



## International Sea Ice Prediction Research Network

Julienne Stroeve, **Cecilia Bitz**, Larry Hamilton, Helen Wiggins, **Elizabeth Hunke**,  
Adrienne Tivy, Jim Overland, Muyin Wang, Jenny Hutchings, Hajo Eicken

and dozens of international collaborators (Paul Kushnir CanSISE among them)



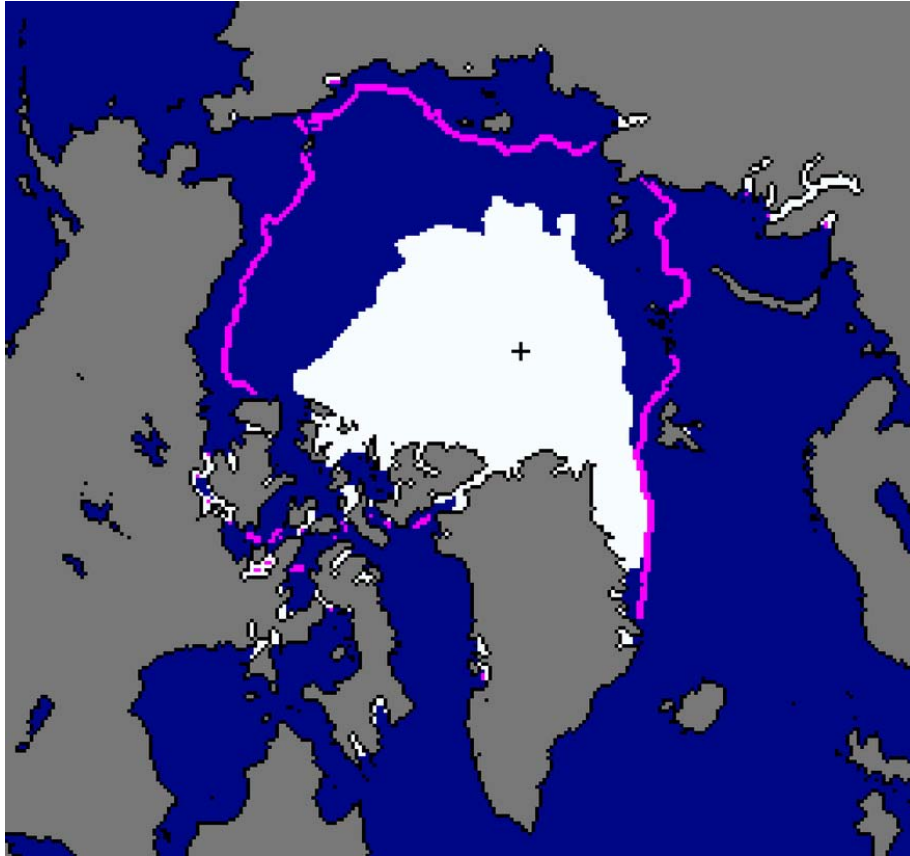
## Prediction Network

- From the SEARCH Arctic Sea Ice Outlook to an International Sea Ice Prediction Network
- Prediction at seasonal to interannual timescale, synergy with climate projections
- Collaboration of observers, modelers, physicists, and social scientists
- Focus on public engagement and advancing the science of sea ice prediction
- Next steps & opportunities

