Supplementary material

Foraging ecology of the common dolphin *Delphinus delphis* revealed by stable isotope analysis

Katharina J. Peters*[1,2], Sarah J. Bury[3], Emma Betty[1], Guido J. Parra[4], Gabriela Tezanos-Pinto[1,5] & Karen A. Stockin[1]

Author affiliations:

[1]Cetacean Ecology Research Group, School of Natural and Computational Sciences, Massey University, Auckland 0745, New Zealand

[2]Global Ecology, College of Science and Engineering, Flinders University, Adelaide 5001, South Australia

[3]National Institute of Water and Atmospheric Research, Greta Point, 301 Evans Bay Parade, Hataitai, Wellington 6021, New Zealand

[4]Cetacean Ecology, Behaviour and Evolution Lab, College of Science and Engineering, Flinders University, Adelaide 5001, South Australia

[5]Molecular Ecology of Aquatic Vertebrates Lab (LEMVA), Los Andes University, Bogota 11711, Colombia

*Corresponding author: k.peters@massey.ac.nz

Extended methods

Details on stable isotope analysis

Carbon isotope data were corrected via a 2-point normalisation process (Paul et al. 2007) using NIST 8573 (USGS40 L-glutamic acid; certified $\delta^{13}C$ = - 26.39 ± 0.09 ‰) and NIST 8542 (IAEA-CH-6 Sucrose; certified $\delta^{13}C$ = - 10.45 ± 0.07 ‰). A 2-point normalisation process using NIST 8573 (USGS40 L-glutamic acid; certified $\delta^{15}N$ = - 4.52 ± 0.12 ‰) and IAEA-N-2 (ammonium sulphate: certified $\delta^{15}N$ = + 20.41 ± 0.2 ‰) was applied to $\delta^{15}N$ data. DL-Leucine (DL-2-Amino-4-methylpentanoic acid, $C_6H_{13}NO_2$, Lot 127H1084, Sigma, Australia) was run every ten samples to check analytical precision and enable drift corrections to be made if necessary. NIST 8547 (IAEA-N1 ammonium sulphate; certified $\delta^{15}N$ = + 0.43 ± 0.04 ‰) and USGS65 Glycine (certified $\delta^{13}C$ = - 20.29 ± 0.04 ‰; certified $\delta^{15}N$ = 20.68 ± 0.06 ‰) were run daily to check isotopic accuracy with 2 laboratory standards L Proline and homogenized squid run as an additional check precision.

Lipid correction formulae

We calculated a $\delta^{13}C$ lipid-correction factor using linear regression analysis of the $\delta^{13}C$ values of the original whole (non lipid-extracted) and lipid-extracted samples.

Common dolphins (*Delphinus delphis*): Corrected $\delta^{13}C$ value = (-7.4674 + 0.5409 × uncorrected $\delta^{13}C$ value)

Prey: Corrected $\delta^{13}C$ value = (-2.6526 + 0.7781 × uncorrected $\delta^{13}C$ value)

Details on Layman metrics

We used 6 different Layman metrics (Layman et al. 2007, Jackson et al. 2011) to measure niche variation between males and female *D. delphis*.

1) **$\delta^{15}N$ range:** distance between the highest and lowest $\delta^{15}N$ values (i.e. max $\delta^{15}N$ – min $\delta^{15}N$). Measure of trophic length of the community.
2) **$\delta^{13}C$ range:** distance between the highest and lowest $\delta^{13}C$ values (i.e., max $\delta^{13}C$- min $\delta^{13}C$). Estimates the diversity of basal resources.
3) **Total area (TA):** total area of the convex hull comprising all data points. Measure of the total amount of niche space occupied and indication of niche width.
4) **Mean distance to centroid (CD):** average Euclidean distance of each sample to the centroid. Measure of niche width and sample spacing.
5) **Mean nearest neighbour distance (MNND):** mean of the Euclidean distances to each sample's nearest neighbor. Measure of density and clustering of individuals.
6) **Standard deviation of nearest neighbour distance (SDNND):** measure of the evenness of spatial density and packing of individuals. Low SDNND values indicate more even distribution of trophic niches.

Supplementary tables

Table S1 Raw data of *Delphinus delphis* recovered from the Hauraki Gulf, New Zealand, between 2004 and 2016. Season refers to the austral season (austral spring/summer = September–February; and austral autumn/winter = March–August).

