Preliminary Science Flight Report
Operation IceBridge Arctic 2011

Flight: **F26**
Mission: **Duck-Clusters**

Flight Report Summary

Aircraft	**P-3B (N426NA)**
Flight Number	026
Flight Request	11P006
Date	Monday, April 25, 2011 (Z)
Purpose of Flight	Mission Duck-Clusters
Take off time	10:10 Zulu from Kangerlussuaq (BGSF)
Landing time	17:38 Zulu at Kangerlussuaq (BGSF)
Flight Hours	7.5 hours.
Aircraft Status	Airworthy.
Sensor Status	All installed sensors operational.
Significant Issues	None
Accomplishments	• Low-altitude surveys (1,500 ft AGL) of the Geocluster sites, 4 outlet glaciers, part of the 2010 accumulation traverse, and ICESat line. • NASA headquarters directed grid search over Koge Bugt for a U.S. Coast Guard plane that has crashed in 1942. • ATM, MCoRDS, accumulation, snow and Ku-band radars, gravimeter, magnetometer, POS/AV, and DMS were operated on the survey lines. • Ramp pass at 2,000 ft AGL for ATM calibration. • Pitch maneuvers over fjord for snow and Ku-band radar.
Geographic Keywords	Koge Bugt, Pikiutdleq Glacier, Bernstorf Glacier, Gyldenlovers Glacier.
ICESat/CryoSat Track	0181.
Repeat Mission	None.

Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
ATM	☑	☒	☒	64 GB	None
MCoRDS	☒	☒	☒	2.2 TB	None.
Snow Radar	☑	☒	☒	400 GB	None
Ku-band Radar	☑	☒	☒	400 GB	None
Accumulation Radar	☒	☒	☒	300 GB	None
DMS	☑	☒	☒	74 GB	None
POS/AV	☑	☑	☑	2 GB	None
Gravimeter	☑	☑	☑	640 MB	None
Magnetometer	☑	☑	☑	480 MB	None

Mission Report (Michael Studinger, Mission Scientist)

Today's mission is a new design with the purpose to re-fly the Geoceiver "cluster" sites which straddle the ridgeline of the Greenland ice sheet southeast of Kangerlussuaq. The sites were first surveyed more than 30 years ago and have been re-surveyed by ATM several times in the intervening years, and thus yield an unusually long dh/dt history for the sites. We also flew a NASA headquarters-directed grid survey for the U.S Coast Guard over a suspected aircraft crash site near Pikiutdleq Glacier/Koge Bugt, where a J2F-4 Grumman Duck is believed to have crashed on November 29, 1942. The grid lines are spaced 500 meters apart. We flew at 3000 ft AGL, with a radar beam that was steered away from the nadir position to increase illumination of potential targets in the ice. During the grid search we had to deconflict with the CReSIS Twin Otter that surveyed the same area. We had to climb rapidly on one occasion and often saw interference between the radar systems form the two aircraft.

We re-flew part of the accumulation traverse from 2010 to get better accumulation radar data. We also added two glaciers north of Koge Bugt to this mission that we could not complete in the SE Glacier mission due to severe turbulence. We also re-flew two glaciers south of Koge Bugt, because the radar settings were not optimized for outlet glaciers in the SE Glacier mission.

The weather in the area was mainly good. We only lost data due to clouds on the northernmost glacier run.

Individual instrument reports from experimenters on board the aircraft:

ATM: worked very well.

MCoRDS: The MCoRDS system worked well.

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.

