



Sea Ice Outlook Workshop
10 March 2009
National Snow and Ice Data Center (NSIDC)
Building RL-2, Room 155/153
Boulder, Colorado

Meeting Notes from Sea Ice Outlook Central Office

Introduction

A Sea Ice Outlook (SIO) Workshop was held in Boulder, Colorado, at the National Snow and Ice Data Center (NSIDC), 10 March 2009, to discuss lessons learned from the 2008 SIO and to plan for the 2009 SIO. Participants included representatives from the SIO Core Integration and Advisory Groups, 2008 SIO Contributors, Central Office Staff, and others. The morning session was dedicated to presentations on Outlook methods, and the afternoon session focused on group discussion of scientific goals, content, format, and presentation, focused on planning for the 2009 Outlook.

The goals of this workshop were to:

1. Discuss the 2008 Outlook results (i.e., what happened and why), gaps in knowledge and ability to produce accurate outlooks, areas for improvement, and overall “lessons learned;”
2. Discuss plans for the 2009 Outlook—main objectives, focus, methodologies of outlooks, format and content of synthesized monthly reports, and outreach activities; and
3. Make recommendations from the above discussions to be incorporated into a short workshop report, which will be circulated to the broader community for input and used as a guide for the 2009 Sea Ice Outlook.

The agenda, presentations, and the participant list are all available via the workshop website at: http://www.arcus.org/search/seaiceoutlook/march_2009_wgm/index.php

Detailed notes and action items from the afternoon discussion session, grouped by topics, follow.

Scientific Goals and Content

The 2008 Outlook was considered a success as a tool for synthesizing and communicating where the scientific community stands as far as understanding seasonal and interannual variability of arctic sea ice. The Outlook was utilized and followed by the arctic science community, as well as the media and public.

What is the Purpose of the Outlook?

Participants discussed the purpose of the Outlook from two points of view: that of the science community and that of the public. There was general consensus that the term "Outlook" is still the best name, but that there seems to be some confusion about the purpose. Participants agreed that the purpose of the outlook needs to be more clearly defined as a research activity (not a prediction exercise). The caveats from last year need to remain the same, but should be more articulately stated. The new description of the SIO must also clearly indicate that the outlook

number is the monthly mean—not the actual minimum. Participants also agreed that it would be useful to highlight particular regions, and include an uncertainty range. Detailed comments are below.

- Jim—really impressed with all comments from this a.m. A lot of ideas sprouted from going through the process, and from building on practices of last year. Stay fairly close to purpose and procedure of last year w/ regard to exchange w/in community. If it's not broken, don't fix it. Good model on the scientific exchange. Don't get overly anxious about forecast / product part. Think about it as a further goal. But, have same caveats as we did last year. Primarily a community among ourselves. Having said that, there is a broader interest in the product. So, maybe have a shell that is the same as last year for scientific community, but think more in terms of additional outreach activities. Rather than just a black and white forecast, a lot of people really liked having ability to see everyone's input verbatim – seeing some of the process was valuable.
- Todd—Bulletin Board—have all data in one place so everyone is essentially starting in the same place. Look at state of Arctic from all those sources.
- Walt—in terms of data, long term there will always be glitches, but you can account for those—have to be patient in getting the data, and taking more time to evaluate. Don't think we'll get to the point that we'll have errors and can't do anything about it
 - If all info is available, individuals can make choices. Find way to make really easily accessible
 - Public doesn't like when #s change b/c they get very suspicious.
 - Ron—I don't like idea of it being so public.
 - Jim—two levels of simplification for public. On one level, scientists want to live with the ambiguity, but we have to find a way to talk to public
 - Pablo—different access to public?
 - Jim—no, different levels of synthesis
 - Serreze—"real" science watered down
 - Add a "Joe the plumber" level"?
 - For now, hide behind the disclaimer and not worry about public
 - Hajo—NSIDC still provides "historical data" and shows the "real" stuff
 - Jim—for scientists, we're saying, "this is the reference point" that we're going to use.
 - Can be useful to have different numbers / reference different numbers
 - You have to be careful what you put out, so you don't get burned
 - Jim Maslanik—people will always find something to burn you with
- We need to be really clear that this is A RESEARCH ACTIVITY
 - Weislaw—are we trying to satisfy public? Or trying to improve our science? We need to really define what we're doing, b/c they are two different things.
 - We need to do both
 - Be really clear where numbers are coming from
 - Jamie—Nobody computing ice extent from AMSR data?
 - Walt—No, but it's based off a different algorithm, so consistency isn't there.
 - Jamie—seems like it would be educational to plot two lines—from different data. The way to resolve the difference between those is to take a look at both.
 - Walt—maybe that's not a bad way to do it, to give people an uncertainty range

