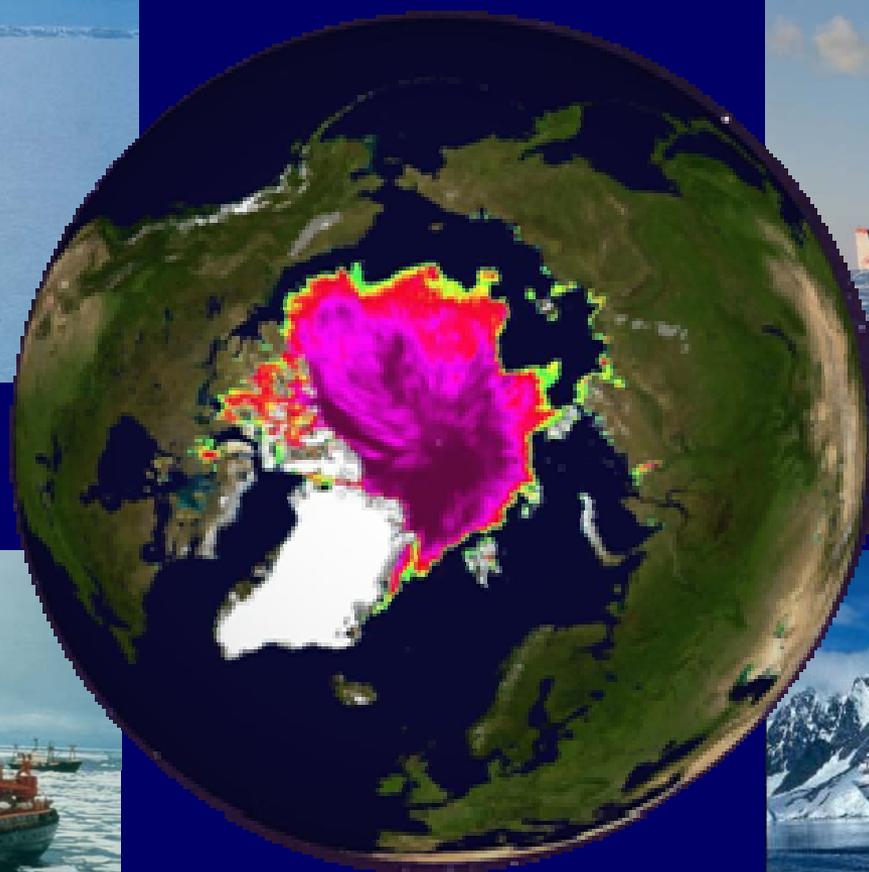


# Arctic Marine Shipping Assessment (AMSA): Responding to Changing Arctic Marine Access

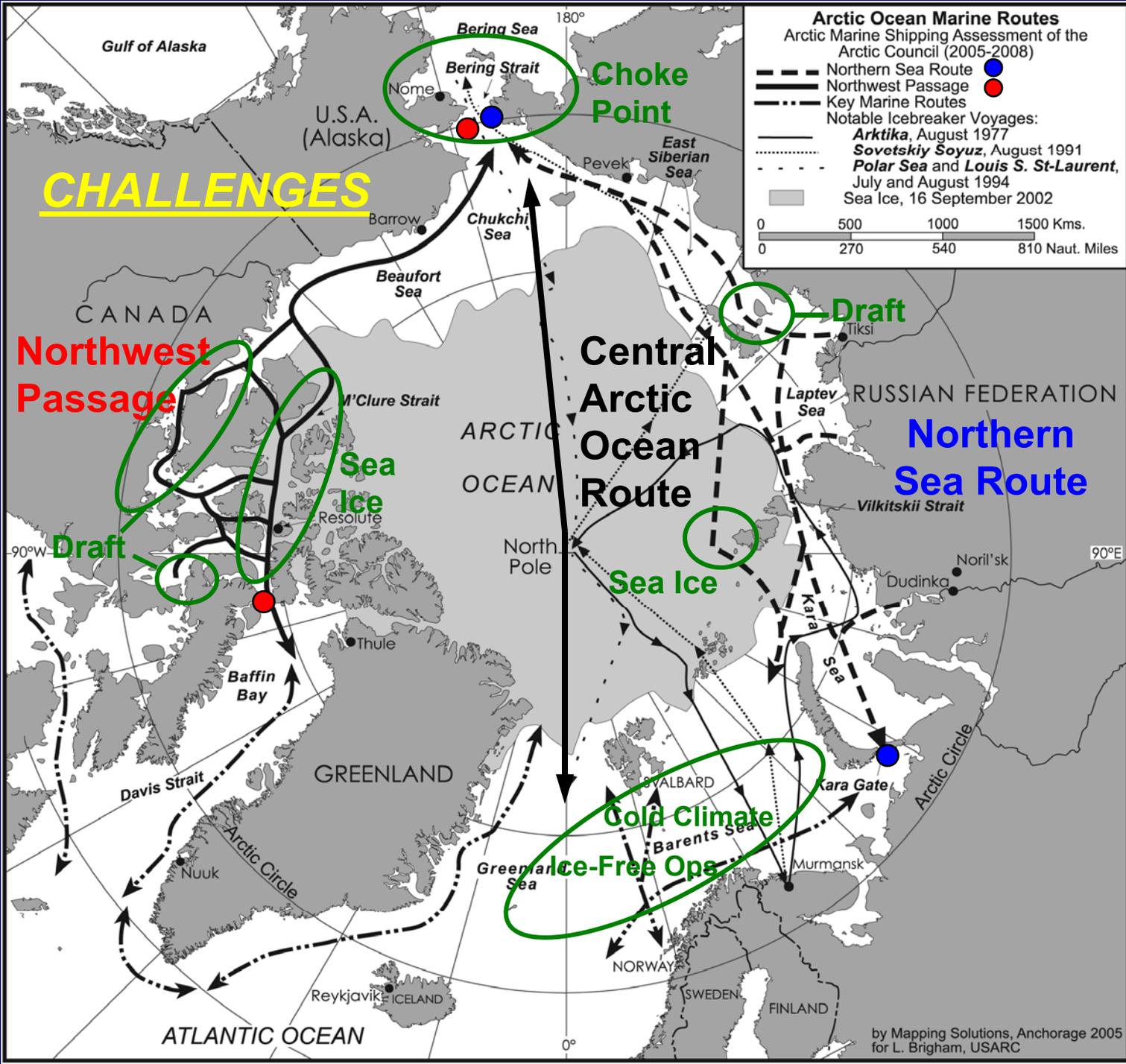
*Impact of an Ice-Diminishing Arctic on Naval & Maritime Operations*

