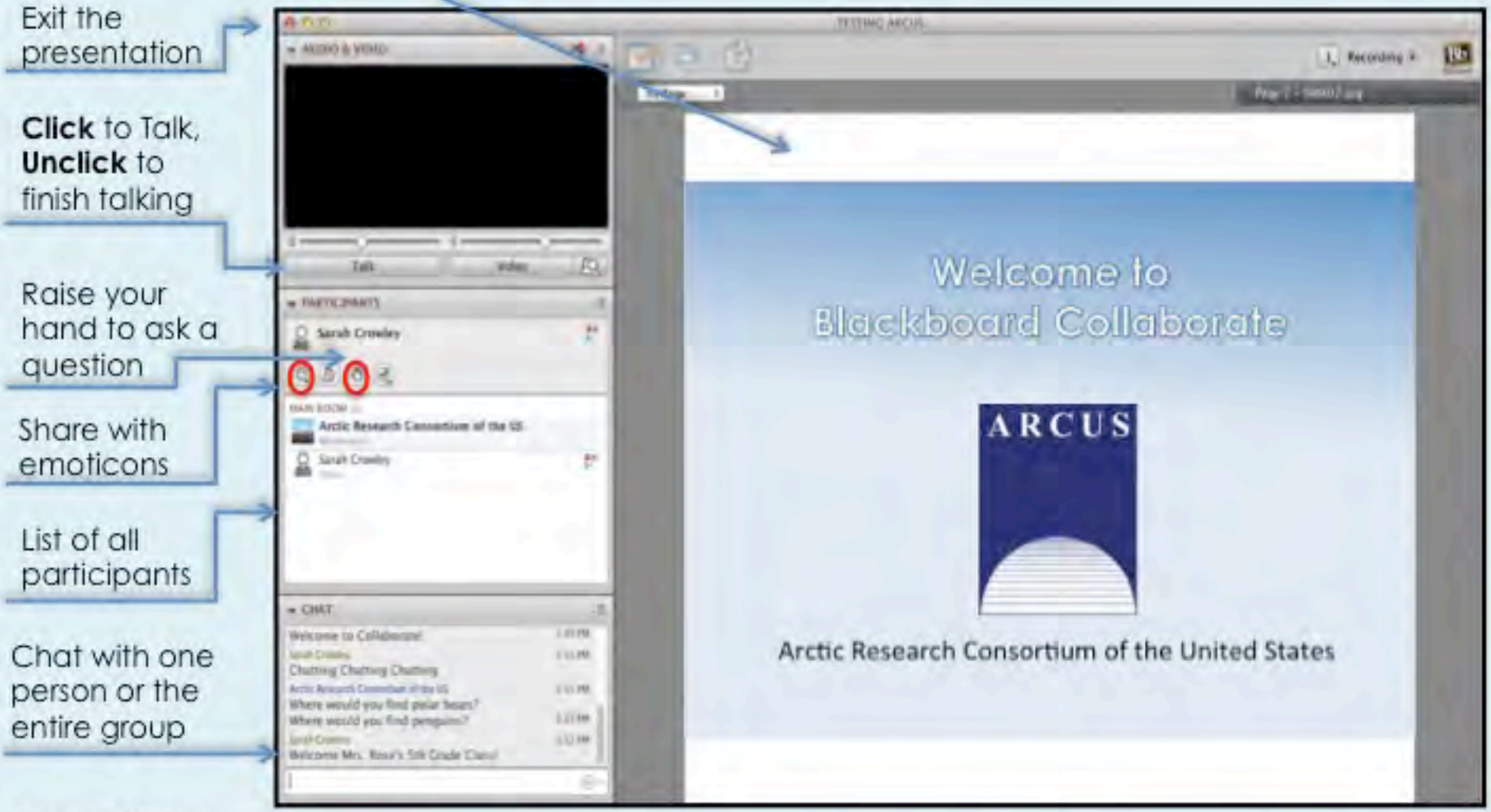
Welcome

Sea Ice Prediction Network (SIPN) Webinar

http://www.arcus.org/sipn

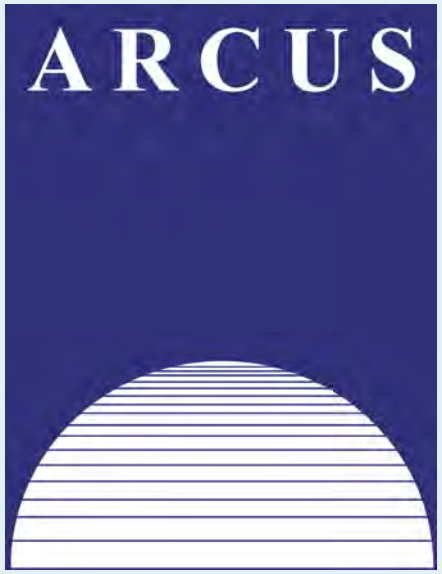
Blackboard collaborate



Please Note:

- Participants using the telephone can mute by pressing *6, and unmute by pressing #6.
- Today's event will be recorded and archived.

