

**Supplementary material**

**Identifying the drivers of the pelagic ecosystem of an oligotrophic bight (KwaZulu–Natal, South Africa) using stable isotopes ( $\delta^{13}\text{C}$ ,  $\delta^{15}\text{N}$ ) and C : N ratio analysis**

*Ander M. de Lecea*<sup>A,C,D</sup>, *Rachel Cooper*<sup>B</sup> and *Albertus J. Smir*<sup>C</sup>

<sup>A</sup>College of Engineering, Agricultural and Life Sciences, Westville Campus, University of KwaZulu–Natal, Durban, KwaZulu–Natal, 4001, South Africa.

<sup>B</sup>Marine Research Institute, University of Cape Town Private Bag X3, Rondebosch, Cape Town, 7701, South Africa.

<sup>C</sup>Department for Biodiversity & Conservation Biology, Life Science Building, University of the Western Cape, Bellville, Cape Town, 7535, South Africa.

<sup>D</sup>Corresponding author. Email: [delecea@protonmail.com](mailto:delecea@protonmail.com)

**Table S1. Bayesian mixing model results for organisms (i.e. consumers) and OM sources (i.e. food source) collected in the wet season of 2010**

The table represents which one of the OM sources is the main driver of the food web in the Thukela Bank. Results for mixing models are presented as the median and the 5th and 95th credibility intervals

