



Science & Education Report

MS FRAM

MS FRAM 11th November to 01st December 2024

In-depth Antarctica, Falklands
& South Georgia Expedition



Picture by Geraldine Prince/HX

MANAGEMENT TEAM

Steffen



Expedition Leader

Monica



Second Expedition
Leader

Juliane



Assistant Expedition
Leader

Tina



Expedition Coordinator



Science & Education Program

"Dear Citizen Scientists,

By joining our ship MS Fram, you have decided on embarking on an immersive learning experience. You have had the opportunity to support real-time research by helping collecting valuable data, while also discovering new places, explorer stories and wildlife in breath-taking destinations.

We hope that this report will remind you of the wonderful adventure you have experienced with us, and we can only wish for you to be back onboard our lovely ship in the near future."

HISTORIANS & STORYTELLERS!

Sandra



Historian

Jane



Historian

Steffi



German Interpreter

Art Corner

Days at sea always bring inspiration and serenity while gently sailing through turbid waters. Hidden talents are revealed under the creative spirits of our historians.



Scientific drawing with Jane



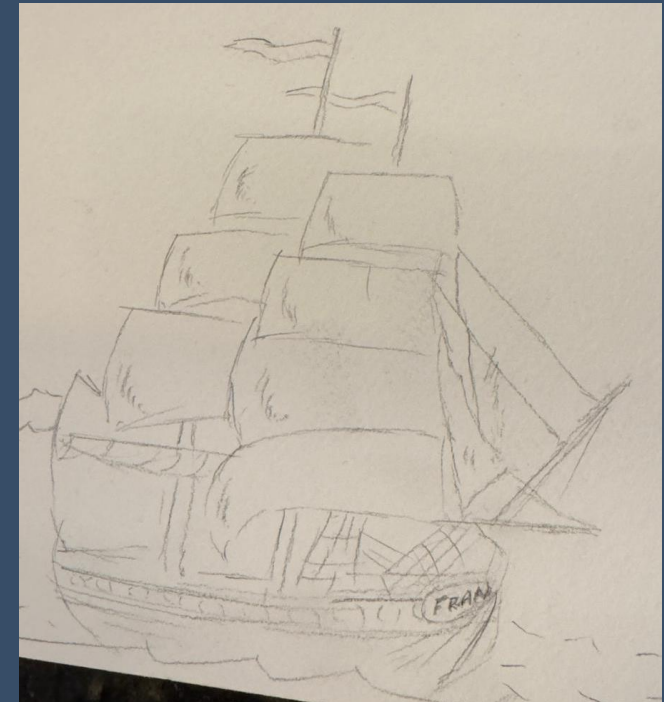
Penguins made out of clay with Jane



The Air Race of MS Fram!



In honour of one of the greatest
Antarctic adventure

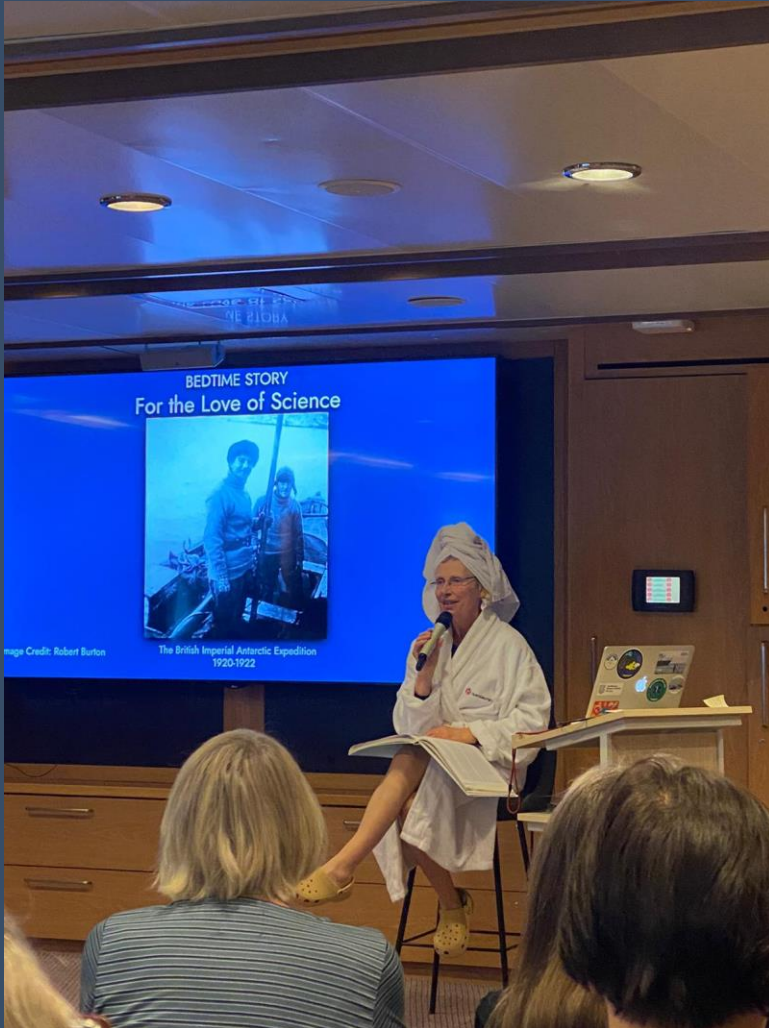


Historical Corner with Sandra



Storytelling

What better way to be rocked to sleep but by the sweet and soothing voices of our Shackleton's lovers.



For the love of Science



Lovely camp story about the first night of Roald Amundsen onboard the Belgica expedition



Listening to the story of Mrs. Chippie

ACTIVITY TEAM

Candice



Paul



Lise



Sport & Sailor's customs

Why not take this opportunity to learn more about sailors and their customs at sea? Thanks to your activity team, you got to practise knots and sing traditional shanties the old fashioned way. Let's not forget about the brain teasers left around the ship for you to familiarise yourself with the art, design and equipment onboard your temporary home.



Knot Workshop



Seashanty rehearsal with Paul



What's in the emergency bags?

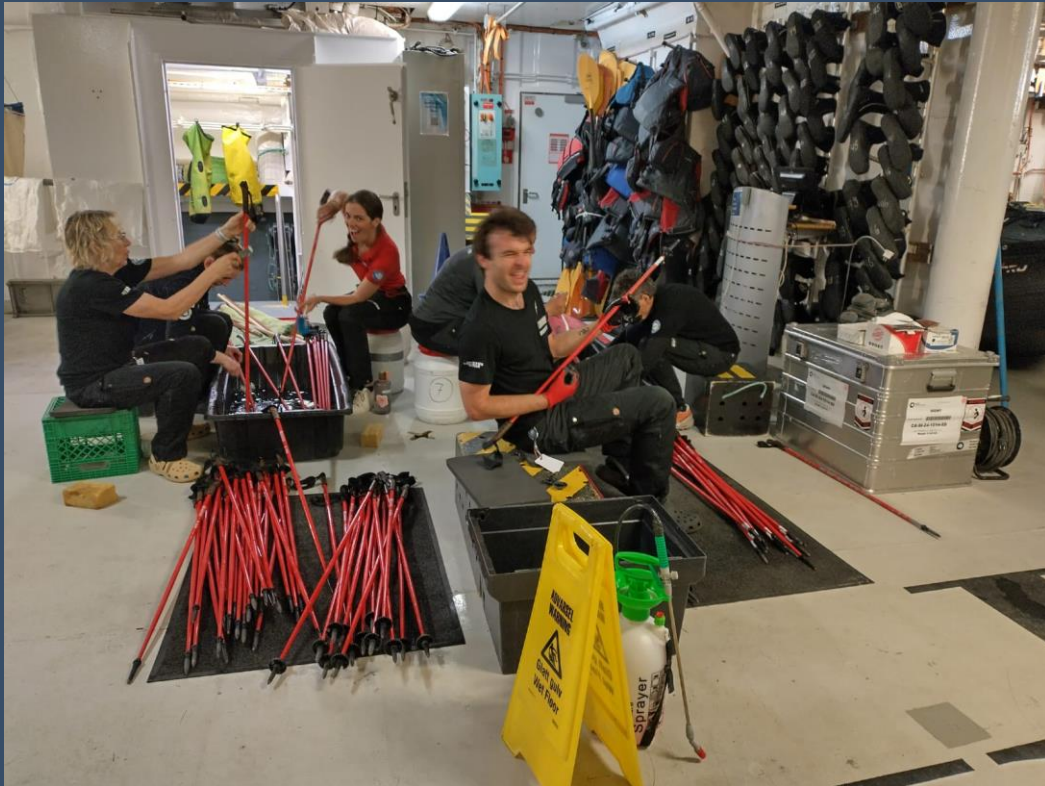
Your Outdoor Adventures

Energized, happy, motivated! Your Activity team has taken you out on many adventures across the different landscapes. Kayaking, hiking, snowshoeing, camping were on the menu every time the conditions allowed.