Arctic Research Consortium of the United States



http://www.arcus.org

Sea Ice Prediction Network (SIPN)

J. Stroeve, C. Bitz, E. Blanchard-Wrigglesworth, H. Eicken, L. Hamilton, E. Hunke, J. Hutchings, P. Jones, W. Meier, J. Overland, A. Tivy, M. Wang, H. Wiggins

National Snow and Ice Data Center
Supporting Cryospheric Research Since 1976

Webinar Outline

- Introduction to SIPN – Julienne Stroeve
- Kickoff workshop goals – Cecilia Bitz
- Workshop challenge and ideas about sea ice predictability – Ed Blanchard Wrigglesworth
- Wrap up – Julienne Stroeve
- Discussion on network activities - all

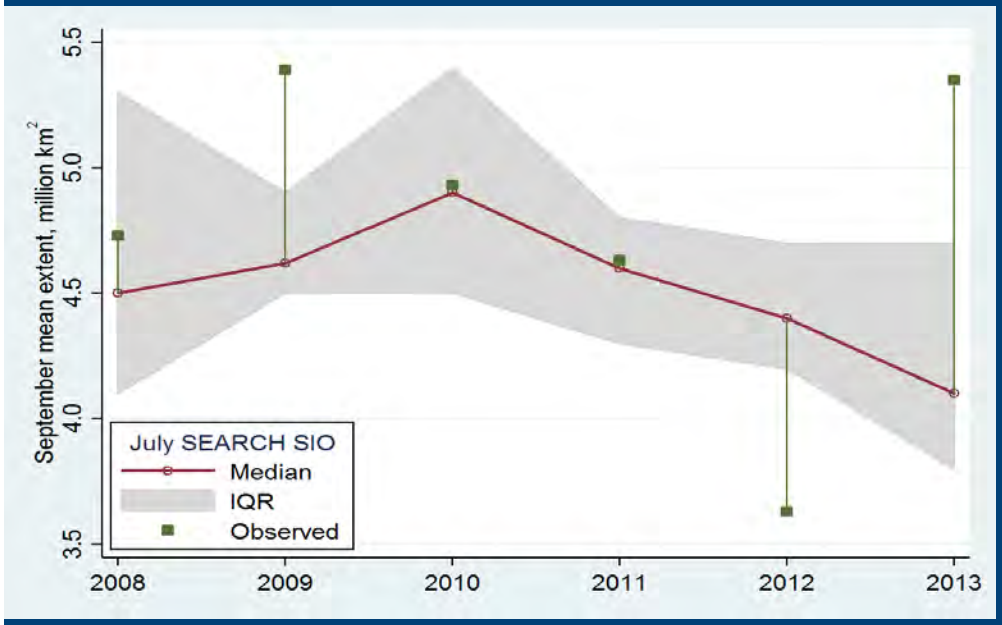
Introduction

- SIPN builds on the SEARCH Sea Ice Outlook and the Sea Ice for Walrus Outlook
  - Forum to intercompare and discuss seasonal ice prediction
  - Outreach and communication tool
  - Community based observations
- Goal of SIPN is to improve sea ice prediction on seasonal to interannual time-scales by developing a network of scientists and stakeholders to advance research on sea ice prediction and communicate sea ice knowledge and tools.
- Observations ⟷ Models

Sea Ice Outlook

- Since 2008, SIO received 309 individual contributions
- Viewed together, the predictions display a bimodal pattern of success regardless of method used.

