

Exploring Antarctic biodiversity data

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21 may 2015

Empowering biodiversity data

Antarctic Treaty

« In order to promote international cooperation in scientific investigation in Antarctica, [...],
Scientific observations and results from Antarctica shall be exchanged and made freely available. »

Our vision: Antarctic biodiversity data are open, linked, useful, interoperable and safe.

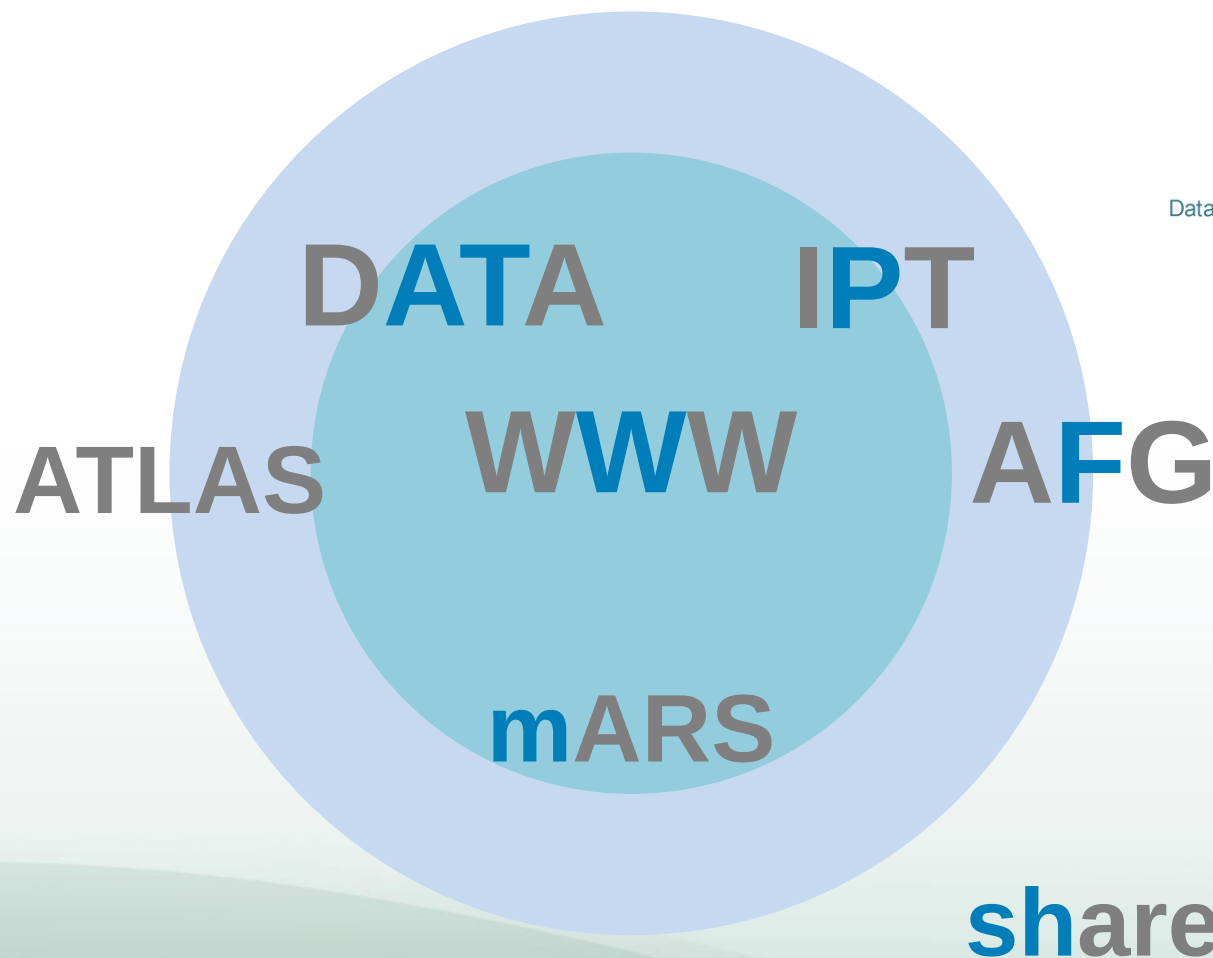


Background

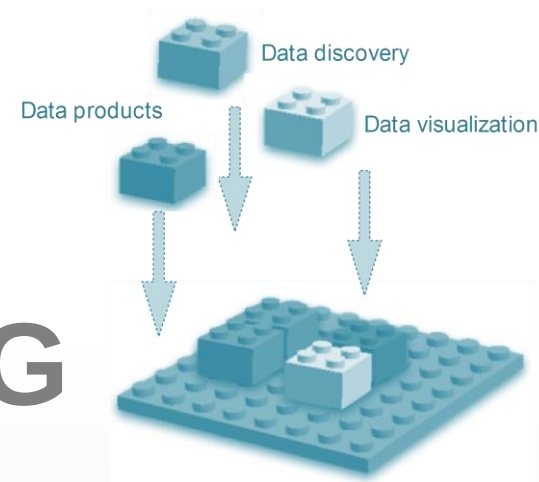
- Born during the IPY as Census of Antarctic Marine Life as the data, visualization and analysis component
- Free and open access to biodiversity data
- SCAR-MarBIN, AntaBIF and AntaBIS projects
- Science, conservation and management
- Networked community developments



Architectural design & developments



MODULAR ARCHITECTURE



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About biodiversity.aq

Funded by the [Belgian Science Policy Office](#), biodiversity.aq is building an innovative Antarctic biodiversity information system, giving access to a distributed network of contributing database, according to the