ID	Year	Sex	Season	$\delta^{15}N$ (‰)	$\delta^{13}C$ (‰)	Body length (cm)
WS04-19Dd	2004	Male	Winter	14.18	-14.69	174
WS04-28Dd	2004	Female	Summer	13.36	-15.73	195
WS04-29Dd	2004	Female	Summer	13.09	-16.01	195
WS04-30Dd	2004	Male	Summer	13.1	-16.21	118
WS04-32Dd	2004	Female	Summer	14.19	-15.84	99
WS04-33Dd	2004	Female	Summer	12.99	-16.87	195
WS04-34Dd	2004	Female	Summer	13.43	-16.41	189
WS04-35Dd	2004	Female	Summer	13.38	-16.68	200
WS04-36Dd	2004	Female	Summer	12.56	-15.87	195
WS05-06Dd	2005	Male	Summer	14.76	-16.42	220
WS05-16Dd	2005	Female	Autumn	16.51	-14.94	207
WS05-18Dd	2005	Male	Summer	12.35	-17.73	213
WS05-19Dd	2005	Male	Summer	12.12	-17.24	207
WS05-20Dd	2005	Male	Summer	11.82	-17.28	211
WS05-24Dd	2005	Female	Autumn	16.18	-16.15	189
WS05-25Dd	2005	Female	Winter	14.68	-15.74	170
WS05-26Dd	2005	Male	Winter	14.66	-15.45	160
KS06-04Dd	2006	Female	Spring	15.19	-15.47	206
WS06-04Dd	2006	Female	Winter	15.44	-15.81	128
WS06-14Dd	2006	Female	Winter	14.95	-15.39	166
WS06-15Dd	2006	Male	Spring	15.78	-15.70	153
KS07-01Dd	2007	Female	Spring	17.04	-15.33	100
KS07-11Dd	2007	Female	Spring	15.32	-16.73	172
KS07-12Dd	2007	Female	Summer	16.18	-15.90	207
WS07-01Dd	2007	Female	Summer	15.68	-16.19	190
KS08-07Dd	2008	Male	Winter	14.37	-16.06	161
KS08-08Dd	2008	Male	Winter	16.76	-15.29	118
KS09-09Dd	2009	Female	Winter	14.88	-16.62	156
KS09-13Dd	2009	Male	Winter	15.11	-15.47	214
KS09-18Dd	2009	Female	Winter	14.56	-15.81	197
KS10-26Dd	2010	Male	Winter	14.3	-16.49	217

KS10-29Dd	2010	Male	Spring	16.42	-16.86	135
KS11-08Dd	2011	Male	Summer	15.41	-16.39	177
KS11-12Dd	2011	Male	Autumn	16.05	-16.32	171
KS11-13Dd	2011	Male	Autumn	14.43	-17.44	217
KS11-14Dd	2011	Female	Autumn	15.33	-17.22	195
KS11-39Dd	2011	Female	Winter	15.21	-17.44	152
KS11-40Dd	2011	Female	Winter	15.21	-17.43	149
KS11-50ADd	2011	Female	Spring	14.27	-16.43	73
KS11-50Dd	2011	Female	Spring	12.58	-17.64	195
KS12-13Dd	2012	Female	Winter	16.71	-16.46	189
KS12-14Dd	2012	Male	Winter	15.93	-17.22	185
KS12-15Dd	2012	Female	Winter	15.53	-16.36	190
KS12-17Dd	2012	Male	Winter	16.7	-16.40	156
KS12-23Dd	2012	Male	Summer	15.89	-16.70	146
KS13-07Dd	2013	Male	Winter	16.03	-17.33	130
KS13-08Dd	2013	Female	Winter	15.8	-17.74	155
KS13-09Dd	2013	Male	Winter	15.92	-17.53	172
KS14-38Dd	2014	Male	Winter	15.3	-17.12	207
KS14-39Dd	2014	Female	Winter	15.29	-17.98	150
KS14-42Dd	2014	Female	Spring	16.2	-17.31	123
KS15-01Dd	2015	Male	Summer	13.22	-17.60	220
KS15-19Dd	2015	Female	Winter	15.29	-17.19	195
KS15-20Dd	2015	Female	Winter	16.18	-16.99	98
KS15-21Dd	2015	Female	Winter	15.28	-17.23	162
KS16-29Dd	2016	Female	Spring	12.71	-17.35	160