Washington, DC ~ 11 July 2007



Lawson W. Brigham, PhD  
vice Chair, PAME & Chair, AMSA  
Arctic Research Commission ~ Anchorage

U.S.



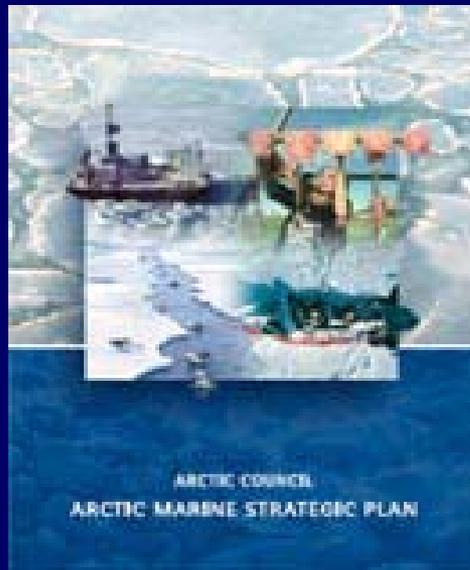
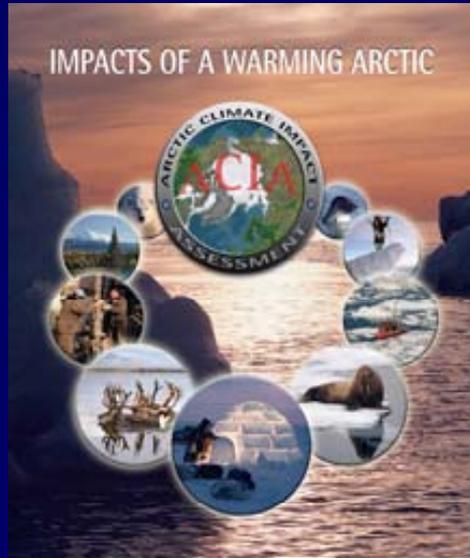
# Arctic Council

## Arctic Marine Shipping Assessment (AMSA)

Reykjavik Declaration, 4<sup>th</sup> Ministerial (Nov 2004)

*“ Request PAME to conduct a comprehensive Arctic marine shipping assessment as outlined in the AMSP under the guidance of **Canada, Finland, and the United States as lead countries** and in collaboration with the EPPR working group and other working groups of the Arctic Council and Permanent Participants as relevant.”*

