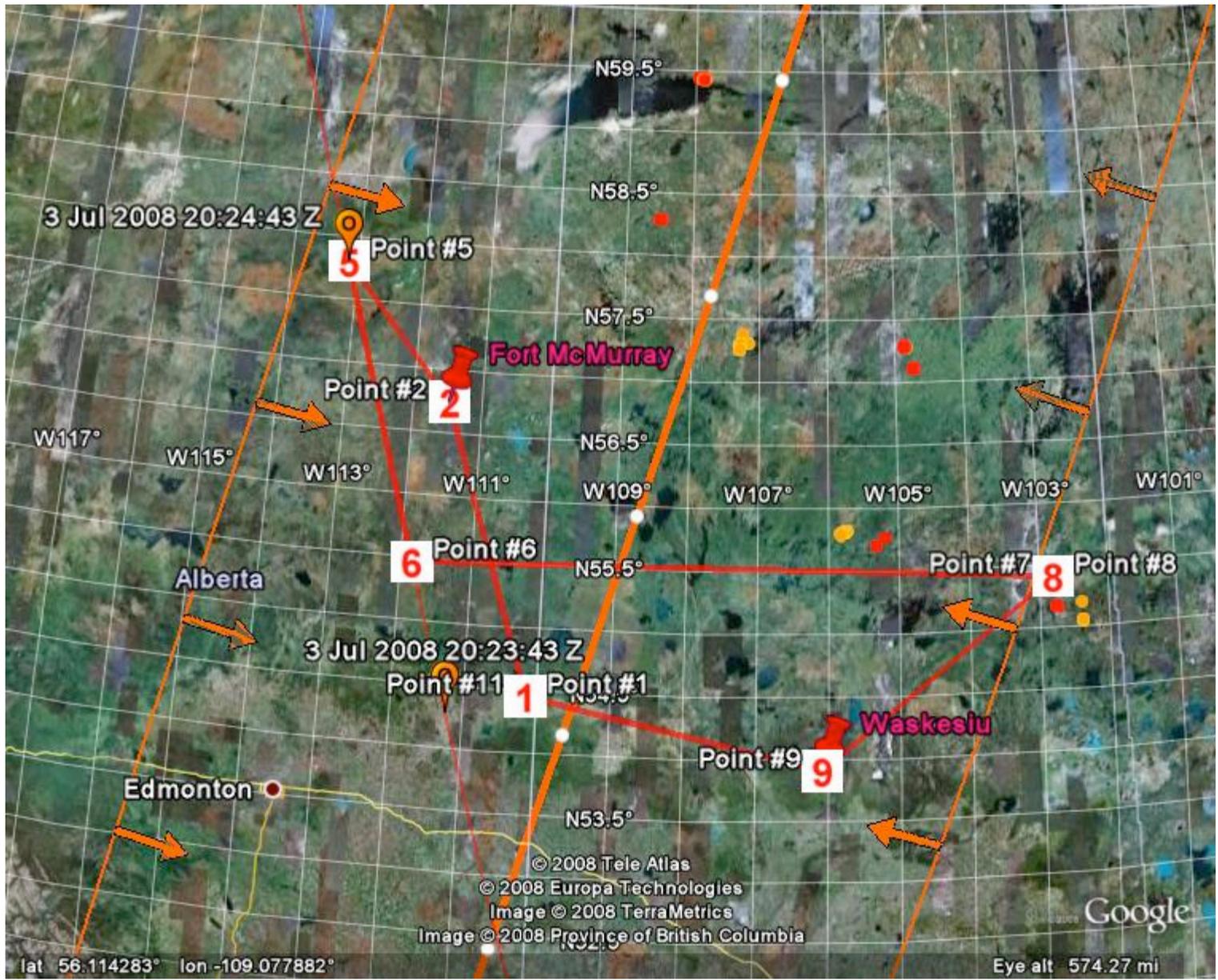


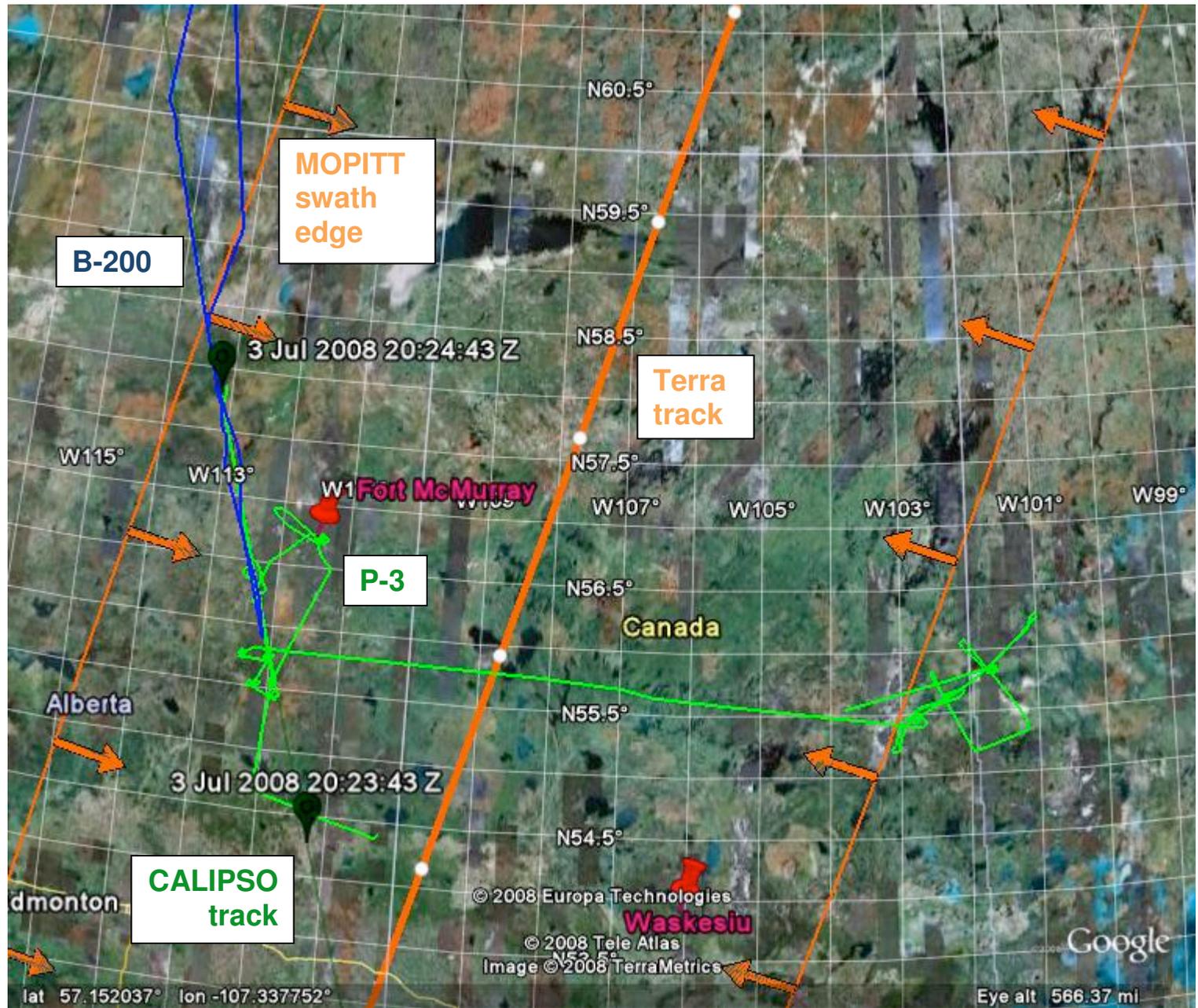
Flight Report
ARCTAS P-3B Data Flight 19, flown 03 Jul 2008 (Local Science)
Submitted by Phil Russell

