Sea Ice Prediction Network (SIPN) Input to IARPC Arctic Research Plan 2017-2021

To: IARPC Arctic Research Plan 2017-21, Sea Ice Goal Drafting Team

From: SIPN Leadership Team: https://www.arcus.org/sipn/leadership

Re: Amended Input Submitted via online form: (http://www.iarpccollaborations.org/Arctic-Research-Plan-2017-2021-Request-for-Information.html)

Date: 28 April 2016

[IARPC questions in blue text, SIPN input in black text]

IARPC Arctic Research Plan 2017-2021: Request for Information

IARPC is currently soliciting information from the Arctic research community and the public to help shape the next Arctic Research Plan 2017-2021. We are looking for funded projects or programs that IARPC can incorporate as Research Objectives and Performance Elements in support of the new research goals. Research Objectives are a specific set of tasks contributing to a research goal (e.g., Improve knowledge of biophysical and chemical interactions and feedbacks as well as their role in the regional context). Performance elements are specific, measurable, attainable activities that demonstrate progress towards achieving the objectives. (e.g., Complete three years of abundance surveys of marine species in the region).

Please indicate your ideas for projects or programs to be incorporated as objectives and/or performance elements into the 9 research goals. If the proposed objectives and/or performance elements are currently funded, please indicate the funding source and duration.

Our project, the Sea Ice Prediction Network (SIPN), has three main goals: to improve sea ice forecasts, advance the Sea Ice Outlook, and improve sea ice prediction systems. Our project aligns well with IARPC sea ice and modeling efforts.

Performance elements related to our project are:

1) Ensure the Sea Ice Outlook serves the prediction and stakeholder community
2) Organize Network teams to write SIO reports and peer-reviewed papers about the predictions
3) Hold community meetings and workshops to advance sea ice prediction
4) Seek community feedback

SIPN is supported by grants to the leadership team via NSF, ONR, and DOE. These grants to SIPN are currently funded through about September 2017. Further in-kind support through salaries of members of the leadership team comes from NASA, ONR-Global and NOAA.

When we requested community feedback in Fall 2015, we received the following input (summarized here) about the needs to improve sea ice prediction:

- Expand research on how to best initialize sea ice condition, including methods to incorporate more observational data, particularly thickness data from NASA IceBridge and ESA CryoSat-2 platforms.
- Encourage SIO participants to contribute local-scale information from forecasts, rather than just the total sea ice extent, to aid in understanding the complexity of sea ice forecasting and ultimately better serve stakeholders.
- Continue to encourage regional outlooks, which often provide detailed conditions based on field observations or high-resolution modeling that are not captured in pan-Arctic efforts. These contributions tend to provide information relevant to activities in Arctic marine and coastal environments.
- Provide resources for a more systematic approach to forecast evaluation, with year round forecasts and presentation of results using metrics to evaluate the local-scale.
- Provide tools to allow for easy regridding/reformatting of spatial maps and to compute common metrics.
- Collect full ensembles of predictions to assess uncertainty information from submissions, including hindcast runs from previous years to provide a quantitative performance assessment of each method/model and their biases.
- Create a research opportunity to create constrained experiments either using the same initialization fields (extent, concentration, thickness) or atmospheric and oceanic forcing to permit intercomparisons of model physics.
- Investigate the differences between the meaning of modeled and observed sea ice concentrations and produce estimates of the uncertainty in the observed sea ice concentration to aid in a better comparison between models and observations.

Communication, coordination, and collaboration will be important as IARPC seeks to accomplish the goals and research objectives. Please indicate how you think communication, coordination and collaboration can best be accomplished.

SIPN seeks to continue our interactions with IARPC, which has been instrumental in creating funding for our participants to contribute to Network activities. The Network benefits from IARPC advertising our activities on the IARPC website and among the IARPC working groups. SIPN's collaboration with the Study of Environmental Arctic Change (SEARCH) Sea Ice Action Team may yield additional insights into effective communication and coordination, in particular in the context of a task group that has been assembled under SEARCH to explore innovative approaches in communicating research synthesis of sea ice loss impacts to researchers, policy-makers, and other stakeholders. At the same time, SIPN provides a window into the sea ice prediction world to experts from outside of the Arctic community and the interested public. Social science research by L. Hamilton (SIPN Leadership Team member) indicates that this type of communication may fill a niche that is not currently served by other means of communication, and may hence also benefit IARPC efforts. In addition, SIPN regularly communicates with other programs and projects, including the Polar Prediction Project, Polar Climate Predictability Initiative, the World Climate Research Programme (WCRP)-Climate and Cryosphere (CliC), WCRP-Climate and Ocean: Variability, Predictability and Change (CLIVAR), and the Sea Ice for Walrus Outlook.

Would you like to provide any other input to the preparation of the Arctic Research Plan 2017-2021?

SIPN has evolved into a research network that serves an important role as an informal forum for different (operational) agencies to engage with the scientific community to discuss, evaluate and synthesize findings on sea ice predictability and specific prediction approaches. SIPN activities reach into and potentially contribute to several of the research goals for the next IARPC 5-year plan (Atmosphere; Sea Ice; Environmental Intelligence). Hence, we would like to put in a plug for the continued support of community models and community forecast efforts. The SIPN leadership team is eager to continue our mission to run the Network, and focus on clearly identified tasks that have emerged from community engagement and assessments. The resource we need most at this time is a way to collect the large amount of data that the Network wishes to archive on a system that permits users to analyze the results where the data are stored.