

Science Flight Report

Operation IceBridge Antarctica 2010



Flight: F03
Mission: Sea Ice 01

Flight Report Summary

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| Aircraft | DC-8 (N817NA) |
| Flight Number | 110108 |
| Flight Request | 118003 |
| Date | Saturday, October 30, 2010 (Z), Day of Year 303 |
| Purpose of Flight | Mission Sea Ice 01 |
| Take off time | 12:06:07 Zulu from Punta Arenas (SCCI) |
| Landing time | 22:19:57 Zulu at Punta Arenas (SCCI) |
| Flight Hours | 10.3 |
| Aircraft Status | Airworthy. |
| Sensor Status | All installed sensors operational. |
| Significant Issues | None |
| Accomplishments | <ul style="list-style-type: none"> • Low-altitude survey (1,500 ft AGL) of several sea ice transects in the Bellingshausen and Amundsen Seas. Completed entire mission as planned. • ATM, snow and Ku-band radars, gravimeter, LVIS, POS/AV, and DMS were operated on the survey lines. • MCoRDS was not in operation on this flight due to the sea ice mission. Instrument team used time on the aircraft during the flight to work on the system and collect test data. • Conducted two ramp passes at Punta Arenas airport for ATM, LVIS and DMS instrument calibration (12,000ft AGL and 1,000 ft AGL). • Collected calibration data over open water/sea ice at 1,500 ft AGL for MCoRDS over Pine Island Bay. • Conducted pitch and roll maneuvers for LVIS calibration over Drake Passage and Strait of Magellan. |
| Geographic Keywords | Amundsen Sea, Bellingshausen Sea, Pine Island Bay, Antarctica |
| ICESat/CryoSat Track | None. |
| Repeat Mission | Yes (2009). |

Science Data Report Summary

| Instrument | Instrument Operational | | | Data Volume | Instrument Issues |
|---------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------|-------------------|
| | Survey Area | Entire Flight | High-alt. Transit | | |
| ATM | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 51 GB | None |
| MCoRDS | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | N/A | None |
| Snow Radar | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 250 GB | None |
| Ku-band Radar | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 250 GB | None |
| LVIS | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | N/A | None |
| DMS | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 74 GB | None |
| POS/AV (510 + 610) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 2 GB | None |
| Gravimeter | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 80 MB | None |
| DC-8 Onboard Data | <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 reflight of last year's sea ice mission over the Bellingshausen and Amundsen Seas. Because of the persistent low pressure of the Bellingshausen Sea in recent weeks, the sea ice edge in the Bellingshausen Sea is much closer to the coast than last year. Because of the weather forecast for today's mission we reversed the waypoint sequence from the original plan and flew the mission in reverse. The first segment of the flight between waypoints 111n and 110n was planned as a high altitude survey for LVIS in order to extend the range of the DC-8. Based on the AMPS model we had expected clear skies in this area (see Fig. 2 with AMPS forecast attached). The GFS model that we get during the weather briefs at the met office predicted similar conditions. We had expected to encounter some clouds near the western end of the survey at 1,500 ft AGL that we expected to underfly and clouds at the eastern end of the survey that would be too low to underfly. Contrary to the forecast from two different models we encountered a dense cloud cover from waypoint 111n to the west. LVIS indicated cloud tops at 6,000 ft that were too dense to penetrate. At 94°W, or 15:07 Z, we decided to descent and try to underfly the cloud layer because we had reached the point in the mission that would leave us with enough fuel to get back to Punta Arenas with a low altitude survey. The cloud layer turned out to be only 1,000 ft thick and below 5,000 ft we were able to see the sea ice. We started surveying with all low altitude sensors and only had to lower flight elevation occasionally to 1,000 ft AGL to avoid clouds. We continued the survey below the unexpected cloud cover and getting into more and more sunny conditions towards the end of the line as expected. At 18:02:25 Z we had a glitch that affected many different systems on the aircraft, from REVEAL, network switches, GPS receivers, Applanix systems. The systems recovered within a few minutes, some needed to be rebooted. The cause for this glitch is unclear. We continue to look into the issue. A first analysis on the aircraft indicates that we have not lost any science data. At 19:43 Z we reach the edge of the sea ice near waypoint 102n and start to climb and head back to Punta Arenas.

Individual instrument reports from experimenters on board the aircraft:

ATM: The ATM systems worked well and collected good data. Some of the clouds in the survey area were too dense to be penetrated by the laser.

MCoRDS: The MCoRDS system was not operated on this flight due to the sea ice mission, but the instrument team used the flight for testing, configuring and calibrating the system.

Snow and Ku-band radar: The snow and Ku-band radars collected 100% data along the low altitude segment of the survey line.

Gravimeter: Worked well. No issues.

DMS: DMS worked well. No issues. Occasional clouds obscured the surface.

LVIS: LVIS did not collect data during the high altitude portion because of the cloud cover. Successful calibration maneuvers over open water.

POS/AV: Systems worked well. No issues.

DC-8 on board data: System worked well.