principles of the [Global Biodiversity Information Facility](#). It is building a new data discovery tool using two complementary networks and will expand these by using an advanced technical architecture, capable of linking with many potential data resources.

biodiversity.aq integrates [SCAR-MarBIN](#) (Scientific Committee on Antarctic Research - Marine Biodiversity Information Network), with the biodiversity databases managed by the [Australian Antarctic Division](#), bringing together data from marine and terrestrial realms.

biodiversity.aq is the data management tool and repository for the biodiversity-related research conducted at the [Princess Elisabeth Station](#).

biodiversity.aq will use the best available technology to integrate, share and disseminate all available information on Antarctic Biodiversity. Its implementation by the Belgian Biodiversity Platform ascertains that biodiversity.aq can take advantage of the relevant experience of the Belgian [GBIF](#) node.

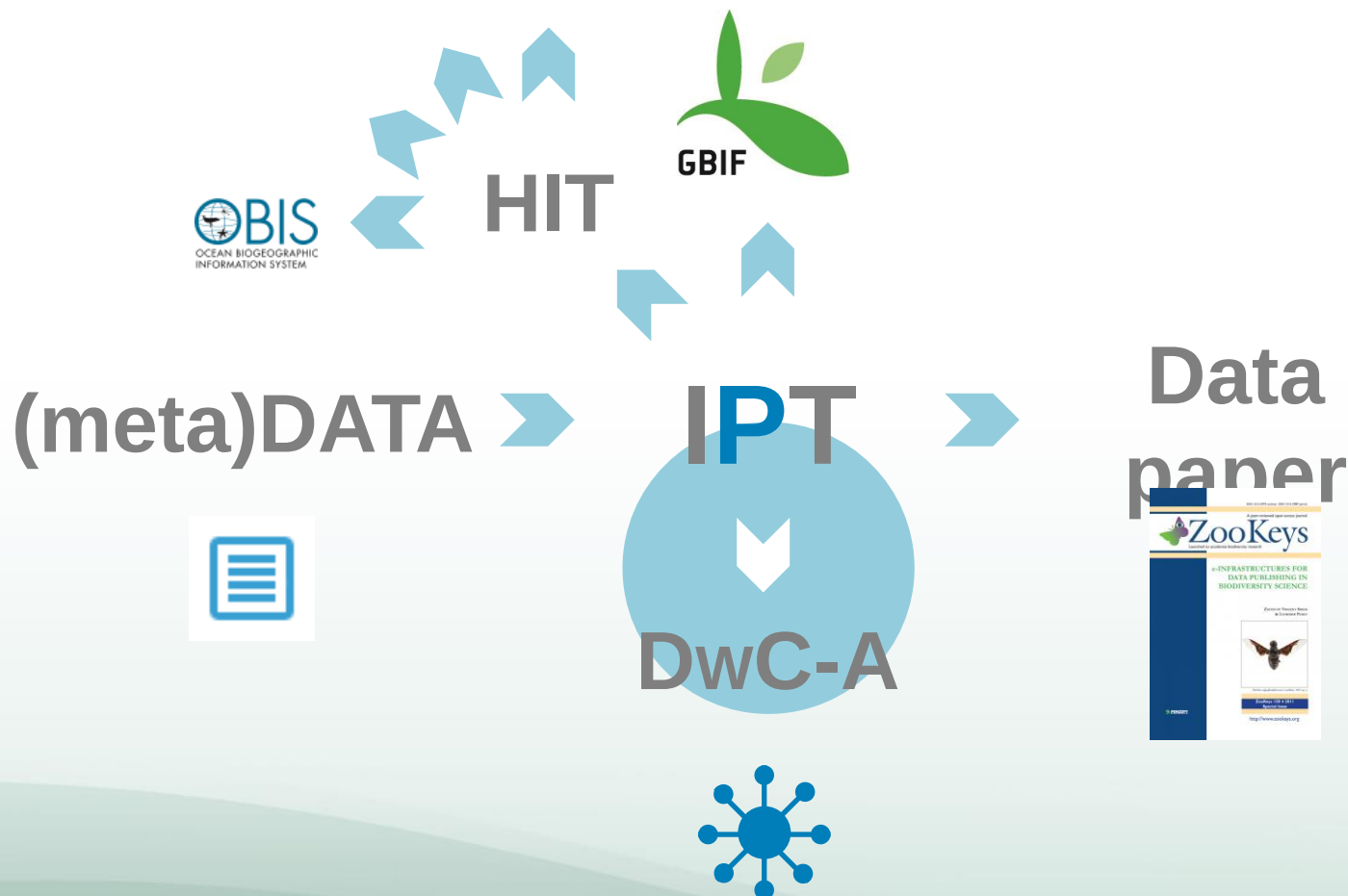
biodiversity.aq is steered by an [International Steering Committee](#) composed of selected experts in the field of Polar biodiversity.

