



Shipping Challenges and Maritime Security in the Arctic

Brief to RUSI 13 Nov 24

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Master Mariner FRIN, FNI



Who owns the Arctic?

“Despite the military photo ops and defiant words aimed at the Russian Bear in the Far North, U.S. diplomatic cables indicate that Stephen Harper doesn't believe there's a threat of military conflict there: He told NATO it is not wanted in the Arctic because there's no likelihood of war.”

Campbell Clark, Globe and Mail,

2011



Definition of the Arctic/Polar Waters

Arctic Boundary as defined by the Arctic Research and Policy Act (ARPA)

All United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering and Chukchi Seas, and the Aleutian chain.¹



Acknowledgement: Funding for this map was provided by the National Science Foundation through the Arctic Research Mapping Application (armap.org) and Contract #0520837 to CH2M HILL for the Interagency Arctic Research Policy Committee (IARPC).

Map author: Allison Gaylord, Nuna Technologies. May 27, 2009.

1. The Aleutian chain boundary is demarcated by the 'Contiguous zone' limit of 24-nautical miles.

Or: Limit of permafrost; tree-line; 10C isotherm;
indigenous cultural areas...?

Early 1900's: High Arctic islands charted by Cdn/Norwegians

Source: Pilot of Arctic Canada, 1st edition, 1959

Explorations since 1800

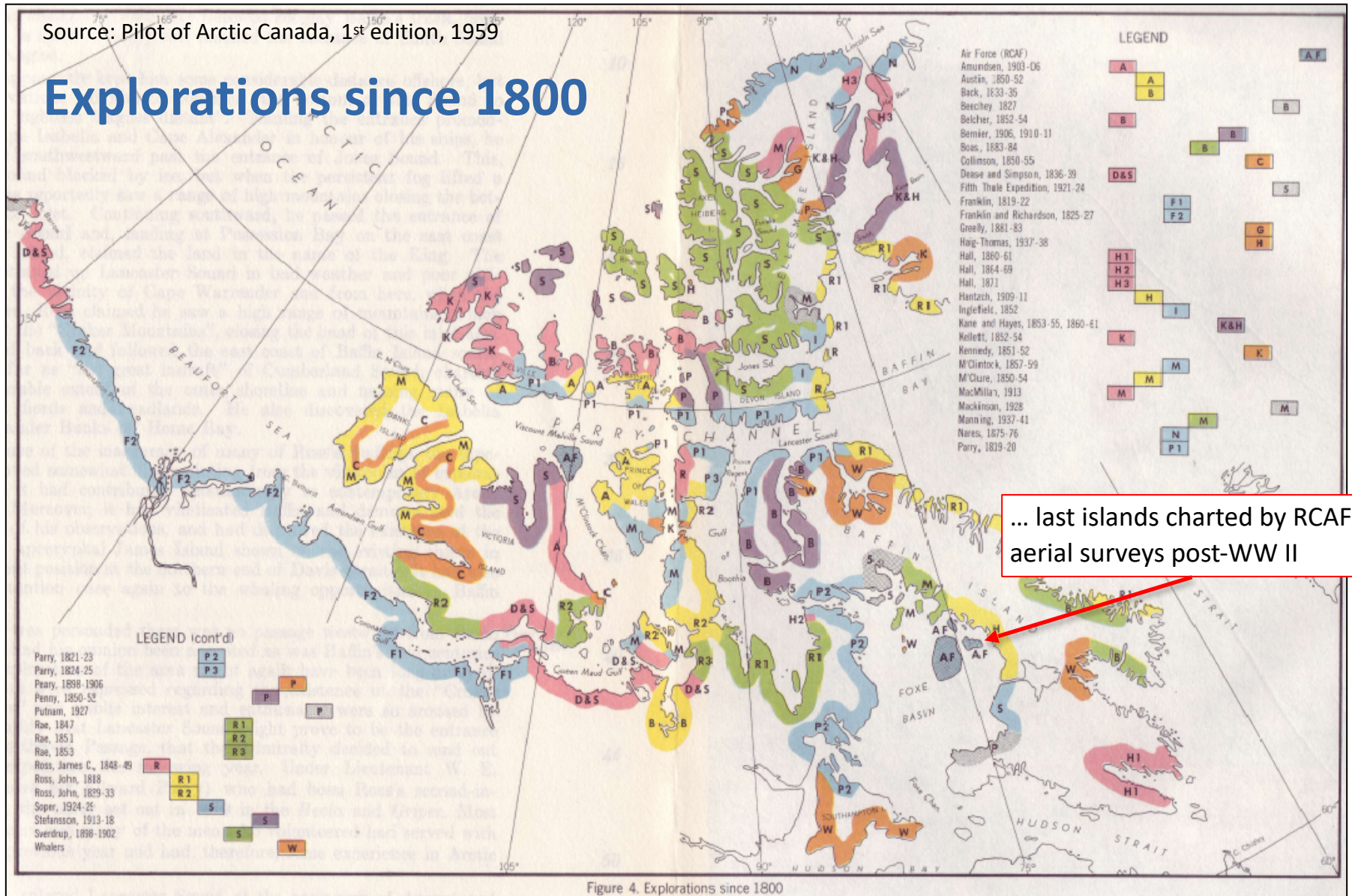


Figure 4. Explorations since 1800

Territorial claims resolution with UK (1880) and Norway (1930)

Challenge, Defence and Response



Canadian Post-war Evolution

1950's — DEW Line Construction, HMCS Labrador 1954, USS Nautilus 1958

1950's — “Relocation” of Inuit from Hudson Bay to the High Arctic

1960's — SS Manhattan 1969

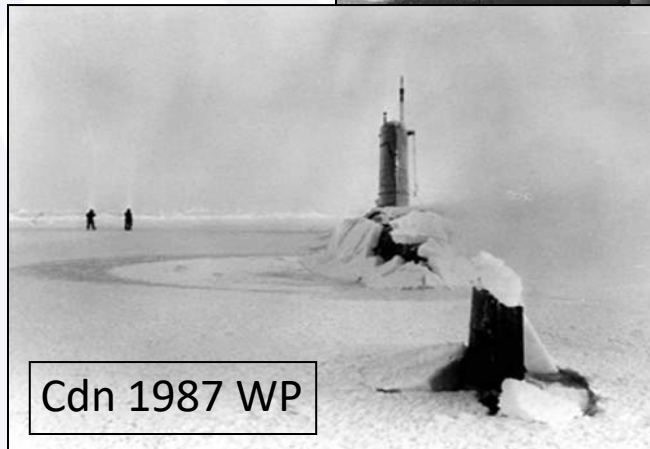
... Arctic Waters Pollution Prevention Act

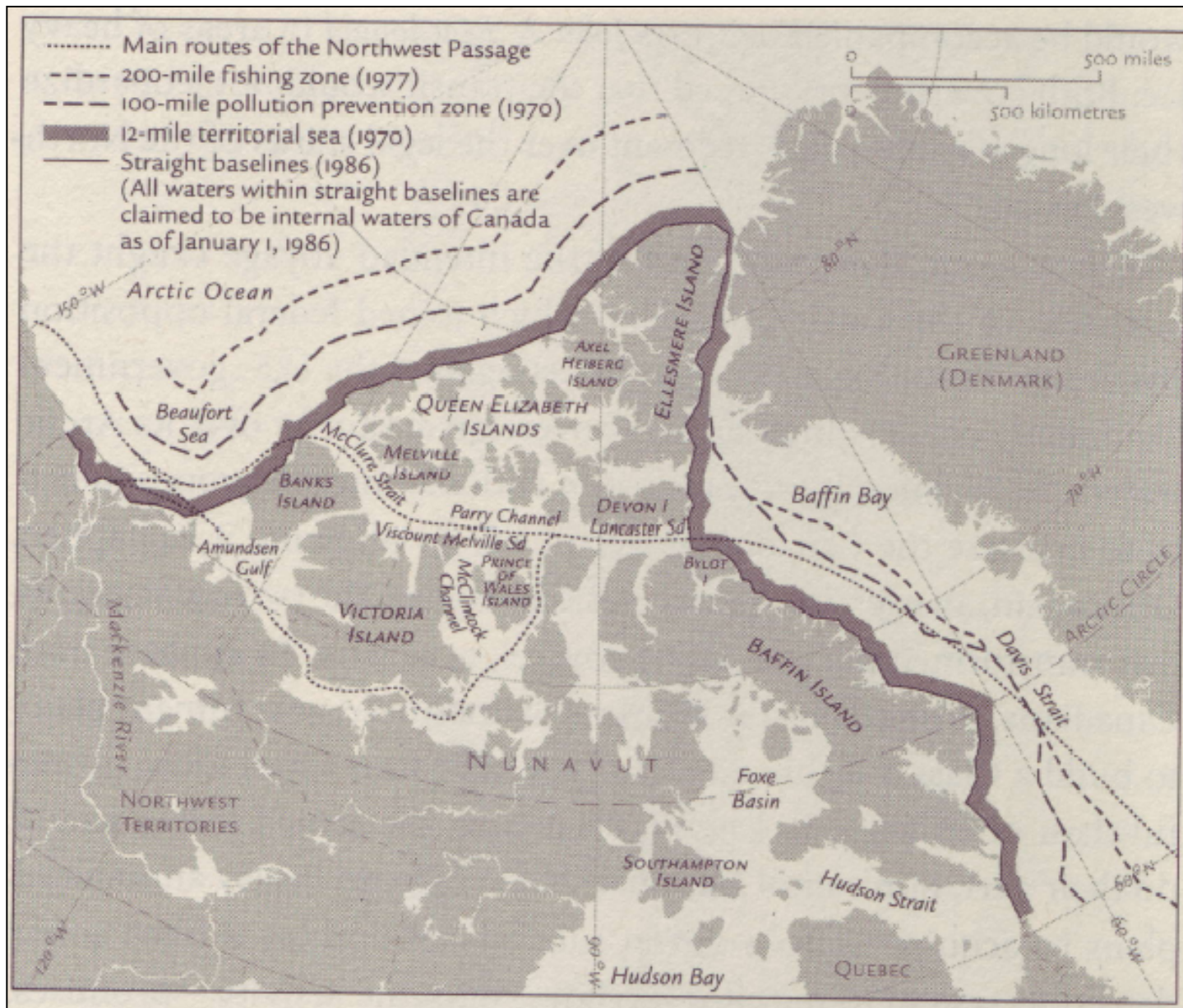
1970's — Royal Canadian Navy “NORPATs”

1980's — Cold war apogee, resource exploration

1985 — USCGC Polar Sea transit of NWP

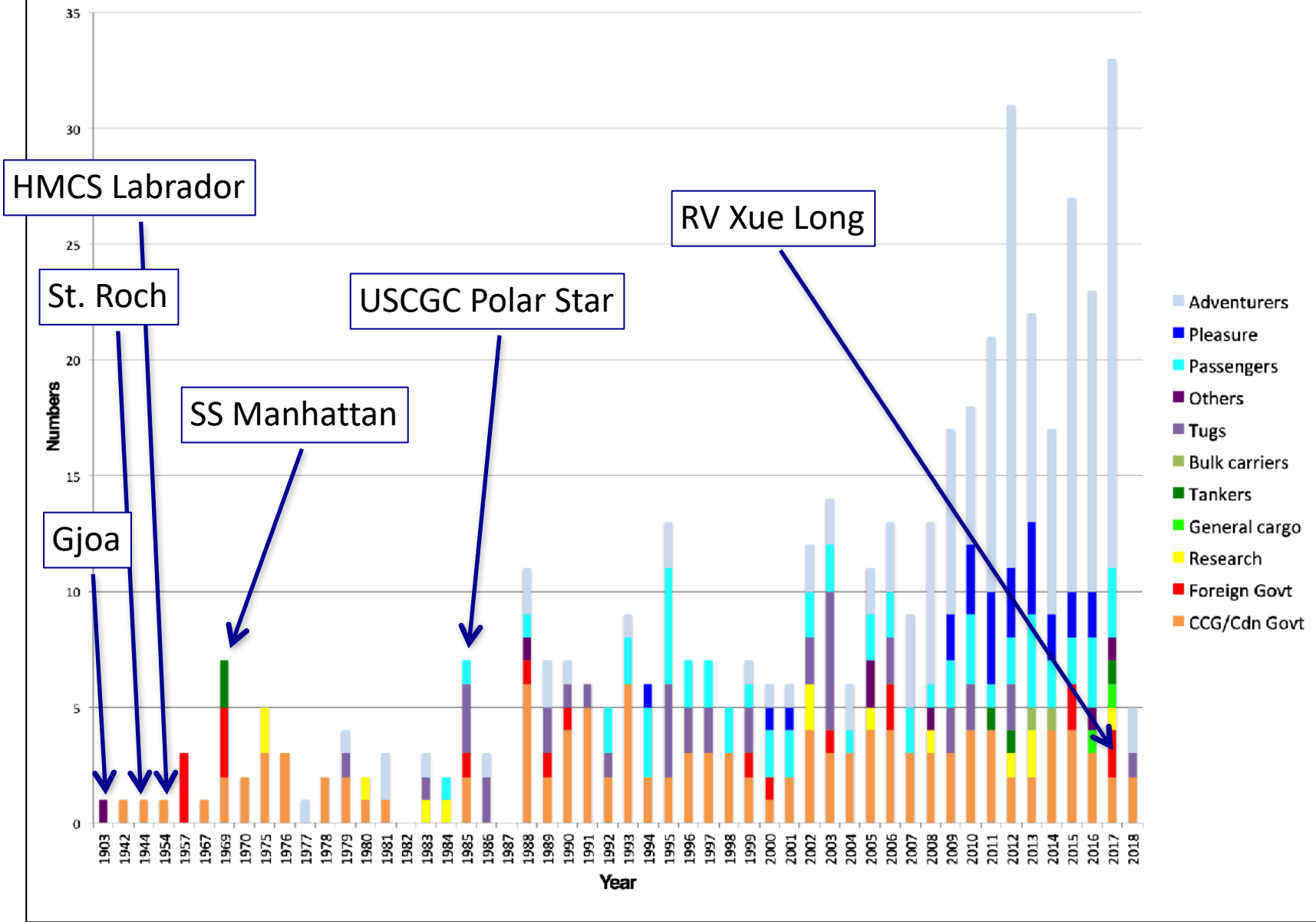
... declaration of Baselines, 1987 Defence White Paper





Limits of Cdn Jurisdiction in the Arctic, c1986
(Grant, *Polar Imperative*, 2010)

Full Transits of the NWP 1903-2018



Source: NORDREG and SPRI statistics

NWP: Internal Waters or International Strait^{1,2}

Arguments for Internal Waters (Canada)

- Historic title (UK, 1880)
- Indigenous use of land and ice
- Seasonal impassability
- Straight baseline enclosure
- Envir. Protection (ice covered waters)
- Burden of emergency response (SAR)
- Precedent of coop/compliance³
- Assertion of Canadian Sovereignty⁴

Arguments for International Strait

- Communication between oceans
- Increasing use
- Economic incentive
- Legal precedent (negative – SCS)
- IW Def'n not critical to envir. protection
- Cooperative management ... “heritage of mankind”⁵

“Sovereignty” a False Cause-Célèbre:

Issue is about transit rights (ie: non-suspension of “expeditious and continuous” passage), not sovereignty or jurisdiction.