Median and interquartile range of July SIO predictions compared with September mean sea ice extent

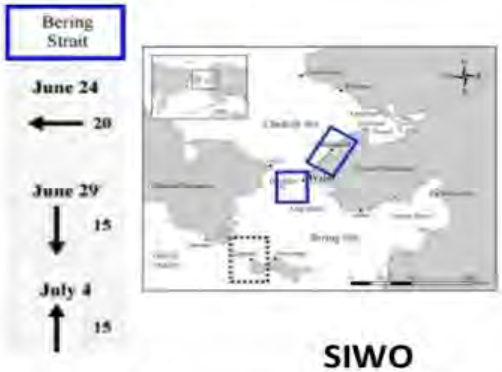


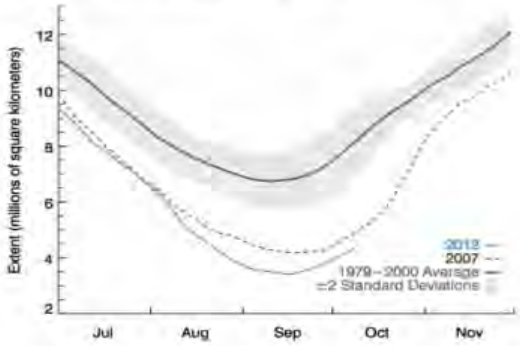
- When the observed extent is far from the trend line, the predictions are as well.

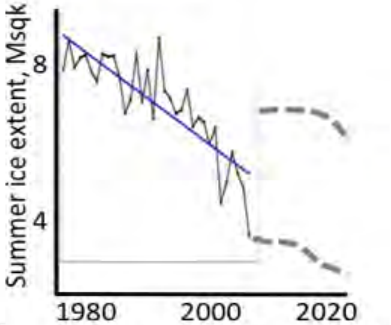
Towards a sea ice prediction network

Timescale and regional scale

Weather (1h – 20d)	Seasonal to interannual (21d – 3yr)	Decadal (>3 yr)
Local to regional	Regional to pan-Arctic	Pan-Arctic







SIWO ←→

SIO ←→

IASC/WCRP ←→

This project ←→

Network activities

Coordinate & evaluate predictions, integrate, assess & guide observations; synthesize predictions & observations; disseminate predictions & engage stakeholders

Outcomes

<u>Scientific community</u>
- New methods
- Improved models
- New standard datasets
- Synthesis

<u>Agencies & Stakeholders</u>
- Testbed to build best practices
- Defined limits of predictability
- New, improved information products
- Safer, more economical operations

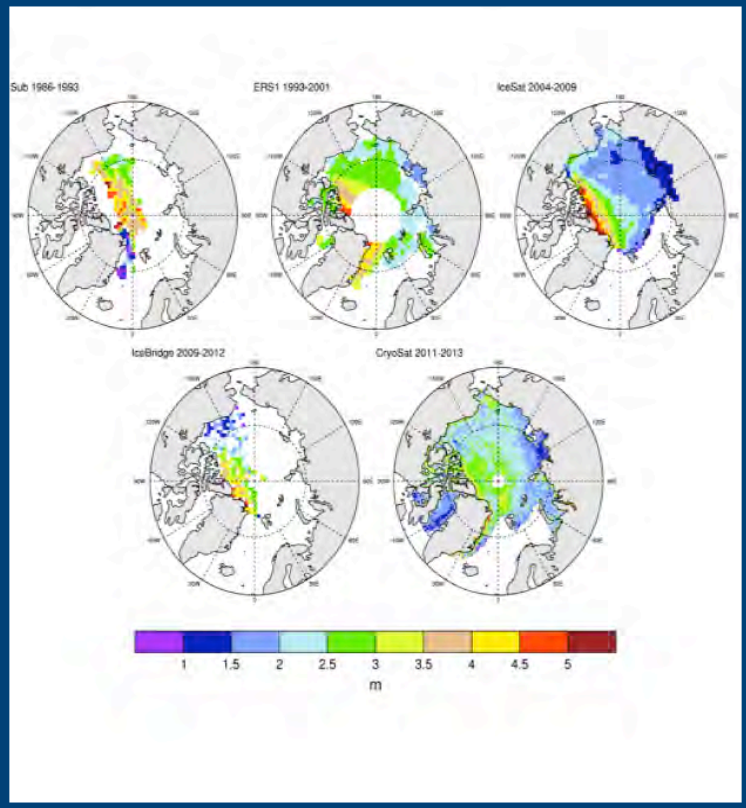
<u>Public</u>
- Expand SIO/SIWO approach
- Accessible data & comparisons
- Engage citizen scientists

SIPN framework

- Coordinate and evaluate predictions (lead Cecilia Bitz)
- Integrate, assess and guide observations (lead Julienne Stroeve)
- Synthesize predictions and observations (lead Jim Overland)
- Disseminate predictions and engage key stakeholders (leads Larry Hamilton and Helen Wiggins)

