



National Needs for Improved Arctic Weather & Climate Predictions: Why Now?



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Director, Center for Solutions to Weather and Climate Risk
Penn State University**

Climate Change. Challenges. Solutions

13 May 2014

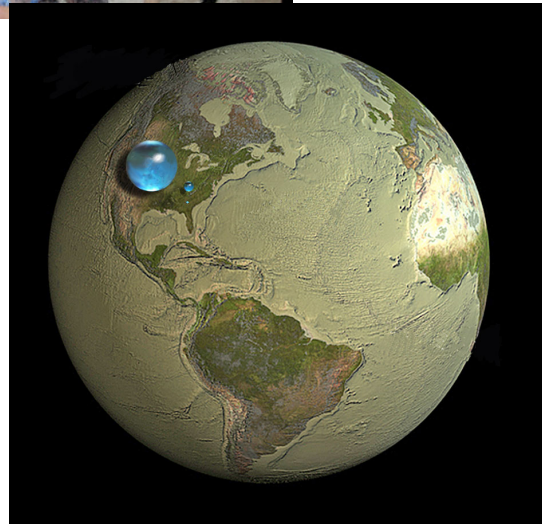


Why Care About Climate Change?



- It's About *People*

- It's About *Water*



- It's About *Change*

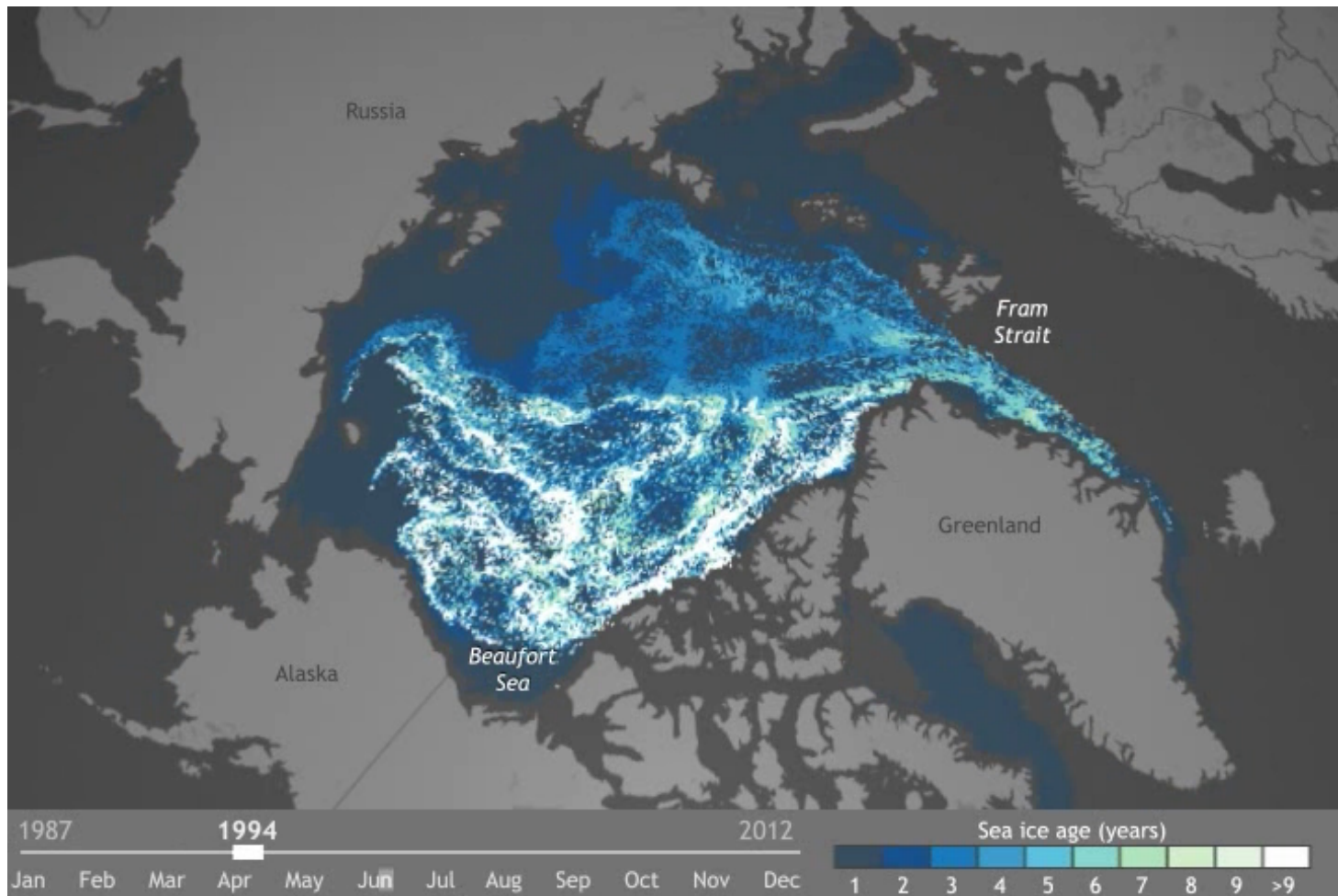




- It's an Ocean
- It's Changing
- It's not a Vacuum

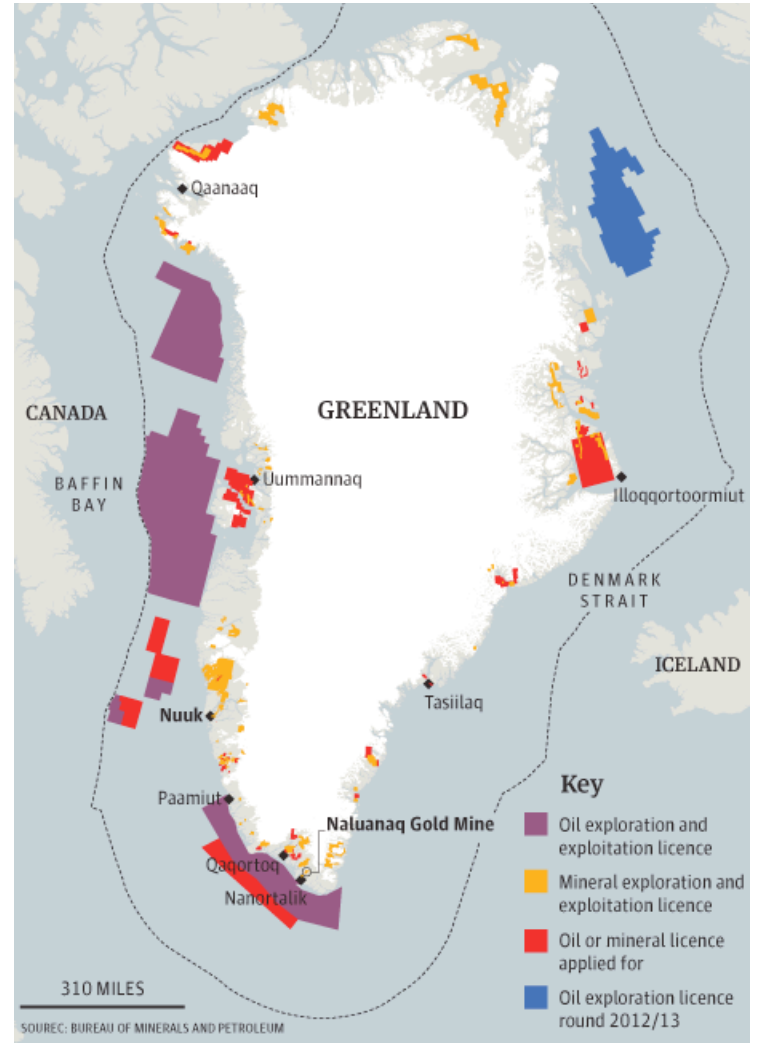
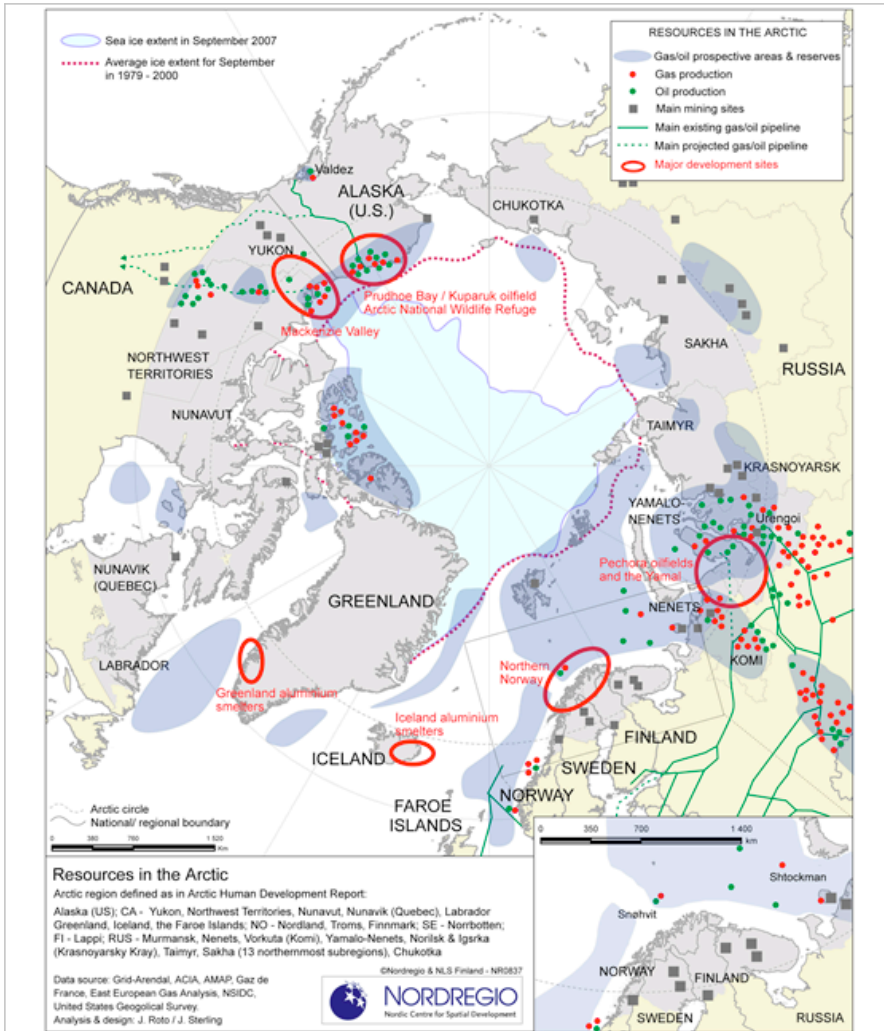


