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Science & Education Report

MS Roald Amundsen

12 January –
28 January
2025

Antarctic Circle Expedition



Guest Scientists

We were fortunate to be joined by two groups of Guest Scientists on this trip. Cait and Henning, sponsored by the World Wildlife Fund, used the MS Roald Amundsen as a platform of opportunity to collect krill and measure their spectral absorption levels. The data they collect will aid in efforts to measure swarms of krill on the surface of the Southern Ocean from satellites— 'Krill from Space!'

Heidi and Andy from the Norwegian Polar Institute also joined us in order to recover and redeploy three 'soundtraps'— passive acoustic monitoring devices— that were deployed by the MS Roald Amundsen last year. These devices recorded marine sounds over the past year, including whale vocalizations! The data collected will help scientists better understand what areas are being used by whales and if they overlap with vessel traffic and the krill fishery.

[Visit our Science & Education Hub](#)
to find out more about our scientific collaborations.





Science & Education Program

Our onboard naturalists guided our guests through our expedition. We used scientific tools to investigate the world around us and saw many interesting fauna, flora, and phenomena!

We used science to observe and explore the places we visited both off and on the ship. From isolating DNA from fruit to getting up close to different types of ice, guests participated in a activities and workshops that gave us a deeper understanding and appreciation for the natural world around us.

On the next pages you can find some highlights of our onboard Science and Education Program as well as our Citizen Science Program.

History

A history of the 'Heroic Age' of Antarctic exploration was brought to life by our Historians, who told us about the scientific efforts as well as harrowing survival stories that marked this period of Antarctic's History.

Jane Rumble, Head of the Polar Regions Department for the UK's Foreign and Commonwealth Office, was a special guest joining us on this expedition. While on board, she gave us an overview of the Antarctic Treaty and its implications for the future of the continent. She also gave us first-hand insight into the process for naming places in Antarctica and for management of Antarctic resources.

In addition to our onboard education, we were able to witness the tangible evidence of human history in Antarctica, including the American and British Bases on Stonington Island, and the remains of the whaling station in Whalers Bay.



Underwater Drone

We had the opportunity to deploy our underwater drone during our journey at the following sites:

- Red Rock Ridge
- Petermann Island
- Cuverville Island
- Whaler's Bay, Deception Island

We caught a glimpse of the Antarctic seafloor and its unique inhabitants, as well as a surprise visit from some curious Gentoo penguins!

View the highlights from our underwater drone footage on HX Underwater Drone Footage [YouTube Channel](#)





Science Boat

We investigated the underwater world during 14 Science Boat sessions exploring the following locations:

- Blind Bay
- Stonington Island
- Detaille Island
- Petermann Island
- Danco Island
- Whalers Bay, Deception Island

We observed and discussed the wildlife and geology in each location to better understand the area's ecology.

We deployed a plankton net to collect phytoplankton and zooplankton, used a CTD to create a physical profile of the water column, and took measurements of turbidity to submit to two Citizen Science projects: the Secchi Disk Project and FjordPhyto.

The data we collected supports research on long-term changes in the phytoplankton communities of the Antarctic Peninsula.

