

RACEPAC Flight #2 – Polar 6 – 140430

Report by Stephan Borrmann

Again all times are local times LT, very approximate “wrist watch times” which may differ from aircraft data system times. The same holds for the altitudes specified here, although here I always directly read off the altitude gage in the cockpit. A few photographs are available for the cloud double layers.

Take off time: 14:11 LT

Situation on the way to C1: Double layer of clouds starting Inuvik. From 14:30 LT onward only the lower clouds remain. 14:35 broken, scattered clouds with ground view; we still fly above land. In the distance a double layer, we aim at the upper one.

Experiment 1: Sampling the upper layer of shallow closed stratus

- * Starting 14:46 LT at 4000 ft in “chasing mode” flying a line through the cloud. Descending to 3700 ft necessary as it is and continues to be difficult to stay inside the cloud.
- * 14:47 LT inside and outside layer, cutting through patches. Descend to 3300 ft to be better inside.
- * 14:49 LT we leave the cloud.

Experiment 2: “Three-step-staircase”, climbing steps up.

- * 14:54 LT arriving at lower level cloud layer. Start sampling 14:55 LT below the cloud layer at 700 ft. There are a few rolls of lowest level clouds visible at still lower altitudes.
- * 14:56 LT climb to cloud bottom at 1200 ft. Sampling inside and sometimes outside of the clouds.
- * 15:00 LT climb to 1500 ft, sampling inside the cloud.
- * 15:02 LT staying at 1500 ft we “laterally leave” the cloud on its top level. End of experiment. Communication with LIDAR on P5: They see through the cloud and say it is at most 100 m thick. Our levels here indicate a thickness of 300 ft.

Experiment 3: “Cloud top entrainment zone sampling”

- * 15:04 LT we drop down a bit to cloud level.
- * 15:05 LT cutting along cloud top entrainment level with many ins and outs.
- * 15:07 LT pilots point out some icing on the wind shield.
- * 15:10 LT plane leaves cloud; end of experiment.

Experiment 4: “Six-step-staircase”, climbing steps up.

- * 15:10 LT, approaching double layer.
- * 15:11 LT start staircase at 1300 ft, 4 minutes in cloud but frequently encountering clear air pockets.
- * 15:15 LT drop to 1100 ft, scratching along the lower cloud edge.
- * 15:18 LT climb to 1400 ft; now fully inside cloud.
- * 15:20 LT climb to 1700 ft, fully inside.
- * 15:22 LT climb to 2000 ft, inside cloud
- * 15:24 LT climb to 2300 ft. inside cloud.
- * 15:25 LT turnaround towards C2 at 2300 ft. Suddenly we exit cloud and are between two cloud layers. Since the turning occurred during the 2 minute step it will be interesting to see whether there are sampling artefacts associated with this directional change. End of experiment. At 15:26 LT we are on the way back to C1.

Experiment 5: “Six-step-staircase”, climbing down.

- * 15:28 LT enter cloud top level at 2200 ft.
- * 15:32 LT drop to 1900 ft, step fully inside cloud. We have 65 miles to C1 and encounter here the strongest icing conditions so far.
- * 15:35 LT goto 1600 ft, step fully inside cloud.
- * 15:36 LT climb to 1700 ft temporarily for deicing.
- * 15:38 LT drop to 1300 ft. This level is at lower cloud edge and we frequently exit and re-enter.
- * 15:40 LT descend to 1000 ft, in and out of cloud samplings.
- * 15:44 LT go lower to 700 ft, now below cloud for sampling possible precipitation.
- * 15:50 LT end of experiment.

Experiment 6: Gas sampling experiment at three altitude levels

- * 15:50 LT climb to 5000 ft, stay there until 15:55 LT, outside of cloud
- * 15:55 LT climb to 7000 ft.
- * 15:59 LT arrive at C1, turn towards Inuvik.
- * 16:02 LT until 16:06 LT climb to 10000 ft
- * 16:12 LT end of experiment.

Return flight: On the way there are scattered broken clouds. Sometimes several layers, also above the plane. At 16:15 LT ice particles are encountered at high altitude. We ask the pilots to climb into the layer above us and they try. In the end it is higher than 12000 ft and out of reach. Probably altocumulus translucidus perlucidus and we occasionally sample precipitation from it.

Landing in Inuvik 16:34 LT.

