

ACLOUD Flight #06 – Polar 5 – 170527—Morning

Mission PI: Manfred Wendisch

Objectives: Meet with CLOUDSAT, collect data for remote sensing of different clouds and above different surfaces (sea ice/open ocean) formed in a weak cold air outbreak.

Crew:

Polar 5	
PI	Manfred Wendisch
Basis Data Acq.	Christoph Petersen
SMART	Johannes Stapf
Eagle/Hawk	Elena Ruiz
MiRAC	Mario Mech
AMALi	Tobias Doktorowski

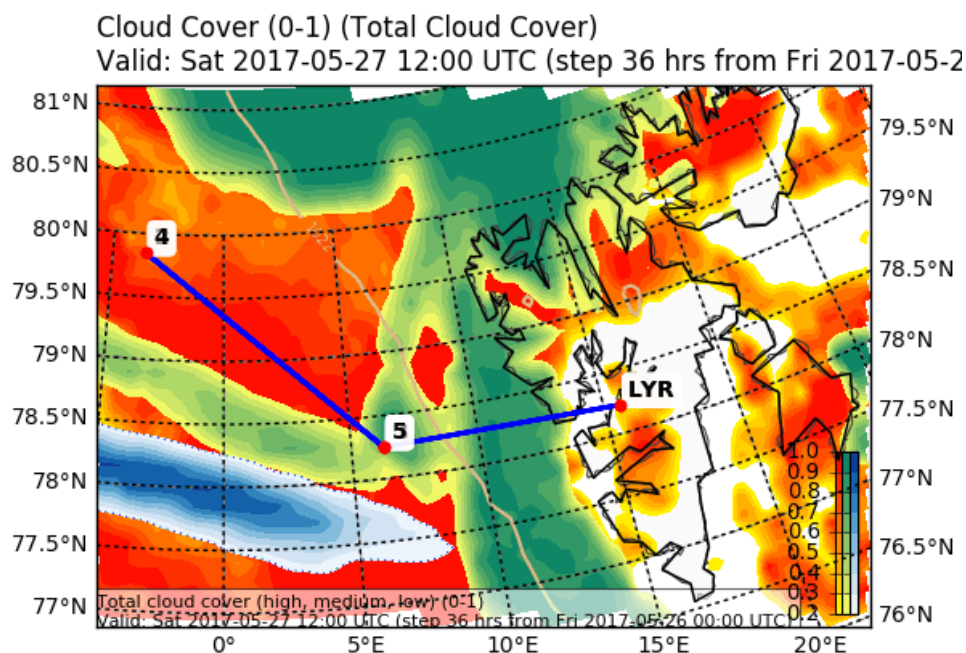
Flight times:

Polar 5	
Take off	07:58 UTC
Touch down	11:23 UTC

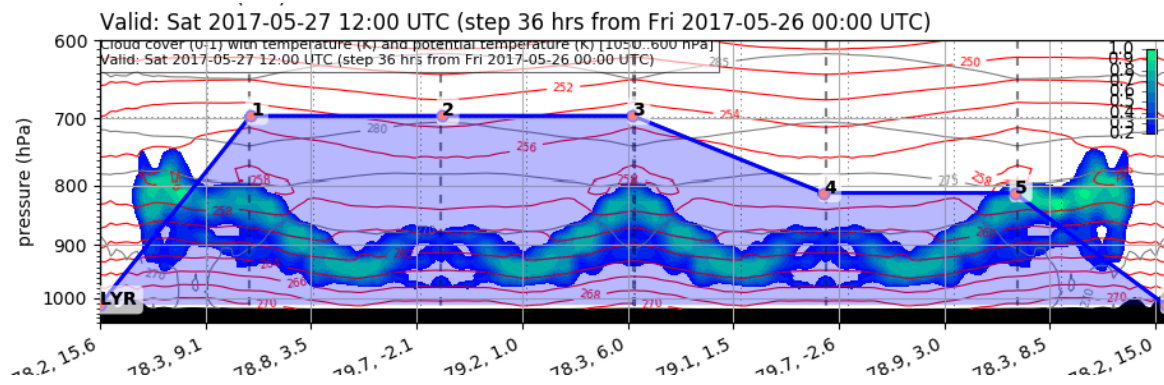
Weather situation as observed during the flight (compare to forecast)

Clouds at different altitudes were predicted by both ECMWF and GSF, and actually also showed up during the flight, see figures below. There were Northeasterly winds at 850 hPa which were well predicted, see figures below.

