The Survey Says: A Summary of Survey Results

Introduction

We received 59 survey responses. This poster presents a summary of the results.

Question 1. In your opinion, what is the biggest impediment to improved sea ice prediction?

- Insufficient data for model initialization, model forcing, model calibration, and model evaluation
- Lack of ice thickness and snow depth observations
- Uncertainty of first year ice behavior in Arctic sea ice system
- Shortness of satellite record
- Lack of detailed process studies
- Lack of data on forcing from atmosphere and ocean
- Shortcomings of sea ice rheologies
- Influence and interactions of natural quasi oscillations
- Insuffient knowledge of sea ice microphysics
- Poorly know surface heat budget including albedo
- Insufficient observations of floes size distribution and marginal ice zone properties.

Question 2. In your opinion, what is the largest modeling uncertainty?

- Paucity of observational data - particularly ice thickness
- How much complexity is necessary?
- Feedback processes
- Simulation of clouds and radiation fluxes
- Surface heat budget
- Albedo
- Atmosphere-ice-ocean modeling and processes
- Errors in heat flux
- Deposition and evolution of snow cover
- Improved parameterizations for Antarctic sea ice processes
- Failure to capture observed Antarctic sea ice trends of past 30-50 years
- Ice dynamic behavior and processes
- Scale dependence and anisotropy of ice mechanics
- Small scale ice dynamics
- Treatment of ridges
- Lack of reliable weather forecasting data for ice dynamics.
- Arctic - melt pond processes
- Antarctic - snow processes
- It depends

Question 3. In your opinion, what is the key sea ice question that needs to be addressed?

- How can we improve predictability of sea ice extent and thickness?
- How can we improve short term sea ice forecasting?
- What are the regional thickness distributions and how do they vary with forcing?
- What is the sensitivity of the ice to global temperature changes?
- What is the impact of Arctic sea ice loss on global climate?
- How does a shift to a first year Arctic ice cover impact atmosphere-ice-ocean interactions?
- Why isn't Antarctic sea ice decreasing?
- What are the relative contributions of thermodynamics and dynamics to Arctic and Antarctic sea ice changes?
- What are the ecosystem impacts of changes in sea ice?
- What are the relative contribution of natural cycles and anthropogenic sources to Arctic sea ice loss?

Question 4. In your opinion, what observations are needed to address 1 – 3?

- Sea ice thickness, sea ice thickness, sea ice thickness
- Ice thickness and snow depth observations
- Time series from long term drift stations
- Increased autonomous data collection
- Continued remote sensing development including CAL/VAL
- Process studies
- Observations of ice stress and deformation
- A central repository for routine sea ice observations
- Studies of atmosphere and ocean properties and forcing

Question 5. What are the most important variables that need to be observed whenever possible in a standardized way?

Primary variables
- All cruises use ASPECT protocol plus photographs
- Ice concentration
- Ice extent
- Ice thickness
- Ice motion
- Ice velocity
- Floe size distribution
- Ice age
- Snow depth

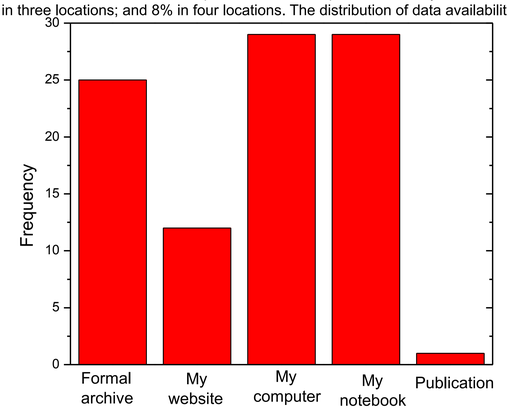
Secondary variables
- Surface heat budget
- Ice stress and deformation
- Partitioning of solar radiation
- Attenuation of ocean waves
- Precise ice properties description (brine pockets, air bubbles, structure)
- Upper ocean heat flux and properties

Question 6. What sea ice field experiments are you aware of in the next few years?