The hidden work

You might be wondering what happens behind the curtains when all of us are onboard. While each department is busy in their daily task to ensure the good functioning of our lovely MS Fram, the activity team takes charge in organizing, sorting, cleaning the equipment at your disposal when ashore. It might not look like much, but thanks to their hard work, we can all appreciate smooth and safe operations whether it is kayaking, hiking, snowshoeing, camping etc.



Pole cleaning between South Georgia and Antarctica



Snowshoeing biosecurity with Lise and Paul



Thank you for helping us keeping those places unique!

Self-cleaning biosecurity station



YOUR MEMORY MAKERS

Geraldine



Photographer

Jan



Videographer

Photo Adventures

We hope that you asked Geraldine and Jan all the questions you had about camera settings during those photo adventures, whether on land or at sea. As you know, a tremendous work goes into the post processing and editing, but the results are always outstanding!



Picture by Jan Hvizdal/HX



Photo Adventure on land, Gold Harbour/South Georgia



Photo Adventure at sea, Errera Channel/Antarctica



Picture by Geraldine Prince/HX

SCIENCE TEAM

Maëva



Science & Education
Coordinator

Linda



Environmental Scientist

George



Ornithologist

Jenna



Marine Scientist

Onboard Workshops

Picture taken at the rock formation session with Linda



Bird Feathers

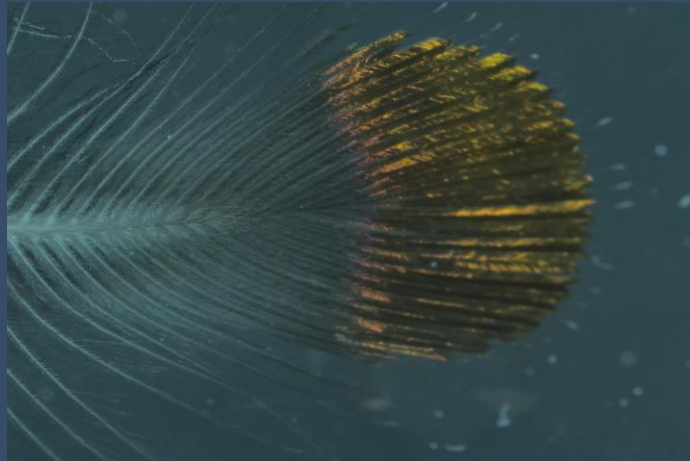
With George. Numerous feathers were seen under the microscope and an insight into the importance of their structure was outlined.



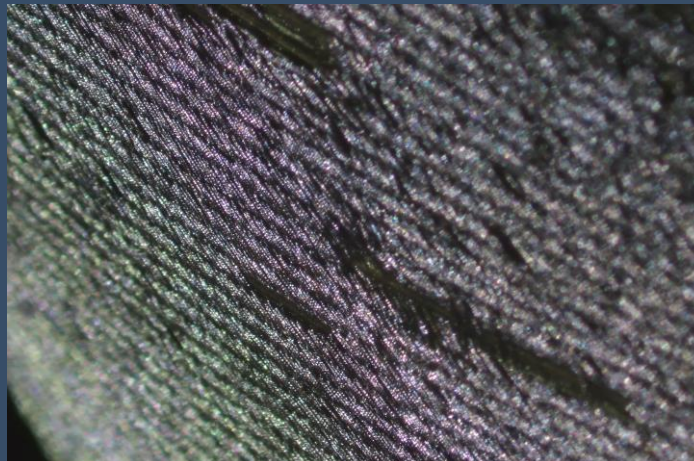
Feather of Upland Goose



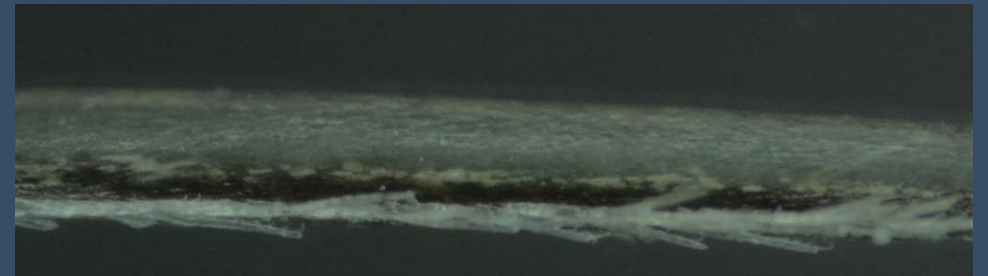
Penguin Feather



Hummingbird feather



Feather of Mellard



Single penguin tail feather

Ice Workshop

With Linda. Learning about the differences between glacier ice and sea ice and how our anthropogenic factors like noise pollution impacts the ecosystems all the way to icy habitats.



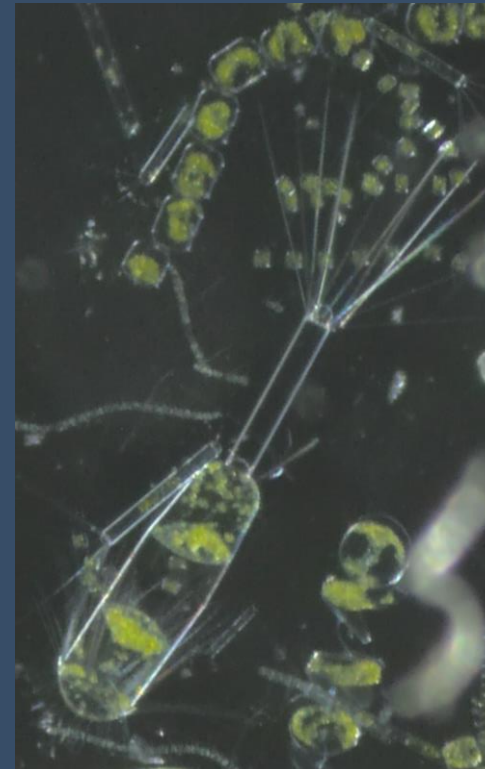
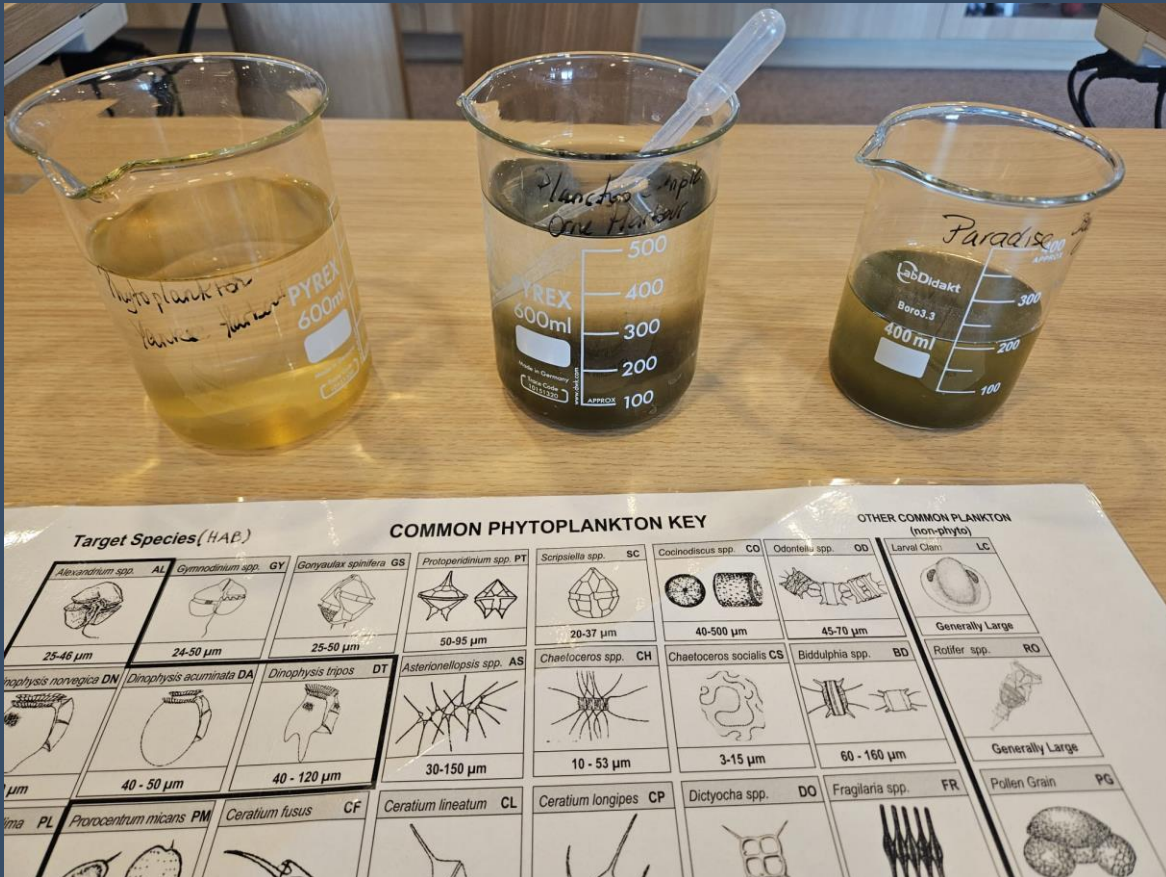
Considering the topic, it seems appropriate to add a couple of pictures of the sightings of the largest iceberg (glacier ice) A23A spotted on our way to Antarctica. (Pictures by Geraldine Prince/HX)



