Science & Education Report

MS Roald Amundsen 2025

Photo: Oscar Farrera

MS Roald Amundsen

Antarctic Circle Expedition

28 Jan 2025 – 13 Feb 2025

Credit: Sonja Storm

Credit: Chiara G Bertulli

Science & Education Program

During the expedition voyage from Ushuaia through the Drake Passage to Antarctica, the Science and Education Team accompanied you on a journey of discovery through one of the most remote and awe-inspiring regions on Earth.

Through lectures, workshops, and cultural visits ashore, they sought to make each day of exploration a unique and enriching learning experience.

Hopefully, these experiences have fostered a greater appreciation for the landscapes, wildlife, and history of this extraordinary part of the world.


Credit: Chiara G Bertulli

Lectures

Lectures on history and culture, flora and fauna, oceanography, and the ice sheet aimed to enhance understanding of Antarctica's rich biodiversity and cultural significance.

Credit: Chiara G Bertulli

Workshops

Hands-on interactive sessions and short talks were held in the science centre to introduce you to plankton, rocks, feathers, ice, to the use of microscopes and to citizen science applications such as iNaturalist and eBird.

History

History is not something that just happens to you, it is something you make, and this trip has been the absolute proof of that sentiment. You are part of the 0.00002 percent of human beings ever to have made it below the Antarctic Circle. If that is not making history, I don't know what is.

On our trip we have encountered a wide variety of historical sites and monuments. From plaques and abandoned bases to tanks(!) and empty whaling stations, the Antarctic past holds no secret for us. There is something quite unique to encountering these very human elements in a clearly non-human environment. One has to admire the resilience and grit of those who came before and ventured into wild places long ago.

Thanks to the efforts of our on-board historians, who delivered a large variety of lectures, you may have found yourself immersed in topics you never considered before, such as the value of cultural heritage or why Shackleton is the Rocky Balboa of exploration! So whatever you do give history some love, because the past is always the business of the present.

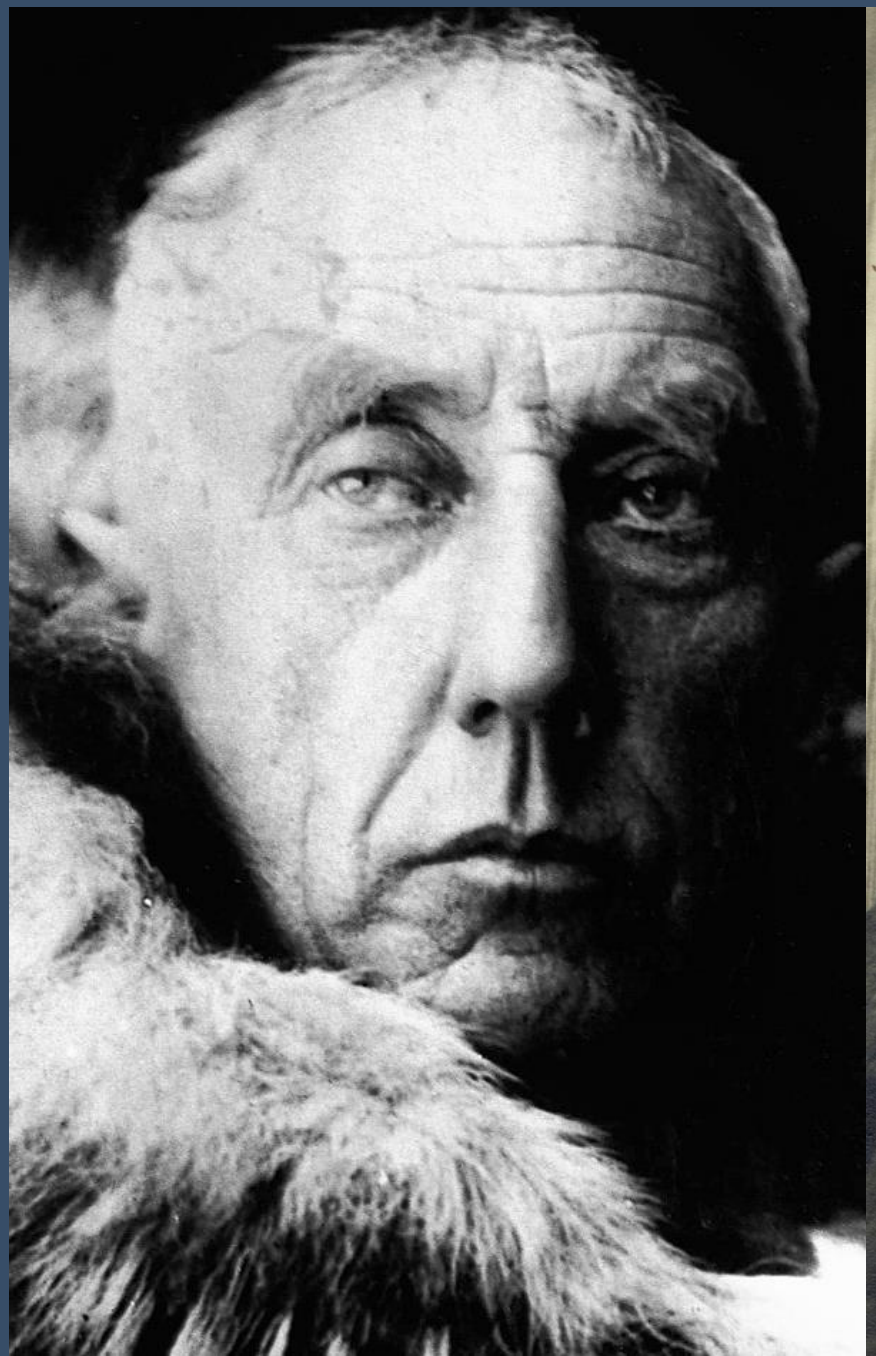
Credit: Niek van Eck

History

What is it about explorers that sparks our interest? Is it their skill, their determination, their resilience, or do they simply look cool? No matter who you are, every exploration story has something in it for you.

During this trip we have discussed the legendary figures of Amundsen and Shackleton, but we have also thrown a light on more unfamiliar characters such as Jackie Ronne who was the first woman to spend a whole winter in the Antarctic. However, we have only scratched the proverbial tip of the ice berg and we hope that when you go home you will explore many more awesome stories from the golden age of exploration.

And when you do, consider that you are now officially a part of this exclusive club in your own right. You have braced the Antarctic challenge head on and came out the other side (largely) unshaved. We are proud to have stood by your side in the winter waste lands of the far south and cannot wait to joining you on your next expedition.



Credit: Wikipedia

Geology

The geology of the Antarctic Peninsula is dominated by igneous and metamorphic rocks. The area was shaped by the subduction of the oceanic Phoenix Plate underneath the continental eastern margin of Gondwana in the Jurassic – Cenozoic between 201 – 66 million years ago.

The intrusive igneous rocks of the Antarctic Peninsula Batholith are today exposed across the peninsula, formed as a massive pocket of molten rock cooled and solidified over likely millions of years, with the overlying rocks since eroded to reveal the igneous rocks below. Examples include the frost weathered pink granite of Red Rock Ridge and the dark gabbro of Horseshoe Island, with its bright green streaks of copper.

Credit: Lois Fleming

Geology

Deception Island is one of just two Antarctic volcanoes that has been observed erupting (the other being Mt Erebus on Ross Island). The volcano is a sea flooded caldera, formed an estimated four thousand years ago thanks to a massive explosive eruption with a VEI (volcanic explosivity index) of six, which blew apart the existing shield volcano. The deposits from the ancient shield are only visible in a few places across the caldera, notably at Neptune's Window.

Deception Island extends 1,400m underwater to the ocean surface and the geothermal heat results in steam and sulphur rising from the waters of Port Foster, but don't be fooled, this is no hot spring. Whaler's Bay itself is home to the abandoned British Antarctic Survey Station B, which was damaged by volcanic activity in 1967 and 1969, the damage coming mostly from volcanic mud flows called lahars.

Cryosphere

A true-to-size, frozen, ship-shaped iceberg blocked our entrance to the Lemaire Channel—but thanks to the skilled manoeuvring of our captain, we managed to squeeze through. A thrilling moment for everyone standing outside on the observation deck!

What would Antarctica be without its vast, frozen landscapes? Ice is what makes this continent so majestic and unapproachable. Together, we have explored its glaciers, towering icebergs, and expansive sea ice, deepening our understanding of this frozen world.

Yet, as we admired the breathtaking scenery, we also recognized the undeniable impact of climate change on the ice, posing risks to this fragile environment. That is why learning about the cryosphere was a fundamental part of our journey.

May these unforgettable memories inspire you to share your love for Antarctica wherever you go!

Arts, Crafts & Creativity

You had the opportunity to explore your creativity through watercolour postcard painting, wildlife origami, Antarctic seabed diorama, and clay modelling, collectively shaping a picturesque representation of Antarctica.

Drawing inspiration from the region's unique wildlife, you learned to create beautiful artworks with watercolours—no prior experience required.

These sessions provided a relaxing space to share stories, connect with fellow travellers, and unwind while onboard.

