University of Zurich[UZH]

URPP Global Change and Biodiversity

lifescience zurich PhD program in Ecology

LIMNO Station

SWISS POLAR INSTITUTE

Diversity and Activity of Microbial Communities in Shallow Ponds of the Arctic Tundra

Dr. Alizée Le Moigne @alizee_lm

Polar Access Fund

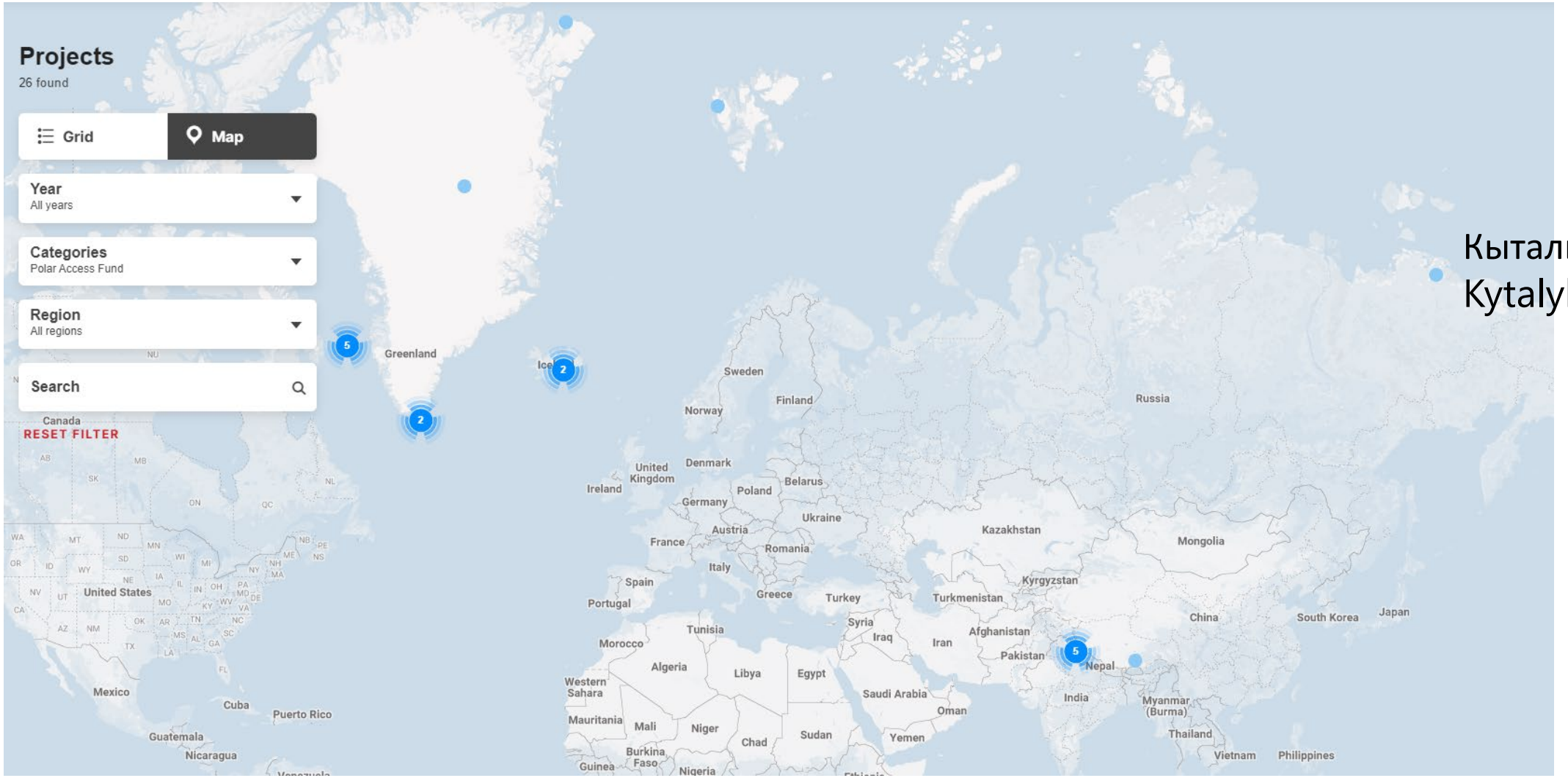
SWISS POLAR INSTITUTE

FONDATION BNP PARIBAS

2018

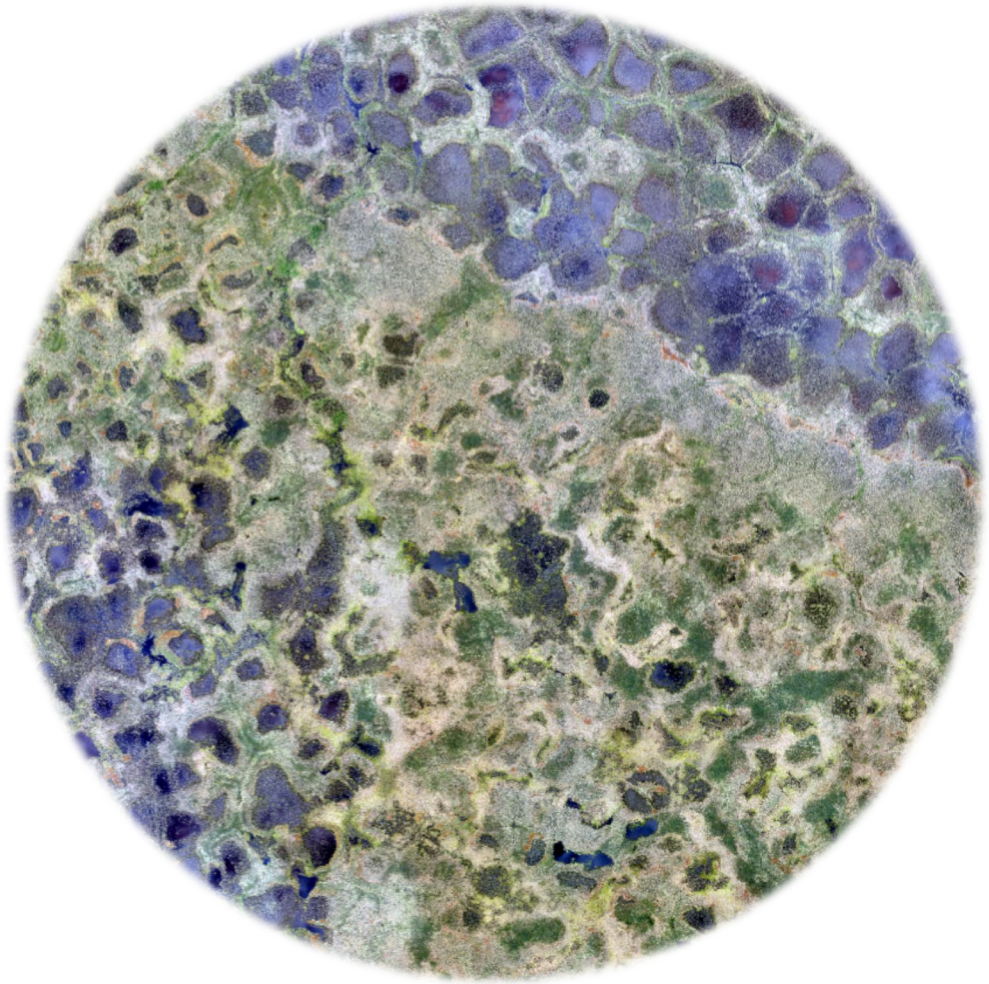
4th july to 1st of August

6 000 CHF