- Pablo—IMS Snow and Ice Product, would like to develop into something similar to sea ice index, to compare the two, cross-validation.
- Hajo—NSIDC gives a single number. So, maybe discussing uncertainty is valuable (guy from Jacksa will be providing data this year?)
 - There will be some ways for people to do that if they really want to dig into it.
 - SIO doesn't want to compete with what NSIDC is already doing very well.
- Walt—focus should really be on the science, what can we learn from it. BUT, we are doing it on a public website, and so we need to be aware of that.
- Pablo—we have to start thinking about better resolution systems to capture the real extent. Need to look regionally.
 - Walt—maybe the way to do it
- Florence—presenting anomalies v. presenting actual numbers
- Weislaw—Are the two passages open at the same time or not?
 - Issue with regionality
 - But still a need for a number
- Hajo—We should draw the conclusion that "here's the area where there's general consensus" but at the same time, we'll see areas where there is disagreement, which may have to do with methods (guidance) others might just be on principle.
 - Highlight those two areas at the end of the season?
 - Jim—for scientists we need to make a guideline (Sept. average minimum, related to NSIDC #) Need to have a common theme. Second point is that we need to have the website for all the links of various data. As a scientific problem, there is inter-comparison
- Pablo—what we're looking for is a mean minimum? There is and continues to be some confusion. So, we need to really define what we are shooting for. ACTUAL minimum or monthly mean?
 - Serrze—monthly
- Does the term "Outlook" still work?—consensus, yes.

ACTION ITEM:

- **Jim, Hajo, and the Central Office to work with core group to develop a clearer explanation of the purpose of the SIO.**
- **Need to be clear about what the SIO values represent. Participants agreed on values to represent the monthly average minimum.**

How do we summarize and synthesize our results for the public?

Participants discussed ways to make the 2009 Outlook more understandable for the public, but maintain the focus as a research activity. The summary needs to provide additional information (not just simplification) (i.e., why was one number really low and others were really high?). Participants would be asked to provide a little more information about their data and outlooks. The idea would be to provide the public with a greater understanding of the activity. Detailed comments are below.

- Jamie—I wouldn't try to make this too simple. But don't over simplify. It's good for people to have something that's a little more complicated, especially if we have a good explanation.

- The "One Paragraph" "Executive Summary" needs to be clearer. Additional information, not further simplification. I.E., why was one of the number really low, and others were really high? Make those kinds of discrepancies really clear.
- Highlighting discrepancies to look at. V. this is just uncertainty and we have to live with it.
- "simplification" is the wrong term. Help people UNDERSTAND.
- Looking at the same format, but more value added interpretation.—Why were there winners and losers?
- Jim—action item, talk to Carlson, what would it take to have more value added. Secondary users are asking more interpretation.
- Kyle—ask people to talk about their data a little more. "This is my number, this is why it's outside of what we see because X"
- Ignatius—Who knows who's method is right.
- Walt—The science can come out of comparing the different methods, whose is working and why? "Cone of uncertainty" – so you have individual cones of uncertainty, and then a combined.
 - We were on the low end of this because xyz, each group could provide own assessment.
- More interpretation, and not just simple facts. But we'll keep in mind we're not talking about "winners" and "losers"

ACTION ITEMS:

- **Jim will talk to Dave Carlson for ideas about more public-level information**
- **Central Office to outline ideas for public-level information**

