

ACLOUD Flight #16 – Polar 6 – 170613

Mission PI: Manfred Wendisch

Objectives: Calibrate the nose boom of both aircraft (P5 and P6) and collect in situ data of aerosol and cloud particles over the open sea West of Spitzbergen. Joint flight with P5, partly collocated. 6 profiles in three saw tooth patterns were performed in addition.

Crew:

Polar 6	
PI	Manfred Wendisch
Basis Data Acq.	Cristina Sans i Coll
Aerosol 1	Udo Kästner
Aerosol 2	Franziska Köllner
Trace Gases	Oliver Eppers
PMS 1	Delphine Leroy

Flight times:

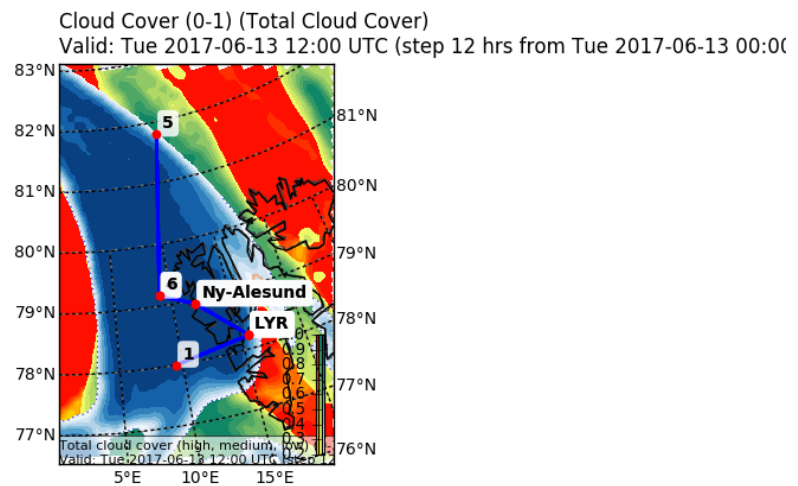
Polar 6	
Take off	14:57 UTC
Touch down	17:16 UTC

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

We mostly flew in between two extended cloud layers, one above (mid-level), the other one below the aircraft. The lower clouds (top heights between 2000-3000 ft) were partly quite homogeneous and extended, the upper clouds were mostly inhomogeneous. We were flying over the open ocean.

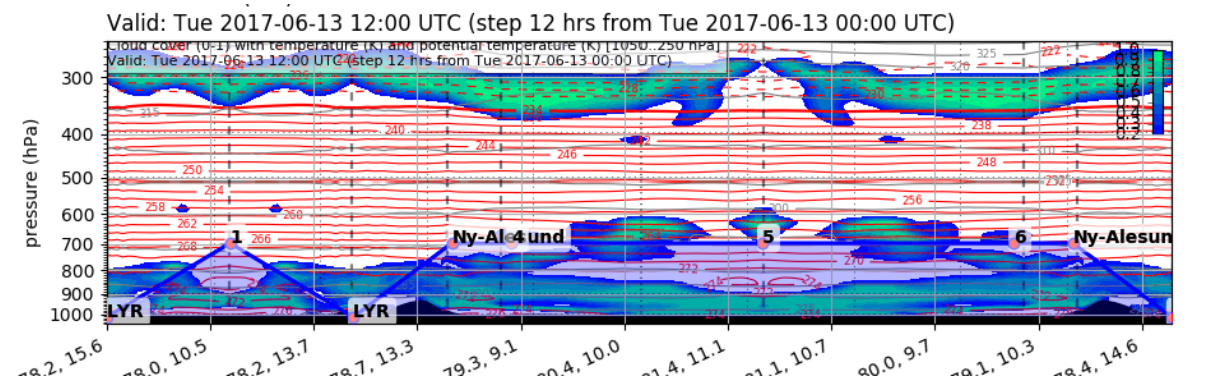
We had drafted two flight plans, one extended version (to Polarstern, point 5 in the graphs below), and a second flight plan was filed just to the west (short flight, to point 1 and back). We opted for the short version because the weather conditions at LYR airport were unsure to some degree with a significant danger of low-hanging clouds and fog.

