Measuring snow transport and sublimation near Princess Elisabeth Station, Antarctica

Armin Sigmund[1], Hendrik Huwald[1,2], Nander Wever[2], Océane Hames[1,2], Michael Lehning[1,2]

[1]Laboratory of Cryosperic Sciences, Swiss Federal Institute of Technology in Lausanne (EPFL), Switzerland
[2]WSL Institute for Snow and Avalanche Research SLF, Davos, Switzerland

Photo: Alexis Merlaud

Photo: Alexis Merlaud


INTERNATIONAL
POLAR
FOUNDATION
princess
elisabeth

Structure

1. Location and conditions at Princess Elisabeth Antarctica (PEA) Station
2. Facilities at PEA Station
3. Project goals
4. Methods and challenges

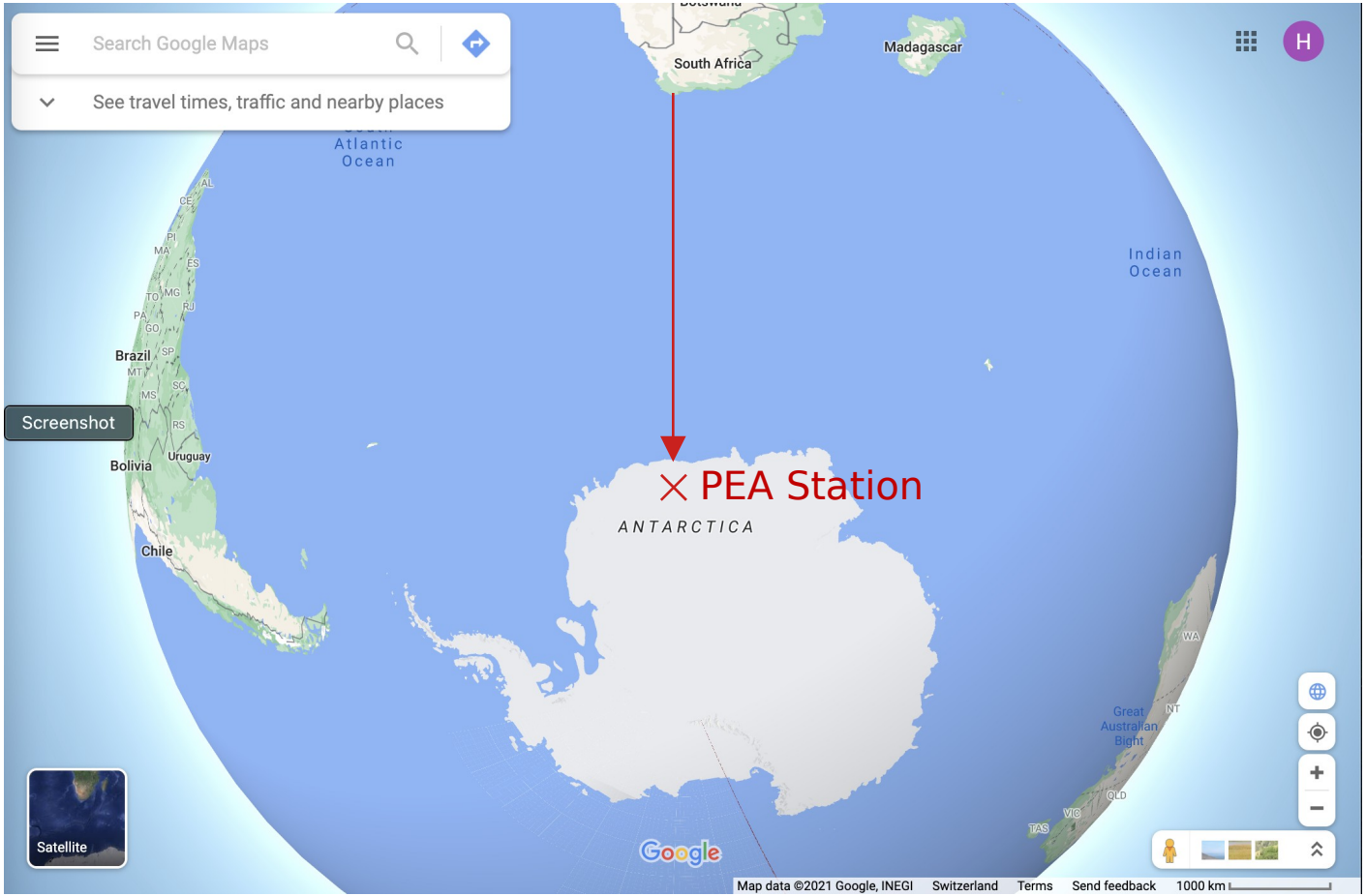
Photo: Martin Leitl