ECMW prediction of clouds—horizontal



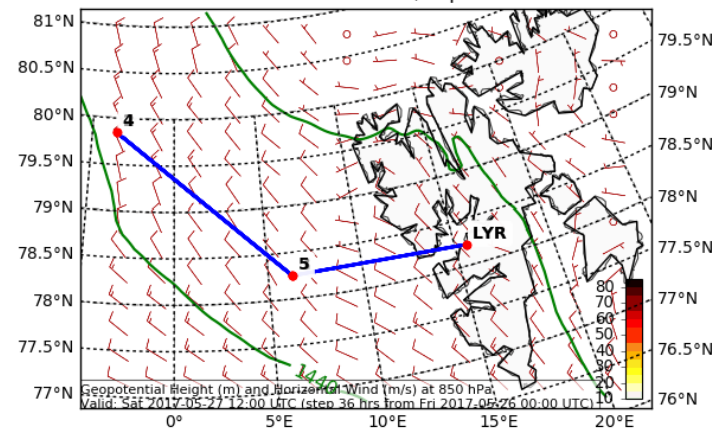
ECMW prediction of clouds—vertical



ECMW prediction of wind 850 hPa

Geopotential Height (m) and Horizontal Wind (m/s) (Wind Speed 10-85 m/s) at 850 (hPa)

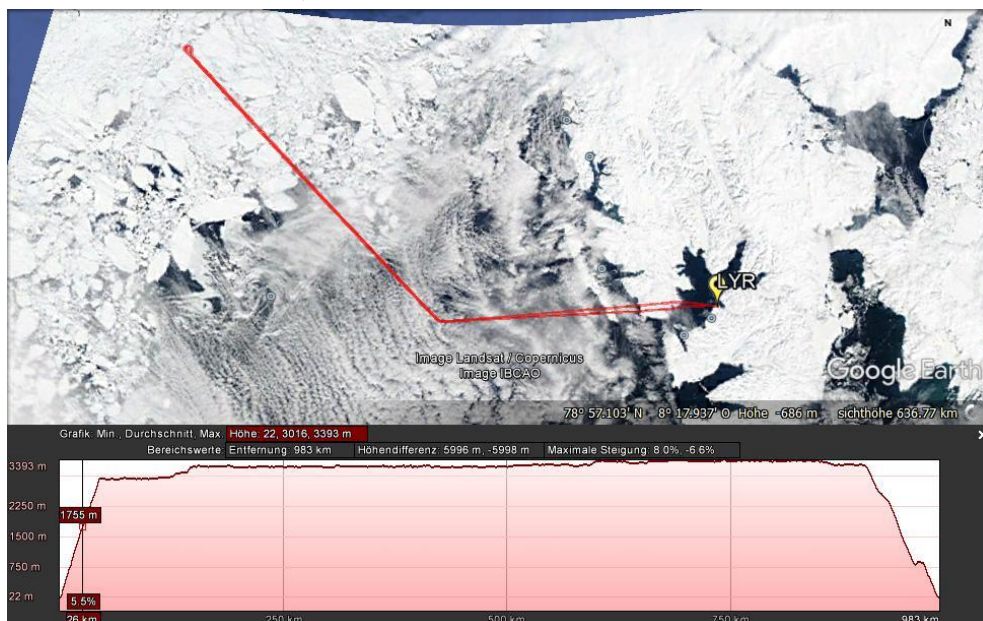
Valid: Sat 2017-05-27 12:00 UTC (step 36 hrs from Fri 2017-05-26 00:00 UTC)



Overview of flight

Horizontal flight pattern and profile for P5

Waypoints: **LYR**: 78° 14.816' N, 15° 27.545' E
C1: 78° 15.000' N, 6° 16.176' E
C2: 79° 50.742' N, 3° 30.786' W



Detailed Flight Log (all times in UTC)

LYR – C1 climb and stay at ≈10,000 ft: 115 NM @ 140kn 45 min

- 07:55 Taxi, all instruments okay
- 07:58 Takeoff
 - o Almost cloudless, some scattered Cu
- 08:08 Start climbing to 10,000 ft in the direction of C1
 - o Cloud penetration, thin cloud
 - o At 10,000 ft cloud below aircraft
- 08:12 Nice clouds below and ahead of us, no cirrus above, see photo

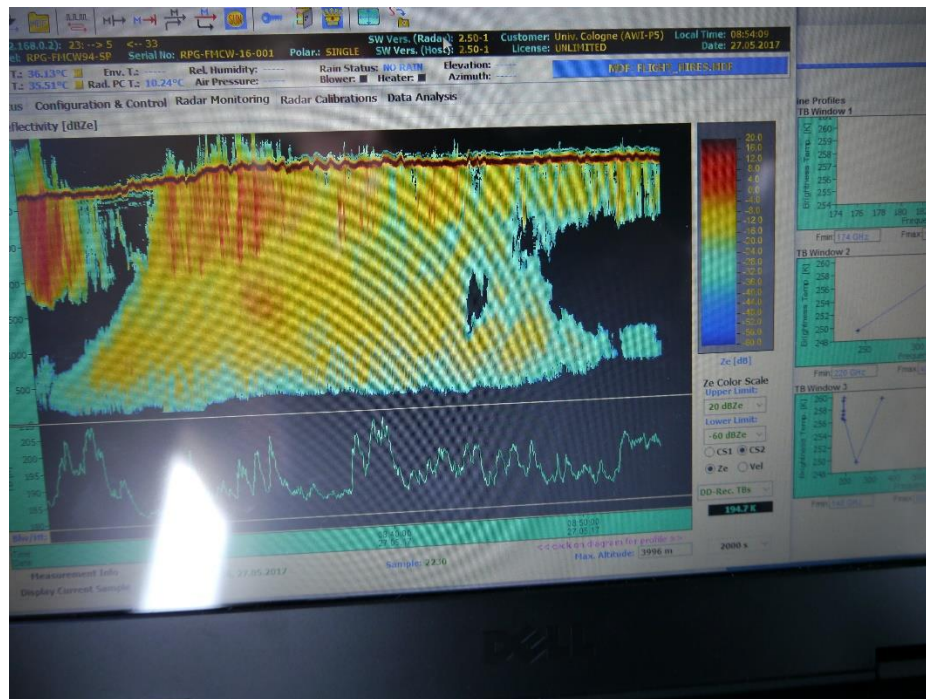


- 08:24 More scattered clouds below



- 08:26 Rather thin clouds
- 08:28 Climbing somewhat higher than 10,000 ft to reach the cloud tops.

