Colombian Flight (DC-8 flying solo)
21 July 2007

Mission Objectives

First, a low-level run to sample the marine boundary layer, and then higher over the Panama Bight to sample cirrus in the convective regions. We then will go down over Colombia to sample the plume of the volcano Nevado de Huila, which shows up on OMI SO_2 imagery. We turn north to a trace-gas sample of the Colombian farming regions, which may be a source of methane – we will do a missed approach at Villavicencio, Colombia. We then will head north to sample dust aerosols in the Caribbean.

~6:15 a.m. – Takeoff.
Reveal shows data now. Yeah! Go Reveal!

6:29 a.m. – Descended toward boundary layer for first part of run. 4-5 min at 1000 ft; 15 ppb ozone.

~6:50 a.m. – Climbed out of boundary layer – 90-105 ppb HNO_3. DIAL sees evidence of dust aerosols above the boundary layer. Ascended into complex cloud decks. Photographs show haloes in the cirrus (below). Photos show dust over Panama as we moved south (below).

~7:45 a.m. – Probing the cirrus decks in the Bight – more aerosols in the Bight, dropped sonde.

~7:48 a.m. – Dropped another sonde.

~8:00 a.m. – Flew out of the Bight region.

~8:46 a.m. – Heading south, DIAL located the plume of Nevado de Huila. We turned around and penetrated the plume several times – very high SO_2, sometimes CO, and CO_2.

~9:12 a.m. – Left the plume area.

~9:55 a.m. – Approached Villavicencio, Colombia.

10:00 a.m. – Flew low over town – spikes in CO and methane (CO > 1 ppbv). Did a low-level run for 15 min – methane 50-60 ppb above typical values in the region – low HCN indicating very low levels of biomass burning. Continued northeast and then turned back to the Caribbean. Broke through the clouds at 18 kft.

Reported high NO_x levels at upper altitudes in Colombia, but not over Bight. Evidence of biomass burning in HCN measurements.

Xchat worked, but very intermittent – worked better as flight progressed.

~10:50 a.m. – Significantly elevated methane as we head north over Columbia in cloud outflow regions. Both CO and HCN enhancements in that region. No ozone change. Passed through high cirrus shield.

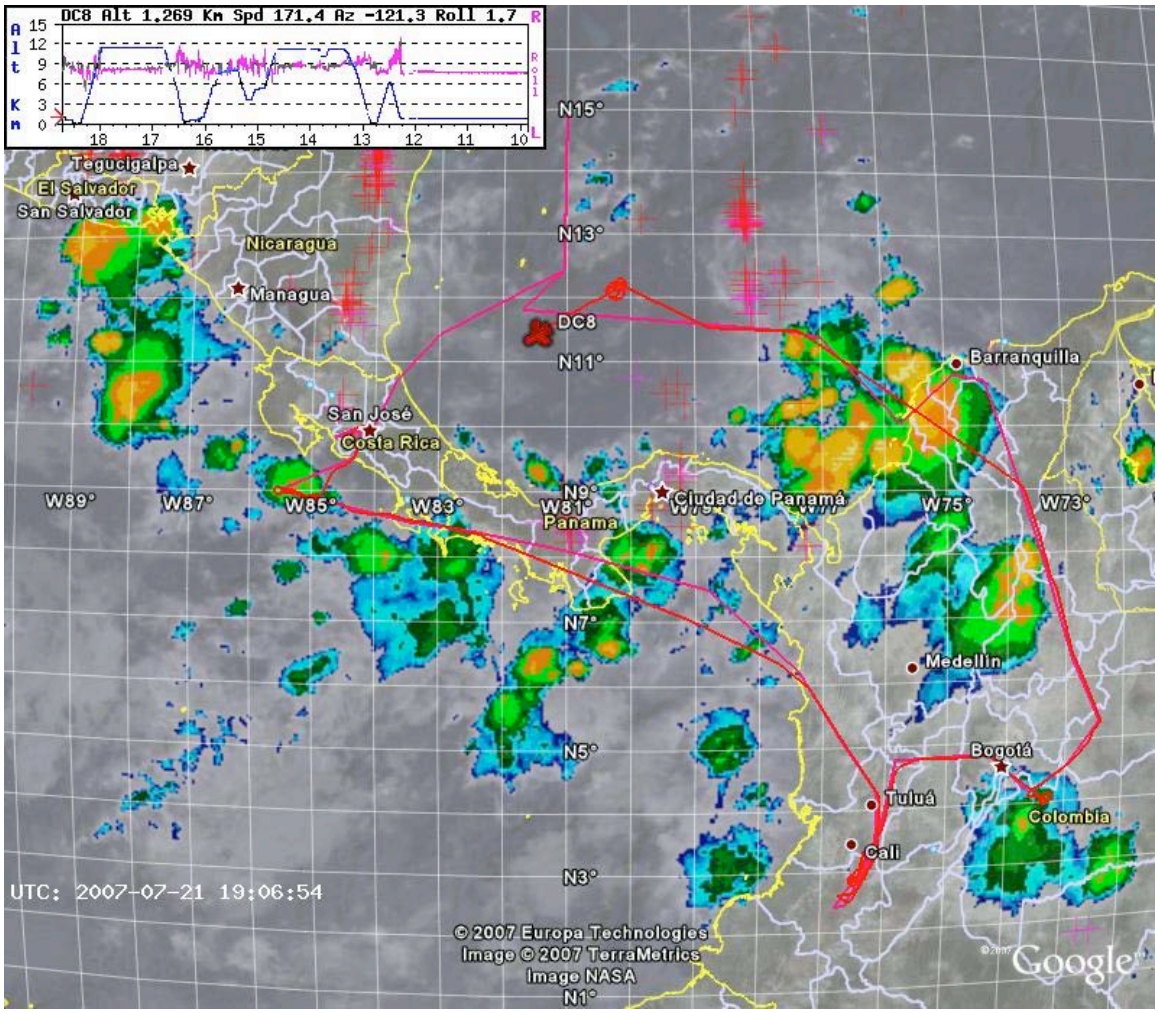
~12:00 n – Clearing below – dust layer evident in DIAL data – spiraled down to boundary layer and then back up to dust layer.

