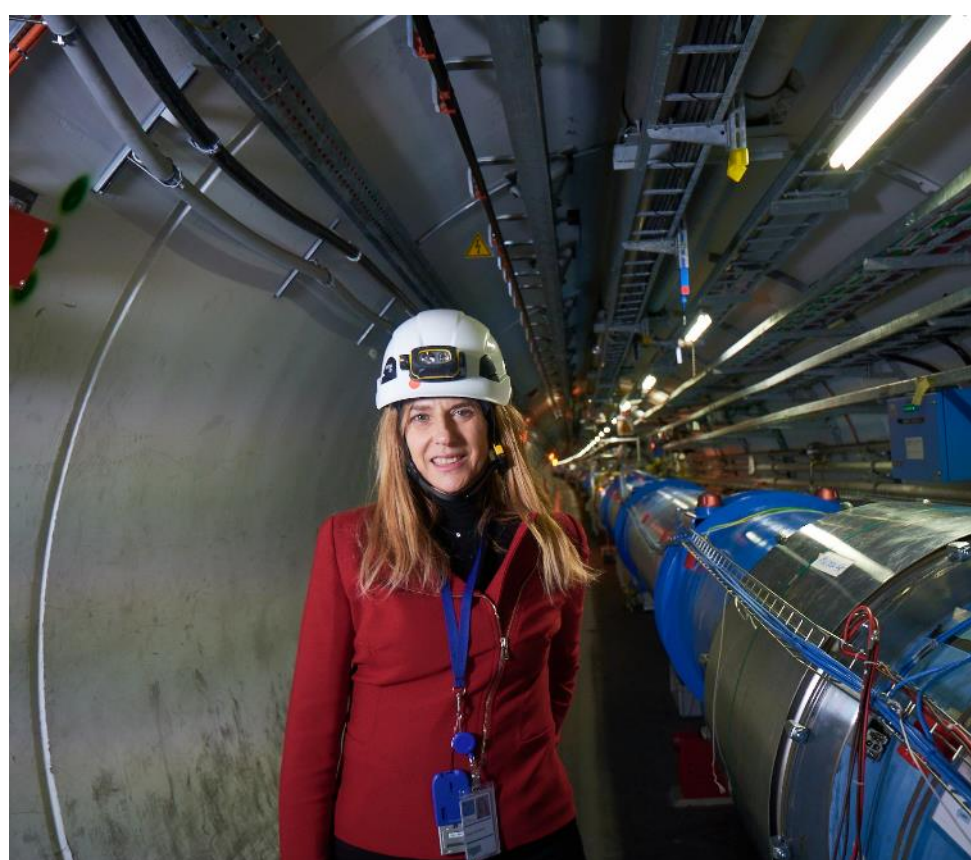


POLARQUEST
CITIZEN SCIENCE



Why do poles matter?

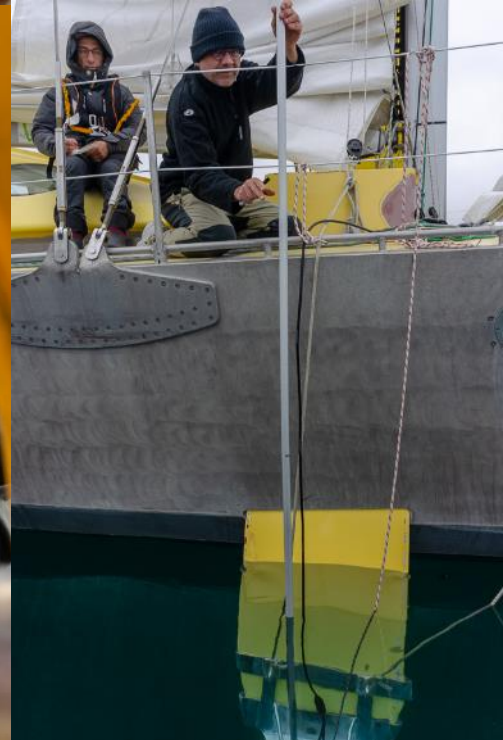
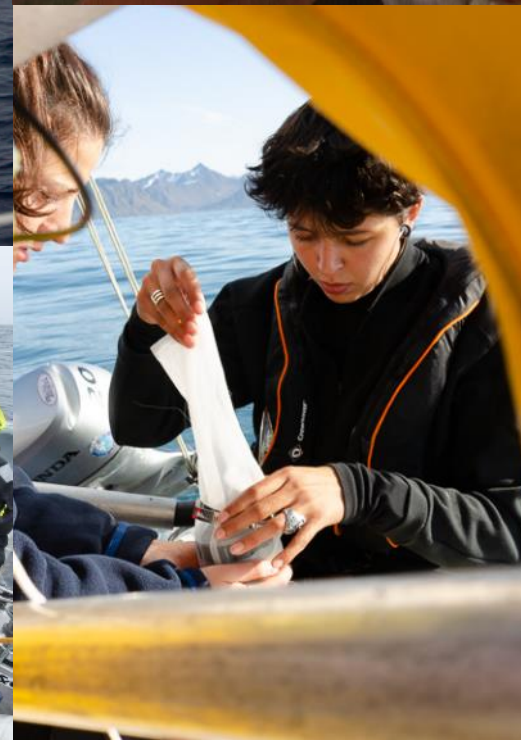


POLARQUEST2018





PQ2018: 82°07' North



Polar QuEEEest 1928 – 2018



The EEE project sails to North Pole !

Airship Italia mission – 1928

Sailboat Nanuq mission – 2018

To measure cosmic ray flux
with 3 detectors

40° in latitude span

5000 km distance

CENTRO
FERMI

Enrico Fermi

MUSEO
STORICO DELLA FISICA
E
CENTRO
STUDI E RICERCHE
ENRICO FERMI



Extreme
Energy
Events

Science inside Schools

PolarquEEEst

All the detectors installed by the end of July 2018



— POLARQUEST2021



Map

 NORWEGIAN POLAR INSTITUTE



TopoSvalbard

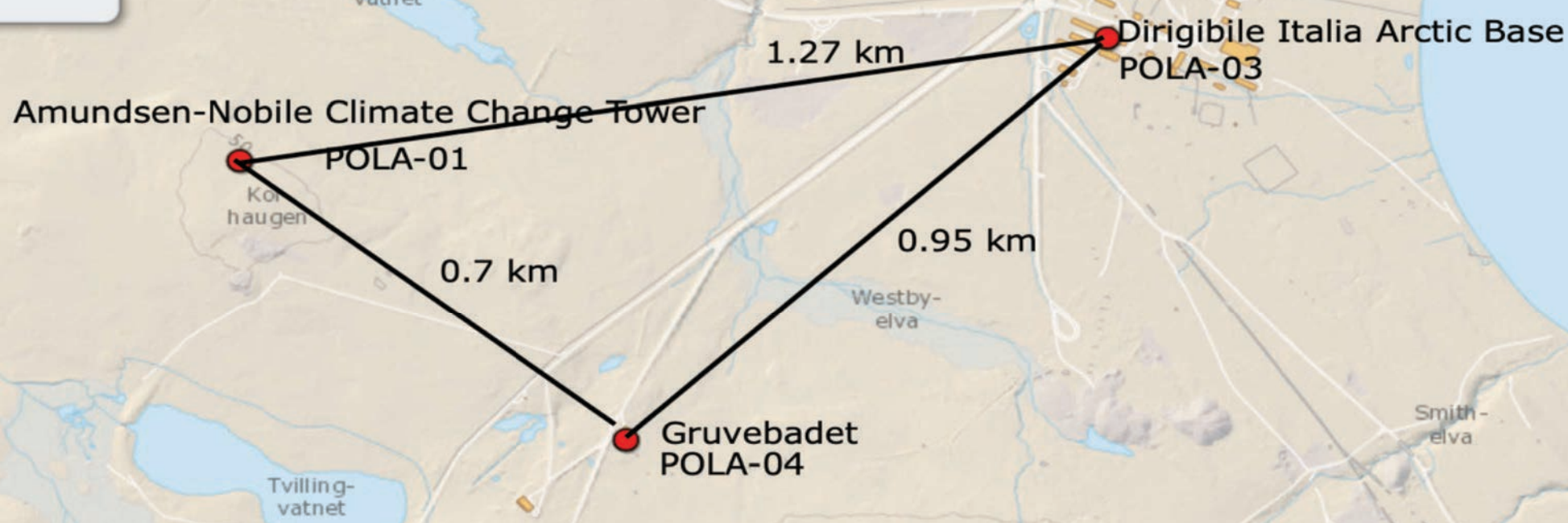
Zoom to place name

945 m / 0.510 nm

0.95 km

North/Lat. East/Long.

