NASA/TM—2000–209972

EOS Aqua AMSR-E Sea Ice Validation Program: Meltpond2000 Flight Report

D.J. Cavalieri

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771

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Abstract

This flight report describes the field component of Meltpond2000, the first in a series of Arctic and Antarctic aircraft campaigns planned as part of NASA's Earth Observing System Aqua sea ice validation program for the Advanced Microwave Scanning Radiometer (AMSR-E). This prelaunch Arctic field campaign was carried out between June 25 and July 6, 2000, from Thule, Greenland, with the objective of quantifying the errors incurred by the AMSR-E sea ice algorithms resulting from the presence of melt ponds. A secondary objective of the mission was to develop a microwave capability to discriminate between melt ponds and seawater using low-frequency microwave radiometers. Meltpond2000 was a multiagency effort involving personnel from the Navy, NOAA, and NASA. The field component of the mission consisted of making five 8-hour flights from Thule Air Base with a Naval Air Warfare Center P-3 aircraft over portions of Baffin Bay and the Canadian Arctic. The aircraft sensors were provided and operated by the Microwave Radiometry Group of NOAA's Environmental Technology Laboratory. A Navy ice observer from the National Ice Center provided visual documentation of surface ice conditions during each of the flights. Two of the five flights were coordinated with Canadian scientists making surface measurements of melt ponds at an ice camp located near Resolute Bay, Canada. Coordination with the Canadians will provide additional information on surface characteristics and will be of great value in the interpretation of the aircraft and high-resolution satellite data sets.

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I. Introduction

The first in a series of Arctic and Antarctic aircraft campaigns planned as part of NASA's Earth Observing System Aqua sea ice validation program for the Advanced Microwave Scanning Radiometer (AMSR-E) was successfully completed in July 2000. This prelaunch Arctic field campaign called Meltpond2000 was carried out between June 25 and July 6 from Thule, Greenland, with the objective of quantifying the errors incurred by the AMSR-E sea ice algorithms resulting from the presence of melt ponds. Melt ponds are currently the largest single source of error in the determination of Arctic sea ice concentrations with satellite passive microwave sensors. A secondary objective of the mission was to develop a microwave capability to discriminate between melt ponds and seawater using low-frequency microwave radiometers.

With the launch of Aqua scheduled for mid 2001, this campaign made use of DMSP SSM/I radiances to validate the standard AMSR-E Arctic sea ice concentration algorithm (Markus and Cavalieri, 2000). The frequencies and polarizations needed by the algorithm closely match those of the SSM/I. The overall approach to meet the validation objectives was to compare sea ice concentrations retrieved from the AMSR-E algorithm using SSM/I radiances with corresponding coincident observations from the aircraft sensors and from high resolution satellite imagery obtained from Landsat 7 ETM+, Terra MODIS, NOAA AVHRR, and RADARSAT. Determination of accuracy will be achieved by comparing the AMSR-E sea ice concentrations with independently derived concentrations from spatially and temporally coincident observations by these other sensors.

Meltpond2000 was a multiagency effort involving personnel from the Navy, NOAA, and NASA. Participants in this campaign are listed by agency in Table 1. The field component of the mission consisted of making five 8-hour flights from Thule Air Base with a Naval Air Warfare Center (NAWC) P-3 over portions of Baffin Bay and the Canadian Arctic. The aircraft sensors were provided and operated by the Microwave Radiometry Group of NOAA's Environmental Technology Laboratory. A Navy ice observer from the National Ice Center provided visual documentation of surface ice conditions during each of the flights. Two of the five flights were coordinated with Canadian scientists making surface measurements at an ice camp located near Resolute Bay, Canada. Coordination with the Canadians provided additional information on surface characteristics and will be of great value in the interpretation of the aircraft and high-resolution satellite data sets.

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NOAA/Environmental Technology Laboratory			
Albin J. Gasiewski	Michael McCormick	Karin Schuler	Taneil Uttal
Naval Air Warfare Center			
Paul Barker	Frank Cox	Miles Ervin	William Heaton
Neal C. Mars Jr.	Aaron McAtee	Leslie Miles	Lynn Mosterd
Patrick Murphy	William Rustmann	John Sandifer	Andrew Salcido
Michael Silah	Kurt Unangst	Glenn W. Wallace	William C. Walsh
National/Navy Ice Center			
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II. NAWC P-3 Aircraft Instrumentation

The P-3 aircraft was equipped with the NOAA Environmental Technology Laboratory (NOAA/ETL) polarimetric scanning radiometers (PSR-A and PSR-C) covering the AMSR-E range of frequencies (6.9 GHz to 89.0 GHz). Boresited with each PSR scanhead was an infrared scanning radiometer operating at 9.6-11 µm. The aircraft also carried the NOAA/ETL scanning low frequency microwave radiometer (SLFMR) operating at 1.4 GHz. A summary of the aircraft instrumentation is given in Table 2.

Table 2. NAWC P-3 Sensors for Meltpond2000

NOAA/ETL Polarimetric Scanning Radiometers (PSR): PSR-A(v, h, U, and V): 10.7, 18.7, 37.0, and 89.0 GHz PSR-C(v, h, U, and V): 5.8-6.2, 6.3-6.7, 6.8-7.1, and 7.2-7.5 GHz
NOAA/ETL Scanning Low Frequency Microwave Radiometer (SLFMR): 1.4 GHz (v-pol.)
NOAA/ETL Infrared scanners operate in the range 9.6-11 µm and are boresited with each PSR scanhead.
NASA GSFC Video and digital cameras

III. NAWC P-3 Flight Summary

A summary of the regions covered, aircraft altitude, and sensors flown on each of the flights is given in Table 3. A map of the study region including the flight lines for each of the five flights is presented in Figure 1. For each of the flights, only one PSR (A or C) was flown, because of the availability of only one PSR positioner. Flights with the PSR-A on June 26 and 27 took advantage of the clear atmospheric conditions over Baffin Bay. The June 26 flight was made at an altitude of 19,000 feet. The objective here was to obtain coincident aircraft data with visible Landsat 7 and Terra MODIS data covering as many DMSP SSM/I footprints as possible. The flight on June 27, a day without Landsat 7 coverage, was flown at an altitude of 4,500 feet to provide the Navy ice observer with a better view of surface conditions while still covering several SSM/I footprints. The June 27 flight pattern was nested within the flight pattern for June 26 (Figure 1). The fifth flight on July 5 was also made over Baffin Bay, but with the PSR-C scanhead. This was done to map the ice cover with the low frequency radiometers.

The ice camp flights were made in combination with flights over Viscount Melville Sound and were flown on June 29 and 30 (Figure 1) along tracks consistent with surface measurements. The first flight over Viscount Melville Sound was made at an altitude of 5,500 feet with the PSR-A, whereas on June 30 the same region was overflown at an altitude of 15,000 feet with the PSR-C. The aircraft altitude on both of the ice camp runs was 1,000 feet. The flight logs for all of the flights are given in Appendix A.

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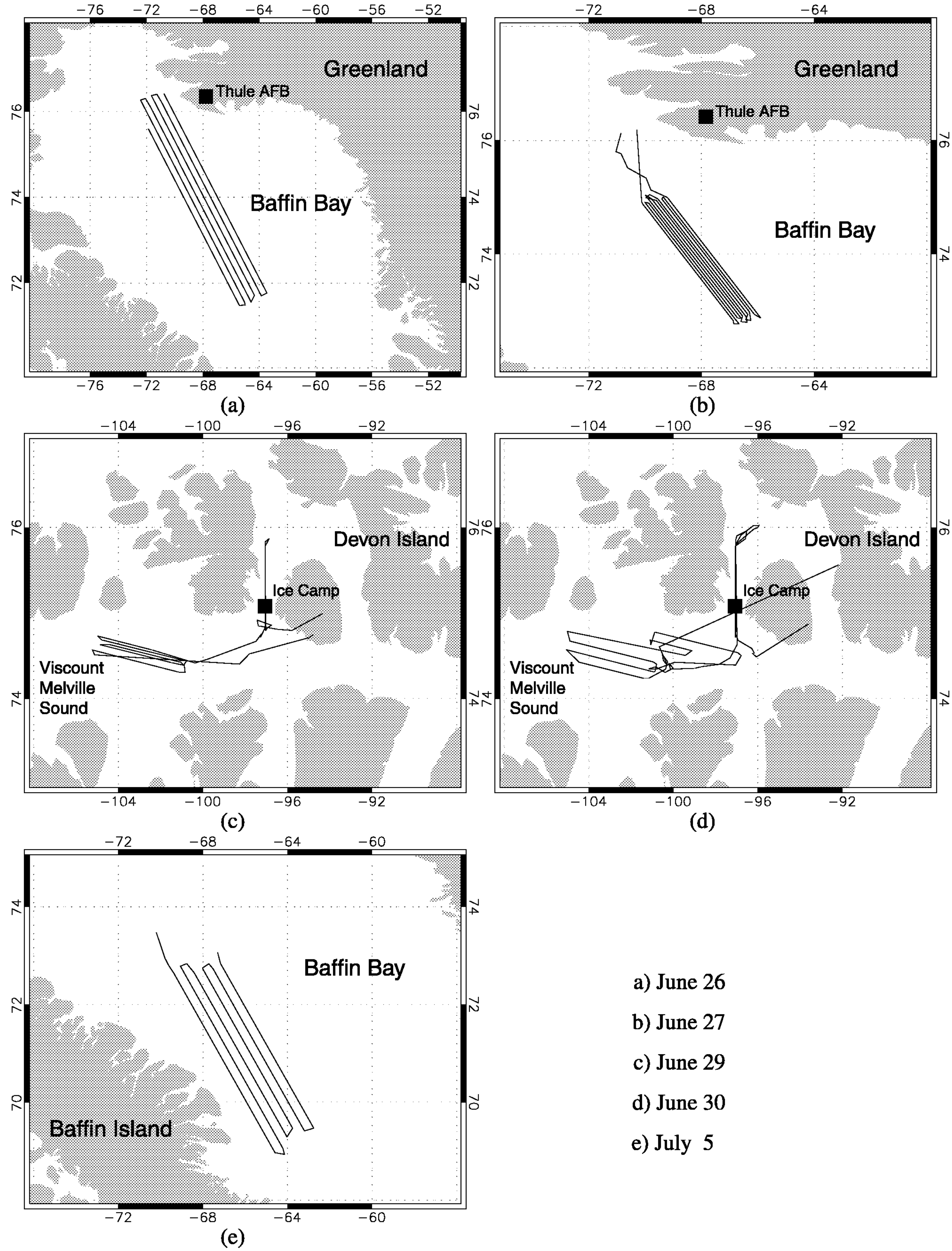

Figure 1. Meltpond2000 NAWC P-3 flight paths, June 26–July 5, 2000

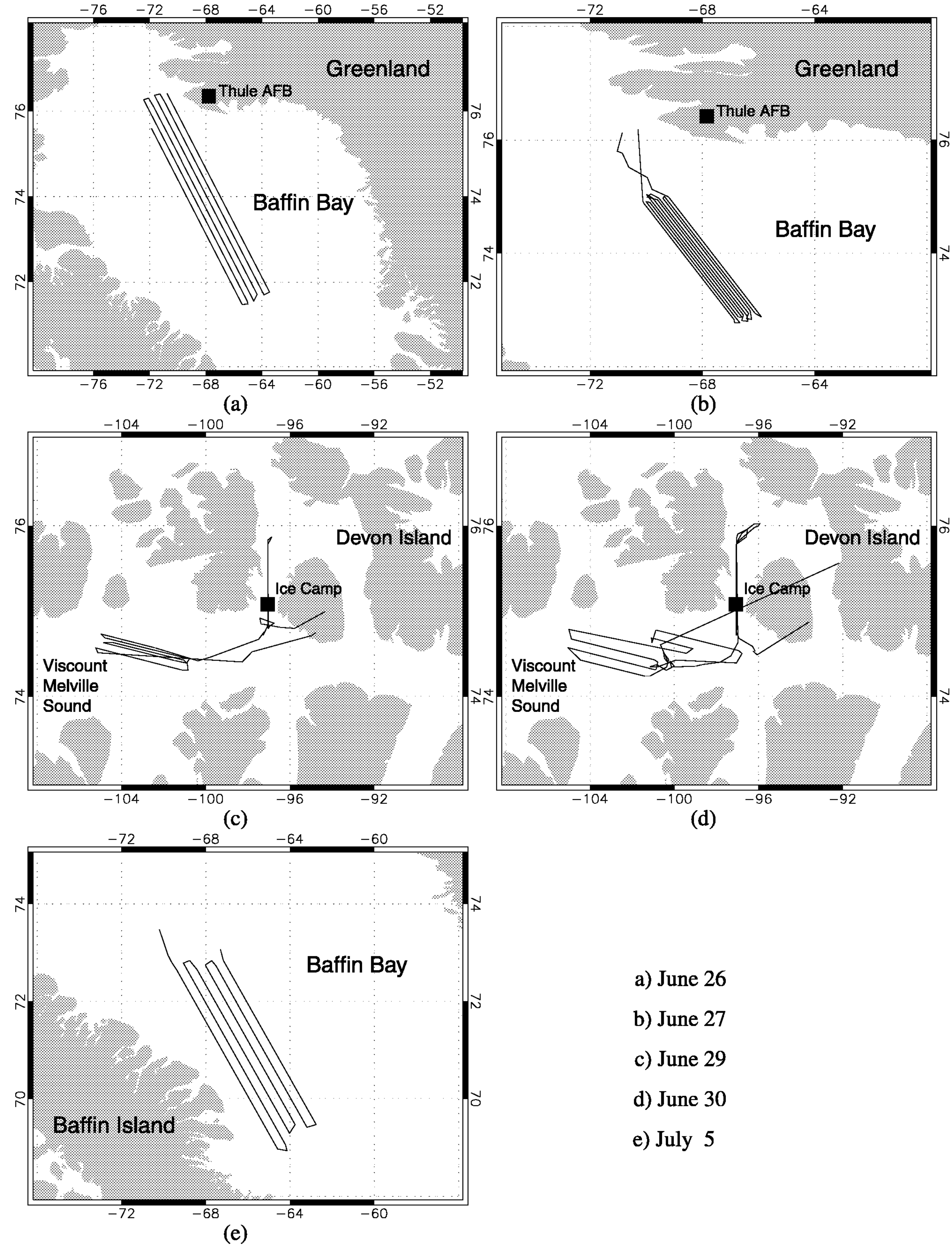

Figure 1. Meltpond2000 NAWC P-3 flight paths, June 26–July 5, 2000

Table 3. Meltpond2000 Flight Summary

Date	Region	Altitude	Sensors
June 26	Baffin Bay	19,000 ft	PSR-A, SLFMR, IR
June 27	Baffin Bay	4,500 ft	PSR-A, SLFMR, IR
June 29	V. Melville Sd.	5,500 ft	PSR-A, SLFMR, IR
	Ice Camp	1,000 ft	PSR-A, SLFMR, IR
June 30	V. Melville Sd.	15,000 ft	PSR-C, SLFMR, IR
	Ice Camp	1,000 ft	PSR-C, SLFMR, IR
July 5	Baffin Bay	21,000 ft	PSR-C, SLFMR, IR

IV. Weather and Sea Ice Conditions

Weather conditions over Baffin Bay were dominated by a high-pressure system over Greenland and so generally clear atmospheric conditions existed in the northern part of the Bay. In contrast, conditions over Viscount Melville Sound, and in the vicinity of the Canadian Ice Camp were more variable, because of an extensive low pressure system situated north and west of the Ice Camp. Poor weather conditions resulted in the cancellation of a flight west of the Canadian Archipelago on July 3. The July 4 1000-500 hPa thickness chart shown in Figure 2 is representative of the weather conditions encountered during Meltpond2000.