Location Species or group	<i>n</i>	$\delta^{15}\text{N}$	$\delta^{13}\text{C}$	C:N	TP	MixSIR results according to TSS location			
<b>Durban Eddy</b>						DE Surface	DE $F_{\max}$	Thukela River	Amatikulu River
<i>Ferosagitta</i> sp.	2	8.60 ± 0.04	-19.67 ± 0.24	4.17 ± 0.14	2.19 ± 0.01	0.67 (0.13–0.87)	0.15 (0.01–0.74)	0.05 (0.00–0.18)	0.07 (0.01–0.25)
<i>Flaccisagitta enflata</i>	14	8.34 ± 0.60	-19.65 ± 0.54	4.08 ± 0.38	2.11 ± 0.18	0.85 (0.72–0.94)	0.08 (0.01–0.23)	0.02 (0.00–0.07)	0.03 (0.00–0.10)
<i>Penaeus</i> sp.	1	7.42	-21.03	5.01	1.84	0.33 (0.04–0.69)	0.27 (0.02–0.69)	0.16 (0.02–0.49)	0.13 (0.01–0.44)
Cephalopoda larva	2	6.97 ± 2.34	-20.67 ± 0.50	5.54 ± 1.83	2.41 ± 0.69	0.17 (0.01 – 0.59)	0.15 (0.01 – 0.51)	0.48 (0.13 – 0.74)	0.10 (0.01 – 0.33)
<i>Subeucalanus monachus</i>	11	6.87 ± 0.37	-19.90 ± 0.56	4.57 ± 0.59	1.68 ± 0.11	0.79 (0.65–0.91)	0.08 (0.01–0.25)	0.09 (0.01–0.21)	0.02 (0.00–0.07)
Ostracoda	1	6.86	-20.87	4.91	1.68	0.33 (0.03–0.70)	0.25 (0.02–0.70)	0.20 (0.02–0.55)	0.10 (0.01–0.39)
<i>Undinula vulgaris</i>	7	6.84 ± 0.29	-19.92 ± 0.60	4.12 ± 0.48	1.67 ± 0.09	0.76 (0.59–0.90)	0.09 (0.01–0.30)	0.09 (0.01–0.24)	0.02 (0.00–0.10)
<i>Lucifer typus</i>	4	6.70 ± 0.23	-20.27 ± 0.19	4.83 ± 0.05	1.63 ± 0.07	0.63 (0.14–0.84)	0.14 (0.01–0.70)	0.14 (0.01–0.34)	0.04 (0.00–0.14)
<i>Euphausia</i> sp.	25	6.64 ± 0.39	-19.98 ± 0.42	3.69 ± 0.21	1.61 ± 0.11	0.80 (0.70–0.89)	0.04 (0.00–0.14)	0.14 (0.05–0.23)	0.01 (0.00–0.04)
Mixture 500	12	6.42 ± 0.17	-20.36 ± 0.33	4.32 ± 0.21	1.55 ± 0.05	0.60 (0.46–0.76)	0.04 (0.00–0.13)	0.34 (0.18–0.48)	0.01 (0.00–0.05)
Mixture 250	12	5.95 ± 0.13	-20.44 ± 0.33	4.50 ± 0.15	1.40 ± 0.03	0.68 (0.55–0.81)	0.07 (0.01–0.21)	0.22 (0.08–0.35)	0.02 (0.00–0.06)
<i>Euphausia frigida</i>	7	5.65 ± 0.73	-20.09 ± 0.34	3.91 ± 0.04	1.32 ± 0.22	0.75 (0.50–0.92)	0.03 (0.00–0.10)	0.19 (0.02–0.45)	0.01 (0.00–0.06)
