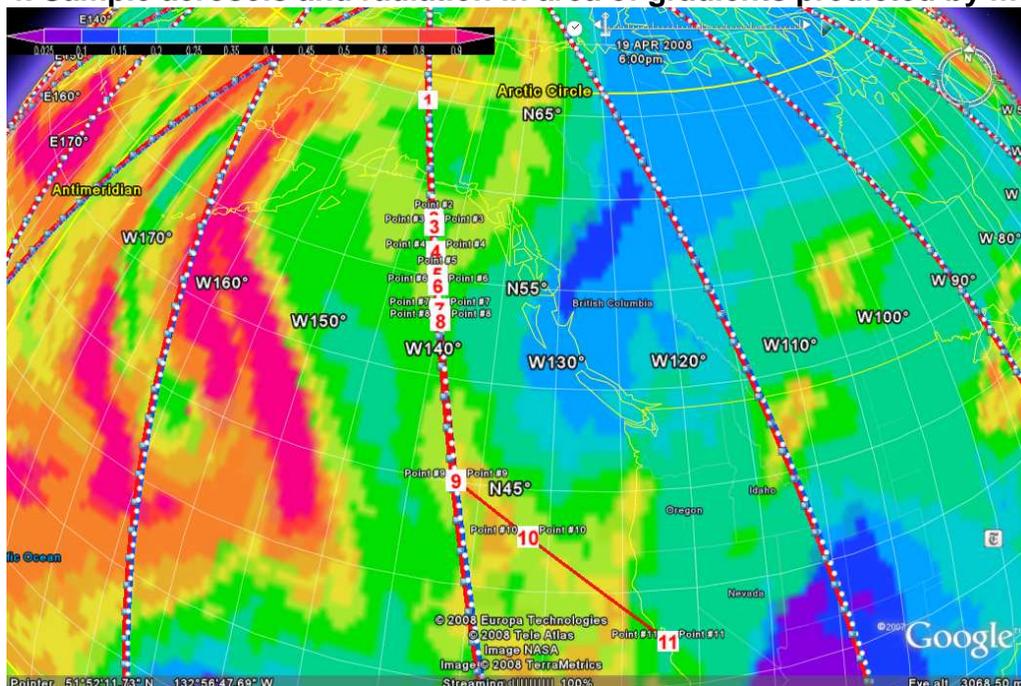


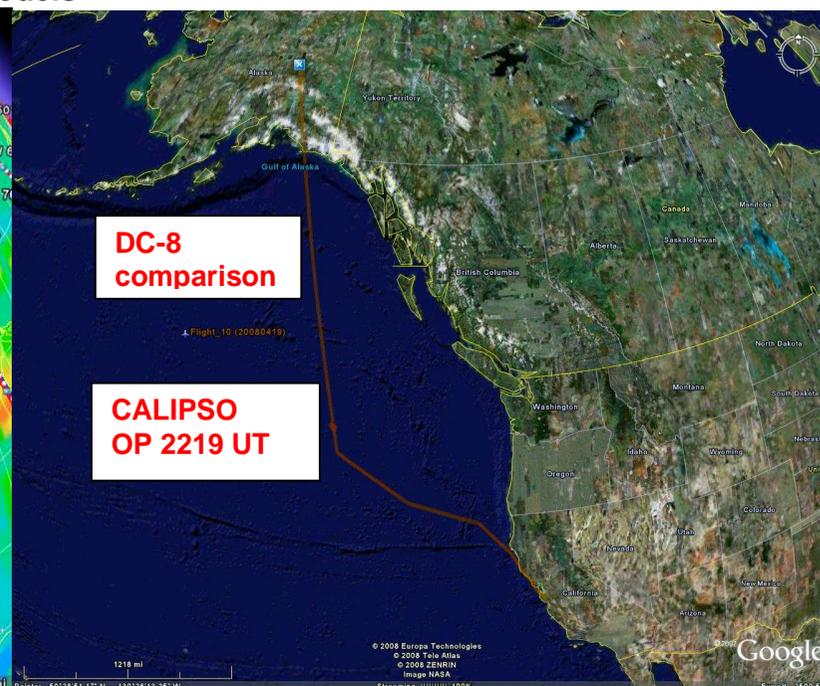
Flight Report
ARCTAS P-3B Data Flight 10, flown 19 Apr 2008 (Transit/Science)
Submitted by Phil Russell