- 08:45 We reach C1, thick clouds below, multilayer



C1 – C2 at 10,000 ft: 147 NM

- 08:50 Inhomogeneous cloud below, no cirrus above, some sea ice
- 09:03 Cloud top about 700 m, quite low, more sea ice below
- 09:08 Clouds getting thicker, no cirrus
- 09:23 Scattered clouds, but no cirrus above, cloud top at 1 km, more sea ice below





- 09:45 We pass C2, turn with a circle
- 09:49 View into direction of C1



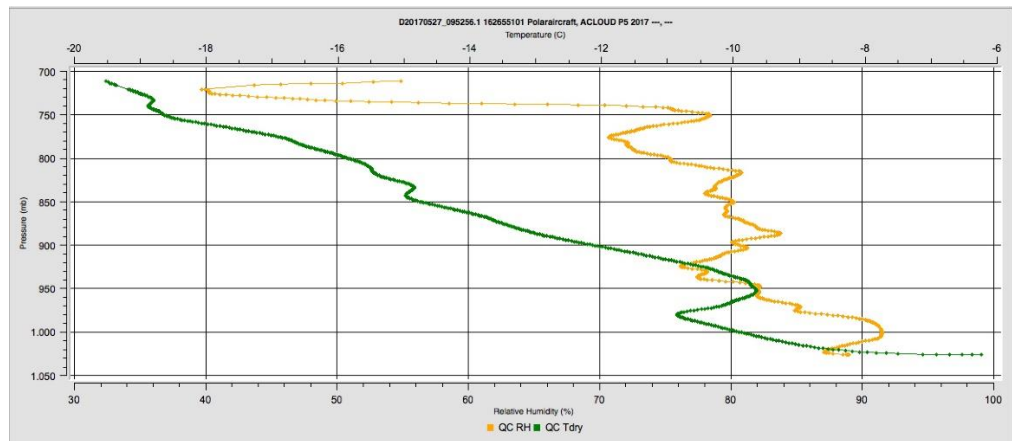
C2 – C1 at 10,000 ft: **147 NM**

Objective: Release three drop sondes at C2, Satellite meeting, and C1

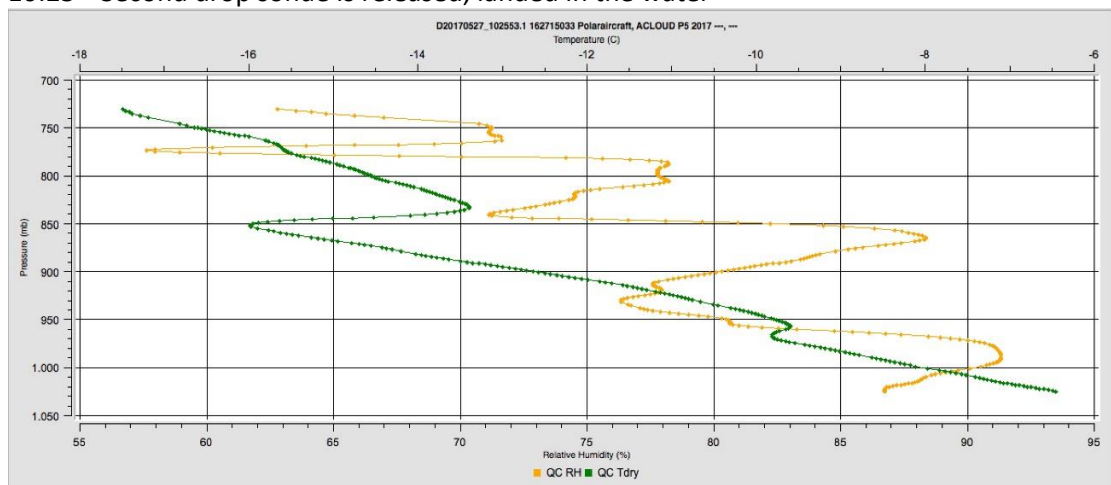
Meet satellite at: **79° 4.044' N, 1° 47.434' E**

10:27:00 UTC

- 09:54 First drop sonde, close to C2, Aircraft slows down, to adjust the meeting to the satellite, pitch about 5°, sonde landed on ice

