



The U.S. Navy's Task Force Climate Change & The Navy's Arctic Roadmap

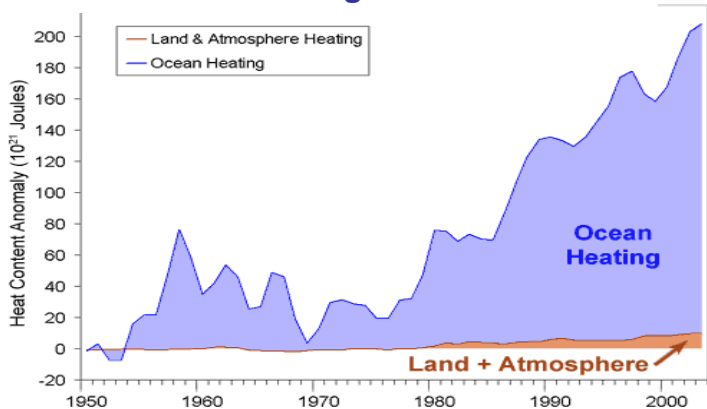


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Office of the Oceanographer of the Navy
June 2011



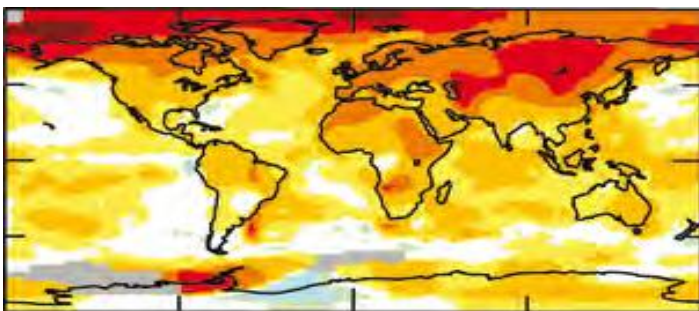
Climate Change Update

The Ocean is Storing Most of the Heat



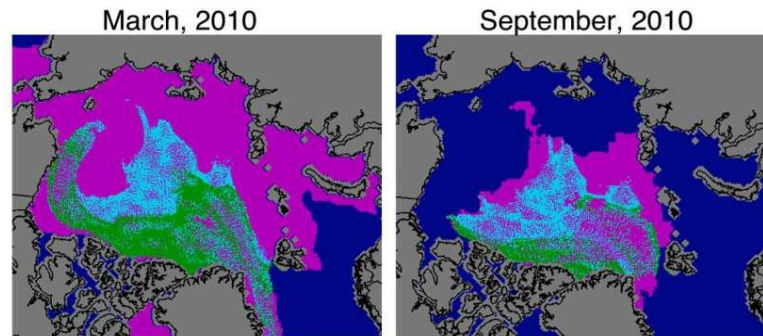
Total Earth Heat Content from 1950 (Murphy 2009). Ocean data taken from Domingues et al 2008

Arctic Warming is 2 x the Rest of the World



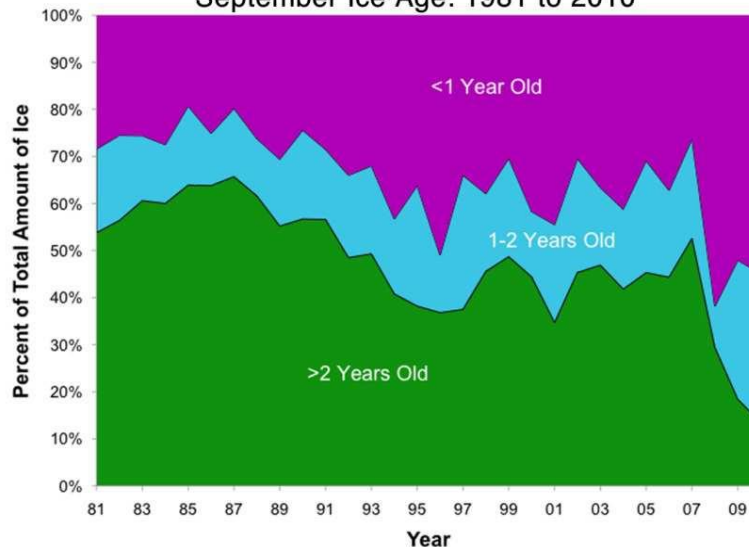
Mean surface temperature 2001-2007 relative to baseline period 1951-1980, from: The Copenhagen Diagnosis, 2009

Arctic Sea Ice Continues to Melt & Thin



■ First-year ice (<1 year old)
 ■ Second-year ice (1-2 years old)
 ■ Multiyear ice (>2 years old)

