

**SWISS POLAR
INSTITUTE**

Open Forum

Part 1

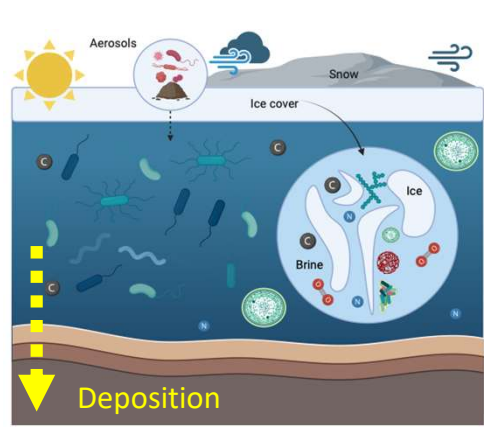


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Anna Carratalà

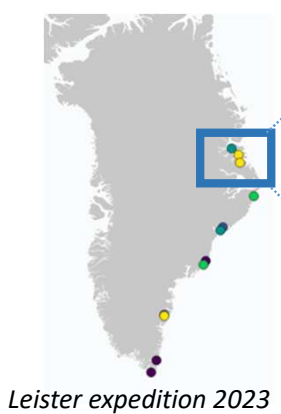
EPFL



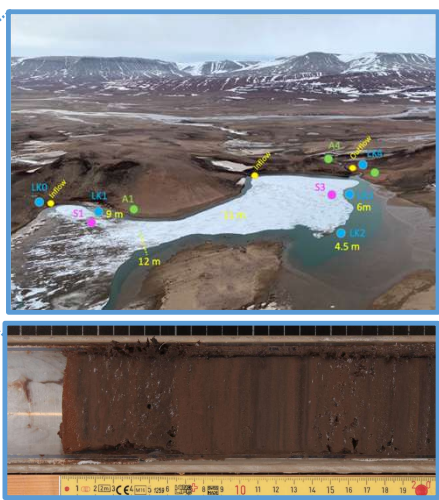


fast
Environmental change
slow

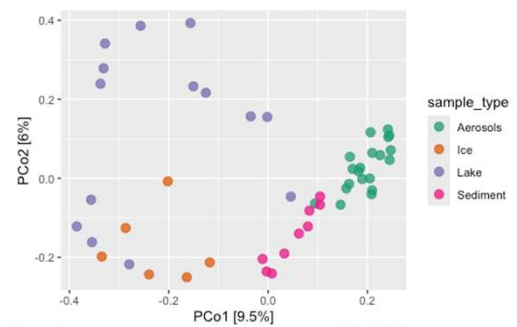
Higher lake bacteria diversity



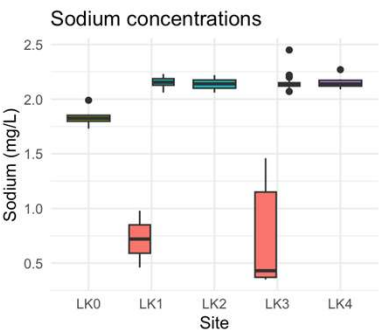
Fieldwork June and September 2024



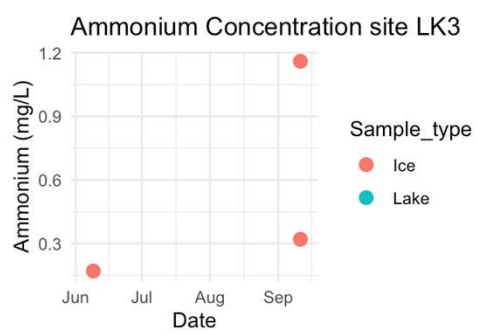
≈ 370 years old lake sediments



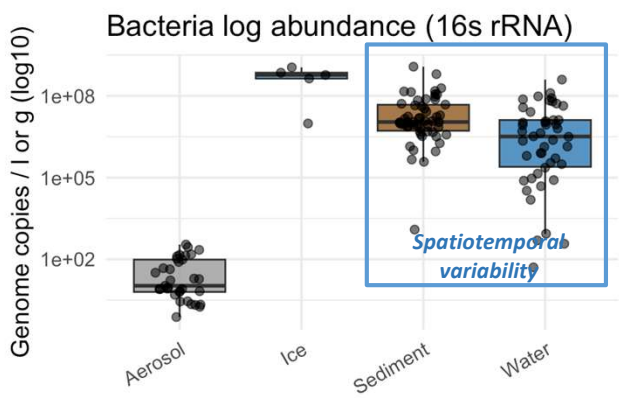
2. Different compartments and time = different bacteria biomass



Sample_type
Ice
Inflow
Lake
Outflow

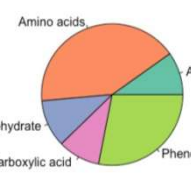


Sample_type
Ice
Lake

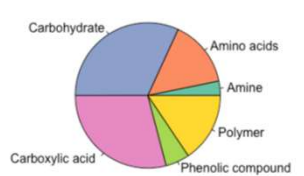


Spatiotemporal variability

Water column



Ice cover



3. Different lake compartments = specific microbial diversity & functions

WHY??... more to come!