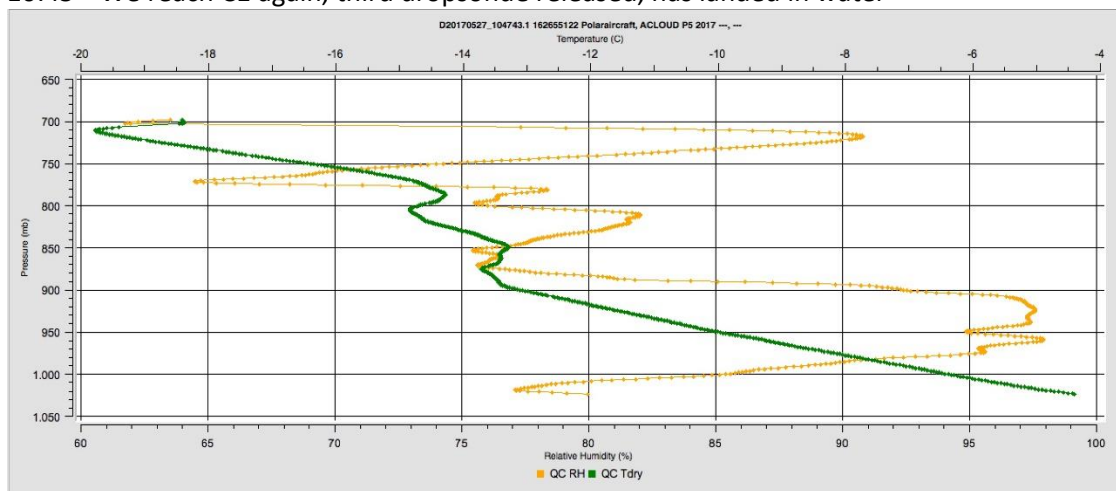


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- 10:22 Satellite point is reached
- 10:23 Second drop sonde is released, landed in the water





- 10:27 CALIPSO flies over us, we met the satellite a little more to the south, as originally planned
- 10:27 Some problems with SMART, data loss for about 10 minutes
- 10:45 We reach C1 again, third dropsonde released, has landed in water



C1 – LYR

115 NM

- 10:50-10:55 Glories observed all the flight back
- 11:23 Touch down

Short before landing.



Instrument Status

Polar 5	
Basis data acquisition	
Nose Boom	
MiRAC	
HATPRO	
AMALi	
SMART	
Eagle/Hawk	
Sun Photometer	
Drop Sondes	3 launched

Comments

SMART had a short stop in the measurements, 10 minutes of data were lost. Eagle and Hawk worked fine, also the radar and microwave worked well. No problems with drop sondes.

No cirrus at all during the whole flight.

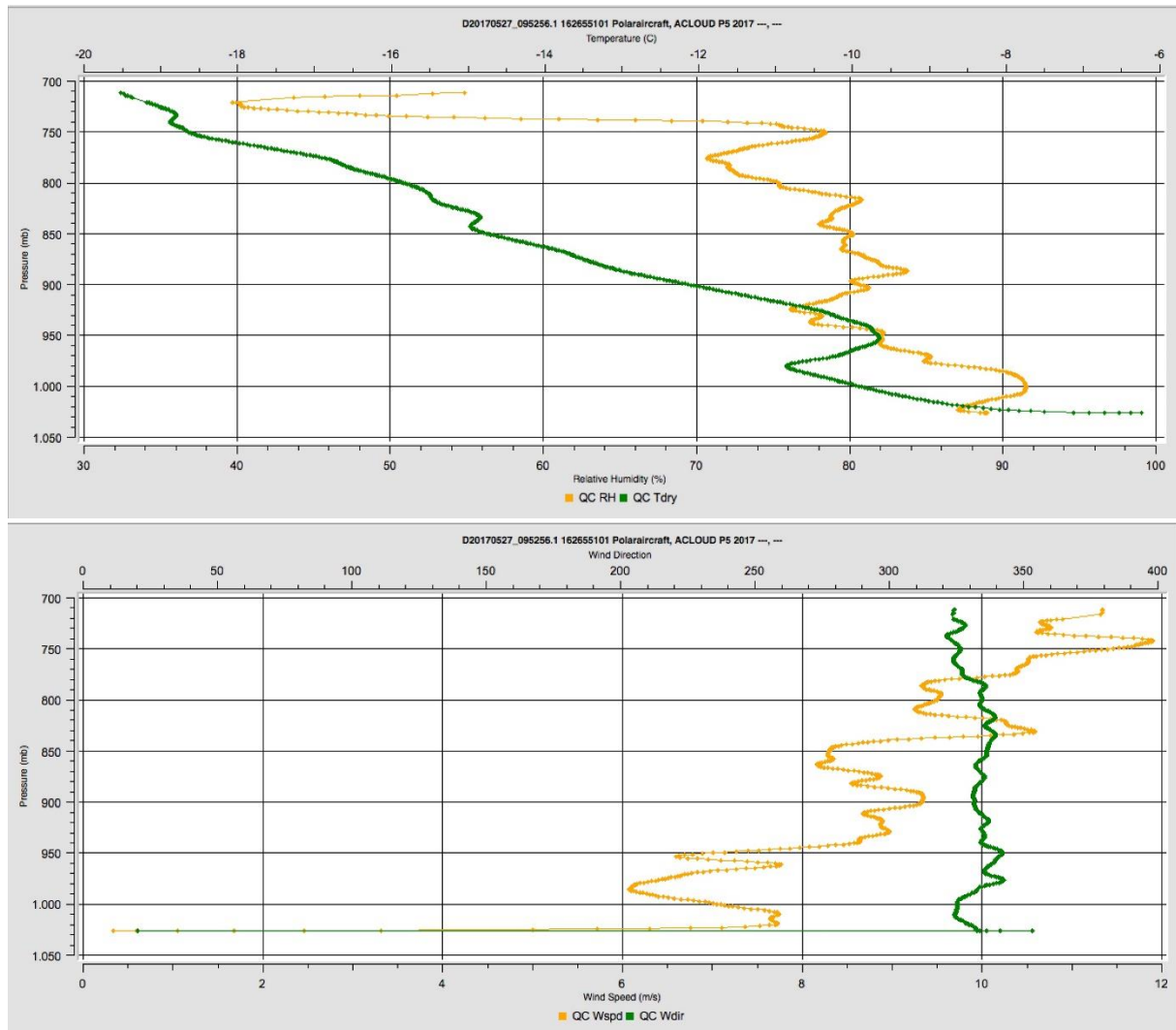
- This flight should ideally work to do a detailed comparison with Cloudsat. We had thick and thin clouds, the cloud radar covered it well.
- Thanks a lot to the crew!



