Middle Latitude Cirrus Cloud Properties Experiment (MACPEx)
Flight 2 Summary Report (11 April 2011).

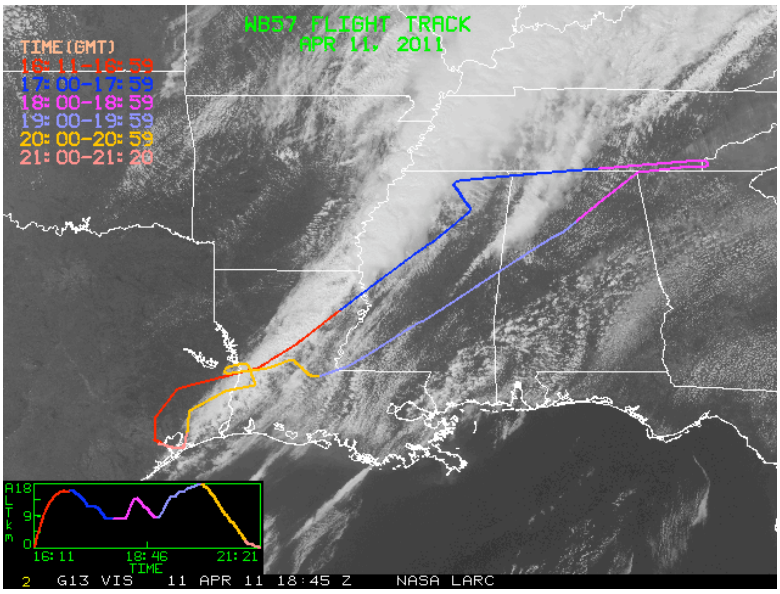

Figure 1. Flight Track overlayed on IR satellite image. Dashed line is Cloudsat track. Images Courtesy of Minnis Group.

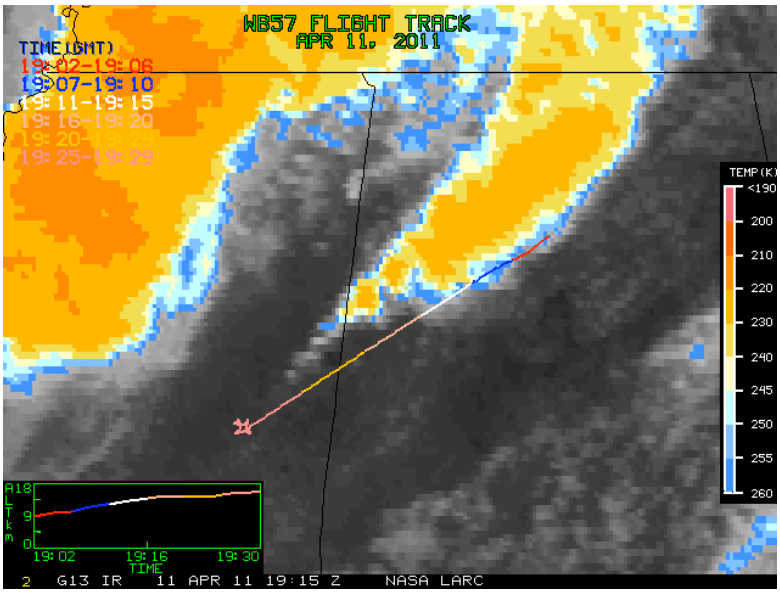

Figure 2. Flight Track image showing fresh anvil sampled around 1900.

1. Purpose of Mission:
Primary Mission:
Sample high clouds associated with convection over the Mississippi and Tennessee Valleys.

Secondary Objective:
Compare measurements of stratospheric water vapor.

2. Flight Summary
The WB57F (926NA) sampled cirrus clouds over the Mississippi and Tennessee River Valleys associated convective outflow. The early part of the flight examined mostly aged anvil remnants that showed evidence of size sorting in the vertical profile of particles collected along the east-west transects (Figure1). A short section of fresh anvil was sampled around 1900 as shown in Figure 2.

3. Instrument Operations Officer Report:

Flight duration – 5.2 hours
Crew – HEI/DOM

Instruments flown: 2DS, ALIAS, CPI, CIMS, CLH, DLH, FCAS, FCDP, FISH , HARWV, HARHAL, HVPS, JLH, MMS, NMASS, O3, O3LITE, PALMS, SID3, ULH, SP2, VIPS

	1107	**Takeoff**	1615	**Land**	

Flight Log

Engine Start	1052				
Data Rec On	1050	**Begin Descent**	1506	**Landing**	1615
Gear extension/retractions					
Gear Up			1108		
Gear Down			1610		

Weather Observations Ascended through cloud deck shortly after takeoff. Above and in clear air in route to way point 2, crossed over distinct storm front. Approaching redefined point 3 just above and to the SW of cirrus layer at FL380. Vectored West and descended into the tops at FL368 for approximately 10 minutes.
Clear air between next waypoints and though wispy cirrus appear significantly above our altitude it did not appear to be solid or continuous enough to reach for the short period evident.
Returning Westerly noted blow of from anvil of convective storm line above route, FL 330-FL365. Ascended into this formation for the short extent the formation existed.
Clear air during the return legs.

Flight Profile
Transit to range uneventful. Transit at FL520 to point 2 with slow decent to initial point 3 as defined by sat phone from Theroy. Descended into IP at FL380 Diverted, PD, to West and decended into could deck at FL360 before returning to planned flight profile. Vectored from point 4 to point 6 per direction from Theory. Spriral Ascent from point 6 was not possible due to ATC conflicts. Spiraled up West of point 6 in clear air and began the return legs. Attempts were made to complete slightly shortened route per Theory, due to fuel state and expected strong headwinds upon return.
RTB at FL570 with stair ascents and dwell at FL470, FL510, FL550. Reached max altitude of FL575 before beginning slow no gear decent.
MMS maneuvers during low altitude hold at 4,000'.

Instrument Notes
PALMS fail on initial start up probably due to power inadvertently applied prior to generator crossover. Most likely power switch thrown during crew insertion. Action per checklist; reset 1X.
SID3 did not connect to server on start up. Most likely due to operator error in multiple mouse clicks starting multiple program starts. Software shut down per normal method and restarted successfully.
HARHAL fail light at 1555 on decent below 6,000'. No action per checklist.
HARVWV fail below 3,000'. No action per checklist.

4. Preliminary Instrument/Data Status for this flight:

SID3	No Data Collected
VIPS	Worked Well
2DS	Worked Well
FCDP	Instruments ran, quality unknown.
HVPS	Worked Well
CPI	Worked Well
CIN	Instrument Defunct
NMASS	No Data Collected.
FCAS	Worked Well
PALMS	Worked Well, Some Issues.
MMS	Worked Well
ALIAS	Worked, Issues noted.
CLH	Worked Well
JLH	Worked Well
ULH	Worked Well
DLH	Alignment Issues
Harvard Water Vapor	Worked, Issues Noted
Harvard TDL	Unknown
Harvard Total Water	Not Ready For flight
Harvard Halogen	Worked but Issues Noted
FISH	Worked Well
CIMS	Worked but Issues Noted
O3	Worked Well
O3Lite	Worked Well