1. Different lake compartments = distinct chemistry (eg. N metabolism)

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Alina Begley

Empa



Monitoring Trace Halogenated Gases

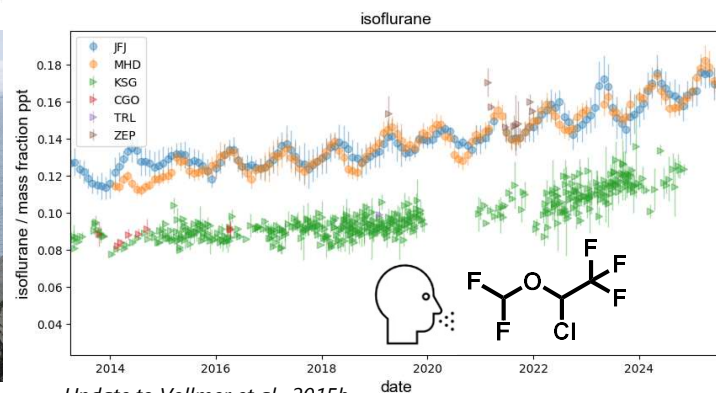
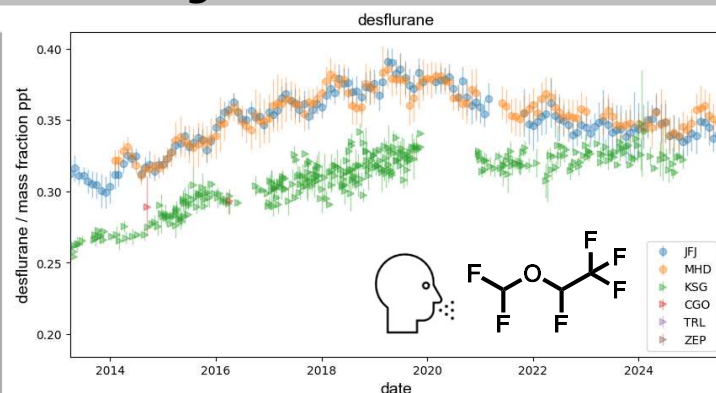
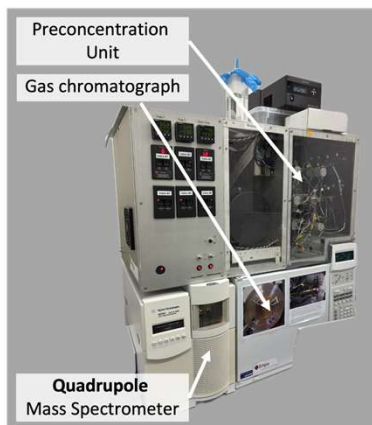
Alina Begley, Livia Schneider, Constantin Lionel, Martin Vollmer, Stefan Reimann



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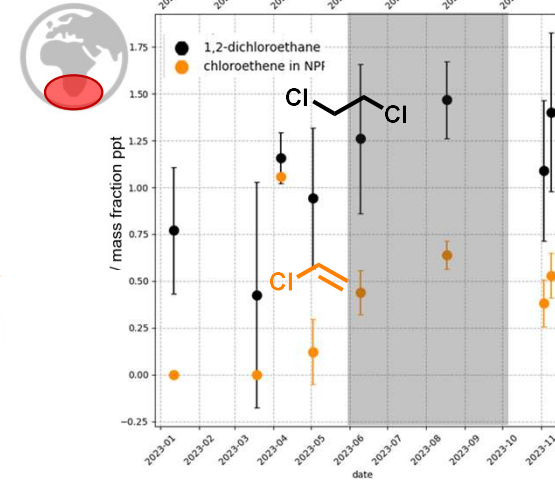
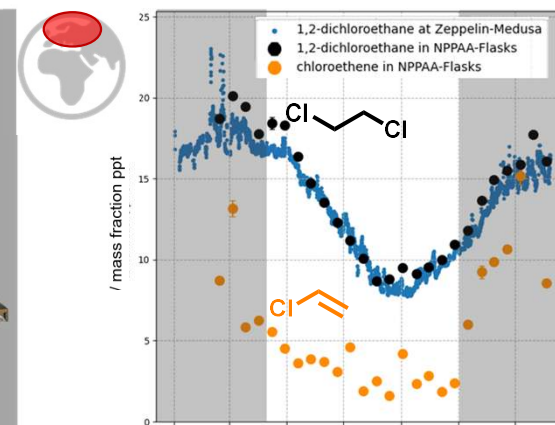
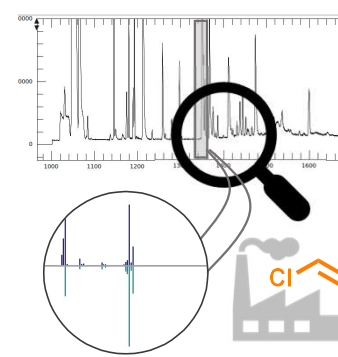
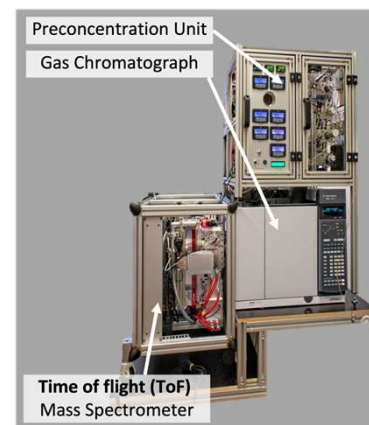


