

# Preliminary Science Flight Report

## Operation IceBridge Antarctica 2011



**Flight:** F19  
**Mission:** TSK 2 Cryo

### Flight Report Summary

<b>Aircraft</b>	DC-8 (N817NA)
<b>Flight Number</b>	120123
<b>Flight Request</b>	128008
<b>Date</b>	Saturday, November 12, 2011 (Z), Day of Year 316
<b>Purpose of Flight</b>	Operation IceBridge Mission TSK 2 Cryo
<b>Take off time</b>	13:59:20 Zulu from Punta Arenas (SCCI)
<b>Landing time</b>	01:32:47 Zulu at Punta Arenas (SCCI) on Sunday, November 13, 2011.
<b>Flight Hours</b>	11.6 hours
<b>Aircraft Status</b>	Airworthy.
<b>Sensor Status</b>	All installed sensors operational.
<b>Significant Issues</b>	None
<b>Accomplishments</b>	<ul style="list-style-type: none"> <li>• Low-altitude survey (1,500 ft AGL) of the Thwaites Glacier and Pine Island Glacier areas along two ICESat and two CryoSat-2 orbits. Completed entire mission as planned.</li> <li>• Added two low altitude passes (3000 ft AGL) over the newly formed rift in Pine Island Glacier.</li> <li>• Collected additional high altitude data over sea ice in the Bellingshausen Sea on approach and on return.</li> <li>• ATM, MCoRDS, snow and Ku-band radars, gravimeter, and DMS were operated on the survey lines.</li> <li>• Conducted one ramp pass (2000 ft AGL) at Punta Arenas airport after takeoff for ATM and DMS instrument calibration.</li> </ul>
<b>Geographic Keywords</b>	Thwaites Glacier, Pine Island Glacier, Antarctica
<b>ICESat Tracks</b>	ICESat: 0190, 0288. CryoSat-2: 8449, 8457.
<b>Repeat Mission</b>	2009, 2010.

## Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
<b>ATM</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	50 GB	None
<b>MCoRDS</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.2 TB	None
<b>Snow Radar</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	230 GB	None
<b>Ku-band Radar</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	230 GB	None
<b>DMS</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	86 GB	Issues with backup GPS.
<b>Gravimeter</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.4 GB	None
<b>DC-8 Onboard Data</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	40 MB	None

### Mission Report (Michael Studinger, Mission Scientist)

This mission is similar to the 2010 TSK2 CryoSat mission, but with some changes. We replace one of the two ICESat lines flown in 2010 with another (from the 2009 TSK2 flight), to avoid duplication with a line occupied during the WAIS Cores flight. CryoSat-2 ground track 8449 was overflowed by CryoSat-2 on November 11, 2011 at 19:15 Z and ground track 8457 was overflowed on November 12, 2011 at 08:36 Z, the same day we acquired data.

The weather in the area was better than expected. We had anticipated more scattered low clouds but only encountered a single thin cloud layer below us that did not cause any issues for the optical sensors on board.

We collected high altitude data over sea ice on the way to the survey area and on the way back to Punta Arenas. We also did two low altitude passes (3000 ft AGL) over the rift. Excellent flying by Dick Ewers resulted in complete coverage of the rift.

The only penguin colony in the area on Bear Peninsula was too far away to cause any issues.