Credit: Chiara G Bertulli

Credit: Chiara G Bertulli


Credit: Chiara G Bertulli


EXPLORING THE UNSEEN
2025
Design by Manuel F. Sosa San Román
@exploring.theunseen
@dibujodenaturaleza
Instrucciones de armado

Credit: Lancy Cheng

Wildlife Watch

While sailing, you were invited to join the expedition team on the deck to scan for marine life and admire the breathtaking scenery of Antarctica.

Our sightings included various avian and mammal species such as south polar skuas, snowy sheathbills, Adélie and Gentoo penguins, humpback and Antarctic minke whales, and Crabeater seals among others.

Science Boat

Over the course of nineteen science boat sessions, our science team conducted water sampling and measurements to explore the diversity and density of plankton and measure the physical properties of water at different depths in the ocean.

The following instruments were used:
1) Plankton net, to collect samples of plankton from the water for study;
2) CTD (Conductivity, Temperature, and Depth device), to measure properties of seawater such as salinity, temperature, and depth;
3) Secchi disk, to determine water clarity by measuring the depth at which the disk becomes invisible, indicating the abundance of phytoplankton;






Credit: Chiara G Bertulli


ROALD AMUNDSEN

FjordPhyto

FjordPhyto is a citizen science project that engages travellers in polar research by collecting phytoplankton and meltwater samples from Antarctic fjords. You participated by deploying a plankton net tow, gathering water samples, and using a filtration system to concentrate phytoplankton onto filters for later microscopic and DNA analysis. These contributions help scientists monitor how glacial melt influences the Antarctic marine ecosystem and phytoplankton communities.

During your voyage, samples were collecred for the FjordPhyto project from five locations: Red Rock Ridge, Horseshoe Island, Bongrain Point, and Deception Island.

Secchi Disk

The turbidity of the water, or water clarity, provides insight into the abundance of plankton and suspended particles. To measure this, you used the Secchi Disk by lowering it into the water until it was no longer visible. The measured depth, known as the Secchi Depth, is an important indicator of water transparency and can be submitted to the Secchi Disk Citizen Science Project, contributing to a global dataset used by researchers to monitor environmental changes in aquatic ecosystems.

During the expedition, the Secchi Disk was deployed. On days with strong currents, measurements were not possible due to unstable conditions.

Two types of Secchi Disks were used:
The white Secchi Disk for the Secchi Disk Citizen Science Project, which focuses on global water clarity trends. The black and white Secchi Disk for the FjordPhyto project, which helps assess phytoplankton concentrations in Antarctic fjords by complementing net tow and meltwater sampling efforts.

Credit: Chiara G Bertulli

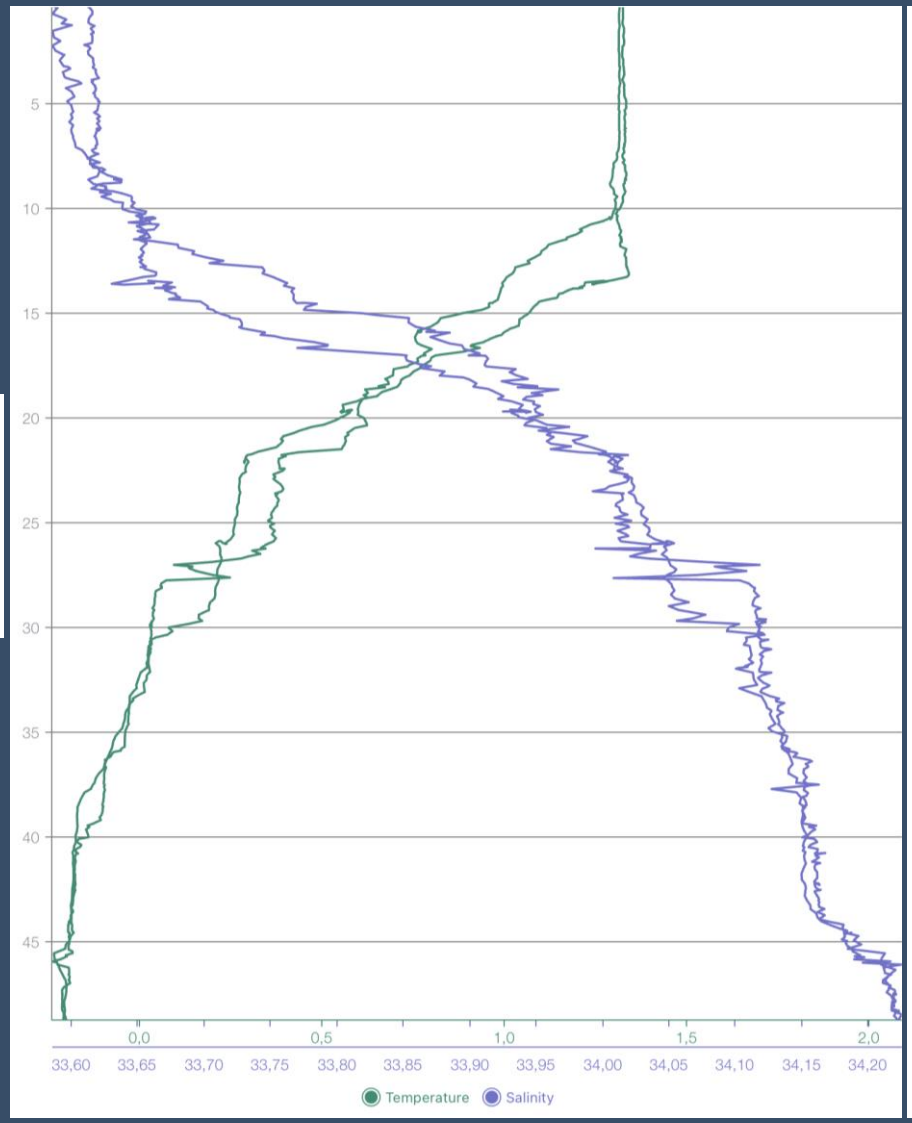
Credit: Chiara G Bertulli

CTD

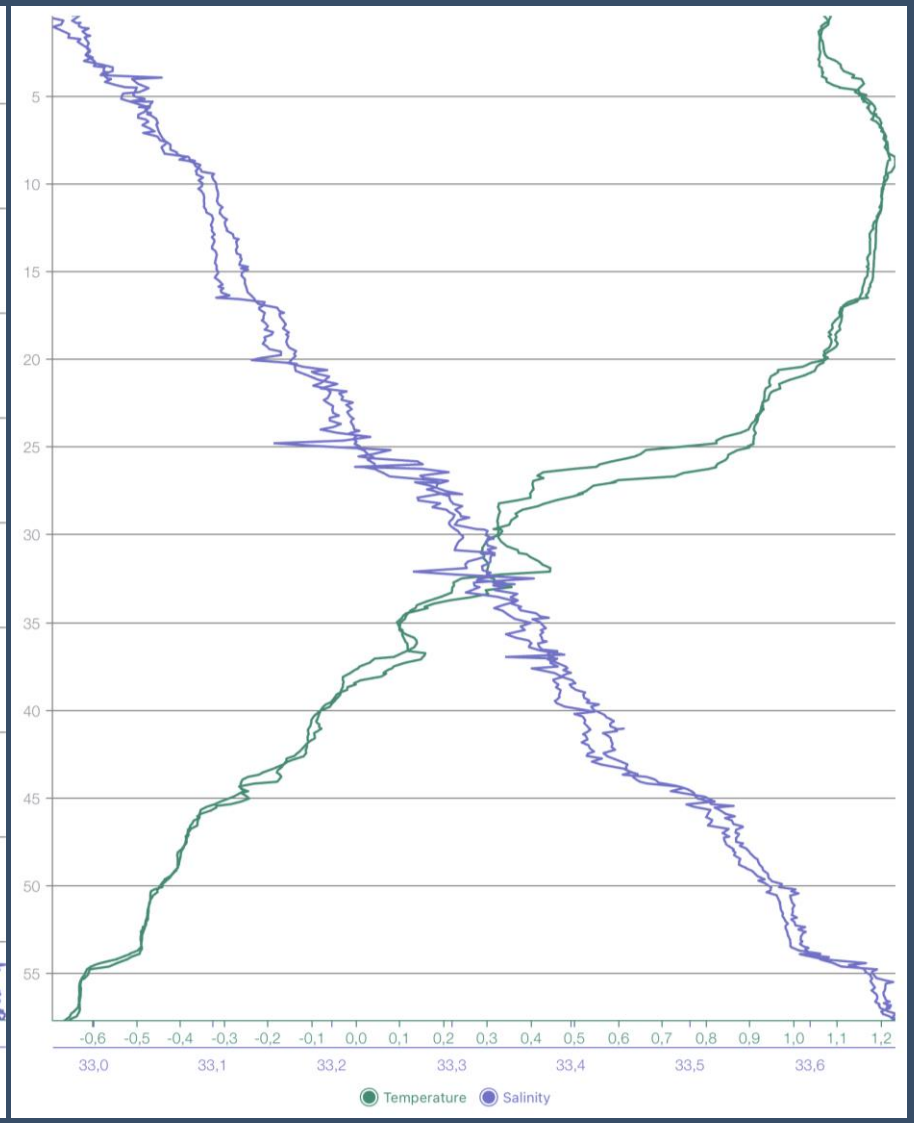
The CTD (Conductivity, Temperature, and Depth) device measures salinity, temperature, and depth, providing key data on ocean conditions. Lowered on a tethered line, it captures water column profiles, helping scientists study glacial melt influence, ocean mixing, and phytoplankton habitats.