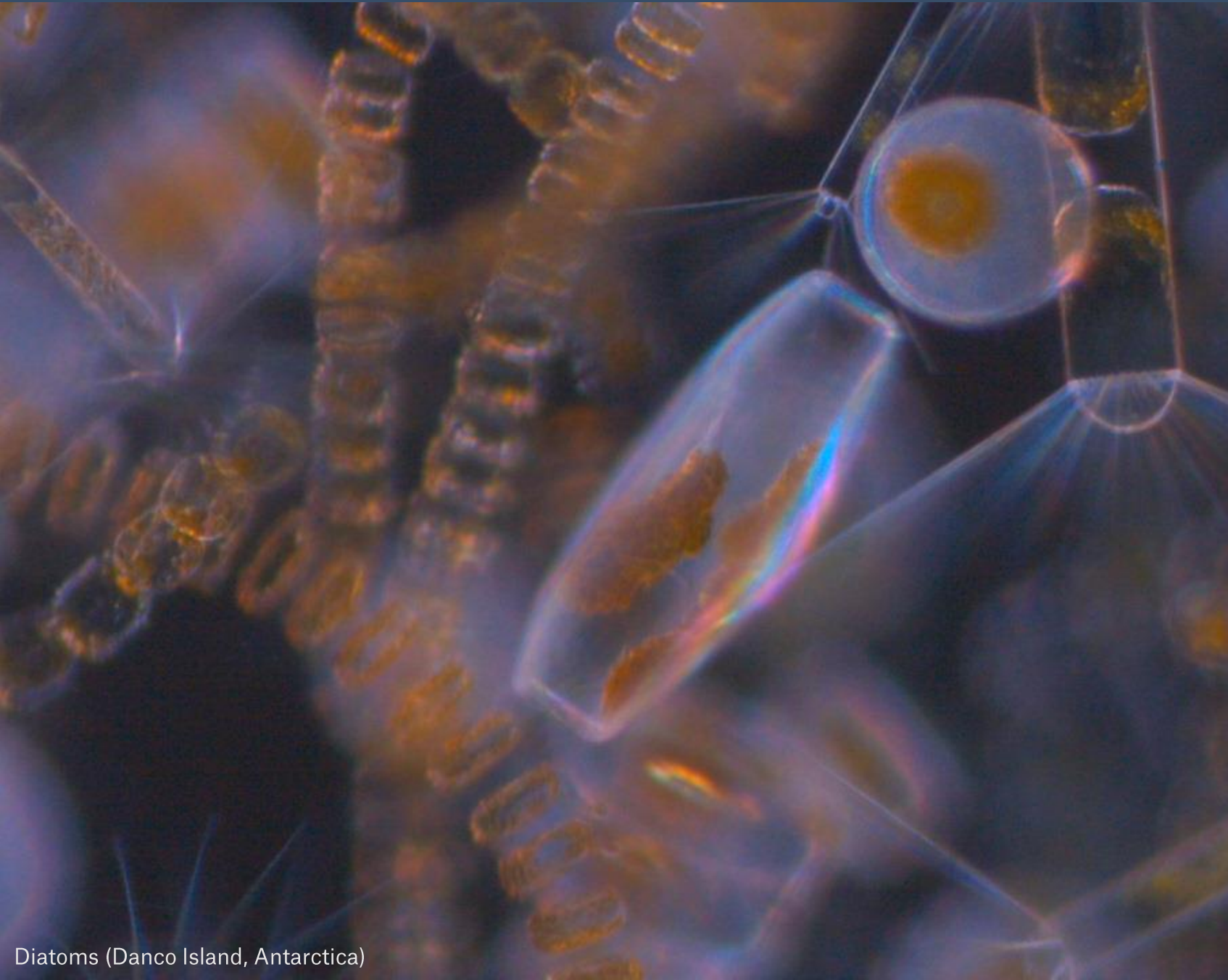
FjordPhyto & the Secchi Disk Project

FjordPhyto is a citizen science project that investigates the influence of melting Antarctic glaciers on plankton communities in the Southern Ocean. For this project we took seawater samples that will be analyzed for the presence of glacial meltwater, different species of phytoplankton, and the DNA of phytoplankton to understand their genetic response to climate change.

The Secchi Disk Project also investigates the presence of phytoplankton, not only in Antarctica, but throughout the world's oceans. You can make your own Secchi disk and continue this project at home!

Learn more about these projects at the [FjordPhyto website](#) and [Secchi Disk Project Website](#)