Key issue – submarine transits.

Notes:

(Not formal, legal arguments ...see Cdr James Kraska for these.)

1 – UNCLOS Art 34.1: The regime of passage through straits **used for international navigation** established in this Part **shall not in other respects affect the legal status of the waters** forming such straits **or the exercise by the States bordering the straits of their sovereignty** or jurisdiction over such waters and their air space, bed and subsoil.

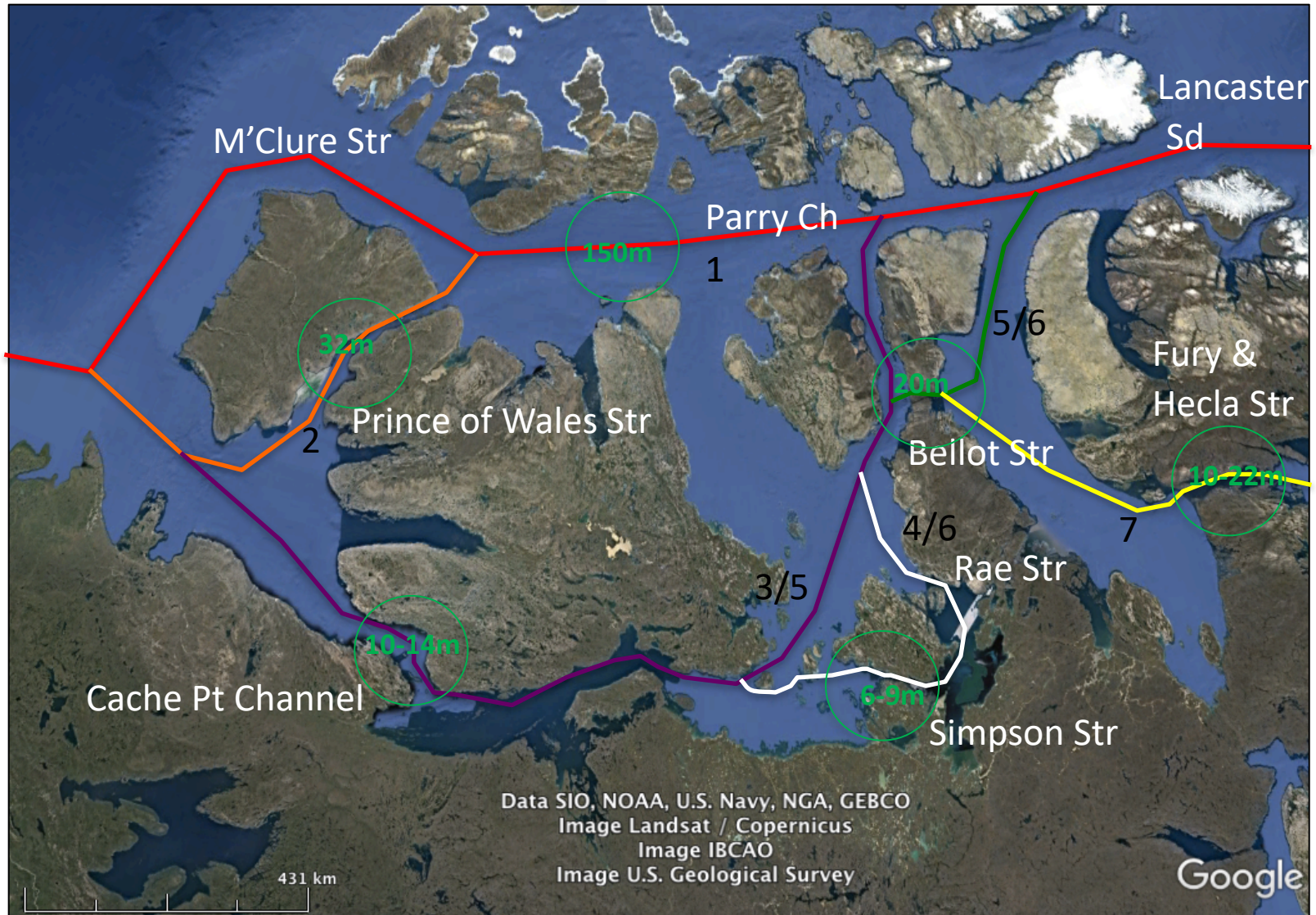
2 - Straits designated as International Straits are defacto within the Territorial Waters (ie: less than 2 x 12nm wide), otherwise the Transit Passage rights of the EEZ or High Seas apply and designation as an international strait is redundant.

3 - Lengthy history of (qualified) cooperation, notification and compliance with Cdn requirements, from USS SEA DRAGON to SS MANHATTAN to USCGC POLAR STAR and USCGC MAPLE to RV XUE LONG

4 – **Sovereignty concerns eased by 1988 CANUS Arctic Cooperation Agreement (cooperation without prejudice to sovereign positions)**

5 – Implicit in environmental arguments, increasingly explicit in non-Arctic nation statements. A red herring wrt the NWP.

The Northwest Passage(s)



NB: Numbering iaw SPRI; Route 6 is Bellot Str & Rae/Simpson Straits



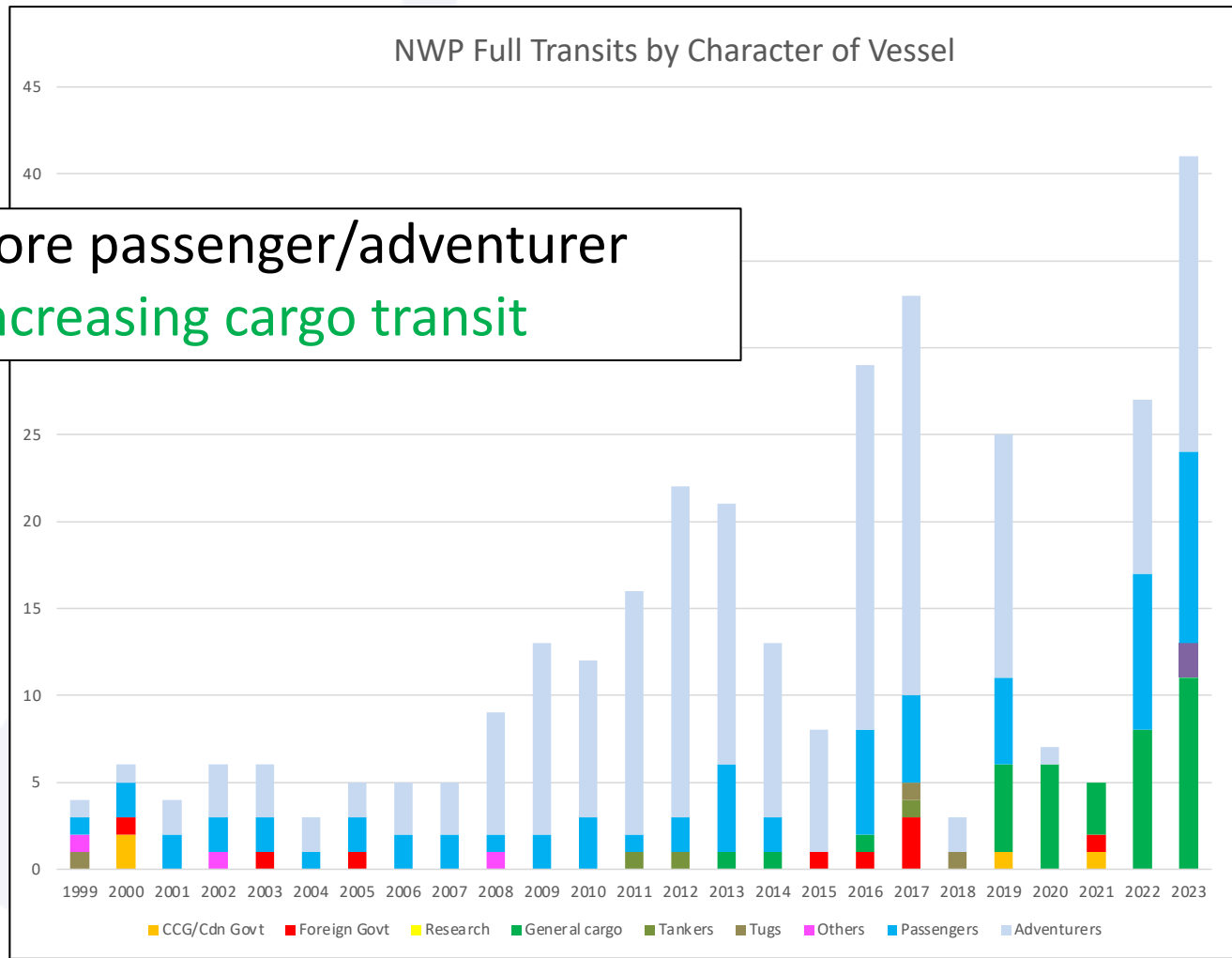
10m

Limiting Drafts

3 – Route Numbers (SPRI)



Changing Patterns of NWP Transits*



➤ Much more passenger/adventurer traffic, **increasing cargo transit**

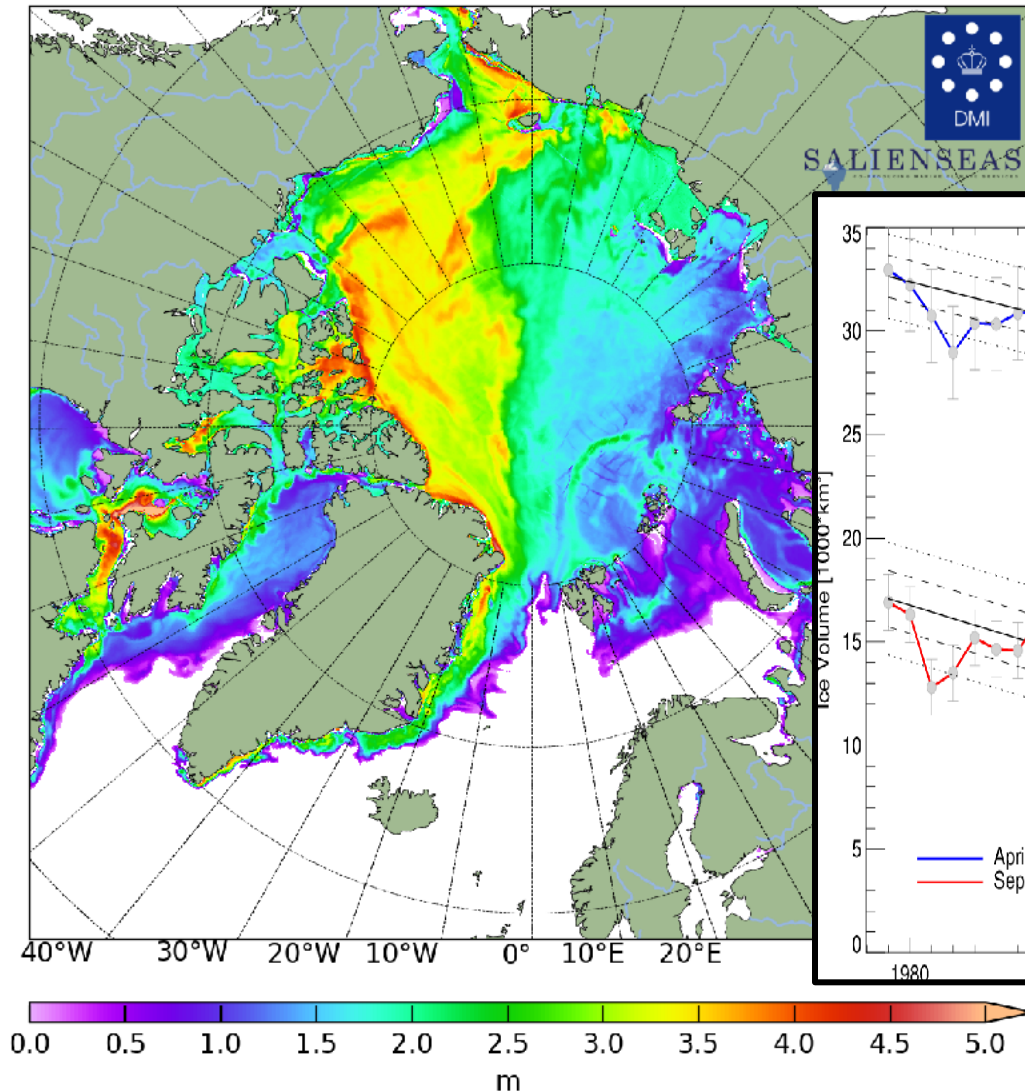
2024: 44 transits by 40 vessels
 ➤ 6 CCG (3); 8 cargo (7); 8 passenger vessels;
 6 motor-yachts; 15 sailing vessels

* "full transits" from SPRI data

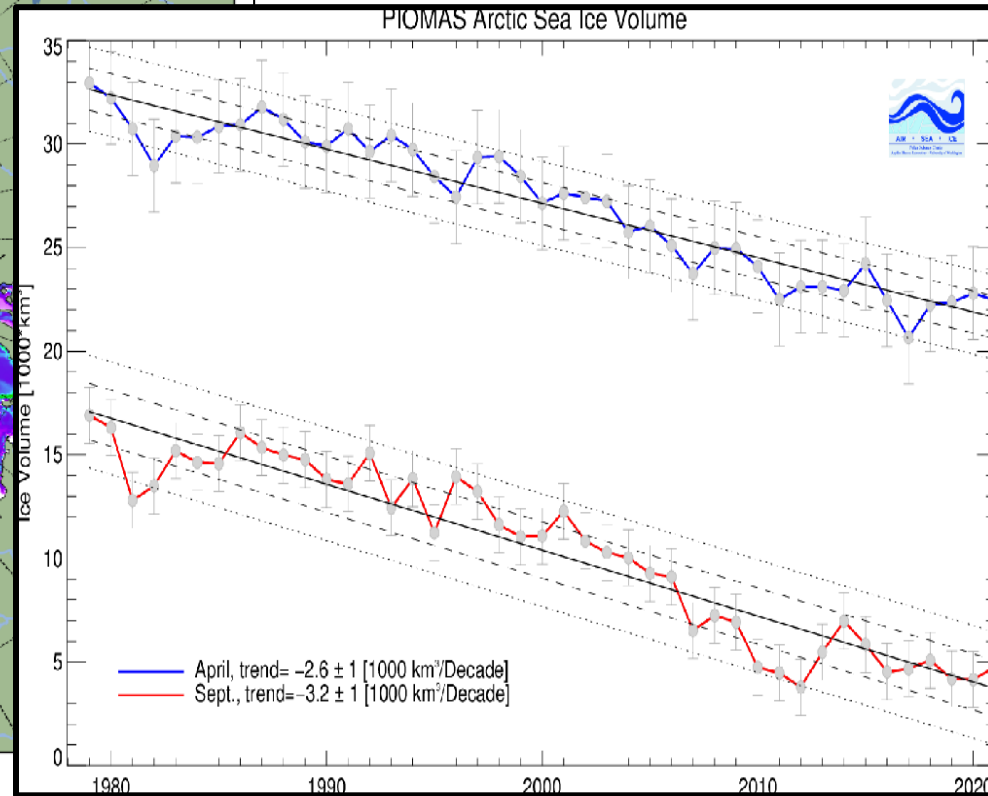


Polar Climate Change ...the end of ice?

