

TC⁴ DC-8 Science Flight
July 17, 2007
Prepared by Mark Schoeberl and Paul Wennberg

Takeoff: 6:59 a.m.

Very low ozone at surface: 2-4 ppbv – rises to 14-15 ppb as we take off. Lots of NO as well - from air pollution, destroys the ozone (Wennberg)

There were problems with the Iridium phones and Xchat

7:20 a.m.: First sonde drop

Convective systems clearly developing elsewhere from plan. Moved racetrack around, but were unable to use any of the fancy communications on the DC-8 – big disappointment. This created a lot of chaos when we were trying to redirect the aircraft. Iridium phones possibly working, but it was impossible to hear anything due to equipment noise.

Sondes dropped in the racetrack – all sondes worked. Basically flew near the top of the convective system.

9:18 a.m.: Descended to 28 kft. Ozone 50, CO 76, sonde dropped at -0.81

9:30 a.m.: Reporting big particles

~10:00 a.m.: Turned south toward Ecuador. At 1°S we began to see significant aerosol layers near 3-5 km that probably were associated with the volcano (we were north of Guayaquil). Dropped a sonde. As we went further south, we saw some lower-level aerosol – probably pollution from Guayaquil. Several ppb of SO₂ in the plume – layer about 800 ft thick. Performed boundary layer run at 1000 ft, then turned north to ascend – CN rose and SO₂ enhanced at 13 kft.

Had trouble getting clearance to join the HIRDLS track – did it a little late. High clouds on the way back. In some cases there was very low ozone over clouds – 20 ppbv or so.

Crossed convective systems on route in, dropped a sonde.

- Mark Schoeberl & Paul Wennberg

2007-07-17 13:04:02



Costa Rica at takeoff

Tentative Flight Plan

Flight Scientists: Paul Wennberg, Mark Schoeberl, and Jay Mace

Sortie: TBD

Pilot: Bill Brockett

Takeoff (MROC): 1240 UTC

Landing (MROC (SJO)): 2050 UTC (2:30 PM local)