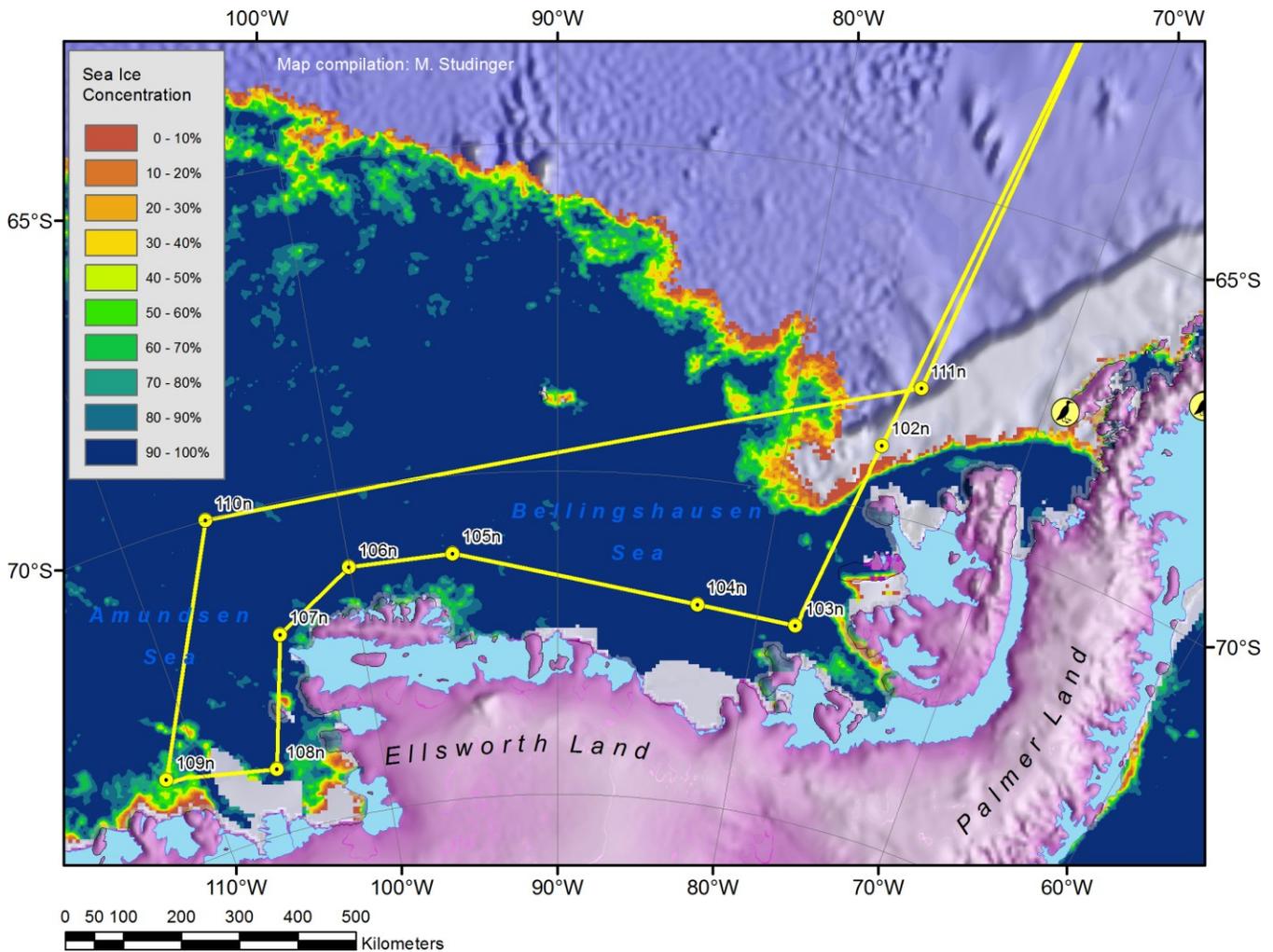


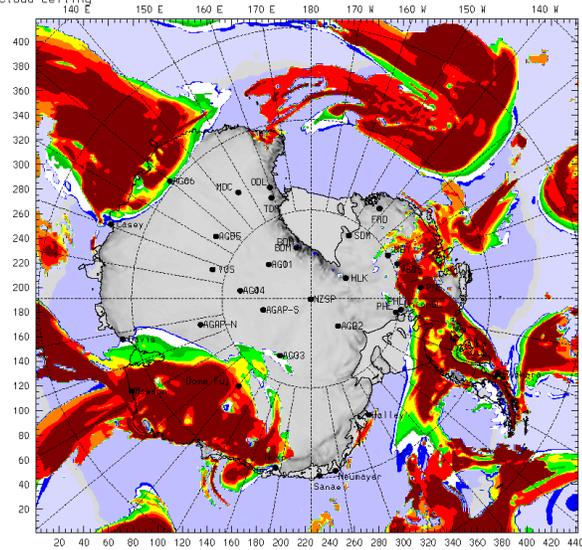
Figure 1: Sea ice mission plotted over sea ice concentration from AMSR-E data (Oct 30, 2010)