Monitoring knowns



Update to Vollmer et al., 2015b

Discovering unknowns



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Christian Hauck

University of Fribourg



PermaCOST



COST Action CA24157

Action Chair Candidate:

Coline Mollaret

**Team Uni Fribourg,
Switzerland:**

Cécile Pellet, Sebastian
Vivéro, Christian Hauck,
Reynald Delaloye,
Christin Hilbich

Network of Proposers:

46 researchers from
24 countries

University of Fribourg
pre-approved (by COST) as
Grant Holder Institution

COordinated and STandardized Monitoring of Permafrost Response to Climate Change

WG1

Permafrost **key parameters**: evaluation
of existing monitoring activities

WG2

Data acquisition standards: temperature,
water content, geophysics, movement, etc

WG3

Data processing standards: routines/codes,
software, homogenisation etc

WG4

Permafrost **state assessment**:
European permafrost map;
state of monitoring activities
(also outside Europe)

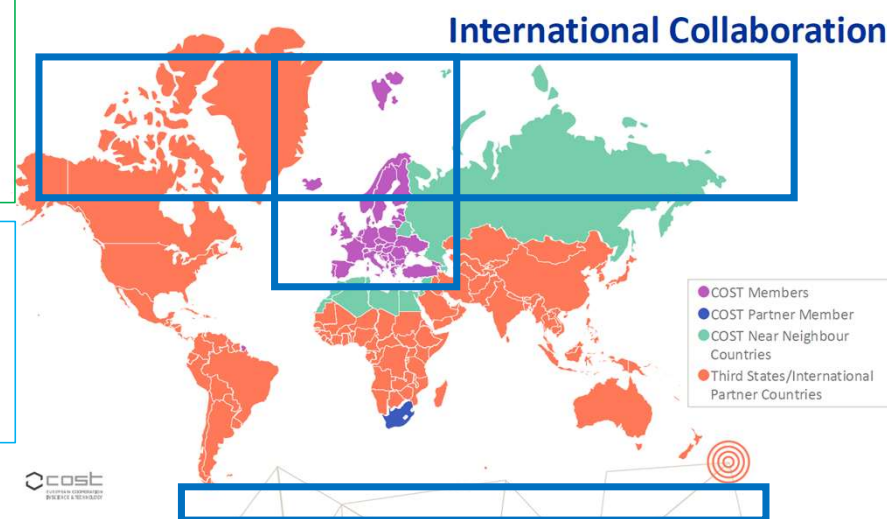
WG5

Permafrost **monitoring
network** promotion:
coordination of
research/operational networks

October 2025 – September 2029

COST provides funding
for research coordination,
training and networking

**Open for all interested
persons & institutions !**
permacost@unifr.ch



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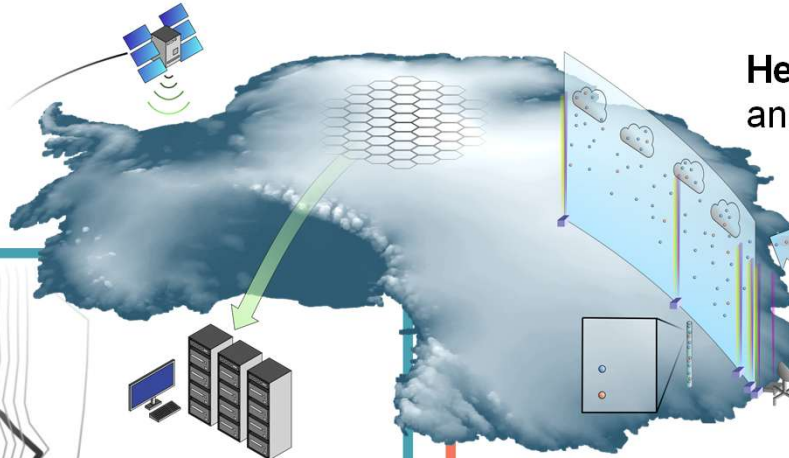
Heather Corden