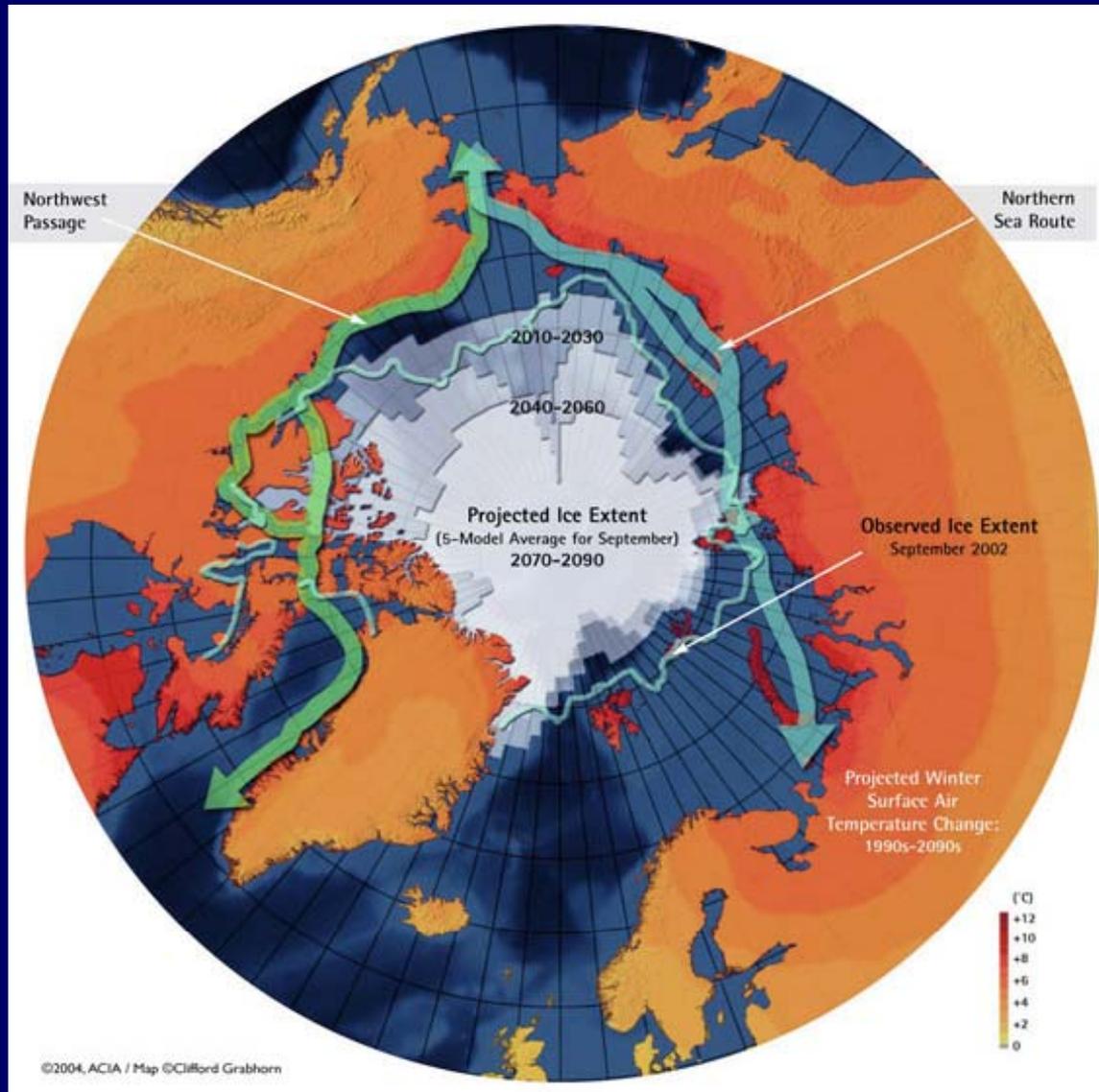
# Arctic Marine Shipping Assessment (AMSA) Key Points



- **AMSA Natural Follow-on to:**
  - Arctic Climate Impact Assessment (ACIA)
  - Arctic Marine Strategic Plan (AMSP)
- **Circumpolar, yet Regional (Large Marine Ecosystems) and Local Focus**
- **Member State Commitment & Support with Data Collection Effort**
- **AMSA web site: [[www.pame.is](http://www.pame.is)]**
- **ACIA web site: [[www.amap.no](http://www.amap.no)]**

# Arctic Climate Impact Assessment

**Key Finding #6: “Reduced sea ice is very likely to increase marine transport and access to resources.”**

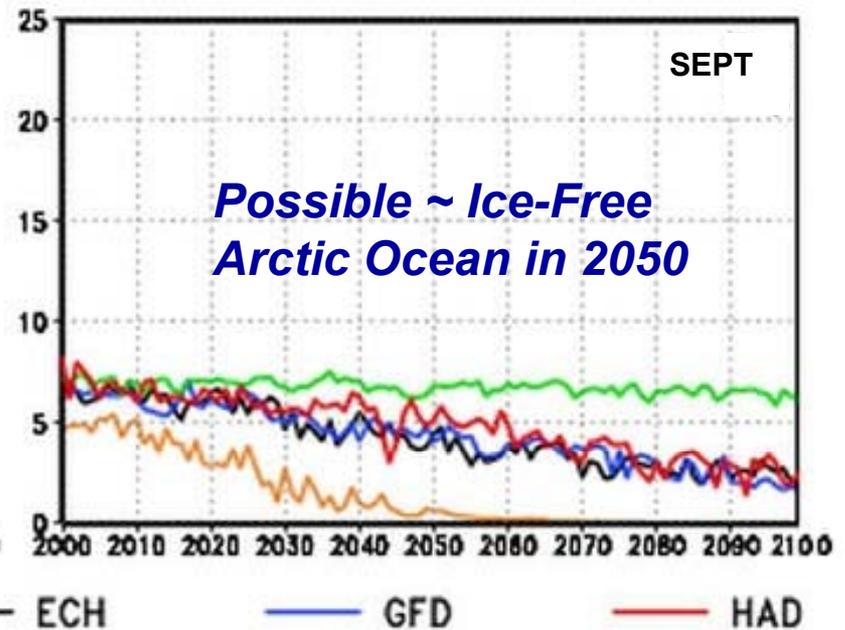
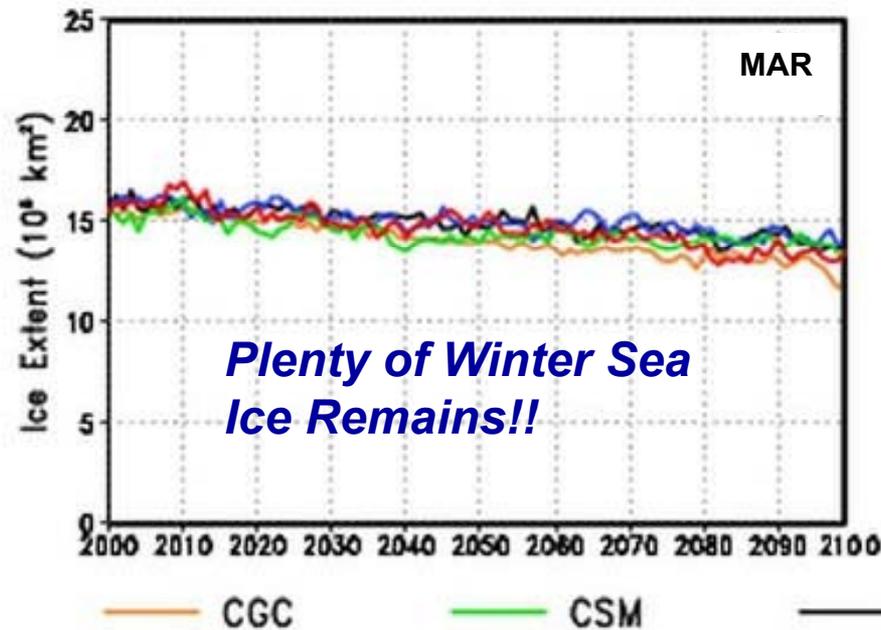


