

Expert Group on Antarctic Biodiversity Informatics

Workshop, SCAR Biology 2023

https://scar.github.io/EGABI/talks/scar_biology_2023/egabi-scarbiol-2023.pdf



Expert Group on Antarctic Biodiversity Informatics

- **2012–2020:** initial term (chief officer: Bruno Danis)
- structure: core group (~10 people) with wider membership open to anyone
- **extended in 2020**
 - change of chief officer, deputy, core group members
 - revision to mission and terms of reference
- **renewed in 2022**

ben.raymond@aad.gov.au



Mission

EGABI supports the Antarctic and Southern Ocean biodiversity science community with resources for data access, integration, analysis, and synthesis.

ben.raymond@aad.gov.au



Terms of reference

EGABI is primarily focused on **computational aspects of biodiversity science**, with particular value placed on transparent, **reproducible science** using open software and data.

EGABI promotes and contributes to the development of

- software tools
- analytical and collaborative platforms
- resources such as user guides, example workflows, tutorials
- other educational material

for biodiversity data access, integration, analysis, and synthesis.

ben.raymond@aad.gov.au



EGABI does this by

- encouraging collaboration and disseminating information regarding biodiversity informatics activities across the SCAR and broader Antarctic science communities
- hosting workshops, online discussion fora, and other channels for community engagement and capacity building
- working with other groups in SCAR and elsewhere to develop integrated or synthesized data products of value to the community
- providing advice to SCAR groups that are engaging in these areas
- engaging in biodiversity science projects and actively developing tools

ben.raymond@aad.gov.au



In collaboration with

There is clearly a close relationship between these activities and other areas of science, and so the EG-ABI group collaborates closely with a range of other groups and initiatives, including:

- the SCAR Standing Committee on Antarctic Data Management
- the Southern Ocean Observing System
- SCAR research programmes and groups
- the Antarctic Environments Portal (environments.aq)
- the SCAR Antarctic Biodiversity Portal (biodiversity.aq)

ben.raymond@aad.gov.au



EGABI is not

It is important to note that EGABI is not primarily about:

- *data publication or data management*, which are the focus of e.g. SCADM, SCAGI, and biodiversity.aq

EGABI's primary interest is in accessing and using such data, and improving community tools for doing so. However, as noted above, EGABI will collaborate in generating data synthesis products, particularly where these aid in downstream data usage by the community

- *domain-specific science under our own auspices.*

EGABI does not instigate its own biological science projects, for example, but we will partner with domain-specific groups on the computational aspects of such projects



Core group

Ben Raymond (Chief Officer)

Anton Van de Putte

(Deputy chief officer, SCADM liaison)

Zephyr Sylvester* (Secretary)

Svenja Halfter* (Communications officer)

Briannyn Woods* (Ant-ICON liaison)

Claudia Andrade Díaz

Huw Griffiths

Kerstin Jerosch

(CoastCarb project liaison)

Lucas Krüger

Yan Ropert-Coudert (EGBAMM liaison)

* ECR

Past core group members

Anne-Sophie Archambeau, Horst Bornemann, Bruno Danis,
Claude De Broyer, Alison Murray, José Xavier

ben.raymond@aad.gov.au



Stay tuned, get involved

Mailing list: <https://lists.scar.org/mailman/listinfo/abi>

EGABI Slack: contact for invite

rOpenSci Slack (R-specific): contact for invite

GitHub: <https://github.com/SCAR/>



ben.raymond@aad.gov.au



Project summaries

ben.raymond@aad.gov.au



The SCAR/rOpenSci initiative

Since 2017, a collaboration with the rOpenSci community to improve resources for users of the R software package in Antarctic and Southern Ocean science: <https://scar.github.io/ropensci/>.

- development of R packages and user guides
- social infrastructure through a welcoming and diverse community
- building the capacity of software users and developers
- hosting workshops (e.g. <https://github.com/SCAR/EGABIcourse19>)
- Slack: contact for invite



ben.raymond@aad.gov.au



R/Shiny apps

e.g. <https://pops.apps.aq/>, in collaboration with INSTANT (Susan Bengtson Nash)

Persistent Organic Pollutants in Antarctica and the Southern Ocean

ANMAP SCAR

Explorer Data download About this app

Sample filtering
Total number of samples: 23539. After filtering: 23539

Sample type: All types

Contaminant group: All groups

Substrate group: All groups

Taxonomic filters (applied to biological samples only) ●

Kingdom: All

Class: All

Phylum: All

Order: All

Map showing sample locations in the Southern Ocean and Antarctic Peninsula. Points are color-coded by contaminant group and numbered.