EPFL

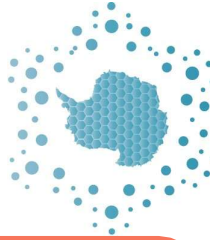


AWACA

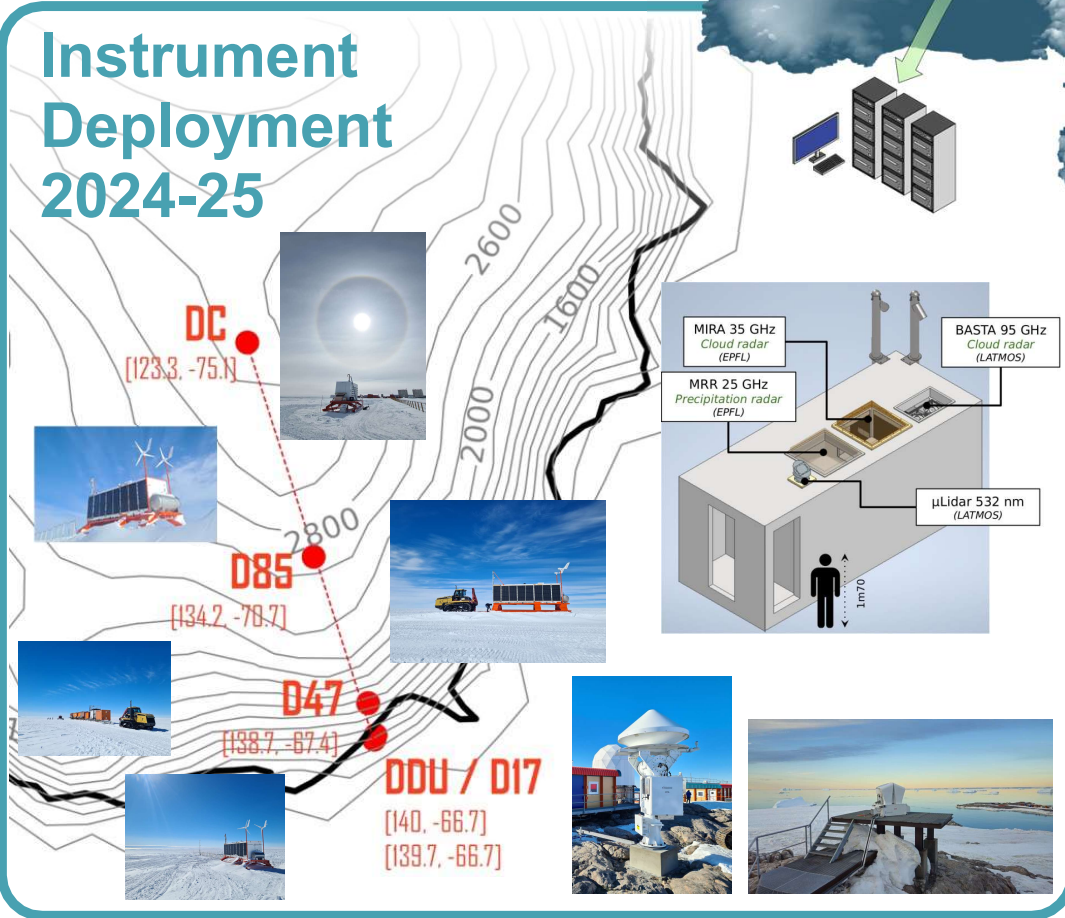
Atmospheric Water Cycle over Antarctica
past, present & future



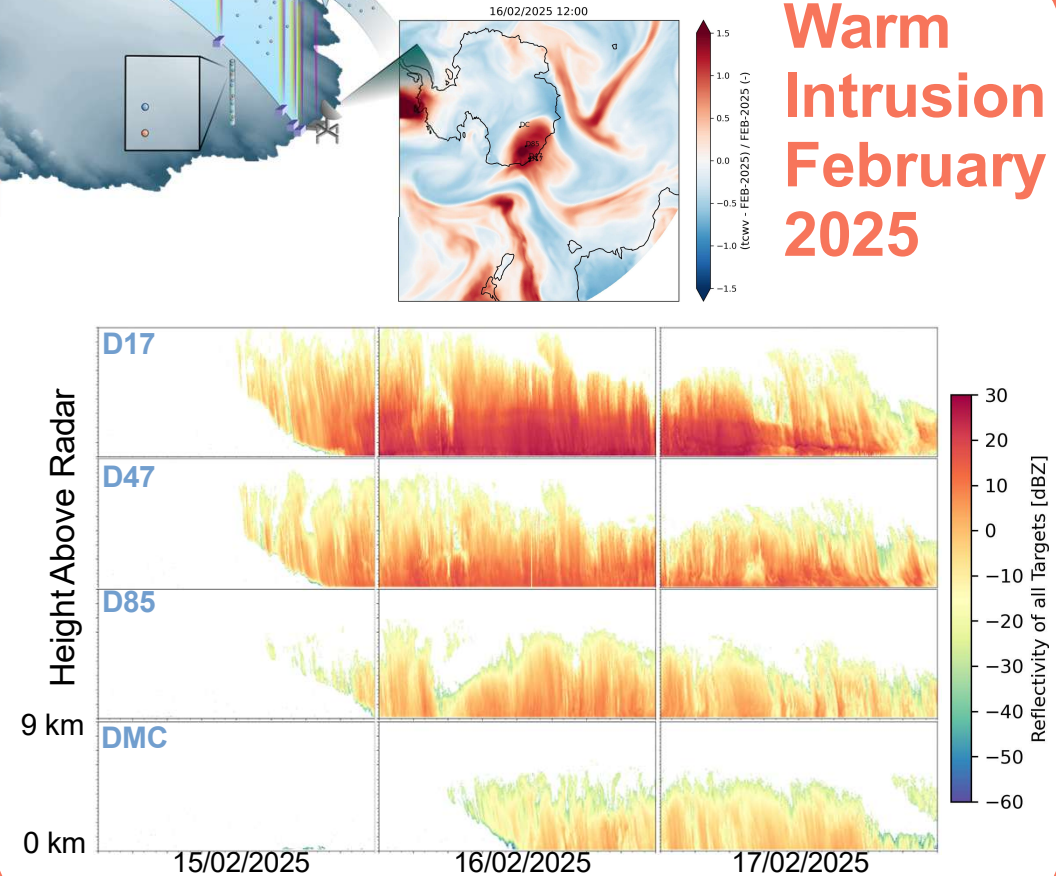
Heather Corden¹, Alexis Berne¹
and the AWACA team²



Instrument Deployment 2024-25



Warm Intrusion February 2025



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Benjamin Hofmann

ETH Zurich/Eawag



Anthro:Relate – Transforming science-society relations in the Anthropocene

In regions such as the Arctic and the Alps, climate change is progressing much faster than on global average. Rapid warming is affecting sensitive ecosystems and causing an increase in extreme events and natural hazards. Parallel to the search for effective answers in policy and practice, the role of science in society is also changing.