# Arctic Climate Impact Assessment

## Climate model projections of sea ice extent: 2000 - 2100

March

September

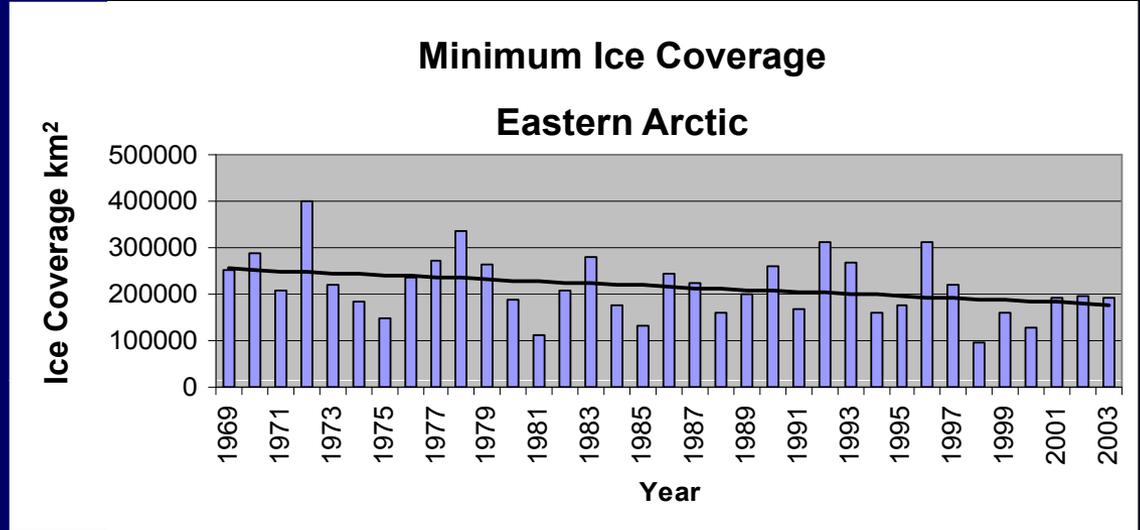
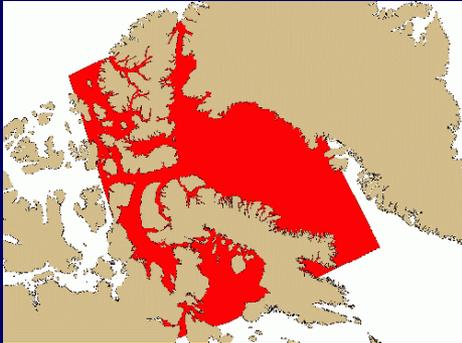


B2 IPCC Moderate Global Scenario

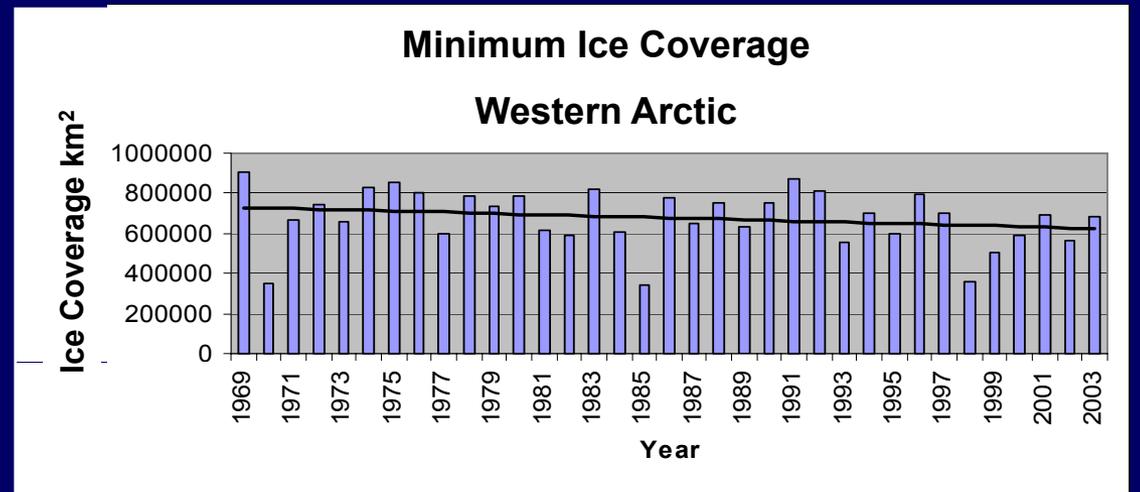
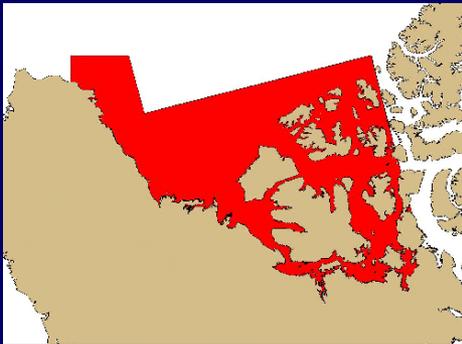
# ACIA and the Northwest Passage