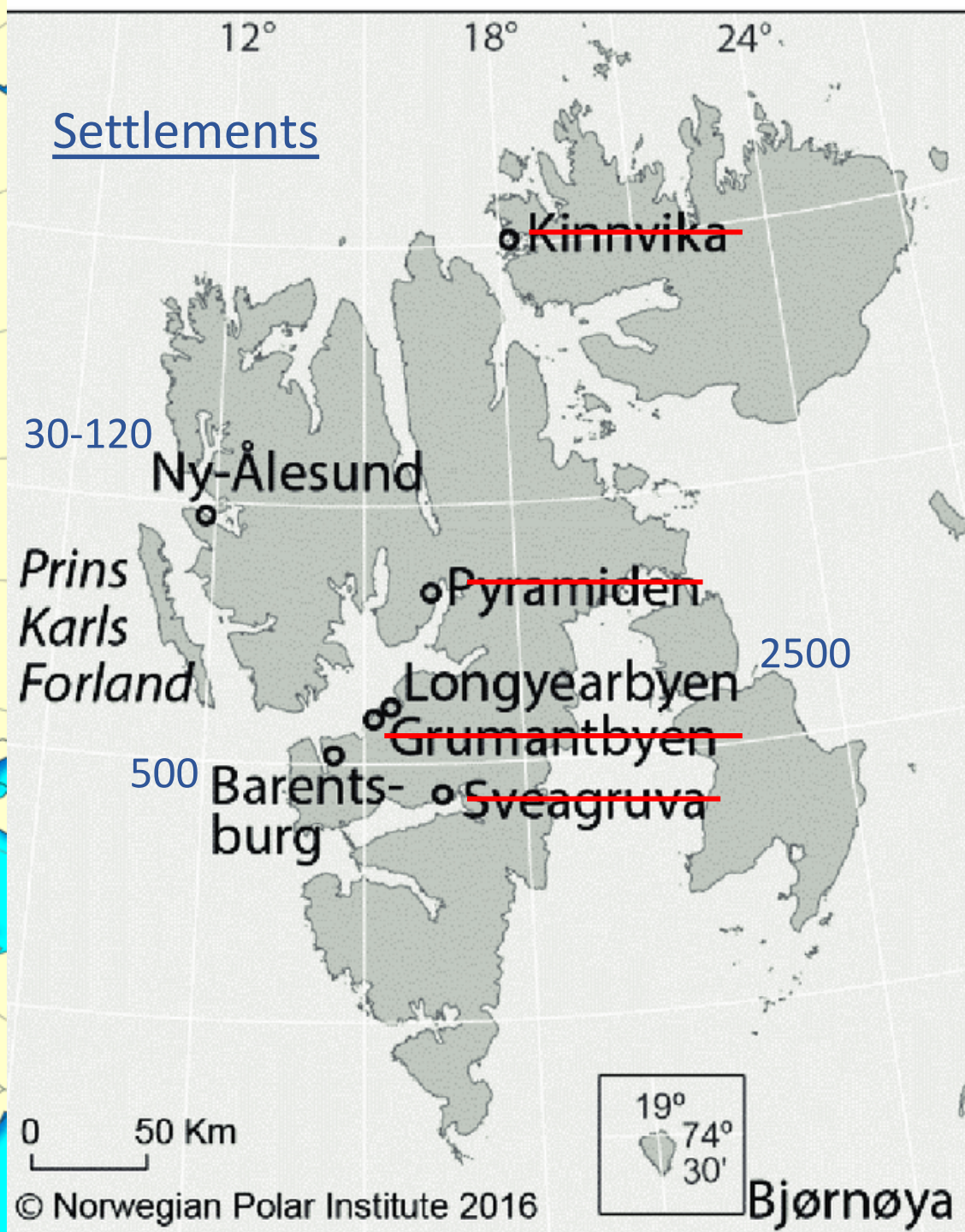


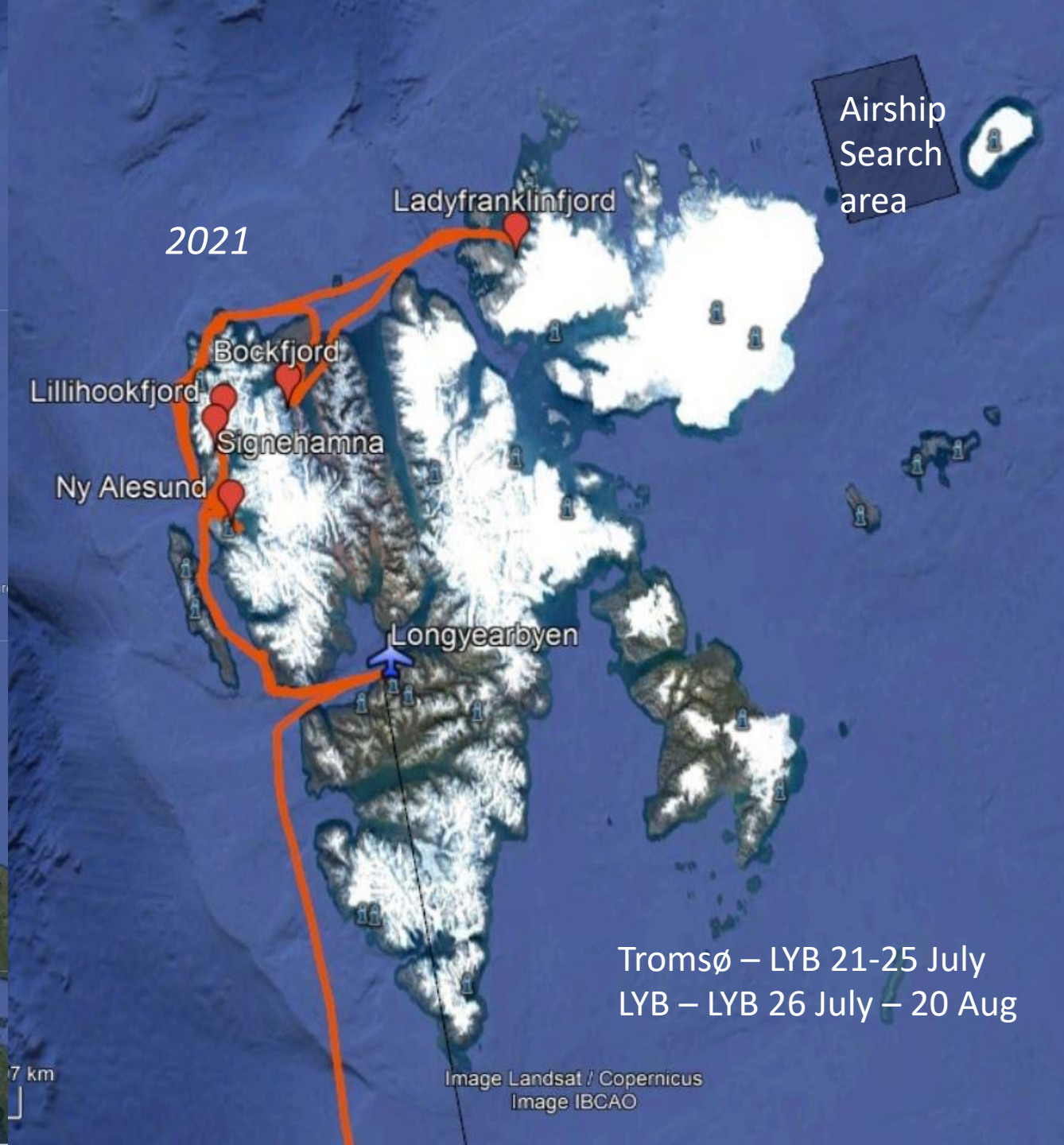








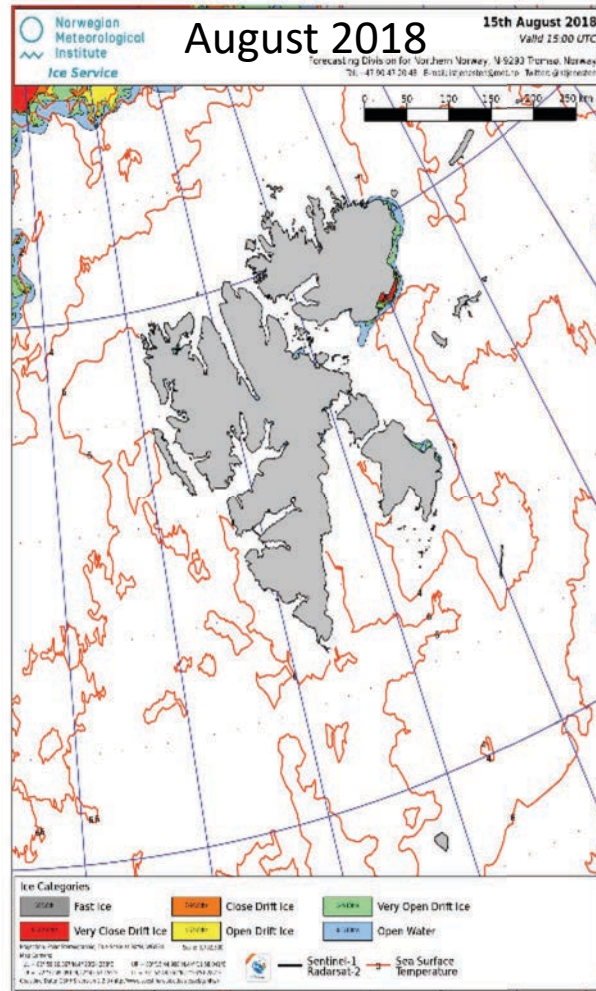




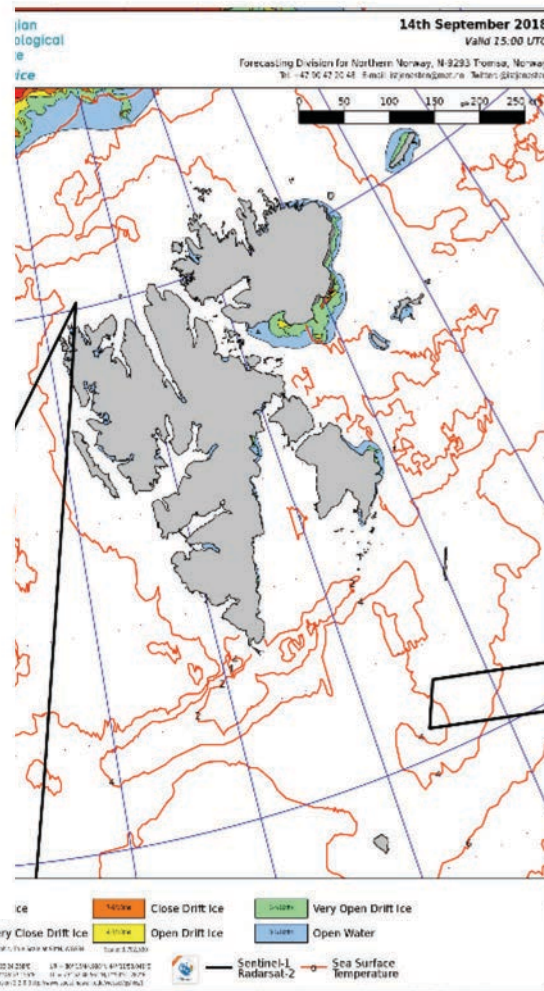
August : 24h daylight but ice still possible