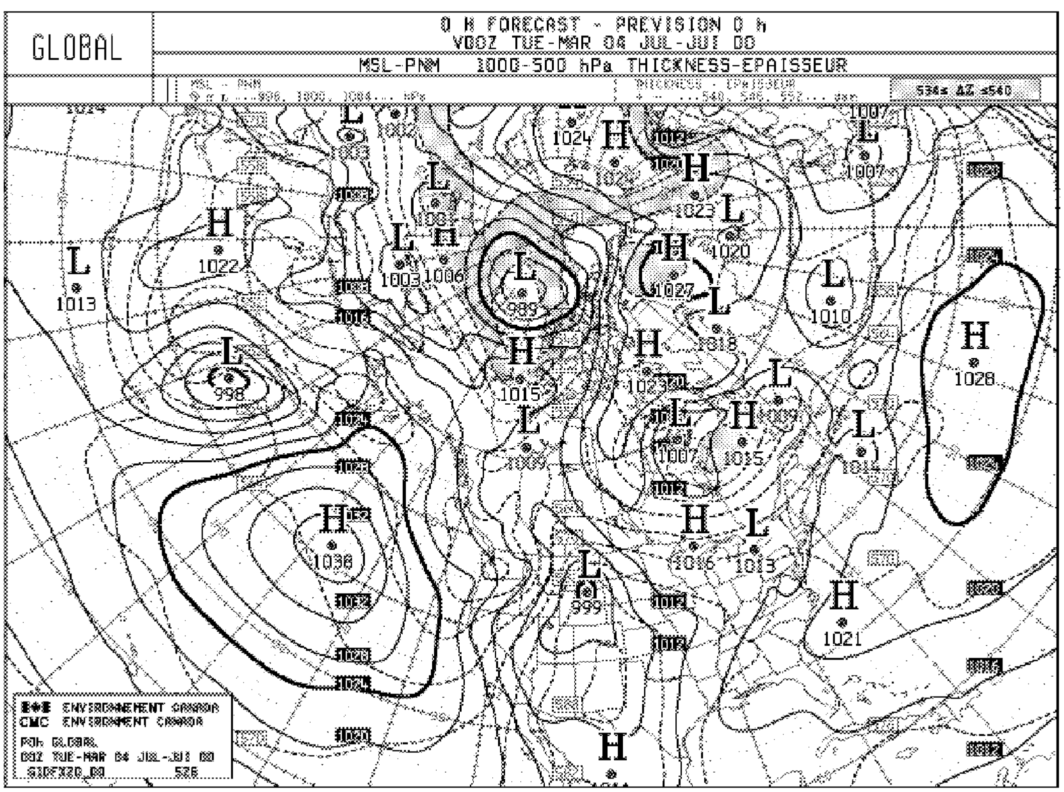

Figure 2. Canadian Weather Analysis (1000-500 hPa Thickness) Chart for July 4.

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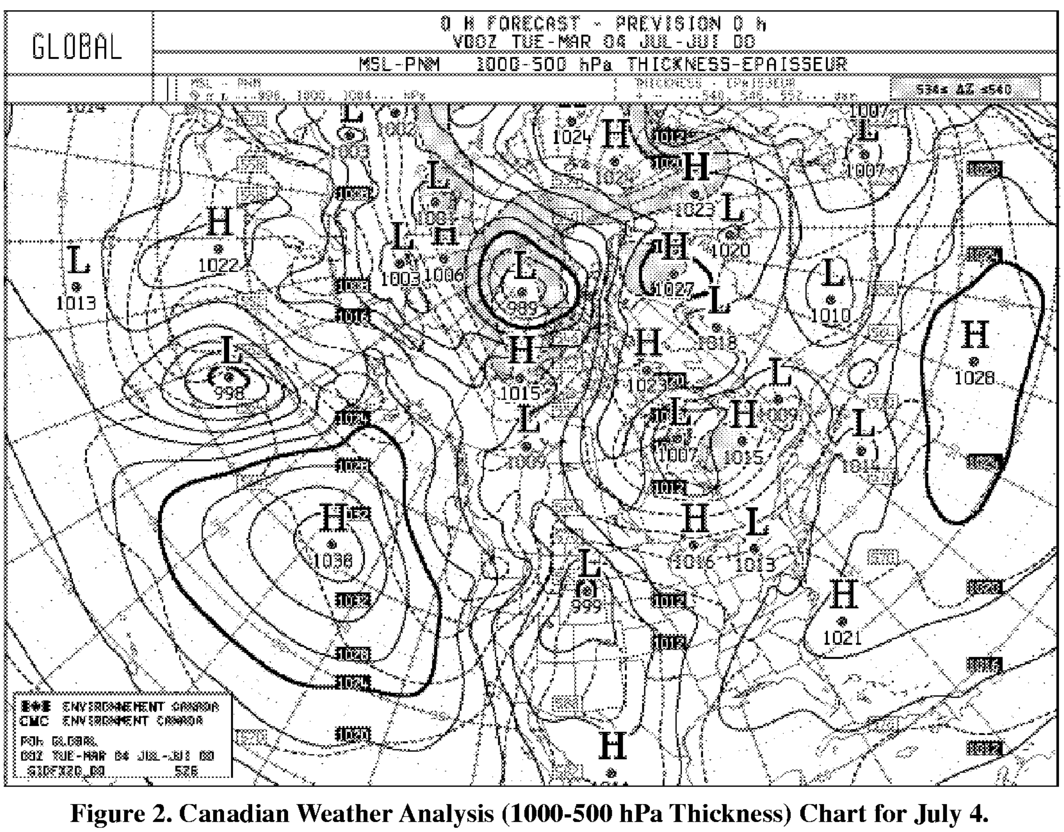

Figure 2. Canadian Weather Analysis (1000-500 hPa Thickness) Chart for July 4.

Sea ice conditions were also quite variable. Open water was present at the northern end of the Baffin Bay with ice concentrations increasing southward to 90-100%. The ice types were primarily thick and medium first-year ice with extensive surface melt ranging from ponding to rotting ice. Over Viscount Melville Sound, the meltwater appeared to be more in the form of lace than ponding. This and the numerous ridges and rough features suggested the presence of multiyear ice. In the vicinity of the ice camp, the ice was estimated to be 30-40% ponded on June 29. A large fraction of surface melt could be seen in sun glint with perhaps 10-40% surface liquid. On June 30, ponding was observed to range from 30-60% during the ice camp runs. The National Ice Center ice reconnaissance logs are provided in Appendix B.

V. Aircraft/Ice Camp Coordination

A key element of this campaign was the coordination between the P-3 flights and surface measurements made by Canadian scientists as part of their study of the morphological and radiative properties of melt ponds on first-year sea ice. The Canadian research program in the Canadian Archipelago near Resolute Bay is part of the ongoing Collaborative-Interdisciplinary Cryospheric Experiment (C-ICE). Two of the five P-3 flights were dedicated to obtaining coincident measurements made at the Canadian ice camp. Flights over the camp were made on June 29 and 30 at an altitude of 1,000 feet to obtain the highest possible spatial resolution with the microwave radiometers and with the video cameras. Because of the low altitude, the sensors were operated in stare mode to provide uninterrupted measurements along the flight track. On June 29 the P-3 carried the PSR-A scanhead, whereas on June 30 the PSR-C scanhead was flown for the purpose of obtaining measurements at the full range of microwave frequencies over the two days.

During the Canadian C-ICE 2000 program, a number of different variables were collected in the vicinity of the ice camp. The data set includes standard meteorological measurements over melt ponds (air temperature, relative humidity, wind speed, incident radiation, reflected radiation) as well as pond temperatures (pond near-surface temperature, 9 cm from top of pond, and 21 cm from top of pond) and pond-ice interface flux. Measurements were logged every 15 minutes but not continuously from initial pond formation to advanced melt stages. Other measurements include photographs of melt pond evolution from initial formation to advanced stages (1 photo taken at least once per day).

VI. Aircraft/Satellite Coordination

The operational DMSP SSM/I provided daily coverage of the entire study region and near real time SSM/I sea ice concentration maps were emailed to Thule in ASCII format for flight planning purposes. An ASCII character sea ice concentration map for Baffin Bay on June 27 is shown in Figure 3. Coordination with high-resolution satellite imagery was another important element in this validation campaign. Prior to our deployment to Thule, arrangements were made to acquire both Terra MODIS and RADARSAT coverage during the mission. Acquisition requests for Landsat 7 coverage were made by email within 48 hours of a planned flight. A Landsat 7 ETM+ image for June 27, a coregistered P-3 PSR-A (19 GHz, V-pol.) mosaic, and a coregistered DMSP SSM/I grid at a resolution of 25-km are shown in Figure 4.

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Ice Concentration, 06 27 2000, Baffin Bay

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    00000000000000000000000000000011111111111111111111111111111111111111111111111111
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291 ######87#8#####7########988888######88#####42210000000000001347#################
292 ######7#######778######98888######88#######431000000000000012355567#############
293 ##########8##8767#####988887#####88#########5210000000100111112224579###########
294 ##########877766#####88888877####8#########9###32000000122211101111247##########
295 ##########7776######888888##7#################520000001233210000001268##########
296 ########8887777######88888#######8#######8#####30000001233310000000246##########
297 ########8############89988#############9888###41000001234311000000025##########
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299 ##################777888878#################97311222345554321000000135##########
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304 ######################99887####8##############987778888887776542100012##########
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306 ##################888#8#######7777##8##########866678889888875420000002#########
307 ##################77#7#########656###7###########7667899999887632000012#########
308 ##################77###########4444457###########8777889999988641000012#########
309 ##############################4323345############87888999998887410000136########
310 ##########9###################43234446###########8887888999888630000002#########
311 ##########8################865444#5545############887788998888631000013#########
312 ##########8#####8##########87766556556############87788988888631000015##########
313 ##########8#####78#########98876766555##############888888988863100001##########
314 ################56########999877765###############88888888888864100002###7######
315 ###########555#55#########999998876545M#############8888888888630000012345######
316 #6#67#######44###5##78999999998877##4#7#############98888888875200000012#45#####
317 #43345###5444###66#78999999988777####67###########9888988888876310000013444#####
318 221232330234####77#8999999996655#####678###########88898888887520000002##46####
319 11M10002224#####88999++999875444####6##8#########88889998888876210000036########
320 2221000233#######999++99987532234##777#8#########877899998888763000002##8#######
321 3322000#########999++998654002345678778#########878999988888753000001###6######
322 332000223#######999+9987443200345777778##########89999888888752000003####5M####
323 332000023#########9++997644443345677667##########9999988888875200000M4###45####
324 220000M2#########9++98753455546677656############+9999888888742000012##435####
325 00000003##4445####+++97543457777766##############99998888887521000000032224####
326 000000002322235##89+9743344#89887##################9999888887521000M001113#####
327 000000000111123###9985333####9986##################99988888763100000 2335#####
328 M00000001232222###997422######8766##################99888888752000011#########
329 000000003###3223##885412##############################998877887410000M002#########
330 00000000#####22357864212################################98767887510000014#########
331 000000023##43223466642223###################77########766778751000012##########
332 00000000223222345444433222345#################56#########66677642000003##########
333 20000000001233455333##30101234##############655#########65677642100013##########
334 32220000001233555323343#000023##############6556#######766666421000013##########
335 44322000000234##43223432000025##############457######98776653210000013##########
```

Figure 3. ASCII character map representing DMSP SSM/I sea ice concentrations on a polar stereographic grid at a resolution of 25 km for Baffin Bay on June 27. Symbols are as follows: Land (#), Missing data (M), Ice concentrations of 100% (+), 90–99% (9), 80–89% (8), ..., 0–9% (0).

Ice Concentration, 06 27 2000, Baffin Bay

```
    0000000000000000000000000000011111111111111111111111111111111111111111111111111
    7777777777888888888899999999990000000000111111111122222222223333333333444444444
    0123456789012345678901234567890123456789012345678901234567890123456789

