

HALO-(AC)³ – 2022/04/01 – Polar6 research flight #08

Objectives:

- * Perform coordinated flight legs with HALO and the P5 where all travel on the same line segment in order to probe cloud properties at the same location with remote sensing and in-situ instruments.
- * Perform trace gas measurements of sufficient duration at higher altitudes.

Mission PI P6:

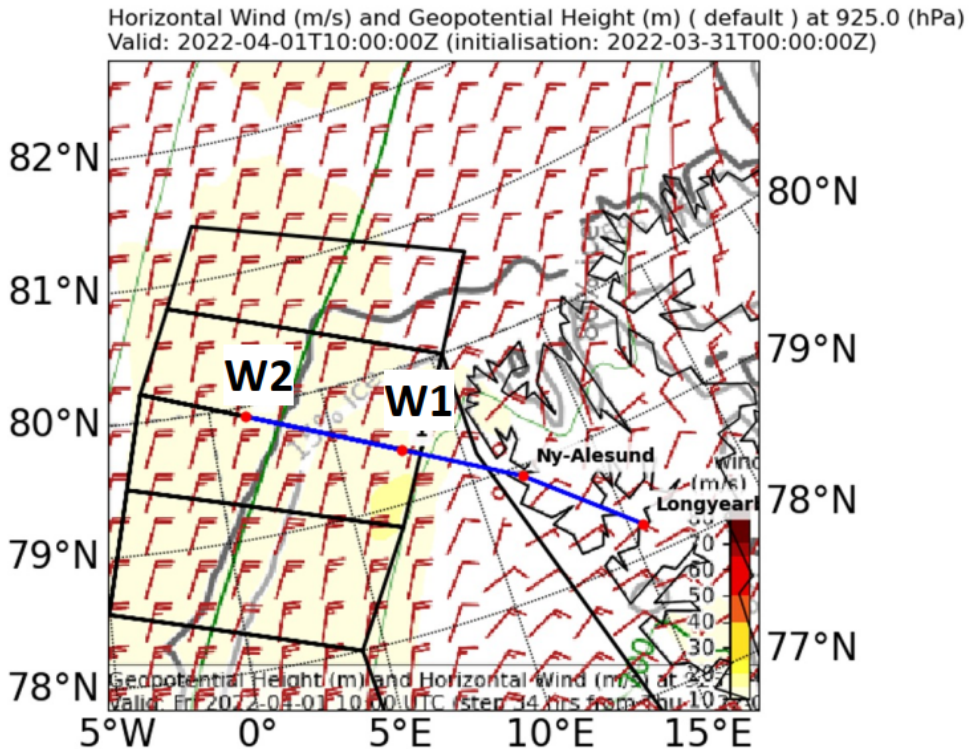
Stephan Borrmann

Polar 6 Crew	
Mission PI	Stephan Borrmann
AWI 1	Max Stöhr
PMS 1	Johanna Mayer
CVI/Aerosol/HERA	Bruno Wetzel
ALABAMA/trace gas	Oliver Eppers
PMS	Elena De La Torre Castro

Flight times:

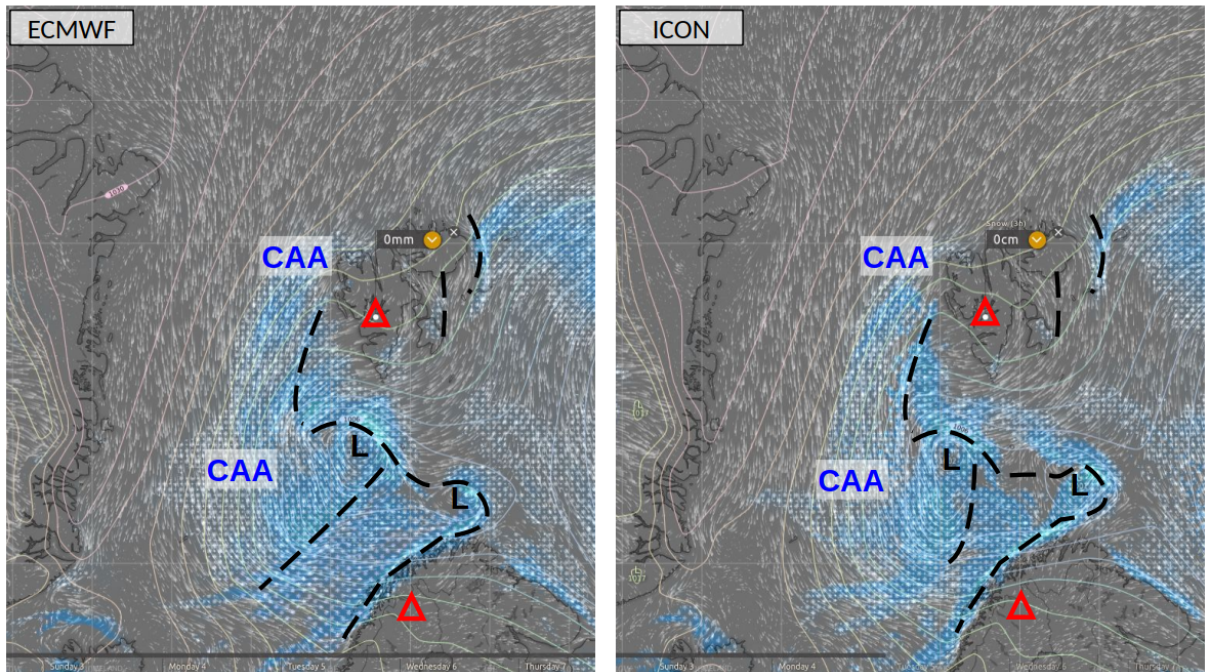
Polar 6	
Take off	09:17 UTC
Touch down	14:30 UTC