ECMW prediction of clouds—horizontal

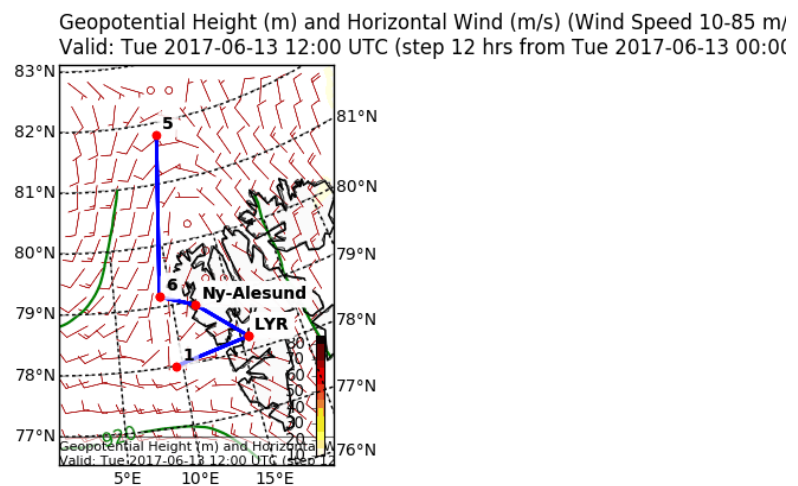


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ECMW prediction of clouds—vertical



ECMW prediction of wind 950 hPa



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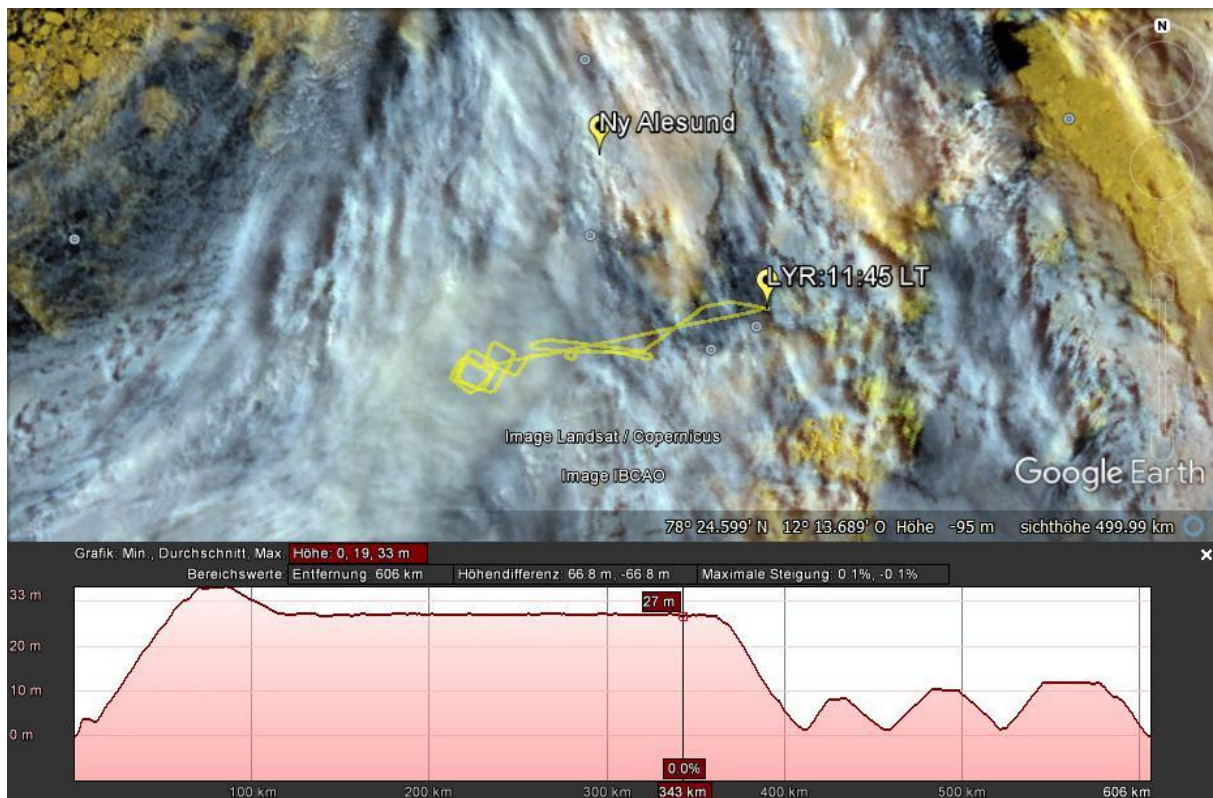
Overview of flight

