The Survey Says…

To help set the stage for the workshop we developed an 11 question on-line survey. The survey asked six questions about impediments to sea ice prediction, modeling uncertainties, key sea ice questions, and the variables that need to be observed. There were also five questions about data archiving and accessibility. There were 59 respondents to the survey from both workshop attendees and the sea ice community. Here we summarize the responses to the 11 survey questions.

Key questions and uncertainties:

Question 1. What is the biggest impediment to improved sea ice prediction? The most common response was that there was a lack of something. This included a lack of data for model initialization, forcing, and evaluation; a lack of understanding of first year sea ice properties and processes; a lack of ice thickness and snow depth observations; a lack of data on atmosphere and ocean forcing; and a lack of completeness of sea ice rheologies.

Question 2. What is the largest modeling uncertainty? There was a wide variety of answers to this question including different approaches to modeling and different processes to model. One uncertainty was the lack of knowing how much complexity is needed. The impact of a paucity of observational data on modeling uncertainty was stated. Deficiencies in the treatment of several processes and properties were identified as creating modeling uncertainty including feedback processes, snow cover evolution, cloud simulation, ice dynamics, the surface heat budget, the ocean heat flux, radiation fluxes, albedo, melt ponds, flooding, ridging. Finally, one response said that it depends on what you are trying to model.

Question 3. What is the key sea ice question that needs to be addressed? Responses to the key question centered on prediction and changing conditions. A central theme was improving short term sea ice forecasting and longer-term sea ice prediction on regional and basin scales. Understanding the reasons for differences in Arctic and Antarctic predictions is important. Other concerns were on determining the relative contributions of dynamics and thermodynamics to Arctic sea ice loss, as well as the anthropogenic and natural cycle contributions. The impact of changes in the sea ice physical system to the ecosystem must also be addressed.

Question 4. What observations are needed to address questions 1 through 4? The most common response was sea ice thickness, sea ice thickness, sea ice thickness. More generally, increased data from autonomous stations, time series observations from long-term drift stations, and continued remote sensing were seen to be essential. Also noted was the need for a central repository for routine Arctic sea ice observations similar to what is being done in the Antarctic.

Question 5. What are the most important variables that need to be observed whenever possible in a standardized way? Many responses discussed the importance of conducting an ice watch on all cruises, with the observed variables based on the ASPECT protocols. The primary parameters to observe are ice concentration, ice thickness, snow depth, pond fraction, and floe size. These parameters will be measured for the primary, secondary, and tertiary ice types present on an hourly or bi-hourly schedule. Photographs of ice conditions should also be taken in conjunction with the observations.

Question 6. What sea ice field experiments are you aware of in the next few years? The answers to this question showed that i) there are many sea ice field experiments planned for the next few years and ii) the information about these field experiments is compartmentalized and not widely known. The answers demonstrate the need for a central clearinghouse of planning field experiments. Such a clearinghouse would greatly facilitate collaborative, international, interdisciplinary research.

Data dissemination and availability:

Question 7. Where is your observational data stored? Select as many as applicable from formal archive, personal website, on my computer, in my lab notebook, and publications. The good news is that 72% of the respondents stored their data at multiple locations. The bad news is only 54% use a formal data archive. The most common locations for data storage is "on my computer" and "in my lab notebook," neither of which are searchable on-line. This creates a significant problem for data accessibility.

Question 8. Where do you look for data? Select as many as applicable from formal archive, personal website, contact people directly, and publications. Over 90% of the respondents look for data in multiple locations. The most common location searched is personal websites (87%), followed by formal data archives (76%). Many people (69%) just contact other researchers directly.

Question 9. If you answered 'Formal Data Archives' in either of the above questions, please indicate which archives. Survey respondents listed 31 different data archives and accessed several archives to satisfy their data needs. The most frequently mentioned archive was the National Snow and Ice Data Center. Other data archives with several responses are Antarctic Sea Ice Properties and ClimaTe (ASPECT), ECMWF reanalysis, and NCEP reanalysis.

Question 10. Finding the data I need is very easy, easy, slightly difficult, difficult, and extremely difficult. The responses were distributed symmetrically around slightly difficult (50%). 27% of the respondents said finding data is easy and 19% said it is difficult Only one person said finding data was very easy and only one found it extremely difficult.

Question 11. If finding data is a challenge for you, what would make it easier? Several people stated the need for one stop data shopping through a central web site providing updated inventories of all the distributed data archives. Formal protocols for data and metadata were also deemed important. It was suggested that data sharing be encouraged by formal referencing of datasets in publications and by requiring that all data be shared.