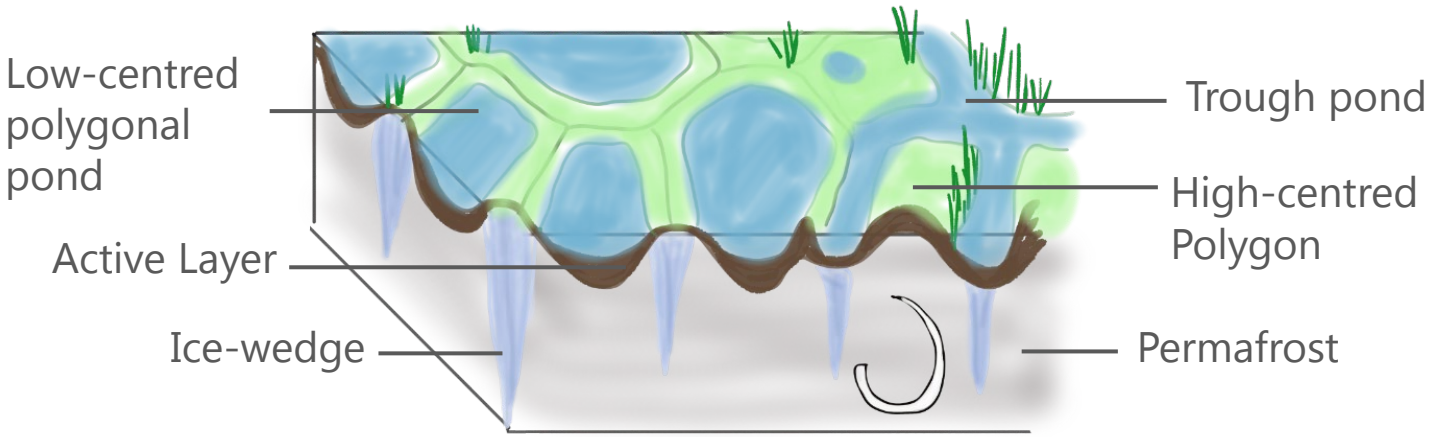


Кыталык
Kytalyk

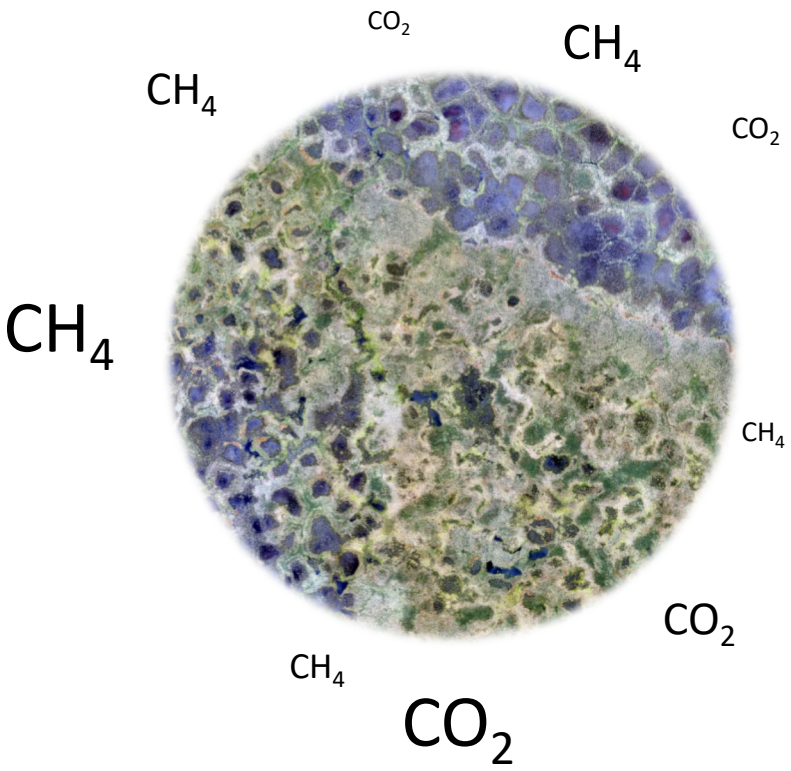
Shallow thermokarst ponds in the Arctic

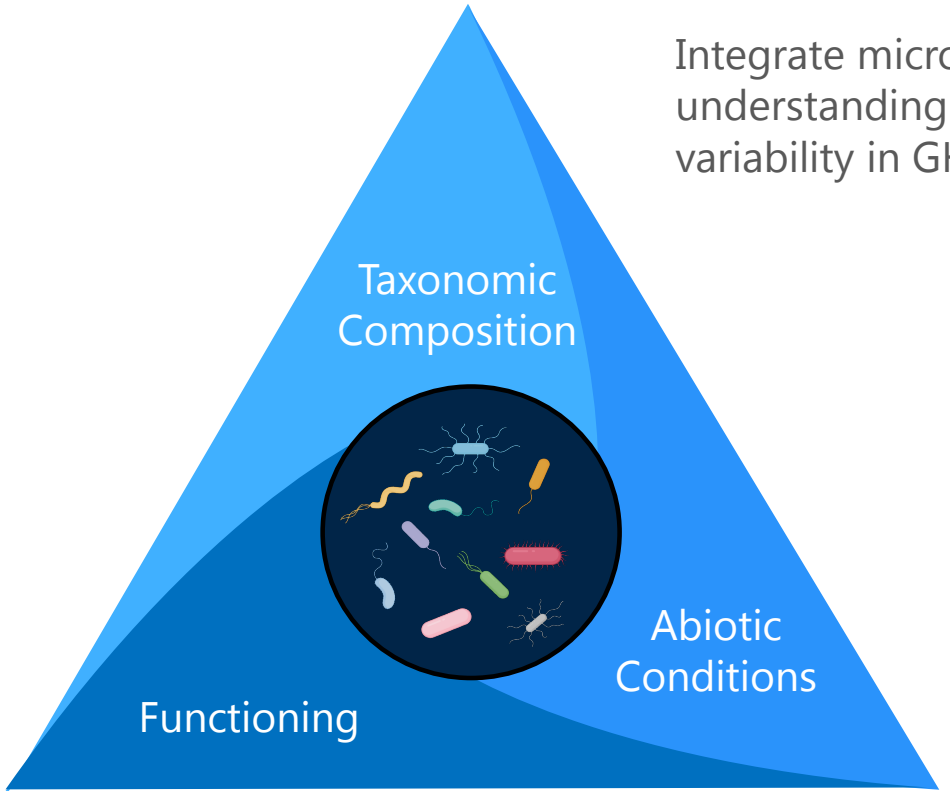


- Biogeochemical hotspots
- Source of CO_2 and CH_4