Intended flight plan:

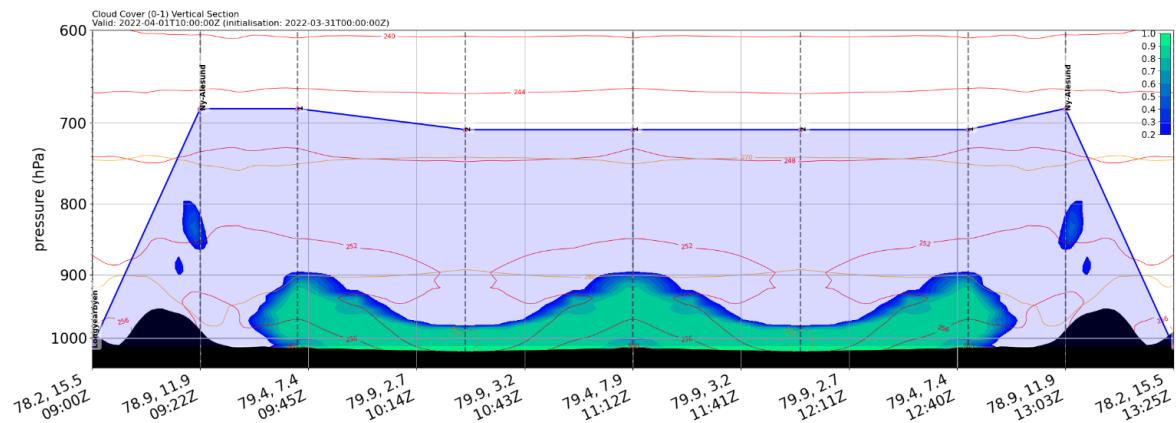


Weather and cloud situation:

Friday, 2022-04-01 12 UTC (+36h)



The cold air outbreak with the northerly flow continued to persist. However a low pressure system south of Svalbard starts to influence general situation.



The cloud top at WP1 was near 2700ft to 3000ft and the cloud base at roughly 400ft with a precipitation zone below. However, towards WP2 the cloud layer became thinner steadily. Also it became more broken closer to the ice edge. In the area of WP1 the clouds were a stratocumulus deck (left picture below), closer to the ice the cloud types were more convective cumulus mediocris or humilis (right photo).



Overview:

- * The three encounters with HALO were executed as planned. The Polar 6 was deep inside clouds at 1000ft during the first and at roughly 2000 ft during the second encounter near WP1.
- * Polar 5 and Polar 6 were flying coordinated behind each other on the same transect lines.
- * The flight plan was executed with minor modifications: The way point WP2 was moved closer to WP1 because over the ice there were no clouds. However, the air above the ice was still probed long enough for the aerosol instruments to gather data. Also two small 8 minute legs were added at the last of the six cloud legs between WP1 and WP2. These two extra legs near WP1 were intentionally positioned a certain distance above the cloud top.
- * Inbound to LYR trace gas steps were flown at 10kft, 12kft, and 14kft in coordination with the instrument PI such that a calibration plus some measurements could be completed at each of these altitudes.
- * In particular the PMS cloud instruments benefitted from the complex staircase pattern that was performed between WP1 and WP2. The first leg was at 200ft, i.e. below cloud base in the precipitation zone. The last leg was flown such that the cloud tops were “scratched”. All other legs were spent inside the clouds on different altitude levels. Care was taken such that the time spent on each level was long enough for good counting statistics.

Instrument Status:

CVI was operating throughout the entire flight.

Trace gas was working continuously, and during the 3 “trace gas altitude steps”.

Polar nephelometer was operating continuously

Nevezorov probe: was working, but the data need to be checked. alfunction.

ALABAMA worked without problems starting above Ny Alesund during the remaining flight and delivered data. Before Ny Alesund the laser coolant pump was too cold.

PMS instruments and **SP2** were working.

HERA sampler was running during the corresponding flight time segments.

Aerosol and Trace gas instruments continuously measured throughout the flight.

Nose-boom: was working according to the expectations.