Horizontal flight pattern and profile for P6

LYR: 78° 14.816' N, 15° 27.545' E
C1: 78° 00.000' N, 9° 30.000' E
LYR: 78° 14.816' N, 15° 27.545' E

We climbed to 10,000 ft at C1. Close to C1 we performed four square patterns at 9,000 ft, with four speeds of 100 kn, 120 kn, 145 kn, 100 kn for each of the squares. This pattern was flown to calibrate the nose boom. On our way back we performed three downward and three upward (3 times a saw tooth) pattern through the lower cloud.

Here is the actual flight pattern we flew (in yellow).



Detailed Flight Log (all times in UTC)

LYR – C1 80 NM @ 160 kn 30 min

- 14:15 Start of motors
- 14:52 Taxi
- 14:56 Take off
We fly through a mixture of clouds in different levels, during the whole flight there are some clouds in higher altitudes above flight level
- 15:06 Above cloud, 6,000 ft
- 15:10 P5 appears on our right side
- 15:12 We reach 10,000 ft
- 15:13 Cloud penetration, we change between 11,000 ft and 9,000 ft
- 15:19 9,000 ft, this is below a high and above low clouds, CPC with 400 cm^{-3}
- 15:26 We reach C1

C1 different speeds 48 min

- 15:28 Begin 1st square 100 kn
- 15:39 Begin 2nd square 120 kn
(ice crystals are reported, falling from above)



- 15:52 Begin 3rd square 145 kn
- 16:04 Begin 4th square 100 kn
CPC with 300 cm^{-3}
- 16:16 End of last (4th) square

First saw tooth

- 16:18 We descend (partly with 1000 ft/min), try saw tooth, orbit to get faster down
- 16:21 6,000 ft
- 16:25 Begin downward saw tooth, enter cloud, +2°C, rain
There are two clouds, a higher one (3000 ft), a lower one (2000 ft)



- 16:29 We reach the lowest level at 500 ft below cloud, stay at this altitude for 2 min



- 16:30 Start climbing with 800 ft/min, 1°C, go through cloud
- 16:32 Reach cloud top



- We return (off the coast) to have another saw tooth.

Second saw tooth

- 16:35 Begin descending into cloud



- 16:41 Reach cloud base at 500 ft
Stay below cloud
- 16:42 Begin ascend into cloud
- 16:48 Reach cloud top (3000 ft)
- We return (towards the coast) to have another saw tooth

Third saw tooth

- 16:51 Begin descending into cloud, start from 3000 ft (descend rate 500 ft/min)
- 16:57 Reach cloud base between 900 ft and 500 ft
Stay 1 min below cloud
Many salt particles reported
- 16:58 Begin ascent into cloud from below (500 ft)
- 17:01 Reach cloud top (2300 ft)





- Go home at 4000 ft, thick cloud below
- 17:16 Touch down
- 17:18 Parking
- 17:28 Motors off

Instrument Status

Polar 6	
Basis data acquisition	
Nose Boom	
PHIPS	
SID-3	
CIP	
PIP	
CDP	
ALABAMA	
CVI	
CVI UHSAS	
CVI	
AWI SP2	
AWI UHSAS	
CO/CO2/O3	

