

TC4 ER-2 Science Flight: July 24, 2007
Flight Report

Flight Scientists: P. Newman, S. Platnick

Sortie: 07-9022

Pilot: Denis Steele

Takeoff (MROC): 1150 UTC (6:00 AM local)

Landing (MROC): 1850 UTC (12:50 PM local)

Duration: ~ 7.0 hours

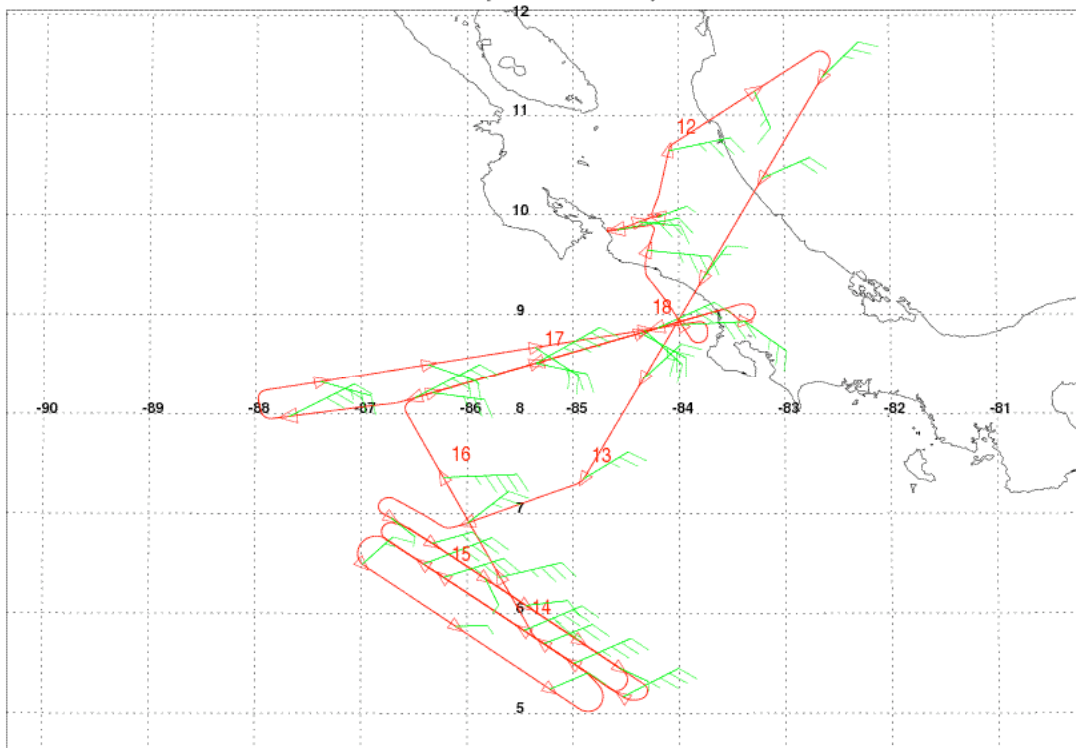
Objectives:

- To perform coordinated cloud sampling of maritime cirrus shield with DC-8 and ER-2
- To sample boundary layer/free troposphere air feeding convection
- To sample cloud outflow
- To profile dust optical depths between the Caribbean and the Pacific