Goals:

1. Comparison w DC-8 along CALIPSO track
2. Stairsteps in DC-8 lidar curtain along CALIPSO track
3. Square spiral during CALIPSO overpass
4. Sample aerosols and radiation in area of gradients predicted by models



Planned flight track

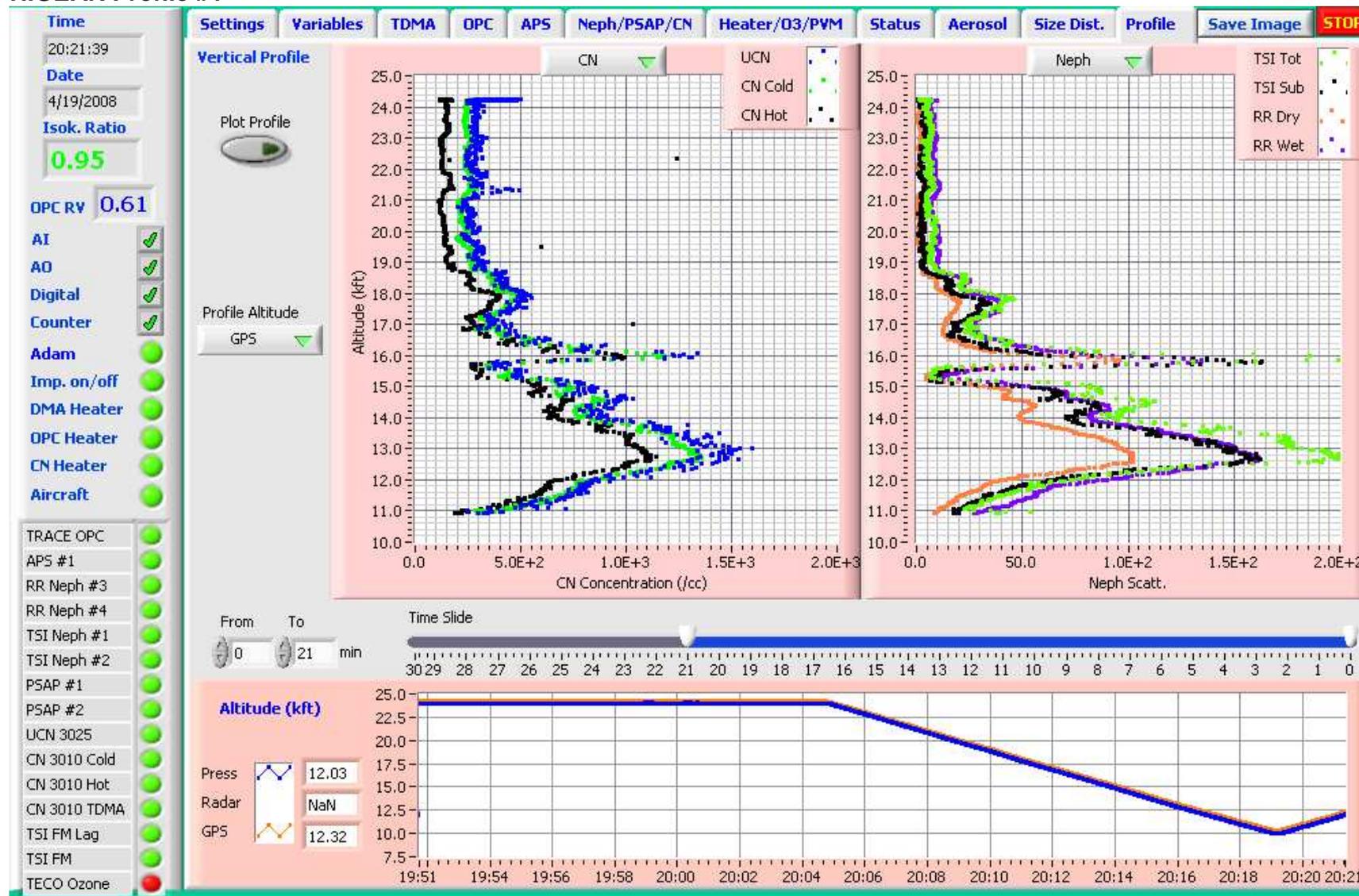


Actual flight track

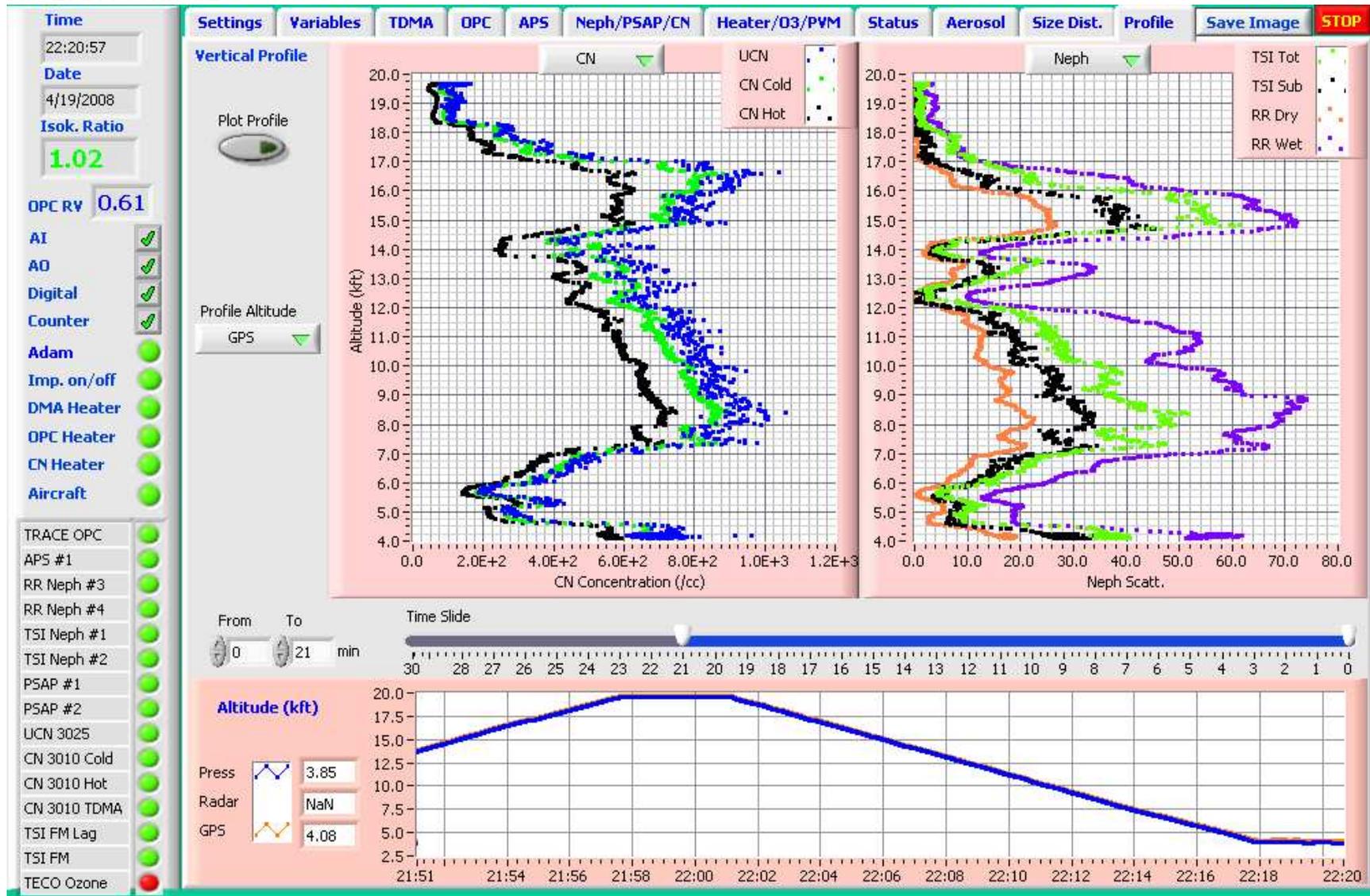
Colors: Total AOD predicted by STEM model for 1800 UTC [1000 ADT] 19 Apr

