

MOSAiC-ACA Flight #04 – Polar 5 – 2020/08/31

Objectives:

Joint Polar 5 and Polar 6 operation close to Longyearbyen and test flight for Polar 5 instruments (nose boom calibration).

Mission PI P5:

André Ehrlich

Polar 5 Crew	
Mission PI	André Ehrlich
Basis Data Acq.	Clemens Gollin
SMART/ Eagle/Hawk	Sebastian Becker
MiRAC / AMALi	Friedhelm Jansen
Media	Stephan Schön
Optional seat	Martin Gehrman

Flight times:

Polar 5	
Take off	12:40 UTC
Touch down	14:55 UTC

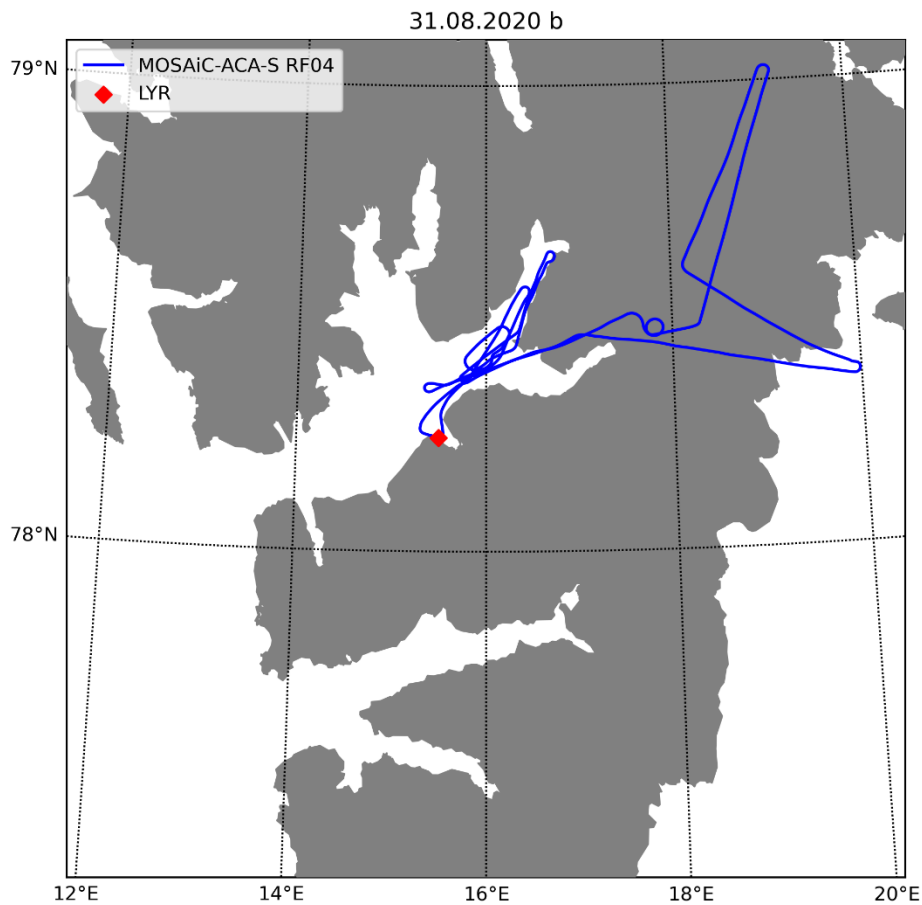
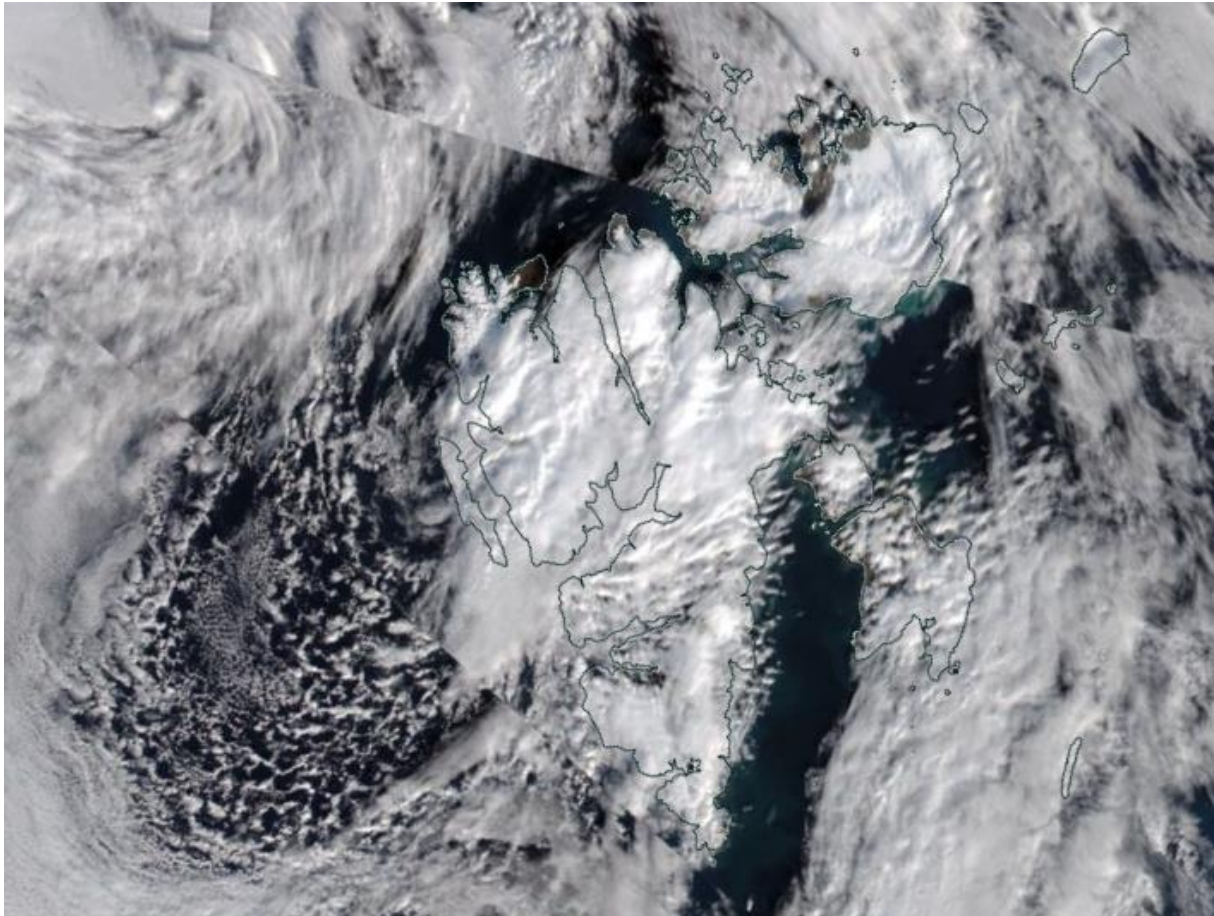