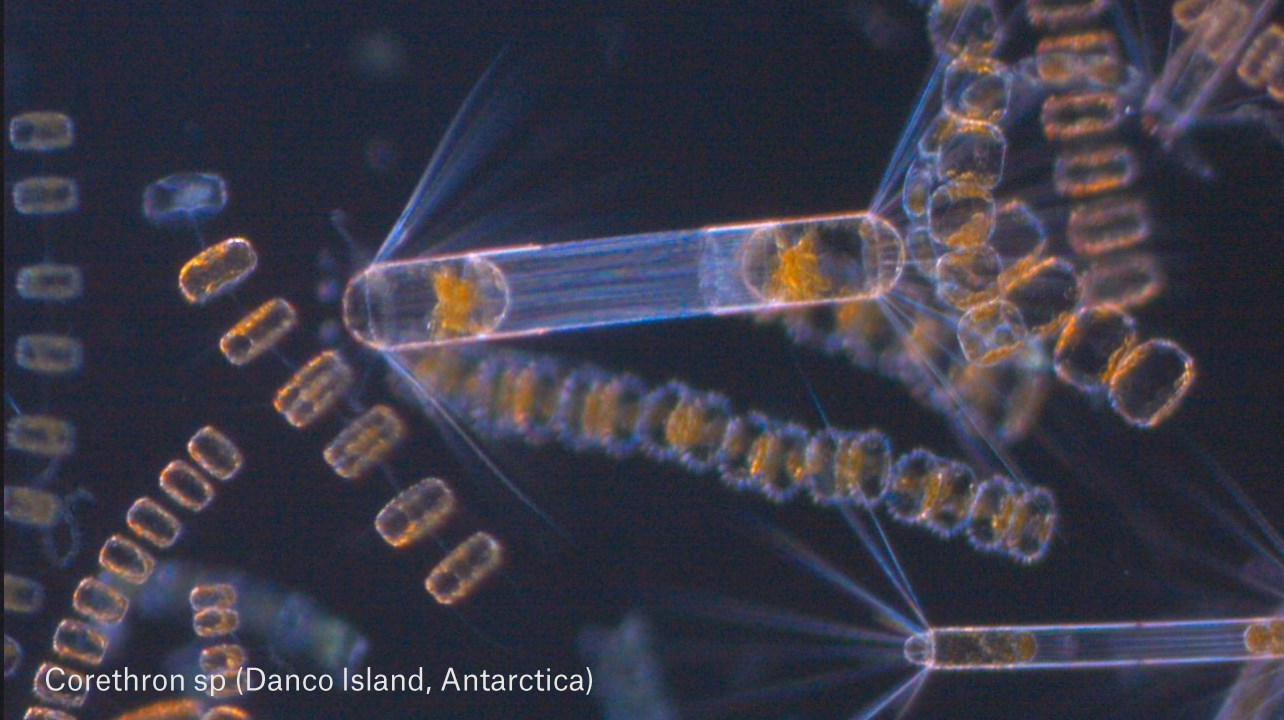


Plankton Samples

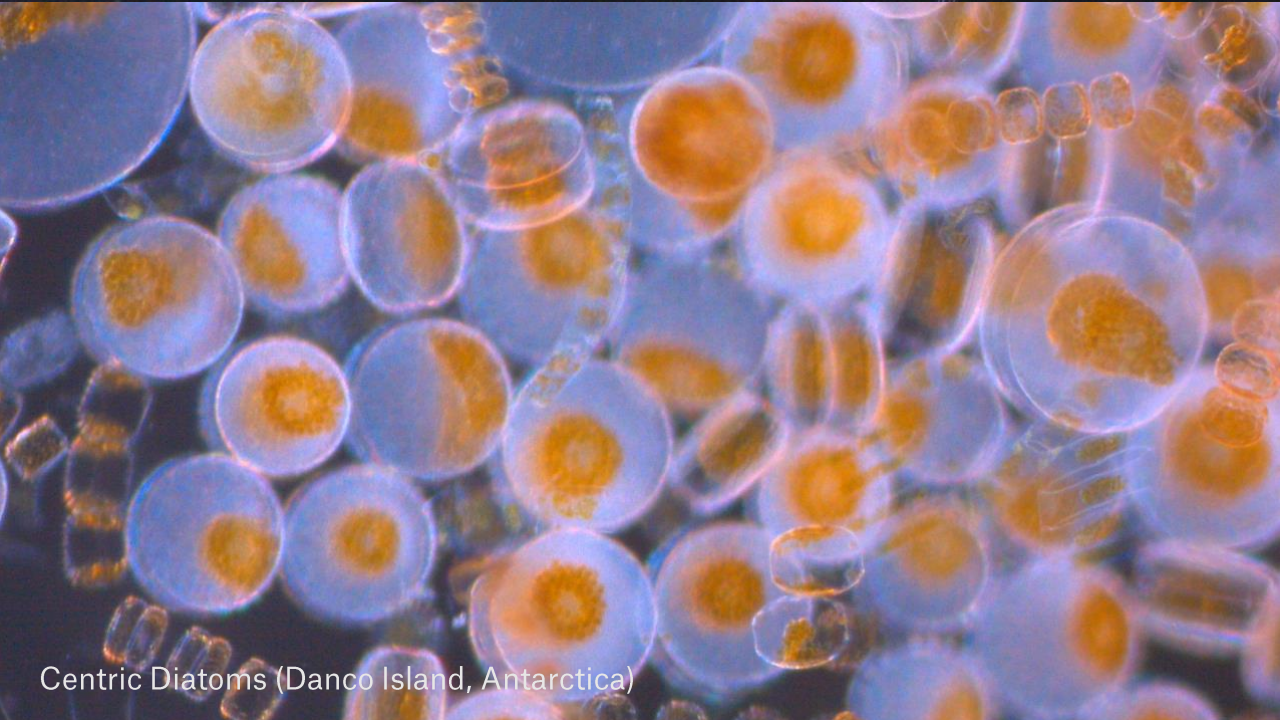
After we collected water samples on the Science Boat, we brought them back to the Science Center to look at their contents under the microscope. Here are some of the things we found!



Copepod (Cuverville, Antarctica)



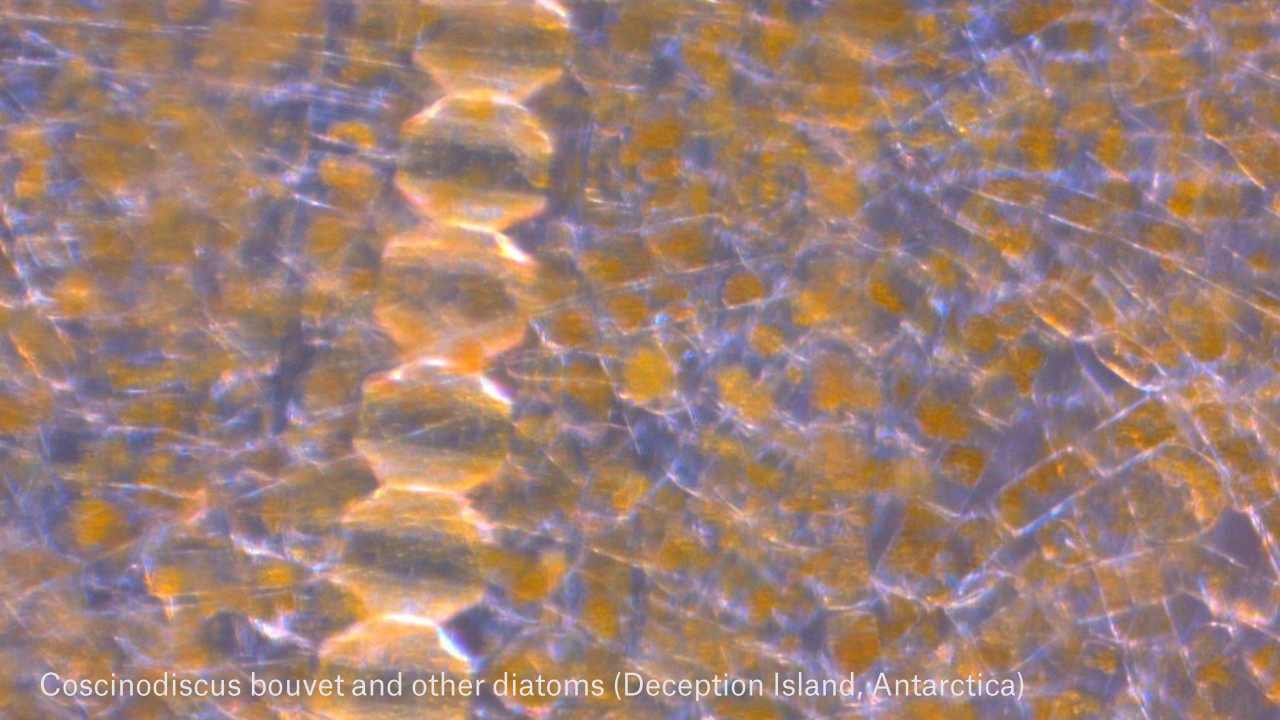
Corethron sp (Danco Island, Antarctica)



Centric Diatoms (Danco Island, Antarctica)



Amphipod sp. (Cuverville Island, Antarctica)



