Preliminary Science Flight Report
Operation IceBridge Arctic 2011

Flight: **F19**
Mission: **SE Flank 01**

Flight Report Summary

Aircraft	**P-3B (N426NA)**
Flight Number	019
Flight Request	11P006
Date	Thursday, April 14, 2011 (Z)
Purpose of Flight	Mission SE Flank 01
Take off time	10:21 Zulu from Kangerlussuaq (BGSF)
Landing time	17:40 Zulu at Kangerlussuaq (BGSF)
Flight Hours	7.4 hours
Aircraft Status	Airworthy.
Sensor Status	All installed sensors operational.
Significant Issues	None
Accomplishments	• Low-altitude survey (1,500 ft AGL) of grid lines along the flank of the SE Greenland Ice Sheet spaced 20 km apart. • Completed two east-west oriented master grid lines. • ATM, MCoRDS snow and Ku-band radars, accumulation radar, gravimeter, magnetometer, POS/AV, and DMS were operated on the survey lines. • Ramp pass at 1,000 ft AGL for ATM calibration.
Geographic Keywords	Southeast Greenland
ICESat/CryoSat Track	None.
Repeat Mission	None.

Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
ATM	☑	☒	☒	60 GB	None
MCoRDS	☒	☒	☒	1.8 TB	None
Snow Radar	☑	☒	☒	340 GB	None
Ku-band Radar	☑	☒	☒	344 GB	None
Accumulation Radar	☒	☒	☒	374 GB	None
DMS	☑	☒	☒	45 GB	None
POS/AV	☑	☑	☑	2 GB	None
Gravimeter	☑	☑	☑	560 MB	None
Magnetometer	☑	☑	☑	420 MB	None

Mission Report (Michael Studinger, Mission Scientist)

The forecast for all remaining mission plans from Kangerlussuaq was poor today, with the exception of the south east. The predicted conditions near the SE coast were pretty much the same as during our roller coaster flight on Monday and we decided to stay away from the severe turbulence today. We expected less turbulent conditions on the icecap and decided to fly SE Flank 01 instead of SE Fjords 01. SE Flank 01 is a new mission, which extends the “SE Coastal” coast-parallel grid uphill to the central ridgeline of the icecap. The lines are spaced 20 km apart.

The satellite image and forecast predicted clouds in the north-eastern part of the survey area of SE Flank 01 and we expected to lose laser data there. We were expecting 30-40 kts cross winds that we thought should be calm on the ice sheet. The conditions we encountered were quite different. The northern part was cloudy as expected with zero visibility. We had only 8 kts winds that caused moderate turbulence much to our surprise. It is unclear how the low wind speed together with the smooth topography of the icecap could cause such strong turbulence. There was a relatively sharp transition to higher winds towards the south with crosswinds between 40 and 60 kts that caused only light to no turbulence as we had expected. The problem on today’s flight was a thick layer of clouds and windblown snow below us that was too dense to be penetrated by the lasers and we lost a significant amount of laser altimeter data today in the northern part of the survey area. The low cloud layer was not in the forecast and is difficult to impossible to be seen on a satellite image since it has the same temperature as the ice surface. The only instruments that have been affected by the windblown snow and cloud cover were DMS and ATM. All other instruments collected good data. Locally, the weater was marginal for takeoff and landing and we did and IFR takeoff with snow showers looming.

Individual instrument reports from experimenters on board the aircraft:

ATM: Lost significant amount of data due to clouds and blowing snow.

MCoRDS: The MCoRDS system worked well.

Snow and Ku-band radar: The snow and Ku-band radars collected 100% data along the line.

Accumulation radar: worked well.

Gravimeter: Worked well. No issues.

Magnetometer: worked well.

DMS: worked very well, but lost significant amount of data due to clouds and blowing snow.