1. Location and conditions at PEA Station

- Belgian research station, managed by

  INTERNATIONAL POLAR FOUNDATION

- Dronning Maud Land, East Antarctica
- 72.0° S, 23.3° E, 1380 m asl.
- ~200 km from the coast
- Access by airplane
- Occupied in austral summer (Nov−Feb)
- Space for 25−40 people
- Air temperature: approx. −40°C to −5°C

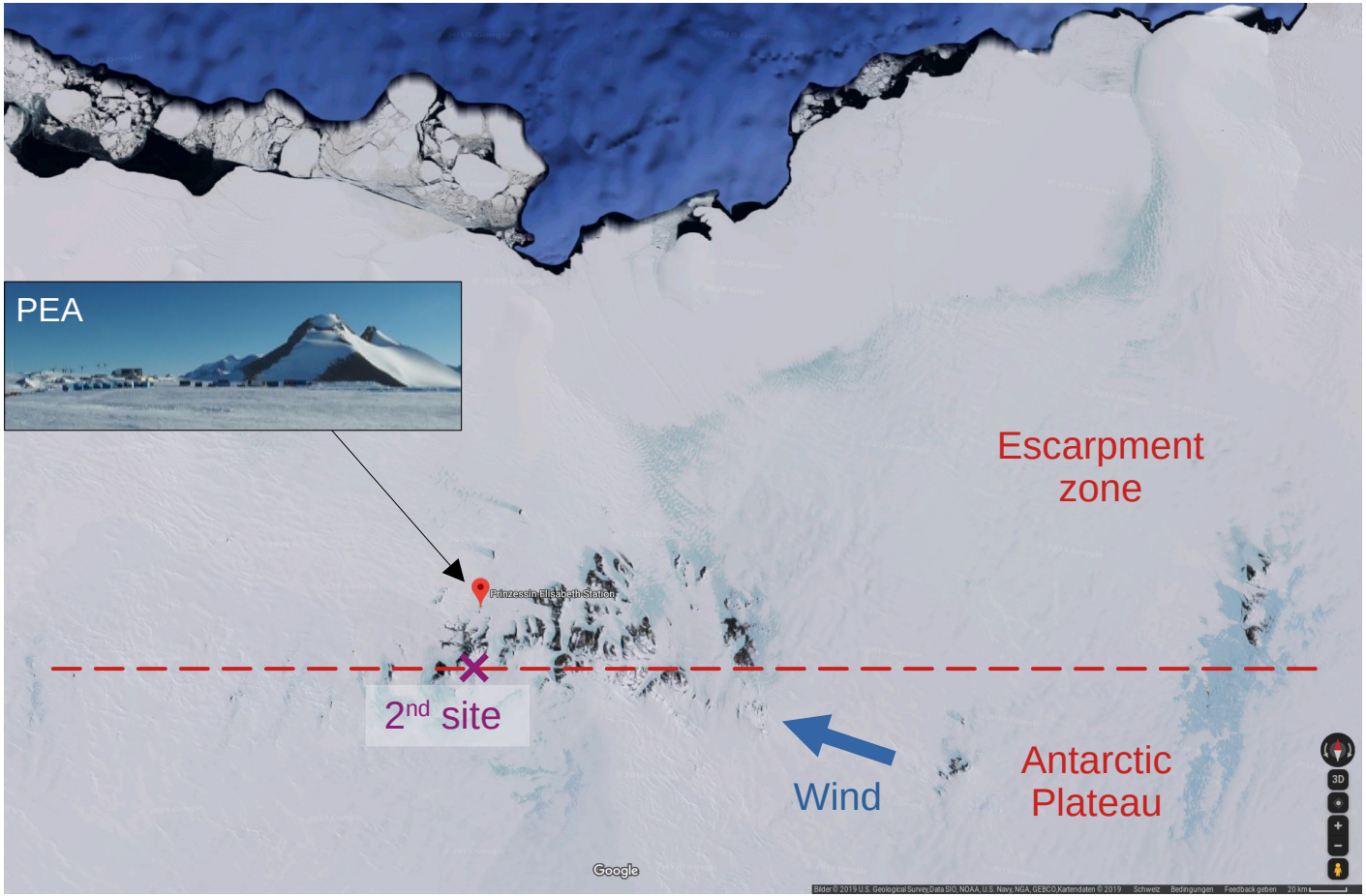


1. Location and conditions at PEA Station

- Belgian research station, managed by

  INTERNATIONAL POLAR FOUNDATION

- Dronning Maud Land, East Antarctica
- 72.0° S, 23.3° E, 1380 m asl.
- ~200 km from the coast
- Access by airplane
- Occupied in austral summer (Nov−Feb)
- Space for 25−40 people
- Air temperature: approx. −40°C to −5°C