These data contribute to long-term monitoring of Antarctic fjords and climate change impacts.

Depth Profile: Palaver Point



Depth Profile: Horseshoe Island



Temperature (°C)
Salinity (PSU)

Our CTD profiles from Palaver Point and Horseshoe Island confirm the above described normal pattern, showing a clear increase in salinity and a decrease in temperature with depth.

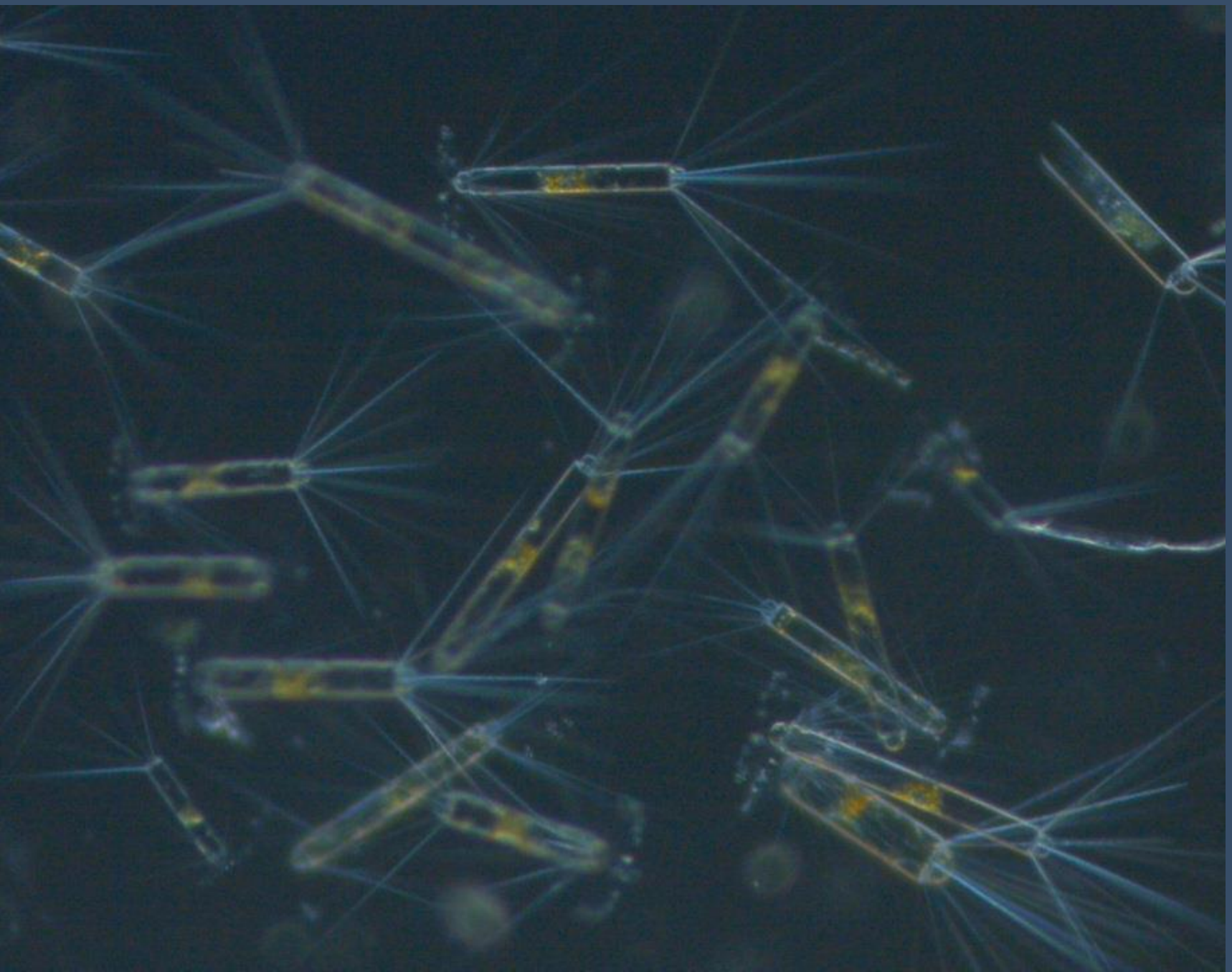
When looking at the scale bars we can see that these are relatively small changes, suggesting a well-mixed water column. This allows nutrients to be replenished to the surface waters for phytoplankton to use in photosynthesis.

Water Sampling

We collected water samples in 7 different locations: Hanusse Bay, Red Rock Ridge, Stonington Island, Horseshoe Island, Bongrain and Palaver Points and Deception Island.

All of the samples were taken from the science boat by either towing the phytoplankton net or the zooplankton net through the water fully submerged for 5-10 minutes.

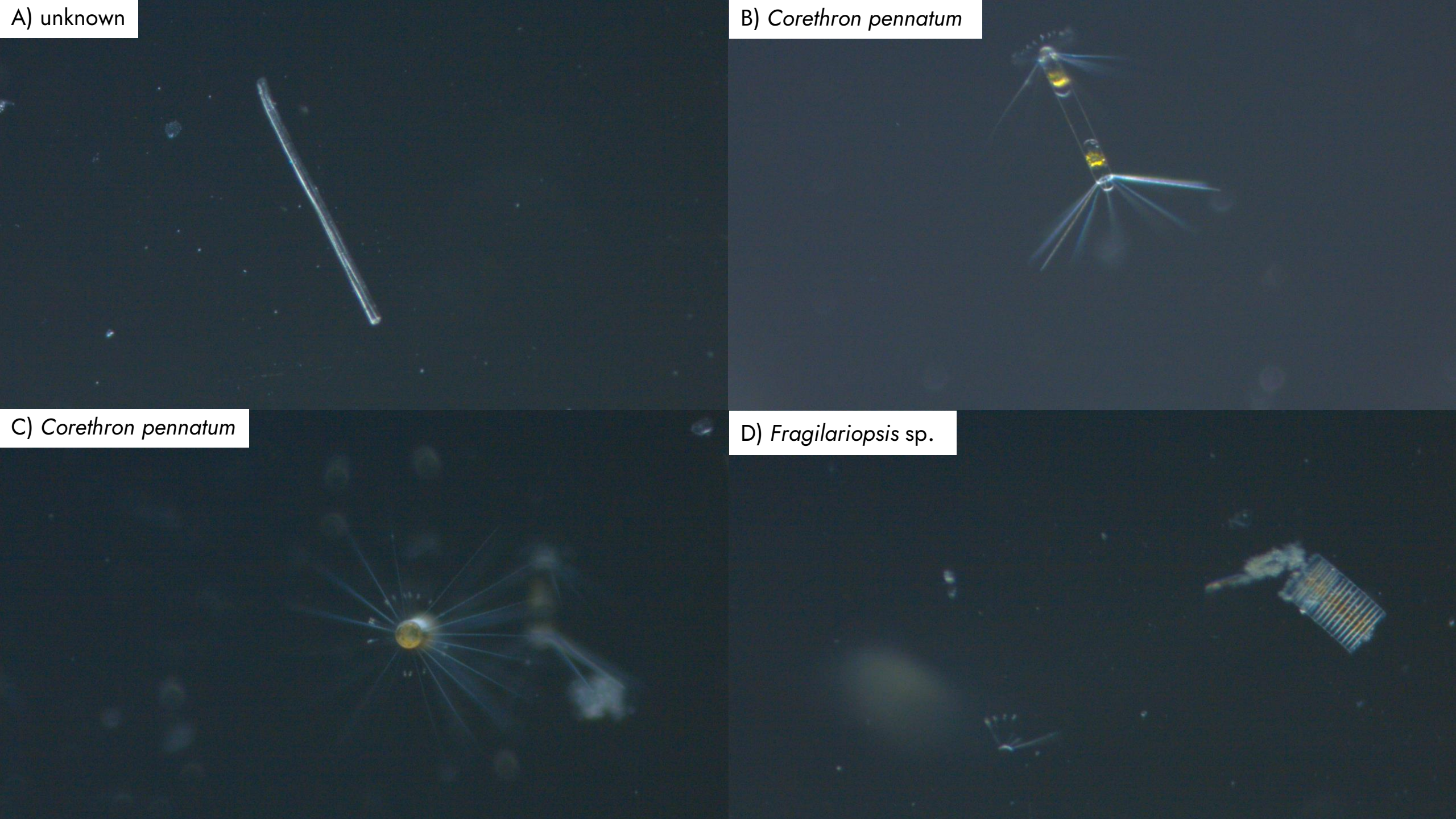
The phytoplankton net had a mesh size of 20µm, the zooplankton net of 200µm.



Plankton Samples

All of the water samples were investigated under the microscopes in the science centre in order to identify the different species of phytoplankton and zooplankton. The images from the big research microscope could be projected onto the screen so that everyone could see what was found in the drops of water. You could also use the smaller binocular microscopes to get hands-on experience and try to find the tiny organisms in the water samples.

Mainly diatoms (phytoplankton) were found in the samples.


A) unknown
B) *Corethron pennatum*
C) *Corethron pennatum*
D) *Fragilariopsis* sp.