Contaminant group bar chart:

Contaminant Group	Z
Dioxin/PCDD/F	~100
Mirene	~10
OCDD's	~1000
Other PCDD/F	~10
PCDD/F	~100
PCDF	~1000
PCDD	~100
PCDD/F	~100
PCDF/F	~10
PCDD/F/OCDD	~10
PCDD/F/OCDF	~10
PCDD/F/OCDF/OCDD	~10

Substrate group bar chart:

Substrate group	Z
Vg	~1000
Fib	~1000
Nicotinamide	~1000
Protein	~1000
Phenylalanine	~1000
Sugar	~1000
Lipid	~1000
fat or oil	~1000
Saccharose	~1000
Salic	~1000
Protein	~1000

Study Details DOI

1 Galbán-Malagón C, Cabrerizo A, Caballero G, Dachs J (2013) Atmospheric occurrence and deposition of hexachlorobenzene and hexachlorocyclohexanes in the Southern Ocean and Antarctic Peninsula. *Atmospheric Environment* 80:41–49. <https://doi.org/10.1016/j.atmosenv.2013.07.061>

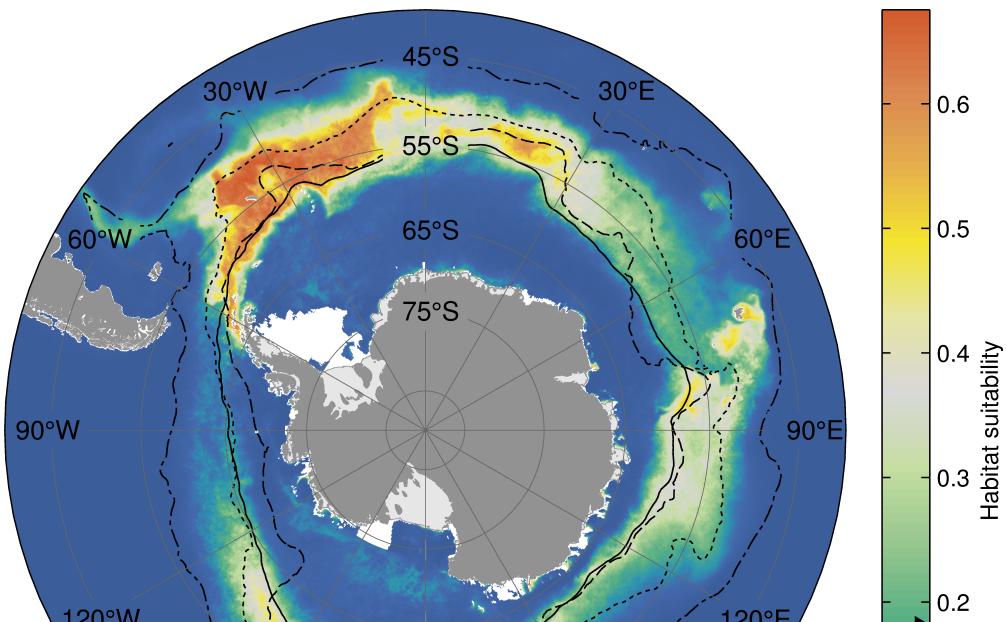
2 Bengtson Nash SM, Wild SJ, Hawker DW, Cropp RA, Hung H, Wania F, Xiao H, Bohlin-Nizzetto P, ... (2013) Atmospheric occurrence and deposition of hexachlorobenzene and hexachlorocyclohexanes in the Southern Ocean and Antarctic Peninsula. *Atmospheric Environment* 80:41–49. <https://doi.org/10.1016/j.atmosenv.2013.07.061>

ben.raymond@aad.gov.au



Spatial modelling

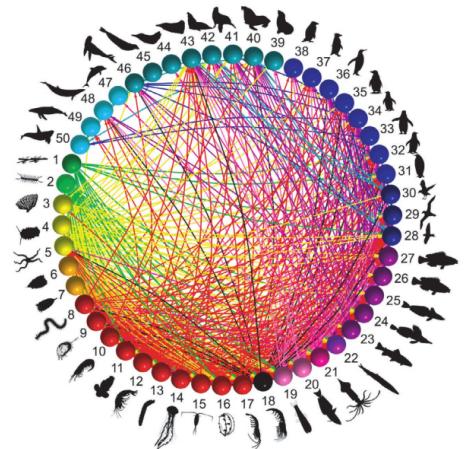
- Lucas Krüger, Briannyn Woods
- spatial biodiversity modelling (e.g. species distribution and habitat selectivity)
- resources, access to software and data, community connection, sharing of expertise
- project scope and format evolving



The Southern Ocean Diet and Energetics Database

<https://diet.apps.aq/>

- diet (gut content, isotope, DNA) and energetic content data, allometric equations
- R packages to work with them
- publications and collaborations



ben.raymond@aad.gov.au



Myctobase

- Briannyn Woods
- Woods et al. (2022) - data compilation, and paper and dataset of predicted distributions. > 17k records of 8 species of mesopelagic fish from > 4500 net hauls

zenodo

October 21, 2021

Myctobase

502 views 443 downloads See more details...