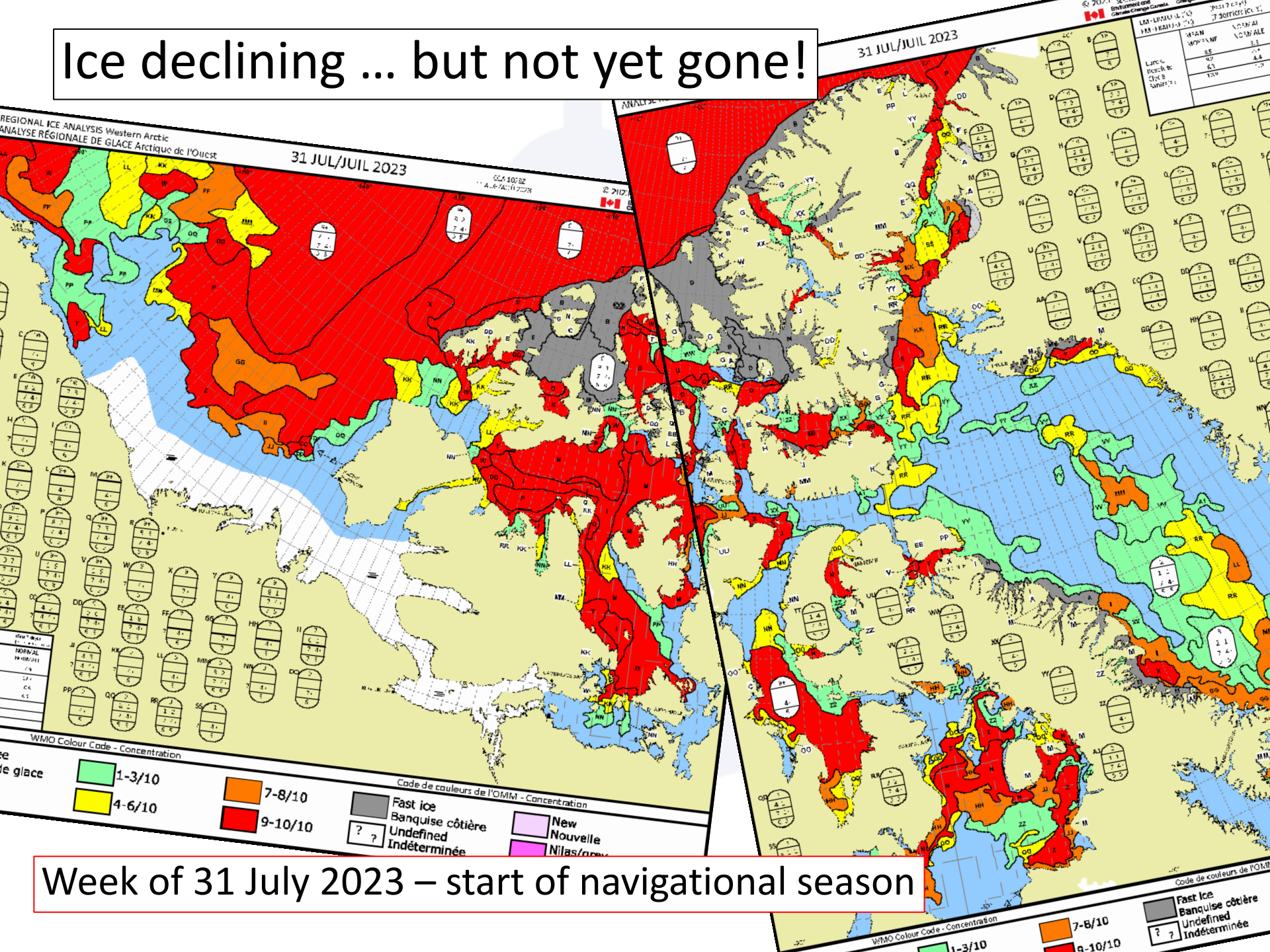
Sea Ice Thickness, 08-May-2022



PIOMAS Arctic Sea Ice Volume



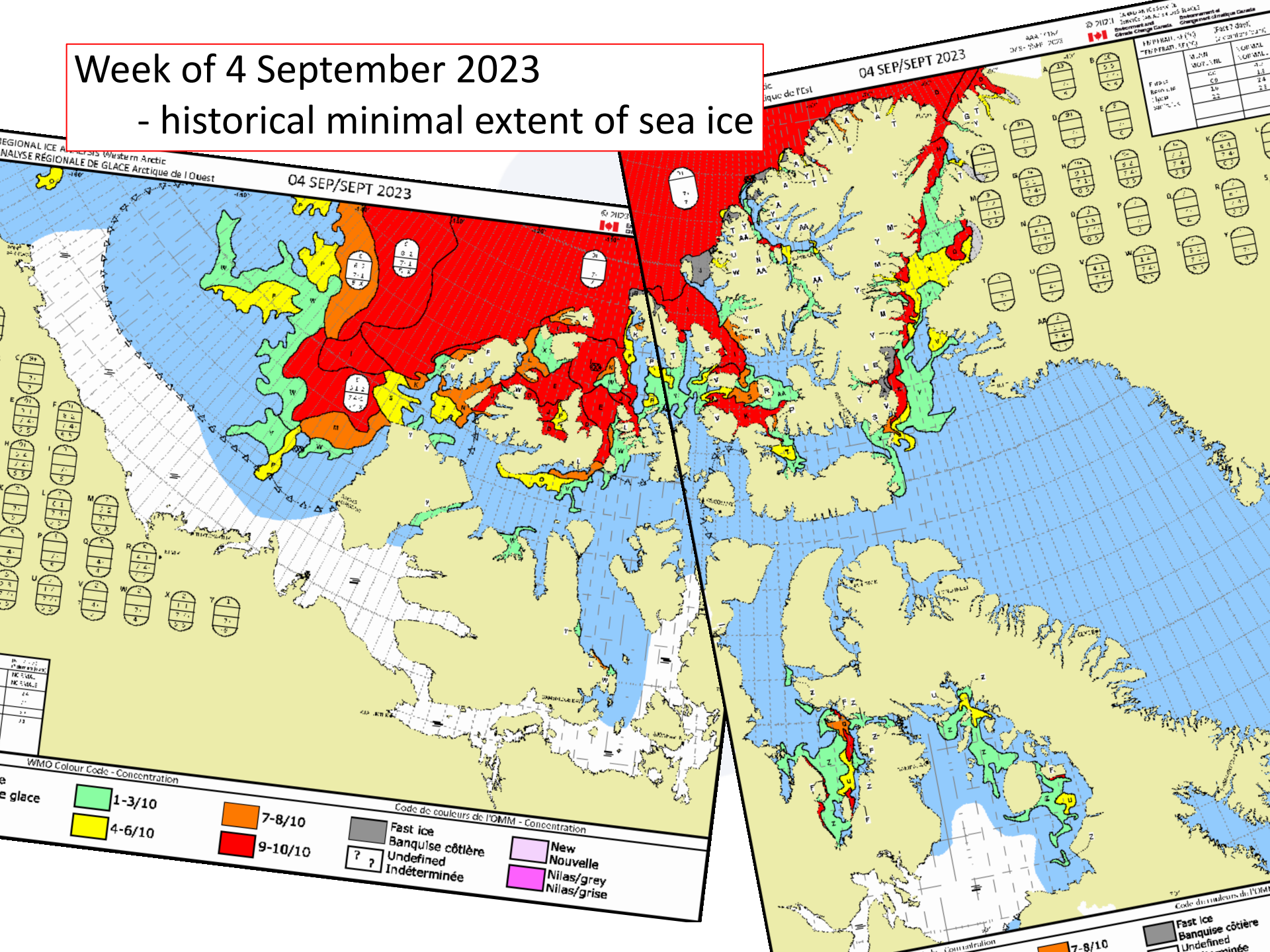
Ice declining ... but not yet gone!



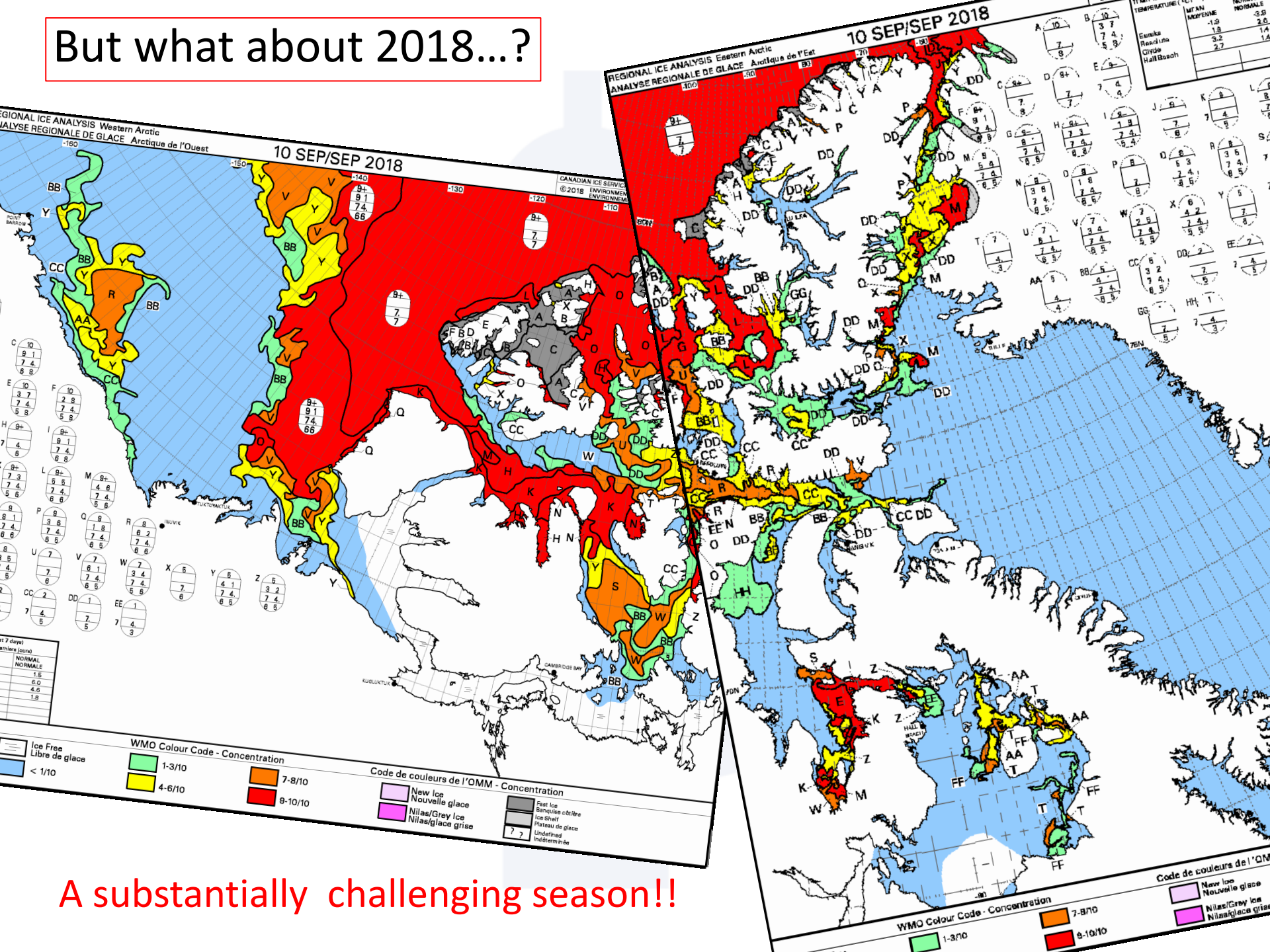
Week of 31 July 2023 – start of navigational season

Week of 4 September 2023

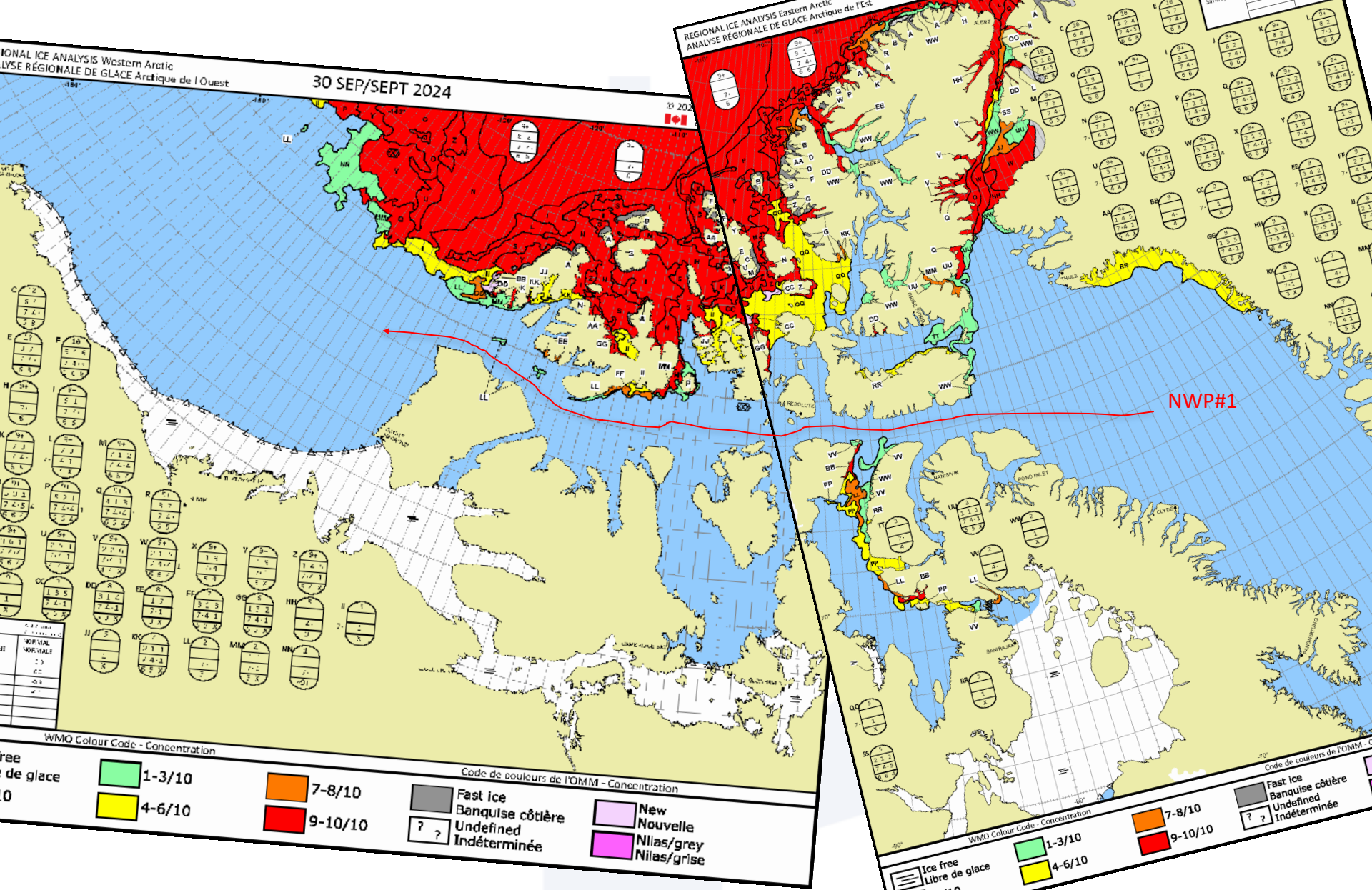
- historical minimal extent of sea ice



But what about 2018...?