September : minimal sea Ice but less daylight and more storms

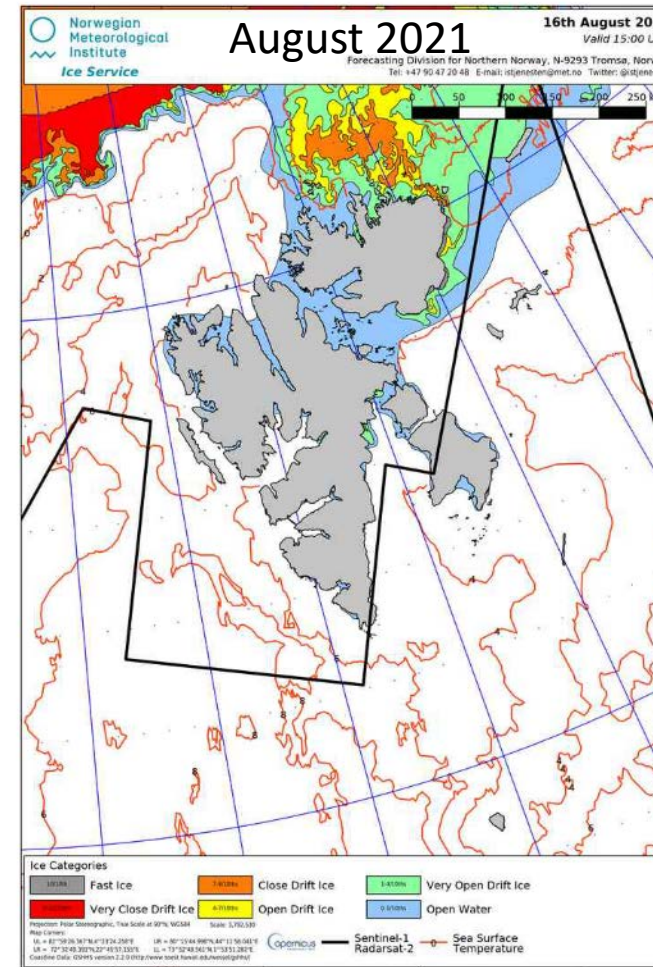
Covid/Quarantine : Norway strict rules, was accessible only 11 July!



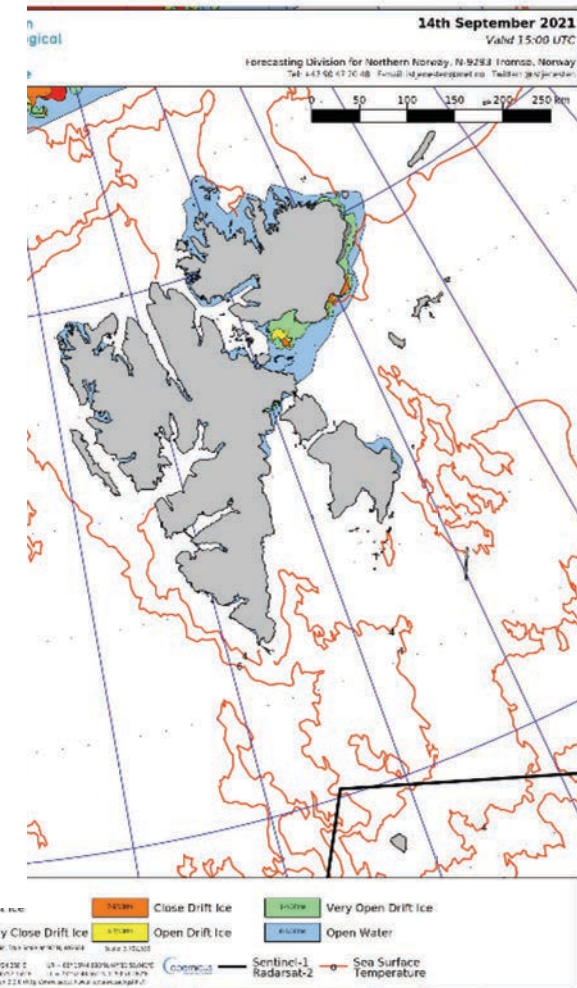
September 2018



August 2021

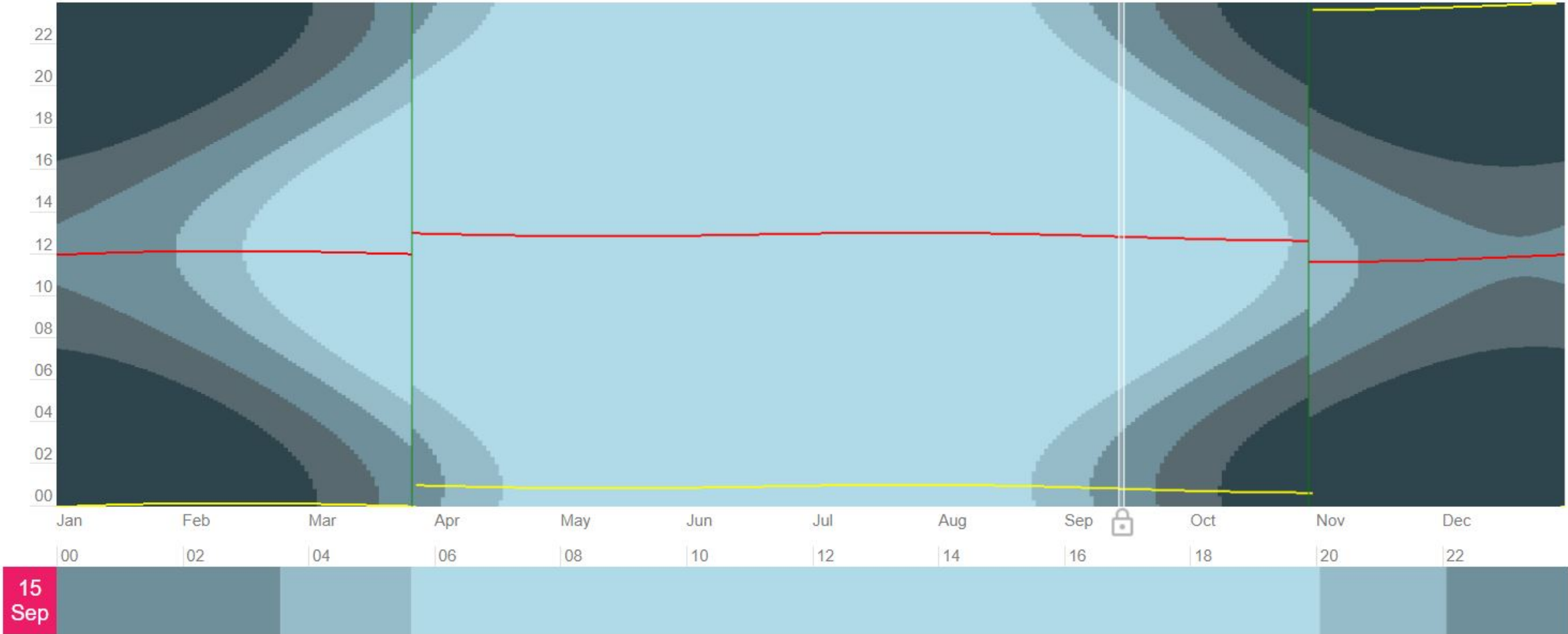


September 2021



2021 Sun Graph for Longyearbyen

Rise/Set Times Day/Night Length



Night: Not for this day
Astronomical Twilight: Not for this day
Nautical Twilight: 00:00 - 03:33
22:02 - 00:00
Civil Twilight: 03:33 - 05:38
20:02 - 22:02
Daylight: 05:38 - 20:02
Solar Noon/Midnight: 12:52
00:52





Metal sailboat : Best Explorer

Size: 15.2 m x 4.3 m (51 ft)

Speed: 7 kn

Depth: 1.40 – 2.90 m

Places : 12 → 10 max used

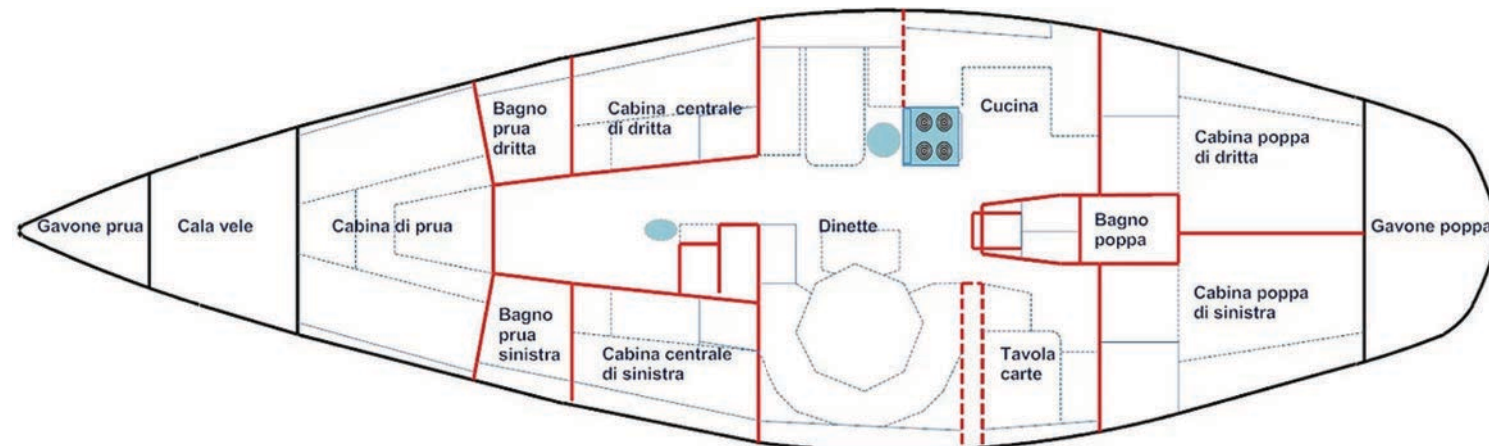
Food: 6 weeks

Fuel: 2000 L (2000 miles)

Water: 1600 L (4 L/pd)

Tender: 6 person zodiac, 15hp, spare

Scientific equipment



2 Expert Crew (captain & co-skipper)

3 Polarquest

4 Scientists

1 Medical Doctor OR Film maker

Crew on board

Nanni : Skipper (Arctic Sail Expeditions Italia)

Nicoletta : Sailor & Cook (Arctic Sail Expeditions Italia)