Image source: novaz / Pixabay



Scope:

Climate change adaptation research in Finland (Lapland) and Switzerland (Grisons)



Transformative relations:

Long-term mobilization of stakeholders + critical engagement with system design



Influence factors:

Local embeddedness, indigenous community, social science involvement, EU funding,...



Dr. Benjamin
Hofmann



Dr. Ariane
Wenger



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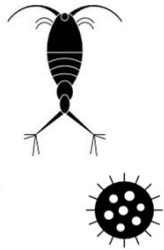
Virginie Marques

WSL



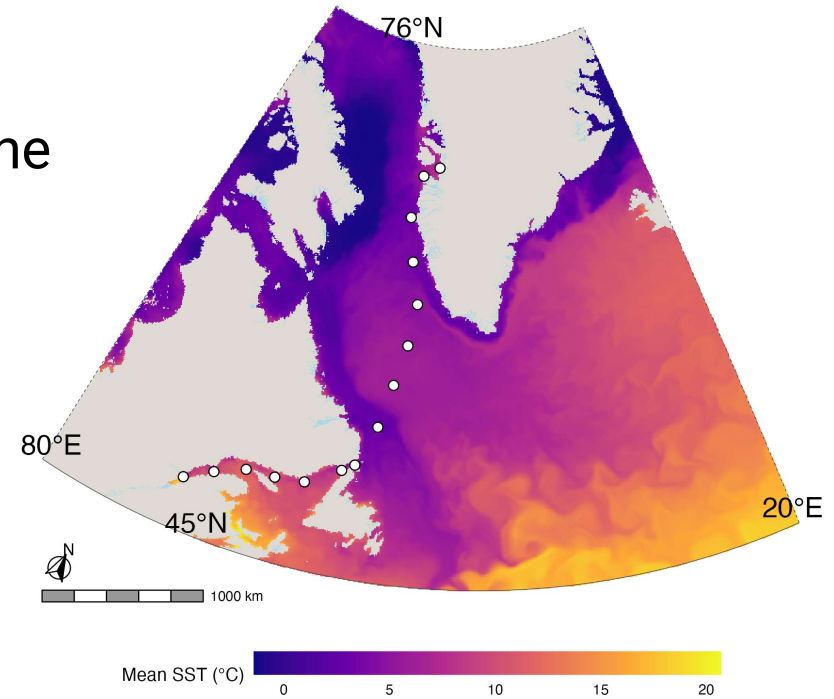
P-BIO

High-latitude gradient of plankton biodiversity from the coast to open sea



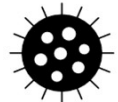
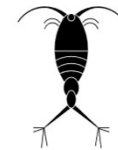
Planktoscope
50-250 μm

eDNA



JUN
26

JUL
05



ETH zürich



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Photo credits: Richard Mardens, Association Forel Heritage

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James Ellison

ETH Zurich



Thermodynamics

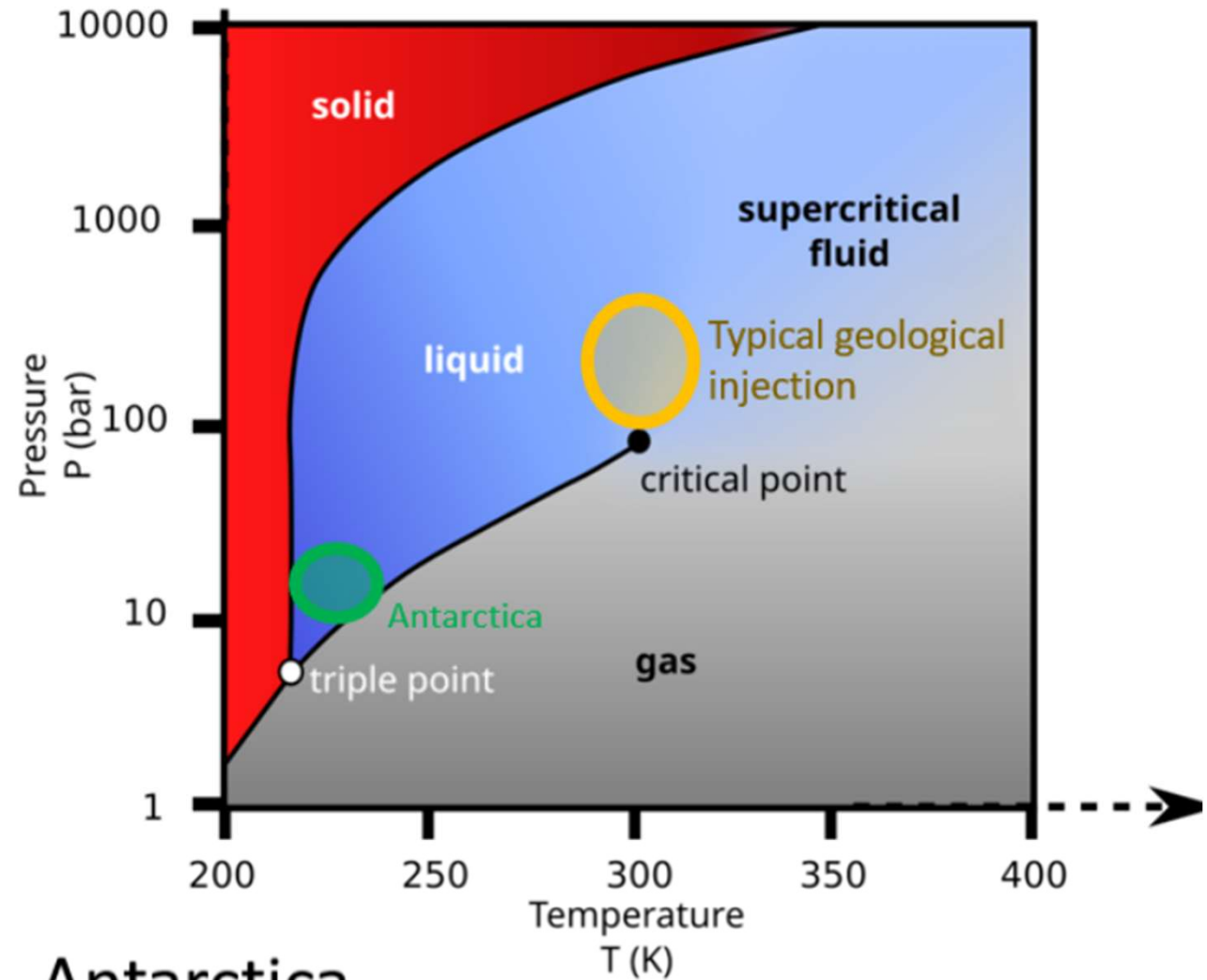
$$\text{Work done}_{\text{Isothermal Compression}} = nRT \ln \frac{P_2}{P_1}$$