Credit: Chiara G Bertulli

NASA Cloud Observer

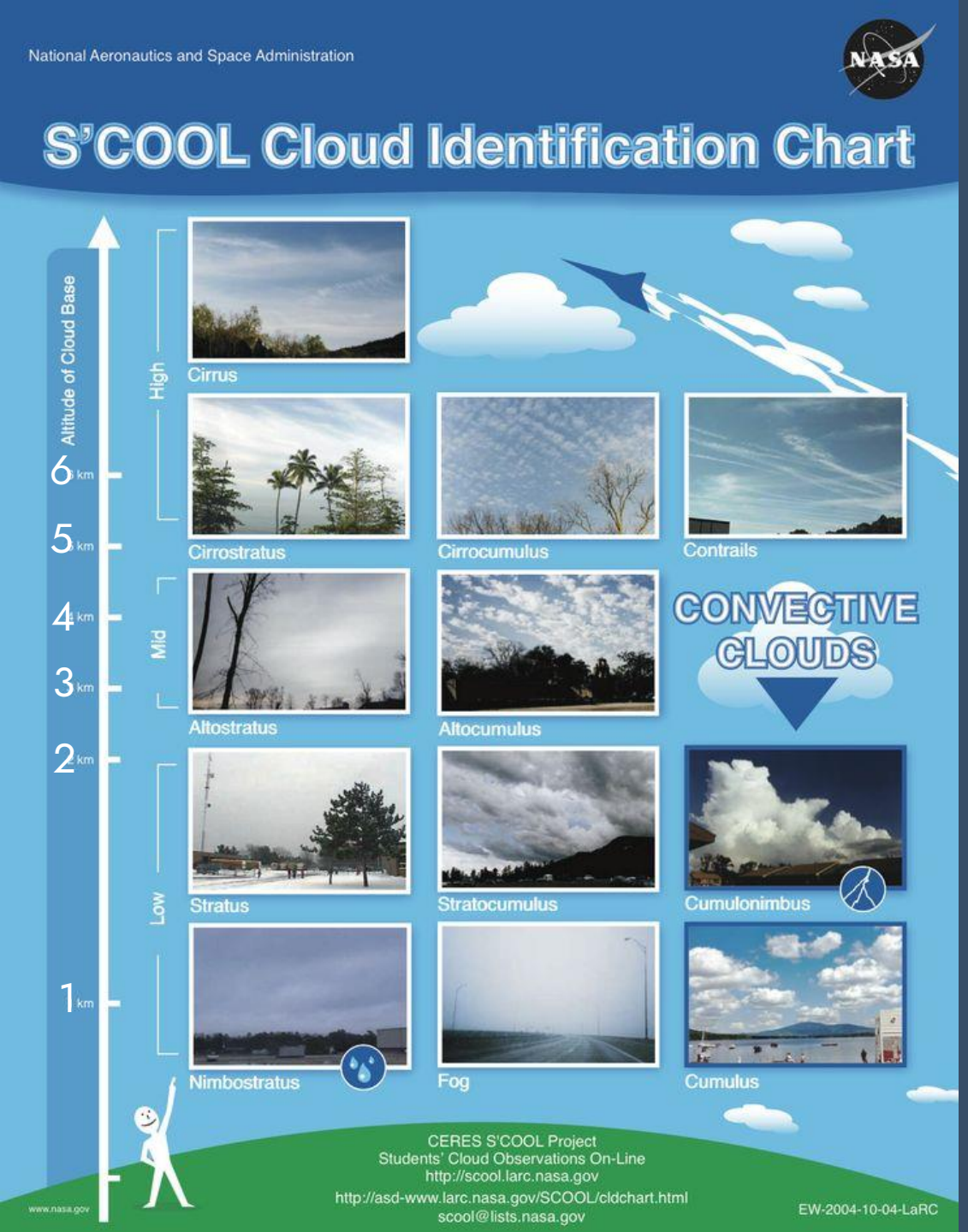
4 Globe Cloud Observations were collected on:

January 30th (At sea; Drake Passage)
February 4th (Pourquoi Pas island)
February 7th (Damoy Point)
February 11th (At sea; Drake Passage)

Your observations will help NASA improve the understanding of Earth's atmosphere and climate by providing valuable data for scientific research and climate modelling. By comparing ground-based data with satellite measurements, scientists can refine cloud classifications, enhance climate models, and improve weather predictions.

If you would like to continue cloud observations at home, you can download the app 'GLOBE Observer.'

View our data on the global map



NASA Cloud Observer

High Clouds (Base above 6,000 meters):

- **Cirrus**: Thin, wispy clouds composed of ice crystals. They often appear as delicate streaks or feathery wisps high in the sky.
- **Cirrostratus**: Thin, sheet-like clouds that cover large portions of the sky. They can create a halo around the sun or moon.
- **Cirrocumulus**: Small, fluffy clouds in a regular pattern, resembling fish scales or ripples.

Medium Clouds (Base between 2,000 and 6,000 meters):

- **Altocumulus**: Puffy, grayish-white clouds with rounded edges. They often form parallel rows or patches.
- **Altostratus**: Thick, grayish clouds that partially obscure the sun or moon. They lack the distinct features of cirrostratus.

Low Clouds (Base below 2,000 meters):

- **Stratus**: Uniform, grayish clouds that cover the sky like a blanket. They can bring drizzle or light rain.
- **Stratocumulus**: Low, lumpy clouds with defined edges. They often appear in rows or patches.
- **Nimbostratus**: Thick, dark gray clouds associated with steady rain or snow.

Remember that these cloud types can vary in appearance and behaviour, but this basic classification helps meteorologists understand weather patterns and atmospheric conditions. If you'd like to explore more examples, you can check out NASA's On-Line Cloud Chart.

View our data on the global map

GLOBE Cloud Observations Paired with NASA Satellite Data

Total Satellite Comparisons: 2

Useful Resources: How to Read My NASA GLOBE Clouds Satellite Comparison Table, How to Compare My Cloud Observations with Satellite Data, Cloud Cover, Cloud Type, Cloud Opacity, Satellites

Observation	GLOBE	NOAA-20 Satellite
Universal Date/Time	2025-01-30 20:37:00	2025-01-30 20:26
Latitude	-62.96	-63.35 to -62.55
Longitude	-62.73	-63.18 to -62.38
Total Cloud Cover	Overcast (>90%)	Overcast 100.00%
High Clouds		Cover: Scattered 46.60% Altitude: 6.44 (km) Phase: Ice 238.91 (K) Opacity: Opaque
Mid Clouds		Cover: Broken 53.40% Altitude: 5.43 (km) Phase: Ice/Water Mix 246.44 (K) Opacity: Opaque
Low Clouds	 Stratus Cover: Overcast (>90%) Opacity: Opaque	
GLOBE Cloud Photos and Corresponding NASA Satellite Images. **Click image to view --->** ***Note: Photos submitted though GLOBE need approval before being displayed, this may take a few days.***	**GLOBE Photos** North East South  West Up Down 	***VIIRS NOAA-20*** Worldview  Worldview Tutorial
Sky Conditions, Surface Conditions and Observer Comments	**Sky Conditions** Sky Visibility : no report Sky Color : no report **Surface Conditions** Snow/Ice : No Standing Water : Yes Muddy : No Dry Ground : No Leaves on Trees : No Raining or Snowing : No	Are there any comments you would like to add? Be sure to add the name of the satellite for our record. Submit Comment

NASA Cloud Report

The NASA GLOBE Cloud Satellite Match reports provide an overview of the citizen scientist's observation (blue) compared with the satellites' observations (white).

Remember that your data (blue column) is looking up from Earth's surface, while the satellites (white columns)vare looking down from space.

This data is then used by NASA to fill gaps in the satellite observations, verify their own data and to improve forecasting the weather.

View our data on the global map

Snow algae

The Snow Algae Project investigates microbial communities living in melting snow, particularly in polar regions. These algae, primarily *Chlamydomonas* species, thrive in nutrient-rich, seasonal meltwater, giving the snow a red, green, or orange hue.