2. Facilities at PEA Station

Broadband internet connection

Instruments (other projects)

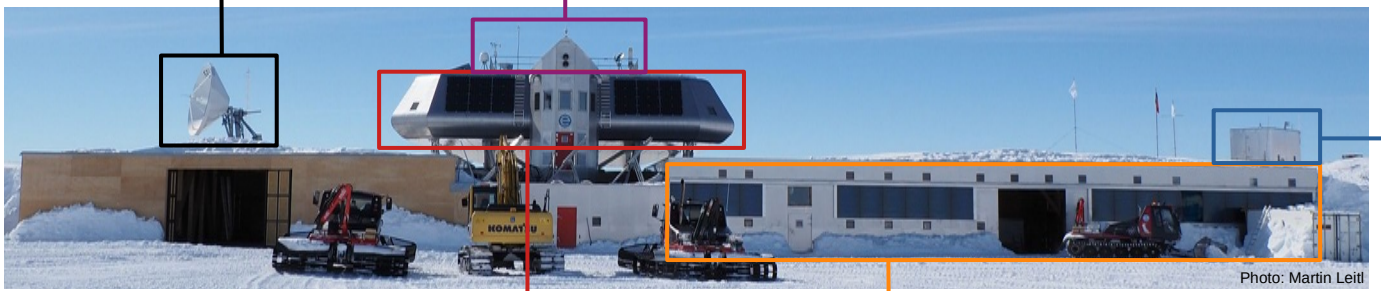


Photo: Martin Leitl

Scientific shelters

(Mobile) science containers

Living and office spaces, bedrooms


Photo: Martin Leitl

Mechanical and electrical workshops, bedrooms

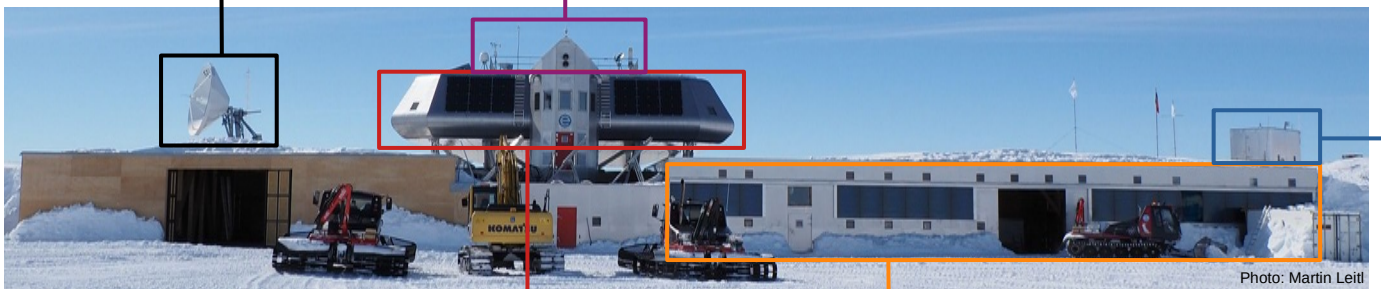
Photo: Henri Robert.

More information on PEA station and other scientific projects: http://www.antarcticstation.org/

2. Facilities at PEA Station

Broadband internet connection

Instruments (other projects)



Scientific shelters

(Mobile) science containers

Living and office spaces, bedrooms

Mechanical and electrical workshops, bedrooms

Vehicles

More information on PEA station and other scientific projects: http://www.antarcticstation.org/

3. Project goals

- Measure automatically **throughout the year**:
  - Horizontal flux of snow transport
  - Turbulent fluxes of vapor (sublimation) and heat
  - Standard meteorology
  - Snow height changes
-