Arctic Sea Ice (1994 – 2012)



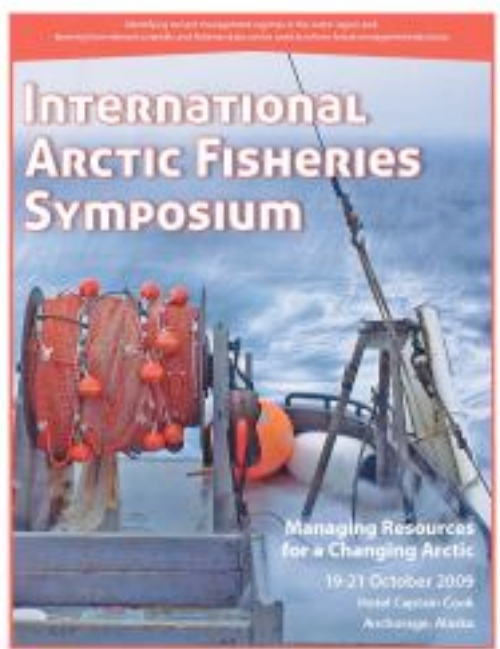
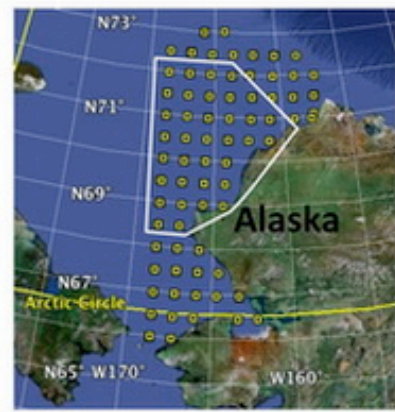
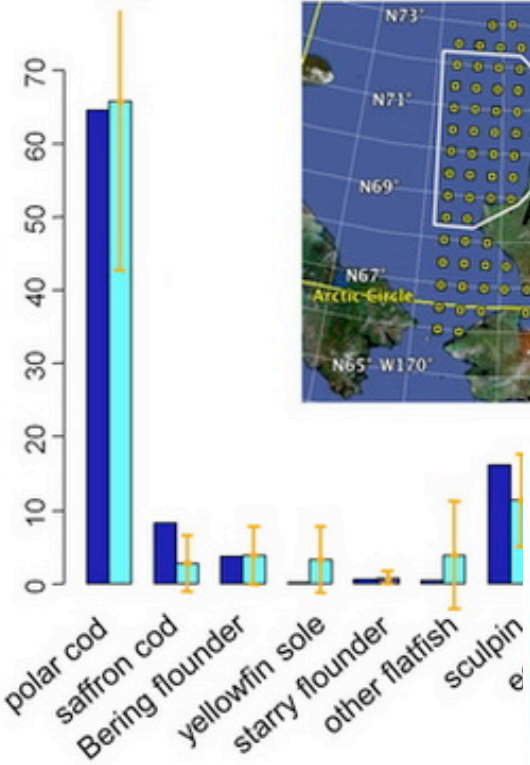
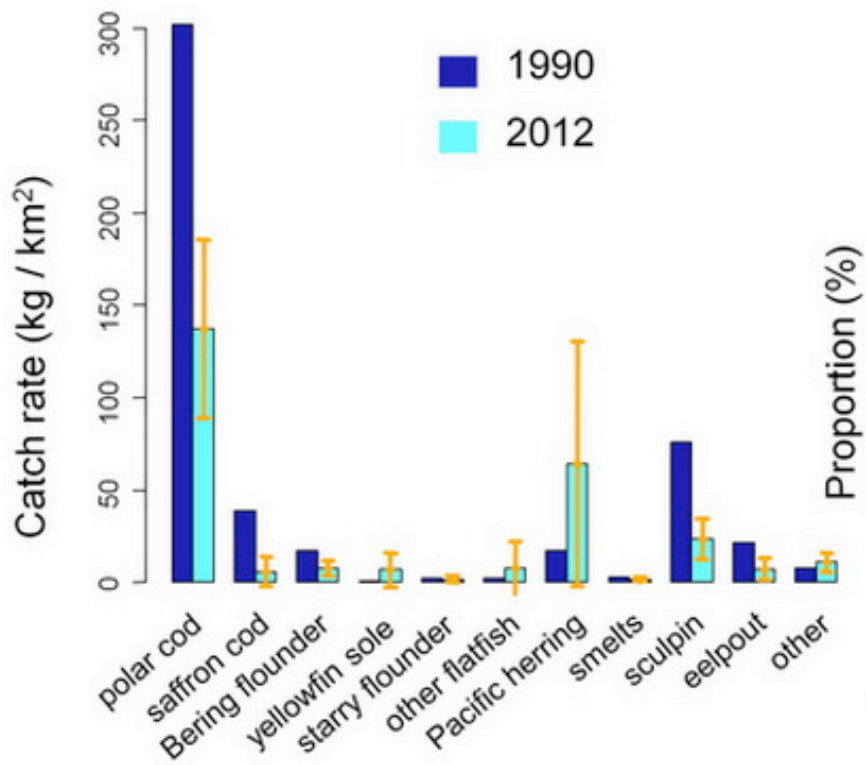


