IX

Science & Education Report

MS Roald Amundsen 21 November – 5 December 2024

Antarctica & Falklands Expedition

Photo: Sonja Storm

Science & Education Program

During our voyage from Ushuaia through the Drake Passage to Antarctica, the Falkland Islands and back to Ushuaia, you had the opportunity to get a deeper insight into and learn about the nature surrounding us and about the places we visited through a diverse onboard program provided by the science and education team.

We invited you to lectures, discovery sessions, citizen science projects and wildlife watches on various topics such as birds, marine mammals, geology, glaciology, climate change, polar exploration and many more.

We hope you enjoyed gaining a deeper understanding of the landscapes, flora and fauna and of the history of this remote part of the world.

Science Boat

During our voyage we went out with the science boat 8 times in 4 different locations in Antarctica and the Falkland Islands:

- Antarctic Peninsula: Pleneau Island, Orne Harbour
- Falkland Islands: Saunders Island, West Point

In order to investigate which plankton communities we find close to the coasts of the Antarctic Peninsula, the South Shetland Islands and the Falkland Islands in the early season, we took water samples and did measurements of the temperature, salinity and clarity of the water.

We did tows of the phytoplankton and zooplankton nets to collect water samples for investigation under the microscope and demonstrated how to use the Secchi disk to determine the clarity of the water, i.e. the abundance of phytoplankton. By deploying the CTD, we received information about the changes of temperature and salinity with depth in the water column.

FjordPhyto

The FjordPhyto project is a citizen science project which investigates the influence of the melting glaciers in Antarctica on the plankton communities in the Southern Ocean.

During voyages to Antarctica, the HX science teams together with the guests perform water sampling and measurements of the parameters of the water at specific GPS locations to support data collcetion for research on longterm changes in the phytoplankton.

During our voyage, we contributed samples and data to the FjordPhyto project from two locations: Pleneau Island and Orne Harbour.

Secchi Disk

The turbidity of the water, i.e. the clarity of the water, provides information about the abundance of plankton. To determine the turbidity of the water, we used the Secchi Disk and measured the depth at which it could just not be seen anymore.
The measured depth is the Secchi Depth which can be submitted to the Secchi Disk Citizen Science Project to contribute to a world wide dataset accessible to researchers.

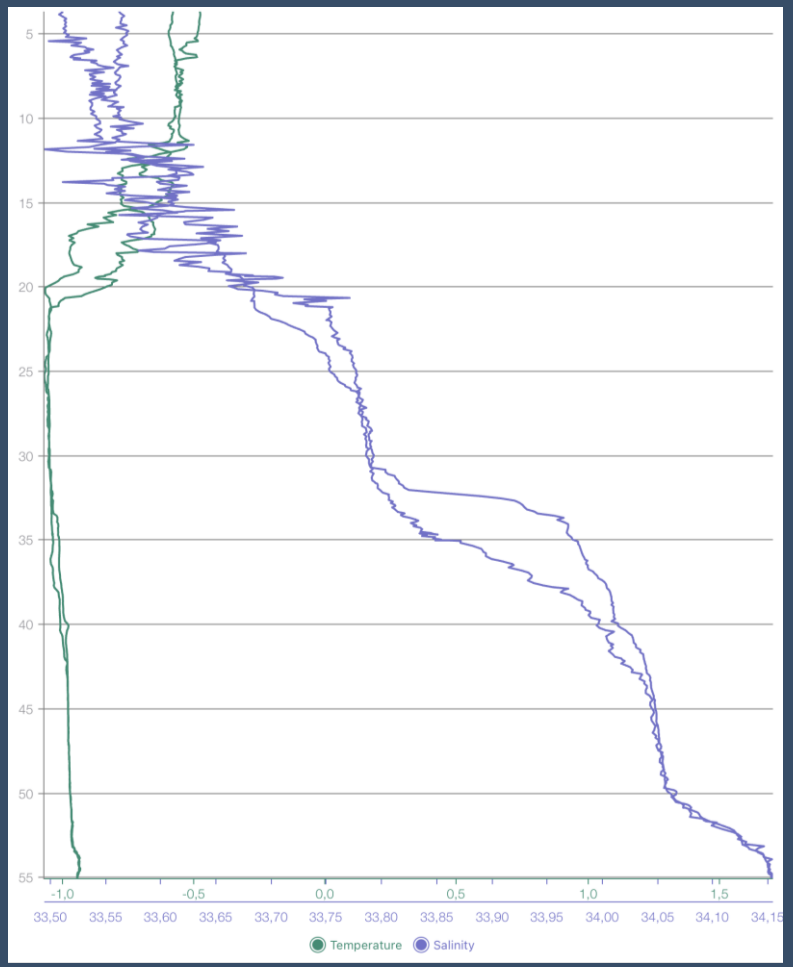
We demonstrated the Secchi Disk in 5 of the 8 science boat sessions. However, as the drift of the boat was too strong or it was too overcast during some of the measurements, we did not submit our readings.

Side note: The white Secchi Disk is used for the Secchi Disk Citizen Science project. The black and white Secchi Disk is use for the Fjordphyto project.

