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# Preliminary Science Flight Report

## Operation IceBridge Antarctica 2011



**Flight:** F07  
**Mission:** Slessor 1

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### Flight Report Summary

<b>Aircraft</b>	DC-8 (N817NA)
<b>Flight Number</b>	120111
<b>Flight Request</b>	128008
<b>Date</b>	Friday, October 21, 2011 (Z), Day of Year 294
<b>Purpose of Flight</b>	Operation IceBridge Mission Slessor 1
<b>Take off time</b>	12:00:12 Zulu from Punta Arenas (SCCI)
<b>Landing time</b>	23:23:40 Zulu at Punta Arenas (SCCI)
<b>Flight Hours</b>	11.5 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) Bailey IceStream, Slessor Glacier and Recovery Glacier. Completed entire mission as planned.</li><li>• Collected data over an ice core site on Berkner Island.</li><li>• ATM, MCoRDS, snow and Ku-band radars, gravimeter, and DMS were operated on the survey lines.</li><li>• Conducted two ramp passes (2000 ft AGL) at Punta Arenas airport for ATM and DMS instrument calibration.</li></ul>
<b>Geographic Keywords</b>	Bailey Ice Stream, Slessor Glacier, Recovery Glacier, Berkner Island, Thyssen Höhe, Shackleton Range, Theron Mountains, Antarctica
<b>ICESat Tracks</b>	0404
<b>Repeat Mission</b>	None.

## 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"/>	42 GB	None
<b>MCoRDS</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1.5 TB	None
<b>Snow Radar</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	200 GB	None
<b>Ku-band Radar</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	200 GB	None
<b>DMS</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	98 GB	None
<b>Gravimeter</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2 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)

Today's mission is a new design. The intention is to sample the grounding line and lower part of Slessor Glacier and Bailey Ice Stream using all IceBridge low-altitude sensors. We also overfly two subglacial lakes on the lower Recovery Glacier, and an ICESat track connecting the two glacier basins. We also flew over an ice core drill site on Berkner Island's Thyssen Höhe.

Today's weather decision was significantly easier than yesterday's. The situation had not changed, which all remaining targets being hopeless, except for Coats Land which was still wide open. We decided to launch for the Slessor Glacier 1 mission. After two ramp passes we turned south to our long commute to one of the most remote places in Antarctica. After transiting over the Drake Passage, the Antarctic Peninsula, the southern Weddell Sea and the Ronne Ice Shelf (impressive views) we descended to Berkner Island and began our survey by collecting data over an old ice core site at Thyssen Höhe. We continued over the Filchner Ice Shelf and started our two profiles along the Slessor Glacier, followed by a line along the Bailey Ice Stream. We turned towards an ICESat line over the Theron Mountains (nice view of the Coalseam Cliffs) that connected the Bailey Ice Stream with the Slessor Glacier, the Shackleton Range and the Recovery Ice Stream, where we surveyed two subglacial lakes. We had a mix of glaciological objectives for today's mission ranging from ice dynamics along flow lines, surface elevation changes along ICESat orbits, bedrock mapping of the critical grounding line zones, and subglacial lakes, which are believed to lubricate the bed below the ice streams allowing for rapid flow of ice from the interior towards the ocean. Both, ATM and DMS collected data in cloud free areas over the Weddell Sea from 37,000 ft.

Known wildlife colonies in the survey area were at safe distance to the flight path of the DC-8.