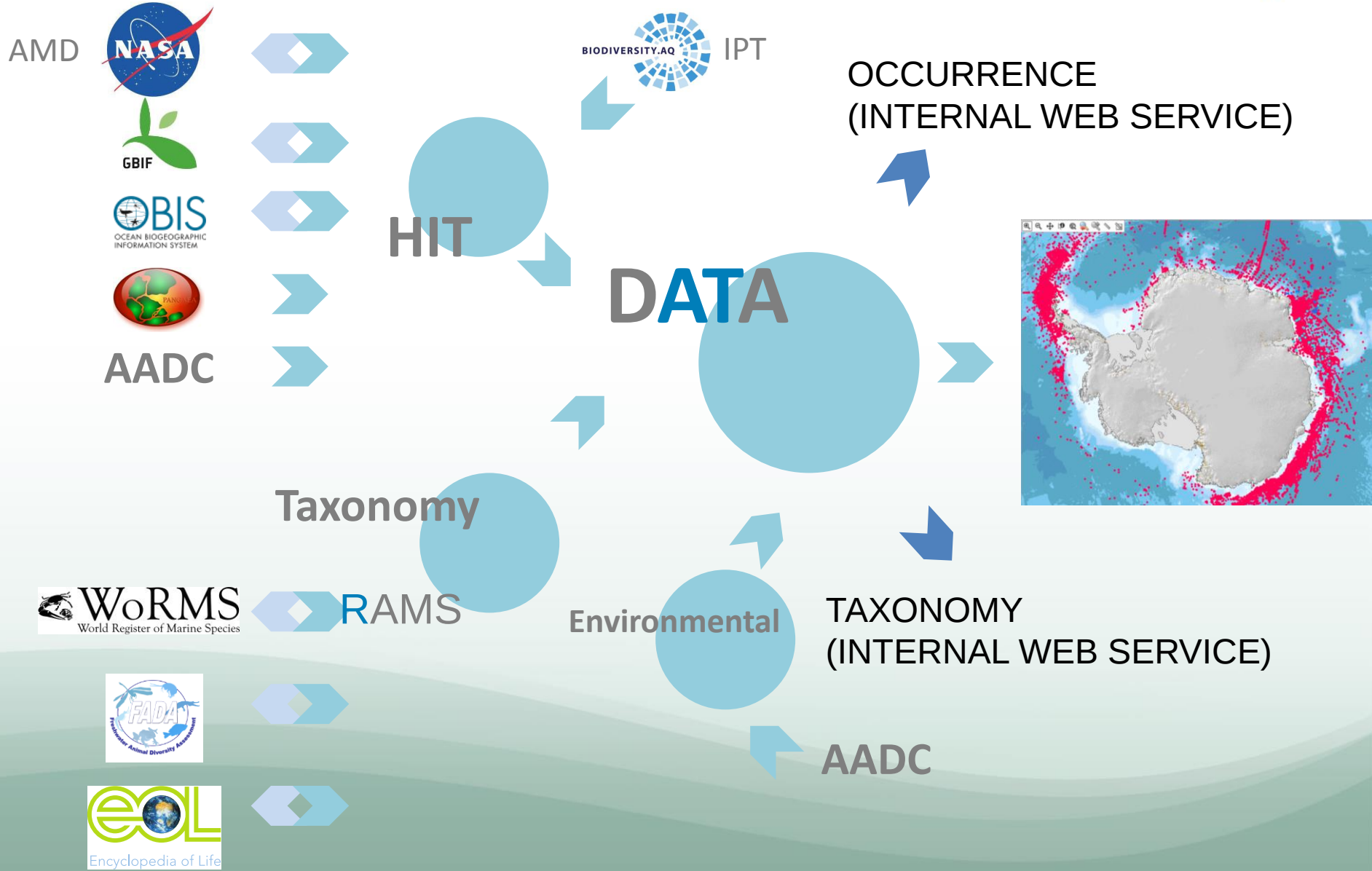
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DATA
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History