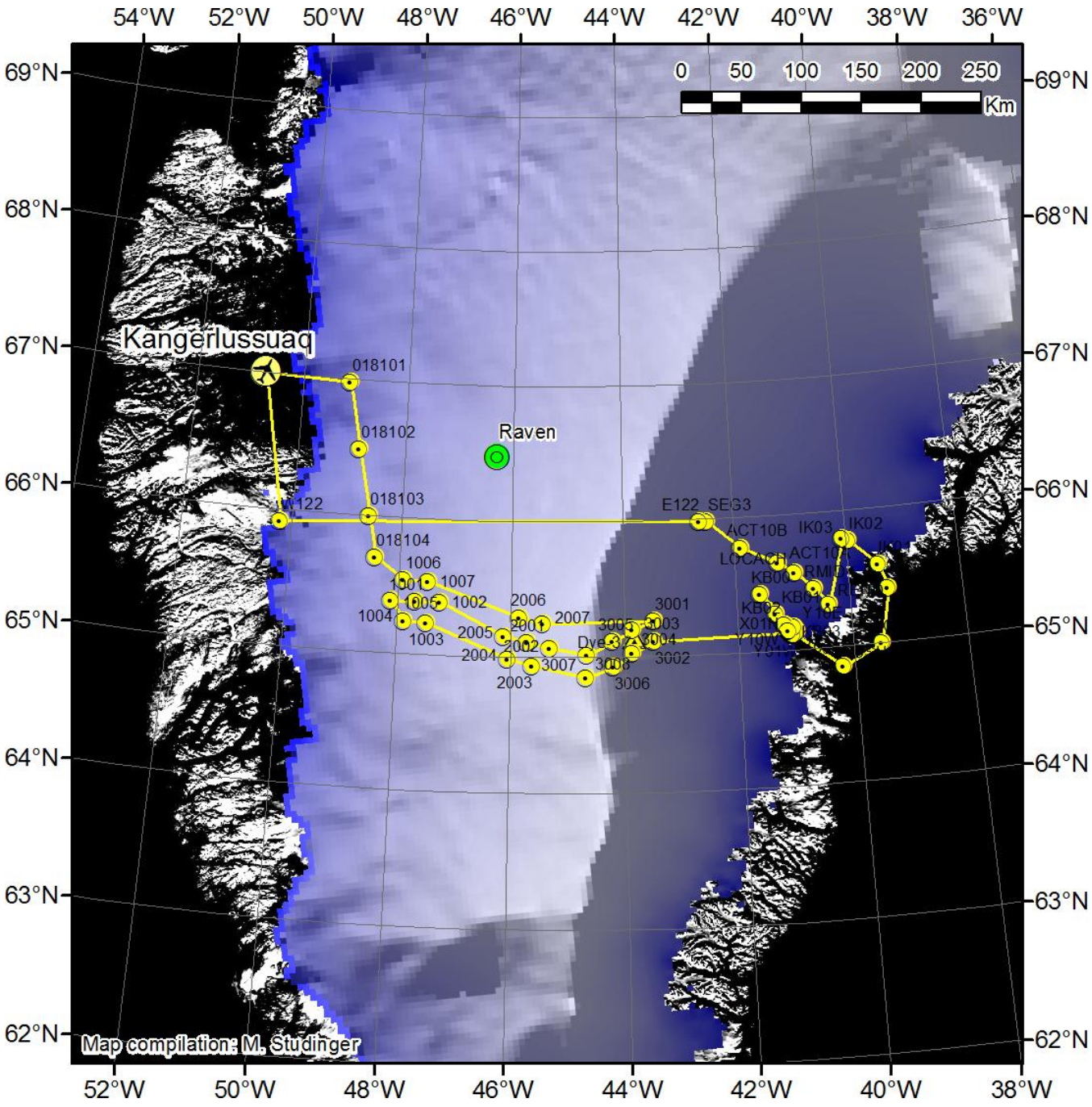

Figure 1: Mission plan for today's flight. We added two glaciers that we could not complete during the turbulent flight a few weeks ago and re-flew two glaciers south of Koge Bugt for better radar data.