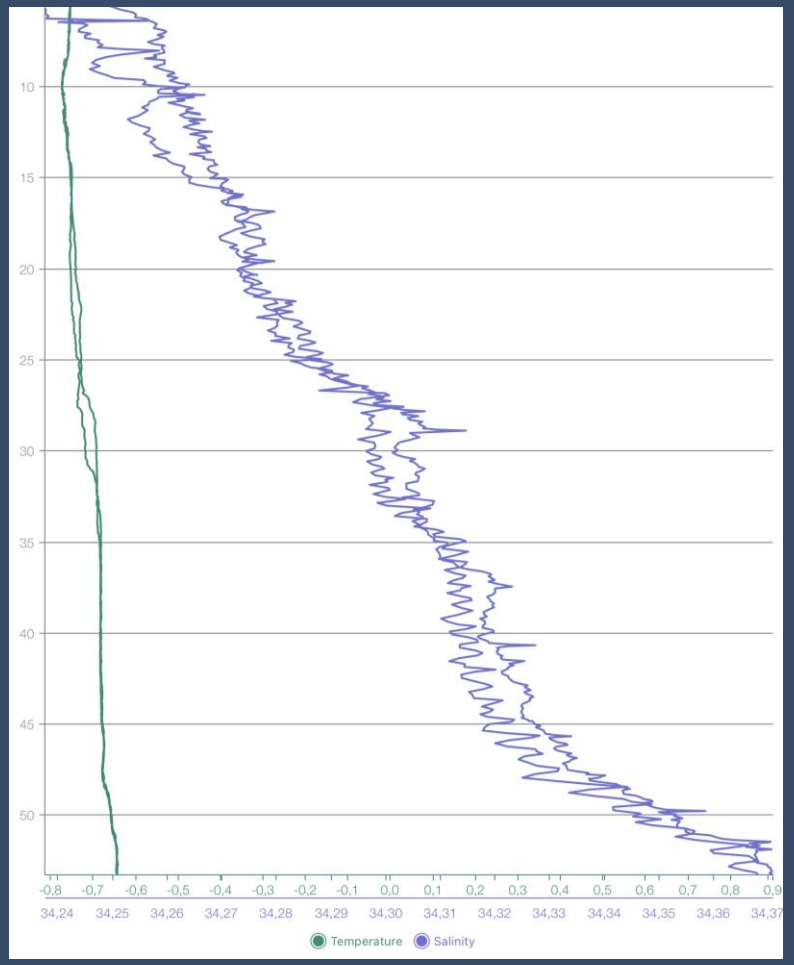
CTD

We utilize CTD (Conductivity, Temperature, Depth) profiles to analyse the stratification within the water column, as both temperature and salinity significantly influence water density. This stratification provides insights into nutrient replenishment at the surface, which is crucial for phytoplankton photosynthesis. Typically, salinity increases with depth while temperature decreases, since cold, salty water is denser than warm, less salty water.

Depth Profile: Pleneau Island



Depth Profile: Orne Harbour



Our CTD profile from Pleneau Island confirms the above described normal pattern, showing a clear increase in salinity and a decrease in temperature with depth. In Orne harbour our salinity also increases with depth and temperature stays mostly constant. When looking at the scale bars we can see 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.

Temperature (°C)
Salinity (PSU)

Water Sampling

We collected water samples in 5 different locations: Pleneau Island, Orne Islands, Orne Harbour, Saunders Island and West Point.
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.

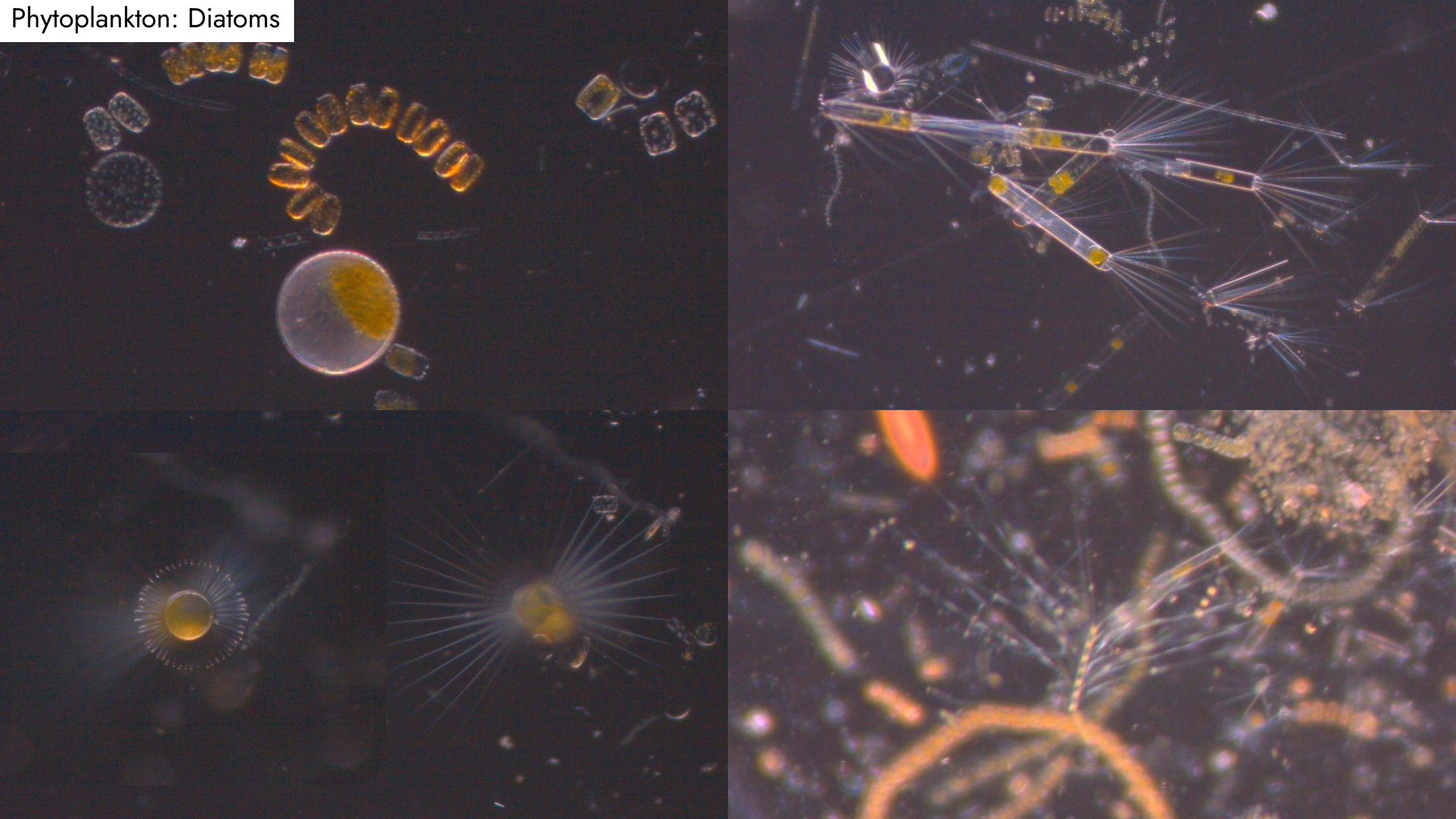
The phytoplankton net had a mesh size of 20µm, the zooplankton net of 100µm.