Supplementary figures

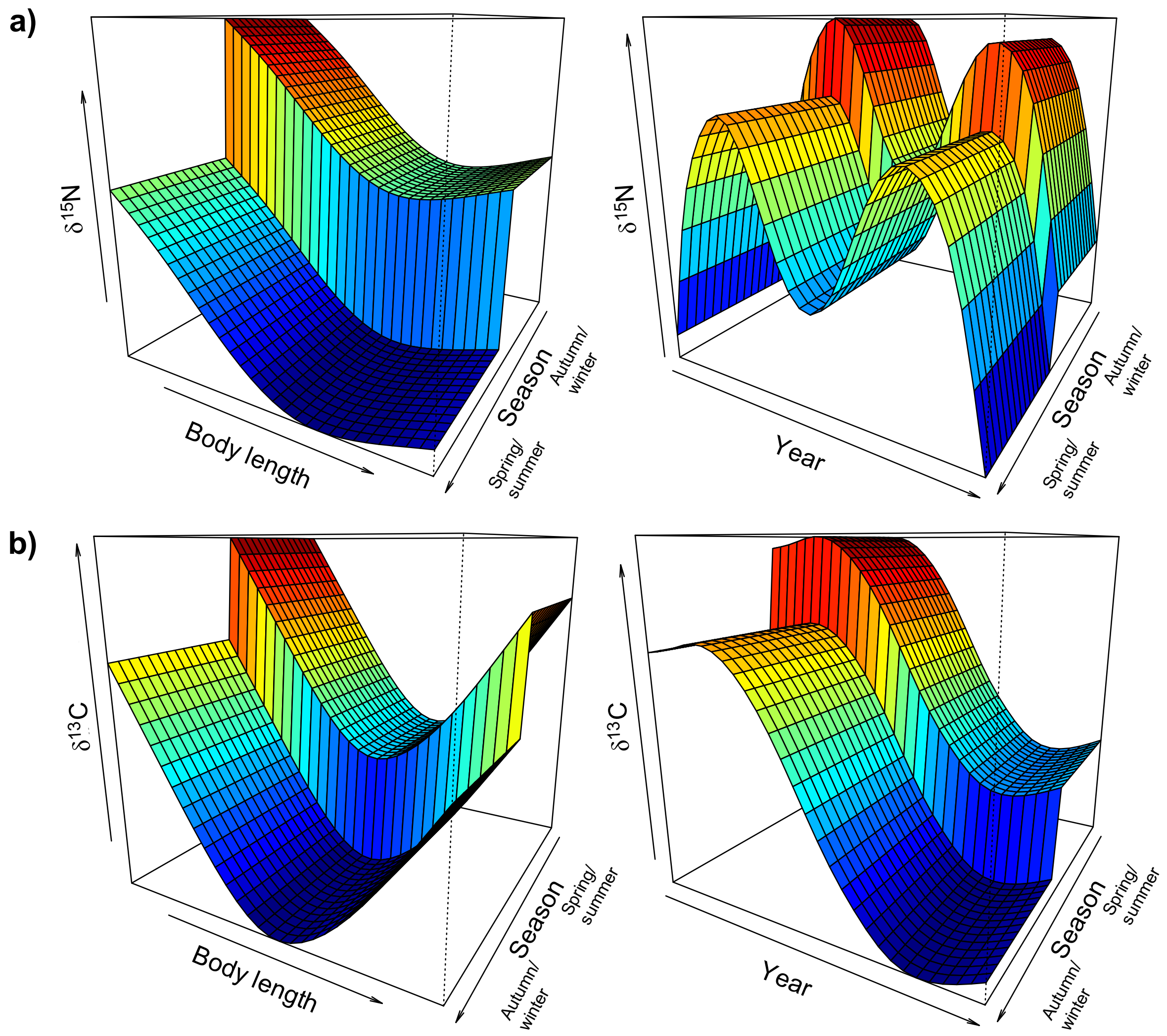

Figure S1 Visual representation of the categorical variable 'season' in GAMs, for **a)** nitrogen and **b)** carbon isotopic values. Graphs in **b)** have been rotated to show lower variable level in front.