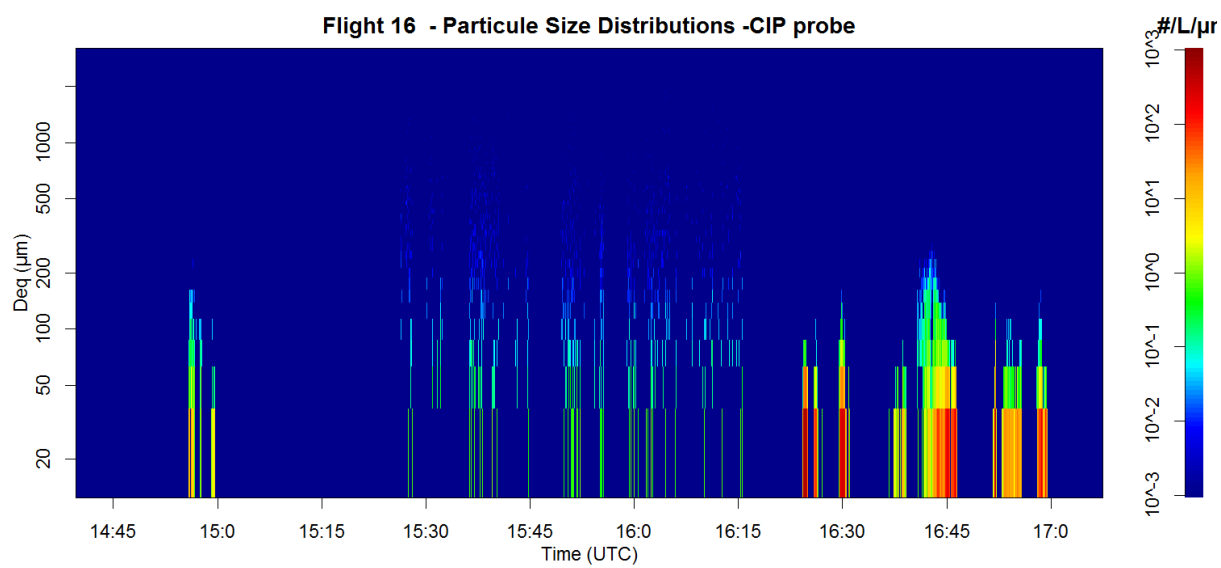
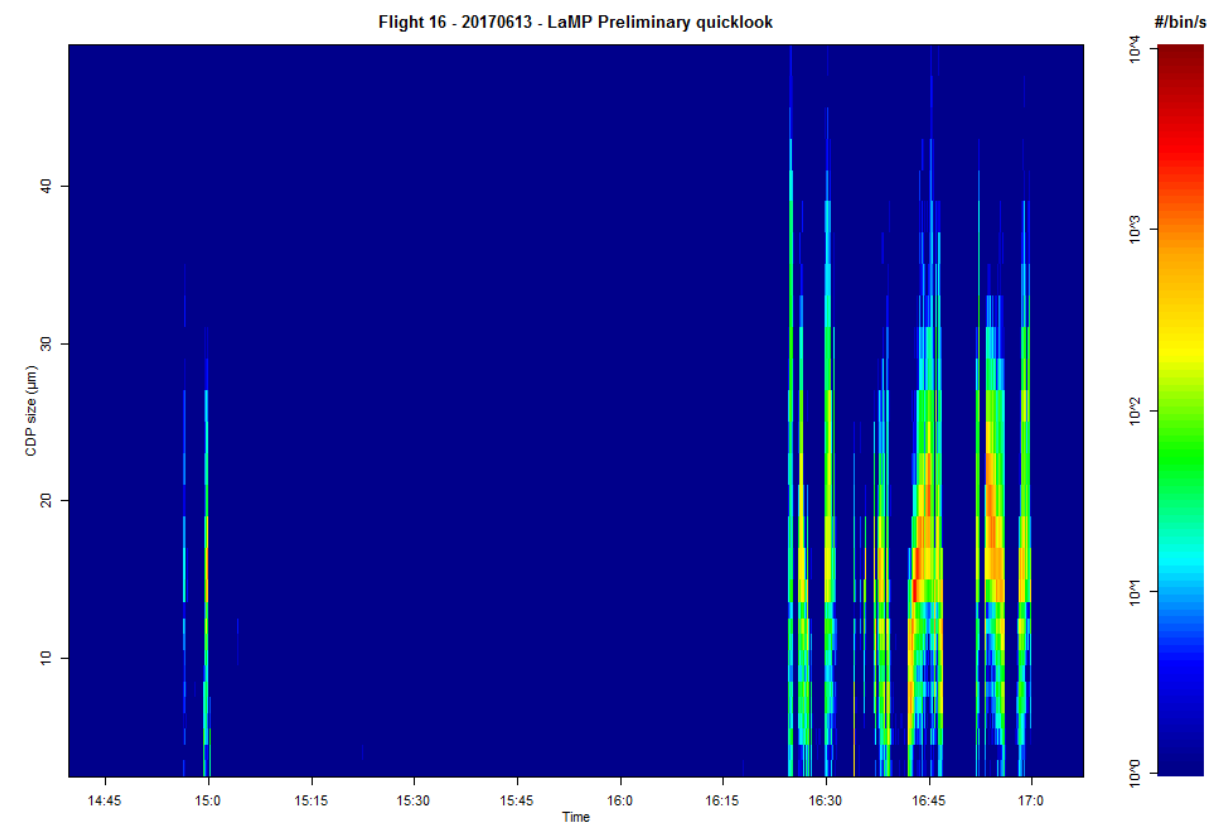
Comments