Plankton Samples

We investigated all of our water samples under the microscopes in the science center in oder to identify the different species of phytoplankton and zooplankton. The images of the big research microscope could be projected to the screen so that everyone around could see what we found in the drops of water. Guests could also use the smaller binocular microscopes to get hands-on and try to find the tiny organisms in our water samples.

We found mainly diatoms (phytoplankton) in our samples and almost no zooplankton. The reason might be that it is still early in the season, spring just started, the light is just coming back, the meltwater adds nutrients to the sea water and the phytoplankton (food source for zooplankton) only just starts to bloom. We expect the amount of zooplankton to increase in the following weeks.

Phytoplankton: Diatoms



Underwater Drone

We deployed our underwater drone from the expedition boat near the Orne Islands.

We had a closer look at icebergs underwater, observing bubbles in the glacial ice as well as different erosional features that only form in the water.

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

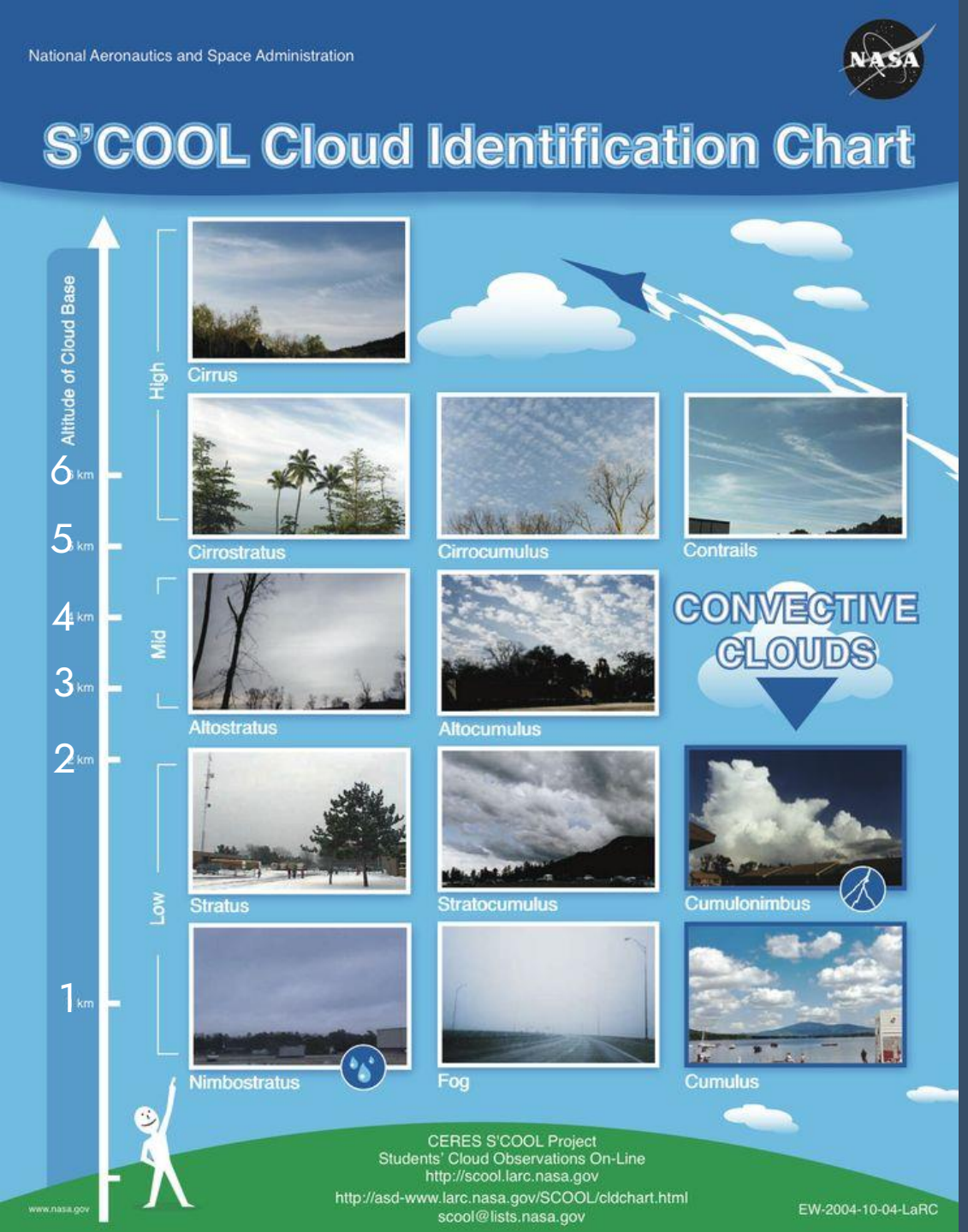
Nov 2024
Antarctica

NASA Cloud Observer

Our NASA citizen scientists met in 3 sessions to perform GLOBE Cloud Observations. Together, we submitted 3 observations from the ships iPads to the global database run by NASA. This time, none of our observations were matched to data from weather satellites orbiting above. However, they will still be used to better understand global weather phenomena. A few guests had the app installed on their mobile devices and carried out and submitted their own observations.