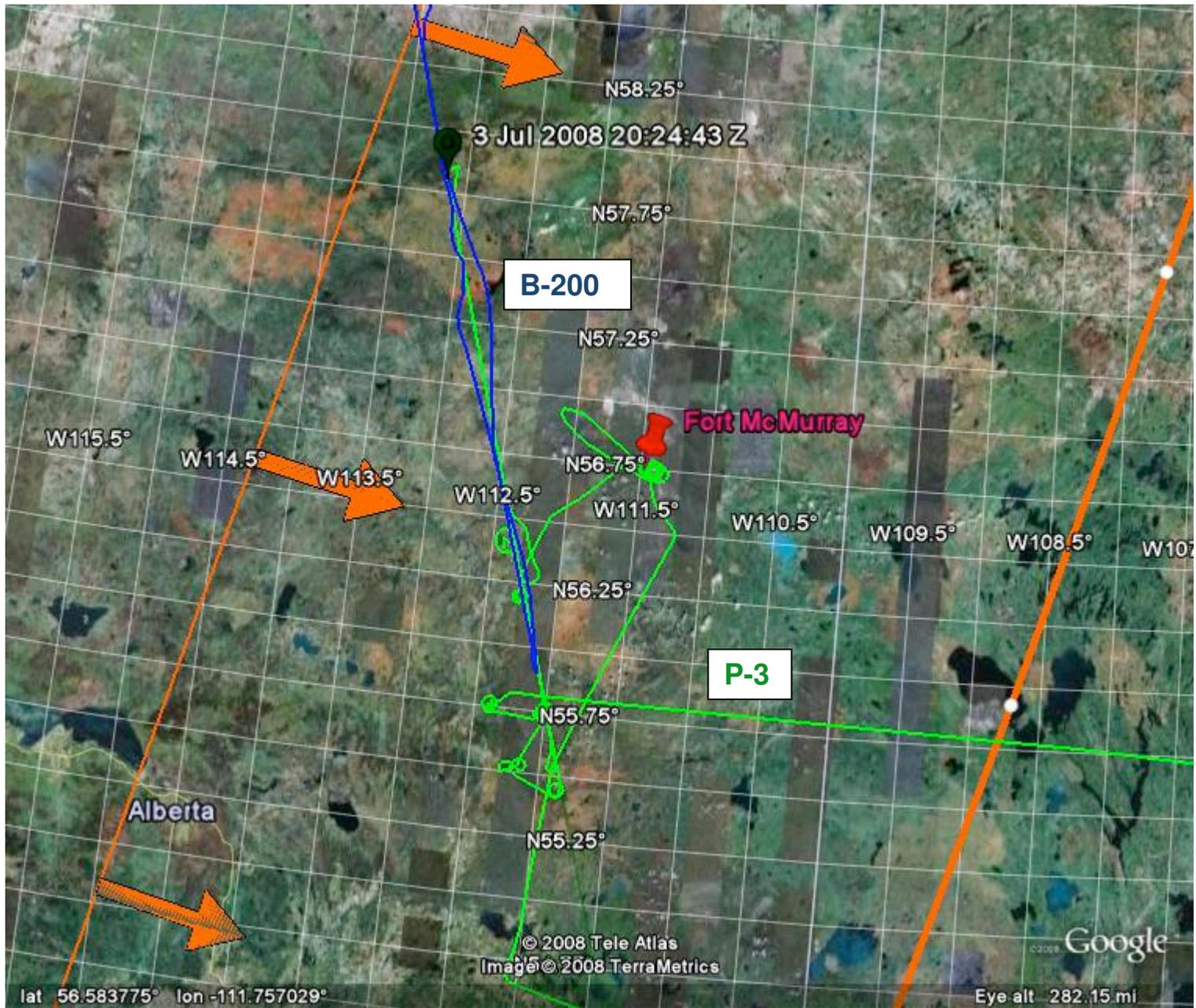
Objectives

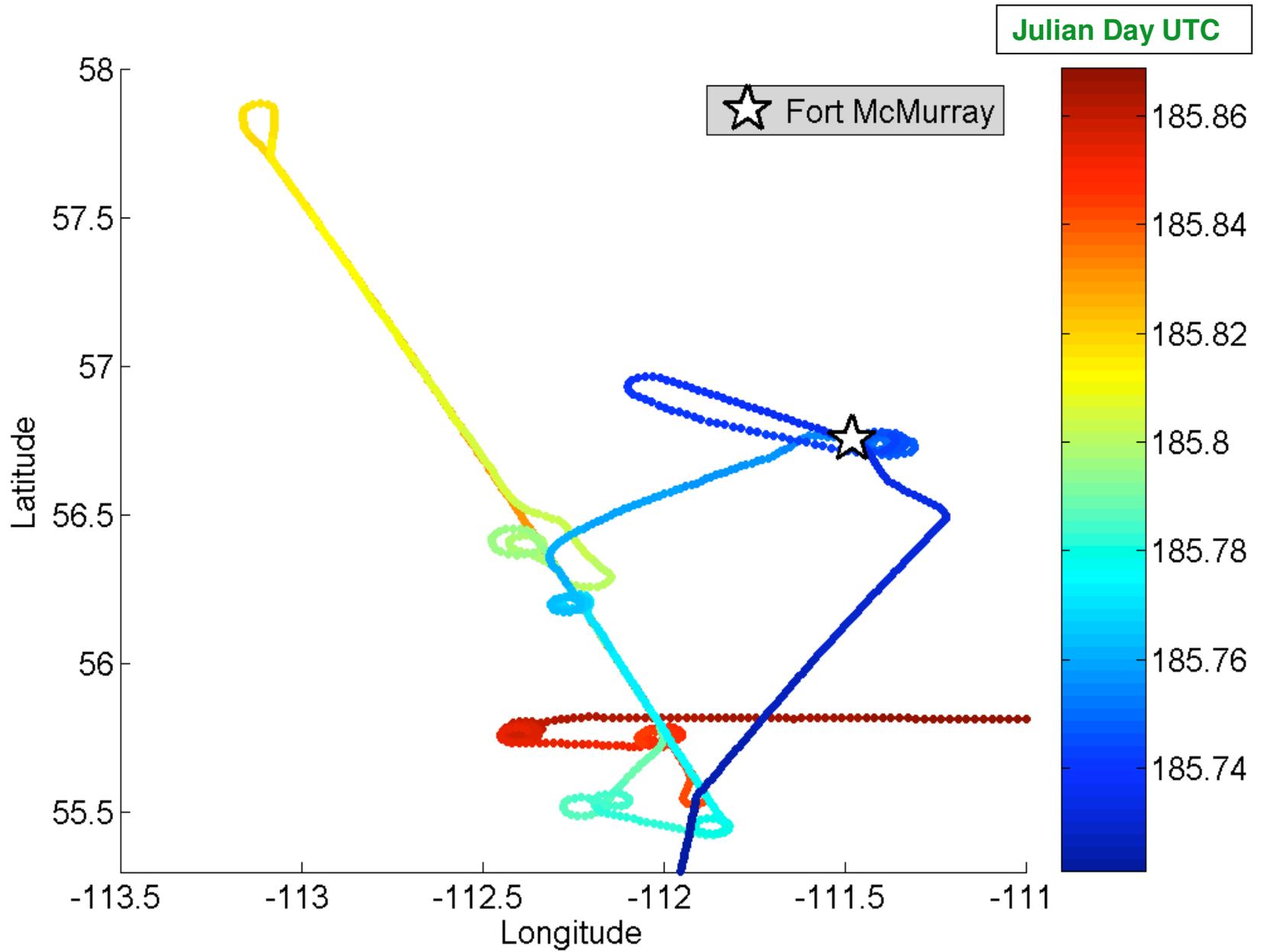
- 1) Ft. McMurray AERONET: CAR circles, AERONET particle property validation & AOD comparison in Terra footprints (MISR [1830 UT], MODIS, MOPITT)
- 2) CALIPSO & Aqua-OMI overpass in A-Train (~2024 UT) w B200
- 3) Reindeer fire
- 4) Waskesiu AERONET: CAR circles, AERONET particle property validation & AOD comparison