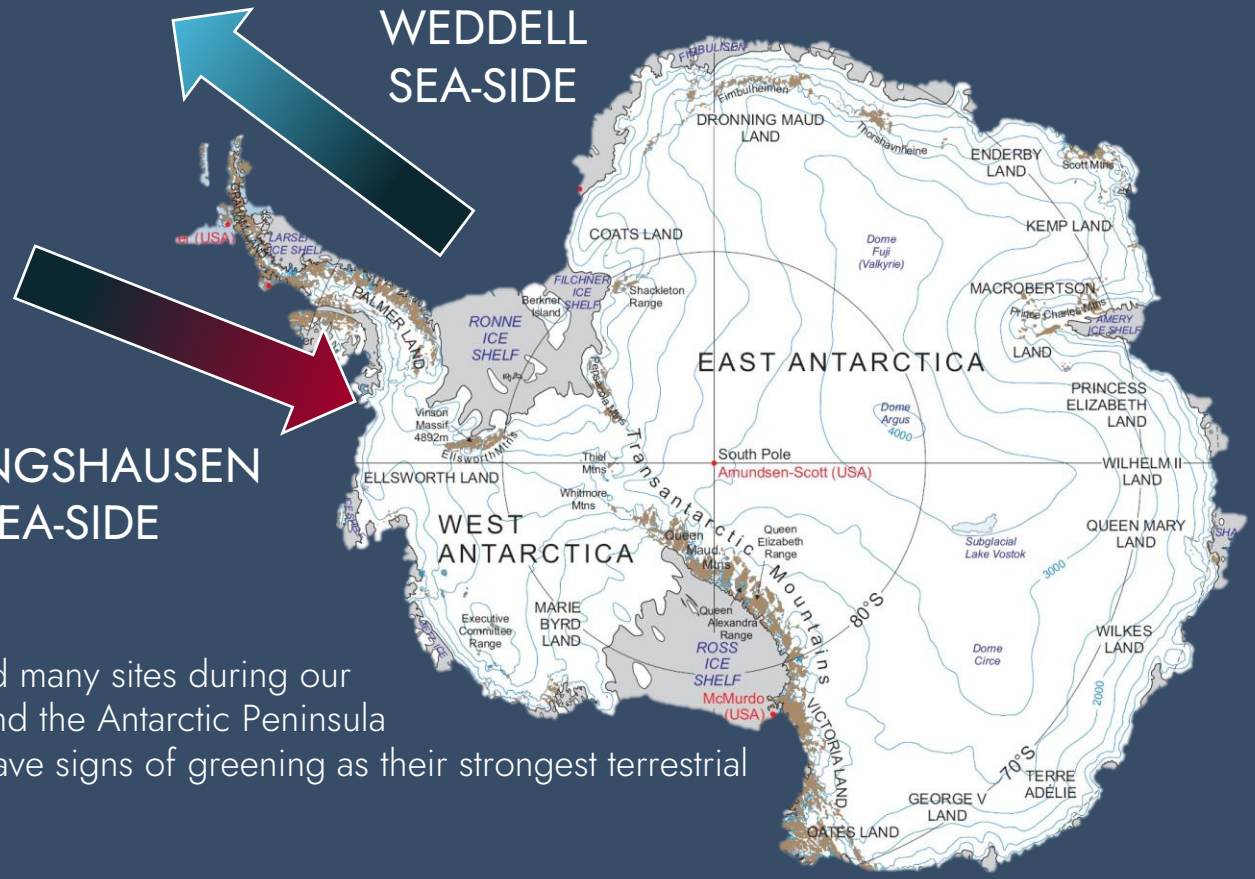
The project aims to understand their ecological role, contribution to biogeochemical cycles, and impact on surface albedo (how they affect snow melt and climate feedback).

By studying snow algae, researchers gain insights into microbial life in extreme environments, their adaptation strategies, and potential implications for climate change as these blooms may accelerate ice and snow melt. The project combines field sampling with laboratory analysis to assess species composition, metabolic activity, and environmental drivers influencing their distribution.

Greening of the Peninsula:

Snow Algae, Rock Lichen and Mosses.

Locations of greening seen:
A – Palaver View Point
B – Stonington Island
C – Horse Shoe Bay
D – Palaver Two Hummock



We observed many sites during our voyage around the Antarctic Peninsula that clearly have signs of greening as their strongest terrestrial feature.

In recent studies of climatological data from eight local research stations along the peninsula, it was found that a southerly wind regime in the eastern side by the Weddell Sea keeps a relatively colder and drier air defining the typical continental climate.

Conversely, a north-northwesterly flow over the western side of the peninsula by the Bellingshausen Sea has relatively warmer and moister air, defining a sub-polar climate.

Due to this sub-polar climate and plenty of penguin nutrients (guano), pioneer species are finding it easier to establish themselves along the western coast.

iNaturalist

Many of you have also contributed to this onboard voyage project by capturing and submitting images of the wildlife and plant life encountered during our journey.

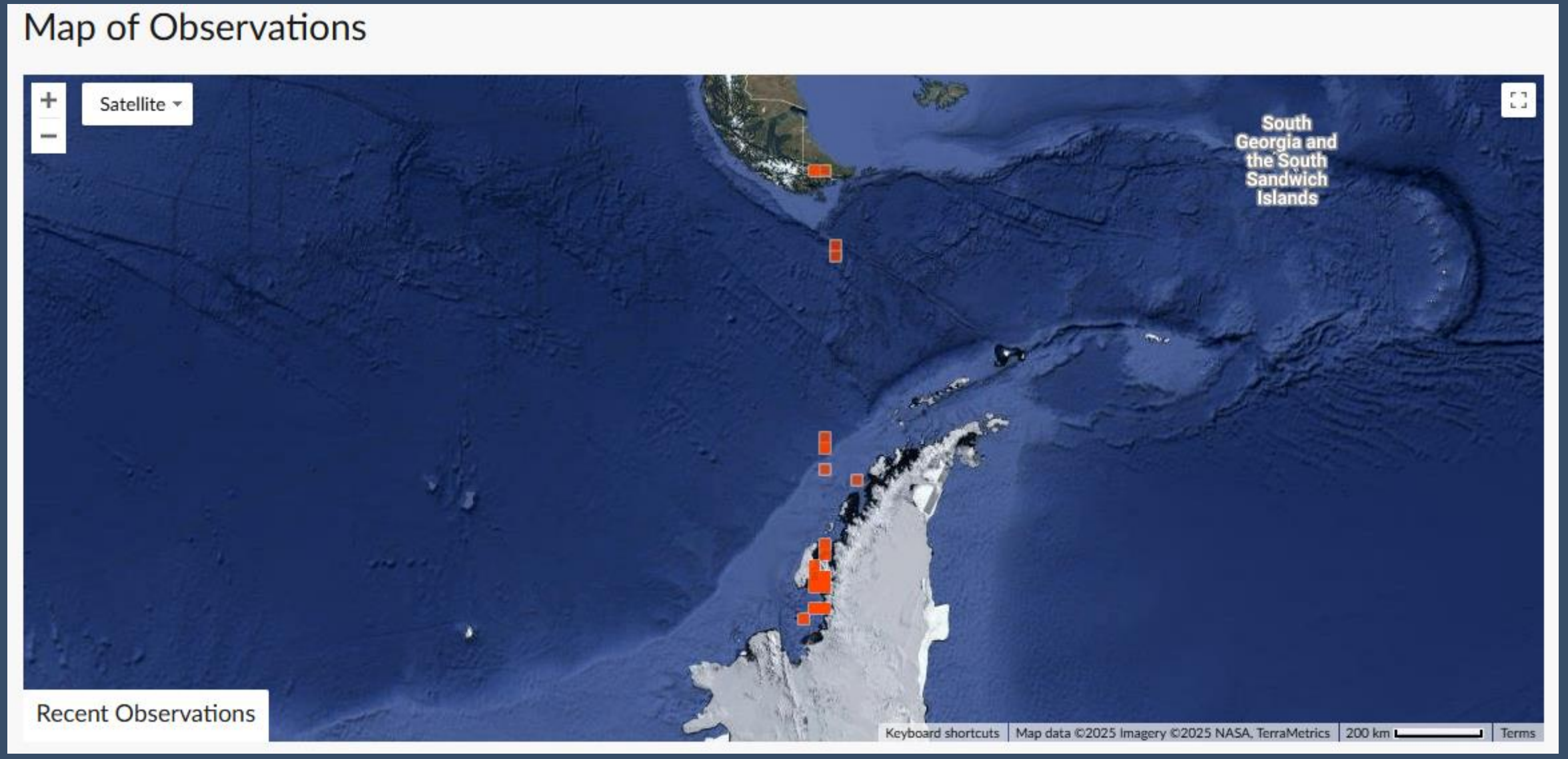
This citizen science initiative helps researchers around the world track biodiversity, monitor species distribution, and better understand ecosystems in remote regions like the one we are exploring together.“

Biodiversity data collected and people involved in it included:
410 Observations
61 Species
80 Identifiers
32 Observers

View our data using this QR code:

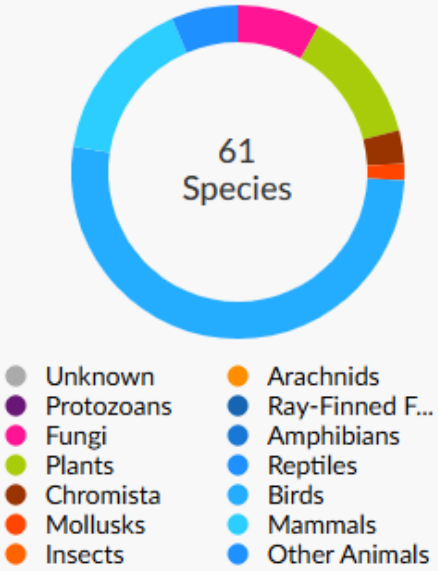
Credit: Adres de Miguel

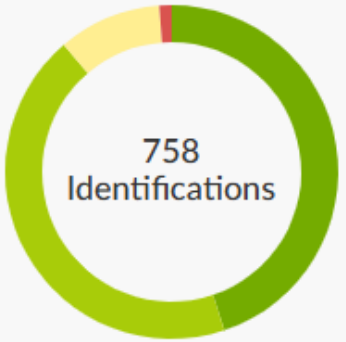
AMANT2502 – MS Roald Amundsen 28.1.-13.2.2025

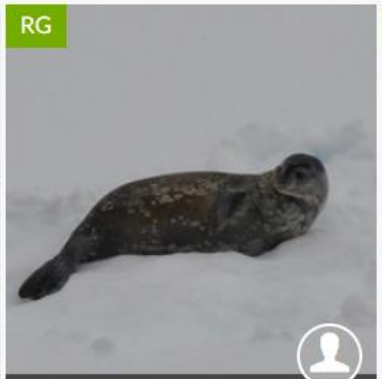


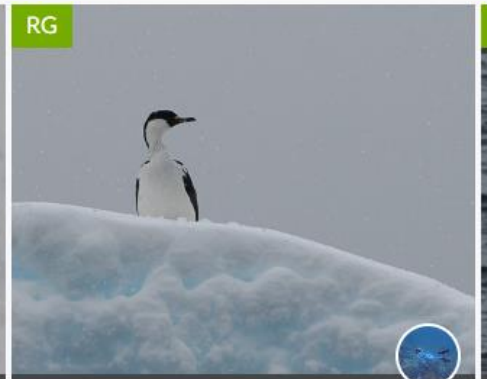
AMANT2502 – MS Roald Amundsen 28.1.-13.2.2025

Stats









Credit: Ted Gatlin/HX

eBird

eBird is an online platform and citizen science project allowing birdwatchers and ornithologists to record, share, and explore bird sightings from around the world.