280 ##8#7########6665445######6566###655######8777#########875322####################
281 ###87########7765555######66######656######887778#####6542113####################
282 ###778#######776555#######6#######766######9987667####42100025###################
283 ###777###7M##766555#6###67#########5456#######8766####21000135###################
284 ##877M7##77#6765545556666 7#########4335#########5566541000013 5###################
285 ###87777777765544445566 67###8###7653223 4########544432000001##8#9################
286 ###77M77877665544456#####888888776543222 4########42210000002#####################
287 ###8777M#7766655556######888887777####32235######310000000014####################
288 ###7M77777#76##666#######88778788######31124####4200000000015####################
289 ####777777#####77#######8877888########4211234#42100000000014####################
290 #####77777#####7########87888#######777643112221100000000013####################
291 ######87#8#####7#######988888######88#####42210000000000001347##################
292 ######7#######778######98888######88#######431000000000000012355567#############
293 ##########8###8767#####988887#####88#########5210000000100111112224579###########
294 ##########877766#####88888877####8#########9###3200000012221110111 1247###########
295 ##########7776######888888##7##################52000000123321000000 1268##########
296 ########8887777######88888#######8########8#####300000012333100000000246##########
297 ########8##############89988###############9888###4100000123431100000000 25##########
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299 ##################777888878#################97311222345554321000000135#########
300 ##################87##888877#################742223445666543210000002 5#########
301 ##################7###9887777##################8543456666666543210000024#########
302 #######################99877#8#################975567777777655432100002 3#########
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304 ######################99887####8################987778888888777654210001 2#########
305 ####################8898888#####88###############876678888888876532100013#########
306 ###################888#8#########7777##8##########866678889888875420000 02#########
307 ###################77#7#########656###7###########766789999988763200001 2#########
308 ###################77###########4444457###########8777889999988641000012#########
309 ###############################4323345############87888999998887410000136########
310 ##########9####################43234446###########88878889998886300000 02#########
311 ##########8##################865444#5545############887788998888631000013#########
312 ##########8#####8###########87766556556############877889888886310000 15#########
313 ##########8#####78##########98876766555############88888889888631000 01##########
314 #################56#########999877765##############88888888888864100002###7######
315 ############555#55########99999887 6545M#############888888888863000001 2345######
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317 #43345###5444###66#78999999988777####67###########9888988888876310000013444#####
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319 11M10002224#####88999++999875444####6##8#########88889998888876210000036########
320 2221000233#######999++99987532234##777#8#########87789999888876300000 2##8#######
321 3322000#########999++998654002345678778#########8789999888887530000 01###6######
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331 000000023##43223466642223####################77########7667787510000 12##########
332 0000000022322234544443322 2345################56#########6667764200000 3##########
333 2000000000123345533 3##30101234##############655#########656776421000 13##########
334 32220000001233555323343#000023##############6556#######7666664210000 13##########
335 44322000000234##43223432000002 5##############457######98776653210000 13##########
```

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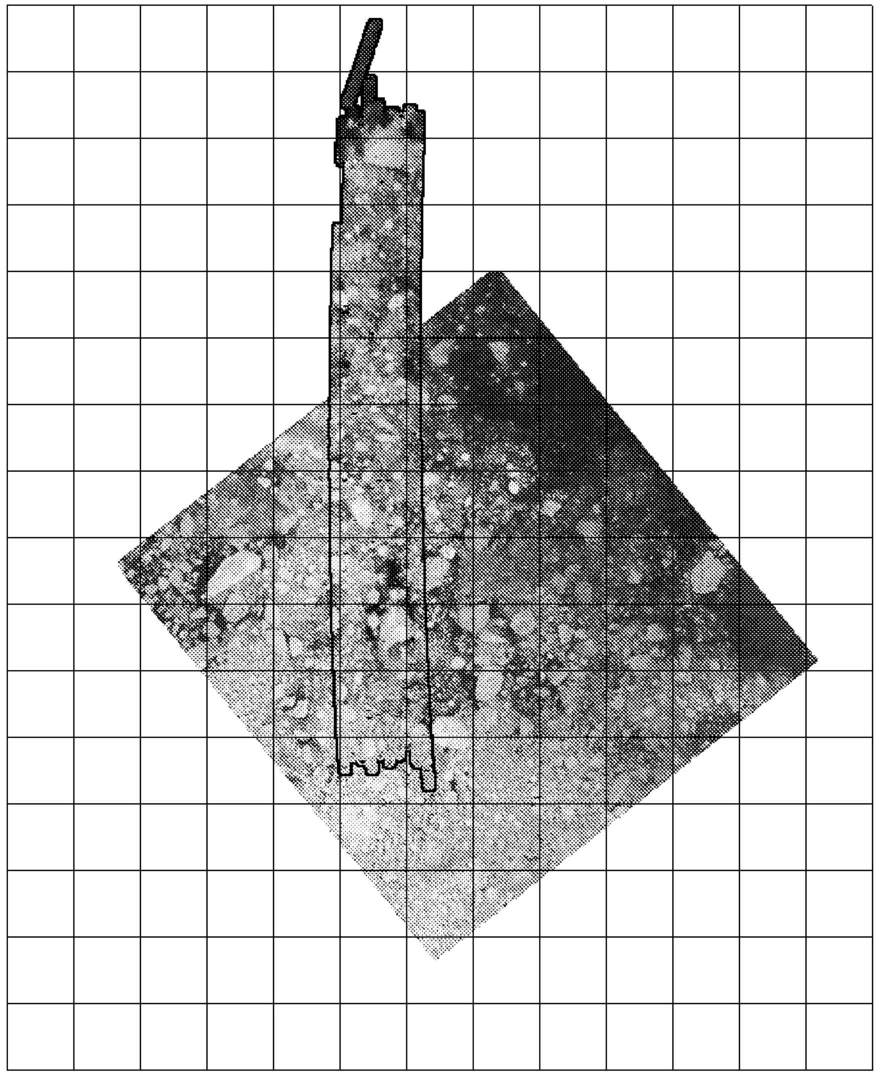
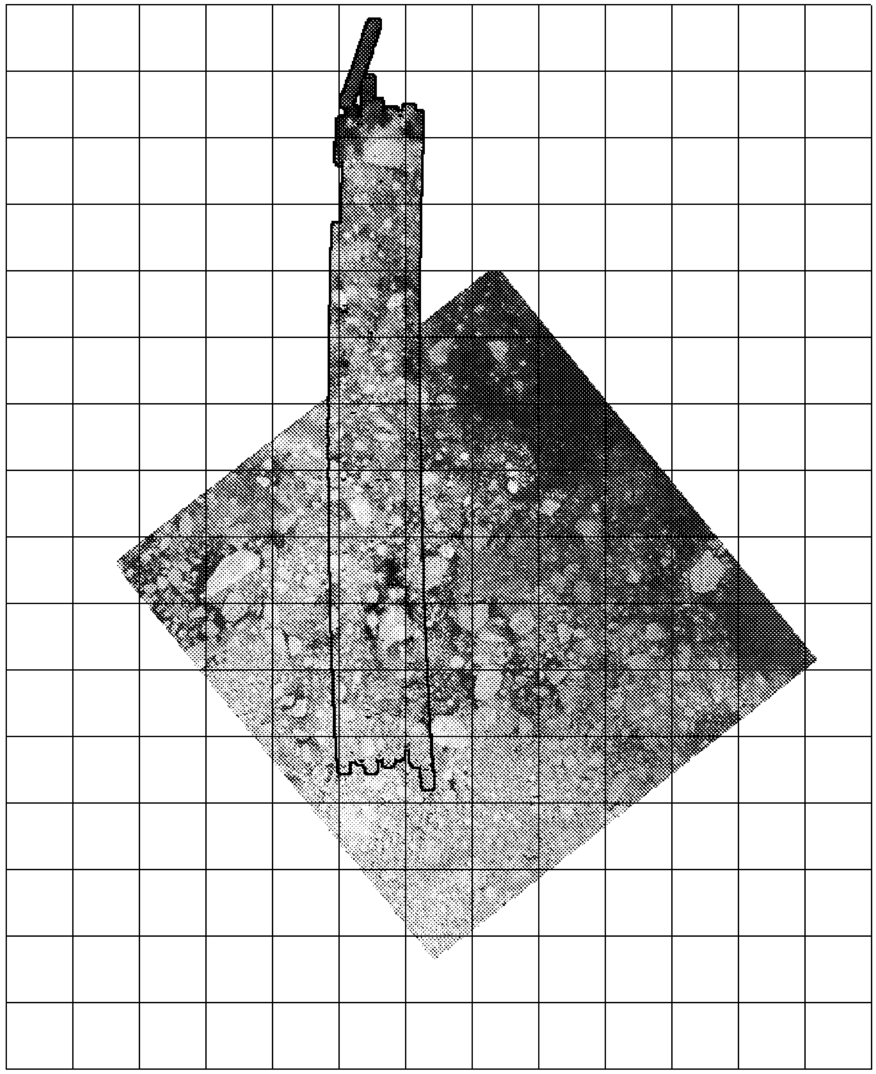


Figure 4. Landsat 7 ETM+ Image of Baffin Bay with PSR brightness temperature (19 GHz, V-pol.) mosaic overlain (outlined in black) for June 27. The Landsat and PSR data are gridded at a resolution of 0.5 km. The 25-km SSMI grid is also shown for comparison.



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VII. Concluding Remarks

This report was written four months after the completion of the mission. During this time a preliminary examination of the aircraft microwave and satellite data sets was undertaken and all indications are that the mission was a success. The particularly good Landsat 7 ETM+ imagery acquired over Baffin Bay during the flights will be particularly useful in putting the aircraft data into a larger spatial context. The coordinated satellite/aircraft/surface data set acquired during Meltpond2000 is expected to serve as the basis for not only validating the AMSR-E Arctic sea ice concentrations, but for improving existing algorithms and for developing new techniques for monitoring the polar regions under summer melt conditions.

VII. Concluding Remarks

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Acknowledgements

The planning and successful completion of this mission resulted from the support received from many individuals. Of paramount importance was the help received from Dr. Elena Lobl, EOS Aqua AMSR-E Science Team Coordinator, in identifying and securing the support needed to make this mission possible. Cheryl Yuhas, Suborbital Science Branch at NASA HQ, helped negotiate the use of the Navy aircraft. Their efforts are gratefully acknowledged.

Dr. Albin J. Gasiewski, sensor scientist for Meltpond2000 and leader of the NOAA/ETL Microwave Radiometry Group, in addition to supplying all the microwave sensors, untiringly provided the leadership, technical expertise, and guidance to ensure that the requisite data were collected on each flight. Al was assisted by Michael McCormick, Karin Schuler, and Dr. Taneil Uttal.

Douglas C. Young, NASA Wallops Aircraft Office, provided substantial assistance in preparing for this campaign. His knowledge of Thule Air Base, the requirements and limitations of operating an aircraft from there, and his overall experience managing an aircraft mission resulted in the success of this campaign.

Jack Gibbons, E-O Sensor Branch, Naval Air Warfare Center, provided the coordination and integration of aircraft, sensors, and science requirements while working within the severe time constraints imposed by the mission which resulted in the aircraft making the first sea ice data flight from Thule, Greenland on schedule. Lynn Mosterd, mission manager for the Navy, and Lt. Miles Ervin, chief pilot of the Navy 150 aircraft, participated in our flight planning sessions to help insure that the science objectives for each flight were met.

Dr. Thorsten Markus, sea ice scientist, JCET/NASA GSFC, assisted with flight planning, with acquiring near real-time DMSP SSMI ice concentration maps, and with requesting the Landsat 7 ETM+ data acquisitions prior to each flight while in Thule. Dr. Edward Kim, sensor scientist, Code 975/NASA GSFC, provided overall support on each of the flights and was responsible for the acquisition of both video and digital aerial photography.

Amy VanBuskirk, AG1 ice observer with the National/Navy Ice Center, provided, in addition to the much needed visual observations, guidance with regard to weather and ice conditions during our flight planning sessions. We are also grateful to other Ice Center personnel including Cheryl Bertoia and AGC Lori Butcher for facilitating teleconferences and meetings prior to our deployment and to Mr. Paul Seymour and Ms. Anita Dungan in acquiring Radarsat imagery.

Major Brimner, Airfield Operations, Thule AB, provided valuable guidance concerning flight operations before our deployment to Thule; Capt. Casstevens arranged for hanger and lab space on our arrival; and TSgt Larry Wilkerson provided logistical support while we were in Thule. Roger Ashley, Phil Eddy, and Jack Stephens at the Weather Operations office gave daily weather briefings and often helped with email communications.

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References

Markus, T. and D. J. Cavalieri, An enhancement of the NASA Team sea ice algorithm, *IEEE Trans. Geosci. and Remote Sensing*, *38*, 1387–1398, 2000.

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Appendix A NAWC P-3 Flight Logs

Appendix A NAWC P-3 Flight Logs

MELTPOND00 Experiment Log–PSR on NAWC P-3 (150)

Date(s):	June 26, 2000 (Julian day 178, Monday)
PSR Flight Code:	DF004
NAVFLIR Number:	
T/O Location:	Thule AB, Greenland
T/O Time (UTC):	1030 (0730 local EDT+1)
Recovery Location:	Thule AB, Greenland
Landing Time (UTC):	1905 (1605 local EDT+1)
Mission Scientist(s):	A. Gasiewski, E. Kim, A. Van Buskirk
PSR Operator(s):	A. Gasiewski, M. McCormick, E. Kim
Scanhead(s):	PSR/A (10.7, 18.7, 21.5, 37, 89 GHz), SLFMR
Purpose of Sortie:	High altitude grid over Baffin Bay for wide area imaging associated with SSMI overflights. SSMI overflight is expected around 6:00 PM local (2100 UTC). Six grids successfully flown, sky cals not performed due to lose fuel mast and need to RTB.
Synoptic Conditions:	
Local Site Conditions:	Isobaric over grid site, some low stratus expected.
Instrument Status:	Normal operation during preflight: 1) IRIG-B not synchronized at scanhead 2) Two home malfunctions during preflight, several successful afterwards during preflight. Successful conical scan operation during preflight. 3) PSR-NAV computer not communicating over net. 4) 10.7V (fourth Stokes) saturating during negative noise diode pulses. 5) A/D B1, CH10,(X/Ku thermistor) shows significant crosstalk from radiometric channels. 6) Loosened fuel mast noticed ~1730. Decision made to RTB to prevent possible loss. PSR scanhead video camera used to monitor fuel mast condition during descent and landing.
Operating Instruments on P3:	PSR/A, SLFMR, GSFC Video
Notes/Flight Synopsis:	First in a back-to-back series of two imaging flights over Baffin Bay.

MELTPOND00 Experiment Log–PSR on NAWC P-3 (150)

Date(s):	June 26, 2000 (Julian day 178, Monday)
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NAVFLIR Number:	
T/O Location:	Thule AB, Greenland
T/O Time (UTC):	1030 (0730 local EDT+1)
Recovery Location:	Thule AB, Greenland
Landing Time (UTC):	1905 (1605 local EDT+1)
Mission Scientist(s):	A. Gasiewski, E. Kim, A. Van Buskirk
PSR Operator(s):	A. Gasiewski, M. McCormick, E. Kim
Scanhead(s):	PSR/A (10.7, 18.7, 21.5, 37, 89 GHz), SLFMR
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Operating Instruments on P3:	PSR/A, SLFMR, GSFC Video
Notes/Flight Synopsis:	First in a back-to-back series of two imaging flights over Baffin Bay.

Time (GMT)	Event
~1100	T/O
1110	SLFMR operating normally, nav data and irig time recorded OK. Data being logged…
1112	PSR-ARCH locked up, required reboot…
1117	PSR-ARCH rebooted, acquisition started…
112000	Check_time: PSR-ARCH: 11:20:17 PSR/A Scanhead: 11:19:38 IRIGB: 11:20:00
~1148	Start line 1, heading 156.60 degrees and 19,000 pressure altitude. PSR-ARCH finally working after several reboot attempts. Several corrupted files noted. Prob able cause is vibration during climbout.
125243	End line 1.
125645	Start line 2…
	Stall during line 2 - lost ~ 1.5 minutes of data.
140410	End line 2.
1409	Start line 3, heading 156.60 degrees …
151145	End line 3.
151620	Start line 4…
162300	End line 4.
162800	Start line 5, heading 156.60 degrees…
~1715	Crossed over boundary between clear air and low (few thousand feet or so top altitude) optically thin cloud layer. The transition was not associated with any obvious changes in ice texture or cover, but is well correlated with a transition in polarization signature. The ice south of this line appears less polarized, even in the low-frequency microwave channels. Warming of scanhead skin temperature observed during line 5 heading southward. Low cloud region at southern end of grid is apparently accompanied by an upper level warming.
172830	End Line 5.
~173330	Start line 6…
1834	End Line 6. stop scanning, Home to protect dangling fuel mast. RTB without sky cals…
1905	Touchdown

Time (GMT)	Event
~1100	T/O
1110	SLFMR operating normally, nav data and irig time recorded OK. Data being logged…
1112	PSR-ARCH locked up, required reboot…
1117	PSR-ARCH rebooted, acquisition started…
112000	Check_time: PSR-ARCH: 11:20:17 PSR/A Scanhead: 11:19:38 IRIGB: 11:20:00