- High spatio-temporal variability of GreenHouse Gases (GHG) emissions



Shallow thermokarst ponds in the Arctic





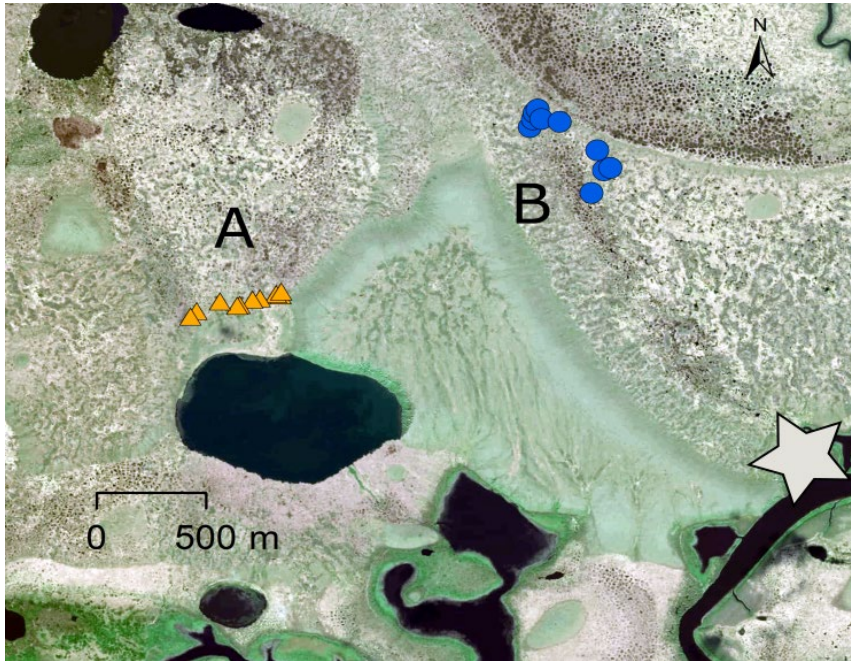
Integrate microbial communities in understanding the variability in GHG emissions