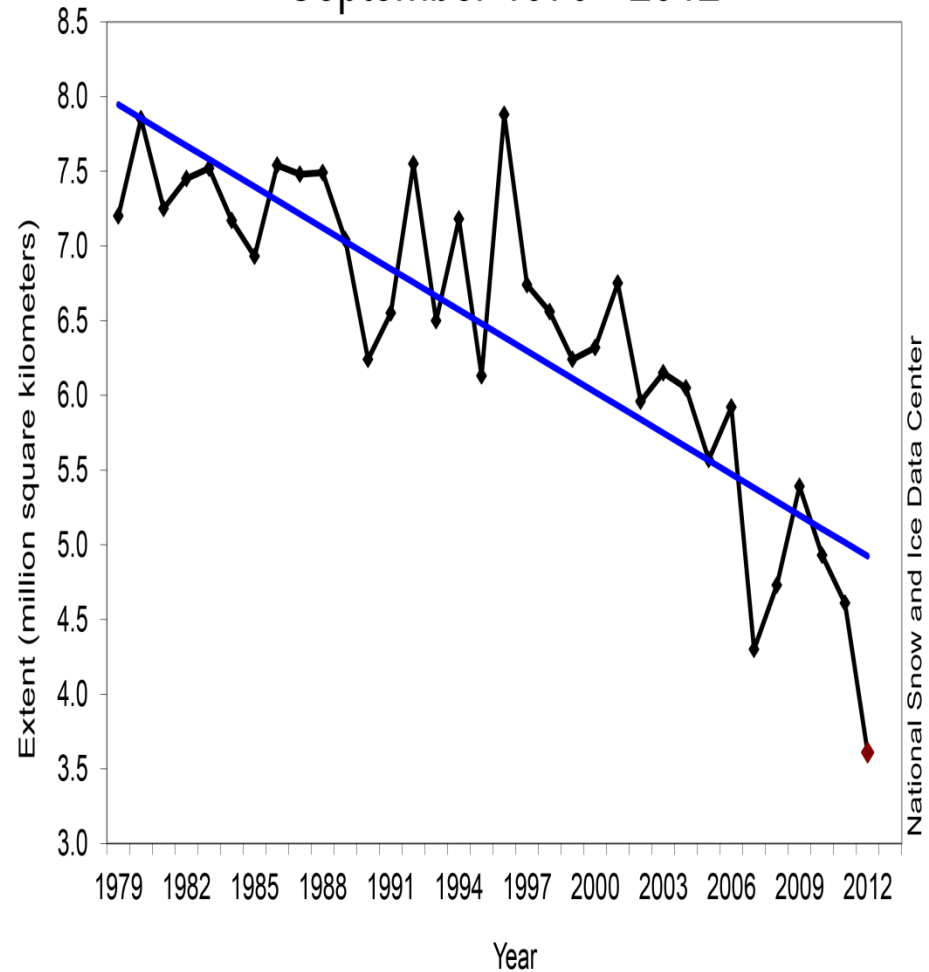
Intercomparison Activities Discussion

# SEA ICE SEPTEMBER 2012

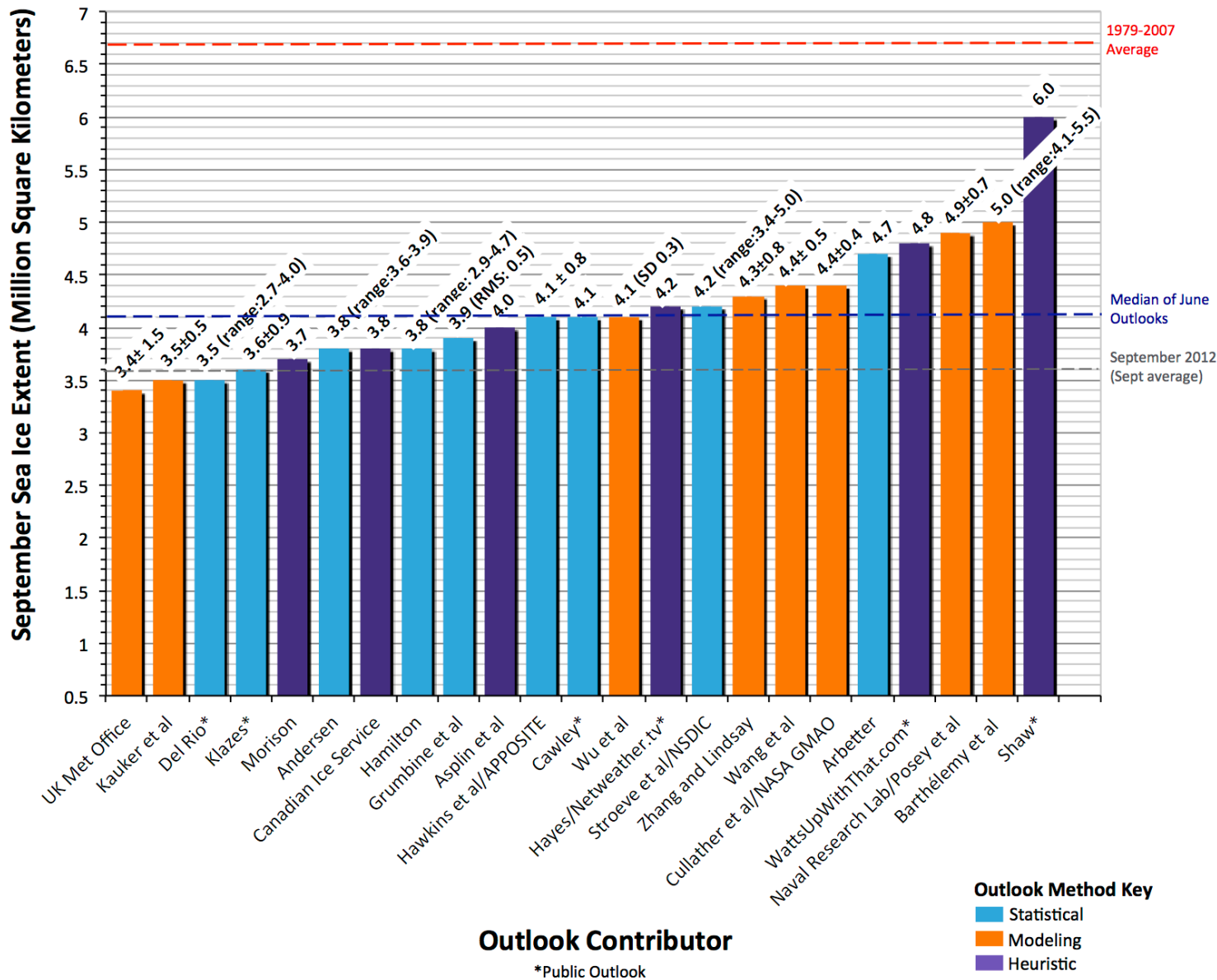
~40 % loss from climatology



## Average Monthly Arctic Sea Ice Extent September 1979 - 2012



# 2013 Sea Ice Outlook: June Report



from large-corporations

# NOAA Cross-Line Office Response to Shell 2012 Sea Ice Season Request



Shell Oil  
Kulluk

No Data	1-3 Tenths
Sea Ice Free	3-6 Tenths
Open Water	7-10 Tenths

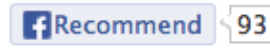
Years	June	July	August	September	October	November	December
2011	Sea Ice Free	Sea Ice Free	Sea Ice Free	Sea Ice Free	Sea Ice Free	Sea Ice Free	17
2010	1-3 Tenths	Sea Ice Free	Sea Ice Free	Sea Ice Free	Sea Ice Free	1	Sea Ice Free
2009	Open Water	Open Water	Open Water	Open Water	Open Water	20	Open Water
2008	Open Water	Open Water	Open Water	Open Water	Open Water	7	Open Water
2007	Open Water	Open Water	Open Water	Open Water	Open Water	9	Open Water
2006	Open Water	Open Water	Open Water	Open Water	Open Water	20	Open Water
2005	Open Water	Open Water	Open Water	Open Water	Open Water	18	Open Water
2004	Open Water	Open Water	Open Water	Open Water	Open Water	8	Open Water
2003	Open Water	Open Water	Open Water	Open Water	Open Water	17	Open Water
2002	Open Water	Open Water	Open Water	Open Water	Open Water	14	Open Water
2001	Open Water	Open Water	Open Water	Open Water	Open Water	8	Open Water