~1148	Start line 1, heading 156.60 degrees and 19,000 pressure altitude. PSR-ARCH finally working after several reboot attempts. Several corrupted files noted. Prob able cause is vibration during climbout.
125243	End line 1.
125645	Start line 2…
	Stall during line 2 - lost ~ 1.5 minutes of data.
140410	End line 2.
1409	Start line 3, heading 156.60 degrees …
151145	End line 3.
151620	Start line 4…
162300	End line 4.
162800	Start line 5, heading 156.60 degrees…
~1715	Crossed over boundary between clear air and low (few thousand feet or so top altitude) optically thin cloud layer. The transition was not associated with any obvious changes in ice texture or cover, but is well correlated with a transition in polarization signature. The ice south of this line appears less polarized, even in the low-frequency microwave channels. Warming of scanhead skin temperature observed during line 5 heading southward. Low cloud region at southern end of grid is apparently accompanied by an upper level warming.
172830	End Line 5.
~173330	Start line 6…
1834	End Line 6. stop scanning, Home to protect dangling fuel mast. RTB without sky cals…
1905	Touchdown

MELTPOND00 Experiment Log - PSR on NAWC P-3 (150)

Date(s):	June 27, 2000 (Julian day 179, Tuesday)
PSR Flight Code:	DF005
NAVFLIR Number:	
T/O Location:	Thule AB, Greenland
T/O Time (UTC):	1058 (0758 local EDT+1)
Recovery Location:	Thule AB, Greenland
Landing Time (UTC):	1856 (1556 local EDT+1)
Mission Scientist(s):	A. Gasiewski, E. Kim, A. Van Buskirk
PSR Operator(s):	A. Gasiewski, M. McCormick, E. Kim
Scanhead(s):	PSR/A (10.7, 18.7, 21.5, 37, 89 GHz), SLFMR

Purpose of Sortie: Low altitude grid over Baffin Bay for pixel intrercomparisons associated with SSMI overflights. SSMI overflight is expected around 6:00 PM local (2100 UTC).

Synoptic Conditions:

Local Site Conditions: Isobaric high over grid site, clear below A/C entire flight, some scattered cirrus ~9,000-9,500', 3/8 to west of grid, 0/8 to north of grid. Winds mostly calm, slight N-NW component (~6 kts) at pattern altitude.

Instrument Status: Diagnostic notes:

1) Several abnormal homing occurrences during preflight.

2) PSR-ARCH computer was not booted in flight until nominal pattern altitude was reached and airspeed reduced. One major lockup of keyboard, ftp, and telnet occurred prior to the start of line 1. The lockup required a reboot of PSR-ARCH.

3) Two stalls were noted during approach to the start of the first flight line.

4) 10.7V (fourth Stokes) not as near saturation at -10volts as for 2000_0626 (DF004). Video drift in this channel is appar ently temperature dependent, and channel should be offset and attenuated accordingly.

Operating Instruments on P3: PSR/A, SLFMR, GSFC Video

Notes/Flight Synopsis: Second in a back-to-back series of two imaging flights over Baffin Bay.

Observer note: Damping of waves between ice floes was easily observed through sun glint. Angular broadening of the sun was typically limited to ~10-20% of a single solar disk “diameter,” as seen reflected at incident an angle of ~45 degrees. Thus, the standard deviation of the slope of the ocean was typically limited to 0.05-0.1 deg.

MELTPOND00 Experiment Log - PSR on NAWC P-3 (150)

Date(s):	June 27, 2000 (Julian day 179, Tuesday)
PSR Flight Code:	DF005
NAVFLIR Number:	
T/O Location:	Thule AB, Greenland
T/O Time (UTC):	1058 (0758 local EDT+1)
Recovery Location:	Thule AB, Greenland
Landing Time (UTC):	1856 (1556 local EDT+1)
Mission Scientist(s):	A. Gasiewski, E. Kim, A. Van Buskirk
PSR Operator(s):	A. Gasiewski, M. McCormick, E. Kim
Scanhead(s):	PSR/A (10.7, 18.7, 21.5, 37, 89 GHz), SLFMR
Purpose of Sortie:	Low altitude grid over Baffin Bay for pixel intrercomparisons associated with SSMI overflights. SSMI overflight is expected around 6:00 PM local (2100 UTC).
Synoptic Conditions:	
Local Site Conditions:	Isobaric high over grid site, clear below A/C entire flight, some scattered cirrus ~9,000-9,500', 3/8 to west of grid, 0/8 to north of grid. Winds mostly calm, slight N-NW component (~6 kts) at pattern altitude.
Instrument Status:	Diagnostic notes: 1) Several abnormal homing occurrences during preflight. 2) PSR-ARCH computer was not booted in flight until nominal pattern altitude was reached and airspeed reduced. One major lockup of keyboard, ftp, and telnet occurred prior to the start of line 1. The lockup required a reboot of PSR-ARCH. 3) Two stalls were noted during approach to the start of the first flight line. 4) 10.7V (fourth Stokes) not as near saturation at -10volts as for 2000_0626 (DF004). Video drift in this channel is appar ently temperature dependent, and channel should be offset and attenuated accordingly.
Operating Instruments on P3:	PSR/A, SLFMR, GSFC Video
Notes/Flight Synopsis:	Second in a back-to-back series of two imaging flights over Baffin Bay. Observer note: Damping of waves between ice floes was easily observed through sun glint. Angular broadening of the sun was typically limited to ~10-20% of a single solar disk "diameter," as seen reflected at incident an angle of ~45 degrees. Thus, the standard deviation of the slope of the ocean was typically limited to 0.05-0.1 deg.

Occasionally, waves (associated with non-specular "rough" areas) could seen building ~100-200 meters leeward of the floe edges. The wind direction was thus determined to be from western side of the track (~W-SW), and probably less than a few m/sec as evidenced by the small wind drift observed at flight altitude and the complete absence of whitecaps. The smooth water between floes represents a potential calibration source for PSR being that the temperature is well known (0 degC) and the water in many regions is nearly smooth by the above standards.

Several photos were taken of the sun reflecting specularly (glistening) from open water areas.

Time (GMT)	**Event**
1058	T/O
1106	Start_all, start psr navigation acquisition process…
1110	Comcon 53.1 15
~1115	PSR-ARCH keyboard, ftp, and telnet locked up (mouse still worked). System rebooted, resumed conical scan…
112945	Start line 1, 4,500' altitude, 210 kias…
120445	End line 1.
	Check_time PSR-ARCH: 120523 PSR/A scanhead: 120445 IRIGB time: 120510
121015	Start line 2…
124630	End line 2.
	Check_time PSR-ARCH: 124913 PSR/A scanhead: 124835 IRIGB time: 124900
125200	Start line 3…
132845	End line 3.
133445	Start line 4…
141445	End line 4.
142050	Start line 5…
145450	End line 5.
	Check_time PSR-ARCH: 145813 PSR/A scanhead: 145734 IRIGB time: 145800

Occasionally, waves (associated with non-specular "rough" areas) could seen building ~100-200 meters leeward of the floe edges. The wind direction was thus determined to be from western side of the track (~W-SW), and probably less than a few m/sec as evidenced by the small wind drift observed at flight altitude and the complete absence of whitecaps. The smooth water between floes represents a potential calibration source for PSR being that the temperature is well known (0 degC) and the water in many regions is nearly smooth by the above standards.

Several photos were taken of the sun reflecting specularly (glistening) from open water areas.

Time (GMT)	Event
1058	T/O
1106	Start_all, start psr navigation acquisition process…
1110	Comcon 53.1 15
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112945	Start line 1, 4,500' altitude, 210 kias…
120445	End line 1.
	Check_time PSR-ARCH: 120523 PSR/A scanhead: 120445 IRIGB time: 120510
121015	Start line 2…
124630	End line 2.
	Check_time PSR-ARCH: 124913 PSR/A scanhead: 124835 IRIGB time: 124900
125200	Start line 3…
132845	End line 3.
133445	Start line 4…
141445	End line 4.
142050	Start line 5…
145450	End line 5.
	Check_time PSR-ARCH: 145813 PSR/A scanhead: 145734 IRIGB time: 145800

150040	Start line 6…
153415	End line 6.
154000	Start line 7…
161420	End line 7.
162000	Start line 8…
165700	End line 8.
170200	Start line 9…
173500	End line 9.
174030	Start line 10…
181445	End line 10.
181600	Xtrack, home,nadir,
181715	Xtrack over blue water, no ice…
182300	Stop, home, nadir - prepare for sky calibrations…
182430	Sky roll #1, sky 70…
182600	Nadir
182745	Sky roll #2, sky 70…
182830	Nadir
183000	Sky roll #3, sky 70…
183100	Nadir
183500	Stop, stow, stop_all_acq, slay nav1553_ingest Check_time PSR-ARCH: 183542 PSR/A scanhead: 183504 IRIGB time: 183530
1856	Touchdown

150040	Start line 6…
153415	End line 6.
154000	Start line 7…
161420	End line 7.
162000	Start line 8…
165700	End line 8.
170200	Start line 9…
173500	End line 9.
174030	Start line 10…
181445	End line 10.
181600	Xtrack, home,nadir,
181715	Xtrack over blue water, no ice…
182300	Stop, home, nadir - prepare for sky calibrations…
182430	Sky roll #1, sky 70…
182600	Nadir
182745	Sky roll #2, sky 70…
182830	Nadir
183000	Sky roll #3, sky 70…
183100	Nadir
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1856	Touchdown

MELTPOND00 Experiment Log - PSR on NAWC P-3 (150)

Date(s):	June 29, 2000 (Julian day 181, Thursday)
PSR Flight Code:	DF006
NAVFLIR Number:	
T/O Location:	Thule AB, Greenland
T/O Time (UTC):	1100 (0800 local EDT+1)
Recovery Location:	Thule AB, Greenland
Landing Time (UTC):	1845 (1545 local EDT+1)
Mission Scientist(s):	A. Gasiewski, E. Kim, A. Van Buskirk
PSR Operator(s):	A. Gasiewski, M. McCormick, E. Kim
Scanhead(s):	PSR/A (10.7, 18.7, 21.5, 37, 89 GHz), SLFMR
Purpose of Sortie:	Ice mapping using PSR/A over SE Melville Sound; Line plots over meltponds east of Truro Island ice camp, Canada.
Synoptic Conditions:	
Local Site Conditions:	

Instrument Status: Normal preflight including previously observed malfunctions:

1) PSR-ARCH photon windows locked up twice, seemed to work consistently after warmup. Lockup is observed via both keyboard and telnet, sometimes independently.

2) Scanhead home command failed on first few attempts, OK thereafter.

3) PSR scanhead video is fed to GSFC video recorder during low-altitude line plots.

4) 10.7V (fourth Stokes) and 18.7U (third Stokes) near satura tion at -10v and +10v, respectively. All other channels well within range.

5) Many reboot attempts of PSR-ARCH. Failures caused by adverse impact of strong vibration on PSR-ARCH hard disk. Problem solved in flight during line 4 of the Melville grid using rubber strips under computer.

6) One SLFMR file problem: the aircraft pitch/roll file A29J0590.DAT was missing. The data from A29J0584.DAT was copied in its place to complete the sr2mat.exe operation.

Operating Instruments on P3: PSR/A, SLFMR, GSFC Video

Notes/Flight Synopsis: First of two identical flights using PSR/A scanhead. To be followed by a flight using the same maneuvers using PSR/C.

MELTPOND00 Experiment Log - PSR on NAWC P-3 (150)

Date(s): June 29, 2000 (Julian day 181, Thursday)
PSR Flight Code: DF006
NAVFLIR Number:
T/O Location: Thule AB, Greenland
T/O Time (UTC): 1100 (0800 local EDT+1)
Recovery Location: Thule AB, Greenland
Landing Time (UTC): 1845 (1545 local EDT+1)
Mission Scientist(s): A. Gasiewski, E. Kim, A. Van Buskirk
PSR Operator(s): A. Gasiewski, M. McCormick, E. Kim
Scanhead(s): PSR/A (10.7, 18.7, 21.5, 37, 89 GHz), SLFMR
Purpose of Sortie: Ice mapping using PSR/A over SE Melville Sound; Line plots over meltponds east of Truro Island ice camp, Canada.

Synoptic Conditions:
Local Site Conditions:
Instrument Status: Normal preflight including previously observed malfunctions:

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Operating Instruments on P3: PSR/A, SLFMR, GSFC Video
Notes/Flight Synopsis: First of two identical flights using PSR/A scanhead. To be followed by a flight using the same maneuvers using PSR/C.

Note: Ice over Melville and ice camp areas was mostly blue, indicating absence of brine and hence frech water ice. This ice was also mostly multiyear, as evidenced by the numerous ridges and rough features resulting from cracks. The melt water also appeared to be more in the form of a lace than a ponding, also indicative of multi-year ice. A large fraction of surface melt could be seen in sun glint, with at perhaps 10–40% sur face liquid.

Time (GMT)	**Event**
~1100	T/O
~1130	Start_all, start psr navigation acquisition process…
1212	Comcon 52.1 15 en route @ 18,000' , dropping to pattern altitude of 4,500', ~60 nmi from Resolute VOR. Over 100% blue ice cover in Wellington Channel, East of Cornwallis Island. Similar 100% cover from Cornwallis out to Melville Sound.
Note	Nadir 25 38 270 required for low-altitude lines
1234	Level off at 4,500'. Thin stratus deck below over most of Melville Sound pattern area. Climbed back up to 5,500' to stay clear of clouds.
1242	PSR-ARCH lockup. Rebooted… Comcon 53.1 15, PSR back up at 124540 for start of line 1. Undercast at ~ 4,500' below.
124730	Start line 1…
1250	Stall, reboot…
~1258	Stall, reboot againl… End line 1.
131000	Start line 2…
133315	Start line 3…
134520	PSR-ARCH locked up, full power-down reboot…
135110	End line 3.
	Start line 4… Major problems rebotting PSR-ARCH. Attempted to install vibration damping rubber strips under chassis. Seems to help, but disk is likely heavily corrupted.
141400	End line 4. Start line 5 shortly thereafter…
~1420	Start line 5…
~1418	PSR-ARCH (after many attempts) successfully boots. Reenter conical scan mode to finish line 5.
1438	End line 5.
1442	Start line 6…
1501	End line 6.
1505	Start line 7…
1523	End line 7.

Note: Ice over Melville and ice camp areas was mostly blue, indicating absence of brine and hence frech water ice. This ice was also mostly multiyear, as evidenced by the numerous ridges and rough features resulting from cracks. The melt water also appeared to be more in the form of a lace than a ponding, also indicative of multi-year ice. A large fraction of surface melt could be seen in sun glint, with at perhaps 10–40% sur face liquid.

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~1418	PSR-ARCH (after many attempts) successfully boots. Reenter conical scan mode to finish line 5.
1438	End line 5.
1442	Start line 6…
1501	End line 6.
1505	Start line 7…
1523	End line 7.

1528	Start line 8…
1546	End line 8.
154615	Begin descend to below clouds, 1,000 altitude.
154840	Nadir 25 38 270 (38 degree starboard stare, 25 second calibration intervals). Stop SLFMR acquisition, restart in beam 3R mode, .25 second dwell time…
1603	Begin left 15° bank circle near waypoint Sierra (74.8333, -97.0581)…
1608	End circle, line up for straight line north for 38° line plot…
1610	Begin ice camp line 1, northbound…
1628	End ice camp line 1, begin left 15° bank circle near waypoint November (75.7750, -97.0581) …
	End circle, line up for straight line south for 38° line plot…
	Ascend to 5,000' to prepare for calibration rolls…
1700	Nadir
1703	Sky roll #1, sky 70…
170445	Nadir
1706	Sky roll #2, sky 70…
1707	Nadir
170730	Sky roll #3, sky 70…
170845	Nadir
171030	RTB, xtrack during transit across Canadian archipelago at 21,000'.
1730	Stop, stow
~1845	Touchdown

1528	Start line 8…
1546	End line 8.
154615	Begin descend to below clouds, 1,000 altitude.
154840	Nadir 25 38 270 (38 degree starboard stare, 25 second calibration intervals). Stop SLFMR acquisition, restart in beam 3R mode, .25 second dwell time…
1603	Begin left 15° bank circle near waypoint Sierra (74.8333, -97.0581)…
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	End circle, line up for straight line south for 38° line plot…
	Ascend to 5,000' to prepare for calibration rolls…
1700	Nadir
1703	Sky roll #1, sky 70…
170445	Nadir
1706	Sky roll #2, sky 70…
1707	Nadir
170730	Sky roll #3, sky 70…
170845	Nadir
171030	RTB, xtrack during transit across Canadian archipelago at 21,000'.
1730	Stop, stow
~1845	Touchdown

MELTPOND00 Experiment Log - PSR on NAWC P-3 (150)

Date(s):	June 30, 2000 (Julian day 182, Friday)
PSR Flight Code:	DF007
NAVFLIR Number:	
T/O Location:	Thule AB, Greenland
T/O Time (UTC):	1100 (0800 local EDT+1)
Recovery Location:	Thule AB, Greenland
Landing Time (UTC):	1905 (1605 local EDT+1)
Mission Scientist(s):	A. Gasiewski, E. Kim, A. Van Buskirk
PSR Operator(s):	A. Gasiewski, M. McCormick, E. Kim
Scanhead(s):	PSR/C (6.00, 6.50, 6.925, 7.325 GHz), SLFMR
Purpose of Sortie:	Ice mapping using PSR/C over SE Melville Sound; line plots over meltponds east of Truro Island ice camp, Canada.
Synoptic Conditions:	Similar to previous flight (2000_0629). Forecast indicates increasing cloud over or Melville Sound, perhaps also over ice camp area.
Local Site Conditions:	
Instrument Status:	Download of PSR/A scanhead and upload of PSR/C scanhead occurred without problem. Normal homing and scanning operation found on first attempt.

Preflight operation of PSR/C:

1) PSR/C scanhead video camera not operating. Connections at inner flange plate checked. Scanhead power and internet connections OK. Problem traced to loose TNC connector on top of inner flange plate, connector tightened, camera OK.

2) PSR-ARCH keyboard locked up during several initial boot attempts. Problem may be related to temperature of computer module. Telnet access from Odysseus laptop PC was OK each time.

3) Scanhead_atod_acq process replaced with modified version which records the system clock (as opposed to the irigb time clock). Note need to run (from root) rtc - s net 3 before acqui sition in order to sync the PSR/C system clock reasonably close to the system time clock of PSR-ARCH.

4) Large A/D channel crosstalk noted in some thermistor channels. Vref (A/D B1, Ch12) channel is heavily coupled to hardware trigger channel.

5) Scanhead and elevation lockup at 1558 suspected to be associated with increased vibration, moisture, and.or electrifi cation resulting from ascent through icing conditions.

MELTPOND00 Experiment Log - PSR on NAWC P-3 (150)

Date(s): June 30, 2000 (Julian day 182, Friday)
PSR Flight Code: DF007
NAVFLIR Number:
T/O Location: Thule AB, Greenland
T/O Time (UTC): 1100 (0800 local EDT+1)
Recovery Location: Thule AB, Greenland
Landing Time (UTC): 1905 (1605 local EDT+1)
Mission Scientist(s): A. Gasiewski, E. Kim, A. Van Buskirk
PSR Operator(s): A. Gasiewski, M. McCormick, E. Kim
Scanhead(s): PSR/C (6.00, 6.50, 6.925, 7.325 GHz), SLFMR
Purpose of Sortie: Ice mapping using PSR/C over SE Melville Sound; line plots over meltponds east of Truro Island ice camp, Canada.
Synoptic Conditions: Similar to previous flight (2000_0629). Forecast indicates increasing cloud over or Melville Sound, perhaps also over ice camp area.

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Instrument Status: Download of PSR/A scanhead and upload of PSR/C scanhead occurred without problem. Normal homing and scanning operation found on first attempt.

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5) Scanhead and elevation lockup at 1558 suspected to be associated with increased vibration, moisture, and.or electrifi cation resulting from ascent through icing conditions.

Operating Instruments on P3: PSR/C, SLFMR, GSFC Video
Notes/Flight Synopsis: Second of two identical flights, uses PSR/C.

Significantly more water coverage of ice observed during ice camp runs than yesterday. Estimate ~30-60% coverage of standing water, greater number of meltponds.

Time (GMT)	Event
~1100	T/O
~1120	Start SLFMR acquisition, 8-beam cross-track scan mode…
1127	Start_all, home, from root: rtc -s net 3 to set system clock on PSR/C
1201	Comcon 55 15, Use 55 degree incidence for AMSR-E sea ice observations.
~1205	Noticed that scanhead video camera no longer functioning, probably loose TNC connector again.
1218	Stop SLFMR, restart in 3R beam stare mode for ice camp lines, 0.25 second dwell time. Begin descent to 1,000' for ice camp lines.
1220	Stop, home, nadir 60 38 270 (38 degree starboard stare, 25 second calibration intervals) to prepare for ice camp lines.
123225	Start 15° left bank turn at 1000' altitude near waypoint Sierra…
123650	End circle, line up for ice camp run #1…
124415	Begin line 1 from Sierra to November (see flight plan for 2000_0629 for waypoints)… Winds 178@11. Stratus overcast layer above A/C at ~2,000'.
1300	End line 1.
130240	Start 15° left bank turn at 1000' altitude near waypoint Sierra…Open water noted at 130255.
1307	End circle around November. Note: Mixed open water, pack ice, and floes in this circle.
131445	Start line 2 from November' to Sierra'. Stratus overcast layer above A/C at ~2,000'.
133445	End line 2. Begin line up for line 3…
133730	Start line 3 from Sierra' to November'. Stratus overcast layer above A/C at ~2,000'.
135320	End line 3.
135900	Start 15° left bank turn at 1000' altitude near waypoint Sierra over mostly open water, some floes (~10%).
140345	End circle around open water near November. Begin line up for line 4 southward.
1413	Start line 4 from November' to Sierra'. Stratus overcast layer above A/C at ~2,000'.
1429	End line 3.
1435	Begin ascent to 5,000' for Melville grid patterns.
143515	Stop, comcon 55 15, restart SLFMR acquisition in 8-beam mode, 0.5 second dwell time…
143715	Level at 5,000', PSR/C and SLFMR in scanning modes, en route to line 5 of Melville Sound grid. Note: grid has been truncated to last 4 of eight total lines to coincide with the four successful 2000_0629 lines.

Operating Instruments on P3: PSR/C, SLFMR, GSFC Video

Notes/Flight Synopsis: Second of two identical flights, uses PSR/C.

Significantly more water coverage of ice observed during ice camp runs than yesterday. Estimate ~30-60% coverage of standing water, greater number of meltponds.

Time (GMT)	Event
~1100	T/O
~1120	Start SLFMR acquisition, 8-beam cross-track scan mode…
1127	Start_all, home, from root: rtc -s net 3 to set system clock on PSR/C
1201	Comcon 55 15, Use 55 degree incidence for AMSR-E sea ice observations.
~1205	Noticed that scanhead video camera no longer functioning, probably loose TNC connector again.
1218	Stop SLFMR, restart in 3R beam stare mode for ice camp lines, 0.25 second dwell time. Begin descent to 1,000' for ice camp lines.
1220	Stop, home, nadir 60 38 270 (38 degree starboard stare, 25 second calibration intervals) to prepare for ice camp lines.
123225	Start 15° left bank turn at 1000' altitude near waypoint Sierra…
123650	End circle, line up for ice camp run #1…
124415	Begin line 1 from Sierra to November (see flight plan for 2000_0629 for waypoints)… Winds 178@11. Stratus overcast layer above A/C at ~2,000'.
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1413	Start line 4 from November' to Sierra'. Stratus overcast layer above A/C at ~2,000'.
1429	End line 3.
1435	Begin ascent to 5,000' for Melville grid patterns.
143515	Stop, comcon 55 15, restart SLFMR acquisition in 8-beam mode, 0.5 second dwell time…
143715	Level at 5,000', PSR/C and SLFMR in scanning modes, en route to line 5 of Melville Sound grid. Note: grid has been truncated to last 4 of eight total lines to coincide with the four successful 2000_0629 lines.

1444	Weather at 5,000' over Melville Sound poor, decision made to ascend to 10,000' and cover the entire Melville sound grid, but with four lines.
1446	Leveling off at 10,000' en route to Melville Sound grid…
1446-1548	Climb to 15,000' to clear icing conditions, PSR elevation failed during ascent. Hard power reboot was necessary to recover control of both axes. Acquisition restarted at west end of line 1, for observations on line 2. PSR/C scanhead computer also locked up during ascent. Note that the scanhead clock was found to lagging by 12 seconds after rebooting.
1548	Restart all acquisition and conical scanning - comcon 55 15 set_pitch 0…
155215	Start line 2…
1558	Broke off line 2 - discovered that grid was misplaced too far south. Repositioning grid and transiting into position to restart entire grid at line 1…
1602 160930	Noticed that scanhead video was functioning again. Start line 1, 15,000' altitude…
162500	End line 1.
162900	Start line 2, 15,000' altitude…
	They are going to have to scrub the Baffin Bay circles based on time constraints.
164345	End line 2 74 23 35 latitude 100 50 63 longitude (approx)
164849	Start line 3 74 29 40 latitude 101 17 00 longitude
.170510	End line 3 74 33 90 latiitude 104 59 00 longitude
	Start line 4
	End line 4
172700	Stop, home, nadir, prepare for steep calibration rolls…
172745	Steep sky roll #1, sky 70
173050	Steep sky roll #2, sky 70
173300	Steep sky roll #3, sky 70
173330	Nadir
1735	Comcon 55 15, RTB… Time to head for dinner.
1738	Restart acquisition processes…
175645	Descend. Stop, stow. stop_all_acq.
190500	Touchdown
	Note: scanhead_atod_acq error noted at PSR-ARCH. A/D program mixed up some channels. Five such meassages noted, time of messages unknown.

1444	Weather at 5,000' over Melville Sound poor, decision made to ascend to 10,000' and cover the entire Melville sound grid, but with four lines.
1446	Leveling off at 10,000' en route to Melville Sound grid…
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1548	Restart all acquisition and conical scanning - comcon 55 15 set_pitch 0…
155215	Start line 2…
1558	Broke off line 2 - discovered that grid was misplaced too far south. Repositioning grid and transiting into position to restart entire grid at line 1…
1602	Noticed that scanhead video was functioning again.
160930	Start line 1, 15,000' altitude…
162500	End line 1.
162900	Start line 2, 15,000' altitude…
	They are going to have to scrub the Baffin Bay circles based on time constraints.
164345	End line 2 74 23 35 latitude 100 50 63 longitude (approx)
164849	Start line 3 74 29 40 latitude 101 17 00 longitude
.170510	End line 3 74 33 90 latiitude 104 59 00 longitude
	Start line 4
	End line 4
172700	Stop, home, nadir, prepare for steep calibration rolls…
172745	Steep sky roll #1, sky 70
173050	Steep sky roll #2, sky 70
173300	Steep sky roll #3, sky 70
173330	Nadir
1735	Comcon 55 15, RTB… Time to head for dinner.
1738	Restart acquisition processes…
175645	Descend. Stop, stow. stop_all_acq.
190500	Touchdown
	Note: scanhead_atod_acq error noted at PSR-ARCH. A/D program mixed up some channels. Five such meassages noted, time of messages unknown.

MELTPOND00 Experiment Log - PSR on NAWC P-3 (150)

Date(s): July 05, 2000 (Julian day 187, Wednesday)
PSR Flight Code: DF008
NAVFLIR Number:
T/O Location: Thule AB, Greenland
T/O Time (UTC): ~1110 (~0810 local EDT+1)
Recovery Location: Thule AB, Greenland
Landing Time (UTC): ~1900 (~1600 local EDT+1)
Mission Scientist(s): A. Gasiewski, E. Kim, T. Uttal
PSR Operator(s): A. Gasiewski, M. McCormick, E. Kim
Scanhead(s): PSR/C (6.00, 6.50, 6.925, 7.32 GHz), SLFMR
Purpose of Sortie: Wide area ice mapping using PSR/C over South Baffin Bay at 21,000'.
Synoptic Conditions: Clear over mapping site, visibility ~50 nmi. Ice conditions ranged from open water to ~95% packed floes.
Local Site Conditions: Overcast , cloud bottoms at ~2,000'.
Instrument Status: Download of PSR/A scanhead and upload of PSR/C scanhead occurred 7/4/00.

Preflight performance:

1) Failed fine homing operation on several attempts. Rebooted PSR-ARCH, home operation successful. Second boot has often been successful after home failure. Suspect that this problem is associated with either charge buildup in motion electronics or humidity which eventually is purged by self heating.

2) PSR/C scanhead video camera not functioning. Suspect problem is within scanhead since camera connector above inner flange plate was repaired and PSR/A functioned well during previous flight (2000_0629).

3) Several in-flight crashes of PSR-ARCH to scanhead ethernet link. Problem apparently eliminated after A/C ground speed was reduced to ~250 kts. Suspect cause is related to vibrations that crashed PSR-ARCH on several previous flights.

4) Several additional malfunctions of scanhead_atod_acq software immediately after completing last line (#6) of grid. Several reboot attempts of both PSR-ARCH and the PSR/C scanhead computer could not bring scenhead_atod_acq process back up operating prolerly. Missed sky calibrations, otherwise, all data throughout last line is excellent.

MELTPOND00 Experiment Log - PSR on NAWC P-3 (150)

Date(s): July 05, 2000 (Julian day 187, Wednesday)
PSR Flight Code: DF008
NAVFLIR Number:
T/O Location: Thule AB, Greenland
T/O Time (UTC): ~1110 (~0810 local EDT+1)
Recovery Location: Thule AB, Greenland
Landing Time (UTC): ~1900 (~1600 local EDT+1)
Mission Scientist(s): A. Gasiewski, E. Kim, T. Uttal
PSR Operator(s): A. Gasiewski, M. McCormick, E. Kim
Scanhead(s): PSR/C (6.00, 6.50, 6.925, 7.32 GHz), SLFMR
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4) Several additional malfunctions of scanhead_atod_acq software immediately after completing last line (#6) of grid. Several reboot attempts of both PSR-ARCH and the PSR/C scanhead computer could not bring scenhead_atod_acq process back up operating prolerly. Missed sky calibrations, otherwise, all data throughout last line is excellent.

	PSR/C scanehad immediately booted and successfully acquired data upon landing. However, the net connection failed after ~ 5 minutes of acquisition. Suspect that the scanhead PC is locking up since all functions on PSR-ARCH apparently continued.
Operating Instruments on P3:	PSR/C, SLFMR, GSFC Video
Notes/Flight Synopsis:	

Time (GMT)	Event
~1110	T/O
112730	Check_time; rtc -s net 3; Note that resetting the real time clock on PSR/C may cause the recording of two distinctly time grids - one much different from IRIGB, but short and located at the beginning of the first .rad file.
1143	Began conical scanning, comcon 55 15, scanhead_atod_acq process failed, net connection to scanhead lost. Rebooted scanhead, net connection restored, …
114630	Second attempt to start conical scanning. Scanhead_atod_acq failed again. Rebooted scanhead computer again, this time A/C ground speed scaled back to 265.
1155	Begin conical scanning, scanhead atod process failed again. Suspect net connection. PSR-ARCH and scanhead both rebooted from power off state. Restarted nav1553_ingest, set scanhead clock, then start_all…
120245	Commence conical scanning again - third attempt after cold power boot. Suspect link failure a result of vibration again…
1211	Start line 1…
	Note: winds at altitude are 17 kts from ~000. Ice is broken, being pushed south slowly. AG1 (A. Vanuskirk) states that winds push floes at ~2% of the near-surface velocity.
1304	End line 1. Note: viewrad images show decidedly larger v-h temperature different cover open water when looking forward versus backward. The discrepancy is up to 20K, where the average v-h difference over open water is ~80K. A smaller v-h discrepancy is also noted within regions over ice. These discrepancies were also noted in observa tions over the Melville Sound during 2000_0630. The discrepancy is seen consis tently in all radiometric bands. It is noted that the aircraft is pitched up ~2.5°, thus accounting for several degrees K of increase in front-look v brightness, and several degrees K of decrease of back-look h brightness. The forward/backward brightness asymmetry is thus apparently due to pitch bias, and should be removable in processing to level 2.3. Note: 10um IR temperature dropped from -16 to -22° C from the north end of line 1 to the southern end. Visibility is ~50 nmi, optically clear to surface. Suspect that 10umIR channel may not be functioning. Need to check all flight lines to be sure…

	PSR/C scanehad immediately booted and successfully acquired data upon landing. However, the net connection failed after ~ 5 minutes of acquisition. Suspect that the scanhead PC is locking up since all functions on PSR-ARCH apparently continued.
Operating Instruments on P3:	PSR/C, SLFMR, GSFC Video
Notes/Flight Synopsis:	

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130945	Start line 2…
133530	Check_time: IRIGB: 133530
	PSR-ARCH: 133535 PSR/C: 133536
140720	End line 2. Shorten tracks from 240 nmi to 215 nmi to accommodate total flight time constraints. Run set_pitch 2.5. Line up for line 3…
141345	Start line 3…
145925	End line 3.
1504	Start line 4…
1550	End line 4.
1555	Start line 5…
1638	End line 5.
164120	Start line 6…
172515	End line 6.
1730	Crash immediately after end of line 6, reboot from power up.
	Setup for sky roll, home, nadir…
173530	Nadir
	Several attempts to reboot scanhead computer failed. Both scanhead_atod_acq and sin net fail sometimes to work. Scanhead A/D process indicates "ERROR: DMM_16_AtoD_1 A/D channels out of sync…". Commend sin net fails to list two nodes. Similar to errors that occurred prior to entering the grid pattern. Sky calibra tion rolls could not be completed.
	Test buoy dropped over North Baffin Nay. SLFMR remained operating through test drop.
~1900	Touchdown

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	PSR-ARCH: 133535 PSR/C: 133536
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~1900	Touchdown

Appendix B NIC Ice Reconnaissance Data Logs

Appendix B NIC Ice Reconnaissance Data Logs

NIC Ice Reconnaissance Data Log

Forms of Ice
x New ice/nilas
0 Pancake <3m
1 Brash <3m
2 Ice Cake 3-20m
3 Small Floe 20-100m
4 Medium Floe 100-500m
5 Big Floe 500-2000m
6 Vast Floe 2-10km
7 Giant Floe >10km
8 Fast Ice/Floebergs
/ Unknown

Topography
0 None
1 New Ridge
2 Weathered ridge
3 Very Weathered ridge
4 Aged ridge
5 Consolidated ridge
6 Vast Floe 2-10km
7 Rafting
/ Unknown

Type of Openings
0 No Openings
1 Crack
2 Fracture 0-50m
3 Fracture 50-200m
4 Fracture 200-500m
5 Fracture >500m
6 Lead
7 Polynya
8 Recur. Polynya
9 Water Between Floes
/ Unknown

Orientation of Opening
0 None
1 No Distinct
2 NE-SW
3 E-W
4 SE-NW
5 N-S
6 Parallels shore to E
7 Parallels shore to S
8 Parallels shore to W
9 Parallels shore to N
/ Unknown

Stage of Melt
0 No Melt
1 Few Puddles
2 Many Puddles
3 Flooded
4 Few Thawholes
5 Many Thawholes
6 Dried
7 Rotten
8 Few Frozen Puddles
9 Refrozen Puddles
/ Unknown

								Partial Concentrations						Form of Ice		Topography					Openings				
Date	Time of Photo/ Ob (Z)	Picture File	Latitude	Longitude	Ground Speed (KTS)	Flight Level	Total Conc.	Second or Multi year	Thick First Year	Medium First Year	Thin First Year	Young	New	Primary	Second	Extent	Primary Type	Second Type	Mean Ridge Height	Max Ridge Height	Type	Orientation	Snow Cover	Stage of Melt	Comments
6/26/00	1010		7226N	6627W	195	190	9		7	2				5	4	7	1	2			9	0		2	
	1015		7247N	6701W			8		7	1				5	4	7	1	2			9	0		2	
	1020		7305N	6729W			8		7	1				5	3	6	1	2			9	0		2	
	1025		7329N	6800W			9		7	2				4	5	7	1	2			9	0		2	
	1035		7420N	6921W			7		6	1				4	3	7	1	2			9	0		2	
	1040		7451N	6948W			8		7	1				4	3	7	1	2			7	2		2	
	1045		7448N	7002W			7		6	1				4	1	6	1	2			7	3		2	BRGYWTR
	1050		7502N	7011W			2		2					1	1	0	0	0			9	0			BRGYWTR
	1140		7400N	6828W			7		6	1				5	4	5	1	2			9	0		2	
	1145		7332N	6740W			7		6	1				5	4	6	1	2			9	0		2	
	1150		7309N	6704W			8		7	1				5	4	7	1	2			9	0		2	
	1155		7248N	6632W			9		7	2				5	4	9	1	2			9	0		1	
	1200		7230N	6604W																					UNDRCAST
	1210		7148N	6400W																					UNDRCAST
	1215		7132N	6412W			9		7	2				5	4						9				
	1220		7151N	6434W																					UNDRCAST
	1230		7237N	6546W																					UNDRCAST
	1235		7226N	6614W			7		6	1				5	4	8	1	2			9	0		2	
	1240		7319N	6650W			6		5	1				5	4	8	1	2			9	0		2	
	1245		7338N	6718W			7		6	1				5	4	8	1	2			9	0		2	
	1250		7400N	6752W			7		6	1				4	3	9	1	2			9	0		2	
	1255		7417N	6818W			6		5	1				4	3	9	1	2			9	0		2	
	1300		7436N	6854W			6		5	1				5	1	8	1	2			7	3		2	BRGYWTR
	1305		7501N	6932W			1		T	T				1	1										BRGYWTR
	1310		7524N	7002W			3		2	1				3	1	6	1	2			9	0		1	BRGYWTR
	1315		7545N	7041W			1		1					1	1										BRGYWTR
	1340		7526N	6942W			4		3	1				1	1						9	0			BRGYWTR
	1345		7454N	6851W			6		5	1				1	1						9	0			BRGYWTR
	1350		7432N	6816W			6		5	1				4	1	7	1	2			9	0			
	1355		7411N	6745W			7		6	1				5	4	8	1	2			9	0		2	
	1400		7348N	6708W			6		5	1				5	4	8	1	2			9	0		2	
	1405		7327N	6634W			7		6	1				5	4	8	1	2			9	0		2	
	1410		7254N	6552W			8		7	1				5	4	8	1	2			9	0		2	
	1415		7242N	6424W																					UNDERCAST
	1430		7141N	6349W																					UNDERCAST
	1445		7237N	6450W			9		7	2				5	4	8	1	2			9	0		2	
	1450		7300N	6527W			7		6	1				5	4	8	1	2			9	0		2	
	1455		7321N	6558W			7		6	1				5	4	8	1	2			9	0		2	
	1500		7343N	6634W			7		6	1				5	3	8	1	2			9	0		2	
	1505		7406N	6710W			7		6	1				5	3	7	1	2			9	0		2	
	1510		7434N	6753W			6		5	1				4	1	6	1	2			9	0		2	

NIC Ice Reconnaissance Data Log

Forms of Ice
x New ice/nilas
0 Pancake <3m
1 Brash <3m
2 Ice Cake 3-20m
3 Small Floe 20-100m
4 Medium Floe 100-500m
5 Big Floe 500-2000m
6 Vast Floe 2-10km
7 Giant Floe >10km
8 Fast Ice/Floebergs
/ Unknown

Topography
0 None
1 New Ridge
2 Weathered ridge
3 Very Weathered ridge
4 Aged ridge
5 Consolidated ridge
6 Vast Floe 2-10km
7 Rafting
/ Unknown

Type of Openings
0 No Openings
1 Crack
2 Fracture 0-50m
3 Fracture 50-200m
4 Fracture 200-500m
5 Fracture >500m
6 Lead
7 Polynya
8 Recur. Polynya
9 Water Between Floes
/ Unknown

Orientation of Opening
0 None
1 No Distinct
2 NE-SW
3 E-W
4 SE-NW
5 N-S
6 Parallels shore to E
7 Parallels shore to S
8 Parallels shore to W
9 Parallels shore to N
/ Unknown

Stage of Melt
0 No Melt
1 Few Puddles
2 Many Puddles
3 Flooded
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5 Many Thawholes
6 Dried
7 Rotten
8 Few Frozen Puddles
9 Refrozen Puddles
/ Unknown

								Partial Concentrations						Form of Ice		Topography					Openings				
Date	Time of Photo/ Ob (Z)	Picture File	Latitude	Longitude	Ground Speed (KTS)	Flight Level	Total Conc.	Second or Multi year	Thick First Year	Medium First Year	Thin First Year	Young	New	Primary	Second	Extent	Primary Type	Second Type	Mean Ridge Height	Max Ridge Height	Type	Orientation	Snow Cover	Stage of Melt	Comments
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	1020		7305N	6729W			8		7	1				5	3	6	1	2			9	0		2	
	1025		7329N	6800W			9		7	2				4	5	7	1	2			9	0		2	
	1035		7420N	6921W			7		6	1				4	3	7	1	2			9	0		2	
	1040		7451N	6948W			8		7	1				4	3	7	1	2			7	2		2	
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	1155		7248N	6632W			9		7	2				5	4	9	1	2			9	0		1	
