,289
<i>Siphonophora</i>	0	55	329	110	0	0	0
<i>Fish larvae</i>	0	0	0	0	0	27	0
<i>Medusae</i>	0	55	0	0	0	0	0
<i>Primno macropa</i>	0	27	0	0	0	0	0

Table S3: Sinking velocities and volumes of FPs (excluding krill FPs) collected in Marine Snow Catchers at P2 and P3 during research cruises JR291 and JR304.

Site	FP volume (mm ³)	FP sinking velocity (m d ⁻¹)	Site	FP volume (mm ³)	FP sinking velocity (m d ⁻¹)
P2	0.040	144	P3	0.010	75
P2	0.031	270	P3	0.027	57
P2	0.008	52	P3	0.002	48
P2	0.040	144	P3	0.026	87
P2	0.031	135	P3	0.002	51
P2	0.057	134	P3	0.005	68
P2	0.019	342	P3	0.014	49
P2	0.011	382	P3	0.028	92
P2	0.072	247	P3	0.023	106
P2	0.044	101	P3	0.009	24
P2	0.007	193	P3	0.091	92
P2	0.017	116	P3	0.066	140
P2	0.035	207	P3	0.012	57
P2	0.002	246	P3	0.006	65
P2	0.016	61	P3	0.010	62
P2	0.001	120	P3	0.006	64
P2	0.003	98	P3	0.002	47
			P3	0.037	36
			P3	0.031	53
			P3	0.014	122
			P3	0.021	36
			P3	0.077	100
			P3	0.018	62
			P3	0.026	64
			P3	0.013	79
			P3	0.083	227
			P3	0.286	203
			P3	0.165	189
			P3	0.007	100
			P3	0.006	74
			P3	0.005	13
			P3	0.115	106
			P3	0.021	60
			P3	0.005	68
			P3	0.018	79