- Weddel Sea - 2013 - Polarstern - Marcel Nicolaus
- Chukchi Sea - Sept, Oct. 2015 - Sikuliag - Steve Ackley
- Beaufort Sea - Spring 2014 - Ice camp - Marginal Ice Zone Experiment
- Antarctic Fast Ice Network
- Fram Strait - Aug/Sept every year - RV Lance - NPI
- Drift Station north of Svalbard to Fram Strait - Jan to July 2015 - RV Lance - NPI
- Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAiC) - ice camp - 2017
- Chukchi Sea - May-June 2013 - USCG Healy
- Arctic Ocean Drift Station - June - Oct 2015 - TransArctic - Dave Barber
- Summer cruises - Summer 2014 and 2016 - China
- Barent's Sea - Norut Narvik

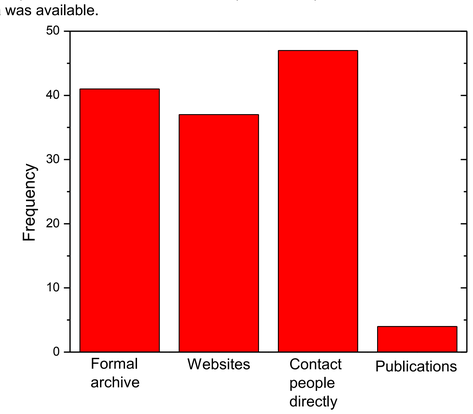
Question 7. Where is your observational data available?

Most people make their data available at multiple locations. 26% post data in only one location; 42% in two locations; 24% in three locations; and 8% in four locations. The distribution of data availability is plotted below.



Question 8. Where do you look for data?

Not surprisingly people tend to look for data in multiple locations. 18% of the respondents looked in one place; 31% looked in two places; and 51% looked in three places. People tended to look in the same type of location where their data was available.



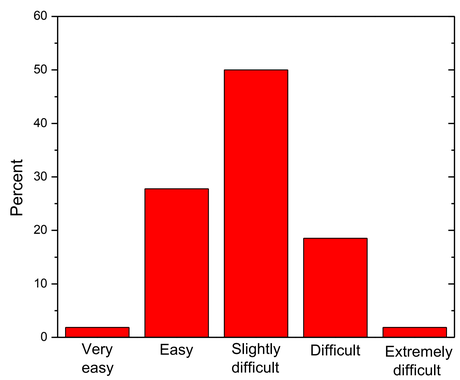
Question 9. Please indicate which formal data archive you use.

Many different data archives were cited. The most frequently cited was the National Snow and Ice Data Center (NSIDC). The mentioned archives are listed below.

- A-CADIS
- Antarctic Glaciological Data Center (at NSIDC)
- Antarctic Sea ice Properties and ClimaTe (ASPECT) data archive
- Applied Physics Laboratory, U Washington
- Arctic Regional Ocean Observing System
- Australian Antarctic Data Center
- CERSAT/Ifremer
- Chinese Polar Data Center
- Cryosphere - Goddard Space Flight Center
- DOE Atmospheric Radiation Measurement archive
- Earth Cube
- ECMWF reanalysis
- ESA
- HadISST
- Ice mass balance buoy data (CRREL)
- Ice thickness climate data record (Lindsay)
- International Arctic Buoy Progam
- International Arctic Research Center
- JAXA
- MDA Geospatial Services (Radarsat data)
- NASA Distributed Active Archive Centers
- NASA LAADS
- National Climate Data Center
- National Snow and Ice Data Center
- NCEP reanalysis
- NOAA Archive
- NOAA CLASS
- Pangea
- PCMDI - Program for Climate Model Diagnosis and Intercomparison
- PolarData
- USAP Antarctic Data Coordination Center (at Lamont Doherty)

Question 10. Finding the data I need is…

We received 47 survey responses. This plot presents a summary of the results.



Question 11. If finding data is a challenge for you, what would make it easier?

- More data
- One stop shopping for data
- Central web site providing updated inventory of data archives
- Uniform data and metadata format protocols
- Formal referencing of datasets in publications
- Script based automated data retrieval
- Formal referencing of data archives
- Legal requirement that all data be shared – academic, governmental, and corporate

Thanks to everyone who participated!