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Expert Provided
Content
(text & images)

DATA



AFG

Occurrence
Taxonomy

AFG Antarctic Chordata Mammalia Carnivora Pinnipedia Suborder
Lobodon carinophaga (Hombroet & Jouinot, 1842)

provided by [ICM-SMMA](#), Mark van den

Description
Crabeater seals have a circumglobal distribution, and are largely restricted to Antarctic pack-ice which makes them difficult to access for scientific study. Adults are 2.0-2.8 m in length, with females slightly larger than males. Males are very consistently throughout the year, but at a typically in the range of 150-220 kg.

Distinguishing Crabeaters
The key distinguishing characteristics of crabeater seals is their relatively uniform colour, as they lack the prominent spots and stripes of the Weddell, Ross and Leopard seals. They are generally slender, more slender and lighter in colour than elephant seals which may also be found in the pack-ice. They have a blunt, square shaped snout in comparison to other seals, and very distinct multi-lobed teeth.

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2023 times added

Species details
Crabeater is also similar with other, pre-modern seals being a fairly white and dark-modern seals light to medium brown. The crabeater is often marked with darker brown, and tend to be darker on the dorsal surface. They are commonly heavily scarred from encounters with icebergs, a common result of young crabeater seals, as from the specific interactions as adults during the breeding season. Crabeater seals have highly specialised and distinct multi-lobed teeth which can interlock to form a 'saw' when their feeding on krill.

Size
The global population size of crabeater seals and its long-term trends are unclear. This is primarily due to the difficulty of conducting surveys in the remote and harsh environment of the pack-ice regions used by the seals. Estimates from the 1970 and 1980s put the global population at around 12 million seals, but these were revised down to 12 million as data improved in the 1990s. It has also been suggested the crabeater seal population increased throughout the 20th century as a consequence of increased availability of krill in the Antarctic and sub-Antarctic waters. Despite some demographic data supporting this idea, there are no systematic survey data from before 1990 to test the hypothesis. ICM coordinated an international pack-ice survey in 1999-2001 which estimated the population of eastern Antarctica (30°-110°E) and southern sub-Antarctic (southern to 60°S, 200°E) at 1.8 million seals. In 2001, 1.8 million seals. Differences in the methodology between the 1999 and 2001 surveys, presented an assessment of trends, and there is still no robust global estimate for the population size for this species.