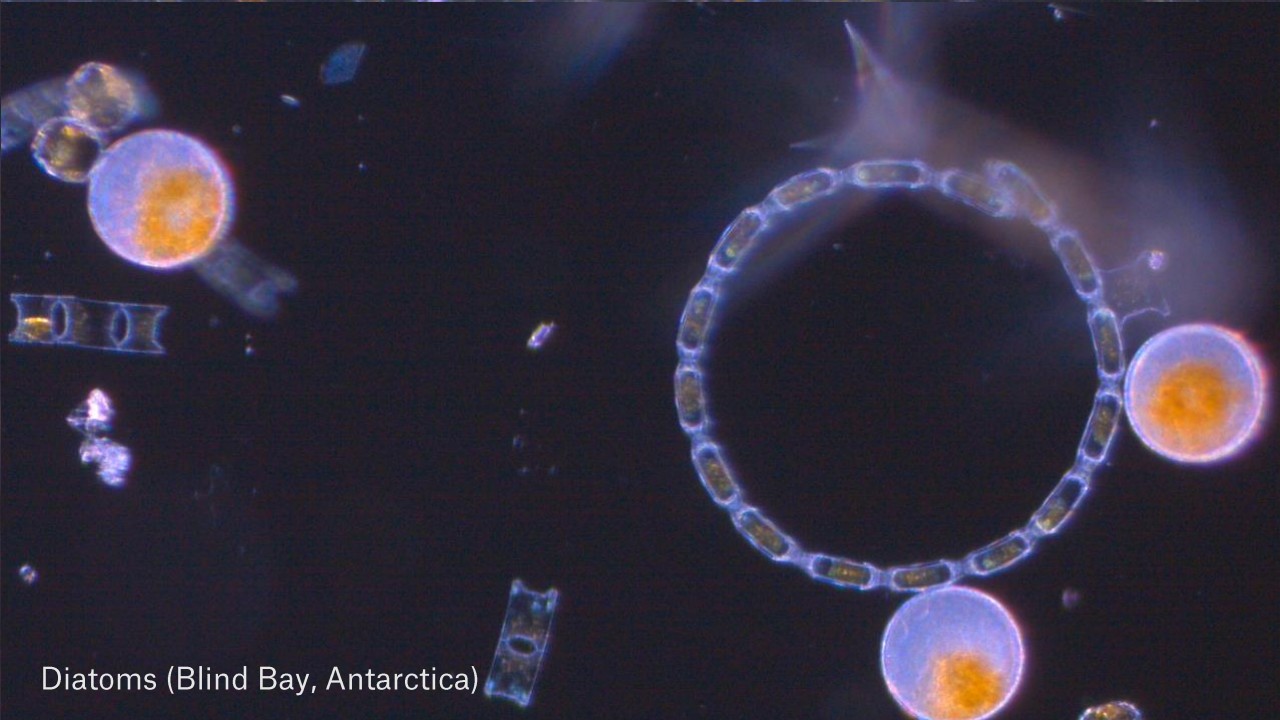
Coscinodiscus bouvet and other diatoms (Deception Island, Antarctica)



Crustacean naupeli larvae (Deception Island, Antarctica)



Hydroid (growing on soundtrap recovered from Bransfield Strait)



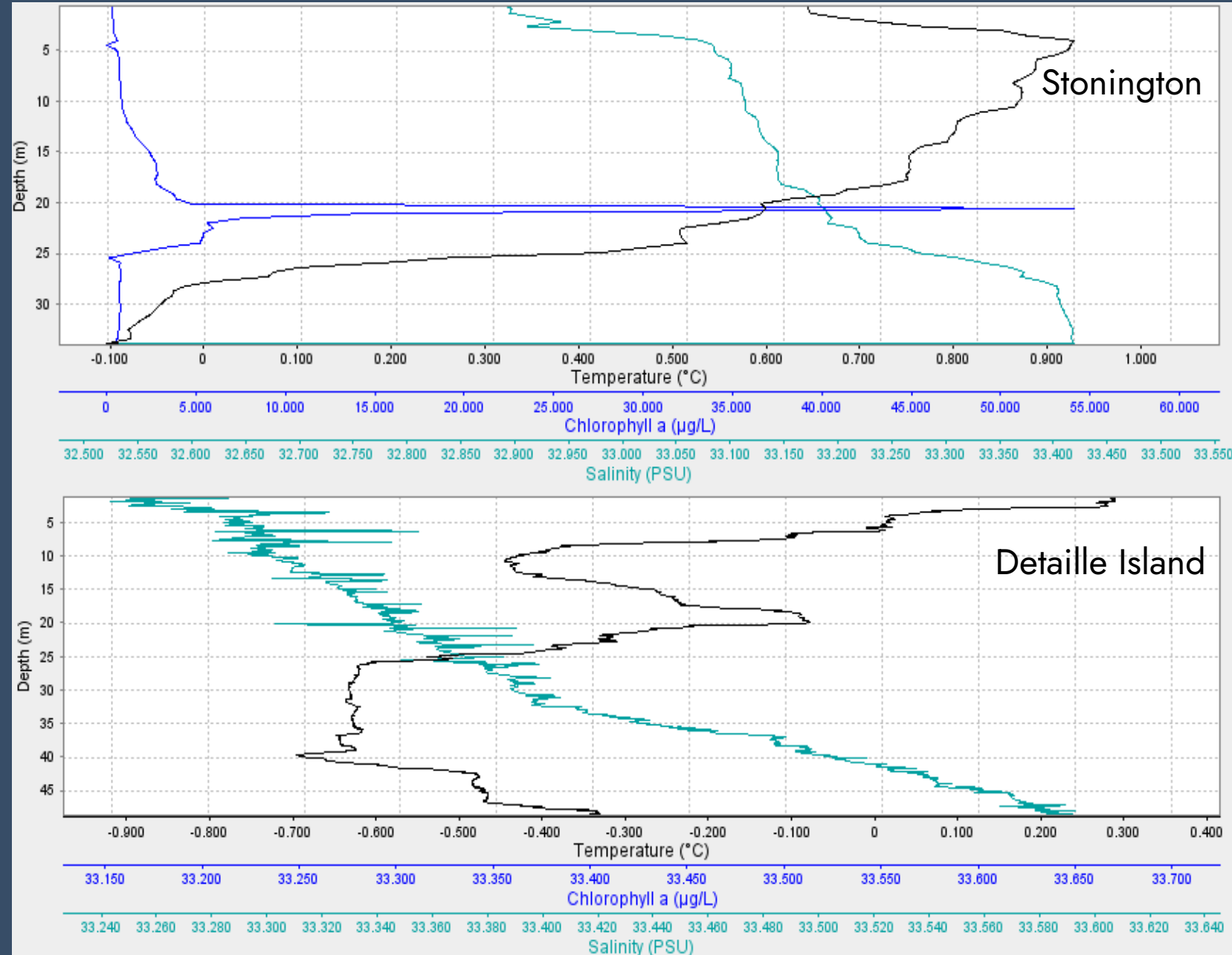
Diatoms (Blind Bay, Antarctica)

CTD Profiles

Our CTD casts gave us insight into the way salinity, temperature, and chlorophyll changed with depth. Every sampling site had a unique profile!

