

Preliminary Science Flight Report

Operation IceBridge Arctic 2011



Flight: F38
Mission: Barnes Ice Cap/Bylot Island

Flight Report Summary

Aircraft	P-3B (N426NA)
Flight Number	038
Flight Request	11P006
Date	Thursday, May 12, 2011 (Z)
Purpose of Flight	Mission Barnes Ice Cap/Bylot Island
Take off time	11:05 Zulu from Thule Air Base (BGTL)
Landing time	17:09 Zulu at Thule Air Base (BGTL)
Flight Hours	6.3 hours.
Aircraft Status	Airworthy.
Sensor Status	All installed sensors operational.
Significant Issues	None
Accomplishments	<ul style="list-style-type: none"> • Low-altitude survey (1,500 ft AGL) of several lines over the Barnes Ice Cap and Bylot Island. • ATM, MCoRDS, accumulation, snow and Ku-band radars, gravimeter, magnetometer, POS/AV, and DMS were operated on the survey lines. • Ramp pass at Thule at 17,500 ft AGL for ATM calibration. • Pitch maneuvers over North Star Bay for snow and Ku-band radar.
Geographic Keywords	Barnes Ice Cap, Baffin Island, Bylot Island.
ICESat/CryoSat Track	None.
Repeat Mission	1995, 2005, 2010.

Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
ATM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 GB	None
MCoRDS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.6 TB	None
Snow Radar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	167 GB	None
Ku-band Radar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	167 GB	None
Accumulation Radar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	160 GB	None
DMS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 GB	None
POS/AV	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2 GB	None
Gravimeter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	560 MB	None
Magnetometer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	420 MB	None

Mission Report (Michael Studinger, Mission Scientist)

The weather over all targets in Greenland was poor today and we surveyed the remaining science targets in Canada, starting with a grid over the Barnes Ice Cap on Baffin Island, followed by another centerline run over Bylot Island. During the last glacial, the vast Laurentide Ice Sheet covered most of Northeast America and Canada and the Barnes Ice Cap is considered the most significant remnant of this past ice sheet. The Barnes Ice Cap is a fairly flat plateau, frozen to its bed, moves very little, and does not have any outlet glaciers on its margins. The NASA ATM team has surveyed the ice cap in 1995, 2000 and 2005, showing a slight acceleration in thinning of this ice cap over time. In addition to reoccupying the existing ATM lines, we flew four parallel lines to map the bedrock and internal layers with the MCoRDS radar. Knowledge of the bedrock topography will allow modeling of ice dynamics which will help estimating the time until the Barnes Ice Cap will be completely melted.

The small hole in the clouds that we saw on the satellite image stayed over the Barnes Ice Cap. The weather was perfect there. The clouds that we saw in the satellite image over Bylot Island unfortunately did not move and were too dense to descent to survey altitude.

Individual instrument reports from experimenters on board the aircraft:

ATM: worked very well. Bylot Island was clouded in.

MCoRDS: worked well. Yesterday's problem was fixed and new calibration data collected.

Snow and Ku-band radar: The snow and Ku-band radars worked well.

Accumulation radar: worked well.

Gravimeter: Worked well. No issues.

Magnetometer: worked well.

DMS: worked very well. Targets over Bylot Island were obscured by clouds.