Measures of Uncertainty

Participants discussed the value of including an uncertainty range in the Outlook. The idea was met with both enthusiasm and apathy, but it was decided that mentioning some kind of bounding (like a range) would help to clarify the Outlook as a whole. Importantly, emphasis should be placed on the nature of the exercise and the motivation behind it. One idea was to point out that more mature forecast efforts demonstrate predictive skill, which this group has not done. But, if we think about it similarly to how hurricane paths are forecasted, people may have more of an understanding—in the same way that people understand that hurricane predictions are not 100% accurate, so should they understand that the SIO is not a predictive activity (think about how the path of a hurricane is demonstrated visually—as the time scale gets longer, the path of the hurricane is shown in a large cone, indicating its exact location to be unpredictable). In thinking about uncertainty, it is important to think about where this activity will go in the future. Perhaps we can aim for a more systematic evaluation of the product in 2010. Would there be any value in an outside reviewer looking at the process and the product(s)? Perhaps after this season, we can have a meeting with an outside examiner, and then set up a formal evaluation technique for the 2010 season. Detailed comments are below.

- "Emphasize the preliminary nature of the exercise and the purpose of motivating our own community to pursue short term forecasts. Point out that more mature forecast efforts demonstrate predictive skill, which we have not done yet. Point the media to examples of what we are trying to achieve in the long run"

- Really need to show the RANGE. If you just pick a number, then the public really gets the wrong idea.
- Walt—think about a way to combine in a reasonable way. Think about it in the hurricane forecast way. People understand that hurricane forecasts are not really accurate, and we need to get that same message across here.
- Kyle—as long as there is SOME kind of bound, we can have a better understanding.
 - Ice Center had range
- Jim—Do we really want to move to more systematic evaluation of the product (2010).
 - 2nd year we have the same goal as first year, so building on first year, but then think forward to 2010 to something more "product" like
 - "We practiced for 2 years, now maybe lets have more formal process"
 - Are we heading toward a formal evaluation process?
- Pablo—Can we actually forecast where is going to be open and where is the ice going to be? That seems like what would be really useful.
- Hajo—If you give us a number, identify what the uncertainty is (if you want / are able to)—encourage, but not require?
- Would it be useful to have an outsider come in and say X method works better b/c blah blah ...?
 - Ron—Do the community provided predictions give enough info to demonstrate predictive skill?
 - Jim M—are we asking ourselves to do something that other disciplines do? Use multiple feeds? Do we HAVE to say this method is the "best" method?
 - Serreze—weather forecasting, use many different feeds, knowing that they are all "wrong" and then fit them to make sense.
 - Jim—I don't think we're going toward one method, but we're learning how to do it, we're developing our predictive skill, still don't really know what we're doing.
 - Ron—are we too hung up on ice extent?
 - Pablo—again, a spatial distribution of different ice types is what "we" would like."
- Hajo—subgroups may be interested in going in particular direction, but community as whole may be more interested in looking at all variability. Maybe invite an outside reviewer to look at it, just to get some ideas in there that we haven't necessarily thought about. Value in that?
- Ignatius—how do ENSO do it?
 - Jamie—comparisons with ocean temps, etc.
- Jim—continue where we are this summer, and then following year, double track, continue on the way we are, and then another where we do more of a prediction track.
 - Next fall, have a meeting, have some outsider take a look (Calder to support?)
 - Then 2010 set up a formal evaluation technique.
- Jamie—so few degrees of freedom
 - Frank—Use hindcast mode to give more than 2 years

ACTION ITEM:

- **In the solicitation for outlooks, include a call for uncertainty ranges (not mandatory)**
- **Core group to determine how we display and communicate the uncertainty ranges**

Regional Outlooks

Workshop participants discussed the overall value to regional outlooks and decided that they were important enough to keep in the Outlook. Some discussion focused on dividing the Arctic into regions or “sectors” in order to better anticipate what might happen overall. In this division, it would be useful to find a standardized way of expressing anticipated ice conditions (like a stop-light, for instance: red (less than average amount of ice), yellow (average amount of ice), green (more than average amount of ice), etc.). Participants determined it would be useful to separate the regional outlooks from the whole, and have a "regional corner" where regional outlooks are highlighted. Detailed comments are below.