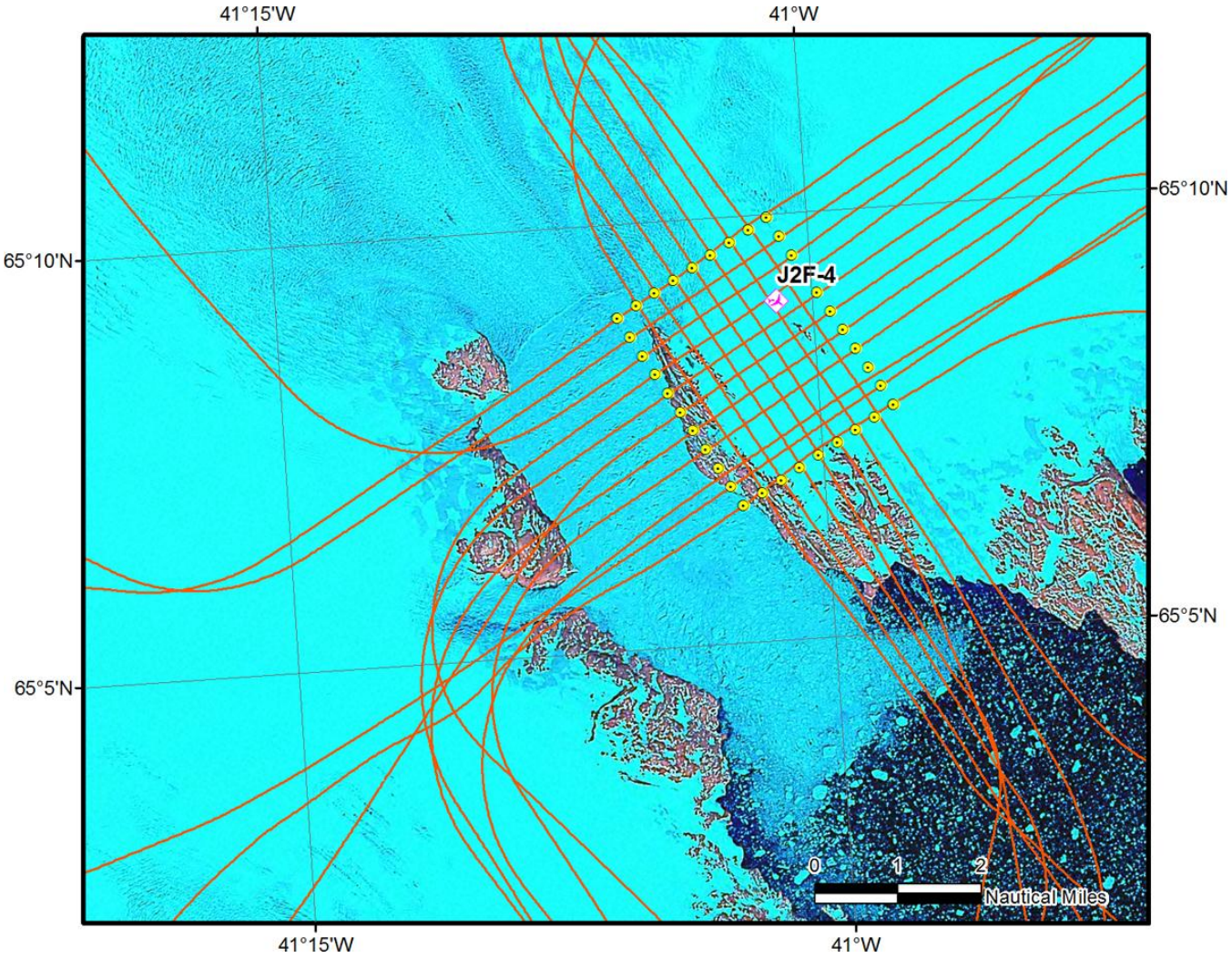

Figure 2: P-3 trajectory of today's flight over Koge Bugt. Line spacing is 500 m.

