



SCAR Southern Ocean Diet and Energetics Database

<https://data.aad.gov.au/trophic>

Core working group:

Antonio Agüera - Maëlle Connan - Hauke Flores - Luis Hückstädt - Mary-Anne Lea - Julie McInnes - Ben Raymond - Fokje Schaafsma - Gabriele Stowasser - Rowan Trebilco - Anton van de Putte - Andrea Walters - José Xavier



General aims

Information on diet and energy flow = fundamental to a range of studies

This project

- a centralised database of data related to diet and energy flow from
- a product of the SCAR community and open for all to participate in and use

Data types

- conventional diet data (e.g. stomach, scat contents)
- stable isotopes
- DNA-based diet identification
- fatty acids
- energetic content

Perhaps:

- allometric equations (length-mass relationships)
- other?



Current data holdings

Seeded from the previous Southern Ocean diet database:

Conventional diet: 26500 records / 1090 taxa / 320 studies

Stable isotopes: 1800 records / 220 taxa / 30 studies

Now being added:

Conventional diet: benthic and myctophid fish

Stable isotopes: seabirds, urchins, orca, seals, toothfish (including data from the EGBAMM web site by Luis Hückstädt)

DNA-based diet: albatrosses, krill

Energetic content: euphausiids, amphipods, fish, squid, jellyfish



Data release

- the "seed" data (from the previous Southern Ocean diet database) are public now
- access to the new data will be limited to the project working groups while the initial papers are in preparation
- full public release once those papers are at a suitable stage



Papers

Papers being prepared while the database is being populated:

1. Energetics review (contact: Fokje Schaafsma)
2. Diet and energetics data in the context of ecosystem modelling and size-based models (contact: Rowan Trebilco)
3. Mesopelagic prey, isoscapes, top predator foraging, acoustics (contact: Andrea Walters)
4. Food web/network structures (contact: Stacey McCormack/Jess Melbourne-Thomas/Rowan Trebilco)
5. Lipid studies in the Southern Ocean: a review and a way forward (contact: Maëlle Connan)
6. Albatross diet (contact: Julie McInnes)

Please make contact if you would like to contribute or see scope for other papers!



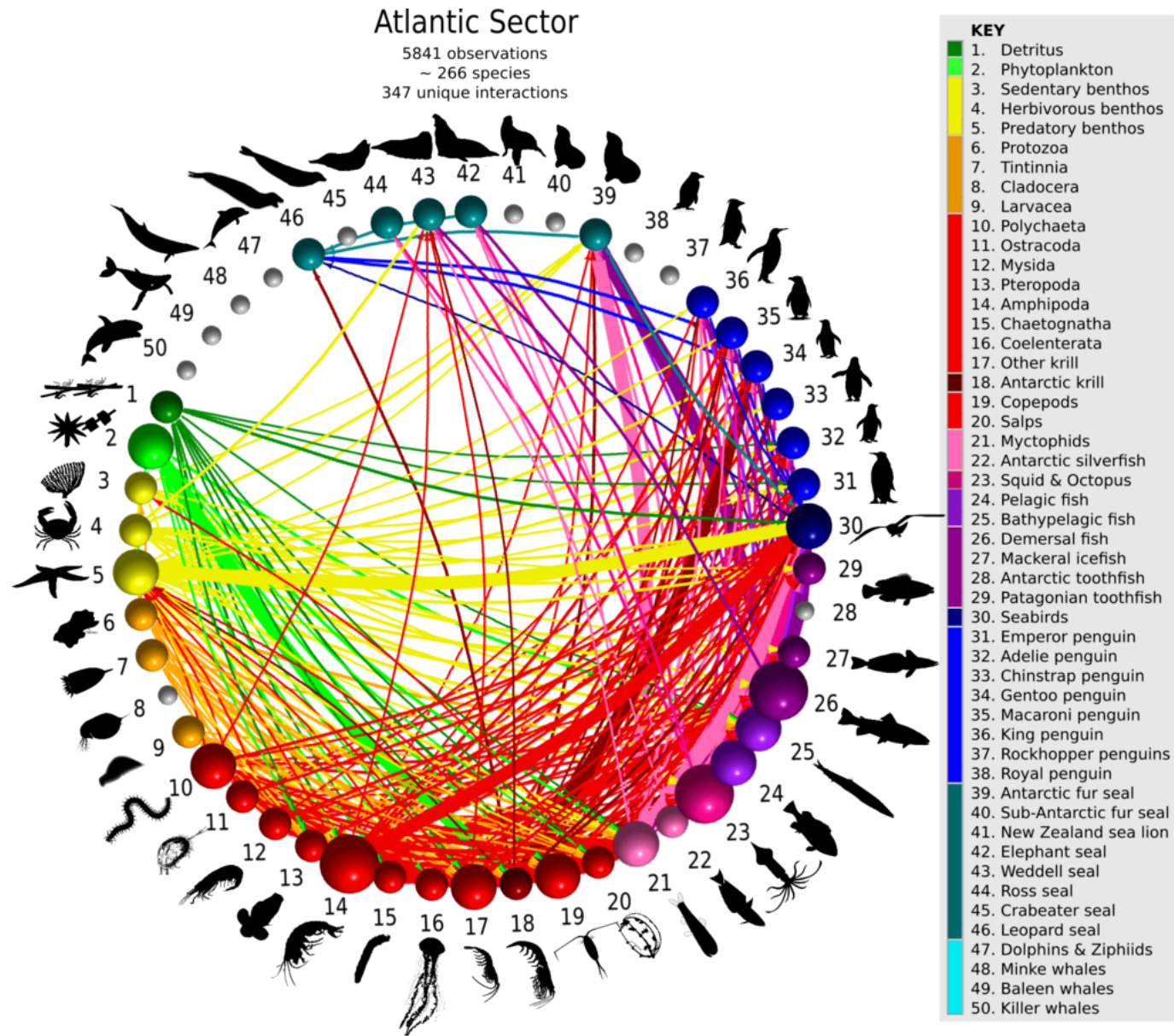


Image: Stacey McCormack

Software tools

R package in development for accessing and manipulating these data.