3. Project goals

- Measure automatically **throughout the year**:
  - Horizontal flux of snow transport
  - Turbulent fluxes of vapor (sublimation) and heat
  - Standard meteorology
  - Snow height changes
- Perform complementary measurements during **summer campaigns**:
  - Snow hardness profiles
  - Photogrammetry with a drone
- Improve **process understanding** of snow transport and its contribution to sublimation
- **Validate and improve models** of snow transport, sublimation, and surface mass balance

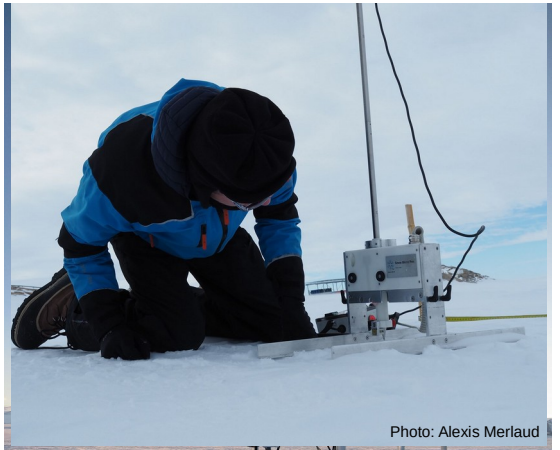
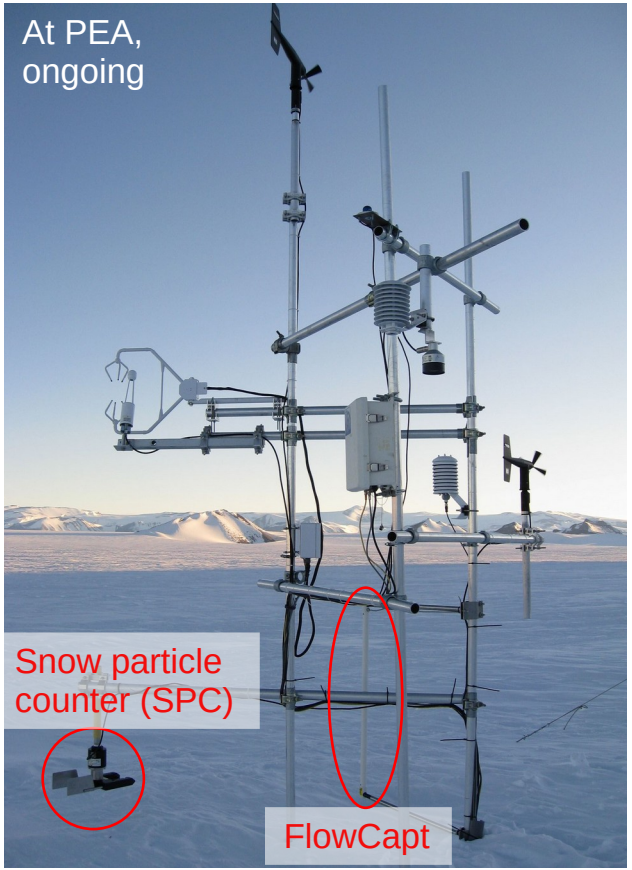


