

## ACLOUD Flight #16 – Polar 5 – 170613

**Mission PI P5: André Ehrlich**

**Objectives: Nose boom calibration square and multilayer clouds.**

**Crew:**

Polar 5	
PI	André Ehrlich
Basis Data Acq.	Lukas Kandroa
SMART	Elena Ruiz
Eagle/Hawk	Tobias Donth
MiRAC	Mario Mech
AMALi	Marek Jacob

**Flight times:**

Polar 5	
Take off	14:56 UTC
Touch down	16:55 UTC

**Weather situation as observed during the flight (compare to forecast):**

A low pressure system in high altitudes west of Svalbard and an occlusion north east of Svalbard were approaching towards the island. Low level clouds were predicted all over the place, mid-level associated with the pressure systems. The fog of the last days almost disappeared but the cloud base was not higher than 1000 m. This did not allow a flight in the morning for the initially planned flight pattern towards Polarstern. The situation improved over the day with increasing cloud base and some gaps in the lowest cloud layer.

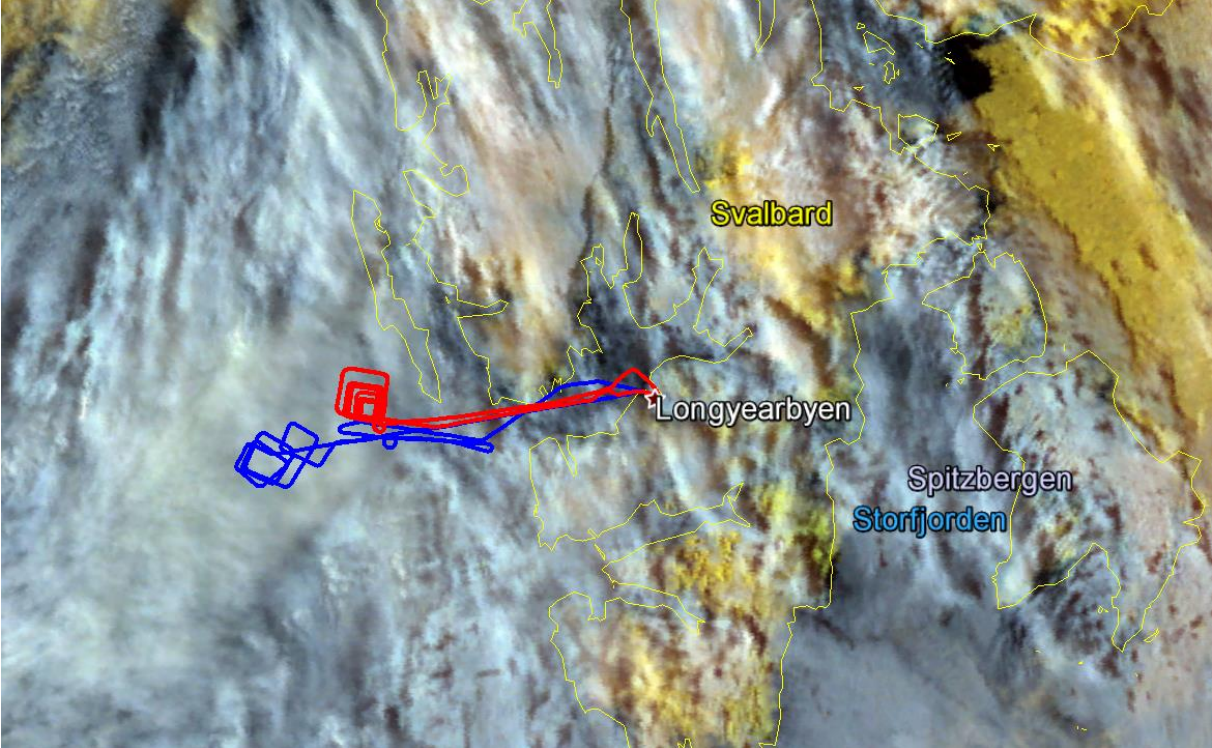
Finally, a shortened flight towards west of Svalbard was conducted. In this area a multilayer cloud field was observed. Some convective clouds close to the coast, low stratiform clouds, partly alto stratus clouds and further west a thick cirrus. Temperatures in the low clouds had been above zero.

**Overview:**

The start of Polar 5/6 was synchronized to allow a climb in close horizontal collocation being in the same altitude at the same time. This worked out until 10 000 ft and allows a detailed comparison of the P5/P6 instrumentation. Some cloud layers were crossed during the ascent. For the lowest leg, the roller doors and the albedometer likely were not opened before entering the cloud (low cloud base). Some clouds exceeded 10 000 ft altitude. To allow reasonable RADAR measurements, the flight level was slightly adjusted to 11 000 ft. Before reaching C1, we started with the calibration square, 2 min legs, and four different speeds. In this area a low level clouds was detected by the radar. During the squared, we noticed some turbulence by motion of the aircraft. Also the radar observed some clouds which Polar 5 penetrated even when the pilots could not identify a “solid” cloud layer. Therefore, we added a second calibration square, 1 min legs, after finishing the first. Before ending the final box, we

released one drop sonde. The second was flown in 8 000 ft altitude. Here, much calmer conditions were observed. After the second box Polar 5 returned to LYR staying in 10 000 ft as long as possible.

**Flight track and pattern:**



One drop sonde was launched in the center of Polar 5 (red) squares.



Multi-layer structure of the clouds observed west of Svalbard.



Some more convective cloud tops close to the west coast.

**Instrument Status:**

<b>Polar 5</b>	
Basis data acquisition	
Nose Boom	
MiRAC	
HATPRO	
AMALi	
SMART	
Eagle/Hawk	
Sun Photometer	
Drop Sondes	1 launched

**Comments:**

All instruments run without serious problems.

**Detailed Flight Logs (Name of author... more than one is possible):**

**André Ehrlich (times UTC)**

- 14:33 Almost overcast at the airport, cloud base at top of the mountains.
- 15:02 Mid- and low-level clouds
- 15:10 Different cloud layers, low, mid and high
- 15:12 within a cloud layer
- 15:14 climb above mid-level clouds
- 15:16 stratiform mid-level cloud above
- 15:18 two cloud layers, low and high cirrus
- 15:20 start first box of calibration pattern
- 15:21 SMART stabilization still spikes in roll and pitch analog channels
- 15:22 Thick cirrus with a halo visible.

15:30 End of first box  
15:36 still multi-layer clouds  
15:42 End of second box  
15:46 quite turbulent  
15:48 cloud conditions unchanged: cirrus above and multi-layer below  
15:53 ½ of the legs are in clouds with respect to the radar  
15:54 start of 4<sup>th</sup> box  
16:03 Drop sonde #1  
16:07 End of 4<sup>th</sup> box  
→ Descend to 8 000 ft  
16:11 start of 1<sup>st</sup> box  
16:13 much calmer in the flight level  
16:17 start of 2<sup>nd</sup> box  
16:23 start of 3<sup>rd</sup> box  
16:25 cloud conditions unchanged, much smoother at 8 000 ft  
16:30 start of 4<sup>th</sup> box  
16:37 end of calibration box pattern  
→ Climb to 10 000ft  
16:44 clouds in all altitudes  
16:47 inside some convective cloud tops  
16:48 start descent

## **Quicklooks:**

### **Drop Sondes**

### **SMART**

### **MiRAC & AMALI**

### **CANON Fish-Eye**

# Eagle/Hawk