Larvacea	1	5.42	-21.5	3.78	1.95	0.19 (0.02–0.62)	0.16 (0.01–0.60)	0.45 (0.07–0.76)	0.08 (0.01–0.35)
<i>Creseis</i> sp.	1	5.39	-20.18	3.41	1.24	0.34 (0.02–0.80)	0.13 (0.01–0.72)	0.31 (0.02–0.76)	0.05 (0.00–0.23)
<i>Thalia democratica</i>	9	5.16 ± 0.51	-20.63 ± 0.48	4.36 ± 0.30	1.87 ± 0.15	0.36 (0.06–0.58)	0.03 (0.00–0.13)	0.59 (0.39–0.82)	0.01 (0.00–0.04)
<b>Thukela Bank</b>						TM Surface	TM $F_{\max}$	Thukela River	Amatikulu River
Ostracoda	1	8.94	-19.78	4.86	2.04	0.38 (0.04–0.76)	0.22 (0.02–0.67)	0.17 (0.02–0.59)	0.10 (0.01–0.36)
<i>Flaccisagitta enflata</i>	7	8.86 ± 0.64	-18.58 ± 0.70	3.72 ± 0.30	2.02 ± 0.19	0.87 (0.73–0.95)	0.03 (0.00–0.14)	0.06 (0.01–0.17)	0.02 (0.00–0.06)
Scyphozoa	2	8.47 ± 0.06	-19.43 ± 0.10	4.12 ± 0.07	1.90 ± 0.02	0.48 (0.06–0.79)	0.19 (0.01–0.66)	0.19 (0.02–0.58)	0.06 (0.01–0.20)
<i>Liriope</i> sp.	2	8.46 ± 0.04	-19.37 ± 0.03	4.07 ± 0.00	1.90 ± 0.01	0.48 (0.06–0.80)	0.18 (0.01–0.67)	0.19 (0.02–0.59)	0.05 (0.00–0.19)
<i>Lucifer typus</i>	2	7.57 ± 0.10	-19.40 ± 0.17	4.79 ± 0.13	2.58 ± 0.03	0.30 (0.03–0.67)	0.17 (0.01–0.62)	0.38 (0.10–0.71)	0.05 (0.00–0.19)
Mixture 500	5	7.55 ± 0.33	-19.36 ± 0.13	4.19 ± 0.04	2.58 ± 0.10	0.42 (0.08–0.65)	0.10 (0.01–0.44)	0.41 (0.22–0.67)	0.03 (0.00–0.10)
<i>Undinula vulgaris</i>	2	7.24 ± 0.33	-19.05 ± 0.38	4.47 ± 0.04	2.49 ± 0.10	0.22 (0.02–0.62)	0.14 (0.01–0.63)	0.48 (0.14–0.79)	0.04 (0.00–0.16)
Mixture 250	5	7.23 ± 0.23	-19.36 ± 0.11	4.21 ± 0.08	2.48 ± 0.07	0.34 (0.05–0.58)	0.10 (0.01–0.41)	0.49 (0.30–0.72)	0.03 (0.00–0.11)
<i>Creseis</i> sp.	1	6.61	-19.37	4.16	2.3	0.17 (0.01–0.53)	0.16 (0.01–0.61)	0.49 (0.14–0.78)	0.07 (0.01–0.27)
<i>Thalia democratica</i>	4	6.07 ± 0.20	-19.90 ± 0.23	4.29 ± 0.06	2.14 ± 0.06	0.15 (0.02–0.37)	0.12 (0.01–0.34)	0.62 (0.46–0.80)	0.05 (0.01–0.18)
<i>Diacavolinia longirostris</i>	2	5.68 ± 0.71	-19.51 ± 0.30	4.03 ± 0.03	2.03 ± 0.21	0.12 (0.01–0.35)	0.10 (0.01–0.35)	0.66 (0.46–0.85)	0.05 (0.00–0.19)