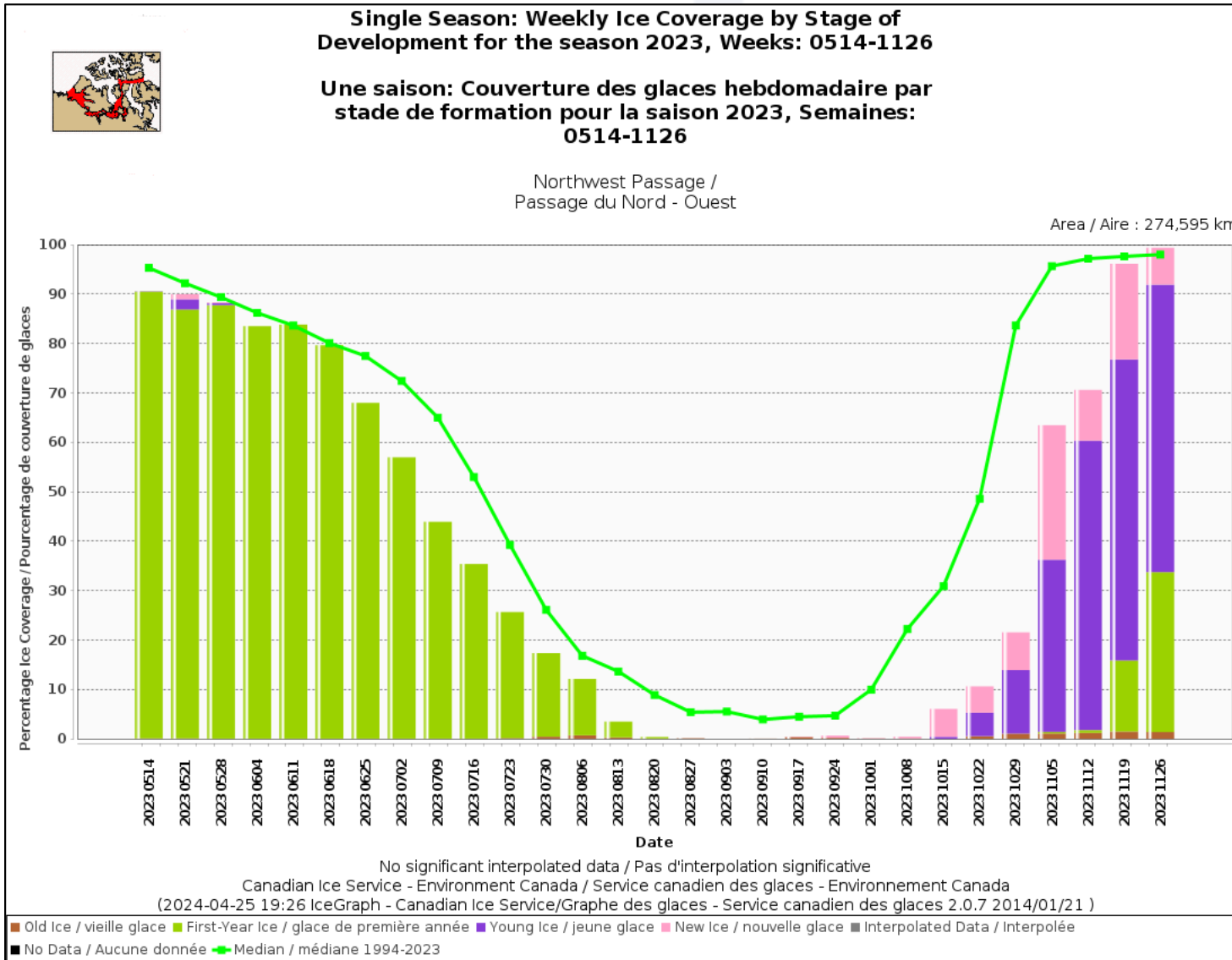
A substantially challenging season!!



2024 — late Sep: NWP Route #1 wide open!



A normal seasonal pattern of ice decay and formation... “NWP”

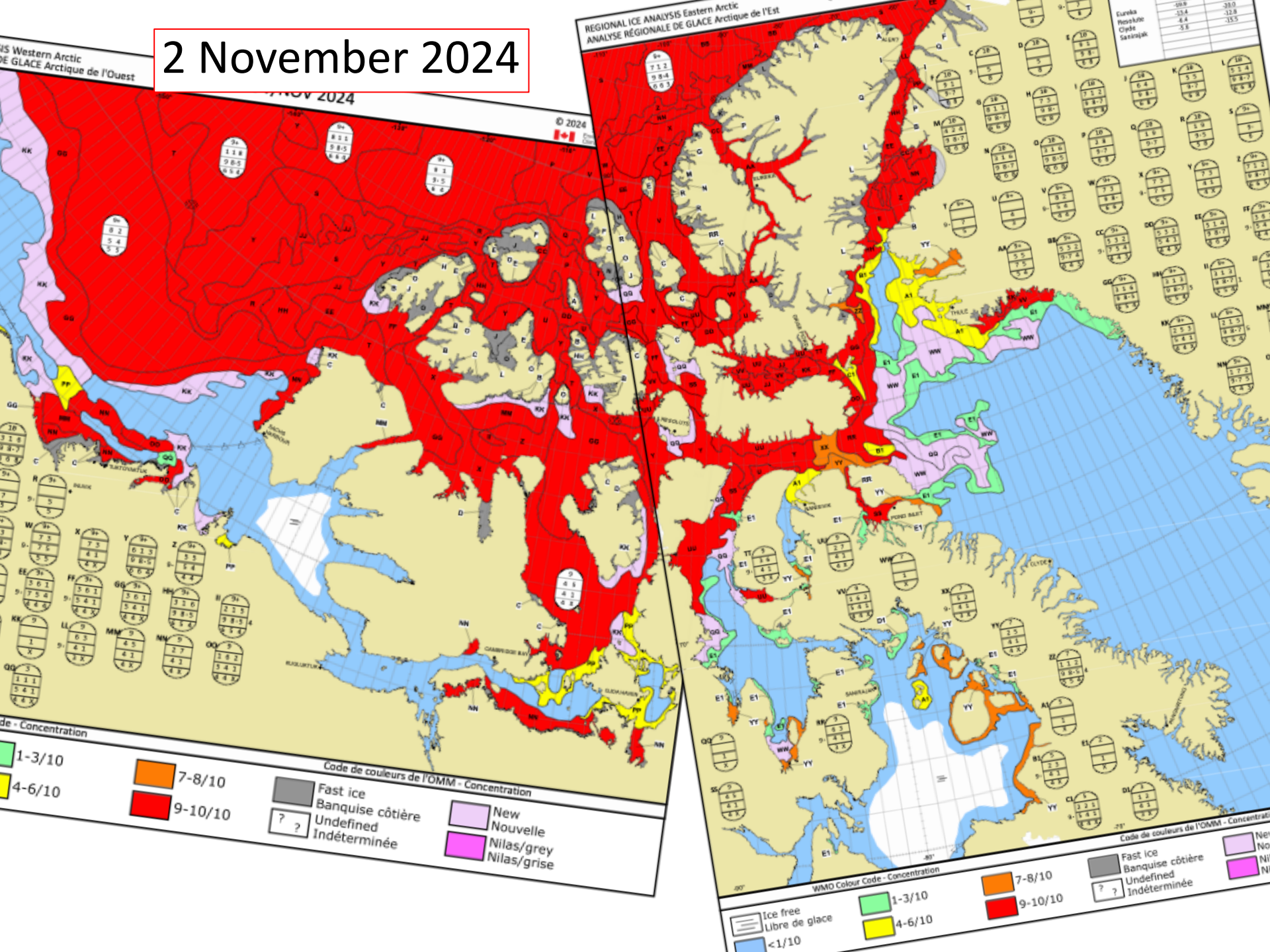


- ❖ Thaw and mobility begins in May
- ❖ “open water” window late Aug to early Oct
- ❖ Recent actuals well below historical medians
- ❖ Very rapid accrual of ice after mid-Oct

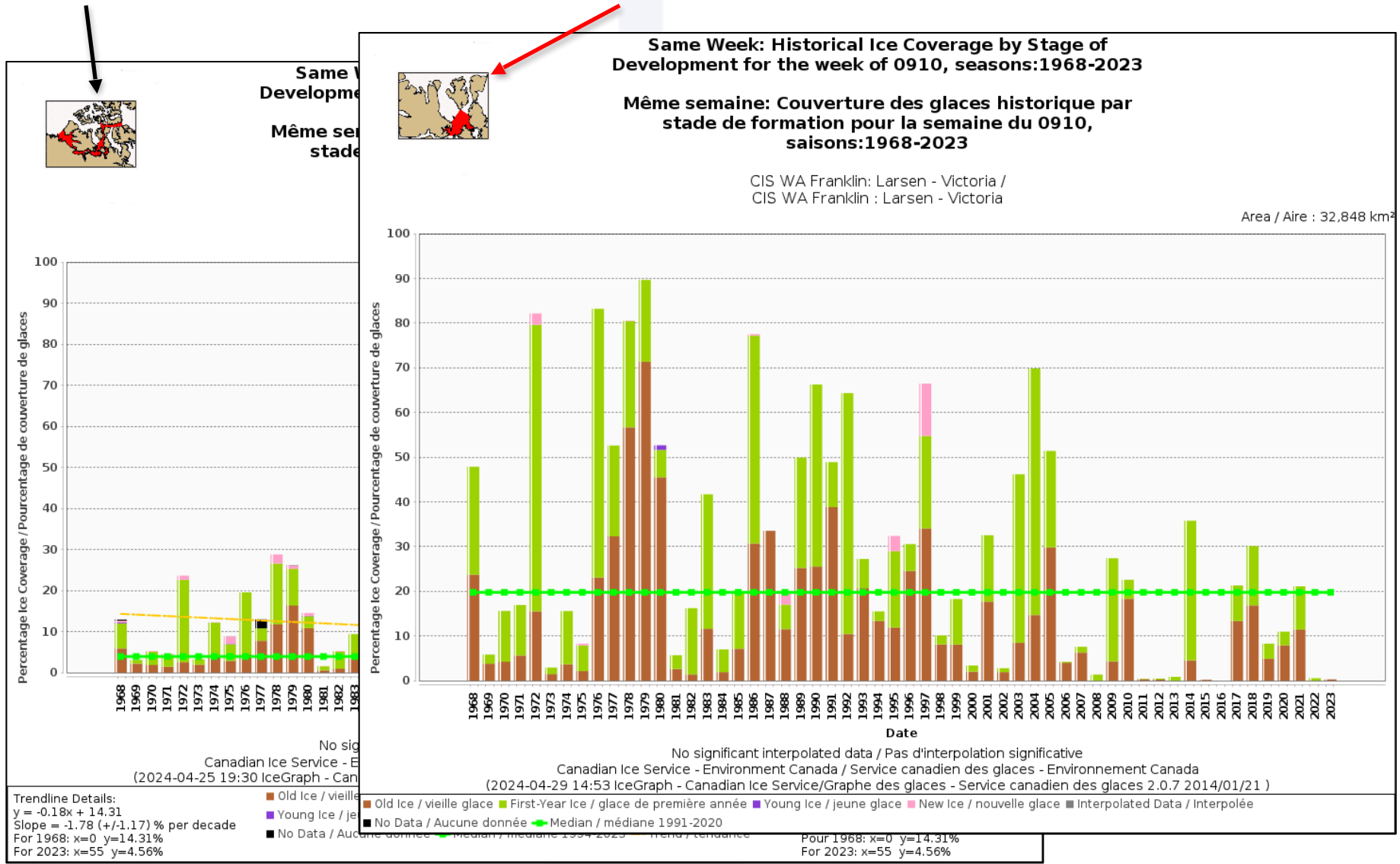
<https://iceweb1.cis.ec.gc.ca/IceGraph/page1.xhtml?lang=en>

Canadian Ice Service, IceGraph tool

2 November 2024



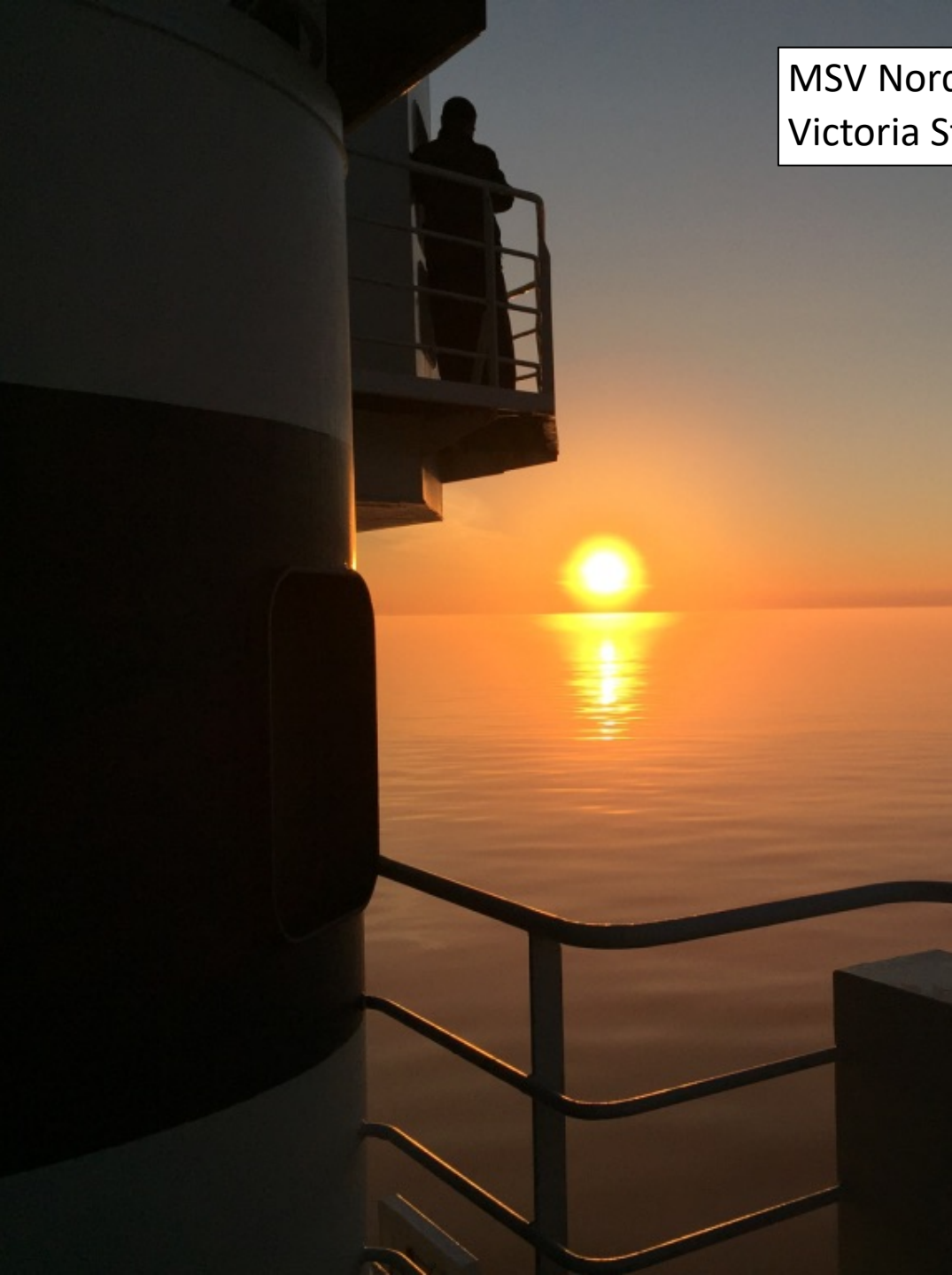
"NWP" as a whole vs "Franklin-Larsen-Victoria" in 2nd week September