- Thanks to the crew!

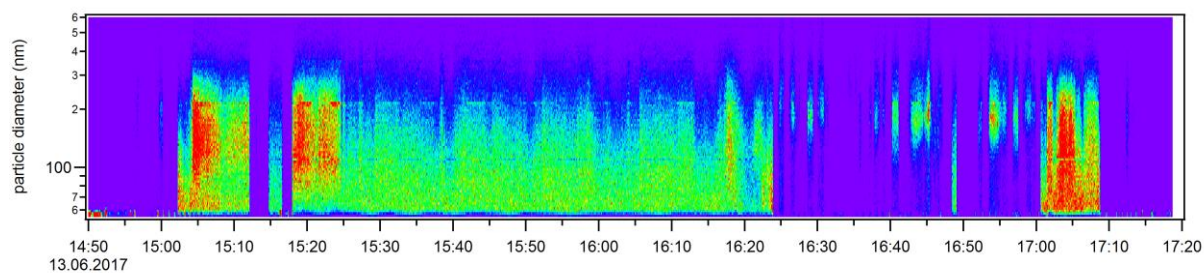
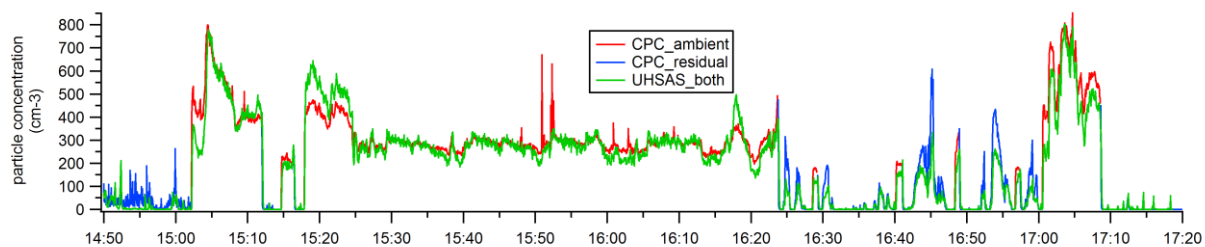
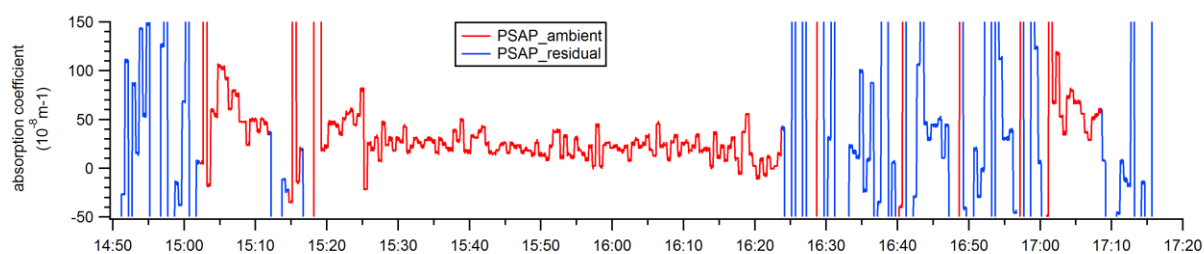
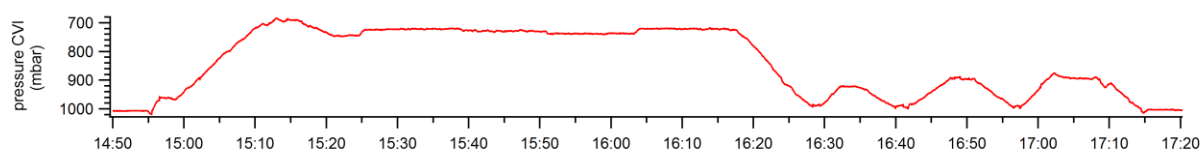