$$P_1 \sim 42 \text{ Pa}$$

Compression to dense phase

$$E_{298K} = 0.20 \text{ kWh/kg}$$

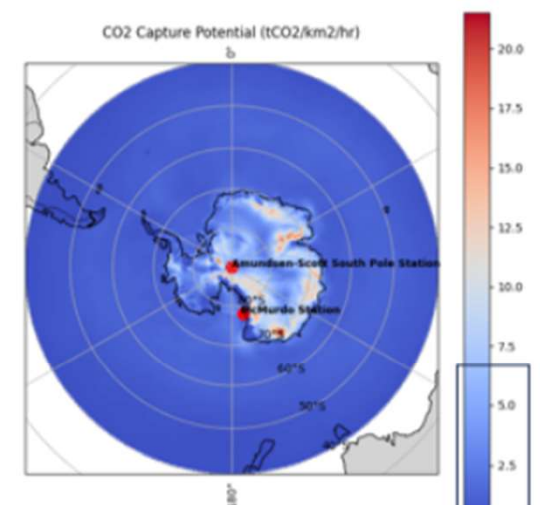
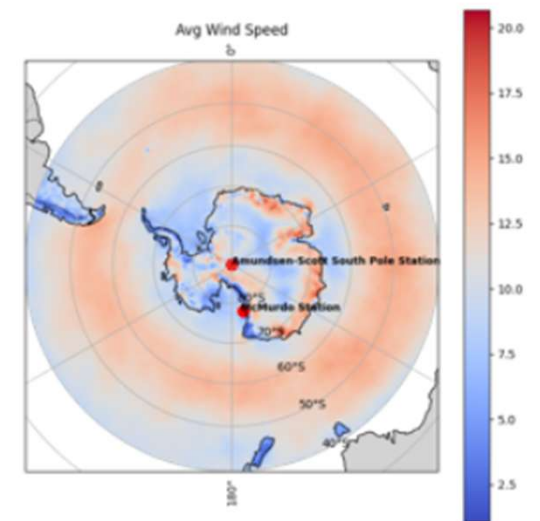
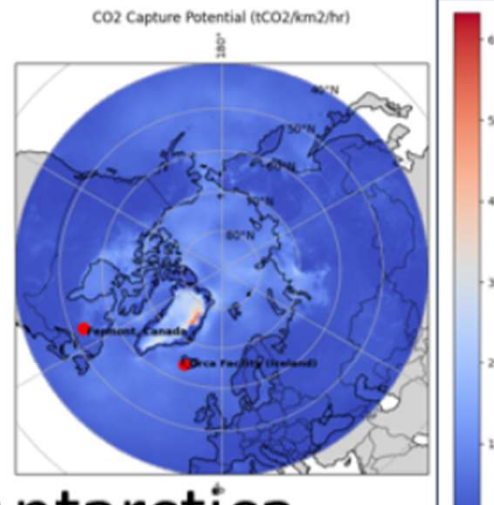
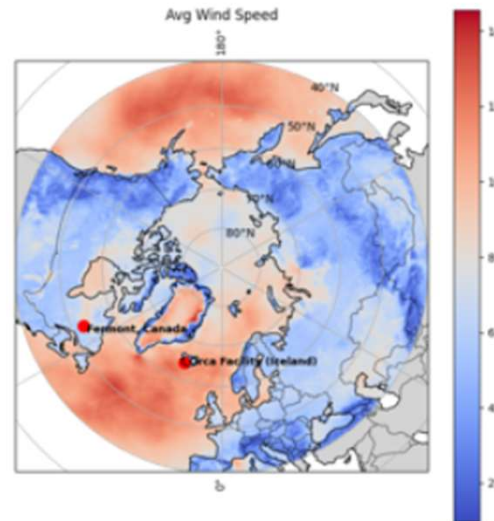
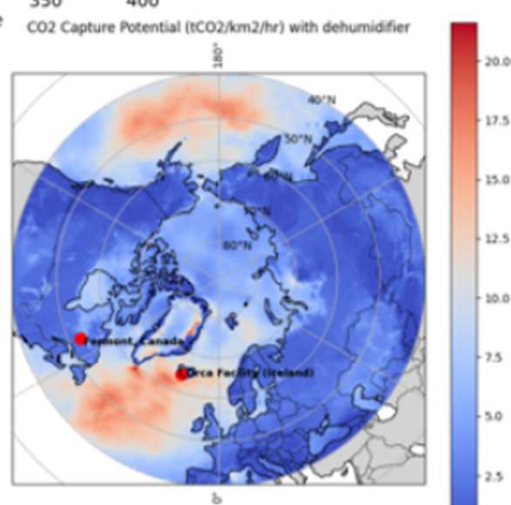
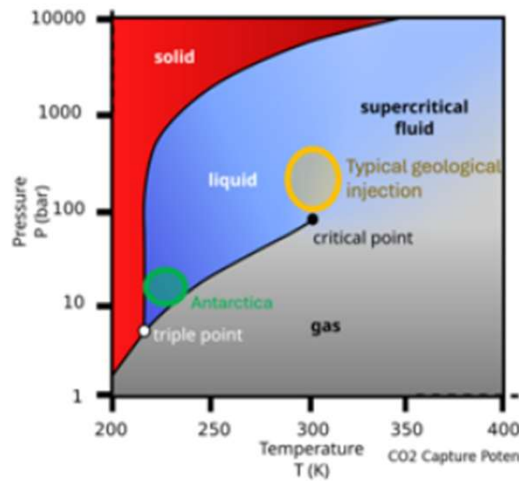
$$E_{220K} = 0.11 \text{ kWh/kg}$$