Location Species or group	<i>n</i>	$\delta^{15}\text{N}$	$\delta^{13}\text{C}$	C:N	TP	MixSIR results according to TSS location				
						TB Surface	TB $F_{\text{max}}$	MS Surface	MS $F_{\text{max}}$	Thukela River
Middle Shelf										
<i>Flaccisagitta enflata</i>	2	8.86 ± 0.05	-18.76 ± 0.47	4.00 ± 0.06	2.12 ± 0.01	0.13 (0.01–0.59)	0.08 (0.01–0.42)	0.21 (0.02–0.65)	0.38 (0.03–0.73)	0.04 (0.00–0.14)
<i>Squilla</i> sp. larval stage	1	8.84	-20.11	4.91	2.12	0.19 (0.02–0.55)	0.15 (0.01–0.49)	0.18 (0.02–0.52)	0.22 (0.02–0.57)	0.10 (0.01–0.32)
<i>Siriealla</i> sp.	1	8.84	-19.99	4.11	2.12	0.19 (0.02–0.56)	0.15 (0.01–0.49)	0.19 (0.02–0.53)	0.23 (0.02–0.57)	0.09 (0.01–0.31)
<i>Liriope tetraphylla</i>	1	8.7	-19.48	4.04	2.08	0.18 (0.01–0.57)	0.14 (0.01–0.50)	0.18 (0.02–0.55)	0.26 (0.02–0.62)	0.07 (0.01–0.26)
Leptostraca larva	1	8.06	-19.54	4.72	1.89	0.16 (0.01–0.57)	0.16 (0.01–0.56)	0.14 (0.01–0.52)	0.29 (0.02–0.66)	0.07 (0.01–0.27)
<i>Lucifer typus</i>	2	7.43 ± 0.04	-19.33 ± 0.07	4.64 ± 0.13	1.70 ± 0.01	0.08 (0.01–0.47)	0.14 (0.01–0.68)	0.07 (0.01–0.28)	0.56 (0.04–0.81)	0.04 (0.00–0.17)
<i>Subeucalanus monachus</i>	1	7.23	-19	4.67	1.64	0.10 (0.01–0.59)	0.17 (0.01–0.69)	0.08 (0.01–0.49)	0.37 (0.02–0.77)	0.05 (0.00–0.23)
Mixture 500	5	7.12 ± 0.10	-19.19 ± 0.48	3.90 ± 0.43	1.61 ± 0.03	0.04 (0.00–0.15)	0.06 (0.00–0.30)	0.03 (0.00–0.13)	0.80 (0.58–0.92)	0.03 (0.00–0.10)
Cephalopoda larva	1	7.04	-20.02	4.85	1.59	0.10 (0.08–0.55)	0.23 (0.01–0.69)	0.08 (0.06–0.16)	0.26 (0.02–0.72)	0.08 (0.01–0.40)
Mixture 250	4	6.74 ± 0.19	-19.85 ± 0.29	4.18 ± 0.17	1.5 ± 0.06	0.04 (0.00–0.15)	0.15 (0.01–0.85)	0.03 (0.00–0.13)	0.70 (0.02–0.90)	0.03 (0.00–0.12)
<i>Undinula vulgaris</i>	7	6.50 ± 0.25	-18.72 ± 0.56	3.69 ± 0.48	1.43 ± 0.07	0.02 (0.00–0.06)	0.02 (0.00–0.07)	0.02 (0.00–0.06)	0.91 (0.84–0.96)	0.02 (0.00–0.06)
Larvacea	1	6.32	-20.99	3.78	1.36	0.07 (0.01–0.36)	0.30 (0.01–0.77)	0.06 (0.00–0.25)	0.13 (0.01–0.67)	0.19 (0.01–0.67)
<i>Euphausia frigida</i>	2	6.16 ± 0.16	-19.55 ± 0.18	4.28 ± 0.26	1.32 ± 0.05	0.04 (0.00–0.20)	0.65 (0.01–0.87)	0.04 (0.00–0.15)	0.15 (0.01–0.88)	0.03 (0.00–0.14)
Richards Bay						RS Surface	RS $F_{\text{max}}$	RS $F_{\text{max}}$ – Bottom	RS Bottom	Mhlatuze River
<i>Ferosagitta</i> sp.	3	7.89 ± 0.32	-19.88 ± 0.46	4.00 ± 0.13	2.25 ± 0.09	0.06 (0.01–0.24)	0.07 (0.01–0.28)	0.06 (0.01–0.24)	0.04 (0.00–0.15)	0.68 (0.49–0.84)
Mysida	1	7.57	-20.92	3.83	2.16	0.14 (0.01–0.52)	0.16 (0.01–0.55)	0.14 (0.01–0.51)	0.09 (0.01–0.32)	0.31 (0.03–0.63)
<i>Flaccisagitta enflata</i>	3	7.23 ± 1.32	-19.94 ± 0.55	4.08 ± 0.34	2.05 ± 0.39	0.06 (0.01–0.21)	0.07 (0.01–0.25)	0.06 (0.01–0.21)	0.04 (0.00–0.13)	0.71 (0.55–0.86)
<i>Pterotrachea</i> sp.	1	6.78	-19.7	3.78	1.92	0.11 (0.01–0.48)	0.11 (0.01–0.45)	0.15 (0.01–0.61)	0.11 (0.01–0.46)	0.32 (0.02–0.66)
<i>Undinula vulgaris</i>	1	6.56	-20.97	4.21	1.86	0.15 (0.01–0.54)	0.17 (0.01–0.57)	0.14 (0.01–0.49)	0.09 (0.01–0.31)	0.28 (0.03–0.61)
<i>Subeucalanus monachus</i>	4	6.17 ± 0.71	-20.49 ± 0.48	4.49 ± 0.49	1.74 ± 0.21	0.09 (0.01–0.32)	0.10 (0.01–0.40)	0.08 (0.01–0.28)	0.04 (0.00–0.16)	0.60 (0.36–0.77)
Mixture 500	3	6.03 ± 0.57	-20.55 ± 0.23	4.17 ± 0.08	1.70 ± 0.17	0.10 (0.01–0.36)	0.12 (0.01–0.46)	0.09 (0.01–0.33)	0.05 (0.00–0.18)	0.55 (0.24–0.75)
<i>Lucifer typus</i>	1	5.43	-20.63	4.48	1.53	0.12 (0.01–0.52)	0.13 (0.01–0.56)	0.12 (0.01–0.54)	0.07 (0.01–0.29)	0.38 (0.04–0.69)
Mixture 250	3	4.91 ± 0.51	-20.30 ± 0.71	4.44 ± 0.25	1.37 ± 0.15	0.07 (0.01–0.24)	0.07 (0.01–0.26)	0.06 (0.01–0.26)	0.04 (0.00–0.16)	0.68 (0.49–0.84)
<i>Euphausia frigida</i>	1	4.56	-19.95	3.89	1.27	0.08 (0.01–0.38)	0.09 (0.01–0.43)	0.09 (0.01–0.59)	0.06 (0.00–0.22)	0.56 (0.06–0.80)
Polychaeta	1	4.42	-21.53	5.31	1.23	0.09 (0.01–0.51)	0.12 (0.01–0.63)	0.09 (0.01–0.51)	0.05 (0.00–0.21)	0.48 (0.04–0.77)