Paola : Project leader & Science communicator (PQ/CERN)

Mike : Technical Coordinator & Photographer (PQ/CERN)

Kevin : Engineer & Diver (PQ/CERN)

Christian : Film maker (Freelance, not on photo)

Christel : E-DNA & Methane/CO2 researcher (Swiss Polar Foundation)

Elias : Student Environmental Sciences (ETH Zurich)

Gianluca : Geographer, Scientific Coordinator & Drone Pilot (PQ / European University Rome)

Dominik : Marine geologist & Seafloor mapping expert (University Gdansk / Norbit)





Crossing the Barents Sea

— Inside the Boat





Limited Space on Board

Authorisations needed

- RiS (Research in Svalbard)
(science permit)



- Sysselmannen (Police)
(permit outside tourist zone 10)

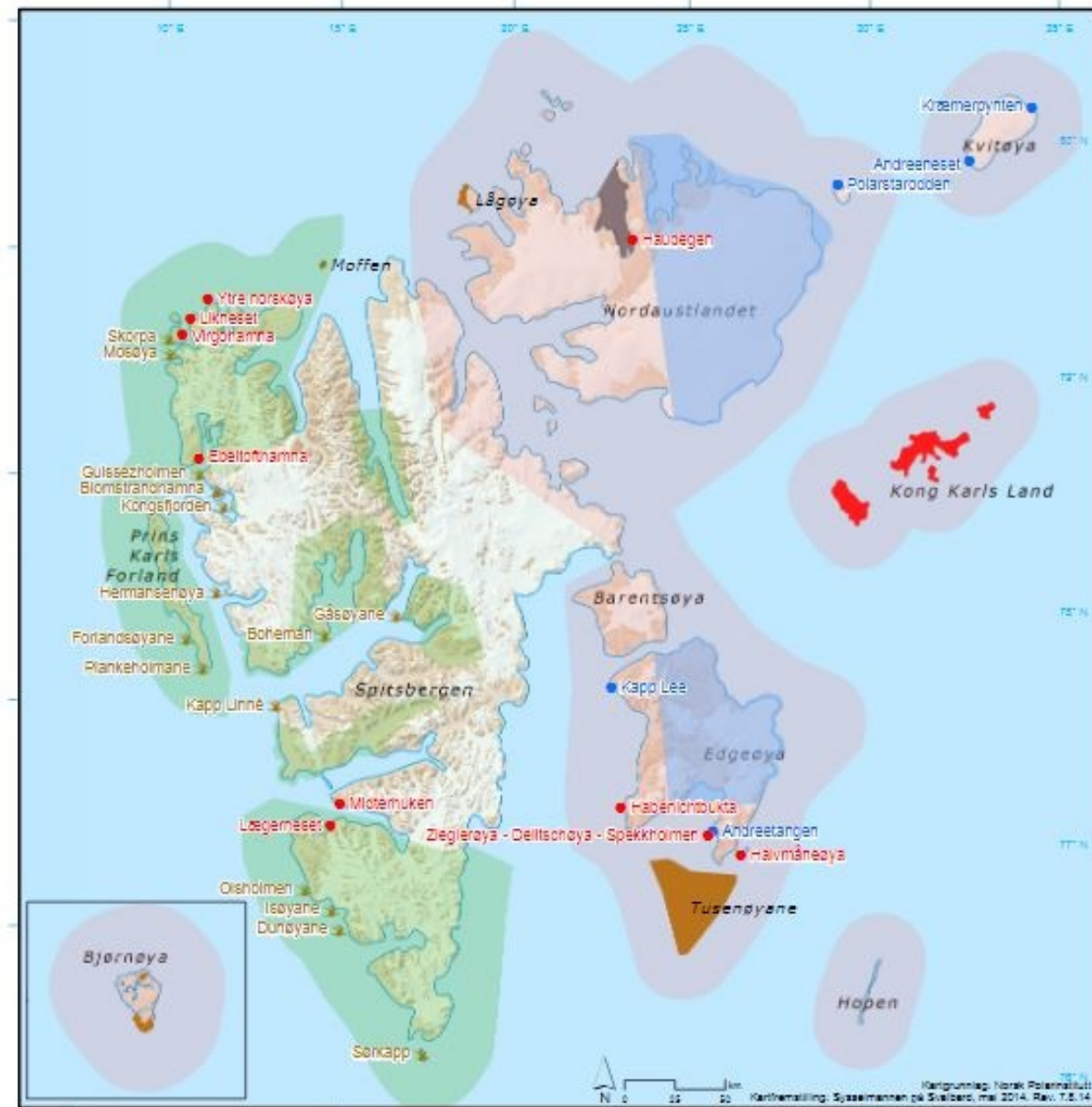


- Weapon permits (Governor)
(proven experience)

- Drone permits (A2)
(max weight 2kg)



Luftfartstilsynet
CIVIL AVIATION AUTHORITY - NORWAY



Areas with access restrictions - Svalbard

- Nature Reserve. 1) and 6)
- National Park. 1)
- Areas where tour operators shall prepare and follow site-specific guidelines for activities. 1)
- Reference area for research. Duty to notify in advance and reporting after the the end of the stay. 1)

Polar Bears







Avoid conflict!

Dangerous bears:

- Females with cubs
- Young inexperienced
- Old males
- Skinny bears...

Predator

300-800 kg

3m tall

Runs 40 km/h

Swims / climbs

Wants to eat you!



2018 incident : One bear dead, one person injured

Polar Bear protection

Observe / situational awareness

- Binoculars
- Drone flight each landing



Bear encounter

- Stay grouped
- Make yourself bigger
- Talk to bear is often enough to scare
- Make more noise
- Flare gun
- Shoot in self defence



Flare guns:

Warning shot when bears at 100-200m
Do not shoot behind bear



Rifles: WW2 Mauser 98
Calibre .30-06 (5 rounds)
4 kg to carry!

Shoot when attacked

Training course!!

Calm nerves!!



■ On watch for Polar Bears



Communications/safety : no internet / phone outside Longyearbyen area



Navigation charts / GPS / AIS / VHF



EPIRB emergency
406/121.5 MHz



Iridium Go
Calls, weather
E-mails
Messages
Photos
- wifi

Iridium phone
Calls, weather



Iridium Inreach
GPS navigation
2 way messages
Emergency



VHF 156-161mhz
5W,+ GPS,
floating, MOB



AIS tracker 161+162 MHz,
GPS, To track tender or
land team



Equipment to bring:

By plane (2x 23kg each): Personal equipment, photo, video, drones, communication

Transport box shipped from CERN: Scientific equip, diving

Local rental: rifles, ammo, flare guns, iridium phone

Local shopping: Food, fuel and water

ONLY in Tromsø, Longyearbyen (& Ny-Alesund)

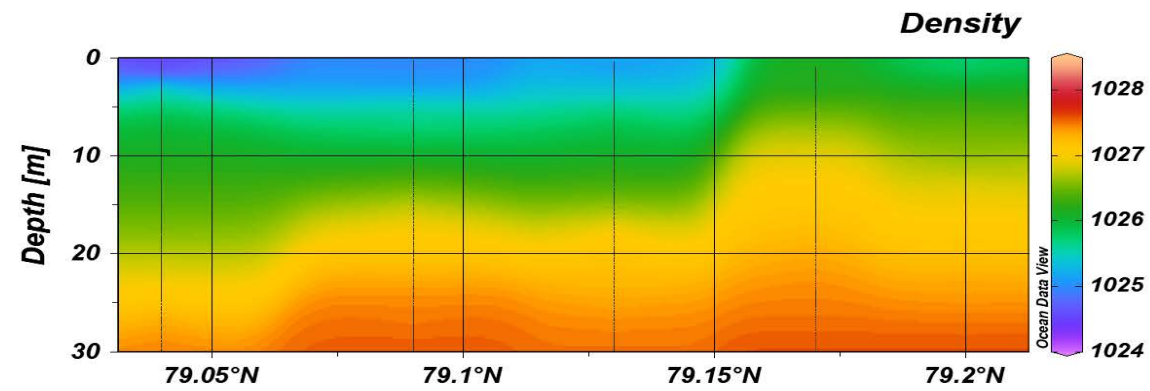
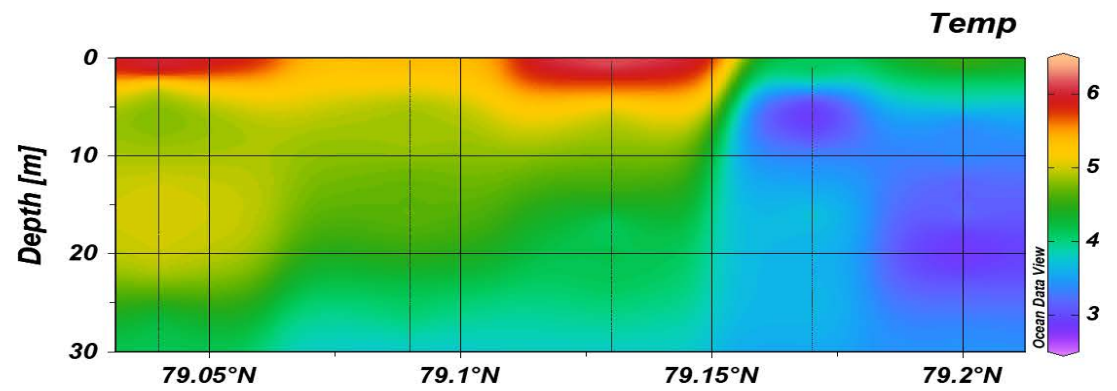
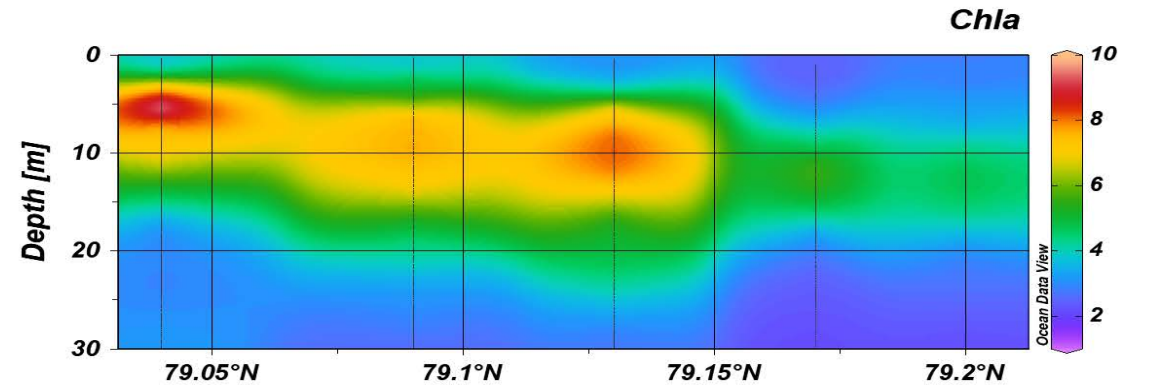
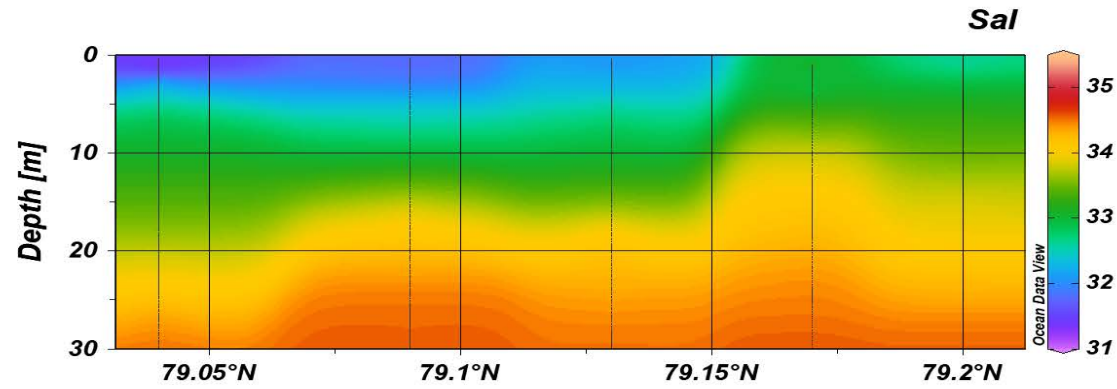