Resources in the Ground...





...in the Water...



Source: NOAA/NMFS



Greenland
BE A PIONEER



**CRUISE
TOURISM**
IN POLAR REGIONS

Promoting Environmental and Social Sustainability?



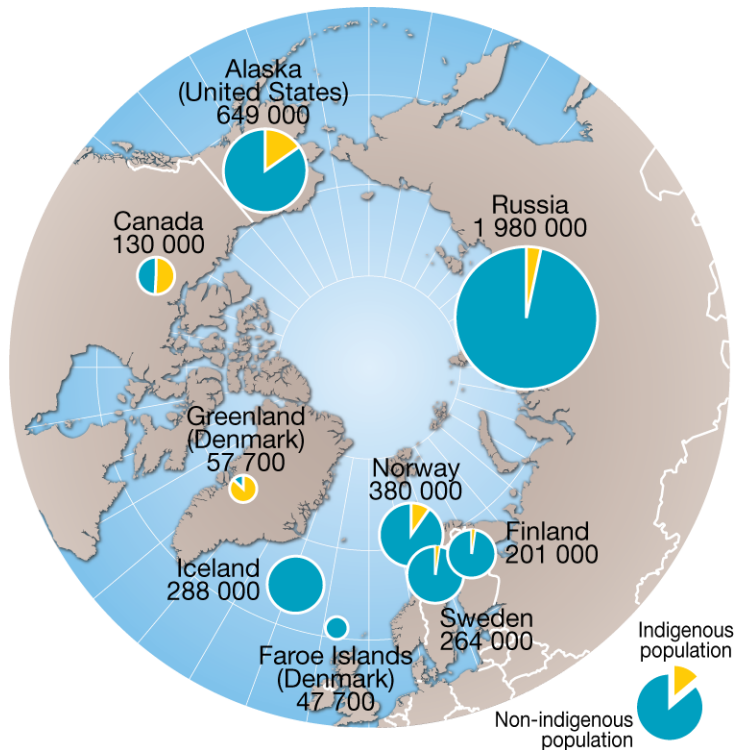
AT THE CROSSROADS OF PRACTICE AND POLICY
July 31-August 2, 2012