2000	Open Water	Open Water	Open Water	Open Water	Open Water	23	Open Water
1999	Open Water	Open Water	Open Water	Open Water	Open Water	24	Open Water
1998	Open Water	Open Water	Open Water	Open Water	Open Water	21	Open Water
1997	Open Water	Open Water	Open Water	Open Water	Open Water	1	Open Water
1996	Open Water	Open Water	Open Water	Open Water	Open Water	15	Open Water
1995	Open Water	Open Water	Open Water	Open Water	Open Water	27	Open Water
1994	Open Water	Open Water	Open Water	Open Water	Open Water	7	Open Water
1993	Open Water	Open Water	Open Water	Open Water	Open Water	19	Open Water
1992	Open Water	Open Water	Open Water	Open Water	Open Water	13	Open Water
1991	Open Water	Open Water	Open Water	Open Water	Open Water	18	Open Water
1990	Open Water	Open Water	Open Water	Open Water	Open Water	15	Open Water

slide from Jim Overland



# Ice threat halts Shell's drilling in Arctic Ocean after one day

September 10, 2012 | By Kim Murphy | *This post has been corrected, as indicated below.*



Only a day after Shell Alaska began drilling a [landmark offshore oil well](#) in the Arctic, the company was forced on Monday to pull off the well in the face of an approaching ice pack.

With the ice floe about 10 miles away, the Noble Discoverer drilling rig was disconnecting from its seafloor anchor Monday afternoon in the Chukchi Sea, about 70 miles from the northwest coast of Alaska.