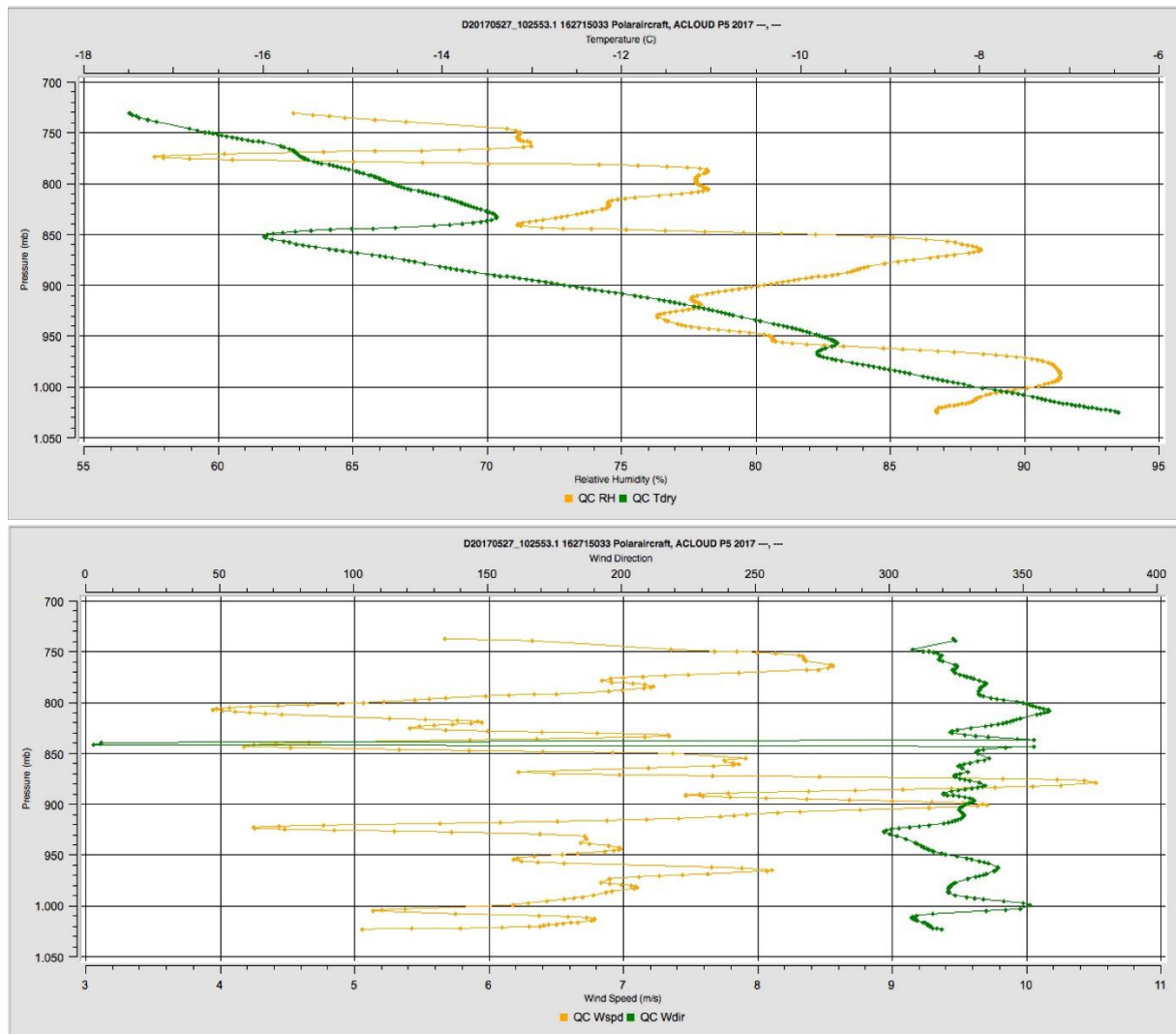
Quicklooks

Drop Sondes