### Individual instrument reports from experimenters on board the aircraft:

**ATM:** Both systems worked well. 5.7 hours of science data collection.

**MCoRDS:** The MCoRDS worked well.

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

**Gravimeter:** Worked well. No issues.

**DMS:** DMS worked well. Issues with backup GPS.

**DC-8 on board data:** System worked well.

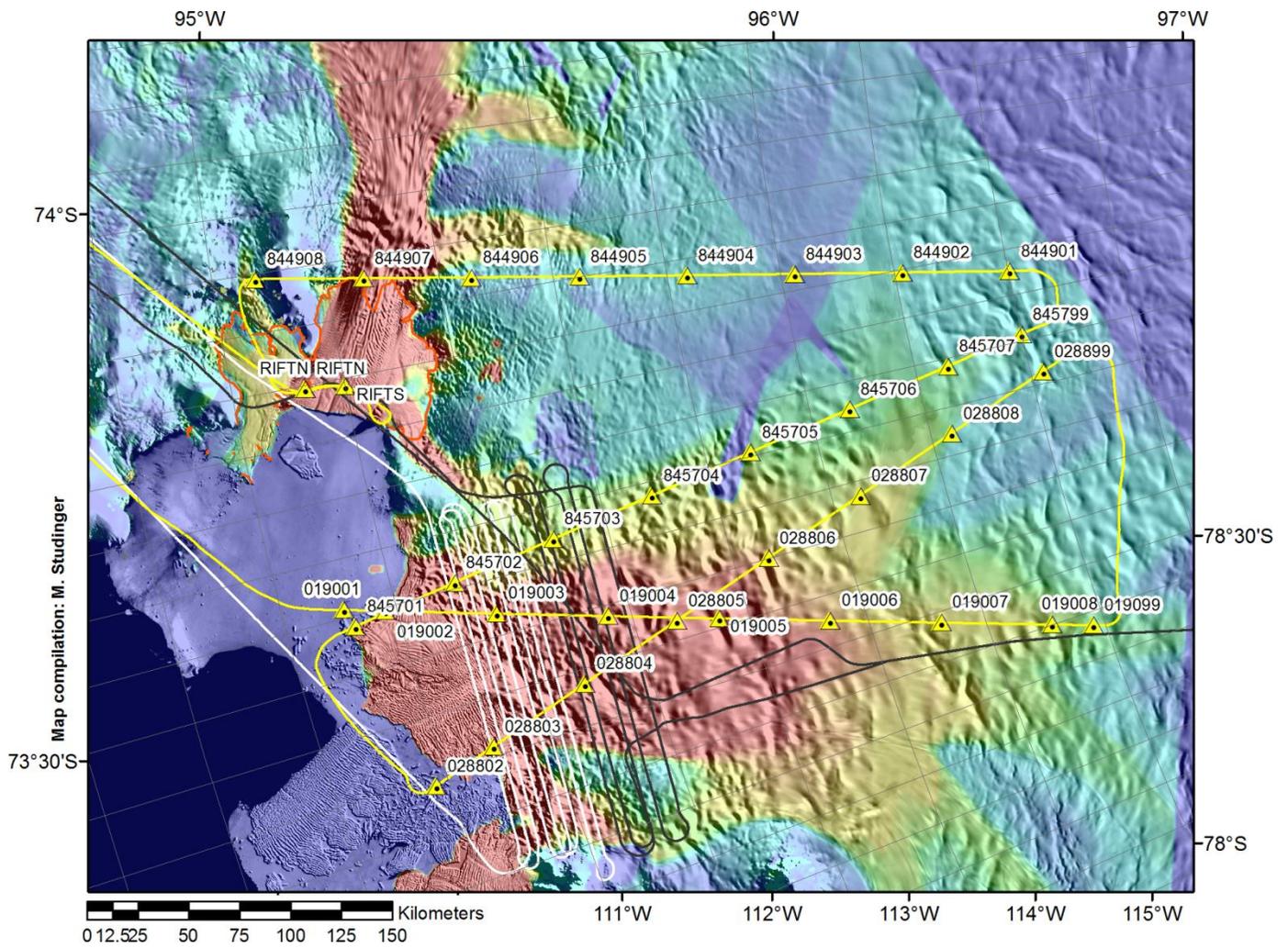


Figure 1: DC-8 trajectory over the Thwaites Glacier (yellow). Background image is MODIS mosaic and ice surface velocity from InSAR. White and black line indicates trajectories from two previous missions.



Figure 2: DMS image of the rift. The image shows one of the several bridges, that typically develop in rifts and open water on the left.