

RACEPAC Flight #12 – Polar 6 – 140517

Report by Stephan Borrmann

General remark: This flight could well be characterized as “exploratory flight into a confusing cloud situation”. Several layers of stratus, stratus pannus, undulatus, nimbostratus, and stratocumulus cloud types were encountered with altocumulus and/or cirrus at mid and high levels. The Polar 6 mostly went along cloud tops because of the icing conditions frequently met. It was not possible to clearly identify/define discrete experiment sections as during all previous flights.



Pictures: Upper row left (13:59 LT) and middle (14:32 LT), different cloud layers. Right: Clear ice deposit (13:53 LT). Lower row left: On way back above the MacKenzie River Delta (14:35 LT). Right: Shortly after landing (15:26 LT).

Take off time: 13:36 LT

Experiment 1: Sampling cloud layer top before reaching C1, and then beyond C1.

- * 13:44 LT: Enter lower cloud layer and scratch along its top levels between 4000 ft and 4500 ft.
- * 13:46 LT: Real entry of the main cloud body. Rain on cockpit window looks like ½ mm drops. Also we pick up little bit of ice. Later sampling entrainment zone.
- * 13:49 LT: Climb to upper cloud level at 4300 ft because icing gets too strong. Despite continuing rain Marcus reports occurrence of bimodal distributions.
- * 13:52 LT: Above cloud at 5000 ft. We had collected “clear ice” and the ice layer on the wings extends to behind the inflatable boot onto the wing surface. This is the most dangerous form of icing as it cannot be shed off.
- * 13:55 LT: We climb through a second layer at 6000 ft.
- * 14:00 LT: Climb higher to the next layer above us. There are at least three layers altogether.
- * 14:04 LT: Arrive at high layer at 8500 ft to 9000 ft.
- * 14:06 LT: Arriving at C1; sampling for 2-3 minutes in this higher layer.
- * 14:06 LT: Suddenly it is not a discrete, single layer anymore but rather the body of the main stratus cloud layer which seems to extend all the way up here now. Again icing. Sampling now at 9300 ft

trying to stay at the top entrainment zone. Again suddenly the cloud body turns into a relatively thin layer.

- * 14:13 LT: Climb to 9500 ft – 9600 ft to stay at cloud layer top.
- * 14:14 LT: Haze/nimbostratus at 9600 ft, but also sometimes cutting through thick patches of cloud. Icing occurring.
- * 14:17 LT: Flying at 10000 ft approaching a cloud wall in front of us, which reaches higher and is too thick for us. To avoid this we turn West and set a new waypoint, C8. Higher clouds above us, altocumulus, can be seen.
- * 14:21 LT: Having climbed to 10500 ft the Polar 6 now turns South to evade the clouds.
- * 14:28 LT: From 10600 ft we descend fast to below all cloud layers because of the risk of icing and no more “way out” options. The sun can be seen through the clouds.
- * 14:38 LT: we arrive at 2000 ft, below the clouds and fly in clear air along the East Channel to Inuvik.

Landing in Inuvik at 15:09 LT.

Polar 5 - 17. May 2014

1953 UTC Flache Wolkendecke unter uns. Nicht komplett geschlossen. Cloudbow und Glorie. Ueber uns homogener Cirrus. Dichter werdend von 0.2 AOD bei 500nm auf 0.13. Messung ueber Land. 11000ft Hoehe. 95m/s Ferry Speed. Wolkenoberkante bei 1400 bis 1500mm. Bei 3000m auch noch duenne Wolkenschicht. Sehr milchig ueber uns.

2002 UTC Ueberwiegend geschlossene und recht homogene dicke Wolkendecke unter uns. Milchiger, aber homogener Cirrus ueber uns. AOD bei von 0.45 bei 500nm und weiter steigend. Cloudbow und Glorie. 120kt und 11000ft. Messung ueber Eis.

2003 UTC Waypoint C1

2008 UTC Ueberwiegend geschlossene und recht homogene dicke Wolkendecke unter uns. Milchiger, aber homogener Cirrus ueber uns. ETwas duenner werdend. AOD bei von 0.35 bei 500nm und weiter steigend. Cloudbow und Glorie. 120kt und 11000ft. Messung ueber Eis. Linkskurve.