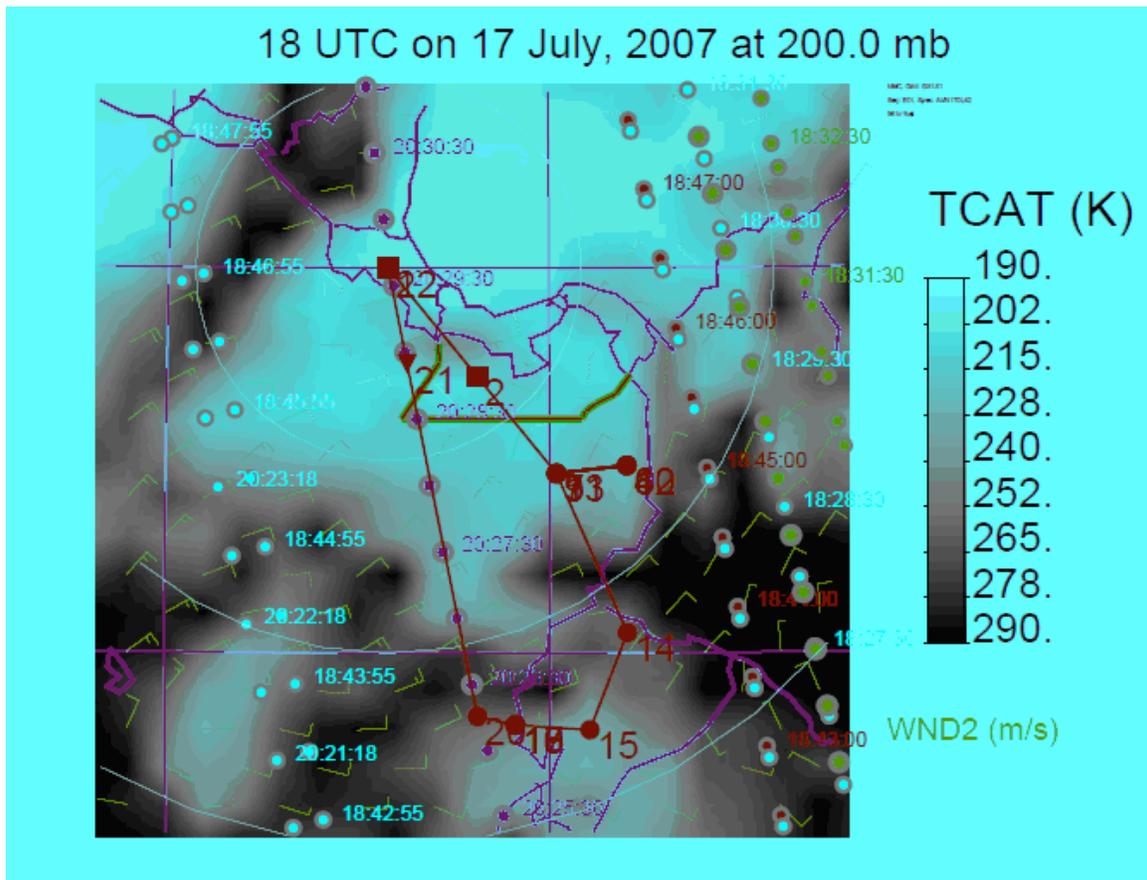
Duration: 8:00

Objectives:

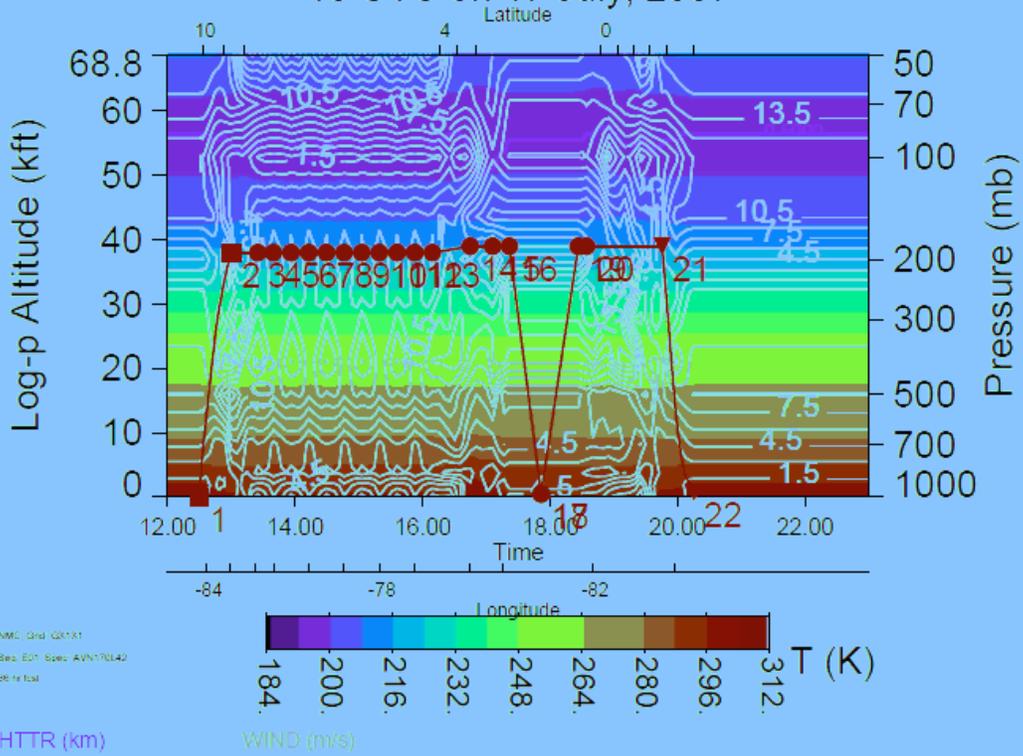
1. Remote sensing of convective systems in Panama Bight
2. *In situ* sampling of convective outflow
3. Coordinate with ER-2 remote measurements
4. Overfly Ecuadorian volcanoes
5. Profile volcanic plume
7. Marine boundary layer sample
8. HIRDLS underfly during return to Costa Rica

Satellite Coordination:

See below – pink points are HIRDLS trajectory.



18 UTC on 17 July, 2007



Flight Plan dc8_2007-07-17a

INFORMATION ABOUT THE PROPOSED WAY POINTS ON THIS FLIGHT:

PT #	LAT	LOE	GMT TIME	SEA	ALT (kft)	DIST (nmi)
1	10o 00'N	84o 13'W	12:30	75.5	0.0	0.00
2	7o 11'N	81o 53'W	13:01	67.2	38.0	219.06
3	4o 40'N	79o 50'W	13:25	60.5	38.0	193.79
4	4o 52'N	78o 00'W	13:40	55.3	38.0	110.07
5	4o 40'N	79o 50'W	13:56	53.3	38.0	110.07
6	4o 52'N	78o 00'W	14:13	47.7	38.0	110.07
7	4o 40'N	79o 50'W	14:30	45.7	38.0	110.07
8	4o 52'N	78o 00'W	14:46	40.3	38.0	110.07
9	4o 40'N	79o 50'W	15:03	38.3	38.0	110.07
10	4o 52'N	78o 00'W	15:19	33.1	38.0	110.07
11	4o 40'N	79o 50'W	15:36	31.2	38.0	110.07
12	4o 52'N	78o 00'W	15:53	26.4	38.0	110.07
13	4o 40'N	79o 50'W	16:09	24.8	38.0	110.07
14	0o 32'N	78o 00'W	16:45	22.2	39.0	271.51
15	2o 00'S	78o 58'W	17:06	23.5	39.0	162.49
16	1o 52'S	80o 54'W	17:22	23.1	39.0	116.19
17	1o 52'S	80o 54'W	17:52	23.7	0.5	0.00
18	1o 52'S	80o 54'W	17:52	23.7	0.5	0.00
19	1o 52'S	80o 54'W	18:27	26.9	39.0	0.00
20	1o 39'S	81o 53'W	18:34	27.2	39.0	60.27
21	7o 30'N	83o 43'W	19:45	33.0	39.0	559.78
22	10o 00'N	84o 13'W	20:15	38.2	0.8	152.68

Meteorological Data: Date: 2007-07-17 Hour: 18 Source: NMC Sequence: E01 Special: AVN170L42 (36-hr forecast)

	Date	Time (GMT)	Lat (deg)	Lon (deg)	Location
Takeoff:	2007-07-17	12:30	10o 00'N	84o 13'W	Juan Santanaria
Landing:	2007-07-17	20:15	10o 00'N	84o 13'W	Juan Santanaria