Welcome to the Scientists

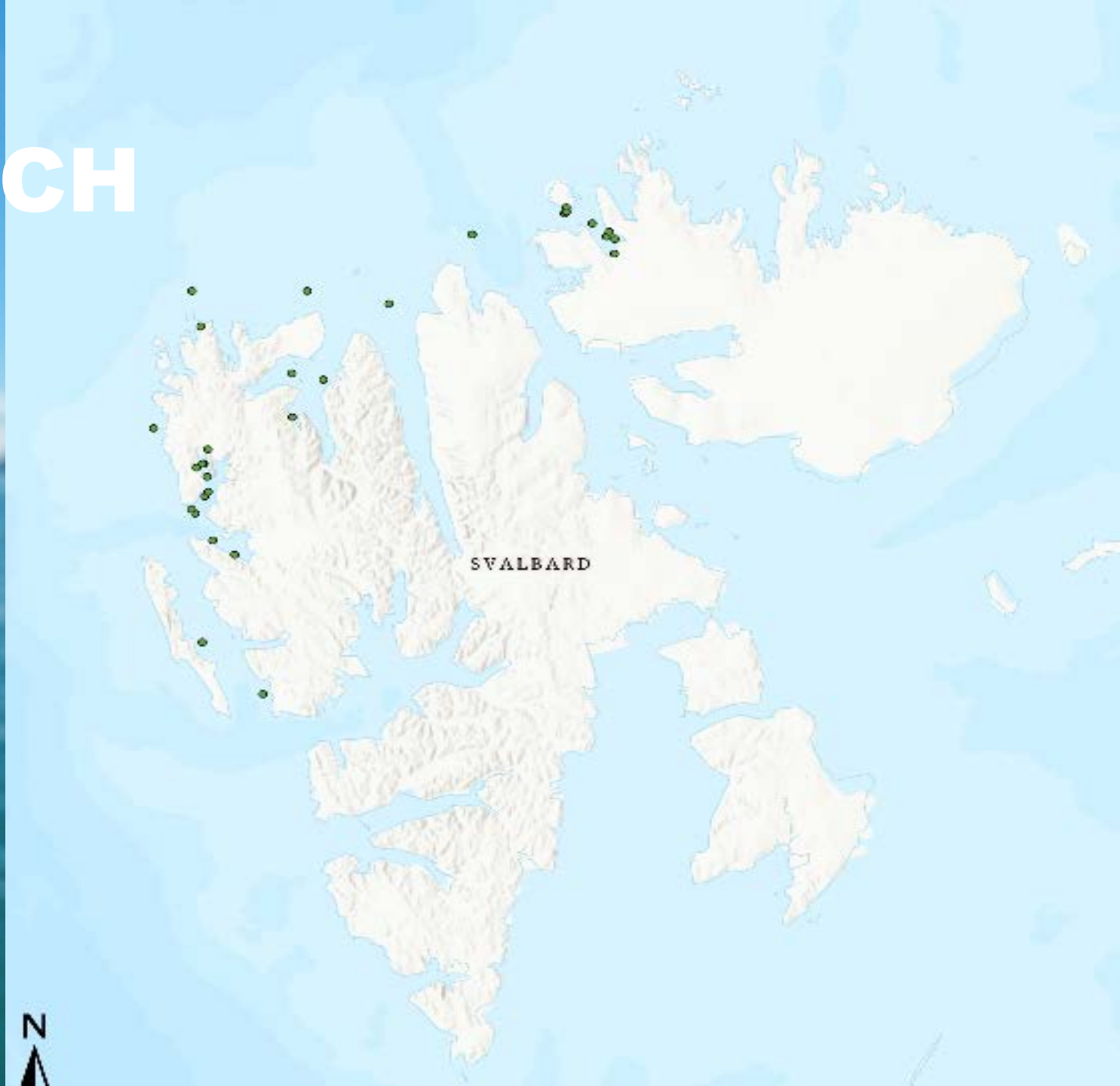
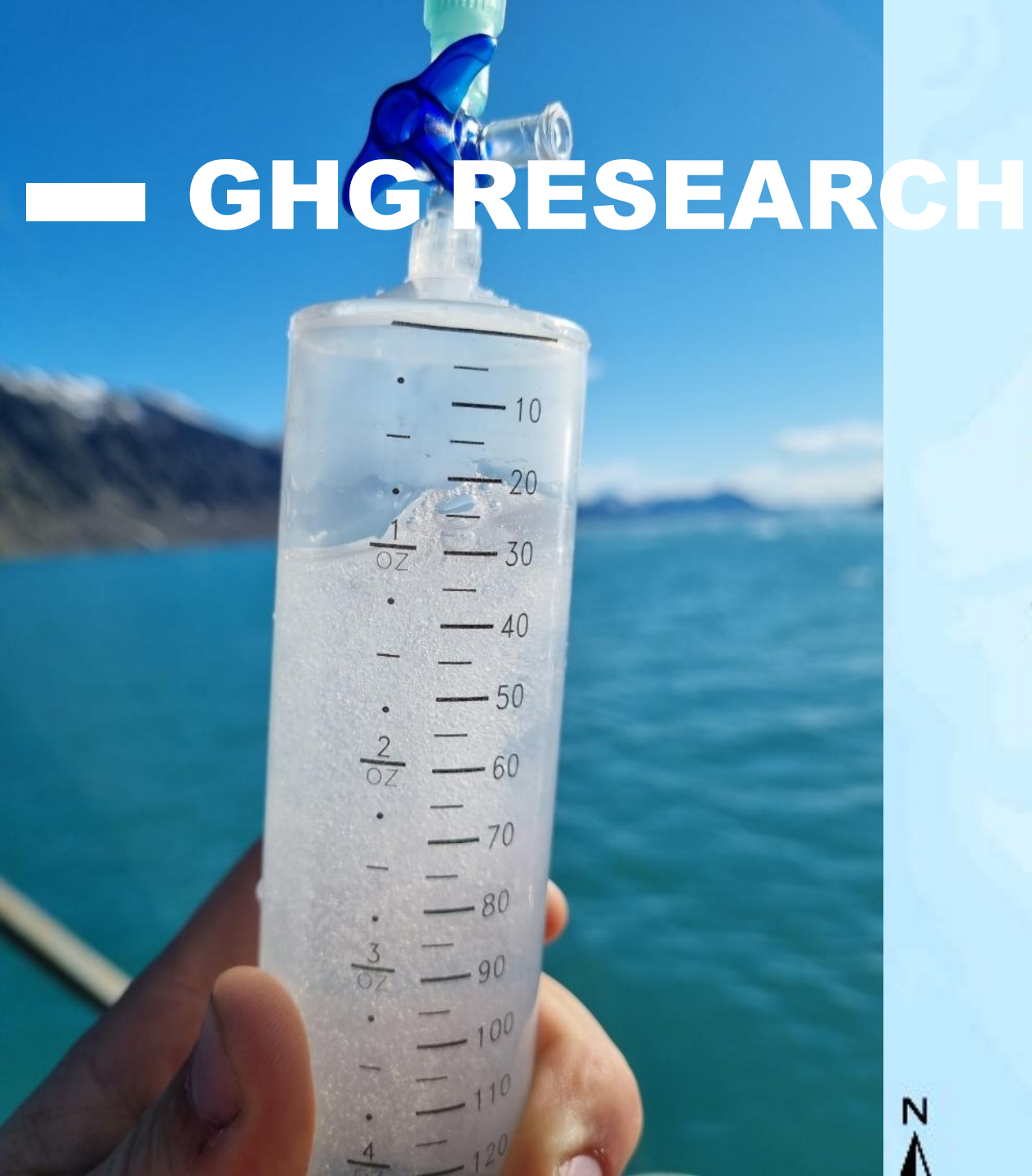