NASA DFRC ER-2 Navigation Recorder Data

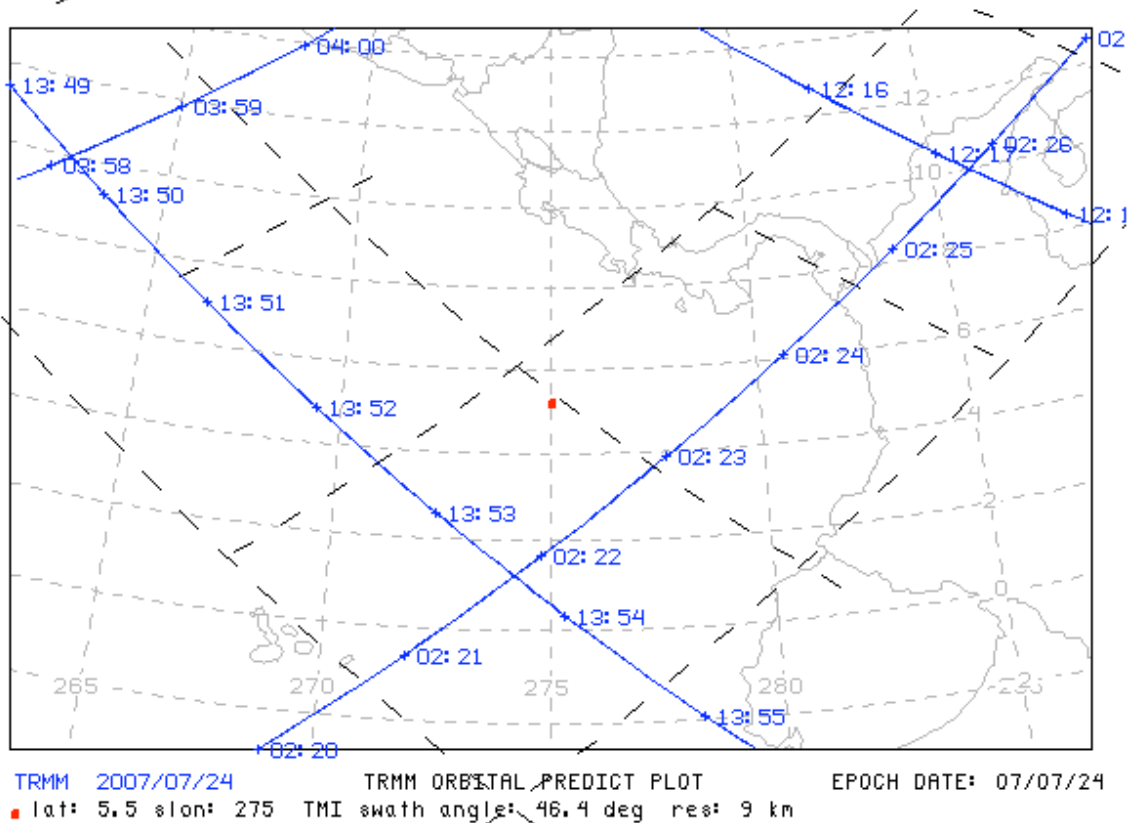
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Provided By: AS&M Data Systems