Stratification, or layering, can occur with salinity and temperature, causing different depths to have different characteristics. If there is no stratification, we call the water column “well mixed.” Typically, salinity increases with depth while temperature decreases, since cold, salty water is more dense. Stratification can provide insights into the availability for nutrient replenishment at the surface, which is crucial for photosynthesis in phytoplankton. Direct measurements of chlorophyll— the photosynthetic pigments in plants and phytoplankton— are a proxy for phytoplankton abundances.

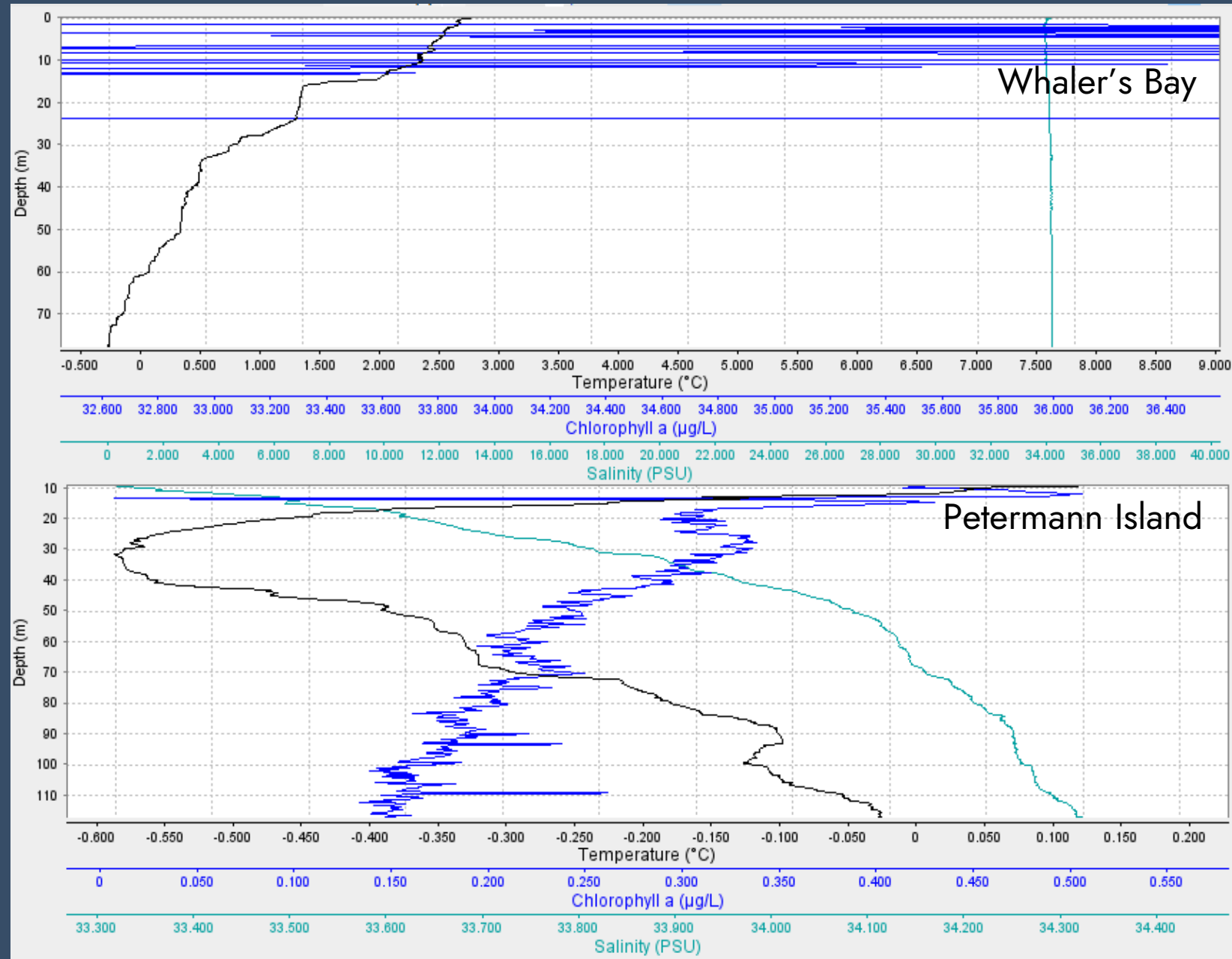
At our 2 sites below the Antarctic Circle, this pattern was well represented, with salinity higher at depth and temperature highest in the top 5 meters. Chlorophyll data from Stonington Island shows a large spike in phytoplankton activity 20m, which the stratified water column may prevent from moving closer to the surface. Perhaps this apparent food source is why our guest scientists caught more krill at this site than any other!