What's in the water?

With Maëva. Sneak peak into the diversity of the plankton life we have in the beautiful destinations we travelled to. Understanding the importance of these tiny creatures for the well-being of the food web.

More details on species and locations coming up.



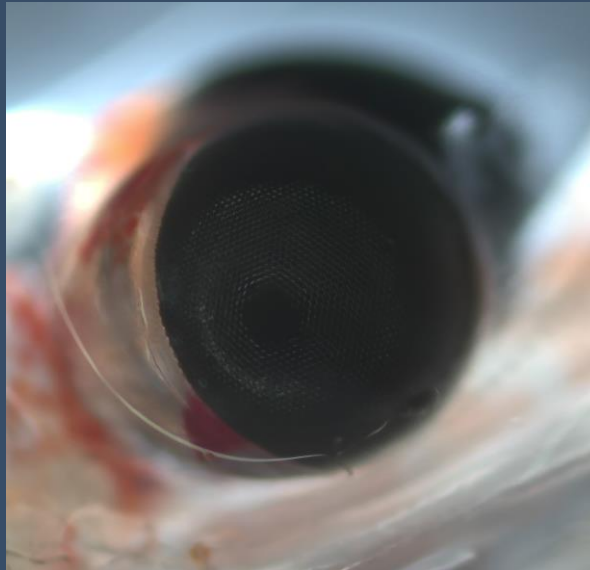
Krilliant!

With Jenna & Maëva. The engine department was kind enough to provide us with the water collected from the ship filtering system, and it contained a few surprises.

Here is a close-up at the Antarctic krill, major component of the foodweb in the South polar waters, providing ressources to penguins, seals, whales etc.



Filtering basket by the mouth to catch large quantities of phytoplankton



Compound eye (just like insects)



Gills used to extract oxygen from the water

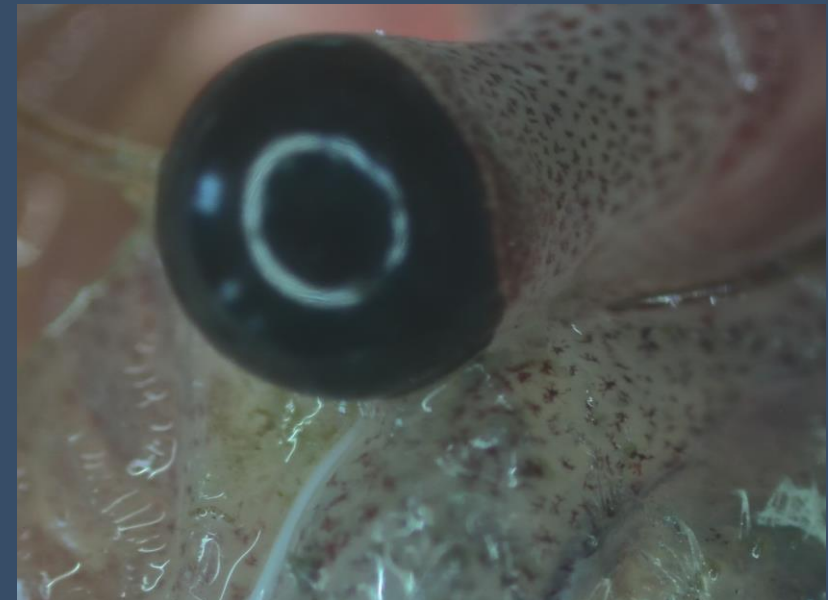
Squat Lobster

Also two of those caught in the water filtering system.
Here are a few close-up looks under the microscope



There are over 900 species of squat lobsters worldwide, and their habitat range varies from deep sea benthic substrates to drifting in the upper water column.

Fun Fact: in March 2022, a squat lobster appeared on the footage taken at the wreck of the Endurance. It is the first proof of the presence of this species in the Weddell Sea!





Science Boat

On our voyage we conducted a total of 8 Science Boats at Carcass Bay (Falklands), Hercules Bay (South Georgia), Yankee Harbour (South Shetlands), Orne Harbour, Paradise Harbour, Port Lockroy (Antarctic Peninsula).

We collected CTD (Conductivity, Temperature, Depth), secchi disk data and water samples for our own use and to be able to follow the bloom of the phytoplankton throughout the season.

[Click here to visit the Secchi Disc Project.](#)

[Click here to listen our sounds records](#)

Picture by Geraldine Prince/HX

Plankton

Falklands

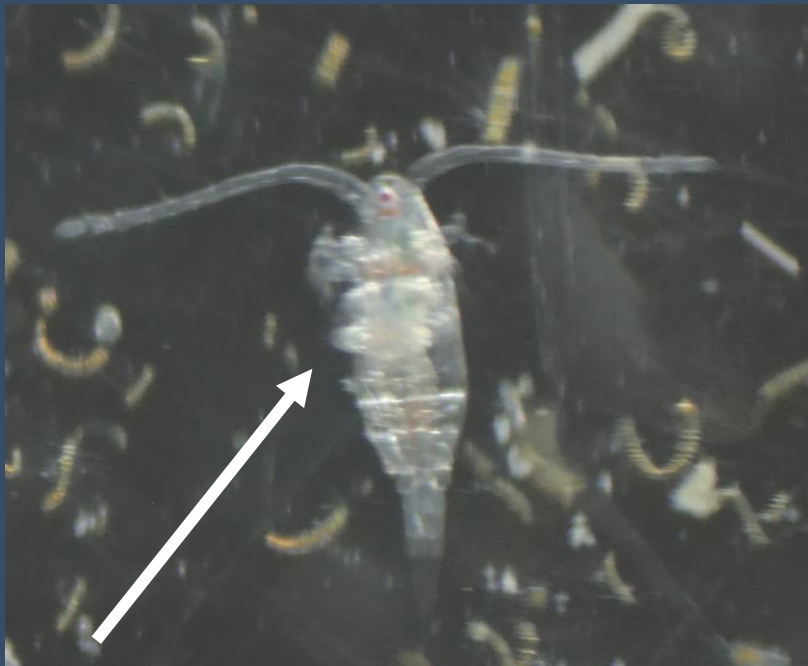
Plankton is the collection of drifting organisms in the water column that do not have the ability to swim or propel themselves against the currents. They could be divided into two main categories; phytoplankton (i.e. microalgae and plants) and zooplankton (i.e. animals).