2003 UTC Waypoint C1

2021 UTC Ueberwiegend geschlossene und recht homogene duenne Wolkendecke unter uns. Milchiger, aber homogener Cirrus ueber uns. ETwas duenner werdend. AOD bei von 0.35 bei 500nm und weiter steigend. Cloudbow und Glorie. 120kt und 11000ft. Messung ueber Eis und Land. Cloudbow und Sunspot vom Eis

Flug abgebrochen, da schlechte Messbedingungen

P5 Tim ... Flug-Nr.: 17.05.2014

Datum: 17.05.2014, Zeiten sind LT

Take-off: 13:34

Start der Messungen: 13:39

Sensor unten wieder festgestellt weil Feder noch nicht wieder eingebaut

13:47: über uns hohe Wolken, unter uns nahezu geschlossene Wolkendecke

13:50: Höhe 11000ft (3300m), 96m/s, ca. 200m unter uns mittelhohe geschlossene Wolkendecke, direkt über uns blauer Himmel, zum Horizont hin höhere Wolken über uns

13:54: unter uns kurz Wolkenlücke, vor uns kommen Cirrus

13:56: AOD=0,1

13:59: direkt unter uns geschlossene Wolkendecke, wir fliegen gerade so drüber, Cirrus über uns (aber recht homogen, Spektren zappeln kaum offenbar)

14:03: C1 passiert, weiter geradeaus

14:11: AOD=0,35 (Cirrus über uns)

14:12: Linkskurve → vor uns höhere Wolken

14:16: sehr dunstig um uns herum, AOD=0,35

14:23: immer noch Cirrus über uns, wieder zurück Kurs Inuvik um weiter südlich nochmal nach Wolken zu schauen → hier sind wir nicht mehr richtig über die Wolken gekommen

14:25: Radianz oben zappelt ziemlich stark, ab und zu unter uns Land sichtbar, diesige, dünne Suppe unter uns

14:30: Abbruch, zurück nach Inuvik, 2800m, 95m/s

14:40: Stop der Messungen

15:02: Landung Inuvik, Flugdauer: 1h30min

Polar 5 UserEvents 17. May 2014

0	2014-05-17 19:30:33.046	Lat= 68° 18,341' N Lon=133° 30,009' W TAXI
1	2014-05-17 19:32:50.255	Lat= 68° 18,200' N Lon=133° 29,991' W Rolling
2	2014-05-17 19:33:20.583	Lat= 68° 18,236' N Lon=133° 28,963' W Takeoff
3	2014-05-17 19:34:13.627	Lat= 68° 18,323' N Lon=133° 24,671' W Deicing on
4	2014-05-17 19:34:20.283	Lat= 68° 18,334' N Lon=133° 24,149' W Video start
5	2014-05-17 19:34:32.408	Lat= 68° 18,362' N Lon=133° 23,097' W KT19 start
6	2014-05-17 19:38:33.646	Lat= 68° 25,686' N Lon=133° 19,300' W Rollerdoors open
7	2014-05-17 19:38:43.346	Lat= 68° 25,961' N Lon=133° 19,324' W Canon Start
8	2014-05-17 19:40:32.766	Lat= 68° 29,343' N Lon=133° 18,728' W Q switch on
9	2014-05-17 19:41:21.853	Lat= 68° 30,689' N Lon=133° 19,796' W Sun Photometer Start
10	2014-05-17 19:47:09.714	Lat= 68° 42,150' N Lon=133° 28,917' W Sun Photometer vereist
11	2014-05-17 19:53:38.203	Lat= 69° 0,634' N Lon=133° 29,081' W Sun Photometer start
12	2014-05-17 20:03:26.075	Lat= 69° 30,192' N Lon=133° 30,228' W Waypoint C1
13	2014-05-17 20:30:19.282	Lat= 69° 25,908' N Lon=134° 5,040' W Back to Inuvik
14	2014-05-17 20:36:58.037	Lat= 69° 5,837' N Lon=134° 2,819' W Eagle stop
15	2014-05-17 20:37:09.912	Lat= 69° 5,238' N Lon=134° 2,766' W Eagle off
16	2014-05-17 20:40:49.134	Lat= 68° 54,663' N Lon=134° 2,261' W LIDA stop
17	2014-05-17 20:44:29.103	Lat= 68° 44,567' N Lon=134° 1,722' W Rollerdoors closed
18	2014-05-17 20:45:15.491	Lat= 68° 42,350' N Lon=134° 1,626' W ScreenDump_DMS- OPERATOR1_MapViewer_2014_05_17_20_45_15.jpg
19	2014-05-17 20:45:18.881	Lat= 68° 42,205' N Lon=134° 1,613' W KT19 closed
20	2014-05-17 21:02:23.643	Lat= 68° 18,228' N Lon=133° 28,883' W Touchdown
21	2014-05-17 21:04:41.033	Lat= 68° 18,321' N Lon=133° 30,012' W Park Position