CTD Profiles

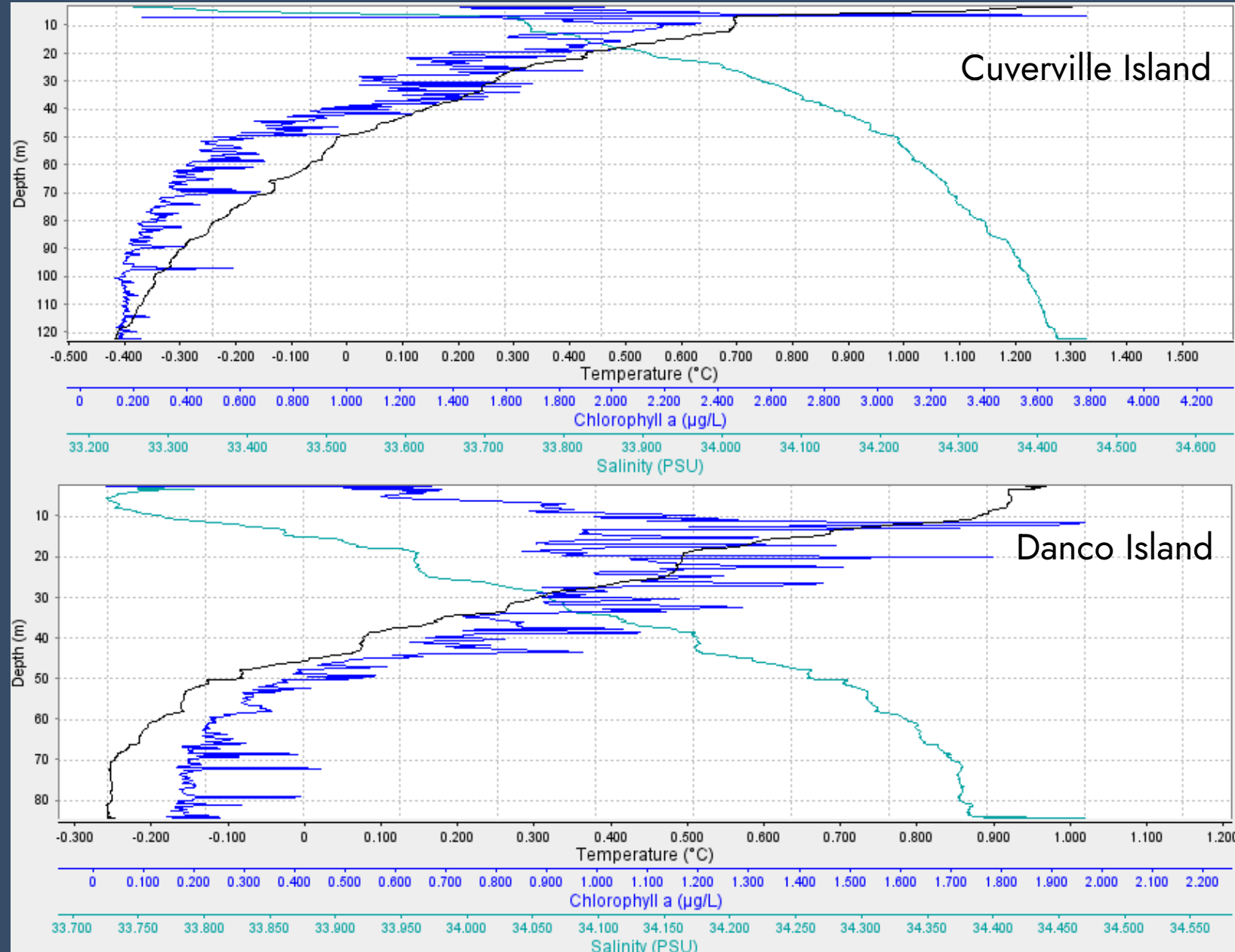
At our sites above the Antarctic Circle, we saw several different patterns. At Whaler's Bay on Deception Island, surface water temperatures were exceptionally high in comparison to our other sites— 4°C— perhaps driven by the relatively closed circulation within the caldera and its geothermal activity. This warmth and associated nutrient input from melting snowpack over the volcanic landscape provided fertilizer for a huge diatom bloom, as can be seen from the high chlorophyll measurements in the top 12m of the Whaler's Bay profile.

At Petermann Island, we saw a striking swing in temperature between 20m and 40m, and chlorophyll measurements, while low, concentrated above this region. This may be due to a midwater current between these depths. This current could be transporting colder water, perhaps from the open ocean nearby, that is sinking below the surface waters, and functionally creating a barrier between the surface and depth.



CTD Profiles

At our sites in the Errera Channel, we saw a perfectly inverse relationship between temperature and salinity as depth increased, following the classic pattern of saltier, colder water sinking down while warm and slightly fresher water remains at the surface. Phytoplankton activity decreased in a steady fashion from the surface to depth, with the highest concentrations above 50m at both sites—where the sunlight can still penetrate well.





NASA Cloud Observer

Our NASA citizen scientists submitted **8** observations to the global database run by NASA. Our observations were matched to data from weather satellites orbiting earth and will be used to better understand global weather phenomena.

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

[View our data](#) on the global map
[Access](#) NASA's Cloud ID Guides

iNaturalist

Our Onboard Naturalists and our guests used the citizen science app iNaturalist to record the flora and fauna seen throughout our journey. Our observations are available to be used in scientific research around the world.