Phytoplankton is the majority of the organic matter collected in all the samples that we got across the destination.

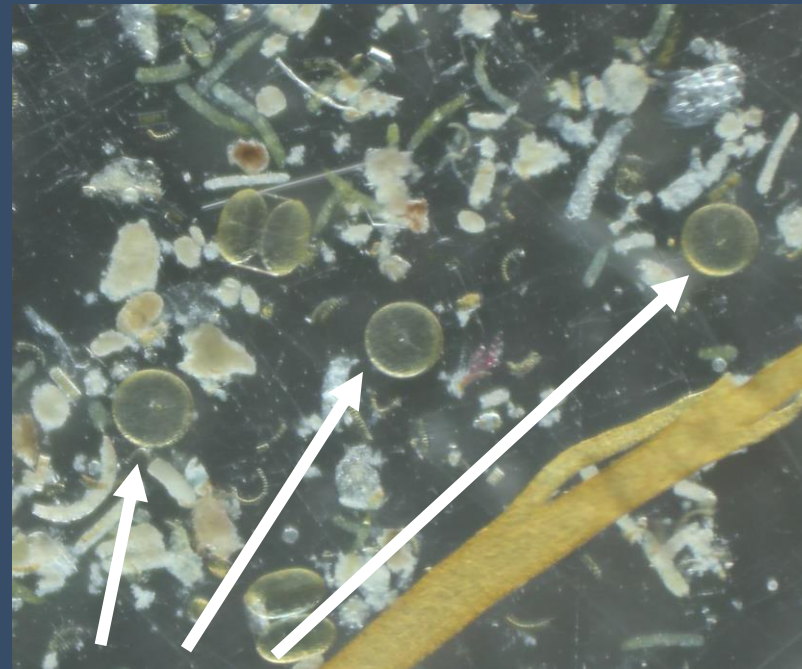
In the Falklands, the concentration can be characterised as “medium level” with approx. 50% of the screen covered with matter. Primarily centric diatoms and chains of centric diatoms.

Two species of zooplankton spotted; a copepod, very common species in the Arctic and sub-polar regions, and a crab larvae.

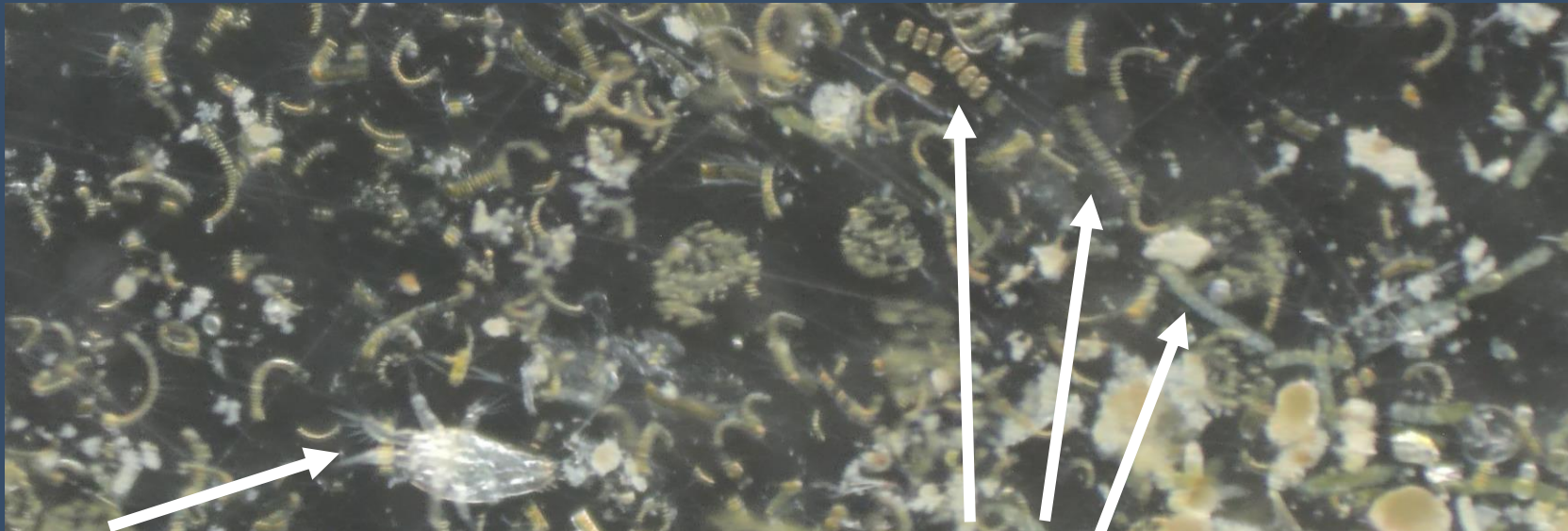
(Photos taken from microscope)