COMMERCIAL APPLICATIONS OF NORTHERN AIRSHIPS



...but especially, the people



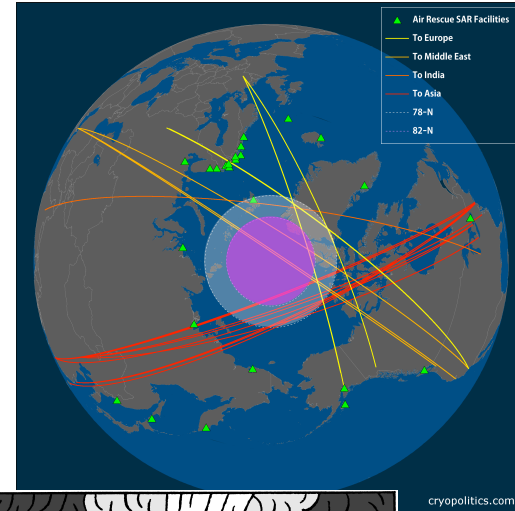
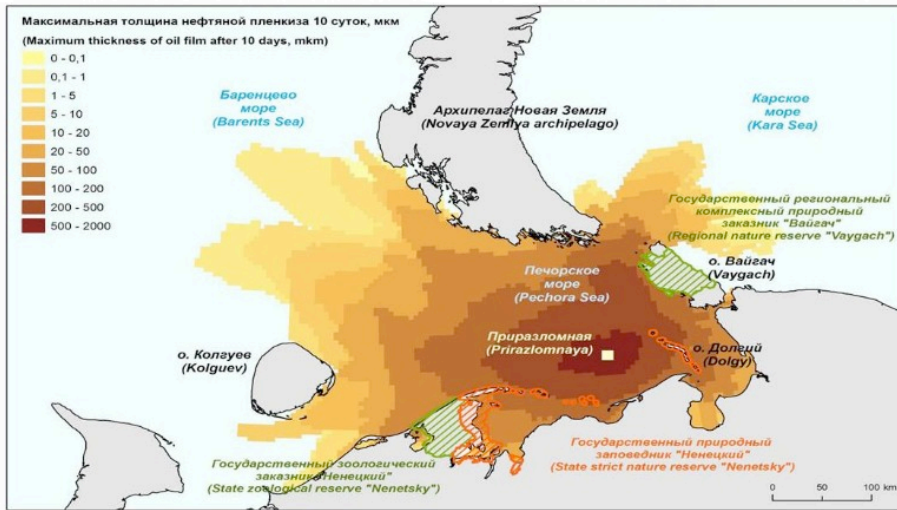
BG Guy Hamel
Premier Eva Aariak





Some Risks, known...

Возможные нефтяные загрязнения акваторий и побережий при разливе нефти в 10000 тонн за 5 суток
 Potential oil pollution of the seawaters and the shoreline after oil spill of 10000 t over 5 days



