



Mixed phase clouds

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(AC)³ Arctic Amplification: Climate Relevant Atmospheric and Surface Processes, and Feedback Mechanisms



What is special for HALO-(AC)³ (compared to previous campaigns)?

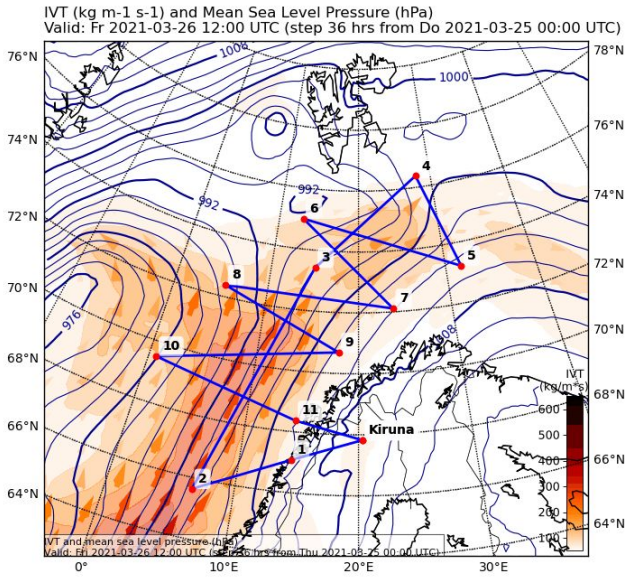
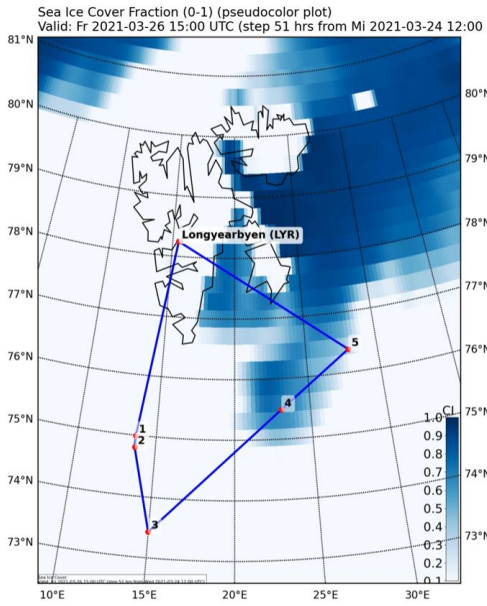
- 1. Three aircrafts available
 - HALO
 - P5 & P6 considered as unit



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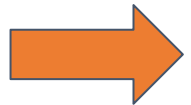


2. Flight distance of HALO



Key questions about Mixed Phase Clouds (MPC)

- What is the microphysical composition of Arctic MPCs?
- What are the radiative properties of Arctic MPCs?
- What are the formation/persistence processes of Arctic MPC?



How are Arctic MPCs influenced and transformed?

- Air mass origin: Warm air intrusions or cold air outbreaks
- Connection to Atmospheric rivers, large scale transport
- Different surfaces (Ocean, Sea ice)
- Aerosol composition

How to investigate?

Remote sensing (HALO + P5)

Active:

- MiRAC (Radar)
- AMALi (LiDAR)
- HAMP (Radar/Radiometer)
- WALES (LiDAR)

Passive:

- Humidity and Temperature profiler
- Up- and downward spectral solar radiation (SMART)
- Fields of radiance (Eagle/Hawk)
- Fish-Eye camera
- Sun-Photometer
- Broadband radiometers
- BACARDI

In-situ (P6)

Cloud probes:



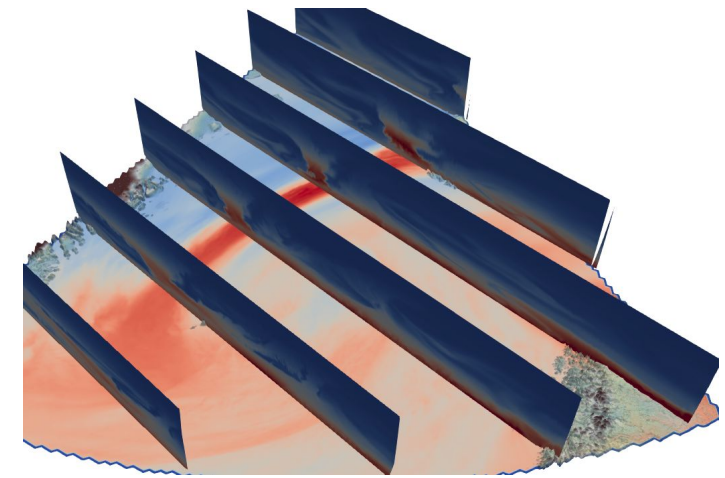
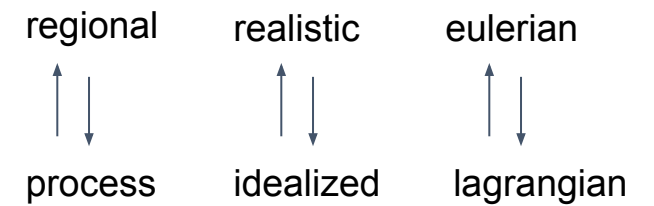
PN: Polar Nephelometer
Nev.: Nevzorov
PIP: Precipitation Imaging Probe
CCP: Cloud Combination Probe
CDP: Cloud Droplet Probe
CIP: Cloud Imaging Probe