Copepod



Centric diatoms



Crab Larvae

Chain of centric diatoms,

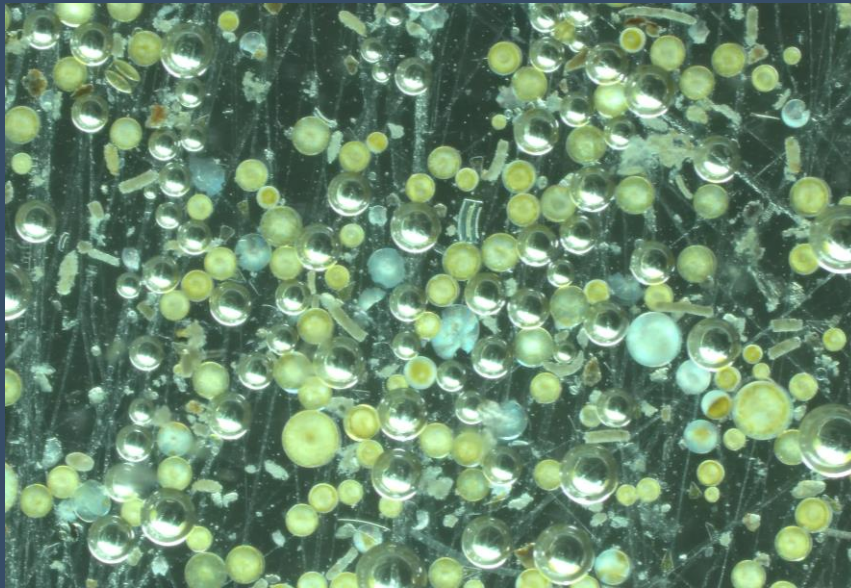
Phytoplankton

South Georgia

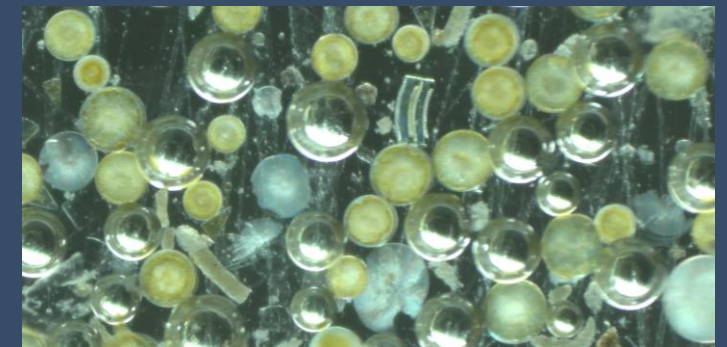
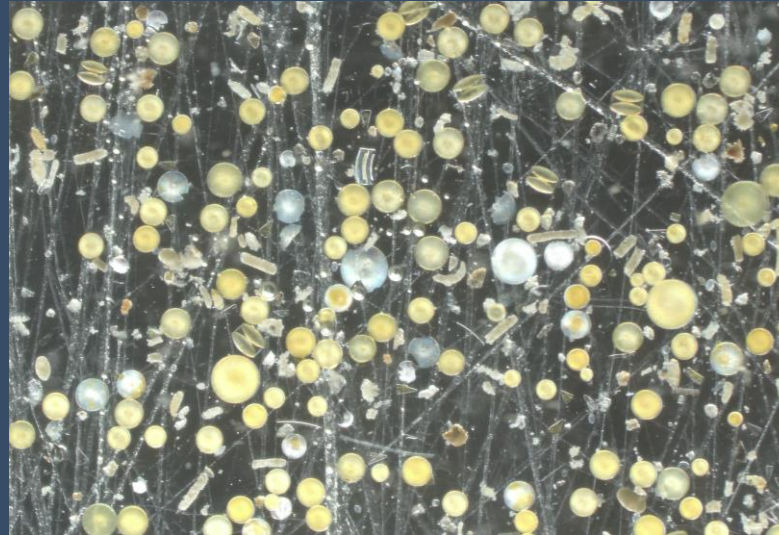
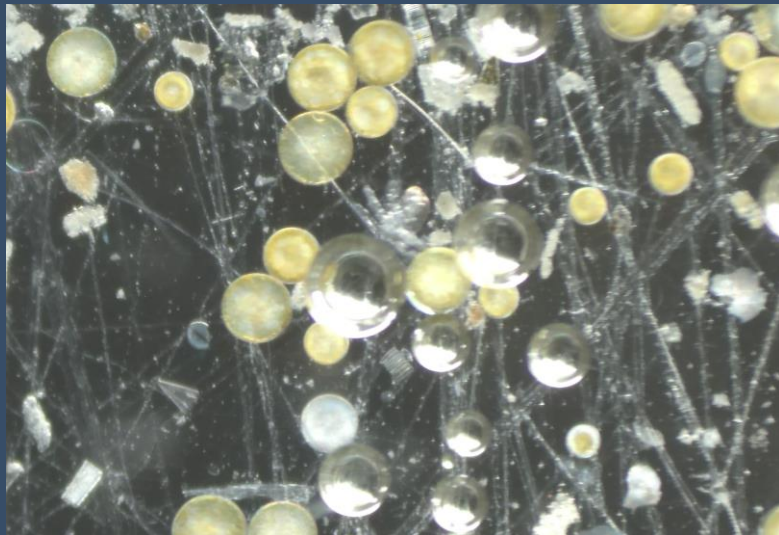
Water collected in South Georgia is proving to be highly concentrated in phytoplankton, in particular from the Diatom family.

Remember that phytoplankton are unicellular microalgae that produce more than 50% of our oxygen, meaning every second breath taken is thanks to those little organisms. All diatoms have a bi-valved external cell wall, called frustule, and made of silica shells.

When the temperature is becoming too warm, they will reduce their buoyancy to sink through the water column. As soon as conditions become more favourable, they are lifted back to the surface by vertical mixing also known as upwelling.



Centric diatoms all around



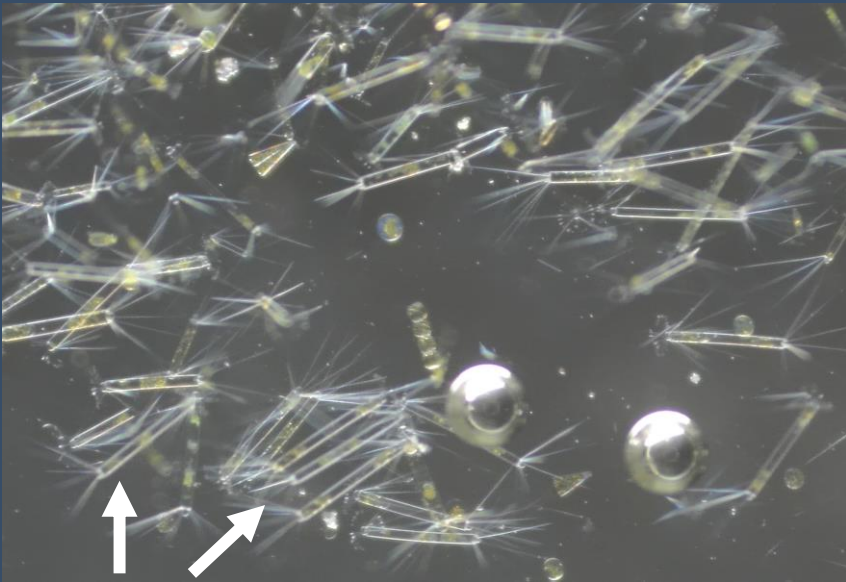
Plankton

South Shetlands

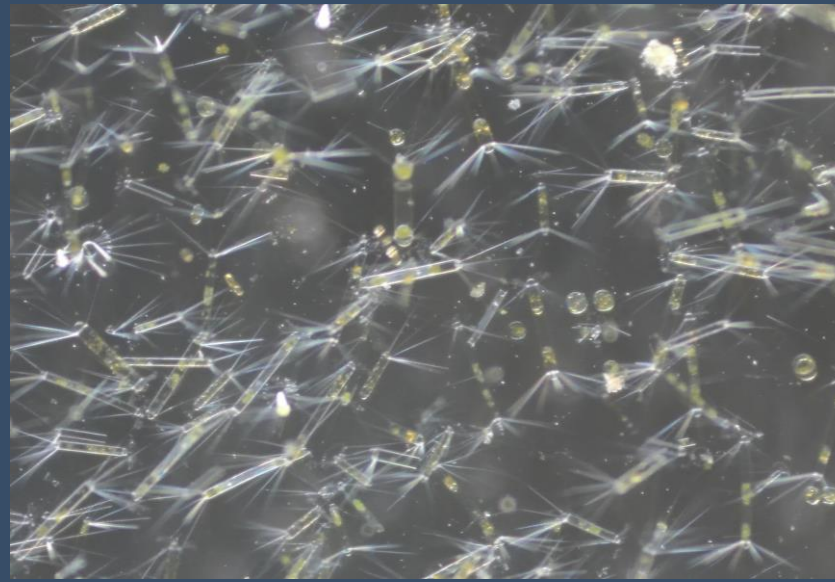
As we reached the colder waters around the South Shetland islands, a new category of diatoms is seen in high number; the corethron diatoms.

Cylindrical cells with dome-shaped valves. Spines on both valves, one valve with series of short hooked spines in addition to the longer ones (hint the name as a reminder of a crown). Chloroplasts (which contain the chlorophyll a, major compound of photosynthesis) are flat and elongated and near the center of the cell.

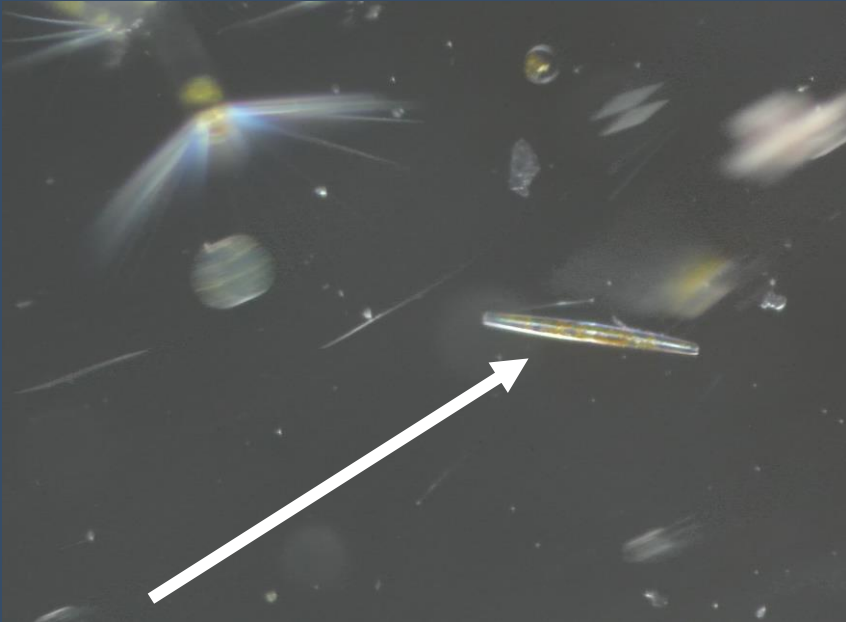
In the larger plankton net (200um), we caught the exoskeleton of a copepod larvae. As they get bigger, they grow out of the external hard shell and vestiges can be found floating in the water column.