**Table S2. Bayesian mixing model results for organisms (i.e. consumers) and OM sources (i.e. food source) collected in the dry season of 2010**

The table represents which one of the OM sources is the main driver of the food web in the Thukela Bank. Results for mixing models are presented as the median and the 5th and 95th credibility intervals

Location	<i>n</i>	$\delta^{15}\text{N}$	$\delta^{13}\text{C}$	C:N	TP	MixSIR results according to TSS location					
Species or group											
<b>Durban Eddy</b>						DE Surface	DE $F_{\max}$	Thukela River	Amatikulu River		
<i>Flaccisagitta enflata</i>	9	8.11 ± 0.66	-20.07 ± 0.32	4.49 ± 0.76	2.18 ± 0.19	0.13 (0.01–0.90)	0.82 (0.03–0.96)	0.02 (0.00–0.07)	0.02 (0.00–0.08)		
Heteropoda	2	7.70 ± 0.09	-19.70 ± 0.79	3.84 ± 0.16	2.30 ± 0.03	0.65 (0.03–0.88)	0.20 (0.01–0.87)	0.04 (0.00–0.16)	0.05 (0.00–0.20)		
<i>Euphausia</i> mixture	3	7.56 ± 0.42	-20.32 ± 0.21	4.19 ± 0.23	2.26 ± 0.12	0.48 (0.03–0.83)	0.41 (0.03–0.87)	0.04 (0.00–0.16)	0.06 (0.00–0.20)		
<i>Euphausia</i> sp.	4	7.43 ± 0.85	-19.86 ± 0.39	3.81 ± 0.11	2.22 ± 0.25	0.72 (0.03–0.90)	0.17 (0.01–0.89)	0.03 (0.00–0.12)	0.04 (0.00–0.16)		
<i>Subeucalanus monachus</i>	7	7.40 ± 0.25	-19.92 ± 0.33	4.91 ± 0.69	2.22 ± 0.07	0.70 (0.02–0.90)	0.22 (0.02–0.92)	0.02 (0.00–0.09)	0.03 (0.00–0.12)		
Mixture 500	8	7.09 ± 0.72	-20.32 ± 0.34	4.17 ± 0.12	2.12 ± 0.21	0.60 (0.03–0.86)	0.33 (0.04–0.89)	0.02 (0.00–0.09)	0.04 (0.00–0.14)		
<i>Undinula vulgaris</i>	9	7.02 ± 0.68	-20.27 ± 0.50	4.26 ± 0.24	2.10 ± 0.20	0.65 (0.04–0.88)	0.27 (0.03–0.89)	0.02 (0.00–0.09)	0.03 (0.00–0.13)		
Scyphozoa	1	7.01	-20.1	4.03	2.1	0.45 (0.03–0.80)	0.28 (0.02–0.79)	0.07 (0.01–0.26)	0.10 (0.01–0.47)		
Mixture 250	8	6.48 ± 0.47	-20.55 ± 0.38	4.29 ± 0.15	1.94 ± 0.14	0.60 (0.10–0.83)	0.29 (0.04–0.80)	0.03 (0.00–0.10)	0.06 (0.00–0.19)		
<i>Creseis</i> sp.	2	5.85 ± 0.17	-20.07 ± 0.99	4.14 ± 0.07	1.76 ± 0.05	0.66 (0.07–0.87)	0.14 (0.01–0.77)	0.05 (0.00–0.18)	0.08 (0.01–0.33)		
<b>Tugela Bank</b>						TB Surface	TB $F_{\max}$	Thukela River	Amatikulu River		
<i>Flaccisagitta enflata</i>	5	8.61 ± 0.71	-18.96 ± 0.18	3.98 ± 0.08	2.41 ± 0.21	0.02 (0.00–0.09)	0.93 (0.87–0.98)	0.02 (0.00–0.04)	0.01 (0.00–0.04)		
<i>Undinula vulgaris</i>	6	8.33 ± 0.60	-19.39 ± 0.44	4.28 ± 0.24	2.33 ± 0.18	0.02 (0.00–0.010)	0.93 (0.87–0.98)	0.02 (0.00–0.07)	0.01 (0.00–0.06)		
<i>Subeucalanus monachus</i>	3	7.87 ± 0.48	-19.10 ± 0.20	4.62 ± 0.47	2.19 ± 0.14	0.03 (0.00–0.13)	0.90 (0.80–0.96)	0.03 (0.00–0.10)	0.02 (0.00–0.08)		
Mixture 500	6	7.87 ± 0.38	-19.23 ± 0.14	4.22 ± 0.19	2.07 ± 0.10	0.02 (0.00–0.08)	0.94 (0.86–0.98)	0.02 (0.00–0.06)	0.01 (0.00–0.06)		
Mixture 250	6	7.46 ± 0.34	-19.22 ± 0.18	4.09 ± 0.13	2.19 ± 0.11	0.02 (0.00–0.08)	0.94 (0.88–0.98)	0.02 (0.00–0.06)	0.01 (0.00–0.06)		
<b>Middle Shelf</b>						TB Surface	TB $F_{\max}$	MS Surface	MS $F_{\max}$	Thukela River	
<i>Flaccisagitta enflata</i>	2	8.81 ± 0.08	-19.81 ± 0.01	4.14 ± 0.14	2.45 ± 0.02	0.04 (0.00–0.14)	0.07 (0.01–0.76)	0.68 (0.02–0.87)	0.08 (0.01–0.82)	0.03 (0.00–0.13)	
<i>Undinula vulgaris</i>	2	7.70 ± 0.80	-18.94 ± 0.04	3.97 ± 0.01	2.12 ± 0.24	0.05 (0.00–0.18)	0.08 (0.01–0.40)	0.64 (0.04–0.84)	0.10 (0.01–0.76)	0.04 (0.00–0.15)	
<i>Euphausia</i> sp.	1	7.56	-19.19	4.27	2.08	0.07 (0.01–0.27)	0.12 (0.01–0.63)	0.47 (0.02–0.76)	0.15 (0.01–0.71)	0.05 (0.00–0.20)	
Mixture 500	2	6.62 ± 0.97	-19.28 ± 0.05	3.98 ± 0.16	1.81 ± 0.28	0.06 (0.00–0.24)	0.10 (0.01–0.63)	0.58 (0.02–0.81)	0.11 (0.01–0.77)	0.04 (0.00–0.15)	
Mixture 250	2	6.53 ± 0.30	-19.36 ± 0.27	4.18 ± 0.06	1.78 ± 0.09	0.07 (0.01–0.26)	0.10 (0.01–0.62)	0.55 (0.02–0.79)	0.12 (0.01–0.76)	0.04 (0.00–0.15)	