P3	0.006	49
P3	0.009	64
P3	0.003	155
P3	0.005	222
P3	0.256	144
P3	0.002	82
P3	0.006	133

Supplementary Figures

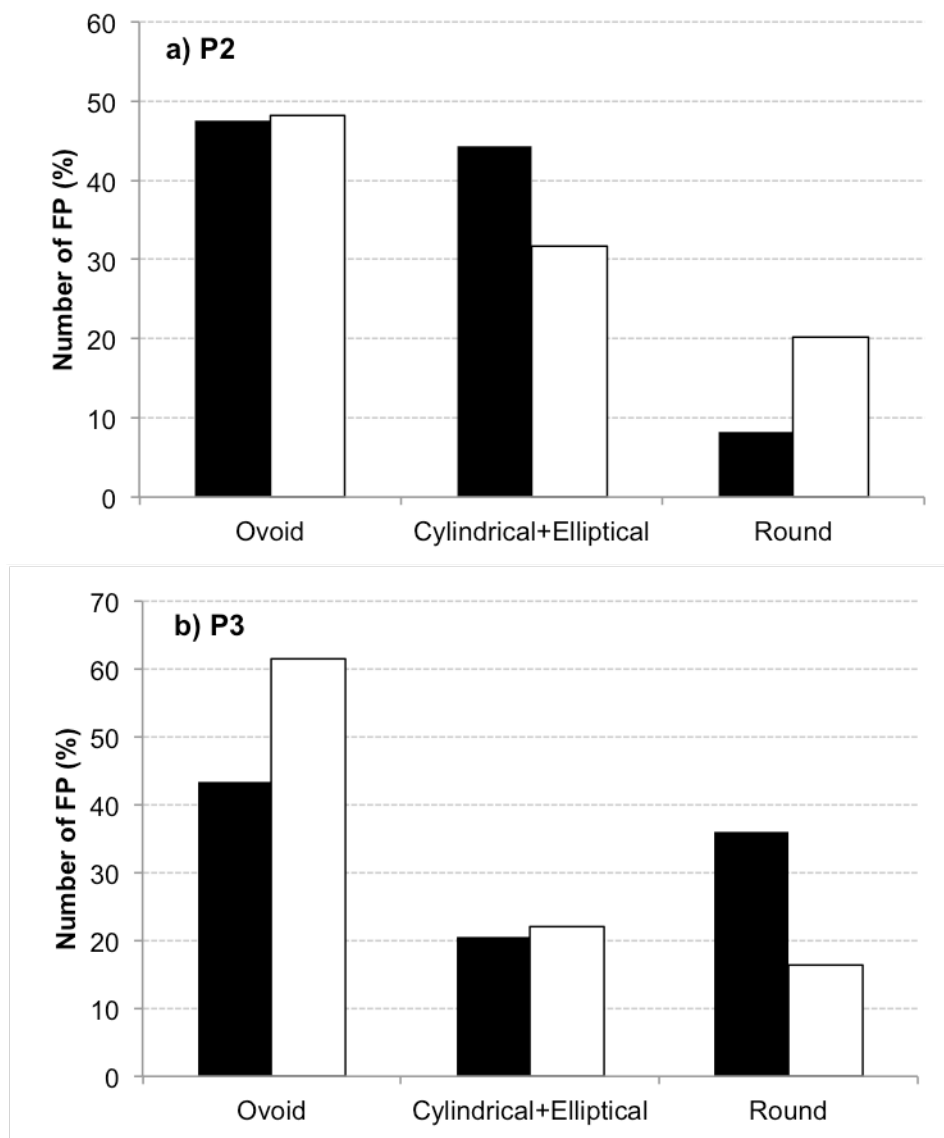


Figure S1: Comparison of sediment trap faecal pellet (FP) morphologies measured in this study (2013 and 2014, black) with those measured historically (2009 and 2010, white) at a) P2 and b) P3. Both studies are means of November and December data. The percent (%) of FPs in each category is broadly consistent between study years (paired t-test $p > 0.5$) providing support for our use of historical data for size comparisons with Marine Snow Catcher data collected in 2013 and 2014.

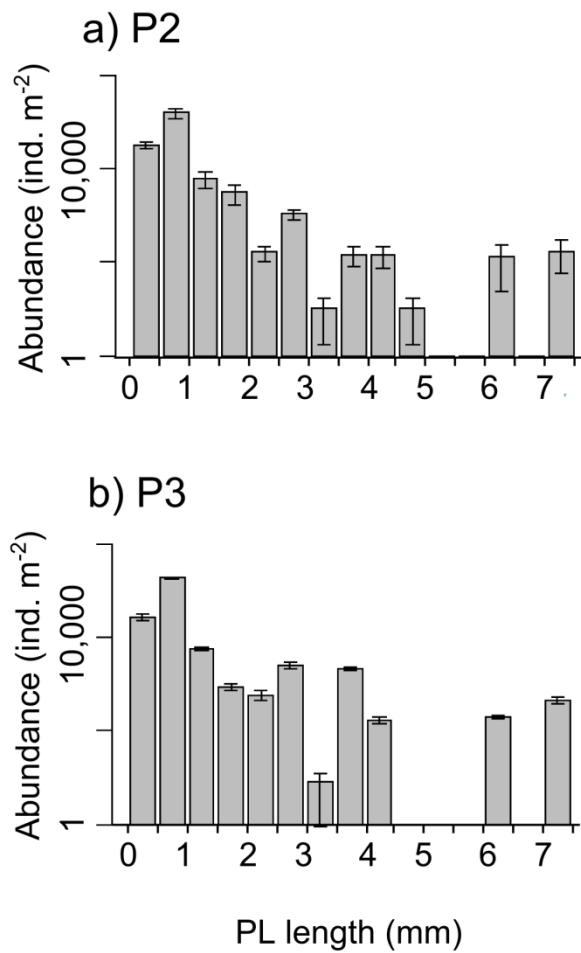


Figure S2: Mesozooplankton abundances in the Scotia Sea. Average (\pm SE) abundance (ind. m⁻²) from Bongo net tows (0-200 m, 200 μ m mesh) taken during cruises JR291 and JR304 for a) P2 and b) P3. Note the log scale on the y axis.