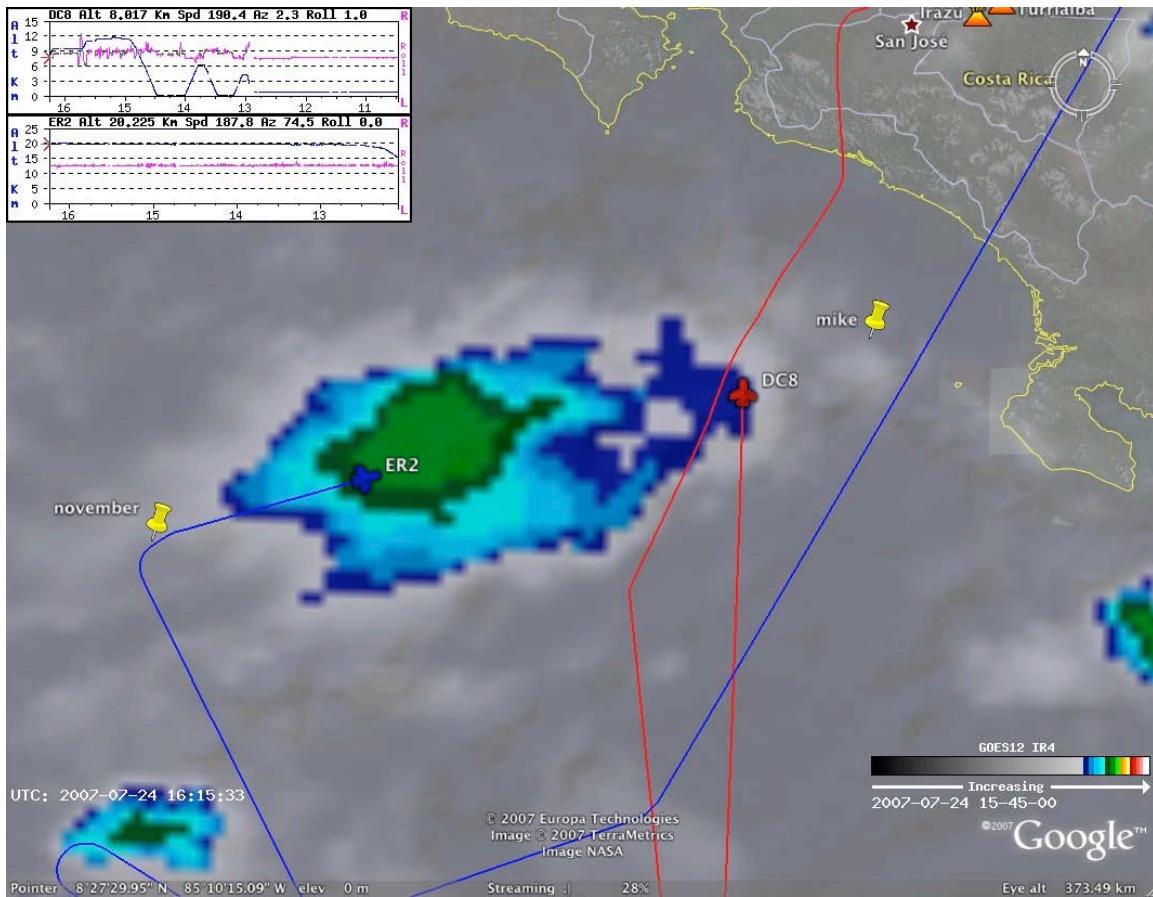
Satellite Coordination:

Terra overpass at 15:36 UT well to the east of the ER-2 racetrack (192° heading) over Colombia. The image below shows the TRMM overpass with the TMI swath superimposed as the dashed lines (image from the NASA Langley TC4 satellite web page: <http://angler.larc.nasa.gov/tc4/>).



Flight Plan Summary (see map):

Takeoff at 1200 UT (6 AM local time). The ER-2 initially flew northeast over the Caribbean into relatively clear air while gaining altitude. The ER-2 then flew southwest along a line with relatively clear air below the aircraft in order to view aerosol concentrations. On this leg, a layer of cirrus was observed in a 12- to 15-km layer. In addition, there was a nice layer of aerosol extending from the surface to 3 km in the Caribbean. After reaching the southwestern point over the Pacific at about 1320 UT, the ER-2 flew two racetrack patterns in a counter-clockwise pattern in coordination with the DC-8 before shifting to a second track for a third rounding. After the DC-8 encountered a lightning strike, the ER-2 was shifted northward to a track that was over a convective core that had a considerable cirrus shield. The image from the RTMM at 1615 UT is shown below. Superimposed on the RTMM image is the GOES IR image showing the cold cirrus on top of this convective core. The ER-2 flew approximately three legs over this core and returned to MROC (San Jose).