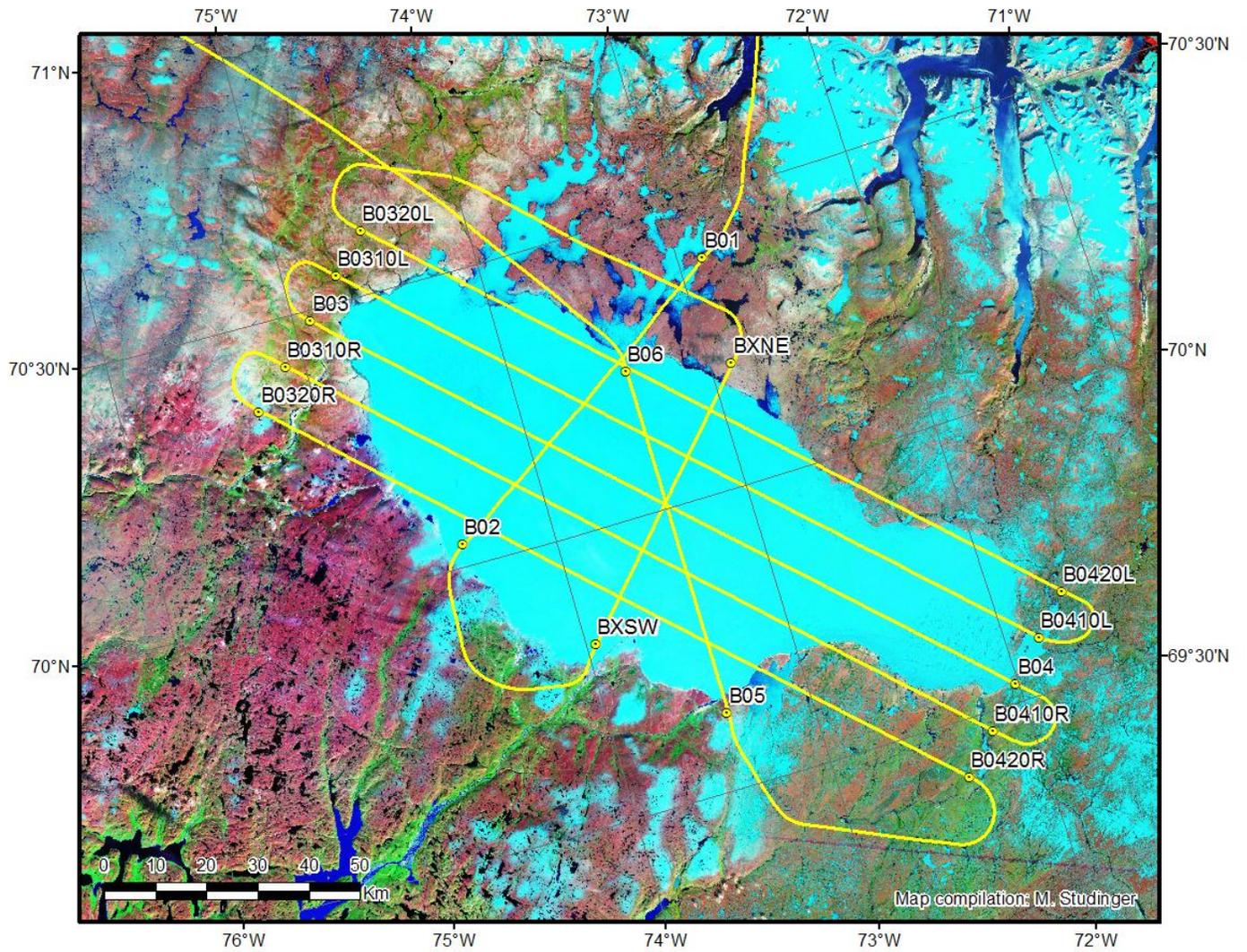


Figure 1: P-3 trajectory of today's flight over the Barnes Ice Cap.

