Preliminary Science Flight Report
Operation IceBridge Arctic 2011

Flight: D10
Mission: Box 5 Flight 2

Flight Report Summary

Aircraft	**LaRC B200 (NASA529)**
Flight Number	D10
Flight Request	11-029 LaRC
Date	Friday, April 22, 2011 (Z)
Purpose of Flight	Monitor surface elevation in the Southwestern part of Greenland, Completed 5 km coastal grid in Box 5 grid (North of Kangerlussuaq and to the Southern end of Disko Bay).
Take off time	1034 Zulu from Kangerlussuaq (BGSF)
Landing time	1555 Zulu at Kangerlussuaq (BGSF)
Flight Hours	5.4
Aircraft Status	Airworthy.
Sensor Status	All installed sensors operational.
Significant Issues	None.
Accomplishments	• High-altitude survey (28,000 ft AGL) of the southwestern Greenland • Completed 1 ICESat Track in Box 5 and 6 grid lines completing 5 km grid spacing in coastal portion of Box 5. • LVIS and camera were operated on the survey lines. • Ramp passes at BGSF. • Pitch and Roll maneuver over frozen fjord at BGSF
Geographic Keywords	Ice Sheet southwestern flank, North of Kangerlussuaq, Russell Glacier, Isunguata Sermia , EGIG line
ICESat/CryoSat Track	419
Repeat Mission	No

Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
LVIS	☑	☑	☑	58 GB	None
LVIS Camera	☑	☑	☑	18 GB	None
POS/AV	☑	☑	☑	2 GB	None

Mission Report (David Rabine, Instrument Operator and Lora Koenig, Mission Scientist)

Today's mission was the second mission to be flown in Box 5 which is located north of Kangerlussuaq. The southern end of Box 5 is at Kangerlussuaq and the northern end at the southern end of Disko Bay. As shown in the satellite image (Figure 1) the region had some high cirrus clouds at take off. The clouds were encountered by the plane in the northeastern and eastern section of the box. Box 5 is one of two highest priority boxes. Today's flight was planned to survey 1 ICESat Track and 6 additional grid lines to complete a 5 km grid spacing from the coast.

The B200 took off at 1034 Z from Kangerlussuaq and completed a pitch and roll and a ramp pass. The plane transited to the north end of Box 5 along the southern portion of the EGIG line (Expédition Glaciologique Internationale Groenland) as a target of opportunity. The plane then headed southeast for 126 nmi on ICESat Track 419. Clouds were encountered on the first section of the ICESat track but did not obscure the surface return. The plane then flew north and south on 6 grid lines from the interior to the coast. The plane encountered the most clouds on the eastern most grid line (grid line 509). The LVIS operator opened LVIS' iris to full open, allowing the maximum return signal, and did not lose the ice surface return. This was the first time LVIS was operating on this campaign with the iris full open. Today's flight was instructional for determining the maximum cloud penetration in which LVIS can still receive the ice surface return. Today's flight combined with yesterday's flight (April 21, 2011, D09, Box 5 Flight 1) achieved a 5 km grid spacing in Box 5 near the coast. The plane landed at Kangerlussuaq at 1555 Z.

LVIS had cirrus clouds in the northeastern and eastern portion of Box 5 but it did not affect the laser return when the iris was full open. LVIS did not lose any data during the flight due to clouds.

Figure 3 below shows the coverage to date of the LVIS/ B200 grids line from this campaign.

Below are the detailed Flight notes from the Instrument Operator. Times from the Instrument Operator on the plane are in local Kangerlussuaq time (-2 hours from Z)

GPS Day 112 (DOW=5 Friday) GPS Week 608+1024 = 1632
Pilot = Rick Yasky, Co-Pilot-Seat = Luci Crittenden, David Rabine in the back.