Le Moigne *et al.*, 2020, Environmental Microbiology

Shallow thermokarst ponds in the Arctic

A

Polygonal
× 10



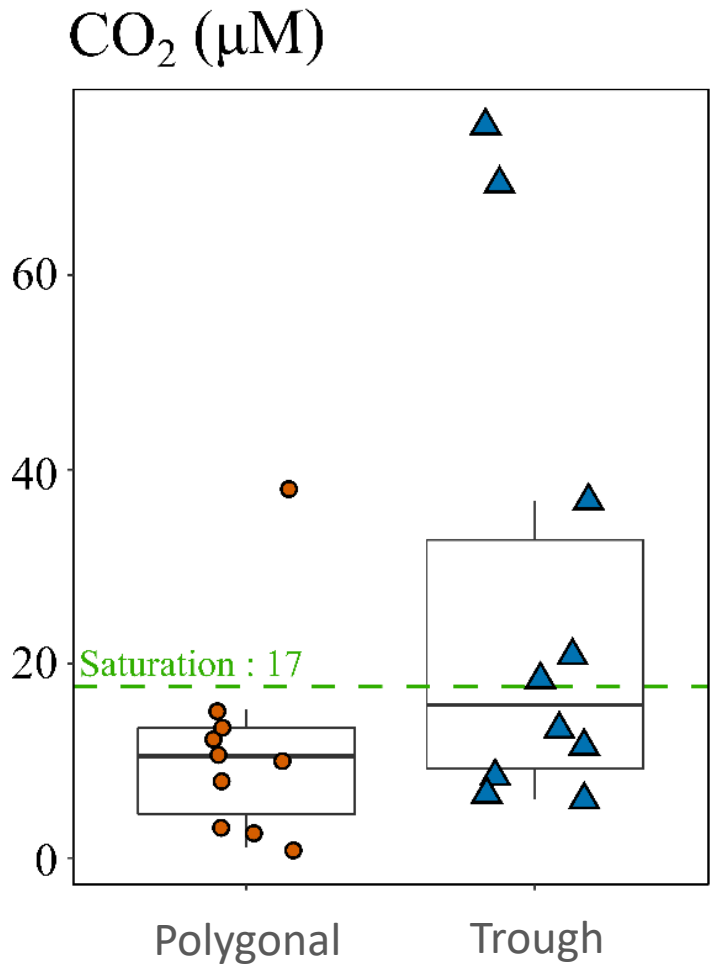
B

Trough
× 10

- CO_2, CH_4
- Bacteria, Microeukaryotes
- Physico-chemical parameters

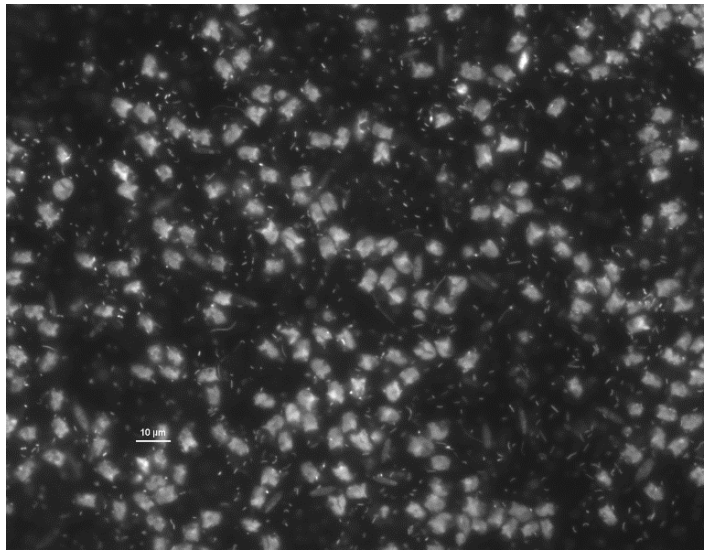
Le Moigne *et al.*, 2020, Environmental Microbiology