Reference
Burns JM, Costa DP, Polak RA, Hindle NM, Ruckstuhl CJ, Caceres NJ, McDowell B, Thompson S, Croxall JP (2024) Winter habitat use and foraging behavior of crabeater seals along the Western Antarctic Peninsula. Deep-Sea Research Part II 227: 105555. Burns JM, Hindle NM, Ruckstuhl CJ, Costa DP (2020) Fine-scale habitat structure of crabeater seals as determined by using telemetry. Deep-Sea Research Part II 21: 105114. Caceres NJ, Fraser MB, Costa DP, Lourenco C (2024) Do crabeater seals 'forage cooperatively'? Deep-Sea Research Part II 21: 2103-2112. Huelbein LA, Burns JM, Caceres NJ, McDowell B, Croxall JP, Costa DP (2023) Use of a satellite in a changing environment: the crabeater seal along the western Antarctic Peninsula. Marine Ecology-Progress Series 671: 287-302. Lam RM, Baily A, Bienen MM (2023) Breeding success and embryo's distance in crabeater seals (Lobodon carinophaga). Reproduction 126: 181-197. Lam RM, Baily A, Bienen MM (2023) Size and growth of the crabeater seal (Lobodon carinophaga). Mammalia 87(1): 131-138. Lourenco C, Ruckstuhl CJ, Bienen MM, Bienen MM, Bienen MM (2024) Taking account of seasonal species in management of the Southern Ocean 3rd: Trends estimating crabeater seal abundance off the Antarctic Peninsula. Journal of Applied Ecology 61: 622-632. Wolf AM, Ruckstuhl CJ, Lourenco C, Caceres NJ, Hindle NM (2021) Crabeater seal diving behaviour in eastern Antarctica. Marine Ecology-Progress Series 637: 261-277.

Species distribution
Distribution info
Crabeater seals are found almost entirely in the Antarctic pack-ice, with only occasional sightings 'leaking out' on sub-Antarctic islands north of the pack-ice front, or even more rarely on the coast of Australia, New Zealand, Africa and South America. Within the pack-ice, their distribution seems to be largely determined by that of the primary prey, Antarctic krill. Breeding studies have shown that in the West Antarctic Peninsula they occur on the continental shelf, while in Eastern Antarctica higher densities are associated with the continental shelf break or the marginal ice zone.

Depth
Crabeater seals typically dive deeper during the day than at night as they follow the