September Ice Age: 1981 to 2010



NSIDC courtesy J. Maslanik and C. Fowler, CU Boulder



Why the Navy Cares

Near-term

- Increasing Arctic maritime activity
- Partnership opportunities
- Energy security initiatives



Mid-Term

- Sea level rise impact on installations
- Water/resource challenges
- Potential increase in Humanitarian Assistance/Disaster Response



Wild-cards

- Ocean acidification
- Abrupt climate change
- Geoengineering

Challenges and opportunities exist



Task Force Climate Change

Establishment

Chief of Naval Operations
Executive Board on May 15, 2009



Composition

Navy, NOAA, USCG in core group with
Joint, interagency, international support



Charter

Global climate change impacts with **near term Arctic focus**



Navy's Arctic Experience

1926

Admiral Byrd's first Over-flight of North Pole



1946

USS Midway tests carrier capabilities



1955-57

Sealift support to construct Distant Early Warning (DEW) line stations



1970's

Cold weather Underway Replenishment experiments



1990's

Submarines continue transits and research



1942-45

World War II: Dutch Harbor, Attu & Kiska



1951-52

Sealift support to enlarge Thule Air Force Base



1958

Nautilus first under-ice transit



1984-85

Arctic undersea exercises



2000's

Continuing Naval exercises





What is the Arctic?

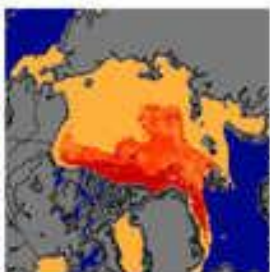
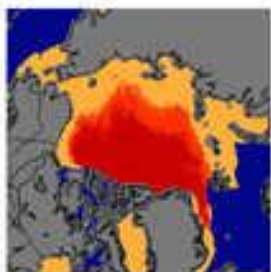
It is an ocean



End of February Arctic Sea Ice Age

1981-2000 Median

2009



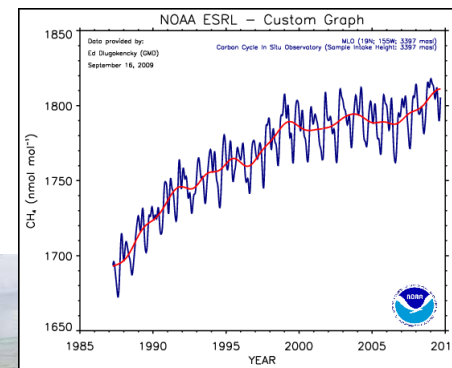
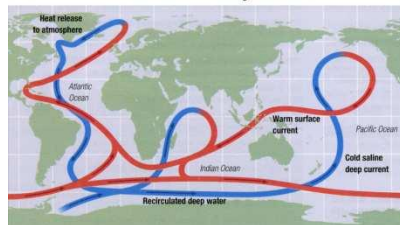
Legend:
■ First year ice (< 1 Year Old)
■ Second year ice (1-2 Years Old)
■ Older ice (> 2 Years Old)

Metzger and C. Fritzen, Univ. Colorado



It is not a vacuum

Global Ocean Conveyor Circulation



It is changing





Arctic Considerations

| | | |
|--|--------------------------------------|--|
| <p>Poorly Charted</p> | <p>Limited Infrastructure</p> | <p>Harsh Operating Environment</p> |
| <p>Security Concerns</p> <p>Maritime boundary Disputes US-Canada Russia-Norway</p> <p>Opportunities Russia & China</p> | <p>Allied Perspective</p> | <p>Transportation Access</p> <p>Shipping industry requirements</p> <ul style="list-style-type: none"> > 8+ weeks of ice-free conditions > Not anticipated for at least 40 years <p>Concerns</p> <ul style="list-style-type: none"> > Insurance > Charts > SAR > Governance > Reliable sea-ice forecasts > Ice-strengthened hulls > Environmental compliance |

Native Perspectives

Gulf Coast, 2005



Unalakleet, 2040



One Scenario

+

=

The Arctic is an ocean, a challenge, but NOT a vacuum



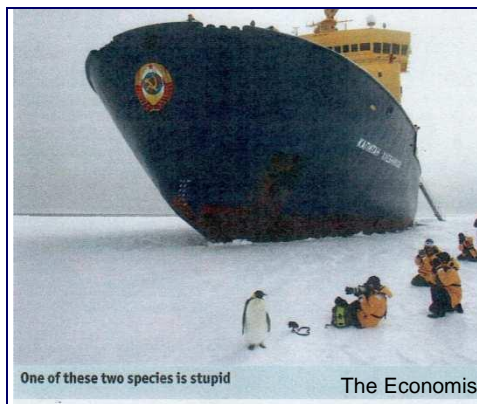
Arctic Trends Assessment

Commercial activity remains limited through 2030



..but after 2050?