07:20 Started Static GPS and Applanix
08:03 Fuel truck showed up a little later than usual, still fueling. Instrument is GO for flight.
08:32 1245 shots missed so far
09:25 Adjusted the fiber pulse up a little bit, it was a little lower than usual this morning
09:58 End of diagonal (EGIG line), and did see clouds north of our north most points, but looked thin and not an issue
09:59 On that long diagonal (ICESat track 419), I did have to adjust the iris in places a fair

amount. Probably bands of lower thin clouds, but no affect on data
10:01 Thin cirrus all around here at the south end also, but again should not be an issue, seeing no problems.
10:10 Adjusted the fiber pulses to be a little stronger.
10:16 Wide open iris right at crossing point, still getting good ground signal, but must be cloud between us and the ground
10:19 Thickest cloud, north of that crossing point. Wide open, signal was ~ 1/2 of what I like to see, but still very good (wide open iris)
10:40 Cloud in the fiber wave, but TX is still solid / clear (cloud all around / below us cirrus, but still getting good signal through)
11:13 Finishing south bound leg, did not have to open the iris this time like the last line, so we are working away from the cloud cover
13:22 1263 shots missed now, missed on one of the turn where the snow/terrain interface was changing
14:00 All done, engines off. Did not do final RNP / Ramp Pass, trying to get in on time.

Individual instrument reports from experimenters on board the aircraft:

LVIS: Worked well, ~99% or better coverage, there was continued radio interference on transmit from some radio transmission. The interference should not cause any significant problem to the altimetry data.

LVIS Camera: Worked well, no issues.

POS/AV: Worked well, no issues.

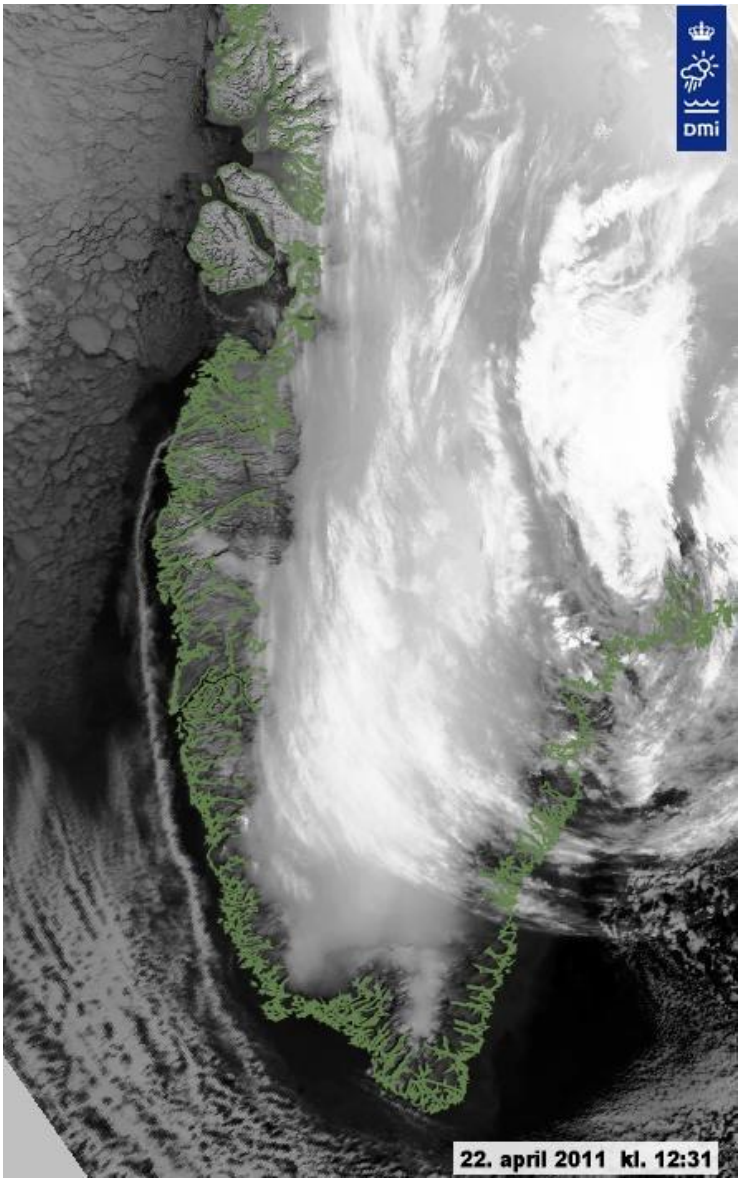

Figure 1: IR Satellite image taken during the flight.