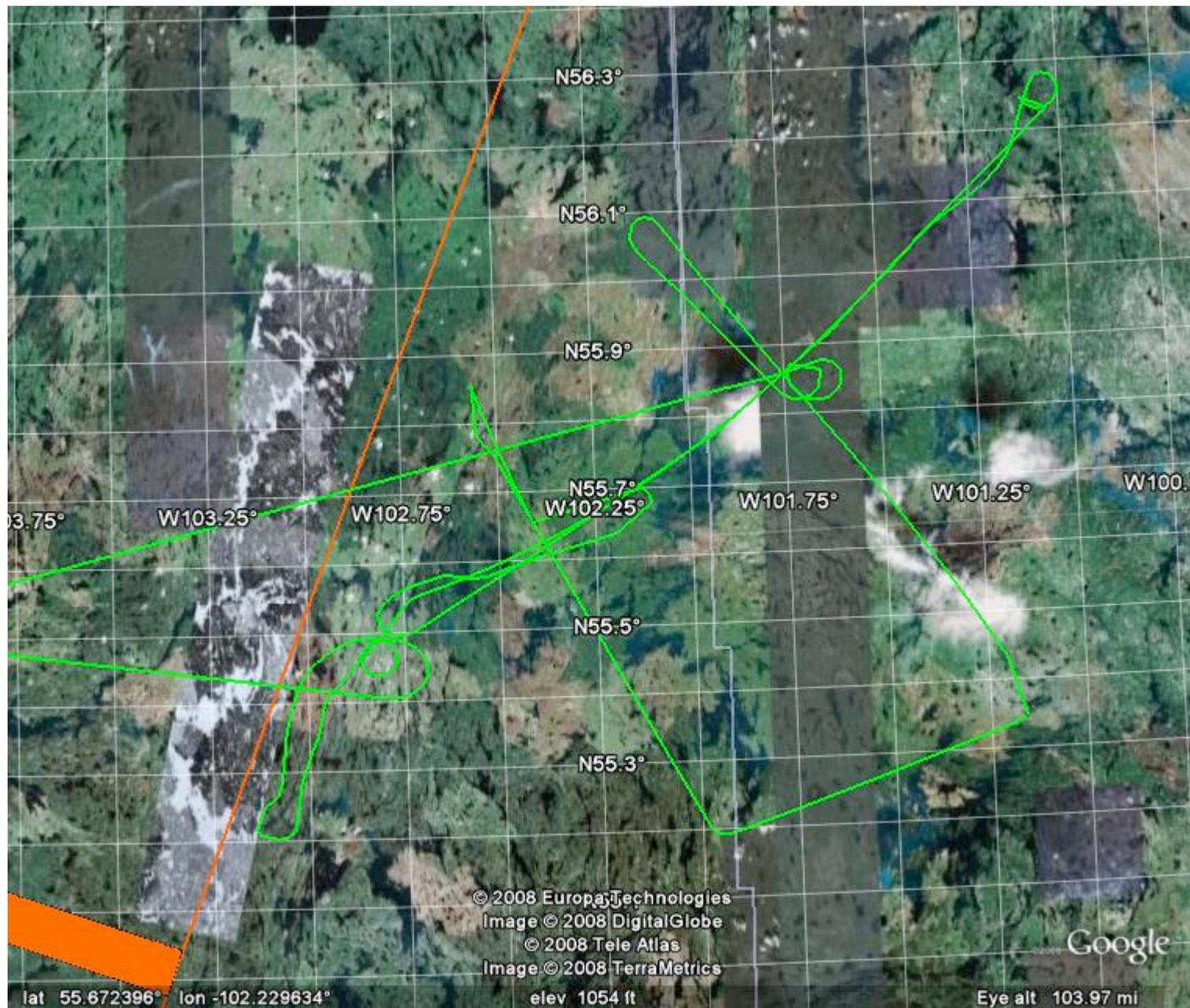
Planned flight track







ASFlight19_20080703firsthalfonlatt.fig, Yohei, 2008-07-04



Actual flight tracks

Summary:

This was a successful flight that studied a fairly uniform regional biomass burning haze (AOD ~0.24) to the west and a huge fire complex to the east with dense smoke in a complex cloud field. Accomplishments include:

1. A spiral down over the Ft. McMurray AERONET site (for comparisons of AATS-AERONET AODs and in situ-AERONET aerosol retrievals)
2. A spiral down on the CALIPSO track in the MISR, MODIS, & MOPITT footprints at Terra overpass time (~1830 UT, for aerosol & CO validation)
3. A radiation stack along the CALIPSO track (for retrieval of aerosol absorption spectra).
4. Additional work along the CALIPSO/A-Train track in the B200 HSRL curtain, including a spiral down at CALIPSO overpass time (2024 UT, for CALIPSO-MODIS-OMI aerosol validation).
5. CAR circles for bidirectional reflectance over forest near the CALIPSO track.
6. Extensive in situ sampling of the large complex of fire smokes near Reindeer Lake, including our highest values of CO (10.6 ppm) and organics yet, and initial indications of particle size increases with distance downwind.
7. A ramped profile of radiative fluxes, AATS AOD, & in situ sampling on approach to Cold Lake for landing (AOD 0.23).

The pilots were outstanding in executing all requested maneuvers that could be accomplished safely. RTMM displays of B200 & P3 tracks, plus GOES Cloud imagery, were very helpful. Xchat was extremely useful for guidance from the ground, including adjustments in plans after we discovered an error in UTC times in the plan we had modified in haste just before takeoff, in response to changing cloud and fire conditions.

Clouds prevented CAR circles at the Ft. McMurray & Waskesiu AERONET sites and also radiation work in the eastern fire complex. These are continuing objectives for future flights.

Timeline: (Additional details are in the Xchat transcript, available from the author)

1654 UT: Takeoff at Cold Lake.

1656: Flow isokinetic

1658: AATS parked, waiting to get above haze, keeping window clean. Looks like uniform smoke pall below.

1750: Spiraling down over Ft. McMurray.

1805: 950 ft AGL, AOD 0.23, heading for woods to get down to 500 ft AGL. AOD 0.24 there (see plots below).

Clouds chase us west before we can do CAR circles.

1826: Spiraling down over CALIPSO track.