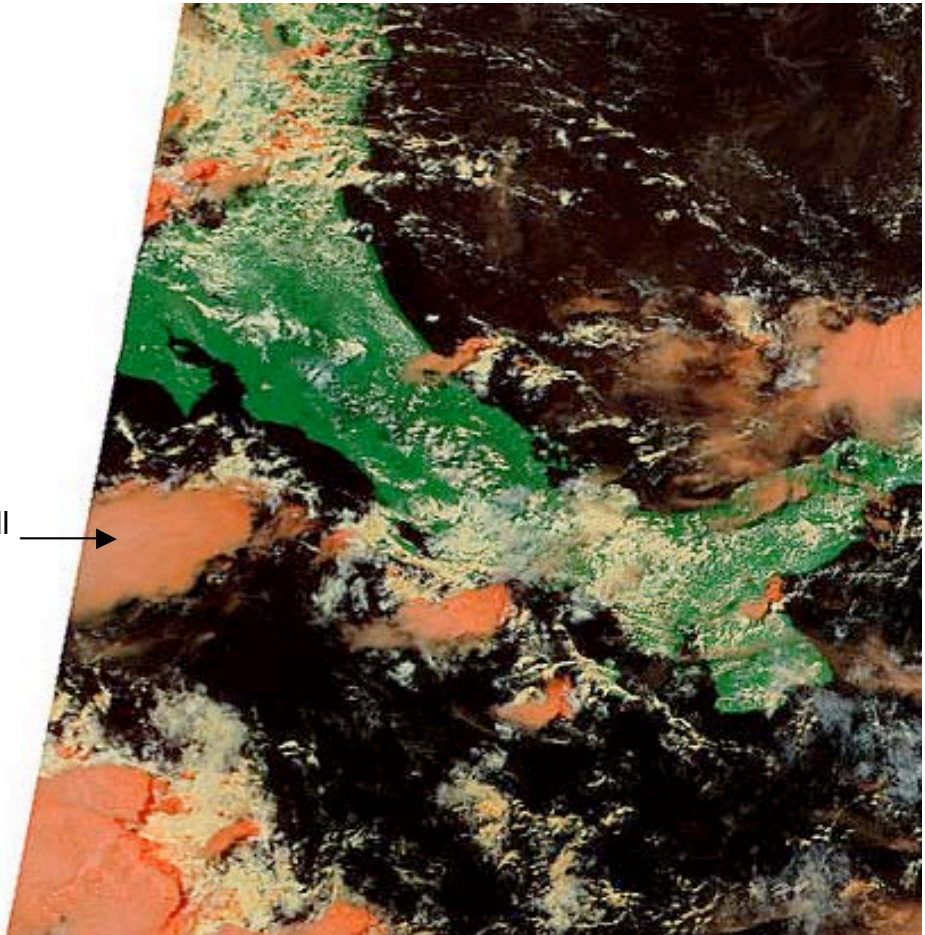
Cloud Conditions during flight:

The racetrack pattern was originally set in the ITCZ. The forecast map showed precipitation accumulation near the actual location of the flight. The track was set near a forecast maximum of precipitation. The Caribbean track was set for relatively cloud-free conditions in order to see the African dust plume. Panama bight convection was predicted to be relatively weak for July 24. The 250-hPa (~32,000 feet) wind pattern showed that the cirrus detrainment for the ITCZ clouds would be from the east to the west at about 10 m/s. The Mike-November line on the image showed that this cirrus detrainment was verified.

MODIS Terra QuickLook Imagery

White clouds indicate liquid water, strong coral/reddish color clouds indicate ice, and slightly reddish clouds might indicate larger water droplets and/or ice particles and/or cirrus overlying water clouds.

November-Mike cell



ER-2 Science Instrument Payload and Status:

Instrument	Status	Notes
CPL Cloud Physics Lidar	G	
CRS Cloud Radar System	G	
EDOP ER-2 Doppler Radar	G	
AMPR Advanced Microwave Precipitation Radiometer	G	
CoSSIR Compact Scanning Sub-mm wave Imaging Radiometer	NA	Ballasted out
MAS MODIS Airborne Simulator	NA	Hard failed, flying as ballast
S-HIS Scanning High Resolution Interferometer	G	
IR Radiometer Broadband flux radiometer (nadir & zenith)	G	
SSFR Solar Spectral Flux Radiometer (nadir & zenith)	G	
MVIS video camera	G	
MTP Microwave Temperature Profiler	G	

G = good; P = partial data collected; F = failure, no data