Antarctica

The best place in the world to do direct air capture of CO₂?

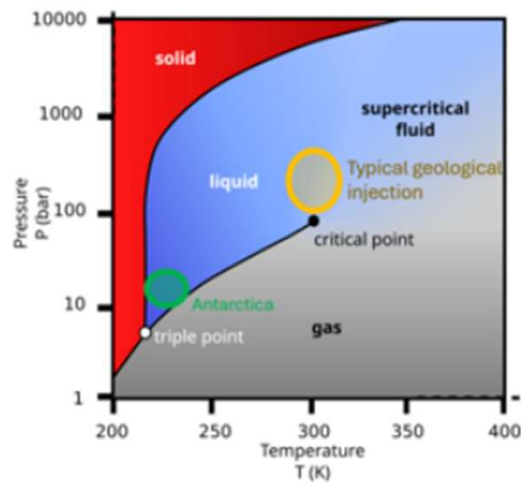
Thermodynamics



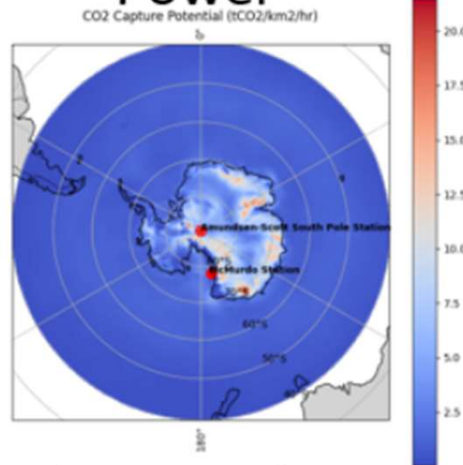
Antarctica

The best place in the world to do direct air capture of CO₂?

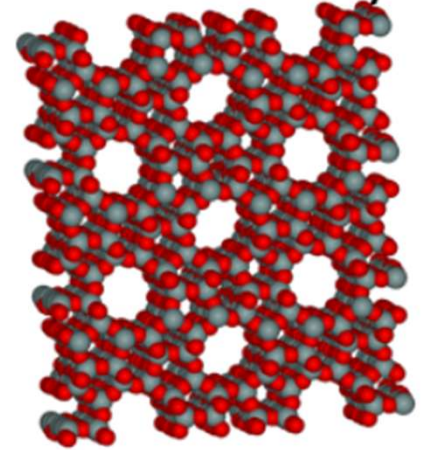
Thermodynamics



Power



Low Humidity



Antarctica

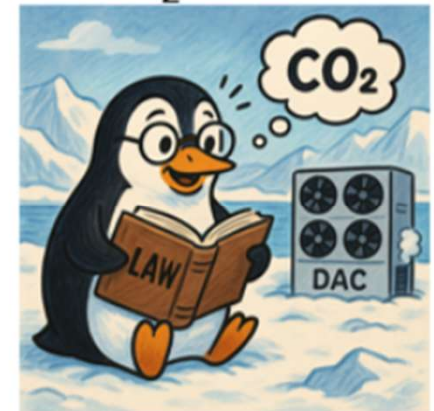
The best place in the world to do direct air capture of CO₂?