## With 2 Ships Damaged, Shell Suspends Arctic Drilling

LA Times above  
NY Times right



James Brooks/Kodiak Daily Mirror, via Associated Press

The drill ship Kulluk in January in Kiliuda Bay, Alaska, where it was towed after it ran aground.

By JOHN M. BRODER  
Published: February 27, 2013

# Arctic Sea Ice Forum

interesting discussions

Watching Arctic Sea Ice 

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**News:**

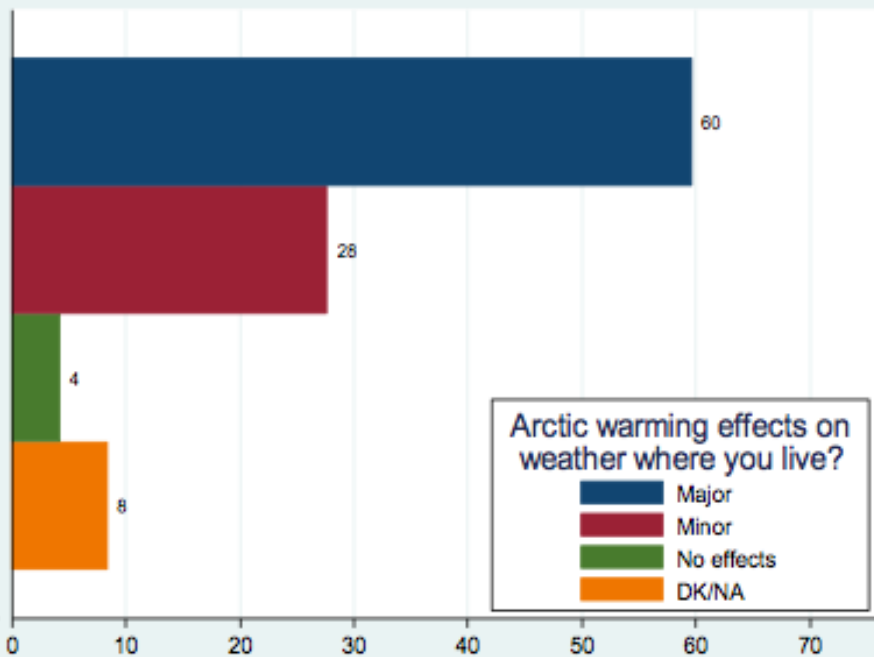
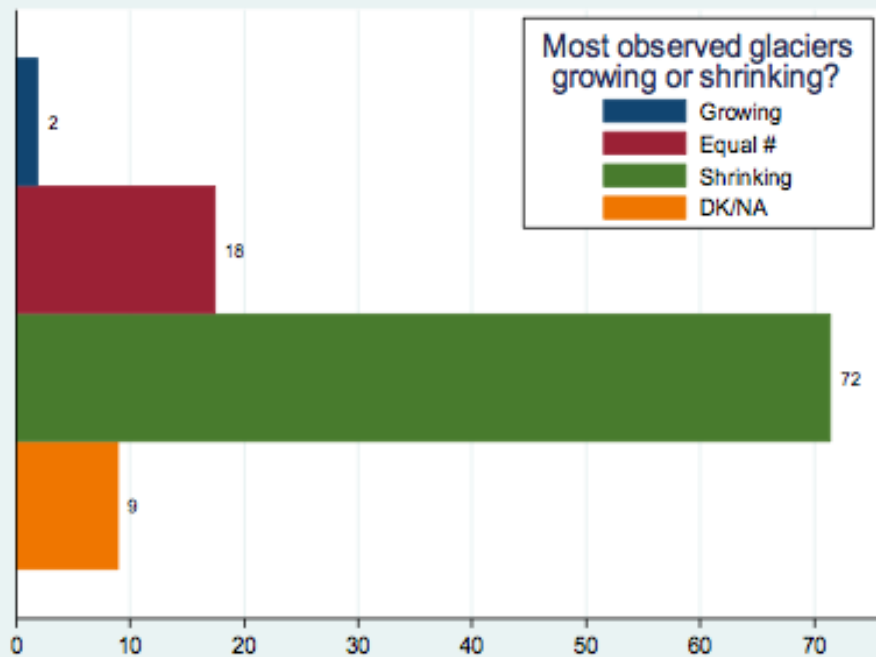
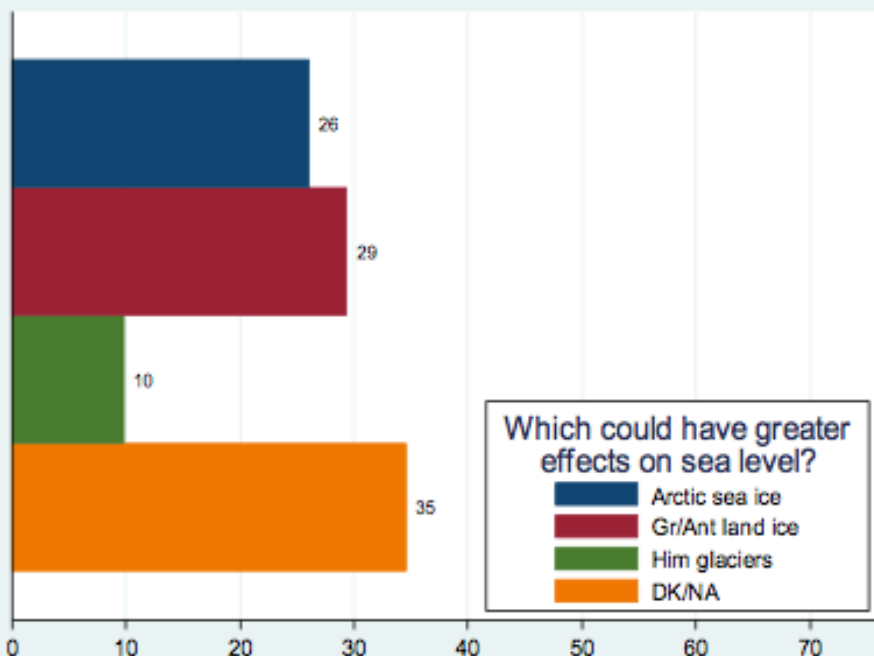
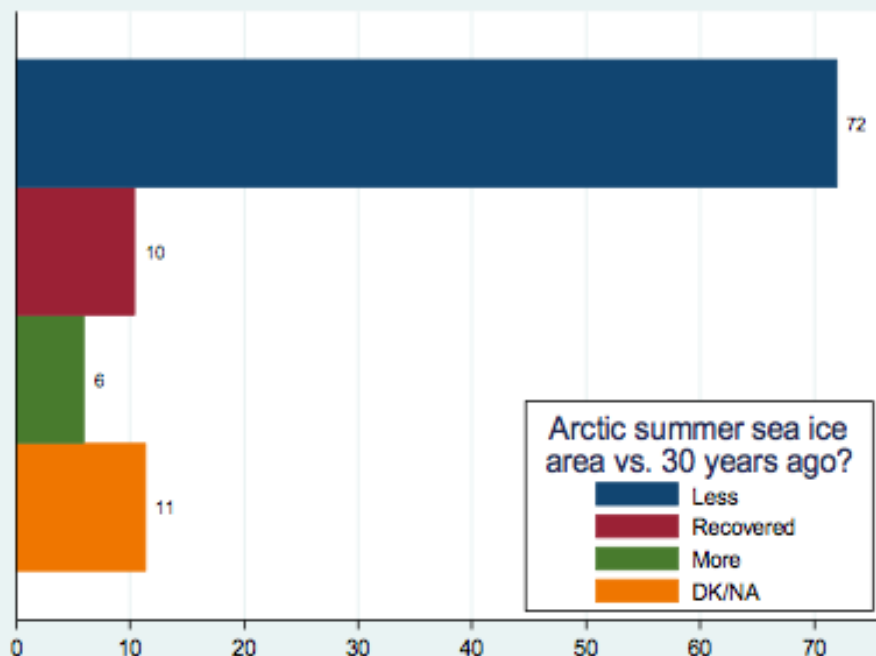
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Subject / Started by		Replies / Views	Last post 
 	<b>Short to Medium Term Arctic Sea Ice Conditions Discussion</b> Started by BornFromTheVoid « 1 2 3 ... 11 »	 510 Replies 21690 Views	<b>Today</b> at 02:08:11 AM by jdallen 
 	<b>NSIDC 2013 Arctic SIE September minimum: June poll</b> Started by Neven	 12 Replies 839 Views	<b>Today</b> at 01:31:40 AM by James Lovejoy 
 	<b>Cryosphere Today 2013 Arctic SIA daily minimum: June poll</b> Started by Neven « 1 2 »	 58 Replies 2292 Views	June 18, 2013, 11:55:02 AM by crandles 