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: 1,254

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	METEOSAT-10 Satellite	Terra Satellite	NOAA-20 Satellite
Universal Date/Time	2023-08-16 11:22:00	2023-08-16 11:10	2023-08-16 11:28	2023-08-16 11:14
Latitude	51.45	51.13 to 51.77	51.01 to 51.81	51.04 to 51.84
Longitude	-0.98	-1.3 to -0.66	-1.38 to -0.58	-1.3 to -0.5
Total Cloud Cover	Scattered (25-50%)	Scattered 27.87%	Scattered 44.35%	Broken 60.24%
High Clouds	Short Lived Contrails: 1 Non Spreading Contrails: 3	No Clouds	Cover: Few (1.70%) Altitude: 10.25 (km) Phase: Ice 226.95 (K) Opacity: Transparent	Cover: Few (4.20%) Altitude: 8.27 (km) Phase: Ice 241.06 (K) Opacity: Transparent
Mid Clouds		Cover: Few (1.64%) Altitude: 2.08 (km) Phase: Water 284.68 (K) Opacity: Transparent	No Clouds	Cover: Isolated 19.38% Altitude: 2.48 (km) Phase: Water 277.9 (K) Opacity: Translucent
Low Clouds	 Cumulus Cover: Scattered (25-50%) Opacity: Opaque	Cover: Scattered 26.23% Altitude: 0.91 (km) Phase: Water 291.24 (K) Opacity: Transparent	Cover: Scattered 42.65% Altitude: 0.98 (km) Phase: Ice/Water Mix 286.09 (K) Opacity: Transparent	Cover: Scattered 36.65% Altitude: 1.43 (km) Phase: Water 283.08 (K) Opacity: Translucent
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	*METEOSAT-10* Visible  Infrared  GEO Tutorial	*MODIS Terra* Worldview  Worldview Tutorial	*VIIRS NOAA-20* Worldview  Worldview Tutorial
Sky Conditions, Surface Conditions and Observer Comments	Sky Conditions Sky Visibility : Clear Sky Color : Blue Surface Conditions Snow/Ice : No Standing Water : No Muddy : No Dry Ground : No Leaves on Trees : Yes 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 Earths surface, while the satellites (white collumns) is 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

iNaturalist

Our onboard naturalists and guests recorded their observations of flora and fauna on the citizen science platform iNaturalist. Many of our observations have been peer reviewed and are available to be used in scientific research around the world.

In total, 11 observers recorded:
- 84 Species
- 235 Total Observations

Submissions are still possible!

View our data submitted on our iNaturalist project here:

2024 21 Nov – 05 Dec
https://www.inaturalist.org/projects/2024-21-nov-05-dec-ms-roald-amundsen-antarctica-and-falklands-expedition-amant2417

2024 21 Nov - 05 Dec: MS Roald Amundsen - Anta...

NOV 21, 2024 - DEC 5, 2024

Observations made by guests and staff on the Amundsen's November '24 voyage to the Antarctic Peninsula and Falkland Islands

Read More ›

Your Membership

PROJECT MEMBERS ONLY

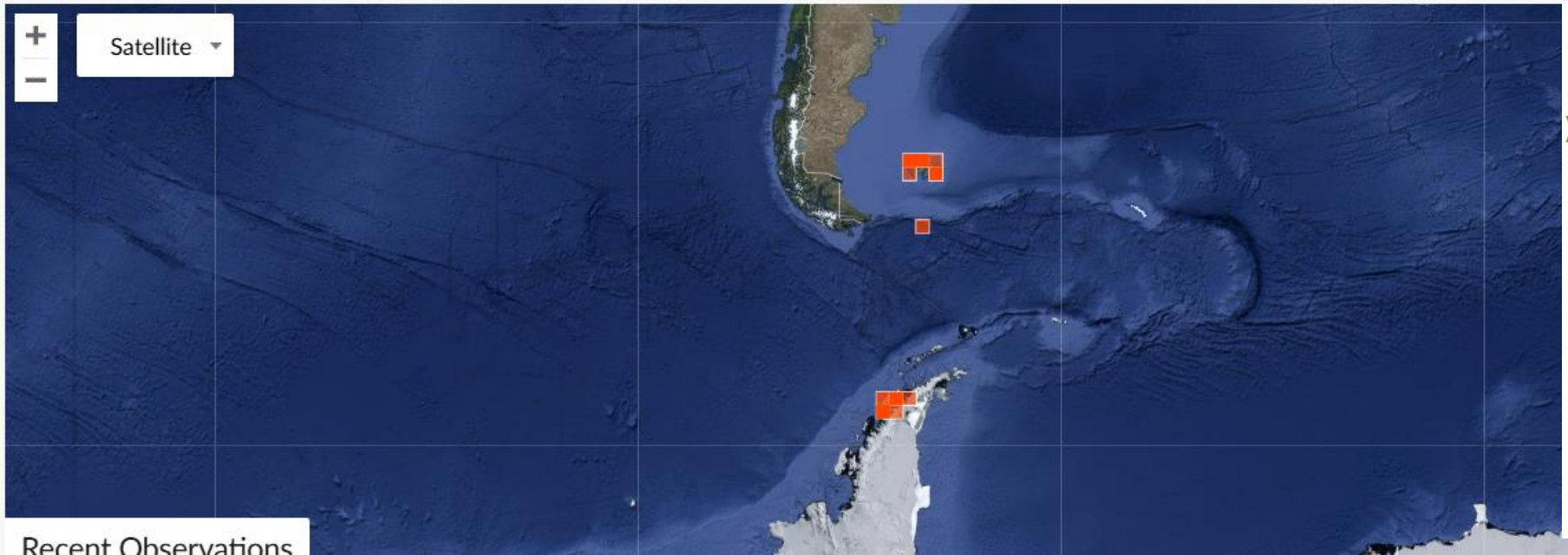
Most Observed Species

	Gentoo Penguin	17
	Chinstrap Penguin	11
	Adelie Penguin	10
	Gorse	7
	Magellanic Penguin	5
	Weddell Seal	5