AMPS 15-km WRF
Fcst. 15 h
SEA ICE FLAG
Cloud ceiling

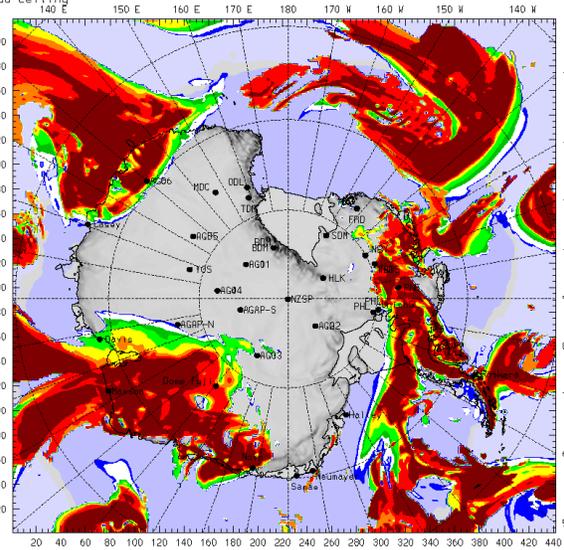
Init. 00 UTC Sat 30 Oct 10
Valid. 15 UTC Sat 30 Oct 10

AMPS 15-km WRF
Fcst. 18 h
SEA ICE FLAG
Cloud ceiling

Init. 00 UTC Sat 30 Oct 10
Valid. 18 UTC Sat 30 Oct 10



Model Info: V3.0.1.1 KF MYJ PBL WSM Sclass Noah LSM 15 km, 43 levels, 75 sec
LW: RRTM SW: Goddard DIFF: simple KM: 2D Smagor



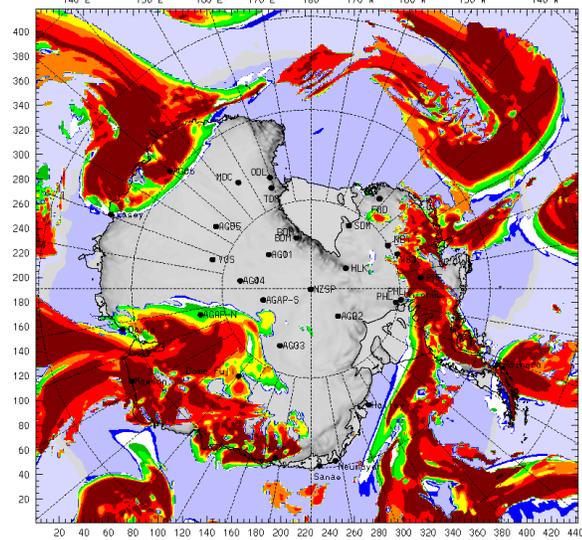
Model Info: V3.0.1.1 KF MYJ PBL WSM Sclass Noah LSM 15 km, 43 levels, 75 sec
LW: RRTM SW: Goddard DIFF: simple KM: 2D Smagor

AMPS 15-km WRF
Fcst. 21 h
SEA ICE FLAG
Cloud ceiling

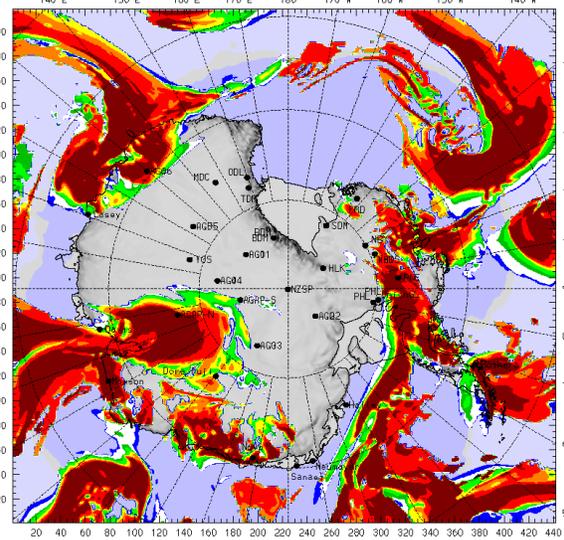
Init. 00 UTC Sat 30 Oct 10
Valid. 21 UTC Sat 30 Oct 10

AMPS 15-km WRF
Fcst. 24 h
SEA ICE FLAG
Cloud ceiling

Init. 00 UTC Sat 30 Oct 10
Valid. 00 UTC Sun 31 Oct 10



Model Info: V3.0.1.1 KF MYJ PBL WSM Sclass Noah LSM 15 km, 43 levels, 75 sec
LW: RRTM SW: Goddard DIFF: simple KM: 2D Smagor



Model Info: V3.0.1.1 KF MYJ PBL WSM Sclass Noah LSM 15 km, 43 levels, 75 sec
LW: RRTM SW: Goddard DIFF: simple KM: 2D Smagor

Figure 2: AMPS forecasts available before takeoff for 15, 18, 21, and 24 UTC, October 30, 2010.