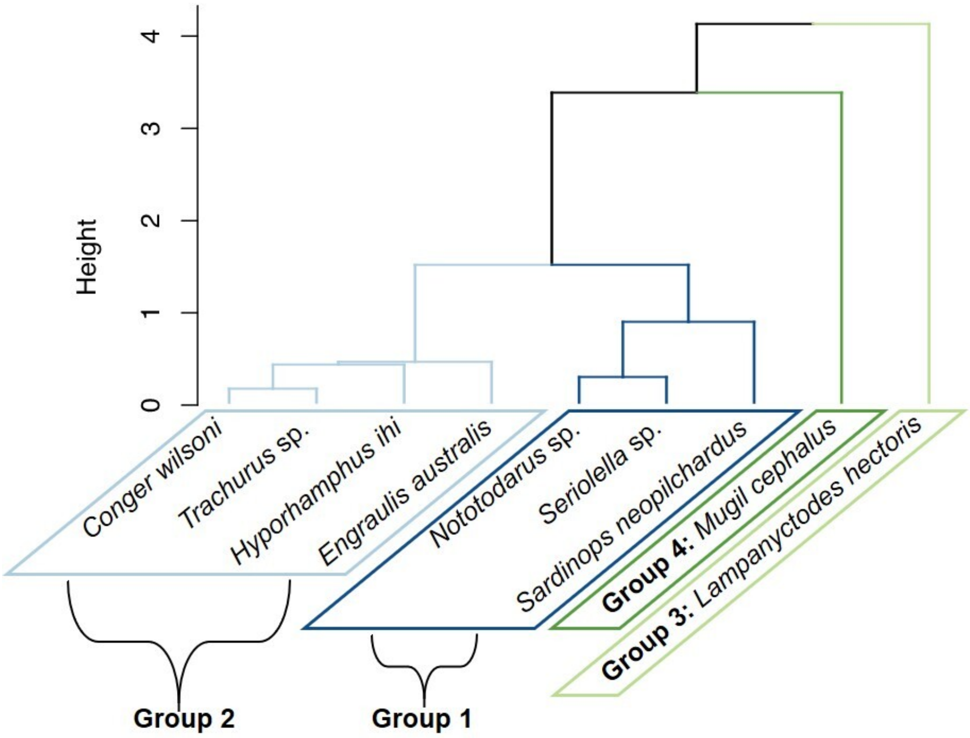

Figure S2 Dendrogram showing clustering of potential prey species. Ward's correlation coefficient = 0.728, height indicates the cophenetic distance between members.

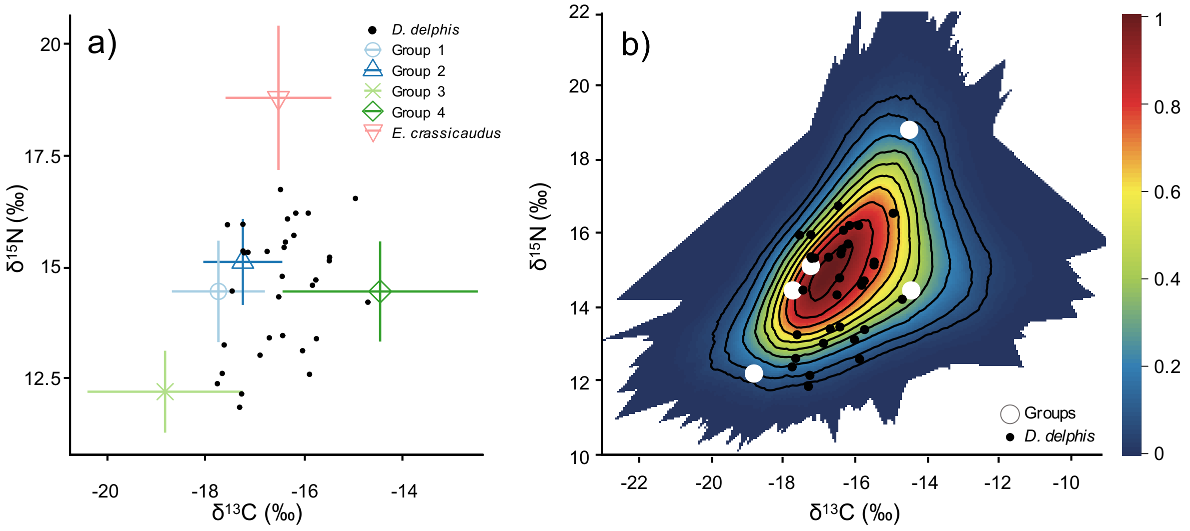

Figure S3 a) Isotopic values for weaned (≥170 cm body length) *Delphinus delphis,* individuals represented as black dots) and their potential dietary source groups (displayed as mean ± 1 SD, with incorporated diet-to-tissue discrimination factors: 1.01 ± 0.37‰ (mean ± SD) for δ^{13}C and 1.57 ± 0.52‰ for δ^{15}N) including *Epigonus crassicaudus* (values obtained from Sepúlveda et al. (2018)). **Group 1:** *Sardinops neopilchardus*, *Seriolella* sp., *Nototodarus* sp.; **Group 2:** *Hyporhamphus ihi*, *Trachurus* sp., *Conger wilsoni*, *Engraulis australis*; **Group 3:** *Lampanyctodes hectoris*; **Group 4:** *Mugil cephalus*. **b)** Mixing polygon for data presented in a), showing individual dolphins (black dots) and potential dietary source groups (white dots). Black lines represent probability contours at 10% levels. By including *E. crassicaudus*, validation improves drastically with only 1 individual dolphin falling outside of the 95% mixing space.

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