Latitude (degrees)	Longitude (degrees)	Time (GMT)	Wind Corrected Time	Altitude (feet)	Distance to Next Pt (nmi)	True Bearing (degrees)	Temperature (celsius)	Wind Speed (knots)	Wind Direction (degrees)	Wind Corr Angle (degrees)	SEA (degrees)	Sun Azim. Rel A/C (degrees)
* 10o 00'N	84o 13'W	12:30	12:30	0 000	219.05	140.45	28.85	2	92 E	999 L	75.5	-69.9
* 7o 11'N	81o 53'W	13:01	13:01	38 000	38.76	140.80	-55.54	11	91 E	0 L	67.2	-70.8
6o 41'N	81o 28'W	13:05	13:06	38 000	116.27	140.85	-55.83	6	129 SE	0 L	65.8	-71.1
5o 10'N	80o 14'W	13:20	13:21	38 000	38.76	140.98	-55.63	11	271 W	0 R	61.8	-72.3
* 4o 40'N	79o 50'W	13:25	13:25	38 000	73.38	83.67	-55.67	14	206 SSW	1 R	60.5	-15.4
4o 48'N	78o 37'W	13:35	13:36	38 000	36.69	83.77	-55.70	18	35 NE	1 R	57.0	-16.0
* 4o 52'N	78o 00'W	13:40	13:41	38 000	73.38	-96.18	-55.91	20	27 MNE	1 L	55.3	163.7
4o 44'N	79o 13'W	13:52	13:52	38 000	36.69	-96.28	-55.60	16	89 E	0 R	53.7	163.4
* 4o 40'N	79o 50'W	13:56	13:57	38 000	73.38	83.67	-55.67	14	206 SSW	1 L	53.3	-16.7
4o 48'N	78o 37'W	14:08	14:09	38 000	36.69	83.77	-55.70	18	35 NE	1 R	49.4	-17.7
* 4o 52'N	78o 00'W	14:13	14:14	38 000	73.38	-96.18	-55.91	20	27 MNE	1 L	47.7	161.8
4o 44'N	79o 13'W	14:25	14:25	38 000	36.69	-96.28	-55.60	16	89 E	0 R	46.2	161.3
* 4o 40'N	79o 50'W	14:30	14:30	38 000	73.38	83.67	-55.67	14	206 SSW	1 L	45.7	-18.9
4o 48'N	78o 37'W	14:42	14:42	38 000	36.69	83.77	-55.70	18	35 NE	1 R	41.9	-20.5
* 4o 52'N	78o 00'W	14:46	14:47	38 000	73.38	-96.18	-55.91	20	27 MNE	1 L	40.3	158.8
4o 44'N	79o 13'W	14:58	14:59	38 000	36.69	-96.28	-55.60	16	89 E	0 R	38.8	157.9
* 4o 40'N	79o 50'W	15:03	15:03	38 000	73.38	83.67	-55.67	14	206 SSW	1 L	38.3	-22.4
4o 48'N	78o 37'W	15:15	15:16	38 000	36.69	83.77	-55.70	18	35 NE	1 R	34.6	-24.8
* 4o 52'N	78o 00'W	15:19	15:20	38 000	73.38	-96.18	-55.91	20	27 MNE	1 L	33.1	154.0
4o 44'N	79o 13'W	15:31	15:32	38 000	36.69	-96.28	-55.60	16	89 E	0 R	31.7	152.5
* 4o 40'N	79o 50'W	15:36	15:37	38 000	73.38	83.67	-55.67	14	206 SSW	1 L	31.2	-28.0
4o 48'N	78o 37'W	15:48	15:49	38 000	36.69	83.77	-55.70	18	35 NE	1 R	27.8	-31.9
* 4o 52'N	78o 00'W	15:53	15:54	38 000	73.38	-96.18	-55.91	20	27 MNE	1 L	26.4	146.1
4o 44'N	79o 13'W	16:05	16:05	38 000	36.69	-96.28	-55.60	16	89 E	0 R	25.1	143.7
* 4o 40'N	79o 50'W	16:09	16:10	38 000	77.57	156.13	-55.67	14	206 SSW	1 L	24.8	-109.5
3o 29'N	79o 18'W	16:21	16:21	38 285	116.36	156.16	-56.52	19	49 NE	1 L	23.3	-116.7
1o 43'N	78o 31'W	16:35	16:36	38 714	77.57	156.20	-57.00	18	90 E	2 L	22.3	-127.6
* 0o 32'N	78o 00'W	16:45	16:46	39 000	40.62	-159.09	-57.73	20	77 ENE	2 L	22.2	180.0
0o 06'S	78o 14'W	16:51	16:52	39 000	121.86	-159.10	-58.03	19	82 E	1 L	22.4	176.7
* 2o 00'S	78o 58'W	17:06	17:07	39 000	116.19	-86.18	-56.74	13	144 SE	1 L	23.5	95.6
* 1o 52'S	80o 54'W	17:22	17:22	39 000	0.00	0.00	-56.94	18	112 ESE	1 L	23.1	4.8
1o 52'S	80o 54'W	17:34	17:22	23 600	0.00	0.00	-22.47	25	67 ENE	89 L	23.1	-2.3
1o 52'S	80o 54'W	17:46	17:22	8 200	0.00	0.00	8.52	10	94 E	80 L	23.4	-9.4
* 1o 52'S	80o 54'W	17:52	17:22	0 500	0.00	0.00	21.57	9	246 WSW	169 L	23.7	-12.8
* 1o 52'S	80o 54'W	17:52	17:22	0 500	0.00	0.00	21.57	9	246 WSW	0 R	23.7	-12.8
1o 52'S	80o 54'W	18:09	17:22	19 750	0.00	0.00	-14.20	17	79 ENE	162 L	25.0	-22.2
* 1o 52'S	80o 54'W	18:27	17:22	39 000	60.27	-77.03	-56.94	18	112 ESE	95 L	26.9	46.6
* 1o 39'S	81o 53'W	18:34	17:30	39 000	39.98	-11.27	-57.23	22	100 E	0 L	27.2	-21.0
0o 59'S	82o 01'W	18:40	17:35	39 000	119.95	-11.27	-57.97	28	94 E	2 R	27.4	-23.9
0o 58'N	82o 24'W	18:55	17:50	39 000	119.95	-11.27	-57.77	27	91 E	3 R	28.0	-31.3
2o 56'N	82o 47'W	19:10	18:05	39 000	119.95	-11.28	-56.95	22	69 ENE	2 R	29.1	-38.1
4o 53'N	83o 11'W	19:25	18:21	39 000	119.95	-11.31	-57.93	20	43 NE	2 R	30.5	-44.1
6o 51'N	83o 35'W	19:40	18:36	39 000	39.98	-11.35	-57.72	7	106 ESE	1 R	32.3	-49.4
* 7o 30'N	83o 43'W	19:45	18:41	39 000	152.68	-11.37	-58.09	11	85 E	1 R	33.0	-50.9
* 10o 00'N	84o 13'W	20:15	19:10	0 805	N/A	N/A	26.25	2	103 ESE	1 R	38.2	N/A

* Denotes a way point