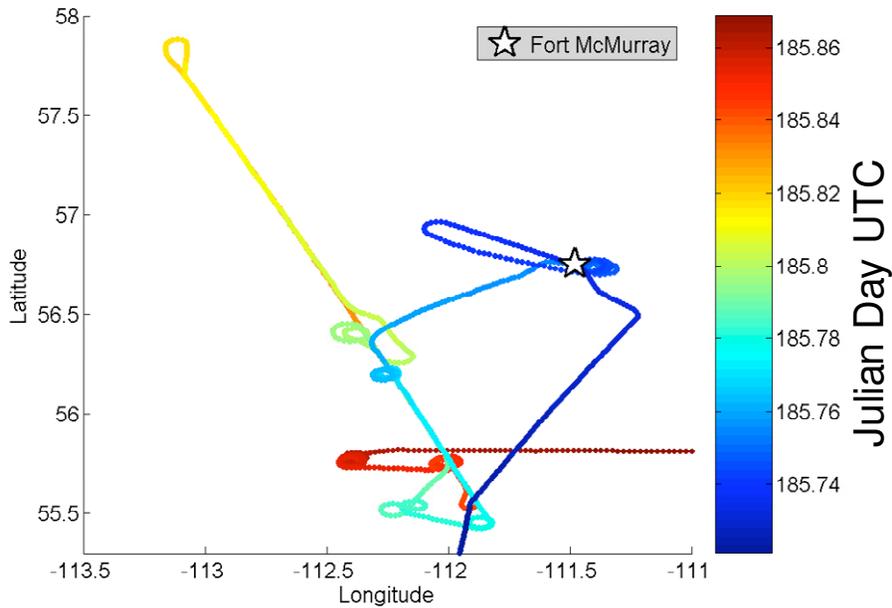
1829: AOD 0.24 on CALIPSO track at Terra OP time.

1841: Start spiral up.

Finish radiation stack on CALIPSO track.

2014: Turning N at S limit.

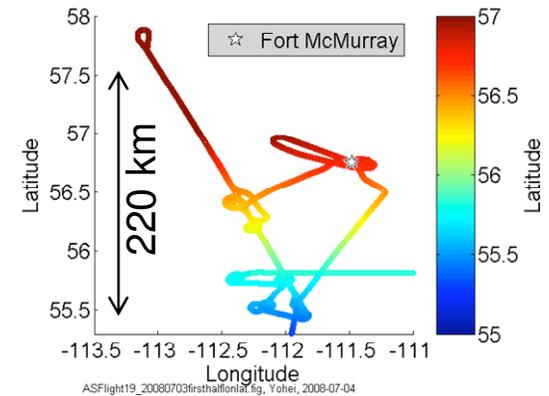
2015: Start spiral down on CALIPSO track under B200.
2024: Base of spiral at CALIPSO OP. B200 heads home.
2037: CAR circles near CALIPSO track.
2045: Heading E for Reindeer Lake area fires.
2131: Lots of fire & smoke below.
2158: Entering plume @ 3.5 to 4 kft. Very smoky, CO 10.58 ppm. Organics: largest concentrations yet.
2214: Heading downwind in plume. AATS AOD ~1. Ground barely visible below.
2220: End 20-min in plume at 3.5 kft. Particle size appeared to increase as we flew downwind.
2222: Spiraling up to 7500 ft.
2225: Start leg upwind. Clouds all around. AATS unparked but only reading cirrus above. In situ readings similar to at 3500 ft.
2235: AATS parked.
2240: Over initial head of fires.
Descent to Cold Lake:
AOD ~0.04 at ~6 km GPS
0042: AOD 0.16, 1.75 km GPS
0043: AOD 0.185, 1.5 km GPS
0049: AOD 0.2, 1 km GPS
0051: AOD 0.23, Land at Cold Lake



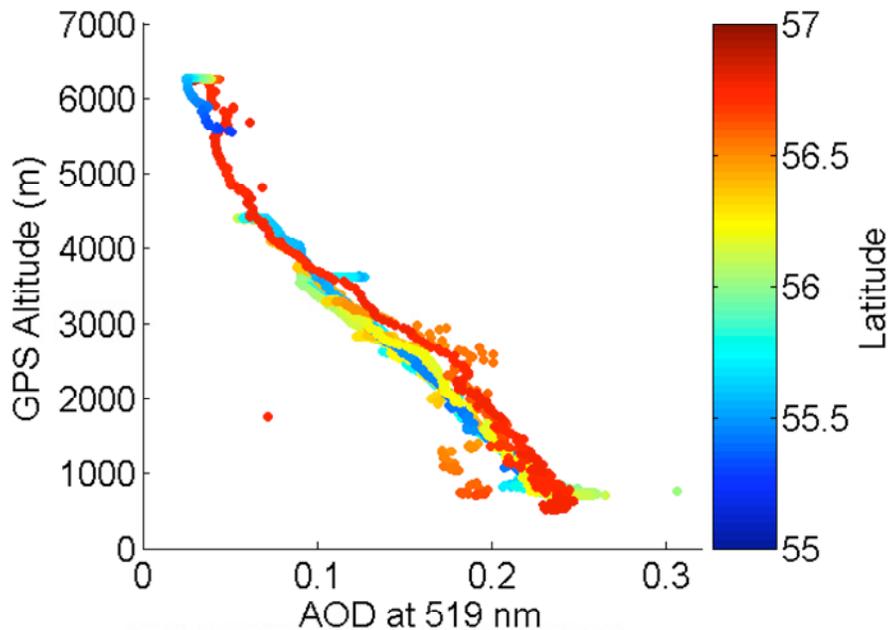
ASFlight19_20080703firshalfonlatt.fig, Yohei, 2008-07-04

The first half of the flight encountered a well-mixed local pollution layer up to ~2 km GPS altitude and a long-range transport air mass above, both homogenous over >200 km.