2011/12 survey questions by L. Hamilton



# *Prediction Network Goals for Modeling*

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- 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
- Link research and operation efforts

## *Prediction Network Modeling Activities – led by Bitz/Hunke*

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- Organize community action teams to coordinate and evaluate seasonal-to-interannual predictions
  - Design intercomparison projects of hindcast and other experiments to improve understanding of sea ice prediction and identify model deficiencies
  - Develop skill metrics tailored to evaluate sea ice predictions in collaboration with observers
  - Design experiments that investigate how best to initialize models
  - Design experiments that can identify and evaluate types of observations that improve prediction

## *continued modeling activities*

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- Organize an action team to synthesize predictions and observations to assess the state of Arctic sea ice
  - Review the Sea Ice Outlooks in previous years
  - Analyze available model output and observations to determine if the last five years in the Arctic are the new normal
  - Evaluate strengths and weaknesses of different prediction approaches
  - Explore how to combine methods to improve predictions

## *NSIDC Component of Network*

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- Define, assemble and disseminate all data sets needed for model hindcast evaluation and sea ice forecasting;
- Produce data sets in near-real-time for seasonal forecasting;
- Develop integrated data sets (remote sensing, aircraft, in situ, local knowledge);
- Evaluate existing data sets (i.e. sea ice concentration) for improving model performance.

# *Observational Products*

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- Sea ice concentration (NASA Team, Bootstrap, others?)
- Sea ice thickness (ICESat, IceBridge, Cryosat)
- Sea ice motion and ice age
- Melt onset and freeze-up
- AVHRR Polar Pathfinder surface albedo and temperature (can we get this in near-real-time?)
- Snow depth (IceBridge, others?)
- In situ ice observations
- Others?



## *Enhancement of current products*

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- Develop integrated data sets;
- Standardize ship-based observations: IceWatch;
- Integrate local and traditional knowledge;
- Include uncertainties;
- Provide key products in near-real-time;
- Provide products in resolutions and formats needed by modelers (e.g. netCDF4)

## *Action Team Mechanism*

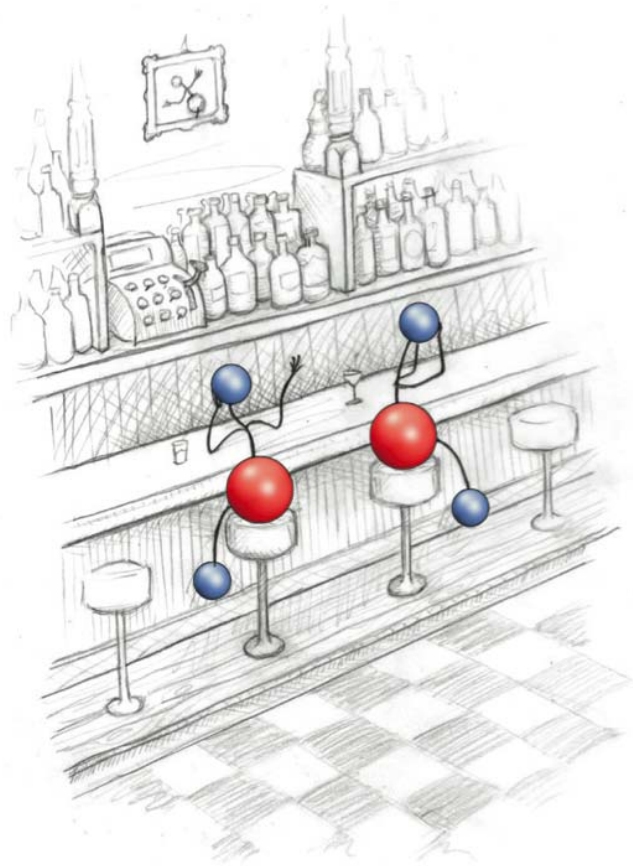
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- Kick-off meeting in late-winter/spring 2014
- Monthly virtual meetings
- Web resources
- Email lists
- Meet in Breckenridge next year in evening/extra day?
- suggestions?

*We want your input!*

*Prediction experiments and methods,  
observations, metrics, communication styles,  
etc*

Questions?



From The Fourth Phase of Water by G. H. Pollack

## *Observer-Modeler Specific near-term tasks*

- *Action teams* to identify and evaluate the types of observational data needed by forecasters, and on what spatial and temporal scale needed.
- Prioritize observations that bring about the most measureable improvements and can be made available in near-real-time.
- *Second Action team* to provide guidance on observing system needs – standardize ice observations