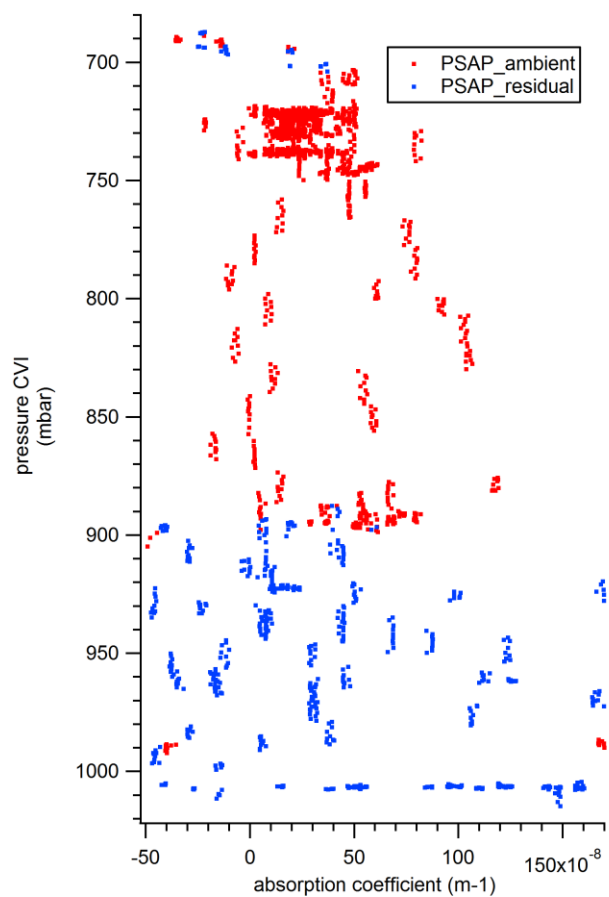
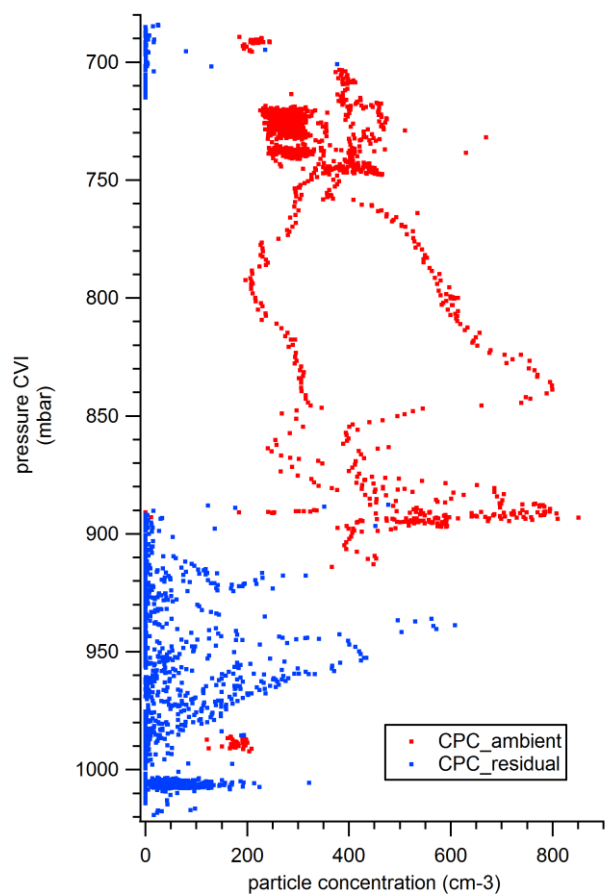
Quicklooks