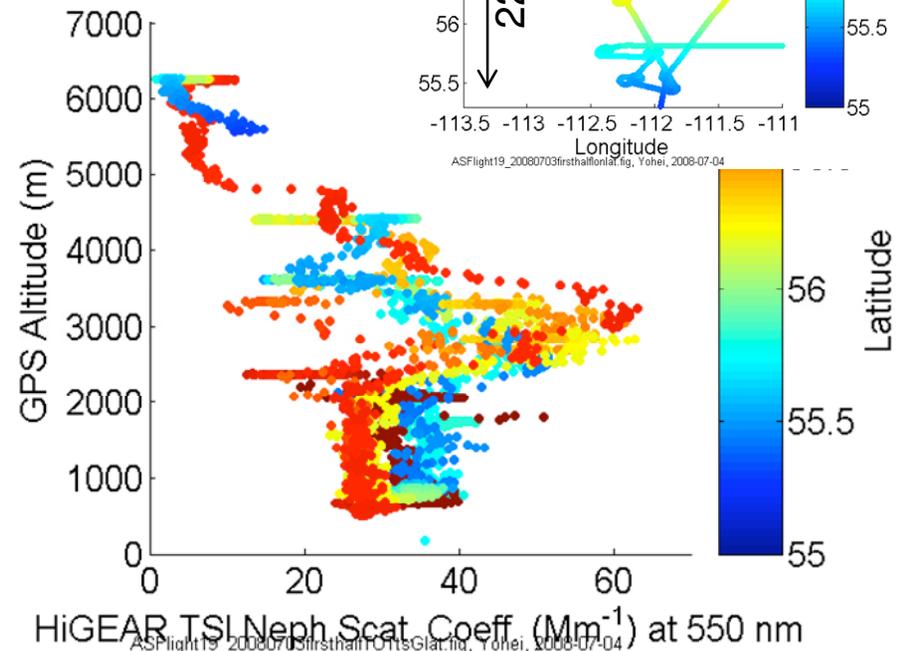
PRELIMINARY DATA from AATS & HiGEAR groups