- Loss of Sea Ice Coverage
- Large Inter-annual Variability

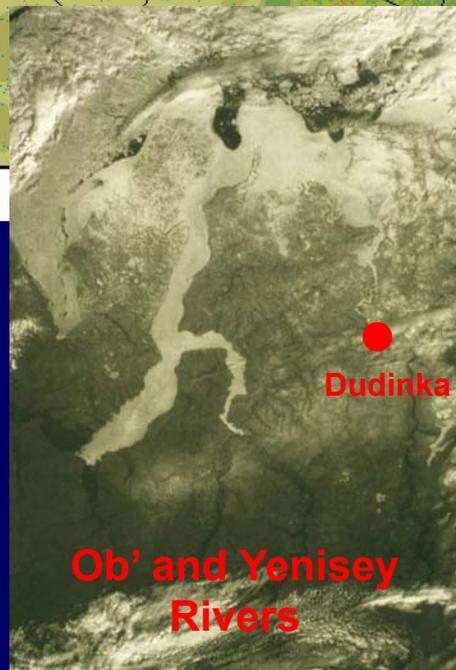
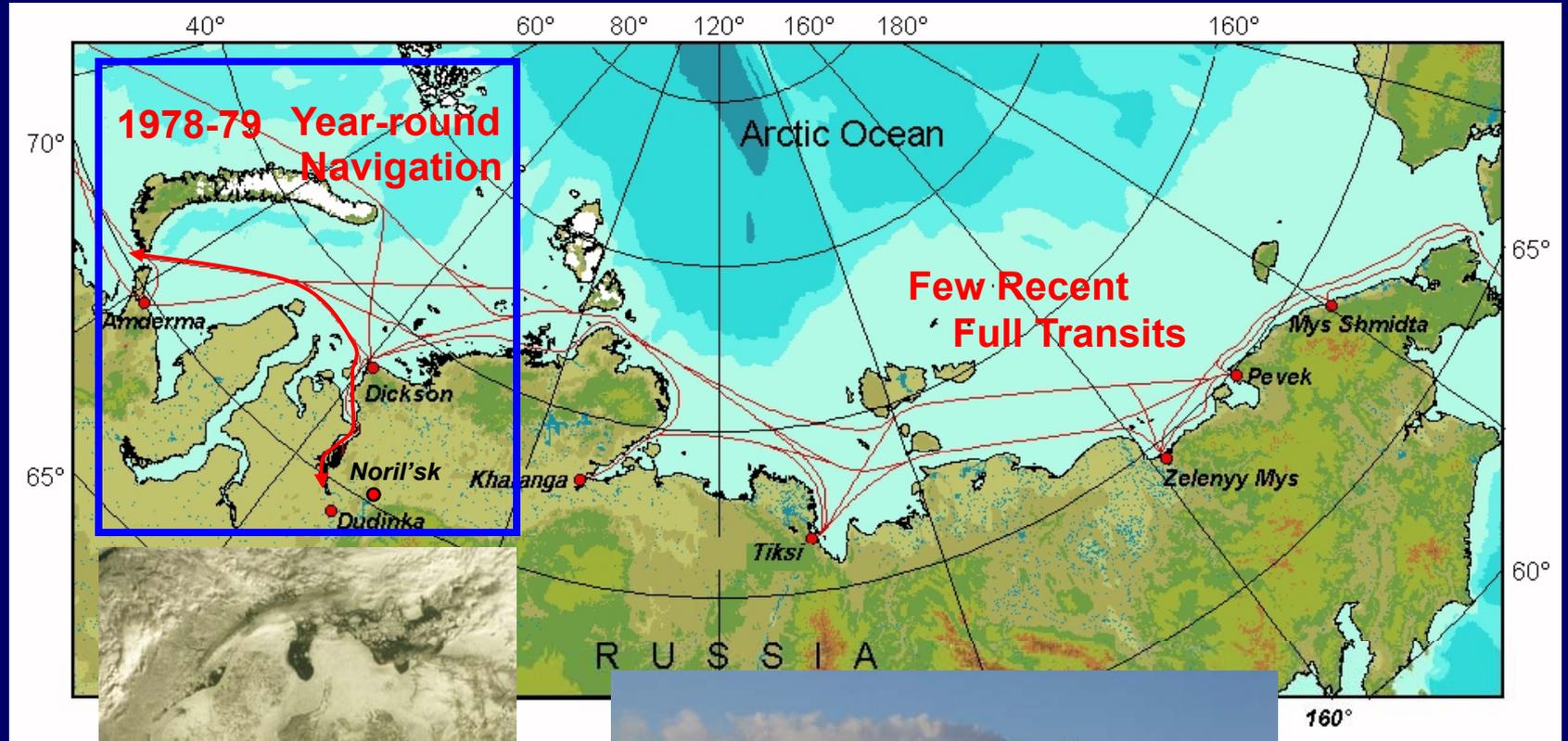
## *Regional Eastern Arctic*