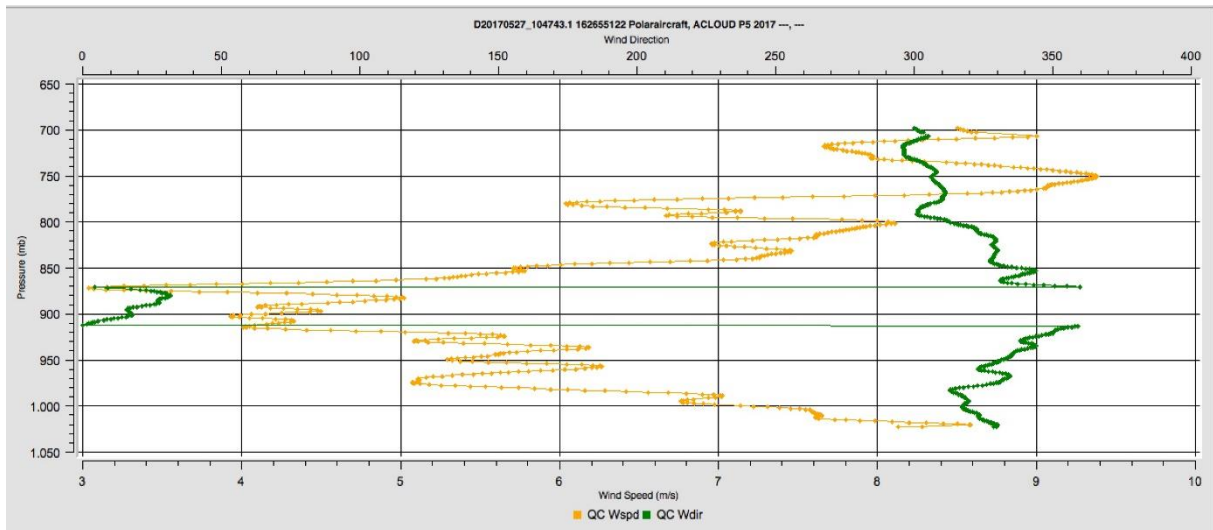
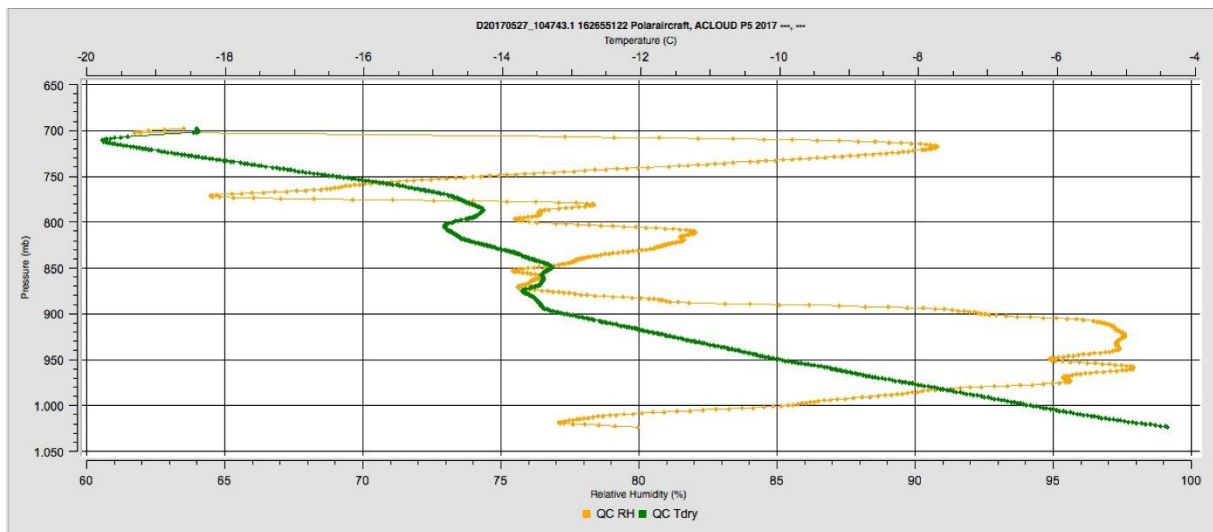
First dropsonde