Remoteness

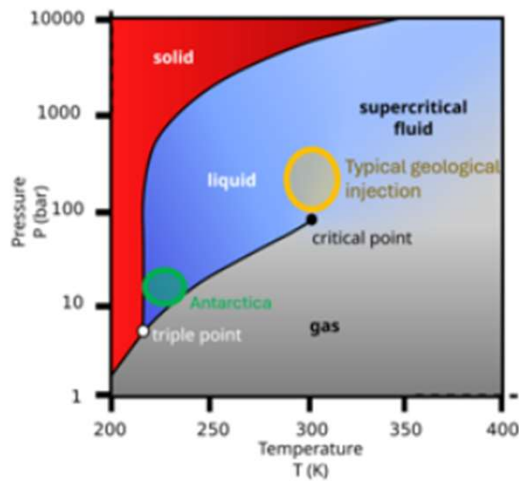


Storage

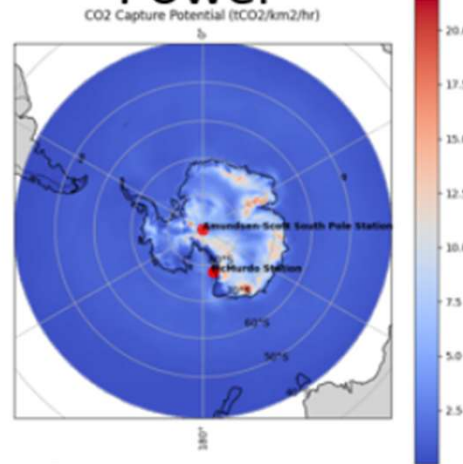


Legality

Thermodynamics

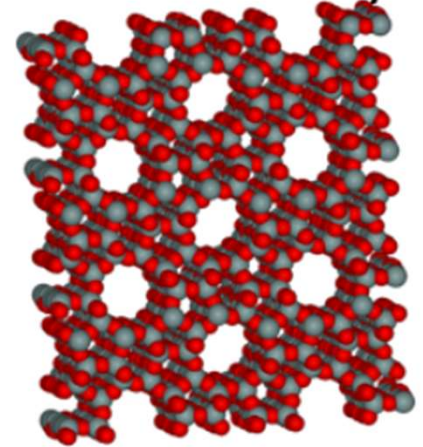


Power

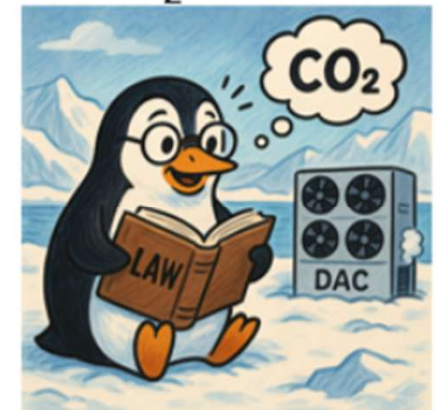
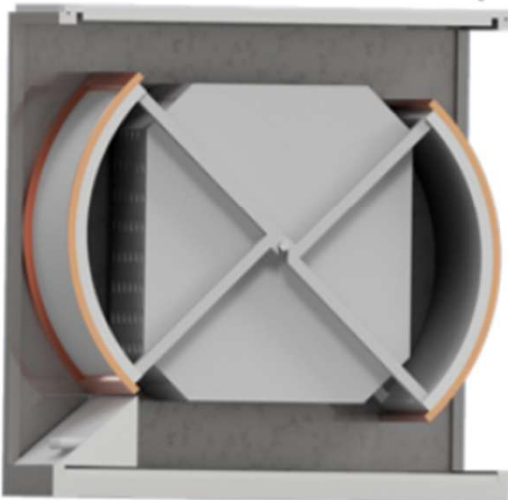


Antarctica

Low Humidity



The best place in the world to do direct air capture of CO₂?



Legality

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Sandra Wells

ETH Zurich



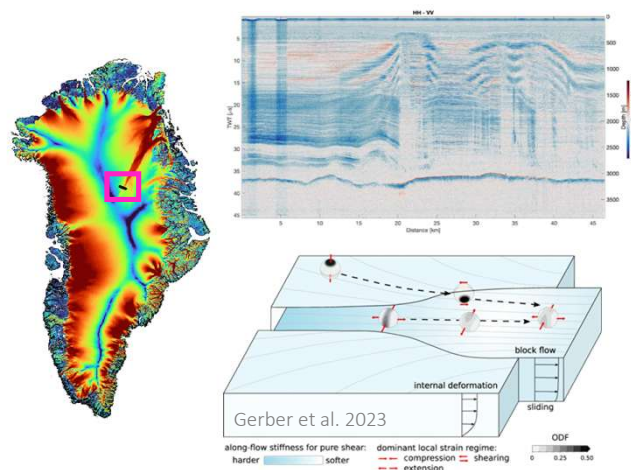
SPI GRANT FOR FIELD AND SUMMER SCHOOLS

Karthaus Summer School 2025



Lectures and exercises:

- ice sheets and glaciers in the climate system
- continuum mechanics
- numerical modelling
- ice rheology
- ice-ocean interaction
- geophysical & remote sensing methods
- ...



Group project: Inferring ice crystal fabric anisotropy from polarimetric radar profiling of the North-East Greenland ice stream



Building a lasting community with students and lecturers (in a breathtaking location!)



Laboratory of Hydraulics,
Hydrology and Glaciology

ETH zürich



Sandra Wells

Swiss Polar Day – Open Forum – 05.09.2025