~12:30 p.m. – Sampled several low-level clouds on the way back. Some precipitation. Stayed in the aerosol layer - went back to boundary layer and up into dust to head back. Dust layer ended about 9500 feet. The dust layer had a significant sulfate component.

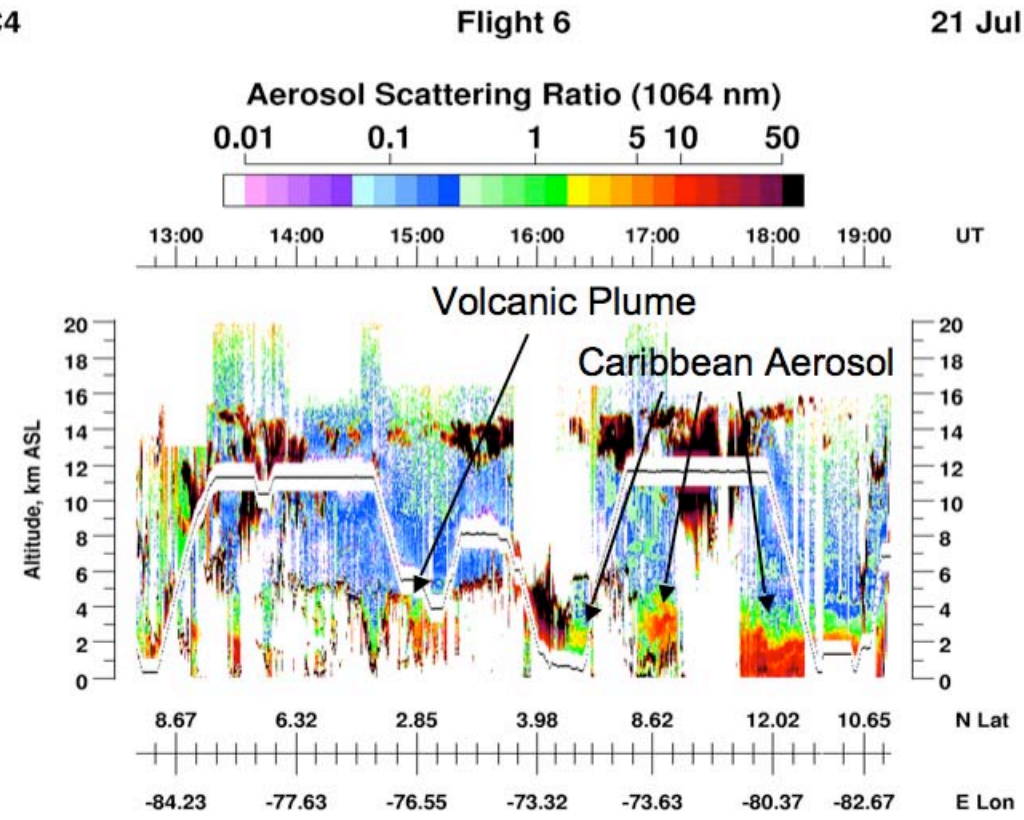
Encountered a 45-min delay getting approval to land due to weather. Put in hold pattern to west of San Jose.