113











— The method

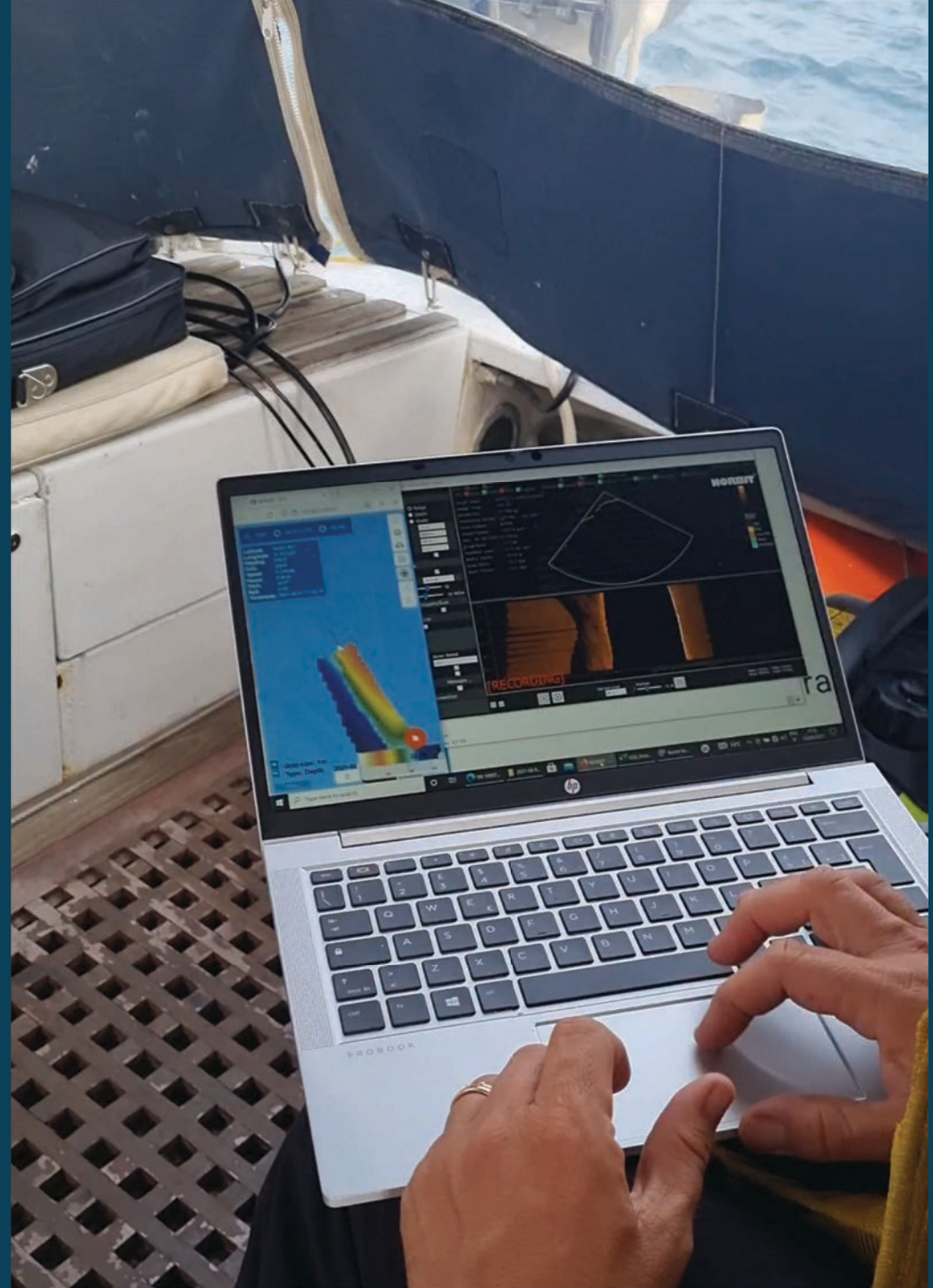
Lady Franklin fjord



Charting the Uncharted



Sonar Scanning

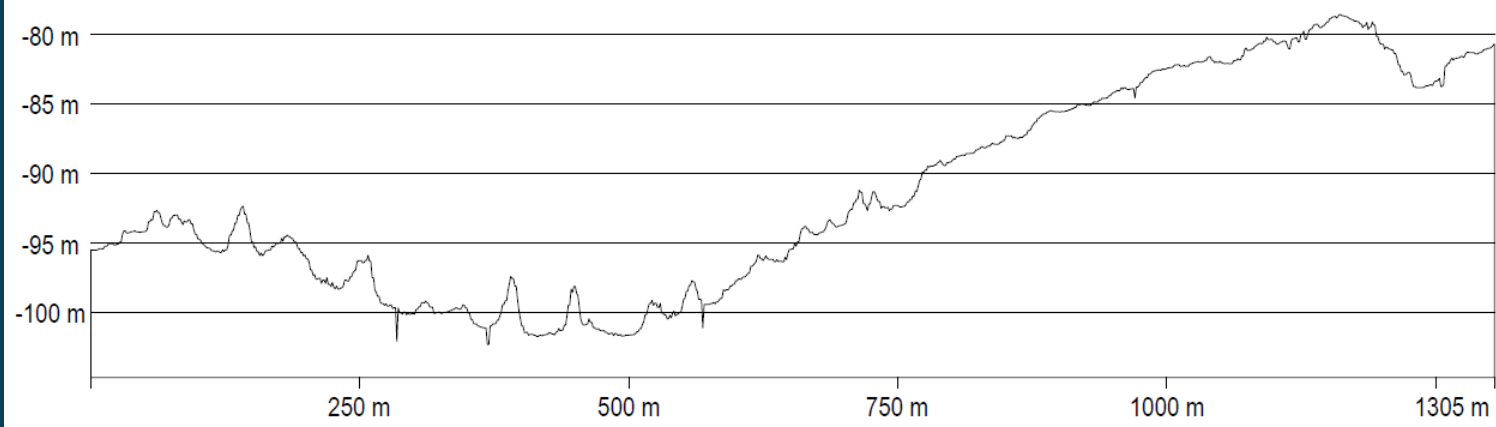
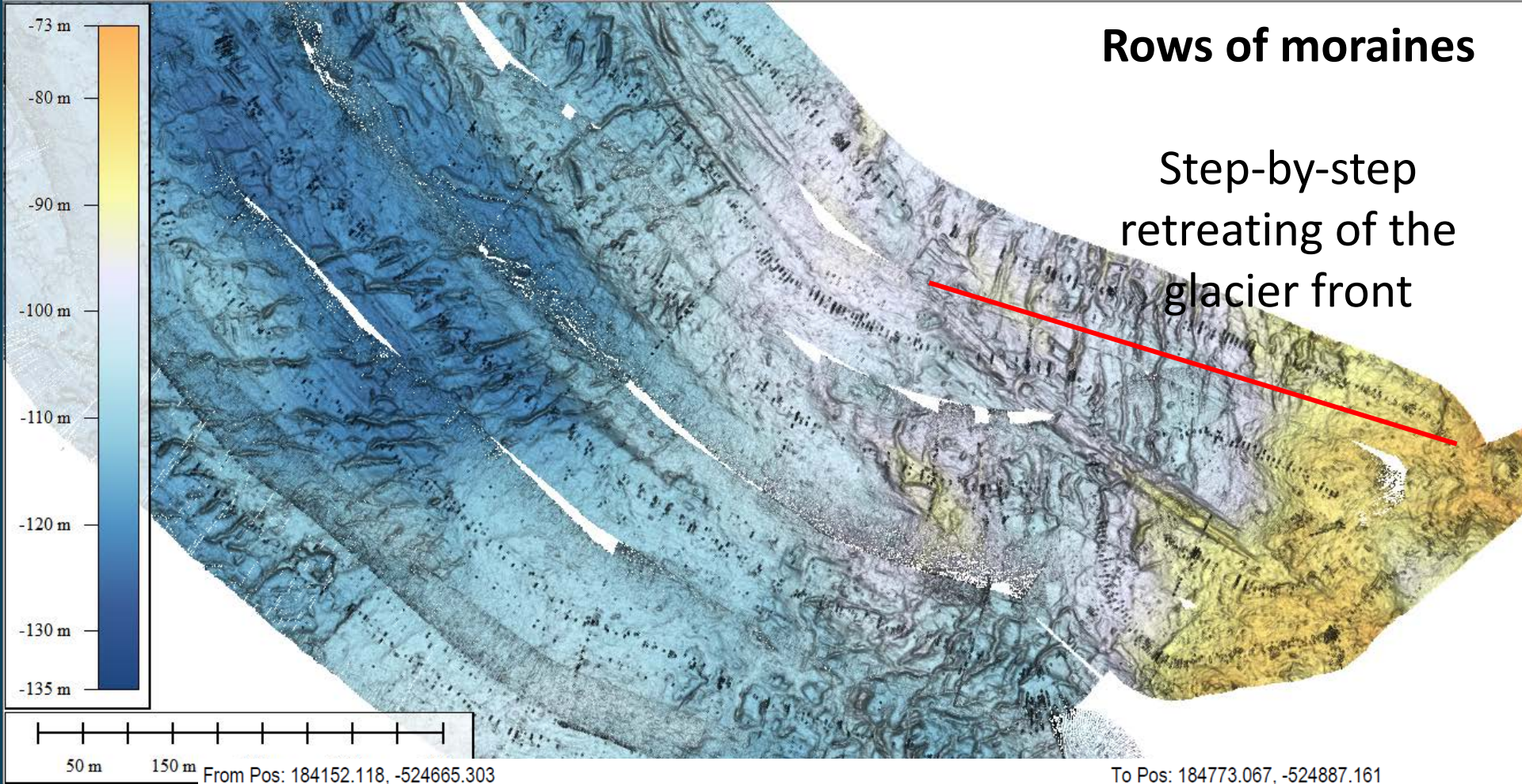