The onboard ornithologists surveyed the birdlife during 15 wildlife watches, completed 25 checklists and recorded 29 species.

View our data using this QR code:

eBird

Submit Explore My eBird Science About News Help

My Trip Reports

Previous

Antarctic Circle on the Amundsen, Jan 28 - Feb 13, 2025

28 Jan – 13 Feb 2025 (17 days)

Link-only

Antarctica | Chile Subregions

M/S Roald Amundsen Science Center, Andrés de Miguel, Lancy Cheng

Share Edit

Happywhale

Six species of whales were encountered during this voyage, along with dolphins. A total of 22 encounters of humpback whale flukes have been uploaded. One particularly exciting discovery was a previously unidentified whale (pictured right), which has now been confirmed as a new addition to the Happywhale catalogue.

This finding is a valuable contribution to science, helping to enhance our understanding of whale populations on a global scale.

Guests from this trip are also encouraged to submit their own photos of individual whales to Happywhale, contributing to their worldwide catalogue of identified whales.

View the MS Roald Amundsen's submissions to Happywhale during our voyage:

https://happywhale.com/user/11890;svy=120596

Happywhale ID: HW-MN1307165

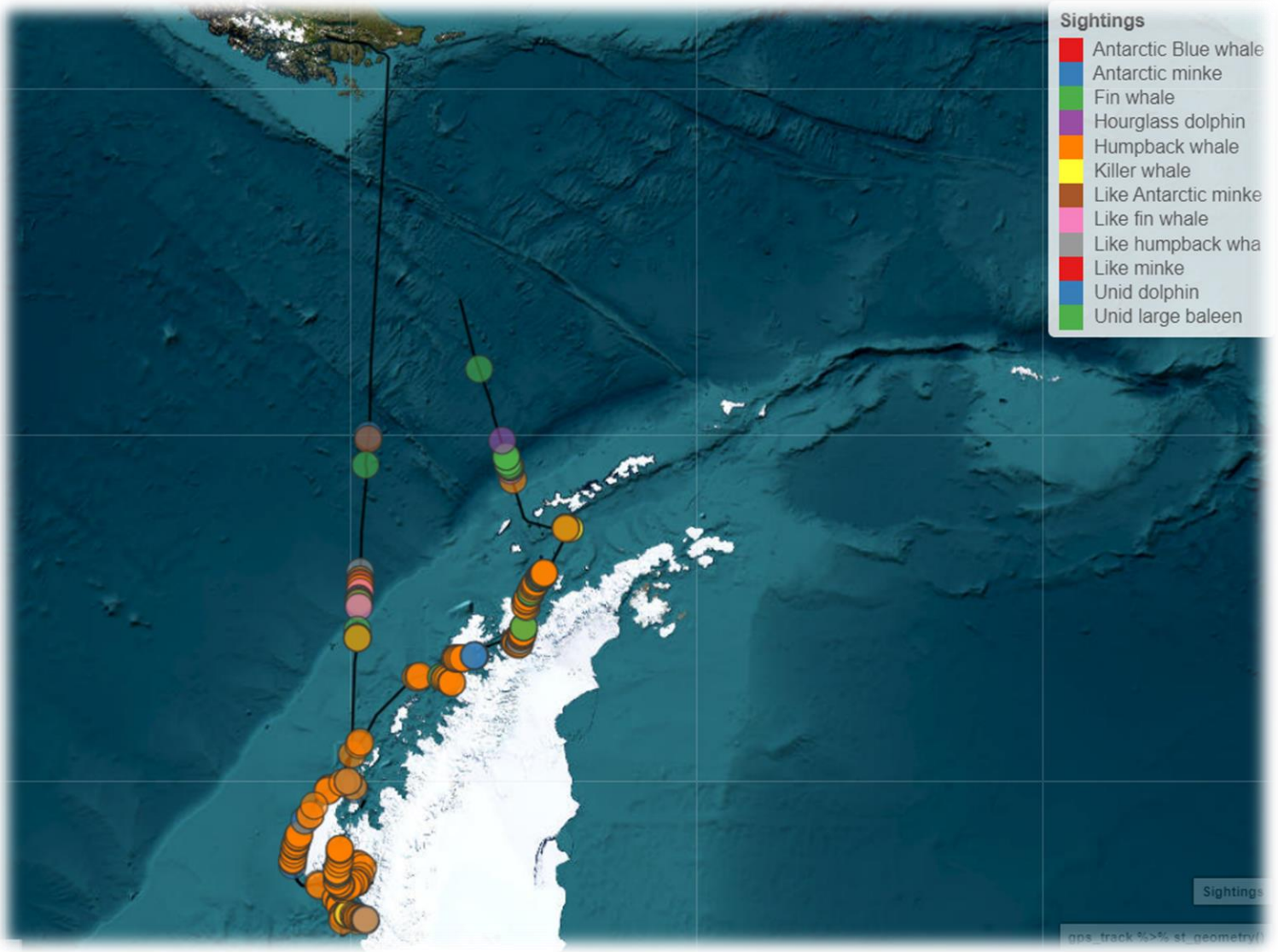
Credit: Matthew Gledhill/HX

Guest Scientists

Trip summary

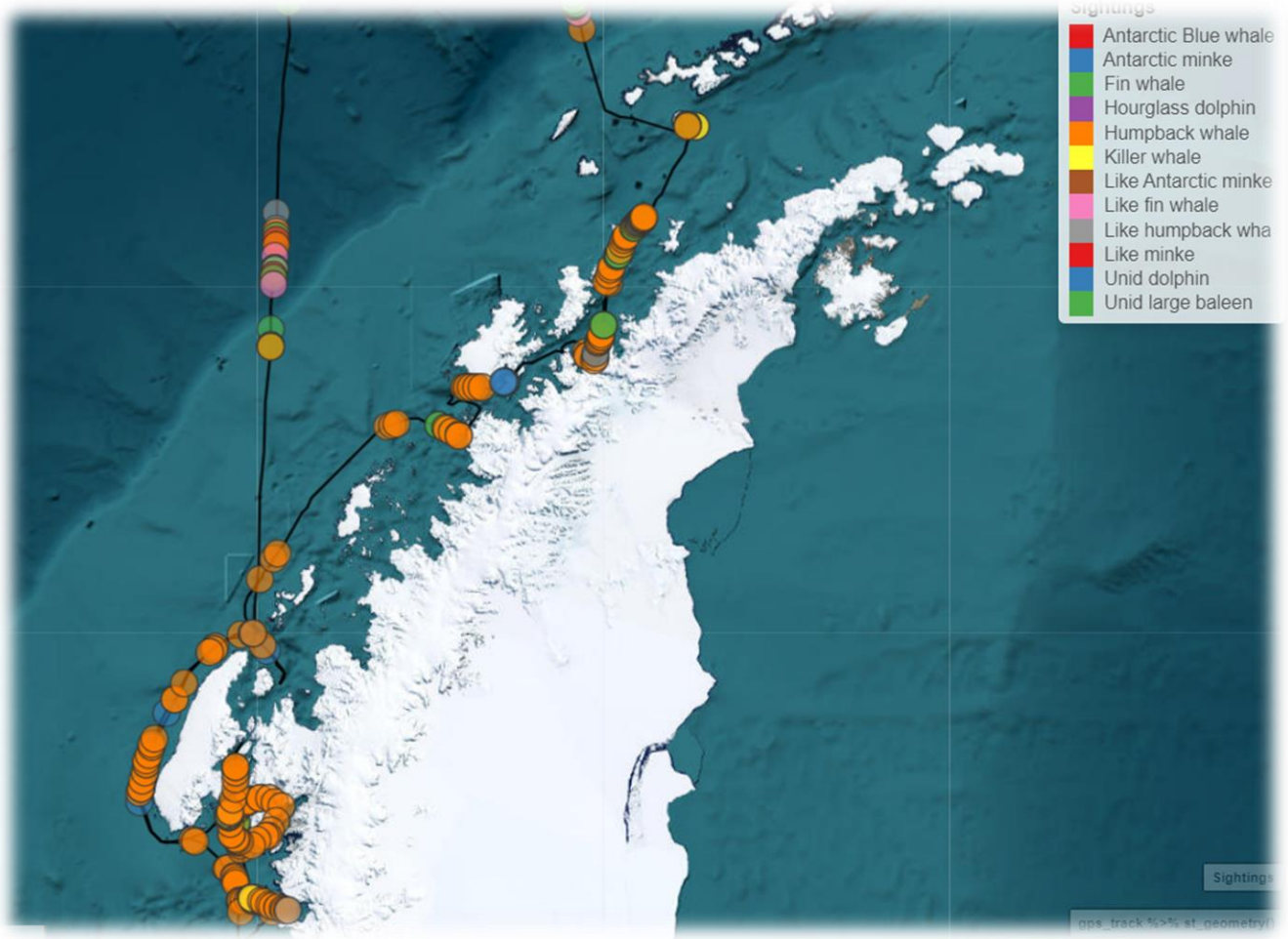
Observations

Common Name	# Sightings	# Animals
Blue Whale	1	1
Hourglass dolphin	1	6
Humpback whale	**146**	**334**
Killer whale	3	46
Antarctic minke	10	19
Fin whale	7	25
Like fin whale	4	9
Like humpback w	9	19
Like minke	2	2
Unid dolphin	1	2
Unid large baleen	25	41
TOTAL	**209**	**504**