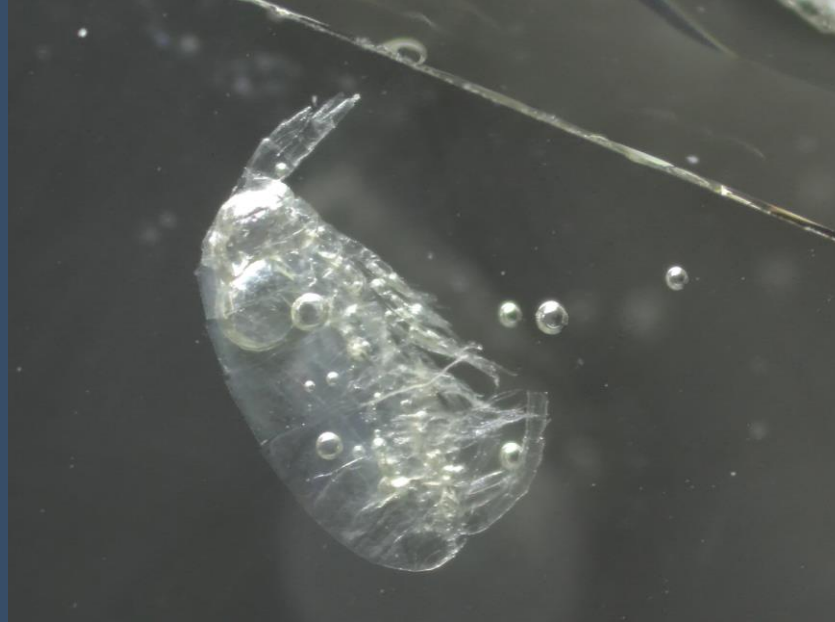
Corethron Diatoms



Corethron Diatoms



Pennate diatom



Copepod exoskeleton

Diatoms

Antarctic Peninsula

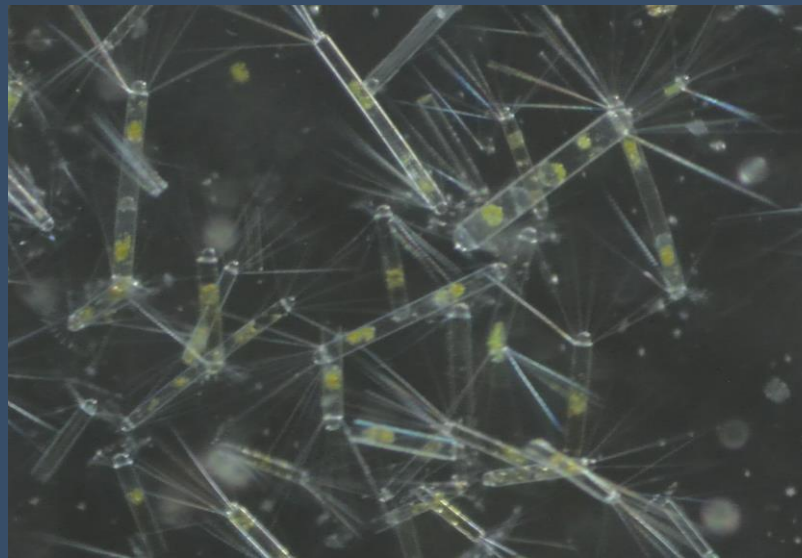
When diatoms divide, each new cell uses the two silica valves to create another valve within the parent cell.

The concentration of phytoplankton in every location on the Peninsula can be characterised as “high level” to even “extremely high level”. It seems we were reaching the peak of the bloom, which is then followed by an important density of zooplanktons later on in the summer. Our findings are marking the beginning of a wildlife-heavy season.

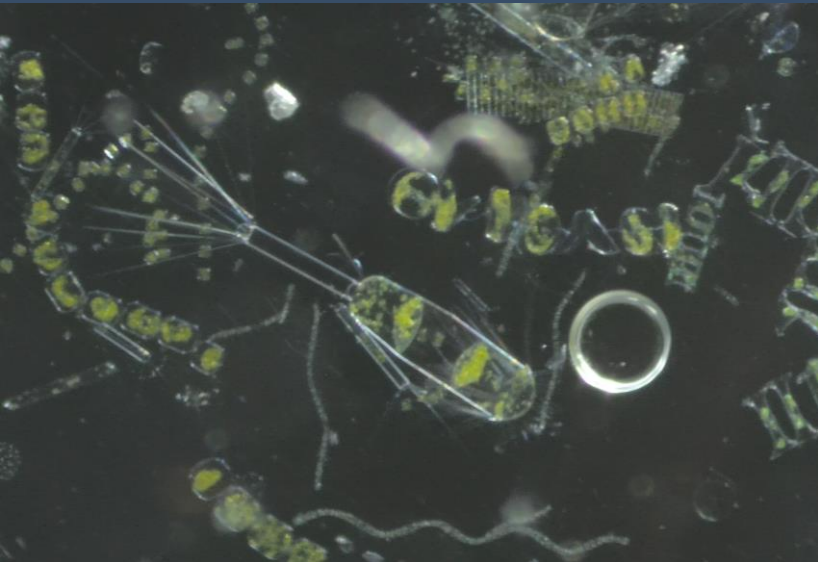
The aim was to show you the diversity of species that exists within the same family of diatoms in those extremely productive waters.



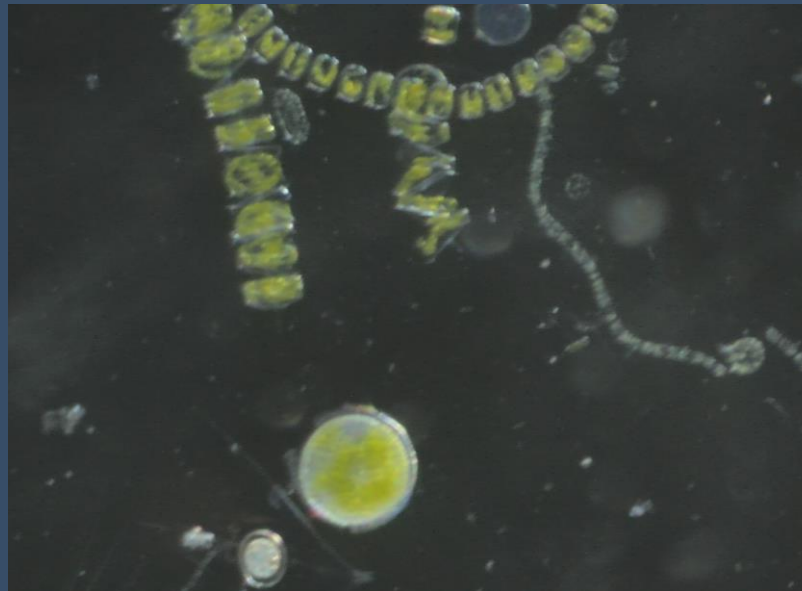
Multi-chain of centric diatoms, Orne Harbour



Corethron diatoms, Orne Harbour



Corethron and centric diatoms, Port Lockroy



Centric diatom, Paradise Bay



Citizen Science Projects

Thank you for participating in the many different citizen science projects we work in collaboration with.