- Hajo—regional outlooks useful, anticipate what is likely to happen, local coastal communities are more interested in this. But, is there value in the small outlooks to the overall Outlook?
 - Serreze—yes, definitely, think about what the Coast Guard would want
 - Ron—divide whole into sectors, we could be really successful in anticipating what will happen. I think that the central arctic is going to be the most difficult this year. Will there be ice in x area at summer minimum? Yes or no? Some simple code: 0, 1, 2 (red, yellow, green)
 - Probability map in quadrants, sectors, etc.
 - Diane—coast guard is already kind of doing it—this is the direction that people are eventually thinking
 - It's not so much what is the ice, it's WHEN will the ice be there?
 - Jamie—maybe that's the key—determination of things that go into it
 - Are you doing observations based on last year, or on something else? Multi-year fraction in the fall, or???
- Hajo—find a way to express anticipated ice conditions, divide into sectors, but then we need a bit more guidance about what kind of information is NEEDED?
 - Jim M— Can be a building block as to how this might pan out? Just a couple sentences or a paragraph? Cant' put numbers necessarily ...
 - Yes, that would be a good start.
 - ACTION—solicit paragraph on ice conditions on certain sector and forward to NIC for analyzing
- Jim—Regional basis may be harder for predictability, because it's more affected by weather.—don't want EVERYONE to do a sector-based approach. On the other hand, there is a real need for passing info, and real-time observations. So, want to know overall ice extent, but then want to have a regional corner, that we can further highlight. Think about how we expand the regional part without changing the main outlook.

ACTION ITEMS:

- **Hajo work up protocol of how to deal with regional outlook content**
- **Solicit paragraph on ice conditions in certain sectors and forward to NIC for analyzing**

Making SIO Data Available via the Website

The suggestion was made that it would help to clarify the discrepancies in the individual outlooks if people had access to data used to create the Outlooks and showing initial conditions. The website should include a section of relevant data sets, and could include a closed section where people could contribute their initial data. The group reached a consensus on sharing data—it would be useful to know everyone's starting point. Some participants would only feel comfortable providing data to individuals (not to have posted online).

- Jim—is there some very preliminary info that Ron could provide by May?
 - Ron—takes a while Maybe get some preliminary
- Serezze—Jim M, tracking data?
- Jim—it would be good for people to provide info
- Ron—I can provide preliminary info, but don't want it to be on web, need to provide to individuals.
- Jim—Ideally, it would be good to know what initial conditions people are starting from. Share to be as a source of info for a lot of people to see.
- Hajo—could have section in relevant links / data sets where we separate out data people are using to initiate their outlook (ASMR, NSIDC, plus YOURS)
- Jim—science community would be really interested in initial conditions. And how we as a community can do better.
- Jamie—other field observations that if they were made in spring would help? Snow? Buoys? Ice-mass balance? Drift history?
 - Ignatius—could make it available. Available already?
 - Hajo to talk to Don
 - Jamie—seems like in long run, would be nice to have some kind of campaign, (LONG TERM) if we want to do this in organized way in long term, short of some giant program, could we do some kind of observational data?
 - Pablo—one in March / April
 - Coast guard
 - Ron—NASA p3 – transit from barrow to Fairbanks and back

ACTION ITEMS:

- **Initial data will be solicited, with a deadline of 15 May 2009**
- **Hajo will talk to Don Perovich (who was absent from the meeting) about getting his buoy data for users (this information will be added to the "initial data")**
- **Central Office will create a section of website to include resources / links to data showing initial conditions and / or related data**

SIO Format and Presentation

Layout of SIO Graph(s)

Discussion focused primarily on the need to make the visual depiction of the outlook values more appealing and easier to understand. Some suggestions included naming the individuals in each bar, including an uncertainty range, and color-coding the bars by "type" of outlook (i.e., method).