Photos

Occurrences map

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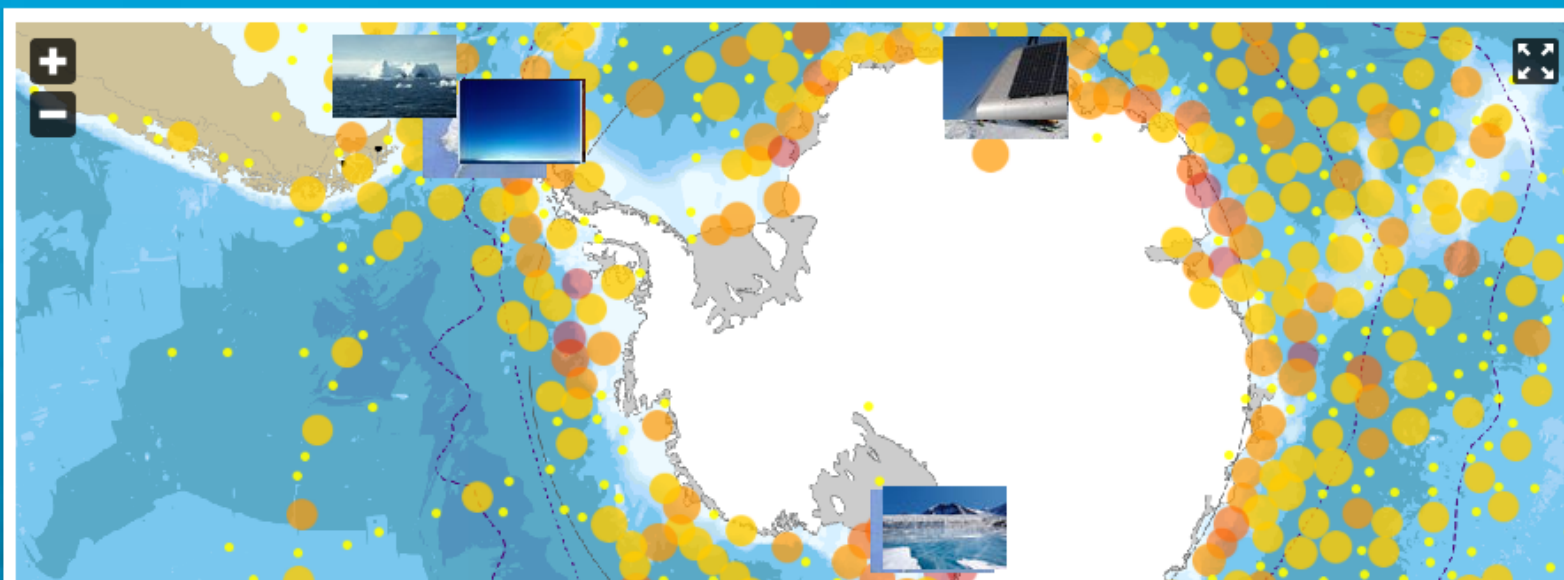
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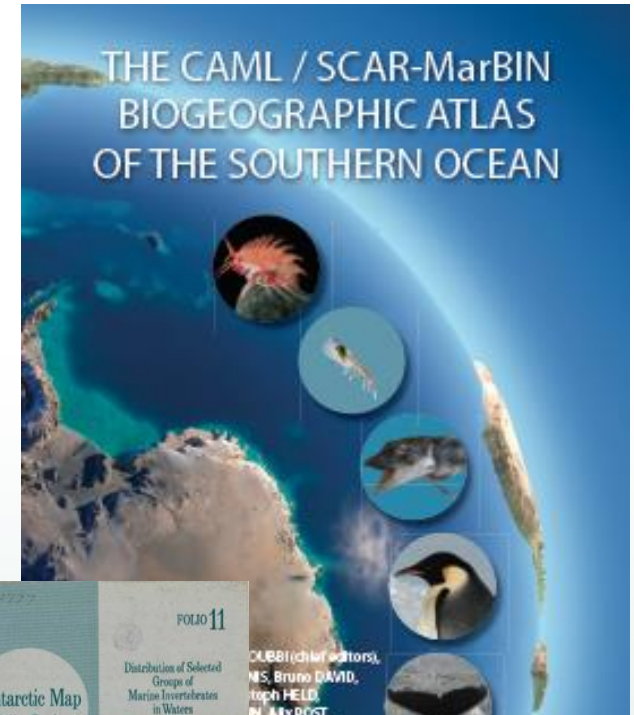


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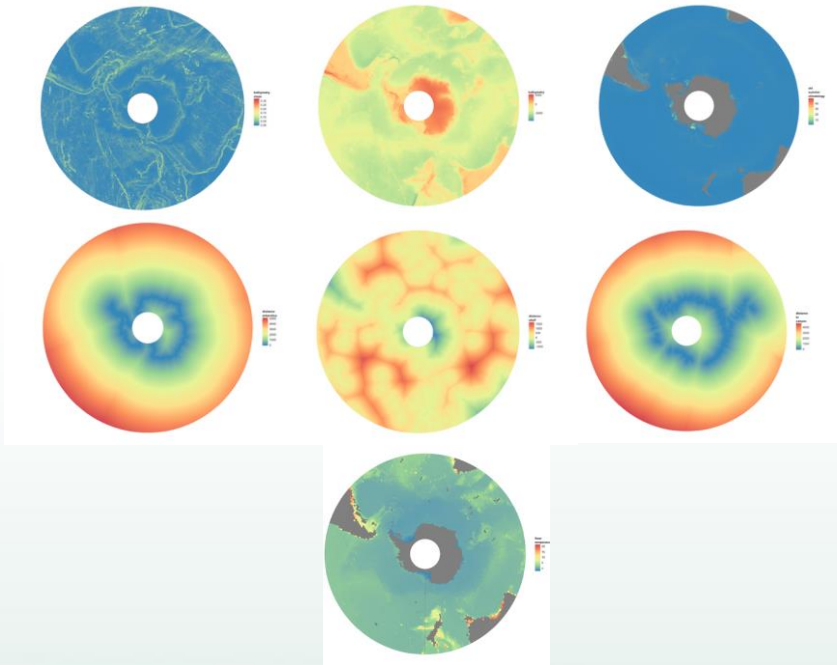