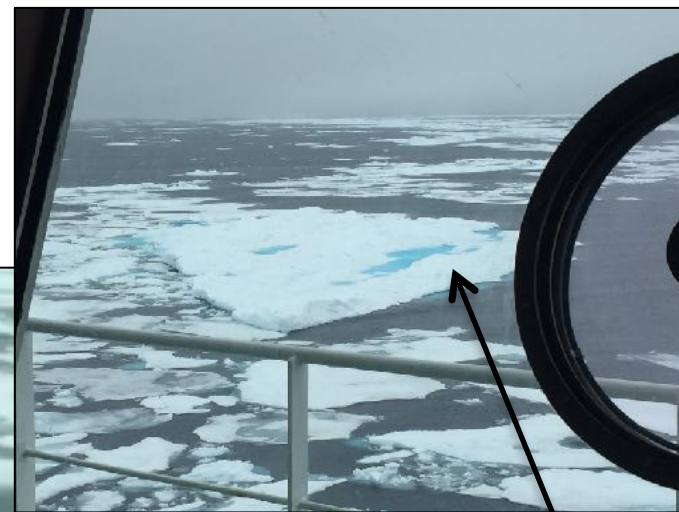
Extreme variability in conditions: SE drift of heavy ice from M'Clintock Channel ...**more melt = more drift!**



MSV Nordica in Bering Strait and
Victoria Strait, mid-July 2017

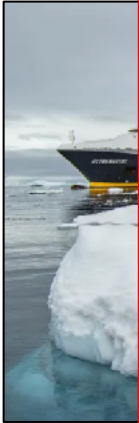


RV XUE LONG in Victoria Strait Early Sep 2017



"Old
Ice"

NWP & Cdn Arctic in 2023/24



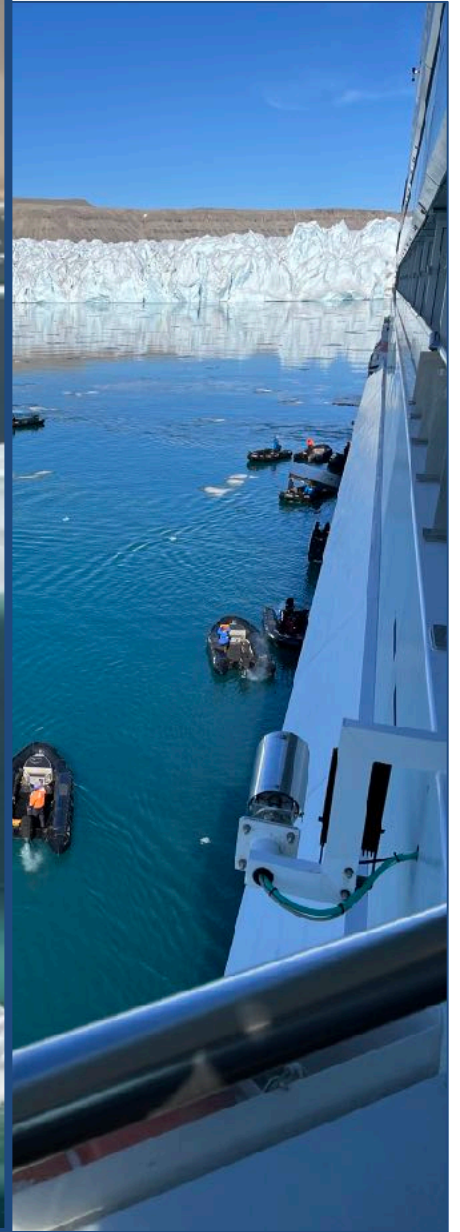
"Arctic Cowboys" 2023



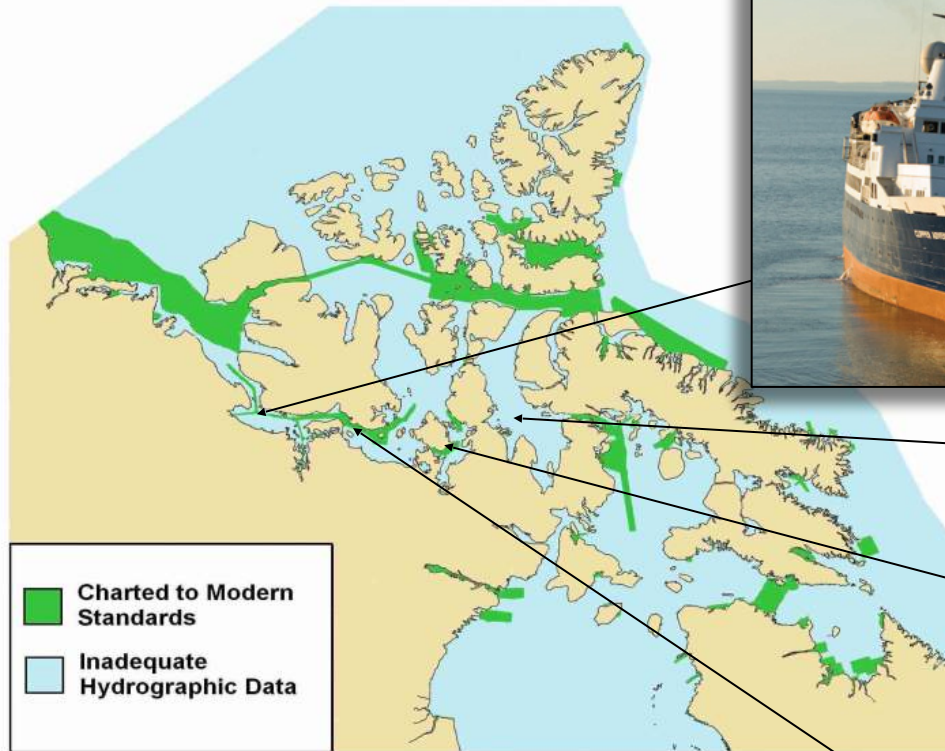
MV Scenic Eclipse, Croker Bay, Aug 2023



Video: Cyprien Jaffrennou



The Arctic Challenge – Vast, Unforgiving, Austere



As of 2021, **~10%** of Cdn waters (NORDREG zone) was surveyed to modern standards (CATZOC A1/A2), and **~40%** of primary and secondary Low Impact Shipping Corridors were surveyed adequately (CATZOC A1/A2/B)
(ARHC National Report of Canada 2021)

MV Clipper Adventurer, Coronation Gulf, Aug 2010



MV Ocean Explorer, Alpefjord GL, Sep 2023



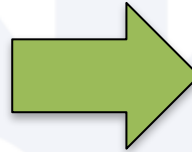


MV Gisela Oldendorff, Baffin Bay, Oct 2023

Arctic Navigation Issues (Practical):

Issues:

- Survivability (ship/pers)
- Safe routes (hydrography)
- Shipping economics
 - Speed/Time/Distance
 - Access dates
 - Reliability of schedule
 - Fuel type/savings
 - Fees
 - Insurance
 - Cargo capacity/draft
 - Resupply
- Navigation systems/aids
- Weather/ice forecasting
- Communications
- Pollution (air and water)
- SAR/salvage availability
- Critical habitat disruption
- Social impacts



Purpose:

- Resupply
- Navigation aids maintenance
- Harvesting/fishing
- Ice escort
- Resource exploration
- Resource extraction
- Science
- Tourism
- Sovereign control/monitoring
- Policing
- SAR
- Defence

Cargo ships ... not all large

Wagenborg "A" Class:
143m x 21.5m x 9.7m
11,864 GT
Ice Class IA

ROYAL
WAGENBORG



A-class

TECHNICAL INFORMATION

M/V Zélada Desgagnés



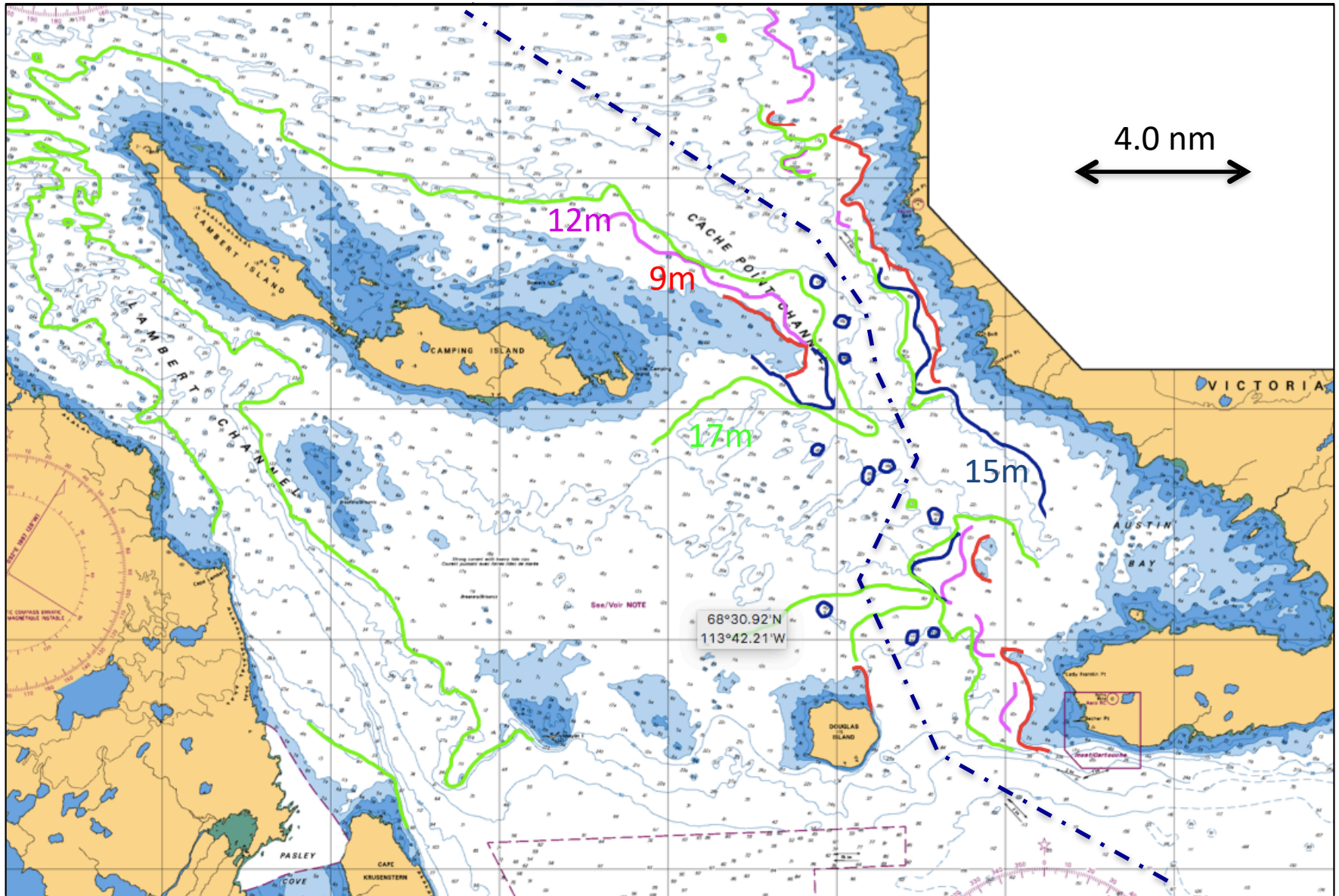
Transarctic Desgagnes:
131m x 21m x 8m
9,611 GT
Ice Class IA



Oldendorff Kamsarmax:
229m x 32m x 14.5m
44,218 GT
Ice Class IC

Is it even possible?

The NWP as an international marine highway:
Cache Point and Lambert Channels...



Northwest Passage/ Polar Routes Trade-offs

Positive:

- ✓ Shorter routes (fuel savings)
- ✓ Expedited voyage (?)