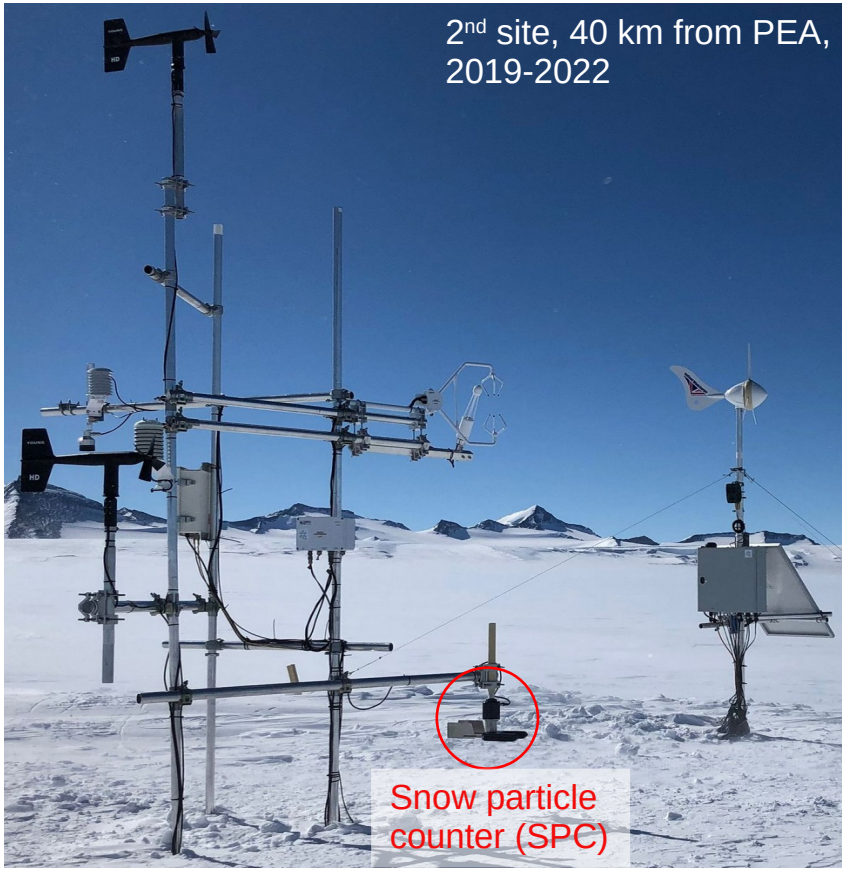
Photo: Alexis Merlaud

Photo: Martin Leitl

4. Methods and challenges

- 2 measurement stations since 2016/2017
  - Snow transport

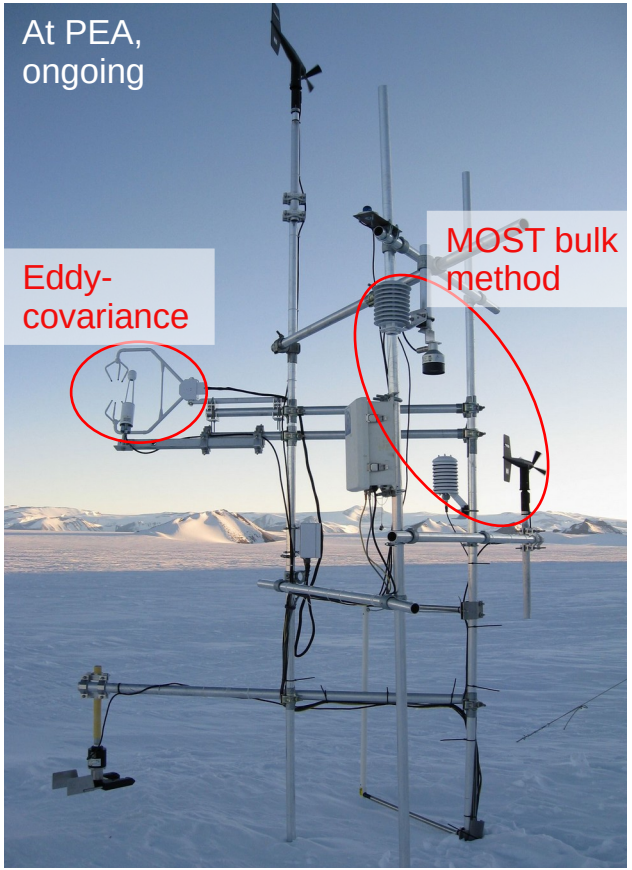


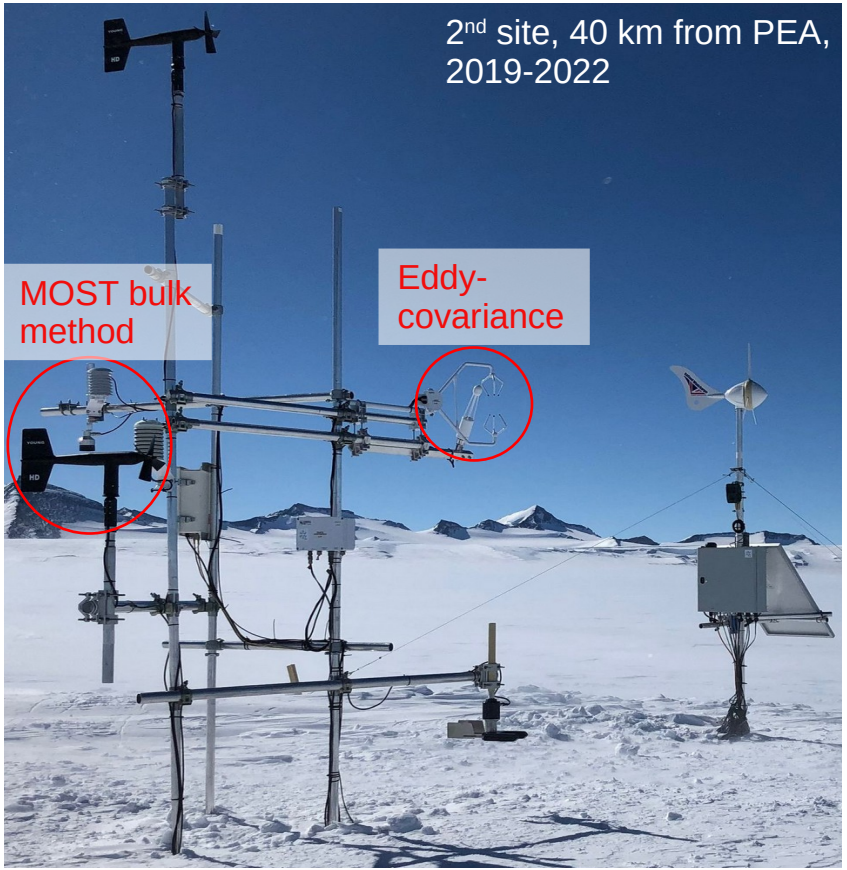


Data of first season is published as Wever et al. (2018), https://www.doi.org/10.16904/envidat.30
More data is available on request and is planned to be published in the future.