Overview

235	84	53	11
OBSERVATIONS	SPECIES	IDENTIFIERS	OBSERVERS

Map | Grid | List | Identify | Search



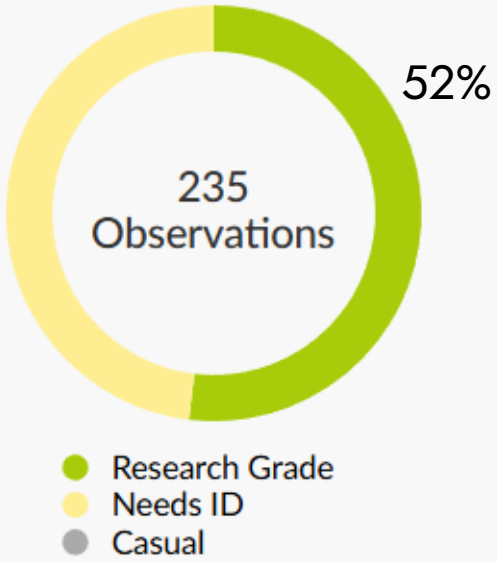
Recent Observations

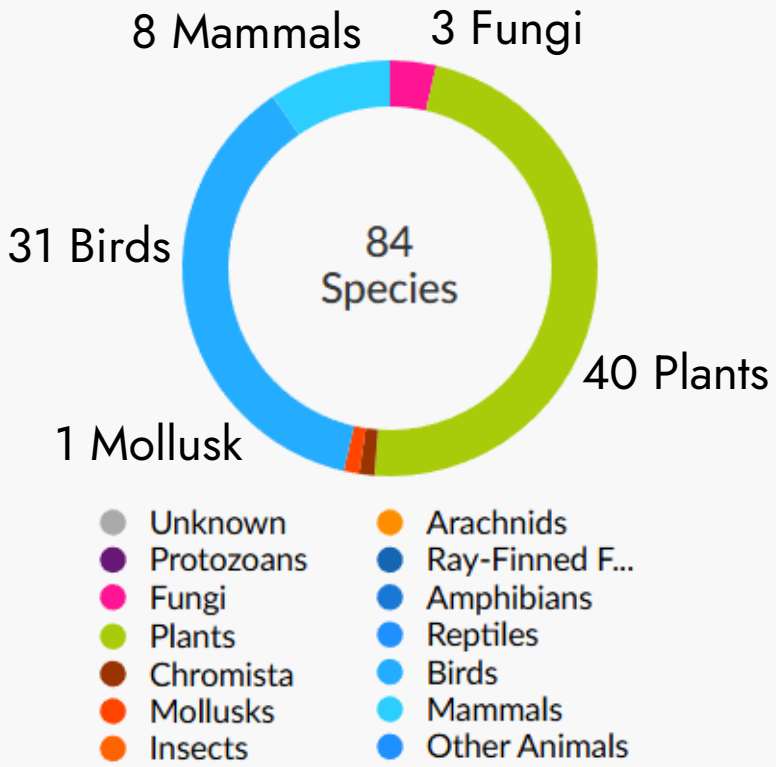
Most Observations

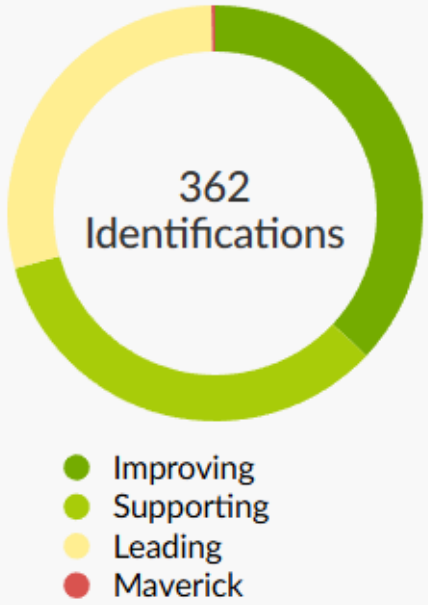
1st	jian_ning	68
	lancycheng	54
	maria_joao78878	29
	svenja2024	19
	johnleigh24	17
	giulia_si	13

Overview | 235 OBSERVATIONS | 84 SPECIES | 53 IDENTIFIERS | 11 OBSERVERS | Stats

Stats







eBird

Our onboard ornithologists were constantly surveying the birdlife we encountered along our route. Including 9 formal wildlife watches we recorded 41 species across 15 eBird checklists. Through the eBird platform, the data we collected is available for scientists around the world.