- Biogeographic Atlas of the Southern Ocean
- Editors: De Broyer & Koubbi
- Redo of Hedgepeth 1969 Folio
- Predictive approach
- Static and dynamic versions
- Modelization loops are ready

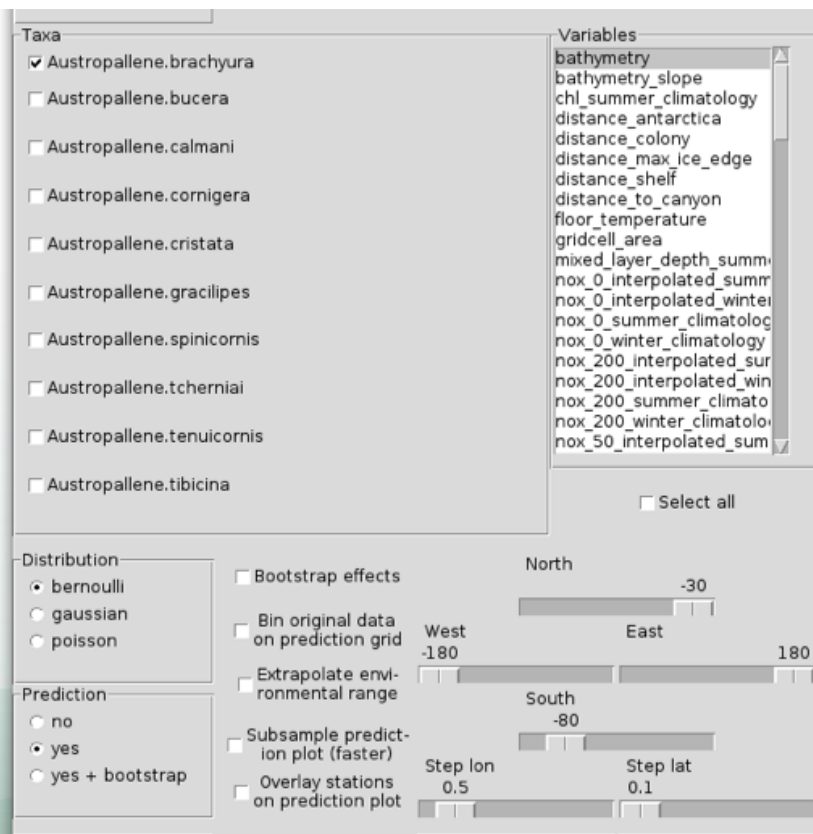


Integrating environmental data and modeling tools

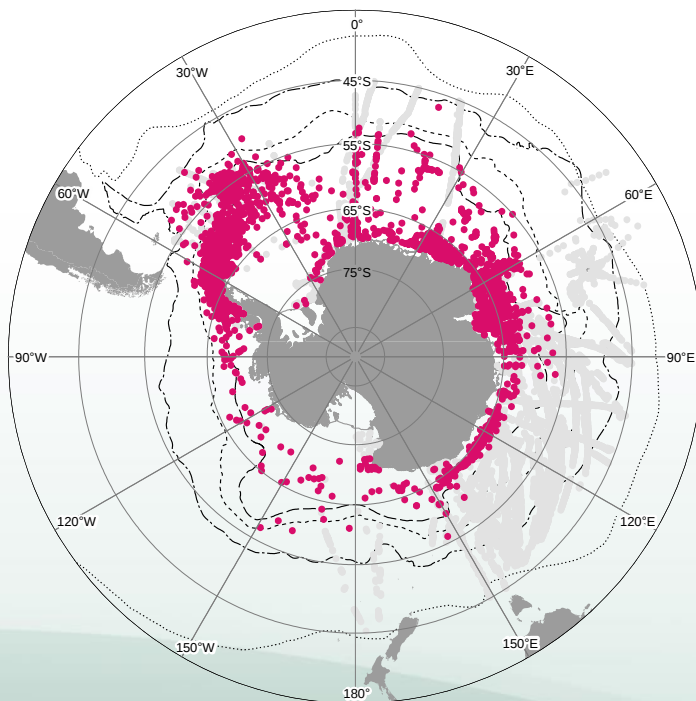
Environmental layers



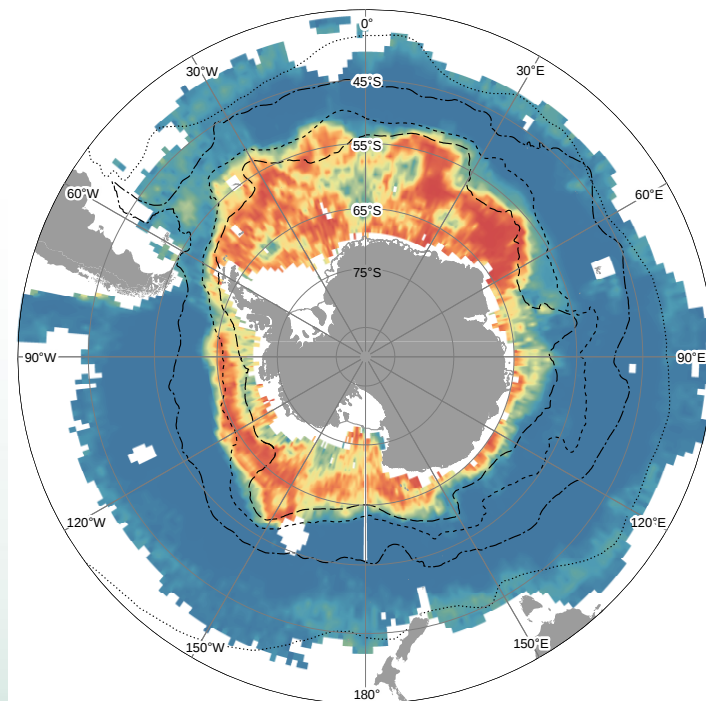
- Slope
- Bathymetry
- Chlorophyll
- Distance to the continent
- Distance to bird colonies
- Distance to ice
- Distance to shelf
- Distance to canyon
- Floor temperature
- ...
- +
- ANTABIF Occurrence records



- R-functions GUI for BRT and GDM
- <https://github.com/jiho/atlasr>



Legend
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Legend
Value
High : 0.994270
Low : 0.001170

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mARS | MICROBIAL ANTARCTIC RESOURCE SYSTEM



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Microbial Antarctic Resource System



THE PATH TO ANTARCTIC MICROBIAL DIVERSITY INFORMATION

mARS is envisioned as an information system dedicated to facilitate the discovery, access and analysis of molecular microbial diversity (meta)data generated by Antarctic researchers.

