



Homeland
Security

U.S. COAST GUARD



U.S. Coast Guard Polar Icebreaker Program

November 2003

USCG Polar Icebreaker Program Update

USCG – Polar Ice OPs Program History



1900

WWII
USCG/USN
Wind class &
Mackinaw

1950's
DEW stations
built - required
icebreakers for
re-supply

1965-66
Joint study - USN
xfers all
icebreakers to
USCG – 8
icebreakers

Late 1970's
POLAR
STAR &
POLAR SEA
built

1980's
Older icebreakers
decommissioned.
By 1989, PSEA
& PSTAR only 2.

2000

TODAY

1885

Cutter Bear – explores
Alaskan waters for 40 years

1936-1941

USCG initiated
intensive study of
heavy icebreaker
design

1946

Operation High
Jump – Admiral
Byrd's Antarctic
expedition

1955-56

First Operation
Deep Freeze
- permanent US
presence on
Antarctica

1971

Alaskan north
slope oil
discovered – polar
icebreakers receive
national interest

1999/2000

USCGC HEALY:
Planned in 80's,
funded 90's,
operational in
2000

Validation of National Polar Icebreaker Requirements

- **1982 Coast Guard Roles and Missions Study**
- **1984 Polar Icebreaker Requirements Study**
- **1990 Presidential Report on Polar Icebreaker**

Requirements

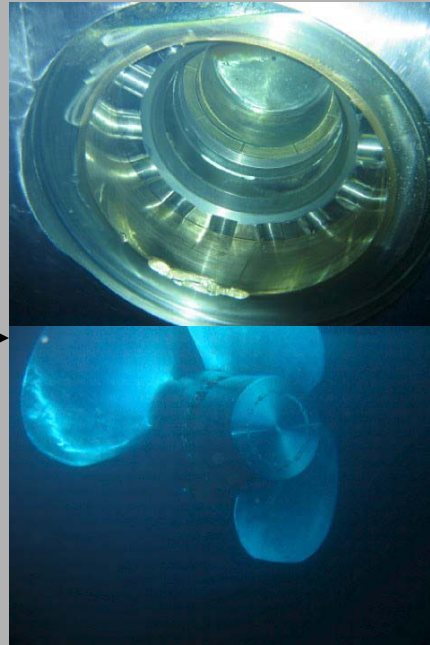
Working to revalidate

- **1995 National Research Council's Arctic Ocean
Research and Supporting Facilities Study**

Polar Icebreakers Maintenance Issues

- 1. Aging 399' WAGB class.**
- 2. Recent Antarctic ice conditions are most severe in USAP history.**
- 3. Deep Freeze operational req'mts exacerbate 399' WAGB maintenance problems.**

Recent Operational Damage: Cause & Effects



Demanding Ice Conditions =
High Maintenance costs &
High Personnel costs!

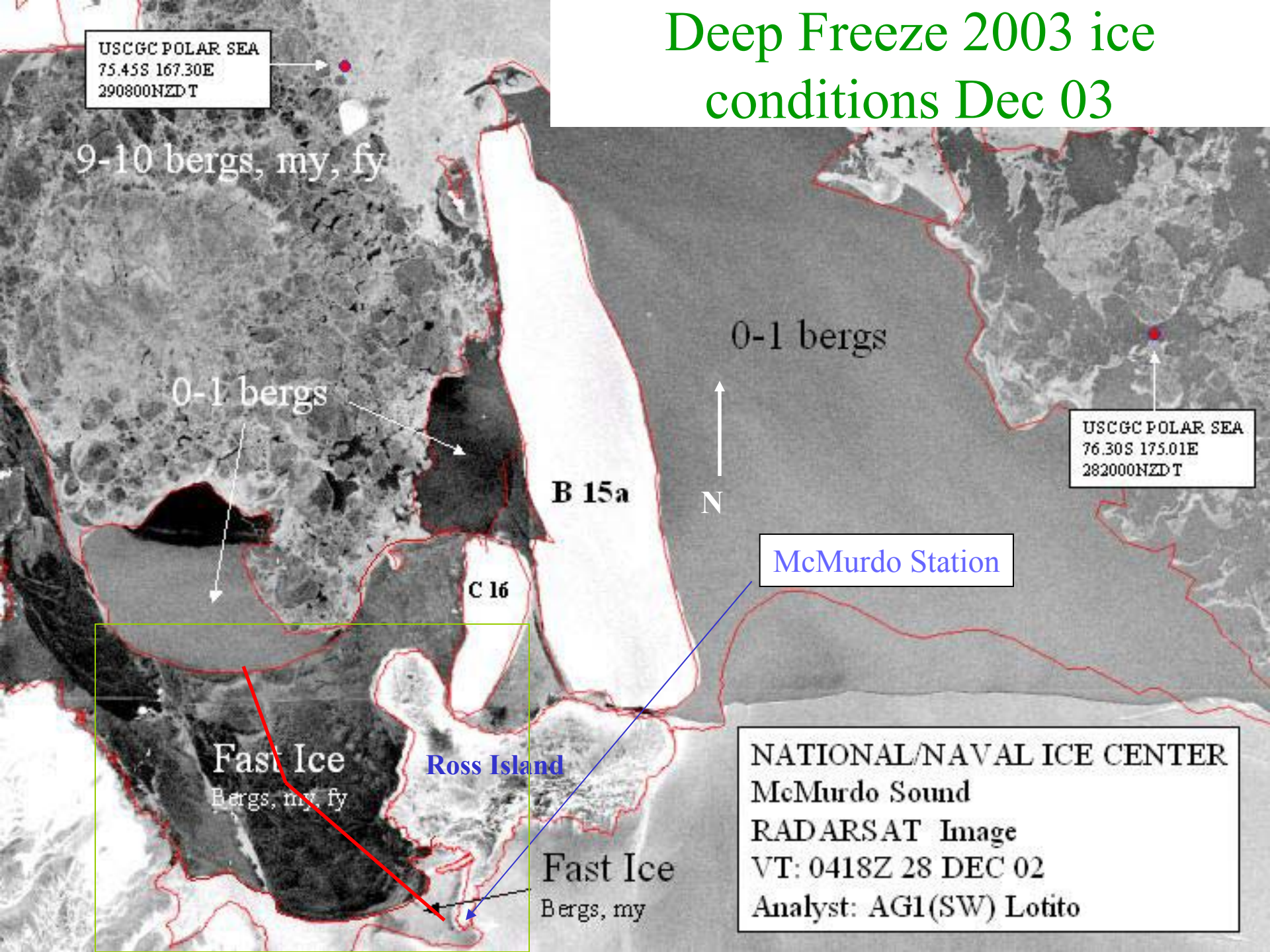


Polar Icebreaker Program issues

1. FY 03 HAPPS \$2.5M reduction
2. FY 04 \$2.5M additive reduction & HAPPS direction to renegotiate MOA
3. Re-validate or update 1990 Presidential Report on Polar Icebreaker Requirements.
4. Replace or upgrade POLAR SEA & POLAR STAR
 - a. Mission analysis, Operational Req'mts – FY04
 - b. Major Acquisition process – start FY 06??
 - c. Competition with other major acquisition projects.
 - d. Removal of one Polar WAGB fm schedule for 1-2 years
 - May need CGC HEALY to assist w/ Operation Deep Freeze, if needed

Operation Deep Freeze

Deep Freeze 2003 ice conditions Dec 03



USCGC POLAR SEA
75.45S 167.30E
290800NZDT

9-10 bergs, my, fy

0-1 bergs

0-1 bergs

B 15a



USCGC POLAR SEA
76.30S 175.01E
282000NZDT

McMurdo Station

C 16

Fast Ice

Bergs, my, fy

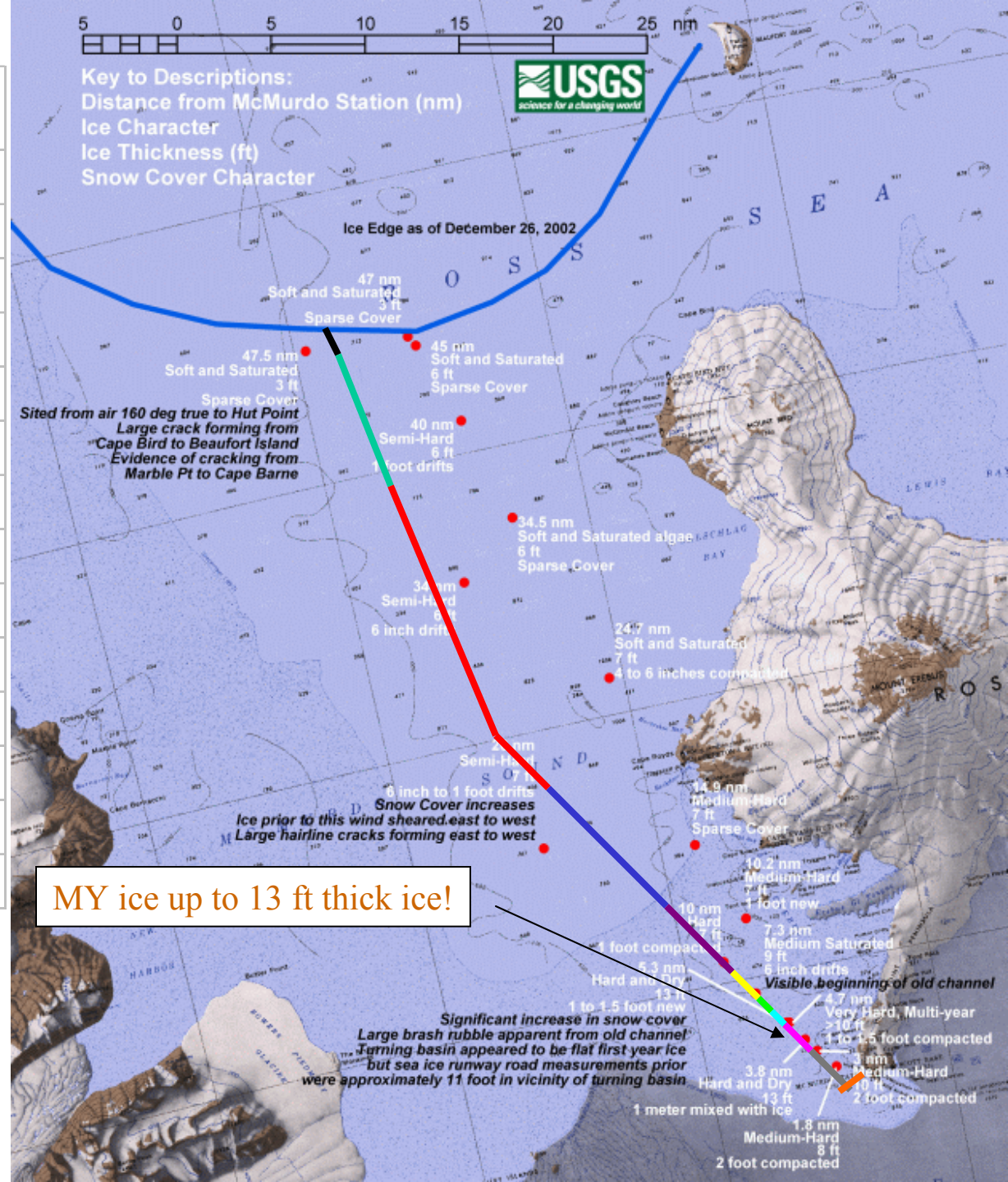
Ross Island

Fast Ice

Bergs, my

NATIONAL/NAVAL ICE CENTER
McMurdo Sound
RADARSAT Image
VT: 0418Z 28 DEC 02
Analyst: AG1(SW) Lotito

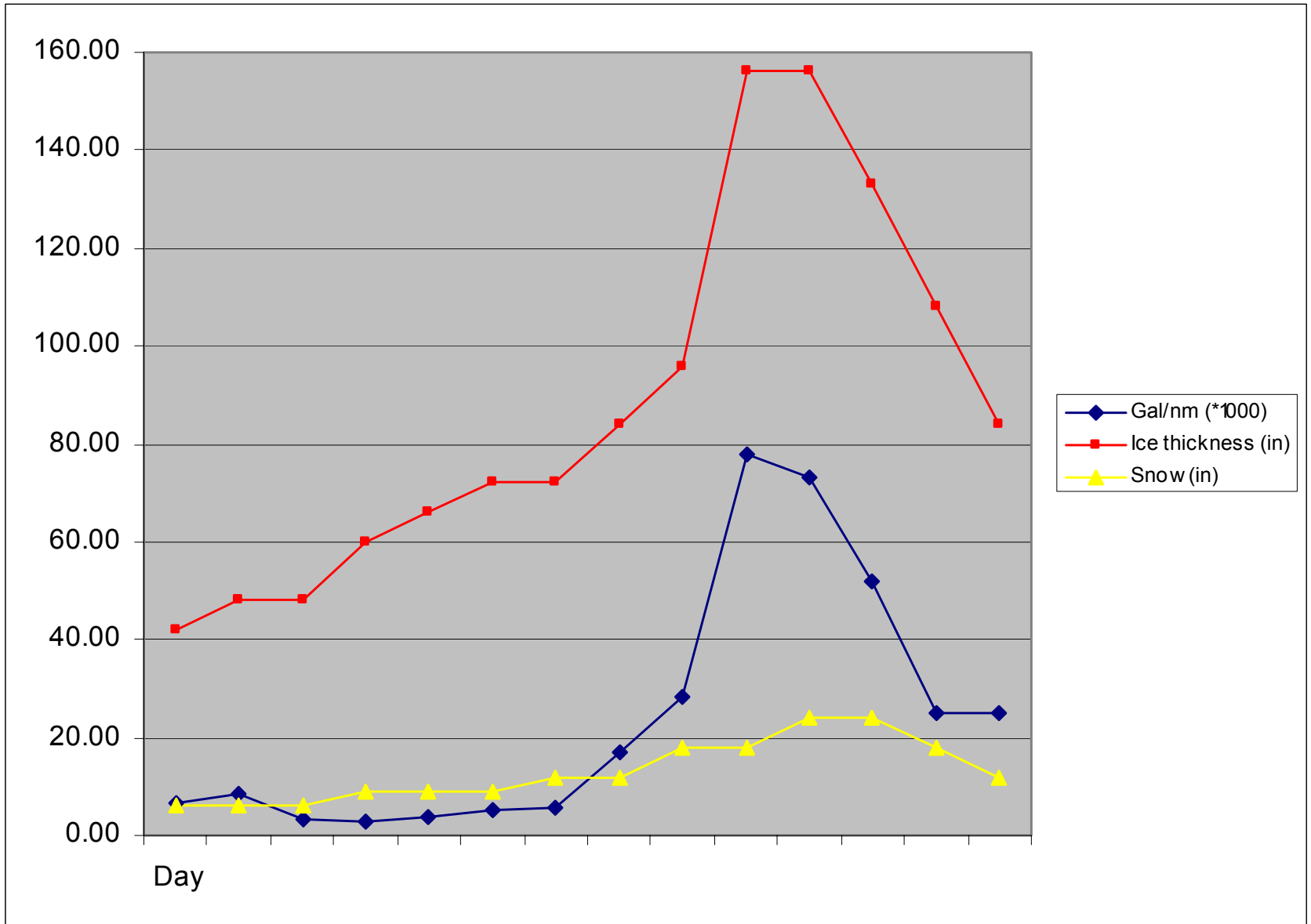
Day	Distance	Ice thickness (in)	Engine Configuration	Hrs ran
30-Dec	0.75	42	2-2-2	5.5
30-Dec	1.25	48	2-T-2	5.1
31-Dec	9	48	T-2-T	8
1-Jan	19	60	T-2-T	16
2-Jan	1.5	66	T-2-T	1.5
2-Jan	7.8	72	T-T-T	9
3-Jan	3.2	72	T-T-T	4
3-Jan	2.3	84	T-T-T	10
4-Jan	1.7	96	T-2-T	16
5-Jan	0.4	156	T-T-T	8
6-Jan	0.8	156	T-T-T	15
7-Jan	1.2	133	T-T-T	16
8-Jan	2.5	108	T-T-T	16
9-Jan	1.5	84	T-T-T	14



MY ice up to 13 ft thick ice!

DF 03 Initial Cut

Initial Cut Fuel Economy



Deep Freeze Operations after 16 Jan 03



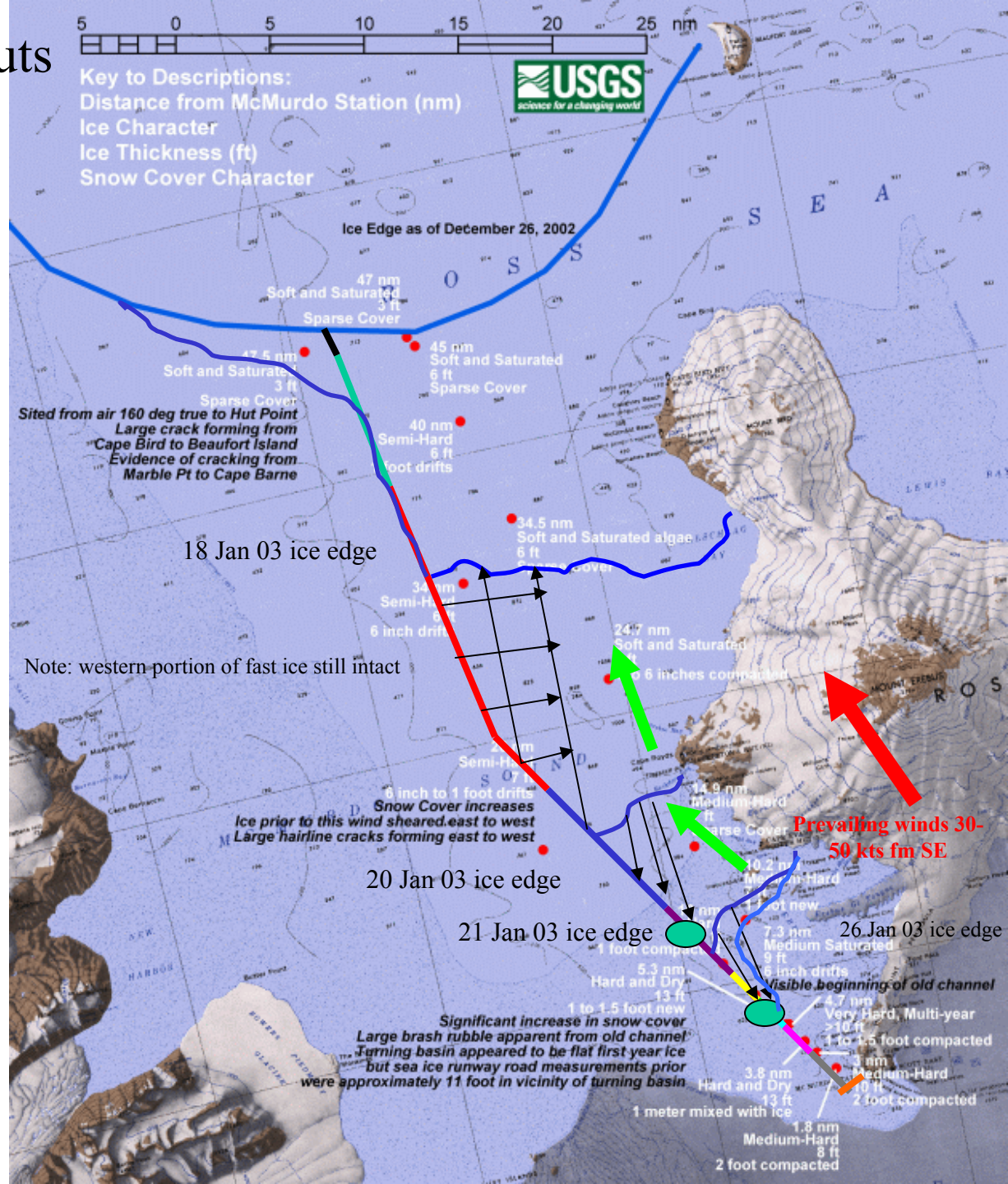
DF 03 Fast ice opening cuts

Started working cuts to open up “pie” slice in fast ice on 18 Jan to take advantage of strong SE winds. On 20 Jan, after completing pie cut, eastern fast ice along west coast of Ross Island breaks free and drifts north

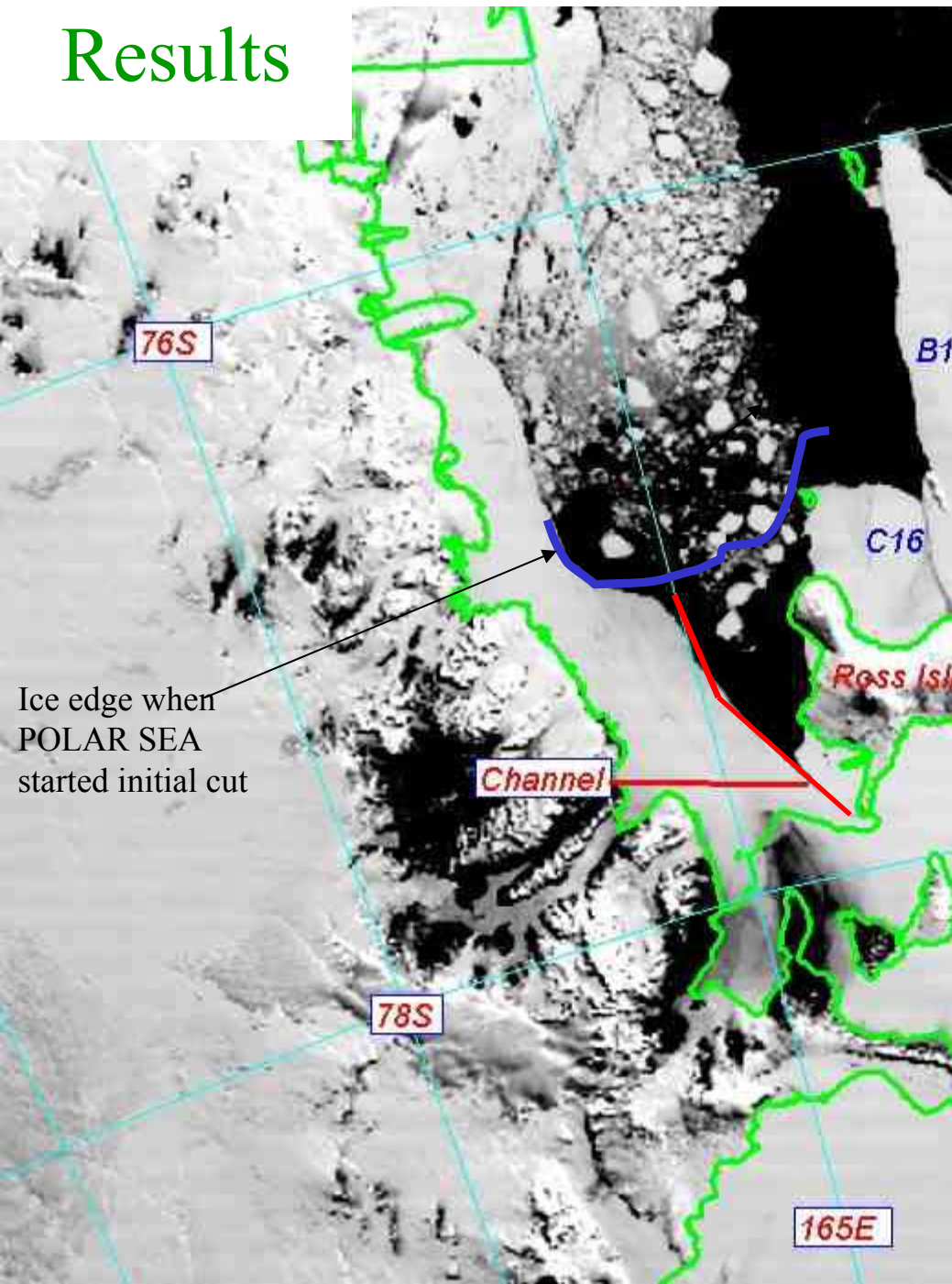
On 20 Jan, POLAR SEA then started working “V” cuts toward 15 nm mid-channel turning basin to allow winds to blow ice out of channel. After completing “V” cuts on 21 Jan, more fast ice breaks free and drifts north.

22-26 Jan 03: POLAR SEA then started “V” cuts to 7.5 nm mid-channel turning basin to take advantage of still strong SE prevailing winds.

28 Jan to present: POLAR SEA working most difficult portion of channel from 7.5 nm to Hut Point. This is very thick and hard multi-year ice. Winds are no longer a factor, correspondingly progress is much slower.



Results

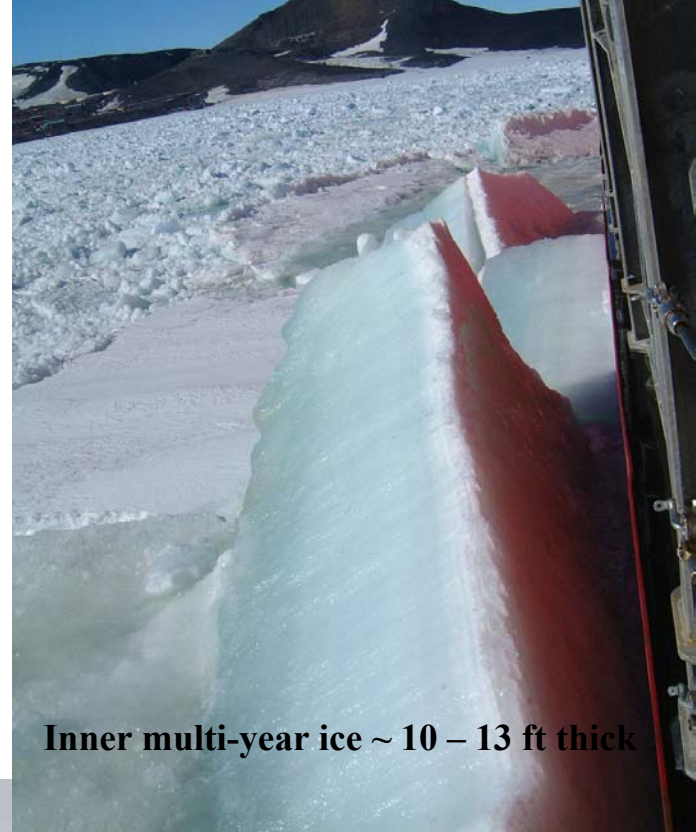


Ice Conditions & Mechanical Problems



Outer first year ice ~ 5 to 6 ft thick

Sea Ice thickness, age & hardness



Inner multi-year ice ~ 10 – 13 ft thick



Multi-year ice. Note color - mostly fresh, very hard

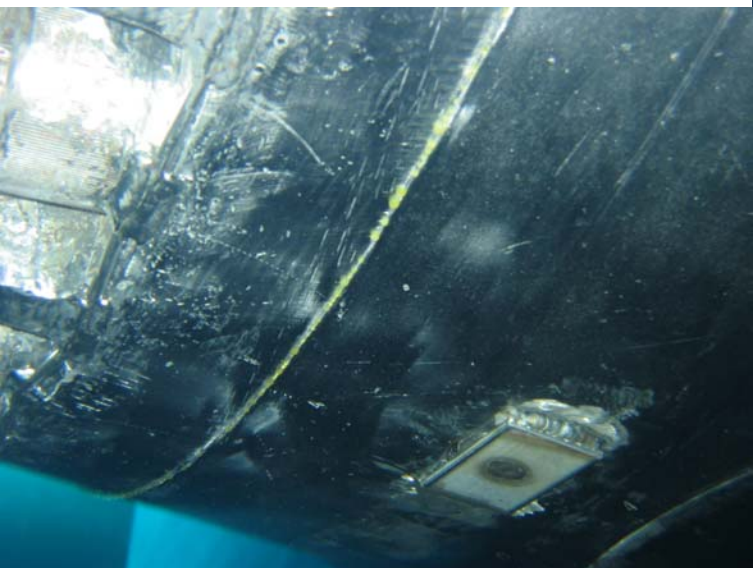
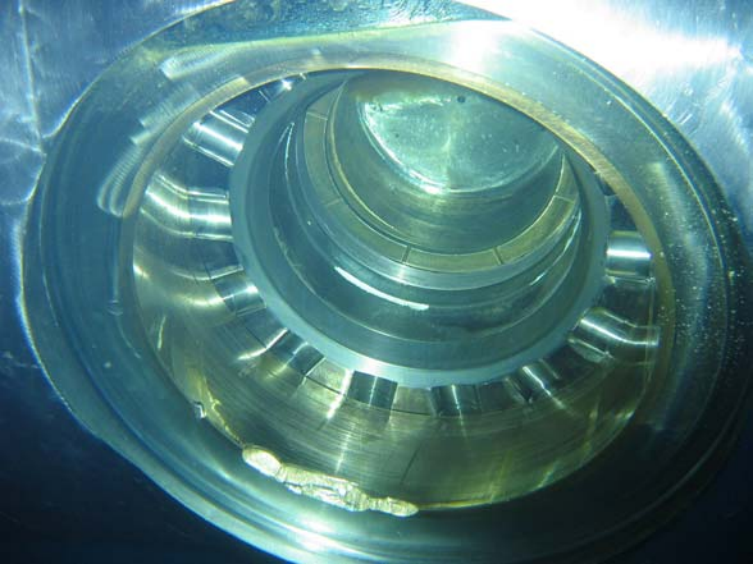


Multi-year ice with ~ 18" snow

JAN 16 2003

Cause - Milling



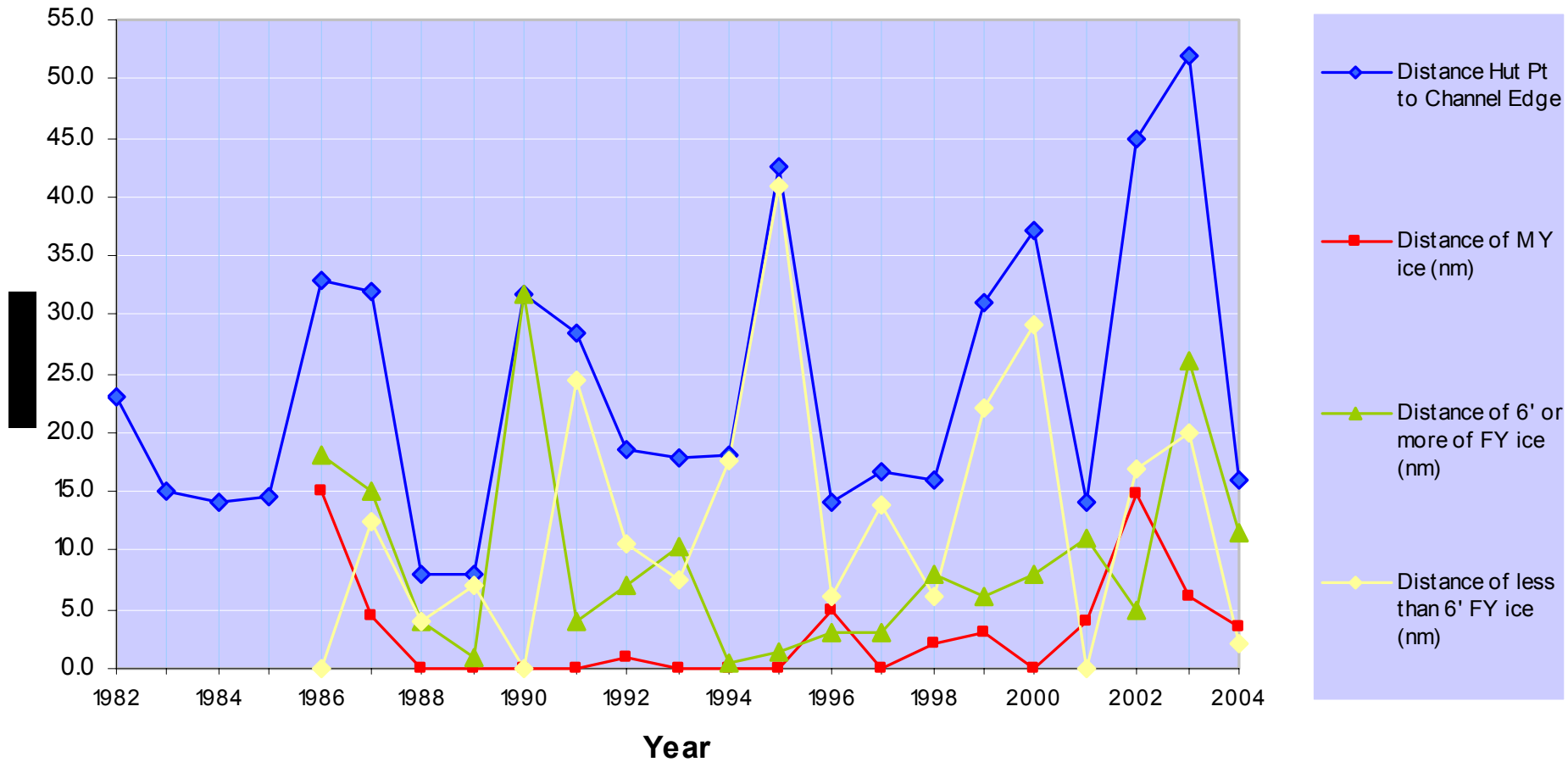


Effect – CPP damage

Current Deep Freeze Ice conditions

Deep Freeze Ice Condition Comparisons

McMurdo Fast Ice Conditions



10 Oct 03 - RADAR

National Ice Center
Naval Ice Center
RadarSat Image
10 October 2003 0101Z

Ross Island

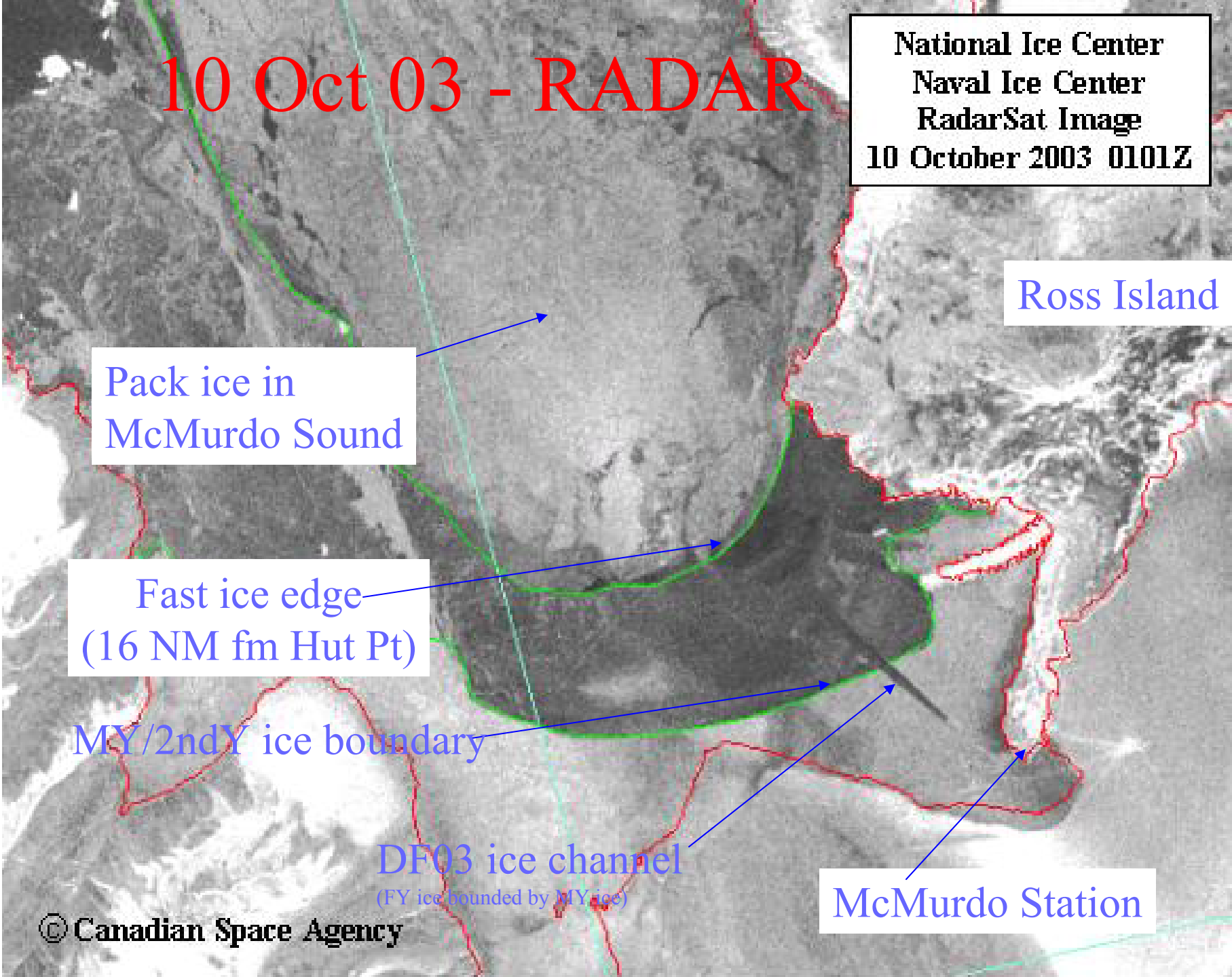
Pack ice in
McMurdo Sound

Fast ice edge
(16 NM fm Hut Pt)

MY/2ndY ice boundary

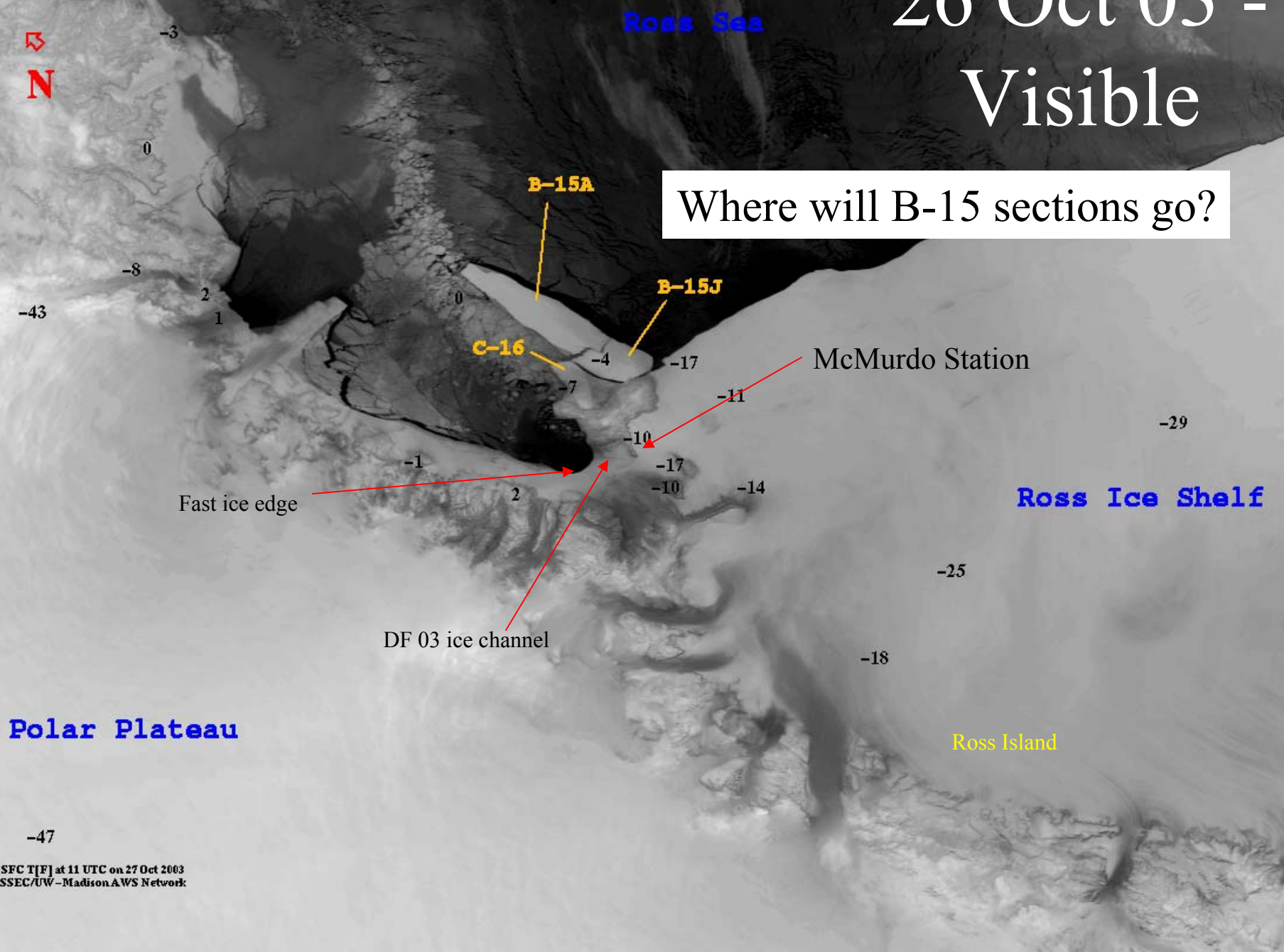
DF03 ice channel
(FY ice bounded by MY ice)

McMurdo Station



26 Oct 03 - Visible

Where will B-15 sections go?



SFC I[F] at 11 UTC on 27 Oct 2003
SSEC/UW-Madison AWS Network