Polar 6 UserEvents 30. April 2014

0	2014-04-30 20:07:21.565	Lat= 68° 18,319' N Lon=133° 29,448' W taxi
1	2014-04-30 20:11:21.429	Lat= 68° 18,219' N Lon=133° 29,280' W take off
2	2014-04-30 20:12:07.691	Lat= 68° 18,392' N Lon=133° 32,754' W Bmed deiceing on
3	2014-04-30 20:15:39.573	Lat= 68° 26,058' N Lon=133° 27,410' W Cr 2 on Rollerdoors
open Kt90 open		
4	2014-04-30 20:21:51.496	Lat= 68° 38,922' N Lon=133° 21,353' W Nezerow balance
5	2014-04-30 20:39:46.240	Lat= 69° 20,373' N Lon=133° 8,053' W Aimmsbackup PC2
neues Ziel Laufwerk E: Aimms....		
6	2014-04-30 21:26:03.651	Lat= 70° 31,326' N Lon=129° 52,513' W wp C2 turn back
7	2014-04-30 21:47:46.336	Lat= 69° 59,844' N Lon=131° 56,150' W 5000 ft up to
8	2014-04-30 21:51:20.468	Lat= 69° 54,740' N Lon=132° 14,506' W 5000 ft
9	2014-04-30 21:55:09.084	Lat= 69° 48,581' N Lon=132° 36,960' W up to 7000 ft
10	2014-04-30 21:57:17.157	Lat= 69° 45,351' N Lon=132° 48,173' W 7000 ft
11	2014-04-30 21:58:04.405	Lat= 69° 44,139' N Lon=132° 52,782' W Nezerov balance 7000 ft
12	2014-04-30 21:59:20.652	Lat= 69° 42,080' N Lon=132° 59,636' W Nezerov balance 7000 ft
done		
13	2014-04-30 22:01:58.134	Lat= 69° 35,011' N Lon=133° 3,706' W up to 10000 ft
14	2014-04-30 22:05:16.737	Lat= 69° 26,545' N Lon=133° 6,778' W 10000 ft
15	2014-04-30 22:07:23.703	Lat= 69° 20,664' N Lon=133° 8,593' W nezerov balance
16	2014-04-30 22:12:41.215	Lat= 69° 5,655' N Lon=133° 10,145' W down for cloud hunting
17	2014-04-30 22:18:24.268	Lat= 68° 48,804' N Lon=133° 5,965' W Nezerov balance 9130
18	2014-04-30 22:23:05.015	Lat= 68° 34,315' N Lon=133° 2,397' W cr2 Aerosol close
Rollerdors close Kt 90 Ld 90		
19	2014-04-30 22:24:52.641	Lat= 68° 28,964' N Lon=133° 0,701' W ccp deicing off
20	2014-04-30 22:33:22.885	Lat= 68° 18,259' N Lon=133° 27,809' W toutsch down
21	2014-04-30 22:37:20.454	Lat= 68° 18,320' N Lon=133° 29,996' W
22	2014-04-30 22:37:46.671	Lat= 68° 18,319' N Lon=133° 30,006' W
23	2014-04-30 22:37:50.062	Lat= 68° 18,319' N Lon=133° 30,006' W

P5 Tim ... Flug-Nr.: 30.04.2014

Datum: 30.04.2014, Zeiten sind LT

Take-off: 14:15

Messbeginn SMART: 14:19 VIS +14:35

NIR 14:35

NIR Spektrometerprogramm ständig abgestürzt,

Neustart PC2+PC3+Spektrometerbox → danach ging es wieder

14:40: keine Cirrus direkt über uns, unter uns nahezu geschlossene Wolkendecke

14:41: Höhe 2867m, ca. 88 m/s

14:44: am Horizont hohe Wolken zu sehen

Linkskurve (genaue Zeit nicht mehr klar)

14:47: Rechtskurve

14:50:45: C1 passiert

14:52: Piloten Nase etwas senken lassen weil Pitch nah am Anschlag

Roll war mal am Anschlag, könnte am Wind liegen der im Moment sehr stark von der Seite weht

14:57: aufgebrochene Wolkendecke unter uns, über uns kein Cirrus, nur am Horizont immer noch hohe Wolken erkennbar, wir sind noch über Eis

15:04: Radianz oben stark erhöht → mittelhohe Wolke über uns

15:06: jetzt über offenem Wasser, davor nahezu parallel zur Eiskante

15:09: nur ca. 200m unter uns 2. Wolkenschicht, über uns gerade nichts

während Leg C1-C2: Höhe: ca. 2850m, Geschwindigkeit: ca. 75m/s

15:15: 2. Wolkenschicht wieder weg unter uns, über uns eigentlich nichts

15:22:30: C2 passiert, wir fliegen noch weiter geradeaus um P6 vorzulassen um auf dem Rückweg dahinter zu sein

15:27:50: Rechtskurve

15:29:15: Linkskurve

ca. 15:32: Dropsonde #1

kurz vor 15:39: C2 wieder passiert, Start Leg C2-C1, wieder abbremesen, ca. 63m/s

15:44: keine Cirrus über uns, unter uns geschlossene Wolkendecke, aber Wolkenoberkanten variieren

15:44:20: Dropsonde #2

15:48: in Flugrichtung vorne rechts hohe Wolken in einiger Entfernung zu sehen, unter uns immer noch geschlossene Wolkendecke