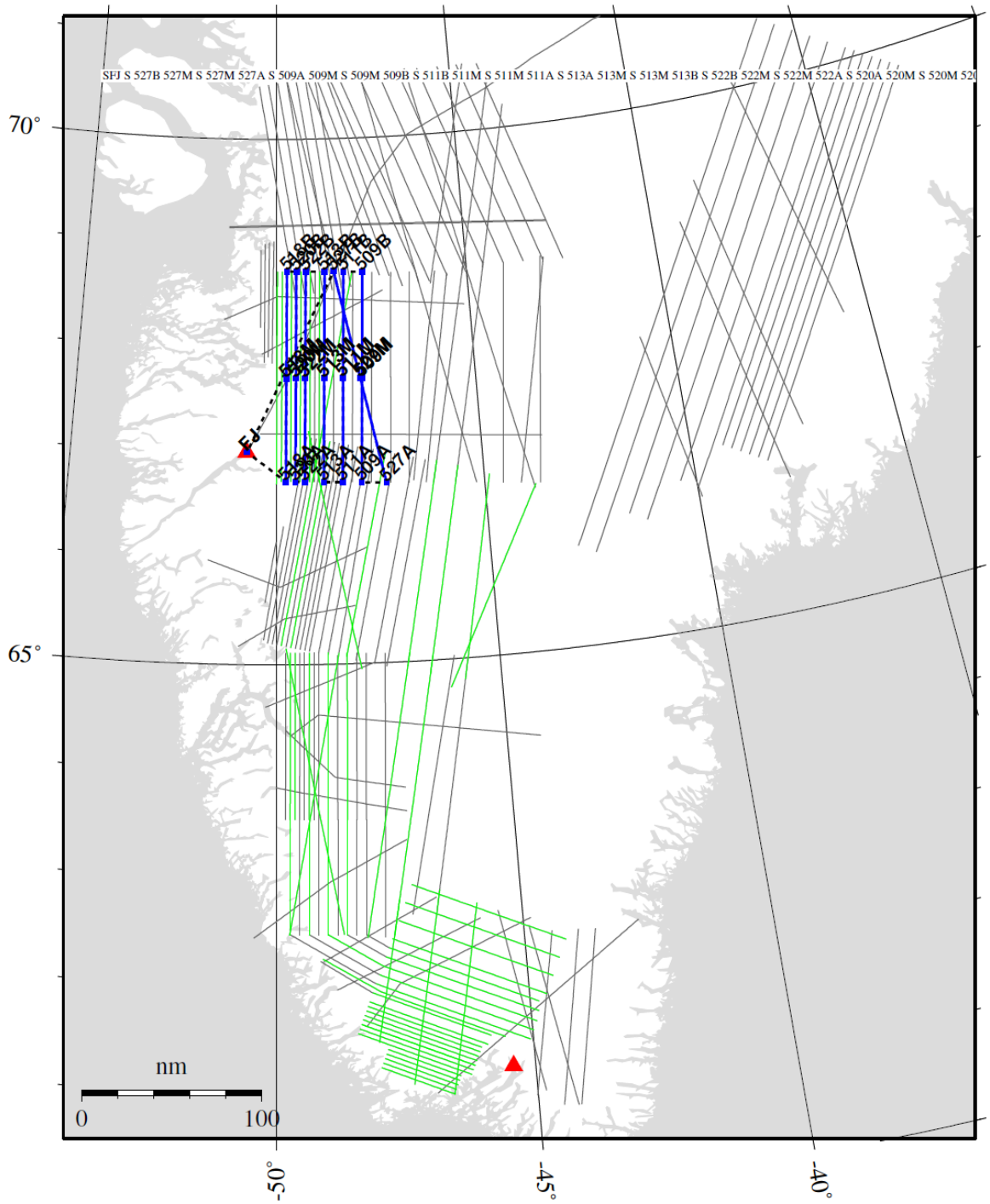

Figure 2: Proposed B200 flight plan for April 21, 2011 (blue). Green lines are previously flown lines.