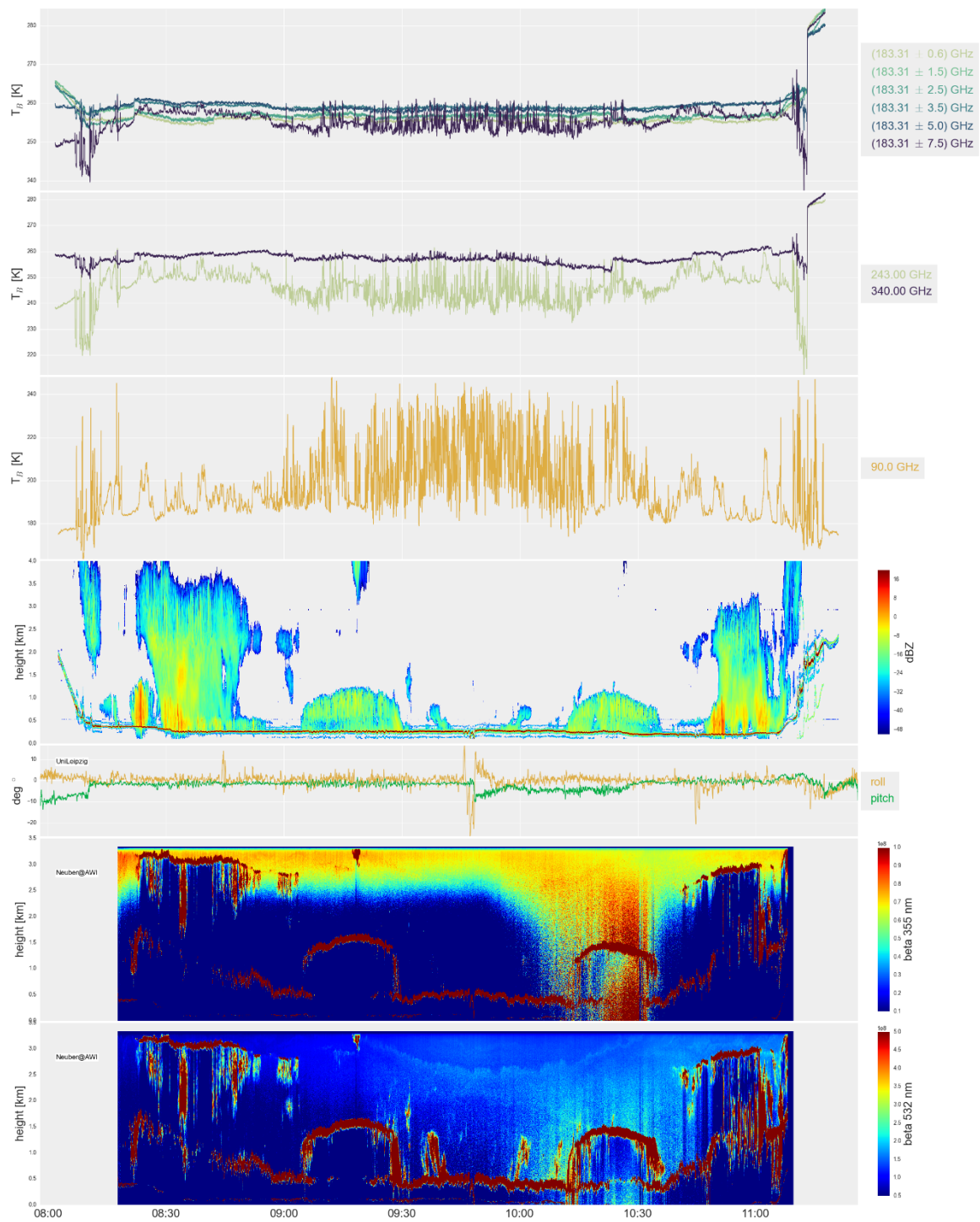
Second dropsonde



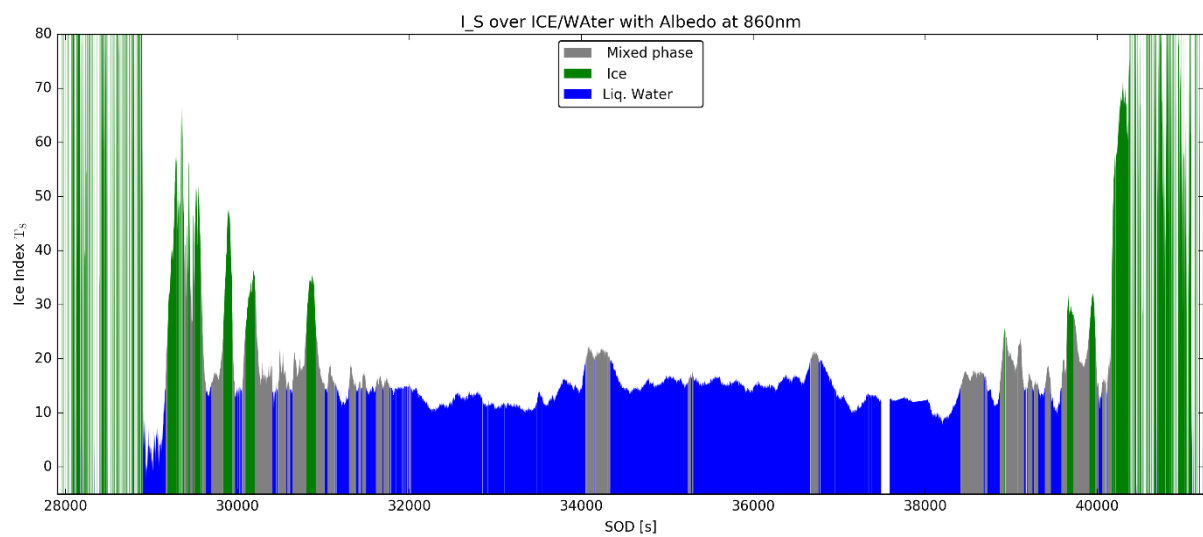
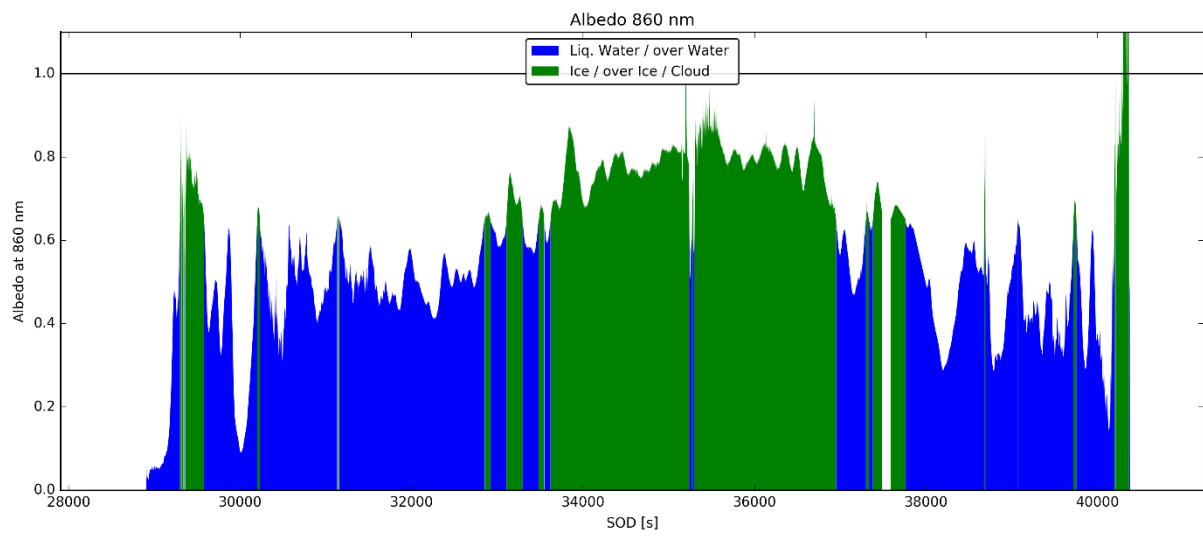
Third dropsonde