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

**ATM:** The ATM lasers worked well and collected good data along the entire survey line.

**MCoRDS:** The MCoRDS worked well. There was a 2.5 minute outage due to a software crash near a turn.

**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. No issues.

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

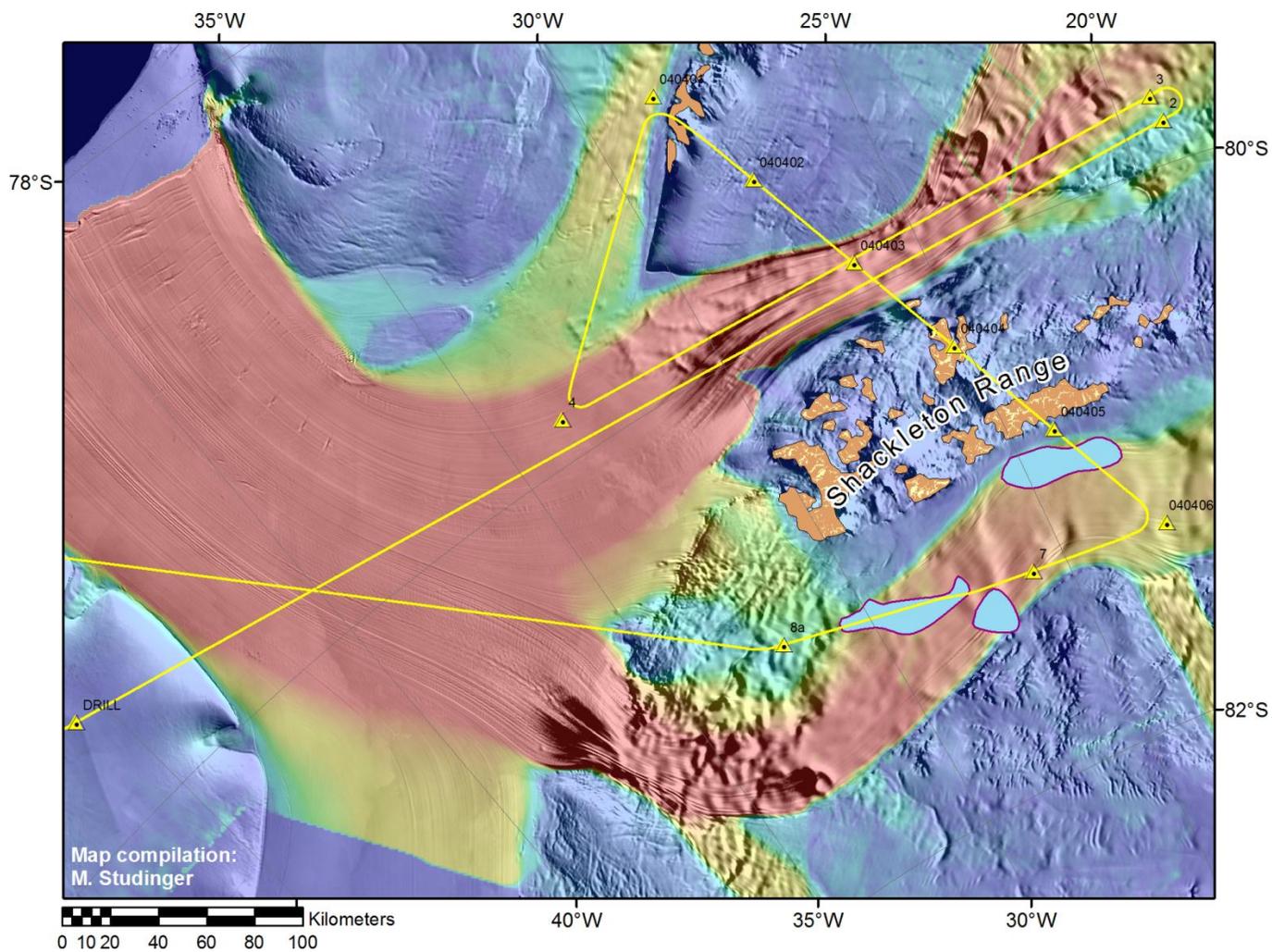


Figure 1: DC-8 trajectory over the Bailey Ice Stream and Slessor and Recovery Glaciers. Subglacial lakes are indicated by blue outlines. Background image is MODIS mosaic and ice surface velocity from InSAR.