Observations

- Effort: Line Transect 33 hours
  Visual Searching 56 hours
- Majority of sightings near Antarctic Continental Shelf.
- The Antarctic Peninsula is a biologically rich area, large stocks of krill.
- Antarctic krill, primary prey for many baleen whales.



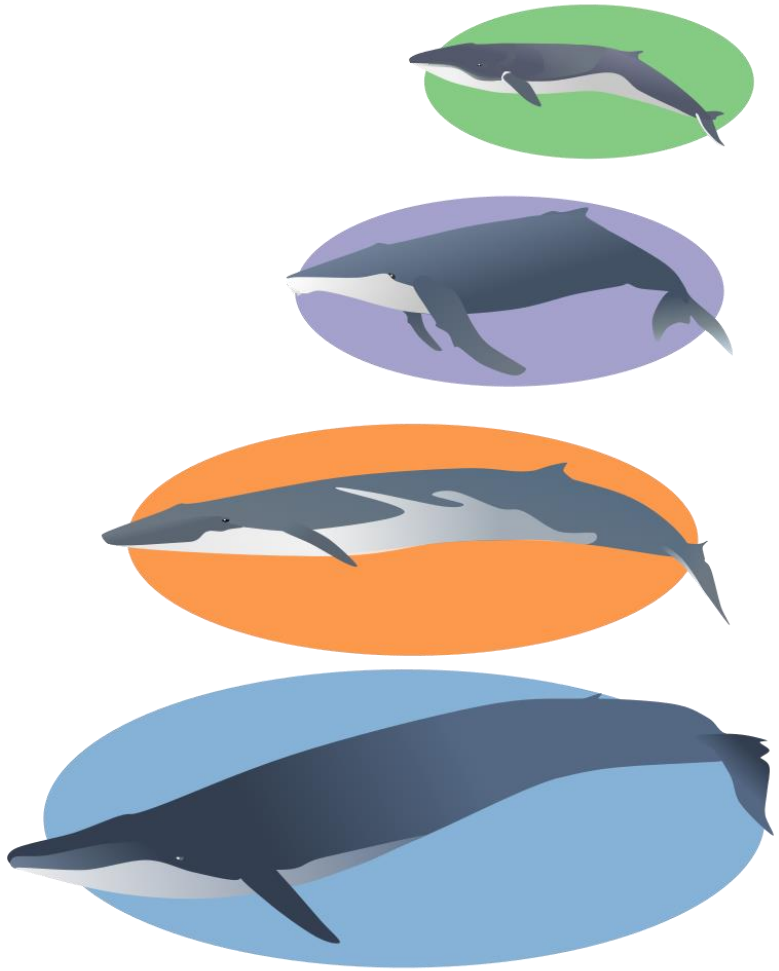
What next?

Data passed to CCAMLR

- The observations made on this trip will be added to a database.
- Shared with krill fishery managers & Convention for the Conservation of Antarctic Living Resources .

Results published in a PhD

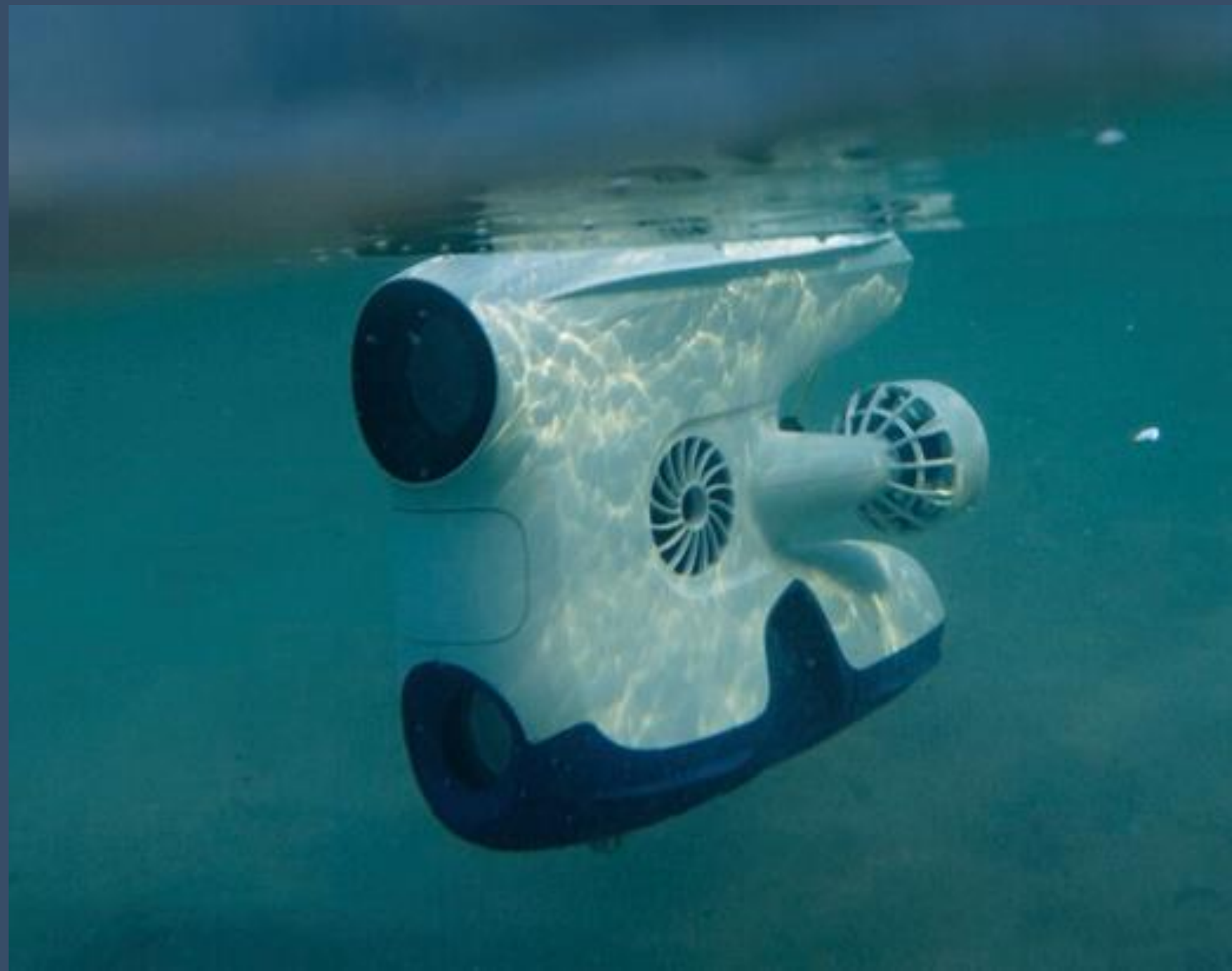
- This data was collected as a part of lead researcher Angus Hendersen's PhD framework.



Underwater Drone

The underwater drone was deployed by the „Exploring the Unseen“ team during this voyage.