Origin-Destination	Panama	NWP	NSR	Suez
Rotterdam-Shanghai	25,588	16,100	15,793	19,550
Bordeaux-Shanghai	24,980	16,100	16,750	19,030
Marseilles-Shanghai	26,038	19,160	19,718	16,460
Gioia Tauro (Italy)-Hong Kong	25,934	20,230	20,950	14,093
Barcelona-Hong Kong	25,044	18,950	20,090	14,693
New York-Shanghai	20,880	17,030	19,893	22,930
New York-Hong Kong	21,260	18,140	20,985	21,570
Rotterdam-Los Angeles	14,490	15,120	15,552	29,750
Lisbon-Los Angeles	14,165	14,940	16,150	27,225

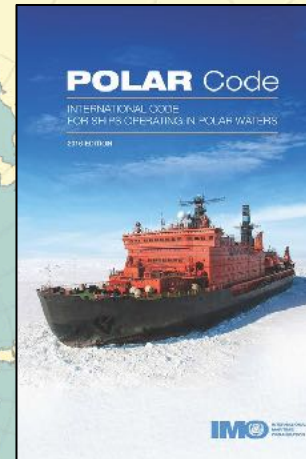
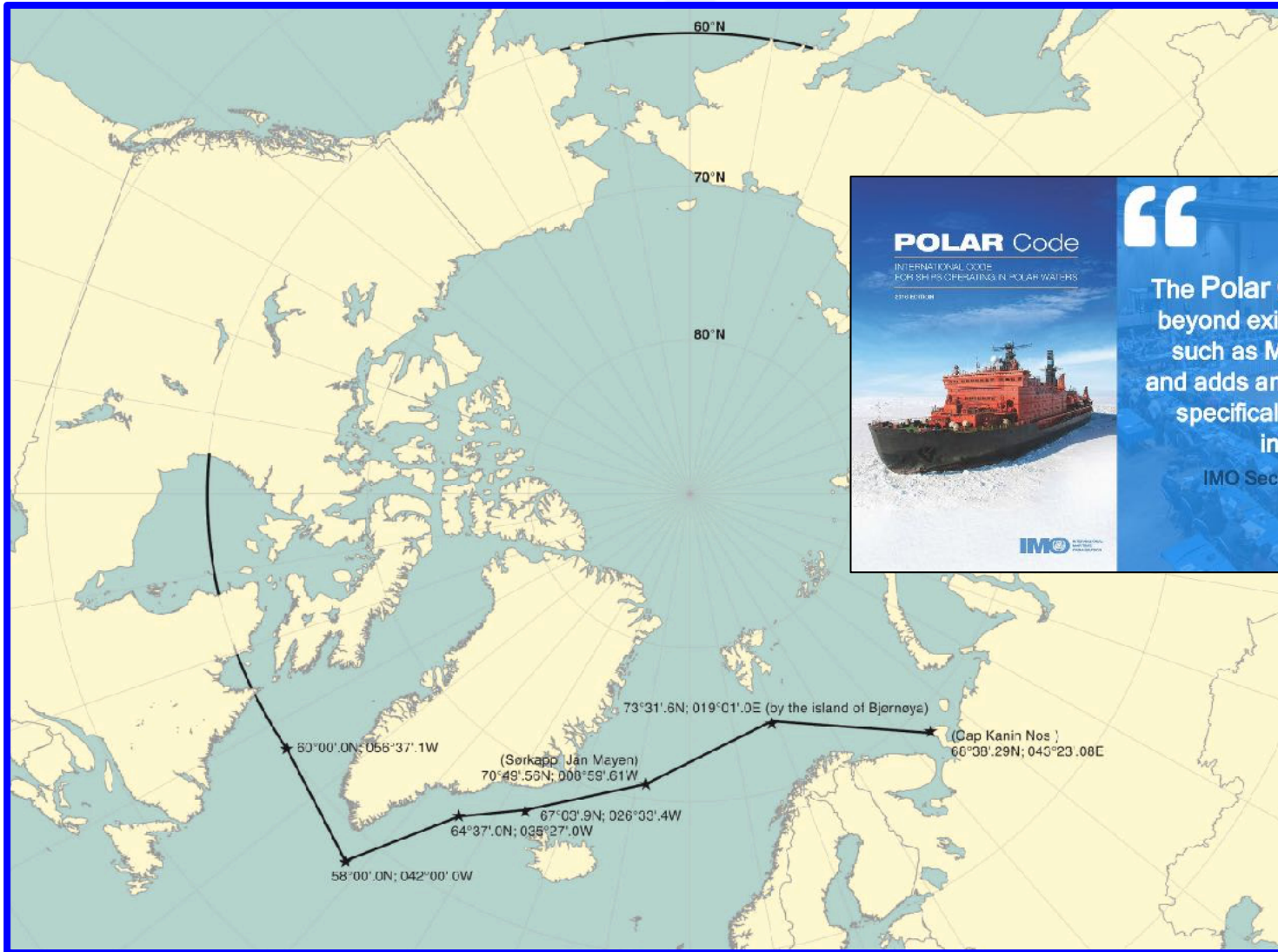
Source: Lackenbauer et al, "China's Arctic Ambitions" 2020

"Currently, we **do not** see the Northern Sea Route as a viable commercial alternative to existing east-west routes. In general, we plan new services according to trading patterns, population centres and our customers demand,"
(Maersk CTO, World Maritime News, 28 Sep 2018)

Negative:

- ❖ Short navigational season
- ❖ Speed/ETA uncertain
- ❖ Cost of Ice Class construction
- ❖ Polar training/certification costs
- ❖ Ice Navigator costs
- ❖ Transit fees/icebreaker escort
- ❖ Additional insurance costs
- ❖ Navigational risks (hydrography)
- ❖ Shallow routes (limited draft, profit loss)
- ❖ Environmental constraints (speed)
- ❖ Scarce SAR/support resources

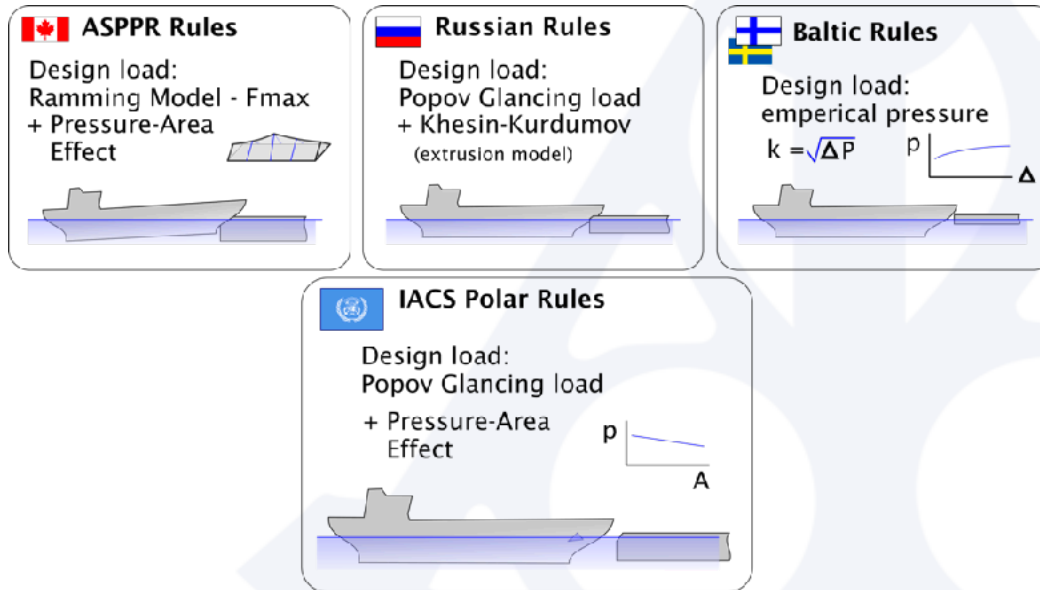
Definition of the Arctic/Polar Waters ... IMO Safety Requirements



“
The Polar Code goes above and beyond existing IMO conventions such as MARPOL and SOLAS and adds an additional layer on top, specifically for ships operating in these areas.
”
IMO Secretary-General Kitack Lim

Arctic “Polar Waters” as defined in the IMO Polar Code ... largely relating to safety of navigation (“polar” ice)

Considerations for Navigation in Polar Waters: *Can you safely go there?*



Graphic source: Claude Daley, MUN

Different schemes of “Ice Classification” devised for varied scenarios, purposes, methodologies

- Survivability
- Sustainability
- Damage control
- Redundancy
- Top-side icing
- Sea Intakes
- Metallurgy
- Structural strength
- Shell plating strength
- Power
- Hull form
- **Speed**

Generalized Ship Ice-Classifications#

CASPPR	IACS	FS	Ice Type, Thickness*	Remarks
CAC1	PC1		MY, >3.0m	Yr-round navigation in polar waters
CAC2	PC2		MY, 3.0m	
CAC3	PC3		SY, 2.5m	
CAC4	PC4		TFY, >1.2m	
Type A	PC5-6	IAS	MFY, 0.7-1.2m	Summer navigation in polar waters;
Type B	PC7	IA	FY, 1.0m	
Type C		IB	FY, 0.5m	Winter navigation in non-polar waters
Type D		IC	GW, 0.3m	
Type E		II	G, 0.15m	

* approx. from AIRSS and ice-class descriptors; >120cm with some old ice inclusions
(Source: adapted from CORA 050)

- a simplified comparison of 3 among some 14 major schemes of ice-classification of ships

“Ice Classes” of Ships

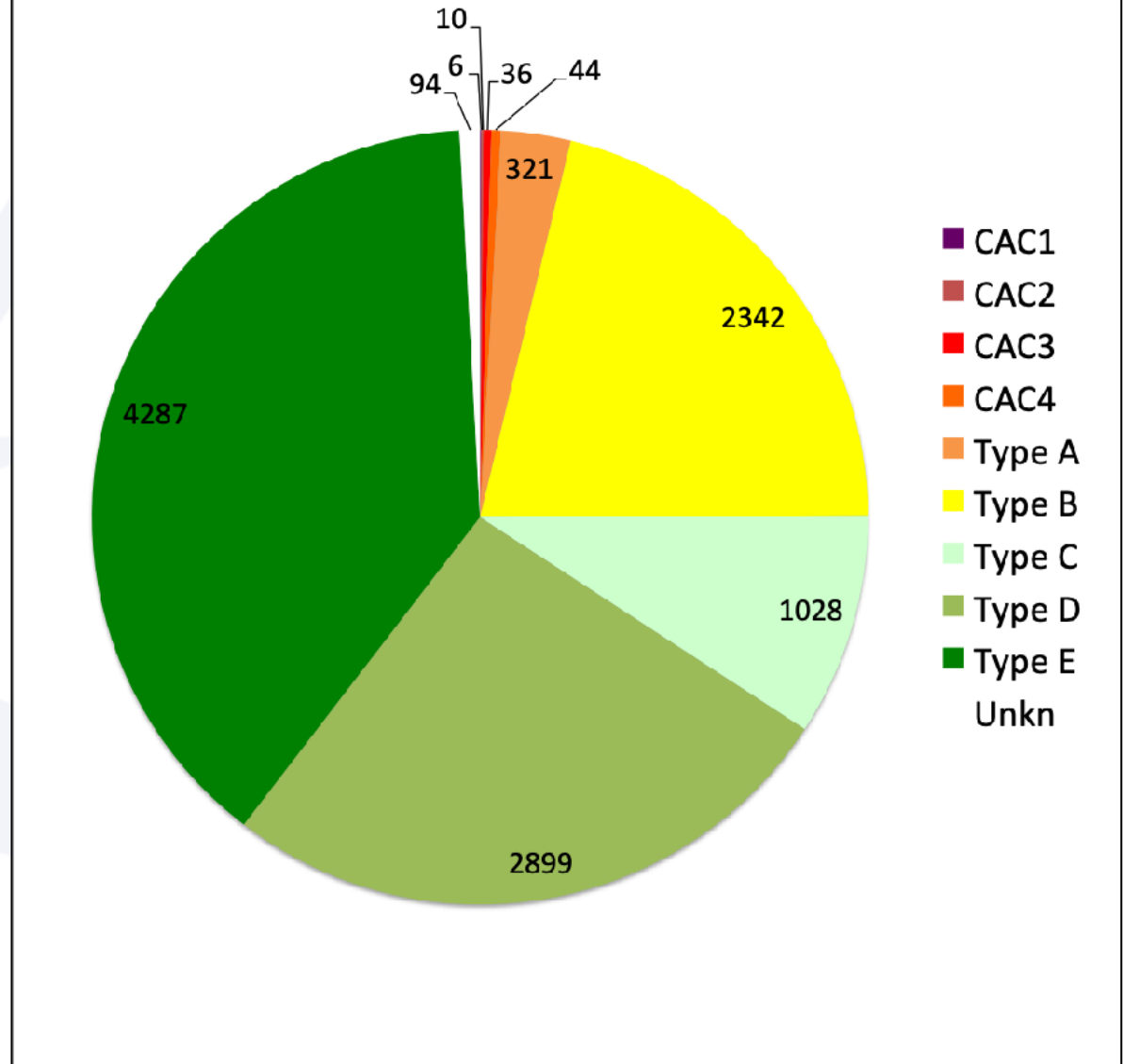
Of ~ 200,000 ships
>100 GT Worldwide*:

- 11,067 “Ice-classed”
- 70 “Icebreakers”
- 417 Type A & above (“icebreaking”)
- 8214 Type C-E (“ice-strengthened”)
- 125 Flags

* Registered ships ...may not include all Govt & Naval ships

Source: Greenwood N. et al. 2018.
Review of Surface Ship Fleets: Ice-Classed Ships. Contract Report DRDC-RDDC-2018-C083, contract # W7714-156105/001-SV TASK 50.

Total # Ships by Ice Class

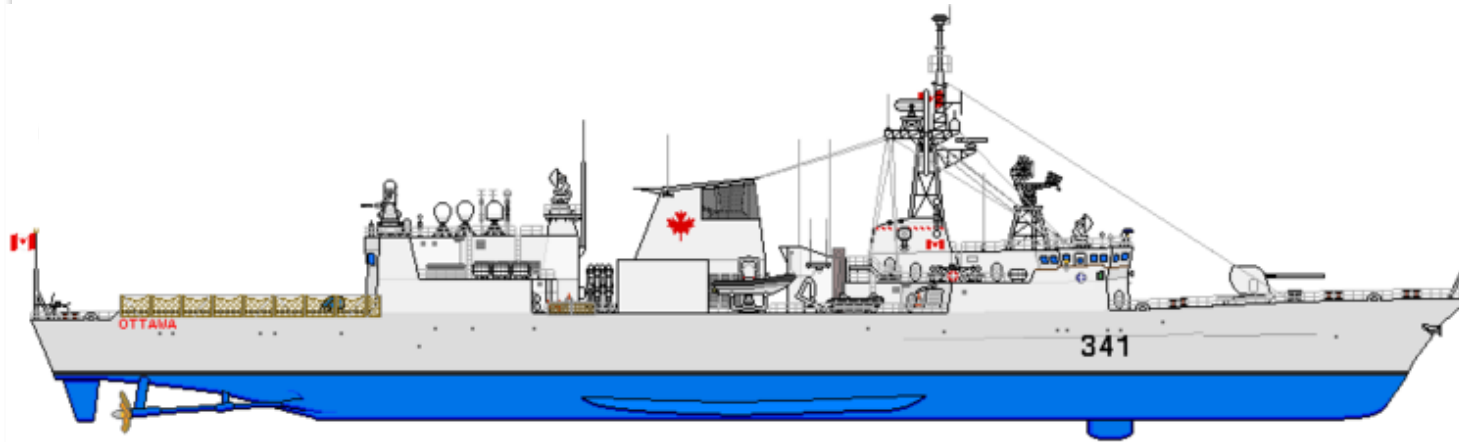


Top 20 Flags of Type A+ Vessels

**** Russia completely dominates world of Polar icebreaking**

Rank O/A	Flag State	CAC1	CAC2	CAC3	CAC4	Type A	Type B	Type C	Type D	Type E	Type A +
2	Russia	6	5	15	26	74	179	121	267	325	126
20	Finland				5	49	54	5	6	3	54
18	Canada			3	3	24	47	17	45	12	30
8	Cyprus			6		19	132	35	99	112	25
24	Sweden		1			20	44	16	13		21
12	Bahamas			6		9	38	24	149	47	15
6	Netherlands					14	326	69	64	73	14
16	Denmark (Dis)					14	65	18	74	22	14
5	Malta					9	132	46	182	187	9
23	Italy					9	31	28	19	31	9
22	United States Of America		2	2	1	2	7	4	68	32	7
45	Kazakhstan					7	1	14	6	7	7
46	Estonia					7	17	3	5	1	7
15	Portugal (Mar)					6	70	13	23	106	6
19	United Kingdom					6	37	15	56	33	6
14	Norway (Nis)					5	57	20	146	11	5
1	China, People's Republic Of				3	1	8	61	28	1090	4
4	Liberia					4	120	46	89	343	4
32	Denmark					4	13	10	34	9	4
36	Faeroe Islands					4	10	1	42		4

RCN Surface “Combatants”