15:52: wieder über Wasser

15:57: Dropsonde #3

16:02: teilweise aufgebrochene Wolkendecke unter uns, über uns: kein Cirrus, nur am Horizont vereinzelt hohe Wolken

16:12: keine Cirrus über uns, in Flugrichtung vorne links hohe Wolken am Horizont, Wolkendecke unter uns deutlich homogener

16:17: Dropsonde #4, C1 wieder passiert, wir fliegen jetzt noch etwas geradeaus weiter, P6 fliegt über Tuk zurück

16:24: links in Fahrtrichtung die hohen Wolken kommen etwas näher, direkt über uns aber keine Cirren

16:27: Kurs Inuvik, Linkskurve
16:29: auch rechts jetzt hohe Wolken über uns
16:30: über uns Wolken → Zeitreihen zappeln
Flughöhe runter auf 2300m, weiter fallend
16:35: Stop der Messungen
16:56: Landung Inuvik, Flugdauer: 2h20min
kein Eis auf Dome oben

Polar 5 UserEvents 30. April 2014

0	2014-04-30 20:09:18.810	Lat= 68° 18,321' N Lon=133° 29,908' W Taxi
1	2014-04-30 20:14:51.382	Lat= 68° 18,235' N Lon=133° 28,689' W Takeoff
2	2014-04-30 20:17:51.947	Lat= 68° 21,090' N Lon=133° 28,146' W Rollerdoors open
3	2014-04-30 20:18:01.853	Lat= 68° 21,403' N Lon=133° 27,674' W Video start
4	2014-04-30 20:18:16.963	Lat= 68° 21,806' N Lon=133° 27,216' W KT19 open
5	2014-04-30 20:18:55.382	Lat= 68° 22,977' N Lon=133° 26,457' W Slewable Camera on
6	2014-04-30 20:19:19.366	Lat= 68° 23,725' N Lon=133° 26,299' W Camera start
7	2014-04-30 20:32:37.578	Lat= 68° 56,959' N Lon=133° 15,215' W Probleme mit NIR Spektrometer
8	2014-04-30 20:34:05.125	Lat= 69° 1,221' N Lon=133° 13,948' W Eagle on
9	2014-04-30 20:34:50.875	Lat= 69° 3,441' N Lon=133° 13,798' W Eagle stop
10	2014-04-30 20:35:10.594	Lat= 69° 4,427' N Lon=133° 13,840' W Eagle start
11	2014-04-30 20:36:58.673	Lat= 69° 9,555' N Lon=133° 12,295' W Smart start
12	2014-04-30 20:50:47.712	Lat= 69° 41,978' N Lon=132° 59,834' W WP C1
13	2014-04-30 20:56:03.596	Lat= 69° 50,170' N Lon=132° 31,029' W Photometer and Video down do not work
14	2014-04-30 21:01:22.150	Lat= 69° 57,882' N Lon=132° 3,142' W Video down works
15	2014-04-30 21:04:32.330	Lat= 70° 2,711' N Lon=131° 45,559' W Eagle stop
16	2014-04-30 21:09:14.990	Lat= 70° 9,868' N Lon=131° 18,655' W Eagle start
17	2014-04-30 21:22:41.603	Lat= 70° 30,097' N Lon=129° 59,882' W WP C2
18	2014-04-30 21:32:17.252	Lat= 70° 38,017' N Lon=129° 27,538' W Dropsonde 3 started
19	2014-04-30 21:39:13.035	Lat= 70° 28,643' N Lon=130° 4,921' W C2 passed
20	2014-04-30 21:44:14.744	Lat= 70° 22,603' N Lon=130° 29,212' W Dropsonde 4 started
21	2014-04-30 21:58:14.994	Lat= 70° 5,192' N Lon=131° 35,870' W Dropsonde 5 started
22	2014-04-30 22:17:02.797	Lat= 69° 41,757' N Lon=133° 0,783' W Dropsonde 6 started
23	2014-04-30 22:20:08.610	Lat= 69° 37,764' N Lon=133° 14,844' W C1 passed shortly before the last DropSonde
24	2014-04-30 22:30:48.356	Lat= 69° 18,320' N Lon=133° 35,076' W Lidar off
25	2014-04-30 22:34:28.161	Lat= 69° 7,051' N Lon=133° 29,532' W Camera stop
26	2014-04-30 22:38:18.138	Lat= 68° 56,132' N Lon=133° 21,379' W Rollerdoors closed
27	2014-04-30 22:40:53.450	Lat= 68° 47,947' N Lon=133° 15,565' W KT19 closed
28	2014-04-30 22:42:30.705	Lat= 68° 42,763' N Lon=133° 12,137' W spectrometer off
29	2014-04-30 22:56:14.391	Lat= 68° 18,255' N Lon=133° 27,948' W Touchdown
30	2014-04-30 22:59:41.380	Lat= 68° 18,343' N Lon=133° 30,018' W Park Position