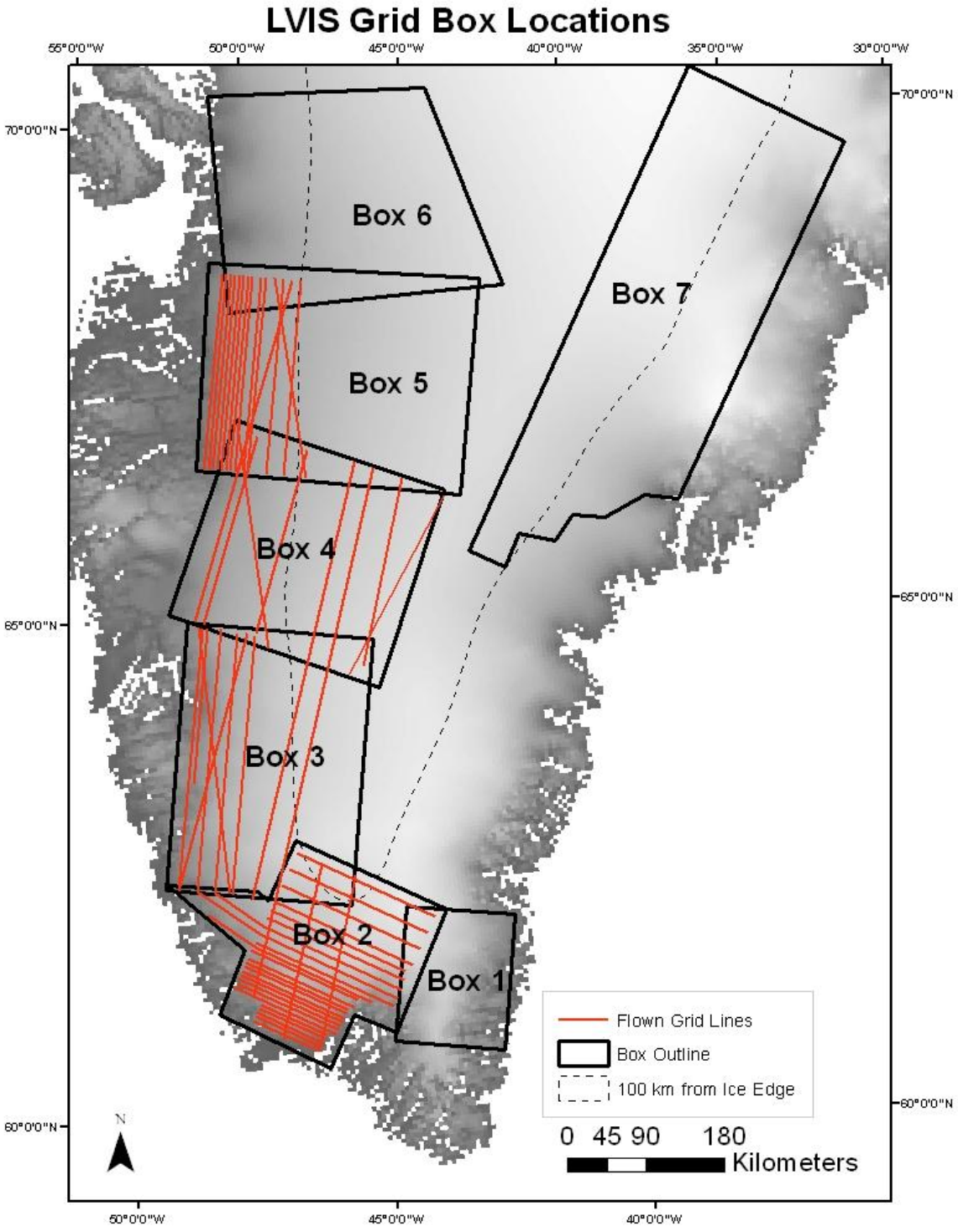

Figure 3: LVIS grid lines flown to date during the B200 Arctic 2011 Operation IceBridge Campaign.