Picture by Geraldine Prince/HX



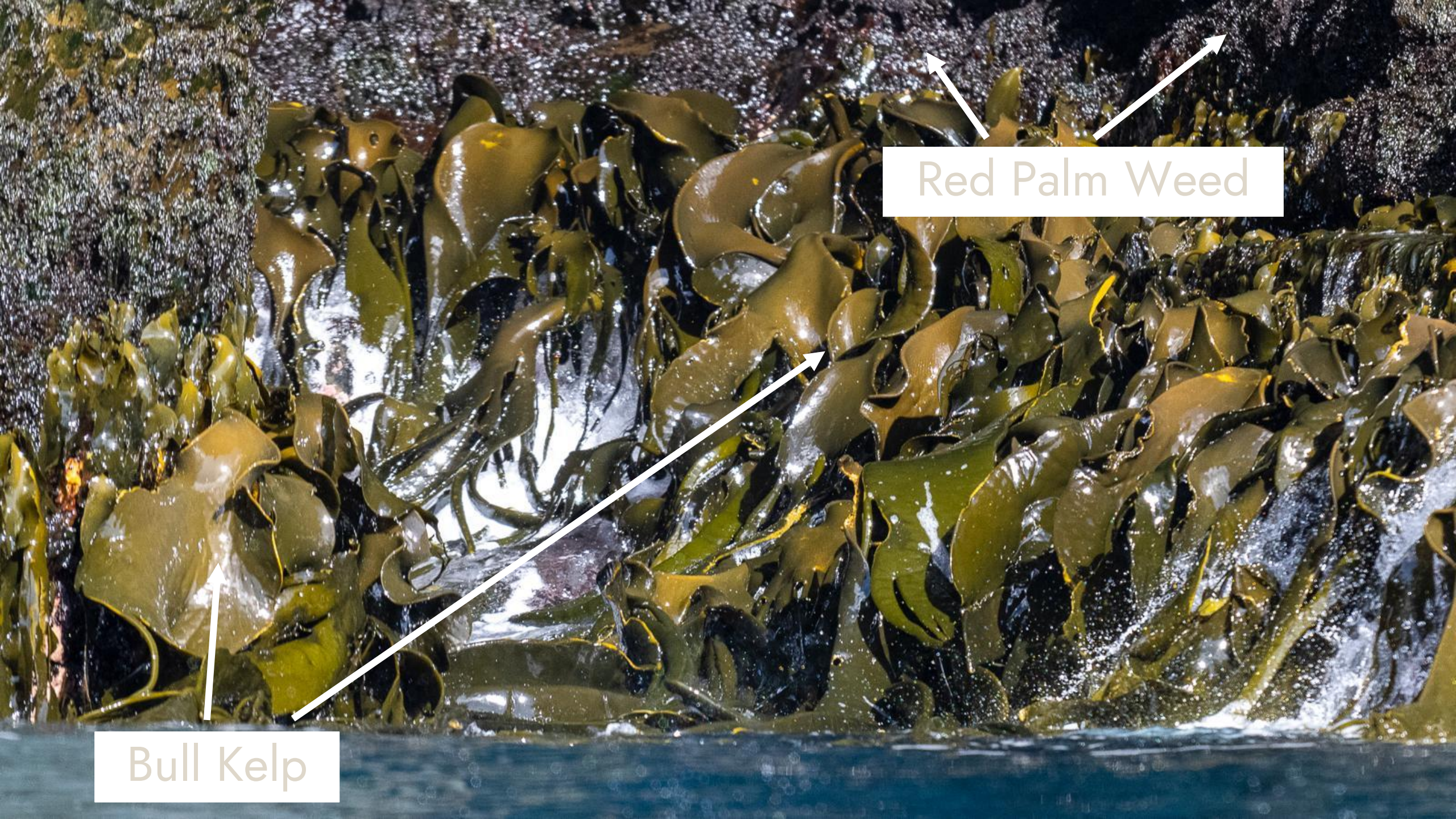
South Georgia Big Seaweed Search Project

On our voyage we conducted 1 Seaweed project data collection in Hercules Bay, South Georgia

The species identified floating in the water near the shoreline was giant kelp, and the ones attached to the coastline on the water edge were the bull kelp and the red palm weed in majority.

Very little to no calcified seaweed has been recorded, confirming the presence of a healthy ecosystem.

The following slides show photos of the seaweed, taken by Geraldine P.



Red Palm Weed

Bull Kelp





Giant Kelp



NASA Globe Cloud Observer

Together with Linda, you collected 8 observations of clouds for the citizen science project of NASA.

[View our data](#) on the global map

Happywhale

A total number of 4 sightings of humpback whales have been submitted to Happywhale thanks to the good quality of the pictures taken.

We have not heard back of any matching individuals yet.

[View our submissions to Happywhale](#)





Light-mantle Albatross. Picture by Géraldine Prince/HX

E-bird

Together with our onboard ornithologist George, you identified and counted 69 species of birds and submitted 37 checklists to Ebird. The most sighted species were the Gentoo penguin, the Imperial Cormorant and the Antarctic Prion.

View our Ebird data by [clicking this link](#)

ORCA Cruise Conservationist



Looking out for whales and dolphins



Ane joined the expedition team as a ORCA cruise conservationist, an UK-based charity looking out for whales and dolphins. During our days at sea, she spent long hours on the outer deck 5, binoculars in her hands, searching with the smallest sign of wildlife breaking the surface of the water. Many of you had a chance to interact with her and learn more about the ORCA charity and the work they do across the world. HX has been working in collaboration with them for several years, and it is always a pleasure to have one of their members join our team for a voyage or two.

ORCA Distance Sampling



Ellie and Charlotte have been on board carrying out some exciting whale research, for a project that is monitoring recovering whale populations in the Southern Ocean with a particular focus around South Georgia and the Antarctic Peninsula. Ellie and Charlotte have been collecting their data from the bridge of the ship using a distance sampling methodology which will enable them to calculate population abundance and density, something which has never been done around South Georgia before. A total of 185 animals have been recorded, see the complete ORCA sightings map [by clicking on this link](#) .



BAS Team

A team from the British Antarctic Survey (BAS) joined the Fram in Stanley, Falkland Islands on 14 November. Under agreement between BAS and HX, it was planned to input the team to Signy research station in the South Orkney Islands. Unfortunately, heavy sea ice prevented Fram from getting near the station so the team remained on board. The contingency plan was initiated and while at Orne Harbour on the Antarctic Peninsula the team were transferred to the BAS ship RRS Sir David Attenborough (SDA) on 25 November. The SDA was able to work through the sea ice and the team arrived at Signy station on 27 November.

BAS and the Signy team are very grateful to HX, Captain, crew, Expedition staff and all guests on board the Fram for their support, warm welcome and great conversation.



**British
Antarctic Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL



Meeting RRS Sir David Attenborough

RRS Sir David Attenborough is a research vessel owned by the Natural Environment Research Council and operated by the British Antarctic Survey for the purpose of research and logistic support.

Fun Fact: A #nameyourship online poll was orchestrated in 2016 to name the vessel, and the name Boaty McBoatface was suggested by BBC Radio presenter James Hand. The idea was so well received that it became the first suggestion in the pool by 33%. The vessel was finally named after the famous man, but one of the submersible got the comic name as an homage to the poll.



The Rescue Mission

After receiving an urgent email from IAATO containing a help request of the National Oceanic and Atmospheric Administration (NOAA) to retrieve a remote specialized underwater glider after the loss of its propulsion, we were able to alter our course to intercept the glider on our way to the Peninsula. Once it was spotted from the bridge, Bosun Renato and two of his men, JP and Walter launched the MOB into 2.5m swell and 40 knots wind to catch the 100kg tube. Wonderful job from our 3 heroes of the day, they deserve our applause for safely bringing back onboard this \$350K piece of engineering!





Species Highlights of the Falkland Islands





Southern Rockhopper Penguin

Latin Name: *Eudyptes chrysocome*

Fun Fact: When the chick hatches, it's the male that will stand at the nest for the first 3 weeks guarding it until it is big enough to fend for itself. During this time the female does all the foraging for the growing chick.