- Serrezze—didn't like graph, list who it is in each bar
 - Can then include uncertainties

- Group different types of forecasts (models, statistical, ensemble, etc)
- Graphics can convey a lot of info if they are done well
- Color code bars by type
- Jim—Responses should be anonymous so you're not swayed by
 - Do we do something different for scientists v. public?
- Walt—labels on bars, can still do something along the same lines so you can have cumulative look
 - Weighted?
 - NOT have a single average ensemble value?
- Walt—median, and then range of observations / outlooks?
- Hajo—Produce "alternative" plots to send to review committee?
 - Concern about having a single number that people will focus on.
 - The idea of the graphic visualization needs to be further thought out, discussed
 - Median would go in middle in Serreze's idea
- Walt—plot in terms of conveying—see how forecast evolves over time, on one graph? Finding a way to see that change graphically.
- Jim—if there are easy analyses that people would like done, we can certainly add to them, but not sure we want to add to

ACTION ITEMS:

- **Central Office to use last year's data to come up with examples of graph types we could use**
- **Then core group and Central Office to discuss and finalize graphs**

Additions and Changes to Website

Participants discussed the value of adding another section to the website that would include links to outside resources, information on how people determine their outlook number, a short summary of winter / spring conditions, and an entire tab dedicated to specific regions (e.g., “The Regional Corner”).

- Another link or something on the side, as to how people are coming up with the number or definition of ice extent.
- Glossary of different terms, including the different definitions
 - Link to the NSIDC glossary site
- Short summary of winter / spring conditions
 - People making available data that assessments are based on —esp. with regional corner
 - NIC—narrative of what winter / summer / spring conditions are like?
 - Walt—NSIDC has a general idea
 - Jim—want to encourage as many resources that are primary links, we may abstract some of it, but the idea is that it would be good to have reviews, maybe pull some together.

ACTION ITEM:

- **Central Office will work on various additions to the website, and circulate among core group (including data, regional corner, etc).**

Timing and Naming of Reports

Last year's outlook produced some confusion with the naming convention. A decision was made to have outlook titles based on the month they are released, but with the caveat that it is based on the prior month's data.

- Todd—Outlook 1, Outlook 2
- If it comes out in July, say "July Report: Based on conditions in June"
- Turn around?
 - Shorten the review process—one review period instead of 2.
 - Would shorten by about 5 days
 - Raises the question about revising committees (cig / ag)
 - Have a smaller core committee?? That is part of initial review committee?
 - No objections
- Jim / Hajo—after workshop, discussed that could rearrange core group to be a smaller "editorial board" (would include Jim, Hajo, Walt, and possibly Ceci Bitz). Other core group members could be shifted to the advisory group.

ACTION ITEMS:

- **Name reports for the month they come out**
- **Further discuss best ways to shorten the review process, including one review from groups rather than two, shorten time for review period, etc.**

Process / Timing for Soliciting Outlooks

A broad solicitation for initial data / spring conditions will be issued in early April, with a data input deadline of 15 May. The first outlook would be due at the end of May for a release in early June. The "initial data" would then be placed in the data section of the website, with an explanation of what it is, and how it might be useful.

- Have broad announcement in early April for solicitation, Data input through May 15, and then 1st outlooks (based on May data) will be due May 30th; and same goes for identifying links, would want website up no later than mid-May

ACTION ITEMS:

- **Immediately begin website additions and changes, as well as outline of regional corner, etc.**
- **Solicitation for initial data - solicitation for links to "initial SIO data" to be done in April—deadline 15 May**
- **Solicitation for individual Outlooks – should do late April, deadline for outlooks end of May, for an early June release**

Products, Papers, Outreach

The original aim to publish 2008 results was to produce a paper for *EOS*, but that will not work, for reasons explained by Jim (see details below). However, *EOS* does have an "announcements" section that the SIO may be able to take advantage of for further publicity. Hajo asked the group to start thinking about products for this year's SIO—possibly a poster or oral session at AGU, a group paper to be submitted to a peer-reviewed journal, possibly several white papers (to be worked on jointly at a paper-writing meeting), also with communication to funding agencies.