Active Primary Production



➢ Undersaturated

Photosynthetic Microbial mats in polygonal ponds

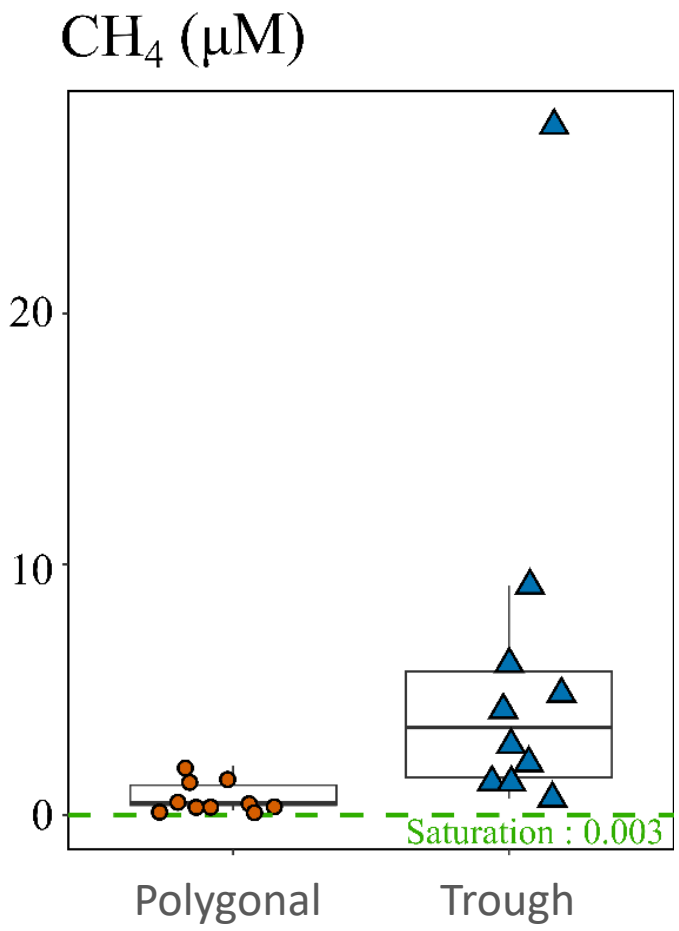


Bloom of *Uroglena* in a polygonal pond

Microscopy image: DAPI stained

Le Moigne *et al.*, 2020, Environmental Microbiology

Methanotrophy $CH_4 \rightarrow CO_2$

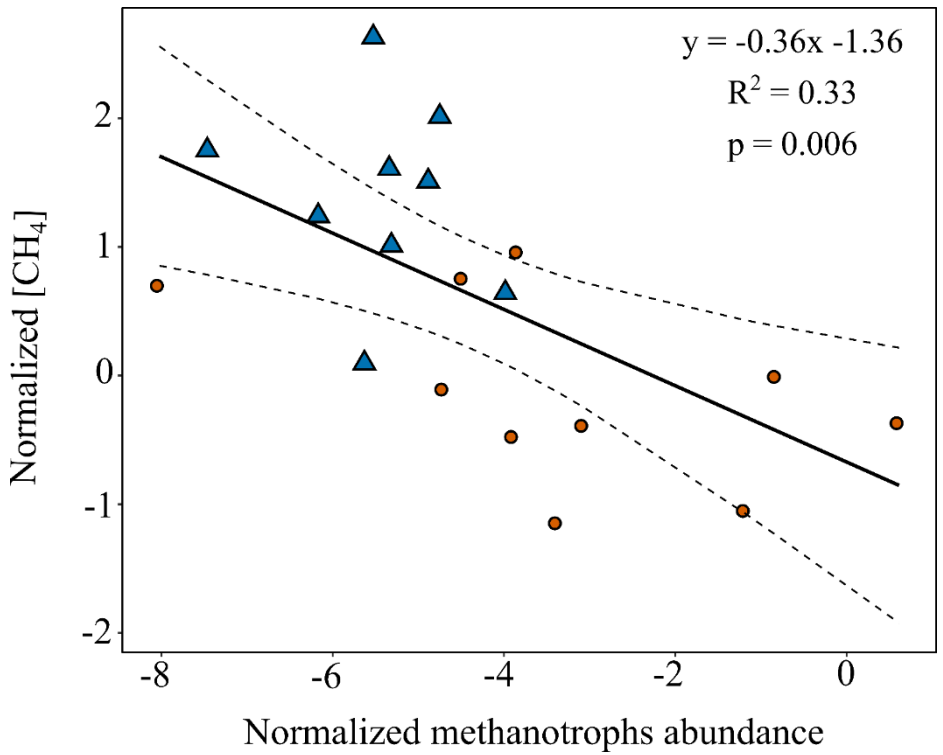


- Saturated

Methanotrophs relative abundance

Polygonal: 1.2 % (0.02 to 9.1)

Trough: 0.2% (0 to 0.9)



Polygonal

Trough

- Potential importance of methanotrophy in mitigating CH_4 concentrations

Le Moigne *et al.*, 2020, Environmental Microbiology

A day in Kytalyk

A day in Kytalyk

9:00 Breakfast (Kacha)

A day in Kytalyk

9:00 Breakfast (Kacha)

10:00 Dressing for the Field

A day in Kytalyk

9:00 Breakfast (Kacha)

10:00 Dressing for the Field

10:20 Looking for ponds

A day in Kytalyk

9:00 Breakfast (Kacha)

10:00 Dressing for the Field

10:20 Looking for ponds

11:00 Sampling

A day in Kytalyk

9:00 Breakfast (Kacha)