## *Regional Western Arctic*



# The Northern Sea Route



**INSROP  
(1999)**

Year- round  
Navigation



**Distance (Nautical Miles)  
Hamburg to Yokohama**

Northern Sea Route ~ 6,920

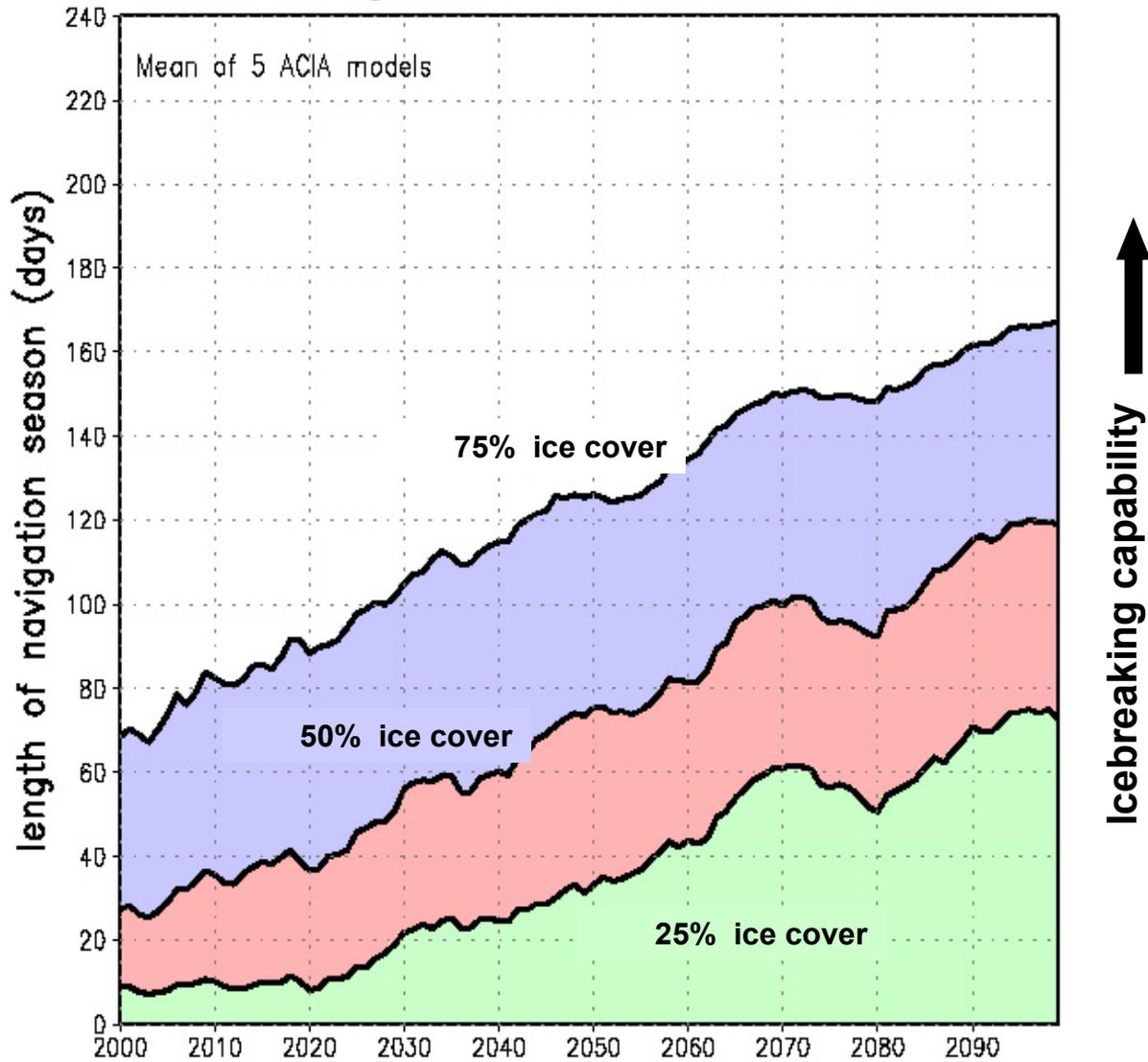
Suez Canal ~ 11,073

Panama Canal ~ 12,420

Cape of Good Hope ~ 14,542

# Arctic Climate Impact Assessment

Northern Sea Route:  
Projection for 2000–2100



# Arctic Council, PAME-led Arctic Marine Shipping Assessment

- **Lead Countries:** Canada, Finland, and USA
- **Key Countries & Regions:** Norway & Russia (Norwegian-Barents-Kara seas), Iceland, Denmark-Greenland-Faroe Islands, Sweden
- **Timeline:** 2005 – 2009 (Completion Spring 2009)
- **Electronic Survey Questionnaire** ~ Sent to Senior Arctic Officials Jan 2006; Continuing 2004 Data Collection from the Arctic States
- **Inclusive Participation:** Member States, Permanent Participants, Council Working Groups; Council Observers; Shipping Industry; Ship Classification Societies; Research Organizations; Others  
~ Key Challenge: Many Non-Arctic Stakeholders