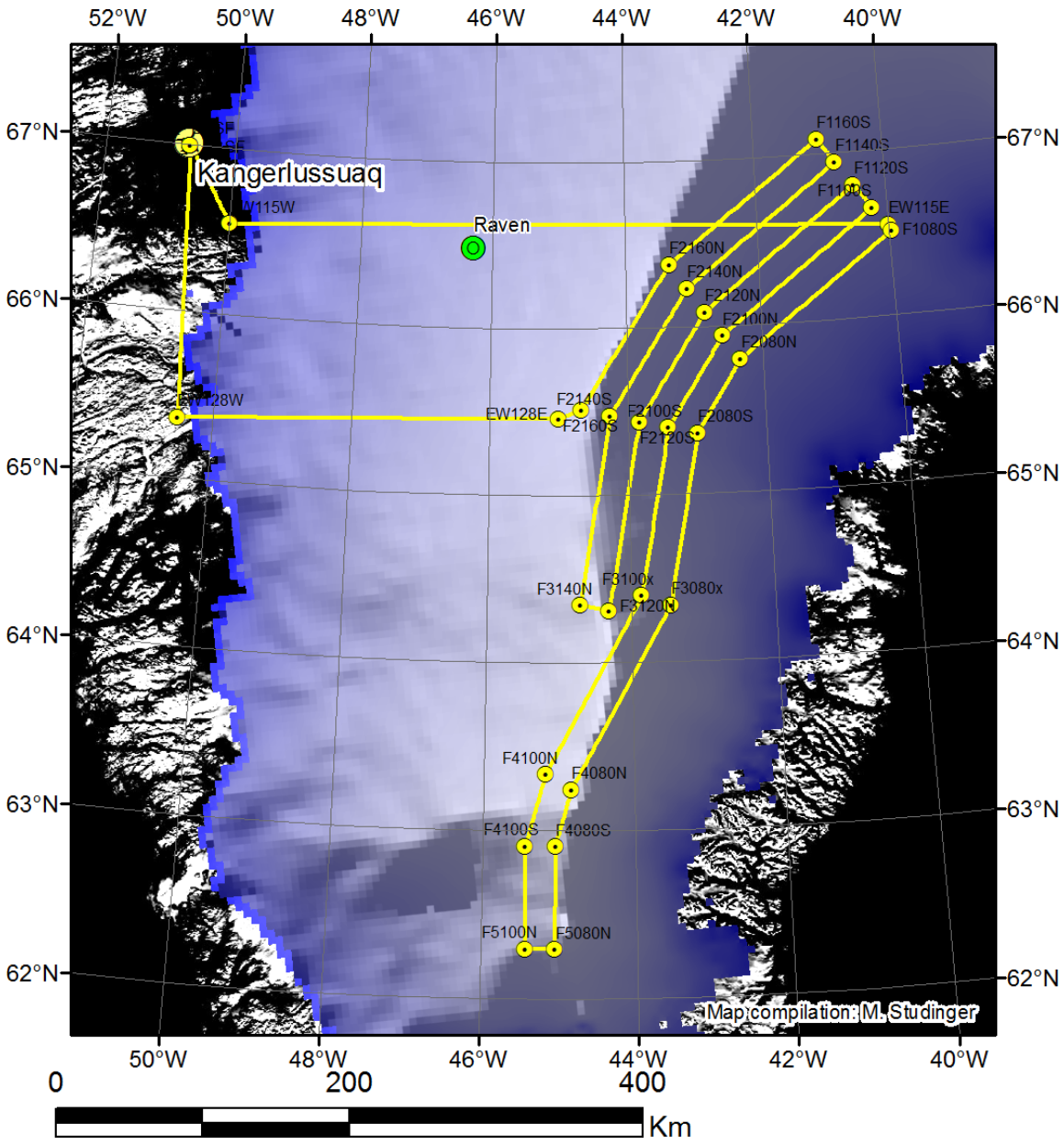

Figure 1: Mission plan for today's flight.