4. Methods and challenges

- 2 measurement stations since 2016/2017
  - Snow transport
  - Turbulent fluxes

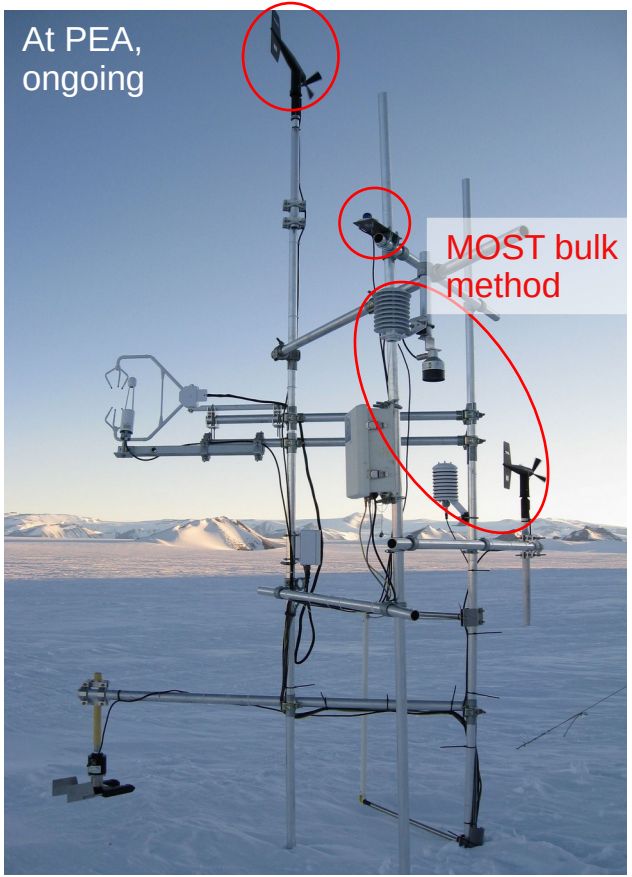


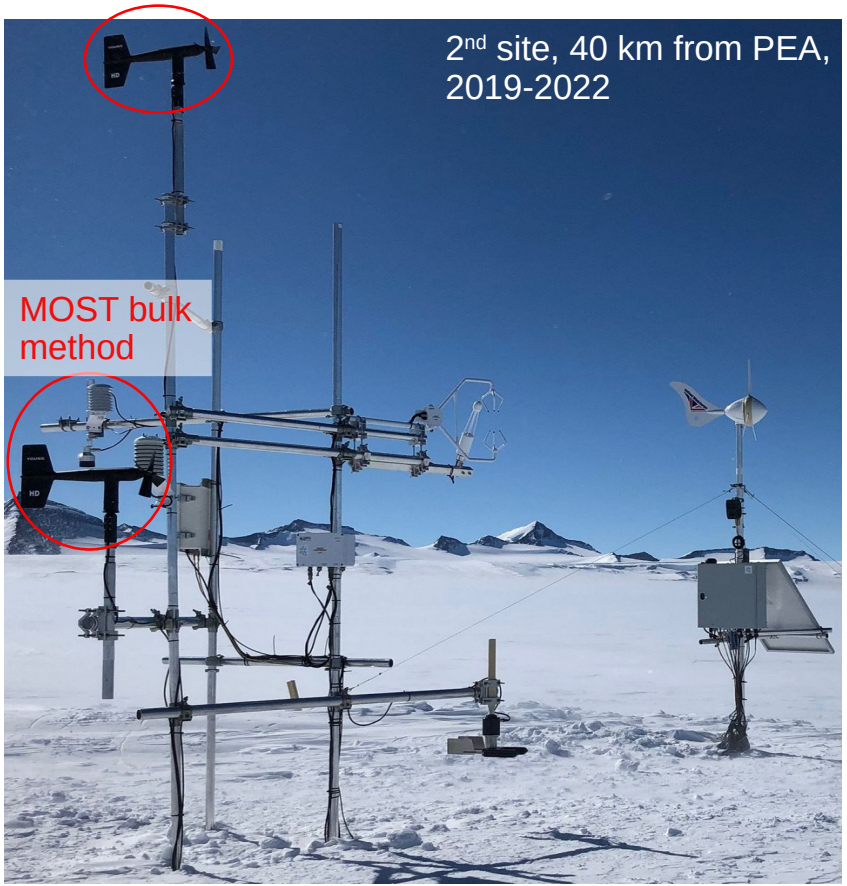


Data of first season is published as Wever et al. (2018), https://www.doi.org/10.16904/envidat.30
More data is available on request and is planned to be published in the future.

4. Methods and challenges

- 2 measurement stations since 2016/2017
  - Snow transport
  - Turbulent fluxes
  - Standard meteorology