Fig. S5.1: Flight Track of Polar 5

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

A low pressure was located close to the north western tip of Svalbard. This position was very stable and led to a southerly flow over Svalbard associated with a low and mid-level cloud layers present over the Isfjord. West of Svalbard only low clouds were expected as visible on the satellite image below. This was the area we aimed to fly for testing the remote sensing instruments and calibrating the nose boom.



Overview:

From the certification flight in the morning, some issues with the heating of the nose boom were reported. Due to this uncertainty, we decided to not fly into clouds during the entire flight. The PMS cloud probes were not operated during the flight.

The first part of the flight was a joint flight with Polar 6 for the film teams on both aircraft. We operated in the close vicinity of the airport in different altitudes. Instrument test were already started during this part.

Due to the strong southerly flow, the orography of the island caused some cloud gaps in the eastern part of the Island. However, the low clouds in the were thicker than expected. Therefore, we could not aim for the intended area of observations left to Svalbard. Instead, we climbed through a cloud gap eastwards and started a first calibration leg for the nose boom. The calibration was not flown

with fixed waypoints. Polar 5 used a constant heading, east-west and north-south. Therefore, the flight track was affected by the southerly winds and the forth and reverse legs did not match perfectly. However, we could finish both calibration legs without flying in clouds. Some clouds could be sampled by the remote sensing instruments, although, over the island the cloud situation was rather complex. Afterwards, we continued with the instruments tests and returned to the airport.

Instrument Status:

Polar 5	
Basis data acquisition	
Nose Boom	
MiRAC-A	
MiRAC-P	
AMALi	
SMART	
Eagle/Hawk	
Sun Photometer	
Polar Nephelometer	Not operated
2D-S	Not operated
CAPS	Not operated
PIP	Not operated
Drop Sondes	None launched

Table S5.1: Instrument status as reported after the flight for all instruments on Polar 5.

Comments: Cloud in situ probes have not been operated.

Detailed Flight Logs:

12:38 Overcast with low and midlevel clouds. Some showers over the fjord

12:40 Take Off

12:46 Broken low clouds, some cirrus

12:48 Roller door open

13:42 Start leg West → East

13:44 Restart HAWK/Eagle – GPS

Changed data storage of Eagle to disk 2

13:53 Turn back East → West (little head wind)

We did fly heading direction and did not follow the way points

- 14:05 Start leg South → North
- 14:16 Turn back North → South
Thin clouds over land
- 14:26 end of leg but continue for nose boom
- 14:34 end of leg
- 14:35 finish Eagle/Hawk recording
- 14:55 touch down



12:45 UTC - Polar 6 as seen during the joint flight.



14:19 UTC Complex cloud structure passed during the horizontal calibration legs.



14:19 UTC Almost cloud free above Polar 5 but some inhomogeneous mid-level clouds south of the flight track.

Quicklooks:

AMALI:

