



Martech Polar

Ice Navigation and Pilotage In the Arctic

Arctic Shipping Best Practice Forum
17 November 2021

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A Canadian Perspective?

North American? Polar?

What we see first hand versus

- Headlines and hyperbole
- Armchair assessments and opinions

Several years Post Polar Code

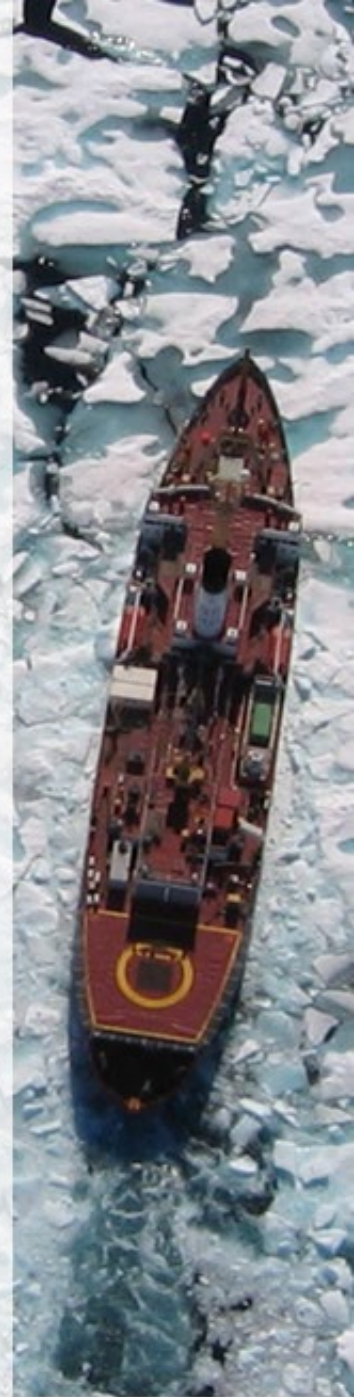
- Apparent gaps



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The Polar Regions are Changing



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The Polar Regions are Changing

BUT

It is not open season for all ships, all year

Considerable challenges remain for both those prepared, and those “less prepared”

Owners/Operators new to Polar Ops often underestimate the complexity and the risks

Too often “goal based” requirements are interpreted to lowest level of compliance “expected”

Operators caught off guard when conditions are not as expected

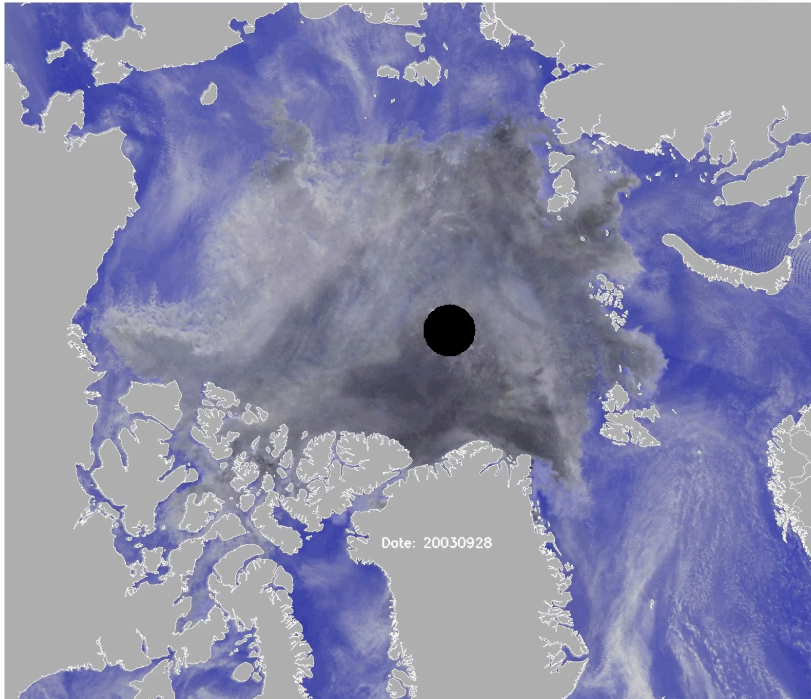


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Challenges

Changing Ice Environment

- Arctic Polar Pack with Multi-year Ice
- Icebergs Baffin Bay, Davis Strait
- Changing conditions year to year
- Remains ice covered 8-9 months per year



Animation Credit – T Agnew



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Challenges

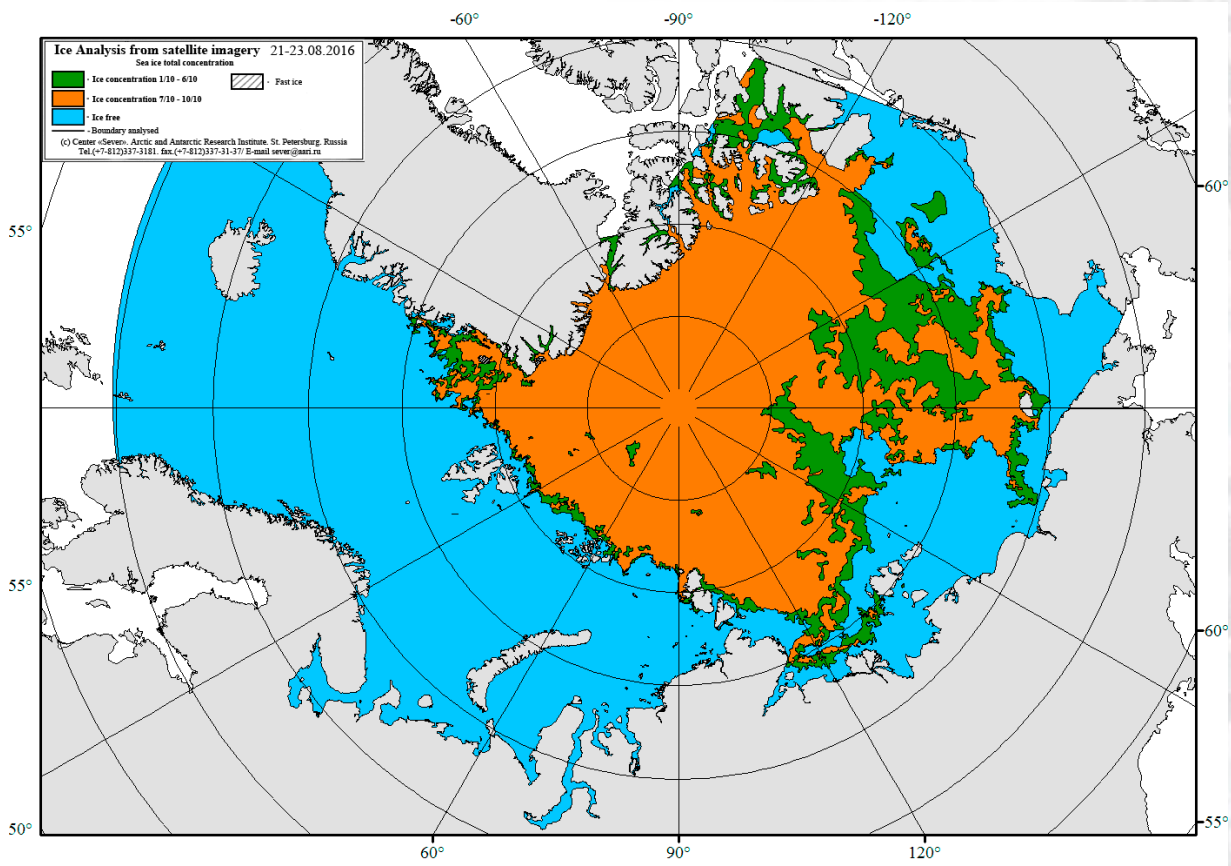
- Winters with less ice will continue to be likely, but:
 - Variability still exists in annual extent and concentration
 - Thinner less compact ice more prone to faster drift and heavier deformation
 - Mariners must consider VARIABILITY may be extreme
 - "Good ice years" does not mean ICE FREE.



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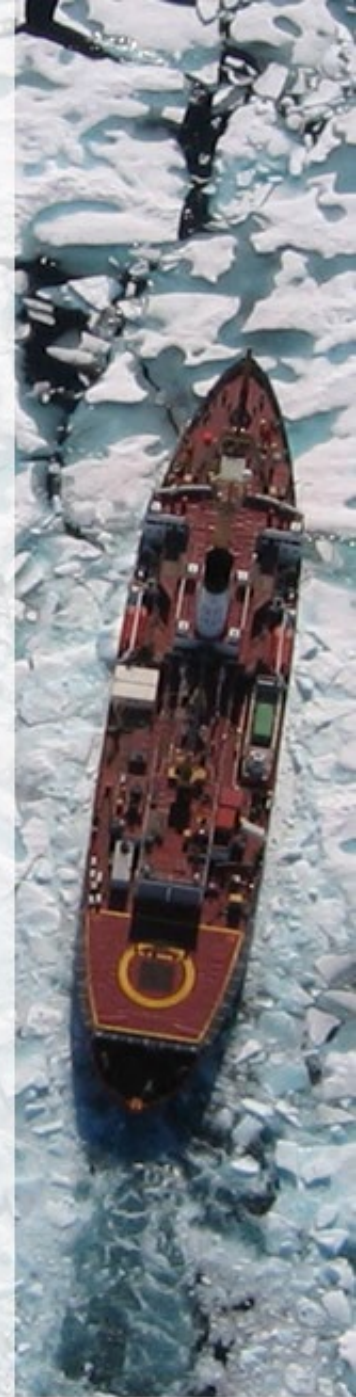
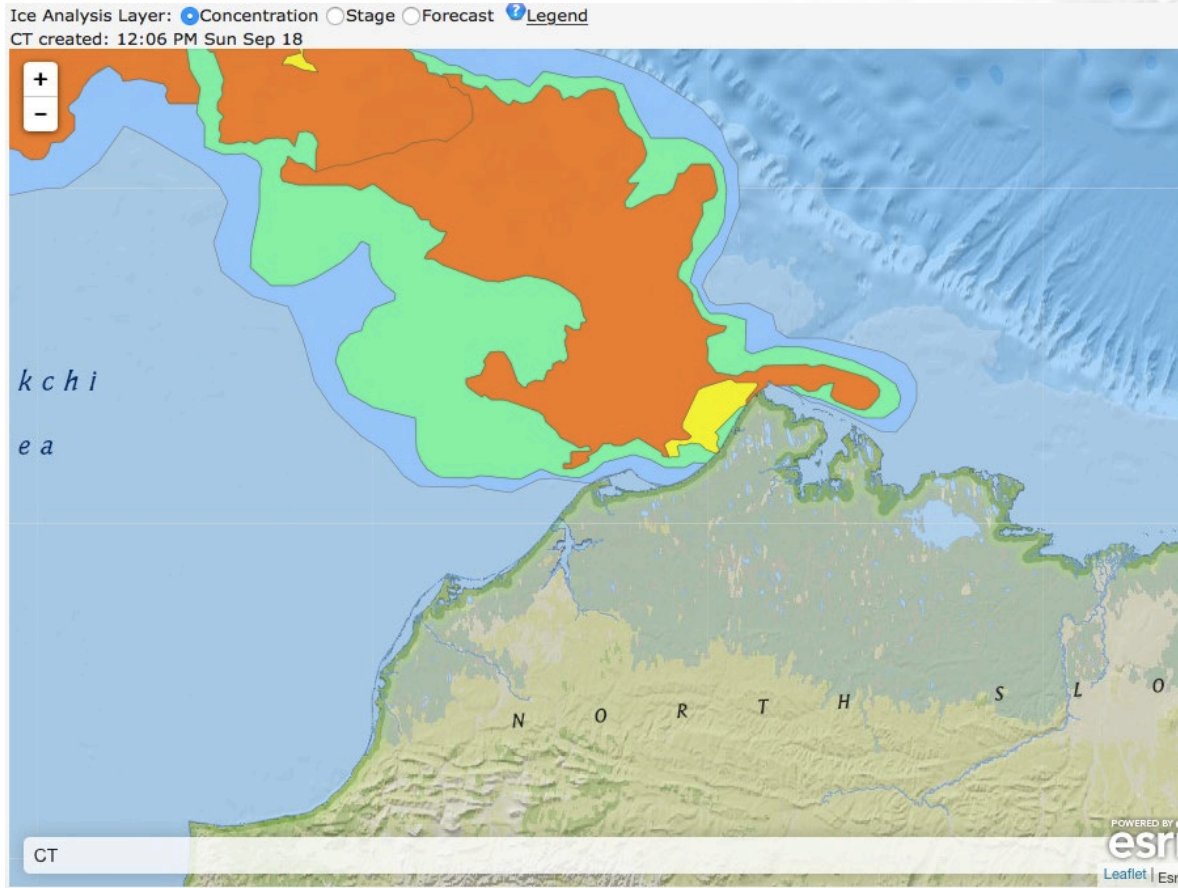


2016



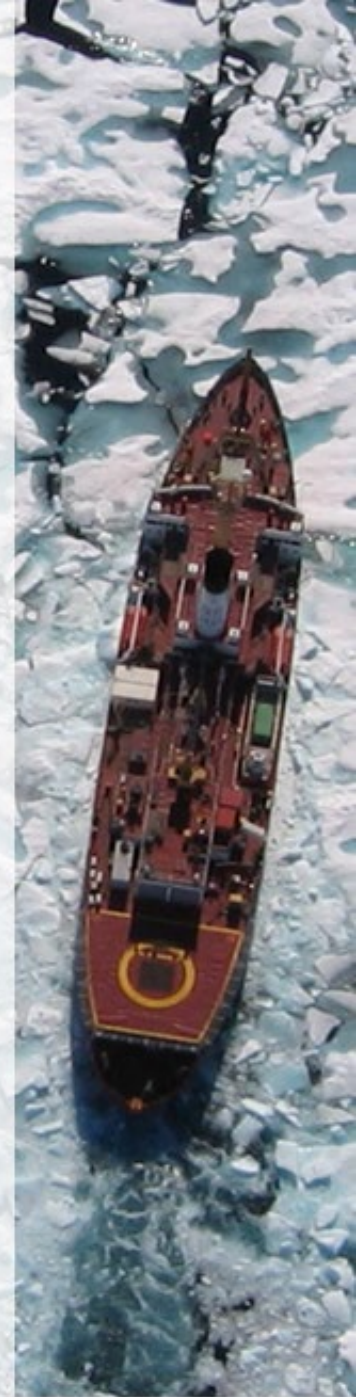
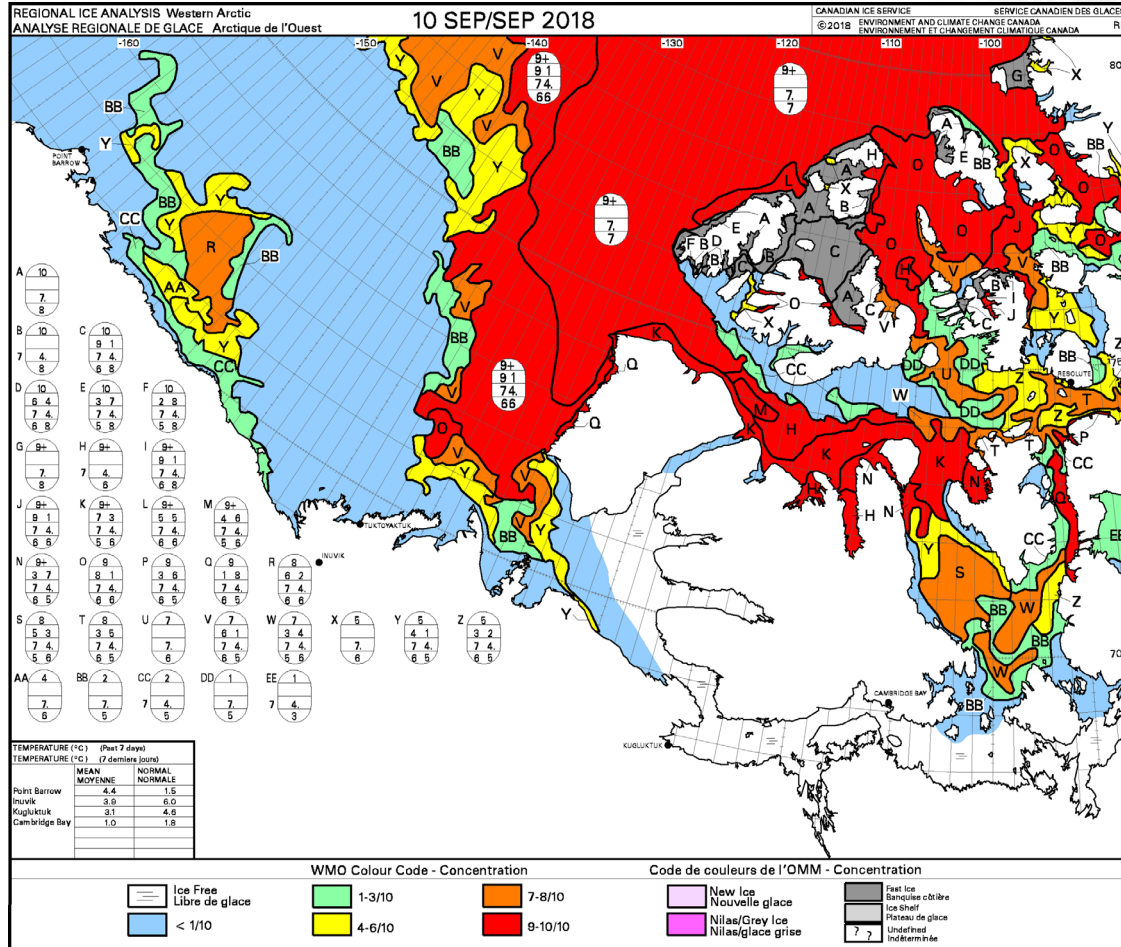
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2016



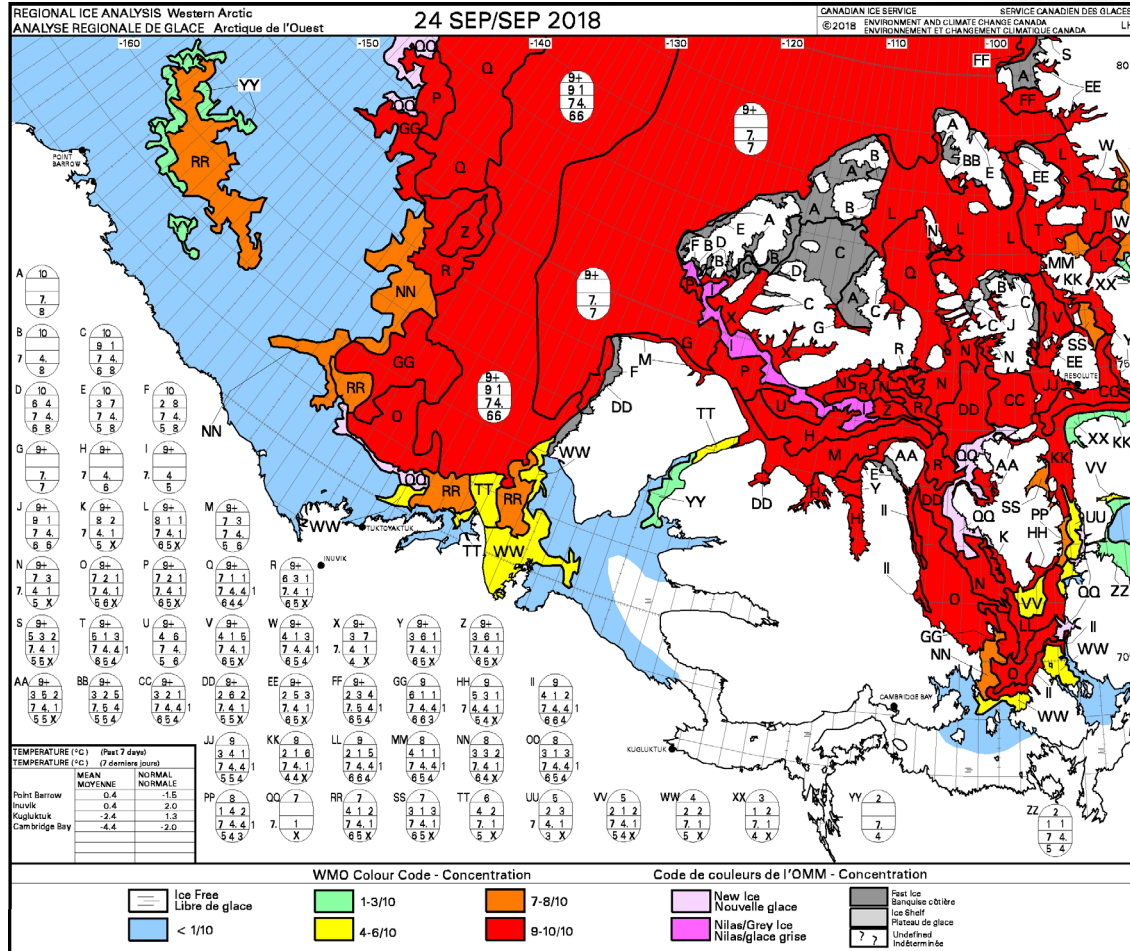
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2018



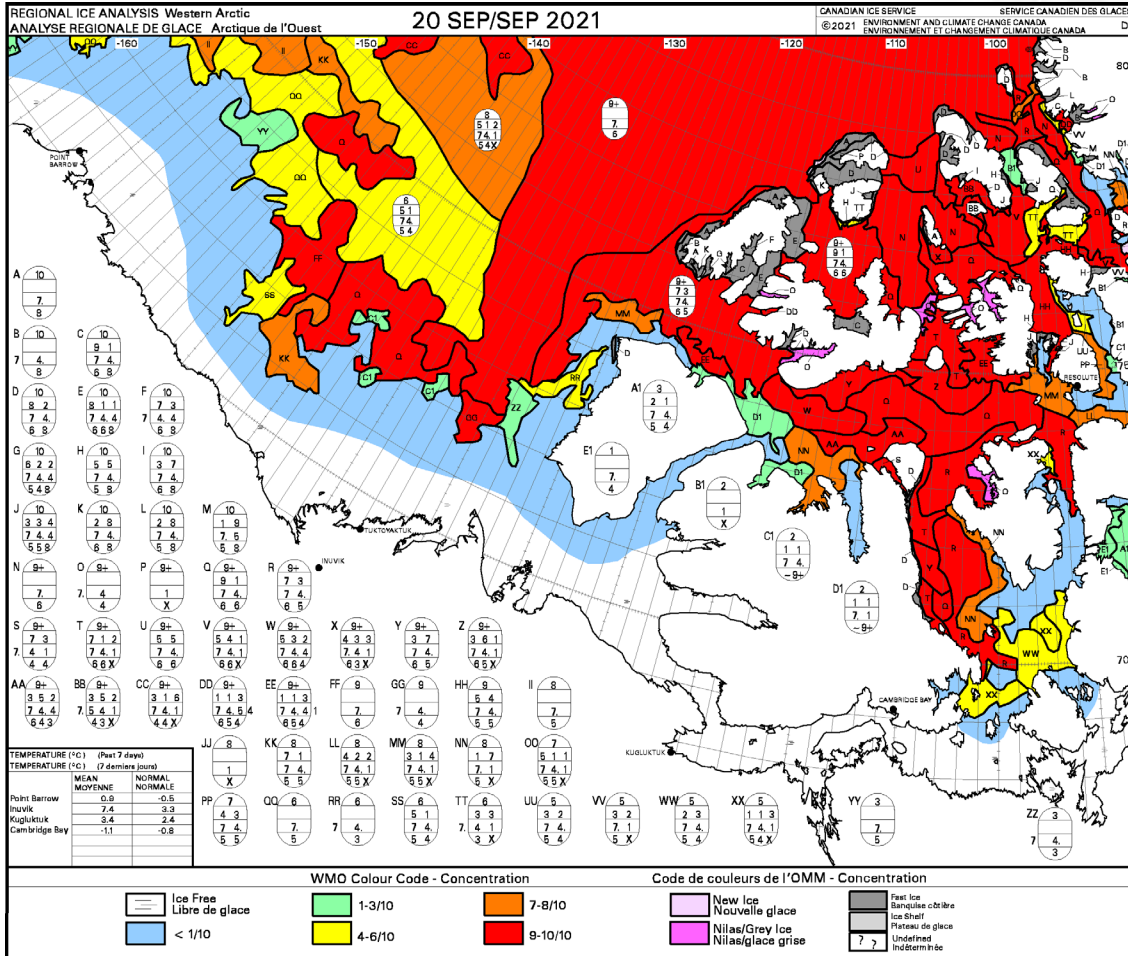
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2018



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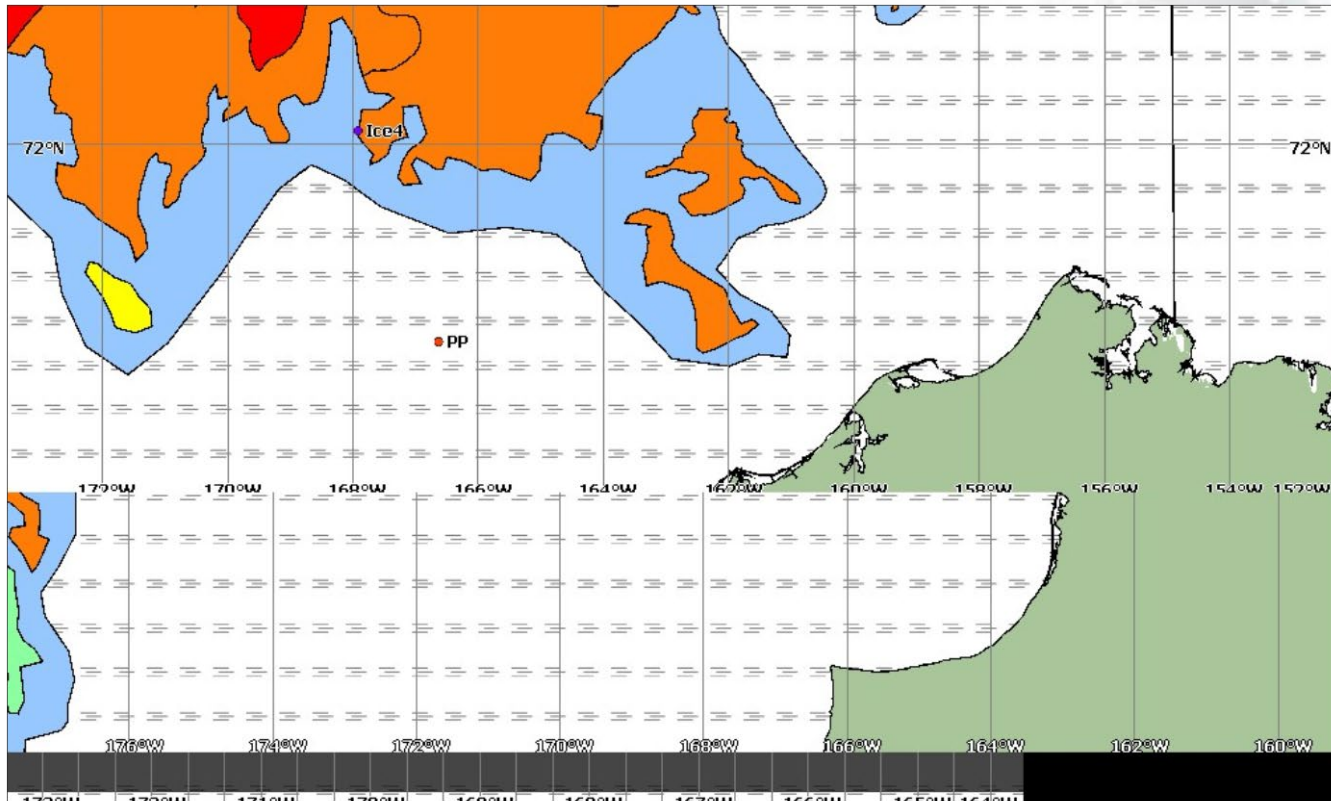
2021



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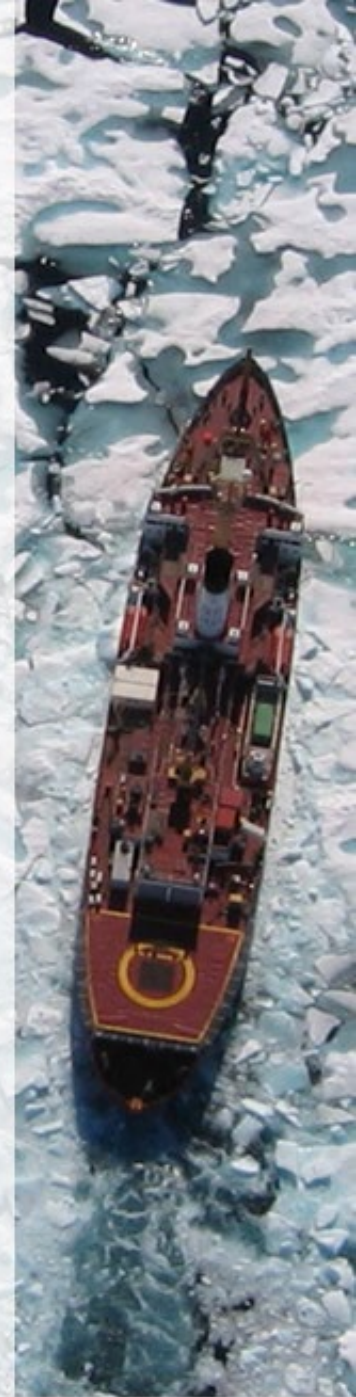
2021

IceNav NOAA 20210924



WMO Colour Code - Concentration

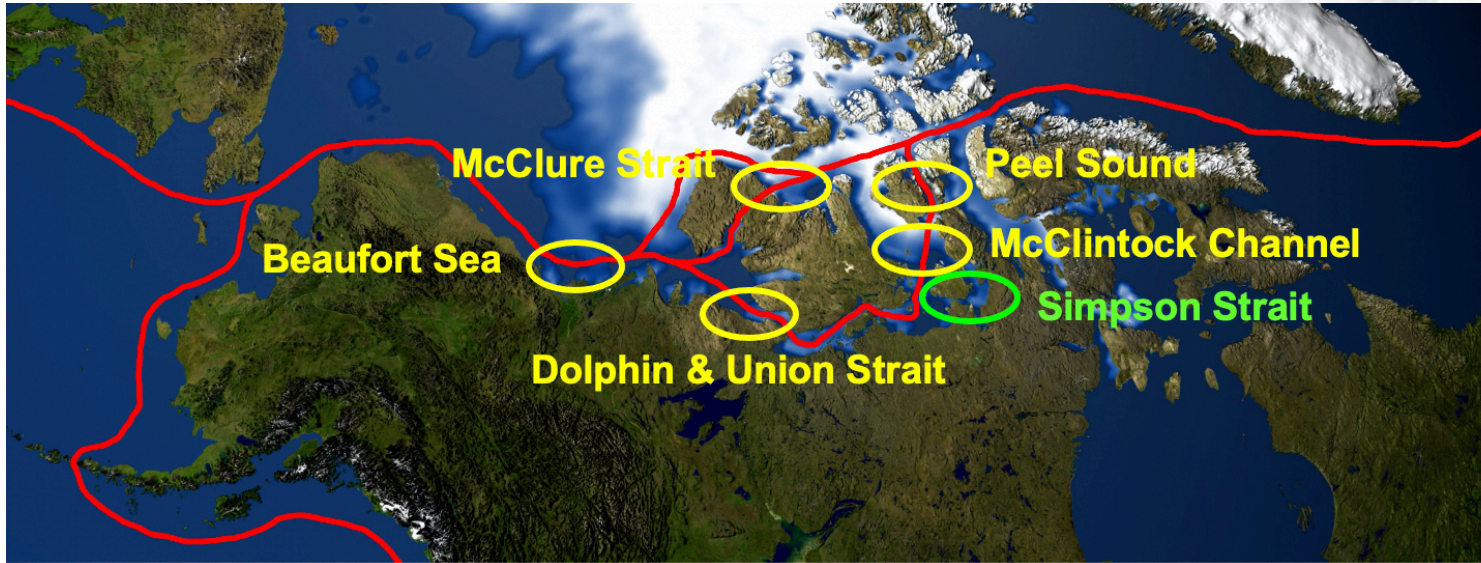
- | | | | | |
|-----------|----------|-----------|-----------------------------|----------------|
| Ice Free | < 1/10 | 1-3/10 | 4-6/10 | 7-8/10 |
| 9-10/10 | Fast Ice | Undefined | New Ice / Brash Ice / Nilas | Nilas/Grey Ice |
| Ice Shelf | | | | |



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Challenges

Persistent Choke Points



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Challenges

- Polar Code – requires the ship and crew meet additional requirements
 - Simply meeting the code is not sufficient
 - Shipboard technical and operational requirements
 - Training and certification of mariners
 - Polar Waters CoP is NOT Ice Navigator
- Less than optimal understanding or implementation of Polar Code requirements.



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Challenges – Training and Certification

- Polar Code Training is NOT universal
- A huge variety in course length, and quality
- Does oversight exist? Can Port State Control look more closely at ships intending to operate in Polar Waters?



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Challenges – Training and Certification

Polar Water Training CERTIFICATION is not universal

- Mariners with no PCT certification at all
- Mariners with training certification but no flag state issued Certificate of Proficiency
- Mariners WITH appropriate training and certification but lacking in rudimentary competence in ICE NAVIGATION
- Nautical Institute Ice Navigator compliments PC and adds ice operations competence <icenavigation@nautinst.org>



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Challenges – Training and Certification

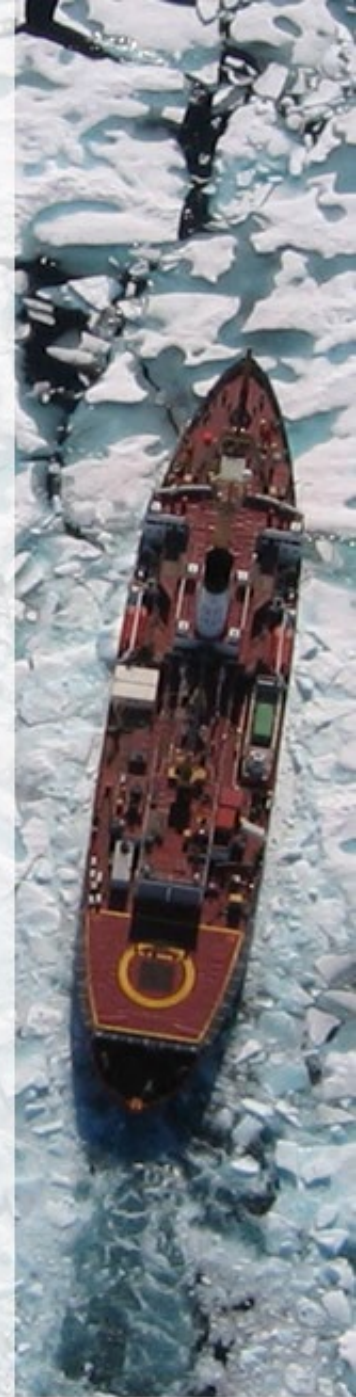
- Ships crewed and experienced is not just a catch phrase



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Challenge

- In depth planning and preparation still necessary
- Crystal Serenity



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Challenges

- Ships designed and built for the environment
- Ill prepared ships are a concern



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Challenges - Infrastructure

Why is it still primarily either "usual players" or expeditionary?

Lack of Local Infrastructure

- Northwest Passage
 - Remote area
 - Small villages
 - No real port, fuel, resupply or repair facilities between Nuuk and Dutch Harbor

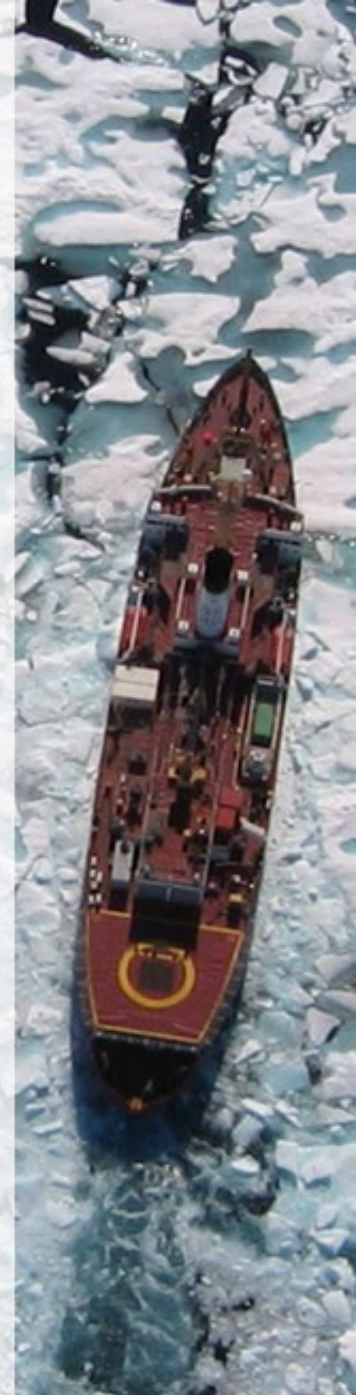
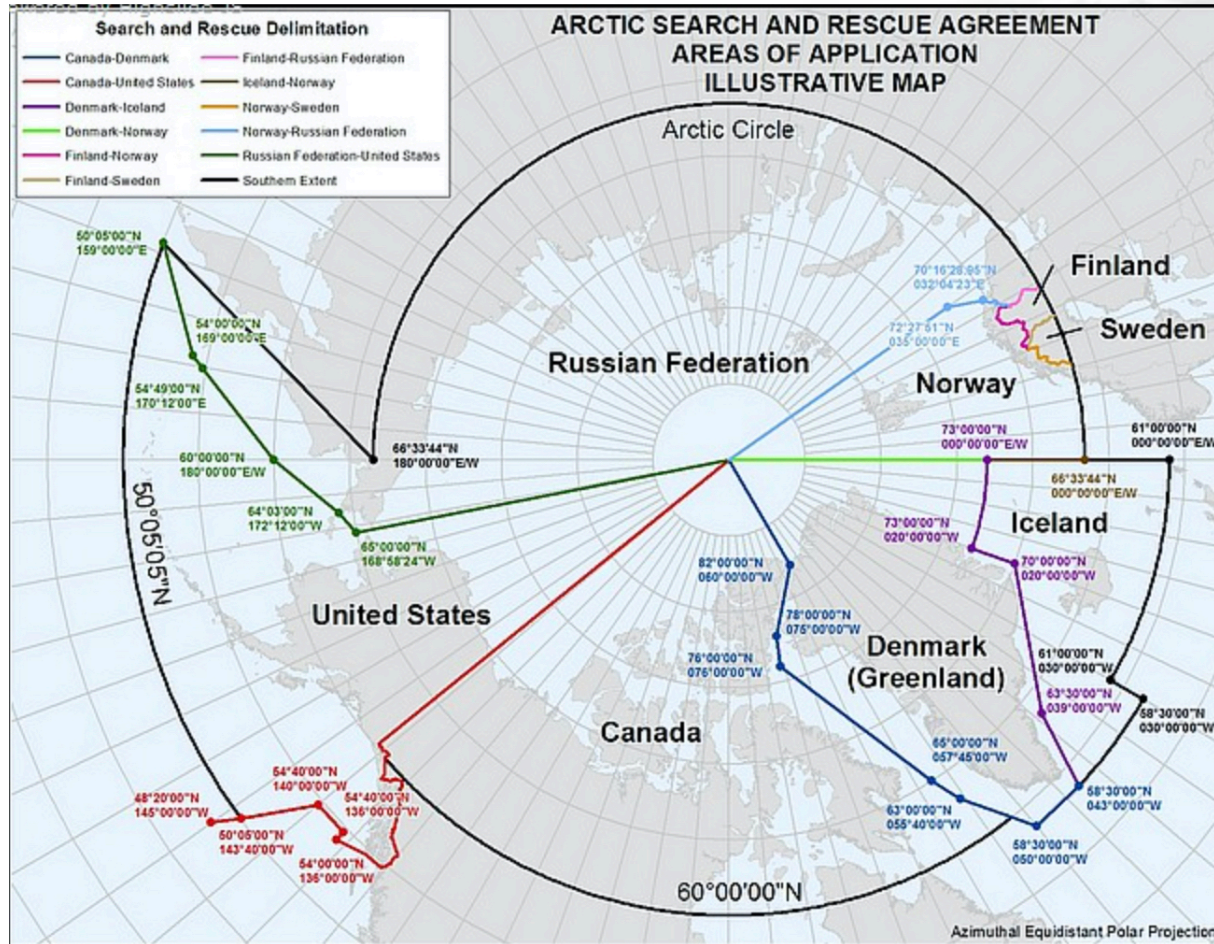


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Challenges – SAR response

Designation of SAR responsibility

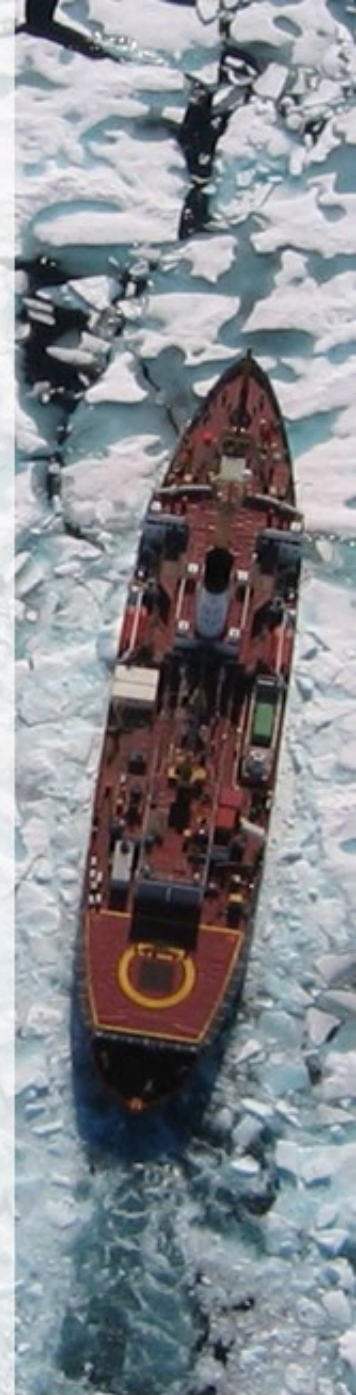
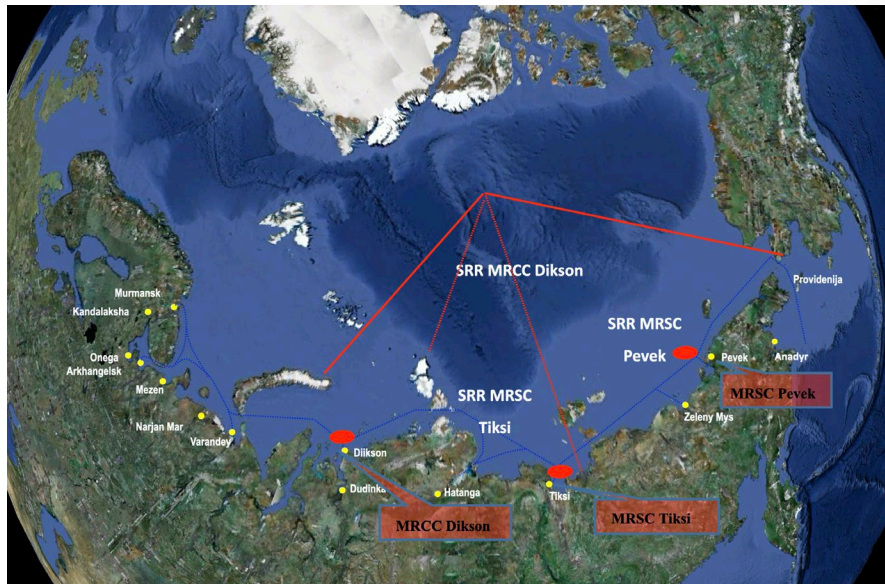


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Challenges

Emergency support is limited

- Russia aggressively building SAR infrastructure
- No similar effort being made by other Arctic coastal states
- USCG Arctic Shield
- Canada does not preposition air assets

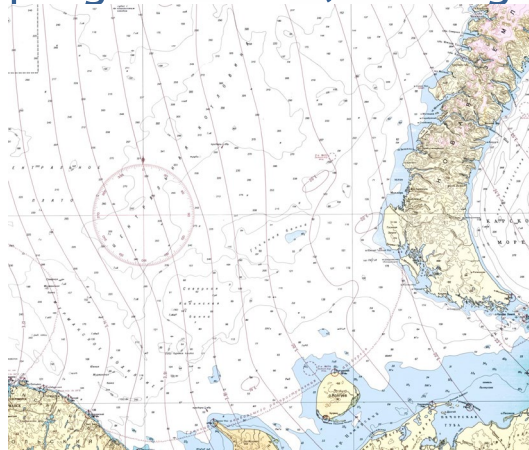


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Challenges

Charts and Charting –

- Adjoining paper charts may have different datums
- Some survey data used still dates to 1800s
- Sporadic soundings in some areas
- Track line soundings in many areas – well surveyed corridors DO exist.
- Paper chart projections may still uses polar gnomonic
- ENC coverage is not complete
 - Raster and Vector chart lack of overlap
- Focus on shipping corridors, leaving areas outside of corridors less

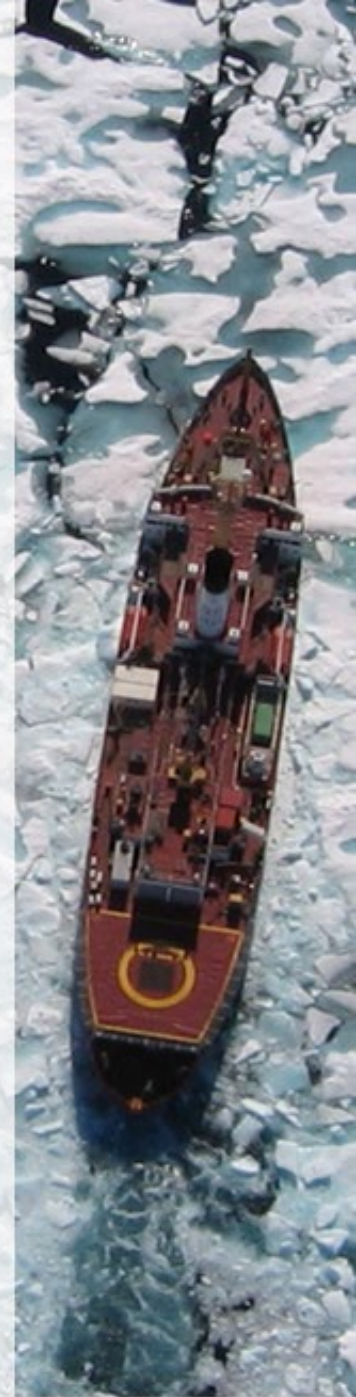


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Challenges

Icebreakers

- Russia operating combined nuclear, and conventional fleet
- Aggressively renewing icebreaking fleet
- USA - only two operationally capable Polar Icebreakers
 - Building two possibly three Polar Security Cutters
- Canada commits up to 6 icebreakers
 - Two Polar Icebreakers “ordered” indefinitely delayed

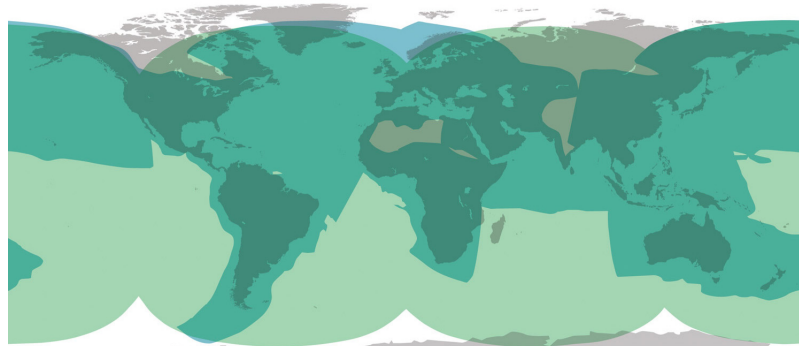


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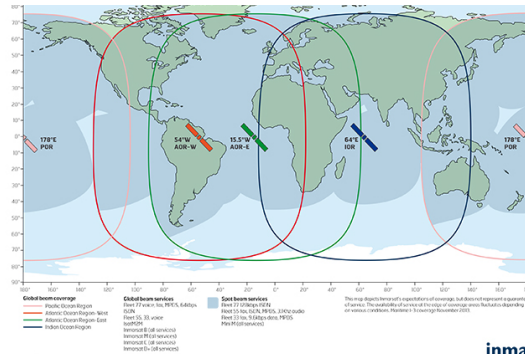
Challenges

Communications

- Outside INMARSAT, on edge of VSAT
 - Satellite gap in central Canadian Arctic
- Iridium and Iridium Next, available but slower
- GMDSS Sat C or HF often fall back



■ Ku-band Coverage with C-band Overlay Coverage ■ Ku-band Coverage Only ■ C-band Coverage Only



Global beam coverage
Foot 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

Global beam services
Foot 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

Global beam services
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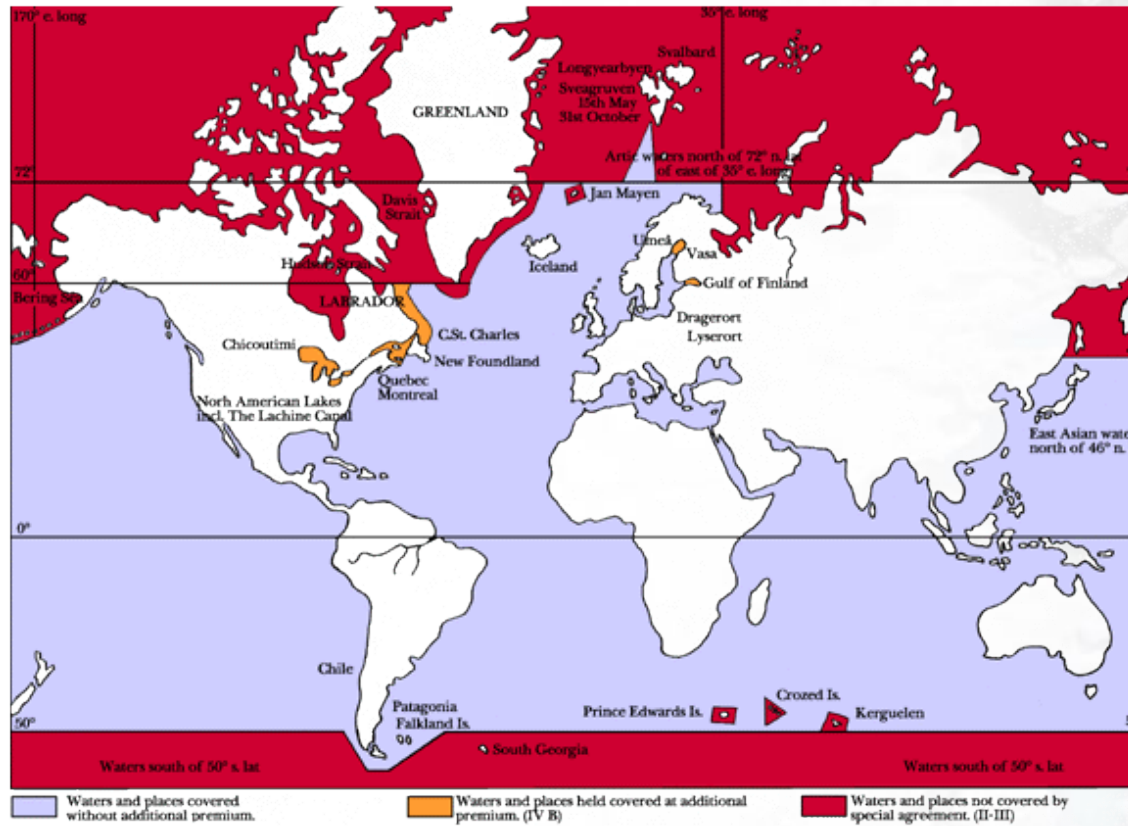
inmarsat.com
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Challenges

Insurance

- Higher premiums



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