PMS

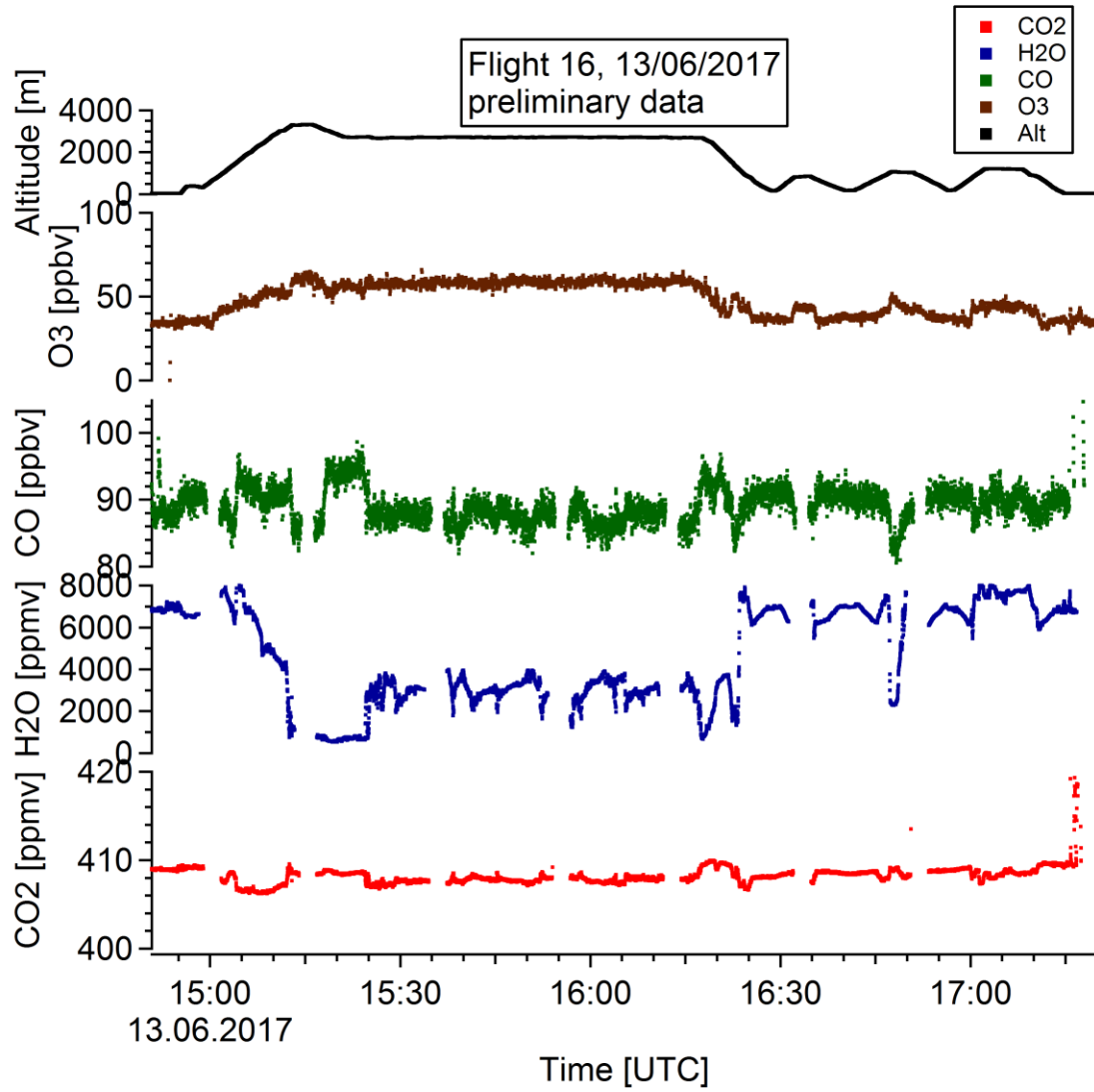


CVI, and measurements behind