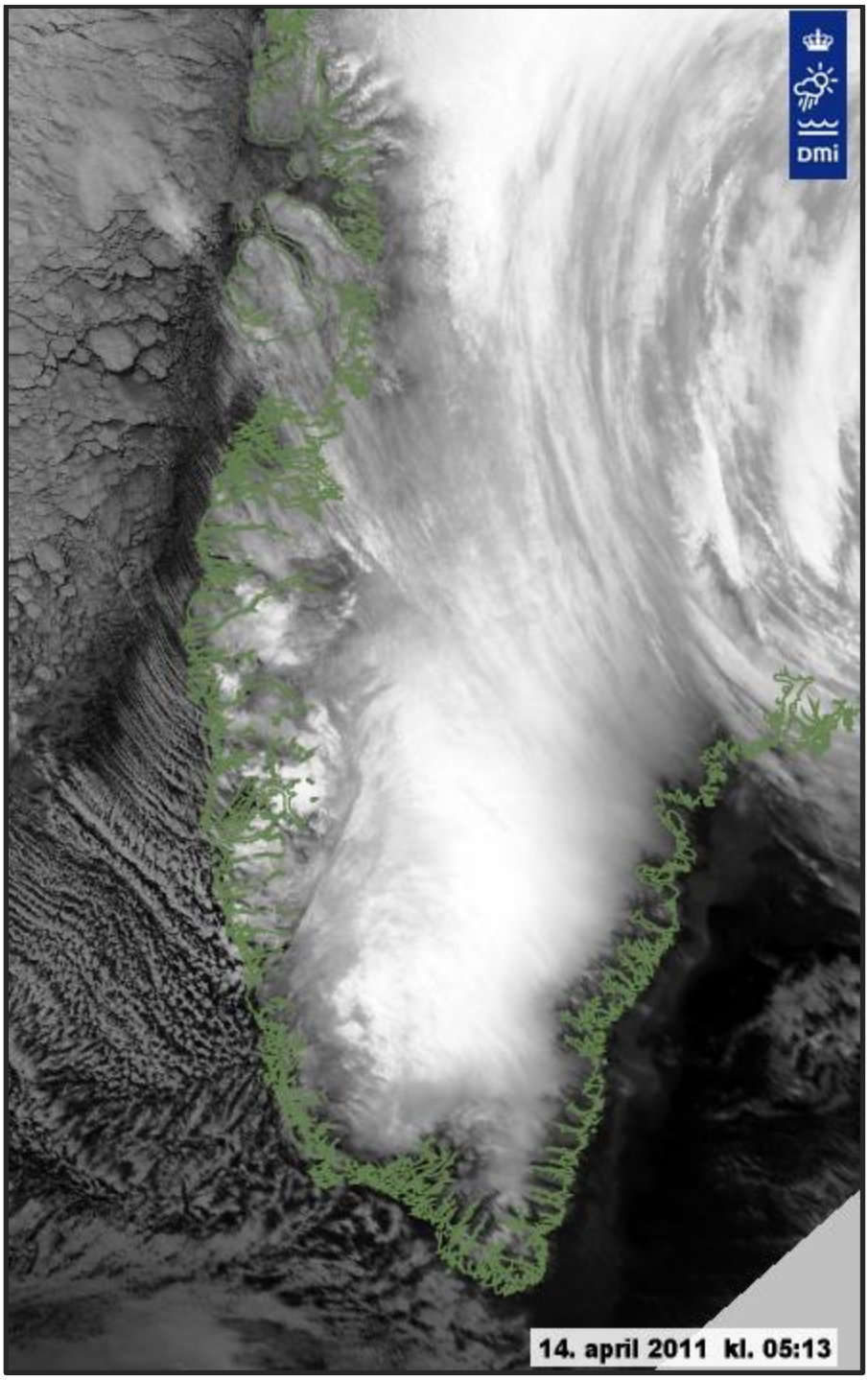

Figure 2: IR satellite image downloaded before flight.