MIRAC & AMALI



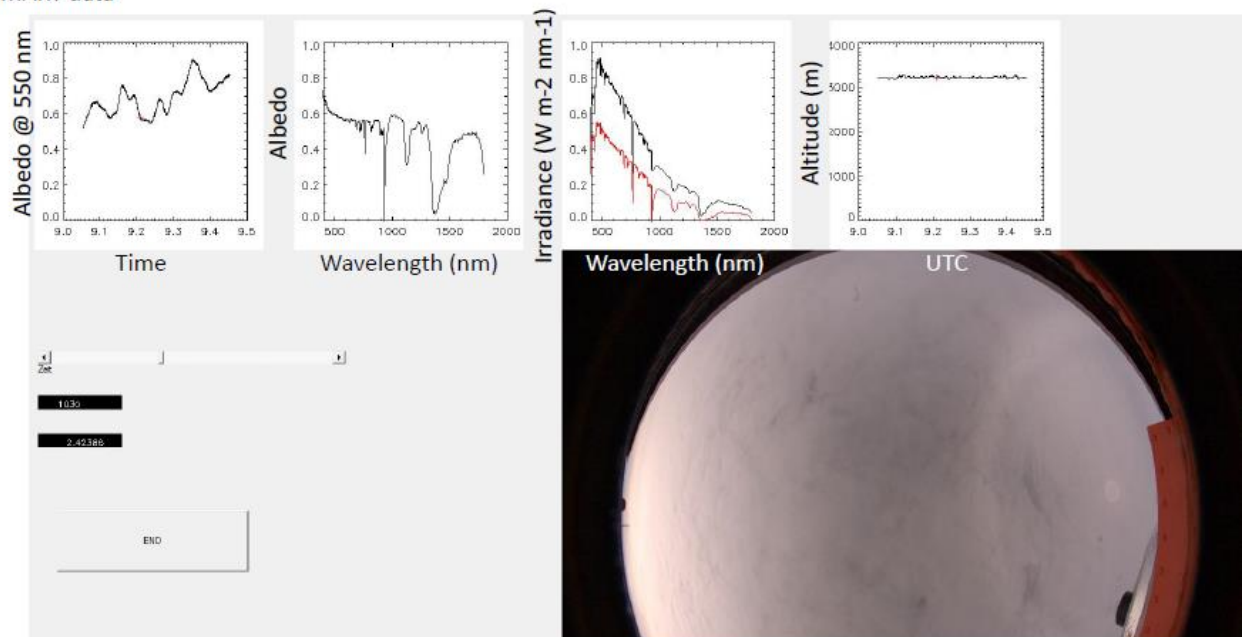
SMART



Green ice, orange mixed-phase, blue liquid water cloud

SMART

SMART data



EAGLE/HAWK