View the highlights from our underwater drone footage on HX Underwater Drone Footage YouTube Channel



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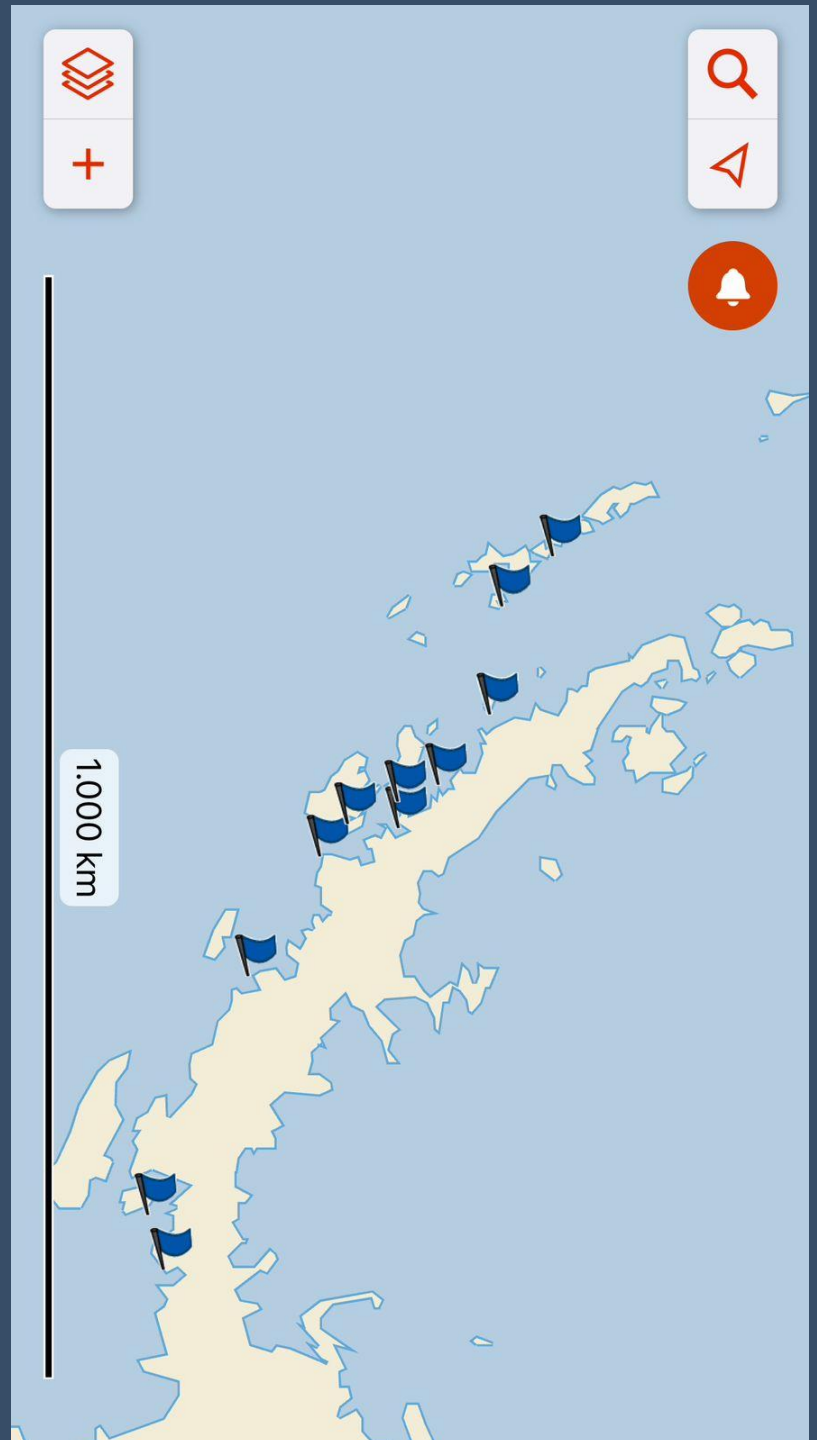
HX Foundation

HURTIGRUTEN EXPEDITIONS



SUMMARY

- Antarctic Circle Expeditions (Jan 28th – Feb 13th 2025)
- 8 sites explored
- Deception Island (62°S) – Stonington (68°S)
- 8 ROV deployments
- ~40 min/deployment. ~320 min / ~ 5,3 h footage

Wildlife List - Birds

Wildlife List – Birds

Scientific Name	English	Deutsch	Francais	Chinese
Stercorarius antarcticus	**Brown Skua**	Subantarktikskua	Labbe antarctique	棕贼鸥
Stercorarius maccormicki	**South Polar Skua**	Antarktikskua	Labbe de McCormick	麦氏贼鸥
Larus dominicanus	**Kelp Gull**	Dominikanermöwe	Goéland dominicain	黑背鸥
Sterna vittata	**Antarctic Tern**	Antarktikseeschwalbe	Sterne couronnée	南极燕鸥
Pygoscelis adeliae	**Adelie Penguin**	Adeliepinguin	Manchot d'Adélie	阿德利企鹅
Pygoscelis papua	**Gentoo Penguin**	Eselspinguin	Manchot papou	白眉企鹅
Pygoscelis antarcticus	**Chinstrap Penguin**	Kehlstreifpinguin	Manchot à jugulaire	纹颊企鹅
Eudyptes filholi	**Southern Rockhopper Penguin**	Felsenpinguin	Gorfou de Filhol	跳岩企鹅
Diomedea exulans	**Snowy Albatross**	Wanderalbatros	Albatros hurleur	漂泊信天翁
Diomedea epomophora	**Southern Royal Albatross**	Südkönigsalbatros	Albatros royal	皇信天翁
Phoebetria palpebrata	**Light-mantled Albatross**	Graumantelalbatros	Albatros fuligineux	灰背信天翁
Thalassarche chrysostoma	**Grey-headed Albatross**	Graukopfalbatros	Albatros à tête grise	灰头信天翁
Thalassarche melanophris	**Black-browed Albatross**	Schwarzbrauenalbatros	Albatros à sourcils noirs	黑眉信天翁
Oceanites oceanicus	**Wilson's Storm Petrel**	Buntfuß-Sturmschwalbe	Océanite de Wilson	烟黑叉尾海燕
Fregetta tropica	**Black-bellied Storm Petrel**	Schwarzbauch-Sturmschwalbe	Océanite à ventre noir	黑腹舰海燕
Macronectes giganteus	**Southern Giant Petrel**	Riesensturmvogel	Pétrel géant	巨鹱
Fulmarus glacialoides	**Southern Fulmar**	Silbersturmvogel	Fulmar argenté	银灰暴风鹱
Thalassoica antarctica	**Antarctic Petrel**	Antarktiksturmvogel	Pétrel antarctique	南极鹱

Wildlife List – Birds

Scientific Name	English	Deutsch	Francais	Chinese
Daption capense	**Cape Petrel**	Kapsturmvogel	Damier du Cap	花斑鞲
Pagodroma nivea	**Snow Petrel**	Schneesturmvogel	Pétrel des neiges	雪鞲
Pterodroma mollis	**Soft-plumaged Petrel**	Weichfeder-Sturmvogel	Pétrel soyeux	柔羽圆尾鞲
Halobaena caerulea	**Blue Petrel**	Blausturmvogel	Prion bleu	蓝鞲
Pachyptila desolata	**Antarctic Prion**	Taubensturmvogel	Prion de la Désolation	鸽锯鞲
Procellaria aequinoctialis	**White-chinned Petrel**	Weißkinn-Sturmvogel	Puffin à menton blanc	白颏风鞲
Ardenna grisea	**Sooty Shearwater**	Dunkler Sturmtaucher	Puffin fuligineux	灰鞲
Leucocarbo bransfieldensis	**Antarctic Shag**	Antarktikscharbe	Cormoran antarctique	南极鸬鹚
Chionis albus	**Snowy Sheathbill**	Weißgesicht-Scheidenschnabel	Chionis blanc	白鞘嘴鸥
Stercorarius chilensis	Chilean Skua	Chileskua	Labbe du Chili	智利贼鸥
Sterna hirundinacea	South American Tern	Falklandseeschwalbe	Sterne hirundinacée	南美燕鸥
Leucocarbo atriceps	Imperial Shag	Blauaugenscharbe	Cormoran impérial	蓝眼鸬鹚

Snow petrel (*Pagodroma nivea*)

Credit: Ted Gatlin/HX

Bue-eyed shag (*Leucocarbo bransfieldensis*)

Credit: Ted Gatlin/HX

Wildlife List - Marine Mammals

Wildlife List – Marine Mammals

SCIENTIFIC NAME	***ENGLISH***	*DEUTSCH*	*FRANÇAIS*	*Chinese*
Balaenoptera musculus	**Blue Whale**	Blauwal	Rorqual bleu, baleine bleue	蓝鲸
Balaenoptera bonaerensis	**Antarctic minke whale**	Südlicher Zwergwal	Rorqual à museau pointu de l'Antarctique	南极小须鲸
Balaenoptera physalus	**Fin whale**	Finnwal	Rorqual commun	长须鲸
Megaptera novaeangliae	**Humpback whale**	Buckelwal	Baleine à bosse	大翅鲸
Orcinus orca	**Killer whale, Orca**	Schwertwal, Orca	Orque	虎鲸
Lagenorhynchus cruciger	**Hourglass dolphin**	Stundenglasdelfin	Lagénorhynque sablier	沙漏斑纹海豚
Arctocephalus australis	**South American fur seal**	Südamerikanischer Seebär	Otarie à fourrure australe	南美毛皮海狮
Arctocephalus gazella	**Antarctic fur seal**	Antartischer Seebär	Otarie à fourrure antarctique	南极毛皮海狮
Leptonychotes weddellii	**Weddell seal**	Weddelrobbe	Phoque de Weddell	韦德尔氏海豹
Hydrurga leptonyx	**Leopard seal**	Seeleopard	Léopard de mer	豹海豹
Lobodon carcinophaga	**Crabeater seal**	Krabbenfresser	Phoque crabier	食蟹海豹

Crabeater seal (*Lobodon carcinophagus*)

Credit: Ted Gatlin/HX

Leopard seal (*Hydrurga leptonyx*)

Credit: Ted Gatlin/HX

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Photo: Oscar Farrera