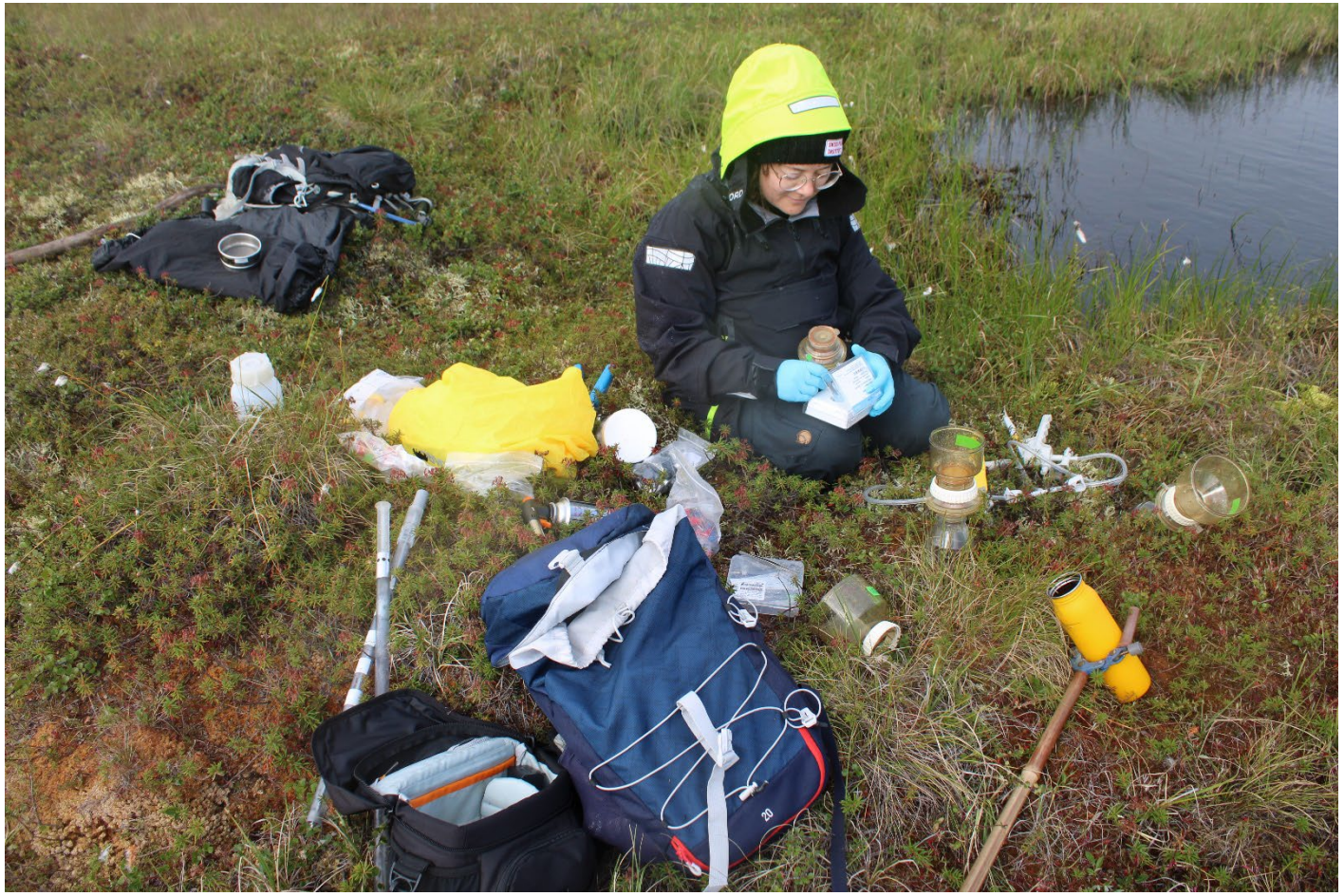
10:00 Dressing for the Field

10:20 Looking for ponds

11:00 Working

13:00 Lunch

A day in Kytalyk



9:00 Breakfast (Kacha)

10:00 Dressing for the Field

10:20 Looking for ponds

11:00 Working

13:00 Lunch

14:00 More ponds

A day in Kytalyk

9:00 Breakfast (Kacha)

10:00 Dressing for the Field

10:20 Looking for ponds

11:00 Working

13:00 Lunch

14:00 More ponds

18:59 Storing samples in the Permafrost cellar

A day in Kytalyk

9:00 Breakfast (Kacha)

10:00 Dressing for the Field

10:20 Looking for ponds

11:00 Working

13:00 Lunch

14:00 More ponds

18:59 Storing samples in the Permafrost cellar

19:00 Dinner

Polar Access Fund

SWISS POLAR INSTITUTE

- 1st Polar Experience
- But not the last…

SWISS POLAR Class

- PAF grant decision committee 2020
- Swiss Polar Class
- Health and Safety course

MEDECIN GRIMM

Thank you!

SPI,

Gabriela Schaepman-Strub,

Jakob Pernthaler,

Sergei Karsanaev,

Trofim Maximov,

Alya,

And many more…