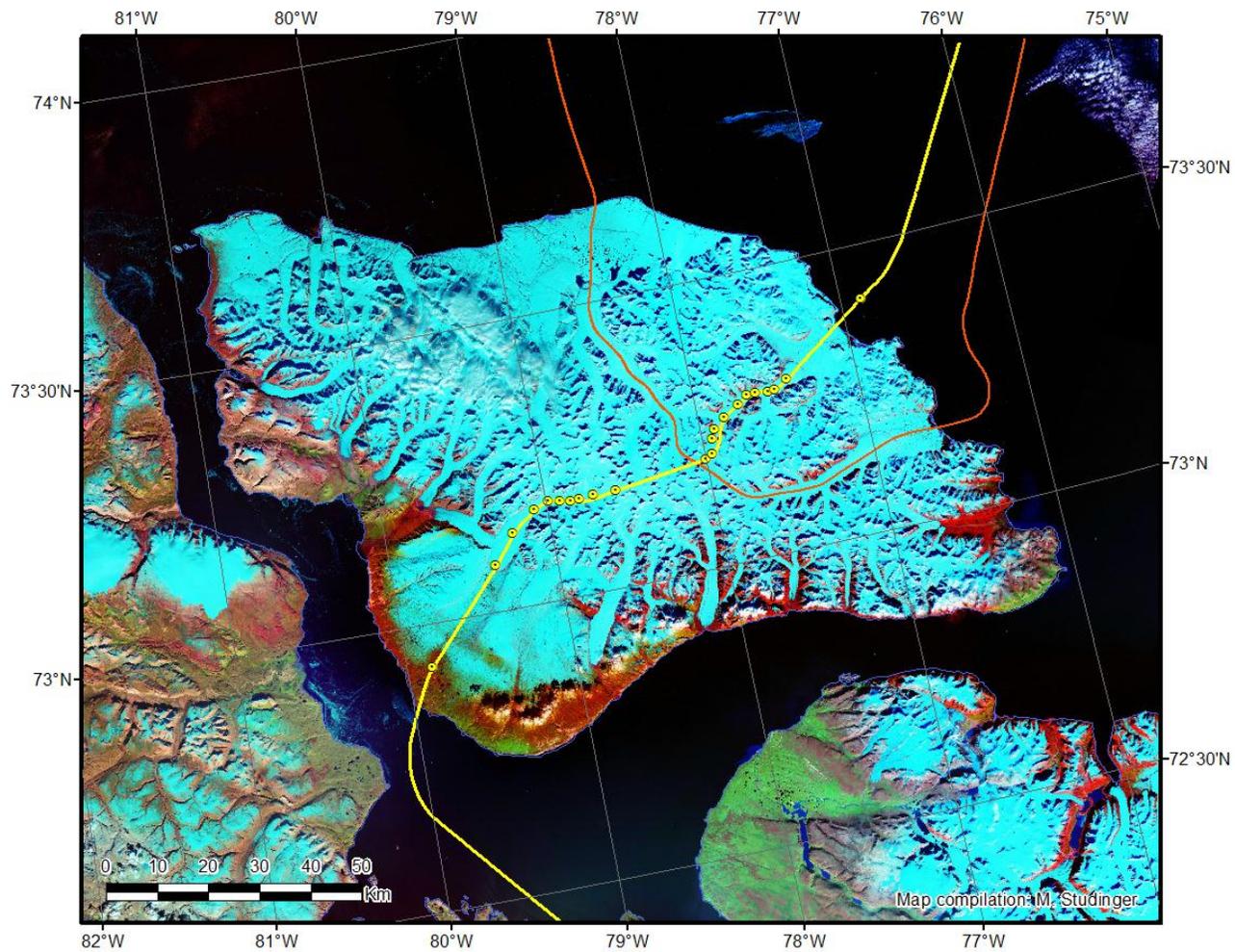


Figure 2: P-3 trajectory in yellow of today's flight over Bylot Island, which was clouded in. Red trajectory is P-3 flight from May 5, 2011 during mission Devon Ice Cap.

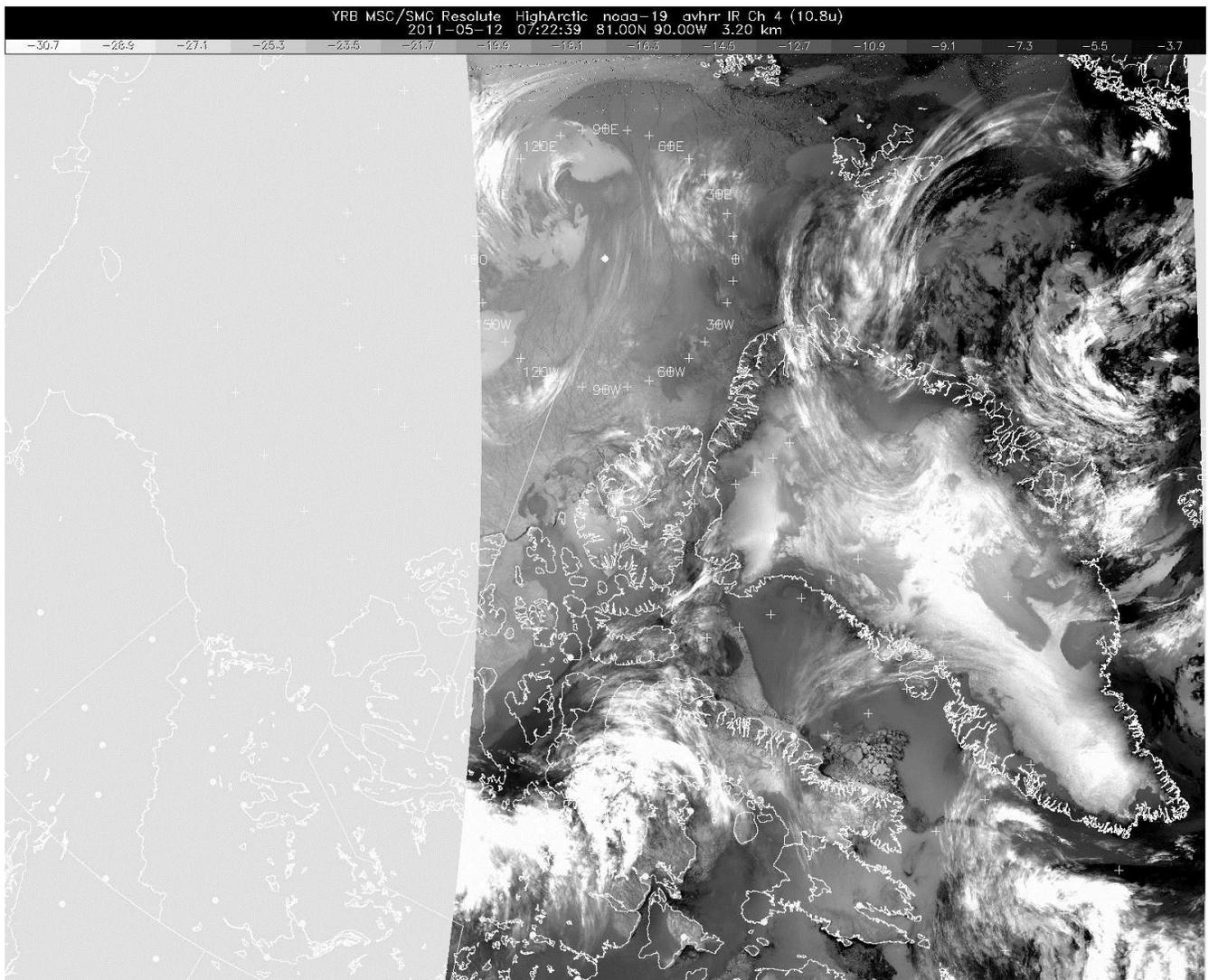


Figure 3: IR satellite image downloaded shortly before takeoff.