Overall, the instruments performed very well.

Mark Schoeberl and Paul Wennberg



RTMM – Review of mission – red is actual mission path, pink is planned flight. Lost contact with RTMM in the Caribbean

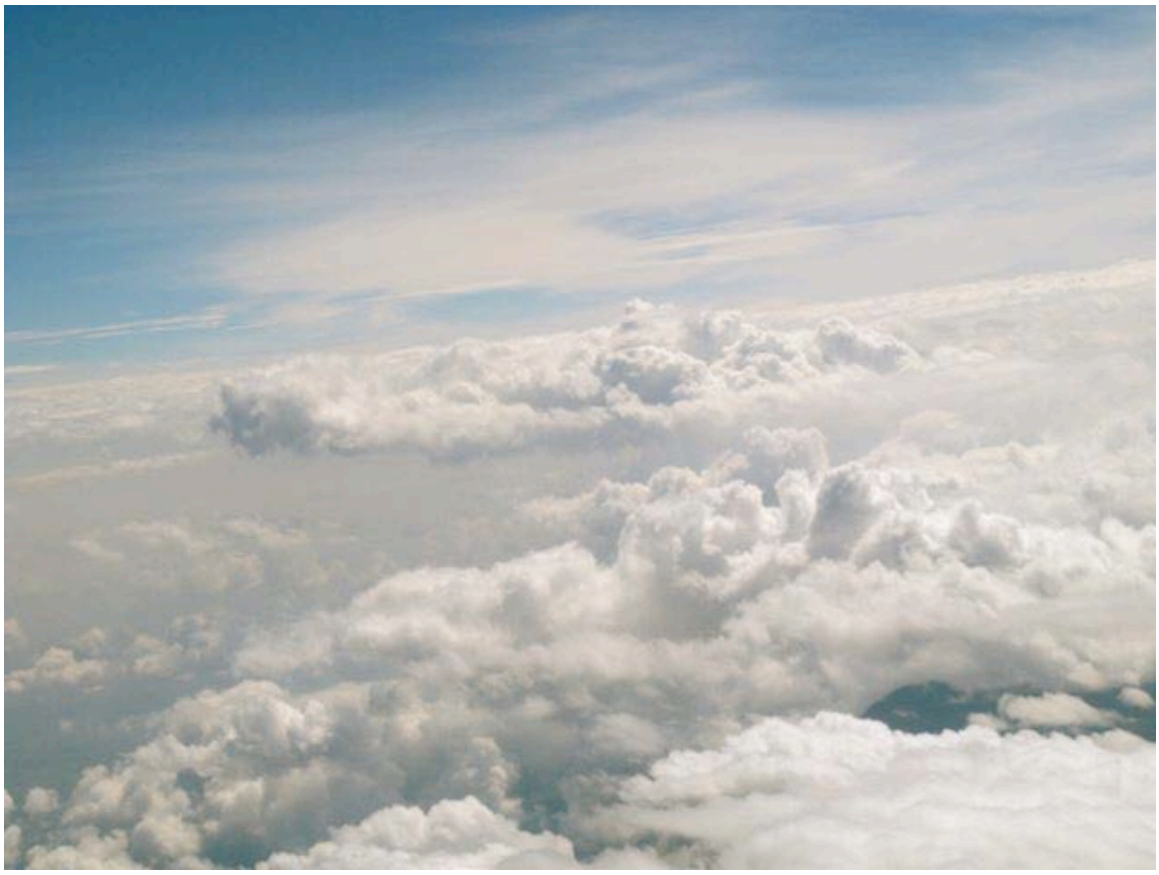


DIAL results from Ed Browell.

The following photos from the flight were taken by Mark Schoeberl:

Cirrus over the Bight showing haloes early in the flight

Convective system over the Bight viewed from the low-level run.



Flying by Panama – Note apparent dust on left of photo.

Valley west of the volcano, filled with pollution from the volcano. Aircraft instruments observed high levels of SO_2 when we descended into the polluted region.

Valley in Colombia near the city of Villavicencio.

Aerosols are obscuring clouds in the Caribbean

Ship observed during boundary layer run east of Costa Rica. We did see a spike of SO_2 in this layer – ship plume?

Group waiting to greet the DC-8 on our rainy return.