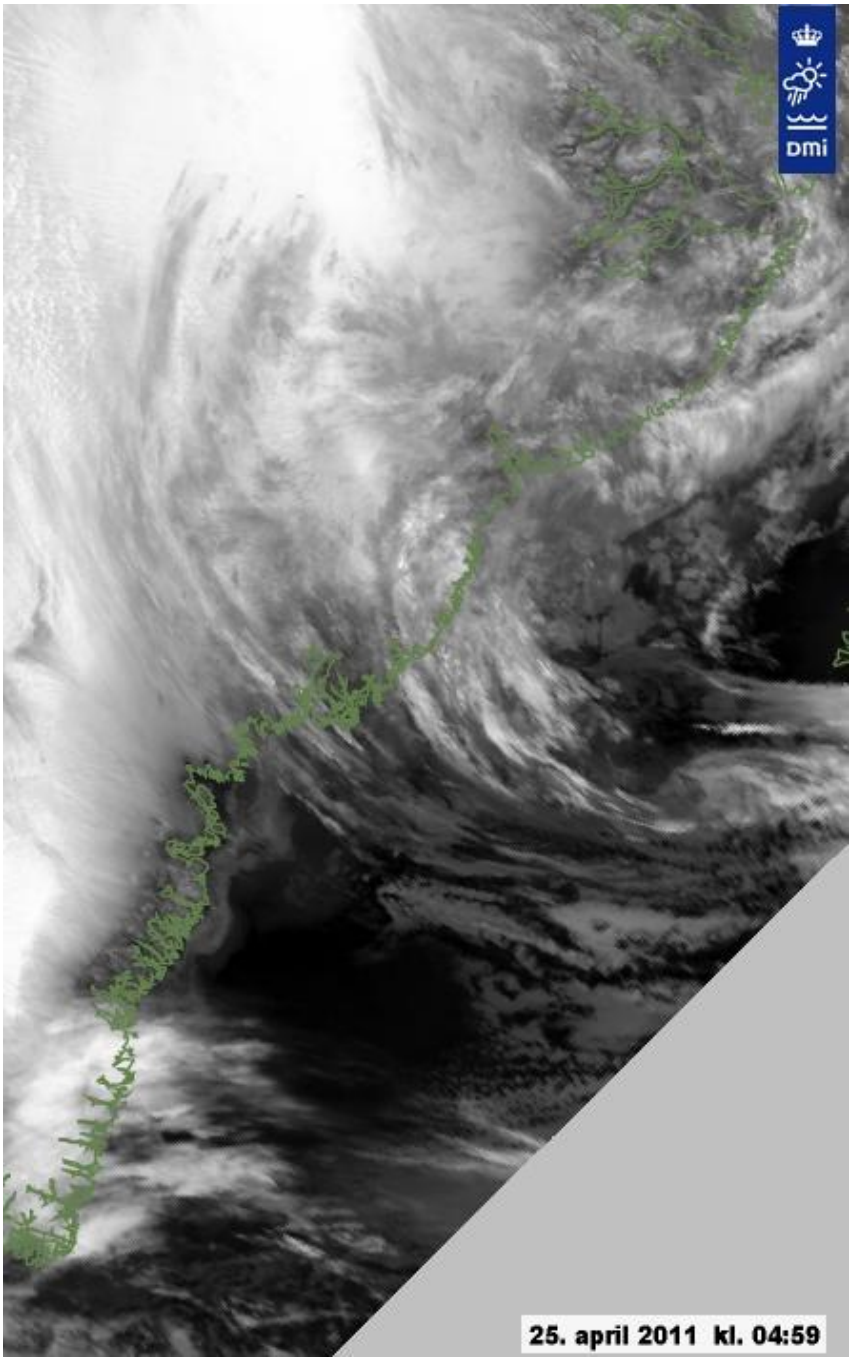

Figure 3: IR satellite image downloaded shortly before takeoff showing multiple layers of clouds in the northern part of the survey area.