Takeoff 1818 UT (delayed by a late fuel truck). DC-8 delayed its takeoff to preserve the planned comparison opportunity. P-3B encountered strong pollution on climbout from Fairbanks. On arrival at Waypoint 2 (planned DC-8 rendezvous point, ~24 kft GPS), AATS & DC-8 lidar indicated subvisible cirrus above, so we agreed to push the comparison to the South. Xchat was not available, so we tried communicating by Iridium phone. That connection was bad, so we relayed info by pilot radio. DC-8 chose 13 kft for the intercomparison altitude. DC-8 & P-3 descended to 13 kft together, passing through some significant layers, including dust (see HiGEAR Profile #1) at 17.4 kft GPS and ~300 ppb CO (per COBALT) at 15.7 kft GPS. The comparison leg at 13 kft lasted 15 minutes, ~2023-2038 UT. Pollution was strong in that leg, per CO and in situ aerosols, which had low f(RH) and lots of black carbon (possibly the most the P-3B encountered in ARCTAS), suggesting a biomass burning source. AOD(499 nm, per AATS) at 13 kft was 0.145, with no cirrus. At end of comparison leg DC-8 planned to climb to 16 kft, then 23 kft, while P-3B descended in DC-8 lidar curtain along CALIPSO track. P-3B descended to 200 ft, encountering puffy cloud tops and associated sulfate at 3.5 kft GPS. Flying at 200 ft under the puffy clouds allowed measurements of AOD wavelength dependence near cloud edges, relevant for studies of aerosol-cloud interactions and satellite discrimination of aerosols from clouds. AOD reached 0.33 at 200 ft between the clouds. At ~2110 UT the P-3B climbed to ~3kft to make a run above cloud tops, potentially useful for studying aerosol entrainment into cloud tops. The leg registered a horizontal gradient in AOD, useful for measuring radiative forcing efficiency. Thereafter a vertical gradient was measured during a climb. At ~2137 UT we started a 10-minute leg at 10 kft, measuring pollution above low cloud, a situation of interest to CALIPSO. AOD at 10 kft was 0.215. At 2155-2157 we climbed to 20 kft for a 2-minute level leg followed by a square spiral down to ~4 kft to measure vertical profiles of radiative flux and AOD along the CALIPSO track. The spiral, which included the CALIPSO overpass at 2219 UT, encountered aerosol layers at several altitudes (see HiGEAR Profile #2). The DC-8, flying ahead, had previously reported layers of biomass smoke at 8-10 kft and dust at 16 kft. At the square spiral base (~4 kft, near cloud top, 2222 UT), P-3B reversed direction, offset ~3 mi from the CALIPSO track, and then retraced our original direction on CALIPSO track. At 2242 UT we broke off the CALIPSO track at 4.5 kft to head for Ames. We encountered aerosol layers at several altitudes en route and on the descent into Ames. These included sulfates, organics, and considerable absorption. AOD was 0.25 upon landing at Ames at 0121 UT (20 Apr).