See <https://github.com/SCAR/sohungry>

Example usage

Load the package and retrieve diet data:

```
library(sohungry)  
x <- so_diet()
```



R package

A summary of what *Electrona carlsbergi* eats:

```
x %>% filter_by_predator_name("Electrona carlsbergi") %>%  
  diet_summary(summary_type="prey")
```

Prey	Fraction diet by weight	Fraction occurrence	Fraction diet by prey items
<i>Euphausia superba</i> (Antarctic krill)		0.02	0.00
Chaetognatha (arrow worms)	0.10		0.33
Copepoda (copepods)		0.05	0.04
Crustacea (crustaceans)	0.11	0.41	0.15
Euphausiids (other krill)	0.32	0.10	0.04
Fish	0.12		
Heterorhabdidae		0.01	0.00
Hyperiididea (hyperiid amphipods)	0.41	0.20	0.04
Malacostraca (class of crustaceans)	0.01	0.20	0.08
Maxillopoda (class of crustaceans)	0.04	0.10	0.24
Salps		0.20	0.05
Uncategorized group	0.38	0.41	0.30

R package

Which studies have looked at the predators of squid?

```
x %>% dplyr::filter(preym_order=="Teuthida") %>%  
  dplyr::select(source_id,source_details) %>% distinct
```

Source ID Details

- 5 Cherel Y (2008) Isotopic niches of emperor and Adelie penguins in Adelie Land, Antarctica. Marine Biology 154: 813-821
- 27 Cherel Y, Bocher P, Trouve C, Weimerskirch H (2002) Diet and feeding ecology of blue petrels Halobaena caerulea at Iles Kerguelen, Southern Indian Ocean. Marine Ecology Progress Series 228: 283-299
- 33 Gales, N.J. and Burton, H.R. (1988) Use of emetics and anaesthesia for dietary assessment of Weddell seals. Australian Wildlife Research 15:423-433
- 48 Reid K, Trathan PN, Croxall JP, Hill HJ (1996) Krill caught by predators and nets: differences between species and techniques. Mar Ecol Prog Ser 140:13-20
- 50 RIDOUX, V. 1994. The diets and dietary segregation of seabirds at the subantarctic Crozet Islands. Mar. Orn. 22: 1-192
- 56 THOMPSON, K.R. 1992. Quantitative analysis of the use of discards from squid trawlers by Black-browed Albatross Diomedea melanophrys in the vicinity of the Falkland Islands. Ibis 134: 11-21
- 58 WEIMERSKIRCH, H., JOUVENTIN, P. & STAHL, J.-C. 1986. Comparative ecology of the six albatrosses breeding on the Crozet Islands. Ibis 128: 195-213
- 59 Weimerskirch H, Bartle JA, Jouventin P, Stahl JC (1988). Foraging Ranges and Partitioning of Feeding Zones in Three Species of Southern Albatrosses. The Condor, 90(1):214-219
- 60 WILLIAMS, A.J. & IMBER, M.J. 1982. Ornithological observations at Gough Island in 1979, 1980 and 1981. S. Afr. J. Antarct. Res. 12: 40-45
- 61 Green, K., Kerry, K.R., Disney, T., and Clarke, M.R. (1986) Dietary studies of light-mantled sooty albatrosses Phoebastria palpebrata from Macquarie and Heard Islands. Marine Ornithology 26:19-26
- 78 Croxall & Prince (unpublished) As cited in Croxall JP, Prince PA (1987) Seabirds as predators on marine resources, especially Krill, at South Georgia. In: Croxall JP (ed) Seabirds: feeding ecology and role in marine ecosystems. Cambridge University Press, London, p 347-368
- 79 CROXALL, J.P., STEELE, W.K, MC INNES, S.J. & PRINCE, P.A. 1995. Breeding distribution of the Snow Petrel Pagodroma nivea. Marine Ornithology 23: 69-99
- 85 HUNTER, S. 1983. The food and feeding ecology of the giant petrels Macronectes halli and Macronectes giganteus at South Georgia. J. Zool., Lond. 200: 521-538; Hunter S (1984) Breeding biology and population dynamics of giant petrels Macronectes at South Georgia (Aves: Procellariiformes). J Zool Lond 203:441-460 (as cited in Croxall JP, Prince PA (1987) Seabirds as predators on marine resources, especially Krill, at South Georgia. In: Croxall JP (ed) Seabirds: feeding ecology and role in marine ecosystems. Cambridge University Press, London, p 347-368)
- 91 Hindell, M. (1988) The diet of the royal penguin Eudyptes schlegeli at Macquarie Island. Emu 88:219-226

How can I get involved?

1. **Contribute data** (particularly from under-represented taxa, regions, or data types). If you have data from an unpublished paper, the data can be embargoed until publication.

- download the template and submit your data: <https://github.com/SCAR/dietandenergetics>

Or, if you have a lot of data in a consistent format, we may be able to script a batch import.

2. **Join a group** working on a paper

3. **Make suggestions** so that this is more useful to the SCAR community

- how you might use such data
- what analytical functionality you would like to see





Contact

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