

# Research front – where ice meets the ocean

Nutrient transport by meltwater plumes to fjord ecosystems



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## Background and motivation

Following a MSc in Mechanical Engineering in Germany and on Svalbard, I did my PhD in Glacier Hydrology at the University of Oslo while leading my own research projects. Afterwards I worked for the Centre of Biorobotics at Tallinn University of Technology helping them to build up their polar research program. Besides my scientific work, I work as Expedition Leader on small expedition ships (currently Lindblad/National Geographic) all over the Arctic and Antarctica, leading teams of around 15 guides and scientists and having overall product delivery responsibility (4-7 Million USD per month). I joined the SEAS program to further establish cross-disciplinary collaboration and initiate a couple of research projects to gather urgently needed climate data from the polar regions.

## Project description

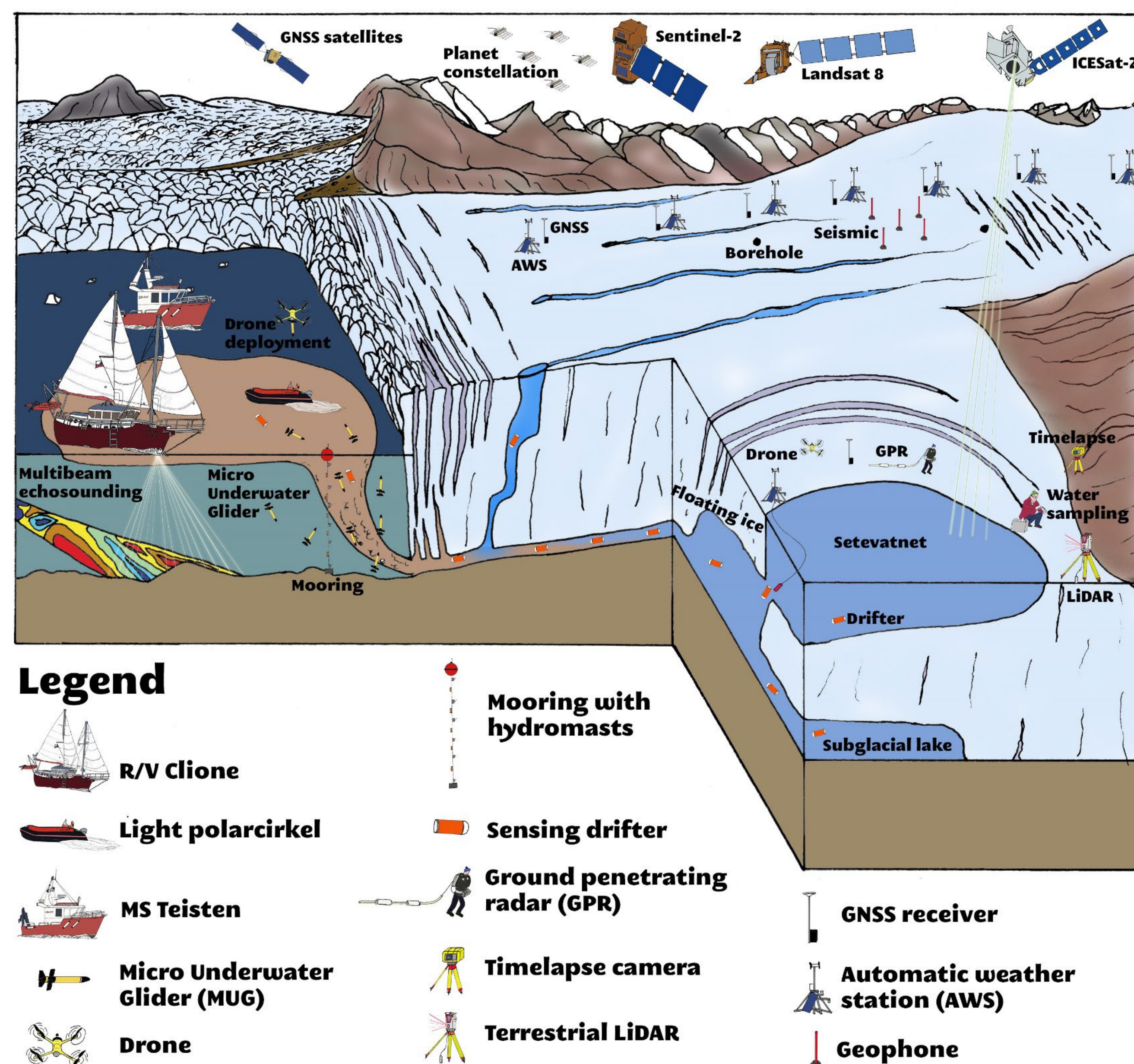
Rapid ongoing climatic warming in the Arctic increases glacier melt and therefore freshwater input into the ocean. This freshwater transports nutrients to fjord ecosystems, both directly as well as indirectly by changing circulation systems in the ocean. Future anticipated glacier melt will therefore impact life in Arctic fjords and local fisheries. It is, however, unclear how these impacts will look like.

## Marine sustainability

By developing enabling technology, adaptive sampling methods and utilizing vessels of opportunity, we'll increase the efficiency of scientific expeditions while at the same time reducing the environmental footprint of scientific data collection. Collected crucial climate data will help to improve system understanding and thereby contribute to sustainable environmental management.

## Highlighted results/activities

- Submitted one Horizon proposal in September
- Panelist at the Arctic Circle Summit in Reykjavik
- Presentation at the Svalbard Science Conference
- Coauthor on 3 posters on the Svalbard Science Conference
- Presentation at the Svalbard Glaciology Workshop
- Invited Guest Speaker at the International Conference on Soft Robotics 2024
- One manuscript ready for submission
- Outreach lecture to >100 highschool students in the US
- Interview for German TV station about glacier melt
- Working on 3 Horizon proposals + 1 RCN FRIPRO to be submitted within the next 6 months



## Main questions

- How will the increasing glacier melt influence fjord ecosystems?
- How can we change the predatory academic system?

## Aims

- Set up a model for nutrient transport by meltwater plumes
- Obtain a one year long field dataset from a glaciated fjord linking fjord dynamics with the dynamics of the glacial drainage system
- Built up a toolbox of enabling technologies to get data from ice-ocean interfaces

## Collaboration team

Kerim Hestnes Nisancioglu, Professor, Department of Earth Sciences, University of Bergen, Norway  
Fiamma Straneo, Professor, Department of Climate, Atmospheric Science and Physical Oceanography, University of California, San Diego, US

Outgoing phase:

1<sup>st</sup> year: Scripps Institute of Oceanography, San Diego, US

2<sup>nd</sup> year: Ilulissat, Greenland

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