Picture by Geraldine Prince/HX



Black-browed Albatross

Latin Name: *Thalassarche melanophris*

Fun Fact: this is the most abundant albatross species in the world with a current estimate of 1.4 million mature individuals.

Picture by Geraldine Prince/HX



Magellanic Penguin

Latin Name: *Spheniscus magellanicus*

Fun Fact: the braying, donkey-like, call of the Magellanic penguin resulted in it often being referred to as the 'jackass penguin'.

Picture by Geraldine Prince/HX



Striated Caracara

Latin Name: *Phalcoboenus australis*

Fun Fact: They are one of the rarest birds of prey in the world with a population possibly as low as 1000 mature birds. On the Falklands, their summer diet is mainly seabirds and on New Island alone caracaras are estimated to take 25,000 thin-billed prions per year.

Picture by Geraldine Prince/HX



Commerson's Dolphins

Latin Name: *Cephalorhynchus commersonii*

Fun Fact: These little dolphins certainly know how to have fun, they don't just surf the wave at the bow of a ship... they surf the waves at Saunders Island beach too! They come within meters of the wash line. On previous occasions they occasionally get stuck as a wave retreats, but another wave soon comes for them to swim back to safety.

Picture by Geraldine Prince/HX

Species Highlights of South Georgia





King Penguin

Latin Name: *Aptenodytes patagonicus*

Fun Fact: They are somewhat of a dietary specialist eating mainly a small schooling fish called lanternfish. To catch these they regularly dive to 100m deep in polar frontal areas.

Picture by Geraldine Prince/HX



Macaroni Penguin

Latin Name: *Eudyptes chrysolophus*

Fun Fact: They have a strange breeding ecology of normally laying two eggs of very different sizes. The first egg is 62% smaller than the second egg and unlikely to survive as the female will normally tip it out of the nest when the second egg arrives.

Picture by Geraldine Prince/HX



Antarctic Fur Seal

Latin: *Arctocephalus gazella*

Fun Fact: Pushed almost to extinction by sealing in the 1800s, seeing these back in their millions today is an inspiring story of wildlife recovery. Roughly 1 in 1,000 is born leucistic, with almost white fur, we see them thrive also as mature adults like the bull seen during our first zodiac cruise in South Georgia.

Picture by Geraldine Prince/HX



Southern Elephant Seal

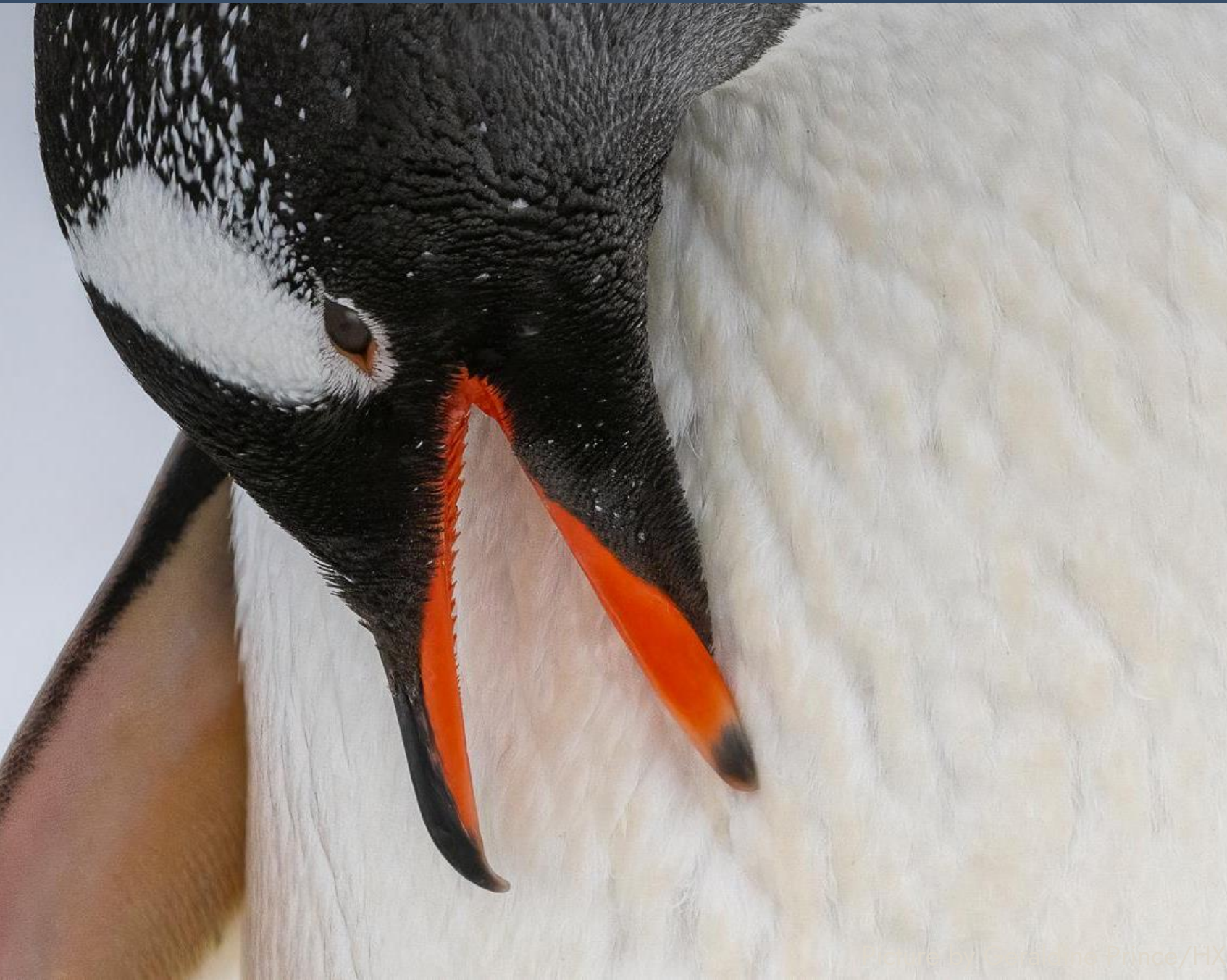
Latin: *Mirounga leonina*

Fun Fact: The mammal with the largest size difference between sexes, bulls can reach 6.5m and 4 tonnes, and females just 2.8m and 800kg. We saw these seals getting very warm in the sun at Gold Harbour, flicking cooler sand from below the surface onto themselves for temporary relief.

Picture by Geraldine Prince/HX

Species Highlights of Antarctica





Gentoo Penguin

Latin Name: *Pygoscelis papua*

Fun Fact: This is known as speedy penguin and is the fastest swimming penguin in the world having been recorded at speeds of 36kmph (22mph).



Chinstrap Penguin

Latin Name: *Pygoscelis antarcticus*

Fun Fact: Chinstrap penguins are experts at the power nap! A recent study showed that they microsleep over 10,000 times a day and accomplish this in 4 second bouts of sleep.

Picture by Geraldine Prince/HX



Adelie Penguin

Latin Name: *Pygoscelis adeliae*

Fun Fact: During the breeding season, Adelie penguins build their nests from small rocks and stones. Males will give females stones as gifts to cement their pair bond

Picture by Geraldine Prince/HX



Humpback Whale

Latin: *Megaptera novaeangliae*

Fun Fact: Also known as the “superheroes of the sea”, there have been a number of records of them rescuing other species from predators like sharks and orcas. With their large pectoral fins, they would actually fight back and slap the predator, rather than fleeing the scene like blue and fin whales would do.

Picture by Geraldine Prince/HX



Weddell Seal

Latin: *Leptonychotes weddellii*

Fun Fact: The southernmost mammal on our planet! These seals maintain breathing holes in the sea ice using their teeth, keeping them away from the oceans edge to avoid predators like orcas and leopard seals. They also sing, even whistling in their sleep, which some of our campers were lucky to hear during the night

Picture by Geraldine Prince/HX



THANK YOU FOR TRAVELLING WITH US!