ASFlight19_20080703firshalfonlatt.fig, Yohei, 2008-07-04

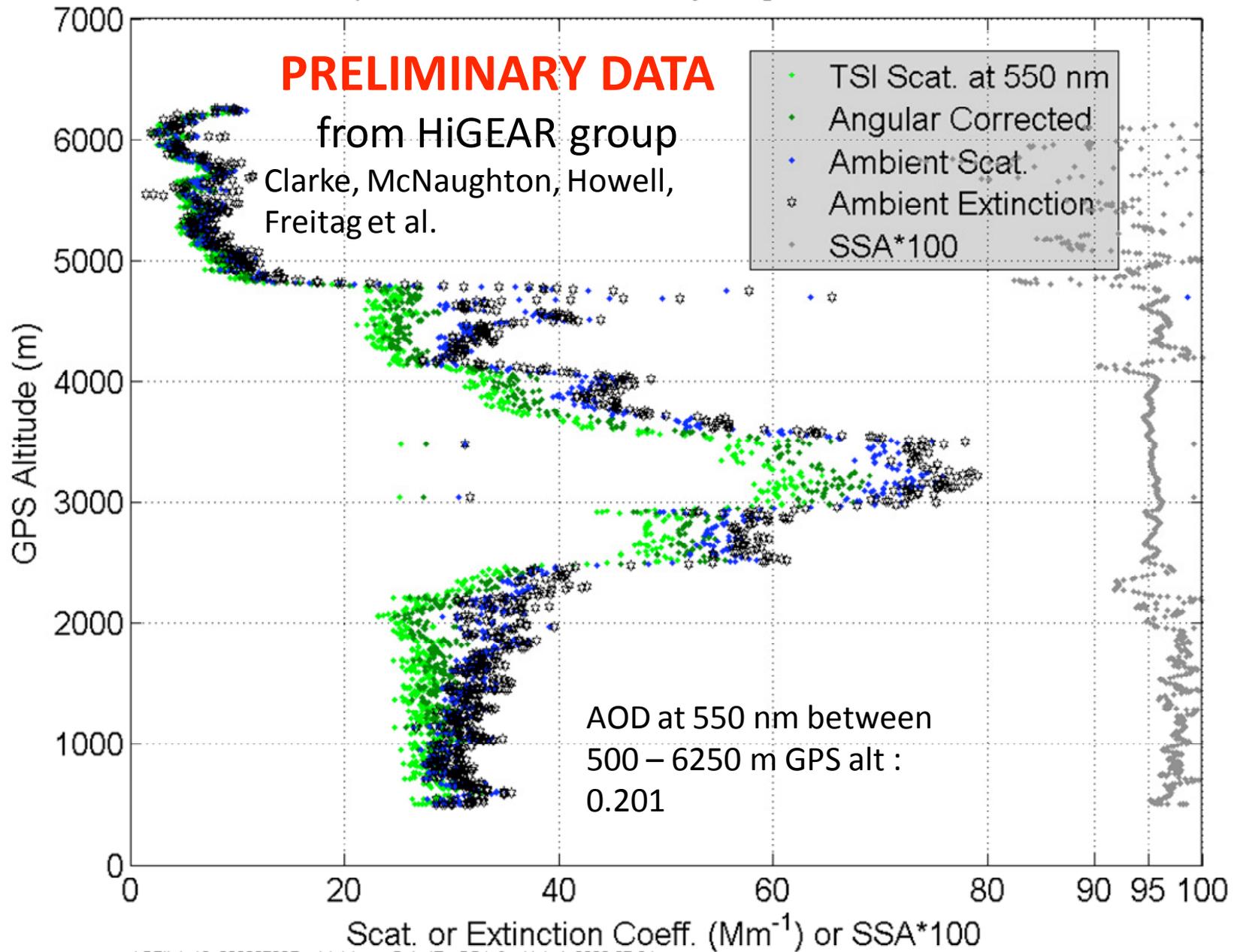


ASFlight19_20080703firshalfAOD519lat.fig, Yohei, 2008-07-04



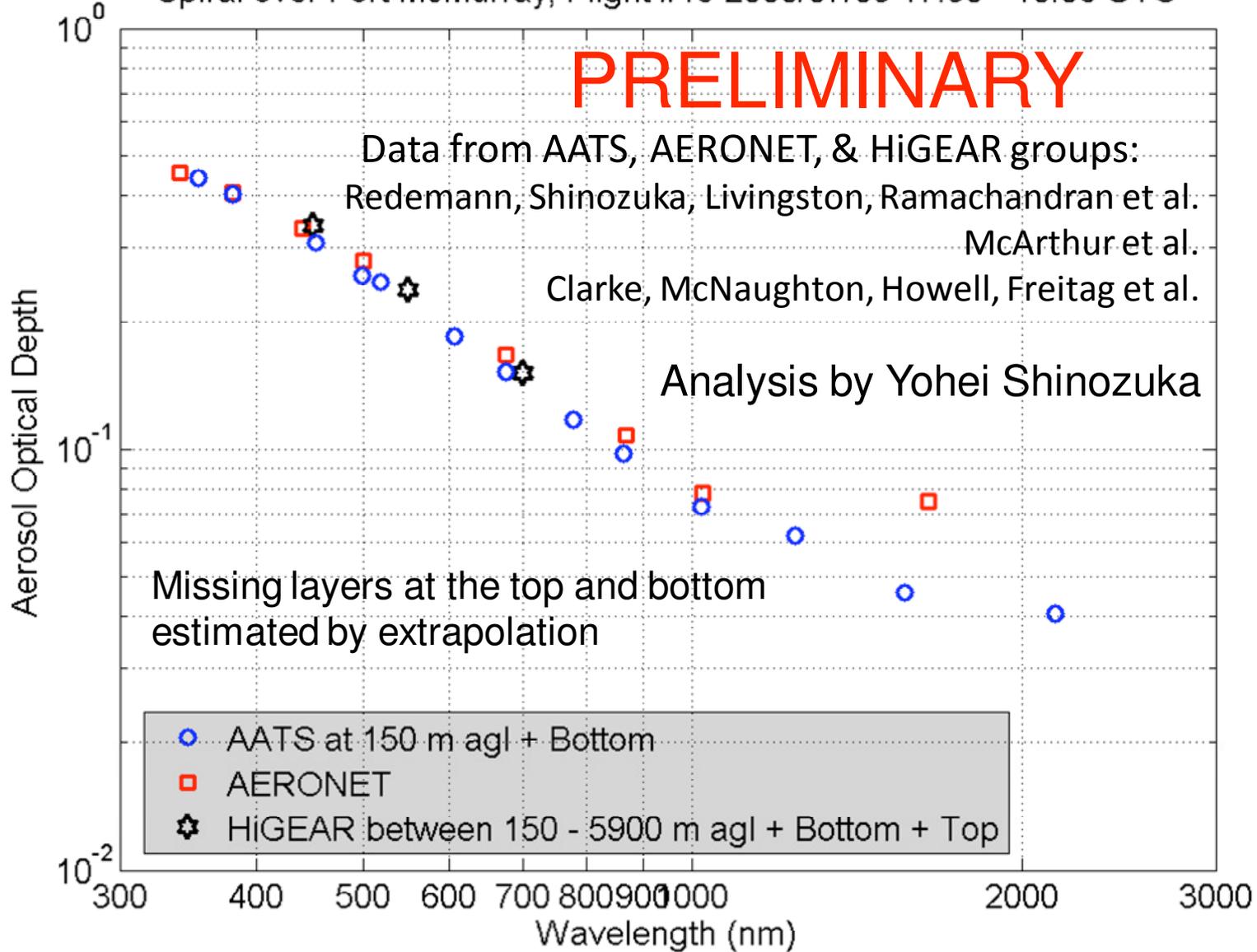
ASFlight19_20080703firshalfTSSGlat.fig, Yohei, 2008-07-04

Spiral over Fort McMurray, Flight 19 20080703



ASFlight19_20080703FortMcMurraySpiralExtSSA.fig, Yohei, 2008-07-04

Spiral over Fort McMurray, Flight #19 2008/07/03 17:50 - 18:06 UTC



ASFlight19_20080703AeronetFortMcMurrayAATSHiGEARextrapolated.fig, Yohei, 2008-07-05

Instrument Reports 03 July 2008

AATS-14	Worked Well -	Set
Status during flight (up/down)		
Accomplishments	No point of measurement for 2 nd half of flight	
Issues encountered		
Status for next flight		
Postflight requirements		
Comments		

Aero 3X	Everything worked fine	Set
Status during flight (up/down)	Main AERO 3X Instrument absent	
Accomplishments	Good Data for Relative Humidity System	
Issues encountered	Main AERO 3X Instrument due to return 5 July	
Status for next flight		
Postflight requirements		
Comments		