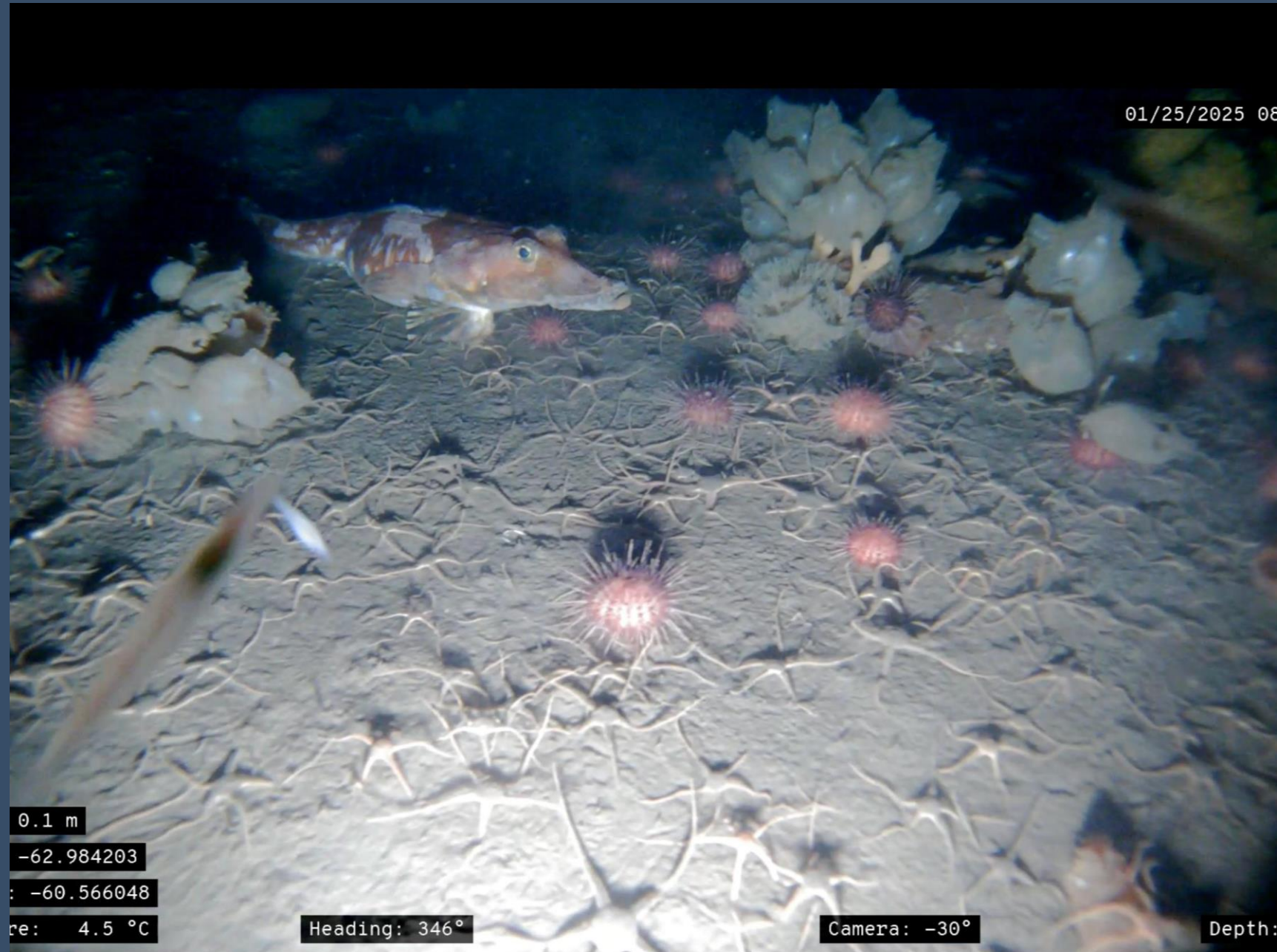
In total we recorded:

- **43** Species
- **97** Observations

... and counting; as you upload more photos from home our dataset grows!

View the data submitted on our iNaturalist project here:

2025 12 - 28 Jan: MS Roald Amundsen - Antarctic Circle (AMANT2501) - iNaturalist





eBird

Our onboard ornithologists were constantly surveying the birdlife we encountered along our route. Including during **8** formal Wildlife Watches and **6** dedicated eBird sessions, we recorded **32** species across **32** eBird checklists over the course of the voyage. Through the eBird platform, the data we collected is available for scientists around the world.

View our eBird data for this trip here:

[Antarctic Circle on the Amundsen,
Jan 12 - Jan 28, 2025 - eBird Trip
Report](#)