Aerosol instruments
CVI, CPC, UHSAS, OPC,
SP2 ALABAMA, HERA,
SMPS

Dropsondes + Nose boom:

- Temperature
- Humidity
- Wind (speed, direction)

Model simulations (ICON, DALES)

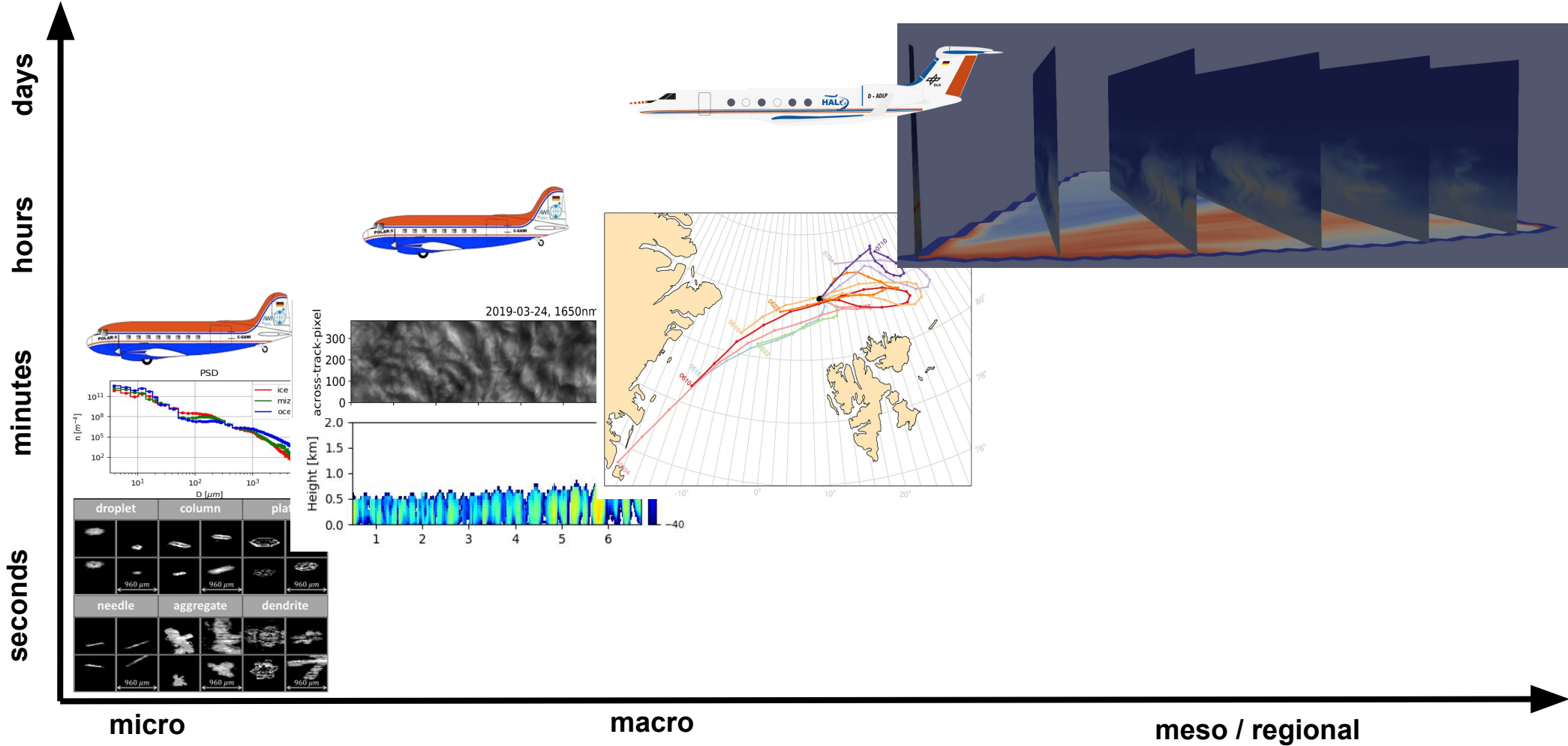


New with Halo-(AC)³

Composition

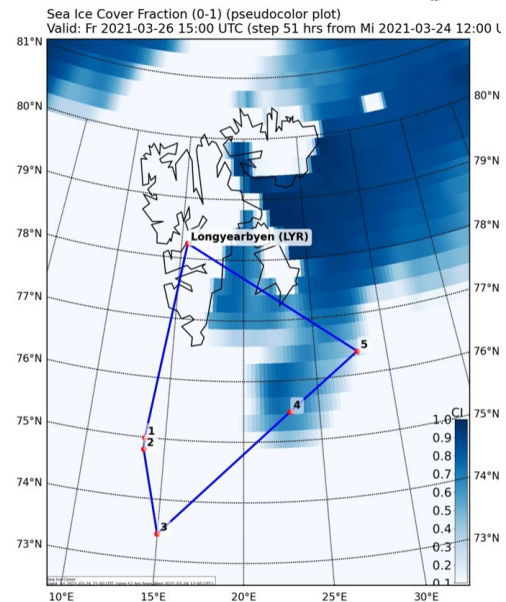
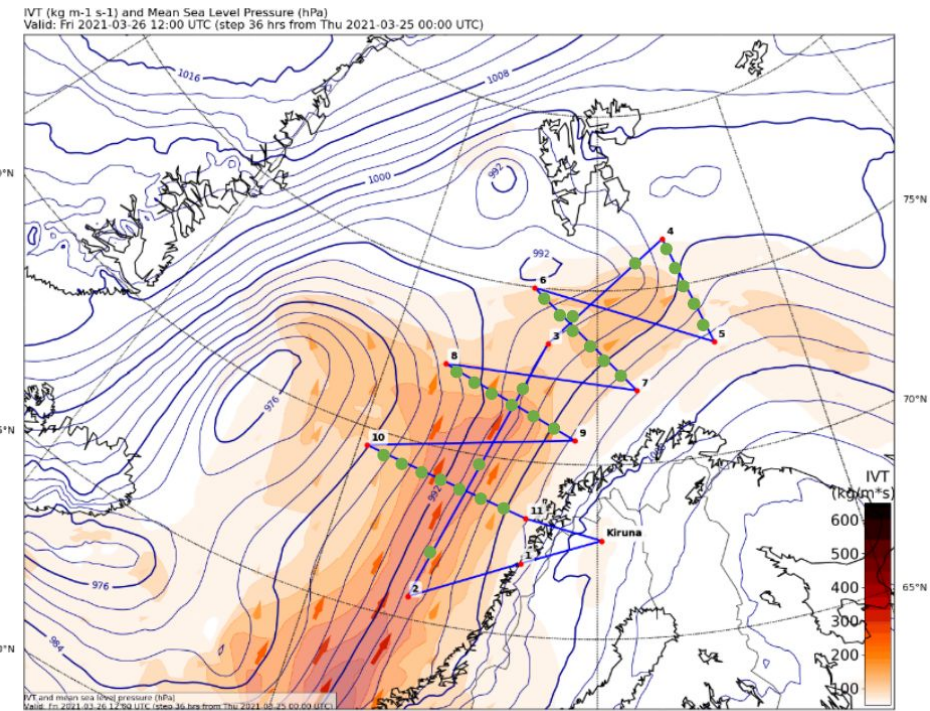
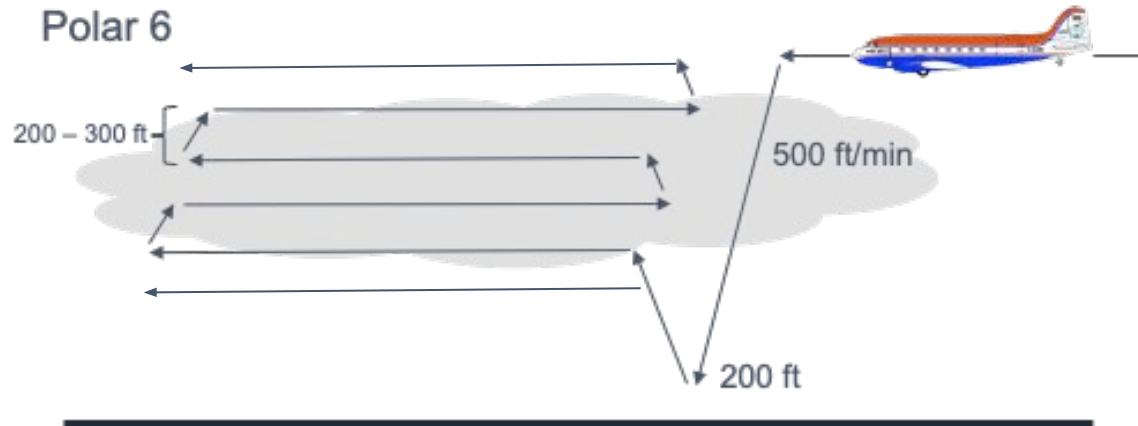
Formation

Transformation



- **Combined flight pattern**

- sample different but connected airmasses with Polar 5 and HALO
- sample clouds (remote sensing and insitu) with Polar 5 and 6



Questions for discussion

How can we benefit most from the special setting during HALO-(AC)³?

- **How can we combine flight pattern?** (Polar 5&6 measuring before or behind warm air intrusion while HALO covering it all; Are collocated flights necessary?)
- **How can we profit most from the Model simulations regarding the flight planning?** (Which area, parameters and forecast time need to be simulated?)
- **Which patterns would we like to analyse before the campaign?**
- **How are observational data used for model benchmarking?**
- **Make a list of priorities?** (Which atmospheric situations have a priority to get studied? (Atmospheric rivers, WAI, CAO, Large scale divergence, etc.), Which type of pattern is most beneficial (e.g. statistics)?)