Courtesy Stanford University



...and unknown



Arctic Trends Assessment

Commercial activity remains limited through 2030

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

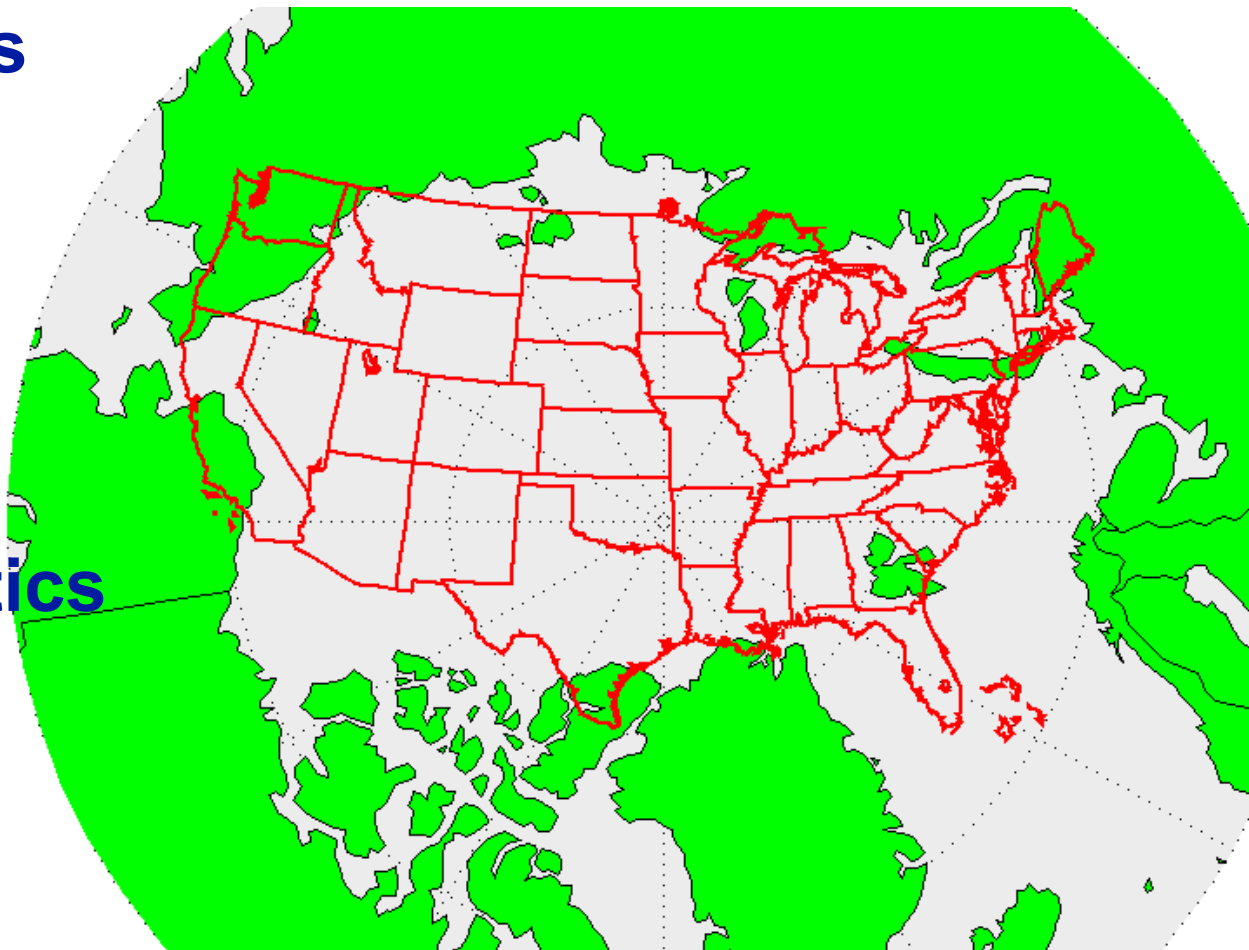


Harsh operating environment will remain the greatest limiting factor



Common Operational Challenges

- **Communications**
- **Navigation**
- **Environment**
- **Access & Logistics**





Harsh under 'normal' conditions





Arctic Trade Routes: Today & Tomorrow



Northern Sea Route

2025: 6 weeks open
41' controlling draft



Transpolar Route

2025: 2 weeks open
Deep ocean transit



Northwest Passage

2025: intermittently open
33' controlling draft

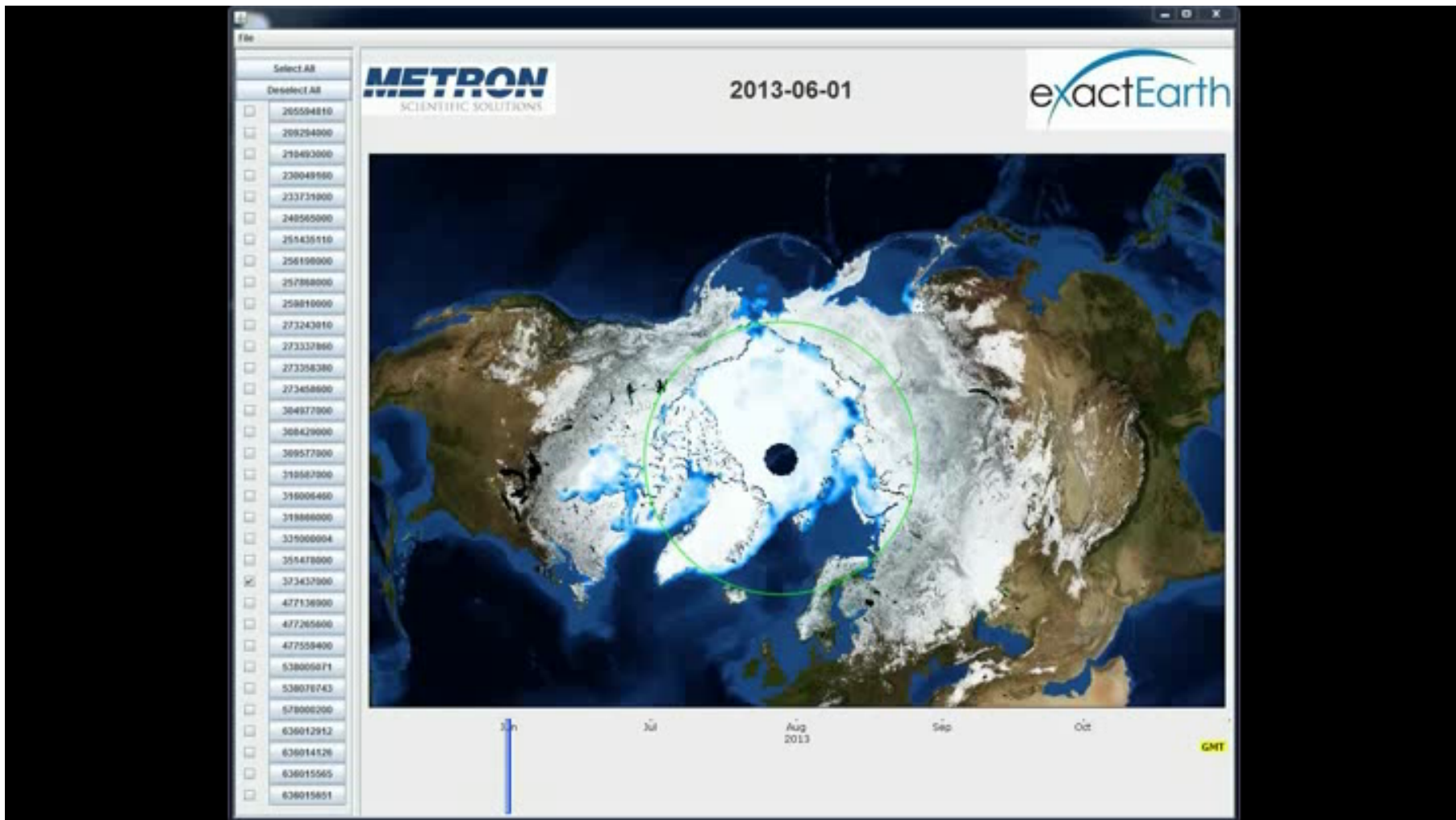
 Crossroads

Sea route distances:
Distance from the
Bering Strait to
Rotterdam

Courtesy: US Navy



M/V NORDIC ORION Summer Cruise 2013





Strategies abound...

NATIONAL STRATEGY
FOR THE ARCTIC REGION

MAY 2013



DEPARTMENT
OF DEFENSE

NOVEMBER 2013

UNITED STATES COAST GUARD
ARCTIC STRATEGY



MAY 2013
WASHINGTON, D.C.

U.S. Navy
Arctic Roadmap
2014 - 2030

NAVY Task Force
Climate Change



National Arctic Implementation Plan

the WHITE HOUSE PRESIDENT BARACK OBAMA

★★★★★ THE WHITE HOUSE WASHINGTON ★★★★★

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White House Releases Implementation Plan for the National Strategy for the Arctic Region

Posted by Patrick Ventrell on January 30, 2014 at 01:09 PM EST

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Today the White House released the Implementation Plan for the National Strategy for the Arctic Region. The Administration solicited input from Alaska Natives, the State of Alaska, Congress, academia, industry and others to develop an Implementation Plan that sets forth the guidelines for Federal Departments and Agencies to execute the National Strategy for the Arctic Region. The Implementation Plan complements and builds upon existing initiatives by Federal, State, local, and tribal authorities, the private sector, and international partners, and also focuses efforts where opportunities exist and action is most needed. It is designed to meet the reality of a changing Arctic environment and uphold our interests in safety and security, protect the environment, and work with international partners to pursue our global objective of combating the effects of climate change as described in the President's Climate Action Plan.