# AMSA Final Report Structure (Draft Chapter Outline)

## **Chapters**

- 1: Introduction & Geography**
- 2: History of Arctic Marine Transport & Governance**
- 3: Current (2004) Levels of Arctic Marine Use (*Data Survey*)**
- 4: Indigenous Arctic Ocean Use (*Town Hall Meetings*)**
- 5: Scenarios of Future Arctic Marine Activity ~ 2020/2050  
(*Scenario Workshops ~ San Francisco and Helsinki*)**
- 6: Environmental Impacts ~ Current /Future Marine Activity**
- 7: Social & Economic Impacts ~ Current/Future Marine Activity**
- 8: Arctic Marine Infrastructure & Anticipated Needs**
- 9: Findings of the Assessment (to the Arctic States & International Maritime Community)**

**Appendices, Research Agenda**

# ***Icebreaker Transits to the North Pole & Trans-Arctic Voyages (1977-2006):***

- 65 Transits to the North Pole (53 Russia, 5 Sweden, 3 USA, 2 Germany, 1 Canada, 1 Norway)
- 21 Ship Transits to the NP in 2004-2006
- 7 Trans-Arctic Voyages (1991, 1994, 1996, 2005)
- Single Non-summer NP Voyage (*Sibir* Voyage May-June 1987)



**25 May 1987**  
**Soviet Nuclear Icebreaker *Sibir***  
**'A Walk Around the World!'**



**Timeless Arctic  
Marine Transport**

**Arctic Marine Vessel Activity ~ AMSA Ship Types**

Tankers ~ Bulk Carriers

Container Ships ~ Tug-Barge Combinations

Fishing Vessels ~ Ferries ~ Passenger Vessels/Cruise Ships

Research Vessels ~ Offshore Supply Vessels

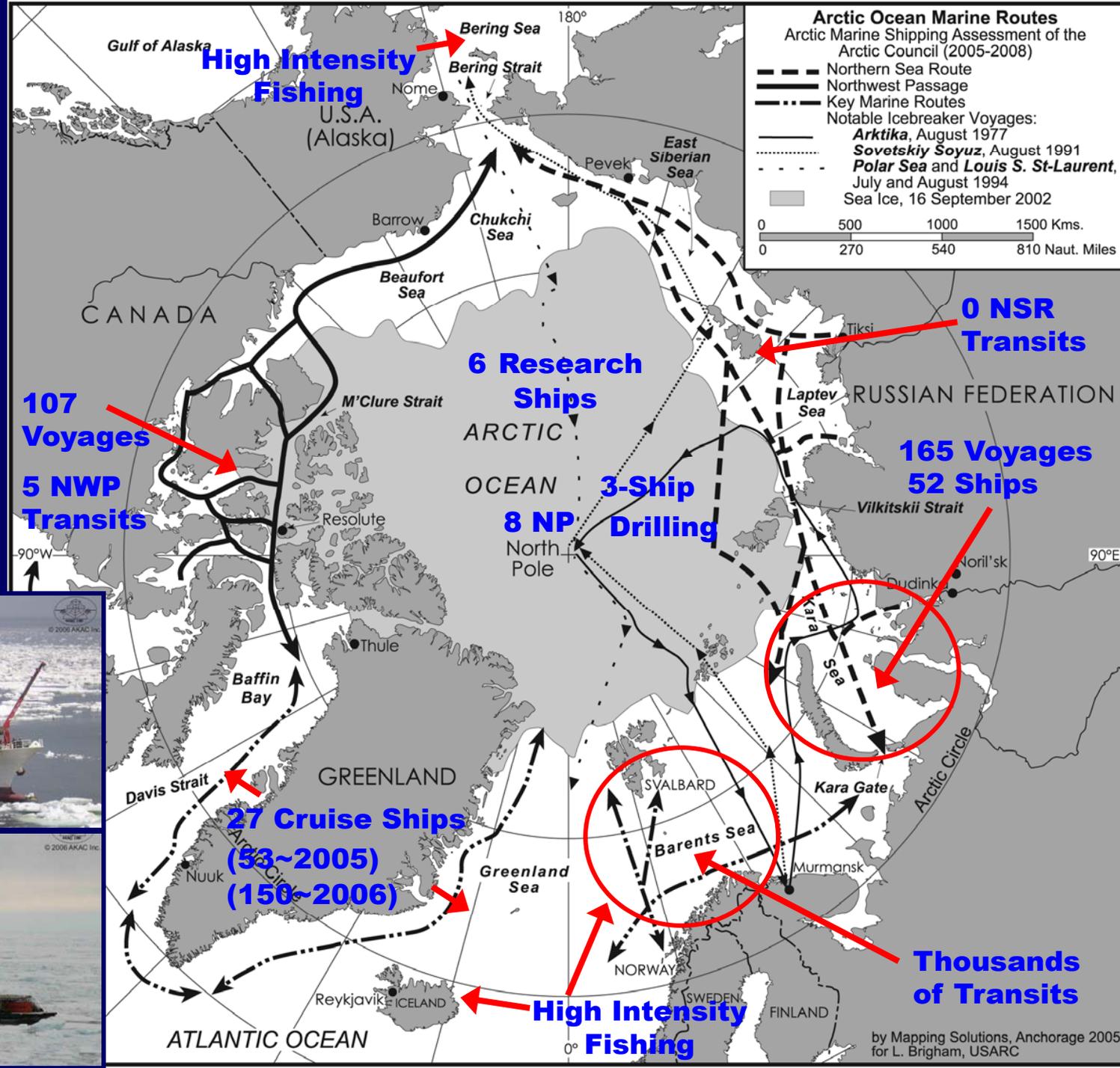
Icebreakers (Government & Commercial) ~ Others