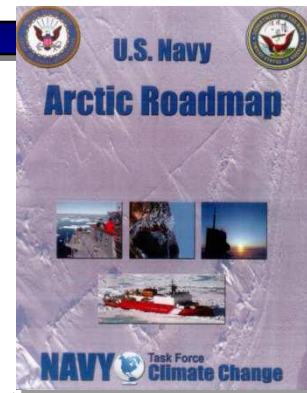
- Shipping, oil, & gas extraction to grow after 2030
- Tourism & maritime research will increase the most
- Fishing to grow but only gradually



Harsh operating environment will remain the greatest limiting factor



Arctic Drivers



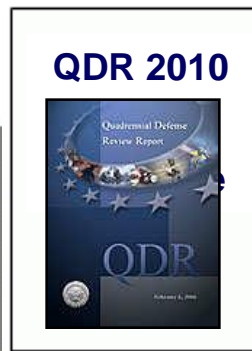
Signed by VCNO



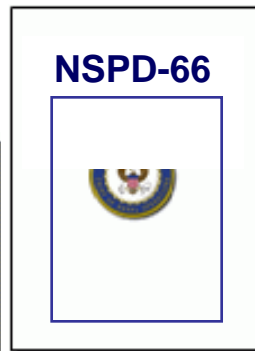
TFCC Established



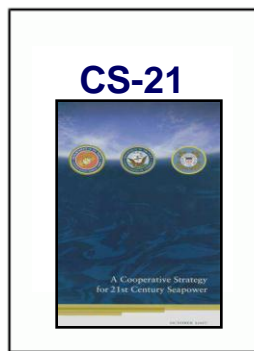
CNO Direction



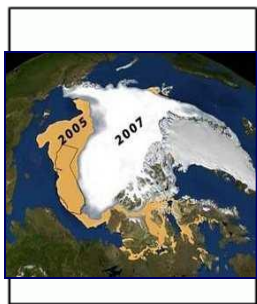
Defense Department Guidance



National Arctic Policy



Maritime Strategy

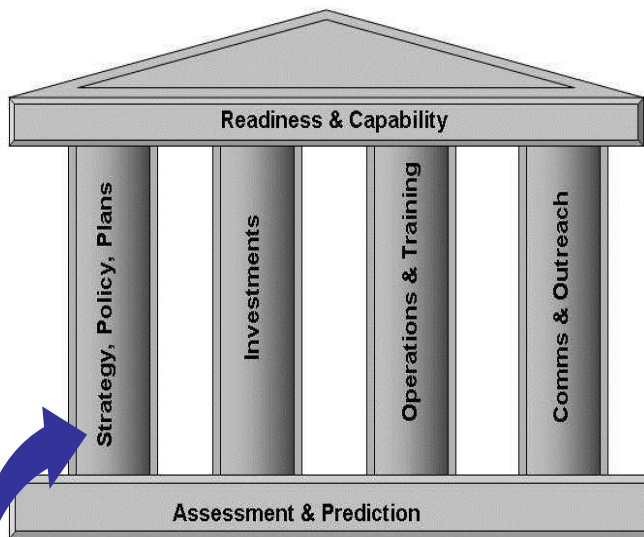


Arctic Ice Decline



Navy Arctic Roadmap

Framework



Execution

Phase 1 (FY10)

- Arctic SIP: Fleet readiness assessment, external studies, strategic implementation plan
- UNCLOS: Advocate for UNCLOS^{***}
- SATCOM: Monitor Polar SATCOM Program^{***}
- Arctic TTX & LOE: Innovative Readiness Training (IRT)^{***}
- Map: Arctic TTX & LOE
- POM-12: POM-12 investments for air-ocean-ice numerical prediction

Phase 2 (FY11-12)

- POM-14: POM-14 CBA, NSP, & SPPs address the Arctic
- Partnerships: Formalize expanded / new cooperative partnerships
- Arctic SAREX, Arctic Edge, Northern Edge NANOOK^{***}
- ICES-11: ICES-11
- Environment: Environmental assessments
- White House: Support National Ocean Policy / Marine Spatial Planning Implementation For Arctic^{***}
- Prediction: Interagency partnership for air-ocean-ice numerical prediction