Indexed in: OpenAIRE

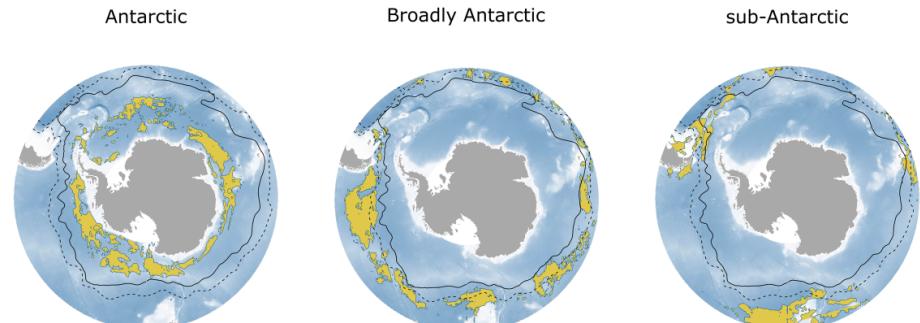
Antarctic Broadly Antarctic sub-Antarctic

The dataset is comprised of three comma-separated files. The first file (event.csv) describes the survey methodology. The second file (individual.csv) contains the measurements of individuals. The third file (occurrence.csv) contains the occurrence ID. The final file (IndividualOccurrence.csv) contains measurements of individuals. Each row contains the event and occurrence ID, which links each measurement to the first and second file. See associated metadata records for definitions and units for each variable in these files.

The final dataset was subject to quality control and validation processes. Entries with ambiguous or incomplete records were identified with a 0 in the column labelled Validation (event.csv) and a description of the missing data can be found in the provided ValidationDescription.csv.

The taxonomic name for each individual was verified against the World Register of Marine Species (<http://www.marinespecies.org>).

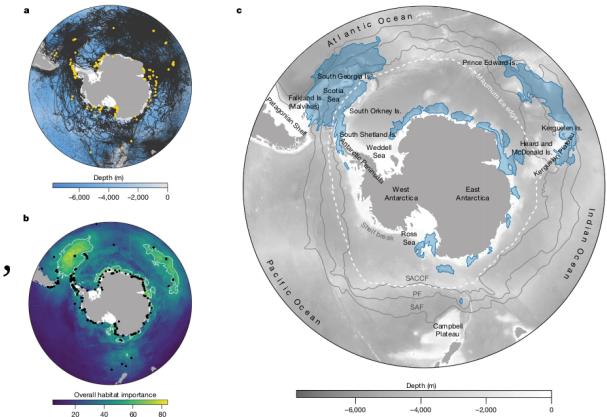
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The Retrospective Analysis of Antarctic Tracking Data

- with EGBAMM, since 2015: a multi-species assessment of Southern Ocean predator animal tracking data to identify Areas of Ecological Significance (AES) ... regions that are important to multiple predators
- main publications in 2020
- follow-on projects continue, e.g.
 - "RAATD2" (Ryan Reisinger)
 - Southern Ocean KBAs
(Sarah Becker, Cassandra Brooks @ Colorado,
workshop at SCAR 2022)



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Register of Antarctic Species

<http://ras.biodiversity.aq> - Anton Van de Putte

- authoritative inventory of Antarctic And Southern Ocean Organisms
- EGABI engagement in conjunction with biodiversity.aq
 - using RAS in their analysis workflows
 - inclusion of trait data for e.g. mechanistic modelling approaches
 - crossover with diet and energetics work



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Essential variables

- Anton Van de Putte
- supporting ecosystem-based management and monitoring in the Southern Ocean
- <https://soossymposium2023.au/essential-variables-workshop/>
- EGABI focus on computational, workflow, software implementation aspects

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Analytical platforms and workflows

- rapid progression of technology
- virtual machines, automated workflows, advanced analytical tools
- personal / institutional / national scale
- diversity of technologies, approaches, functionality
- commercial and open-source
- is there a need for guidance or resources? A targeted workshop?



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