# The Maritime Arctic of Today

## Snapshot of Summer 2004 Traffic

### Modes of Arctic Marine Transport

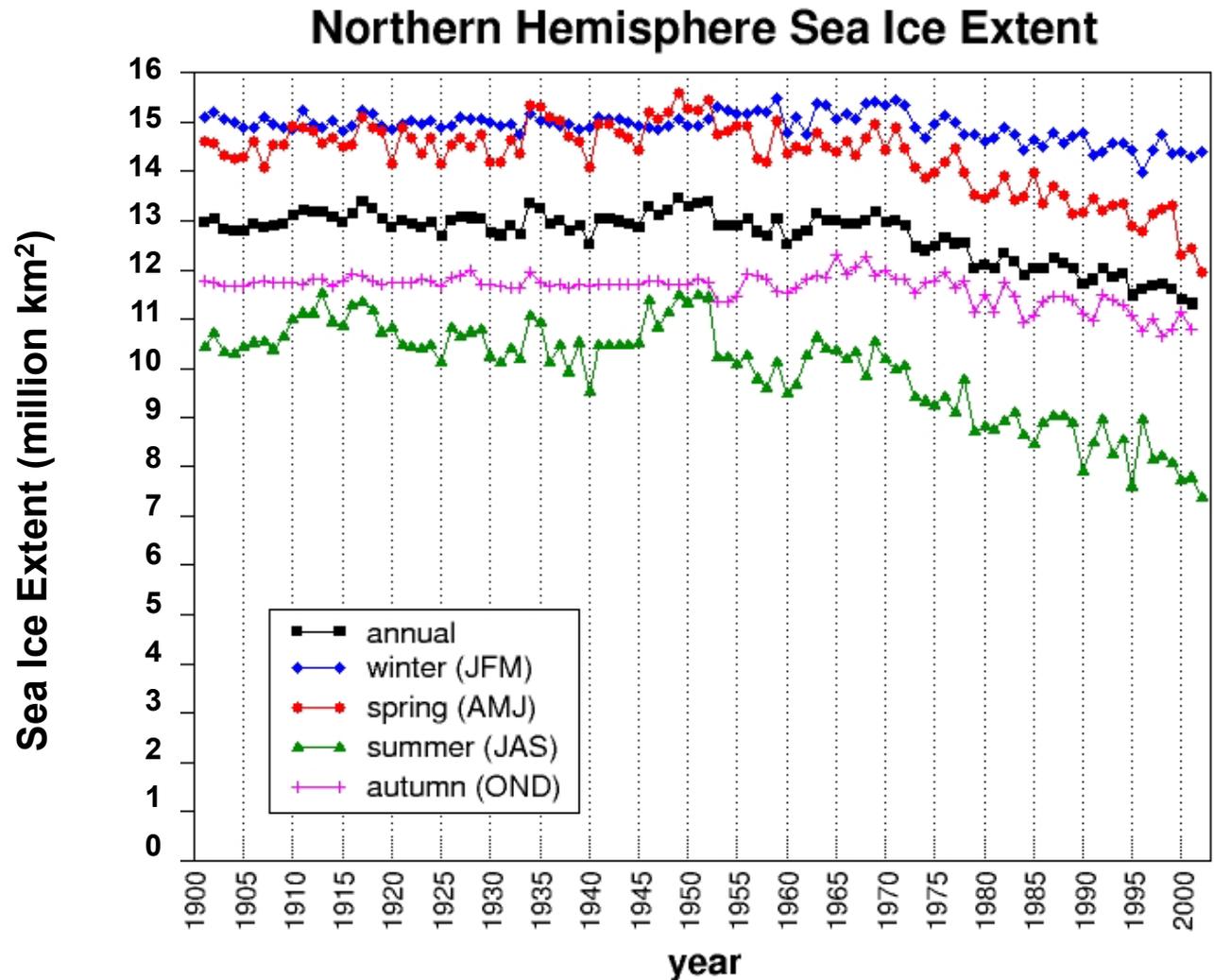
- Destinalional / Regional
- Trans-Arctic
- Trans-Arctic with Transshipment
- Intra-Arctic



## Sea Ice

Observational data show  
a decrease of coverage

- Extent decrease is largest in summer
- Extent decrease is largest since late 1980s
- Extent seasonal decreases since 1950s



# 16 September 2002