12 FFH (brash ice)

Length 134m

Beam 16.4m

Draught 7.4m

Displacement 4770 tonnes



6 AOPS (PC 5 ~ 1m FY ice)

Length 103m

Beam 19m

Draught 5.75m

Displacement 6400 tonnes



12 MCDV (Type D ~ 30cm FY ice)

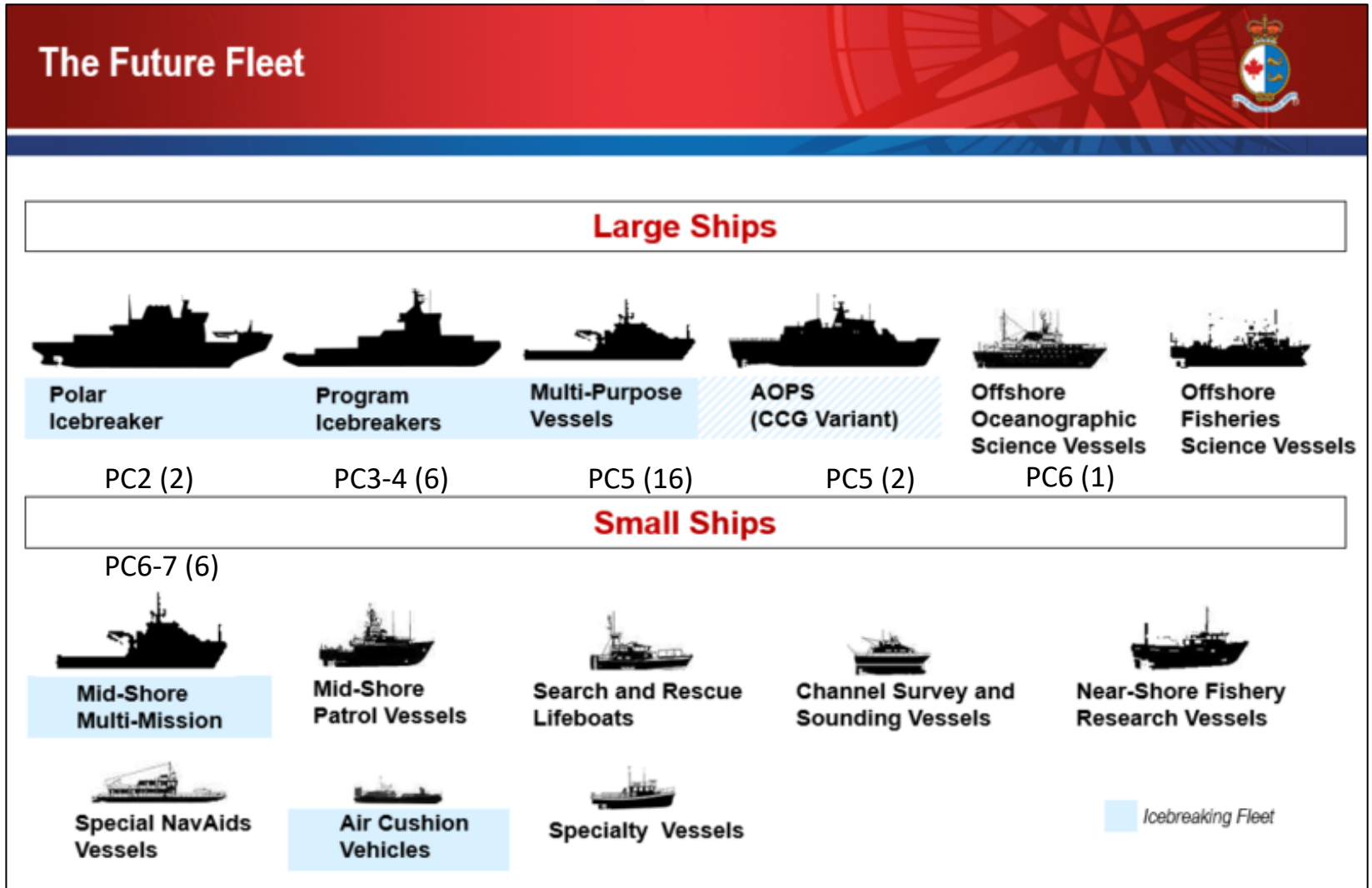
Length 55m

Beam 11.3m

Draught 3.4m

Displacement 970 tonnes

Canadian Coast Guard Renewal



CCG building up to 27-33 major (Type A+) ice-capable vessels



Who Can Go There?



Arktika class, **NUC** (6, 2 in service) CAC1



Arktika (Proj 22220), **NUC** (3 planned, 1 launched) CAC1



Vaygach, **NUC** (2 in class) shallow draft, CAC 2-3



Viktor Chernomyrdin, DE (building), CAC2



Admiral Makarov, DE (3 in class) CAC2



Murmansk, DE (3 in class) CAC3

Russian Icebreaker Fleet c. 2018



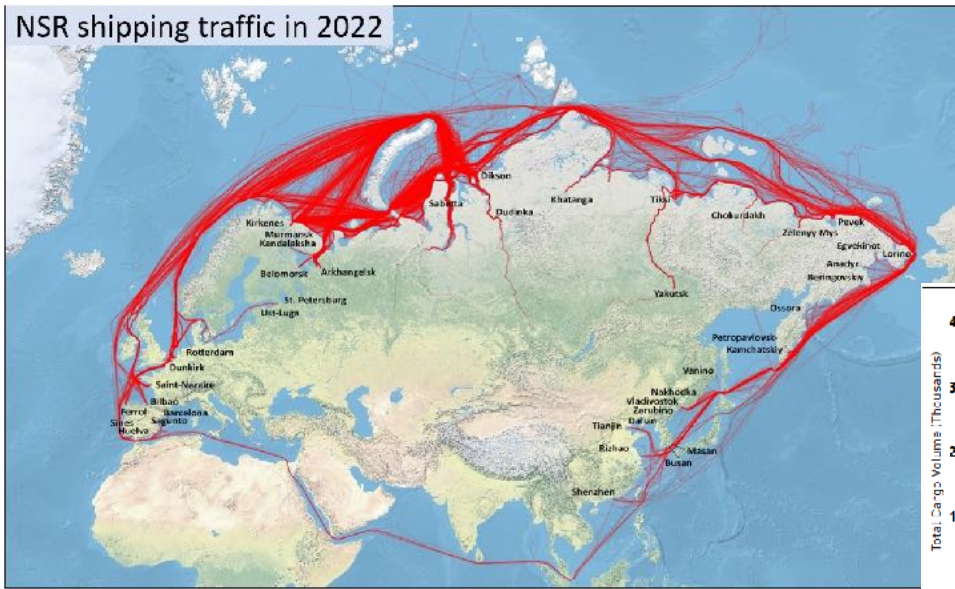
Kapitan Sorokin, DE (4 in class), CAC3
Some employed in eco-tourism



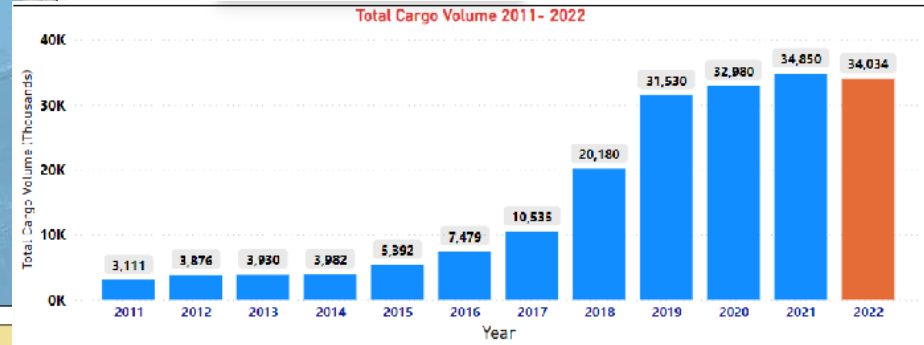
Moskva, DE (2 in class) CAC4

Representative only ...as of 2018,
52 of CAC4+, 126 of Type A+

NSR shipping traffic in 2022

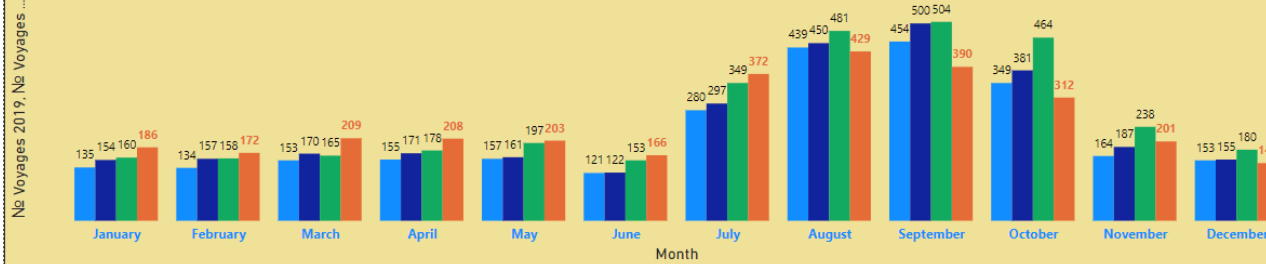


Total Shipping volumes on the NSR, 2022



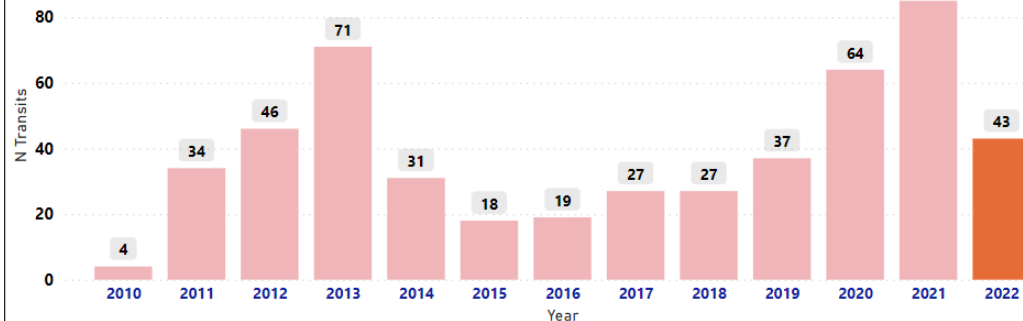
Nº Voyages by Year and Month

● Nº Voyages 2019 ● Nº Voyages 2020 ● Nº Voyages 2021 ● Nº Voyages 2022



Source: CHNL <https://arctic-lio.com/nsr-2022-short-report/>

N Transits by Year



- Year-round for LNG
- Seasonal otherwise
- Variable
- Impacted by Ukraine war 2022

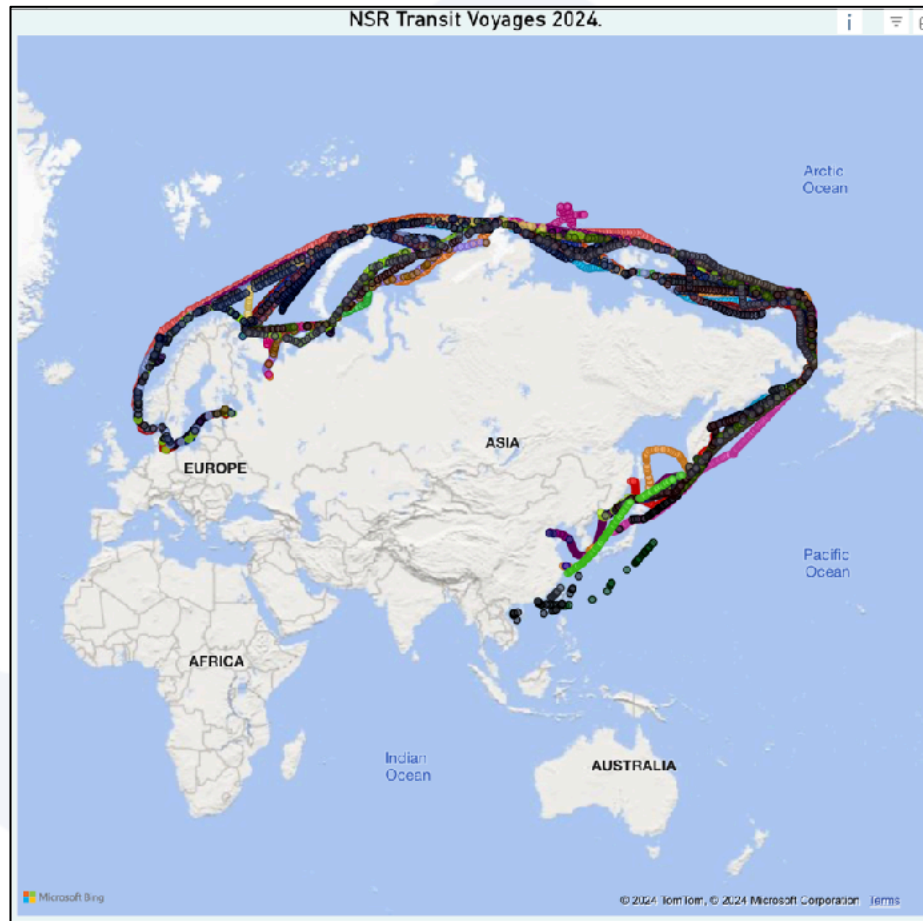
Transits of the NSR as of 30 Oct 2024

Transits:

Limited in numbers, destinations, cargoes

Total Cargo = 3.055M mt

Source: CHNL
<https://chnl.no/news/overview-of-transit-navigation-on-the-nsr-update-september-30-2024/>



From	To			Grand Total
	China	Netherlands	Russia	
China			26	26
Russia	34	1	34	69
Grand Total	34	1	60	95

Type	Grand Total
Tanker	36
Bulk	15
Container	11
General cargo	10
Fishing	4
Icebreaker	4
LNG carrier	4
Others	3
Heavy load	2
Reefer	2
Supply	2
Research	1
Tug	1
Grand Total	95

Cargo	Total
Ballast	41
Crude Oil	18
Containers	17
General cargo	5
Coal	4
Fish and seafood	3
Iron ore concentrate	3
Fertilizers	2
LNG	1
Oil products	1
Grand Total	95