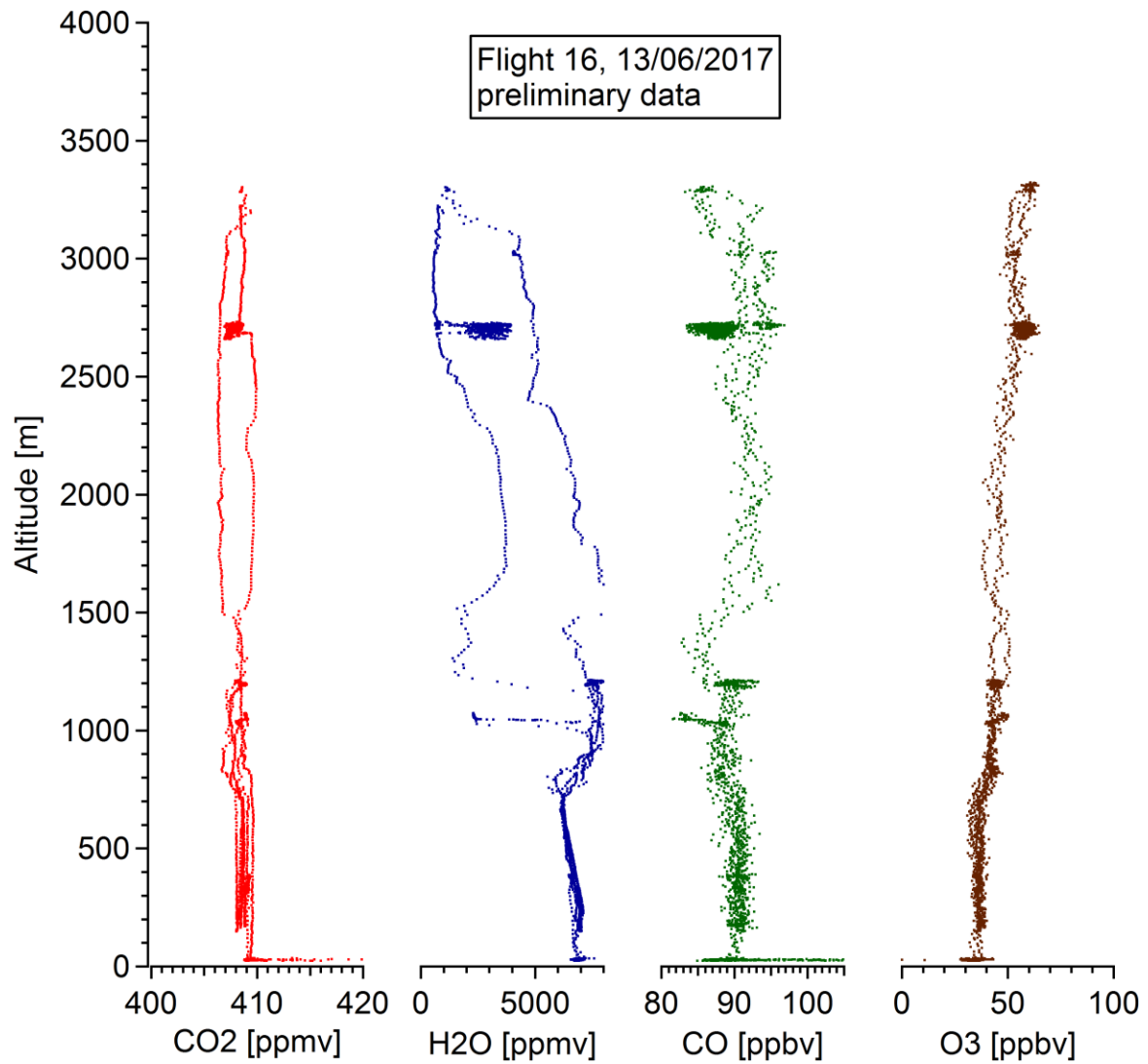




Trace gases



Trace Gases



Alabama