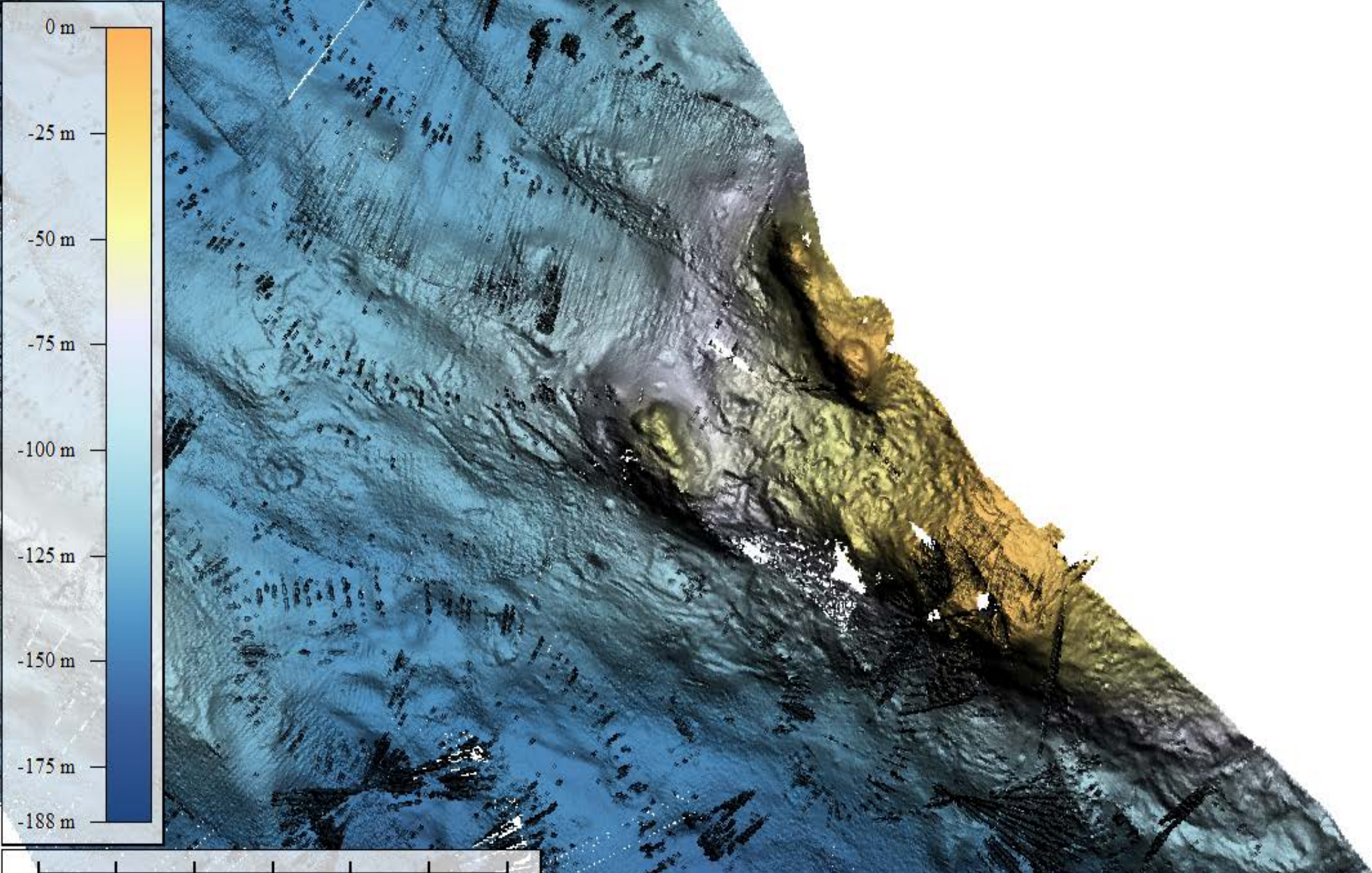
— Lady Franklin Glacier is the least visited in Svalbard







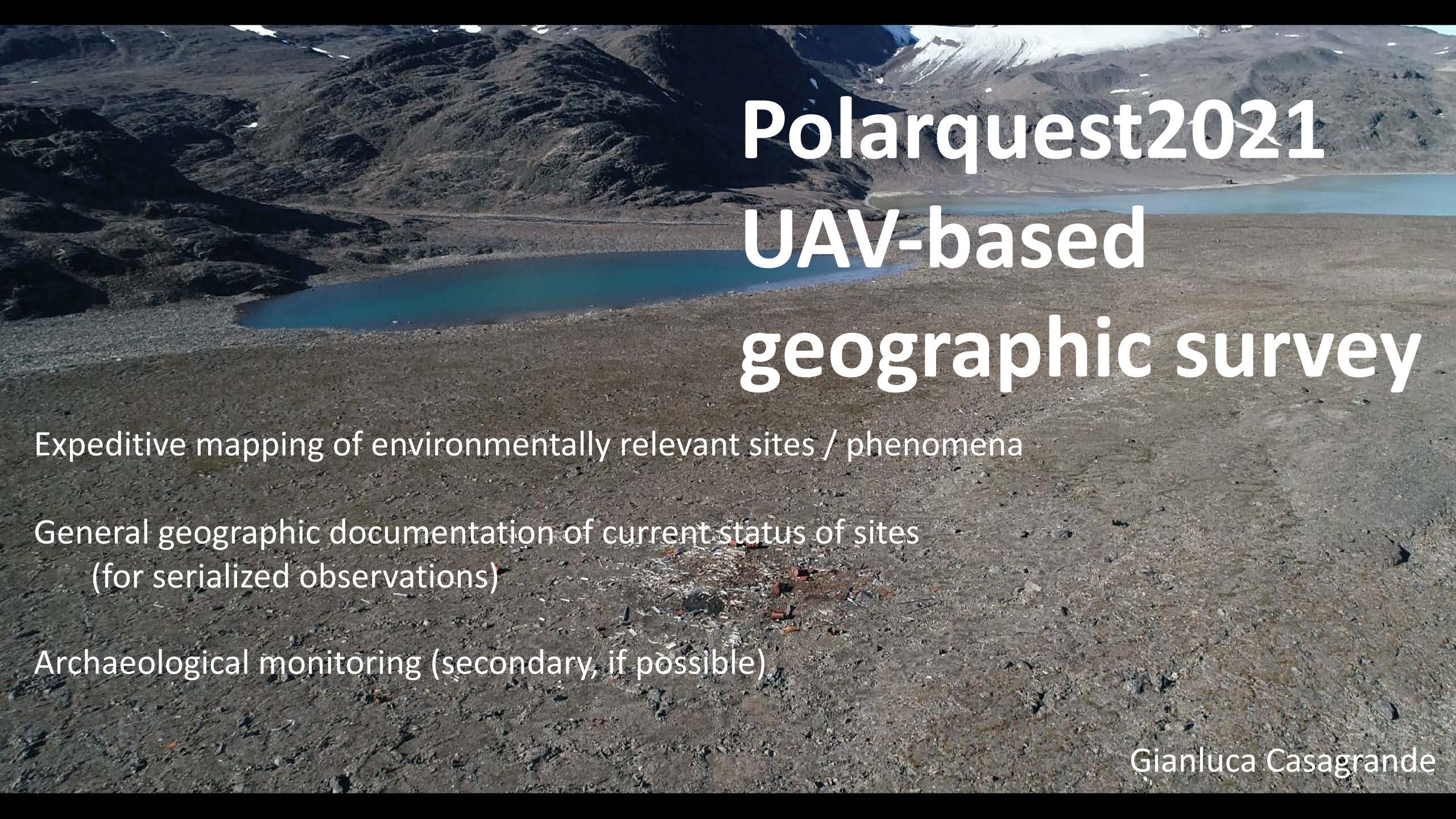






— Freediving In Uncharted Waters

■ 13m deep 0°C



Polarquest2021 UAV-based geographic survey

Expeditive mapping of environmentally relevant sites / phenomena

General geographic documentation of current status of sites
(for serialized observations)

Archaeological monitoring (secondary, if possible)

Gianluca Casagrande



Knospe / Nussbaum Nazi Meteo station

Profile: archaeological monitoring

Technique: low level aerophotogrammetry (30-40 m a.g.l.)