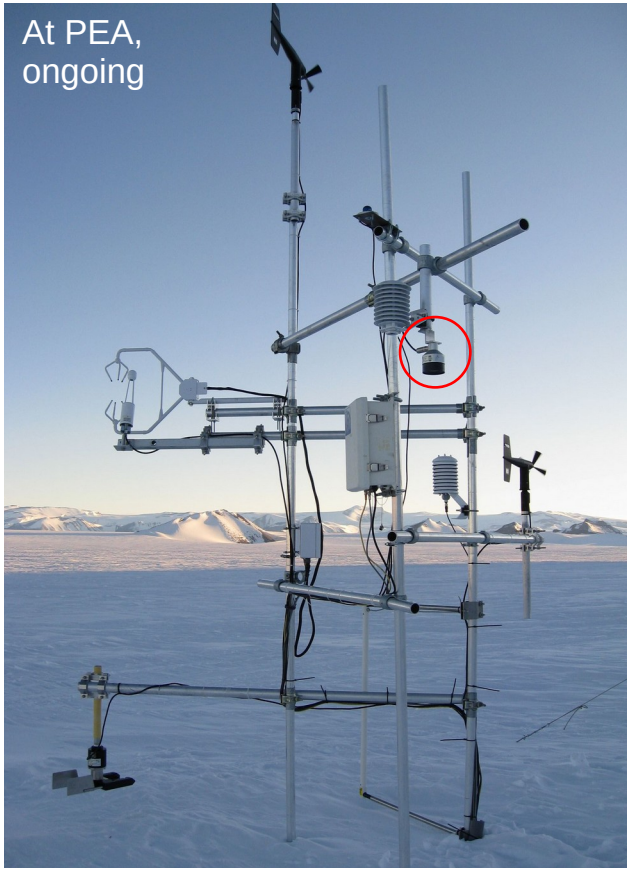


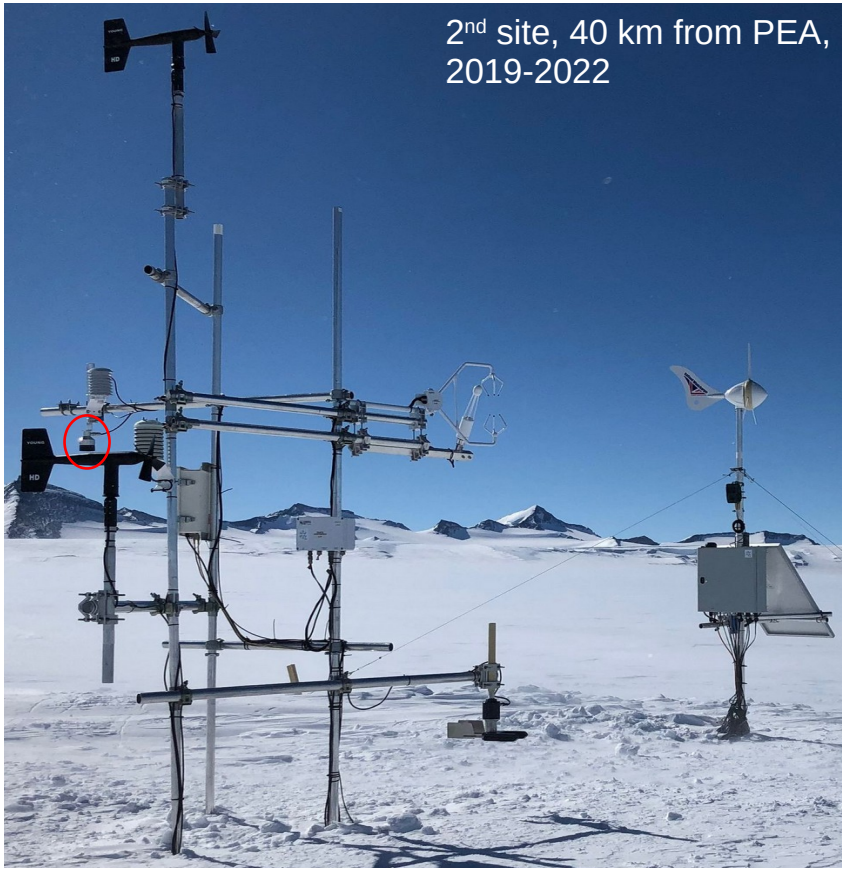


Data of first season is published as Wever et al. (2018), https://www.doi.org/10.16904/envidat.30
More data is available on request and is planned to be published in the future.

4. Methods and challenges

- 2 measurement stations since 2016/2017
  - Snow transport
  - Turbulent fluxes
  - Standard meteorology
  - Snow height changes

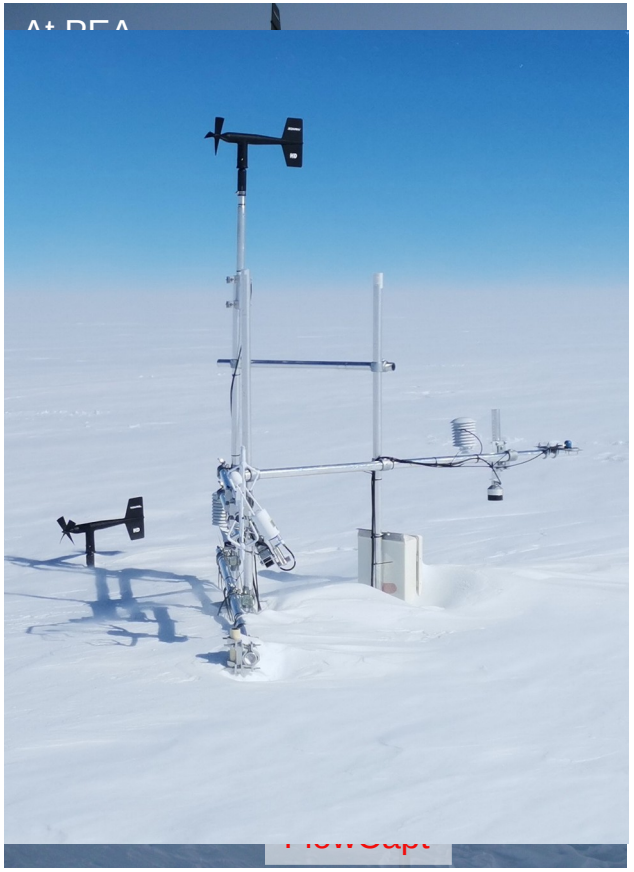




Data of first season is published as Wever et al. (2018), https://www.doi.org/10.16904/envidat.30
More data is available on request and is planned to be published in the future.

4. Methods and challenges

- 2 measurement stations since 2016/2017
  - Snow transport
  - Turbulent fluxes
  - Standard meteorology
  - Snow height changes
- Challenges
  - Power supply in austral winter
  - Snow accumulation buries the SPC



Data of first season is published as Wever et al. (2018), https://www.doi.org/10.16904/envidat.30
More data is available on request and is planned to be published in the future.

Thank you!

Project funded by

SWISS POLAR INSTITUTE

Swiss National Science Foundation

Photo: Martin Leitl