While the Implementation Plan is designed to guide the activities of Federal Departments and Agencies, successful implementation will depend upon active engagement and coordination with Alaska Natives and the State of Alaska. The Implementation Plan will be reviewed on an annual basis to ensure that progress continues to be made in

GIVE FEEDBACK ABOUT THIS PAGE

YOUR FEDERAL TAXPAYER RECEIPT



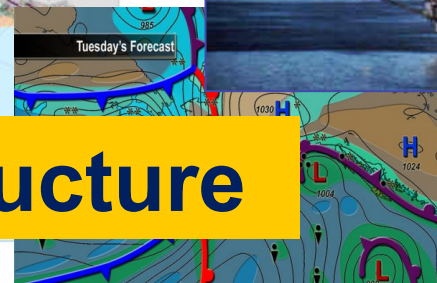
Launch the Receipt

WHITE HOUSE BLOGS



Required Capacity...part of a team

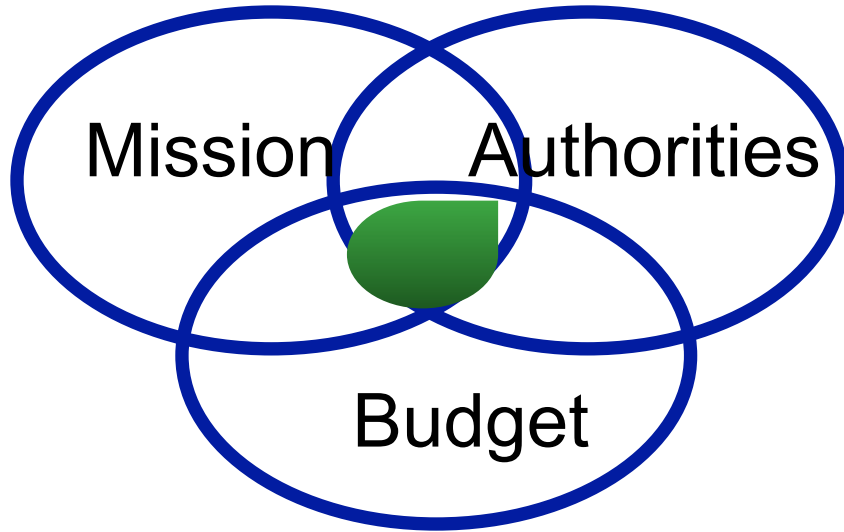
- Ice breakers
- Ice hardened USN vessels
- Observations
- Navigation surveys and infrastructure
- Arctic domain awareness
- Bases for support
- Port(s)
- Energy infrastructure
- Communications



Awareness & Infrastructure



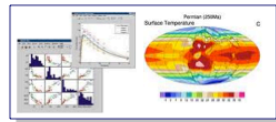
A Potential Way Ahead...



Improving Prediction Capability

Earth System Prediction Capability

Recapitalize aging suite of global atmospheric models



Interagency collaboration

Revolutionary advancement National predictive architecture



“Begin with the end in mind”

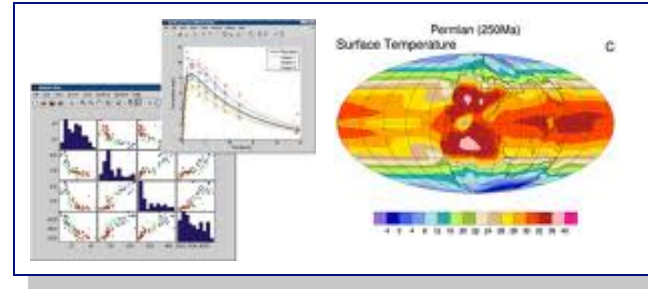
Thank You...



Improving Prediction Capability

Earth System Prediction Capability

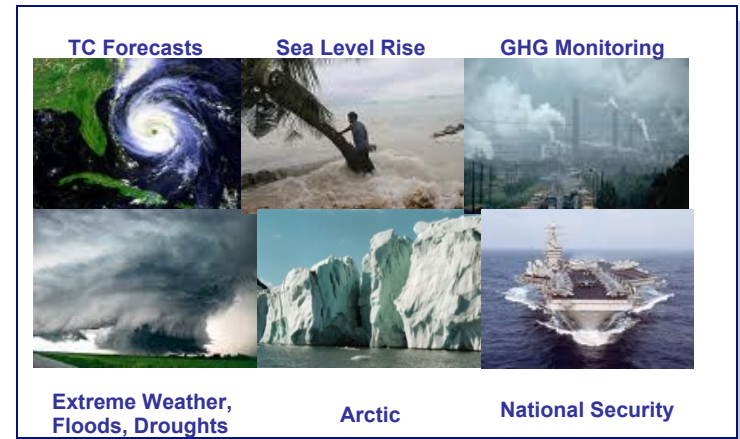
Recapitalize aging suite of global atmospheric models



Interagency collaboration



Revolutionary advancement National predictive architecture



Initial Navy investments in today's budget