View our data for this trip here:
https://ebird.org/tripreport/297262

Antarctica and the Falklands on the Amundsen, 21 Nov - 05 Dec 2024

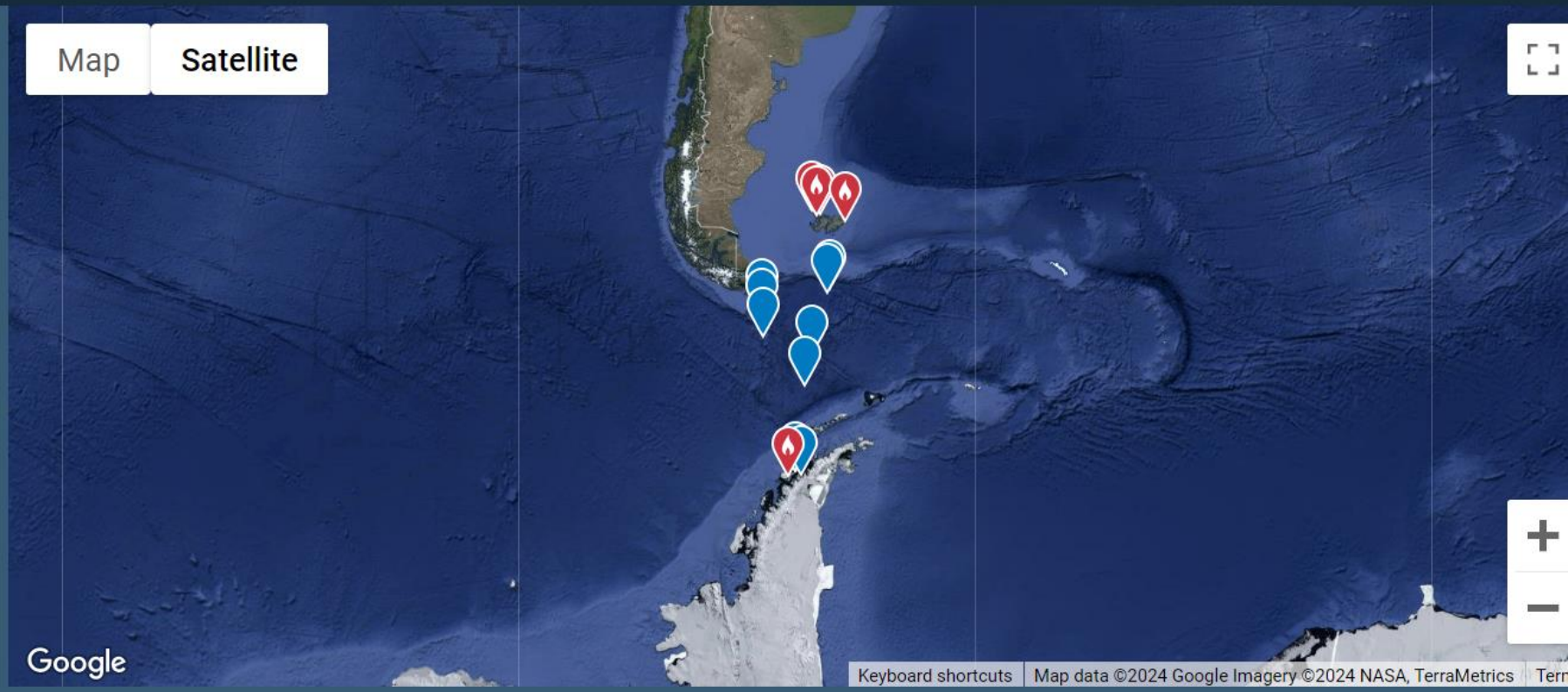
21 Nov – 5 Dec 2024 (15 days)

Link-only

Antarctica | Argentina | Chile | Falkland Islands (Malvinas) Subregions

M/S Roald Amundsen Science Center, Lancy Cheng, Rob Lidstone-Scott

Share Edit



Happywhale

We encountered 6 species of whales and dolphins during our trip. We have 1 humpback whale fluke (pictured right). We have received confirmation that this whale has never been identified before and is new to the Happywhale catalogue! An exciting contribution to science and will help us to understand whale populations better on a global scale.

Our guests can also submit photos of individuals from this trip to Happywhale to add to their catalogue of identified whales across the world.

View the MS Roald Amundsen's submissions to Happywhale during our voyage: https://happywhale.com/user/11890;svy=107984

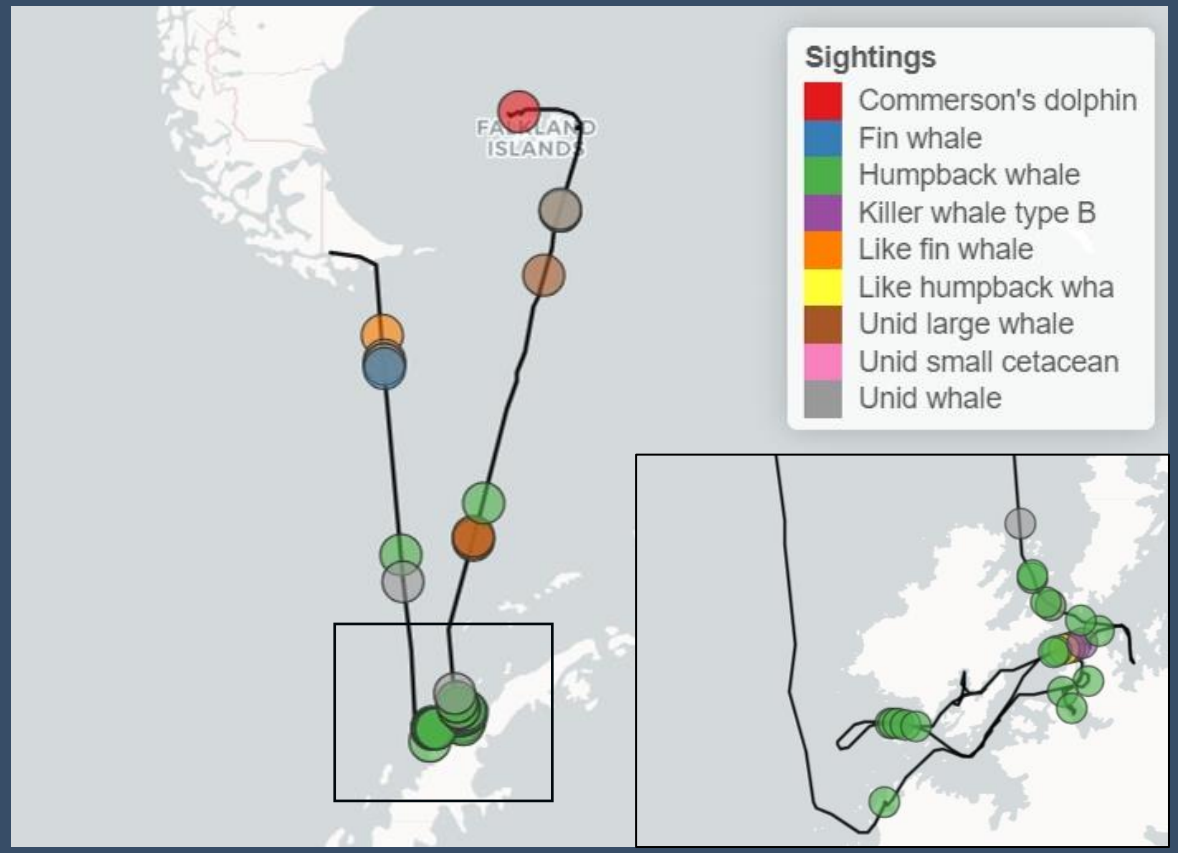
Overall ORCA Survey Effort:

- 389.1 km
- 22 hrs 7 mins
- 8 species
- 88 individuals

ORCA Looking out for Whales and Dolphins

Species	Number seen
Humpback whale	8
Killer whale	8
Peale's dolphin	4
Commerson's dolphin	8
Unidentified whale	7
Antarctic Fur Seal	1
Weddell Seal	2
South American Fur Seals	47
South American Sea Lion	3 (Pier)
Unidentified seals	3

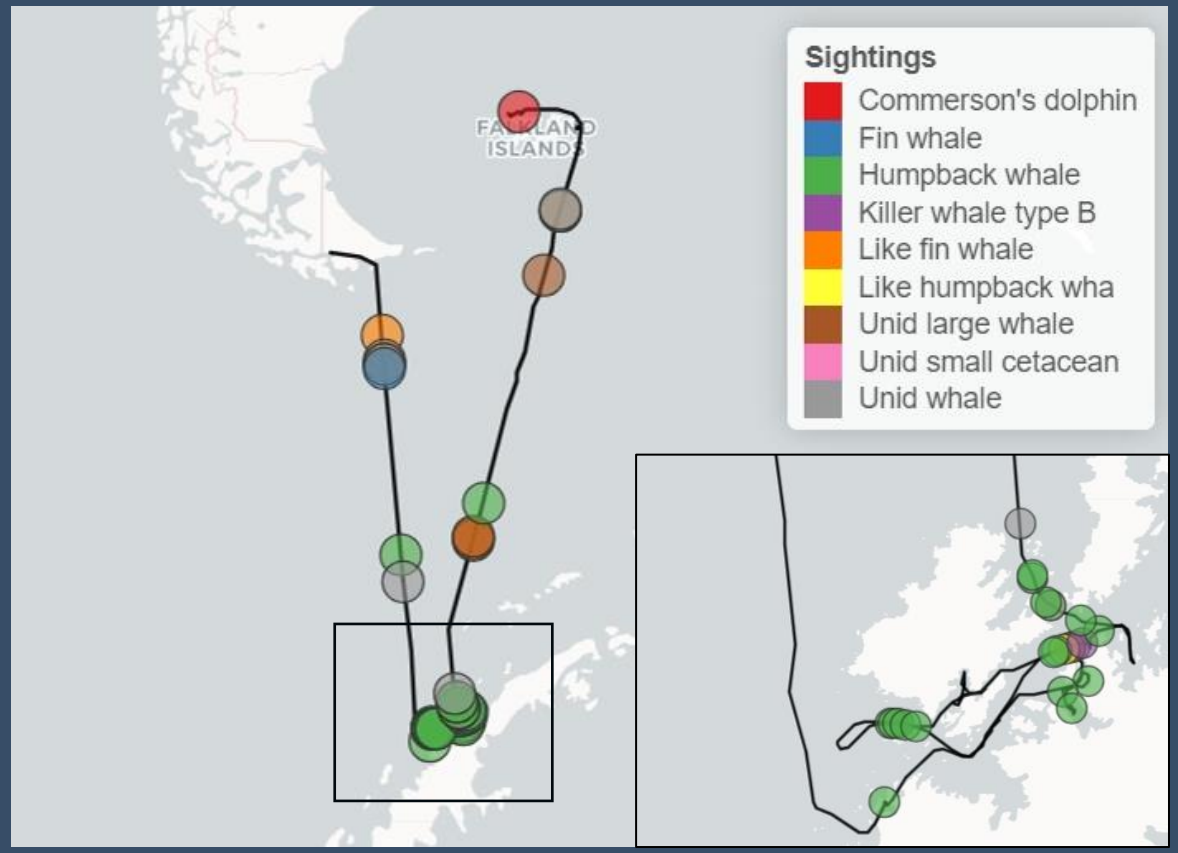
Polar Whale Watch



Target species:

Species	No. sightings	No. animals
Fin whale	1	1
Humpback whale	20	31
Like fin whale	4	6
Like humpback whale	1	2

Polar Whale Watch



Humpback whale

Fin whale

Orca

Commerson's dolphin

UNIVERSITY of TASMANIA

IMAS

Institute for Marine and Antarctic Studies

Sea Ice Seals

On thin ice – the behaviour and habitat use of pinnipeds in the Antarctic peninsula 2024

Gabby Burke

View our data for this trip here: https://ebird.org/tripreport/286554

Total: 33

???: 18

Weddell Seal : 14
(Leptonychotes weddellii)

Antarctic Fur Seal: 1
(Arctocephalus gazella)


Ice: 21
Pack ice: 3
Fast ice: 18
Snow: 12

Wildlife List - Birds

Wildlife List – Birds

Scientific Name	English	Deutsch	Francais	Chinese
Chloephaga picta	**Upland Goose**	Magellangans	Ouette de Magellan	斑胁草雁
Chloephaga hybrida	**Kelp Goose**	Kelpgans	Ouette marine	白草雁
Chloephaga rubidiceps	**Ruddy-headed Goose**	Rotkopfgans	Ouette à tête rousse	棕头草雁
Tachyeres brachypterus	**Falkland Steamer Duck**	Falkland-Dampfschiffente	Brassemer des Malouines	短翅船鸭
Lophonetta specularioides	**Crested Duck**	Schopfente	Canard huppé	冠鸭
Anas flavirostris	**Yellow-billed Teal**	Südandenente	Sarcelle tachetée	黄嘴鸭
Rollandia rolland	**White-tufted Grebe**	Rollandtaucher	Grèbe de Rolland	白簇鼬鸊
Chionis albus	**Snowy Sheathbill**	Weißgesicht-Scheidenschnabel	Chionis blanc	白鞘嘴鸥
Haematopus leucopodus	**Magellanic Oystercatcher**	Magellanaustернfischer	Huîtrier de Garnot	智利蛎鹬
Haematopus ater	**Blackish Oystercatcher**	Südamerikanischer Austernfischer	Huîtrier noir	南美蛎鹬
Charadrius modestus	**Rufous-chested Dotterel**	Rotbrust-Regenpfeifer	Pluvier de d'Urville	棕胸鸻
Charadrius falklandicus	**Two-banded Plover**	Falkland-Regenpfeifer	Pluvier des Falkland	双斑鸻
Gallinago paraguaiae	**Magellanic Snipe**	Magellanbekassine	Bécassine de Magellan	南美沙锥
Calidris fuscicollis	**White-rumped Sandpiper**	Weißbürzel-Strandläufer	Bécasseau à croupion blanc	白腰滨鹬
Stercorarius antarcticus	**Brown Skua**	Subantarktikskua	Labbe antarctique	棕贼鸥
Stercorarius maccormicki	**South Polar Skua**	Antarktikskua	Labbe de McCormick	麦氏贼鸥
Chroicocephalus maculipennis	**Brown-hooded Gull**	Patagonienmöwe	Mouette de Patagonie	褐头鸥
Leucophaeus scoresbii	**Dolphin Gull**	Blutschnabelmöwe	Goéland de Scoresby	豚鸥

