

The ISOBAR project (2016–2018) – Observations on the stable polar Atmospheric Boundary Layer from Remotely Piloted Aircraft Systems

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Purpose

- ABL processes in the Arctic
- Turbulence within the Stable ABL
- ABL Parameterization Schemes

Methods

- Measurement strategies to resolve all relevant processes
- Multiscale modelling experiments



Observations

- Measurement strategy
 - ground based flux and met stations
 - ABL remote sensing and profiling systems
 - RPAS (profiles and turbulence)



- Three field campaigns

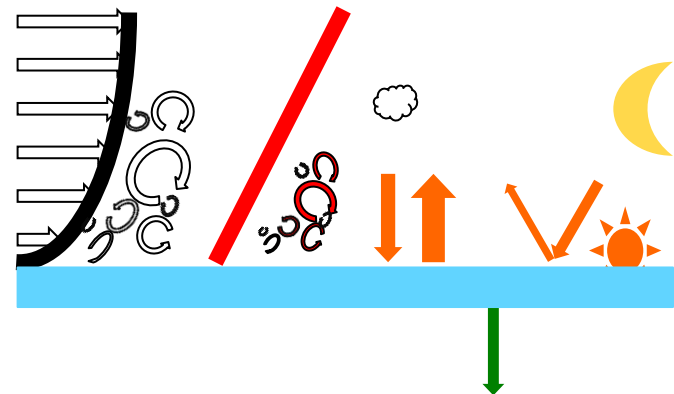
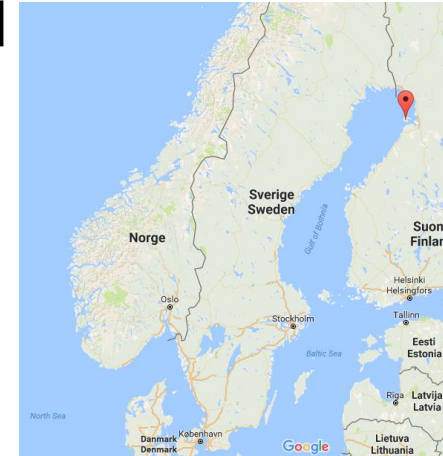
Validation Campaign

- Andøya Space Centre, Norway
- 2 weeks in Dec 2016
- Improve measurement strategies
- RPAS validation
 - against 80 m tower (EC)
 - additional profiling systems
 - intercomparison



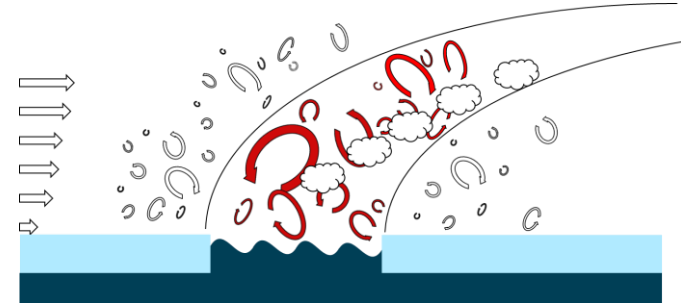
Observations on SBL over homogeneous ice surface

- Hailuoto (Karlö), Bothnian Bay, Finland
- 3 weeks in Feb/Mar 2017
- Stable Boundary Layer Observations
 - Ice stations (AWS + EC)
 - RPAS observations
 - Remote sensing systems
 - Balloon profiles



Observations on the Arctic SBL over strong surface heterogeneities

- Around Svalbard
- Planned for winter/spring 2018
- Measurements:
 - AWS + EC stations
 - Profiling systems
 - RPAS systems
 - Profiles and turbulence measurements on both sides of the internal boundary
 - Flights across the internal boundary



High-resolution numerical model experiments

- Single Column Model
 - Develop improved stability functions based on WP2
 - Compare model results to experiments
- LES (PALM)
 - Idealized simulations of Arctic ABL, initialized with observations
 - Virtual RPAS measurements compare to observations
- WRF
 - Idealized simulations
 - Implementation of improved stability functions in parametrization schemes
 - Comparison of measurements to simulations based on different parameterization schemes