BBR	Worked Well – No Problems	Set
Status during flight (up/down)		
Accomplishments		
Issues encountered		
Status for next flight		
Postflight requirements		
Comments		

CAR & CANS	Very Good Data	Set
Status during flight (up/down)		
Accomplishments		
Issues encountered		
Status for next flight		
Postflight requirements		
Comments		

CCN	Worked Well	Set
Status during flight (up/down)		

Accomplishments	
Issues encountered	
Status for next flight	
Postflight requirements	
Comments	

COBALT	COBALT Worked Well	Set
Status during flight (up/down)	Inlet Problem solved	
Accomplishments		
Issues encountered		
Status for next flight		
Postflight requirements		
Comments		

HIGEAR	Excellent Flight	Set
Status during flight (up/down)		
Accomplishments		
Issues encountered		
Status for next flight		
Postflight requirements		
Comments		

AMS	Had 2 in-flight computer crashes	Set
Status during flight (up/down)	Otherwise worked well	
Accomplishments	Lost Data equated to approx 1/2 each crash	
Issues encountered	Probably total data loss approx 1 hours	
Status for next flight		
Postflight requirements		
Comments		

PDS	Fully Operational entire flight	Set
Status during flight (up/down)		
Accomplishments		
Issues encountered		

Status for next flight	
Postflight requirements	
Comments	

REVEAL & RTMM	Very Good	Set
Status during flight (up/down)		
Accomplishments		
Issues encountered		
Status for next flight		
Postflight requirements		
Comments		

SSFR	Very Good	Set
Status during flight (up/down)		
Accomplishments		
Issues encountered		
Status for next flight		
Postflight requirements		
Comments		

WFF Flight Report

Aircraft :	NASA P-3B
Operating Site(s) From / To :	CYOD/CYOD
Flight Date :	July 3, 2008
Flight Number / Data Flight # :	595/ ARCTAS Science Flight # 19
Time out:	1043 (L)
Time in:	1855 (L)
Flight Time :	8.2
Flt Request # / PI:	8P301/ Phil Russell
Purpose of Flight :	Data [X] Ferry [] Functional Check [] Other []
Sensor Payload :	ARCTAS (flight)
Comments :	<p>Aircraft is in an up status and ready for the next flight. All science instruments are functioning nominally. Flight #595, Data Flight #19 was 8.2 hours with a departure time of 1043 (L) and landing 1855 (L). A successful flight that studied a fairly uniform regional biomass burning haze (AOD ~0.24) to the west and a huge fire complex to the east with dense smoke in a complex cloud field.</p> <p>Accomplishments include:</p> <ol style="list-style-type: none"> 1. A spiral down over the Ft. McMurray AERONET site (for comparisons of AATS-AERONET AODs and in situ-AERONET aerosol retrievals) 2. A spiral down on the CALIPSO track in the MISR, MODIS, & MOPITT footprints at Terra overpass time (~1830 UT, for aerosol & CO validation) 3. A radiation stack along the CALIPSO track (for retrieval of aerosol absorption spectra).

	<p>4. Additional work along the CALIPSO/A-Train track in the B200 HSRL curtain, including a spiral down at CALIPSO overpass time (2024 UT, for CALIPSO-MODIS-OMI aerosol validation).</p> <p>5. CAR circles for bidirectional reflectance over forest near the CALIPSO track.</p> <p>6. Extensive in situ sampling of the large complex of fire smokes near Reindeer Lake, including record high values of CO (10.6 ppm) and organics, and initial indications of particle size increases with distance downwind.</p> <p>7. A ramped profile of radiative fluxes, AATS AOD, & in situ sampling on approach to Cold Lake for landing (AOD 0.23).</p> <p>The pilots were outstanding in executing all requested maneuvers that could be accomplished safely. RTMM displays of B200 & P3 tracks, plus GOES Cloud imagery, were very helpful. Xchat was extremely useful for guidance from the ground, including adjustments in plans after we discovered an error in UTC times in the plan we had modified in haste just before takeoff, in response to changing cloud and fire conditions.</p> <p>Clouds prevented CAR circles at the Ft. McMurray & Waskesiu AERONET sites and also radiation work in the eastern fire complex. These are continuing objectives for future flights.</p>
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SUBMITTED BY: Colleen Kelly

03 July 2008

Flight Hours for ARCTAS Campaign

Flight	Date	Aircraft Flight #	Data Flight#	Duration (hr)	Remaining Hours*
<i>Total Allocated</i>					<i>90.3</i>
Reveal Test /Training Flight	6/13/2008	583	PCF 1	2.0	88.3
Transit To NUQ	6/19/2008	582	Trans	7.7**	No charge
PCF/Data	6/22/08	584	#11	3.5	84.8
CARB/Data	6/24/08	585	#12	8.0	76.8
ARCTAS Transit Flt	6/26/08	587	#13/14	6.6/.9	69.3
ARCTAS Science Flt	6/28/08	591	#15	4.0	65.3
ARCTAS Science Flt	6/29/08	592	#16	7.9	57.4
ARCTAS Science Flt	6/30/08	593	#17	5.6	51.8
ARCTAS Science Flt	7/02/08	594	#18	6.5	45.3
ARCTAS Science Flt	7/3/08	595	#19	8.2	37.1

*Allotted flight hours include the following:
 ARCTAS – 75 hours
 CARB – 8 hours
 Hours carried over from Spring ARCTAS – 7.3

** transit flight billed as a maintenance flight
 Transit flight allow approx 5.5 hours to include customs clearance at Dover