SIPN goals for observations (CU Lead)

- Define, assemble and disseminate data sets needed for sea ice forecasting – need community input!!
  - Links to sea ice observations (http://nsidc.org/data/sipn/)
- Develop integrated data sets
  - Framework and tools for standardized surface-based ship observations
- Obtain guidance from predictive models on observing strategies
- Validate remote sensing products
  - Including uncertainty estimates



Prediction Network Modeling Goals (UW lead)

- To determine the predictability of Arctic sea-ice at regional and local level
- To create a community of modelers (statistical and physical) to advance sea ice prediction methods
- To improve sea ice models for prediction
- To determine how we can best observe the Arctic system to inform sea ice prediction
- To make sea ice forecasts with uncertainty estimates

2014 Sea Ice Prediction Workshop – 1-2 April

- Plan the 2014 SEARCH Sea Ice Outlook (SIO)
- Advance the science of sea ice prediction
- Coordinate experiments
- Define data sets for initialization and validation
- Create new and better metrics for evaluation
- Identify stakeholder needs

April 1-2 Workshop – apply now

- Still time to apply to attend! Email Cecilia Bitz bitz@uw.edu
- About 50 so far, room for 25 more. All who make sea ice predictions, observers, analysts, science communicators, theoreticians, all are welcome
- Workshop Agenda posted for comment at www.arcus.org/sipn

April 1-2 Workshop Agenda Summary

- SIO of the past
- Keynote by Ed Hawkins, APPOSITE project
- Stakeholder needs and communicating the SIO
- New datasets
- New directions for sea ice prediction systems and SIO
- Predictability versus reality
- Plan intercomparison experiments
- Discussion

April 1-2 Workshop Challenge

- There is considerable range in SIO forecasts
- Probably due both to different initial conditions and methods
- We propose a simple experiment to test sensitivity of prediction method, to get us started…

April 1-2 Workshop Challenge

- Initial condition perturbation for spring/early summer 2013 for predicting September 2013 – hence a sensitivity test of the 2013 SIO (pan Arctic)
  - Perturb thickness by up to 1m, without changing extent
  - Or perturb a roughly equivalent variable, like ice age
- See www.arcus.org/sipn for more information
- Send results by workshop to ed@atmos.uw.edu

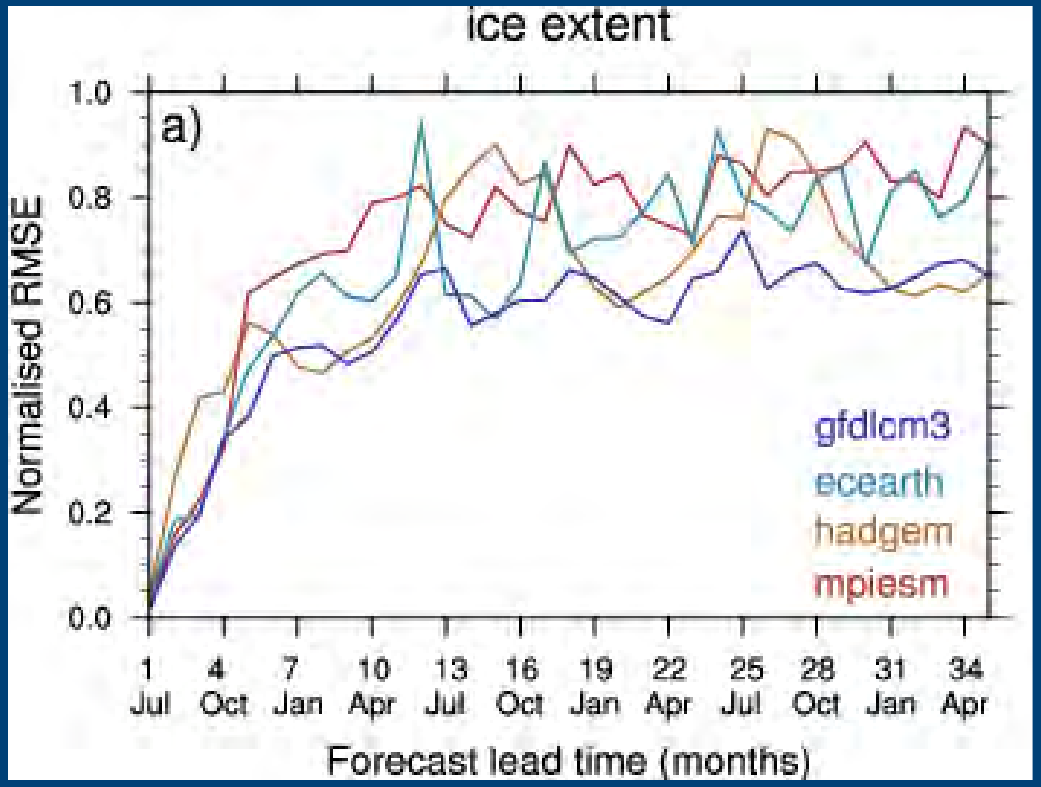
April 1-2 Workshop – Expanding on one topic now