mARS will allow the discovery and integration of these microbial resources using the Antarctic Biodiversity Information Facility ([ANTABIE](#)) infrastructure.

By harboring this information directly at [ANTABIE](#), Antarctic scientists will have the information archived and accessible through common language queries.

Resources

mars.biodiversity.aq



White Paper

Provide input on our white paper



(polar)MiMarks template

Create your own Antarctic field guides...



mARS sequence set template

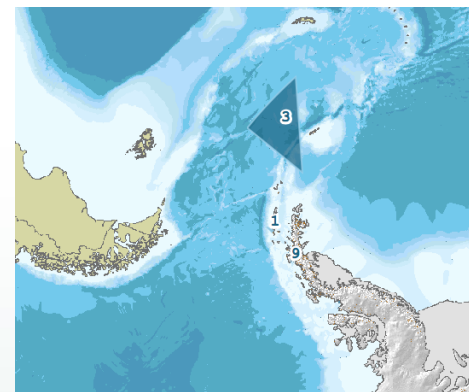
Template for sequence data

Sequence set summary

MiMARKS



mARS



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mARS white paper

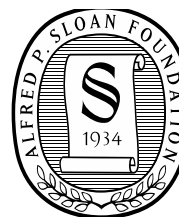
-
- ***Step 1: Data description and discovery***
- ***Step 2: Habitat and Microbial Sequence Metadata Entry***
 - *(MiMARKS Data Standard; Microbial_Sequence_Set_Template)*
- ***Step 3: Georeferenced-molecular sequence database integration***
- ***Step 4: Processing batch sequence data –Circum-Antarctic microbial diversity***

Continued efforts

Our vision: Antarctic biodiversity data are open, linked, useful, interoperable and safe.

- Webservices, analytical tools integrated into the LifeWatch Infrastructure

Privileged partners



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Associate partners