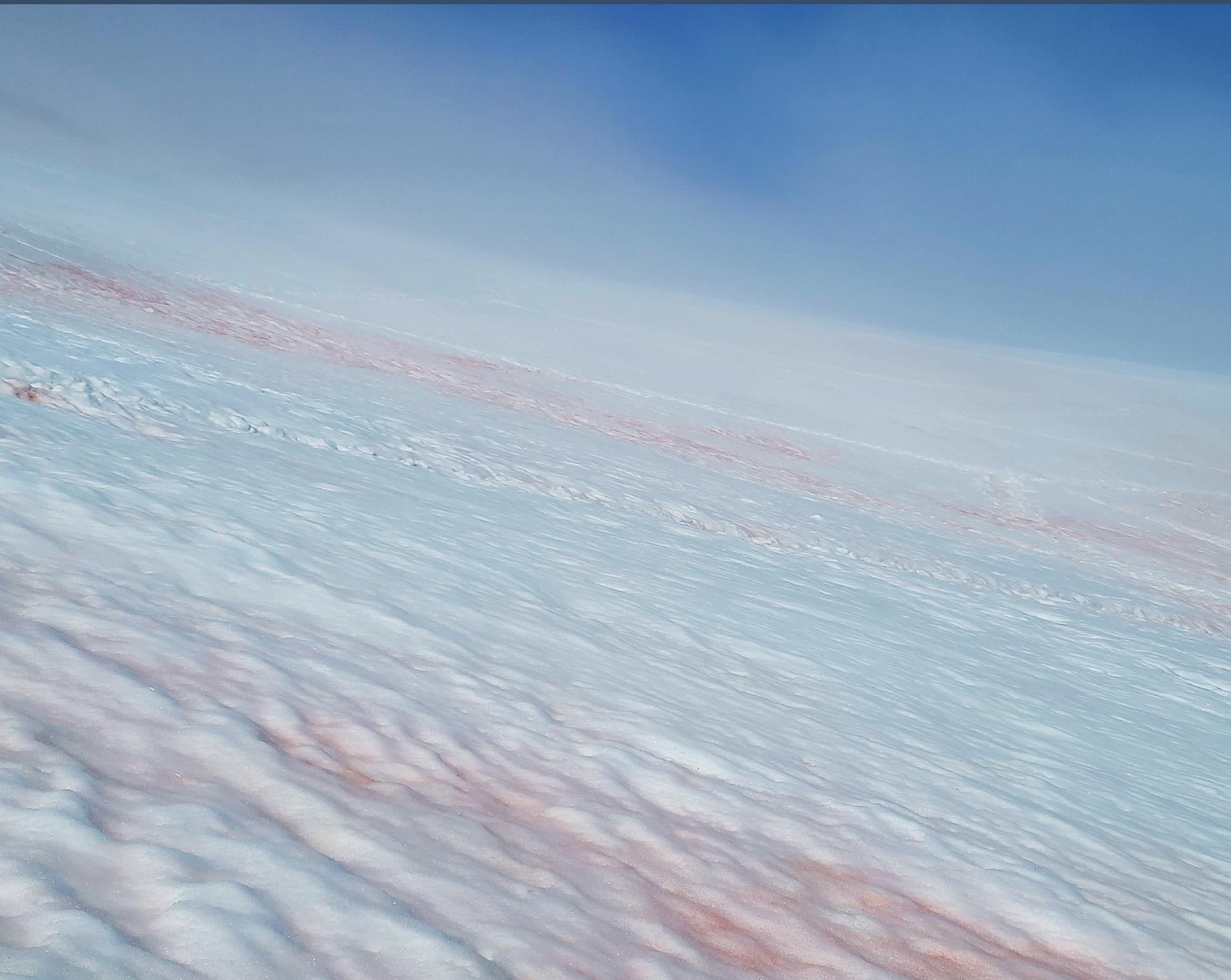
Happywhale

We have submitted photos of **3** individuals from this trip to Happywhale, adding to their catalogue of identified whales across the world. Happywhale uses the fingerprint-like patterns on humpback whales' flukes and the saddle patch marks of orca to identify them from user-submitted photographs. We have received matches for **2** humpback whale individuals so far!

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

MS Roald Amundsen Dec 29 – Jan 12 Happywhale





Snow Algae

We collected **3** observations for Western Washington University's "Snow Algae Project" both from the ship and on the landing sites in Antarctica.

Snow algae are small photosynthetic organisms that grow seasonally on glaciers and snow and ice packs. This phenomenon is observed in polar and alpine regions. Scientists are investigating how snow algae affect the albedo, or reflectance of sunlight, of the areas where it is found, and how this in turn affects snowmelt.

View our more information about this project here:

[Western Washington Cryosphere Studies and Aquatic Biogeochemistry Lab - Home](#)

Wildlife List - Birds



Wildlife List — Birds

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

Wildlife List — Birds

| Scientific Name | English | Deutsch | Francais | Chinese |
|-----------------------------------|----------------------|------------------------------|------------------------|---------|
| <i>Thalassoica antarctica</i> | Antarctic Petrel | Antarktiksturmvogel | Pétrel antarctique | 南极鹱 |
| <i>Daption capense</i> | Cape Petrel | Kapsturmvogel | Damier du Cap | 花斑鹱 |
| <i>Pagodroma nivea</i> | Snow Petrel | Schneesturmvogel | Pétrel des neiges | 雪鹱 |
| <i>Pterodroma mollis</i> | Soft-plumaged Petrel | Weichfeder-Sturmvogel | Pétrel soyeux | 柔羽圆尾鹱 |
| <i>Halobaena caerulea</i> | Blue Petrel | Blausturmvogel | Prion bleu | 蓝鹱 |
| <i>Pachyptila desolata</i> | Antarctic Prion | Taubensturmvogel | Prion de la Désolation | 鸽锯鹱 |
| <i>Pachyptila belcheri</i> | Slender-billed Prion | Dünnschnabel-Sturmvogel | Prion de Belcher | 细嘴锯鹱 |
| <i>Procellaria aequinoctialis</i> | White-chinned Petrel | Weißkinn-Sturmvogel | Puffin à menton blanc | 白颈风鹱 |
| <i>Ardenna gravis</i> | Great Shearwater | Großer Sturmtaucher | Puffin majeur | 大鹱 |
| <i>Ardenna grisea</i> | Sooty Shearwater | Dunkler Sturmtaucher | Puffin fuligineux | 灰鹱 |
| <i>Leucocarbo bransfieldensis</i> | Antarctic Shag | Antarktikscharbe | Cormoran antarctique | 南极鸬鹚 |
| <i>Chionis albus</i> | Snowy Sheathbill | Weißgesicht-Scheidenschnabel | Chionis blanc | 白鞘嘴鸥 |
| <i>Theristicus melanopis</i> | Black-faced Ibis | Schwarzzügelibis | Ibis à face noire | 黑脸鸮 |



Wildlife List - Marine Mammals

Wildlife List — Marine Mammals

| SCIENTIFIC NAME | ENGLISH | DEUTSCH | FRANÇAIS | Chinese |
|---------------------------------|--------------------------------|-----------------------|--|---------|
| <i>Balaenoptera bonaerensis</i> | Antarctic minke whale | Südlicher Zwergwal | Rorqual à museau pointu de l'Antarctique | 南极小须鲸 |
| <i>Balaenoptera physalus</i> | Fin whale | Finnwal | Rorqual commun | 长须鲸 |
| <i>Megaptera novaeangliae</i> | Humpback whale | Buckelwal | Baleine à bosse | 大翅鲸 |
| <i>Balaenoptera borealis</i> | Sei whale | Seiwal | Rorqual de Rudolphi | 塞鲸 |
| <i>Lagenorhynchus obscurus</i> | Dusky dolphin | Schwarzdelfin | Lagénorhynque obscur | |
| <i>Otaria byronia</i> | South American sea lion | Mähnenrobbe | Lion de mer d'Amérique du Sud | 南海狮 |
| <i>Leptonychotes weddellii</i> | Weddell seal | Weddelrobbe | Phoque de Weddell | 韦德尔氏海豹 |
| <i>Mirounga leonina</i> | Southern elephant seal | Südlicher See-Elefant | Eléphant de mer austral | 南象海豹 |
| <i>Hydrurga leptonyx</i> | Leopard seal | Seeleopard | Léopard de mer | 豹海豹 |
| <i>Lobodon carcinophaga</i> | Crabeater seal | Krabbenfresser | Phoque crabier | 食蟹海豹 |
| <i>Arctocephalus gazella</i> | Antarctic fur seal | Antartischer Seebär | Otarie à fourrure antarctique | 南极毛皮海狮 |



IX

**Connect With Your
Inner Scientist**