	1200		7230N	6604W																					UNDRCAST
	1210		7148N	6400W																					UNDRCAST
	1215		7132N	6412W			9		7	2				5	4						9				
	1220		7151N	6434W																					UNDRCAST
	1230		7237N	6546W																					UNDRCAST
	1235		7226N	6614W			7		6	1				5	4	8	1	2			9	0		2	
	1240		7319N	6650W			6		5	1				5	4	8	1	2			9	0		2	
	1245		7338N	6718W			7		6	1				5	4	8	1	2			9	0		2	
	1250		7400N	6752W			7		6	1				4	3	9	1	2			9	0		2	
	1255		7417N	6818W			6		5	1				4	3	9	1	2			9	0		2	
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	1340		7526N	6942W			4		3	1				1	1						9	0			BRGYWTR
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	1350		7432N	6816W			6		5	1				4	1	7	1	2			9	0			
	1355		7411N	6745W			7		6	1				5	4	8	1	2			9	0		2	
	1400		7348N	6708W			6		5	1				5	4	8	1	2			9	0		2	
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Topography
- 0 None
- 1 New Ridge
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- 3 Very Weathered ridge
- 4 Aged ridge
- 5 Consolidated ridge
- 6 Vast Floe 2-10km
- 7 Rafting
- / Unknown

Type of Openings
- 0 No Openings
- 1 Crack
- 2 Fracture 0-50m
- 3 Fracture 50-200m
- 4 Fracture 200-500m
- 5 Fracture >500m
- 6 Lead
- 7 Polynya
- 8 Recur. Polynya
- 9 Water Between Floes
- / Unknown

Orientation of Opening
- 0 None
- 1 No Distinct
- 2 NE-SW
- 3 E-W
- 4 SE-NW
- 5 N-S
- 6 Parallels shore to E
- 7 Parallels shore to S
- 8 Parallels shore to W
- 9 Parallels shore to N
- / Unknown

Stage of Melt
- 0 No Melt
- 1 Few Puddles
- 2 Many Puddles
- 3 Flooded
- 4 Few Thawholes
- 5 Many Thawholes
- 6 Dried
- 7 Rotten
- 8 Few Frozen Puddles
- 9 Refrozen Puddles
- / Unknown

								Partial Concentrations						Form of Ice		Topography					Openings				
Date	Time of Photo/ Ob (Z)	Picture File	Latitude	Longitude	Ground Speed (KTS)	Flight Level	Total Conc.	Second or Multi year	Thick First Year	Medium First Year	Thin First Year	Young	New	Primary	Second	Extent	Primary Type	Second Type	Mean Ridge Height	Max Ridge Height	Type	Orientation	Snow Cover	Stage of Melt	Comments
6/27/2000	830		7500N	7002W	200-225	4500	6		5	1			T	4	3	8	1	2	/	/	9	/	0	7	40%
	835		7430N	6935W	200-225	4500	7		5	2			T	4	3	7	1	2	/	/	9	/	0	7	40%
	840		7415N	6904W	200-225	4500	8		5	3			T	5	3	4	1	2	/	/	9	/	0	7	40%
	845		7402N	6843W	200-225	4500	8		5	3			T	5	3	7	1	2	/	/	9	/	0	7	40%
	850		7344N	6816W	200-225	4500	7		5	2			T	4	3	7	1	2	/	/	9	/	0	7	30%
	900		7306N	6706W	200-225	4500	9		6	2			T	5	4	8	1	2	/	/	9	/	1	1	20%
	905		7252N	6655W	200-225	4500	9		7	2			T	5	4	8	1	2	/	/	9	/	1	1	30%
	910		7250N	6647W	200-225	4500	9		7	2			T	5	4	7	1	2	/	/	9	/	1	2	50%
	915		7250N	6713W	200-225	4500	8		6	2			T	5	3	6	1	2	/	/	9	/	1	2	50%
	920		7250N	6740W	200-225	4500	8		6	2			T	5	4	6	1	2	/	/	9	/	1	2	60%
	925		7250N	6802W	200-225	4500	7		6	1			T	5	3	7	1	2	/	/	9	/	0	7	40%
	930		7250N	6829W	200-225	4500	7		5	2			T	4	3	5	1	2	/	/	9	/	0	7	40%
	935		7410N	6851W	200-225	4500	7		5	2			T	5	3	5	1	2	/	/	9	/	0	7	30%
	940		7426N	6916W	200-225	4500	8		6	2			T	4	1	4	1	2	/	/	9	/	0	7	30%
	945		7441N	639W	200-225	4500	8	T	5	2			T	4	1	4	1	2	/	/	9	/	0	7	40%
	950		7458N	6957W	200-225	4500	7	T	5	2			T	4	1	4	1	2	/	/	9	/	0	7	40%
	955		7438N	6925W	200-225	4500	8		6	2			T	4	1	5	1	2	/	/	9	/	0	7	60%
	1000		7425N	6906W	200-225	4500	8		6	2			T	5	1	6	1	2	/	/	9	/	0	7	60%
	1005		7412N	6845W	200-225	4500	7		5	2			T	5	3	8	1	2	/	/	9	/	0	7	50%
	1010		7356N	6820W	200-225	4500	7		5	2			T	4	3	7	1	2	/	/	9	/	1	2	50%
	1015		7339N	6754W	200-225	4500	8		6	2			T	5	3	6	1	2	/	/	9	/	1	2	40%
	1020		7323N	6729W	200-225	4500	7		6	1			T	4	3	8	1	2	/	/	9	/	1	2	40%
	1025		7309N	6708W	200-225	4500	8		7	1			T	5	4	8	1	2	/	/	9	/	1	2	50%
	1035		7256N	6627W	200-225	4500	9		6	3				4	3	5	1	2	/	/	9	/	2	2	50%
	1040		7313N	6709W	200-225	4500	8		6	2				5	3	7	1	2	/	/	9	/	1	7	30%
	1045		7324N	6727W	200-225	4500	8		6	2				5	3	6	1	2	/	/	9	/	2	2	50%
	1050		7339N	6750W	200-225	4500	8		6	2				5	3	6	1	2	/	/	9	/	2	2	60%
	1055		7353N	6811W	200-225	4500	8		6	2				4	3	7	1	2	/	/	9	/	1	7	40%
	1100		7409N	6838W	200-225	4500	7		7	2				4	3	7	1	2	/	/	9	/	1	7	30%
	1105		7422N	6856W	200-225	4500	8		6	2				4	3	6	1	2	/	/	9	/	1	7	30%
	1115		7451N	6940W	200-225	4500	7	T	6	2				3	1	5	1	2	/	/	8	3	1	7	30%
	1120		7500N	6947W	200-225	4500	6		5	1				1	1	3	1	2	/	/	9	/	2	2	30%
	1125		7445N	6921W	200-225	4500	7		5	2				4	3	4	1	2	/	/	9	/	0	7	30%
	1130		7428N	685W	200-225	4500	7		5	2				4	3	6	1	2	/	/	9	/	1	2	30%
	1135		7411N	6829W	200-225	4500	8		6	2				5	3	6	1	2	/	/	9	/	1	2	50%
	1140		7352N	6801W	200-225	4500	8		6	2				5	3	7	1	2	/	/	9	/	1	2	40%
	1145		7333N	6732W	200-225	4500	6		5	1				5	4	7	1	2	/	/	9	/	1	2	50%
	1150		7313N	6701W	200-225	4500	8		6	2				4	3	6	1	2	/	/	9	/	1	2	40%
	1155		7255N	6630W	200-225	4500	9		7	2				5	4	7	1	2	/	/	9	/	1	2	60%
	1200		7250N	6624W	200-225	4500	9		7	2				5	4	5	1	2	/	/	9	/	1	2	60%
	1225		7421N	6843W	200-225	4500	7		5	2				4	3	5	1	2	/	/	9	/	1	2	40%
	1230		7437N	6906W	200-225	4500	7		5	2				5	3	5	1	2	/	/	9	/	1	2	40%
	1235		7455N	6933W	200-225	4500	6		5	1				1	1	7	1	2	/	/	9	/	1	2	50%
	1240		7457N	6927W	200-225	4500	8		6	2				5	3	7	1	2	/	/	9	/	1	2	30%
	1245		7440N	6901W	200-225	4500	7		6	1				3	1	6	1	2	/	/	9	/	1	2	40%
	1250		7423N	6835W	200-225	4500	7		6	1				4	3	7	1	2	/	/	9	/	1	2	30%
	1255		7405N	6806W	200-225	4500	7		6	1				4	3	7	1	2	/	/	9	/	1	2	30%
	1300		7348N	6740W	200-225	4500	8		6	2				5	4	7	1	2	/	/	9	/	1	2	30%
	1305		7331N	6715W	200-225	4500	6		5	1				5	3	7	1	2	/	/	9	/	1	2	40%
	1310		7315N	6651W	200-225	4500	8		7	1				4	3	6	1	2	/	/	9	/	1	2	40%
	1315		7257N	6623W	200-225	4500	8		7	1				5	4	7	1	2	/	/	9	/	1	2	40%
	1320		7256N	6617W	200-225	4500	8		7	1				5	4	6	1	2	/	/	9	/	1	2	50%
	1325		7313N	6642W	200-225	4500	8		7	1				5	4	5	1	2	/	/	9	/	1	2	40%
	1330		7329N	6707W	200-225	4500	6		5	1				4	3	5	1	2	/	/	9	/	1	2	40%
	1335		7346N	6733W	200-225	4500	8		7	1				4	3	7	1	2	/	/	9	/	2	2	50%
	1340		7401N	6756W	200-225	4500	8		7	1				5	4	7	1	2	/	/	9	/	1	2	40%
	1347		7427N	6836W	200-225	4500	7	T	6	1				4	1	5	1	2	/	/	9	/	0	2	40%
	1350		7436N	6850W	200-225	4500	7		6	1				4	1	6	1	2	/	/	9	/	0	7	30%
	1355		7451N	6912W	200-225	4500	6		5	1				4	1	7	1	2	/	/	8	3	0	7	40%
	1400		7500N	6919W	200-225	4500	7		6	1				3	1	4	1	2	/	/	9	/	1	2	30%
	1420		7353N	6734W	200-225	4500	7		6	1				4	3	7	1	2	/	/	9	/	2	2	60%
	1425		7337N	6710W	200-225	4500	8		6	2				4	5	7	1	2	/	/	9	/	1	2	50%
	1430		7319N	6642W	200-225	4500	8		6	2				4	3	7	1	2	/	/	9	/	2	2	40%
	1435		7258N	6610W	200-225	4500	8		6	2				5	3	8	1	2	/	/	9	/	2	2	50%
	1440		7255N	6559W	200-225	4500	8		6	2				4	3	7	1	2	/	/	9	/	2	2	40%
	1445		7313N	6627W	200-225	4500	7		5	2				4	3	5	1	2	/	/	9	/	1	2	40%
	1450		7332N	6657W	200-225	4500	7		5	2				4	3	4	1	2	/	/	9	/	2	2	50%
	1455		7350N	6724W	200-225	4500	7		6	1				4	3	6	1	2	/	/	9	/	1	2	50%
	1500		7404N	6746W	200-225	4500	7		6	1				4	3	5	1	2	/	/	9	/	1	2	40%
	1505		7421N	6812W	200-225	4500	5		4	1				4	1	6	1	2	/	/	9	/	1	2	40%
	1510		7439N	6839W	200-225	4500	7		5	2				4	3	5	1	2	/	/	9	/	1	2	50%
	1515		7459N	6910W	200-225	4500	7		5	2				1	1	5	1	2	/	/	8	3	0	1	20%
	1518		7504N	6930W	200-225	4500	1		1					1	1						8	1	0	/	BRGYWTR

NIC Ice Reconnaissance Data Log

Forms of Ice
- x New ice/nilas
- 0 Pancake <3m
- 1 Brash <3m
- 2 Ice Cake 3-20m
- 3 Small Floe 20-100m
- 4 Medium Floe 100-500m
- 5 Big Floe 500-2000m
- 6 Vast Floe 2-10km
- 7 Giant Floe >10km
- 8 Fast Ice/Floebergs
- / Unknown

Topography
- 0 None
- 1 New Ridge
- 2 Weathered ridge
- 3 Very Weathered ridge
- 4 Aged ridge
- 5 Consolidated ridge
- 6 Vast Floe 2-10km
- 7 Rafting
- / Unknown

Type of Openings
- 0 No Openings
- 1 Crack
- 2 Fracture 0-50m
- 3 Fracture 50-200m
- 4 Fracture 200-500m
- 5 Fracture >500m
- 6 Lead
- 7 Polynya
- 8 Recur. Polynya
- 9 Water Between Floes
- / Unknown

Orientation of Opening
- 0 None
- 1 No Distinct
- 2 NE-SW
- 3 E-W
- 4 SE-NW
- 5 N-S
- 6 Parallels shore to E
- 7 Parallels shore to S
- 8 Parallels shore to W
- 9 Parallels shore to N
- / Unknown

Stage of Melt
- 0 No Melt
- 1 Few Puddles
- 2 Many Puddles
- 3 Flooded
- 4 Few Thawholes
- 5 Many Thawholes
- 6 Dried
- 7 Rotten
- 8 Few Frozen Puddles
- 9 Refrozen Puddles
- / Unknown

Date	Time of Photo/ Ob (Z)	Picture File	Latitude	Longitude	Ground Speed (KTS)	Flight Level	Total Conc.	Partial Concentrations: Second or Multi year	Partial Concentrations: Thick First Year	Partial Concentrations: Medium First Year	Partial Concentrations: Thin First Year	Partial Concentrations: Young	Partial Concentrations: New	Form of Ice: Primary	Form of Ice: Second	Topography: Extent	Topography: Primary Type	Topography: Second Type	Mean Ridge Height	Max Ridge Height	Openings: Type	Openings: Orientation	Snow Cover	Stage of Melt	Comments
6/27/2000	830		7500N	7002W	200-225	4500	6		5	1			T	4	3	8	1	2	/	/	9	/	0	7	40%
	835		7430N	6935W	200-225	4500	7		5	2			T	4	3	7	1	2	/	/	9	/	0	7	40%
	840		7415N	6904W	200-225	4500	8		5	3			T	5	3	4	1	2	/	/	9	/	0	7	40%
	845		7402N	6843W	200-225	4500	8		5	3			T	5	3	7	1	2	/	/	9	/	0	7	40%
	850		7344N	6816W	200-225	4500	7		5	2			T	4	3	7	1	2	/	/	9	/	0	7	30%
	900		7306N	6706W	200-225	4500	9		6	2			T	5	4	8	1	2	/	/	9	/	1	1	20%
	905		7252N	6655W	200-225	4500	9		7	2			T	5	4	8	1	2	/	/	9	/	1	1	30%
	910		7250N	6647W	200-225	4500	9		7	2			T	5	4	7	1	2	/	/	9	/	1	2	50%
	915		7250N	6713W	200-225	4500	8		6	2			T	5	3	6	1	2	/	/	9	/	1	2	50%
	920		7250N	6740W	200-225	4500	8		6	2			T	5	4	6	1	2	/	/	9	/	1	2	60%
	925		7250N	6802W	200-225	4500	7		6	1			T	5	3	7	1	2	/	/	9	/	0	7	40%
	930		7250N	6829W	200-225	4500	7		5	2			T	4	3	5	1	2	/	/	9	/	0	7	40%
	935		7410N	6851W	200-225	4500	7		5	2			T	5	3	5	1	2	/	/	9	/	0	7	30%
	940		7426N	6916W	200-225	4500	8		6	2			T	4	1	4	1	2	/	/	9	/	0	7	30%
	945		7441N	639W	200-225	4500	8	T	5	2			T	4	1	4	1	2	/	/	9	/	0	7	40%
	950		7458N	6957W	200-225	4500	7	T	5	2			T	4	1	4	1	2	/	/	9	/	0	7	40%
	955		7438N	6925W	200-225	4500	8		6	2			T	4	1	5	1	2	/	/	9	/	0	7	60%
	1000		7425N	6906W	200-225	4500	8		6	2			T	5	1	6	1	2	/	/	9	/	0	7	60%
	1005		7412N	6845W	200-225	4500	7		5	2			T	5	3	8	1	2	/	/	9	/	0	7	50%
	1010		7356N	6820W	200-225	4500	7		5	2			T	4	3	7	1	2	/	/	9	/	1	2	50%
	1015		7339N	6754W	200-225	4500	8		6	2			T	5	3	6	1	2	/	/	9	/	1	2	40%
	1020		7323N	6729W	200-225	4500	7		6	1			T	4	3	8	1	2	/	/	9	/	1	2	40%
	1025		7309N	6708W	200-225	4500	8		7	1			T	5	4	8	1	2	/	/	9	/	1	2	50%
	1035		7256N	6627W	200-225	4500	9		6	3				4	3	5	1	2	/	/	9	/	2	2	50%
	1040		7313N	6709W	200-225	4500	8		6	2				5	3	7	1	2	/	/	9	/	1	7	30%
	1045		7324N	6727W	200-225	4500	8		6	2				5	3	6	1	2	/	/	9	/	2	2	50%
	1050		7339N	6750W	200-225	4500	8		6	2				5	3	6	1	2	/	/	9	/	2	2	60%
	1055		7353N	6811W	200-225	4500	8		6	2				4	3	7	1	2	/	/	9	/	1	7	40%
	1100		7409N	6838W	200-225	4500	7		7	2				4	3	7	1	2	/	/	9	/	1	7	30%
	1105		7422N	6856W	200-225	4500	8		6	2				4	3	6	1	2	/	/	9	/	1	7	30%
	1115		7451N	6940W	200-225	4500	7	T	6	2				3	1	5	1	2	/	/	8	3	1	7	30%
	1120		7500N	6947W	200-225	4500	6		5	1				1	1	3	1	2	/	/	9	/	2	2	30%
	1125		7445N	6921W	200-225	4500	7		5	2				4	3	4	1	2	/	/	9	/	0	7	30%
	1130		7428N	685W	200-225	4500	7		5	2				4	3	6	1	2	/	/	9	/	1	2	30%
	1135		7411N	6829W	200-225	4500	8		6	2				5	3	6	1	2	/	/	9	/	1	2	50%
	1140		7352N	6801W	200-225	4500	8		6	2				5	3	7	1	2	/	/	9	/	1	2	40%
	1145		7333N	6732W	200-225	4500	6		5	1				5	4	7	1	2	/	/	9	/	1	2	50%
	1150		7313N	6701W	200-225	4500	8		6	2				4	3	6	1	2	/	/	9	/	1	2	40%
	1155		7255N	6630W	200-225	4500	9		7	2				5	4	7	1	2	/	/	9	/	1	2	60%
	1200		7250N	6624W	200-225	4500	9		7	2				5	4	5	1	2	/	/	9	/	1	2	60%
	1225		7421N	6843W	200-225	4500	7		5	2				4	3	5	1	2	/	/	9	/	1	2	40%
	1230		7437N	6906W	200-225	4500	7		5	2				5	3	5	1	2	/	/	9	/	1	2	40%
	1235		7455N	6933W	200-225	4500	6		5	1				1	1	7	1	2	/	/	9	/	1	2	50%
	1240		7457N	6927W	200-225	4500	8		6	2				5	3	7	1	2	/	/	9	/	1	2	30%
	1245		7440N	6901W	200-225	4500	7		6	1				3	1	6	1	2	/	/	9	/	1	2	40%
	1250		7423N	6835W	200-225	4500	7		6	1				4	3	7	1	2	/	/	9	/	1	2	30%
	1255		7405N	6806W	200-225	4500	7		6	1				4	3	7	1	2	/	/	9	/	1	2	30%
	1300		7348N	6740W	200-225	4500	8		6	2				5	4	7	1	2	/	/	9	/	1	2	30%
	1305		7331N	6715W	200-225	4500	6		5	1				5	3	7	1	2	/	/	9	/	1	2	40%
	1310		7315N	6651W	200-225	4500	8		7	1				4	3	6	1	2	/	/	9	/	1	2	40%
	1315		7257N	6623W	200-225	4500	8		7	1				5	4	7	1	2	/	/	9	/	1	2	40%
	1320		7256N	6617W	200-225	4500	8		7	1				5	4	6	1	2	/	/	9	/	1	2	50%
	1325		7313N	6642W	200-225	4500	8		7	1				5	4	5	1	2	/	/	9	/	1	2	40%
	1330		7329N	6707W	200-225	4500	6		5	1				4	3	5	1	2	/	/	9	/	1	2	40%
	1335		7346N	6733W	200-225	4500	8		7	1				4	3	7	1	2	/	/	9	/	2	2	50%
	1340		7401N	6756W	200-225	4500	8		7	1				5	4	7	1	2	/	/	9	/	1	2	40%
	1347		7427N	6836W	200-225	4500	7	T	6	1				4	1	5	1	2	/	/	9	/	0	2	40%
	1350		7436N	6850W	200-225	4500	7		6	1				4	1	6	1	2	/	/	9	/	0	7	30%
	1355		7451N	6912W	200-225	4500	6		5	1				4	1	7	1	2	/	/	8	3	0	7	40%