The group was asked to think about this for further discussion at the end of the season. Detailed comments are below.

- Status on EOS? —funny but tragic story (Jim)—EOS now you have to write a proposal, sent in at beg of Nov. Finally heard back last week (on proposal!) They said “We don't need another Sea Ice is Going Away article.” But, they do have brief announcements. So, to that, send in what we're doing this year, as well as what happened last year. Talk about communication effort. Focus on ongoing product.
- Hajo—people are putting in time and effort, at some point we may want to split into "volunteer fire crew" and the "professionals" maybe in form of session at a meeting, a small paper that summarizes "this is where we are" and "this is where it could go." Asks group to think about this. (paper writing meeting)
 - EOS, maybe they'll give an advertisement
 - Advertise link to broader community
 - People participate b/c they get something out of it. How much more do we want to have? (how much more than website and communication)
 - Talks about doing joint papers on what happened in 2007, idea is to get whole community working together
 - But don't want to say that collective is better than smaller individually organized working groups
 - Spending more time on methods (for next winter)
 - Try for something at AGU?
 - Rather have individuals get rewarded than us try to do some collective group thing
 - More relevant to bring together different perspectives, aim for group paper? Small group paper?
 - Poster session at AGU? May not get an oral session
 - NASA is under conference travel restrictions, so keep in mind
 - Joint session at AGU / atmospheric forecasting? Get ideas from different community that knows things we don't
 - Jim—conclusion—what is way forward? Are we going to do a white paper? Or are we going to go toward individual contributions?
 - HAJO—need to have something that we can pass on to funding agencies. Here are areas that appear to be promising, or areas that are needed, etc.
 - Would we put this on the website? Make it transparent? (YES!)
 - Does it have to be peer reviewed or not?
 - Will be internationally important, as well.
 - Helen—we could also add a simple webpage that has a bibliography of relevant peer-reviewed papers.

ACTION ITEM:

- **Jim to look into making use of the "announcements" section of EOS**
- **Discussion of products (presentations, papers, etc.) to be further discussed further and at end of season**

Media and Public Outreach

A major point of discussions at this workshop was to make the purpose and content of the SIO more understandable to the public. All participants emphasized, however, that in doing this, the public **MUST** understand that the activity is **NOT** a formal forecast. One suggestion was to have a press release at the beginning of the season to get the press's attention—to give them something to "track" and then write about at the end of the season. It is crucial that this is cast as an **initial** outcast, and not a formal forecast. Another discussion point was a resource for K-12 teachers—links and resources. ARCUS can develop this.

- Walt—NSIDC only does a press release at the end, intentionally
- Jim—Maybe have one for June outlook based on May data?
 - Walt—press releases get attention. That will raise the visibility in terms of public. Would want to have some sort of "canned response" or at least someone responsible for responses (ARCUS, NOAA research, or someone)
 - Plan is to come out of our shell a bit more? If so, implies that we need to do something a bit more. Write in a way that science journalists will pick up on to track Really cast it as "initial" "outlook" "scientists coming together to share data" etc.
 - Pick up idea of press conference at AGU at end of season
- K-12 / teacher resources?
 - Best done through links
 - Resource not curriculum
 - Solicit for potential educational reference

ACTION ITEMS:

- **Central office will draft a press release for beginning of season and then pass around to core group**
- **Central Office will work on K-12 links / resources**

Miscellaneous

The addition of more links to press/media stories and the SIO email list will be really valuable changes to this year's Outlook. It would also be useful to have a set of stock SIO slides that could be downloaded for presentations.

- Debriefing / post-mortem after each season really valuable.
 - Good to have as a formal jumping off point. Make this part of AGU / summarizing / Workshop type of thing / web-meeting
- Teleconference?
 - Would rather have people spending time thinking about what their number is and why, than to spend time holding conference calls, etc.
- Mailing List will be valuable
- Serreze—few stock ppt slides on SIO

ACTION ITEMS:

- **Central Office to create a set of stock PPT slides about the SIO**
- **Develop a plan for a post-mortem meeting or in person meeting**
- **Encourage use of SIO email list for group communication**