HiGEAR Profile #1



HiGEAR Profile #2



Instrument Reports

AATS-14	
Status during flight (up/down)	Great flight
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	Need 90 minutes to remove instrument, but no power requirement. Will also need time tomorrow around 9 AM if everything is not removed tonight.
Comments	Instrument unparked and tracking entire flight with the exception of a few minutes under some clouds

Aero 3X	
Status during flight (up/down)	Worked on and off
Accomplishments	
Issues encountered	Had some issues
Status for next flight	
Postflight requirements	Will try to remove what is possible tonight, then need about an hour at 9 AM tomorrow
Comments	

BBR	
Status during flight (up/down)	Worked fine whole flight
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	Need 1 hour; Power 10 minutes
Comments	

CAR	N/A
Status during flight (up/down)	
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	

Comments	
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CCN	Was not operated today; just started it up and it worked fine
Status during flight (up/down)	
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	
Comments	

COBALT	
Status during flight (up/down)	Up except for a few dropouts
Accomplishments	
Issues encountered	A few dropouts in current controller at start of wingtip to wingtip with DC-8
Status for next flight	
Postflight requirements	90 minutes to remove - need to get box out as well; power 10 minutes
Comments	Saw extremely large CO values, around 350 PPB

HIGEAR	
Status during flight (up/down)	Worked fine all day
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	90 minutes. Power 20 minutes
Comments	CO, black carbon and absorption were all well correlated and we recorded some of the highest values of the campaign. tDMA's in the plumes are consistent with biomass burning aerosol with relatively high refractory volumes.

AMS	
Status during flight (up/down)	Worked well most of the flight
Accomplishments	
Issues encountered	

Status for next flight	
Postflight requirements	Power 5 to 10 minutes
Comments	Intriguing contrasts between areas with lots of organics and lots of sulphate

PDS	
Status during flight (up/down)	Worked well all day
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	Power 20 to 30 minutes
Comments	Has worked 100% throughout this mission

REVEAL	N/A
Status during flight (up/down)	
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	
Comments	

SSFR	
Status during flight (up/down)	Worked fine whole flight
Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	Need to check with Warren
Comments	Probably got good data

WFF Flight Report

Aircraft :	NASA P-3B
Operating Site(s) From / To :	PAFA / KNUQ
Flight Date :	April 19, 2008
Flight Number / Data Flight # :	559 / 10
Time out:	1813 (Z)
Time in:	0130 (Z)
Flight Time :	7.3
Flt Request # / PI:	8P301/ Phil Russell
Purpose of Flight :	Data [X] Ferry [] Functional Check [] Other []
Sensor Payload :	ARCTAS
Comments :	Today's science flight was very successful; all mission objectives were met. The flight included an intercomparison flight with the NASA DC-8 under a CALIPSO track. The aircraft and all instruments are in an up status The plane will be located at Chico California for the next 3 to 4 weeks to undergo unscheduled maintenance to repair a fuel seep and reinstall a repaired elevator. This was the last science flight for the ARCTAS Spring campaign.

SUBMITTED BY: Cate Fairchild 20 April, 2008

Flight Hours for ARCTAS Campaign

Flight	Date	Aircraft Flight #	Data Flight#	Duration (hr)	Remaining Hours*
<i>Total Allocated</i>					75
Engineering ck flt 1	3/14/2008	535		2.8	72.2
Engineering ck flt 2	3/24/2008	537		2.3 (1.0)*	71.2
Project ck flight 1	3/25/2008	536	1	3.0	68.2
Project ck flight 2	3/27/2008	538	2	3.4	64.8
Transit to Yellowknife	3/31/2008	541	3	7.6	57.2
Transit to Fairbanks	4/1/04	542	4	6.5	50.7
Functional ck flight	4/5/08	546		0.5**	50.7
Science flight	4/6/08	545	5	8.6	42.1
Science flight	4/8/08	548-1	6	8.6	33.5
Science flight	4/9/08	548-2	7	8.7	24.8
Science flight	4/13/08	554	8	5.4	19.4
Science flight	4/15/08	557	9	8.2	11.2
Science flight	4/19/08	559	10	7.3	3.9
Return transit	TBD			TBD+	0

+ NOTE: Due to maintenance action, Wallops will cover transit time over 3.9 hours

* Science only charged 1 hour for ECF #2

** Science not charged for 4/5/08 functional check flight