New Russian Construction



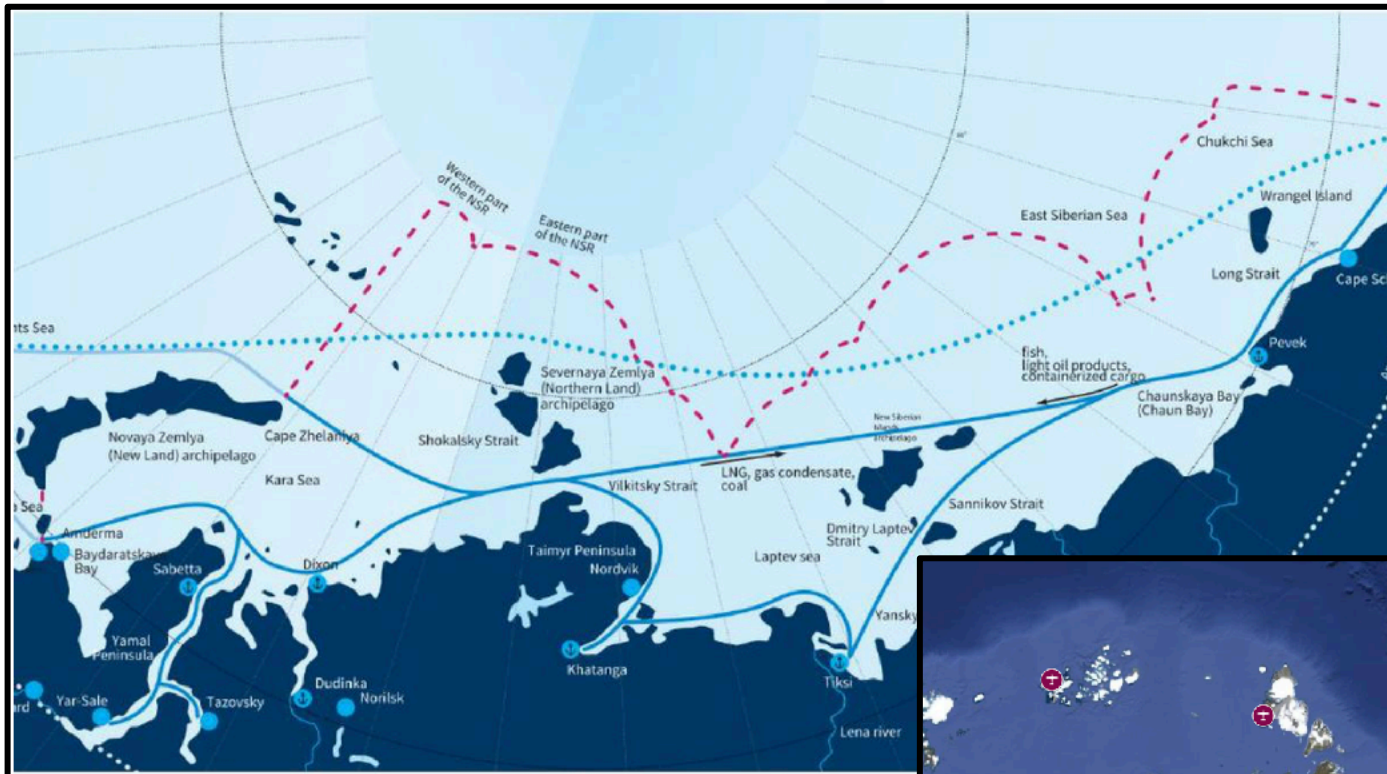
Arktika and Sibir,
2 delivered of 5 planned
33,530t disp., NUC 60 MW
Draft 10.5m
Ice Class RMRS Icebreaker9 (3m)

Project 10510 Leader class,
first of 3 to be delivered 2030
69,700t disp, NUC 120 MW
Draft 13m
Ice class RMRS Icebreaker9 (4m)



Project 23550, *Ivan Papanin class*
2 ordered of 4 planned, delivery 2024
6800t disp, DE 7 MW
Draft 6m
Frigate armament (76mm, CIWS, Kalibr SSM)
Ice class RMRS Arc7 (~2m+)

Russian Northern Sea Route (NSR)



Depth Limitations:
 General SW route - 10m
 Dmitry Laptev – 7.7m
 Sannikov Str – 12m
 N of Novosibirskiy Is – 12+m

- ❖ Historical usage
- ❖ UNCLOS Art 234 “Ice Clause” ...EEZ
- ❖ Kola Peninsula bastion of 2nd strike
- ❖ Perceived NATO pressures
- ❖ Increasing militarization
- ❖ China as “complicator”



Map Legend	
	Airfield or Airport
	Port or Naval Facility
	Nuclear Facility
	Radio-electronic Facility
	In Construction Airfield or Airport
	In Construction Dual-Use Facility
	Multi-purpose Military Facility
	Filter Locations

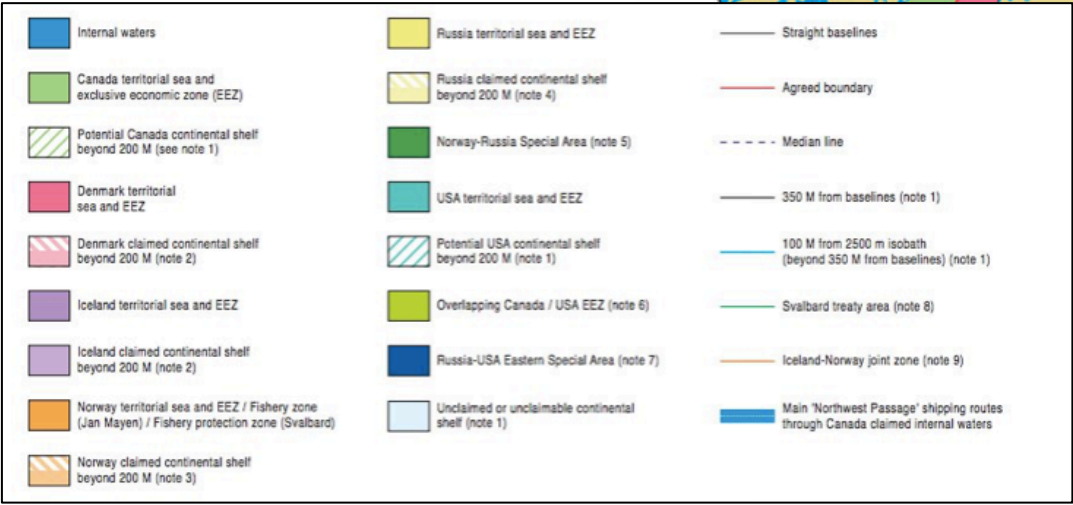
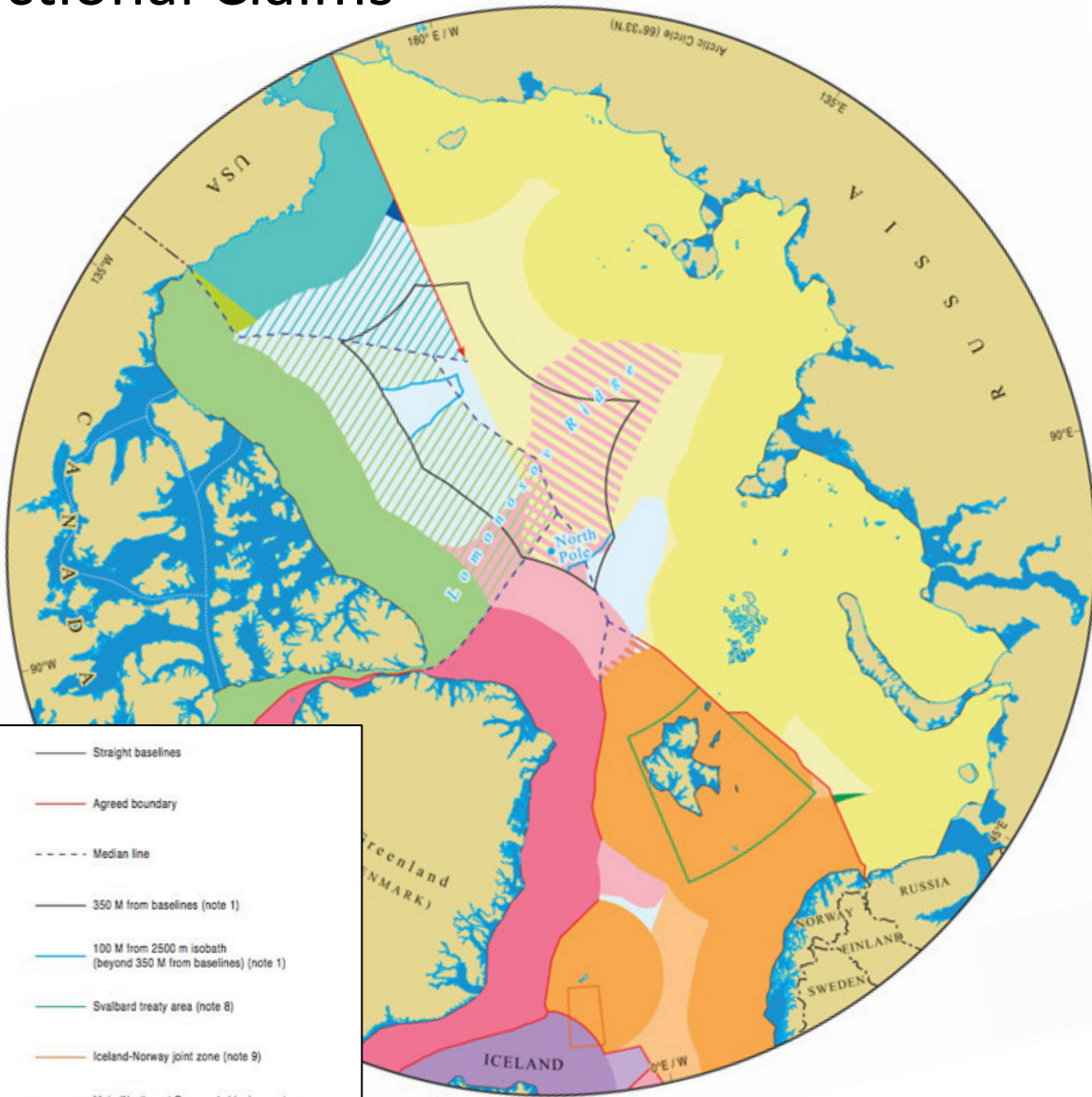
A Really “Cold” War...?

- ❖ Arctic is becoming more accessible ...with risks
- ❖ Arctic will see more maritime traffic (mostly destination vice transit) ...SAR responsibilities will increase
- ❖ Nations’ sovereign responsibilities will be met with increasing military/ para-military presence
- ❖ There will be continued competition to define off-shore estates (EEZ+) ...UNCLOS and Arctic Council/Bilateral discussion will remain preferred mechanisms for dispute resolution
- ❖ *What will be the incentive for states to challenge others’ positions on Arctic sovereignty?*
- ❖ *The Arctic: new military arena, or just the penalty box?*

Arctic Maritime Jurisdictional Claims

Recent/Remaining issues:

- ◆ RU – NO Barents Sea demarcation (2010)
- ◆ CA – DE regarding Hans Island/ Lincoln Sea (2023)
- ◆ CA – US regarding Beaufort Sea
- ◆ Continental Shelf Extensions (Lomonosov Ridge)



Source: <https://www.dur.ac.uk/ibru/resources/arctic/>

Arctic Interests/Strategies of Non-Arctic Nations

Arctic Council (AC) Observers

Canada
Denmark
Norway
Russia
USA
Finland
Iceland
Sweden
China (PRC)
France
Germany
India
Italy
Japan
Korea, South
Netherlands
Poland
Singapore
Spain
Switzerland
UK
Turkey (Pending)

Fears of Arctic States:

- ◆ Challenge to sovereignty
- ◆ Obstruction of seabed claims
- ◆ Marine Safety (SAR)
- ◆ Environmental protection
- ◆ Social disruption
- ◆ Economic control/dominance
- ◆ Hijacking of multi-lat'l forums
- ◆ Bureaucratization of AC...
- ◆ Security ...?

Interests of AC Observers:

- Science
- Climate change
- Navigation (trade routes)
- Resource access
- Tourism
- Economic development
- National Pride
- Historical interests
- International engagement

Common Ground:

- ✓ Climate science
- ✓ Marine safety
- ✓ Environmental protection
- ✓ Multilateral forum for cooperation

2023, AC (WG level) resumed under Norwegian chairmanship

Vulnerabilities/Threats/Challenges to Canadian Arctic Sovereignty?

Vulnerabilities

- *Continued/accelerating climate change.*
- Increased traffic in the north
- Weak national presence in the north
- Diminished military capability/capacity
- Diminished administrative capacity/ effectiveness
- Poor hydrography/SAR response capacity
- Poor investment by GoC in northern infrastructure
- Deficient surveillance capabilities in the Arctic (AG Rpt 2022)
- Lack of US backing for Cdn NWP position

Threats

- Foreign capabilities/capacities?
- Incentives (political, economic, scientific)?
- Foreign investment in resource industries?

Direct Challenges (?)

- Violation of territorial limits
- Unchallenged/unimpeded transits
- Flaunting of environmental regulations
- Testing of air defence responses

Perennial military intelligence conundrum:

Capabilities/ Opportunities vs Intent?

➤ What will Canada do about direct challenges?

Our North, Strong and Free: A Renewed Vision for Canada's Defence (3 May 2024)

In our North, we need to confront the reality of climate change. Our Arctic is warming at four times the global average, opening the region to the world, which was previously protected by the Polar Ice Cap year-round. ...
... could become the most important area of competition between Europe and the United States. ...
... greater Russian activity in the Arctic, ...
... a growing number of countries, ...
... platforms are mapping the region. ...
... about the region. ...
... building up their military capabilities. ...
... impact our security in the Arctic. ...
... long-range aircraft and submarines. ...
... that move faster and further. ...
... Arctic becomes more important. ...
... we need to ensure our defence capabilities can assert our sovereignty in the Arctic.

“The most urgent and important task we face is asserting Canada’s sovereignty in the Arctic and northern regions, where the changing physical and geopolitical landscapes have created new threats and vulnerabilities to Canada and Canadians”

[??]

...
Similarly, despite not being an Arctic nation, China seeks to become a “polar great power” by 2030 and is demonstrating an intent to play a larger role in the Arctic.

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...
To better protect our Arctic and northern regions from emerging and existing threats—such as advanced submarines, hypersonic and cruise missiles, surveillance activities—and to enhance our ability to respond to emergencies and disasters, we will establish greater presence, reach, mobility, and responsiveness across Canada, including our Arctic, through a network of northern operational support hubs, a fleet of airborne early warning aircraft, deployable sensors on our coasts and underwater, a satellite ground station in the High Arctic, enhanced foreign intelligence capabilities, and new tactical helicopters.

85 mentions of “Arctic”,
Focus on climate change, China, Russia,
... popular sentiment?

Arctic Military Conflict (unlikely)

- ◆ Resource exploitation in contested areas still hypothetical
- ◆ Actual resource exploitation is in uncontested areas
- ◆ Arctic (NWP) unlikely to become a military sustainment route
- ◆ Arctic (NWP) unlikely to become a critical trade route (for very long time)
- ◆ Navies hard pressed to recapitalize temperate-water capabilities, let alone acquire Arctic capable vessels of dubious military utility
- ◆ *But, there is a northern **threat axis** even if there is not a military objective or physical challenge in/to the north.*
- ◆ *And, the Chinese will be more subtle, patient ... economic rather than physical infiltration?*

➤ ***Do we know our Arctic as well as others do??***



Questions?



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Challenges to Canadian Sovereignty in the North

New Zealander sails through Arctic on custom yacht in violation of COVID-19 restrictions

'I am a yacht, not a bloody cruise ship,' says Peter Smith, who's adamant he will not be turned around

[John Last](#) · CBC News · Posted: Aug 26, 2020 1:00 AM PDT | Last Updated: August 26, 2020



Canada disputes Chinese news report that famous sailor was turned back from Northwest Passage

Zhai Mo's attempted non-stop circumnavigation of the Arctic has been a big story in Chinese media



[John Last](#) · CBC News · Posted: Sep 17, 2021 12:29 PM PDT | Last Updated: September 20, 2021