Predictability vs Reality

- Elephant in the room: What is the predictability? How do we attain it?
- 'Perfect' model experiments can give an upper limit of predictability (for that model)
- How does predictability vary across different models/ methods
- How 'robust' is the predictability? Are some years inherently more predictable than others?
- Why are some hindcasts more successful than others?

April 1-2 Workshop – Expanding on one topic now

Predictability vs Reality



Different general circulation models (GCMs) exhibit similar patterns of predictability, but details differ

Guemas et al, in revision

April 1-2 Workshop – Expanding on one topic now

Predictability vs Reality

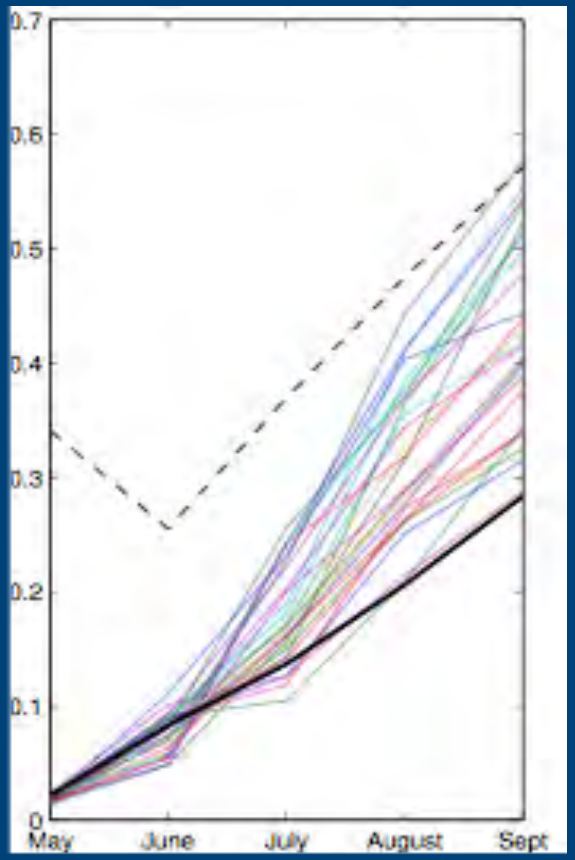


Fig by Ed BW

- Even using one GCM, different years can show very different predictability.
- Each colored line represents growth in ensemble spread of forecasts for a particular year each initialized in May.
- Dashed line is background level, a measure of no predictability
- Some years are well below even in September.
- Other years most predictability is lost by August.

April 1-2 Workshop – Expanding on one topic now

Predictability vs Reality

- Results from hindcasts are not robust even those that are fall within a group of numerical models, statics, or expert judgment.
- Some groups have found significant success in September hindcasts that were initialized in May, others have found no predictability.
- Yet methods within a group are based on similar physics or assumptions and have access to broadly the same observations.
- We do not know yet what matters most: method or initial conditions (accuracy or just a more predictable year)

Seeking your input on data sets

- We are eager to hear input on what data sets are needed to make predictions, particularly if based on an objective criteria

- There are various reports available, but they do not substitute for a continuing conversation with the community

Become a part of SIPN!!

- Join the Network at www.arcus.org/sipn for future announcements, including future webinar dates, meetings, and activities.
- Join an action team!
- Links to new datasets: (http://nsidc.org/data/sipn/) - invite community input to what data sets, format, resolution needed.
- Link to participating in the 2014 SIO: (http://www.arcus.org/search-program/seaiceoutlook)

Questions?

This presentation will be archived online.
When posted, a link will be available at:
http://www.arcus.org/sipn

Thank You!

Kronebreen glacier, Svalbard, Norway. Photo by Jan-Gunnar Winther

This presentation will be archived online.
When posted, a link will be available at:
http://www.arcus.org/sipn

ARCUS