Recommendations for Understanding Arctic System Change: Report from a Workshop

Excerpts for the SEARCH SSC

EXCERPTS FROM EXECUTIVE SUMMARY

- The disperse nature of collaborations arising will mean that virtual universities and research centers must be opened and cultivated.

- Arctic change can be viewed as a challenge to both national and international security. As such it should be addressed through scenario studies akin to those applied by the military, which could take the form of "environmental gaming". Modeling is best cast as a means for emphasizing ecological services and global feedbacks. Think tank activities should be supported to get the ball rolling on the requisite research.

- Funds should be steered away from the standard several-year cycle into two unfamiliar but potentially more productive modes: one very short in turnover (on the order of months) and one much longer than is customary (on the order of a decade).

- Much admiration was expressed by the attendees for "skunk works" style operations—a term borrowed from the aerospace industry to describe group given a high degree of autonomy and unhampered by bureaucracy, tasked with working on advanced or innovative projects.

- The phenomenon of mediated modeling (where different stakeholders and experts are brought together to develop a simulation model) was discussed in the context of how we could better integrate perspectives from industry and local peoples.

- In contrast to the recommendations for new and potentially high-risk approaches such as those discussed above, there was consistent agitation for increasing support of existing approaches.

SIMPLE LIST OF THE SCIENTIFIC QUESTIONS

1. How Predictable are Different Aspects of the Arctic System, and How Can Improved Understanding of Predictability Facilitate Planning, Mitigation, and Adaptation?

2. What are the Arctic System's Tipping Points and Abrupt Changes that are Most Consequential for Ecosystems and Humans?

3. How Will the Critical Intersections Between Human and Natural Systems in the Arctic Change Over the Next Several Decades?

4. What are the Critical Linkages Between the Arctic System and the Global System?

5. How will Changes in the Cryosphere Drive Changes the Economic, Social, and Environmental Components of the Arctic System?

EXCERPTS FROM: RECOMMENDED APPROACHES AND ACTIVITIES

1. Scientific Approaches

Utilize Place-Based Science – Place-based science would focus on "synthesis sites" where studies are co-located and data is synthesized together. Each place is a center (or "bull's eye") that naturally creates intersections among disciplines and system components.

Inter- or Transdisciplinary Research – Research that spans disciplines, especially research crossing the physical, biological and social science boundaries, remains a major challenge still. Frameworks such as ecosystem services or local and traditional knowledge can help advance research in this direction.

Short-term, Intensive Science Retreats – To supplement longer-term science efforts, workshop participants recommended short-term science activities in the model of a 1-2 week "think tank" retreat or workshop, with the aim to produce specific products.

Focus on Down-Scaled Predictions and Projections - While efforts to improve our understanding of arctic change can include a variety of scientific approaches, societally relevant information will require a focus on projections, predictions, and scenarios of future states at regional and local scales.

Synthesis Activities – Although efforts should allow for projects to fill in key observational gaps as part of an integrated program, priority should be given to synthesis activities, and some science questions could be approached with a 'no new data collection' rule.

Online sharing and public engagement - Online sharing and citizen science can result in significant contributions..

2. Program Management Recommendations

- The standard review/panel review process is not the best model. Agencies should consider jointly-reviewed or jointly 'owned' process, where a steering committee or representatives of programs are involved. For example, a Steering Committee, working with a funding agency, could select a priority science question(s), the agency(ies) could release a call for 2-page pre-proposals, a steering committee could select the pre-proposals with the best ideas, and the PIs of the selected pre-proposals could meet in person for 2-3 days to develop a full proposal that integrates the ideas.

- Programs need to provide sufficient support for efforts and cannot rely on volunteer time, and need to provide for mechanisms for direct collaboration (including international collaboration) between projects, and between funding agencies.

3. Capacity-Building

There is a need for skill and knowledge exchange as the scientific community:

- Annual science meetings – community-wide 'all-hands' meetings and/or meetings for groups of PIs and projects
- Interdisciplinary training via seminars and webinars
- Visiting scientist program for knowledge exchange (1 week to 3 month visits)
- Summer schools focused on a key science question(s)
- Organized online network of experts accessible for information and guidance
- Funding for stipends for local observers and experts, particularly for individuals who can bridge scientific and traditional/indigenous knowledge systems
- Incubation grants to build connections to social science/human dimensions communities

4. Communication

Develop ongoing networks and exchanges to/from the public (e.g., key stakeholders) and decision-makers, in order to help define specific research activities and convey scientific information back to decision-makers.

Improved information-sharing between scientists and resource managers. This could be described as a current institutional communications barrier that can be overcome through, for example, including agency scientists in research teams.

5. Partnerships and Coordination

Improved coordination across U. S. agencies through joint funding initiatives, formal agreements, or other partnerships. This could be facilitated by IARPC.

Coordination with non-arctic science communities is also essential. Partnerships with global modeling, Earth system, and paleoclimate communities, etc.

Improved ties with social sciences are needed to enhance human components in modeling and predictive exercises, and to consider the societal implications of research results.

Strong connections to established observational programs, including AON, NEON, and LTER will help develop observational networks responsive to modeling needs.

6. Data and Information Sharing

Data management cannot be an afterthought in the scientific process. Need a culture of open and collaborative data and information sharing