	1400		7500N	6919W	200-225	4500	7		6	1				3	1	4	1	2	/	/	9	/	1	2	30%
	1420		7353N	6734W	200-225	4500	7		6	1				4	3	7	1	2	/	/	9	/	2	2	60%
	1425		7337N	6710W	200-225	4500	8		6	2				4	5	7	1	2	/	/	9	/	1	2	50%
	1430		7319N	6642W	200-225	4500	8		6	2				4	3	7	1	2	/	/	9	/	2	2	40%
	1435		7258N	6610W	200-225	4500	8		6	2				5	3	8	1	2	/	/	9	/	2	2	50%
	1440		7255N	6559W	200-225	4500	8		6	2				4	3	7	1	2	/	/	9	/	2	2	40%
	1445		7313N	6627W	200-225	4500	7		5	2				4	3	5	1	2	/	/	9	/	1	2	40%
	1450		7332N	6657W	200-225	4500	7		5	2				4	3	4	1	2	/	/	9	/	2	2	50%
	1455		7350N	6724W	200-225	4500	7		6	1				4	3	6	1	2	/	/	9	/	1	2	50%
	1500		7404N	6746W	200-225	4500	7		6	1				4	3	5	1	2	/	/	9	/	1	2	40%
	1505		7421N	6812W	200-225	4500	5		4	1				4	1	6	1	2	/	/	9	/	1	2	40%
	1510		7439N	6839W	200-225	4500	7		5	2				4	3	5	1	2	/	/	9	/	1	2	50%
	1515		7459N	6910W	200-225	4500	7		5	2				1	1	5	1	2	/	/	8	3	0	1	20%
	1518		7504N	6930W	200-225	4500	1		1					1	1						8	1	0	/	BRGYWTR

NIC Ice Reconnaissance Data Log

Forms of Ice	Topography	Type of Openings	Orientation of Opening	Stage of Melt
x New ice/nilas	0 None	0 No Openings	0 None	0 No Melt
0 Pancake <3m	1 New Ridge	1 Crack	1 No Distinct	1 Few Puddles
1 Brash <3m	2 Weathered ridge	2 Fracture 0-50m	2 NE-SW	2 Many Puddles
2 Ice Cake 3-20m	3 Very Weathered ridge	3 Fracture 50-200m	3 E-W	3 Flooded
3 Small Floe 20-100m	4 Aged ridge	4 Fracture 200-500m	4 SE-NW	4 Few Thawholes
4 Medium Floe 100-500m	5 Consolidated ridge	5 Fracture >500m	5 N-S	5 Many Thawholes
5 Big Floe 500-2000m	6 Vast Floe 2-10km	6 Lead	6 Parallels shore to E	6 Dried
6 Vast Floe 2-10km	7 Rafting	7 Polynya	7 Parallels shore to S	7 Rotten
7 Giant Floe >10km	/ Unknown	8 Recur. Polynya	8 Parallels shore to W	8 Few Frozen Puddles
8 Fast Ice/Floebergs		9 Water Between Floes	9 Parallels shore to N	9 Refrozen Puddles
/ Unknown		/ Unknown	/ Unknown	/ Unknown

Date	Time of Photo/ Ob (Z)	Picture File	Latitude	Longitude	Ground Speed (KTS)	Flight Level	Total Conc.	Partial Concentrations						Form of Ice		Topography			Mean Ridge Height	Max Ridge Height	Openings		Snow Cover	Stage of Melt	Comments
								Second or Multi year	Thick First Year	Medium First Year	Thin First Year	Young	New	Primary	Second	Extent	Primary Type	Second Type			Type	Orientation			
6/29/2000	1250		7425N	9957W	200	2500	10	1	9					8		8	4				0	0	4	2	30%
	1255		7432N	9851W	200	2500	10	1	9					8		8	4				0	0	4	2	30%
	1300		7438N	9754W	200	1200	10	1	9					8		8	4	2			3	3	5	2	40%
	1305		7445N	9720W	200	1200	10	1	9					8		8	4	2			0	0	7	2	40%
	1310		7448N	9701W	200	1200	10	1	9					8		8	4	2			0	0	6	2	40%
	1315		7502N	9700W	200	1200	10	10						8		5	4	2			0	0	6	1	30%
	1325		7535N	9701W	200	1200	9	1	8					8		5	4	2			7	8	7	4	40%
	1335		7554N	9656W	200	1200	9	1	8					8		4	4	2			6	0	6	4	40%
	1340		7540N	9701W	200	1200	9	1	8					8		3	4				0	0	7	4	40%
	1345		7525N	9701W	200	1200	9	1	8					8		2	4				7	8	5	2	40%
	1350		7510N	9701W	200	1200	10	10						8		5	4	2			0	0	5	2	30%
	1355		7458N	9702W	200	1200	10	10						8		5	4	2			0	0	5	2	30%

NIC Ice Reconnaissance Data Log

Forms of Ice	Topography	Type of Openings	Orientation of Opening	Stage of Melt
x New ice/nilas	0 None	0 No Openings	0 None	0 No Melt
0 Pancake <3m	1 New Ridge	1 Crack	1 No Distinct	1 Few Puddles
1 Brash <3m	2 Weathered ridge	2 Fracture 0-50m	2 NE-SW	2 Many Puddles
2 Ice Cake 3-20m	3 Very Weathered ridge	3 Fracture 50-200m	3 E-W	3 Flooded
3 Small Floe 20-100m	4 Aged ridge	4 Fracture 200-500m	4 SE-NW	4 Few Thawholes
4 Medium Floe 100-500m	5 Consolidated ridge	5 Fracture >500m	5 N-S	5 Many Thawholes
5 Big Floe 500-2000m	6 Vast Floe 2-10km	6 Lead	6 Parallels shore to E	6 Dried
6 Vast Floe 2-10km	7 Rafting	7 Polynya	7 Parallels shore to S	7 Rotten
7 Giant Floe >10km	/ Unknown	8 Recur. Polynya	8 Parallels shore to W	8 Few Frozen Puddles
8 Fast Ice/Floebergs		9 Water Between Floes	9 Parallels shore to N	9 Refrozen Puddles
/ Unknown		/ Unknown	/ Unknown	/ Unknown

								Partial Concentrations						Form of Ice		Topography					Openings				
Date	Time of Photo/ Ob (Z)	Picture File	Latitude	Longitude	Ground Speed (KTS)	Flight Level	Total Conc.	Second or Multi year	Thick First Year	Medium First Year	Thin First Year	Young	New	Primary	Second	Extent	Primary Type	Second Type	Mean Ridge Height	Max Ridge Height	Type	Orientation	Snow Cover	Stage of Melt	Comments
6/29/2000	1250		7425N	9957W	200	2500	10	1	9					8		8	4				0	0	4	2	30%
	1255		7432N	9851W	200	2500	10	1	9					8		8	4				0	0	4	2	30%
	1300		7438N	9754W	200	1200	10	1	9					8		8	4	2			3	3	5	2	40%
	1305		7445N	9720W	200	1200	10	1	9					8		8	4	2			0	0	7	2	40%
	1310		7448N	9701W	200	1200	10	1	9					8		8	4	2			0	0	6	2	40%
	1315		7502N	9700W	200	1200	10	10						8		5	4	2			0	0	6	1	30%
	1325		7535N	9701W	200	1200	9	1	8					8		5	4	2			7	8	7	4	40%
	1335		7554N	9656W	200	1200	9	1	8					8		4	4	2			6	0	6	4	40%
	1340		7540N	9701W	200	1200	9	1	8					8		3	4				0	0	7	4	40%
	1345		7525N	9701W	200	1200	9	1	8					8		2	4				7	8	5	2	40%
	1350		7510N	9701W	200	1200	10	10						8		5	4	2			0	0	5	2	30%
	1355		7458N	9702W	200	1200	10	10						8		5	4	2			0	0	5	2	30%

NIC Ice Reconnaissance Data Log

Forms of Ice
- x New ice/nilas
- 0 Pancake <3m
- 1 Brash <3m
- 2 Ice Cake 3-20m
- 3 Small Floe 20-100m
- 4 Medium Floe 100-500m
- 5 Large Floe 500m-2km
- 6 Vast Floe 2-10km
- 7 Giant Floe >10km
- 8 Fast Ice/Floebergs
- / Unknown

Topography
- 0 None
- 1 New Ridge
- 2 Weathered ridge
- 3 Very Weathered ridge
- 4 Aged ridge
- 5 Consolidated ridge
- 6 Vast Floe 2-10km
- 7 Rafting
- / Unknown

Type of Openings
- 0 No Openings
- 1 Crack
- 2 Fracture 0-50m
- 3 Fracture 50-200m
- 4 Fracture 200-500m
- 5 Fracture >500m
- 6 Lead
- 7 Polynya
- 8 Recur. Polynya
- 9 Water Between Floes
- / Unknown

Orientation of Opening
- 0 None
- 1 No Distinct
- 2 NE-SW
- 3 E-W
- 4 SE-NW
- 5 N-S
- 6 Parallels shore to E
- 7 Parallels shore to S
- 8 Parallels shore to W
- 9 Parallels shore to N
- / Unknown

Stage of Melt
- 0 No Melt
- 1 Few Puddles
- 2 Many Puddles
- 3 Flooded
- 4 Few Thawholes
- 5 Many Thawholes
- 6 Dried
- 7 Rotten
- 8 Few Frozen Puddles
- 9 Refrozen Puddles
- / Unknown

								Partial Concentrations						Form of Ice		Topography					Openings				
Date	Time of Photo/ Ob (Z)	Picture File	Latitude	Longitude	Ground Speed (KTS)	Flight Level	Total Conc.	Second or Multi year	Thick First Year	Medium First Year	Thin First Year	Young	New	Primary	Second	Extent	Primary Type	Second Type	Mean Ridge Height	Max Ridge Height	Type	Orientation	Snow Cover	Stage of Melt	Comments
6/30/2000	933		7428N	9612W	192	1000	10	2	8					8		3	4	2			0	0	4	2	30%
	935		7407N	9817W	192	1000	10	2	8					8		4	4	2			0	0	6	2	40%
	940		7440N	9833W	192	1000	10	2	8					8		4	4	2			6	2	7	2	30%
	945		7449N	9703W	192	1000	10	2	8					8		5	4	2			0	0	8	4	30%
	950		7508N	9703W	192	1000	10	2	8					8		4	4	2			0	0	4	4	60%
	955		7526N	9703W	192	1000	10	3	6					8		5	4	2			0	0	4	3	40%
	1000		7545N	9700W	192	1000	10	1	9					8		6	4	2			0	0	4	4	40%
	1005		7552N	9626W	192	1000	6	3	3					4	3	4	4	2			9	0	7	2	40%
	1010		7554N	9618W	192	1000	9	4	5					4	3	4	2	4			9	0	4	2	50%
	1015		7548N	9700W	192	1000	9	3	6					4	8	4	2	4			9	0	4	2	60%
	1020		7530N	9702W	192	1000	10	1	9					8		3	4	2			0	0	4	3	60%
	1030		7500N	9702W	192	1000	10	2	8					8		3	4	2			0	0	4	3	50%
	1035		7445N	9710W	192	1000	10	3	7					8		4	4	2			0	0	4	3	60%
	1040		7456N	9702W	192	1000	10	2	8					8		4	4	2			6	3	4	3	60%
	1045		7512N	9702W	192	1000	10	1	9					8		3	4	2			0	0	4	3	60%
	1050		7531N	9702W	192	1000	10	1	9					8		6	4	2			0	0	4	3	60%
	1055		7549N	9656W	192	1000	9	1	8					5	4	7	4	2			9	0	6	2	50%
	1100		7559N	9608W	192	1000	1	T	1					1	1	0	0	0			9	0			
	1105		7601N	9558W	192	1000	5	1	4					4	3	4	4	2			9	0	4	3	
	1110		7556N	9643W	192	1000	10	1	9					8		6	4	2			0	0	6	2	30%
	1115		7538N	9702W	192	1000	10	1	9					8		5	4	2			7	8	5	2	60%
	1120		7521N	9702W	192	1000	10		10					8		3	4	2			0	0	4	3	60%
	1125		7508N	9702W	192	1000	10	1	9					8		5	4	2			0	0	5	3	50%
	1130		7450N	9702W	192	1000	10	1	9					8		5	4	2			0	0	5	3	50%

NIC Ice Reconnaissance Data Log

Forms of Ice
- x New ice/nilas
- 0 Pancake <3m
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- 5 Large Floe 500m-2km
- 6 Vast Floe 2-10km
- 7 Giant Floe >10km
- 8 Fast Ice/Floebergs
- / Unknown

Topography
- 0 None
- 1 New Ridge
- 2 Weathered ridge
- 3 Very Weathered ridge
- 4 Aged ridge
- 5 Consolidated ridge
- 6 Vast Floe 2-10km
- 7 Rafting
- / Unknown

Type of Openings
- 0 No Openings
- 1 Crack
- 2 Fracture 0-50m
- 3 Fracture 50-200m
- 4 Fracture 200-500m
- 5 Fracture >500m
- 6 Lead
- 7 Polynya
- 8 Recur. Polynya
- 9 Water Between Floes
- / Unknown

Orientation of Opening
- 0 None
- 1 No Distinct
- 2 NE-SW
- 3 E-W
- 4 SE-NW
- 5 N-S
- 6 Parallels shore to E
- 7 Parallels shore to S
- 8 Parallels shore to W
- 9 Parallels shore to N
- / Unknown

Stage of Melt
- 0 No Melt
- 1 Few Puddles
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- / Unknown

Date	Time of Photo/ Ob (Z)	Picture File	Latitude	Longitude	Ground Speed (KTS)	Flight Level	Total Conc.	Partial Concentrations: Second or Multi year	Thick First Year	Medium First Year	Thin First Year	Young	New	Form of Ice: Primary	Second	Topography: Extent	Primary Type	Second Type	Mean Ridge Height	Max Ridge Height	Openings: Type	Orientation	Snow Cover	Stage of Melt	Comments
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	935		7407N	9817W	192	1000	10	2	8					8		4	4	2			0	0	6	2	40%
	940		7440N	9833W	192	1000	10	2	8					8		4	4	2			6	2	7	2	30%
	945		7449N	9703W	192	1000	10	2	8					8		5	4	2			0	0	8	4	30%
	950		7508N	9703W	192	1000	10	2	8					8		4	4	2			0	0	4	4	60%
	955		7526N	9703W	192	1000	10	3	6					8		5	4	2			0	0	4	3	40%
	1000		7545N	9700W	192	1000	10	1	9					8		6	4	2			0	0	4	4	40%
	1005		7552N	9626W	192	1000	6	3	3					4	3	4	4	2			9	0	7	2	40%
	1010		7554N	9618W	192	1000	9	4	5					4	3	4	2	4			9	0	4	2	50%
	1015		7548N	9700W	192	1000	9	3	6					4	8	4	2	4			9	0	4	2	60%
	1020		7530N	9702W	192	1000	10	1	9					8		3	4	2			0	0	4	3	60%
	1030		7500N	9702W	192	1000	10	2	8					8		3	4	2			0	0	4	3	50%
	1035		7445N	9710W	192	1000	10	3	7					8		4	4	2			0	0	4	3	60%
	1040		7456N	9702W	192	1000	10	2	8					8		4	4	2			6	3	4	3	60%
	1045		7512N	9702W	192	1000	10	1	9					8		3	4	2			0	0	4	3	60%
	1050		7531N	9702W	192	1000	10	1	9					8		6	4	2			0	0	4	3	60%
	1055		7549N	9656W	192	1000	9	1	8					5	4	7	4	2			9	0	6	2	50%
	1100		7559N	9608W	192	1000	1	T	1					1	1	0	0	0			9	0			
	1105		7601N	9558W	192	1000	5	1	4					4	3	4	4	2			9	0	4	3	
	1110		7556N	9643W	192	1000	10	1	9					8		6	4	2			0	0	6	2	30%
	1115		7538N	9702W	192	1000	10	1	9					8		5	4	2			7	8	5	2	60%
	1120		7521N	9702W	192	1000	10		10					8		3	4	2			0	0	4	3	60%
	1125		7508N	9702W	192	1000	10	1	9					8		5	4	2			0	0	5	3	50%
	1130		7450N	9702W	192	1000	10	1	9					8		5	4	2			0	0	5	3	50%

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Goddard Space Flight Center
Greenbelt, Maryland 20771

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13. ABSTRACT *(Maximum 200 words)*
This flight report describes the field component of Meltpond2000, the first in a series of Arctic and Antarctic aircraft campaigns planned as part of NASA's Earth Observing System Aqua sea ice validation program for the Advanced Microwave Scanning Radiometer (AMSR-E). This prelaunch Arctic field campaign was carried out between June 25 and July 6, 2000 from Thule, Greenland, with the objective of quantifying the errors incurred by the AMSR-E sea ice algorithms resulting from the presence of melt ponds. A secondary objective of the mission was to develop a microwave capability to discriminate between melt ponds and seawater using low-frequency microwave radiometers. Meltpond2000 was a multiagency effort involving personnel from the Navy, NOAA, and NASA. The field component of the mission consisted of making five 8-hour flights from Thule Air Base with a Naval Air Warfare Center P-3 aircraft over portions of Baffin Bay and the Canadian Arctic. The aircraft sensors were provided and operated by the Microwave Radiometry Group of NOAA's Environmental TechnologyLaboratory. A Navy ice observer from the National Ice Center provided visual documentation of surface ice conditions during each of the flights. Two of the five flights were coordinated with Canadian scientists making surface measurements of melt ponds at an ice camp located near Resolute Bay, Canada. Coordination with the Canadians will provide additional information on surface characteristics and will be of great value in the interpretation of the aircraft and high-resolution satellite data sets.

14. SUBJECT TERMS
Sea ice validation, Advanced Microwave Scanning Radiometer, melt ponds, EOS.

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