Wildlife List – Birds

Scientific Name	English	Deutsch	Francais	Chinese
Larus dominicanus	**Kelp Gull**	Dominikanermöwe	Goéland dominicain	**黑背**鸥
Sterna vittata	**Antarctic Tern**	Antarktikseeschwalbe	Sterne couronnée	**南极燕**鸥
Sterna hirundinacea	**South American Tern**	Falklandseeschwalbe	Sterne hirundinacée	**南美燕**鸥
Aptenodytes patagonicus	**King Penguin**	Königspinguin	Manchot royal	**王企**鹅
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
Spheniscus magellanicus	**Magellanic Penguin**	Magellanpinguin	Manchot de Magellan	**南美企**鹅
Eudyptes chrysocome	**Southern Rockhopper Penguin**	Südfelsenpinguin	Gorfou sauteur	凤头黄眉企鹅
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**
Macronectes giganteus	**Southern Giant Petrel**	Riesensturmvogel	Pétrel géant	**巨**鳽
Macronectes halli	**Northern Giant Petrel**	Hallsturmvogel	Pétrel de Hall	**霍氏巨**鳽
Fulmarus glacialoides	**Southern Fulmar**	Silbersturmvogel	Fulmar argenté	银灰暴风鳽

Wildlife List – Birds

Scientific Name	English	Deutsch	Francais	Chinese
Thalassoica antarctica	**Antarctic Petrel**	Antarktiksturmvogel	Pétrel antarctique	南极鳽
Daption capense	**Cape Petrel**	Kapsturmvogel	Damier du Cap	花斑鳽
Pagodroma nivea	**Snow Petrel**	Schneesturmvogel	Pétrel des neiges	雪鳽
Halobaena caerulea	**Blue Petrel**	Blausturmvogel	Prion bleu	蓝鳽
Pachyptila desolata	**Antarctic Prion**	Taubensturmvogel	Prion de la Désolation	鸽锯鳽
Pachyptila belcheri	**Slender-billed Prion**	Dünnschnabel-Sturmvogel	Prion de Belcher	细嘴锯鳽
Procellaria aequinoctialis	**White-chinned Petrel**	Weißkinn-Sturmvogel	Puffin à menton blanc	白颏风鳽
Ardenna grisea	**Sooty Shearwater**	Dunkler Sturmtaucher	Puffin fuligineux	灰鳽
Phalacrocorax magellanicus	**Magellanic Cormorant**	Felsenscharbe	Cormoran de Magellan	岩鸬鹚
Leucocarbo atriceps	**Imperial Shag**	Kaiserscharbe	Cormoran impérial	蓝眼鸬鹚
Leucocarbo bransfieldensis	**Antarctic Shag**	Antarktikscharbe	Cormoran antarctique	南极鸬鹚
Nycticorax nycticorax	**Black-crowned Night Heron**	Nachtreiher	Bihoreau gris	夜鹭
Cathartes aura	**Turkey Vulture**	Truthahngeier	Urubu à tête rouge	红头美洲鹫
Phalcoboenus australis	**Striated Caracara**	Falklandkarakara	Caracara austral	红腿巨隼
Cinclodes antarcticus	**Blackish Cinclodes**	Falkland-Uferwipper	Cinclode fuligineux	淡黑抖尾地雀
Muscisaxicola maclovianus	**Dark-faced Ground Tyrant**	Maskengrundtyrann	Dormilon bistré	暗脸地霸鹟
Turdus falcklandii	**Austral Thrush**	Magellandrossel	Merle austral	南美鸫
Passer domesticus	**House Sparrow**	Haussperling	Moineau domestique	家麻雀

Wildlife List – Birds

Scientific Name	English	Deutsch	Francais	Chinese
Leistes loyca	**Long-tailed Meadowlark**	Langschwanzstärling	Sturnelle australe	长尾草地鹨
Melanodera melanodera	**White-bridled Finch**	Weißbart-Ammertangare	Mélanodère à sourcils blancs	黑喉雀鹀

Wildlife List - Marine Mammals

Wildlife List – Marine Mammals

SCIENTIFIC NAME	***ENGLISH***	*DEUTSCH*	*FRANÇAIS*	*Chinese*
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
Cephalorhynchus commersonii	**Commerson's dolphin**	Commerson-Delfin	Céphalorhynque de Commerson	**黑白海豚**
Lagenorhynchus australis	**Peale's dolphin**	Peale-Delfin	Lagénorhynque de Peale	**皮氏斑**纹海豚
Orcinus orca	**Killer whale, orca**	Schwertwal, Orca	Orque	**虎**鲸
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
Otaria byronia	**South American sea lion**	Mähnenrobbe	Lion de mer d'Amérique du Sud	**南海**狮
Leptonychotes weddellii	**Weddell seal**	Weddelrobbe	Phoque de Weddell	韦德尔氏海豹
Mirounga leonina	**Southern elephant seal**	Südlicher See-Elefant	Eléphant de mer austral	**南象海豹**

Photo: Oscar Farrera