Location	<i>n</i>	$\delta^{15}\text{N}$	$\delta^{13}\text{C}$	C:N	TP	MixSIR results according to TSS location	
Species or group							
Richards Bay South						RS Surface and $F_{\max}$	Mhlatuze River
<i>Flaccisagitta enflata</i>	4	$8.79 \pm 0.16$	$-19.69 \pm 0.68$	$3.96 \pm 0.07$	$2.53 \pm 0.05$	0.96 (0.92–1.00)	0.04 (0.01–0.08)
<i>Undinula vulgaris</i>	3	$7.21 \pm 0.20$	$-19.89 \pm 0.21$	$4.39 \pm 0.27$	$2.06 \pm 0.06$	0.96 (0.92–1.00)	0.04 (0.01–0.08)
<i>Euphausia</i> sp.	1	7.13	-20.65	4.07	2.04	0.97 (0.90–1.00)	0.04 (0.00–0.10)
Mixture 500	5	$7.04 \pm 0.87$	$-20.48 \pm 0.17$	$4.48 \pm 0.38$	$2.01 \pm 0.26$	0.98 (0.95–1.00)	0.02 (0.00–0.05)
<i>Subeucalanus monachus</i>	3	$6.89 \pm 0.58$	$-19.94 \pm 0.16$	$5.21 \pm 0.56$	$1.93 \pm 0.22$	0.96 (0.90–1.00)	0.04 (0.01–0.10)
<i>Euphausia frigida</i>	2	$5.88 \pm 0.40$	$-20.54 \pm 0.15$	$4.32 \pm 0.15$	$1.67 \pm 0.12$	0.95 (0.88–1.00)	0.05 (0.01–0.12)
Mixture 250	5	$5.76 \pm 0.43$	$-20.57 \pm 0.14$	$4.37 \pm 0.17$	$1.61 \pm 0.16$	0.98 (0.95–1.00)	0.02 (0.00–0.05)