Phase 3 (FY13-14)

- POM-14: Execute POM-14
- Partnerships: Implement expanded / new cooperative partnerships
- UUV: Arctic UUV operations
- QDR: Update roadmap ICW QDR

Composition



Navy recognized as a valued joint, interagency, & international partner in the Arctic

^{***} Indicates recurring action



Recent Arctic Activity

About the Arctic



Finland
Arctic
Strategy



Canada National
Arctic Policy



Russian
Arctic
Strategy



Arctic Council
Reaffirms
UNCLOS



Arctic Council
SAR Agreement

Within the Arctic



Chinese
research
cruise



US & Other
International
Research



Vigilant Eagle 2010



Arctic Crossroads 2010



Multiple NSR transits



US-CAN ECS survey



NWP cruise
Ship & Oil Tanker
groundings



Russian Oil
Tankers Collide



Navy is engaging with Arctic & non-Arctic countries



Navy Accomplishments: April 2010 – April 2011

Education



Naval Post Graduate School Arctic Science & Security theses



Arctic science & security Study topics at US Naval Academy



Naval War College courses address Arctic Science & Security Topics

Studies & Assessments



Naval Arctic Mission Analysis



Naval Studies Board study



Naval Arctic Capability Based Assessment

Outreach & Engagement



NSS Interagency Policy Committee



State Department Arctic Policy Group



Conferences, Symposia, Media events



Leadership visits & staff talks

Policy, Strategy, & Plans



Support Arctic Section In 2010 UCP



Navy Arctic Strategic Objectives



USN-USCG Arctic Activity Plan

Operations & Training



Navy-NOAA Bering Strait Survey



Arctic Care 2010



ICEX 2011



USS Taylor Port Visit to Murmansk



Pacer Goose



Operation NANOOK/NATSIG

Science & Research



NRL Kara Sea Research cruise



Interagency partnership For air-ocean-ice numerical prediction



Science Ice Exercise Plan

Improve understanding

Ensure readiness (resilience)



Navy Activity On and Under the Ice

Technology Demonstrations – ICEX-11



Aerial resupply



SSN 778 surfaced



Ice-mining



VIP visit

Interagency Research Efforts – Operation Ice Bridge 2011



Greenland Ice Sheet





Naval Studies Board Recommendations

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine
NAVAL STUDIES
BOARD



Support ratification of UNCLOS



Address naval coastal installation vulnerabilities



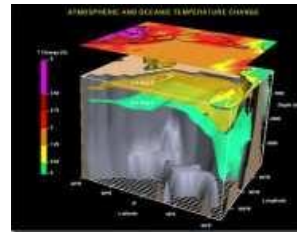
Prepare for increase in HA/DR, Arctic missions



Address emerging technical requirements (e.g. polar ops)



Address partnership demands



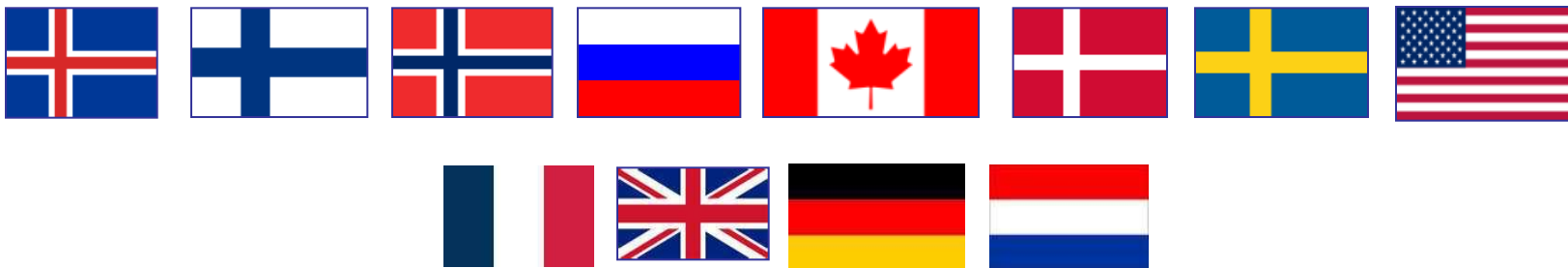
Support research & development

Navy action is already underway



Arctic Military Roundtable

- Share what Defense Forces are doing to adapt to climate change, retain military mission capability resilience, and adapt to changing missions
- Build relationships and reduce regional tensions.



Avoid Perception of “Militarizing” the Arctic



Some Final Thoughts ...





Discussion



 facebook.com/NavyTFCC