Purpose: ortophotography / GIS mapping / 3D modelling / 3D printing





Perspective 309

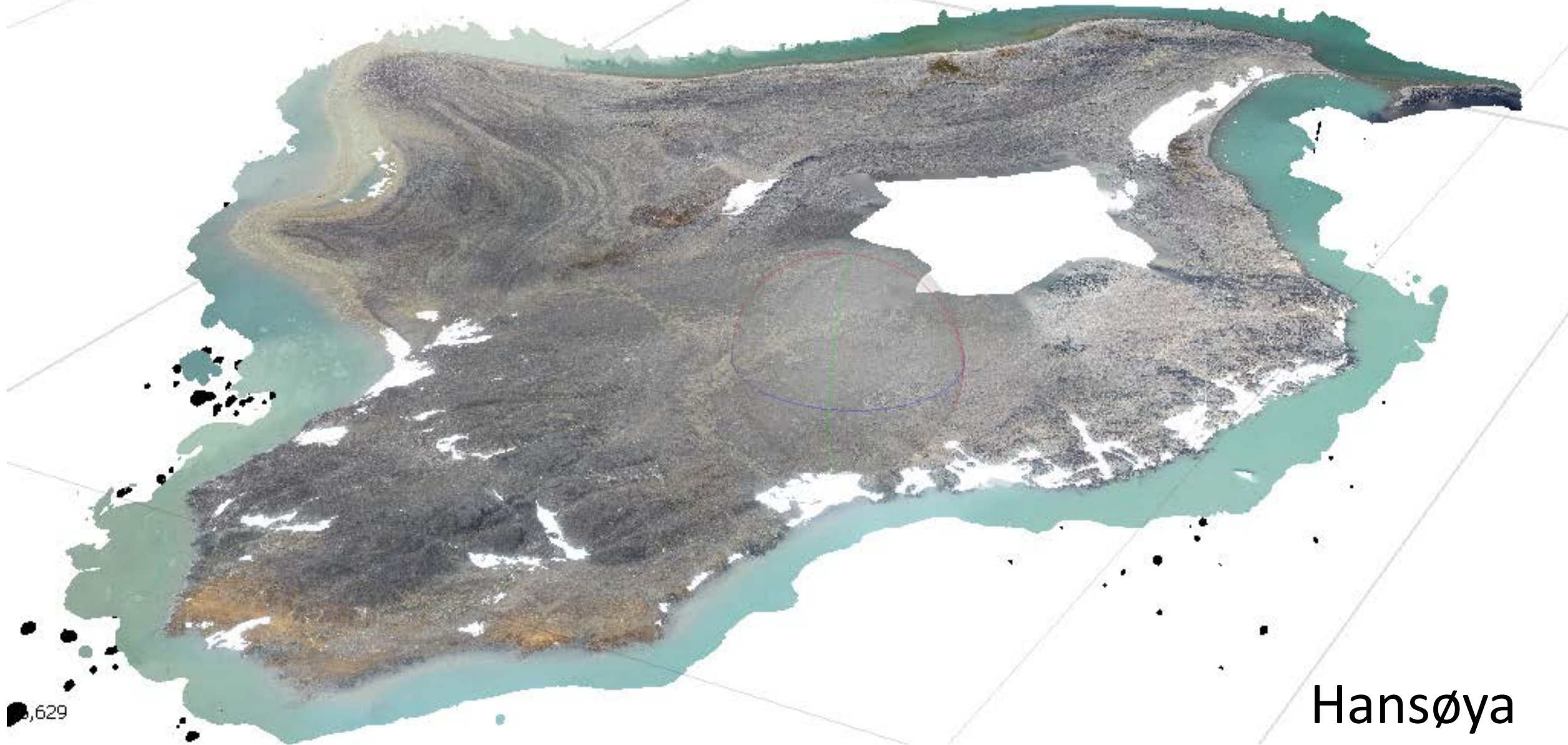
Snap: Axis, 3D

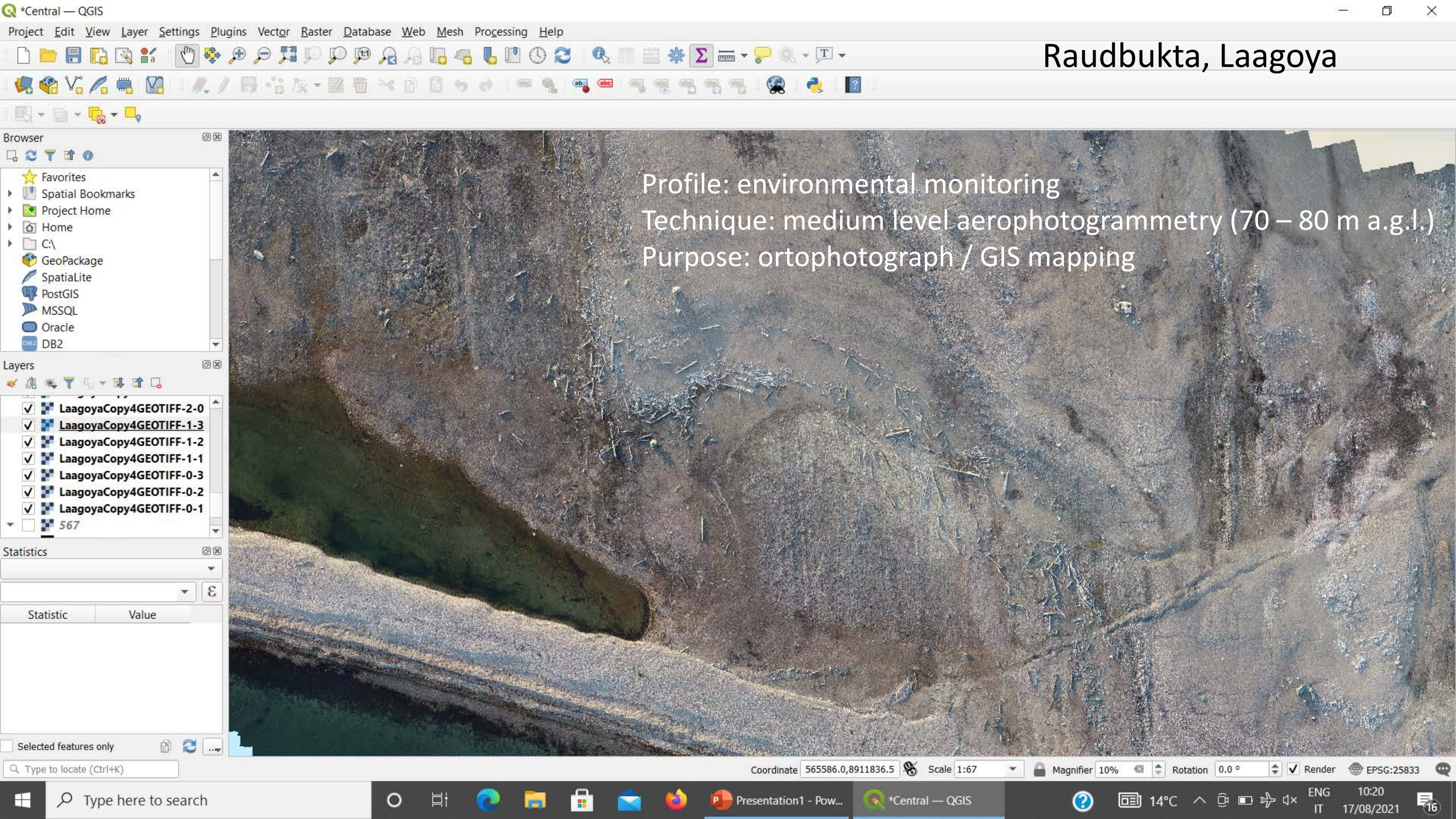
faces: 5,065,894 vertices: 2,535,866

Profile: geographic observation and artificial debris accumulation; geologic mapping

Technique: high level aerophotogrammetry (120 m a.g.l.)

Purpose: ortophotograph / GIS mapping / 3D modelling





Profile: environmental monitoring
Technique: medium level aerophotogrammetry (70 – 80 m a.g.l.)
Purpose: ortophotograph / GIS mapping



Jotunkjeldene, Bockfjorden

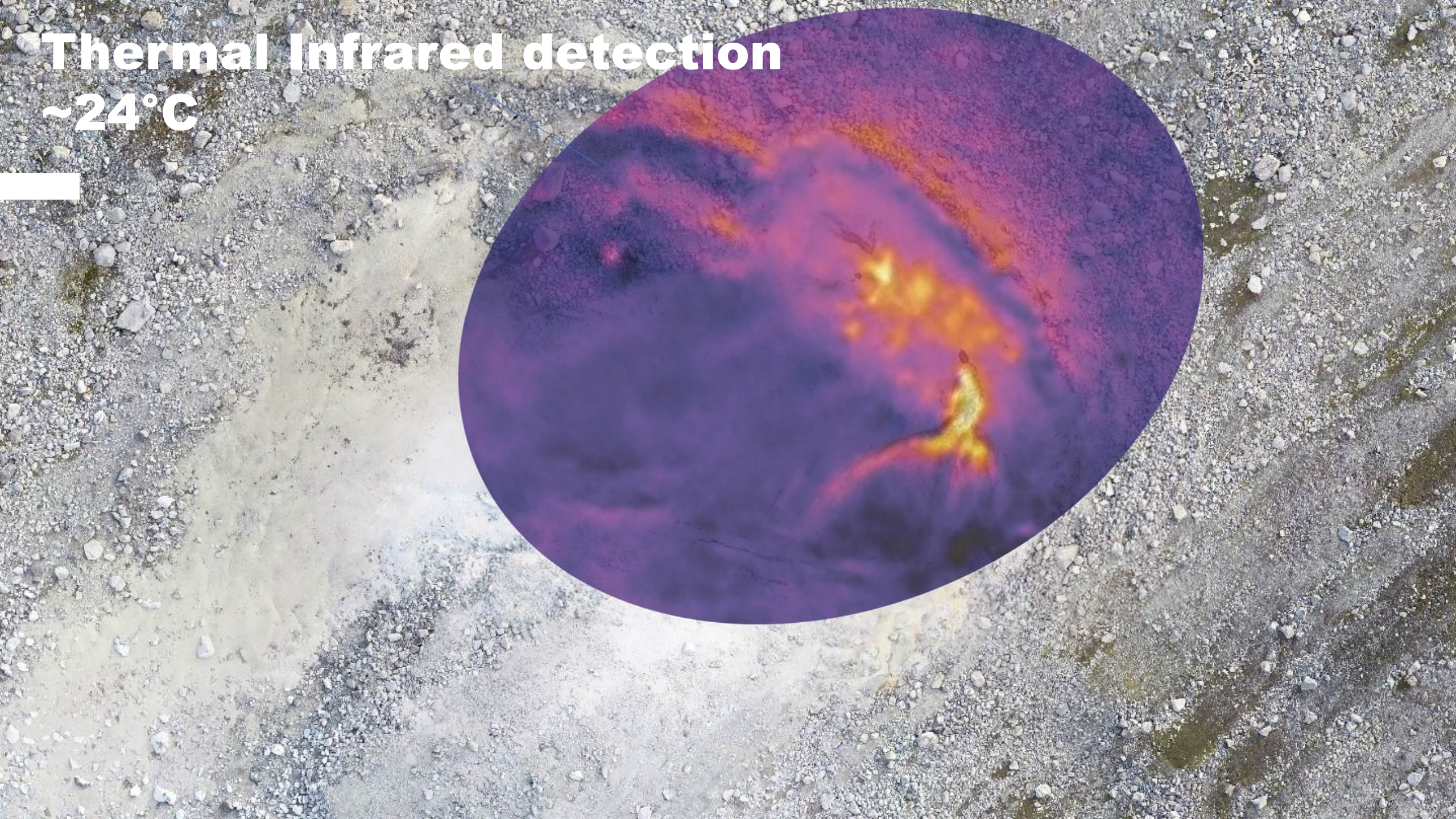
The only thermal area of Svalbard



Profile: geographic observation and artificial debris accumulation; geologic mapping

Technique: medium level aerophotogrammetry (70-90 m a.g.l.)

Purpose: ortophotograph / GIS mapping / 3D modelling / thermal mapping



Thermal Infrared detection
~24°C



— plastic sampling



LAGOYA: 80°15' N









— DRIFTWOOD







the team

SCIENTIFIC PARTNERS

SWISS POLAR
INSTITUTE



TECHNICAL PARTNERS



dema



PowerVision

OUTREACH PARTNERS



 polarquest.org

POLARQUEST
CITIZEN SCIENCE

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Insta: @scienceadventurers

